



CATALOG No. 5

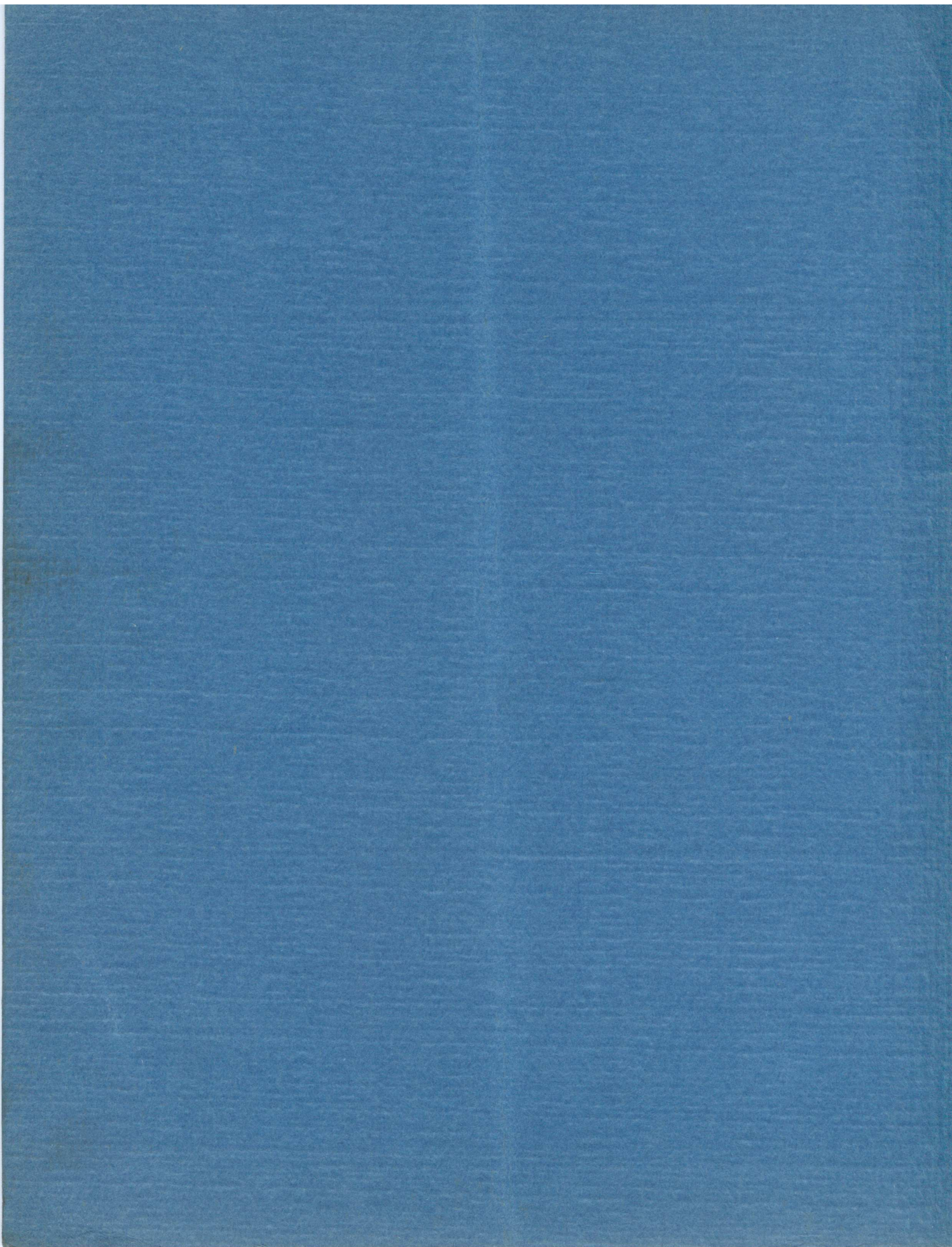
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"AMERICAN"

PRECISION TOOL ROOM LATHES

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THE AMERICAN TOOL WORKS COMPANY
CINCINNATI, U. S. A.
LATHES - RADIALS - SHAPERS



"AMERICAN"

