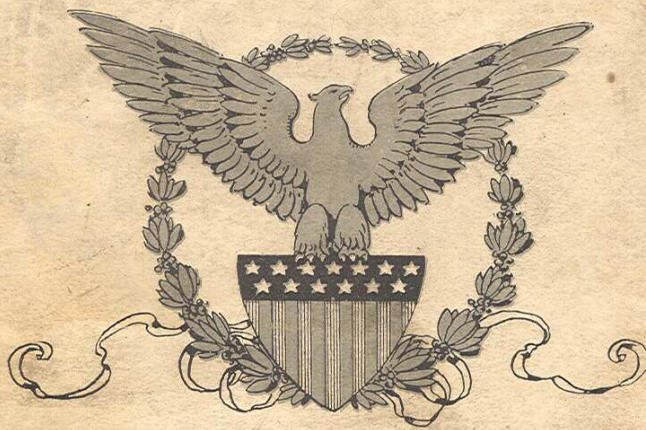


MACHINE TOOLS
OF THE MOST
ADVANCED DESIGN

*POWER - ACCURACY -
SIMPLICITY - DURABILITY.*



THE AMERICAN TOOL WORKS CO.

MAIN OFFICES AND WORKS
CINCINNATI, U.S.A.

Cable Address "LATHE" Cincinnati.

A WORD TO THOSE INTERESTED IN ADVANCED METHODS OF MODERN SHOP PRACTICE

*Conducive To
Reduced Production Cost & Increased Output.*

THE UNIVERSAL USE OF HIGH SPEED STEELS, with their enormous capacity for high speeds and heavy feeds, has revolutionized shop methods and created a necessity for machines of greatly increased power, wider variation in speeds and with facilities for quick and easy handling, in order that the full efficiency of these steels may be utilized.

THE OPPORTUNITY FOR GREAT TIME SAVING, reduction of costs and increased output per man is now afforded managers of machine shops. Accuracy and quality of the work produced preserves the profitable business thus gained through the adoption of modern methods.

ANALYZE YOUR SHOP EQUIPMENT, see that every machine tool is the best of its class. A weak spot in your Lathe, Planer, Shaper, Drill or other department will unbalance your entire plant. Machine work for a given job should reach the assembling floors at the proper time, correctly machined, so as to permit of erecting with a minimum of hand labor.

IT IS MISPLACED ECONOMY to use a machine tool which cannot hold its own with the best. Such machines should be disposed of and replaced by better ones. As there is always a market for semi-obsolete tools, these can be sold to help pay the cost of new "profit-producing" machines.

HIGH SPEED STEELS, while enabling the machine operator to increase his output of finished work, at the same time imposes greater stresses and heavier burdens upon the machine.

THE ORDINARY MACHINE TOOL of the past is entirely inadequate to stand up under such service and will break down attempting to accomplish results possible with the up-to-date machine, designed especially to accommodate the high efficiency of these steels.

THE DESIGN AND CONSTRUCTION of Modern Machine Tools requires the most exacting care, especially that there be sufficient metal to resist all strains.

A MACHINE MUST BE AMPLY HEAVY, but mere weight of metal does not of itself signify superiority over other machines, nor does it alone insure increased "productive capacity."

IT IS THE PROPER DISTRIBUTION of the metal throughout the machine which makes it capable of effective service.

"AMERICAN" LATHES, PLANERS, SHAPERS AND RADIAL DRILLS are of the most modern design and extreme care has been exercised to properly distribute the metal so that they will have ample weight and stiffness to resist the most severe strains and stresses of present day practice, but, at the same time, be not too cumbersome for easy handling by the operator.

WE CLAIM FOR OUR MACHINES that they are of the most advanced design, scientifically proportioned, of ample weight and built with the most exacting care. The general workmanship and accuracy of alignments are of the very highest grade. Detailed descriptions and illustrations of same are found in our sectional catalogue. Our Instruction Book, sent with each machine, will be found very helpful to those desiring information pertaining to the installation and operation of our machines.

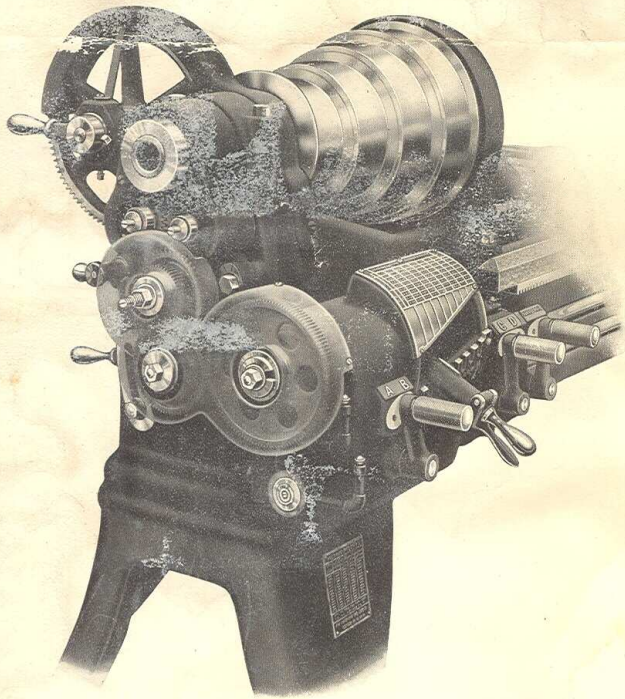
IF YOU HAVE ANY DIFFICULT MACHINE PROBLEMS to solve, send them to us. If we have a machine which will do the work better and cheaper, we will say so. If not, we will candidly so advise you.

ANALYZE YOUR SHOP COSTS. You will be surprised what enormous gains can be made by substituting more productive machines. Save time and preserve the accuracy and quality of your product. This is the dominating feature of modern works management.

DO NOT HESITATE, but investigate the matter today and write us at your earliest convenience. This is a subject very near your heart and pocket-book. Don't fail to try for reduced shop cost.

OUR REPRESENTATIVE will call if you so desire. Give us the opportunity to demonstrate the superior quality of "American" Lathes, Planers, Shapers and Radial Drills.

THE AMERICAN TOOL WORKS COMPANY.



METRIC PITCHES				
GEAR ON STUD	FEED BOX LEVERS			
	A-D	B-D	A-C	B-C
	M/M	M/M	M/M	M/M
40	.5	1.0	2.0	4.0
45	.5625	1.125	2.25	4.5
50	.625	1.25	2.5	5.0
55	.6875	1.375	2.75	5.5
60	.75	1.5	3.0	6.0
65	.8125	1.625	3.25	6.5
70	.875	1.75	3.5	7.0
75	.9375	1.875	3.75	7.5
80	1.0	2.0	4.0	8.0
85	1.0625	2.125	4.25	8.5
90	1.125	2.25	4.5	9.0
95	1.1875	2.375	4.75	9.5
100	1.25	2.5	5.0	10.0
PLACE 127 TOOTH GEAR ON GEAR BOX LOCK TUMBLER IN LOWEST HOLE				
THE AMERICAN TOOL WORKS CO. CINCINNATI, U.S.A.				

Metric Pitches

When specified by the purchaser, "American" High Duty Lathes can be readily arranged to cut metric pitches in addition to the regular range of English or Whitworth threads.

The method of conversion from the English to the metric range on these new lathes is unusually simple and efficient. There is absolutely no change made in the regular design of the lathe nor is there any complicated mechanism to apply in order to secure the desired result. The only work incident to making the conversion is the replacing of the original gear on the stud, the intermediate gear and the driving gear on the quick change box with the proper transposing gears that are furnished to produce the required range of pitches. Furthermore the operation of this mechanism is so extremely simple that it is practically impossible to make a mistake in securing the desired pitch.

After the three transposing gears have been applied to produce one metric pitch all the other pitches, shown on the index plate and enumerated below, can be secured by simply interchanging the gear on the stud with the particular gear shown by the index plate to be necessary

for the desired pitch, and then setting the two compounding levers, located at the left and right of the tumbler lever, to the positions as indicated on the index plate.

After once applying the 127 tooth transposing gear to the box it is not removed until it again becomes necessary to cut English or Whitworth threads, when the original gear is replaced.

All gear combinations incident to obtaining the entire range of metric pitches are calculated with the tumbler lever in the first position as it is shown in the above illustration. Therefore, when cutting metric threads the position of this lever must not be changed.

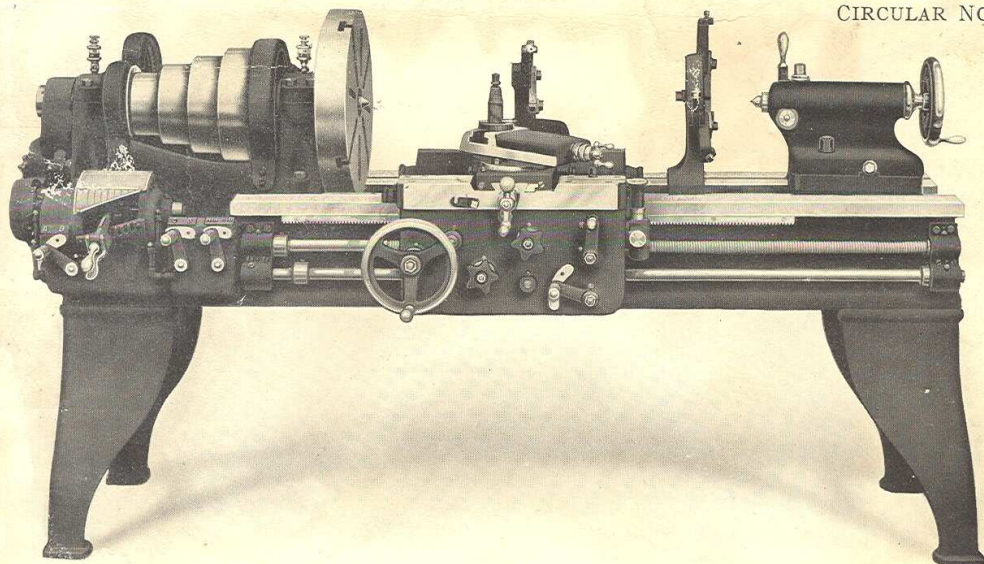
In order that the screw cutting mechanism may be properly set for cutting both metric and English threads, two index plates, one showing the combinations for metric and one for English pitches, are furnished with each lathe arranged for metric conversion.

Special threads and pitches not listed below can be obtained by the use of additional compounding gears. However, those shown below are considered sufficient for ordinary use.

14 inch	16-inch	18-inch	20-inch	24-inch M. P.	24-inch	27-inch	30-inch	36-inch, M. P.
.5	.5	.5	.5	.5	1.00	1.00	1.00	1.00
.5625	.5625	.5625	.5625	.5625	1.125	1.125	1.125	1.125
.625	.625	.625	.625	.625	1.25	1.25	1.25	1.25
.6875	.6875	.6875	.6875	.6875	1.375	1.375	1.375	1.375
.75	.75	.75	.75	.75	1.5	1.5	1.5	1.5
.8125	.8125	.8125	.8125	.8125	1.625	1.625	1.625	1.625
.875	.875	.875	.875	.875	1.75	1.75	1.75	1.75
.9375	.9375	.9375	.9375	.9375	1.875	1.875	1.875	1.875
1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00
1.0625	1.0625	1.0625	1.0625	1.0625	2.25	2.25	2.25	2.25
1.125	1.125	1.125	1.125	1.125	2.5	2.5	2.5	2.5
1.25	1.25	1.1875	1.1875	1.1875	2.75	2.75	2.75	2.75
1.375	1.375	1.25	1.25	1.25	3.00	3.00	3.00	3.00
1.5	1.5	1.375	1.375	1.375	3.25	3.25	3.25	3.25
1.625	1.625	1.5	1.5	1.5	3.5	3.5	3.5	3.5
1.75	1.75	1.625	1.625	1.625	3.75	3.75	3.75	3.75
1.875	1.875	1.75	1.75	1.75	4.00	4.00	4.00	4.00
2.00	2.00	1.875	1.875	1.875	4.5	4.5	4.5	4.5
2.125	2.125	2.00	2.00	2.00	5.00	5.00	5.00	5.00
2.25	2.25	2.125	2.125	2.125	5.5	5.5	5.5	5.5
2.5	2.5	2.25	2.25	2.25	6.00	6.00	6.00	6.00
2.75	2.75	2.375	2.375	2.375	6.5	6.5	6.5	6.5
3.00	3.00	2.5	2.5	2.5	7.00	7.00	7.00	7.00
3.25	3.25	2.75	2.75	2.75	7.5	7.5	7.5	7.5
3.5	3.5	3.00	3.00	3.00	8.00	8.00	8.00	8.00
3.75	3.75	3.25	3.25	3.25	9.00	9.00	9.00	9.00
4.00	4.00	3.5	3.5	3.5	10.00	10.00	10.00	10.00
4.25	4.25	3.75	3.75	3.75	11.00	11.00	11.00	11.00
4.5	4.5	4.00	4.00	4.00	12.00	12.00	12.00	12.00
5.00	5.00	4.25	4.25	4.25	13.00	13.00	13.00	13.00
5.5	5.5	4.5	4.5	4.5	14.00	14.00	14.00	14.00
6.00	6.00	4.75	4.75	4.75	15.00	15.00	15.00	15.00
6.5	6.5	5.00	5.00	5.00	.....	.....	.....	.....
7.00	7.00	5.5	5.5	5.5	.....	.....	.....	.....
7.5	7.5	6.00	6.00	6.00	.....	.....	.....	.....
8.00	8.00	6.5	6.5	6.5	.....	.....	.....	.....
8.5	8.50	7.00	7.00	7.00	.....	.....	.....	.....
9.00	9.00	7.5	7.5	7.5	.....	.....	.....	.....
.....	.....	8.00	8.00	8.00	.....	.....	.....	.....
.....	.....	8.5	8.5	8.5	.....	.....	.....	.....
.....	.....	9.00	9.00	9.00	.....	.....	.....	.....
.....	.....	9.5	9.5	9.5	.....	.....	.....	.....
.....	.....	10.00	10.00	10.00	.....	.....	.....	.....

THE AMERICAN TOOL WORKS CO.
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS.
CINCINNATI, U. S. A.



CIRCULAR NO. 5.

FIGURE NO. 5.

Code Word: LADLE.

14-inch "American" High Duty Lathe

With 4-Speed and 8-Speed "Patented" Geared Heads for Belt or Motor Drive, 9-Speed, Double Back Geared Head and 8-Speed Single-Back Geared Head, Cone Pulley Drive.

Built in Any length of Bed, from 6 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....	6 ft.
6-ft. Bed takes bet. Centers, tailstock flush, Geared Head....	3 ft. 1½ in.
6-ft. Bed takes bet. Centers, tailstock flush, Cone Head.....	3 ft. 1½ in.
Dia. Hole through Spindle, to clear bar.....	1¼ in.
Size of Tool ordinarily used.....	½ in. x 1 in.
Taper of Centers, Morse.....	No. 3
Feed to Compound Rest top slide.....	4¼ in.

Swings over Wings of Carriage.....	15¼ in.
Swings over Carriage Bridge.....	9½ in.
Width of Driving Belt—Geared Heads—4 & 8 Speed....	3 in.
Dia. of Driving Pulley.....	10 in.
Speed of Driving Pulley, r. p. m. (8 Speed Geared Head).....	390
Speeds of Driving Pulley, r. p. m. (4 Speed Geared Head)....	547—340
Width of Driving Belt—Cone Head.....	2½ in.
Dia. of Cone Steps.....	5⅜-6¾-8½-9½ in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements of power, rigidity, durability, accuracy of alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves particular mention. The metal is properly distributed so as to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work.

ABUNDANCE OF POWER is available, far surpassing the efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. Steel gears are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle.

THE SINGLE BACK GEARED HEAD provides 8 spindle speeds, and is designed for a medium class of work. The cone steps are of large diameters and of wide face, thus insuring ample belt area. Four direct spindle speeds are afforded and 4 reduced speeds. All shafts are of high grade steel, accurately ground and run in high quality phosphor bronze bearings, having efficient oiling facilities. Sight-feed oilers are furnished on the spindle bearings.

CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed, and is widened to such an extent, as good practice and judgment require. Has full continuous bearing of 21 in. on the "Vs." Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 1¼ in. diameter, and chased 4 threads per inch permitting engagement of half nuts at any point with the use of the thread dial when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

SPINDLE is of high carbon, hammered steel, accurately ground and has hole to clear 1¼ in. bar, its entire length. Bearings are of the best quality phosphor bronze, and equipped with "sight-feed" oilers. Is of extra large diameter, which design insures the highest degree of rigidity and power.

APRON is tongued, grooved and firmly bolted to carriage, extending its entire length. It is double, giving all shafts a double bearing. Both longitudinal and cross feeds are reversed thru lever from front of apron. Cross-feed is obtained thru a friction and can be instantly released under heaviest load. Half-nuts are controlled by lever from front of apron. All the gears and pinions in apron are steel, of wide face, coarse pitch, and cut from the solid with special cutters. Convenient means for thorough lubrication are provided from the front. A non-interfering device is provided, making it impossible to simultaneously engage feeding and screw-cutting mechanism. Thread Dial is regularly furnished and is arranged to be instantly disconnected from lead screw when not in use.

COMPOUND REST is of very heavy construction. Top and bottom slides are fitted with full length taper gibs, having end screw adjustment thus providing continuous, accurate bearings. Swivel is a complete circle with 2 clamping bolts in the base, and is graduated on both sides for any angle up to 90 degrees each side of zero. Its bearing is very solid on account of the extra wide carriage bridge top. Slide screw has micrometer adjustment.

QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, representing many features of excellence, including steel gears. It provides a range of changes, for feeding and screw cutting, which is practically unlimited. Forty-eight standard changes are shown on the index plate, listing threads from 2 to 112 threads per inch, including 11¼ pipe threads, and feeds from 8 to 448 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads, 2, 2¼, 2½, 2¾, 3, 3¼, 3½, 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28, 32, 36, 40, 44, 46, 48, 52, 56, 64, 72, 80, 88, 92, 96, 104, 112. The rate of feed is 4 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed mechanism is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharpe "20-degree involute pointed tooth type, which provides an

exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place. In the quick change mechanism the lead screw and feed rod operate independently, the lead screw being used only for thread cutting and the feed rod for all other feeding purposes.

SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements. This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions with long, continuous bearings on ways. It is of the double clamping stud type with the back bolt running to top of barrel for convenience in clamping. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a hand wheel. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girths at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center. V's are large and accurately scraped. Wall at tail-stock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.

SPECIAL LUBRICATION. This has been made a feature on the machine and every bearing has been carefully provided for, including "sight-feed" oilers for spindle bearings, thus insuring long life and freedom of motion to all parts.

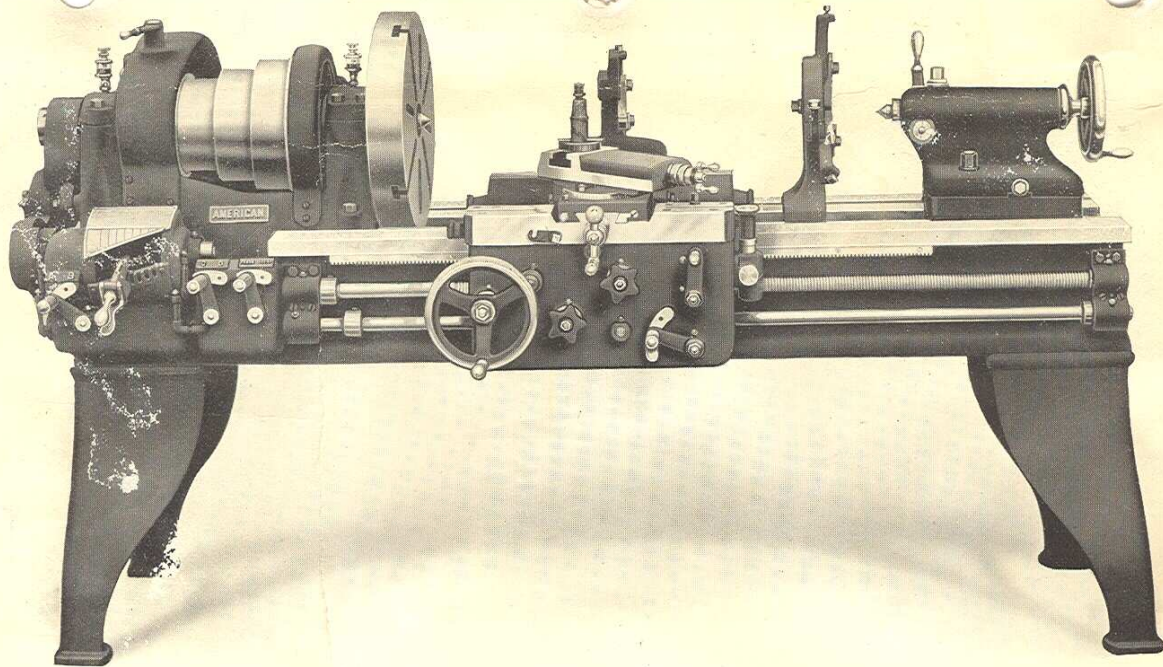


FIGURE NUMBER 5-C.

Code Word. LADLEALARM.

THE DOUBLE BACK-GEARED HEAD is the ideal type for a lathe which is to be used for a general class of work, due to the fact that it will accommodate such a wide range. The cone diameters are large and the back gear ratios unusually high, which insures ample power for taking heavy cuts on large diameter work, while the three direct spindle speeds are suitable for turning work of smaller diameters at high speeds and for finishing. Nine (9) Spindle Speeds, three (3) direct, three (3) reduced and three (3) double reduced are provided which cover a nicely graded range. The step diameters are exceptionally large, being 6 1/2 inches, 8 inches and 9 1/2 inches for a 2 1/2 inch belt, thus giving ample area for belt contact. All shafts are of high grade steel and are ground. Bearings are bushed with a high quality of oil and are thoroughly lubricated. The spindle bearings are

DOUBLE FRICTION COUNTERSHAFT is regularly supplied (except with Motor Drive), for the single back geared, the double back geared and 8 speed Patented Geared Head types, which furnishes one forward and one reverse speed. When conditions do not require a reverse speed this can be used as an additional forward speed. Triple Friction Countershaft is regularly furnished with the 4 Speed Patented Geared Head Drive.

REGULAR EQUIPMENT, upon which base price is determined, includes large and small face plates, compound, steady and follow rests, thread dial, countershaft for belt drives, and wrenches also instruction book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this Lathe with improved taper attachment, turret on carriage, turret on shears, turret tool post, 4 speed and 8 speed "patented" geared heads for belt or gears and index plates for

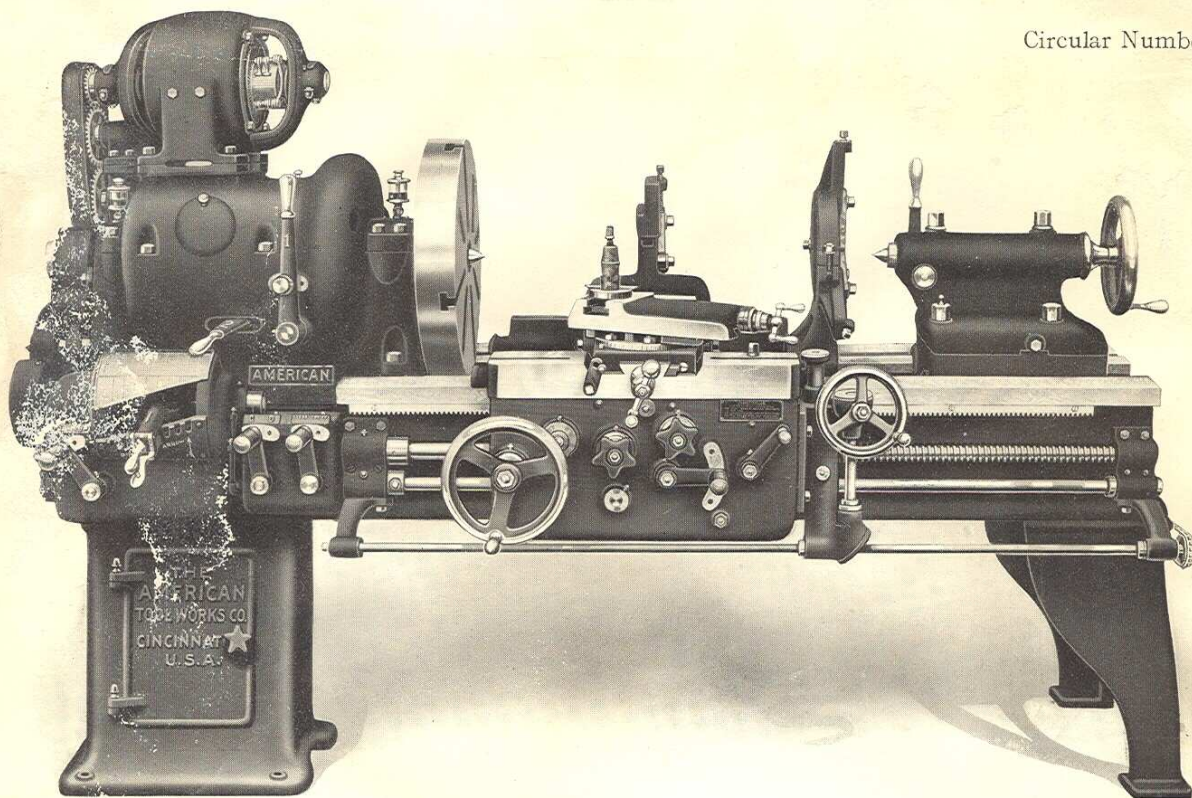


Figure Number 13-M.

Motor Drive thru "Patented" Geared Head.

Code Word:—LAPELTORY.

18-inch "American" High Duty Lathe

With 4-Speed "Patented" Geared Head for Belt or Motor Drive, 9-Speed, Double Back Geared Head and 8-Speed Single-Back Geared Head, Cone Pulley Drive.

Built in Any length of Bed, from 6 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....6 ft.
6-ft. I d takes bet. Centers, tailstock flush, Geared Head.....2 ft. 3 in.
6-ft. I d takes bet. Centers, tailstock flush, Cone Head.....2 ft. 3 in.
Dia. 1 through Spindle, to clear bar.....1½ in.
Size of ordinarily used.....5/8 in. x 1¼ in.
Taper centers, Morse.....No. 4.
Feed to compound Rest top slide.....6¼ in.

Swings over Wings of Carriage.....20½ in.
Swings over Carriage Bridge.....13¼ in.
Width of Driving Belt.....Geared Head.....5 in.
Dia. of Driving Pulley.....12 in.
Speed of Driving Pulley, r. p. m. ".....455 & 283.
Width of Driving Belt.....Cone Head.....3½ in.
Dia. of Cone Steps.....7-9-11-13 in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements of power, rigidity, durability, accuracy in alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves particular mention. The metal is properly distributed so as to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work.

ABUNDANCE OF POWER is available, far surpassing the efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. Steel gears are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle.

MOTOR DRIVE THROUGH "PATENTED" GEARED HEAD. The method of motor application to "American" Lathes is extremely simple and efficient, only three gears being used in connecting the armature and the main driving shafts. A variable speed motor, either of the direct or alternating current type, is located on top of the "patented" geared head, and connected to the main driving shaft through spur gearing. Four mechanical speed changes are provided which, multiplied by the number of working contacts on the controller gives the total number of spindle speeds obtainable in either direction. Spindle speed range is from 11 to 320 r. p. m. The motor is under constant control through the controller handwheel, conveniently located on right end of carriage, where a dial indicates how the controller is set. This drive is absolutely free from vibration.

THE FUNDAMENTAL SPEED CHANGES are made through the manipulation of the levers on front of headstock. Motor speed can be comparatively high,

600 to 1200 R. P. M., thereby keeping down the size and first cost of same. Head is under constant control through 2 sensitive but powerful friction clutches, by means of which the lathe can be started and stopped without stopping the motor.

SIZE OF MOTOR depends upon the nature of the work to be handled. We prefer to have you specify size of motor desired, after having made a thorough investigation of the usages to which the lathe is to be put, so that a motor of the proper "horse-power" will be supplied. The services of our engineering department are at your disposal to properly determine the range of speeds and size of motor particularly suited to your requirements. If the lathe must stand up to continuous hard work, a large motor must be used, whereas, if it is intended only for a general line of work, a motor of normal power will be amply sufficient. Power of motor should be from 6 to 12 H. P.

CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed, and is widened to such an extent, as good practice and judgment require. Has full continuous bearing of 28 in. on the "Vs." Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 1½ in. diameter, and chased 2 threads per inch permitting engagement of half nuts at any point with the use of the thread dial when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

SPINDLE is of high carbon, hammered steel, accurately ground and has hole to clear 1½ in. bar, its entire length. Bearings are of the best quality phosphor bronze, and equipped with "sight-feed" oilers. Is of extra large diameter, which design insures the highest degree of rigidity and power.

QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, representing many features of excellence, including steel gears. It provides a range of changes for feeding and screw cutting, which is practically unlimited. 48 standard changes are shown on the index plate, listing threads from 1 to 56 threads per inch, including 11½ pipe threads, and feeds from 8 to 448 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads, 1, 1½, 1¾, 1⅝, 1⅞, 1⅞, 1½, 1⅝, 1¾, 2, 2¼, 2½, 2¾, 2⅞, 3, 3¼, 3½, 4, 4½, 5, 5½, 5¾, 6, 6½, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28, 32, 36, 40, 44, 46, 48, 52, 56. The rate of feed is 8 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed mechanism is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharpe "20-degree involute pointed tooth type, which provides an exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place. In the quick change mechanism the lead screw and feed rod operate independently, the lead screw being used only for thread cutting and the feed rod for all other feeding purposes.

SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears, any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements.

This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions with long, continuous bearings on ways. It is of the quadruple clamping stud type with back bolts running to top of barrel for convenience in clamping. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a hand wheel. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girders at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern, which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center. V's are large and accurately scraped. Wall at tail-stock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw bearings are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.

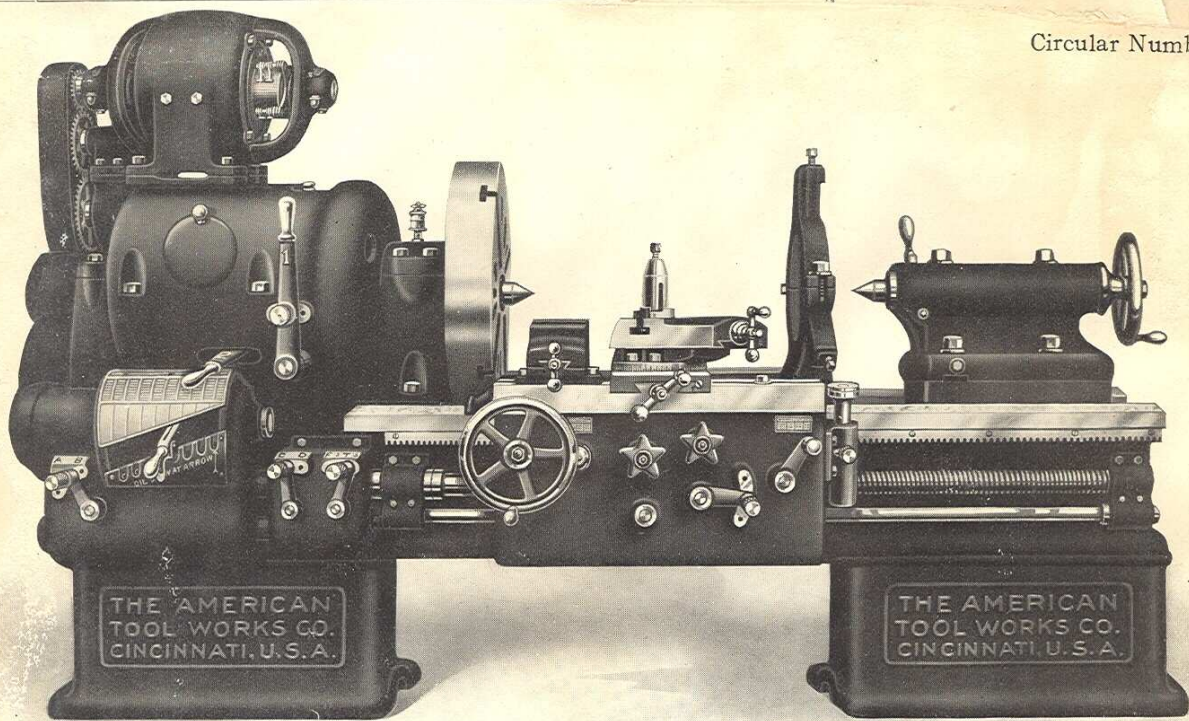


Figure Number 26-M.

Motor Drive thru "Patented" 4-Speed Head.

Code Word:—LABELTORY.

20-inch "American" High Duty Lathe

With 4-Speed "Patented" Geared Head for Belt or Motor Drive, 9-Speed, Double Back Geared Head and 8-Speed Single-Back Geared Head, Cone Pulley Drive.

Built in Any Length of Bed, from 8 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....8 ft.
8-ft. Bed takes bet. Centers, tailstock flush, Geared Head.....3 ft. 10 in.
8-ft. Bed takes bet. Centers, tailstock flush, Cone Head.....3 ft. 10 in.
Dia. Hole through Spindle, to clear bar.....1 1/8 in.
Size of Tool ordinarily used.....3/4 in. x 1 1/2 in.
Taper of Centers, Morse.....No. 4.
Feed to Compound Rest top slide.....7 1/4 in.

Swings over Wings of Carriage.....22 1/2 in.
Swings over Carriage Bridge.....14 1/2 in.
Width of Driving Belt——Geared Head.....6 in.
Dia. of Driving Pulley.....12 in.
Speed of Driving Pulley, r. p. m. ".....450 & 275.
Width of Driving Belt——Cone Head.....3 3/4 in.
Dia. of Cone Steps.....7 5/8-9 3/4-11 7/8-14 in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements of power, rigidity, durability, accuracy in alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves particular mention. The metal is properly distributed so as to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work. Its massive proportions admirably take care of the enormous available power.

ABUNDANCE OF POWER is available, far surpassing the high efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. Steel gears are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle. This feature is of particular value on a lathe of this size, where expensive work is being machined and every delay costs money.

MOTOR DRIVE THROUGH "PATENTED GEARED HEAD." The method of motor application to "American" Lathes is extremely simple and efficient, only three gears being used in connecting the armature and the main driving shafts. A variable speed motor, either of the direct or alternating current type, is located on top of the "patented" geared head, and connected to the main driving shaft through spur gearing. Four mechanical speed changes are provided which, multiplied by the number of working contacts on the controller gives the total number of spindle speeds obtainable in either direction. Spindle speed range is from 9.6 to 295 r. p. m. The motor is under constant control through the controller handwheel, conveniently located on right end of carriage, where a dial indicates how the controller is set. This drive is absolutely free from vibration.

THE FUNDAMENTAL SPEED CHANGES are made through the manipulation of the levers on front of headstock. Motor speed can be comparatively high,

600 to 1200 R. P. M., thereby keeping down the size and first cost of same. Head is under constant control through 2 sensitive but powerful friction clutches, by means of which the lathe can be started and stopped without stopping the motor.

SIZE OF MOTOR depends upon the nature of the work to be handled. We prefer to have you specify size of motor desired, after having made a thorough investigation of the usages to which the lathe is to be put, so that a motor of the proper "horse-power" will be supplied. The services of our engineering department are at your disposal to properly determine the range of speeds and size of motor particularly suited to your requirements. If the lathe must stand up to continuous hard work, a large motor must be used, whereas, if it is intended only for a general line of work, a motor of normal power will be amply sufficient. Power of motor should be from 6 to 12 H. P.

CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed, and is widened to such an extent, as good practice and judgment require. Has full continuous bearing of 30 in. on the "V's." Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 1 3/4 in. diameter, and chased 2 threads per inch, permitting engagement of half nuts at any point with the use of the thread dial when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

SPINDLE is of high carbon, hammered steel, accurately ground and has hole to clear 1 1/2 in. bar, its entire length. Bearings are of the best quality phosphor bronze, and equipped with "sight-feed" oilers. Is of extra large diameter, which design insures the highest degree of rigidity and power.

QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, representing many features of excellence, including steel gears. It provides a range of changes for feeding and screw cutting, which is practically unlimited. 48 standard changes are shown on the index plate, listing threads from 1 to 56 threads per inch, including 1 1/2 pipe threads, and feeds from 8 to 448 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 2, 2 1/4, 2 1/2, 2 3/4, 3, 3 1/4, 3 1/2, 4, 4 1/2, 5, 5 1/2, 5 3/4, 6, 6 1/2, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 18, 20, 22, 23, 24, 26, 28, 32, 36, 40, 44, 46, 48, 52, 56. The rate of feed is 10 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed mechanism is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharp "20-degree involute pointed tooth type, which provides an exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place. In the quick change mechanism the lead screw and feed rod operate independently, the lead screw being used only for thread cutting and the feed rod for all other feeding purposes.

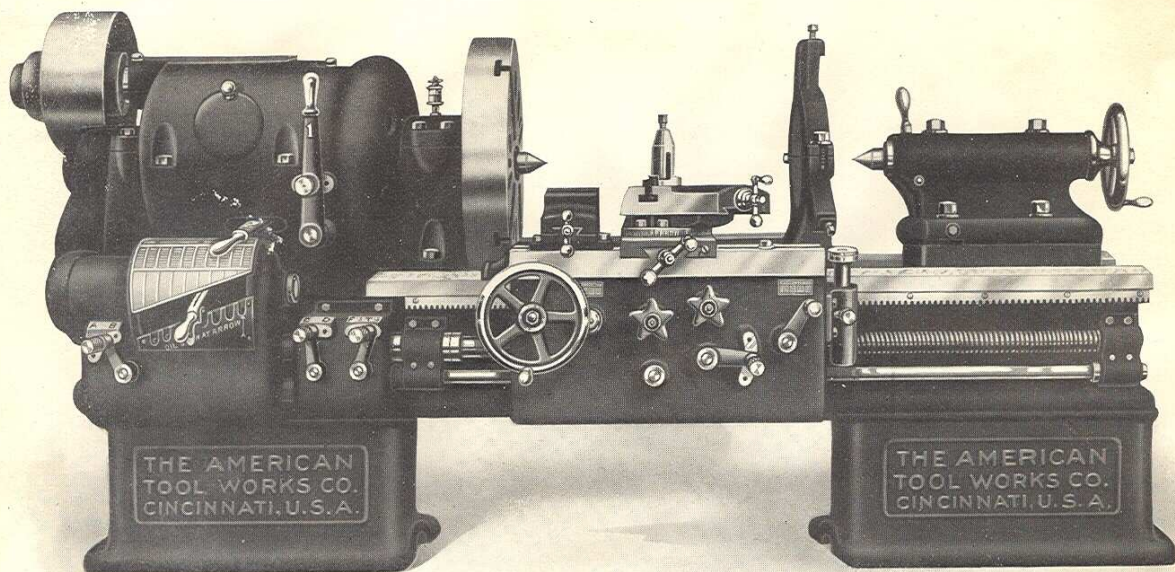
SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears, any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements.

This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions with long, continuous bearings on ways. It is of the quadruple clamping stud type with back bolts running to top of

barrel for convenience in clamping. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a hand wheel. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girders at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern, which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center. V's are large and accurately scraped. Wall at tail-stock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw bearings are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.



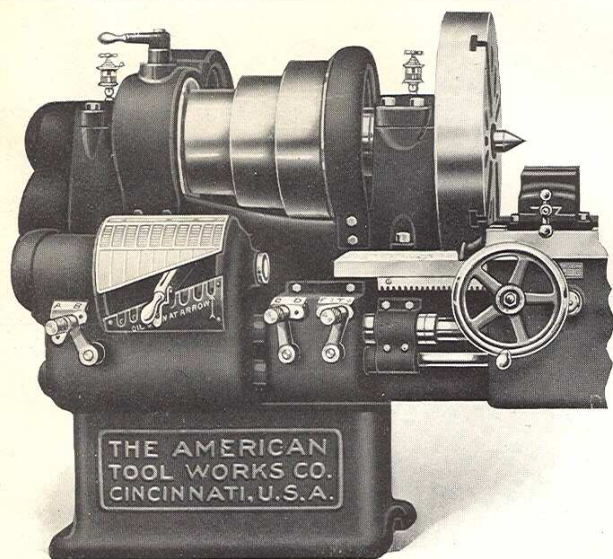
"Patented" 4-Speed Head, Belt Drive.

Figure Number 26-G.

Code Word:—LABELTHER.

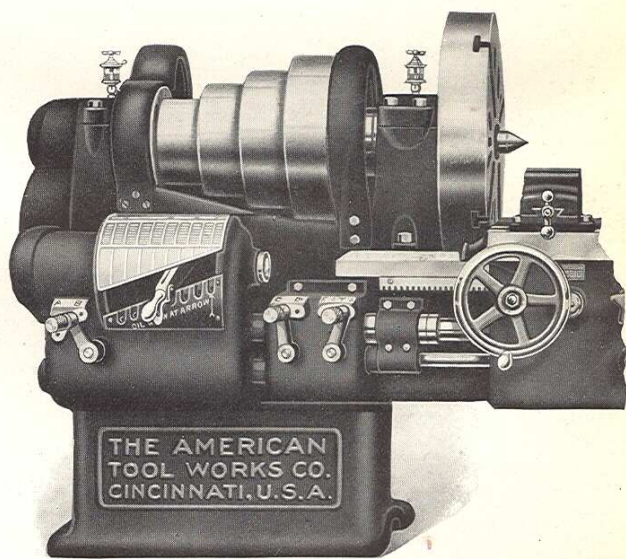
BELT DRIVEN "PATENTED" GEARED HEADSTOCK is furnished for those who require a wide range of spindle speeds and great power. The head is of the Compound Geared type, and is identical with that used for Motor Drive. 12 Spindle Speeds (8 forward and 4 reverse or 12 forward and no reverse), 9.6 to 295 R. P. M. are obtainable thru the geared head in connection with the Triple Friction Countershaft regularly furnished. An index plate conspicuously located on the head indicates plainly how to obtain the different speeds. Some idea of the power this head will transmit can be gained from the fact that the maximum gear ratio afforded is at the unusually high rate of 28.7 to 1. The head is massively proportioned and possesses sufficient rigidity to resist all strains to which it may be subjected. The extreme simplicity of this head is an important feature. Only 6 gears are used to produce 4 fundamental spindle speeds. The gears are cut from the solid with special cutters, are of wide face and unusually coarse pitch and are tested for accuracy on a special gear testing machine. The driving pulley is of large diameter and affords

a large area of belt contact. It runs on a massive bronze bushed steel sleeve, thus relieving the driving shaft of all belt strains. The Pulley has an improved automatic oiling system which insures proper lubrication at all times. 2 sensitive but powerful friction clutches are provided which are controlled by a convenient lever, by means of which the gears in the head can be stopped or slightly moved without interfering with the driving belt, thus permitting speed changes to be easily made. All shafts in the head are of crucible steel and are accurately ground. The headstock bearings are of the best quality of phosphor bronze with excellent lubricating facilities, including sight feed oilers for spindle bearings. This headstock can be quickly and easily converted into motor drive at any time after installation, by simply removing pulley drive unit and placing a motor on top of headstock, (a flat surface being regularly planed off on each head before leaving our plant) and connecting motor to driving shaft of head through spur gearing. A triple friction countershaft is furnished, with two forward and one reverse speeds.



3-Step Cone, Double Back Geared

Figure Number 26-C. Code Word:—LABELALARM



4-Step Cone, Single Back Geared Head

Figure Number 26.

Code Word:—LABEL

THE DOUBLE BACK GEARED HEADSTOCK provides 9 Spindle Speeds, 3 direct, 3 reduced and 3 double reduced speeds. These speeds cover a nicely graded range, suitable for a wide range of work. The step diameters are exceptionally large, being 9 1/2 in.—11 1/4 in.—14 in. for a 4 in. belt, thus providing ample area for belt contact. All shafts are of high grade steel and accurately ground. Bearings are bushed with a high quality of phosphor bronze and are thoroughly lubricated. The spindle bearings are provided with sight-feed oilers.

APRON is tapered, grooved and firmly bolted to carriage, extending its entire length. It is double, giving all shafts a double bearing. Both longitudinal and cross feeds are reversed thru lever from front of the apron, and not at headstock as on most lathes. This feature is of especial value on long beds, where operator is far removed from head. Cross-feed is obtained thru a friction and can be instantly released under heaviest load. Half-nuts are controlled by lever from front of apron. All the gears and pinions in apron are steel, of wide face, coarse pitch, and cut from the solid with special cutters. Convenient means for thorough lubrication are provided from the front. Rack pinion can be withdrawn from feed rack when screw cutting. A non-interfering device is provided, making it impossible to simultaneously engage feeding and screw-cutting mechanism. **Thread Dial** is regularly furnished and is arranged to be instantly disconnected from lead screw when not in use.

COMPOUND REST is of very heavy construction. Top and bottom slides are fitted with full length taper gibs having end screw adjustment thus providing continuous, accurate bearings. Swivel is a complete circle with 4 clamping bolts in the base, and is graduated for any angle up to 90 degrees each side of zero. Its bearing is very solid on account of the extra wide carriage bridge top. Slide screw has micrometer adjustment.

THE SINGLE BACK GEARED HEADSTOCK provides 8 spindle speeds and is designed for a medium class of work. The cone steps are of large diameters and of wide face, thus insuring ample belt area. 4 direct spindle speeds are afforded and 4 reduced speeds. As in the other types of heads, all shafts are of high grade steel, accurately ground and run in high quality phosphor bronze bearings, having efficient oiling facilities. Sight-feed oilers are furnished on the spindle bearings.

SPECIAL LUBRICATION. This has been made a feature on the machine and every bearing has been carefully provided for, including "sight-feed" oilers, for spindle bearings, thus insuring long life and freedom of motion to all parts.

DOUBLE FRICTION COUNTERSHAFT is regularly supplied (except with Motor Drive), for the single back geared and the double back geared types, which furnishes one forward and one reverse speed. When conditions do not require a reverse speed this can be used as an additional forward speed. Triple Friction Countershaft is regularly furnished with the Patented Geared Head Drive.

REGULAR EQUIPMENT, upon which base price is determined, includes compound, steady, follow and full swing rests, thread dial, countershaft for belt drives, and wrenches also instruction book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this Lathe with improved taper attachment turret on carriage, turret on shears, turret tool post, "patented" geared headstock, for belt or motor drive, double back geared headstock, extra gears and index plates for special fine, coarse or metric threads.

THE AMERICAN TOOL WORKS CO.
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

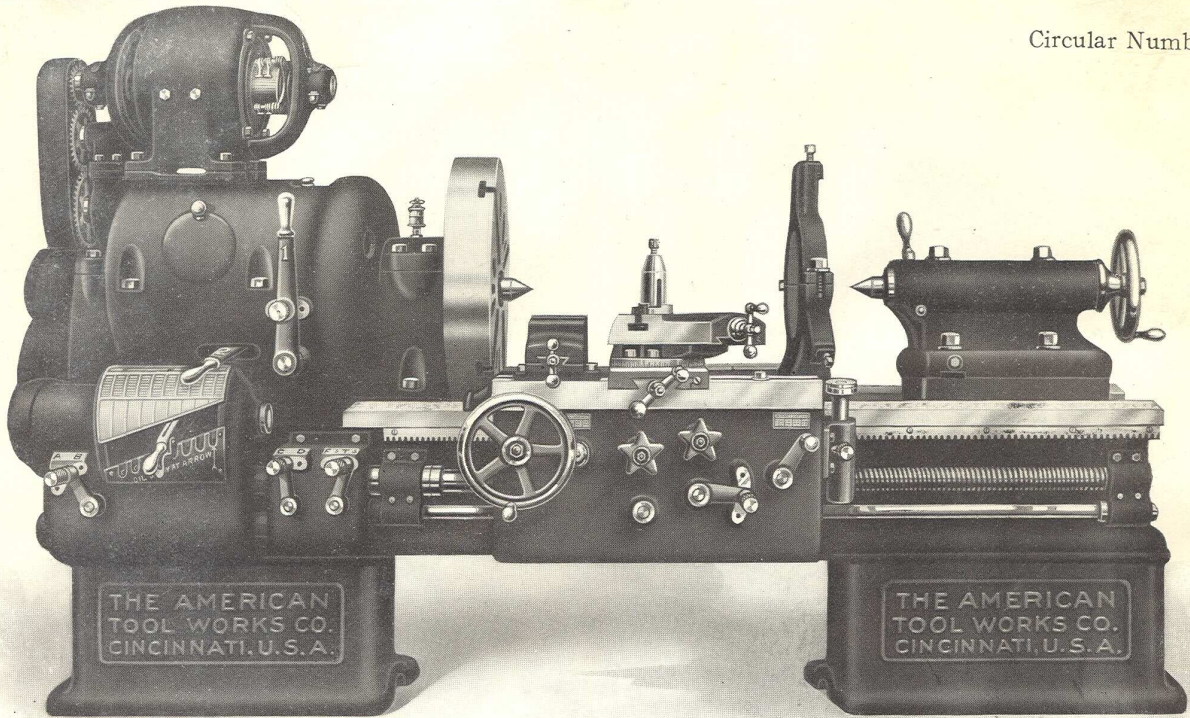


Figure Number 28-M.

Motor Drive thru "Patented" 4-Speed Head.

Code Word:—LABORTORY.

24-inch "American" High Duty Lathe

MEDIUM PATTERN.

With 4-Speed "Patented" Geared Head for Belt or Motor Drive, 9-Speed, Double Back Geared Head and 8-Speed Single-Back Geared Head, Cone Pulley Drive.

Built in Any length of Bed, from 8 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....8 ft.
8-ft. Bed takes bet. Centers, tailstock flush, Geared Head...3 ft. 10 in.
8-ft. Bed takes bet. Centers, tailstock flush, Cone Head...3 ft. 10 in.
Dia. Hole through Spindle, to clear bar.....1 1/8 in.
Size of Tool ordinarily used.....3/4 in. x 1 1/2 in.
Taper of Centers, Morse.....No. 4.
Feed to Compound Rest top slide.....7/4 in.

Swings over Wings of Carriage.....24 1/2 in.
Swings over Carriage Bridge.....17 1/2 in.
Width of Driving Belt—Geared Head.....6 in.
Dia. of Driving Pulley.....12 in.
Speed of Driving Pulley, r. p. m. ".....450 & 275.
Width of Driving Belt—Cone Head.....3 3/4 in.
Dia. of Cone Steps.....7 5/8-9 3/4-11 7/8-14 in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements of power, rigidity, durability, accuracy in alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves particular mention. The metal is properly distributed so as to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work. Its massive proportions admirably take care of the enormous available power.

ABUNDANCE OF POWER is available, far surpassing the high efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. Steel gears are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle. This feature is of particular value on a lathe of this size, where expensive work is being machined and every delay costs money.

MOTOR DRIVE THROUGH "PATENTED" GEARED HEAD. The method of motor application to "American" Lathes is extremely simple and efficient, only three gears being used in connecting the armature and the main driving shafts. A variable speed motor, either of the direct or alternating current type, is located on top of the "patented" geared head, and connected to the main driving shaft through spur gearing. Four mechanical speed changes are provided which, multiplied by the number of working contacts on the controller gives the total number of spindle speeds obtainable in either direction. Spindle speed range is from 9.6 to 295 r. p. m. The motor is under constant control through the controller handwheel, conveniently located on right end of carriage, where a dial indicates how the controller is set. This drive is absolutely free from vibration.

THE FUNDAMENTAL SPEED CHANGES are made through the manipulation of the levers on front of headstock. Motor speed can be comparatively high,

600 to 1200 R. P. M., thereby keeping down the size and first cost of same. Head is under constant control through 2 sensitive but powerful friction clutches, by means of which the lathe can be started and stopped without stopping the motor.

SIZE OF MOTOR depends upon the nature of the work to be handled. We prefer to have you specify size of motor desired, after having made a thorough investigation of the usages to which the lathe is to be put, so that a motor of the proper "horse-power" will be supplied. The services of our engineering department are at your disposal to properly determine the range of speeds and size of motor particularly suited to your requirements. If the lathe must stand up to continuous hard work, a large motor must be used, whereas, if it is intended only for a general line of work, a motor of normal power will be amply sufficient. Power of motor should be from 6 to 12 H. P.

CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed, and is widened to such an extent, as good practice and judgment require. Has full continuous bearing of 30 in. on the "Vs." Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 1 3/4 in. diameter, and chased 2 threads per inch, permitting engagement of half nuts at any point with the use of the thread dial when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

SPINDLE is of high carbon, hammered steel, accurately ground and has hole to clear 1 1/4 in. bar, its entire length. Bearings are of the best quality phosphor bronze, and equipped with "sight-feed" oilers. Is of extra large diameter, which design insures the highest degree of rigidity and power.

QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, representing many features of excellence, including steel gears. It provides a range of changes for feeding and screw cutting, which is practically unlimited. 48 standard changes are shown on the index plate, listing threads from 1 to 36 threads per inch, including 1 1/2 pipe threads, and feeds from 8 to 448 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads, 1, 1 1/8, 1 1/4, 1 1/2, 1 3/4, 1 7/8, 1 5/8, 1 3/4, 2, 2 1/4, 2 1/2, 2 3/4, 2 7/8, 3, 3 1/4, 3 1/2, 4, 4 1/2, 5, 5 1/2, 5 3/4, 6, 6 1/2, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28, 32, 36, 40, 44, 46, 48, 52, 56. The rate of feed is 10 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed mechanism is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharp "20-degree involute pointed tooth type, which provides an exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place. In the quick change mechanism the lead screw and feed rod operate independently, the lead screw being used only for thread cutting and the feed rod for all other feeding purposes.