PRECISION
TOOL ROOM
LATHES

DESIGNED AND BUILT EXPRESSLY FOR THE
RAPID AND ECONOMICAL PRODUCTION OF
PRECISION TOOL ROOM WORK

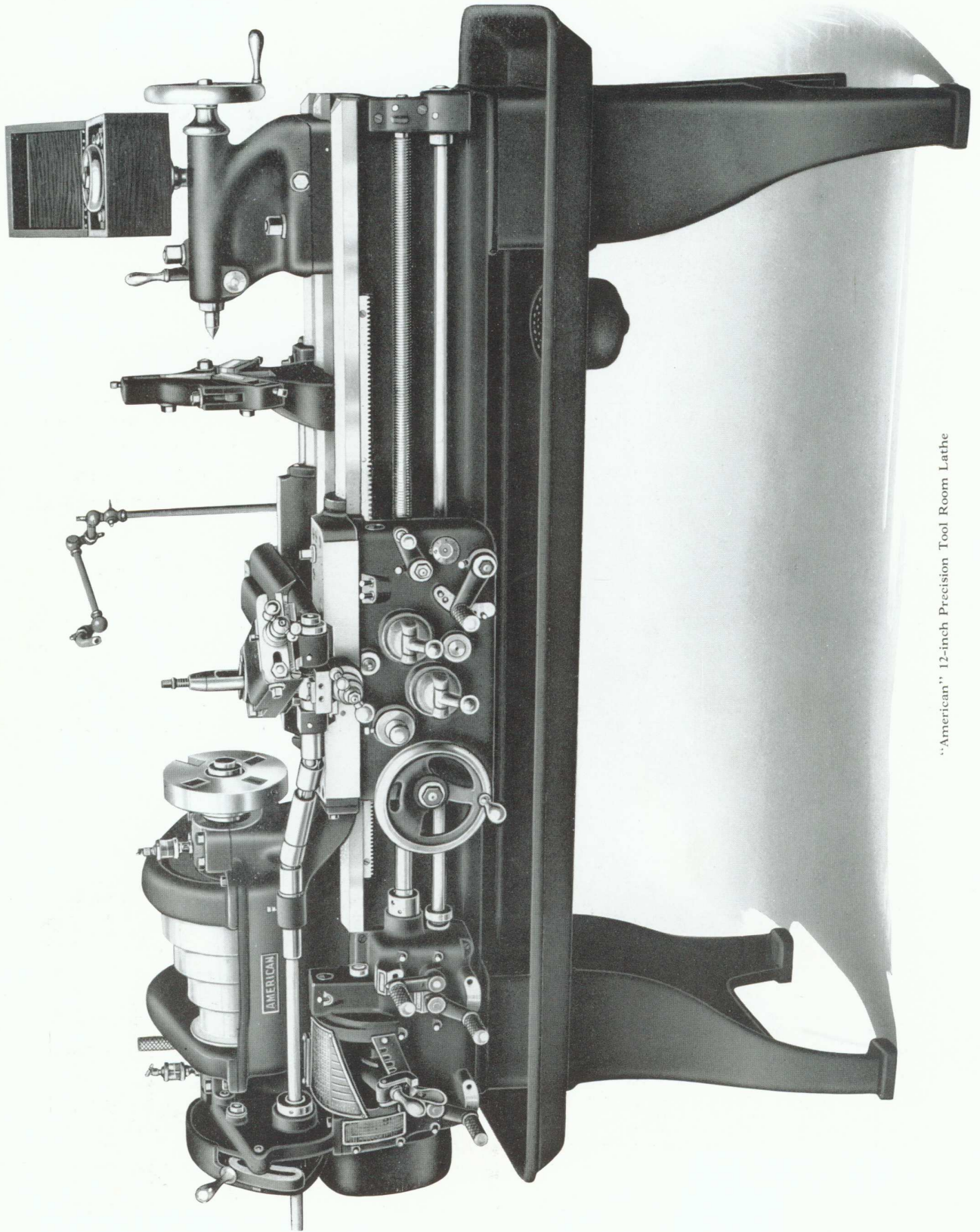
CATALOG No. 5

THE AMERICAN TOOL WORKS COMPANY

CINCINNATI, U. S. A.

LATHES - RADIALS - SHAPERS

Trade
Cat.
.A502
1934

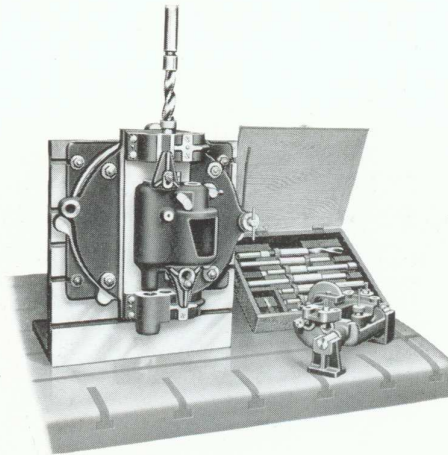


"American" 12-inch Precision Tool Room Lathe

ACCURACY



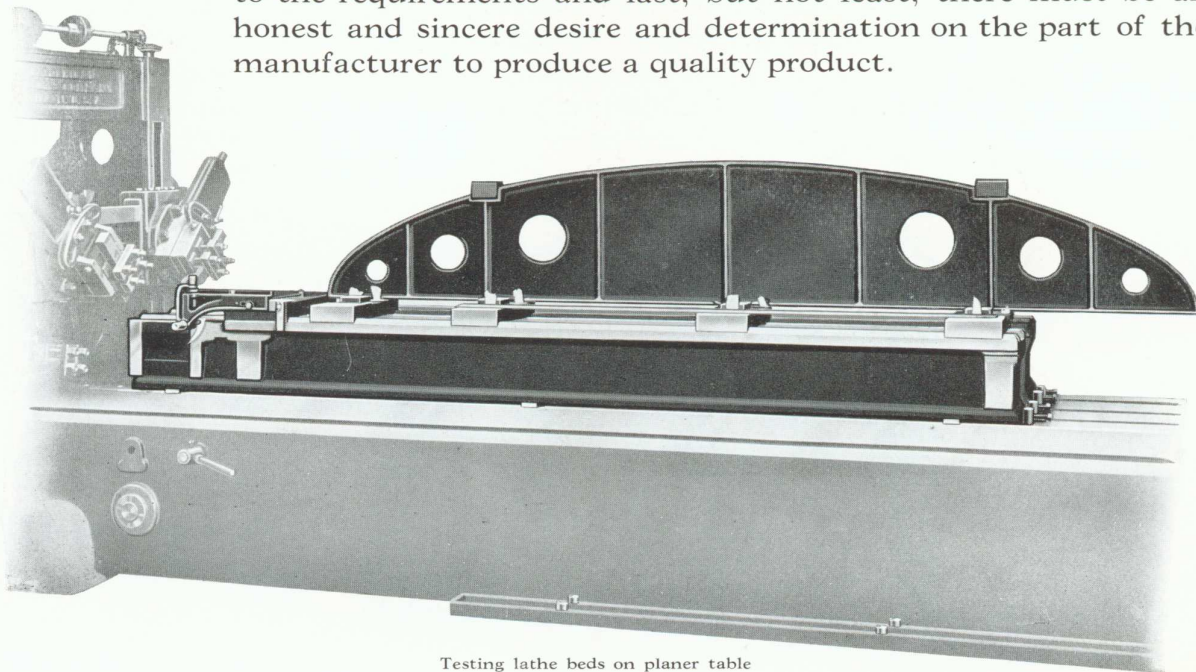
Hardened and lapped master for spindle noses
and face plates
(Fig. No. 1)



Drilling jig for quick change gear boxes
(Fig. No. 2)

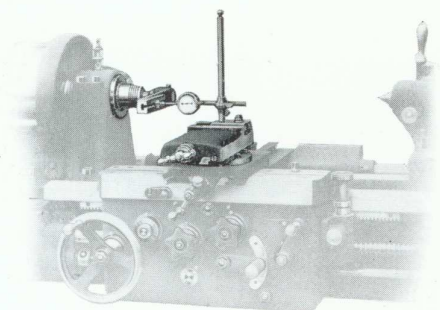
Accuracy is unmistakably the outstanding essential of a high quality tool room lathe; not merely accuracy of alignments, but inherent accuracy of each and every piece that goes into the machine—accuracy of machining, accuracy of bearings, accuracy of fitting—the kind of accuracy, in fact, that lasts, and guarantees high quality and dependable service for a reasonable period of years.

The first requisite for the production of a high quality product is an organization that understands the meaning of quality and knows how to secure it. The next essential is an equipment of modern machinery, of jigs, templates, gauges, aligning and measuring instruments and a knowledge of their uses. Then there come the selection and use of the various materials best suited to the requirements and last, but not least, there must be an honest and sincere desire and determination on the part of the manufacturer to produce a quality product.

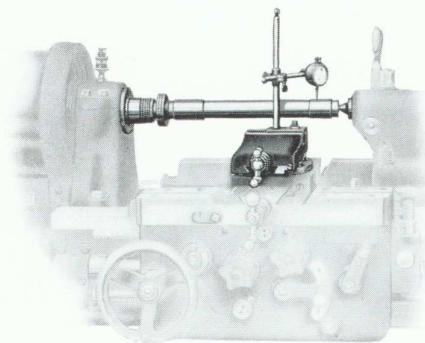


Testing lathe beds on planer table
(Fig. No. 3)

ACCURACY



Testing cross slide alignment
(Fig. No. 1)

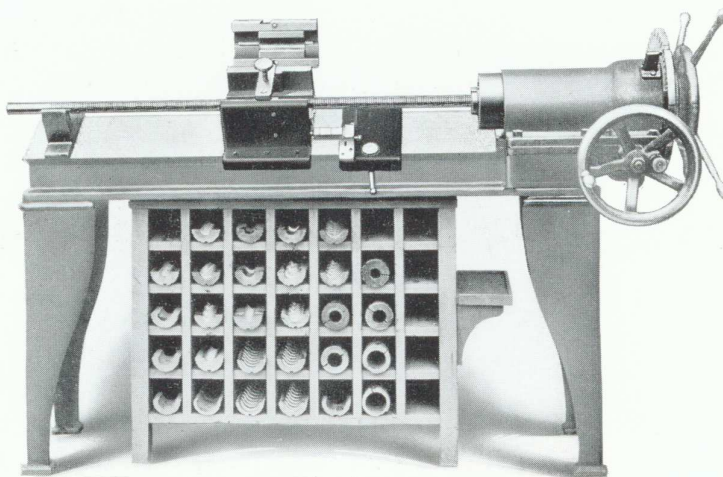


Testing headstock and tailstock alignments
(Fig. No. 2)

That none of these qualifications is lacking in The American Tool Works Company is conclusively evidenced by its many years of successful participation in the tool room lathe industry, by its maintenance of leadership and by the character of its clientele, including, as it does, the largest, the most successful and the most prominent units of the metal working industry, both in this country and abroad. The American Tool Works Company's organization extends over a period of fifty odd years. It has been developed with discretion and care and is eminently qualified, from the standpoint of sincerity of purpose, knowledge and experience, to produce the very highest standard of quality product.

PRECISION LEADSCREWS

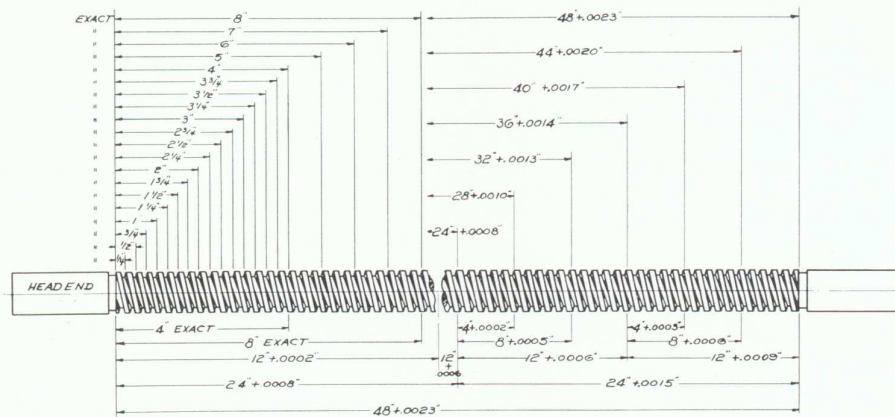
One of the major requirements of the modern tool room lathe is a precision threading mechanism. This requirement is met in the "American" Tool Room Lathe by a precision quick change gear threading mechanism including precisely cut and accurately machine-lapped gears and, as regular equipment without additional cost to the purchaser, a precision, minimum error, tested and guaranteed leadscrew.