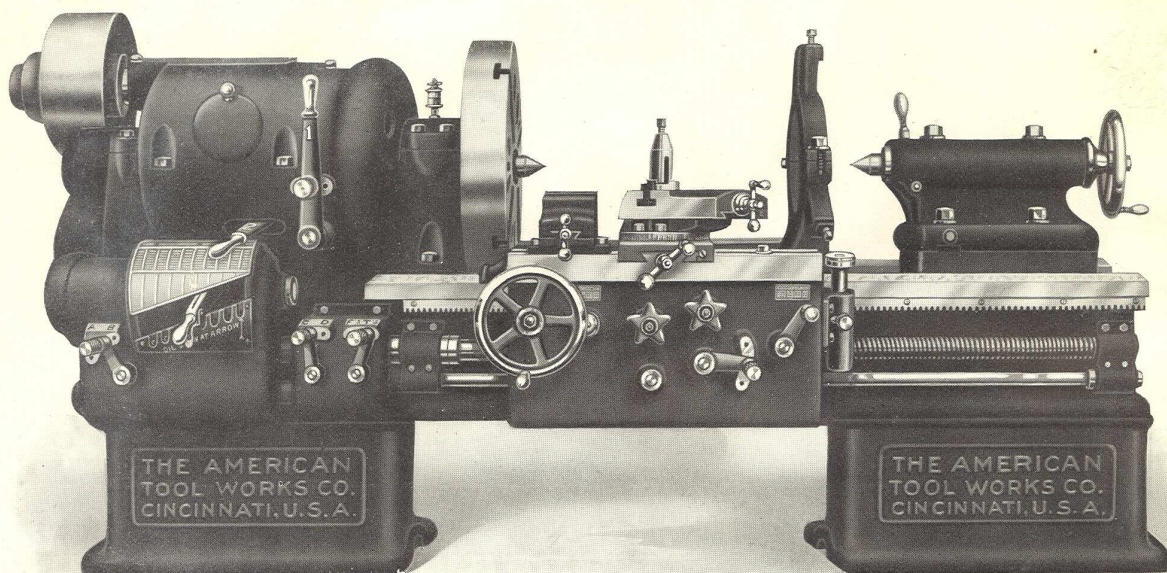
SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears, any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements.

This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions with long, continuous bearings on ways. It is of the quadruple clamping stud type with back bolts running to top of

barrel for convenience in clamping. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a hand wheel. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girders at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern, which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center. V's are large and accurately scraped. Wall at tail-stock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw bearings are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.



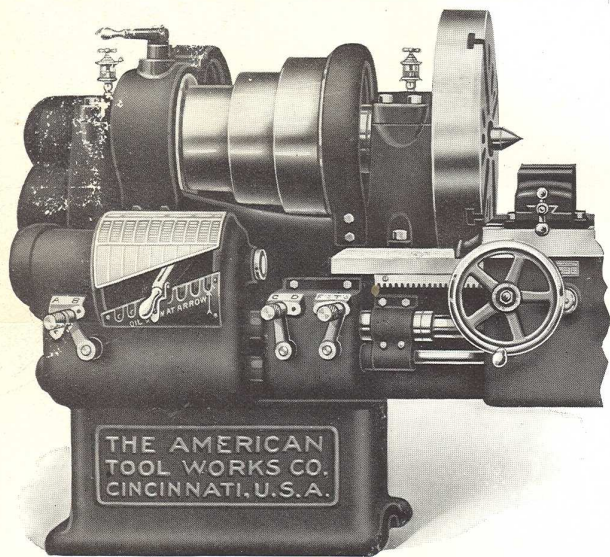
"Patented" 4-Speed Head, Belt Drive.

Figure Number 28-G.

Code Word:—LABORTHER.

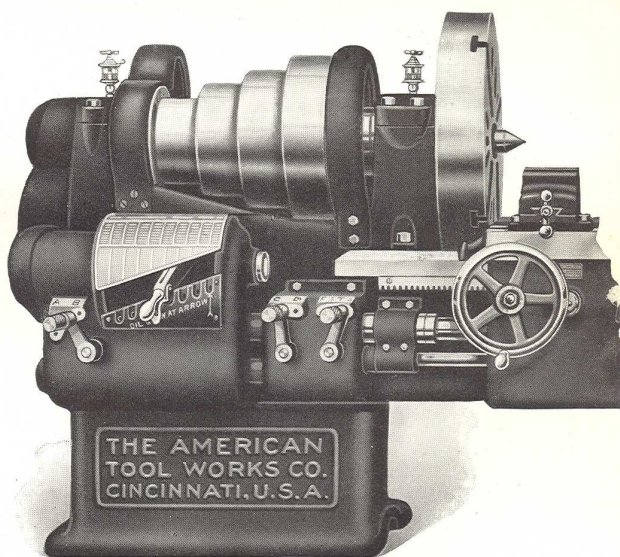
BELT DRIVEN "PATENTED" GEARED HEADSTOCK is furnished for those who require a wide range of spindle speeds and great power. The head is of the Compound Geared type, and is identical with that used for Motor Drive. 12 Spindle Speeds (8 forward and 4 reverse or 12 forward and no reverse), 9.6 to 295 R. P. M. are obtainable thru the geared head in connection with the Triple Friction Countershaft regularly furnished. An index plate conspicuously located on the head indicates plainly how to obtain the different speeds. Some idea of the power this head will transmit can be gained from the fact that the maximum gear ratio afforded is at the unusually high rate of 28.7 to 1. The head is massively proportioned and possesses sufficient rigidity to resist all strains to which it may be subjected. The extreme simplicity of this head is an important feature. Only 6 gears are used to produce 4 fundamental spindle speeds. The gears are cut from the solid with special cutters, are of wide face and unusual coarse pitch and are tested for accuracy on a special gear testing machine. The driving pulley is of large diameter and affords

a large area of belt contact. It runs on a massive bronze bushed steel sleeve, thus relieving the driving shaft of all belt strains. The Pulley has an improved automatic oiling system which insures proper lubrication at all times. 2 sensitive but powerful friction clutches are provided which are controlled by a convenient lever, by means of which the gears in the head can be stopped or slightly moved without interfering with the driving belt, thus permitting speed changes to be easily made. All shafts in the head are of crucible steel and are accurately ground. The headstock bearings are of the best quality of phosphor bronze with excellent lubricating facilities, including sight feed oilers for spindle bearings. This headstock can be quickly and easily converted into motor drive at any time after installation, by simply removing pulley drive unit and placing a motor on top of headstock, (a flat surface being regularly planed off on each head before leaving our plant) and connecting motor to driving shaft of head through spur gearing. A triple friction countershaft is furnished, with two forward and one reverse speeds.



3-Step Cone, Double Back Geared

Figure Number 28-C. Code Word:—LABORALARM



4-Step Cone, Single Back Geared Head

Figure Number 28.

Code Word:—LABOR

THE DOUBLE BACK GEARED HEADSTOCK provides 9 Spindle Speeds, 3 direct, 3 reduced and 3 double reduced speeds. These speeds cover a nicely graded range, suitable for a wide range of work. The step diameters are exceptionally large, being $9\frac{1}{2}$ in.— $11\frac{1}{4}$ in.—14 in. for a 4 in. belt, thus providing ample area for belt contact. All shafts are of high grade steel and accurately ground. Bearings are bushed with a high quality of phosphor bronze and are thoroughly lubricated. The spindle bearings are provided with sight-feed oilers.

APRON is tongued, grooved and firmly bolted to carriage, extending its entire length. It is double, giving all shafts a double bearing. Both longitudinal and cross feeds are reversed thru lever from front of the apron, and not at headstock as on most lathes. This feature is of especial value on long beds, where operator is far removed from head. Cross-feed is obtained thru a friction and can be instantly released under heaviest load. Half-nuts are controlled by lever from front of apron. All the gears and pinions in apron are steel, of wide face, coarse pitch, and cut from the solid with special cutters. Convenient means for thorough lubrication are provided from the front. Rack pinion can be withdrawn from feed rack when screw cutting. A non-interfering device is provided, making it impossible to simultaneously engage feeding and screw-cutting mechanism. Thread Dial is regularly furnished and is arranged to be instantly disconnected from lead screw when not in use.

COMPOUND REST is of very heavy construction. Top and bottom slides are fitted with full length taper gibbs having end screw adjustment thus providing continuous, accurate bearings. Swivel is a complete circle with 4 clamping bolts in the base, and is graduated for any angle up to 90 degrees each side of zero. Its bearing is very solid on account of the extra wide carriage bridge top. Slide screw has micrometer adjustment.

THE SINGLE BACK GEARED HEADSTOCK provides 8 spindle speeds and is designed for a medium class of work. The cone steps are of large diameters and of wide face, thus insuring ample belt area. 4 direct spindle speeds are afforded and 4 reduced speeds. As in the other types of heads, all shafts are of high grade steel, accurately ground and run in high quality phosphor bronze bearings, having efficient oiling facilities. Sight-feed oilers are furnished on the spindle bearings.

SPECIAL LUBRICATION. This has been made a feature of the machine and every bearing has been carefully provided for, including "sight-feed" oilers, for spindle bearings, thus insuring long life and freedom of motion to all parts.

DOUBLE FRICTION COUNTERSHAFT is regularly supplied (except with Motor Drive,) for the single back geared and the double back geared types, which furnishes one forward and one reverse speed. When conditions do not require a reverse speed this can be used as an additional forward speed. Triple Friction Countershaft is regularly furnished with the Patented Geared Head Drive.

REGULAR EQUIPMENT, upon which base price is determined, includes compound, steady, follow and full swing rests, thread dial, countershaft for belt drives, and wrenches also instruction book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this Lathe with improved taper attachment turret on carriage, turret tool post, "patented" geared headstock, for belt or motor drive, double back geared headstock, extra gears and index plates for special fine, coarse or metric threads.

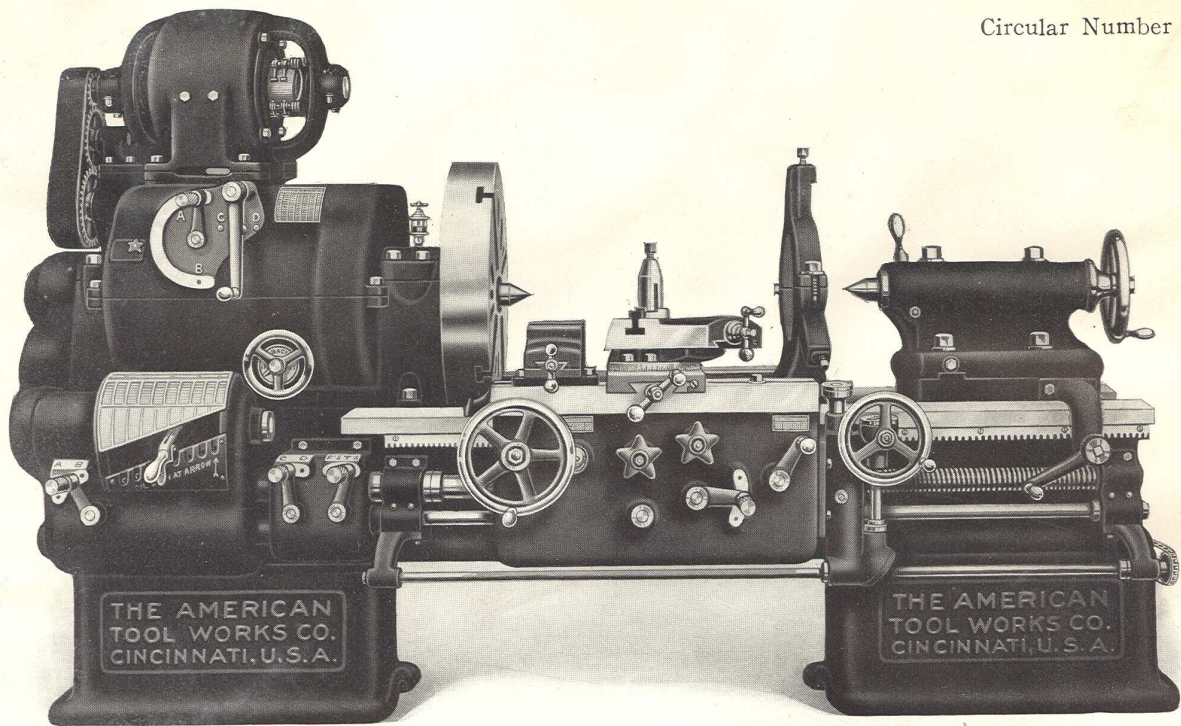
THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

Oct. 4, 1911.

5000—B.



Motor Drive thru "Patented" 8-Speed Head.

Figure Number:—32M.

Code Word:—LARCHTORY.

24-inch "American" High Duty Lathe

With 8-Speed "Patented" Geared Head for Belt or Motor Drive, 9-Speed, Double Back Geared Head and 8-Speed Single Back Geared, Cone Pulley Drive.

Built in Any length of Bed, from 10 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....10 ft.
10-ft. Bed takes bet. Centers, tailstock flush, Geared Head.....5 ft. 0 in.
10-ft. Bed takes bet. Centers, tailstock flush, Cone Head.....5 ft. 0 in.
Dia. Hole through Spindle, to clear bar.....2 1-16 in.
Size of Tool ordinarily used..... $\frac{3}{4}$ in. x $1\frac{1}{2}$ in.
Taper of Centers, Morse.....No. 5
Feed to Compound Rest top slide.....8 in.

Swings over Wings of Carriage.....26 $\frac{1}{2}$ in.
Swings over Carriage Bridge.....17 $\frac{1}{2}$ in.
Width of Driving Belt——Geared Head.....6 in.
Dia. of Driving Pulley——".....16 in.
Speed of Driving Pulley, r. p. m.——".....300.
Width of Driving Belt——Cone Head.....4 $\frac{1}{2}$ in.
Dia. of Cone Steps.....9—11 $\frac{1}{2}$ —14—16 $\frac{1}{2}$ in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the **most exacting requirements** of power, rigidity, durability, accuracy in alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves particular mention, as an abundance of metal is used just where it is needed to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work. Its massive proportions admirably take care of the enormous available power.

ABUNDANCE OF POWER is available, far surpassing the high efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. **Steel gears** are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle. This feature is of particular value on a lathe of this size, where expensive work is being machined and every delay costs money.

MOTOR DRIVE THROUGH "PATENTED" GEARED HEAD. The method of motor application to "American" Lathes is extremely simple and efficient, only three gears being used in connecting the armature and the main driving shafts. A constant speed motor, either of the direct or alternating current type, is located on top of the "patented" geared head, and connected to the main driving shaft through spur gearing. Eight (8) fundamental spindle speeds are obtainable 7.3 to 70 r. p. m., and the motor is under constant control through the controller handwheel, conveniently located on right end of carriage, where a dial indicates how the controller is set. This drive is absolutely free from vibration.

THE FUNDAMENTAL SPEED CHANGES are made through the manipulation of the levers and handwheel on front of headstock. Motor speed can be comparatively high, 1000 to 1200 R. P. M., thereby keeping down the size and first cost of same. Head is under constant control thru 2 sensitive but powerful friction clutches located on the high speed shaft, by means of which the lathe can be started and stopped without stopping the motor.

SIZE OF MOTOR depends upon the nature of the work to be handled. We prefer to have you specify size of motor desired, after having made a thorough investigation of the usages to which the lathe is to be put, so that a motor of the proper "horse-power" will be supplied. The services of our engineering department are at your disposal to properly determine the range of speeds and size of motor particularly suited to your requirements. If the lathe must stand up to continuous hard work, a large motor must be used, whereas, if it is intended only for a general line of work, a motor of normal power will be amply sufficient. Power of motor should be from 7 $\frac{1}{2}$ to 15 H. P.

CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed, and is widened to such an extent, as good practice and judgment require. Has full continuous bearing of 37 in. on the "Vs." Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 2 in. diameter, and chased 2 threads per inch, permitting engagement of half nuts at any point without the use of the thread dial, except when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

SPINDLE is of high carbon, hammered steel, accurately ground and has hole to clear 2 1-16 in. bar, its entire length. Bearings are of the best quality phosphor bronze, and equipped with "sight-feed" oilers. Is of taper construction and extra large diameter, which design insures the highest degree of rigidity and power.

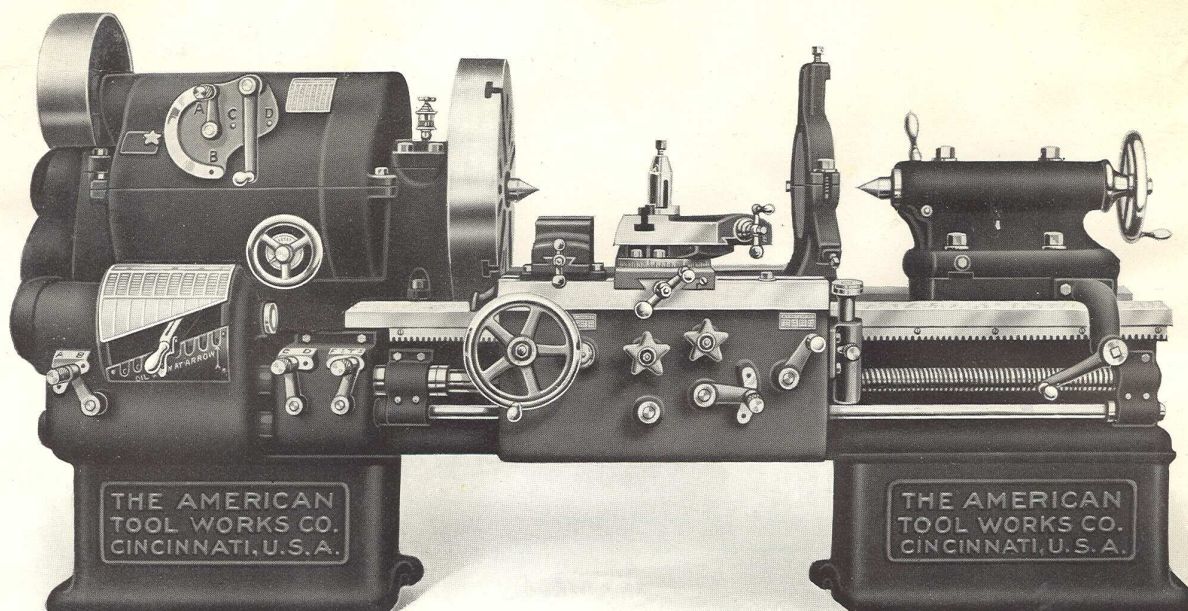
QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, representing many features of excellence, including all steel gears. It provides a range of changes for feeding and screw cutting, which is practically unlimited. 48 standard changes are shown on the index plate, listing threads from $\frac{1}{2}$ to 28 threads per inch, including 11 $\frac{1}{2}$ pipe threads, and feeds from 5 to 280 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads: $\frac{1}{2}$, $\frac{3}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, 1 $\frac{1}{8}$, 1 $\frac{1}{4}$, 1 $\frac{3}{8}$, 1 $\frac{1}{2}$, 1 $\frac{5}{8}$, 1 $\frac{3}{4}$, 2, 2 $\frac{1}{4}$, 2 $\frac{1}{2}$, 2 $\frac{3}{4}$, 3, 3 $\frac{1}{4}$, 3 $\frac{1}{2}$, 4, 4 $\frac{1}{2}$, 5, 5 $\frac{1}{2}$, 5 $\frac{3}{4}$, 6, 6 $\frac{1}{2}$, 7, 8, 9, 10, 11, 11 $\frac{1}{2}$, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28. The rate of feed is 10 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed mechanism is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharpe "20-degree involute pointed tooth type, which provides an exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place. In the quick change mechanism the lead screw and feed rod operate independently, the lead screw being used only for thread cutting and the feed rod for all other feeding purposes.

SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears, any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements. This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions with long, continuous bearings on ways and is moved along bed by crank and gear. It is of the quadruple clamping

stud type with back bolts running to top of barrel for convenience in clamping, and is further secured against movement by a pawl dropped into rack cast in center of bed, which is exceptionally valuable when doing heavy work. Pawl can be lifted out of engagement by pull-rod on end of tailstock. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a hand wheel. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity. Rack pinion can be withdrawn so that tailstock can be removed without running it off end of bed.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girders at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern, which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center, which carries a rack for engaging pawl dropped from tailstock. V's are large and accurately scraped. Wall at tail-stock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw bearings are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.



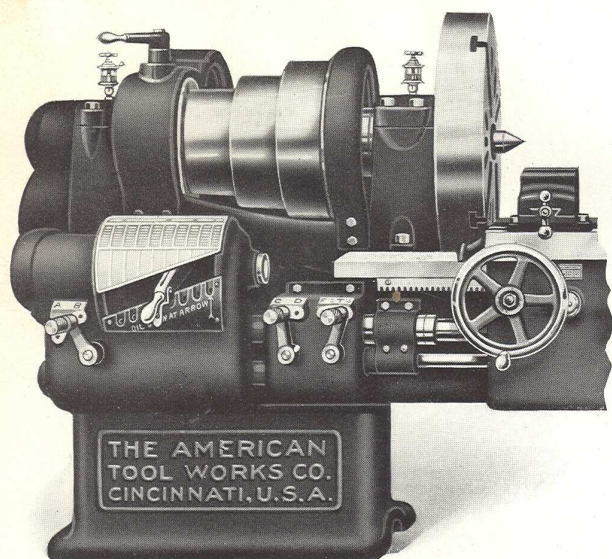
"Patented" 8-Speed Head, Belt Drive

Figure Number 32-G.

Code Word:—LARCHTHER

BELT DRIVEN "PATENTED" GEARED HEADSTOCK is furnished for those who require a wide range of spindle speeds and great power. The head is of the Compound Back Geared type, and is identical with that used for Motor Drive. 8 spindle speeds are obtained from 7.3 to 270 R. P. M., by operating the hand wheel and levers on front of the head. An index plate conspicuously located on the head indicates plainly how to obtain the different speeds. Some idea of the power this head will transmit can be gained from the fact that the maximum gear ratio afforded is at the unusually high rate of 41 to 1. The head is massively proportioned and possesses sufficient rigidity to resist all strains to which it may be subjected. The extreme simplicity of this head is an important feature. Only 12 gears are used to produce the 8 spindle speeds. The gears are cut from the solid with special cutters, are of wide face and unusually coarse pitch and are tested for accuracy on a special gear testing machine. The teeth of the slip gears are "machine rounded" to facilitate meshing. The driving pulley is of large diameter and affords a large area of

belt contact. It runs on a massive bronze bushed steel sleeve, thus relieving the driving shaft of all belt strains. The Pulley has an improved automatic oiling system which insures proper lubrication at all times. 2 sensitive but powerful friction clutches are provided on the initial drive shaft which are controlled by a convenient drop lever, by means of which the gears in the head can be stopped or slightly moved without interfering with the driving belt, thus permitting speed changes to be easily made. All shafts in the head are of crucible steel and are accurately ground. The headstock bearings are of the best quality of phosphor bronze with excellent lubricating facilities, including sight feed oilers for spindle bearings. This headstock can be quickly and easily converted into motor drive at any time after installation, by simply removing pulley drive unit and placing a motor on top of headstock, (a flat surface being regularly planed off on each head before leaving our plant) and connecting motor to driving shaft of head through spur gearing.



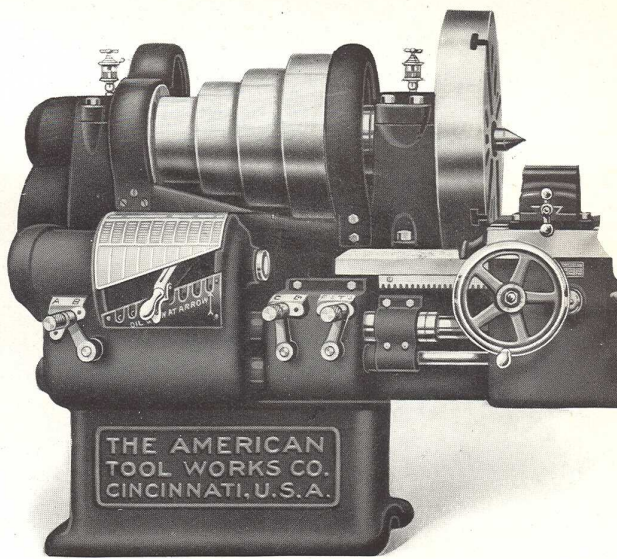
3-Step Cone, Double Back Geared Head

Figure Number 32-C. Code Word:—LARCHALARM

THE DOUBLE BACK GEARED HEADSTOCK provides 9 Spindle Speeds, 3 direct, 3 reduced and 3 double reduced speeds. These speeds cover a nicely graded range, suitable for a wide range of work. The step diameters are exceptionally large, being 10 3/4 in.—13 3/4 in.—16 in. for a 4 1/2 in. belt, thus providing ample area for belt contact. All shafts are of high grade steel and accurately ground. Bearings are bushed with a high quality of phosphor bronze and are thoroughly lubricated. The spindle bearings are provided with sight-feed oilers.

APRON is tongued, grooved and firmly bolted to carriage, extending its entire length. It is double, giving all shafts a double bearing. Both longitudinal and cross feeds are reversed thru lever from front of the apron, and not at headstock as on most lathes. This feature is of especial value on long beds, where operator is far removed from head. Cross-feed is obtained thru a friction and can be instantly released under heaviest load. Half-nuts are controlled by lever from front of apron. All the gears and pinions in apron are steel, of wide face, coarse pitch, and cut from the solid with special cutters. Convenient means for thorough lubrication are provided from the front. Rack pinion can be withdrawn from feed rack when screw cutting. A non-interfering device is provided, making it impossible to simultaneously engage feeding and screw-cutting mechanism. Thread Dial is regularly furnished and is arranged to be instantly disconnected from lead screw when not in use.

COMPOUND REST is of very heavy construction. Top and bottom slides are fitted with full length taper gibs having end screw adjustment, thus providing continuous, accurate bearings. Swivel is a complete circle with 4 clamping bolts in the base, and is graduated for any angle up to 90 degrees each side of zero. Its bearing is very solid on account of the extra wide carriage bridge top. Slide screw has micrometer adjustment.



4-Step Cone, Single Back Geared Head

Figure Number 32. Code Word:—LARCH

THE SINGLE BACK GEARED HEADSTOCK provides 8 spindle speeds and is designed for a medium class of work. The cone steps are of large diameters and of wide face, thus insuring ample belt area. 4 direct spindle speeds are afforded and 4 reduced speeds. As in the other types of heads, all shafts are of high grade steel, accurately ground and run in high quality phosphor bronze bearings having efficient oiling facilities. Sight-feed oilers are furnished on the spindle bearings.

SPECIAL LUBRICATION. This has been made a feature on the machine and every bearing has been carefully provided for, including "sight-feed" oilers, for spindle bearings, thus insuring long life and freedom of motion to all parts.

DOUBLE FRICTION COUNTERSHAFT is regularly supplied, except with Motor Drive, which furnishes one forward and one reverse speed. When conditions do not require a reverse speed this can be used as an additional forward speed.

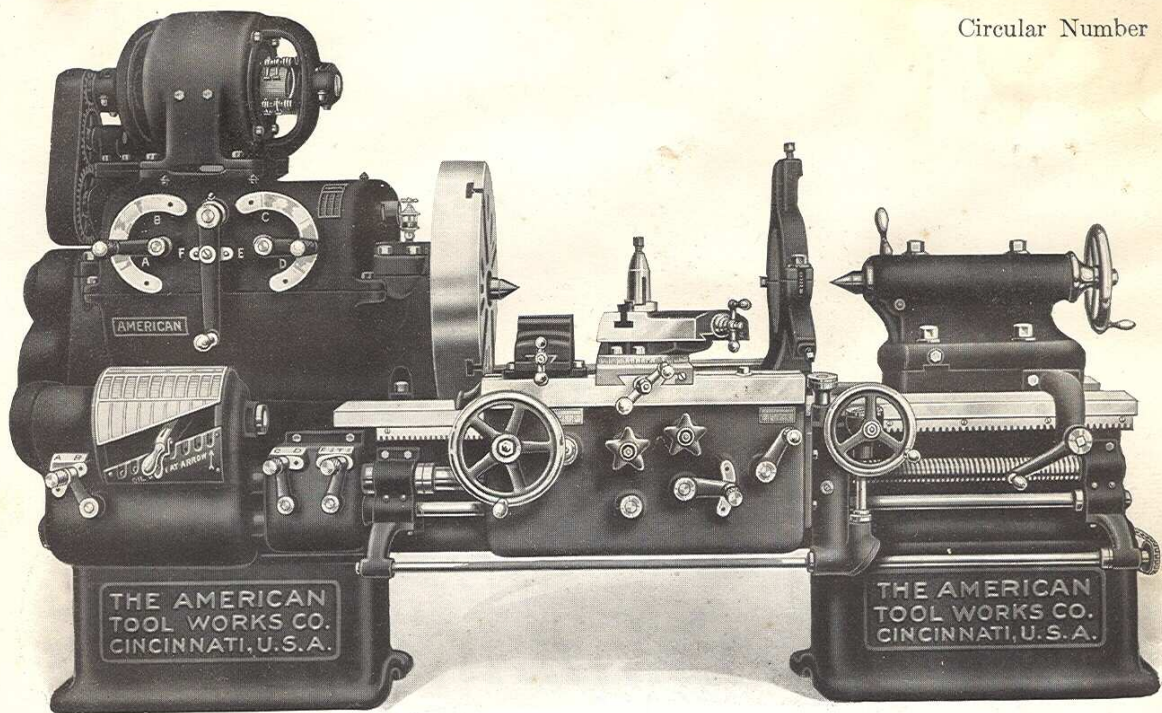
REGULAR EQUIPMENT, upon which base price is determined, includes compound, steady, follow and full swing rests, thread dial, countershaft for belt drives, and wrenches; also instruction book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this Lathe with improved taper attachment turret on carriage, turret on shears, turret tool post, "patented" geared headstock, for belt or motor drive, double back geared headstock, extra gears and index plates for special fine, coarse or metric threads.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.



Motor Drive thru "Patented" 8-Speed Geared Head.

Figure Number:—34M.

Code Word:—LARKTIDE.

27-inch "American" High Duty Lathe

With 8-Speed "Patented" Geared Head for Belt or Motor Drive, 9-Speed, Double Back Geared Head and 8-Speed Single Back Geared Head, Cone Pulley Drive.

Built in Any length of Bed, from 10 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....10 ft.
10-ft. Bed takes bet. Centers, tailstock flush, Geared Head...5 ft. 0 in.
10-ft. Bed takes bet. Centers, tailstock flush, Cone Head...5 ft. 0 in.
Dia. Hole through Spindle, to clear bar.....2 1-16 in.
Size of Tool ordinarily used..... $\frac{3}{4}$ in. x $1\frac{1}{2}$ in.
Taper of Centers, Morse.....No. 5.
Feed to Compound Rest top slide.....8 in.

Swings over Wings of Carriage.....28 $\frac{1}{2}$ in.
Swings over Carriage Bridge.....20 $\frac{1}{2}$ in.
Width of Driving Belt—Geared Head.....6 in.
Dia. of Driving Pulley—".....16 in.
Speed of Driving Pulley, r. p. m. ".....300.
Width of Driving Belt—Cone Head.....4 $\frac{1}{2}$ in.
Dia. of Cone Steps.....9—11 $\frac{1}{2}$ —14—16 $\frac{1}{2}$ in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements of power, rigidity, durability, accuracy of alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves special mention, as an abundance of metal is used just where it is needed to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work. Its massive proportions admirably take care of the enormous available power.

ABUNDANCE OF POWER is available, far surpassing the high efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. Steel gears are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle. This feature is of particular value on a lathe of this size, where expensive work is being machined and every delay costs money.

MOTOR DRIVE THROUGH "PATENTED" GEARED HEAD. The method of motor application to "American" Lathes is extremely simple and efficient, only three gears being used in connecting the armature and the main driving shafts. A constant speed motor either of the direct or alternating current type, is located on top of the "patented" geared head, and connected to the main driving shaft through spur gearing. Eight (8) fundamental spindle speeds are obtainable 7.4 to 260 r. p. m., and the motor is under constant control through the controller handwheel, conveniently located on right end of carriage, where a dial indicates how the controller is set. This drive is absolutely free from vibration.

THE FUNDAMENTAL SPEED CHANGES are made through the manipulation of the levers on front of headstock. Motor speed can be comparatively high, 1000 to 1200 R. P. M., thereby keeping down the size and first cost of same. Head is under constant control thru 2 sensitive but powerful friction clutches located on the high speed shaft, by means of which the lathe can be started and stopped without stopping the motor.

SIZE OF MOTOR depends upon the nature of the work to be handled. We prefer to have you specify size of motor desired, after having made a thorough investigation of the usages to which the lathe is to be put, so that a motor of the proper "horse-power" will be supplied. The services of our engineering department are at your disposal to properly determine the range of speeds and size of motor particularly suited to your requirements. If the lathe must stand up to continuous hard work, a large motor must be used, whereas if it is intended only for a general line of work, a motor of normal power will be amply sufficient. Power of motor should be from $7\frac{1}{2}$ to 15 H. P.

CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed and is widened to such an extent, as good practice, and judgment require. Has continuous bearing of 37 in. on the "Vs." Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 2 in. diameter, and chased 2 threads per inch, permitting engagement of half nuts at any point without the use of the thread dial except when fractional threads are desired. It is made from high carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

SPINDLE is of high carbon, hammered steel, accurately ground and has hole to clear 2 1-16 in. bar, its entire length. Bearings are of the best quality phosphor bronze, and equipped with "sight-feed" oilers.

QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, and representing many features of excellence, including all steel gears. It provides a range of changes for feeding and screw cutting which is practically unlimited. 48 standard changes are shown on the index plate, listing threads from $\frac{1}{8}$ to 28 threads per inch, including 11 $\frac{1}{2}$ pipe threads, and feeds from 5 to 280 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, 1, 1 $\frac{1}{8}$, 1 $\frac{1}{4}$, 1 $\frac{3}{8}$, 1 $\frac{7}{8}$, 1 $\frac{1}{2}$, 1 $\frac{3}{4}$, 1 $\frac{1}{2}$, 2, 2 $\frac{1}{4}$, 2 $\frac{3}{4}$, 3, 3 $\frac{1}{4}$, 3 $\frac{1}{2}$, 4, 4 $\frac{1}{2}$, 5, 5 $\frac{1}{2}$, 5 $\frac{3}{4}$, 6, 6 $\frac{1}{2}$, 7, 8, 9, 10, 11, 11 $\frac{1}{2}$, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28. The rate of feed is 10 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed mechanism is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharpe 20-degree involute pointed tooth type, which provides an exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place. In the quick change mechanism the lead screw and feed rod operate independently, the lead screw being used only for thread cutting and the feed rod for all other feeding purposes.

SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears, any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements. This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions, with long, continuous bearings on ways and is moved along bed by crank and gear. It is of the quadruple clamping

stud type with back bolts running to top of barrel for convenience in clamping, and is further secured against movement by a pawl dropped into rack cast in center of bed, which is exceptionally valuable when doing heavy work. Pawl can be lifted out of engagement by pull-rod on end of tailstock. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a hand wheel. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity. Rack pinion can be withdrawn so that tailstock can be removed without running it off end of bed.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girders at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center which carries a rack for engaging pawl dropped from tailstock. V's are large and accurately scraped. Wall at tailstock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw bearings are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.

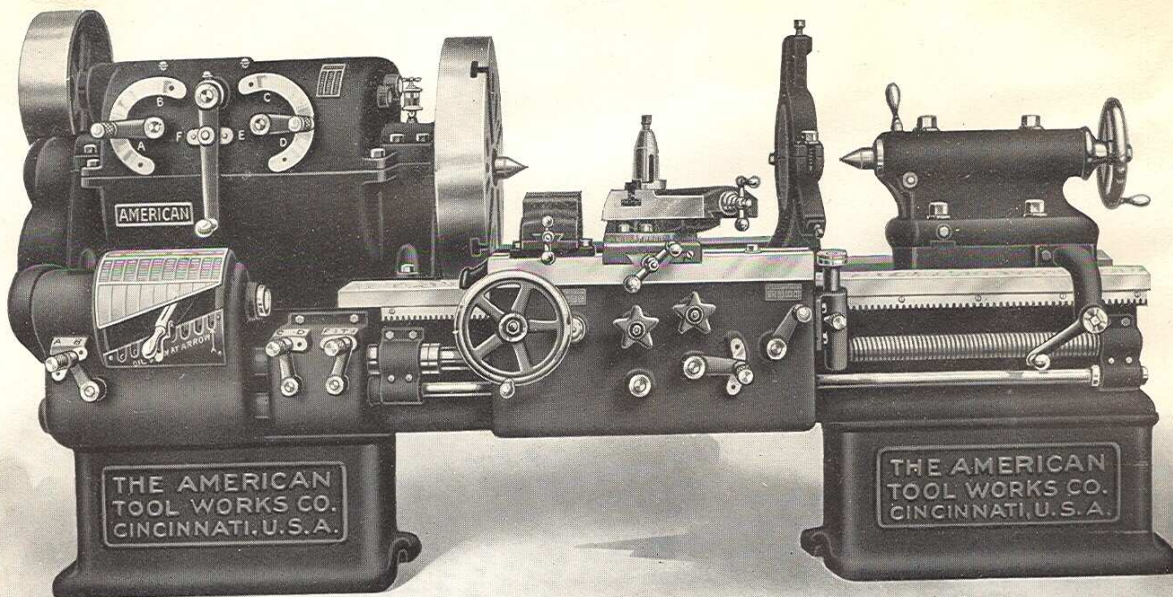


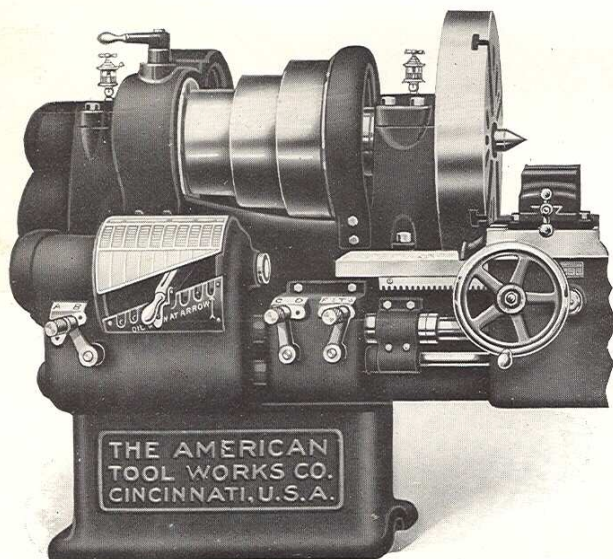
Figure Number 34-G.

"Patented" 8-Speed Geared Head, Belt Drive.

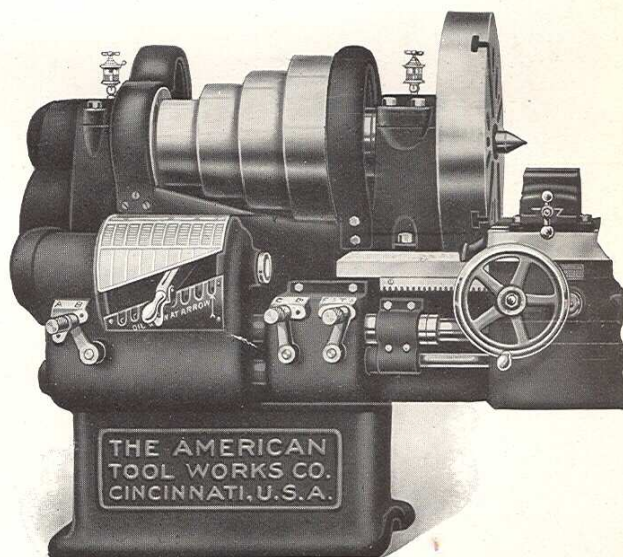
Code Word:—LARKTICK.

BELT DRIVEN "PATENTED" GEARED HEADSTOCK is furnished for those who require a wide range of spindle speeds and great power. The head is of the Compound Back Geared type, and is identical with that used for Motor Drive. **8 spindle speeds** are obtained from **7.4 to 260 R. P. M.**, by operating the levers on front of the head. An index plate conspicuously located on the head indicates plainly how to obtain the different speeds. Some idea of the power this head will transmit can be gained from the fact that the **maximum gear ratio** afforded is at the unusually high rate of **41 to 1**. The head is massively proportioned and possesses sufficient rigidity to resist all strains to which it may be subjected. The extreme simplicity of this head is an important feature. Only **11 gears** are used to produce **8 spindle speeds**. The gears are cut from the solid with **special cutters** are of wide face and unusually coarse pitch and are tested for accuracy on a special gear testing machine. The teeth of the slip gears are "machine rounded" to facilitate meshing. The driving pulley is of large diameter and affords a large area of belt contact. It runs

on a massive bronze bushed steel sleeve, thus relieving the driving shaft of all belt strains. The pulley has an improved **automatic oiling system** which insures proper lubrication at all times. **2 sensitive but powerful friction clutches** are provided on the initial drive shaft which are controlled by a convenient drop lever by means of which the gears in the head can be stopped or slightly moved without interfering with the driving belt, thus permitting speed changes to be easily made. All shafts in the head are of crucible steel and are accurately ground. The headstock bearings are of the best quality **phosphor bronze** with excellent lubricating facilities, including **sight-feed oilers** for spindle bearings. This headstock can be quickly and easily converted into motor drive at any time after installation, by simply removing pulley drive unit and placing a motor on top of headstock, (a flat surface being regularly planed off on each head before leaving our plant) and connecting motor to driving shaft of head through spur gearing.



3-Step Cone, Double Back Geared Head.
Figure Number 34-C. Code Word:—LARKALARM



4-Step Cone, Single Back Geared Head.
Figure Number 34. Code Word:—LARK

THE DOUBLE BACK GEARED HEADSTOCK provides 9 Spindle Speeds, 3 direct, 3 reduced and 3 double reduced speeds. These speeds cover a nicely graded range, suitable for a wide range of work. The step diameters are exceptionally large, being 10 3/4 in.—13 3/8 in.—16 in. for a 4 1/2 in. belt, thus providing ample area for belt contact. All shafts are of high grade steel and accurately ground. Bearings are bushed with a high quality of **phosphor bronze** and are thoroughly lubricated. The spindle bearings are provided with **sight-feed oilers**.

THE SINGLE BACK GEARED HEADSTOCK provides 8 spindle speeds and is designed for a medium class of work. The cone steps are of large diameters and of wide face, thus insuring ample belt area. 4 direct spindle speeds are afforded and 4 reduced speeds. As in the other types of heads, all shafts are of high grade steel, accurately ground and run in high quality **phosphor bronze** bearings having efficient oiling facilities. **Sight-feed oilers** are furnished on the spindle bearings.

APRON is tongued, grooved and firmly bolted to carriage, extending its entire length. It is double, giving all shafts a double bearing. Both longitudinal and cross feeds are reversed thru lever from front of the apron. This feature is of especial value on long beds, where operator is far removed from head. Cross-feed is obtained thru a friction and can be instantly released under heaviest load. Half-nuts are controlled by lever from front of apron. All the gears and pinions in apron are steel of wide face, coarse pitch, and cut from the solid with special cutters. Convenient means for thorough lubrication are provided from the front. Rack pinion can be withdrawn from feed rack when screw cutting. A non-interfering device is provided, making it impossible to simultaneously engage feeding and screw cutting mechanism. **Thread Dial** is regularly furnished and is arranged to be instantly disconnected from lead screw when not in use.

COMPOUND REST is of very heavy construction. Top and bottom slides are fitted with full length taper gibs having end screw adjustment, thus providing continuous and accurate bearings. Swivel is a complete circle with 4 clamping bolts in the base, and is graduated for any angle up to 90 degrees each side of zero. Its bearing is very solid on account of the extra wide carriage bridge top. Slide screw has micrometer adjustment.

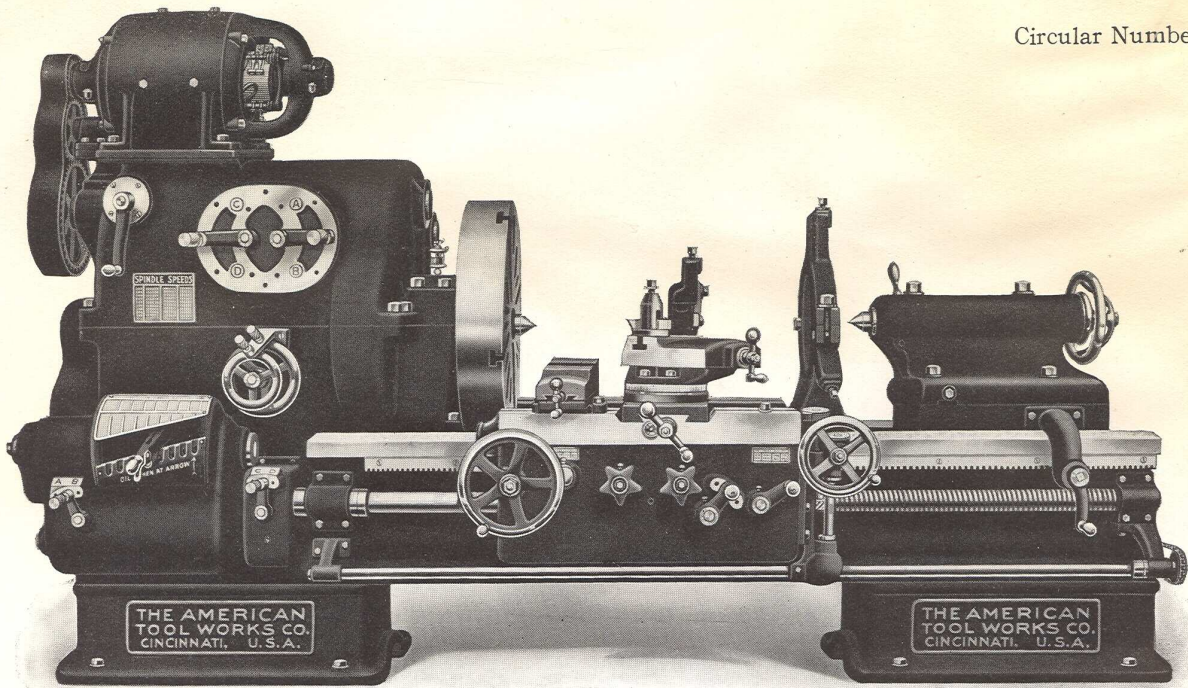
SPECIAL LUBRICATION. This has been made a feature on the machine and every bearing has been carefully provided for, including "sight-feed" oilers for spindle bearings, thus insuring long life and freedom of motion to all parts.

DOUBLE FRICTION COUNTERSHAFT is regularly supplied, except with Motor Drive, which furnishes one forward and one reverse speed. When conditions do not require a reverse speed this can be used as an additional forward speed.

REGULAR EQUIPMENT upon which base price is determined, includes large and small face plates, compound, steady, follow and full swing rests, thread dial, countershaft for belt drives, and wrenches; also instruction book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this Lathe with improved taper attachment, turret on carriage, turret on shears, turret tool post, "patented" geared headstock, for belt or motor drive, double back geared headstock, extra gears and index plates for special fine, coarse or metric threads.

THE AMERICAN TOOL WORKS CO.
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.
MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.



Motor Drive thru "Patented" 12-Speed Head.

Figure Number:—46-M.

Code Word:—LINENTORY.

36-inch "American" High Duty Lathe

(MEDIUM PATTERN)

With 12-Speed "Patented" Geared Head for Belt or Motor Drive, 12-Speed, Triple Geared Head, Cone Pulley Drive, 9-Speed, Double Back Geared Head and 8-Speed Single Back Geared, Cone Pulley Drive.
Built in Any Length of Bed, from 10 ft. up, advancing by 2 ft. Lengths.

Standard Length of Bed.....10 ft.
10-ft. Bed takes bet. Centers, tailstock flush, Geared Head 4 ft. 3 in.
10-ft. Bed takes bet. Centers, tailstock flush, Cone Head 3 ft. 9 in.
Dia. Hole through Spindle.....2 1/8 in.
Size of Tool ordinarily used.....1 in. x 2 in.
Taper of Centers, Morse.....No. 5.
Feed to Compound Rest top slide.....9 1/2 in.

Swings over Wings of Carriage.....36 1/2 in.
Swings over Carriage Bridge.....28 1/4 in.
Width of Driving Belt——Geared Head.....6 in.
Dia. of Driving Pulley.....18 in.
Speed of Driving Pulley, r. p. m. ".....340.
Width of Driving Belt——Cone Head.....5 1/4 in.
Dia. of Cone Steps.....10 1/8—13 5/8—16 1/8—20 1/4 in.

THIS NEW MODEL "AMERICAN" LATHE represents an important advance in design and the highest degree of development found in this class of tool, which we unhesitatingly recommend as being capable of fulfilling the **most exacting requirements** of power, rigidity, durability, accuracy in alignments and convenience in operation. The severe duty required of a lathe of this size has been given careful study and every vital point is fully developed. Our years of experience in designing and building machine tools have resulted in the development of this new lathe which we particularly recommend for High Speed, Heavy Duty Shop Service.

MASSIVE DESIGN of this machine deserves particular mention, as an abundance of metal is used just where it is needed to insure the utmost rigidity, thereby overcoming practically all chatter and vibration, which results in true, smooth work. Its massive proportions admirably take care of the enormous available power.

ABUNDANCE OF POWER is available, far surpassing the high efficiency of the most improved high speed steels. A minimum of power is wasted throughout the drive of the machine because of the reduction in the number of running parts, together with the most direct form of drive to the main spindle and through the feed works. This, coupled with excellent lubrication, insures the highest percentage of power delivered to the tool. Steel gears are liberally distributed throughout the machine where our experience has found them necessary, are of the coarsest pitch practicable and cut from the solid with special cutters, no range cutters being used.

EASE OF OPERATION. All levers, hand wheels and controlling mechanisms are placed conveniently for the operator, making the machine a desirable tool to handle. This feature is of particular value on a lathe of this size, where expensive work is being machined and every delay costs money.

MOTOR DRIVE THROUGH "PATENTED" GEARED HEAD. The method of motor application to "American" Lathes is extremely simple and efficient, only three gears being used in connecting the armature and the main driving shafts. A constant speed motor, either of the direct or alternating current type, is located on top of the "patented" geared head, and connected to the main driving shaft through spur gearing. Twelve (12) fundamental spindle speeds are obtainable 6 to 275 r. p. m., and the motor is under constant control through the controller handwheel, conveniently located on right end of carriage, where a dial indicates how the controller is set. This drive is absolutely free from vibration.

THE FUNDAMENTAL SPEED CHANGES are made through the manipulation of the levers and handwheel on front of headstock. Motor speed can be comparatively high, 1000 to 1200 R. P. M., thereby keeping down the size and first cost of same. A sensitive, but powerful, friction clutch is provided on the driving gear for starting, stopping or slightly moving the gears in head, to

QUICK CHANGE GEAR MECHANISM deserves special mention, being designed on entirely original lines, representing many features of excellence, including all steel gears. It provides a range of changes for feeding and screw cutting, which is practically unlimited. 48 standard changes are shown on the index plate, listing threads from 1/4 to 28 threads per inch, including 1 1/2 pipe threads, and feeds from 5 to 280 cuts per inch. There are 32 fundamental changes provided by the quick change unit, which in combination with an auxiliary quadrant and a pair of compound gears on end of bed produce the following threads: 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 2, 2 1/4, 2 1/2, 2 3/4, 2 7/8, 3, 3 1/4, 3 1/2, 4, 4 1/2, 5, 5 1/2, 5 3/4, 6, 6 1/2, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28. The rate of feed is 10 times the number of threads at the same setting. The index plate is located on the feed box directly over the sliding tumbler and clearly shows how to obtain each thread and feed. The feed box is a complete unit, embodying what is usually carried in two sections. It consists of a gear box on front of bed with 2 levers and steel sliding tumbler, the latter working in conjunction with a cone of 8 steel gears. Cone of gears and tumbler gear are of Brown & Sharpe "20-degree involute pointed tooth type" which provides an exceptionally strong tooth and permits of instant engagement while running, without the tumbler gear riding on the top of cone gear before dropping into place.

SPECIAL THREADS AND FEEDS. It is frequently necessary to cut odd threads, either coarse or fine, and metric pitches, on the same lathe. This has been amply provided for on the above lathe. By means of the Auxiliary Quadrant, which is regularly furnished, and the use of special gears, any thread or feed can be obtained. Metric pitches are obtained thru the English Lead Screw and transposing gears. These special gears can be furnished by us at a slight additional cost, or customer can cut them to meet his requirements. This feature is of inestimable value as it provides for all emergencies of the above nature and fits the lathe for a wide range of work, from the finest threads to coarse worms.

TAILSTOCK is of massive proportions with long, continuous bearings on ways and is moved along bed by crank and gear. It is of the quadruple clamping

facilitate making speed changes without shock to the parts or interfering with the motor speed. Index plate shows clearly how to secure desired speeds.

SIZE OF MOTOR depends upon the nature of the work to be handled. We prefer to have you specify size of motor desired, after having made a thorough investigation of the usages to which the lathe is to be put, so that a motor of the proper "horse-power" will be supplied. The services of our engineering department are at your disposal to properly determine the range of speeds and size of motor particularly suited to your requirements. If the lathe must stand up to continuous hard work, a large motor must be used, whereas, if it is intended only for a general line of work, a motor of normal power will be amply sufficient. Power of motor should be from 7 1/2 to 15 H. P.