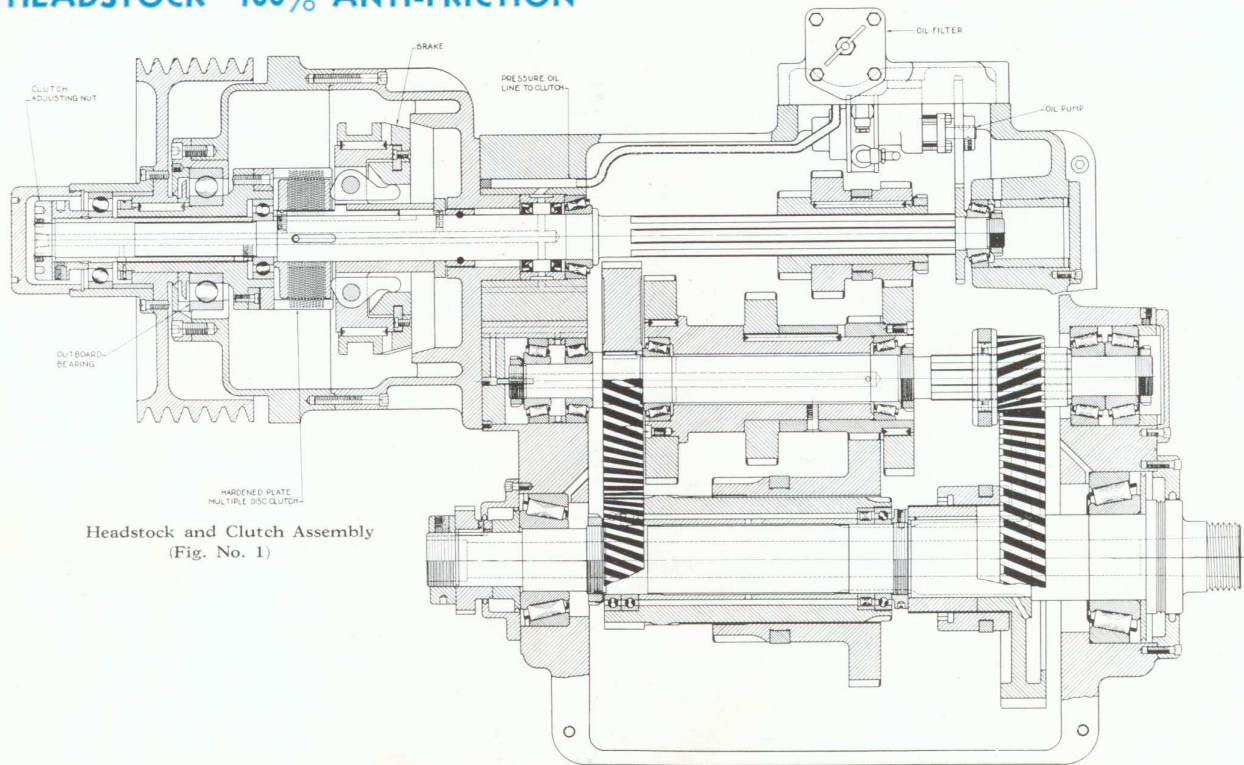
Leadscrew testing machine
(Fig. No. 3)

PRECISION LEADSCREWS

Our precision leadscrews are produced on a highly specialized, recently developed, super-accurate leadscrew lathe which has been engineered, designed and developed for the express purpose of producing leadscrews of great precision. The utmost care is exercised in the production of these screws, and an exhaustive accuracy test is made upon completion, a record of which is retained for reference and upon which our accuracy guarantee is based.

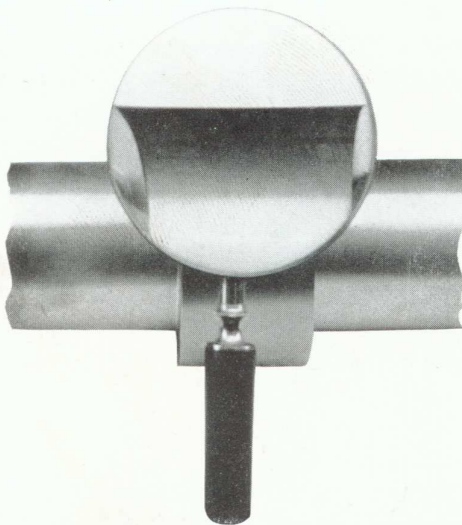


HEADSTOCK—100% ANTI-FRICTION



Headstock and Clutch Assembly
(Fig. No. 1)

degree. Only three shafts including the spindle are employed, providing plenty of space inside the headstock bowl to permit the use of large diameter and wide face gears. All gears are hobbled. All gears are made from alloy steel forgings, heat treated and hardened. Each mating pair of gears is machine lapped under predetermined load in the most modern gear-lapping machines to insure smooth and quiet operation. The back geared speeds are thru helical gears. The selective speed gears are of the spur tooth type, with machine rounded teeth adopted for quick and easy engagement, thus avoiding the use of objectionable friction or jaw clutches in the speed-changing mechanism. All speed changes are made through sliding gears except the high-speed run, which is through a slip gear automobile type of clutch. Slip gears slide on multiple splines.