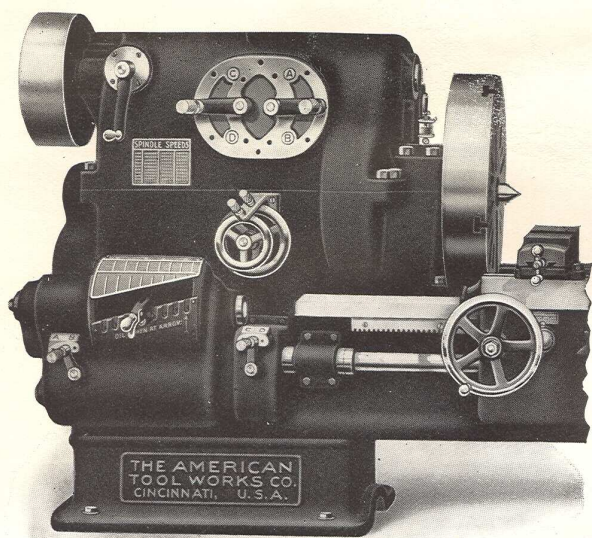
CARRIAGE is very heavy, especially in the bridge, which is particularly deep due to the drop "V" bed, and is widened to such an extent, as good practice and judgement require. Has full continuous bearing of 44 in. on the "Vs" Carriage is gibbed its full length on the back and a clamp is provided on each end at the front, the right hand clamp being used for binding to the bed.

LEAD SCREW is extra large, 2 1/4 in. diameter, and chased 1 thread per inch, permitting engagement of half nuts at any point without the use of the thread dial, except when fractional threads are desired. It is made from high-carbon, ground stock, chased from a Brown & Sharpe Master Screw and carefully tested on a special apparatus built for that purpose, thus insuring a lead screw of great accuracy and long life.

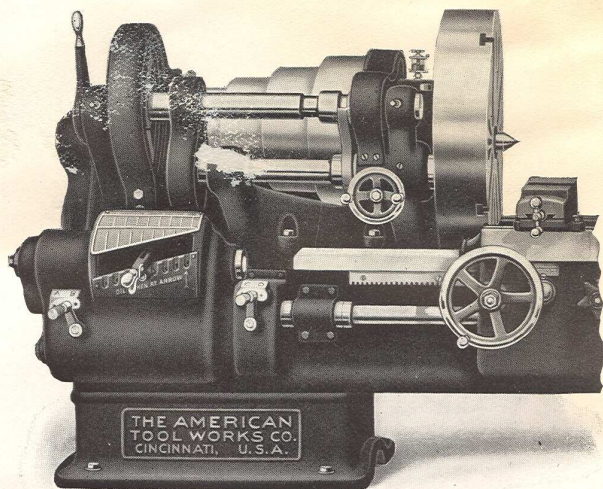
SPINDLE is of high carbon, hammered steel, accurately ground and has hole 2 9/16 in. its entire length. Bearings are of the best quality phosphor bronze, (not of babbit metal) and equipped with "sight-feed" oilers. Is of taper construction and extra large diameter, which design insures the highest degree of rigidity and power.

stud type with back bolts running to top of barrel for convenience in clamping, and is further secured against movement by a pawl dropped into rack cast in center of bed, which is exceptionally valuable when doing heavy work. Pawl can be lifted out of engagement by pull-rod on end of tailstock. Tailstock barrel is solid, of large diameter and equipped with an improved form of plug-binder for clamping the spindle. Tailstock is provided with set-over feature for turning tapers and is of the off-set type, which allows the compound rest to be set in a plane parallel to the bed. Spindle has exceptionally long travel, is graduated in inches, and actuated by a dished hand wheel, which brings rim closer to the operator, also being free from the lost motion and backlash of the gear-operated type. When spindle is extended, it is given an extra support by a projecting nose on tailstock, which is further reinforced by a wide rib, extending from the tip to the base, insuring exceptional rigidity. Rack pinion can be withdrawn so that tailstock can be removed without running it off end of bed.

BED is of deep section, exceptionally heavy and thoroughly braced by cross box girths at short intervals its entire length, affording a degree of rigidity sufficient to resist the heaviest cuts without vibration. Is our "patented" drop "V" pattern, which gives great additional swing and permits of adding considerable metal to depth of carriage bridge. This insures much greater stiffness to resist the downward thrust of the tool than the equivalent widening of the bridge, as on other lathes. Bed is further strengthened by a web cast through the center, which carries a rack for engaging pawl dropped from tailstock. V's are large and accurately scraped. Wall at tail-stock end is cut out to permit of slipping tailstock off without taking out the bolts. Gear box and lead screw bearings are tongued and grooved to bed, thereby insuring accurate and permanent alignment. Steel feed rack is of best quality, with teeth cut from a solid bar.



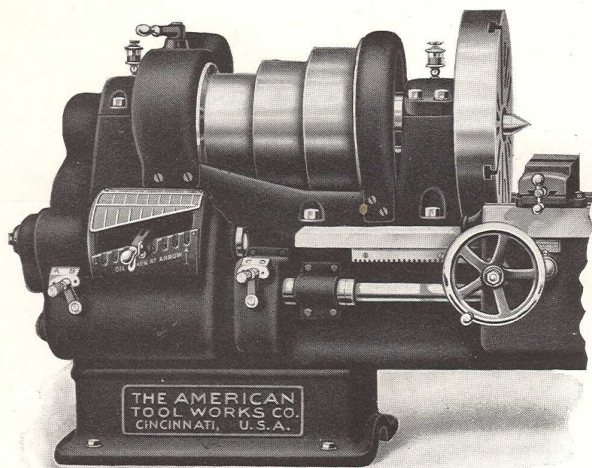
"Patented" 12-Speed Head, Belt Drive
Figure Number 46:—G. Code Word:—LINENTHER



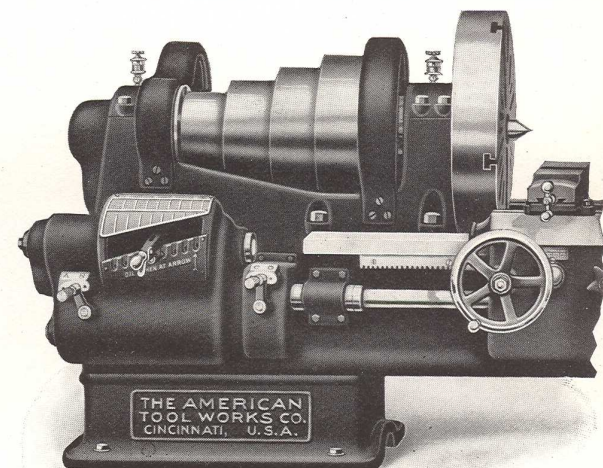
4-Step Cone, Triple Geared Head
Figure Number:—47. Code Word:—LINENAWNING

BELT DRIVEN "PATENTED" GEARED HEADSTOCK is furnished for those who require a wide range of spindle speeds and great power. The head is of the Compound Back Geared type, and is identical with that used for Motor Drive. 12 spindle speeds are obtained from 6 to 275 R. P. M., by operating the hand wheel and levers on front of the head. An index plate conspicuously located on the head indicates plainly how to obtain the different speeds. Some idea of the power this head will transmit can be gained from the fact that the maximum gear ratio afforded is at the unusually high rate of 56.6 to 1. The head is massively proportioned and possesses sufficient rigidity to resist all strains to which it may be subjected. The extreme simplicity of this head is an important feature. Only 14 gears are used to produce the 12 spindle speeds. The gears are cut from the solid with special cutters, are of wide face and unusually coarse pitch and are tested for accuracy on a special gear testing machine. The teeth of the slip gears are "machine rounded" to facilitate meshing. The driving pulley is of large diameter and affords a large area of belt contact. It runs on a massive bronze bushed steel sleeve, thus relieving the driving shaft of all belt strains. The Pulley has an improved automatic oiling system which insures proper lubrication at all times. A sensitive but powerful friction clutch is provided in the driving pulley which is controlled by a convenient drop lever, by means of which the gears in the head can be stopped or slightly moved without interfering with the driving belt, thus permitting speed changes to be easily made. All shafts in the head are of

high grade steel and are accurately ground. The headstock bearings are of the best quality of phosphor bronze with excellent lubricating facilities, including sight feed oilers for spindle bearings. This headstock can be quickly and easily converted into motor drive at any time after installation, by simply removing pulley drive unit and placing a motor on top of headstock, (a flat surface being regularly planed off on each head before leaving our plant) and connecting motor to driving shaft of head through spur gearing. **THE TRIPLE GEARED HEADSTOCK** provides 12 spindle speeds and will transmit great power. The cone pulley has 4 steps, 5-5-16 face, which are of large diameter. An unusually large area of belt contact is afforded which combined with the extra high gear ratios insure ample power for any work within the range of the machine. The headstock is very rigidly constructed and will resist, without vibration, all strains which may be exerted upon it. The triple gears are of the slip gear type and are readily engaged by rack and pinion at front of head, through the manipulation of the hand wheel, which also automatically engages the direct drive to spindle when face plate pinion is withdrawn. The internal gear is planed integral with the face plate, and the pinion is cut solid with the shaft. All gears involved are of coarse pitch, wide face and are cut with special cutters. All shafts are of high grade steel accurately ground. The headstock bearings are of the best quality of phosphor bronze and means are provided for thorough lubrication. Sight feed oilers are furnished on the spindle bearings.



3-Step Cone, Double Back Geared Head
Figure Number 46-C. Code Word:—LINENALARM



4-Step Cone, Single Back Geared Head
Figure Number:—46. Code Word:—LINEN

THE DOUBLE BACK GEARED HEADSTOCK provides 9 Spindle Speeds, 3 direct, 3 reduced and 3 double reduced speeds. These speeds cover a nicely graded range suitable for a wide range of work. The step diameters are exceptionally large and the faces unusually wide, thus providing ample area for belt contact. All shafts are of high grade steel and accurately ground. Bearings are bushed with a high quality of phosphor bronze and are thoroughly lubricated. The spindle bearings are provided with sight-feed oilers.

APRON is tongued, grooved and firmly bolted to carriage, extending its entire length. It is double, giving all shafts a double bearing. Both longitudinal and cross feeds are reversed thru lever from front of the apron, and not at headstock as on most lathes. This feature is of especial value on long beds, where operator is far removed from head. Cross-feed is positive and can be instantly released under heaviest load. Half-nuts are controlled by lever from front of apron. All the gears and pinions in apron are steel, of wide face, coarse pitch, and cut from the solid with special cutters. Convenient means for thorough lubrication are provided from the front. Rack pinion can be withdrawn from feed rack when screw cutting. A non-interfering device is provided, making it impossible to simultaneously engage feeding and screw-cutting mechanism. Thread Dial is regularly furnished and is arranged to be instantly disconnected from lead screw when not in use.

COMPOUND REST is of very heavy construction. Top and bottom slides are fitted with full length taper gibs having end screw adjustment, thus providing continuous, accurate bearings. Swivel is a complete circle with 4 clamping bolts in the base, and is graduated for any angle up to 90 degrees each side of zero. Its bearings are very solid on account of the extra wide carriage bridge top. Slide screw has micrometer adjustment.

THE SINGLE BACK GEARED HEADSTOCK provides 8 spindle speeds and is designed for a medium class of work. The cone steps are of large diameters and of wide face, thus insuring ample belt area. 4 direct spindle speeds are afforded and 4 reduced speeds. As in the other types of heads, all shafts are of high grade steel, accurately ground and run in high quality phosphor bronze bearings having efficient oiling facilities. Sight-feed oilers are furnished on the spindle bearings.

SPECIAL LUBRICATION. This has been made a feature on the machine and every bearing has been carefully provided for, including "sight-feed" oilers, for spindle bearings, thus insuring long life and freedom of motion to all parts.

DOUBLE FRICTION COUNTERSHAFT is regularly supplied, except with Motor Drive, which furnishes one forward and one reverse speed. When conditions do not require a reverse speed this can be used as an additional forward speed.

REGULAR EQUIPMENT, upon which base price is determined, includes compound, steady, follow and full swing rests, thread dial, countershaft for belt drives, and wrenches; also instruction book for the installation and operation of our machine tools.

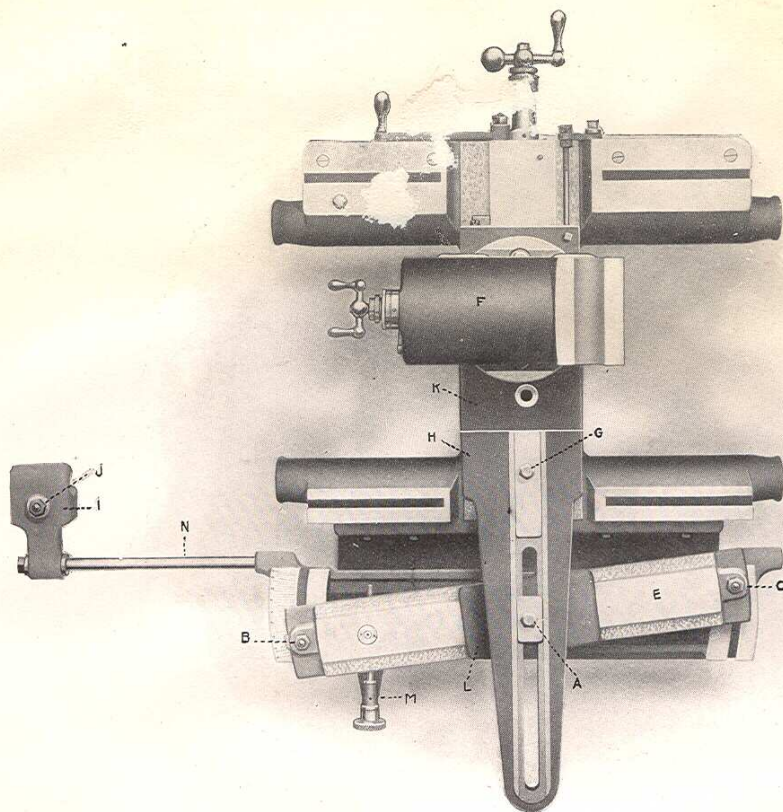
AT EXTRA COST, we can equip this Lathe with improved taper attachment turret on carriage, turret on shears, turret tool post, "patented" geared headstock for belt or motor drive, triple geared headstock, double back geared headstock, extra gears and index plates for special fine, coarse or metric threads.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

Fig. No. 100-B.
Code Word:
TEEN.



"American" Taper Attachment For Lathes 14-inch to 42-inch Inclusive.

THE "AMERICAN" TAPER ATTACHMENT, shown above, is both in design and operation extremely simple, the construction being such as to avoid the spring and inconvenience usually found in such a device. All parts are amply heavy and numerous sliding joints are avoided, thus insuring extreme rigidity and accuracy of tapers produced therefrom.

BOLTED TO AND TRAVELING WITH the carriage, it may be instantly thrown into operation at any point along the lathe bed, by simply tightening one binder nut (J) on clamping dog, or disengaged by releasing the same.

WHEN ATTACHED FOR TAPER WORK the sliding shoe is directly connected with bottom slide of tool rest by a heavy cast iron yoke, making its operation instantaneous, at the same time doing away with all lost motion, weakness and inaccuracy found in taper attachments directly connected with cross feed screw.

CROSS FEED NUT is always connected with tool rest, therefore can not fall to one side and out of position.

NUT FOR ENGAGING SLIDING SHOE is arranged to slide in slot in yoke connected with tool rest, and is attached to or released from yoke, as the case may be, by tightening or loosening a single screw.

ACCURATE GRADUATIONS are provided for quickly setting to any desired taper within its range, and in addition there is provided a convenient hand screw with graduated collar, used for extremely accurate setting.

WHEN TAPER ATTACHMENT is ordered BEFORE lathes leave our works, all work necessary to its application is finished, so lathe and attachment reach customer ready for use, without any further work being necessary on his part.

WHEN TAPER ATTACHMENT is ordered AFTER lathe leaves our works, it can be readily applied by the user, as all our lathe carriages are drilled to jigs, and properly tapped ready to receive taper attachment, with a small amount of fitting. Complete information relative to such fitting is furnished by us. There is no necessity of a planed strip on the bed, or any work except a slight amount of fitting to the carriage.

THE AMERICAN TOOL WORKS CO.
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS:
CINCINNATI, U. S. A.

Jan. 1, 1912.

2500-B.

Rests for "American" Lathes.

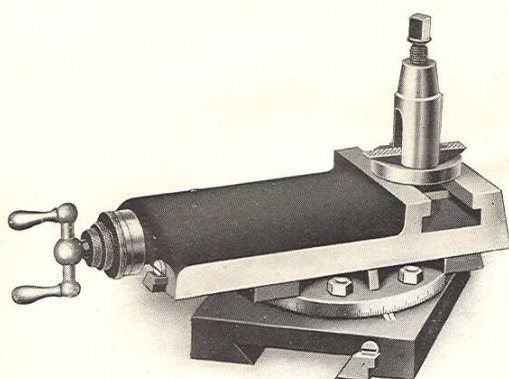


Fig. No. 500.
COMPOUND REST.

Regularly supplied on all sizes of "American" Lathes is massive in construction. Top slide can be rotated in a complete circle and swivel is graduated on the sides in degrees both sides of zero. Top and bottom slides have full length taper gibs with end screw adjustment. T-slot has ample allowance of metal around it to prevent spring from clamping. Tool post is made from bar steel and the tool post screw from hardened tool steel. Cross feed screw is supplied with micrometer collar which is graduated in thousandths. Concave collar and wedge are supplied with tool post for lathes up to 24-in. Medium Pattern inclusive, and step collar on lathes 24-in. Heavy Pattern up to 36-in. Medium Pattern, inclusive.

The top slide for 36-in. Heavy Pattern Lathes and larger is supplied with a 4-stud tool holder, similar to Fig. No. 503, and top slide is arranged for power angular feed, while swivel is clamped by four bolts. 4 stud tool holder or power angular feed can be supplied on lathes 14-in. to 36-in. Medium Pattern, inclusive, at extra cost.

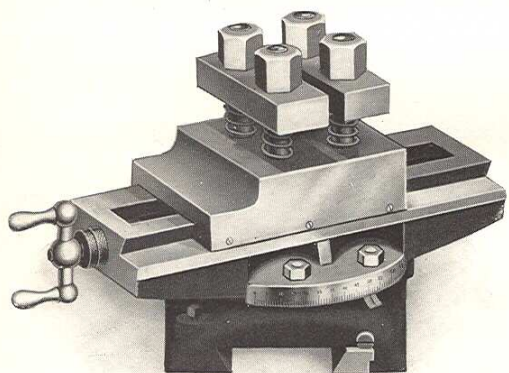


Fig. No. 503.
ENGLISH REST.

The rest is of very heavy design and has an extra long travel of the top slide, making it valuable in turning tapers, boring, etc. Upon the bottom slide is mounted the long swivel, which is graduated in degrees both sides of zero, and firmly clamped by two bolts. Cross feed screw in swivel has a journal at both ends and carries a collar graduated to .001 in. Top slide is fitted with 4-stud tool holder, as shown. Studs are so located as to allow of straps being placed in the reverse position. This rest is supplied on lathes from 14-in. to 36-in. Medium Pattern, at extra cost.

IN GENERAL.

All carriage rests for a given size lathe are interchangeable on the carriage dovetail (except No. 502, which is used only on carriage wing.) The rear ends of bottom slides are equipped with our "patented connection" for coupling to taper attachment.

Tool posts are made of hardened steel and equipped with hardened tool steel screws. Slots in tool posts are of such size as to permit the use of large cutting tools, also tool holders, such as the Armstrong, Western, etc.

Removable dirt guard is supplied on all carriage rests, to protect the screw from chips and dirt, when no taper attachment is furnished, as with same no guard is necessary.

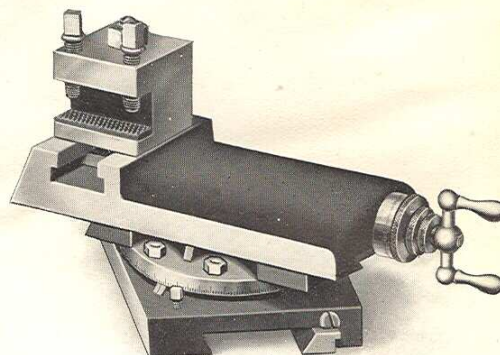


Fig. No. 501.
EUROPEAN REST.

This rest is similar to Compound Rest, shown opposite, except that the tool post and details are replaced by a forged steel Square Tool Block having double clamp screws of hardened tool steel. The cutting tool rests on a hardened steel serrated plate and is firmly clamped by the screws shown. Block may be swiveled around its center stud and firmly clamped in any position. This style of rest is furnished on lathes up to 36-in. Medium Pattern, inclusive, at extra cost.

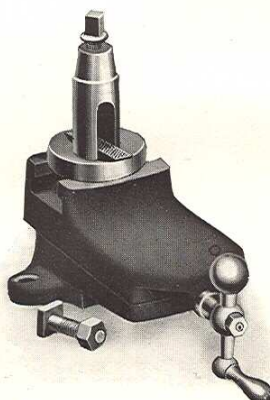


Fig. No. 502.
FULL SWING REST.

This rest is of heavy construction and is arranged for clamping to left end of front carriage wing, by two bolts.

Is used for turning large diameter work up to the full swing of the lathe. May be moved horizontally in the T-slot of the carriage wing. Top slide has transverse movement thru ball crank and screw.

This rest is furnished at extra cost on 14-in., 16-in., and 18-in. lathes, but is regularly supplied on 20-in. size and larger. 36-in. Heavy Pattern size and larger are equipped with 4-stud tool holder, instead of the tool post shown.

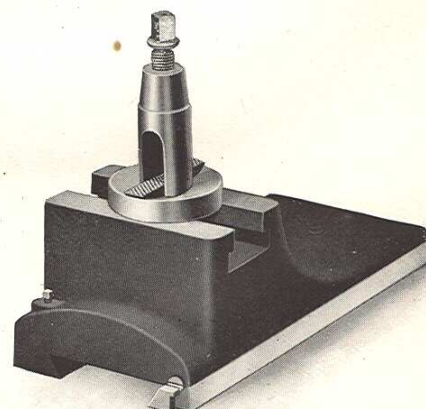


Fig. No. 504.
PLAIN BLOCK REST.

Supplied on any size of "American" Lathe in place of the Compound Rest. Is exceedingly rigid and particularly adapted to heavy roughing work and where no angular turning is necessary. Is fitted with full length taper gib, having end-screw adjustment. On lathes 14-in. to 24-in. Medium Pattern, inclusive, tool post is equipped with concave collar and wedge; but on 24-in. Heavy Pattern and larger, with step collar.

THE AMERICAN TOOL WORKS CO.

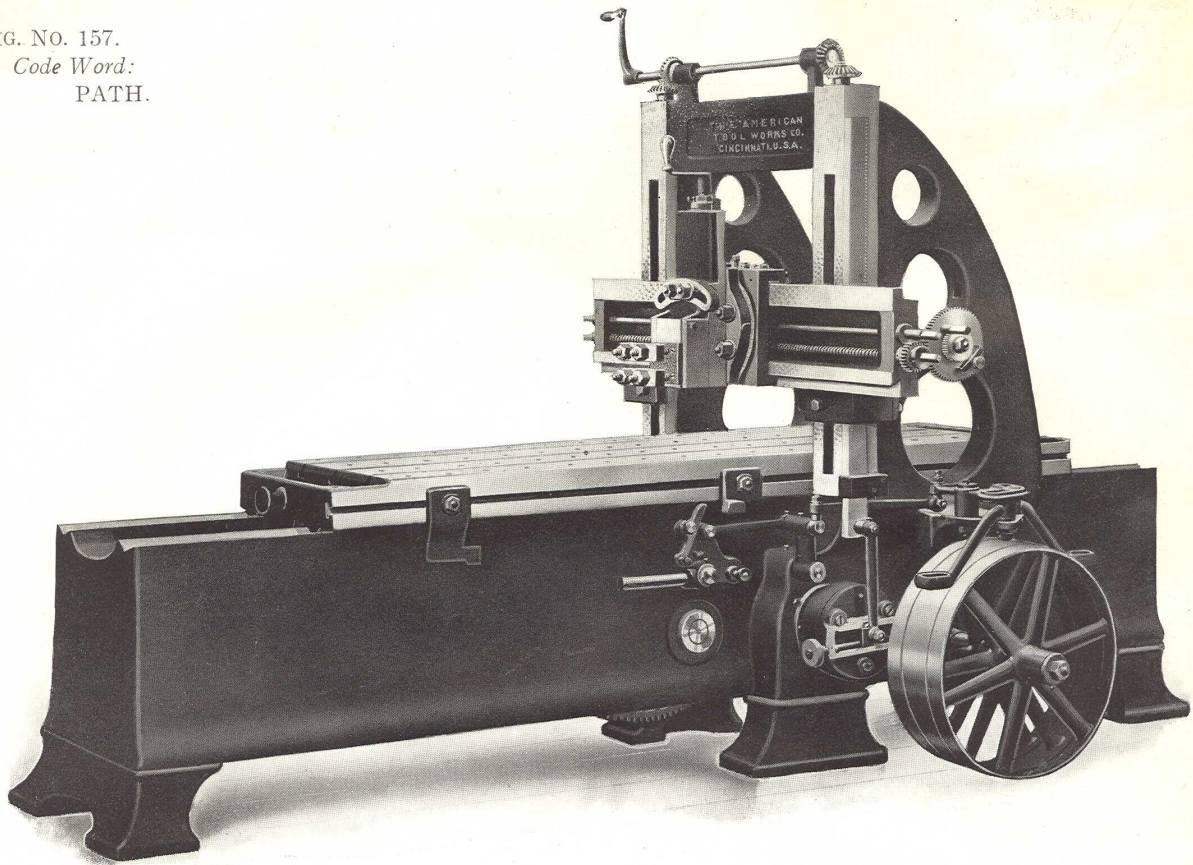
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS:
CINCINNATI, U. S. A.

Feb. 1, 1912.

2500-B.

FIG. NO. 157.
Code Word:
PATH.



24x24-inch Metal Planer (STANDARD PATTERN)

WITH ONE OR TWO HEADS ON CROSSRAIL.

Planes Wide.....	24½ in.	Planes High.....	24½ in.
Standard Length of Table	6 ft.	Length of Bed for 6 ft. Table.....	10 ft.

Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS in shop practice, and the present extensive use of special high speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands, we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern planer work, and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

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ALTHOUGH ACCURACY is the most essential requisite of planer construction there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following particular attention is called to these features as developed in "American" Planers.

PROPER FACILITIES FOR LUBRICATION are of the utmost importance in machine tool construction. A machine tool will produce satisfactory results only as long as its bearings, both cylindrical and flat, are in good condition and do not show undue wear; in other words, the average life of a machine tool is equal to that of its bearings.

THE OILING SYSTEM OF "AMERICAN" PLANERS, is so designed as to secure the most satisfactory results possible. The bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil to the various bearings are brought to a central point on the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings in which a felt strip is inserted; this felt insert serves to filter the oil, as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced to the bearing through oil holes and grooves which permits the oil to run out before it has performed its proper function.

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THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry the loose oil. The V's have frequent automatic oil rollers, and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep pattern, extra wide between the V's, thoroughly braced by box cross girds at short intervals and rigidly supported on heavy legs. Is made unusually long in proportion to table length, leaving but very little overhang of table when planing at full length.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Holes are drilled and reamed from the solid. Stop holes are provided at extreme ends of table, which allow planing of work much longer than that

specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt proof feature, which completely protects the V's from chips and dirt and has quick return, reversing without shock or jar. An improved shifting mechanism removes the belt from one pulley before the return belt engages the other, thus obviating all disagreeable shrieking of belts. Shifting mechanism is arranged so that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents accidental starting of table. Pockets are of rounded form, making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated.

THE DRIVING PINIONS are all made from Steel Forgings and all gears are cut from the solid with special cutters made for the particular number of teeth in each gear, and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of cross rail at any elevation. They are of double webbed, cored section type, exceptionally heavy, and are secured to bed by substantial means. They are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped into surface plates.

CROSSRAIL is box section with wide bearings. Is raised and lowered rapidly by hand.

HEAD is firmly secured to saddle by four bolts, instead of two, as on most planers. Is accurately scraped to the rail, and has automatic cross, vertical and angular feeds, and can be operated by hand from either side of the machine. Saddle is graduated for angular planing. Has down feed of unusual length, with micrometer adjustment, facilitating rapid and accurate work. Down slides have complete Taper Gib Adjustment. Feed rack is cut from bar steel. When an extra head is ordered, the rail is made extra long, so that left head may be run to the extreme end, allowing the other head to plane the full regular width of the machine. Feeds of each head are independent.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable, and all gears, as well as the feed rack, are cut from steel. The feed and elevating screw are made from Special High Carbon Ground Screw Stock.

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REGULAR EQUIPMENT, upon which base price is determined, includes an efficient self-oiling countershaft, with pulleys 12 inches diameter for 4-inch belt, to run 425 R. P. M. and all necessary wrenches. **INSTRUCTION BOOK** for the installation and operation of our machines is regularly furnished.

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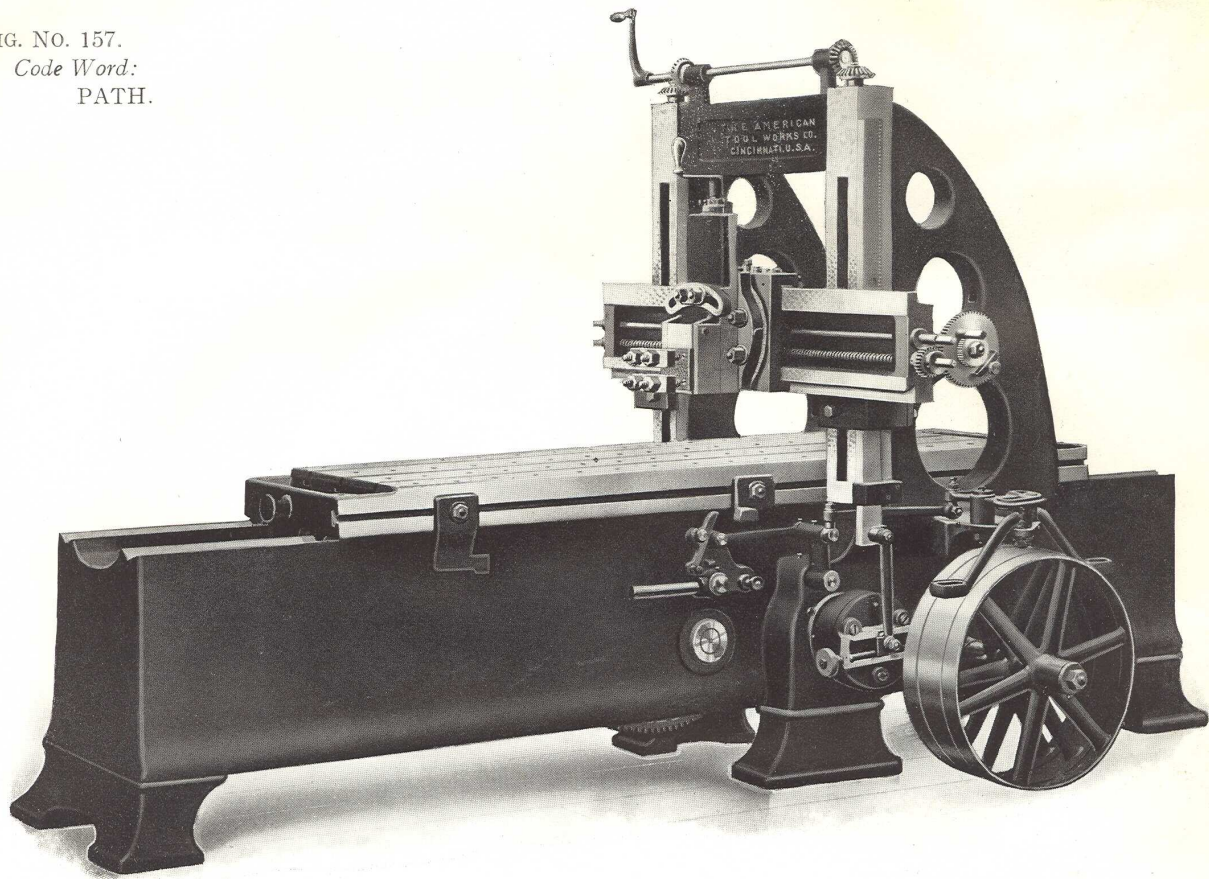
THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS:

CINCINNATI, U. S. A.

FIG. NO. 157.
Code Word:
PATH.



24 x 24 - inch Metal Planer (STANDARD PATTERN)

WITH ONE OR TWO HEADS ON CROSSRAIL.

Planes Wide.....24½ in. Planes High.....24½ in.
Standard Length of Table6 ft. Length of Bed for 6 ft. Table.....10 ft.
Advancing by Even Lengths of Table up to any Desired Length.

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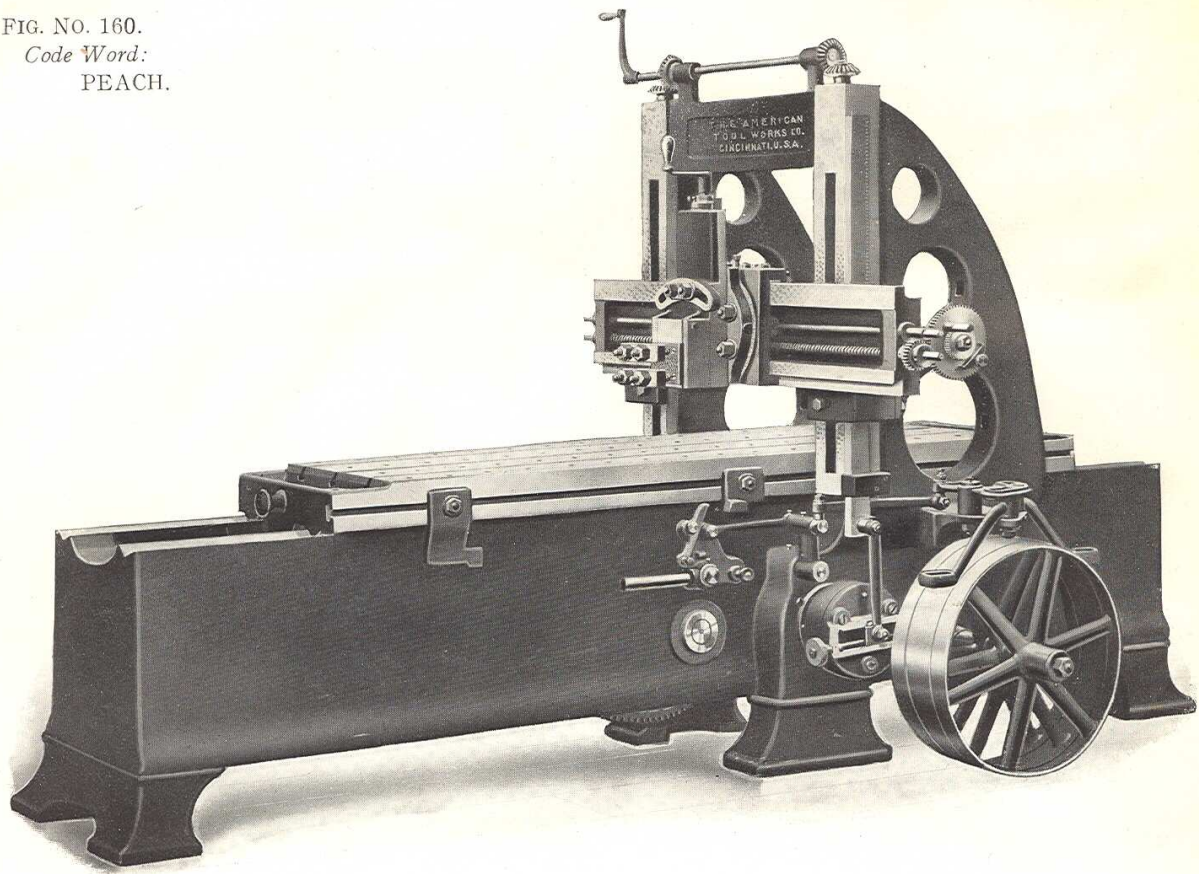
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THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS:
CINCINNATI, U. S. A.

FIG. NO. 160.
Code Word:
PEACH.



26 x 26 - inch Metal Planer (STANDARD PATTERN)

WITH ONE OR TWO HEADS ON CROSSRAIL.

Planes Wide.....	26½ in.	Planes High.....	26½ in.
Standard Length of Table.....	6 ft.	Length of Bed for 6 ft. Table.....	10 ft.

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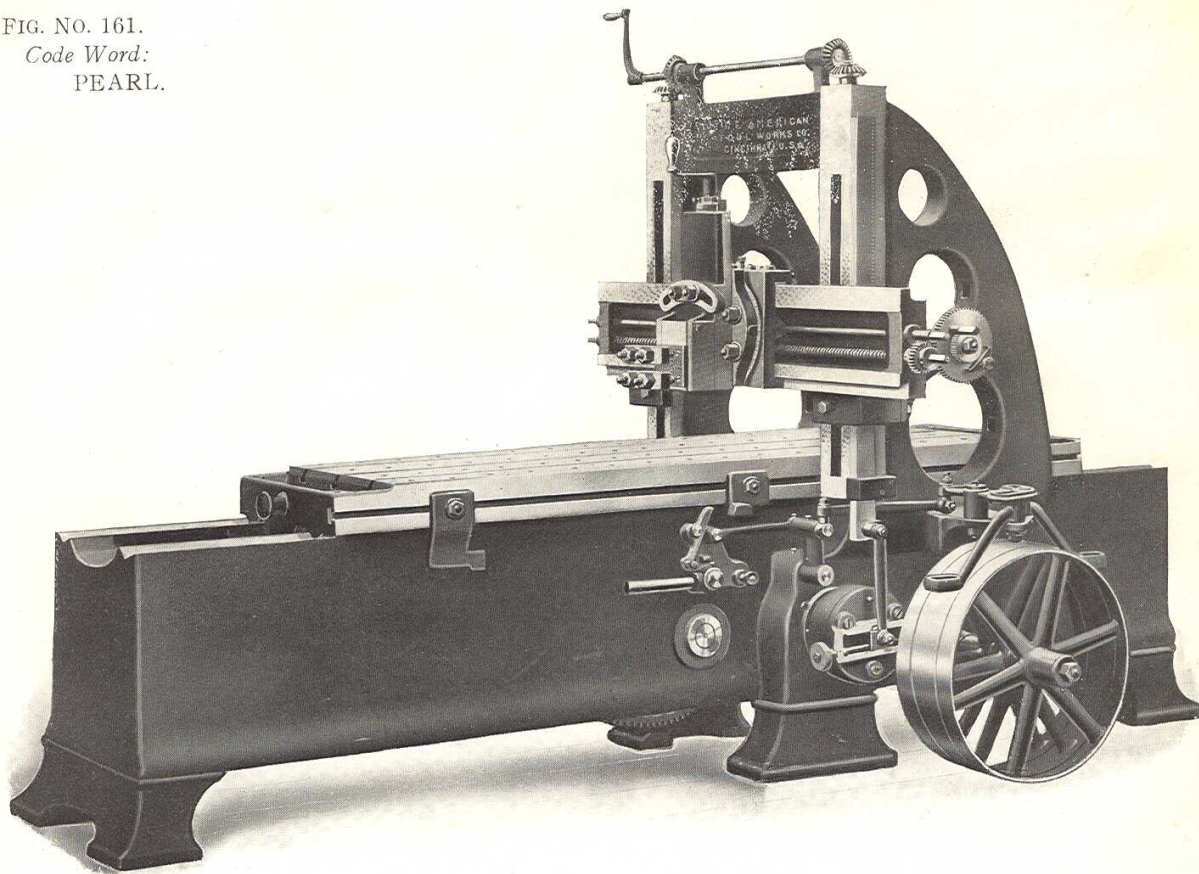
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THE AMERICAN TOOL WORKS CO. LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. NO. 161.
Code Word:
PEARL.



28 x 28 - inch Metal Planer (STANDARD PATTERN)

WITH ONE OR TWO HEADS OR CROSSRAIL.

Planes Wide.....28½ in. Planes High.....28½ in.
Standard Length of Table.....6 ft. Length of Bed for 6 ft. Table.....10 ft.
Advancing from Even Lengths of Table up to any Desired Length.

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THE OILING SYSTEM OF "AMERICAN" PLANERS is so designed as to secure the most satisfactory results possible. The bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil to the various bearings are brought to a central point on the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings in which a felt strip is inserted; this felt insert serves to filter the oil as well as to properly dis-

tribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced to the bearing through oil holes and grooves which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying **Aluminum Tight Pulleys** in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry the loose oil. The V's have frequent automatic oil rollers, and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep pattern, extra wide between the V's, thoroughly braced by box cross girds at short intervals and rigidly supported on heavy legs. Is made unusually long in proportion to table length, leaving but very little overhang of table when planing at full length.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Holes are drilled and reamed from the solid. Stop holes are provided at extreme ends of table, which allow planing of work much longer than that

specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt and has quick return, reversing without shock or jar. An improved shifting mechanism removes the belt from one pulley before the return belt engages the other, thus obviating all disagreeable shrieking of belts. Shifting mechanism is arranged so that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents accidental starting of table. Pockets are of rounded form, making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated.

THE DRIVING PINIONS are all made from Steel Forgings and all gears are cut from the solid with special cutters made for the particular number of teeth in each gear, and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of cross rail at any elevation. They are of double webbed, cored section type, exceptionally heavy, and are secured to bed by substantial means. They are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped into surface plates.

CROSSRAIL is box section with wide bearings. Is raised and lowered rapidly by hand.

HEAD is firmly secured to saddle by four bolts, instead of two, as on most planers. Is accurately scraped to the rail, and has automatic cross, vertical and angular feeds, and can be operated by hand from either side of the machine. Saddle is graduated for angular planing. Has down feed of unusual length, with micrometer adjustment, facilitating rapid and accurate work. Down slides have complete Taper Gib Adjustment. Feed rack is cut from bar steel. When an extra head is ordered, the rail is made extra long, so that left head may be run to the extreme end, allowing the other head to plane the full regular width of the machine. Feeds of each head are independent.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable, and all gears, as well as the feed rack, are cut from steel. The feed and elevating screws are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, it being of the adjustable disk friction type. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design affords a large area of frictional contact and is guaranteed by us to pull all heads at the coarsest feeds provided.

REGULAR EQUIPMENT, upon which base price is determined, includes an efficient self-oiling countershaft, with pulleys 12 inches diameter for 4-inch belt, to run 425 R. P. M. and all necessary wrenches. **INSTRUCTION BOOK** for the installation and operation of our machines is regularly furnished.

WE CAN EQUIP THIS PLANER at EXTRA COST with extra head on cross-rail, electric motor drive and parallel drive; also with **MULTI-SPEED DRIVE** giving two (2) speeds through countershaft and four (4) speeds through cone speed variator, providing suitable cutting speeds for all classes of planer work.

FOR WIDENED PLANERS see our special circular No. 165 and No. 168 which describe respectively sizes up to 36 in. x 30 in. and 72 in. x 60 in.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

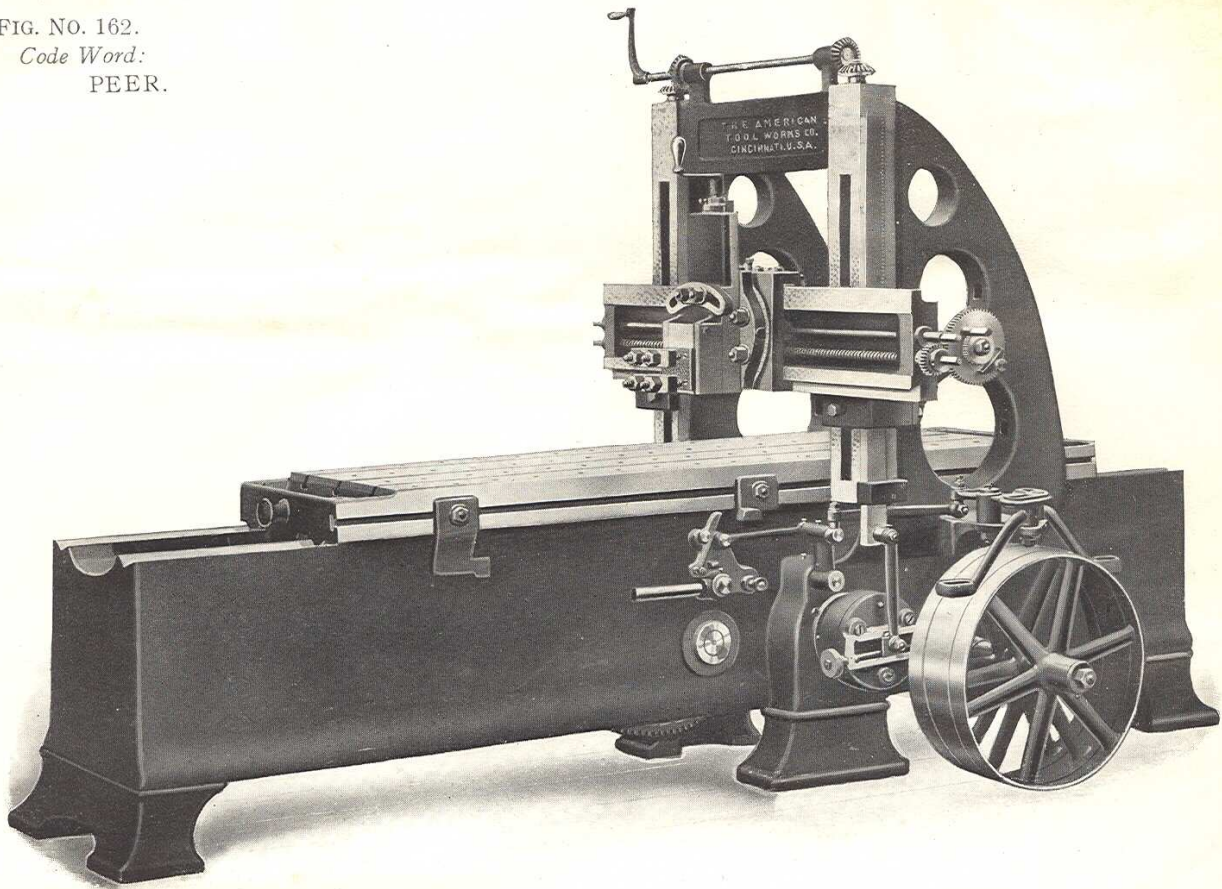
MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

FIG. NO. 162.

Code Word:

PEER.



30x30-inch Metal Planer (MEDIUM PATTERN)

WITH ONE OR TWO HEADS OR CROSSRAIL.

Planes Wide.....30½ in. Planes High.....30½ in.
Standard Length of Table.....6 ft. Length of Bed for 6 ft. Table.....10 ft.
Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS on shop practice, and the present extensive use of special high speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible, in very recent years. To meet these changed conditions and new demands, we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern planer work, and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

IN MACHINE CONSTRUCTION, planed surfaces invariably form the foundation from which all other parts are fitted and aligned. It is therefore of the utmost importance that a high degree of accuracy be maintained in the construction and alignment of a metal planer, for this type of machine tool more nearly reproduces the quality of workmanship inherent in itself than any other metal working machine, consequently if a planer lacks the necessary degree of accuracy the work planed will frequently require considerable scraping, which in itself is the most costly of shop operations. Therefore, undue scraping should be eliminated, not only for reasons of economy, but because a true planed bearing is in every respect superior to a scraped bearing.

THE WORKMANSHIP and alignment of "American" planers are of a quality and accuracy that only thoroughly modern equipment and skilled workmen can produce. As a further assurance of their quality "American" planers are fully and positively guaranteed, if set up and levelled properly to plane up to their maximum capacity perfectly square and parallel within a limit of .001 part of an inch.

ALTHOUGH ACCURACY is the most essential requisite of planer construction there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following, particular attention is called to these features as developed in "American" Planers.

PROPER FACILITIES FOR LUBRICATION are of the utmost importance in machine tool construction. A machine tool will produce satisfactory results only as long as its bearings, both cylindrical and flat, are in good condition and do not show undue wear; in other words, the average life of a machine tool is equal to that of its bearings.

THE OILING SYSTEM OF "AMERICAN" PLANERS is so designed as to secure the most satisfactory results possible. The bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil to the various bearings are brought to a central point on the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings in which a felt strip is inserted; this felt insert serves to filter the oil as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced to the bearing through oil holes and grooves which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying **Aluminum Tight Pulleys** in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry the loose oil. The V's have frequent automatic oil rollers, and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep pattern, extra wide between the V's, thoroughly braced by box cross girths at short intervals and rigidly supported on heavy legs. Is made unusually long in proportion to table length, leaving but very little overhang of table when planing at full length.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Holes are drilled and reamed from the solid. Stop holes are provided at extreme ends of table, which allow planing of work much longer than that

specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt and has quick return, reversing without shock or jar. An improved shifting mechanism removes the belt from one pulley before the return belt engages the other, thus obviating all disagreeable shrieking of belts. Shifting mechanism is arranged so that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents accidental starting of table. Pockets are of rounded form, making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated.

THE DRIVING PINIONS are all made from Steel Forgings and all gears are cut from the solid with special cutters made for the particular number of teeth in each gear, and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of cross rail at any elevation. They are of double webbed, cored section type, exceptionally heavy, and are secured to bed by substantial means. They are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped into surface plates.

CROSSRAIL is box section with wide bearings. Is raised and lowered rapidly by hand.

HEAD is firmly secured to saddle by four bolts, instead of two, as on most planers. Is accurately scraped to the rail, and has automatic cross, vertical and angular feeds, and can be operated by hand from either side of the machine. Saddle is graduated for angular planing. Has down feed of unusual length, with micrometer adjustment, facilitating rapid and accurate work. Down slides have complete Taper Gib Adjustment. Feed rack is cut from bar steel. When an extra head is ordered, the rail is made extra long, so that left head may be run to the extreme end, allowing the other head to plane the full regular width of the machine. Feeds of each head are independent.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable, and all gears, as well as the feed rack, are cut from steel. The feed and elevating screws are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, it being of the adjustable disk friction type. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design affords a large area of frictional contact and is guaranteed by us to pull all heads at the coarsest feeds provided.

REGULAR EQUIPMENT, upon which base price is determined, includes an efficient self-oiling countershaft, with pulleys 12 inches diameter for 4-inch belt, to run 425 R. P. M. and all necessary wrenches. **INSTRUCTION BOOK** for the installation and operation of our machines is regularly furnished.

WE CAN EQUIP THIS PLANER at EXTRA COST with extra head on cross-rail, electric motor drive and parallel drive; also with **MULTI-SPEED DRIVE** giving two (2) speeds through countershaft and four (4) speeds through cone speed variator, providing suitable cutting speeds for all classes of planer work.

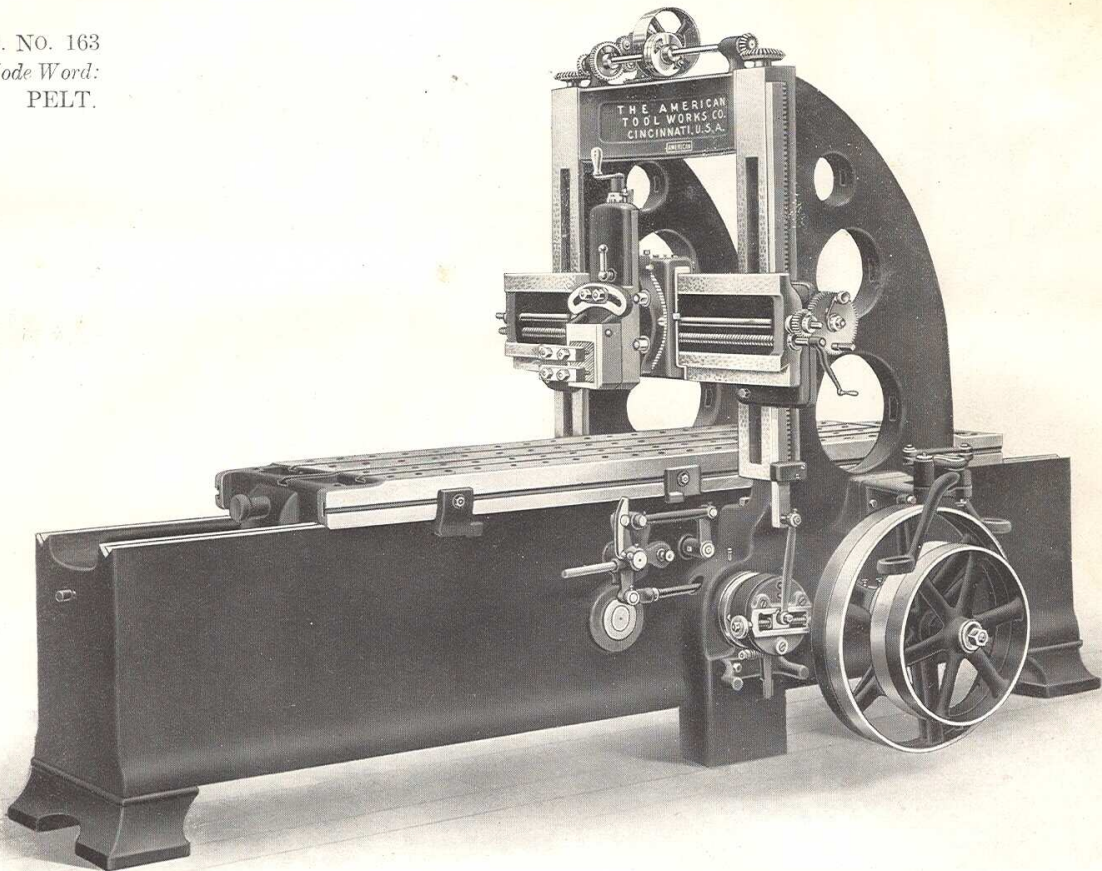
FOR WIDENED PLANERS see our special circular No. 165 and No. 168 which describe respectively sizes up to 36-in. x 30 in. and 72 in. x 60 in.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. NO. 163
Code Word:
PELT.



30 x 30 inch Metal Planer

(STANDARD PATTERN)

WITH ONE, TWO, THREE OR FOUR HEADS.

Planes Wide..... 30½ in. Planes High..... 30½ in.
Standard Length of Table..... 8 ft. Length of Bed for 8 ft. Table..... 12½ ft.
Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS in shop practice, and the extensive use of special high-speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern Planer work, and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

IN MACHINE CONSTRUCTION planed surfaces invariably form the foundation from which all other parts are fitted and aligned. It is therefore of the utmost importance that a high degree of accuracy be maintained in the construction and alignment of a metal planer, for this type of machine tool more nearly reproduces the quality of workmanship inherent in itself than any other metal working machine; consequently if a planer lacks the necessary degree of accuracy, the work planed will frequently require considerable scraping, which in itself is the most costly of shop operations. Therefore, undue scraping should be eliminated, not only for reasons of economy but because a true planed bearing is in every respect, superior to a scraped bearing.

THE WORKMANSHIP and alignment of "American" planers are of a quality and accuracy that only thoroughly modern equipment and skilled workmen can produce. As an assurance of their quality "American" planers are fully and positively guaranteed, if set up and leveled properly, to plane up to their maximum capacity perfectly square and parallel within a limit of .001 part of an inch.

ALTHOUGH ACCURACY is the most essential requisite of planer construction, there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following, particular attention is called to these features as developed in "American" Planers.

PROPER FACILITIES FOR LUBRICATION are of the utmost importance in machine tool construction. A machine tool will produce satisfactory results only as long as its bearings, both cylindrical and flat, are in good condition and do not show undue wear; in other words, the average life of a machine tool is equal to that of its bearings.

THE OILING SYSTEM OF "AMERICAN" PLANERS is so designed as to secure the most satisfactory results possible. The bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil to the various bearings are brought to a central point on the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings in which a felt strip is inserted.

This felt insert serves to filter the oil as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced directly to the bearing through oil holes and grooves which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying **Aluminum Tight Pulleys** in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry loose oil. The V's have frequent automatic oil rollers and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is of the square end type. Is of deep pattern, extra wide between the V's thoroughly braced by box cross girders at short intervals and rigidly supported on heavy legs. It is made unusually long in proportion to table length, leaving but very little overhang of table when planing at full length.

TABLE is of ample proportions, well braced by ribs to obtain great strength without unnecessary weight. T-slots are planed from the solid with very liberal allowance of metal around them to obviate all spring from clamping. Holes are drilled and reamed from the solid. Stop holes are provided at extreme ends of table, which allow planing of work much longer than that specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt, and has quick return, reversing without shock or jar. An improved shifting mechanism removes the cutting belt from tight driving pulley before the return belt engages it, thus obviating all disagreeable shrieking of belts. Shifting mechanism is so arranged that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become

loose thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents accidental starting of table. Pockets are of rounded form, making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated.

THE DRIVING PINIONS are all made from Steel Forgings and all gears are cut from the solid with special cutters made for the particular number of teeth in each gear, and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of crossrail at any elevation. They are of double-webbed, cored section type, exceptionally heavy, and are secured to bed by substantial means. They are tied together at top by an arch of deep box form giving great rigidity when taking side cuts and when the crossrail is in a high position. The bearings for the rail are very wide, and are scraped to surface plates.

CROSSRAIL is box section with wide bearings. Is raised and lowered rapidly by our improved power elevating device equipped with an adjustable flange coupling on elevating shaft, through which perfect alignment between rail and table can be quickly and easily maintained. The rail is made extra long when two heads are furnished, so that the left head may be run to the extreme end, allowing the other head to plane the full regular width of the machine.

RAIL HEADS are made right and left to permit of planing close together. Are firmly secured to saddles by four bolts, instead of two, as on most planers.

Down slides have complete Taper Gib Adjustment. Saddles are accurately scraped to rail and graduated for angular planing. Feeds are automatic and in all directions, and hand feeds can be operated from either side of the machine. Each head has variable independent power feeds, and also a ready hand adjustment. Down feed is provided with micrometer adjustment. Feed rack is cut from bar steel.

SIDE HEADS can be furnished, but must be specified in advance. Complete Taper Gib Adjustment is provided. They are counterbalanced, have power and hand vertical feed and hand cross feed, the handle traveling with the head, making operation very convenient. Rail heads and side heads have separate feed mechanisms, which operate entirely independently in all directions and at either end of the stroke. Feed screw is provided with micrometer adjustment.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable and all gears, as well as the feed rack, are cut from steel. The feed and elevating screws are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, its construction involving the use of an adjustable combination band and disk friction. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable studs. This design provides a much larger frictional area than the usual type of large band friction and is guaranteed by us to pull all heads at the coarsest feeds provided. The disk friction has a further effect of relieving the band friction of any wear during the reverse or cutting stroke, as the latter is held open by the action of the disk friction and is only in actual working contact at the instant of reverse. On planers equipped with four heads an outside friction is provided for the left hand side head.

REGULAR EQUIPMENT, upon which base price is determined, includes an efficient self-oiling countershaft, with pulleys 12 inches diameter for 4-inch belt, to run 424 r. p. m. for 24 ft. cutting speed, also, all necessary wrenches. **INSTRUCTION BOOK** for the installation and operation of our machines is regularly furnished.

WE CAN EQUIP THIS PLANER at EXTRA COST with extra head on cross-rail, one or two side heads, described above, electric motor drive and parallel drive; also with **MULTI-SPEED DRIVES** giving two (2) speeds through countershaft or four (4) speeds through "patented" cone variator, providing suitable cutting speeds for all classes of planer work.

FOR WIDENED PLANERS, see our special circulars No. 165 and No. 168, which describe, respectively, sizes up to 36-in. x 30-in. and 72-in. x 60-in.

THE AMERICAN TOOL WORKS CO.

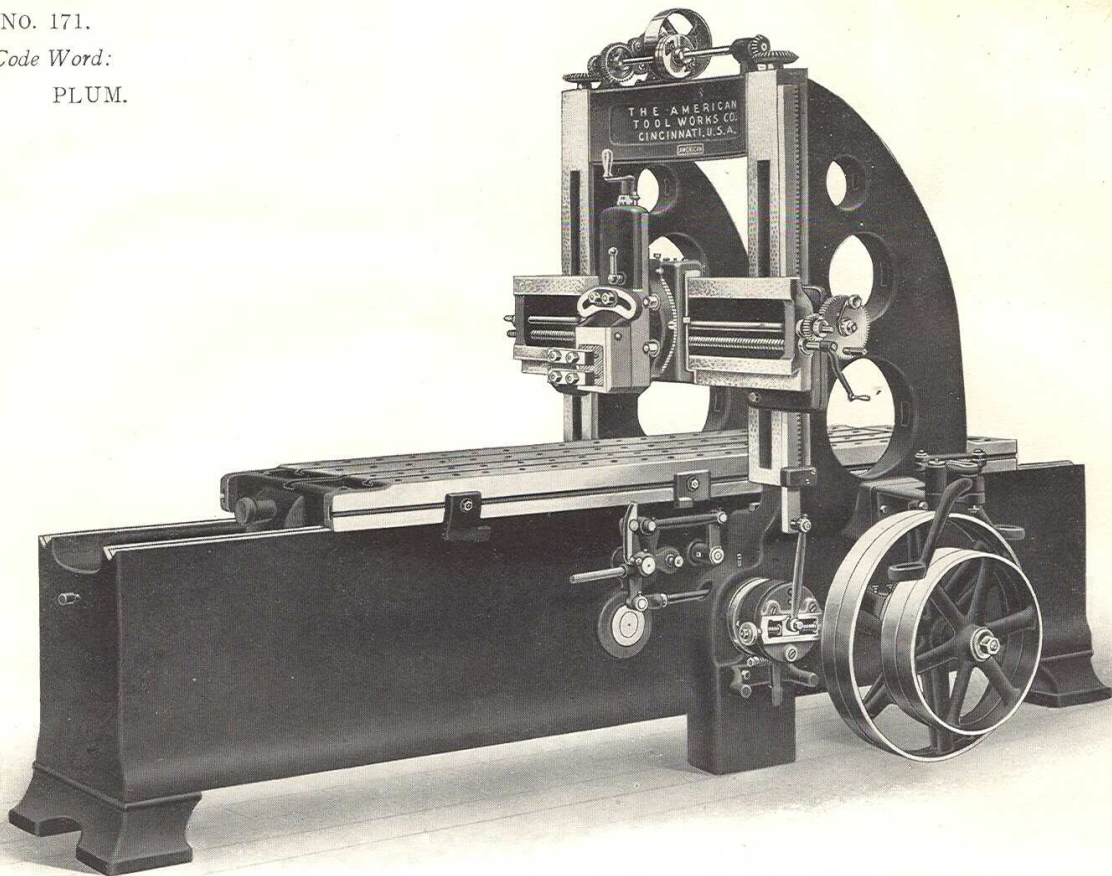
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. NO. 171.

Code Word:

PLUM.



36 x 36-inch Metal Planer (MEDIUM PATTERN)

WITH ONE, TWO, THREE OR FOUR HEADS ON CROSSRAIL.

Planes Wide.....	36½ in.	Planes High.....	37 in.
Standard Length of Table.....	8 ft.	Length of Bed for 8 ft. Table.....	12½ ft.
Advancing by Even Lengths of Table up to any Desired Length.			

MODERN METHODS in shop practice, and the extensive use of special high-speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern Planer work, and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

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NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying Aluminum Tight Pulleys in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary a few drops once a week being all that is required. This style of bushing effectually provides against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry loose oil. The V's have frequent automatic oil rollers and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep pattern, extra wide between the V's, thoroughly braced by box cross girds at short intervals and rigidly supported on heavy legs. It is made unusually long in proportion to table length, leaving but very little overhang of table when planing at full length.

TABLE is of ample proportions, well braced by ribs to obtain great strength without unnecessary weight. T-slots are planed from the solid with very liberal allowance of metal around them to obviate all spring from clamping. Holes are drilled and reamed from the solid. Stop holes are provided at extreme ends of table, which allow planing of work much longer than that specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt, and has quick return, reversing without shock or jar. An improved shifting mechanism removes the cutting belt from tight driving pulley before the return belt engages it, thus obviating all disagreeable shrieking of belts. Shifting mechanism is so arranged that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose thereby allowing the table to travel too far after

instant of reverse. A safety locking device prevents accidental starting of table. Pockets are of rounded form, making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated.

THE DRIVING PINIONS are all made from Steel Forgings and all gears are cut from the solid with special cutters made for the particular number of teeth in each gear, and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of crossrail at any elevation. They are of double-webbed, cored section type, exceptionally heavy, and are secured to bed by substantial means. They are tied together at top by an arch of deep box form giving great rigidity when taking side cuts and when the crossrail is in a high position. The bearings for the rail are very wide, and are scraped to surface plates.

CROSSRAIL is box section with wide bearings. Is raised and lowered rapidly by our improved power elevating device, equipped with an adjustable flange coupling on elevating shaft, through which perfect alignment between rail and table can be quickly and easily maintained. The rail is made extra long when two heads are furnished, so that the left head may be run to the extreme end, allowing the other head to plane the full regular width of the machine.

RAIL HEADS are made right and left to permit of planing close together. Are firmly secured to saddles, by four bolts, instead of two, as on most planers.

Down slides have complete Taper Gib Adjustment. Saddles are accurately scraped to rail and graduated for angular planing. Feeds are automatic and in all directions, and hand feeds can be operated from either side of the machine. Each head has variable independent power feeds, and also a ready hand adjustment. Down feed is provided with micrometer adjustment. Feed rack is cut from bar steel.

SIDE HEADS can be furnished but must be specified in advance. Complete Taper Gib Adjustment is provided. They are counterbalanced. Have power and hand vertical feed and hand cross feed, the handle traveling with the head, making operation very convenient. Rail heads and side heads have separate feed mechanisms, which operate entirely independently in all directions and at either end of the stroke. Feed screw is provided with micrometer adjustment.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable and all gears, as well as the feed rack, are cut from steel. The feed and elevating screws, are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, its construction involving the use of an adjustable combination band and disk friction. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design provides a much larger frictional area than the usual type of large band friction and is guaranteed by us to pull all heads at the coarsest feeds provided. The disk friction has a further effect of relieving the band friction of any wear during the reverse or cutting stroke, as the latter is held open by the action of the disk friction and is only in actual working contact at the instant of reverse. On Planers equipped with four heads an outside friction is provided for the left hand side head.

REGULAR EQUIPMENT, upon which base price is determined, includes an efficient self-oiling countershaft, with pulleys 12 inches diameter for 4-inch belt, to run 424 r. p. m. for 24 ft. cutting speed, also, all necessary wrenches. INSTRUCTION BOOK for the installation and operation of our machines is regularly furnished.

WE CAN EQUIP THIS PLANER at EXTRA COST with extra head on cross-rail, one or two side heads, described above, electric motor drive and parallel drive; also with MULTI-SPEED DRIVE giving two (2) speeds through countershaft and four (4) speeds through "patented" cone variator, providing suitable cutting speeds for all classes of planer work.

FOR WIDENED PLANERS, see our special circulars No. 165 and No. 168, which describe, respectively, sizes up to 36-in. x 30-in. and 72-in. x 60-in.

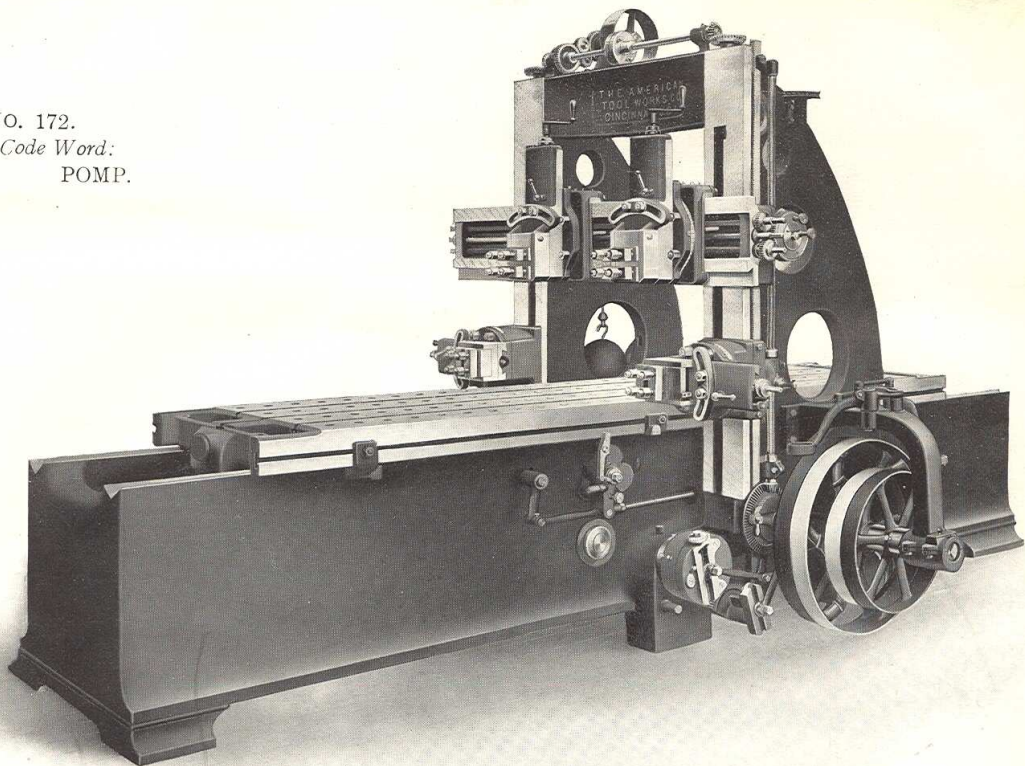
THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS.

CINCINNATI, U. S. A.

FIG. NO. 172.
Code Word:
POMP.



36 x 36-inch Metal Planer (HEAVY PATTERN.)

WITH ONE, TWO, THREE OR FOUR HEADS.

Planes Wide.....	36½ in.	Planes High.....	37 in.
Standard Length of Table.....	8 ft.	Length of Bed for 8 ft. Table.....	12½ ft.

Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS in shop practice, and the present extensive use of special high speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands, we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern planer work and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

IN MACHINE CONSTRUCTION planed surfaces invariably form the foundation from which all other parts are fitted and aligned. It is therefore of the utmost importance that a high degree of accuracy be maintained in the construction and alignment of a metal planer, for this type of machine tool more nearly reproduces the quality of workmanship inherent in itself than any other metal working machine, consequently if a planer lacks the necessary degree of accuracy the work planed will frequently require considerable scraping, which in itself is the most costly of shop operations. Therefore, undue scraping should be eliminated, not only for reasons of economy, but because a true planed bearing is in every respect superior to a scraped bearing.

THE WORKMANSHIP and alignment of "American" planers are of a quality and accuracy that only thoroughly modern equipment and skilled workmen can produce. As a further assurance of their quality "American" planers are fully and positively guaranteed, if set up and leveled properly, to plane up to their maximum capacity perfectly square and parallel within a limit of .001 part of an inch.

ALTHOUGH ACCURACY is the most essential requisite of planer construction there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following, particular attention is called to these features as developed in "American" Planers.

PROPER FACILITIES FOR LUBRICATION are of the utmost importance in machine tool construction. A machine tool will produce satisfactory results only as long as its bearings, both cylindrical and flat, are in good condition and do not show undue wear; in other words, the average life of a machine tool is equal to that of its bearings.

THE OILING SYSTEM of "American" Planers, is so designed as to secure the most satisfactory results possible. The main driving or pulley shaft runs in three (3) long Phosphor Bronze Bearings, which are ring oiled. Large pockets serve to retain the lubricant, which after its passage over the bearings, is carried back to the pockets by return ducts, thus producing a circulating oiling system which keeps the bearings constantly flooded with oil. The other bearings in the driving mechanism are oiled by means of a gravity system

which is very effective. Oil pipes which carry a liberal supply of oil are brought to a central point at the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings, in which a felt strip is inserted. This felt insert serves to filter the oil, as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced directly to the bearing through oil holes and grooves, which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying Aluminum Tight Pulleys in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry loose oil. The V's have frequent automatic oil rollers and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep box girder form, extra wide between the V's and thoroughly braced by heavy box cross girders at short intervals. Has bearing on foundation the entire length. Is of unusual length in proportion to table, leaving very little overhang of table when planing at full length. The V's are wide, giving good wearing surface and are scraped their entire length to a perfect fit.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-Slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Stop holes are provided at extreme ends of table which allow planing of work much longer than that specified at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt, and has quick return reversing without shock or jar. Pockets are of rounded form making easy the removal of chips and dirt.

AN IMPROVED SHIFTING MECHANISM removes the belt from one pulley before the return belt engages the other, thus avoiding all disagreeable shrieking of belts. This shifting mechanism is so arranged that table can be run from

under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents the table from starting before the operator is ready.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated. A feature of this mechanism is that the bull wheel is fixed on its shaft which runs in two long bushed bearings. The two long journals provide a large bearing surface and the provision made for oiling is very efficient.

THE DRIVING GEARS are all made from steel castings and the PINIONS from steel forgings. They are cut from the solid with special cutters for the particular number of teeth in each gear and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of crossrail at any elevation. They are of double-webbed, cored section type, exceptionally heavy, and secured to bed by substantial means. Are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped to surface plates.

CROSSRAIL is of box section with wide bearings. Is extra long, so that either head can be run to the extreme end, allowing the other head to plane the full regular width of the table. Is raised and lowered rapidly by our improved power elevating device, equipped with an adjustable flange coupling on elevating shaft, through which perfect alignment between rail and table can be quickly and easily maintained. Elevating screws are hung on hardened and ground collars.

RAIL HEADS are made right and left to permit of planing close together. Complete Taper Gib Adjustment is provided. Saddles are of one piece construction, having no loose clamps at the back to cause trouble, and are graduated for angular planing. Down feed screws are supplied with ball bearings which facilitate accurate adjustment from the squared rod at end of rail. Each rail head has automatic variable and independent power feeds in all directions, and also a ready hand adjustment thus permitting either head to be used as a side head on work which the regular side head would not reach. Down feed is provided with micrometer adjustment. Feed rack is cut from bar steel.

SIDE HEADS can be furnished, if desired, at any time after the machine is built, with slight modifications. Complete Taper Gib Adjustment is provided. They are counterbalanced and can be run below the level of the table when not in use. Have power and hand vertical feed and hand cross feed, the ratchet crank furnished, traveling with the head, making operation very convenient. Rail heads and side heads have separate feed mechanisms which operate independently in all directions and at either end of the stroke. Feed screw is provided with micrometer adjustment.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable, and all gears, as well as the feed rack, are cut from steel. The feed and elevating screws are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, its construction involving the use of an adjustable combination band and disk friction. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design provides a much larger frictional area than the usual type of large band friction and is guaranteed by us to pull all heads at the coarsest feeds provided. The disk friction has a further effect of relieving the band friction of any wear during the reverse or cutting stroke, as the latter is held open by the action of the disk friction and is only in actual working contact at the instant of reverse. On Planers equipped with four heads an outside friction is provided for the left hand side head.

REGULAR EQUIPMENT, upon which base price is determined, includes one head on cross rail, an efficient self-oiling countershaft with pulleys 14 in. diameter for 5 in. belt to run 488 r. p. m.; also all necessary wrenches and

INSTRUCTION BOOK for the installation and operation of our machines.
WE CAN EQUIP THIS PLANER, at extra cost, with extra head on rail, one or two side heads, described above, electric motor drive and parallel drive; also with Multi-Speed Drive, giving two (2) speeds through countershaft and four (4) speeds through cone speed variator, providing suitable cutting speeds for all classes of planer work.

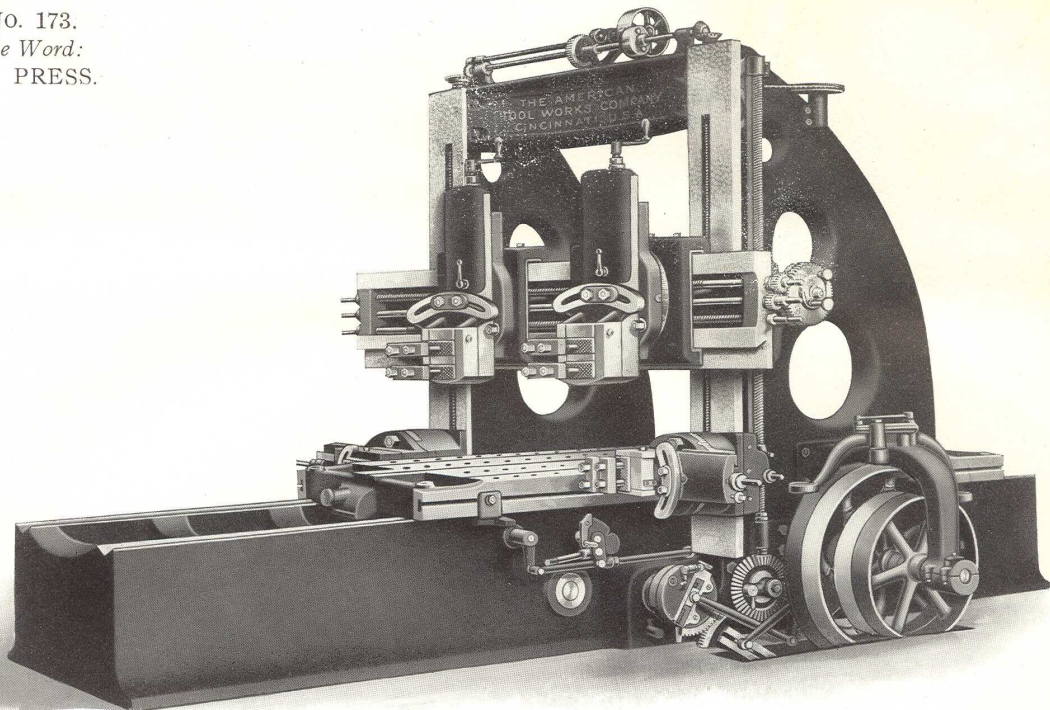
FOR WIDENED PATTERN PLANERS see our special circulars describing them.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. NO. 173.
Code Word:
PRESS.



42 x 42 - inch Metal Planer

(STANDARD PATTERN)

WITH ONE, TWO, THREE OR FOUR HEADS.

Planes Wide 42½ in. Planes High 43 in.
Standard Length of Table 10 ft. Length of Bed for 10 ft. Table 16 ft. 6 in.
Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS in shop practice, and the present extensive use of special high speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands, we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern planer work and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

IN MACHINE CONSTRUCTION planed surfaces invariably form the foundation from which all other parts are fitted and aligned. It is therefore of the utmost importance that a high degree of accuracy be maintained in the construction and alignment of a metal planer, for this type of machine tool more nearly reproduces the quality of workmanship inherent in itself than any other metal working machine, consequently if a planer lacks the necessary degree of accuracy the work planed will frequently require considerable scraping, which in itself is the most costly of shop operations. Therefore, undue scraping should be eliminated, not only for reasons of economy, but because a true planed bearing is in every respect superior to a scraped bearing.

THE WORKMANSHIP and alignment of "American" planers are of a quality and accuracy that only thoroughly modern equipment and skilled workmen can produce. As a further assurance of their quality "American" planers are fully and positively guaranteed, if set up and leveled properly, to plane up to their maximum capacity perfectly square and parallel within a limit of .001 part of an inch.

ALTHOUGH ACCURACY is the most essential requisite of planer construction there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following, particular attention is called to these features as developed in "American" Planers.

PROPER FACILITIES FOR LUBRICATION are of the utmost importance in machine tool construction. A machine tool will produce satisfactory results only as long as its bearings, both cylindrical and flat, are in good condition and do not show undue wear; in other words, the average life of a machine tool is equal to that of its bearings.

THE OILING SYSTEM of "American" Planers, is so designed as to secure the most satisfactory results possible. The main driving or pulley shaft runs in three (3) long Phosphor Bronze Bearings, which are ring oiled. Large pockets serve to retain the lubricant, which after its passage of the bearings, is carried back to the pockets by return ducts, thus producing a circulating oil system which keeps the bearings constantly flooded with oil. The other bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil are brought to a central point at the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings, in which a felt strip is inserted. This felt insert serves to filter the oil, as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced directly to the bearing through oil holes and grooves, which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying Aluminum Tight Pulleys in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry loose oil. The V's have frequent automatic oil rollers and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep box girder form, extra wide between the V's and thoroughly braced by heavy box crossribs at short intervals. Has bearing on foundation the entire length. Is of unusual length in proportion to table, leaving very little overhang of table when planing at full length. The V's are wide, giving good wearing surface and are scraped their entire length to a perfect fit.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Stop holes are provided at extreme ends of table which allow planing of work much longer than that specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt, and has quick return reversing without shock or jar. An improved shifting mechanism removes the belt from one pulley before the return belt engages the other, thus avoiding all disagreeable shrieking of belts. This shifting mechanism is so arranged that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents the table from starting before the operator is ready. Pockets are of rounded form making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated. A feature of this mechanism is that the bull wheel is fixed on its shaft which runs in two long bushings. The two long journals provide a large bearing surface and the provision made for oiling is very efficient.

THE DRIVING GEARS are all made from steel castings and the PINIONS from steel forgings. They are cut from the solid with special cutters for the particular number of teeth in each gear and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of crossrail at any elevation. They are of double-webbed, cored section type, exceptionally heavy, and secured to bed by substantial means. Are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped to surface plates.

CROSSRAIL is of box section with wide bearings. Is extra long, so that either head can be run to the extreme end, allowing the other head to plane the full regular width of the machine. Is raised and lowered rapidly by our improved power elevating device, equipped with an adjustable flange coupling on elevating shaft, through which perfect alignment between rail and table can be quickly and easily maintained. Elevating screws are hung on hardened and ground collars.

RAIL HEADS are made right and left to permit of planing close together, Complete Taper Gib Adjustment is provided. Saddles are of one piece construction, having no loose clamps at the back to cause trouble, and are graduated for angular planing. Down feed screws are supplied with ball bearings which facilitate accurate adjustment from the squared rod at end of rail. Each rail head has automatic variable and independent power feeds in all directions, and also a ready hand adjustment, thus permitting either head to be used as a side head on work which the regular side head would not reach. Down feed is provided with micrometer adjustment. Feed rack is cut from bar steel.

SIDE HEADS can be furnished, if desired, at any time after the machine is built, with slight modifications. Complete Taper Gib Adjustment is provided. They are counterbalanced and can be run below the level of the table when not in use. Have power and hand vertical feed and hand cross feed, the ratchet crank furnished, traveling with the head, making operation very convenient. Rail heads and side heads have separate feed mechanisms which operate independently in all directions and at either end of the stroke. Feed screw is provided with micrometer adjustment.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable and all gears, as well as the feed rack, are cut from steel. The feed and elevating screw are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, its construction involving the use of an adjustable combination band and disk friction. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design provides a much larger frictional area than the usual type of large band friction and is guaranteed by us to pull all heads at the coarsest feeds provided. The disk friction has a further effect of relieving the band friction of any wear during the reverse or cutting stroke, as the latter is held open by the action of the disk friction and is only in actual working contact at the instant of reverse. On Planers equipped with four heads an outside friction is provided for the left hand side head.

REGULAR EQUIPMENT, upon which base price is determined, includes one head on cross rail, an efficient self-oiling countershaft with pulleys 14 in. diameter for 6 in. belt to run 560 r. p. m.; also all necessary wrenches and INSTRUCTION BOOK for the installation and operation of our machine.

WE CAN EQUIP THIS PLANER, at extra cost, with extra head on rail, one or two side heads described above, electric motor drive and parallel drive; also with Multi-Speed Drive, giving two (2) speeds through countershaft and four (4) speeds through cone speed variator, providing suitable cutting speeds for all classes of planer work.

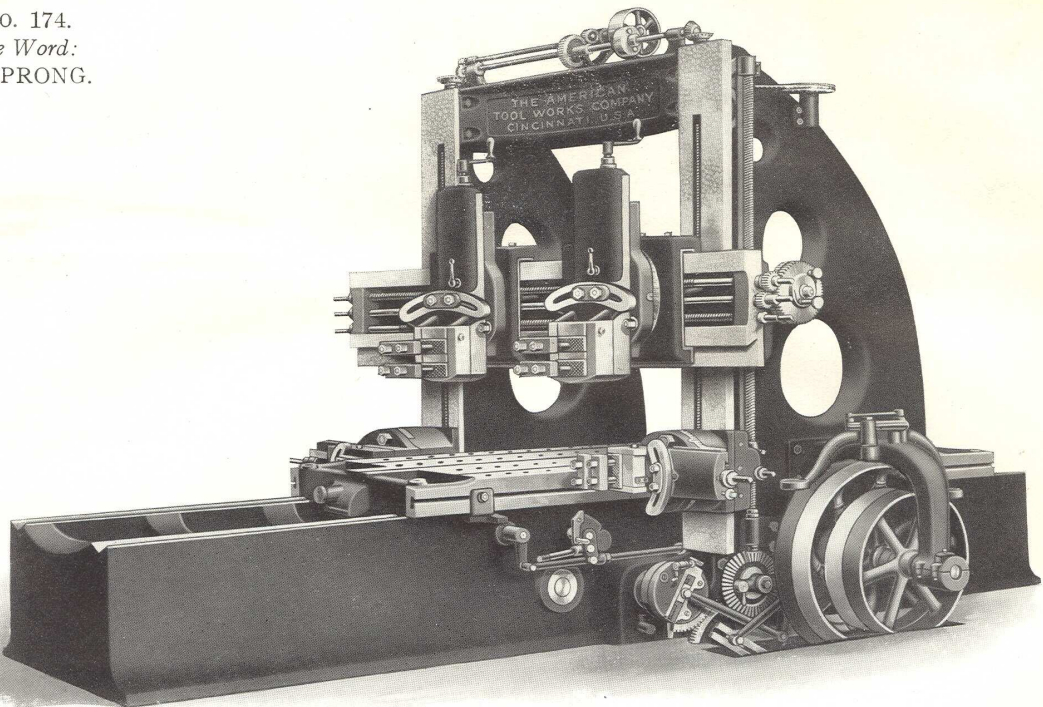
FOR WIDENED PATTERN PLANERS see our special circulars describing them.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. NO. 174.
Code Word:
PRONG.



48 x 48 - inch Metal Planer (STANDARD PATTERN)

WITH ONE, TWO, THREE OR FOUR HEADS.

Planes Wide.....	48½ in.	Planes High.....	49 in.
Standard Length of Table.....	10 ft.	Length of Bed for 10 ft. Table.....	16 ft. 6 in.

Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS in shop practice, and the present extensive use of special high speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands, we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern planer work and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

IN MACHINE CONSTRUCTION planed surfaces invariably form the foundation from which all other parts are fitted and aligned. It is therefore of the utmost importance that a high degree of accuracy be maintained in the construction and alignment of a metal planer, for this type of machine tool more nearly reproduces the quality of workmanship inherent in itself than any other metal working machine, consequently if a planer lacks the necessary degree of accuracy the work planed will frequently require considerable scraping, which in itself is the most costly of shop operations. Therefore, undue scraping should be eliminated, not only for reasons of economy, but because a true planed bearing is in every respect superior to a scraped bearing.

THE WORKMANSHIP and alignment of "American" planers are of a quality and accuracy that only thoroughly modern equipment and skilled workmen can produce. As a further assurance of their quality "American" planers are fully and positively guaranteed, if set up and leveled properly, to plane up to their maximum capacity perfectly square and parallel within a limit of .001 part of an inch.

ALTHOUGH ACCURACY is the most essential requisite of planer construction there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following, particular attention is called to these features as developed in "American" Planers.

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THE OILING SYSTEM of "American" Planers, is so designed as to secure the most satisfactory results possible. The main driving or pulley shaft runs in three (3) long Phosphor Bronze Bearings, which are ring oiled. Large pockets serve to retain the lubricant, which after its passage of the bearings, is carried back to the pockets by return ducts, thus producing a circulating oil system which keeps the bearings constantly flooded with oil. The other bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil are brought to a central point at the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings, in which a felt strip is inserted. This felt insert serves to filter the oil, as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced directly to the bearing through oil holes and grooves, which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically elimi-

venting damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents the table from starting before the operator is ready. Pockets are of rounded form making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated. A feature of this mechanism is that the bull wheel is fixed on its shaft which runs in two long bushed bearings. The two long journals provide a large bearing surface and the provision made for oiling is very efficient.

THE DRIVING GEARS are all made from steel castings and the PINIONS from steel forgings. They are cut from the solid with special cutters for the particular number of teeth in each gear and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of crossrail at any elevation. They are of double-webbed, cored section type, exceptionally heavy, and secured to bed by substantial means. Are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped to surface plates.

CROSSRAIL is of box section with wide bearings. Is extra long, so that either head can be run to the extreme end, allowing the other head to plane the full regular width of the machine. Is raised and lowered rapidly by our improved power elevating device, equipped with an adjustable flange coupling on elevating shaft, through which perfect alignment between rail and table can be quickly and easily maintained. Elevating screws are hung on hardened and ground collars.

RAIL HEADS are made right and left to permit of planing close together, Complete Taper Gib Adjustment is provided. Saddles are of one piece construction, having no loose clamps at the back to cause trouble, and are graduated for angular planing. Down feed screws are supplied with ball bearings which facilitate accurate adjustment from the squared rod at end of rail. Each rail head has automatic variable, and independent power feeds in all directions, and also a ready hand adjustment, thus permitting either head to be used as a side head on work which the regular side head would not reach. Down feed is provided with micrometer adjustment. Feed rack is cut from bar steel.

SIDE HEADS can be furnished, if desired, at any time after the machine is built, with slight modifications. Complete Taper Gib Adjustment is provided. They are counterbalanced and can be run below the level of the table when not in use. Have power and hand vertical feed and hand cross feed, the ratchet crank furnished, traveling with the head, making operation very convenient. Rail heads and side heads have separate feed mechanisms which operate independently in all directions and at either end of the stroke. Feed screw is provided with micrometer adjustment.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable and all gears, as well as the feed rack, are cut from steel. The feed and elevating screw are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, its construction involving the use of an adjustable combination band and disk friction. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design provides a much larger frictional area than the usual type of large band friction and is guaranteed by us to pull all heads at the coarsest feeds provided. The disk friction has a further effect of relieving the band friction of any wear during the reverse or cutting stroke, as the latter is held open by the action of the disk friction and is only in actual working contact at the instant of reverse. On Planers equipped with four heads an outside friction is provided for the left hand side head.

REGULAR EQUIPMENT, upon which base price is determined, includes one head on cross rail, an efficient self-oiling countershaft with pulleys 14 in. diameter for 6 in. belt to run 560 r. p. m.; also all necessary wrenches and INSTRUCTION BOOK for the installation and operation of our machine.

WE CAN EQUIP THIS PLANER, at extra cost, with extra head on rail, one or two side heads described above, electric motor drive and parallel drive; also with Multi-Speed Drive, giving two (2) speeds through countershaft and four (4) speeds through cone speed variator, providing suitable cutting speeds for all classes of planer work.

FOR WIDENED PATTERN PLANERS see our special circulars describing them.

nated on "American" Planers by applying Aluminum Tight Pulleys in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry loose oil. The V's have frequent automatic oil rollers and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

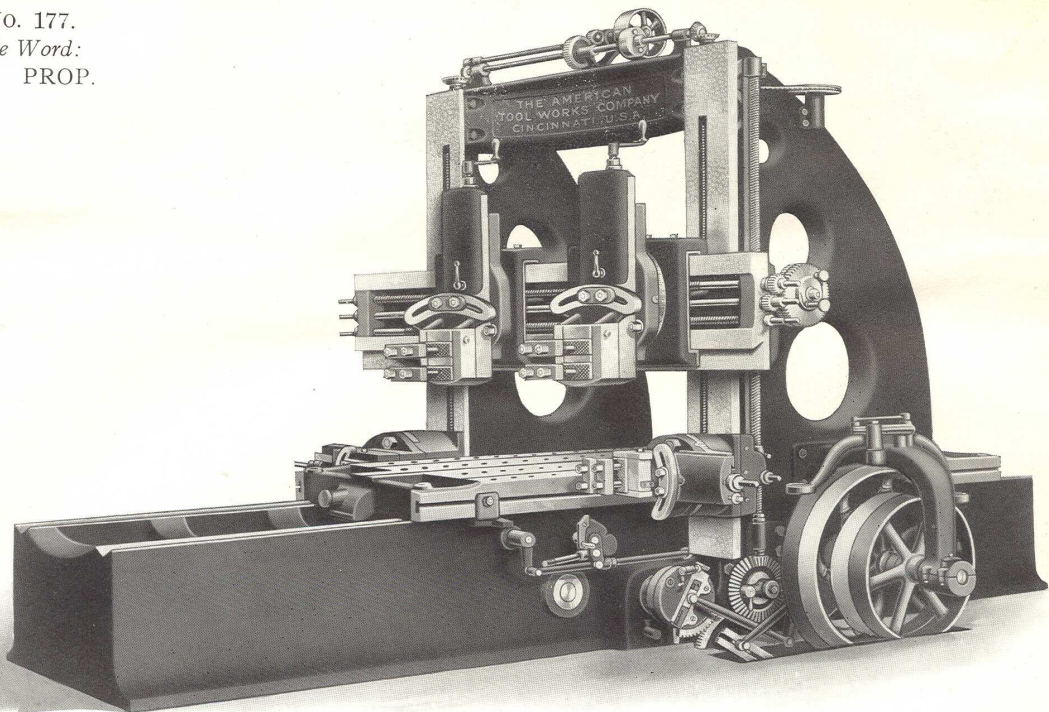
BED is the square end type. Is of deep box girder form, extra wide between the V's and thoroughly braced by heavy box cross girders at short intervals. Has bearing on foundation the entire length. Is of unusual length in proportion to table, leaving very little overhang of table when planing at full length. The V's are wide, giving good wearing surface and are scraped their entire length to a perfect fit.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-Slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Stop holes are provided at extreme ends of table which allow planing of work much longer than that specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt, and has quick return reversing without shock or jar. An improved shifting mechanism removes the belt from one pulley before the return belt engages the other, thus avoiding all disagreeable shrieking of belts. This shifting mechanism is so arranged that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus pre-

THE AMERICAN TOOL WORKS CO. LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. NO. 177.
Code Word:
PROP.



60 x 60 - inch Metal Planer (STANDARD PATTERN)

WITH ONE, TWO, THREE OR FOUR HEADS.

Planes Wide.....	.61 in.	Planes High.....	.61 in.
Standard Length of Table.....	12 ft.	Length of Bed for 12 ft. Table.....	21 ft.

Advancing by Even Lengths of Table up to any Desired Length.

MODERN METHODS in shop practice, and the present extensive use of special high speed tool steels, have brought into common usage degrees of Speeds and Feeds regarded as utterly impossible in very recent years. To meet these changed conditions and new demands, we build a line of extra powerful and rigid Planers, in the construction of which we have taken into careful consideration every condition influencing modern planer work and "American" Planers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

IN MACHINE CONSTRUCTION planed surfaces invariably form the foundation from which all other parts are fitted and aligned. It is therefore of the utmost importance that a high degree of accuracy be maintained in the construction and alignment of a metal planer, for this type of machine tool more nearly reproduces the quality of workmanship inherent in itself than any other metal working machine, consequently if a planer lacks the necessary degree of accuracy the work planed will frequently require considerable scraping, which in itself is the most costly of shop operations. Therefore, undue scraping should be eliminated, not only for reasons of economy, but because a true planed bearing is in every respect superior to a scraped bearing.

THE WORKMANSHIP and alignment of "American" planers are of a quality and accuracy that only thoroughly modern equipment and skilled workmen can produce. As a further assurance of their quality "American" planers are fully and positively guaranteed, if set up and leveled properly, to plane up to their maximum capacity perfectly square and parallel within a limit of .001 part of an inch.

ALTHOUGH ACCURACY is the most essential requisite of planer construction there are also several other important considerations of design which must be observed in order to produce a machine which will be capable of planing accurate work with the greatest possible economy, therefore, in the following, particular attention is called to these features as developed in "American" Planers.

PROPER FACILITIES FOR LUBRICATION are of the utmost importance in machine tool construction. A machine tool will produce satisfactory results only as long as its bearings, both cylindrical and flat, are in good condition and do not show undue wear; in other words, the average life of a machine tool is equal to that of its bearings.

THE OILING SYSTEM of "American" Planers, is so designed as to secure the most satisfactory results possible. The main driving or pulley shaft runs in three (3) long Phosphor Bronze Bearings, which are ring oiled. Large pockets serve to retain the lubricant, which after its passage of the bearings, is carried back to the pockets by return ducts, thus producing a circulating oil system which keeps the bearings constantly flooded with oil. The other bearings in the driving mechanism are oiled by means of a gravity system which is very effective. Oil pipes which carry a liberal supply of oil are brought to a central point at the outside of the bed where they are easily accessible. These pipes terminate at a slot cut lengthwise in the bushings, in which a felt strip is inserted. This felt insert serves to filter the oil, as well as to properly distribute it over the entire bearing, and also insures every drop of oil to be used to the best advantage. This arrangement is much superior to that commonly used by which the oil is introduced directly to the bearing through oil holes and grooves, which permits the oil to run out before it has performed its proper function.

NO OVER-RUN OF THE TABLE. Over-run of the table, which is caused by the momentum developed by the driving pulleys, has been practically eliminated on "American" Planers by applying Aluminum Tight Pulleys in place of the cast iron pulleys formerly used. The Aluminum Pulleys by virtue of their lower specific gravity will develop only one-third the momentum that a cast iron pulley of the same dimensions, and running under similar conditions, will. Another advantage from the use of Aluminum Pulleys is that the belts do not deteriorate nearly so rapidly and can be used 2" longer than when used with the cast iron pulley.

THE LOOSE PULLEYS run on removable babbitt bushings in which graphite inserts are moulded. These bushings are fitted with felt strips which retain the slight amount of oil necessary; a few drops once a week being all that is required. This style of bushing provides effectually against the flying oil (so ruinous to belts) which is characteristic of the usual bronze bushing which is recessed to carry loose oil. The V's have frequent automatic oil rollers and all waste oil is drained into pockets cast integral with the bed where it can be easily drawn off. This construction eliminates the detrimental effects of oil on wood and concrete floors.

BED is the square end type. Is of deep box girder form, extra wide between the V's and thoroughly braced by heavy box cross girders at short intervals. Has bearing on foundation the entire length. Is of unusual length in proportion to table, leaving very little overhang of table when planing at full length. The V's are wide, giving good wearing surface and are scraped their entire length to a perfect fit.

TABLE is of ample thickness, well braced by ribs to obtain great strength without unnecessary weight. T-Slots are planed from the solid with very liberal allowance of metal around them, to obviate all spring from clamping. Stop holes are provided at extreme ends of table which allow planing of work much longer than that specified, at one setting, a feature not commonly found on other planers. It is equipped with improved dirt-proof feature, which completely protects the V's from chips and dirt, and has quick return reversing without shock or jar. An improved shifting mechanism removes the belt from one pulley before the return belt engages the other, thus avoiding all disagreeable shrieking of belts. This shifting mechanism is so arranged that table can be run from under the tool for examination of work and both dogs are so constructed that they pass entirely over the tumbler, thus preventing damage to parts should belts break or become loose, thereby allowing the table to travel too far after instant of reverse. A safety locking device prevents the table from starting before the operator is ready. Pockets are of rounded form making easy the removal of chips and dirt.

THE DRIVING MECHANISM is of very substantial construction and is rigidly supported. The ratio of speed reduction in the driving train is unusually high. This in connection with the extra wide driving belt insures ample pressure at the table rack. The driving shafts are all accurately ground and are made from .60 crucible steel. They run in long solid bushings, which are ground and fitted bodily into holes bored and reamed in the bed. This construction brings the bushings and their supports close up to the driving gears where the greatest strains are concentrated. A feature of this mechanism is that the bull wheel is fixed on its shaft which runs in two long bushed bearings. The two long journals provide a large bearing surface and the provision made for oiling is very efficient.

THE DRIVING GEARS are all made from steel castings and the PINIONS from steel forgings. They are cut from the solid with special cutters for the particular number of teeth in each gear and are tested for accuracy on a special gear testing machine. This method insures a quiet, smooth running drive with a minimum of wear in the gears.

HOUSINGS. We guarantee the housings, when leaving our works, to be square with bed both front and side, and the faces in perfect alignment with each other, thus insuring a perfect fit of crossrail at any elevation. They are of double-webbed, cored section type, exceptionally heavy, and secured to bed by substantial means. Are tied together at top by an arch of deep box form, giving great rigidity when taking side cuts and when crossrail is in a high position. Bearings for the rail are very wide, scraped to surface plates.

CROSSRAIL is of box section with wide bearings. Is extra long, so that either head can be run to the extreme end, allowing the other head to plane the full regular width of the machine. Is raised and lowered rapidly by our improved power elevating device, equipped with an adjustable flange coupling on elevating shaft, through which perfect alignment between rail and table can be quickly and easily maintained. Elevating screws are hung on hardened and ground collars.

RAIL HEADS are made right and left to permit of planing close together, Complete Taper Gib Adjustment is provided. Saddles are of one piece construction, having no loose clamps at the back to cause trouble, and are graduated for angular planing. Down feed screws are supplied with ball bearings which facilitate accurate adjustment from the squared rod at end of rail. Each rail head has automatic variable and independent power feeds in all directions, and also a ready hand adjustment, thus permitting either head to be used as a side head on work which the regular side head would not reach. Down feed is provided with micrometer adjustment. Feed rack is cut from bar steel.

SIDE HEADS can be furnished, if desired, at any time after the machine is built, with slight modifications. Complete Taper Gib Adjustment is provided. They are counterbalanced and can be run below the level of the table when not in use. Have power and hand vertical feed and hand cross feed, the ratchet crank furnished, traveling with the head, making operation very convenient. Rail heads and side heads have separate feed mechanisms which operate independently in all directions and at either end of the stroke. Feed screw is provided with micrometer adjustment.

THE FEED MECHANISM is of very convenient and efficient construction. The material used is positively the best obtainable and all gears, as well as the feed rack, are cut from steel. The feed and elevating screw are made from Special High Carbon Ground Screw Stock.

THE FEED FRICTION is of an improved type, its construction involving the use of an adjustable combination band and disk friction. The disk friction consists of two large leather washers held against the friction head by adjustable plates held in tension by three adjustable spring studs. This design provides a much larger frictional area than the usual type of large band friction and is guaranteed by us to pull all heads at the coarsest feeds provided. The disk friction has a further effect of relieving the band friction of any wear during the reverse or cutting stroke, as the latter is held open by the action of the disk friction and is only in actual working contact at the instant of reverse. On Planers equipped with four heads an outside friction is provided for the left hand side head.

REGULAR EQUIPMENT, upon which base price is determined, includes one head on cross rail, an efficient self-oiling countershaft with pulleys 14 in. diameter for 6 in. belt to run 560 r. p. m.; also all necessary wrenches and INSTRUCTION BOOK for the installation and operation of our machine.

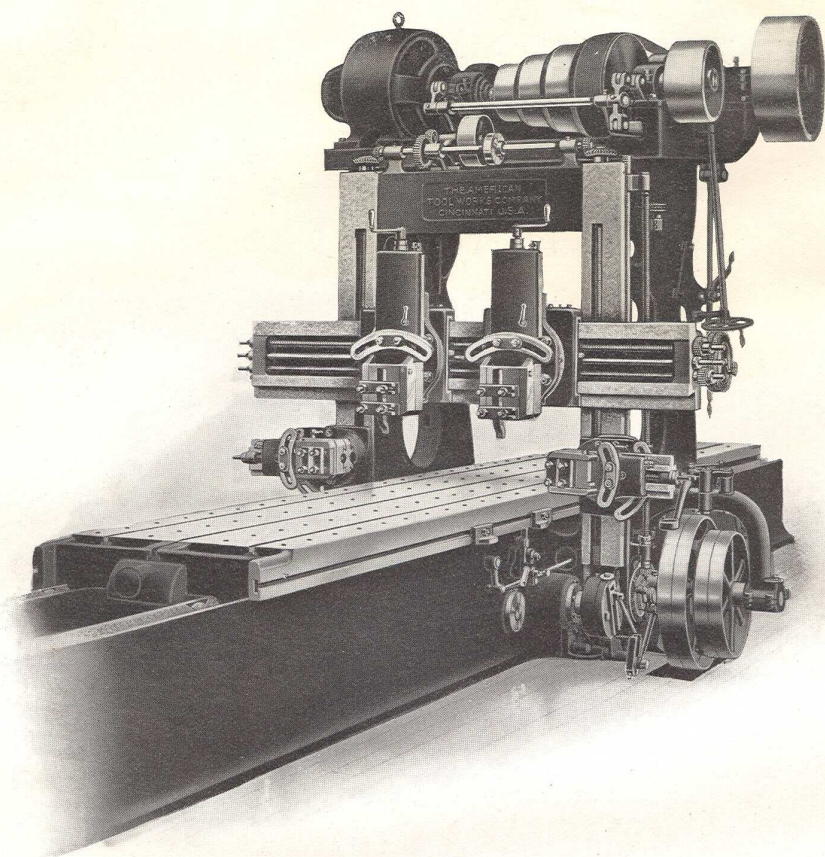
WE CAN EQUIP THIS PLANNER, at extra cost, with extra head on rail, one or two side heads described above, electric motor drive and parallel drive; also with Multi-Speed Drive, giving two (2) speeds through countershaft and four (4) speeds through cone speed variator, providing suitable cutting speeds for all classes of planer work.

FOR WIDENED PATTERN PLANERS see our special circulars describing them.

THE AMERICAN TOOL WORKS CO. LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

Fig. No. 181.
Code Word:
PILOT.



“American” Multi-Speed Planers.

“PATENTED”

BELT OR ELECTRIC MOTOR DRIVEN.

WE BUILD METAL PLANERS WITH ONE (1), TWO (2) AND FOUR (4) CUTTING SPEEDS, the range of cutting speeds depending upon the size of the planer and the character of the work to be operated on. Each type has a constant speed return of the platen, which is greatly in excess of its respective highest cutting speed. In reducing planing costs to a minimum the “up-to-date” Works Manager often requires Variable Cutting Speeds, as above indicated. We furnish planers to suit all these requirements and request that customers inform us correctly as to the nature of their work, in order that we may recommend and bid on the most suitable machine for the work.

FOUR (4) CUTTING SPEEDS

With Constant Speed Return.

BELT OR MOTOR DRIVEN.

THE FOUR (4) SPEEDS are obtained through a pair of opposed four step cone pulleys operated by an endless belt between them, the whole being mounted upon a substantial platform on top of the housings. The belt is shifted from step to step and provides a range of speeds calculated to cover the most exacting requirements. These, with the constant high speed return of the platen, insure the greatest working economy.

SIMPLICITY OF THE VARIATOR. This drive has primarily two distinct and necessary advantages over the old geared drive, viz: Simplicity of Design and Freedom from Destructive Vibration. There are no change gears to break, stick to or cut shafts, no troublesome frictions to wear and be adjusted, no jaw clutches to be bruised or broken and no large reservoir of oil to be splashing and leaking over the machine. It is free from the distracting noise and vibration of the gear driven type, which condition becomes worse as the parts are subjected to wear, on account of the excessive speed of the gears. Such vibration invariably imparts inaccuracy to the work being planed and hence unfits the geared drive for accurate planer work. This new Speed Variator is absolutely free from all the above defects and insures the smoothest possible work. Its simplicity, efficiency and durability will appeal to those interested in this type of drive.

THE SHIFTING OF THE BELT is novel and very effective. A pair of belt forks are moved alternately along guide rods by means of a pair of cylindrical cams, which revolve alternately through the medium of a set of intermittent gears operated by the hand wheel shown at rear. One revolution of this wheel shifts the belt from one step to another and a shot pin indicates the complete revolution. The cam rolls have spiral slots milled in their peripheries, each belt fork being moved along the guide rods through the medium of a roller operating in the spiral slots. The relation between the cams and forks is such as to shift the belt off of the high step of one cone before placing it on the high step of the opposing cone.