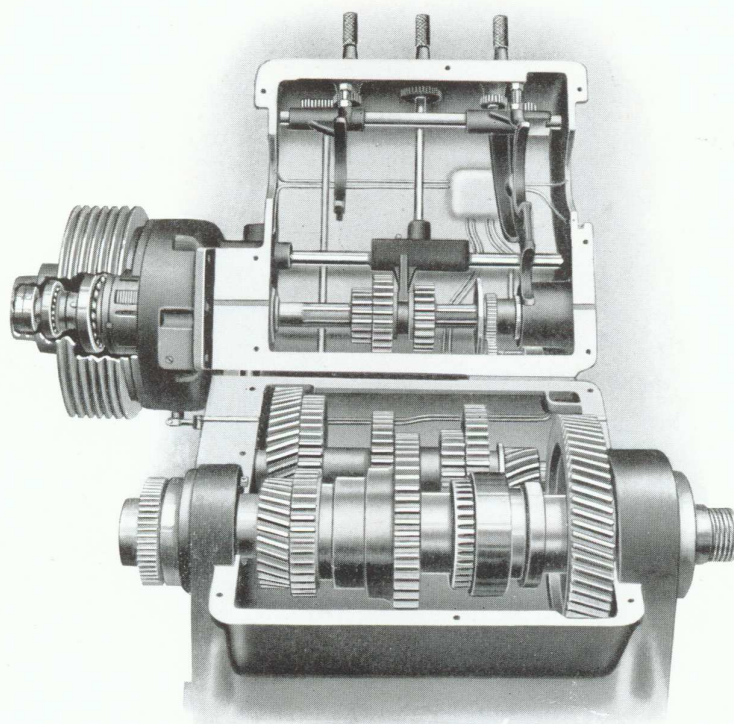


Example of fine finish produced by "American" Geared Head Lathes. This finish was produced at 750 feet per minute, .003" feed in 1045 steel. Note the complete absence of gear or chatter marks even under magnification.

(Fig. No. 2)

The "American" Geared Head is 100% anti-friction. The starting clutch and brake unit, all shafts including the spindle, and every loose sleeve are anti-friction mounted. There is not one plain bearing throughout the entire headstock mechanism.

PATENTED GEARED HEAD

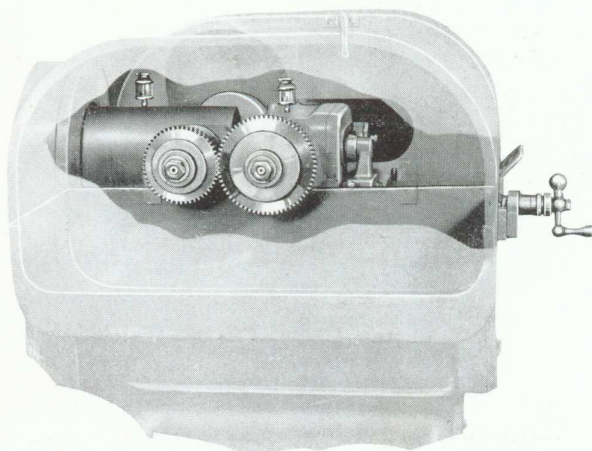


Interior of Geared Head (Fig. No. 1)

Twelve (12) spindle speeds in geometrical progression are provided covering a wide range, which may be varied materially to suit the nature of the work to be done. Speeds as high as 2000 R. P. M. are permissible with this head.

AUTOMATIC OILING

The headstock is 100% automatically oiled. The entire mechanism, including the starting clutch and brake unit, the shaft and spindle bearings, the loose sleeves and all the gears, are oiled by the pump located in the head. The starting unit is oiled directly from the pump under pressure thru the hollow drive shaft, providing a constant supply of cool, filtered oil for this entire mechanism. All oil is forced through a metal oil filter before passing to operating mechanism, thus insuring the use of only clean, filtered oil and effectively guarding against the dangers of dirty oil. The pump delivers oil to the reservoir in the head cover which serves as a distributing tank for supplying oil to the bearings and gear teeth.



Patented Gear-Lapping Machine (Fig. No. 2)

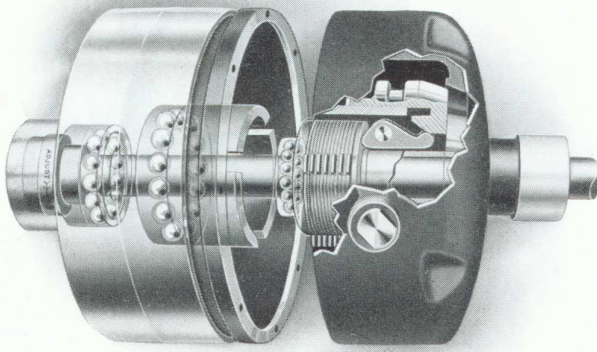
STARTING CLUTCH AND BRAKE

The starting clutch and brake unit is used harder and oftener than any other unit of the lathe. It is operated every time the spindle is started and stopped and transmits all power to the headstock. This important unit has been developed to a point of perfection that positively insures efficient functioning and complete satisfaction during the effective life of the lathe.

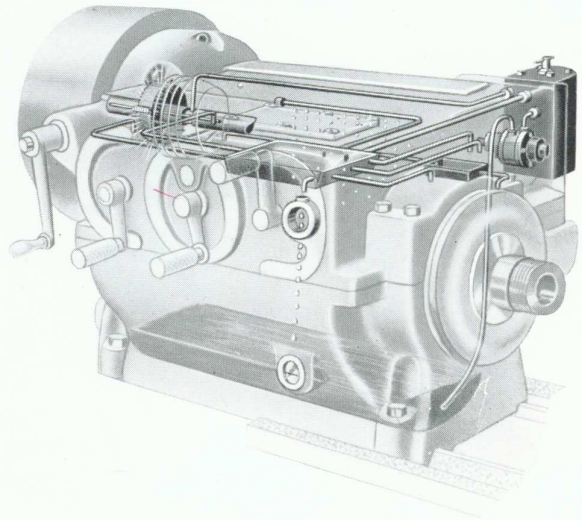
In the construction of the starting clutch and brake unit we have not relied upon any of the commercial clutches afforded by the market, but at considerable expense have developed our own multiple disc clutch and brake and in it have achieved a masterpiece of design that accurately reflects the inherent value offered by "American" Lathes.