THE TENSION OF THE BELT is controlled by the vertical lever, shown at the rear, operating in a radial slot. This lever is of convenient height and operates a pair of bell cranks through link connection. The bell cranks serve as levers to slide the “driven” cone towards the “driver,” thus slackening the belt. This feature, together with the mechanical belt shifting device and the fact that the steps of the pulleys are beveled on the edge, so as to offer no resistance to the passage of the belt, permits of easily making rapid changes of speed, even though the belt is very wide. After the belt is located for the desired speed, it is brought up tight by moving the hand lever to the point where tension is sufficient for the work, after which the lever is securely clamped by the binder handle shown.

THE DRIVEN CONE BEING MOVED TOWARDS THE DRIVER, which former carries the planer driving belt, is a distinct feature, inasmuch as the tension

of the vertical belts is not disturbed when making speed changes, and the danger of their flying off, from becoming loose, is overcome.

ALL SHAFTS in this Variator are of large diameter, accurately ground and run in massive phosphor bronze journals perfectly lubricated by the “ring” or “dynamo” system of oiling. Journals are supplied with liberal oil wells and return ducts, thereby preventing the oil from escaping and coming in contact with the belts. The bearings are of the “ball and socket” type insuring perfect alignment at all times.

SPEEDS CHANGED WITHOUT STOPPING. This is a valuable feature of this drive, as with the old geared type it was necessary to wait until the mechanism slowed down to almost a stand still before the clutches or gears could be engaged. With this drive it is far easier to make the changes while in motion than otherwise. Driving pulleys have fly-wheel rims, the momentum of which reduces to a minimum all shocks to the driving mechanism due to intermittent cutting and at reversing, also insuring a steady even pull at the cutting tool. They are perfectly balanced, running without the least vibration even on the highest speeds. This, coupled with the smoothness of the drive, the scientific

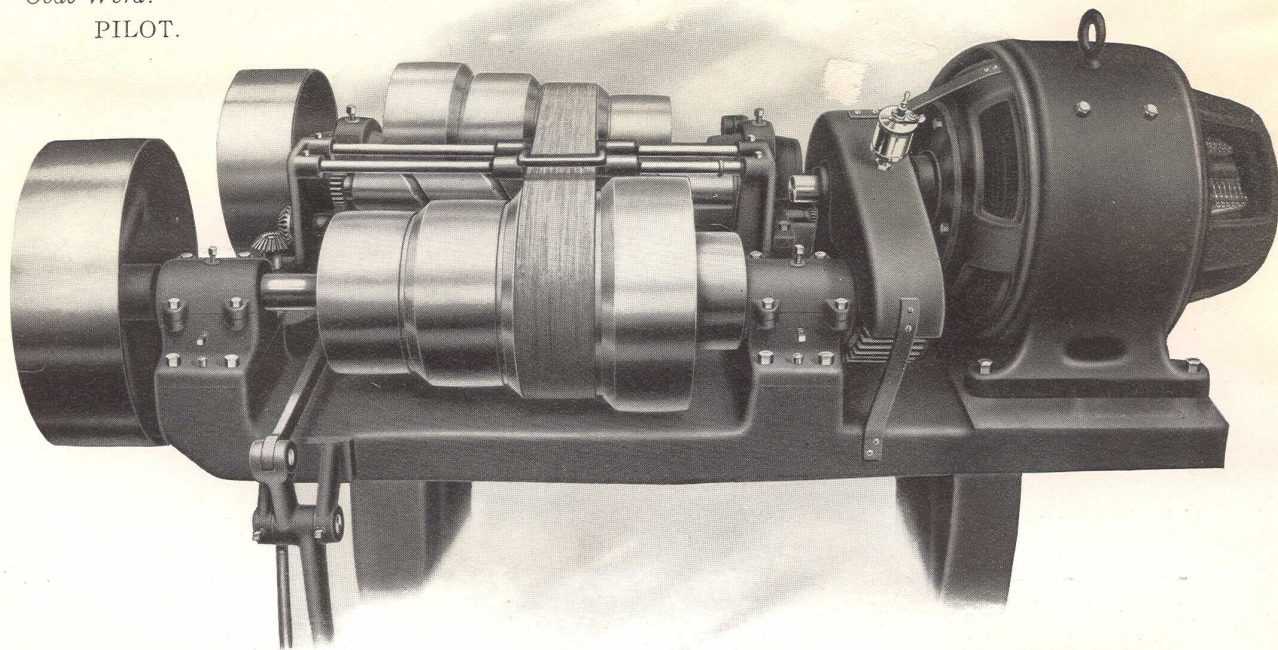
design and accuracy of the planer itself, insures a finished job which is free from imperfections, requiring the least, if any, attention from the vise hands in fitting.

CUTTING SPEEDS can be arranged suitable to individual requirements, but are regularly furnished to provide 20 ft., 30 ft., 40 ft., and 50 ft., with a constant return speed of about 80 ft.

BELT DRIVE (Drive “L”—Code Word—PINCH) is regularly furnished with this Variator, the tight and loose pulleys being applied to the rear cone shaft. The drive can be obtained direct from a line shaft, provided same has a sufficient speed, but, slow shafts of about 150 R. P. M., require an intermediate or “jack” shaft. With our construction it is a simple matter to convert the belt drive into a motor drive at any time after the machine is installed.

ELECTRIC MOTOR DRIVE (Drive “M”—Code Word—PILOT) illustrated above, may be furnished. A constant speed motor is required, either of the Direct or Alternating Current type. The motor is direct connected to the Variator through spur gearing. A starting box is all the controlling mechanism necessary. Should the motor at any time become disabled, the driving gear on end of Variator shaft, may be replaced by a pulley, and the planer driven by belt from a countershaft or another motor conveniently placed. The flexibility of this construction insures the constant use of this machine at all times.

FIG. NO. 181.
Code Word:
PILOT.



TOP VIEW OF DRIVE "M"
"Patented"

"American" Multi-Speed Planers.

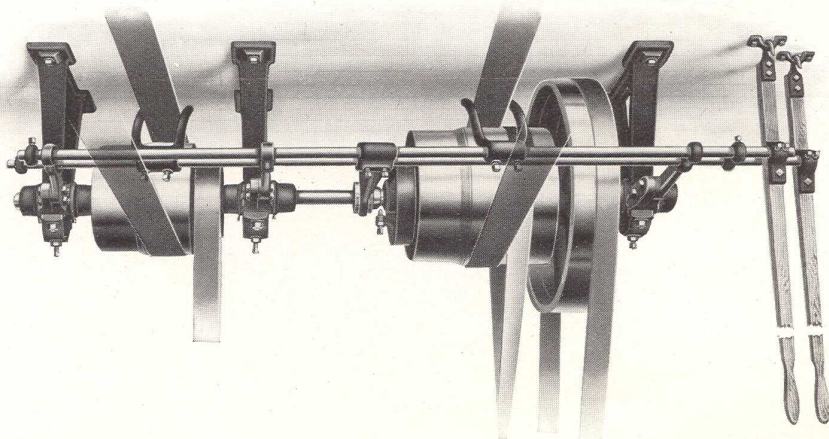
PATENTED
BELT OR ELECTRIC MOTOR DRIVEN.
(CONTINUED)

TWO (2) CUTTING SPEEDS.
With Constant Speed Return.

BELT DRIVEN ONLY.

THE TWO (2) SPEEDS, (Drive "W"—Code Word—MIST) are obtained thru a simple and efficient Two Speed Countershaft (shown below) free from gears,

which is attached to the ceiling in the usual manner. The self oiling feature of this countershaft minimizes attention to it and insures the longest life.



ONE (1) CUTTING SPEEDS.
BELT OR MOTOR DRIVEN.

BELT DRIVE. This style is our regular standard pattern, which is the most generally used.

MOTOR DRIVE (Drive "P"—Code Word—MEEK) may be furnished and con-

SPECIAL INFORMATION as to the various speeds furnished with any given size planer will be supplied upon request.

STANDARD SQUARE PLANERS we build in 22 in., 24 in., 26 in., 28 in., 30 in., 33 in., 36 in., 42 in., 48 in. and 60 in., sizes, also suitable.

sists of a constant Speed Motor, either of the Direct or Alternating Current type, mounted on a substantial platform on top of housings, and is direct connected, thru spur gearing, to the upper shaft which carries the driving pulleys, the large pulley having a heavy fly-wheel rim.

WIDENED PLANERS taking up to 72 in., between housings. For detailed information concerning any particular size "American" Planer, see circulars illustrating and describing same.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

May 15, 1911.

2500—B.

Tables and Vises for "American" Crank Shapers.



Fig. No. 224-E.
MOLD MAKERS' VISE
For 16 in., 20 in., 24 in. sizes.
Code Word: KIN.

This Vise has extra heavy jaws of unusual depth and length, well ribbed and extremely rigid. The right hand end of jaws extends beyond the vise body. Both jaws are steel faced their full depth. Swivel base is provided with graduated scale for accurate settings. This vise is interchangeable with the regular vise. Screw is always in tension.

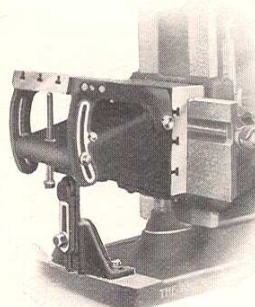


Fig. No. 224-D.
MOLD MAKERS' TILTING TABLE
For 20 in., 24 in. sizes.
Code Word: LENCE.

This table consists of a rigid knee securely clamped to the saddle. It carries a Tilting Top which permits angular settings above or below the horizontal, by means of an adjustable screw. It is securely clamped in any position by segments on each side, and a graduated scale on front segment provides for accurate settings. A taper pin locates table in central position.

This table is interchangeable with regular plain box table.

"American" Shapers are of entirely new design, possess our "Patented" Feed Mechanism and features which fit them equally well for tool room and manufacturing purposes.

They have sufficient power to handle the heaviest class of work intended for each size, which, with the nicely graded range of speeds and quick return stroke, insures the highest Productive Capacity.

Accuracy of Alignments is given special attention, every shaper being within .001" the full stroke of ram. This insures Absolute Accuracy in work produced, and makes them suitable for the most exacting requirements.

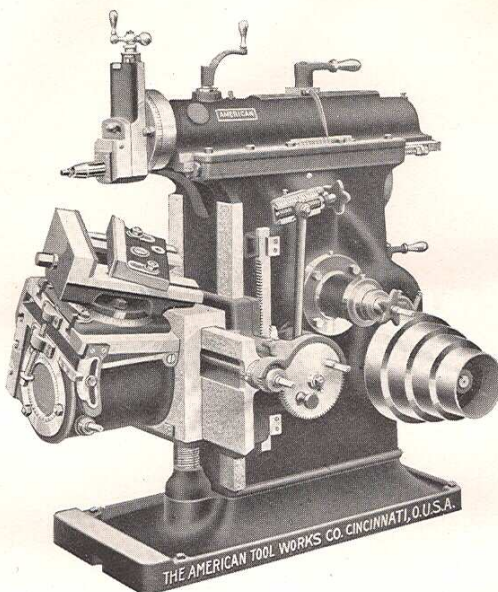


Fig. No. 217-B
UNIVERSAL TABLE AND VISE.
For 15 in., 16 in., 20 in., 24 in. sizes.
Code Word: UNIT.

This table is extremely rigid and is carried on a trunion cast integral with saddle. The table is securely clamped in any position by three bolts on the front, which extend through the table into an angular "T" slot in saddle. A large graduated disc at the front provides means for accurate settings. Positive stops for both sides of table insure setting them square.

Tilting top is regularly furnished, which is elevated by a screw and securely clamped in any position by the segments on both sides. Front segment has graduated scale to insure accurate settings.

Table is swiveled around the trunion by means of worm and worm wheel, which also acts as a lock to prevent table from swinging around when carrying a load.

Universal Vise is very heavy. Jaws are faced with steel. Base is graduated in degrees. Outer jaw is solid to better resist the thrust of the cut, and screw is always in tension. Sliding jaw is extra long, swivels on stud of large diameter is clamped at any angle by the two bolts shown and located parallel with front jaw by taper pin.

This table and vise are admirably adapted to tool-room requirements and a high degree of accuracy is guaranteed.

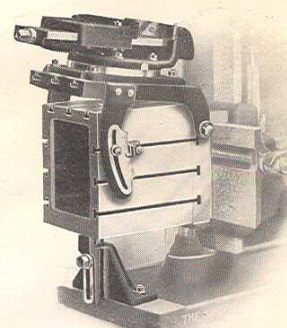


Fig. No. 224-F.
TILTING TOP FOR BOX TABLE
For 15 in., 16 in., 20 in., 24 in. sizes.
Code Word: LENT.

This consists of an auxiliary table hinged to the saddle and clamped at any angle by segments on both sides. Graduated scale is provided on front segment for accurate setting. This top may be applied to any plain box table. Tables for 20 in. and 24 in. sizes are provided with elevating screws similar to No. 217-B.

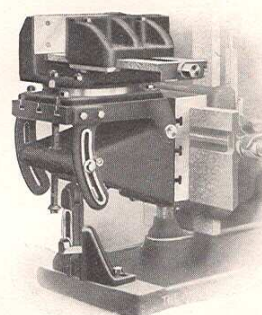


Fig. No. 224-K
MOLD MAKERS' VISE AND TABLE
(Combined.)
For 20 in., 24 in. sizes.

This equipment consists of mold-makers vise No. 224-E mounted upon the mold-makers' table No. 224-D as described on this page and may be applied at any time to the regular shaper. It is interchangeable with the regular table and vise.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

Jan. 1, 1912.

PAGE V.

2500—B.

Drives for "American" Crank Shapers.

BUILT IN 15 in.,

in., 24 in. SIZES.



Fig. No. 224.
CONE PULLEY DRIVE.
Regularly Furnished.

The above Drive is our regular 4-step Cone and is most generally used. In all sizes except the 15 in., it is supplemented by a back gear ratio. Face and diameter of steps are such as to give abundance of power.

Pulley runs on massive bearing cast integral with the column, which is exceptionally long, extending well into the center of cone, thereby eliminating the necessity of an outboard bearing, for cone shaft. Bearing is bronze lined and provided with means for thorough lubrication.

"American" Shapers can be equipped with the various drives shown, particularly fitting them for special requirements.

They have sufficient power to shape the heaviest class of work intended for each size, which, with the nicely graded range of speeds, and quick return stroke, insures the Highest Productive Capacity.

Accuracy of Alignments is given special attention, every shaper being within .001" the full stroke of ram. This insures absolute Accuracy in work produced, and fits them for the most exacting requirements.

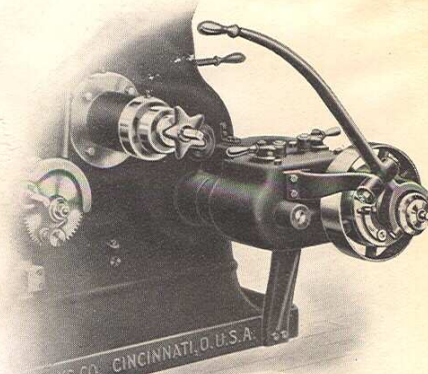


Fig. No. 224-V.
BELT DRIVE "V".
Code Word: LING.

This Drive is through a 4-Speed Gear Box driven by a Single Pulley, which outfit replaces the regular cone pulley. It provides changes of speed through the manipulation of the two levers shown.

Power is thrown on or off by the manipulation of the long hand lever, which controls a powerful friction on the driving pulley. This is especially convenient in stopping, starting and moving the ram to any desired position in the stroke.

Eight cutting speeds are obtainable when used with the back geared machines.

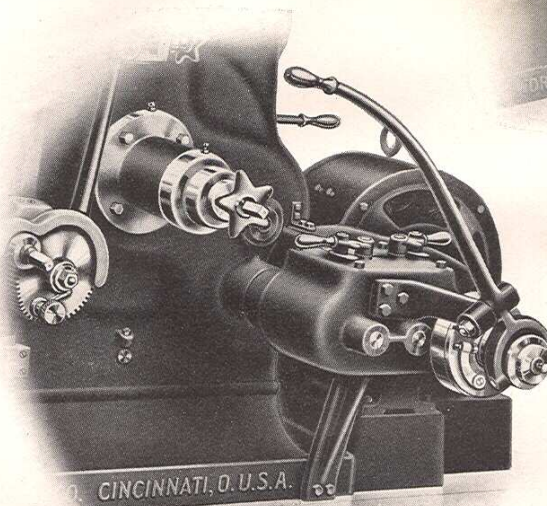


Fig. No. 224-S.
MOTOR DRIVE "S".
Code Word: LOGY.

It consists of a Constant Speed Motor mounted on back of column and connected by spur gearing to the driving shaft of the 4-speed box, through a friction controlled by the long hand lever shown. This lever enables the operator to stop and start the shaper with motor running continuously. It also permits of moving the ram to any desired position in the stroke and greatly facilitates manipulation of the levers on top of speed box.

"American" Shapers have a Powerful stroke and Quick Return. Stroke is changed and positioned without stopping the machine.

Feed Mechanism, similar to that used on a planer, gives positive feed of wide range, with Automatic Release should table be fed into end of rail. Can be adjusted at graduated slot head while running.

Sliding Bearings are extra wide, scraped to surface plates, and are provided with continuous Taper Gibs having end screw adjustment, for taking up the wear.

Running Bearings are bushed to afford replenishing in case of wear. The telescopic elevating screw removes the necessity for opening in the floor.

Other valuable features are—large keyseating capacity, powerful vise, detachable table, great accuracy, power, rigidity and scientific lubrication for all parts.

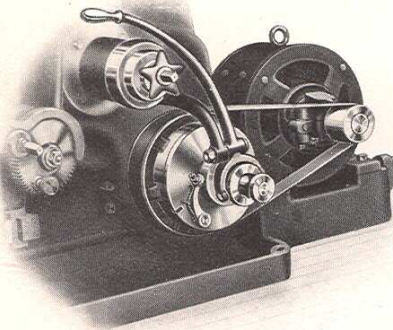


Fig. No. 224-U.
MOTOR DRIVE "U".
Code Word: MOCK.

With this drive, a Variable Speed Motor, of 3 to 1 ratio, is mounted on an extension to the base and direct connected through belt to large pulley on driving shaft of the machine. No speed box is used, variation being through the motor. The long hand lever operates a friction which permits stopping or starting the machine without interfering with the speed of the motor.

The lever is also very valuable in controlling the movement of the ram.

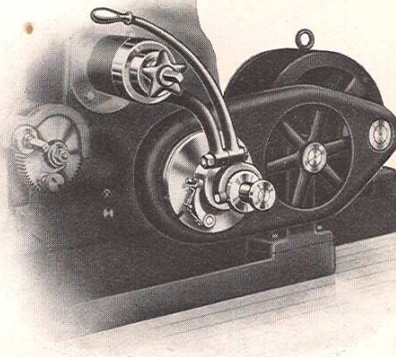


Fig. No. 224-T.
MOTOR DRIVE "T".
Code Word: METER.

A Variable Speed Motor, of 3 to 1 ratio, is mounted on an extension to the base and direct connected through spur gearing to the driving shaft of the machine. No speed box is necessary, the variations being through the motor. A rawhide intermediate driving gear is used.

Movement of the ram is under perfect control through the long hand lever shown, which operates a friction connection between the motor and the driving shaft, thus eliminating the necessity of starting and stopping the motor.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

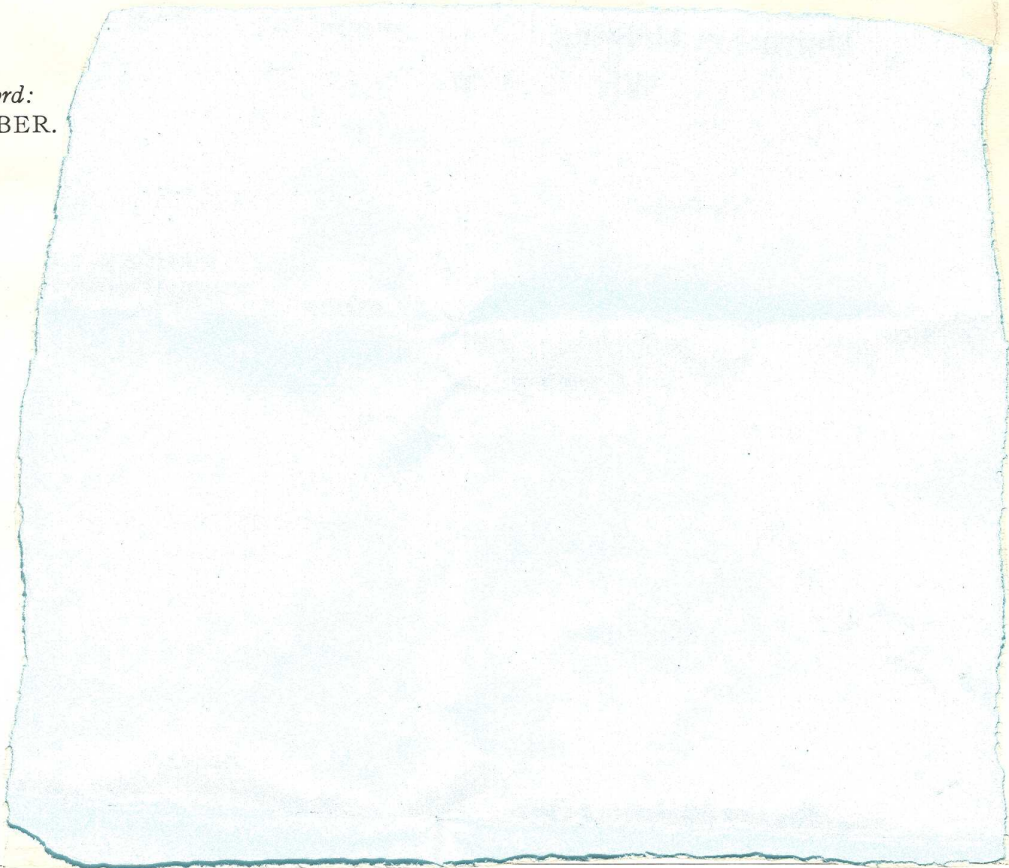
MAIN OFFICES AND WORKS,
CINCINNATI, U.S.A.

Jan. 1st 1912.

PAGE D.

2500—B.

FIG. NO. 203.
Code Word:
SABER.



15-inch Single-Geared Crank Shaper.

(PATENTED.)

Length of Stroke	15¼ in.	Vertical Travel of Table	14 in.
Down Feed to Head.....	6 in.	Horizontal Travel of Table	18 in.

MODERN METHODS in shop practice, and the present extensive use of special high-speed tool steels, have made the ordinary shaper of the past entirely inadequate to meet the demands of present day practice. The shaper, heretofore regarded as essentially a tool-room machine, has been made a manufacturing machine. To meet these changed conditions and new demands, we build a line of extra heavy and powerful shapers, taking into careful consideration the most severe requirements of modern shaper work, and "American" Shapers, as they stand today, are absolutely beyond comparison in their facilities for High-Speed Work Production, Accuracy of Alignments and Durability.

COLUMN is unusually deep and wide, tapering slightly toward the top, giving the machine a neat, graceful and substantial appearance. It is strongly braced internally, braces being so disposed as to meet the heaviest strains. The column is scientifically reinforced inside, on the line of strain, affording exceptional rigidity. Projects both front and rear at the top, providing an exceptionally long bearing for the ram.

BASE is of large proportions, very deep and strongly ribbed, affording an excellent foundation for the machine. It is of pan construction to catch oil drippings, thus protecting the floor.

RAM is very heavy and is designed for uniform rigidity, throughout entire length of stroke. Is thoroughly braced by internal ribs, and has long wide bearings on column with **CONTINUOUS TAPER GIB** having end screw adjustment for taking up the wear.

STROKE of ram is positive and has four (4) rates of speed, ranging from 20 to 65 strokes per minute. The length of stroke may be easily changed at will without stopping the machine. The device for positioning the stroke is located on the ram near the head and may be operated while the machine is running. A pointer on the ram traveling along an index, shows the length of stroke as set. Rocker arm is extra heavy and thoroughly braced and gives to the ram practically a uniform rate of speed its entire stroke, also provides an exceedingly quick return. The gearing ratio and wide belts are calculated to furnish sufficient power for work adapted to this type of machine.

HEAD is operative at any angle within an arc of 100 degrees and has convenient and efficient locking device. Down slide is fitted with **CONTINUOUS TAPER GIB** having end screw adjustment for taking up the wear. Down feed is of unusual length, feed screw having an adjustable graduated collar reading to .001 in. Has large tool post for using holders with inserted cutters and has tool steel tool post screw and tool steel serrated back plate.

TABLE is of box form with three T-slots on both top and sides, cut from the solid, with ample allowance of metal around them. Is thoroughly braced internally, insuring accuracy and great stiffness and is readily detachable.

APRON is accurately fitted to cross rail and is provided with **CONTINUOUS TAPER GIB** having end screw adjustment for taking up the wear. Has three T-slots on face for clamping work when table is removed.

PATENTED AUTOMATIC STOP releases the feed and thus prevents breakage to parts when tool is fed into the cut or should the apron be accidentally fed to its limit in either direction on the rail.

CROSS RAIL is of box form, very heavy and strongly ribbed. Is of exceptional length, giving the table a long horizontal range or travel. Has extra wide bearings for apron scraped to surface plates. Is bolted to column by clamps and bolts of improved design, which prevent cross rail from dropping away when the binder bolts are loosened. A **TELESCOPIC ELEVATING SCREW** of large diameter, is provided, having ball-bearing thrust for making easy the elevation of rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw. Elevating gears are of steel, planed from the solid.

CROSS FEED is of our new "patented" design. Is variable and automatic with a range of .006 in. to .150 in. instantly obtainable while the machine is running, at slot head near top of column, conveniently operated and accurately set by the knurled knob shown. Is supplied with graduations and pointer either side of zero, reading from 1 to 25 notches, each notch representing .006 in. feed. Construction is such as to render unnecessary any adjustment of feeding mechanism due to change of position of rail, a fault common to almost every other make of shaper. Feed is uniform as set, regardless of position of rail. The feed is thrown in or out, also reversed through knob on large feed gear. Large feed gear is supplied with squared rod to receive crank, making possible quick advance or return of the table. Feed gears are neatly covered to afford protection. Feed rack is cut from bar steel.

KEYSEATING CAPACITY. Rocker arm is made double section at the top and this with large opening through the column permits a shaft 2½ in. diam. to be passed under the ram for keyseating. Larger shafts may be keyseated by setting over table to allow shaft to pass outside of column, using the head set on an angle.

WISE is of new design throughout; is of heavy pattern. Jaws are deep and faced with steel. Is clamped by two bolts to swivel base, (graduated in degrees), which latter is exceptionally large, covering nearly the entire area of the table top and being clamped to same by four bolts. Vise screw has bearing at both ends and is always in tension when holding the work.

LUBRICATION. Special attention has been paid to the thorough lubrication of all working parts thereby insuring long life and satisfactory service from the machine. Ram slides are provided with felt wipers at both the front and center of the column, assisting in perfect lubrication, also preventing oil from dripping down over the front of the machine. An oil pocket is cast integral with the column at the rear, storing any waste of oil, which may be drawn off at any time through a pipe extending from rear of column. A large quantity of oil is stored in a pocket cast integral with arm with suitable means of distribution, insuring thorough lubrication of crank pin and sliding block in rocker arm.

COUNTERSHAFT has tight and loose pulleys 12 in. diam. 3¼ in. face, to run 180 r. p. m.

IN GENERAL. All gears are cut from the solid with special cutters and are coarse pitch and wide face. Bevel gears are planed from the solid. Pinions in driving train are cut from **BAR STEEL**. Easy access is provided to all working parts through large door on rear side. All bearings are extra wide and scraped to surface plates. All running bearings are bushed to permit relining in case of wear. Bearing for driving pulley is massive and cast

integral with column, and is exceptionally long, extending well into the center of cone, eliminating the necessity of an out board bearing for cone shaft. This bearing is bronze bushed. All shafts are of high carbon crucible steel accurately ground. Points of danger are amply covered to prevent injury to operator.

THE ACTION of this shaper is remarkable in its smoothness even under the heaviest cuts. In planing work which is afterwards to be scraped to a surface, the accuracy and evenness of the cut are such as to reduce any necessary scraping to a minimum.

REGULAR EQUIPMENT, upon which base price is determined, includes vise, countershaft, all necessary wrenches, and automatic safety stop described above.

WE CAN EQUIP THIS SHAPER, AT EXTRA COST, with automatic stop dog for cross rail, whereby feed may be stopped at any point, circular attachment, mold makers' vise, tilting table top, universal table, four-speed gear box and electric motor drive.

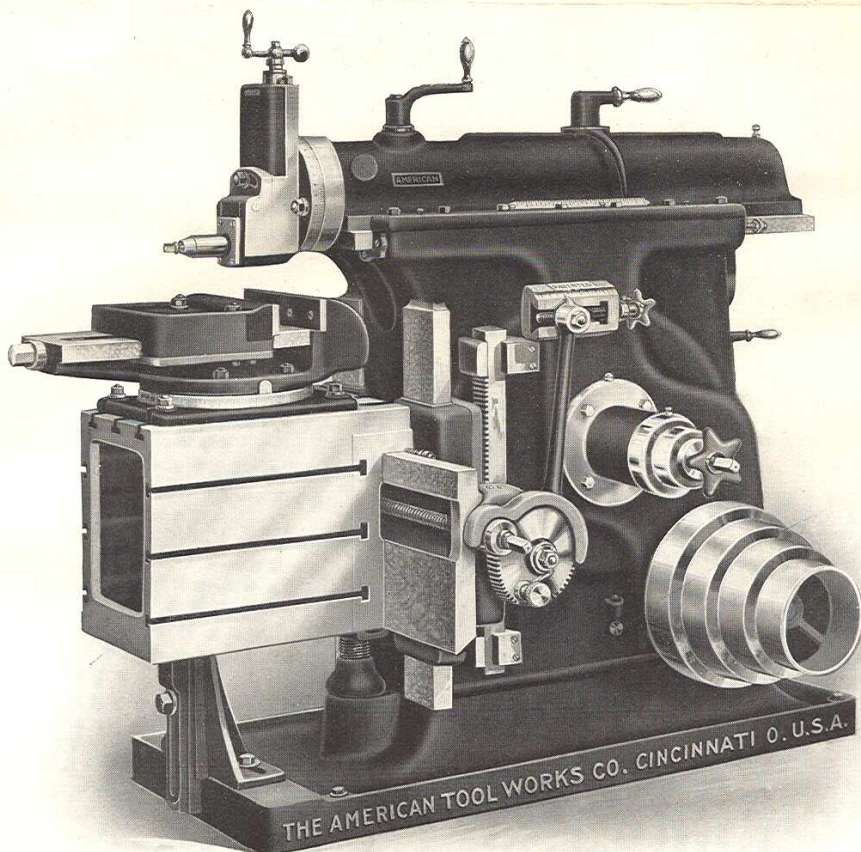
THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. No. 220.

Code Word.
SKIP.



20-inch Back-Geared Crank Shaper.

WITH EXTENSION BASE.
(PATENTED)

Length of Stroke.....20 $\frac{3}{4}$ in.
Down Feed to Head.....9 in.

Vertical Travel of Table14 $\frac{1}{2}$ in.
Horizontal Travel of Table26 $\frac{1}{2}$ in.

MODERN METHODS in shop practice, and the present extensive use of special high-speed tool steels, have made the ordinary shaper of the past entirely inadequate to meet the demands of present day practice. The shaper, heretofore regarded as essentially a tool room machine, has been made a manufacturing machine as well. To meet these changed conditions and new demands, we build a line of extra heavy and powerful shapers, 15 in. to 24 in. stroke, taking into careful consideration the most severe requirements of modern shaper work, and "American" Shapers, as they stand today, are absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Durability.

THE CLASS OF WORK handled on a Shaper usually requires extreme accuracy, and as accurate work can only be produced by accurate machines, unusual care must be given to the construction of this type of machine tool.

IN THE CONSTRUCTION of "American" Shapers the very highest possible degree of accuracy is maintained throughout, the greatest limit of error allowed being only .001 part of an inch. We positively guarantee that if properly set up they will plane up to their maximum capacity within the above limit of error. A high degree of accuracy is especially desirable, for very frequently work planed up on a Shaper is afterwards to be scraped to a surface, in which event the accuracy and evenness of the cut reduces the scraping to a minimum.

THE MATERIAL used throughout is also guaranteed to be of the very best obtainable for the purposes used. All gears are cut from the solid with special cutters; each gear being cut with a separate cutter especially adapted to the number of teeth in the gear. This method insures a quiet running machine with a minimum of wear on the gears. The pinions are all made of bar steel and bevel gears are planed from the solid steel.

ALL SHAFTS are made of crucible steel and are accurately ground, and all running bearings are bushed, thus providing for easy renewal in case of wear. Bearings for driving pulley are massive and are cast integral with the column. The main bearing is exceptionally long and extends well into the center of the cone, thus eliminating the necessity of an outboard bearing for the cone shaft. This bearing is bronze bushed.

THE DRIVE is very powerful; the cone pulley steps being of very large diameter and of unusual width, which in connection with very high ratios, provides a powerful drive.

RAM AND ROCKER ARM are of an improved design, which provides a very rigid and efficient construction. The rocker arm is rigidly connected to the pivot shaft at bottom of column which supports all the weight of the arm and other parts, thus relieving the ram from any "dead weight" and eliminating undue vibration. The connection between the rocker arm and ram is through a double link which is arranged so as to pull down on the arm during the cutting stroke, thus tending to overcome the upward thrust of the tool.

THIS CONSTRUCTION is far superior to that used on other designs in which the Rocker Arm is attached directly to the Ram. With this latter construction the Rocker Arm tends to lift the Ram during the first half of the cutting stroke, and moreover, necessitates the Ram carrying the "dead weight" of all the parts at all times, which creates more rapid wear on the ram bearings, besides

consuming more power. This latter design will also cause the work to show all the vibration which takes place in the Rocker Arm. On "American" Shapers the Rocker Arm is made in a complete "U" section for its entire length and is further strengthened by heavy transverse and cross ribbing. Ram is very heavy and is designed for uniform rigidity throughout entire length of stroke. Is thoroughly braced by internal ribs, and has long wide bearings on column with CONTINUOUS TAPER GIB having end screw adjustment, for taking up the wear.

FULL LENGTH TAPER GIBS WITH END SCREW ADJUSTMENT are provided in all flat bearings for taking up the wear. Experience has proven this Gib Construction to be by far the most satisfactory to use on a shaper, for its use insures a full length metal to metal contact at all times, which is impossible with other designs, and also permits of easy adjustment.

COLUMN is unusually deep and wide, tapering slightly towards the top, giving the machine a neat, graceful and substantial appearance. It is strongly braced internally, braces being so disposed as to meet the heaviest strains. The column is further reinforced outside, on the line of strain, by a wide, deep rib cast integral with the wall. Projects both front and rear at the top, providing exceptionally long bearing for the ram.

BASE is of large proportions, very deep and strongly ribbed, affording an excellent foundation for the machine. Is of extension type, with pad at the end to receive table support. It is of pan construction to catch oil drippings, thus protecting the floor.

STROKE of ram is positive and has eight (8) rates of speed, ranging from 7.7 to 96 strokes per minute. The length of stroke may be easily changed at will without stopping the machine. The device for positioning the stroke, is located on the ram near the head and may be operated while the machine is running. A pointer on the ram traveling along an index, shows the length of stroke as set. The machine is readily changed from single to back-geared through a convenient self-locking lever, and has the remarkable back-gear ratio of 24.3 to 1, which, with the large cone pulley, gives it extraordinary power for taking heavy cuts.

HEAD is operative at any angle within an arc of 100 degrees and has convenient and efficient locking device. Down slide is fitted with CONTINUOUS TAPER GIB having end screw adjustment, for taking up the wear. Down feed is of unusual length, feed screw having an adjustable graduated collar reading to .001 in. Has large tool post for using holders with inserted cutters and has tool steel tool post screw and tool steel serrated back plate.

TABLE is of box form with three T-slots on both top and sides, cut from the solid, with ample allowance of metal around them. Is thoroughly braced internally, insuring accuracy and great stiffness and is readily detachable.

APRON is accurately fitted to cross rail and is provided with CONTINUOUS TAPER GIB having end screw adjustment, for taking up the wear. Has three T-slots on face for clamping work when table is removed.

PATENTED AUTOMATIC STOP releases the feed and thus prevents breakage to parts when tool is fed into the cut or should the apron be accidentally fed to its limit in either direction on the rail.

CROSS RAIL is of box form, very heavy and strongly ribbed. Is of exceptional length, giving the table a long horizontal range of travel. Has extra wide bearings for apron scraped to surface plates. Is bolted to column by clamps and bolts of improved design, which prevent cross rail from dropping away when the binder bolts are loosened. A TELESCOPIC ELEVATING SCREW of large diameter is provided, having ball-bearing thrust for making easy the elevation of rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw. Elevating gears are of steel, planed from the solid.

CROSS FEED is of our new "patented" design. Is variable and automatic with a range of .008 to .200 in. instantly obtainable while the machine is running, at slot head near top of column, conveniently operated and accurately set by the star knob shown. Is supplied with pointer and graduations either side of zero, reading from 1 to 25 notches, each notch representing .008 in. feed. Construction is such as to render unnecessary any adjustment of feeding mechanism due to change of position of rail, a fault common to almost every other make of shaper. Feed is uniform as set, regardless of position of rail. The feed is thrown in or out, also reversed through knob on large feed gear. Feed gears are neatly covered to afford protection. Feed rack is cut from bar steel.

KEYSEATING CAPACITY. Rocker arm is made double section at the top and this, with large opening through the column, permits a shaft 3 $\frac{1}{2}$ in. diam.

to be passed under the ram for keyseating. Larger shafts may be keyseated by setting over table to allow shaft to pass outside of column, using the head set on an angle.

WISE is of new design throughout and heavy pattern. Jaws are deep and faced with steel. Is clamped by four (4) bolts to swivel base, (graduated in degrees), which latter is exceptionally large, covering nearly the entire area of the table top and being clamped to same by four (4) bolts. Vise screw has bearing at both ends and is always in tension when holding the work.

LUBRICATION. Special attention has been paid to the thorough lubrication of all working parts thereby insuring long life and satisfactory service from the machine. Ram slides are provided with felt wipers at both the front and center of the column, assisting in perfect lubrication, also preventing oil from dripping down over the front of the machine. Ram slides are oiled from the center where oil pockets are provided, from which felt wipers take their supply of oil and distribute it through grooves to the extreme ends of the slides, thus doing away with a multiplicity of oil holes to be attended to. An oil pocket is cast integral with the column at the rear, storing any waste of oil, which may be drawn off at any time through a pipe extending from rear of column. A large quantity of oil is stored in a pocket cast integral with rocker arm, which, with suitable means of distribution, insures thorough lubrication of crank pin and sliding block in rocker arm.

COUNTERSHAFT has tight and loose pulleys 16 in. diam. by 4 $\frac{1}{4}$ in. face, to run 190 r. p. m.

REGULAR EQUIPMENT, upon which base price is determined, includes vise, countershaft, all necessary wrenches, and automatic safety stop described above. INSTRUCTION BOOK for the installation and operation of our machine tools is regularly furnished.

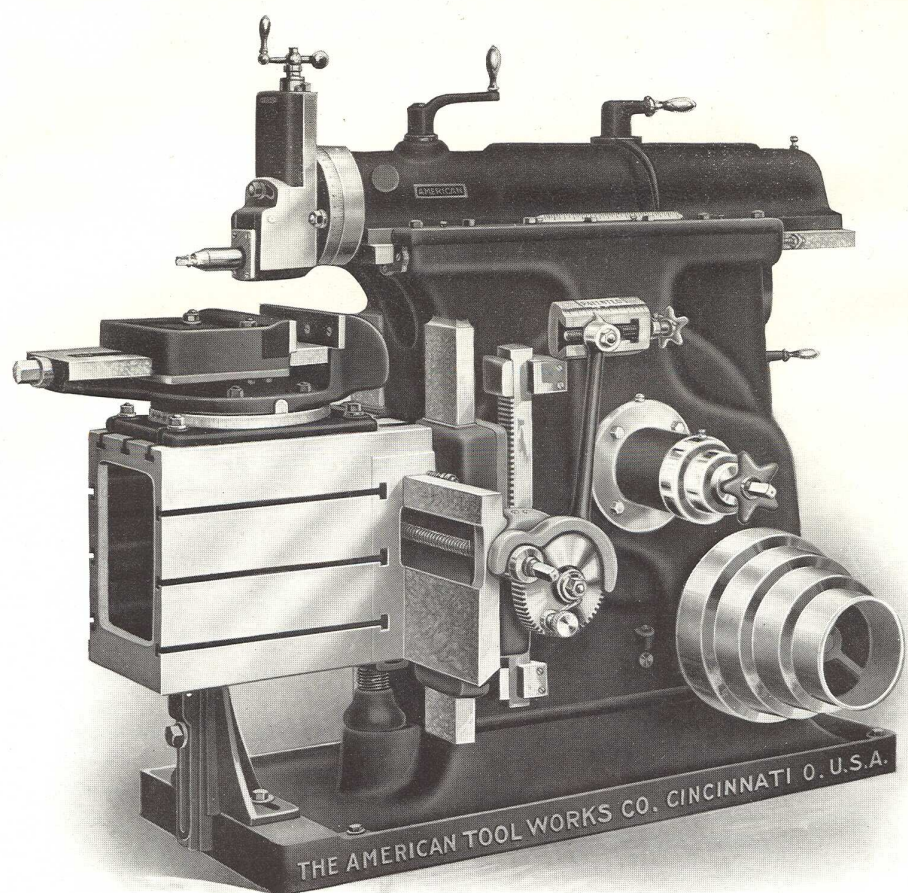
WE CAN EQUIP THIS SHAPER, at EXTRA COST, with power down feed, circular attachment, mold maker's vise, and table, tilting top for box table, with tilting side, four-speed gear box and electric motor drive.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

FIG. No. 224.
Code Word.
SOUL.



24-inch Back-Geared Crank Shaper

WITH EXTENSION BASE
(PATENTED)

Length of Stroke.....	24¾ in.	Vertical Travel of Table.....	14 in.
Down Feed to Head	9 in.	Horizontal Travel of Table	26½ in.

MODERN METHODS in shop practice, and the present extensive use of special high-speed tool steels, have made the ordinary shaper of the past entirely inadequate to meet the demands of present day practice. The shaper, heretofore regarded as essentially a tool room machine, has been made a manufacturing machine. To meet these changed conditions and new demands, we build a line of extra heavy and powerful shapers, 15 in. to 24 in. stroke, taking into careful consideration the most severe requirements of modern shaper work, and "American" Shapers, as they stand today, are absolutely beyond comparison in their facilities for High-Speed Work Production, Accuracy of Alignments and Durability.

COLUMN is unusually deep and wide, tapering slightly towards the top, giving the machine a neat, graceful and substantial appearance. It is strongly braced internally, braces being so disposed as to meet the heaviest strains. The column is further reinforced outside, on the line of strain, by a wide, deep rib cast integral with the wall. Projects both front and rear at the top, providing exceptionally long bearing for the ram.

BASE is of large proportions, very deep and strongly ribbed, affording an excellent foundation for the machine. Is of extensive type, with pad at the end to receive table support, when same is furnished. It is of pan construction to catch oil drippings, thus protecting the floor.

RAM is very heavy and is designed for uniform rigidity throughout entire length of stroke. Is thoroughly braced by internal ribs, and has long wide bearings on column with CONTINUOUS TAPER GIB having end screw adjustment, for taking up the wear.

STROKE of ram is positive and has eight (8) rates of speed, ranging from 9 to 108½ strokes per minute. The length of stroke may be easily changed at will without stopping the machine. The device for positioning the stroke is located on the ram near the head and may be operated while the machine is running. A pointer on the ram traveling along an index, shows the length of stroke as set. Rocker arm is extra heavy and thoroughly braced and gives to the ram practically a uniform rate of speed its entire stroke, also providing an exceedingly quick return. The machine is readily changed from single to back-geared through a convenient self locking lever, and has the remarkable back-gear ratio of 24.3 to 1, which, with the large cone pulley, gives it extraordinary power for taking heavy cuts.

HEAD is operative at any angle within an arc of 100 degrees and has convenient and efficient locking device. Down slide is fitted with CONTINUOUS TAPER GIB having end screw adjustment, for taking up the wear. Down feed is of unusual length, feed screw having an adjustable graduated collar reading to .001 in. Has large tool post for using holders with inserted cutters and has tool steel tool post screw and tool steel serrated back plate.

TABLE is of box form with three T-slots on both top and sides, cut from the solid, with ample allowance of metal around them. Is thoroughly braced internally, insuring accuracy and great stiffness and is readily detachable.

APRON is accurately fitted to cross rail and is provided with CONTINUOUS TAPER GIB having end screw adjustment, for taking up the wear. Has three T-slots on face for clamping work when table is removed.

PATENTED AUTOMATIC STOP releases the feed and thus prevents breakage to parts when tool is fed into the cut or should the apron be accidentally fed to its limit in either direction on the rail.

CROSS RAIL is of box form, very heavy and strongly ribbed. Is of exceptional length, giving the table a long horizontal range of travel. Has extra wide bearings for apron scraped to surface plates. Is bolted to column by clamps and bolts of improved design, which prevent cross rail from dropping away when the binder bolts are loosened. A TELESCOPIC ELEVATING SCREW of large diameter is provided, having ball-bearing thrust for making easy the elevation of rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw. Elevating gears are of steel, planed from the solid.

CROSS FEED is of our new "patented" design. Is variable and automatic with a range of .008 in. to .200 in. instantly obtainable while the machine is running, at slot head near top of column, conveniently operated and accurately set by the star knob shown. Is supplied with pointer and graduations either side of zero, reading from 1 to 25 notches, each notch represent-

ing .008 in. feed. Construction is such as to render unnecessary any adjustment of feeding mechanism due to change of position of rail, a fault common to almost every other make of shaper. Feed is uniform as set, regardless of position of rail. The feed is thrown in or out, also reversed through knob on large feed gear. Feed gears are neatly covered to afford protection. Feed rack is cut from bar steel.

KEYSEATING CAPACITY. Rocker arm is made double section at the top and this, with large opening through the column, permits a shaft 3¾ in. diam. to be passed under the ram for keyseating. Larger shafts may be keyseated by setting over table to allow shaft to pass outside of column, using the head set on an angle.

WISE is of new design throughout; is of heavy pattern. Jaws are deep and faced with steel. Is clamped by four (4) bolts to swivel base, (graduated in degrees) which latter is exceptionally large, covering nearly the entire area of the table top and being clamped to same by four (4) bolts. Vise screw has bearing at both ends and is always in tension when holding the work.

LUBRICATION. Special attention has been paid to the thorough lubrication of all working parts thereby insuring long life and satisfactory service from the machine. Ram slides are provided with felt wipers at both the front and center of the column, assisting in perfect lubrication, also preventing oil from dripping down over the front of the machine. Ram slides are oiled from the center where oil pockets are provided, from which felt wipers take their supply of oil and distribute same through oil grooves to the extreme ends of the slides, thus doing away with a multiplicity of oil holes to be attended to. An oil pocket is cast integral with the column at the rear, storing any waste of oil, which may be drawn off at any time through a pipe extending from rear of column. A large quantity of oil is stored in a pocket cast integral with the rocker arm, which, with suitable means of distribution, insures thorough lubrication of crank pin and sliding block in rocker arm.

COUNTERSHAFT has tight and loose pulleys 16 in. diam. by 4¼ in. face, to run 190 r. p. m.

IN GENERAL. All gears are cut from the solid with special cutters and are coarse pitch and wide face. Bevel gears are planed from the solid. Pinions in driving train are cut from BAR STEEL. Easy access is provided

to all working parts through large door on rear side. All bearings are extra wide and scraped to surface plates. All running bearings are bushed to afford replenishing in case of wear. Bearing for driving pulley is massive and cast integral with column and is exceptionally long, extending well into the center of cone, eliminating the necessity of an out board bearing for cone shaft. This bearing is bronze bushed. All shafts are of high carbon crucible steel, accurately ground. Points of danger are amply covered to prevent injury to operator.

THE ACTION of this shaper is remarkable in its smoothness even under the heaviest cuts. In planing work which is afterwards to be scraped to a surface, the accuracy and evenness of the cut are such as to reduce any necessary scraping to a minimum.

REGULAR EQUIPMENT, upon which base price is determined, includes vise, countershaft, all necessary wrenches and automatic safety stop described above; also INSTRUCTION BOOK for the installation and operation of our machine tools.

WE CAN EQUIP THIS SHAPER, at EXTRA COST, with power down feed, circular attachment, mold makers' vise and table, tilting top for box table, universal table with tilting side, four-speed gear box and electric motor drive.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

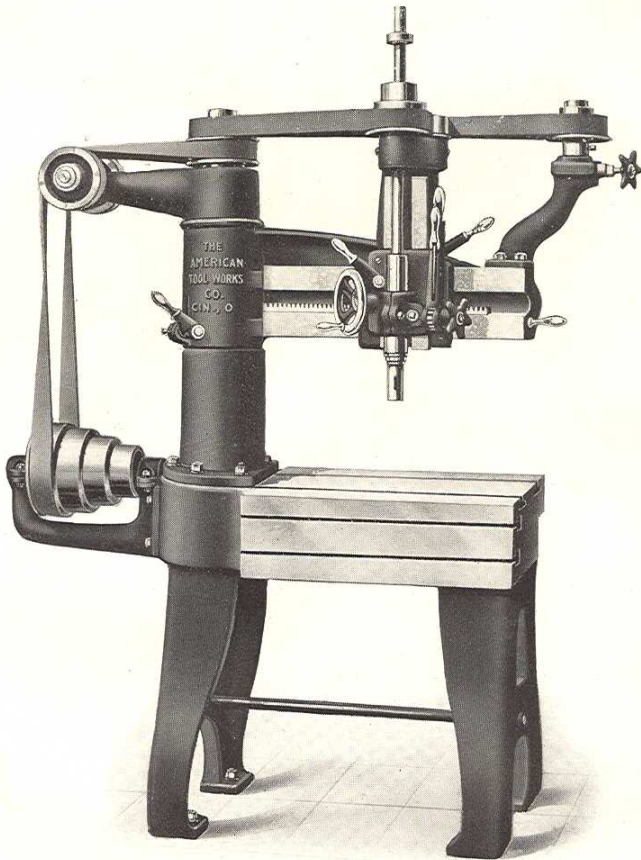
MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

2-Ft. DRILL.

FIG. No. 300.

Code Word:

ROAR.



3-Ft. DRILL.

FIG. No. 311.

Code Word:

ROUT.

High Speed "Sensitive" Radial Drill

BUILT WITH 2-FT. AND 3-FT. ARMS

	2-ft. Arm.	3-ft. Arm.		2-ft. Arm.	3-ft. Arm.
Spindle Speeds, r. p. m.	300 to 900	300 to 900	Traverse of Spindle at One Setting	5½ in.	5½ in.
Drills to Center of Circle outside of Column	49 in.	73 in.	Vertical Traverse of Head Slide	8 in.	8 in.
Min'm Dist. from Spindle Center to Column	6¼ in.	6¼ in.	Traverse of Head on Arm	18¼ in.	30¼ in.
Max'm Distance from Spindle to Table	19 in.	19 in.	Distance from Underside of Head to Table	15¾ in.	15¾ in.
Height of Table above Floor	35 in.	35 in.	Width of Drive Belt on Machine	2 in.	2 in.
Working Surface of Table Top	20x28½ in.	20x40½ in.	Width of Drive Belt on Countershaft	2½ in.	2½ in.
Working Surface of Table Side	6¼x28½ in.	6¼x40½ in.	Floor Space (full swing)	66¾x87½ in.	78¾x111¼ in.
Max'm Height to Highest Point of Spindle	7 ft. 7½ in.	7 ft. 7½ in.	Speed of Countershaft (2-speed) r. p. m.	310 and 387	310 and 387

BELT OR MOTOR DRIVEN

THERE IS AN ENORMOUS AMOUNT OF DRILLING which is most profitably performed on the Sensitive Drill, when using the smaller sizes of Drills up to and including ¾ in. dia., which sizes must be driven at a high velocity in order to obtain their full efficiency. This is particularly true of drills made from high speed steel. The High Speed "Sensitive" Radial Drill, as shown above, has been developed and built by us to combine the efficiency of the sensitive drill with the convenience and high productive capacity of the radial. In the drilling of switch boards, automobile chassis, transmission cases and other parts, cash register details, harvesting machinery and the host of requirements for small hole drilling, this machine is unquestionably the most profitable tool for the work. It is not only endowed with the required spindle speeds and power, but is particularly adapted to this class of work, because of its wide utility and the extreme ease and rapidity with which it can be handled.

THIS RADIAL DRILL is the result of careful study, investigation, and an exhaustive series of tests covering a wide range of speeds for drills up to ¾ in. dia., of both carbon and high speed steel. The machine has demonstrated, to an astonishing degree, its particular fitness for work of this character, showing a productive capacity far in excess of that heretofore possible.

GENERAL DESIGN, is of the most scientific and advanced type, and is such as to greatly simplify operation of the machine. All levers are directly at the operator's hand, and the movement of the head and arm, in locating same for drilling, is most easily and quickly accomplished, thus facilitating rapid manipulation. The work to be drilled lays on the large table, which is of a convenient height from the floor, and does not have to be reset for drilling each individual hole. This feature saves considerable time and also insures uniformity and accuracy in the alignments of the holes.

DRIVING MECHANISM There are no gears in the driving mechanism of this drill from the countershaft thru to the main spindle, it being driven by means of a 2 in. double belt running at a high rate of speed, thus transmitting an abundance of power and speed direct to the spindle of the drill. The spindle belt is kept at proper tension by turning the star knob shown at the top.

BALL BEARINGS All the driving and idler pulleys are equipped with our special ball bearings, which consist of a double set of hardened and ground ball races and cones, one set being located at each end of the pulley journals. They are so constructed as to be dust proof and form a retainer for the lubricant (preferably vaseline and graphite) which needs to be renewed only at long intervals.

SPINDLE is of high carbon crucible steel, accurately ground and provided with a dust-proof self-lubricating ball thrust bearing. Has six changes of speed ranging from 300 to 900 r. p. m. in geometrical progression, obtainable through a 2-speed countershaft and 3-step cone pulley, regularly furnished. Is provided at the top with an adjustable stop collar, which may be used as a depth gauge. Spindle is fed by a long hand lever and ratchet wheel, the latch handle being self-releasing when in the uppermost position. A convenient star wheel supplies quick return to the spindle.

COLUMN is of tubular section, well ribbed internally and of sufficient stiffness to withstand the strains to which it is subjected. It extends through the arm into the cap at top of drill and is firmly bolted to the top of table.

ARM is of our parabolic beam and tube section design, which has afforded such exceptional rigidity on our larger drills, giving the greatest resistance to bending and torsional strains. Its construction is such that the lower line is parallel with the table, thus enabling the full capacity of the drill to be used at any point along the arm. It swings easily on the column and may be securely clamped in any position by means of a convenient binder lever. The arm does not move vertically, since provision is made on the head for variable heights of work.

HEAD is of special design and is moved rapidly along the arm by hand wheel through angular rack and spiral pinion, and may be clamped at any point along the arm by the lever shown at the right of head. Head consists of the main saddle which slides upon the arm and carries an auxiliary sliding head upon a vertical dovetail. This allows a vertical movement to the head, doing away with the necessity of elevating or lowering the arm, thereby covering the full range of work between the table and the arm. Vertical slide may be securely locked by the lever shown at the left of head. Ample means are supplied for taking up the wear of all slides.

TABLE is accurately planed and is of full box construction, strongly ribbed and mounted upon substantial legs, forming a most rigid and convenient arrangement. It is of proper height to enable the average operator to conveniently stand up to his work. The top and front sides are fitted with "T" slots, planed from the solid, and the back end is planed so as to be of service in squaring up work, etc.

COUNTERSHAFT The 2-speed countershaft is of special design for high speed work. Shaft is turned and ground. The boxes in hangers are of our new improved gravity and wick oiling type, taking their supply from large oil reservoirs, needing attention only at long intervals. Countershaft carries a 3-step cone pulley, with a pair of friction pulleys 10 in. dia. x 3 in. face, and should run 310 and 387 r. p. m.

REGULAR EQUIPMENT, upon which base price is determined, includes 2-speed countershaft and belts. Wrenches are not required.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

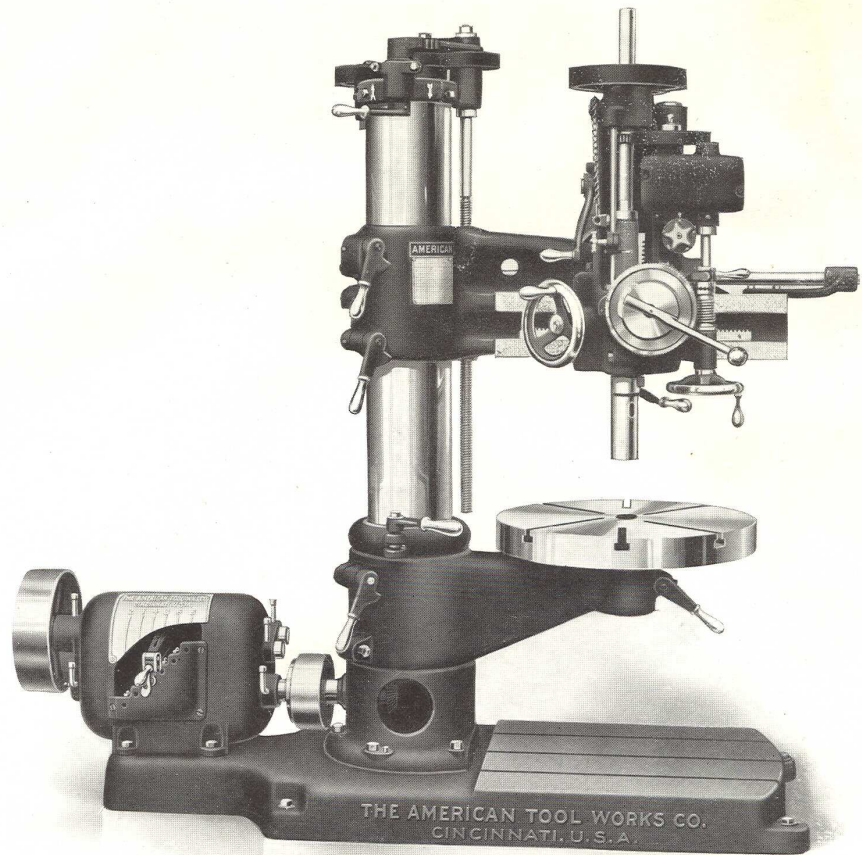
MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

May 1st, 1912.

2500—B.

Fig. No. 340.
Code Word:
RACE.



2-foot Back Geared, High Speed Radial Drill

Drills to Center of Circle outside of Column.....4 ft. 5 in. Traverse of Spindle11 in.
Greatest Distance from Spindle to Base.....3 ft. 9½ in. Traverse of Head on Arm.....16 in.

BUILT WITH EITHER CONE PULLEY OR SPEED BOX DRIVE.

THE INTRODUCTION OF HIGH SPEED STEEL TWIST DRILLS, with their enormous productive capacity and ability to stand up under speeds and feeds previously unheard of, also, the inevitable supplanting of the Upright by the Radial Drill for "all around" purposes, has led us to bring out a full line of Radials, having 2 ft., 2½ ft., 3 ft., 3½ ft., 4 ft., 5 ft., 6 ft. and 7 ft. arms, one size being herewith described. This drill has surpassed all known records for rapid drilling and heavy tapping and is absolutely beyond comparison in its facilities for High Speed Work Production, Accuracy of Alignment and Durability.

PROPER LUBRICATION is a very important consideration in high speed machines. This feature has been thoroughly provided for in these drills as all bearings are oiled thru oil pipes and oilers, which in connection with liberal oil chambers and felt wipers insure at all times the proper distribution of oil.

FEEDING MECHANISM on the head provides four (4) distinct rates of feed covering a carefully chosen range, in geometrical progression from .007 in. to .020 in. These feeds are all readily obtained by the simple turning of the knob on feed box until the desired feed shown on dial comes opposite a fixed pointer. This method of feed change is by far the simplest yet devised as it requires no reference to index plates and subsequent handling of levers. The all-gear feeds, when supplied instead of belted feeds, insure vastly increased productive capacity, rapidity of change and positive action. The feed train is engaged and disengaged at the worm wheel thru a friction clutch and lever, which also controls the quick advance and return of spindle. This feed friction is so designed as to permit the drill being crowded to its full capacity without unduly straining the feeding mechanism.

DEPTH GAUGE AND AUTOMATIC TRIP. Feeds can be automatically tripped at any position of spindle by adjustable trip-dog and pointer, acting on the worm clutch. Spindle sleeve is graduated its entire traverse in sixteenths which permits of the spindle feed being accurately tripped at a predetermined depth from any position within the limits of its travel by merely setting the trip dog so that its pointer reads from zero to the desired depth. The trip also acts automatically at extreme limit of spindle travel thereby preventing breakage of feed mechanism thru carelessness.

6-SPEED BOX is of Cone and Tumbler construction affording a positive drive and eliminating all slipping of frictions under heavy loads. This box gives 6 changes of speed, each one of which can be instantly obtained while the machine is running at full speed by simply shifting the tumbler from one position to another.

The Tumbler is locked securely in its position by means of a latch and locking pin which prevents the throwing out of the tumbler under severe strain. The cone and tumbler gears are of the Brown & Sharpe 20 degree involute pointed tooth type and are made from a Special Grade of Steel Carbonized and Hardened. Experience has proven this to be the best possible type to use where running gears are meshed broadside as it makes the meshing of the gears extremely easy and eliminates the tendency of the gears to "ride". An auxiliary drive is provided which is automatically engaged and disengaged thru a friction by the raising and lowering of the sliding tumbler. This rotates the cone of gears while changing speeds, thus lessening the shock when the tumbler and cone gears are engaged. A spring shock absorber located in the line of drive between the speed, box and the initial driving gears absorbs all shocks thereby greatly prolonging the life of the driving mechanism.

A MOTOR of any type may be attached by various methods, connection being made either direct or thru gear, chain or belt. However, our experience has proven that motor on base connected by gearing to 6-speed box is the most simple, efficient and serviceable method. Drive "G" in our booklet illustrates this method.

SPINDLE on our cone driven Radial has sixteen (16) changes of speed, ranging from 33 to 400 R. P. M., in geometrical progression, all immediately available without stopping the machine. This wide range of spindle speeds, advancing

by close increments, combined with the exceptional driving power of the machine, renders the drill equally efficient with either ordinary carbon or high speed twist drills. A speed plate fixed to the arm girdle shows at a glance how to obtain suitable speeds for any work within the capacity of the machine. Spindle is counterbalanced and has frictional quick advance and return.

COLUMN is of double tubular type. This construction provides the equivalent of a double column and affords unusual rigidity for resisting severe strains. The sleeve, or outer column, revolves on hardened and ground conical roller bearings, and may be easily swung around and quickly clamped in position by means of our patent "V" clamping ring. This binds the sleeve firmly to the inner column, which extends entirely through and has full bearing for the sleeve at both top and bottom.

ARM is of parabolic beam and tube section, giving greatest resistance to bending- and torsional strains. Its lower portion is parallel with the base, and thus permits work being operated upon in close proximity to the column without the necessity of an extreme reach of spindle. Arm is clamped to column by two binder levers, obviating loose wrenches, and is provided with gib-screw, permitting arm to work freely, without sagging, while binder handles are loose. It is raised and lowered rapidly by a double thread coarse pitch screw, and controlled instantly by a convenient lever, arrow points indicating the proper direction.

HEAD is moved rapidly along the arm by hand-wheel thru angular rack and spiral rack pinion. It has convenient clamping device for locking it in any position. Back gears are located on the head, thus bringing the greatest speed reduction direct to spindle. They may be engaged or disengaged WITHOUT SHOCK while the machine is in operation, by a convenient lever, the high speed run being engaged thru a friction.

TAPPING MECHANISM is carried on the head, between the back gears and speed box, thus giving to the frictions, already very powerful, the benefit of the back gear ratio, making unusually heavy tapping operations possible, and also permitting taps to be backed out at an accelerated speed. The lever for starting, stopping, or reversing the spindle, is controlled at the head from the front of the machine.

BASE is of massive proportions, strongly ribbed, especially at the point of support of column. Is accurately planed and has large T-slots with an ample allowance of metal around them.

BEARINGS are all made from a high-grade Phosphor Bronze.

ROUND TABLE is regularly furnished, has top surface 24 in. diameter and liberal T-slots. Is supported on a very rigid knee, which can be swung to either side when working on the base.

REGULAR EQUIPMENT, upon which base price is determined, includes round table, double friction countershaft and cone pulley drive. Instruction Book for installing and operating our machines is regularly supplied.

AT EXTRA COST, we can equip this drill with speed box, described above, and electric motor drive.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

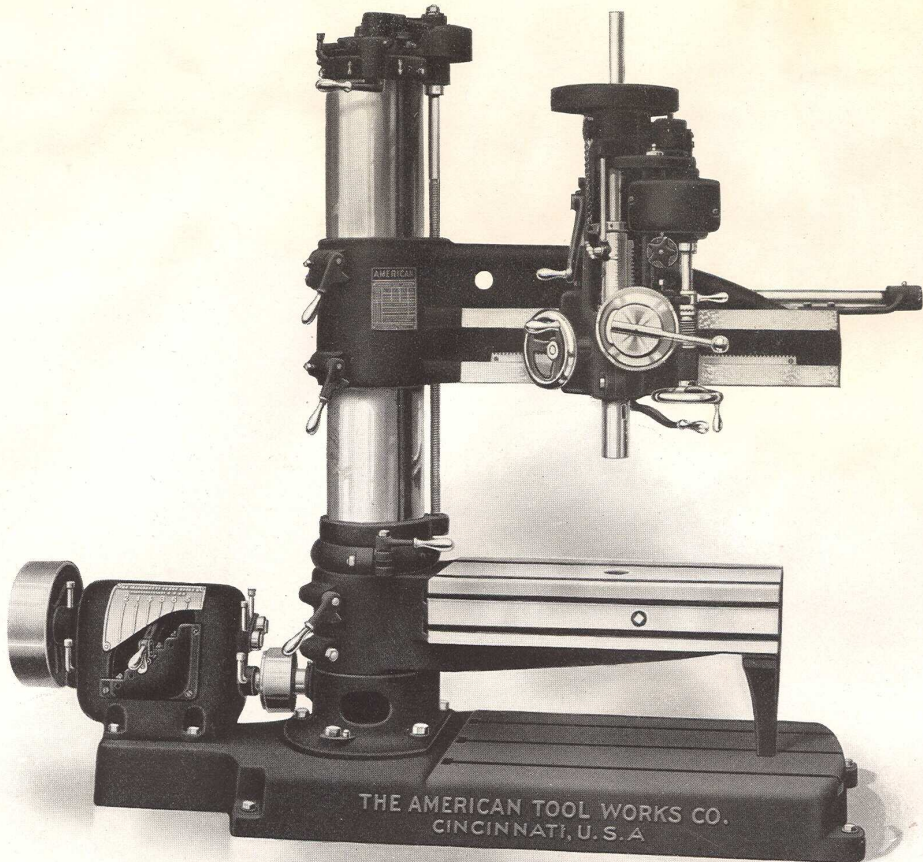
March 1st, 1911.

5000—B.

Fig. No. 347.

Code Word:

RAKE



3 1/2-foot Back Geared, High Speed Radial Drill

Drills to Center of Circle outside of Column.....84 in.
Greatest Distance from Spindle to Base.....51 in.

Traverse of Spindle.....12 in.
Traverse of Head on Arm.....33 3/4 in.

BUILT WITH EITHER CONE PULLEY OR SPEED BOX DRIVE.

THE INTRODUCTION OF HIGH SPEED STEEL TWIST DRILLS, with their enormous productive capacity and ability to stand up under speeds and feeds previously unheard of, also, the inevitable supplanting of the Upright by the Radial Drill for "all around" purposes, has led us to bring out a full line of Radials, having 2 ft., 2 1/4 ft., 3 ft., 3 1/2 ft., 4 ft., 5 ft., 6 ft. and 7 ft. arms, one size being herewith described. This drill has surpassed all known records for rapid drilling and heavy tapping and is absolutely beyond comparison in its facilities for High Speed Work Production, Accuracy of Alignment and Durability.

PROPER LUBRICATION is a very important consideration in high speed machines. This feature has been thoroughly provided for in these drills as all bearings are oiled thru oil pipes and oilers, which in connection with liberal oil chambers and felt wipers insure at all times the proper distribution of oil.

FEEDING MECHANISM on the head provides four (4) distinct rates of feed covering a carefully chosen range, in geometrical progression from .007 in. to .020 in. These feeds are all readily obtained by the simple turning of the knob on feed box until the desired feed shown on dial comes opposite a fixed pointer. This method of feed change is by far the simplest yet devised as it requires no reference to index plates and subsequent handling of levers. The all-gear feeds, when supplied instead of belted feeds, insure vastly increased productive capacity, rapidity of change and positive action. The feed train is engaged and disengaged at the worm wheel thru a friction clutch and lever, which also controls the quick advance and return of spindle. This feed friction is so designed as to permit the drill being crowded to its full capacity without unduly straining the feeding mechanism.

DEPTH GAUGE AND AUTOMATIC TRIP. Feeds can be automatically tripped at any position of spindle by adjustable trip-dog and pointer, acting on the worm clutch. Spindle sleeve is graduated its entire traverse in sixteenths which permits of the spindle feed being accurately tripped at a predetermined depth from any position within the limits of its travel by merely setting the trip dog so that its pointer reads from zero to the desired depth. The trip also acts automatically at extreme limit of spindle travel thereby preventing breakage of feed mechanism thru carelessness.

6-SPEED BOX is of Cone and Tumbler construction affording a positive drive and eliminating all slipping of frictions under heavy loads. This box gives 6 changes of speed, each one of which can be instantly obtained while the machine is run-

ning at full speed by simply shifting the tumbler from one position to another. The Tumbler is locked securely in its position by means of a latch and locking pin which prevents the throwing out of the tumbler under severe strain. The cone and tumbler gears are of the Brown & Sharpe 20 degree involute pointed tooth type and are made from a Special Grade of Steel Carbonized and Hardened. Experience has proven this to be the best possible type to use where running gears are meshed broadside as it makes the meshing of the gears extremely easy and eliminates the tendency of the gears to "ride". An auxiliary drive is provided which is automatically engaged and disengaged thru a friction by the raising and lowering of the sliding tumbler. This rotates the cone of gears while changing speeds, thus lessening the shock when the tumbler and cone gears are engaged. A spring shock absorber located in the line of drive between the speed box and the initial driving gears absorbs all shocks thereby greatly prolonging the life of the driving mechanism.

A MOTOR of any type may be attached by various methods, connection being made either direct or thru gear, chain or belt. However, our experience has proven that motor on base connected by gearing to 6-speed box is the most simple, efficient and serviceable method. Drive "G" in our booklet illustrates this method.

SPINDLE on our cone driven Radial has sixteen (16) changes of speed, ranging from 33 to 400 R. P. M., in geometrical progression, all immediately available without stopping the machine. This wide range of spindle speeds, advancing by close increments, combined with the exceptional driving power of the

machine, renders the drill equally efficient with either ordinary carbon or high speed twist drills. A speed plate fixed to the arm girdle shows at a glance how to obtain suitable speeds for any work within the capacity of the machine. Spindle is counterbalanced and has frictional quick advance and return.

COLUMN is of double tubular type. This construction provides the equivalent of a double column and affords unusual rigidity for resisting severe strains. The sleeve, or outer column, revolves on hardened and ground conical roller bearings, and may be easily swung around and quickly clamped in position by means of our patent "V" clamping ring. This binds the sleeve firmly to the inner column, which extends entirely through and has full bearing for the sleeve at both top and bottom.

ARM is of parabolic beam and tube section, giving greatest resistance to bending and torsional strains. Its lower portion is parallel with the base, and thus permits work being operated upon in close proximity to the column without the necessity of an extreme reach of spindle. Arm is clamped to column by two binder levers, obviating loose wrenches, and is provided with gib-screw, permitting arm to work freely, without sagging, while binder handles are loose. It is raised and lowered rapidly by a double thread coarse pitch screw, and controlled instantly by a convenient lever, arrow points indicating the proper direction.

HEAD is moved rapidly along the arm by hand-wheel thru angular rack and spiral rack pinion. It has convenient clamping device for locking it in any position. Back gears are located on the head, thus bringing the greatest speed reduction direct to spindle. They may be engaged or disengaged WITHOUT SHOCK while the machine is in operation, by a convenient lever, the high speed run being engaged thru a friction.

TAPPING MECHANISM is carried on the head, between the back gears and speed box, thus giving to the frictions, already very powerful, the benefit of the back gear ratio, making unusually heavy tapping operations possible, and also permitting taps to be backed out at an accelerated speed. The lever for starting, stopping, or reversing the spindle, is controlled at the head from the front of the machine.

BASE is of massive proportions, strongly ribbed, especially at the point of support of column. Is accurately planed and has large T-slots with an ample allowance of metal around them.

BEARINGS are all made from a high-grade Phosphor Bronze.

PLAIN BOX TABLE has top surface of 16 in. x 32 in., and also side surface of 6 in. x 32 in., the latter giving the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots. We direct particular attention to the convenient and time-saving features of the Swinging Table (illustrated above) as compared with the Base Table, for the smaller sizes of Radial Drills.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, double friction countershaft with pulleys 12 in. diameter for 3 in. belt, to run 280 and 335 r. p. m., and cone pulley drive. Instruction Book for installing and operating our machines is regularly supplied. No wrenches are required.

WE CAN EQUIP THIS DRILL at EXTRA COST, with speed box described above, worm swiveling table, round table and electric motor drive.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

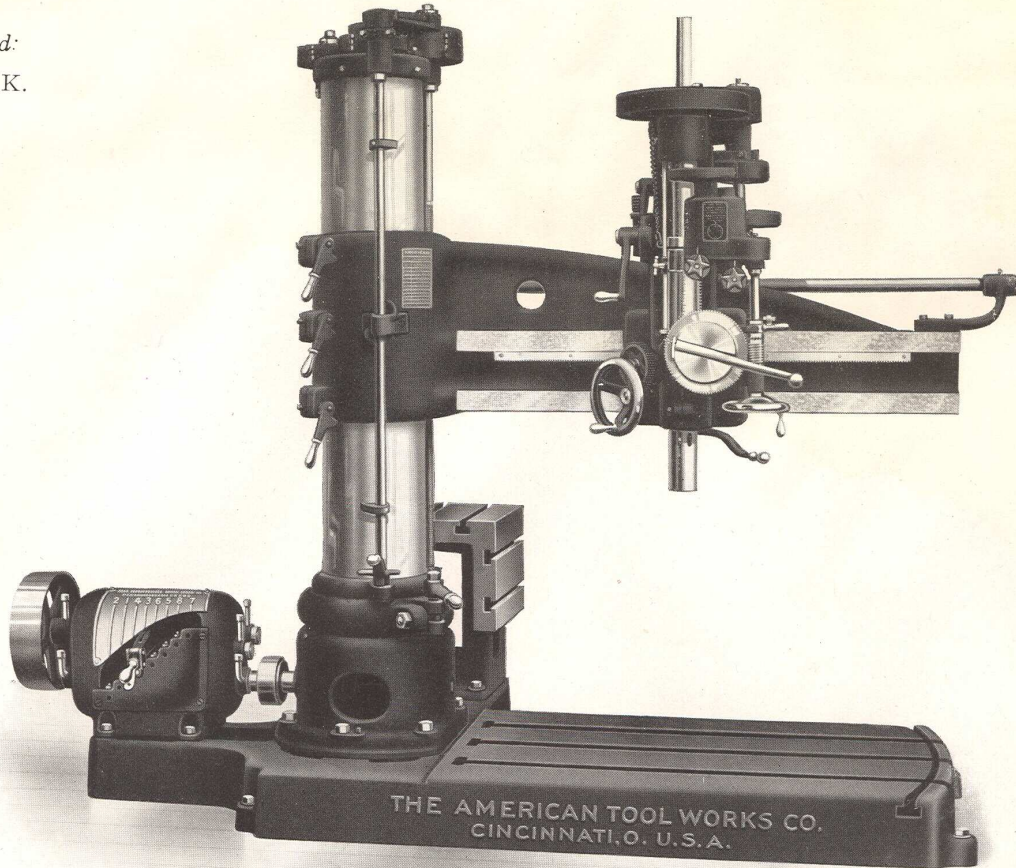
March 1st, 1911.

5000—B.

Fig. No. 357.

Code Word:

RANK.



4-foot Triple Geared, High Speed Radial Drill

WITH PLAIN ARM.

Drills to Center of Circle outside of Column.....8 ft. 1½ in.
Greatest Distance from Spindle to Base.....4 ft. 10½ in.

Traverse of Spindle.....15 in.
Traverse of Head on Arm.....3 ft. 4¼ in.

BUILT WITH EITHER CONE PULLEY OR SPEED BOX DRIVE.

THE INTRODUCTION OF HIGH SPEED STEEL TWIST DRILLS, with their enormous capacity and ability to stand up under speeds and feeds previously unheard of, also, the inevitable supplanting of the Upright by the Radial Drill for "all around" purposes, has led us to bring out a full line of Radials, having 2 ft. 2½ ft., 3 ft., 3½ ft., 4 ft., 5 ft., 6 ft. and 7 ft. arms, one size being herewith described. This drill has surpassed all known records for rapid drilling and heavy tapping and is absolutely beyond comparison in its facilities for High Speed Work Production, Accuracy of Alignments and Durability.

PROPER LUBRICATION is a very important consideration in high speed machines. This feature has been thoroughly provided for in these drills as all bearings are oiled thru oil pipes and oilers, which in connection with liberal oil chambers and felt wipers insure at all times the proper distribution of oil.

FEEDING MECHANISM on the head provides eight (8) distinct rates of feed, covering a carefully chosen range, in geometrical progression, from .0066 in. to .0633 in. These feeds are all readily obtained by the simple turning of a dial on the feed box until the desired feed, indexed thereon, comes opposite a fixed pointer. This method of feed change is by far the simplest yet devised, as it requires no reference to index plates and subsequent handling of levers. The all-gear feeds, when supplied instead of belted feeds, insure vastly increased productive capacity, rapidity of change and positive action. The feed train is engaged and disengaged at the worm wheel thru a friction clutch and lever, which also controls the quick advance and return of spindle. This feed friction is so designed as to permit the drill being crowded to its full capacity without unduly straining the feeding mechanism.

DEPTH GAUGE AND AUTOMATIC TRIP. Feeds can be automatically tripped at any position of spindle by adjustable trip dog and pointer acting on the worm clutch. Spindle sleeve is graduated its entire traverse in sixteenths, which permits of the spindle feed being accurately tripped at a predetermined depth from any position within the limits of its travel by merely setting the trip dog so that its pointer reads from zero to the desired depth. The trip also acts automatically at extreme limit of spindle travel, thereby preventing breakage of feed mechanism thru carelessness. Two or more dogs can be supplied, making it possible to counterbore any number of holes without resetting.

8-SPEED BOX is of Cone and Tumbler construction, affording a positive drive and eliminating all slipping of frictions under heavy loads. This box gives eight (8) changes of speed, each one of which can be instantly obtained while

the drill is running at full speed by simply shifting the tumbler from one position to another. The tumbler is locked securely in its position by means of a latch and locking pin, which prevents the throwing out of the same under severe strains. The Cone and Tumbler Gears are of the Brown & Sharpe 20 degree involute pointed tooth type and are made from a Special Grade of Steel Carbonized and Hardened. Experience has proven this to be the best possible type to use where running gears are meshed broadside, as it makes the meshing of the gears extremely easy and eliminates the tendency of the gears to "ride". An auxiliary drive is provided, which is automatically engaged and disengaged through a friction by the raising and lowering of the sliding Tumbler. This rotates the cone of gears while changing speeds, thus lessening the shock when the Tumbler and Cone Gears are engaged. A spring shock absorber located in the line of drive, between the speed box and the initial driving gears absorbs all shocks, thereby greatly prolonging the life of the driving mechanism.

A MOTOR of any type may be attached by various methods, connection being made either direct or thru gear, chain or belt. However, our experience has proven that motor on base connected by gear to 8-speed box is the most simple, efficient and serviceable method. Drive "G", in our booklet and "motor driven radial drill" circular illustrate this method.

SPINDLE has twenty-four (24) changes of speed, ranging from 15.6 to 309 R. P. M. in geometrical progression, all immediately available without stopping the machine. This wide range of spindle speeds, advancing by close increments, combined with the exceptional driving power of the machine, renders

the drill equally efficient with either ordinary carbon or high speed twist drills, also for boring and tapping. A speed plate fixed to the arm girdle shows at a glance how to obtain suitable speeds for any work within the capacity of the machine. Spindle is counter-balanced and has frictional quick advance and return.

COLUMN is of double tubular type. This construction provides the equivalent of a double column and affords unusual rigidity for resisting severe strains. The sleeve, or outer column, revolves on hardened and ground conical roller bearings, and may be easily swung around and quickly clamped in position by means of our patent "V" clamping ring. This binds the sleeve firmly to the inner column, which extends entirely through and has full bearing for the sleeve at both top and bottom.

ARM is of parabolic beam and tube section, giving greatest resistance to bending and torsional strains. Its lower portion is parallel with the base and thus permits work being operated upon in close proximity to the column without the necessity of an extreme reach of spindle. Arm is clamped to column by three binder levers, obviating loose wrenches, and is provided with gib-screw, permitting arm to work freely, without sagging, while binder handles are loose. Is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled instantly by a convenient lever, marked ears indicating the proper direction. Automatic safety stops are regularly provided which prevent damage thru carelessness in raising and lowering the arm.

HEAD is moved rapidly along the arm by hand-wheel operating spiral pinion in rack—a device self locking at all points, it being necessary to use the hand binder only for the heavier operations. **TRIPLE GEARS** are located on the head, thus bringing the greatest speed reduction direct to spindle. They may be engaged or disengaged **WITHOUT SHOCK** or jar while the machine is in operation by a convenient lever.

TAPPING MECHANISM is carried on the head, between triple gears and speed box, thus giving to the frictions, already very powerful, the benefit of the triple gear ratio, making unusually heavy tapping operations possible, and also permitting taps to be backed out at an accelerated speed. The lever for starting, stopping, or reversing the spindle, is controlled at the head from the front of the machine.

BASE is of massive proportions, strongly ribbed, especially at the point of support of column. Is accurately planed and has large T-slots with an ample allowance of metal around them. Base has extension for table, which saves the handling of same when operator wishes to change from heavy to light work, etc.

BEARINGS are all made from a high-grade Phosphor Bronze.

TABLE has top surface of 20 in., by 20 in., and also side surface, thus giving the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, double friction countershaft and cone pulley drive. Instruction Book for installing and operating our machines is regularly supplied. No wrenches are required.

AT EXTRA COST, we can equip this drill with speed box described above, universal table, electric motor drive and Special Bases described in another circular.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

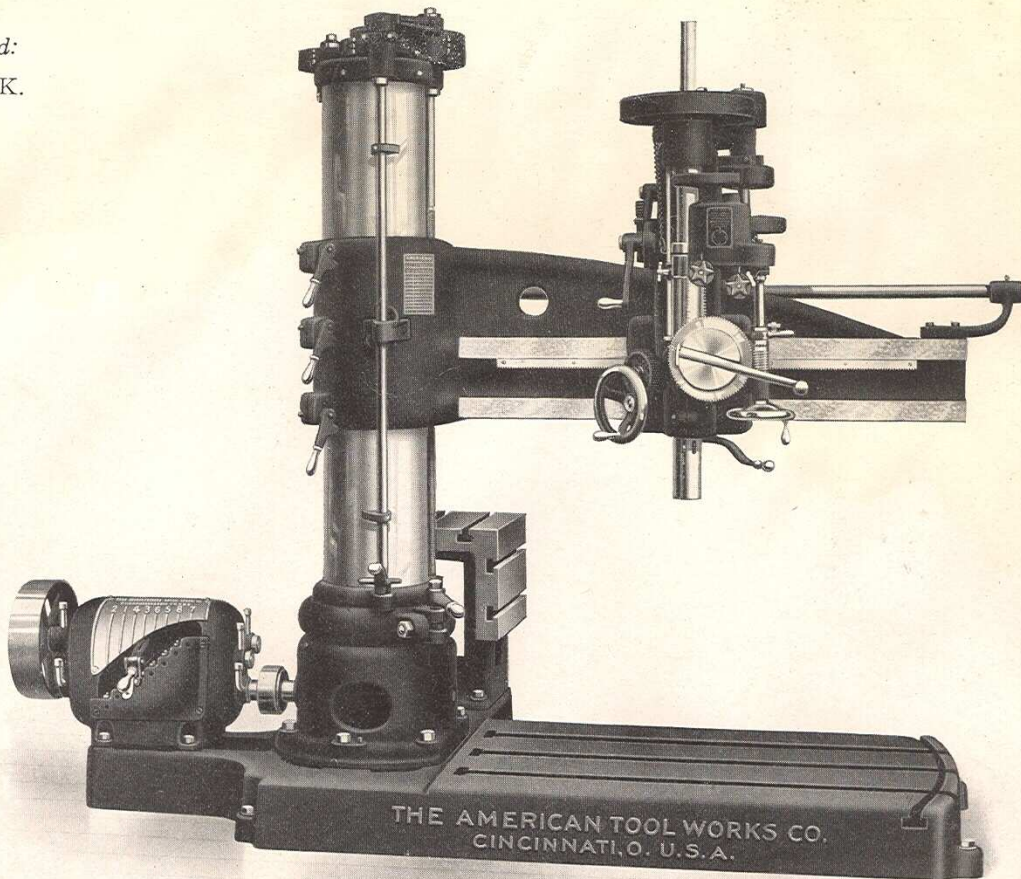
MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

Fig. No. 361.

Code Word:

RICK.



6-foot Triple Geared, High Speed Radial Drill

WITH PLAIN ARM.

Drills to Center of Circle outside of Column.....12 ft.
Greatest Distance from Spindle to Base.....6 ft. 1½ in.

Traverse of Spindle.....20 in.
Traverse of Head on Arm.....5 ft. 4 in.

BUILT WITH EITHER CONE PULLEY OR SPEED BOX DRIVE.

THE INTRODUCTION OF HIGH SPEED STEEL TWIST DRILLS, with their enormous capacity and ability to stand up under speeds and feeds previously unheard of, also, the inevitable supplanting of the Upright by the Radial Drill for "all around" purposes, has led us to bring out a full line of Radials, having 2 ft., 2½ ft., 3 ft., ½ ft., 4 ft., 5 ft., 6 ft. and 7 ft. arms, one size being herewith described. This drill has surpassed all known records for rapid drilling and heavy tapping and is absolutely beyond comparison in its facilities for High Speed Work Production, Accuracy of Alignments and Durability.

PROPER LUBRICATION is a very important consideration in high speed machines. This feature has been thoroughly provided for in these drills as all bearings are oiled thru oil pipes and oilers, which in connection with liberal oil chambers and felt wipers insure at all times the proper distribution of oil.

FEEDING MECHANISM on the head provides eight (8) distinct rates of feed, covering a carefully chosen range, in geometrical progression, from .0066 in. to .0633 in. These feeds are all readily obtained by the simple turning of a dial on the feed box until the desired feed, indexed thereon, comes opposite a fixed pointer. This method of feed change is by far the simplest yet devised, as it requires no reference to index plates and subsequent handling of levers. The all-gear feeds, when supplied instead of belted feeds, insure vastly increased productive capacity, rapidity of change and positive action. The feed train is engaged and disengaged at the worm wheel thru a friction clutch and lever, which also controls the quick advance and return of spindle. This feed friction is so designed as to permit the drill being crowded to its full capacity without unduly straining the feeding mechanism.

DEPTH GAUGE AND AUTOMATIC TRIP. Feeds can be automatically tripped at any position of spindle by adjustable trip dog and pointer acting on the worm clutch. Spindle sleeve is graduated its entire traverse in sixteenths which permits of the spindle feed being accurately tripped at a predetermined depth from any position within the limits of its travel by merely setting the trip dog so that its pointer reads from zero to the desired depth. The trip also acts automatically at extreme limit of spindle travel, thereby preventing breakage of feed mechanism thru carelessness. Two or more dogs can be supplied, making it possible to counterbore any number of holes without resetting.

8-SPEED BOX is of Cone and Tumbler construction, affording a positive drive and eliminating all slipping of frictions under heavy loads. This box gives

eight (8) changes of speed, each one of which can be instantly obtained while the machine is running at full speed by simply shifting the tumbler from one position to another. The tumbler is locked securely in its position by means of a latch and locking pin, which prevents the throwing out of the same under severe strains. The Cone and Tumbler Gears are of the Brown & Sharpe 20 degree involute pointed tooth type and are made from a Special Grade of Steel Carbonized and Hardened. Experience has proven this to be the best possible type to use where running gears are meshed broadside, as it makes the meshing of the gears extremely easy and eliminates the tendency of the gears to "ride". An auxiliary drive is provided, which is automatically engaged and disengaged through a friction by the raising and lowering of the sliding Tumbler. This rotates the cone of gears while changing speeds, thus lessening the shock when the Tumbler and Cone Gears are engaged. A spring shock absorber located in the line of drive between the speed box and the initial driving gears absorbs all shocks, thereby greatly prolonging the life of the driving mechanism.

A MOTOR of any type may be attached by various methods, connection being made either direct or thru gear, chain or belt. However, our experience has proven that motor on base connected by gear to 8-speed box is the most simple, efficient and serviceable method. Drive "G", in our booklet and "motor driven radial drill" circular illustrate this method.

SPINDLE has twenty-four (24) changes of speed, ranging from 15.6 to 309 R. P. M. in geometrical progression, all immediately available without stopping the machine. This wide range of spindle speeds, advancing by close increments, combined with the exceptional driving power of the machine, ren-

ders the drill equally efficient with either ordinary carbon or high speed twist drills, also for boring and tapping. A speed plate fixed to the arm girdle shows at a glance how to obtain suitable speeds for any work within the capacity of the machine. Spindle is counter-balanced and has frictional quick advance and return.

COLUMN is of double tubular type. This construction provides the equivalent of a double column and affords unusual rigidity for resisting severe strains. The sleeve, or outer column, revolves on hardened and ground conical roller bearings, and may be easily swung around and quickly clamped in position by means of our patent "V" clamping ring. This binds the sleeve firmly to the inner column, which extends entirely through and has full bearing for the sleeve at both top and bottom.

ARM is of parabolic beam and tube section, giving greatest resistance to bending and torsional strains. Its lower portion is parallel with the base and thus permits work being operated upon in close proximity to the column without the necessity of an extreme reach of spindle. Arm is clamped to column by three binder levers, obviating loose wrenches, and is provided with gib-screw, permitting arm to work freely, without sagging, while binder handles are loose. Is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled instantly by a convenient lever, marked cars indicating the proper direction. Automatic safety stops are regularly provided which prevent damage thru carelessness in raising and lowering the arm.

HEAD is moved rapidly along the arm by hand-wheel operating spiral pinion in rack—a device self locking at all points, it being necessary to use the hand binder only for the heavier operations. **TRIPLE GEARS** are located on the head, thus bringing the greatest speed reduction direct to spindle. They may be engaged or disengaged **WITHOUT SHOCK** or jar while the machine is in operation by a convenient lever.

TAPPING MECHANISM is carried on the head, between triple gears and speed box, thus giving to the frictions, already very powerful, the benefit of the triple gear ratio, making unusually heavy tapping operations possible, and also permitting taps to be backed out at an accelerated speed. The lever for starting, stopping, or reversing the spindle, is controlled at the head from the front of the machine.

BASE is of massive proportions, strongly ribbed, especially at the point of support of column. Is accurately planed and has large T-slots with an ample allowance of metal around them. Base has extension for table, which saves the handling of same when operator wishes to change from heavy to light work, etc.

BEARINGS are all made from a high-grade Phosphor Bronze.

TABLE has top surface of 20 in., by 20 in., and also side surface, thus giving the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, double friction countershaft and cone pulley drive. Instruction Book for installing and operating our machines is regularly supplied. No wrenches are required.

AT EXTRA COST, we can equip this drill with speed box described above universal table, electric motor drive and Special Bases described in another circular.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

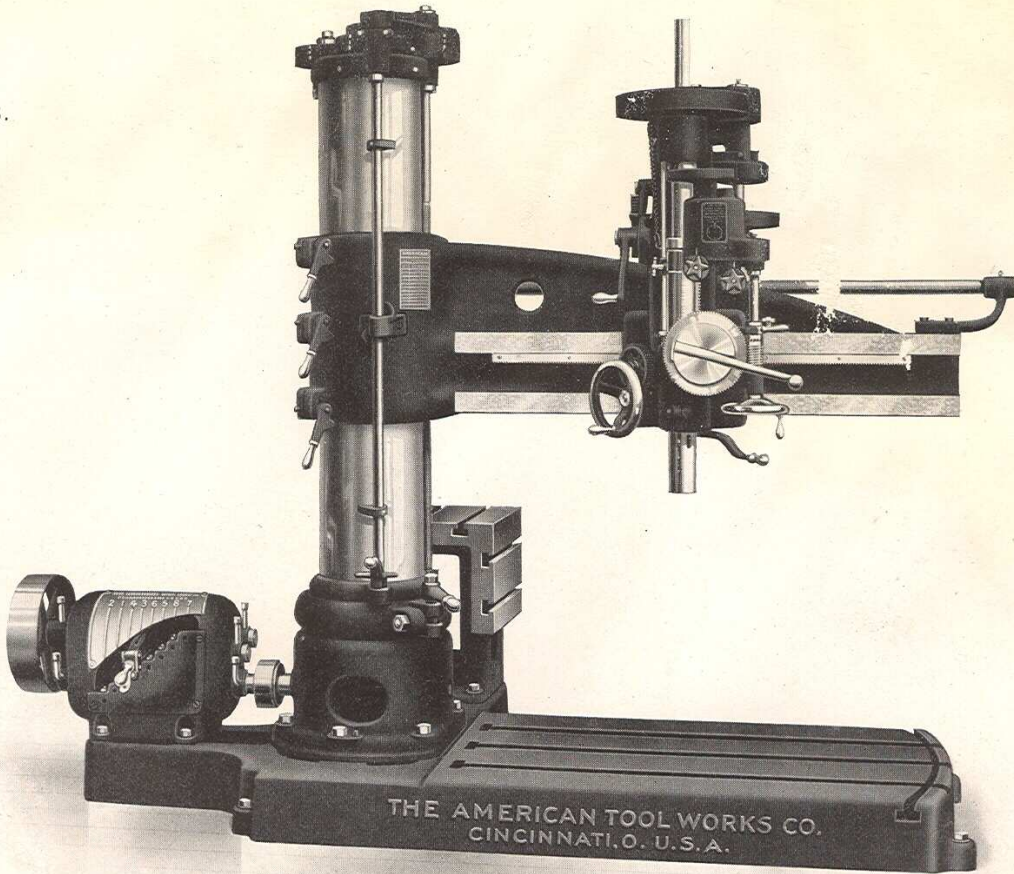
MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

Fig. No. 375.

Code Word:

RIB.



7-foot Triple Geared, High Speed Radial Drill

WITH PLAIN ARM.

Drills to Center of Circle outside of Column.....14 ft. Traverse of Spindle.....20 in.
Greatest Distance from Spindle to Base.....6 ft. 1½ in. Traverse of Head on Arm.....6 ft. 4 in.

BUILT WITH EITHER CONE PULLEY OR SPEED BOX DRIVE.

THE INTRODUCTION OF HIGH SPEED STEEL TWIST DRILLS, with their enormous capacity and ability to stand up under speeds and feeds previously unheard of, also, the inevitable supplanting of the Upright by the Radial Drill for "all around" purposes, has led us to bring out a full line of Radials, having 2 ft., 2½ ft., 3 ft., 3½ ft., 4 ft., 5 ft., 6 ft. and 7 ft. arms, one size being herewith described. This drill has surpassed all known records for rapid drilling and heavy tapping and is absolutely beyond comparison in its facilities for High Speed Work Production, Accuracy of Alignments and Durability.

PROPER LUBRICATION is a very important consideration in high speed machines. This feature has been thoroughly provided for in these drills as all bearings are oiled thru oil pipes and oilers, which in connection with liberal oil chambers and felt wipers insure at all times the proper distribution of oil.

FEEDING MECHANISM on the head provides eight (8) distinct rates of feed covering a carefully chosen range, in geometrical progression, from .0066 in. to .0033 in. These feeds are all readily obtained by the simple turning of a dial on the feed box until the desired feed, indexed thereon, comes opposite a fixed pointer. This method of feed change is by far the simplest yet devised, as it requires no reference to index plates and subsequent handling of levers. The all-gear feeds, when supplied instead of belted feeds, insure vastly increased productive capacity, rapidity of change and positive action. The feed train is engaged and disengaged at the worm wheel thru a friction clutch and lever, which also controls the quick advance and return of spindle. This feed friction is so designed as to permit the drill being crowded to its full capacity without unduly straining the feeding mechanism.

DEPTH GAUGE AND AUTOMATIC TRIP. Feeds can be automatically tripped at any position of spindle by adjustable trip dog and pointer acting on the worm clutch. Spindle sleeve is graduated its entire traverse in sixteenths, which permits of the spindle feed being accurately tripped at a predetermined depth from any position within the limits of its travels by merely setting the trip dog so that its pointer reads from zero to the desired depth. The trip also acts automatically at extreme limit of spindle travel, thereby preventing breakage of feed mechanism thru carelessness. Two or more dogs can be supplied, making it possible to counterbore any number of holes without resetting.

S-SPEED BOX is of Cone and Tumbler construction, affording a positive drive and eliminating all slipping of frictions under heavy loads. This box gives

eight (8) changes of speed, each one of which can be instantly obtained while the machine is running at full speed by simply shifting the tumbler from one position to another. The tumbler is locked securely in its position by means of a latch and locking pin, which prevents the throwing out of the same under severe strains. The Cone and Tumbler Gears are of the Brown & Sharpe 20 degree involute pointed tooth type and are made from a Special Grade of Steel Carbonized and Hardened. Experience has proven this to be the best possible type to use where running gears are meshed broadside, as it makes the meshing of the gears extremely easy and eliminates the tendency of the gears to "ride". An auxiliary drive is provided, which is automatically engaged and disengaged through a friction by the raising and lowering of the sliding Tumbler. This rotates the cone of gears while changing speeds, thus lessening the shock when the Tumbler and Cone Gears are engaged. A spring shock absorber located in the line of drive between the speed box and the initial driving gears absorbs all shocks, thereby greatly prolonging the life of the driving mechanism.

A MOTOR of any type may be attached by various methods, connection being made either direct or thru gear, chain or belt. However, our experience has proven that motor on base connected by gear to S-speed box is the most simple, efficient and serviceable method. Drive "G", in our booklet and "motor driven radial drill" circular illustrate this method.

SPINDLE has twenty-four (24) changes of speed, ranging from 15.6 to 309 R. P. M. in geometrical progression, all immediately available without stopping the machine. This wide range of spindle speeds, advancing by close increments, combined with the exceptional driving power of the machine, ren-

ders the drill equally efficient with either ordinary carbon or high speed twist drills, also for boring and tapping. A speed plate fixed to the arm girde shows at a glance how to obtain suitable speeds for any work within the capacity of the machine. Spindle is counter-balanced and has frictional quick advance and return.

COLUMN is of double tubular type. This construction provides the equivalent of a double column and affords unusual rigidity for resisting severe strains. The sleeve, or outer column revolves on hardened and ground conical roller bearings, and may be easily swung around and quickly clamped in position by means of our patent "V" clamping ring. This binds the sleeve firmly to the inner column, which extends entirely through and has full bearing for the sleeve at both top and bottom.

ARM is of parabolic beam and tube section, giving greatest resistance to bending and torsional strains. Its lower portion is parallel with the base and thus permits work being operated upon in close proximity to the column without the necessity of an extreme reach of spindle. Arm is clamped to column by three binder levers, obviating loose wrenches, and is provided with gib-screw, permitting arm to work freely, without sagging, while binder handles are loose. Is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled instantly by a convenient lever, marked ears indicating the proper direction. Automatic safety stops are regularly provided which prevent damage thru carelessness in raising and lowering the arm.

HEAD is moved rapidly along the arm by hand-wheel operating spiral pinion in rack—a device self locking at all points, it being necessary to use the hand binder only for the heavier operations. **TRIPLE GEARS** are located on the head, thus bringing the greatest speed reduction direct to spindle. They may be engaged or disengaged **WITHOUT SHOCK** or jar while the machine is in operation by a convenient lever.

TAPPING MECHANISM is carried on the head, between triple gears and speed box, thus giving to the frictions, already very powerful, the benefit of the triple gear ratio, making unusually heavy tapping operations possible, and also permitting taps to be backed out at an accelerated speed. The lever for starting, stopping, or reversing the spindle, is controlled at the head from the front of the machine.

BASE is of massive proportions, strongly ribbed, especially at the point of support of column. Is accurately planed and has large T-slots with an ample allowance of metal around them. Base has extension for table, which saves the handling of same when operator wishes to change from heavy to light work, etc.

BEARINGS are all made from a high-grade Phosphor Bronze.

TABLE has top surface of 20 in., by 20 in., and also side surface, thus giving the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, double friction countershaft and cone pulley drive. Instruction Book for installing and operating our machines is regularly supplied. No wrenches are required.

AT EXTRA COST, we can equip this drill with speed box described above, universal table, electric motor drive and Special Bases described in another circular.

THE AMERICAN TOOL WORKS CO

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS:

CINCINNATI, U. S. A.

March 1, 1911.

5000-B.

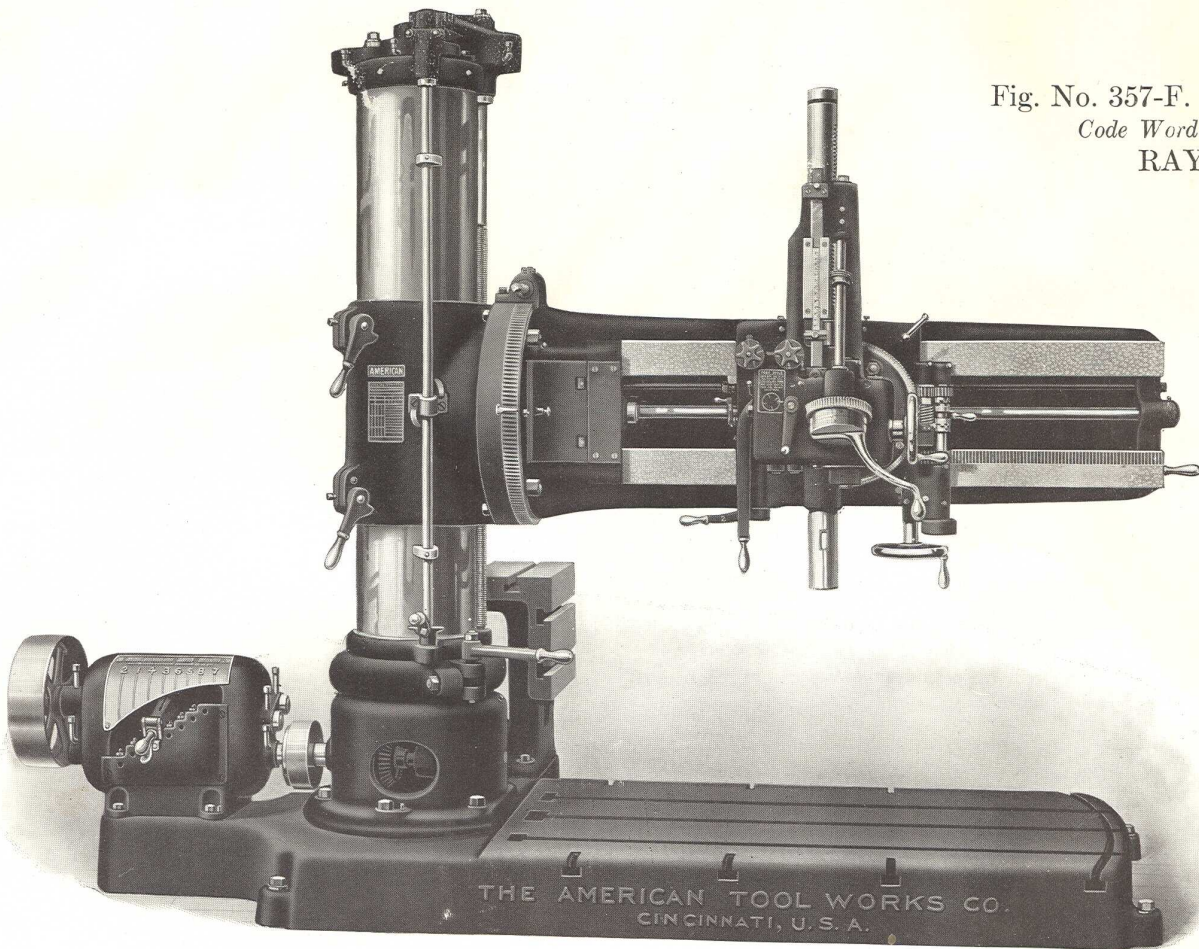


Fig. No. 357-F.
Code Word.
RAYS.

4-foot Arm Full Universal, Triple Geared Radial

Drills to Center of Circle on Base outside of Column 8 ft. $\frac{1}{4}$ in.
Greatest Distance from Spindle to Base 5 ft. $\frac{3}{4}$ in.

Traverse of Spindle 16 in.
Traverse of Head on Arm 27 in.

BUILT WITH EITHER CONE PULLEY, SPEED BOX OR MOTOR DRIVE.

THE UNIVERSAL RADIAL has heretofore proven entirely inadequate to the severe duty imposed upon the modern plain arm radial, but its field of usefulness in machine shops is so large that a revolution in design was imperative. Up to the present time the Universal Radial has been incapable of driving to the limit high speed steel drills, principally because of lack of power and springing of the arm. The new machine, shown above, represents a radical departure in design, and the very highest development in this type of drill, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements in Power, Rigidity, Durability and Convenience of Operation.

THIS RADIAL DRILL is the result of long and careful consideration, and in its design we have incorporated the many excellent features of our Plain Radials, which have placed them absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Productive Capacity.

RIGIDITY OF THE ARM is doubtless one of the most essential qualities in radial drill design. This, however, is very noticeably lacking in many other makes of Universal Radials, for the reason that either one or more walls of the arm section are cut away in order to incorporate the arm shaft and other transmission elements. This weakening obviously unfits the arm for severe duty and for resisting the combined stresses of torsion and deflection.

REINFORCED DOUBLE SECTION ARM CONSTRUCTION. The design of the arm of this new Universal Radial has eliminated every weakness heretofore encountered. It is made in the form of upper and lower tube sections which are bound together in the back by a double wall of metal and further re-enforced by heavy transverse ribbing. On the front wall, "ways" are formed for carrying the unusually wide and rigid saddle, which is firmly locked at any point along the arm by means of a powerful clamping device. This in addition binds together the double arm sections and saddle into a very compact unit, thus affording unparalleled strength for resisting all strains. Arm is clamped to column by two binder levers, obviating loose wrenches, and is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled by a convenient lever, marked ears indicating the proper direction to throw lever for raising or lowering. This lever cannot be operated until slightly raised from its bearing, thus guarding against accident through unintentional movement while the arm is clamped to column. Arm is rotated in a complete circle by worm engaging worm wheel cut in the periphery of the arm

flange. This movement, in connection with the swiveling head, permits drilling and tapping at any angle radiating from the center of a sphere and is firmly clamped, as set, by four large binder bolts. Arm is graduated in degrees on its periphery, readings being taken at a fixed pointer.