This starting clutch and brake unit is entirely anti-friction mounted—no plain bearings being used. It is provided with a substantial outboard support to eliminate overhang and is 100% lubricated under pump pressure.

The multiple disc clutch is of the all-metal type practically impervious to wear. The discs are made of "Atkins" carefully tempered "saw blade" steel and each alternate disc is permanently deformed or warped in a die. Under the pressure of engagement the deformed plates contact with the adjacent flat plates, but when the pressure is released to disengage the clutch, the deformed plates, due to their spring action, spring away from the adjacent flat plates, providing a complete release of the clutch, thus insuring freedom from spindle creeping due to drag of the discs.



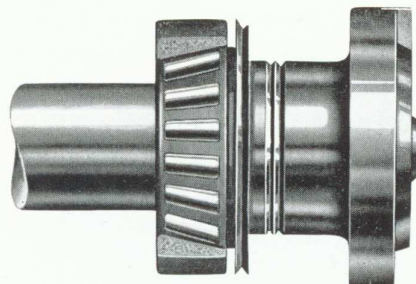
Patented Multiple Disc Clutch and Brake used in the initial Driving Unit of "American" Geared Heads
(Fig. No. 2)



Automatic, Pump Circulating Oiling System
(Fig. No. 1)

The cone type brake which operates in unison with the clutch is also oiled automatically by means of the head lubricating system and provides adequate braking effort to quickly stop the spindle even at the high speeds now being provided for cutting with cemented carbide tools.

SPINDLE BEARINGS

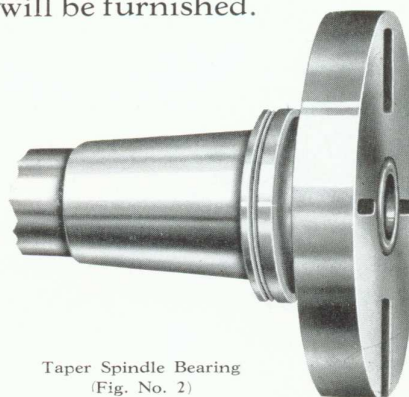


Timken Spindle Bearing
Flanged Spindle Nose
(Fig. No. 1)

The Timken "zero" bearing spindle mounting has been adopted as standard for "American" geared head tool room lathes and is recommended and guaranteed for this class of lathe service. However, some lathe users prefer the plain spindle bearing to the anti-friction type; consequently, we have made provision to substitute the taper type plain spindle bearing for the anti-friction when preferred. Unless specifically ordered, anti-friction type of spindle bearing will be furnished.

TYPE OF SPINDLE NOSE OPTIONAL

At customer's option, either the threaded or flanged spindle nose is provided. For general purpose and tool room work requiring frequent changes of face plates, fixtures and chucks, the threaded type is recommended. For chucking operations and mounting heavy fixtures, flanged type is preferred.



Taper Spindle Bearing
(Fig. No. 2)



Flanged Spindle Nose
(Fig. No. 3)

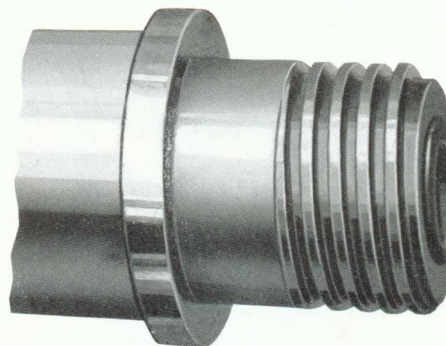
FLANGED SPINDLE NOSE

The flanged nose is an integral part of the spindle forging. It is accurately machined to master gauges as are likewise the face plates and chucks to insure perfect interchangeability. A centralizing taper is provided on the flange to quickly and accurately center the plates and fixtures, which are in turn firmly held to the flange by a substantial key and large bolts. The application and removal of plates, chucks and fixtures are quick and easy.

THREADED SPINDLE NOSE

The "American" threaded spindle nose combines accuracy and rigidity of chuck and face plate mounting with ease of application and removal.

The outer half of the nose is threaded to quickly move the fixture to or from its seat directly adjacent to threaded portion, and to hold it in position when screwed home against the nose shoulder. Spindle nose and plates are machined to highly accurate masters to absolutely insure interchangeability.



Threaded Spindle Nose
(Fig. No. 4)

MECHANICAL APRON CONTROL

This unit, which is regularly furnished on all geared head lathes, provides means for instantly starting and stopping the lathe spindle from the apron. The apron control handle is located at the right-hand side of the apron and operates the multiple disc clutch in the initial driving unit, as well as a powerful brake. On motor driven lathes we can supply, at slight additional cost, an electrical apron control either in place of or in addition to the mechanical control, which, instead of start, stop and brake, provides start, stop and reverse, through the motor. When the electrical apron control only is furnished, the brake control from the apron is eliminated unless the electrical equipment includes an automatic control panel which provides a dynamic brake.

SPINDLE REVERSE FROM APRON

When a mechanical apron control is furnished, no means is provided for reversing the spindle from the apron position. If, however, customer desires a reverse, obtainable from the apron position, it can be secured, at extra cost, through a reversing mechanism incorporated in the initial driving unit. This new reversing mechanism also supplies a brake for stopping the spindle, which operates at the neutral point between forward and reverse positions.