HEAD is of very compact design and is equipped with powerful Steel Triple Gears. It may be swivelled through a complete circle by means of a hand wheel and worm which engages a worm wheel fixed to the head. This feature is of special value in setting the spindle for angular drilling. The worm holds the swiveling head in any position and eliminates all possibility of accident, through the head swinging around of its own weight, when the clamping bolts are loosened. The hand wheel affords quicker motion than the use of a wrench. Graduations on head show, at a fixed pointer, the angle as set, and three binder bolts are provided for securely clamping the head at any angle. Head is moved rapidly along the arm by means of multiple gearing and rack, through the same hand wheel that swivels the head, by simply engaging the clutch shown. A binder is supplied which permits of readily locking the head at any point along the arm.

SADDLE SHAFT CONSTRUCTION. A feature of great merit is found in the power transmitting elements between the arm shaft and the spindle. The saddle shaft, which forms part of this connection, is offset to one side of the spindle and is mounted in two (2) long bearings, one of which is integral with the saddle and the other with the swiveling head. Power is transmitted from the saddle shaft, through mitre gears, to a shaft in the front of head, from which the spindle is driven through spur gears. This construction eliminates the cramping, consequent loss of power and rapid wear, which is obviously unavoidable in other makes of universal drills where the spindle is driven directly from the arm shaft through bevel gears mounted on each side of an extremely short, single saddle bearing.

SPINDLE has twenty-four (24) changes of speed, with speed box drive, or cone pulley drive with double friction countershaft, advancing in geometrical progression, ranging from 19 to 314 R. P. M., all immediately available by means of two levers, without stopping the machine. The wide range of speeds obtainable, together with the enormous power and unusual rigidity render this drill equally efficient when using either the ordinary carbon or high speed twist drills, and particularly fits it for a wide range of tapping requirements. A speed plate, fixed to the arm of the girdle, shows at a glance how to obtain suitable speeds for the work being operated upon. Spindle is provided with both hand and power feeds, also with quick advance and return.

TRIPLE GEARS are made of STEEL, are of powerful design and provide one direct and two reduced speeds, through the medium of spur gears and positive clutches. They are operated from the front of the head saddle by a convenient lever, without stopping the machine. Triple gears are mounted on the back of the saddle and are fully enclosed by the upper walls of the arm, thus permitting the universal arm to be rotated through a complete circle with no possibility of any overhanging mechanism interfering with the work being machined. This is a distinct feature on this drill.

FEEDING MECHANISM is located on the head and provides eight (8) distinct rates of positive geared feed, covering a carefully chosen range in geometrical progression from .006; to .090; per revolution of spindle. This mechanism is controlled by two dials, on the face of which the respective feeds are plainly indicated. Any one of the feeds is instantly obtained by merely turning

the dial until the desired feed comes opposite a fixed pointer. The rate of feed being used is plainly indicated at all times and reference to index plates is unnecessary. The feed train is engaged and disengaged at the worm wheel through a Friction Clutch and lever, which lever also controls the quick advance and return of the spindle. This feed friction is so designed as to permit the machine being crowded to the limit of its capacity without unduly straining the feed works.

DEPTH GAUGE AND AUTOMATIC TRIP are of greatly improved and simplified design and will trip spindle at any predetermined depth. Readings are taken from zero on a vertical "scale", similar to an ordinary machinist's scale, making unnecessary the reading of a circular gauge. The tripping mechanism is so arranged that the spindle will be tripped at any point within the limit of travel by merely setting the trip dog so that the scale reads the depth to be drilled from zero. This trip automatically acts at the full travel of spindle, thus preventing breakage to feed mechanism. Feed can be tripped by hand at any point.

TAPPING MECHANISM is mounted on the girdle portion of the arm between the triple gears and the speed box. This construction has a distinct advantage over other designs of universal radials where the tapping attachment is incorporated in the saddle mechanism, as it permits the use of more liberal proportions in the design of the reversing frictions and other parts than is otherwise possible. Not only is increased strength given to the tripping attachment on account of the high gear ratio, but, a neater and more compact saddle design is obtained which has no cumbersome, overhanging mechanism. The consequent reduction in weight of saddle, enables the operator to manipulate the head along the arm with greater ease and rapidity.

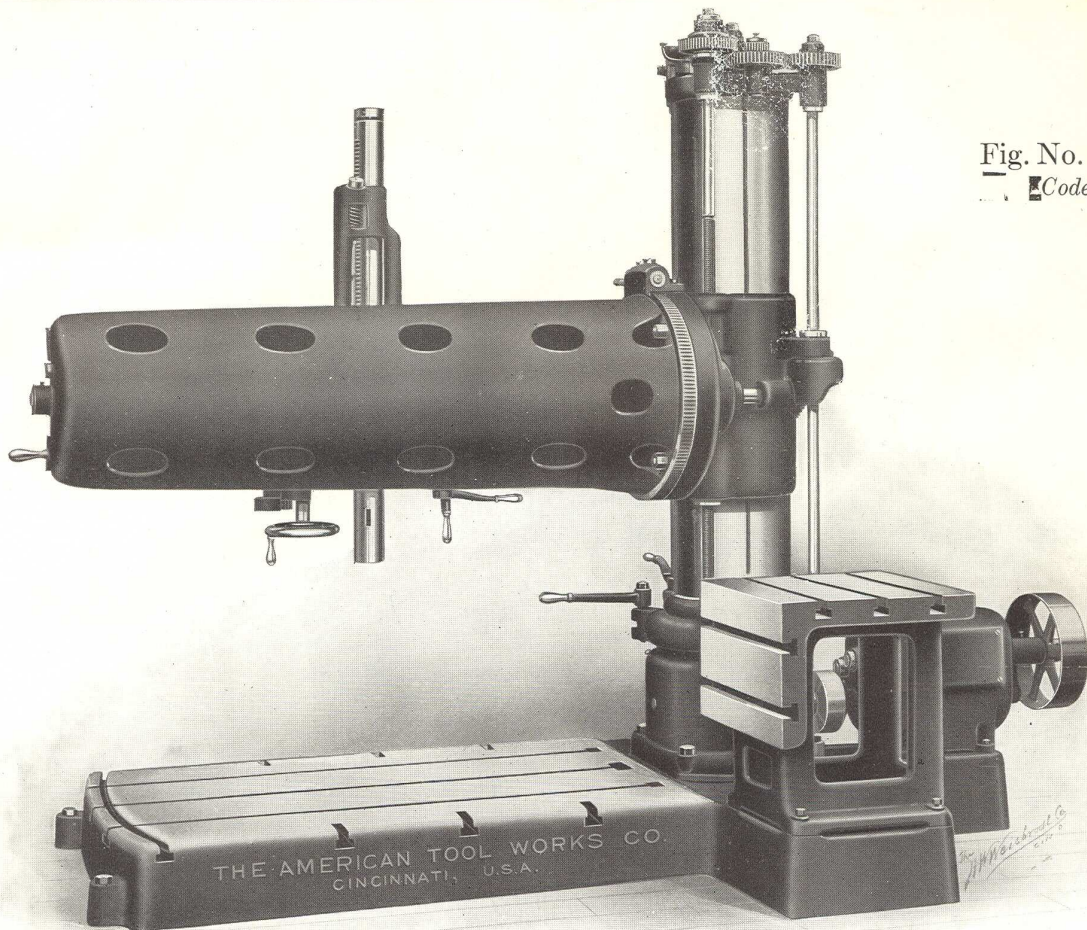


Fig. No. 357-F.
Code Word:
RAYS.

REAR VIEW.

4-foot Arm Full Universal Triple Geared Radial

(CONTINUED)

TAPPING MECHANISM OPERATES through powerful friction clutches. The lever for operating this mechanism is placed on the front of saddle and controls the starting, stopping and reversing of the spindle. Owing to the fact that the tapping attachment is located between the speed box and triple gears, the frictions, already very powerful, receive the benefit of the triple gear ratio and have comparatively light duty to perform, thus making possible unusually heavy tapping without undue strain, and permitting taps to be withdrawn at an accelerated speed. The great power of the frictions require but a light adjustment, and the lever operating same is consequently thrown in and out of engagement with a very slight amount of effort.

COLUMN is of double tubular type. The sleeve, or outer column, revolves on conical roller bearings which are hardened and ground. The column may be clamped in any position by means of our patent "V" clamping ring, which may be moved around the stump to accommodate the convenience of the operator. This ring when clamped, binds the column sleeve firmly to the inner column or stump, which extends through the entire length of the sleeve and has a long bearing for the outer column at both top and bottom. This construction provides the equivalent of a double column and affords exceptional rigidity.

BASE is of massive proportions and has unusual depth. Is strongly ribbed lengthwise and transversely, especially at the point where column is bolted. It is planed with the greatest possible accuracy, and has large T-slots with ample allowance of metal around them.

SPEED BOX is of the cone and tumbler type and provides eight (8) changes of speed, each one of which is instantly available by the mere shifting of the tumbler lever. **ALL GEARS** in box are made of a high grade STEEL carbonized and hardened, and are of very coarse pitch and wide face. The gears in speed box are of the Brown & Sharp "20 degree involute pointed tooth type," extensive tests having proven this form of tooth to be far superior to any other for use where gears are intermeshed broadside. An auxiliary train of gearing between the pulley and cone shafts is also provided, which is thrown into engagement, through a friction, by the mere lifting of the tumbler lever. This rotates the cone gears while changing speeds and thus permits changes being made without shock to the gears. Tumbler lever and gears are securely located

PLAIN BOX TABLE has top surface of 28 in. by 28 in. and also liberal side surface, thus providing the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

UNIVERSAL TABLE consists of a swivel base on which is mounted a heavy housing which carries the tilting top of table. Top can be swivelled to any angle within 90 degrees and either face can be set in a vertical position by means of a segment and worm operated through a pair of reduction gears. This arrangement, together with the T-handle wrench, makes it very easy to swivel the table when carrying a heavy load. The top can be securely clamped to housing by two bolts, thereby relieving the worm and segment of undue strain, since they are self-locking in themselves. Graduated dials, on both top and base, show the angle at which table is set.

BRONZE BEARINGS are used throughout this drill, which are renewable in case of wear. Where babbitt bearings are used, this feature is not available.

SPECIAL LUBRICATION. The increased speeds and feeds possible with the most modern machine tools, require that they have superior lubricating facilities to the older style machines. This feature has been thoroughly and carefully provided for in Every Bearing in this radial drill, and is a factor which should not be overlooked in the selection and purchase of a machine, from which the best results are to be obtained.

ALL GEARS subjected to severe duty are made of STEEL, the pinions being cut from bar stock, while all gears are made from high grade steel castings. The spur gears are accurately cut and center distances tested for accuracy within very close limits, on a special machine built for the purpose. Mitre gears are planed theoretically correct (not milled), thus insuring quiet running and long life to the parts.

OPERATIVE FACILITIES are of the utmost convenience, all speed and feed changes and other operations may be easily and quickly accomplished from the

front of the machine. All operating levers, with the exception of speed box lever, are located on the head and saddle, at all times convenient to the operator.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, countershaft, cone pulley drive and wrenches; also Instruction Book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this drill with speed box, universal table, electric motor drive and Special Bases described on another page.

THE AMERICAN TOOL WORKS CO.
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

May 1st, 1912.

2500—B.

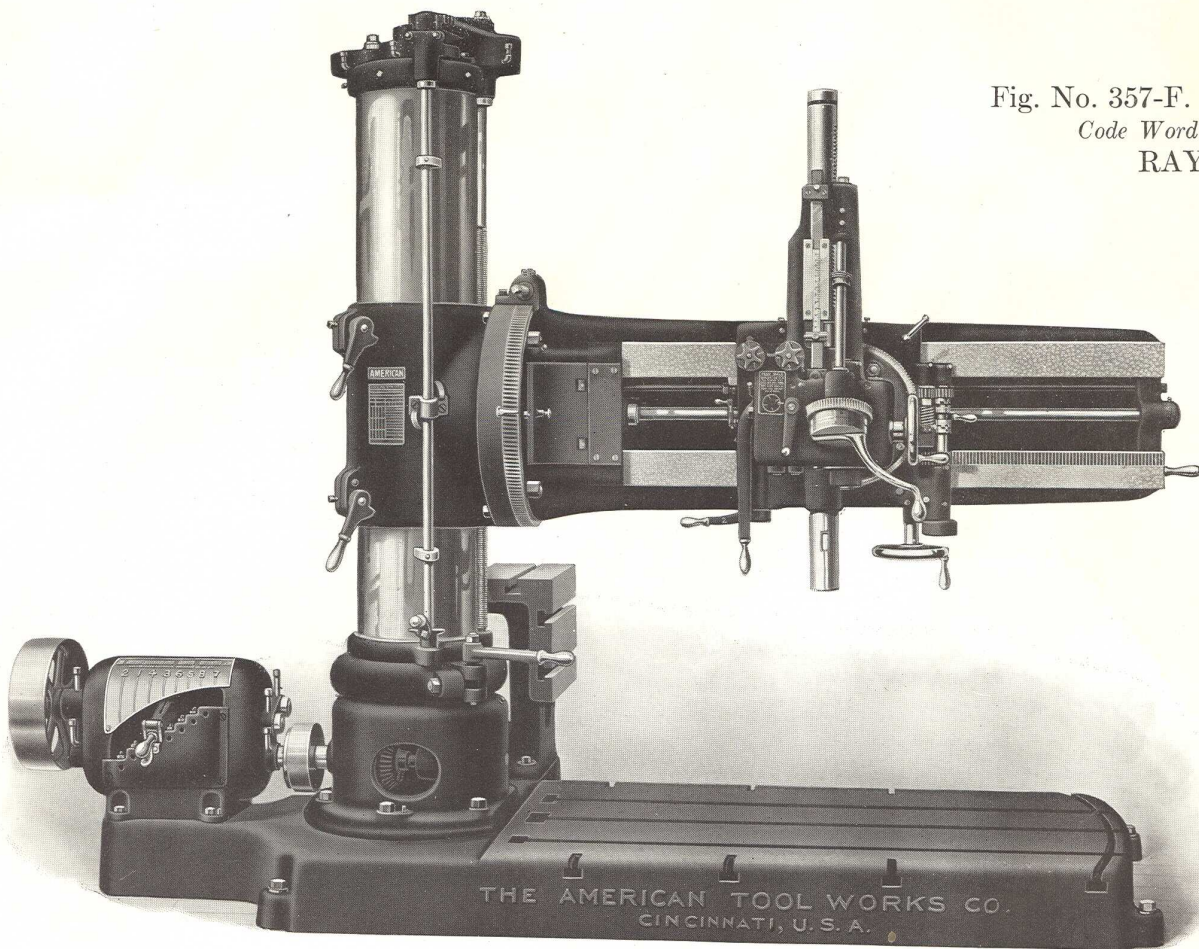


Fig. No. 357-F.
Code Word.
RAYS.

4-foot Arm Full Universal, Triple Geared Radial

Drills to Center of Circle on Base outside of Column.....8 ft. $\frac{1}{4}$ in.
Greatest Distance from Spindle to Base.....5 ft. $\frac{3}{4}$ in.
Traverse of Spindle.....16 in.
Traverse of Head on Arm.....27 in.

BUILT WITH EITHER CONE PULLEY, SPEED BOX OR MOTOR DRIVE.

THE UNIVERSAL RADIAL has heretofore proven entirely inadequate to the severe duty imposed upon the modern plain arm radial, but its field of usefulness in machine shops is so large that a revolution in design was imperative. Up to the present time the Universal Radial has been incapable of driving to the limit high speed steel drills, principally because of lack of power and springing of the arm. The new machine, shown above, represents a radical departure in design, and the very highest development in this type of drill, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements in Power, Rigidity, Durability and Convenience of Operation.

THIS RADIAL DRILL is the result of long and careful consideration, and in its design we have incorporated the many excellent features of our Plain Radials, which have placed them absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Productive Capacity.

RIGIDITY OF THE ARM is doubtless one of the most essential qualities in radial drill design. This, however, is very noticeably lacking in many other makes of Universal Radials, for the reason that either one or more walls of the arm section are cut away in order to incorporate the arm shaft and other transmission elements. This weakening obviously unfits the arm for severe duty and for resisting the combined stresses of torsion and deflection.

REINFORCED DOUBLE SECTION ARM CONSTRUCTION. The design of the arm of this new Universal Radial has eliminated every weakness heretofore encountered. It is made in the form of upper and lower tube sections which are bound together in the back by a double wall of metal and further re-enforced by heavy transverse ribbing. On the front wall, "ways" are formed for carrying the unusually wide and rigid saddle, which is firmly locked at any point along the arm by means of a powerful clamping device. This in addition binds together the double arm sections and saddle into a very compact unit, thus affording unparalleled strength for resisting all strains. Arm is clamped to column by two binder levers, obviating loose wrenches, and is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled by a convenient lever, marked ears indicating the proper direction to throw lever for raising or lowering. This lever cannot be operated until slightly raised from its bearing, thus guarding against accident through unintentional movement while the arm is clamped to column. Arm is rotated in a complete circle by worm engaging worm wheel cut in the periphery of the arm

flange. This movement, in connection with the swiveling head, permits drilling and tapping at any angle radiating from the center of a sphere and is firmly clamped, as set, by four large binder bolts. Arm is graduated in degrees on its periphery, readings being taken at a fixed pointer.

HEAD is of very compact design and is equipped with powerful Steel Triple Gears. It may be swiveled through a complete circle by means of a hand wheel and worm which engages a worm wheel fixed to the head. This feature is of special value in setting the spindle for angular drilling. The worm holds the swiveling head in any position and eliminates all possibility of accident, through the head swinging around of its own weight, when the clamping bolts are loosened. The hand wheel affords quicker motion than the use of a wrench. Graduations on head show, at a fixed pointer, the angle as set, and three binder bolts are provided for securely clamping the head at any angle. Head is moved rapidly along the arm by means of multiple gearing and rack, through the same hand wheel that swivels the head, by simply engaging the clutch shown. A binder is supplied which permits of readily locking the head at any point along the arm.

SADDLE SHAFT CONSTRUCTION. A feature of great merit is found in the power transmitting elements between the arm shaft and the spindle. The saddle shaft, which forms part of this connection, is offset to one side of the spindle and is mounted in two (2) long bearings, one of which is integral with the saddle and the other with the swiveling head. Power is transmitted from the saddle shaft, through mitre gears, to a shaft in the front of head, from which the spindle is driven through spur gears. This construction eliminates the cramping, consequent loss of power and rapid wear, which is obviously unavoidable in other makes of universal drills where the spindle is driven directly from the arm shaft through bevel gears mounted on each side of an extremely short, single saddle bearing.

SPINDLE has twenty-four (24) changes of speed, with speed box drive, or cone pulley drive with double friction countershaft, advancing in geometrical progression, ranging from 19 to 314 R. P. M., all immediately available by means of two levers, without stopping the machine. The wide range of speeds obtainable, together with the enormous power and unusual rigidity render this drill equally efficient when using either the ordinary carbon or high speed twist drills, and particularly fits it for a wide range of tapping requirements. A speed plate, fixed to the arm of the girdle, shows at a glance how to obtain suitable speeds for the work being operated upon. Spindle is provided with both hand and power feeds, also with quick advance and return.

TRIPLE GEARS are made of STEEL, are of powerful design and provide one direct and two reduced speeds, through the medium of spur gears and positive clutches. They are operated from the front of the head saddle by a convenient lever, without stopping the machine. Triple gears are mounted on the back of the saddle and are fully enclosed by the upper walls of the arm, thus permitting the universal arm to be rotated through a complete circle with no possibility of any overhanging mechanism interfering with the work being machined. This is a distinct feature on this drill.

FEEDING MECHANISM is located on the head and provides eight (8) distinct rates of positive geared feed, covering a carefully chosen range in geometrical progression from .006; to .060; per revolution of spindle. This mechanism is controlled by two dials, on the face of which the respective feeds are plainly indicated. Any one of the feeds is instantly obtained by merely turning

the dial until the desired feed comes opposite a fixed pointer. The rate of feed being used is plainly indicated at all times and reference to index plates is unnecessary. The feed train is engaged and disengaged at the worm wheel through a Friction Clutch and lever, which lever also controls the quick advance and return of the spindle. This feed friction is so designed as to permit the machine being crowded to the limit of its capacity without unduly straining the feed works.

DEPTH GAUGE AND AUTOMATIC TRIP are of greatly improved and simplified design and will trip spindle at any predetermined depth. Readings are taken from zero on a vertical "scale", similar to an ordinary machinist's scale, making unnecessary the reading of a circular gauge. The tripping mechanism is so arranged that the spindle will be tripped at any point within the limit of travel by merely setting the trip dog so that the scale reads the depth to be drilled from zero. This trip automatically acts at the full travel of spindle, thus preventing breakage to feed mechanism. Feed can be tripped by hand at any point.

TAPPING MECHANISM is mounted on the girdle portion of the arm between the triple gears and the speed box. This construction has a distinct advantage over other designs of universal radials where the tapping attachment is incorporated in the saddle mechanism, as it permits the use of more liberal proportions in the design of the reversing frictions and other parts than is otherwise possible. Not only is increased strength given to the tapping attachment on account of the high gear ratio, but, a neater and more compact saddle design is obtained which has no cumbersome, overhanging mechanism. The consequent reduction in weight of saddle, enables the operator to manipulate the head along the arm with greater ease and rapidity.

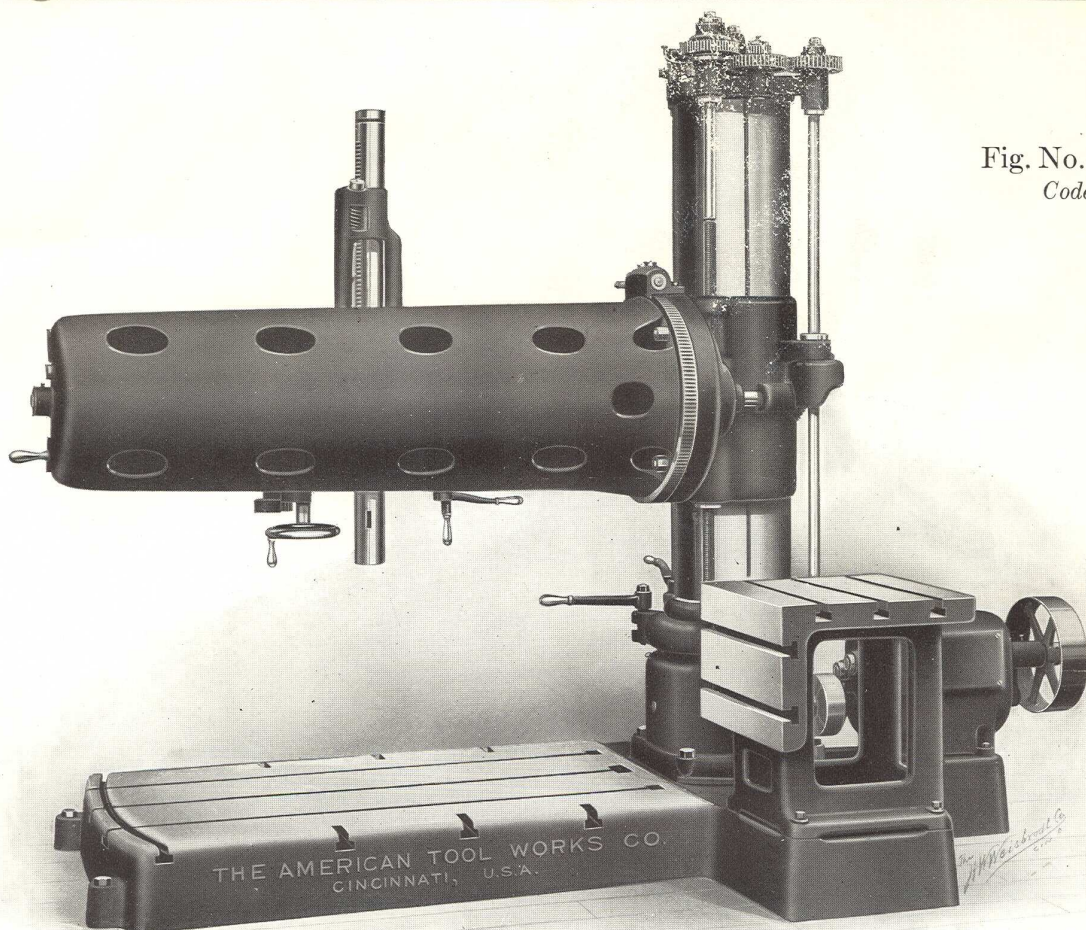


Fig. No. 357-F.
Code Word:
RAYS.

REAR VIEW.

4-foot Arm Full Universal Triple Geared Radial

(CONTINUED)

TAPPING MECHANISM OPERATES through powerful friction clutches. The lever for operating this mechanism is placed on the front of saddle and controls the starting, stopping and reversing of the spindle. Owing to the fact that the tapping attachment is located between the speed box and triple gears, the frictions, already very powerful, receive the benefit of the triple gear ratio and have comparatively light duty to perform, thus making possible unusually heavy tapping without undue strain, and permitting taps to be withdrawn at an accelerated speed. The great power of the frictions require but a light adjustment, and the lever operating same is consequently thrown in and out of engagement with a very slight amount of effort.

COLUMN is of double tubular type. The sleeve, or outer column, revolves on conical roller bearings which are hardened and ground. The column may be clamped in any position by means of our patent "V" clamping ring, which may be moved around the stump to accommodate the convenience of the operator. This ring when clamped, binds the column sleeve firmly to the inner column or stump, which extends through the entire length of the sleeve and has a long bearing for the outer column at both top and bottom. This construction provides the equivalent of a double column and affords exceptional rigidity.

BASE is of massive proportions and has unusual depth. Is strongly ribbed lengthwise and transversely, especially at the point where column is bolted. It is planed with the greatest possible accuracy, and has large T-slots with ample allowance of metal around them.

SPEED BOX is of the cone and tumbler type and provides eight (8) changes of speed, each one of which is instantly available by the mere shifting of the tumbler lever. **ALL GEARS** in box are made of a high grade STEEL carbonized and hardened, and are of very coarse pitch and wide face. The gears in speed box are of the Brown & Sharp "20 degree involute pointed tooth type," extensive tests having proven this form of tooth to be far superior to any other for use where gears are intermeshed broadside. An auxiliary train of gearing between the pulley and cone shafts is also provided, which is thrown into engagement, through a friction, by the mere lifting of the tumbler lever. This rotates the cone gears while changing speeds and thus permits changes being made without shock to the gears. Tumbler lever and gears are securely located

PLAIN BOX TABLE has top surface of 28 in. by 28 in. and also liberal side surface, thus providing the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

UNIVERSAL TABLE consists of a swivel base on which is mounted a heavy housing which carries the tilting top of table. Top can be swivelled to any angle within 90 degrees and either face can be set in a vertical position by means of a segment and worm operated through a pair of reduction gears. This arrangement, together with the T-handle wrench, makes it very easy to swivel the table when carrying a heavy load. The top can be securely clamped to housing by two bolts, thereby relieving the worm and segment of undue strain, since they are self-locking in themselves. Graduated dials, on both top and base, show the angle at which table is set.

BRONZE BEARINGS are used throughout this drill, which are renewable in case of wear. Where babbitt bearings are used, this feature is not available.

SPECIAL LUBRICATION. The increased speeds and feeds possible with the most modern machine tools, require that they have superior lubricating facilities to the older style machines. This feature has been thoroughly and carefully provided for in Every Bearing in this radial drill, and is a factor which should not be overlooked in the selection and purchase of a machine, from which the best results are to be obtained.

ALL GEARS subjected to severe duty are made of STEEL, the pinions being cut from bar stock, while all gears are made from high grade steel castings. The spur gears are accurately cut and center distances tested for accuracy within very close limits, on a special machine built for the purpose. Mitre gears are planed theoretically correct (not milled), thus insuring quiet running and long life to the parts.

OPERATIVE FACILITIES are of the utmost convenience, all speed and feed changes and other operations may be easily and quickly accomplished from the

front of the machine. All operating levers, with the exception of speed box lever, are located on the head and saddle, at all times convenient to the operator.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, countershaft, cone pulley drive and wrenches; also Instruction Book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this drill with speed box, universal table, electric motor drive and Special Bases described on another page.

THE AMERICAN TOOL WORKS CO.
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

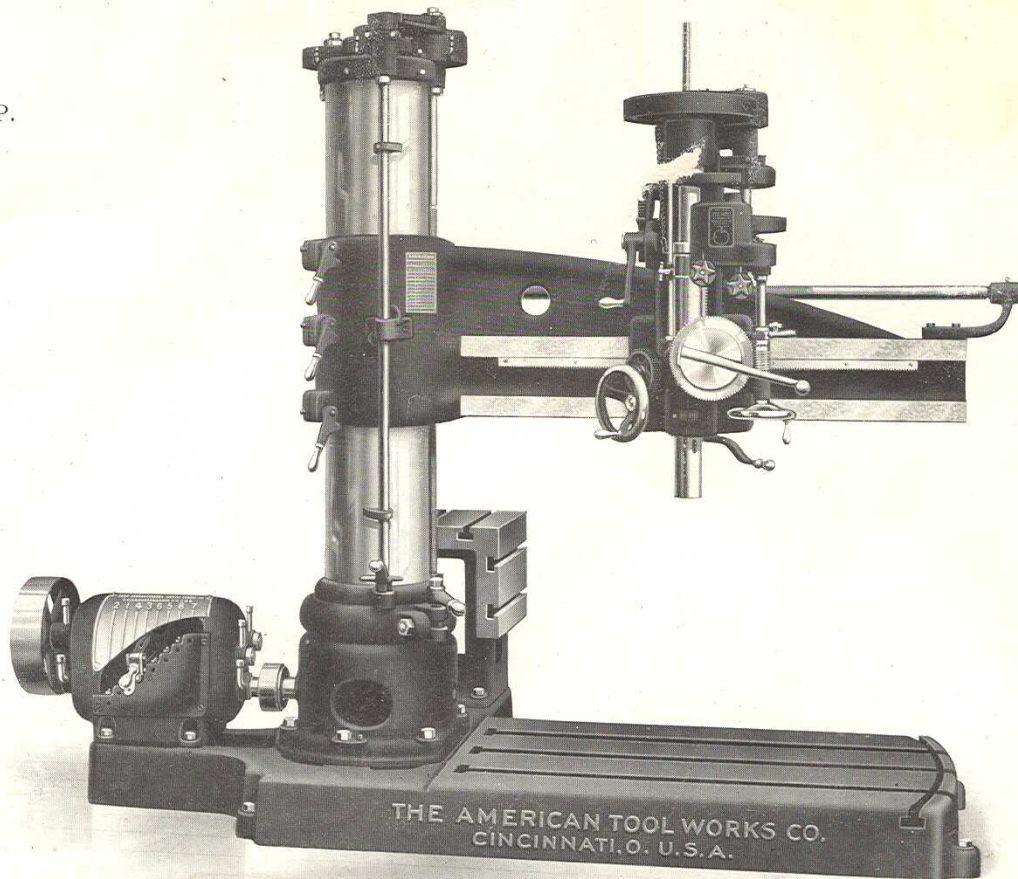
May 1st, 1912.

2500—B.

Fig. No. 358.

Code Word:

RAP.



5-foot Triple Geared, High Speed Radial Drill

WITH PLAIN ARM.

Drills to Center of Circle outside of Column.....10 ft. Traverse of Spindle.....18 in.
Greatest Distance from Spindle to Base.....5 ft. $\frac{7}{8}$ in. Traverse of Head on Arm.....4 ft. $3\frac{3}{8}$ in.

BUILT WITH EITHER CONE PULLEY OR SPEED BOX DRIVE.

THE INTRODUCTION OF HIGH SPEED STEEL TWIST DRILLS, with their enormous capacity and ability to stand up under speeds and feeds previously unheard of, also, the inevitable supplanting of the Upright by the Radial Drill for "all around" purposes, has led us to bring out a full line of Radials, having 2 ft., $2\frac{1}{2}$ ft., 3 ft., $3\frac{1}{2}$ ft., 4 ft., 5 ft., 6 ft. and 7 ft. arms, one size being herewith described. This drill has surpassed all known records for rapid drilling and heavy tapping and is absolutely beyond comparison in its facilities for High Speed Work Production, Accuracy of Alignments and Durability.

PROPER LUBRICATION is a very important consideration in high speed machines. This feature has been thoroughly provided for in these drills as all bearings are oiled thru oil pipes and oilers, which in connection with liberal oil chambers and felt wipers insure at all times the proper distribution of oil.

FEEDING MECHANISM on the head provides eight (8) distinct rates of feed, covering a carefully chosen range, in geometrical progression, from .0006 in. to .0633 in. These feeds are all readily obtained by the simple turning of a dial on the feed box until the desired feed, indexed thereon, comes opposite a fixed pointer. This method of feed change is by far the simplest yet devised, as it requires no reference to index plates and subsequent handling of levers. The all-gear feeds, when supplied instead of belted feeds, insure vastly increased productive capacity, rapidity of change and positive action. The feed train is engaged and disengaged at the worm wheel thru a friction clutch and lever, which also controls the quick advance and return of spindle. This feed friction is so designed as to permit the drill being crowded to its full capacity without unduly straining the feeding mechanism.

DEPTH GAUGE AND AUTOMATIC TRIP. Feeds can be automatically tripped at any position of spindle by adjustable trip dog and pointer acting on the worm clutch. Spindle sleeve is graduated its entire traverse in sixteenths which permits of the spindle feed being accurately tripped at a predetermined depth from any position within the limits of its travel by merely setting the trip dog so that its pointer reads from zero to the desired depth. The trip also acts automatically at extreme limit of spindle travel, thereby preventing breakage of feed mechanism thru carelessness. Two or more dogs can be supplied, making it possible to counterbore any number of holes without resetting.

8-SPEED BOX is of Cone and Tumbler construction, affording a positive drive and eliminating all slipping of frictions under heavy loads. This box gives eight (8) changes of speed, each one of which can be instantly obtained while the machine is running at full speed by simply shifting the tumbler from one

position to another. The tumbler is locked securely in its position by means of a latch and locking pin, which prevents the throwing out of the same under severe strains. The Cone and Tumbler Gears are of the Brown & Sharpe 20 degree involute pointed tooth type and are made from a Special Grade of Steel Carbonized and Hardened. Experience has proven this to be the best possible type to use where running gears are meshed broadside, as it makes the meshing of the gears extremely easy and eliminates the tendency of the gears to "ride". An auxiliary drive is provided, which is automatically engaged and disengaged through a friction by the raising and lowering of the sliding Tumbler. This rotates the cone of gears while changing speeds, thus lessening the shock when the Tumbler and Cone Gears are engaged. A spring shock absorber located in the line of drive between the speed box and the initial driving gears absorbs all shocks, thereby greatly prolonging the life of the driving mechanism.

COLUMN is of double tubular type. This construction provides the equivalent of a double column and affords unusual rigidity for resisting severe strains. The sleeve, or outer column, revolves on hardened and ground conical roller bearings, and may be easily swung around and quickly clamped in position by means of our patent "Y" clamping ring. This binds the sleeve firmly to the inner column, which extends entirely through and has full bearing for the sleeve at both top and bottom.

ARM is of parabolic beam and tube section, giving greatest resistance to bending and torsional strains. Its lower portion is parallel, with the base and thus permits work being operated upon in close proximity to the column without the necessity of an extreme reach of spindle. Arm is clamped to column by three binder levers, obviating loose wrenches, and is provided with gib-screw, permitting arm to work freely, without sagging, while binder handles are loose. Is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled instantly by a convenient lever, marked ears indicating the proper direction. Automatic safety stops are regularly provided which prevent damage thru careless in raising and lowering the arm.

HEAD is moved rapidly along the arm by hand-wheel operating spiral pinion in rack—a device self locking at all points, it being necessary to use the hand binder only for the heavier operations. **TRIPLE GEARS** are located on the head, thus bringing the greatest speed reduction direct to spindle. They may be engaged or disengaged **WITHOUT SHOCK** or jar while the machine is in operation by a convenient lever.

TAPPING MECHANISM is carried on the head, between triple gears and speed box, thus giving to the frictions, already very powerful, the benefit of the

triple gear ratio, making unusually heavy tapping operations possible, and also permitting taps to be backed out at an accelerated speed. The lever for starting, stopping, or reversing the spindle, is controlled at the head from the front of the machine.

BASE is of massive proportions, strongly ribbed, especially at the point of support of column. Is accurately planed and has large T-slots with an ample allowance of metal around them. Base has extension for table, which saves the handling of same when operator wishes to change from heavy to light work, etc.

BEARINGS are all made from a high-grade Phosphor Bronze.

TABLE has top surface of 20 in., by 20 in., and also side surface, thus giving the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, double friction countershaft and cone pulley drive. Instruction Book for installing and operating our machines is regularly supplied. No wrenches are required.

AT EXTRA COST, we can equip this drill with speed box described above, universal table, electric motor drive and Special Bases described in another circular.

A MOTOR of any type may be attached by various methods, connection being made either direct or thru gear, chain or belt. However, our experience has proven that motor on base connected by gear to 8-speed box is the most simple, efficient and serviceable method. Drive "G", in our booklet and "motor driven radial drill" circular illustrate this method.

SPINDLE has twenty-four (24) changes of speed, ranging from 15.6 to 309 R. P. M. in geometrical progression, all immediately available without stopping the machine. This wide range of spindle speeds, advancing by close increments, combined with the exceptional driving power of the machine, ren-

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS:

CINCINNATI, U. S. A.

March 1st, 1911.

5000—B.

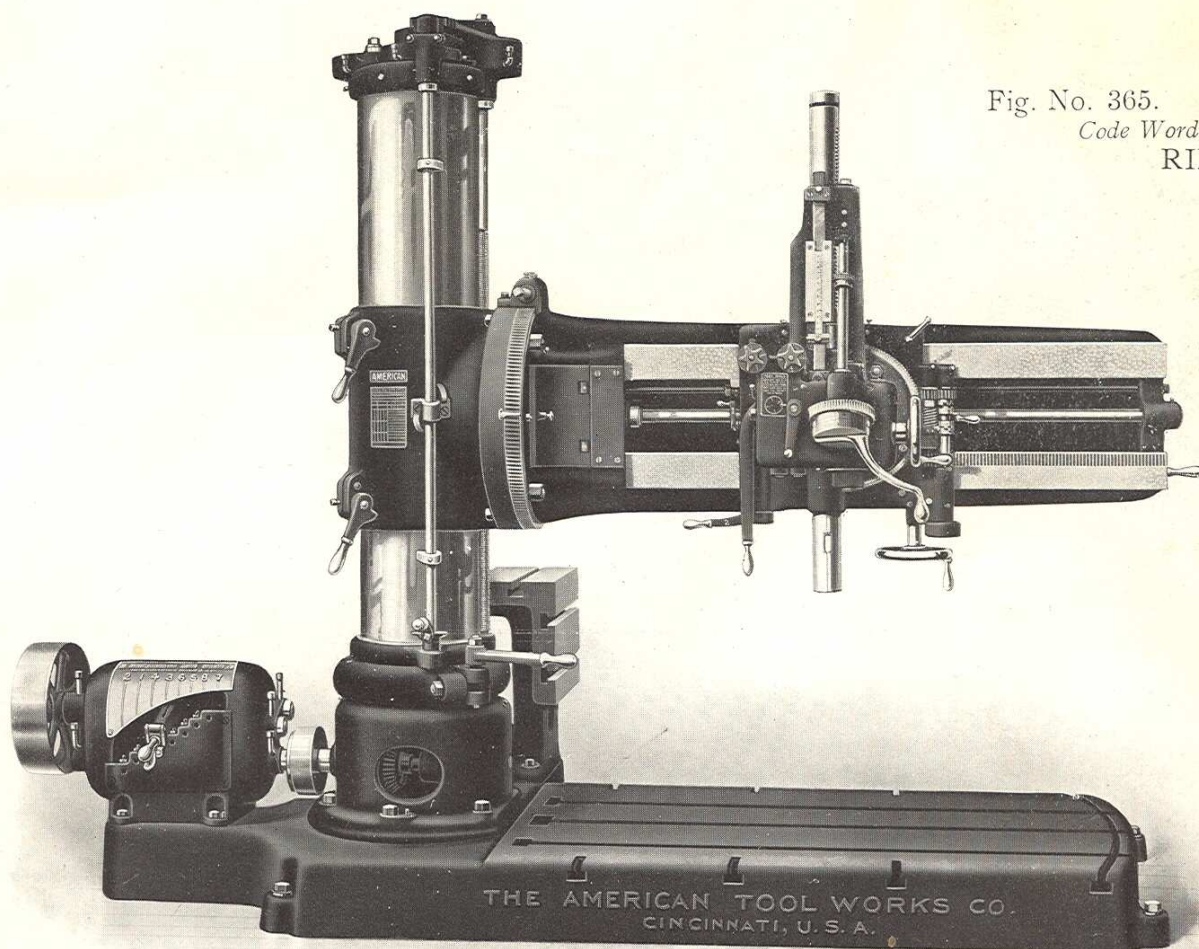


Fig. No. 365.

Code Word.

RIDE.

6-foot Arm Full Universal, Triple Geared Radial

Drills to Center of Circle on Base outside of Column.....12 ft. 3 in. Traverse of Spindle.....20 in.
Greatest Distance from Spindle to Base6 ft. 4 1/4 in. Traverse of Head on Arm.....48 in.

BUILT WITH EITHER CONE PULLEY, SPEED BOX OR MOTOR DRIVE.

THE UNIVERSAL RADIAL has heretofore proven entirely inadequate to the severe duty imposed upon the modern plain arm radial, but its field of usefulness in machine shops is so large that a revolution in design was imperative. Up to the present time the Universal Radial has been incapable of driving to the limit high speed steel drills, principally because of lack of power and springing of the arm. The new machine, shown above, represents a radical departure in design, and the very highest development in this type of drill, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements in Power, Rigidity, Durability and Convenience of Operation.

THIS RADIAL DRILL is the result of long and careful consideration, and in its design we have incorporated the many excellent features of our Plain Radials, which have placed them absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Productive Capacity.

RIGIDITY OF THE ARM is doubtless one of the most essential qualities in radial drill design. This, however, is very noticeably lacking in many other makes of Universal Radials, for the reason that either one or more walls of the arm section are cut away in order to incorporate the arm shaft and other transmission elements. This weakening obviously unfits the arm for severe duty and for resisting the combined stresses of torsion and deflection.

UNITED-DOUBLE-TUBE ARM CONSTRUCTION. The design of the arm of this new Universal Radial has eliminated every weakness heretofore encountered. It is made in the form of upper and lower tube sections which are bound together in the back by a double wall of metal and further re-enforced by heavy transverse ribbing. On the front wall, "ways" are formed for carrying the unusually wide and rigid saddle, which is firmly locked at any point along the arm by means of a powerful clamping device. This in addition binds together the double arm sections and saddle into a very compact unit, thus affording unparalleled strength for resisting all strains. Arm is clamped to column by two binder levers, obviating loose wrenches, and is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled by a convenient lever, marked ears indicating the proper direction to throw lever for raising or lowering. This lever cannot be operated until slightly raised from its bearing, thus guarding against accident through unintentional movement while the arm is clamped to column. Arm is rotated in a complete circle by worm engaging worm wheel cut in the

periphery of the arm flange. This movement, in connection with the swivelling head, permits drilling and tapping at any angle radiating from the center of a sphere and is firmly clamped, as set, by four large binder bolts. Arm is graduated in degrees on its periphery, readings being taken at a fixed pointer.

HEAD is of very compact design and is equipped with powerful Steel Triple Gears. It may be swivelled through a complete circle by means of a hand wheel and worm which engages a worm wheel fixed to the head. This feature is of special value in setting the spindle for angular drilling. The worm holds the swivelling head in any position and eliminates all possibility of accident, through the head swinging around of its own weight, when the clamping bolts are loosened. The hand wheel affords quicker motion than the use of a wrench. Graduation on head show, at a fixed pointer, the angle as set, and three binder bolts are provided for securely clamping the head at any angle. Head is moved rapidly along the arm by means of multiple gearing and rack, through the same hand wheel that swivels the head, by simply engaging the clutch shown. A binder is supplied which permits of readily locking the head at any point along the arm.

SADDLE SHAFT CONSTRUCTION. A feature of great merit is found in the power transmitting elements between the arm shaft and the spindle. The saddle shaft, which forms part of this connection, is offset to one side of the spindle and is mounted in two (2) long bearings, one of which is integral with the saddle and the other with the swivelling head. Power is transmitted from the saddle shaft, through mitre gears, to a shaft in the front of head, from which the spindle is driven through spur gears. This construction eliminates the cramping, consequent loss of power and rapid wear, which is obviously unavoidable in other makes of universal drills where the spindle is driven directly from the arm shaft through bevel gears mounted on each side of an extremely short, single saddle bearing.

SPINDLE has twenty-four (24) changes of speed, with speed box drive, or cone pulley drive with double friction countershaft, advancing in geometrical progression, ranging from 19 to 314 R. P. M., all immediately available by means of two levers, without stopping the machine. The wide range of speeds obtainable, together with the enormous power and unusual rigidity render this drill equally efficient when using either the ordinary carbon or high speed twist drills, and particularly fits it for a wide range of tapping requirements. A speed plate, fixed to the arm girdle, shows at a glance how to obtain suitable speeds for the work being operated upon. Spindle is provided with both hand and power feeds, also with quick advance and return.

TRIPLE GEARS are made of STEEL, are of powerful design and provide one direct and two reduced speeds, through the medium of spur gears and positive clutches. They are operated from the front of the head saddle by a convenient lever, without stopping the machine. Triple gears are mounted on the back of the saddle and are fully enclosed by the upper walls of the arm, thus permitting the universal arm to be rotated through a complete circle with no possibility of any overhanging mechanism interfering with the work being machined. This is a distinct feature on this drill.

FEEDING MECHANISM is located on the head and provides eight (8) distinct rates of positive geared feed, covering a carefully chosen range in geometrical progression from .006" to .060" per revolution of spindle. This mechanism is controlled by two dials, on the face of which the respective feeds are plainly indicated. Any one of the feeds is instantly obtained by merely

turning the dial until the desired feed comes opposite a fixed pointer. The rate of feed being used is plainly indicated at all times and reference to index plates is unnecessary. The feed train is engaged and disengaged at the worm wheel through a Friction Clutch and lever, which lever also controls the quick advance and return of the spindle. This feed friction is so designed as to permit the machine being crowded to the limit of its capacity without unduly straining the feed works.

DEPTH GAUGE AND AUTOMATIC TRIP are of greatly improved and simplified design and will trip spindle at any predetermined depth. Readings are taken from zero on a vertical "scale", similar to an ordinary machinist's scale, making unnecessary the reading of a circular gauge. The tripping mechanism is so arranged that the spindle will be tripped at any point within the limit of travel by merely setting the trip dog so that the scale reads the depth to be drilled from zero. This trip acts automatically at the full travel of spindle, thus preventing breakage to feed mechanism. Feed can be tripped by hand at any point.

TAPPING MECHANISM is mounted on the girdle portion of the arm between the triple gears and the speed box. This construction has a distinct advantage over other designs of universal radials where the tapping attachment is incorporated in the saddle mechanism, as it permits the use of more liberal proportions in the design of the reversing frictions and other parts than is otherwise possible. Not only is increased strength given to the tapping attachment on account of the high gear ratio, but, a neater and more compact saddle design is obtained which has no cumbersome, overhanging mechanism. The consequent reduction in weight of saddle, enables the operator to manipulate the head along the arm with greater ease and rapidity.

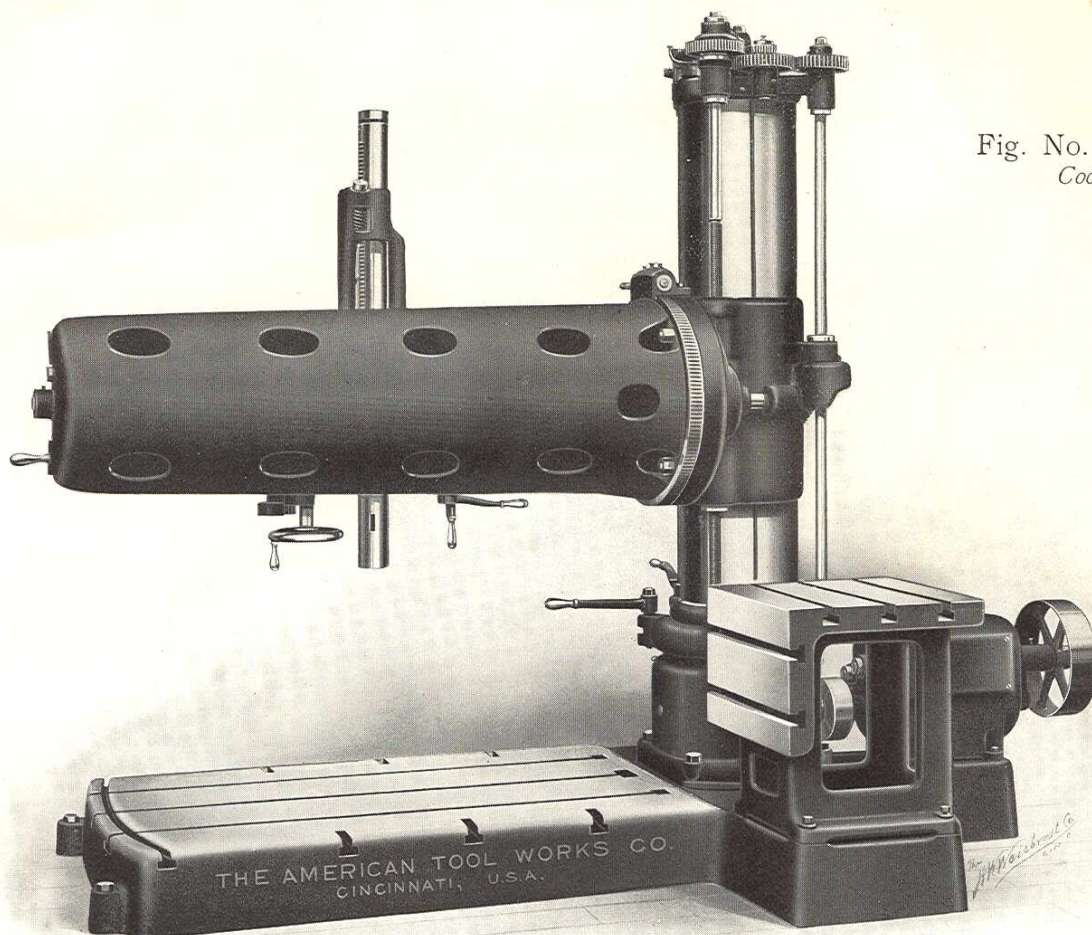


Fig. No. 365.
Code Word;
RIDE.

REAR VIEW.

6-foot Arm Full Universal, Triple Geared Radial

(CONTINUED)

TAPPING MECHANISM OPERATES through large diameter friction clutches, which will transmit ample power for handling all classes of work on this drill. The lever for operating this mechanism is placed on the front of saddle and controls the starting, stopping and reversing of the spindle. Owing to the fact that the tapping attachment is located between the speed box and triple gears, the frictions, already very powerful, receive the benefit of the triple gear ratio and have comparatively light duty to perform, thus making possible unusually heavy tapping without undue strain, and permitting taps to be withdrawn at an accelerated speed. The great power of the frictions require but a light adjustment, and the lever operating same is consequently thrown in and out of engagement with a very slight amount of effort.

COLUMN is of double tubular type. The sleeve, or outer column is mounted on 2 sets of Hess-Bright Roller bearings which support the weight of the sleeve and also relieves the side thrust. This construction greatly facilitates the swinging of the arm. An improved binding arrangement is supplied for binding the sleeve to the inner column or stump, which extends through the entire length of the sleeve and has a long bearing for the outer column at both top and bottom. This construction provides the equivalent of a double column and affords exceptional rigidity.

BASE is of massive proportions and has unusual depth. Is strongly ribbed lengthwise and transversely, especially at the point where column is bolted. It is planed with the greatest possible accuracy, and has large T-slots with ample allowance of metal around them.

SPEED BOX is of the cone and tumbler type and provides eight (8) changes of speed, each one of which is instantly available by the mere shifting of the tumbler lever. **ALL GEARS** in box are made of a high grade STEEL carbonized and hardened, and are of very coarse pitch and wide face. The gears in speed box are of the Brown & Sharp "20 degree involute pointed tooth type," extensive tests having proven this form of tooth to be far superior to any other for use where gears are intermeshed broadside. An auxiliary train of gearing between the pulley and cone shafts is also provided, which is thrown into engagement, through a friction, by the mere lifting of the tumbler lever. This rotates the cone gears while changing speeds and thus permits changes being made without shock to the gears. Tumbler lever and gears are securely located in their various positions by means of a latch

PLAIN BOX TABLE has top surface of 28 in. by 28 in. and also liberal side surface, thus providing the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

UNIVERSAL TABLE consists of a swivel base on which is mounted a heavy housing which carries the tilting top of table. Top can be swivelled to any angle within 90 degrees and either face can be set in a vertical position by means of a segment and worm operated through a pair of reduction gears. This arrangement, together with the T-handle wrench, makes it very easy to swivel the table when carrying a heavy load. The top can be securely clamped to housing by two bolts, thereby relieving the worm and segment of undue strain, since they are self locking in themselves. Graduated dials, on both top and base, show the angle at which table is set.

BRONZE BEARINGS are used throughout this drill, which are renewable in case of wear. Where babbit bearings are used, this feature is not available.

SPECIAL LUBRICATION. The increased speeds and feeds possible with the most modern machine tools, require that they have superior lubricating facilities to the older style machines. This feature has been thoroughly and carefully provided for in Every Bearing in this radial drill, and is a factor which should not be overlooked in the selection and purchase of a machine, from which the best results are to be obtained.