PATENTED 4-VEE BED

The bed has been made unusually rigid by increased depth, thicker walls and heavier ribbing. A special mixture is used, containing 40% steel scrap and other ingredients, which produces a semi-steel of approximately 40,000 pounds tensile strength and a scleroscopic hardness of 35 to 38 degrees. The outstanding characteristic of this special metal is the close grained, wear-resisting surface it provides for the carriage bearings.

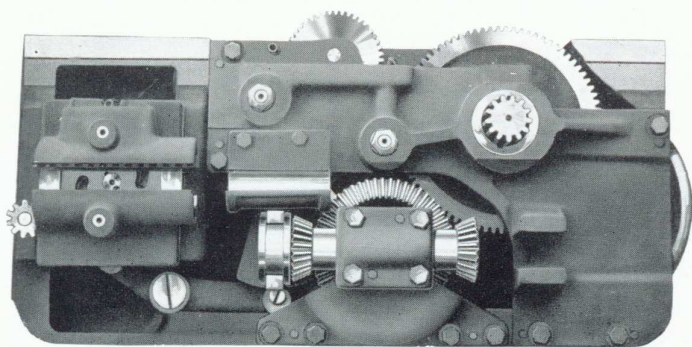
"American" Lathe beds provide 4 large vees for the carriage and tailstock guides, the two inner Vees being dropped below the outer Vees to provide greater swing over the bed and additional carriage bridge thickness. In our opinion, the vee bearing is much easier to keep clean and consequently offers greater resistance to cutting and wear than a flat bearing. When wear does occur, the 4-vee bed wears more evenly than one using a vee and a flat bearing, for it is perfectly obvious that a vee bearing and a flat bearing will not wear equally. The 4-vee bed



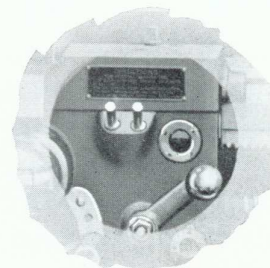
4-Vee Bed

PATENTED 4-VEE BED

in providing 2 vee guides for both the carriage and the tailstock insures longer life for their alignments, resulting in the maintenance of accuracy over a longer period of service than is possible with any other type of bed. This is particularly advantageous for tool room service.



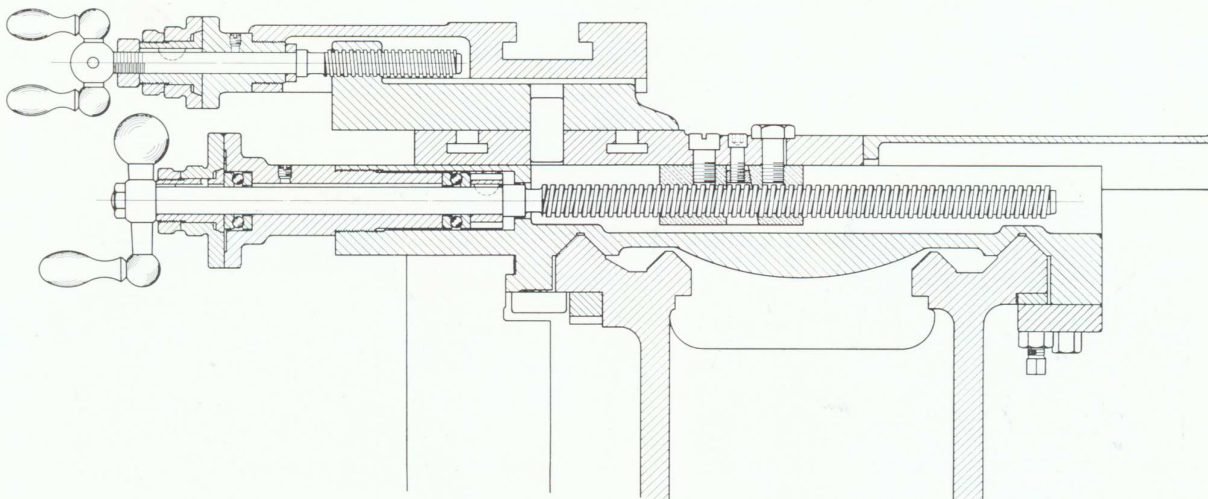
Apron (Fig. No. 1)



One-Shot Oiling (Fig. No. 2)

APRON

The "American" Lathe apron is a substantial, compact unit using all heat-treated, carefully processed gears and providing outer supports for all studs. The control for both the cross and longitudinal feeds is through convenient and easily operated drop levers which actuate clutches of the well-known "automobile" control type. The longitudinal friction is the cone type, while the cross feed is through a safety angular tooth type. Both units are held in engagement by a heavy coil spring the same as the automobile clutch and consequently rarely, if ever, require adjustment. Both are disengaged positively and instantly without effort even under the heaviest cuts by means of a cam actuated by the drop type control levers.



Carriage Assembly with Anti-friction Cross Feed Screw and Compensating Nut (Fig. No. 3)