ALL GEARS subjected to severe duty are made of STEEL, the pinions being cut from bar stock, while all gears are made from high grade, steel castings. The spur gears are accurately cut and center distances tested for accuracy within very close limits, on a special machine built for the purpose. Mitre gears are planed theoretically correct (not milled), thus insuring quiet running and long life to the parts.

OPERATIVE FACILITIES are of the utmost convenience, all speed and feed changes and other operations may be easily and quickly accomplished from the front of the machine. All operating levers, with the exception of speed box lever, are located on the head and saddle, at all times convenient to the operator.

and locking pin. A CUSHION, in the line of drive, absorbs all shocks and thus insures long life to the driving mechanism.

A **MOTOR** of any type may be attached by various methods, connection being made either direct or through gears, chain or belt. However, our experience has proven that a motor on base, connected by gearing to speed box, is the most simple, efficient and serviceable method. This type is known as Drive "G" and is shown in our booklet.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, countershaft, cone pulley drive and wrenches; also Instruction Book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this drill with speed box, universal table, electric motor drive and Special Bases described on another page.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

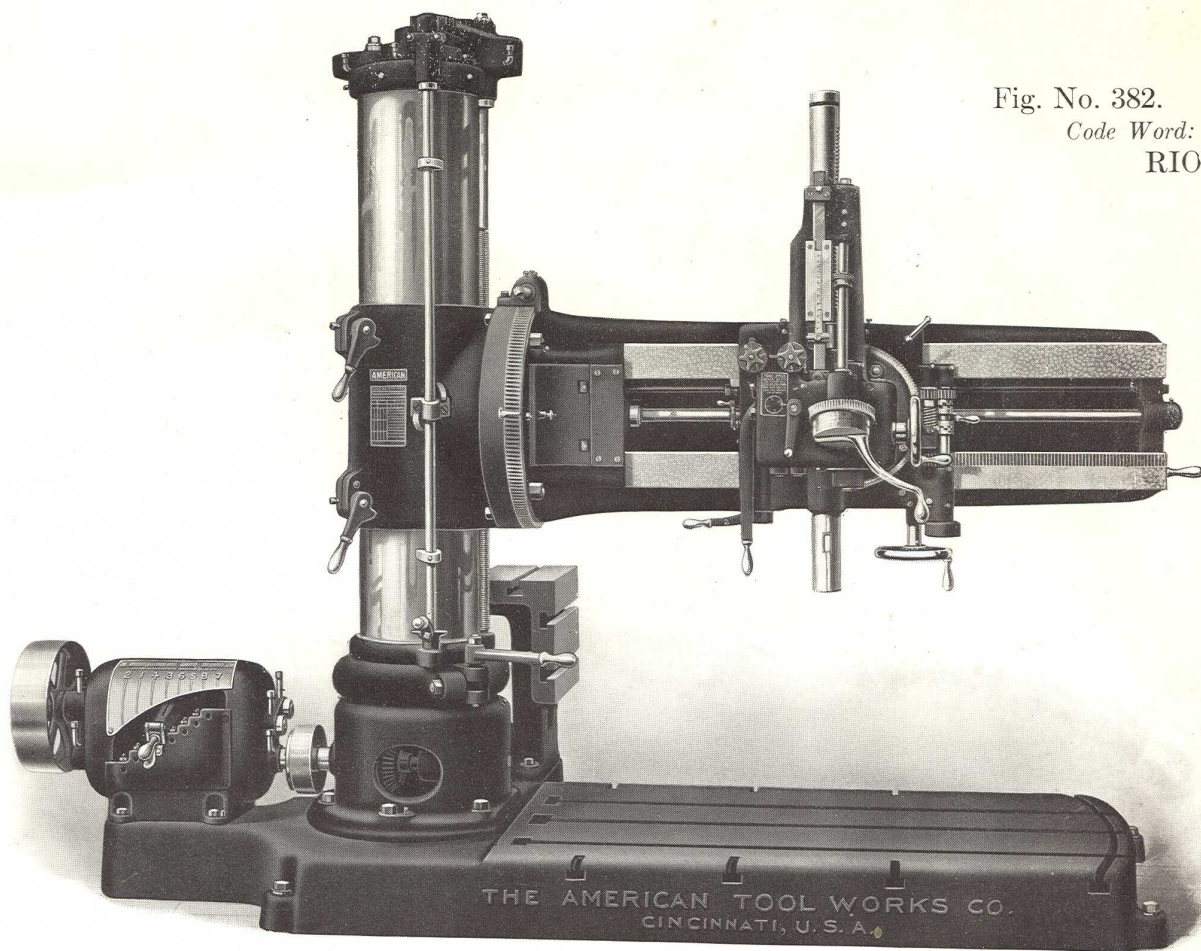


Fig. No. 382.

Code Word:

RIOT.

7-foot Arm Full Universal, Triple Geared Radial

Drills to Center of Circle on Base outside of Column.....14 ft. 3 in.
Greatest Distance from Spindle to Base.....6 ft. 4 1/4 in.

Traverse of Spindle.....20 in.
Traverse of Head on Arm.....60 in.

BUILT WITH EITHER CONE PULLEY, SPEED BOX OR MOTOR DRIVE.

THE UNIVERSAL RADIAL has heretofore proven entirely inadequate to the severe duty imposed upon the modern plain arm radial, but its field of usefulness in machine shops is so large that a revolution in design was imperative. Up to the present time the Universal Radial has been incapable of driving to the limit high speed steel drills, principally because of lack of power and springing of the arm. The new machine, shown above, represents a radical departure in design, and the very highest development in this type of drill, which we unhesitatingly recommend as being capable of fulfilling the most exacting requirements in Power, Rigidity, Durability and Convenience of Operation.

THIS RADIAL DRILL is the result of long and careful consideration, and in its design we have incorporated the many excellent features of our Plain Radials, which have placed them absolutely beyond comparison in their facilities for High Speed Work Production, Accuracy of Alignments and Productive Capacity.

RIGIDITY OF THE ARM is doubtless one of the most essential qualities in radial drill design. This, however, is very noticeably lacking in many other makes of Universal Radials, for the reason that either one or more walls of the arm section are cut away in order to incorporate the arm shaft and other transmission elements. This weakening obviously unfits the arm for severe duty and for resisting the combined stresses of torsion and deflection.

REINFORCED DOUBLE SECTION ARM CONSTRUCTION. The design of the arm of this new Universal Radial has eliminated every weakness heretofore encountered. It is made in the form of upper and lower tube sections which are bound together in the back by a double wall of metal and further re-enforced by heavy transverse ribbing. On the front wall, "ways" are formed for carrying the unusually wide and rigid saddle, which is firmly locked at any point along the arm by means of a powerful clamping device. This in addition binds together the double arm sections and saddle into a very compact unit, thus affording unparalleled strength for resisting all strains. Arm is clamped to column by two binder levers, obviating loose wrenches, and is raised and lowered rapidly by a double thread coarse pitch screw, hung on ball bearings, and controlled by a convenient lever, marked ears indicating the proper direction to throw lever for raising or lowering. This lever cannot be operated until slightly raised from its bearing, thus guarding against accident through unintentional movement while the arm is clamped to column. Arm is rotated in a complete circle by worm engaging worm wheel cut in the periphery of the arm

flange. This movement, in connection with the swiveling head, permits drilling and tapping at any angle radiating from the center of a sphere and is firmly clamped, as set, by four large binder bolts. Arm is graduated in degrees on its periphery, readings being taken at a fixed pointer.

HEAD is of very compact design and is equipped with powerful Steel Triple Gears. It may be swivelled through a complete circle by means of a hand wheel and worm which engages a worm wheel fixed to the head. This feature is of special value in setting the spindle for angular drilling. The worm holds the swivelling head in any position and eliminates all possibility of accident, through the head swinging around of its own weight, when the clamping bolts are loosened. The hand wheel affords quicker motion than the use of a wrench. Graduations on head show, at a fixed pointer, the angle as set, and three binder bolts are provided for securely clamping the head at any angle. Head is moved rapidly along the arm by means of multiple gearing and rack, through the same hand wheel that swivels the head, by simply engaging the clutch shown. A binder is supplied which permits of readily locking the head at any point along the arm.

SADDLE SHAFT CONSTRUCTION. A feature of great merit is found in the power transmitting elements between the arm shaft and the spindle. The saddle shaft, which forms part of this connection, is offset to one side of the spindle and is mounted in two (2) long bearings, one of which is integral with the saddle and the other with the swivelling head. Power is transmitted from the saddle shaft, through mitre gears, to a shaft in the front of head, from which the spindle is driven through spur gears. This construction eliminates the cramping, consequent loss of power and rapid wear, which is obviously unavoidable in other makes of universal drills where the spindle is driven directly from the arm shaft through bevel gears mounted on each side of an extremely short, single saddle bearing.

SPINDLE has twenty-four (24) changes of speed, with speed box drive, or cone pulley drive with double friction countershaft, advancing in geometrical progression, ranging from 19 to 314 R. P. M., all immediately available by means of two levers, without stopping the machine. The wide range of speeds obtainable, together with the enormous power and unusual rigidity render this drill equally efficient when using either the ordinary carbon or high speed twist drills, and particularly fits it for a wide range of tapping requirements. A speed plate, fixed to the arm of the girdle, shows at a glance how to obtain suitable speeds for the work being operated upon. Spindle is provided with both hand and power feeds, also with quick advance and return.

TRIPLE GEARS are made of STEEL, are of powerful design and provide one direct and two reduced speeds, through the medium of spur gears and positive clutches. They are operated from the front of the head saddle by a convenient lever, without stopping the machine. Triple gears are mounted on the back of the saddle and are fully enclosed by the upper walls of the arm, thus permitting the universal arm to be rotated through a complete circle with no possibility of any overhanging mechanism interfering with the work being machined. This is a distinct feature on this drill.

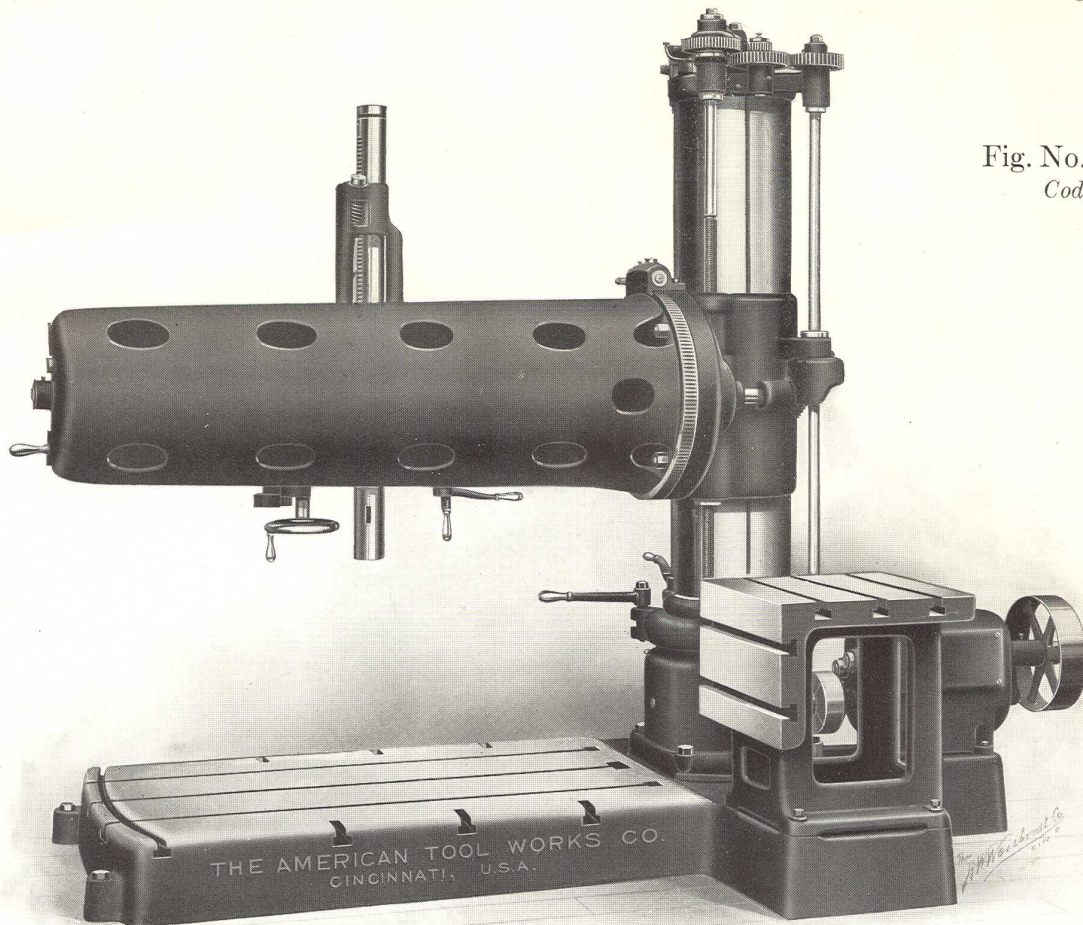
FEEDING MECHANISM is located on the head and provides eight (8) distinct rates of positive geared feed, covering a carefully chosen range in geometrical progression from .006; to .060; per revolution of spindle. This mechanism is controlled by two dials, on the face of which the respective feeds are plainly indicated. Any one of the feeds is instantly obtained by merely turning

the dial until the desired feed comes opposite a fixed pointer. The rate of feed being used is plainly indicated at all times and reference to index plates is unnecessary. The feed train is engaged and disengaged at the worm wheel through a Friction Clutch and lever, which lever also controls the quick advance and return of the spindle. This feed friction is so designed as to permit the machine being crowded to the limit of its capacity without unduly straining the feed works.

DEPTH GAUGE AND AUTOMATIC TRIP are of greatly improved and simplified design and will trip spindle at any predetermined depth. Readings are taken from zero on a vertical "scale", similar to an ordinary machinist's scale, making unnecessary the reading of a circular gauge. The tripping mechanism is so arranged that the spindle will be tripped at any point within the limit of travel by merely setting the trip dog so that the scale reads the depth to be drilled from zero. This trip automatically acts at the full travel of spindle, thus preventing breakage to feed mechanism. Feed can be tripped by hand at any point.

TAPPING MECHANISM is mounted on the girdle portion of the arm between the triple gears and the speed box. This construction has a distinct advantage over other designs of universal radials where the tapping attachment is incorporated in the saddle mechanism, as it permits the use of more liberal proportions in the design of the reversing frictions and other parts than is otherwise possible. Not only is increased strength given to the tapping attachment on account of the high gear ratio, but, a neater and more compact saddle design is obtained which has no cumbersome, overhanging mechanism. The consequent reduction in weight of saddle, enables the operator to manipulate the head along the arm with greater ease and rapidity.

Fig. No. 382.
Code Word:
RIOT.



REAR VIEW.

7-foot Arm Full Universal Triple Geared Radial

(CONTINUED)

TAPPING MECHANISM OPERATES through powerful friction clutches. The lever for operating this mechanism is placed on the front of saddle and controls the starting, stopping and reversing of the spindle. Owing to the fact that the tapping attachment is located between the speed box and triple gears, the frictions, already very powerful, receive the benefit of the triple gear ratio and have comparatively light duty to perform, thus making possible unusually heavy tapping without undue strain, and permitting taps to be withdrawn at an accelerated speed. The great power of the frictions require but a light adjustment, and the lever operating same is consequently thrown in and out of engagement with a very slight amount of effort.

COLUMN is of double-tubular type. The sleeve, or outer column, revolves on conical roller bearings which are hardened and ground. The column may be clamped in any position by means of our patent "V" clamping ring, which may be moved around the stump to accommodate the convenience of the operator. This ring when clamped, binds the column sleeve firmly to the inner column or stump, which extends through the entire length of the sleeve and has a long bearing for the outer column at both top and bottom. This construction provides the equivalent of a double column and affords exceptional rigidity.

BASE is of massive proportions and has unusual depth. Is strongly ribbed lengthwise and transversely, especially at the point where column is bolted. It is planed with the greatest possible accuracy, and has large T-slots with ample allowance of metal around them.

SPEED BOX is of the cone and tumbler type and provides eight (8) changes of speed, each one of which is instantly available by the mere shifting of the tumbler lever. ALL GEARS in box are made of a high grade STEEL carbonized and hardened, and are of very coarse pitch and wide face. The gears in speed box are of the Brown & Sharp "20 degree involute pointed tooth type," extensive tests having proven this form of tooth to be far superior to any other for use where gears are intermeshed broadside. An auxiliary train of gearing between the pulley and cone shafts is also provided, which is thrown into engagement, through a friction, by the mere lifting of the tumbler lever. This rotates the cone gears while changing speeds and thus permits changes being made without shock to the gears. Tumbler lever and gears are securely located

PLAIN BOX TABLE has top surface of 28 in. by 28 in. and also liberal side surface, thus providing the equivalent of an angle plate. Both top and side surfaces are accurately planed and supplied with large T-slots.

UNIVERSAL TABLE consists of a swivel base on which is mounted a heavy housing which carries the tilting top of table. Top can be swivelled to any angle within 90 degrees and either face can be set in a vertical position by means of a segment and worm operated through a pair of reduction gears. This arrangement, together with the T-handle wrench, makes it very easy to swivel the table when carrying a heavy load. The top can be securely clamped to housing by two bolts, thereby relieving the worm and segment of undue strain, since they are self-locking in themselves. Graduated dials, on both top and base, show the angle at which table is set.

BRONZE BEARINGS are used throughout this drill, which are renewable in case of wear. Where babbitt bearings are used, this feature is not available.

SPECIAL LUBRICATION. The increased speeds and feeds possible with the most modern machine tools, require that they have superior lubricating facilities to the older style machines. This feature has been thoroughly and carefully provided for in Every Bearing in this radial drill, and is a factor which should not be overlooked in the selection and purchase of a machine, from which the best results are to be obtained.

ALL GEARS subjected to severe duty are made of STEEL, the pinions being cut from bar stock, while all gears are made from high grade steel castings. The spur gears are accurately cut and center distances tested for accuracy within very close limits, on a special machine built for the purpose. Mitre gears are planed theoretically correct (not milled), thus insuring quiet running and long life to the parts.

OPERATIVE FACILITIES are of the utmost convenience, all speed and feed changes and other operations may be easily and quickly accomplished from the

front of the machine. All operating levers, with the exception of speed box lever, are located on the head and saddle, at all times convenient to the operator.

A MOTOR of any type may be attached by various methods, connection being made either direct or through gears, chain or belt. However, our experience has proven that a motor on base, connected by gearing to speed box, is the most simple, efficient and serviceable method. This type is known as Drive "G" and is shown in our booklet.

REGULAR EQUIPMENT, upon which base price is determined, includes plain box table, countershaft, cone pulley drive and wrenches; also Instruction Book for the installation and operation of our machine tools.

AT EXTRA COST, we can equip this drill with speed box, universal table, electric motor drive and Special Bases described on another page.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,

CINCINNATI, U. S. A.

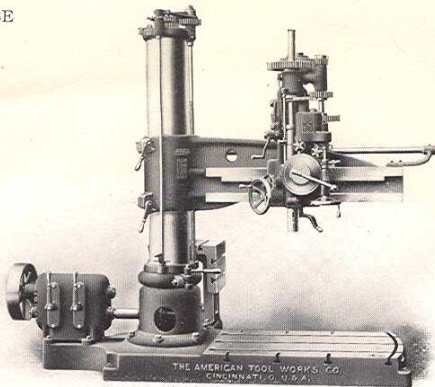
May 1st, 1912.

2500—B.

Bases for "American" Radial Drills.

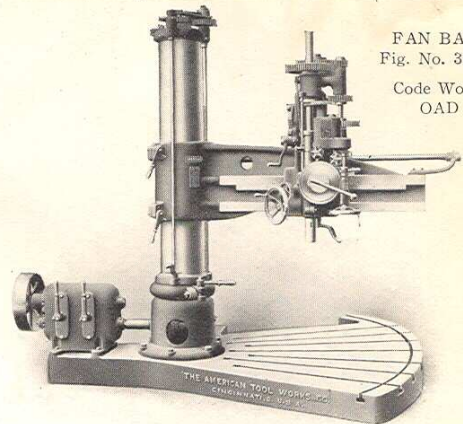
BUILT FOR 2 ft., 2½ ft., 3 ft., 3½ ft., 4 ft., 5 ft., 6 ft., and 7 ft. SIZES.

STANDARD BASE
Fig. No. 357



SPECIAL BASES
and
SPECIAL DRIVES
to suit
SPECIAL
REQUIREMENTS

FAN BASE
Fig. No. 357-F
Code Word:
OAD

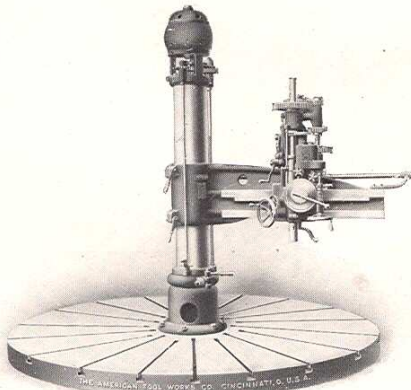


REGULARLY FURNISHED. Strongly ribbed and has extension at rear for plain box or universal table (except on the 2, 2½, 3, 3½ ft. sizes.) Has large T-slots with ample allowance of metal around them, and radial slot for an outboard support.

It provides an increased area for setting up work and permits of spindle operating over the entire surface. Has radial T-slot to accommodate an outboard support if desired, also extension to base for table (except on the 2, 2½, 3 and 3½ ft. sizes.) This base is furnished at extra cost.

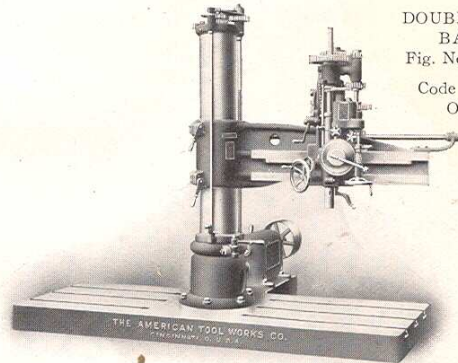
ROUND BASE
Fig. No. 357-R.

Code Word:
ORY



Round base is desirable where continuous operations are carried on. It allows a great number of parts to be worked upon in rapid succession without handling same or changing tools each time an operation is completed. This drill may be driven by a variable speed motor on top of column or by a countershaft direct connected to center shaft at top of column through mitre gears. This base is furnished at extra cost.

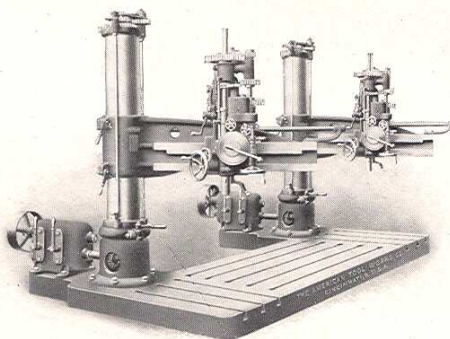
DOUBLE END
BASE.
Fig. No. 357-D
Code Word:
OUS



Where two settings of work are desired, to insure continuous operation, this base is very desirable. Work can be drilled or tapped on one end while being taken off and replaced on the other. It does not occupy much space in the aisle, since it can be set close to wall. This base is furnished at extra cost.

DOUBLE
COLUMN
UNITED BASE.
Fig. No. 357-W.

Code Word:
OER

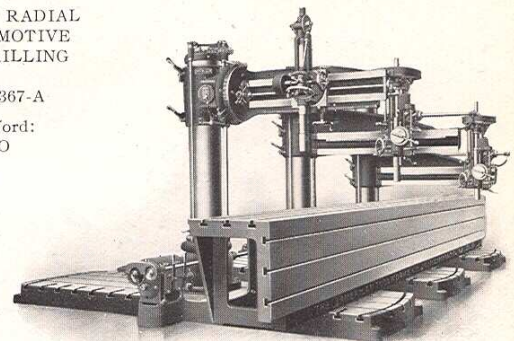


This type of radial drill offers advantages where long pieces of work are to be machined or where a series of operations are started by one of the drills and the work slid over under the other drill for the finishing operation. This saves handling with cranes or lifting from one base to another.

COMBINED RADIAL
AND LOCOMOTIVE
FRAME DRILLING
MACHINE

Fig. No. 367-A

Code Word:
LOCO



This machine is particularly adapted to drilling long work, such as locomotive frames, architectural iron work, etc. Bases of drills are made double, as in Fig. No. 357-D. The substantial table is made in one piece and extends the full length of the three drill bases. The bases are not united. Drill arms can be swung around, without touching the adjacent column, to operate as a regular radial drill on the other end of the double base. Send for special circular describing this machine.

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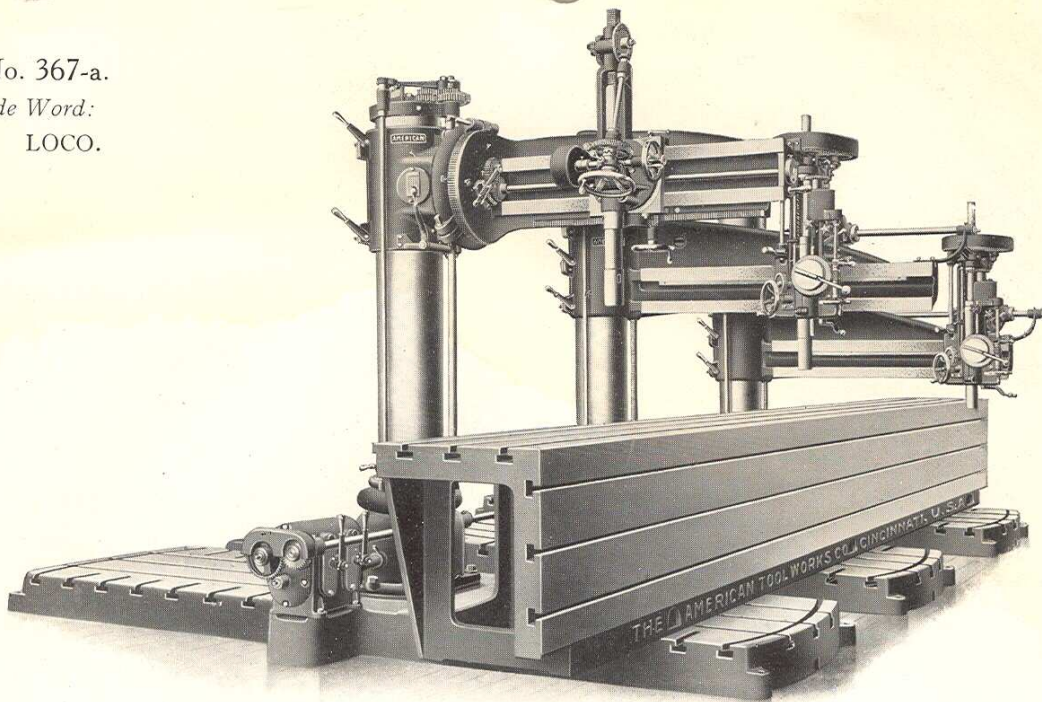
June 25th, 1910.

2500—B.

Fig. No. 367-a.

Code Word:

LOCO.



American Combination Radial and Locomotive Frame Drilling Machine.

THE AMERICAN COMBINATION RADIAL AND LOCOMOTIVE FRAME DRILLING MACHINE, as will be seen, consists of three 6' Radial Drills, two of which are Plain and one Full Universal, each with double base and one long T-slotted table extending across them. The drills are driven with one motor through the medium of a "four-speed box" on the base of each. This box is operated by the two levers shown, either while the machine is running or stopped, and affords eight mechanical speed changes with the back gears. The connection between the speed boxes and the drills is through spur gearing, obviating all end thrust. The driving shaft from the motor passes through each stump wherein it is journaled.

COLUMNS are of double tubular type. The sleeve, of outer column, revolves on conical roller bearings, hardened and ground, and is clamped in any position by our patent "V" clamping ring. This makes the outer column practically integral with the inner, which extends the entire height, supplying full bearing for the outer column at both top and bottom. This gives the equivalent of a double column, affording exceptional rigidity.

EACH DRILL IS A COMPLETE UNIT IN ITSELF, the speeds of any one being entirely independent of the others, and may either be used to work on a locomotive frame clamped to the long table, or the arm may be swung around to do a great variety of radial work on the opposite end of base, or on the box table furnished, but not shown. Each arm may be swung in the complete circle without touching an adjacent column.

THE TRIPLE GEARS being on the heads not only deliver the power direct to the spindle, but through levers conveniently located, enable the operator to have full control of the same at all times. This permits tapping with the triple gears in when required, and changing instantly to accelerated speed for backing out without stopping the machine or the operator changing his position.

THE SPINDLE of each drill is started, stopped and reversed by a lever on the head, convenient to the operator, which obviates the necessity of stopping any of the running parts, except the spindle, thus saving considerable time.

THE TAPPING ATTACHMENT, controlled by the same lever, is between the triple gears and the speed box, thus giving to the already powerful double-band frictions the benefit of a triple gear ratio making unusually heavy tapping operations possible.

EIGHT POSITIVE FEEDS are supplied on each radial in geometrical progression, each instantly and easily obtainable through two dials on the head, which show clearly the desired feed to be used. The power feed is delivered from the worm wheel to the spindle through a powerful friction controlled by the handle used for quick advance and return.

DEPTH GAUGES and AUTOMATIC TRIPS are supplied and the spindles are graduated. SAFETY STOPS prevent the spindles from feeding beyond the limit of travel, thus averting subsequent damage. ALL GEARS ARE COVERED, to protect them from contact with over-head cranes.

THE ADVANTAGES of this machine, through its flexibility, power, ease of operation and productive capacity, will surely appeal to those railroad officials interested in this type of machine tool.

NOTE: The above illustration shows only the make-up of the tool. The new style Radials now furnished are illustrated and described in separate circulars.

THE AMERICAN TOOL WORKS CO.

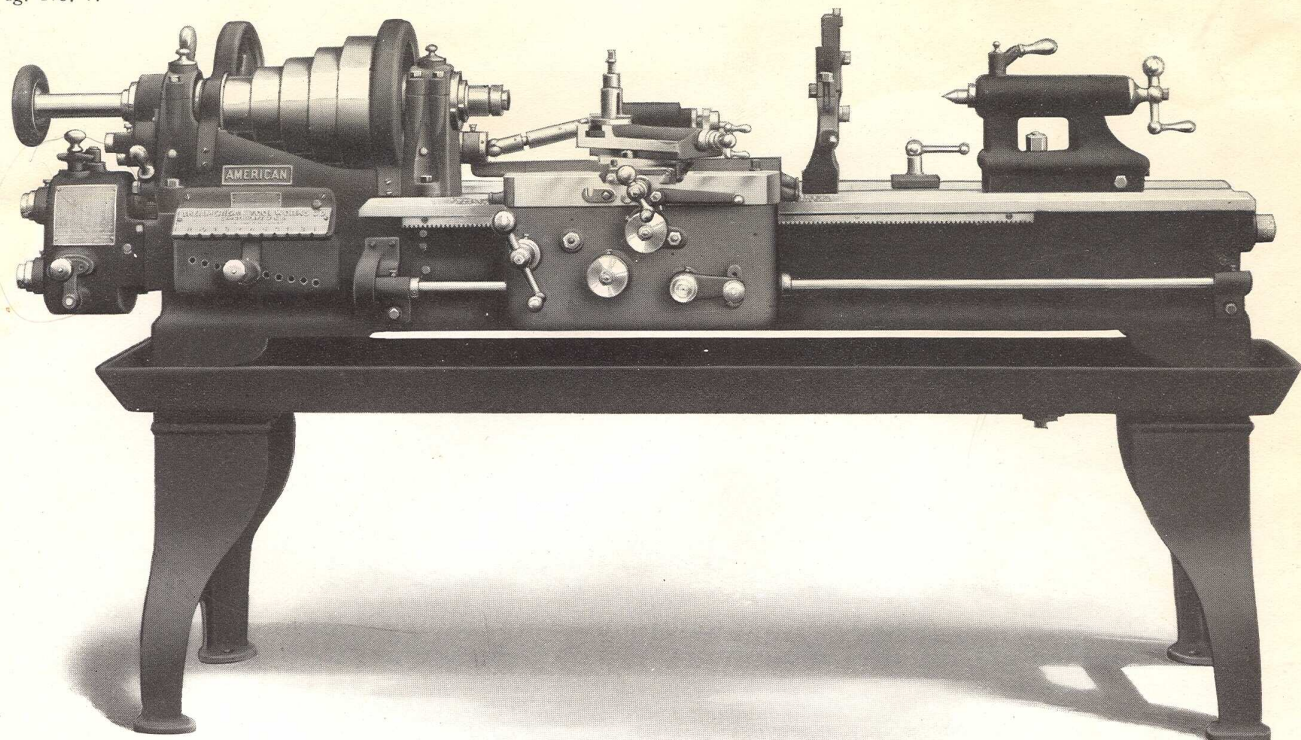
LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

March 15, 1910.

2500—B

Fig. No. 7.



FRONT VIEW.

14-in. and 16-in. "American" Tool Room Lathe

Equipped with Draw-in Collet Chuck, Taper Attachment, Compound Rest, Pan and Quick Change Feeding and Thread Cutting Mechanism.

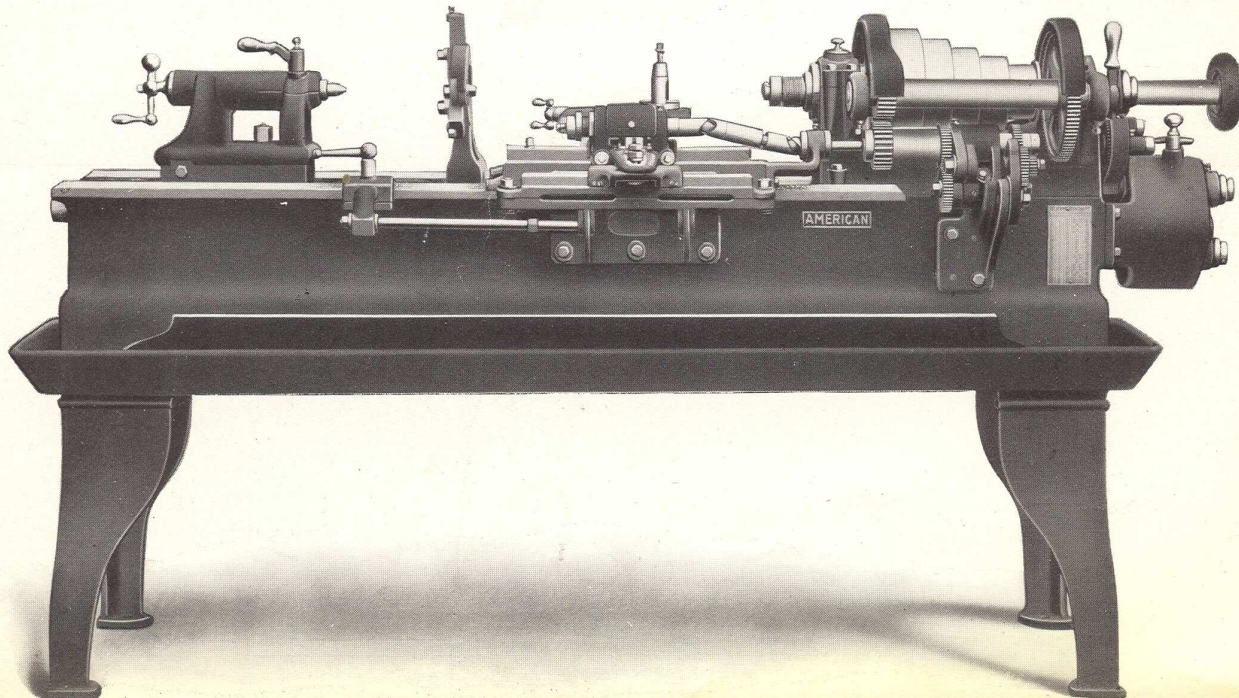
GENERAL DESCRIPTION of these Lathes may be found on Circulars No. 6 and No. 8.

TAPER ATTACHMENT as shown (for 14 in. to 42 in. inclusive) is, both in design and operation, extremely simple, the construction being such as to avoid the spring and inconvenience usually found in such a device. All parts are amply heavy and numerous sliding joints are avoided, thus insuring extreme rigidity and accuracy of tapers produced therefrom.

BOLTED TO AND TRAVELING WITH THE CARRIAGE it may be instantly thrown into operation at any point along the lathe bed by simply tightening one binder nut on clamping dog, or disengaged by releasing same.

WHEN TAPER ATTACHMENT is ordered AFTER lathe leaves our works, it can be readily applied by the user, as all our lathe carriages are drilled to jigs properly tapped ready to receive taper attachment, with a small amount of fitting. Complete information relative to the fitting is furnished by us. There is no necessity of a planed strip on the bed or any work except a slight amount of fitting to the carriage.

RELIEVING ATTACHMENT produces accurate relief for the teeth of taps, gear cutters, milling cutters, cutters with formed teeth (except those with square thread), cutters for boring bars, hobs, etc., and offers facilities for turning odd shapes, also boring holes irregularly and out of round. The actu-



REAR VIEW.

WHEN ATTACHED FOR TAPER WORK the sliding shoe is directly connected with bottom slide of tool rest by a heavy cast iron yoke, making its operation instantaneous, at the same time doing away with all loss motion, weakness and inaccuracy found in taper attachments directly connected with cross feed screw.

CROSS FEED NUT is always connected with tool rest, therefore can not fall to one side and out of position.

NUT FOR ENGAGING SLIDING SHOE, is arranged to slide in slot in yoke connecting with tool rest, and is attached to or released from yoke, as the case may be, by tightening or loosening a single screw.

ACCURATE GRADUATIONS are provided for quickly setting to any desired taper within its range, and in addition there is provided a convenient hand screw with graduated collar, used for extremely accurate setting.

WHEN TAPER ATTACHMENT is ordered BEFORE lathe leaves our works, all work necessary to its application is finished, so lathe and attachment reach customer ready for use, without any further work being necessary on his part.

ating mechanism is attached to the rear of the lathe bed, and is driven by spur gearing meshing into the face wheel, not interfering in any way with the use of the lathe for manufacturing purposes. The motion is transmitted to cam spindle thru change gearing and telescoping shaft, side spindle being mounted in cam box, which is located on the yoke that connects the taper attachment to the bottom slide.

THIS CAM BOX carries four fundamental cams which are used to move the bottom slide to the work in order to relieve the tap or cutter in the lathe. Two (2), three (3), five (5) and seven (7) point cams are furnished, which, being multiplied by the change gears, produce all divisions shown on index plate from two (2) to fifty-six (56) without any excessive speed to the cam shaft. This range is produced with only eight (8) change gears.

THIS ATTACHMENT does not require the removal of the compound rest when changing to regular work and does not incapacitate the lathe for such work.

AN EXTRA (5th) CAM is regularly furnished for work requiring very slight relief, such as small taps with fine threads.

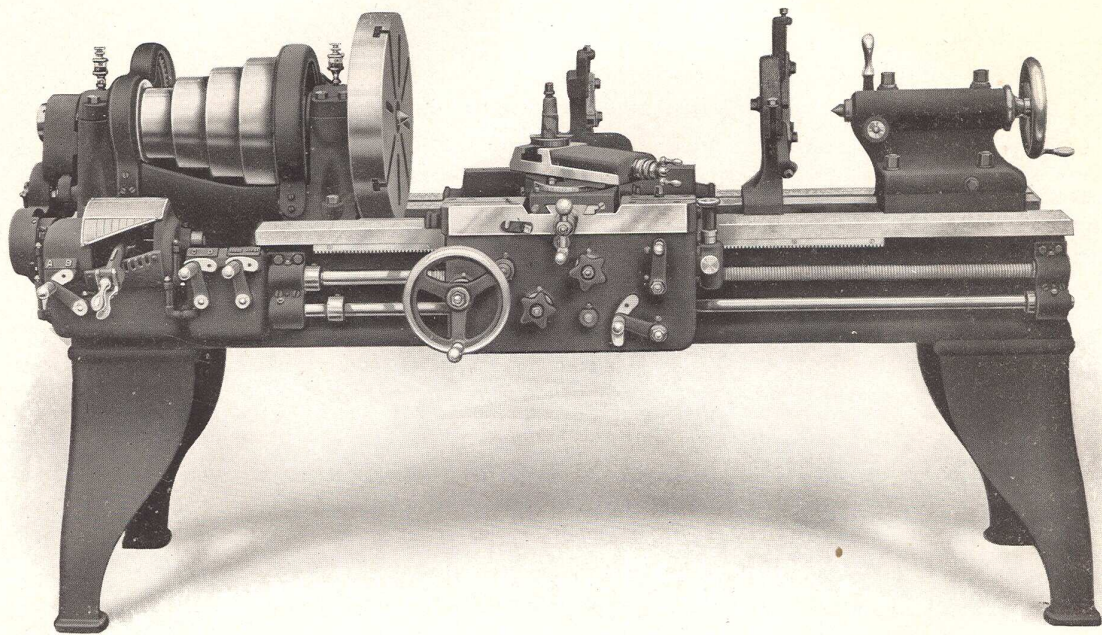
DRAWN-IN COLLET CHUCK will receive collets for holding rods 0 in. to $\frac{3}{4}$ in. Mechanism can be quickly applied or removed.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS.

MAIN OFFICES AND WORKS,
CINCINNATI, U. S. A.

“AMERICAN” HIGH DUTY LATHES



In the following description attention is directed to the more important and essential characteristics of the new model “American” High Duty Lathes which represent a very considerable advance in the construction of the engine lathe. The features described herein will therefor merit the most careful consideration, for a thorough understanding of the many improvements of this new design will show that neither expense nor intelligent effort has been spared in its development. We confidently claim that this new machine is superior to any lathe now on the market; and with good reason, for its design is unquestionably superior to that of any other, as will be obvious from an unbiased examination, and its workmanship in all respects is fully guaranteed to be the very best that skilled mechanics and modern shop methods can produce.

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THE AMERICAN TOOL WORKS COMPANY HIGH DUTY LATHES

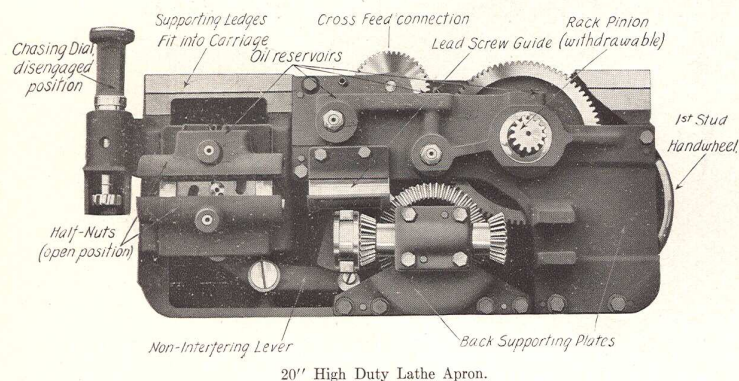
The bed construction.—The bed is ribbed transversely with heavy double walled cross girths spaced 2' apart. A rib is also carried lengthwise in the center of the bed. On the 24" Heavy Pattern and larger sizes, a rack is cast integral with the center rib and the tailstock is provided with a pawl which engages this rack for resisting the end thrust when heavy work is being turned.

The carriage vees are chilled on all sizes up to 24" Medium Pattern inclusive, thus providing a harder metal on the shears than on the carriage bearings, consequently the wear will be largely confined to the carriage where it will not impair the accuracy or alignment of the machine. On larger sizes this same result is accomplished by making the bed casting of semi-steel which provides a hard, close grained metal for the vee bearings as well as giving additional strength and rigidity.

The carriage shears on all sizes are wider and the bearings longer than are usually provided on other makes. The bridge has also been widened and is of unusually great depth by reason of the patented drop vee bed construction. On the 30" size and upwards the carriage bridge also has a bearing on the front tailstock "vee."

The compound rest is of a very rigid design, the swivel being made completely circular and is graduated in degrees. On the 18" and larger sizes it is clamped to the cross slide by means of four bolts. Full length taper gibs having end screw adjustment are also provided on both the cross and compound rest slides. These gibs are placed on the right hand side where they will not receive the thrust of the tool under ordinary working conditions.

The tailstock is of our improved four bolt design, except on the 14" size, with the rear bolts carried to the top for convenience in clamping. The tailstock spindle is clamped in position by means of a double plug binder which is so constructed as to securely clamp the spindle at any position without possibility of throwing it out of alignment.



The spindle is made of a special .075 carbon hammered crucible steel spindle stock, and all other shafts, including the lead screw, are made of a .045 carbon special ground stock.

The spindle bearings are equipped with sight feed oil cups, and all other important bearings are oiled by means of our improved gravity oiling system;—the oil being carried to the bearings through oil pipes conspicuously located, which hold a generous supply of oil.

The spindle thrust bearing of the 30" and larger sizes consist of five collars, alternately of bronze and hardened and ground steel. The bronze collars are provided with oil grooves.

Renewable bronze bushed bearings are furnished throughout the machine, and the loose gears in the apron are also lined with bronze; the studs on which they run being case-hardened and ground, thus providing a hard bearing surface without impairing their strength.

The apron of the 20" and larger sizes is made in a complete double wall or box section, giving all studs and shafts a double bearing. The aprons of the smaller sizes are of the semi-box type, and all important studs and shafts are also provided with an out-board support. The rack pinions of the 20" and larger sizes can be withdrawn from the rack when cutting threads, thus obviating the possibility of "chatter" or vibration when cutting coarse pitch screws.

A separate feed rod, in addition to the lead screw is furnished on all sizes up to and including the 27". The mechanism is so arranged that when either the lead screw or feed rod is in use, the other is disengaged. In other words, when the feed rod is being used, the lead screw is at rest and visa versa. These members are engaged and disengaged by means of the lever at the extreme right-hand end of the quick change gear box. The apron mechanism is also arranged so that the half nuts are locked out when the rod feed is in use or visa versa.

A **thread dial** is regularly furnished, thus obviating the necessity of using a backing belt or a reversing motor for thread cutting. The thread dial is placed at the right of the apron and can be readily disengaged from the lead screw when not in use.

The **lead screw** is made from .045 carbon ground lead screw stock. The threads are cut to a guaranteed accuracy limit of .001" per foot. These screws are unusually large in diameter and the threads are of a very coarse pitch—the 14" and 16" being 4 per inch single thread,—the 18" 20" 24" and 27" are 2 per inch single thread,—and the larger sizes one per inch single thread. These screws are chased by means of a special lead screw made with a Brown & Sharpe master screw which is 4" in diameter.

The **1" pitch lead screw** used on the larger sized lathes permits engaging the half nuts at any point when chasing any threads excepting those having a fractional pitch. On the 18" to 27" inclusive the half nuts may be engaged at any points when chasing screws having an even number of threads per inch.

The **coarse pitch lead screw** and the comparatively low apron ratio required provides the further great advantage of obviating the necessity of speeding up through the quick change gear mechanism for the coarser pitches and feeds. As a matter of fact, no member of the quick change mechanism does at any time run faster than the initial driving shaft, and the compounding gears are therefore only used for cutting the finer threads and feeds. Consequently, a very direct transmission is provided for heavy turning, etc.

An **automatic stop** is regularly provided on the 14" to 27" sizes inclusive, for disengaging the longitudinal feed at any predetermined point. The automatic stop can also be furnished at an extra charge on the 30", 36" and 42" sizes.

Steel gearing:—All gears in the entire quick change gear mechanism are regularly made from .045 carbon bar steel. The apron gearing is also made of the same material with exception of two large gears which are made from steel castings.

The **cone gears** of the quick change gear mechanism are cut with the improved Brown & Sharpe 20 degree involute cutters which form a pointed tooth slightly rounded at the top. This is the only proper and satisfactory form of tooth for use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and a stronger section than the 14½ degree tooth.

The **tumbler lever** of the quick change mechanism is cast steel and is bronze bushed. It is guided into its respective positions by means of a slotted plate attached to the front of the box. Consequently, the gears can not be engaged before they are in their proper position for meshing.

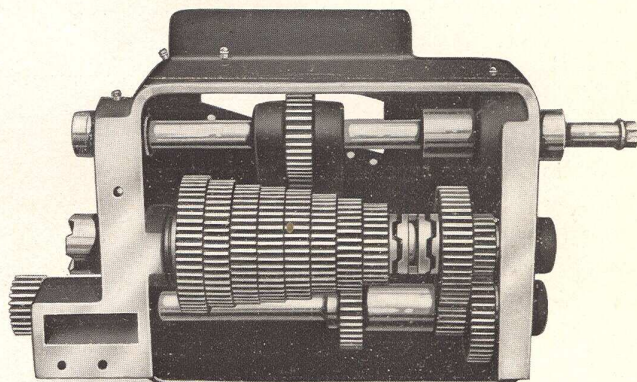
The **quick change gear mechanism** forms a complete unit in itself and is mounted on the front of the machine, being fixed to the bed by means of a tongue and groove which insures permanently accurate alignment. This mechanism is much more easily accessible for any necessary attention than where it is incorporated in the bed under the headstock.

The **feed compounding** is done by means of taper jaw clutches which may be easily engaged. This construction is undoubtedly superior to that used on other designs which have a compound mechanism of the tumbler gear type bolted on the end of the bed.

All loose gears in the quick change mechanism are bronze bushed.

The **auxiliary quadrant**. While these new pattern lathes are provided with an unusually wide range of thread and feed changes, provision for applying extra gears is also made by means of an auxiliary quadrant on the end of the bed; thus enabling the use or application of such extra change gears as will be necessary to cut all special or metric threads not regularly furnished with the standard equipment.

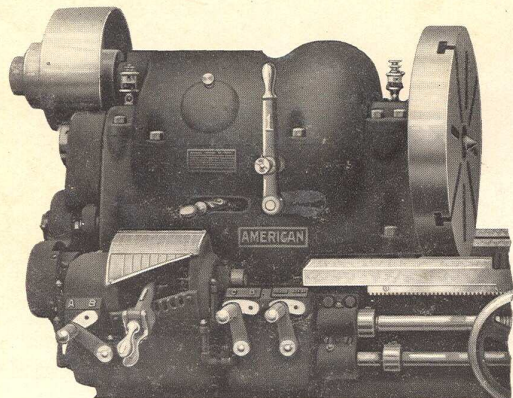
Guaranteed accuracy.—With regard to the accuracy of these lathes, we will guarantee that if properly set up and levelled, they will bore or turn true within .001" per foot. The material entering into their construction is also guaranteed in every respect to be the very best procurable for the purposes used. We will further guarantee to replace any breakages or damage to the machine due to defective material or faulty workmanship.



Interior of the Quick Change Gear Box.

HEADSTOCKS.

The cone pulley drive.—The Four Step Cone, Single Back Geared Head is furnished as a standard equipment on all sizes from the 14" to the 36" Medium Pattern inclusive. On the 36" and 42" Heavy Pattern Lathes, the standard style of drive is the Four Step Cone, Triple Geared, Face Plate Drive. This latter style of head can also be furnished on the 30" and 36" Medium Pattern Lathes.



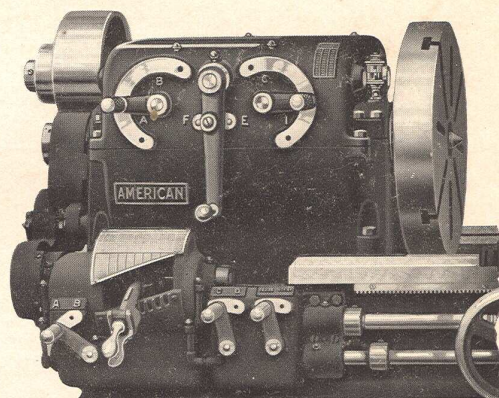
4 Speed Patented Geared Head.

Three step cone double back geared head can be furnished on all sizes from the 14" to the 36" Medium Pattern inclusive. On this style of head, a lever is provided which extends to the front of the head, by means of which the operation of the double back gear mechanism is greatly facilitated.

The four speed patented geared head, belt or motor driven. This style of drive can be furnished on all sizes from the 14" to 36" Medium Pattern inclusive. This head provides the simplest geared drive ever designed, only seven (7) gears and two shafts being used in its construction. It is operated in connection with a triple friction countershaft and provides either eight (8) forward and four (4) reverse speeds or twelve (12) forward speeds. This head also provides an ideal form of drive when used in connection with a variable speed motor.

The eight speed patented geared head, belt or motor driven. This is a recent development in "American" lathes and has proven to be very successful. Its construction is very simple and efficient as only three shafts and eleven gears are used to obtain the eight speed changes. This head, when belt driven, is operated in connection with a double friction countershaft. As a thread dial is regularly furnished with the machine, a "backing" belt need not be used, and consequently, both countershaft speeds may be forward, giving sixteen spindle speeds. This style of head can be furnished on all sizes from the 14" to the 27" inclusive.

The twelve speed patented geared head, belt or motor driven. This drive is furnished only on the 30" and 36" Medium Pattern lathes. The design of this head is simply an extension of that used on the eight speed head, there being only three shafts and twelve gears used in its construction. A double friction countershaft is also furnished with this drive.



8 Speed Patented Geared Head.

The geared head of the 36" and 42" heavy pattern lathes is of the triple geared, face plate driven type. It provides 16 spindle speeds, eight of which are obtained thru the spindle drive and the other eight thru the face plate drive. This head is of an unusually rugged and powerful design, being particularly adapted to the heaviest class of lathe work, such as is found in railroad shops, forge shops and steel mills. Some idea of its great driving power may be gathered from the fact that the greatest speed reduction thru the face plate drive is at the unusually high ratio of 237 to 1. At the normal countershaft speed, the belt will deliver from 30 to 35 H. P. which is far in excess of the power heretofore provided on any lathe of this size or swing. Moreover, we will positively and unqualifiedly guarantee that this lathe is so substantially constructed thruout that it will utilize this power to the greatest possible advantage in machining any work within its capacity.

Fig. No. 341.

Code Word:

RAFT.