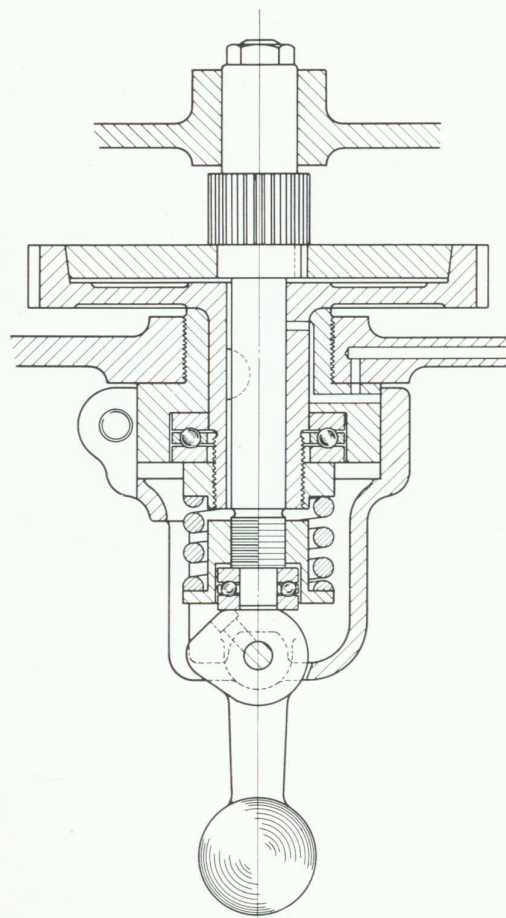
APRON

Both the longitudinal and cross feed units are provided with overload safety features. The longitudinal friction will slip when overloaded, and the cross feed clutch will automatically disengage itself.

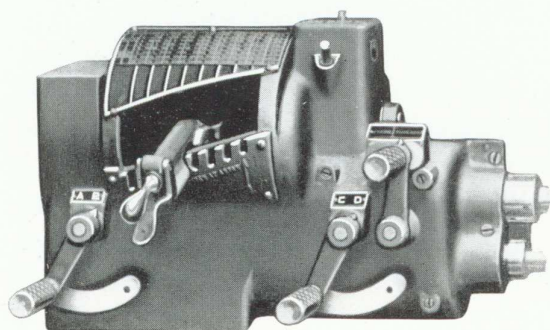
The oiling of the entire apron is accomplished by means of an instantaneous "one-shot" oiling system. One action of the plunger supplies sufficient oil to the distributing reservoir to thoroughly lubricate the apron mechanism for an entire day. The "one-shot" system delivers an adequate supply of oil, but does not supply it in the wasteful abundance of some other systems. The carriage bearings on the bed and the carriage cross slide are also thoroughly oiled by our improved "one-shot" system.

QUICK CHANGE GEAR MECHANISM

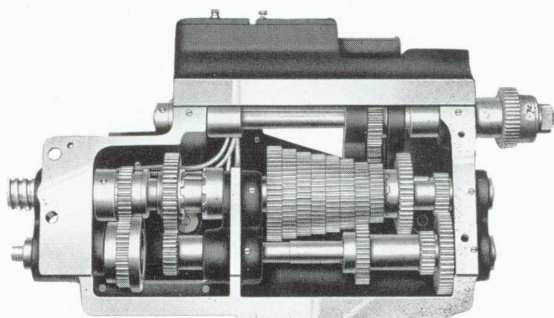
Every standard thread ordinarily used is supplied by the "American" quick change mechanism. It provides a range of 48 threads and feeds, yet is simple in design and easy to operate. Only 17 gears are used, all of which are steel and 10 of which are cone and tumbler gears cut with 20° cutters to produce a pointed tooth, which is easily and instantaneously meshed without fear of clashing. The tumbler lever is cast steel and bronze bushed, is located in its various positions by a notched plate, which prevents improper meshing, after which it is locked in position by a spring latch and locking pin, which eliminate vibration and wear between the cone and tumbler gears.



Longitudinal Clutch
(Fig. No. 1)



(Fig. No. 2)



(Fig. No. 3)

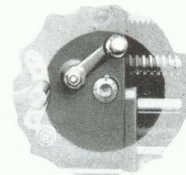
Quick change gear box, front and rear views

ONE-SHOT OILING FOR QUICK CHANGE GEAR BOX

The oiling of the quick change gear box is accomplished by means of an instantaneous "one-shot" oiling system. One action of the plunger supplies sufficient oil to the distributing reservoir to thoroughly lubricate the entire mechanism for a day. The "one-shot" system delivers an adequate supply of oil, but does not supply it in wasteful abundance.

THREAD DIAL

A thread dial is regularly furnished, thus obviating the necessity of using a backing belt or a reversing motor for thread cutting. This dial is conveniently placed at the right of the apron where it can be easily seen and read by the operator.



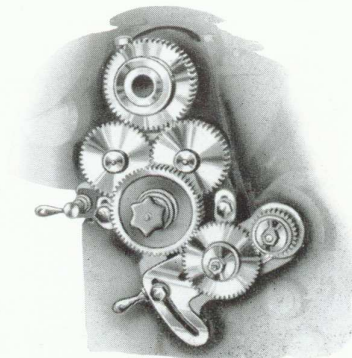
Thread Dial (Fig. No. 1)

SEPARATE LEADSCREW AND FEED ROD

A separate leadscrew and feed rod are furnished which are selective and independent of each other. The leadscrew is preserved exclusively for threading, while the feed rod is used for all feeding operations. Thus, by relieving the leadscrew of feeding operations and using it exclusively for threading, it is only reasonable to assume that it will wear less, and retain its accuracy longer than if it were called upon to function on feeding operations as well as when thread chasing. Furthermore, the leadscrew and feed rod are independent of each other. When one is in operation, the other is stationary, consequently on the "American" Lathe, the leadscrew bearings are in service only when the leadscrew is being used, and therefore are of longer life and accuracy than on the average lathe, which does not have the independent leadscrew and feed rod.

SPECIAL THREADS

The quadrant at the head end of the bed provides means for substituting special gears for those regularly furnished, in order to cut special threads and pitches not regularly included in the standard thread range. This is a valuable characteristic, as it affords a practically unlimited range for threading operations.



Quadrant construction (Fig. No. 2)

COARSE AND FINE THREADS

If a range of coarser or finer threads than regularly provided is desired, we can at very slight additional cost furnish a pair of compounding gears to replace the standard idler gear, which will provide both a coarser and finer range of threads. The application of these wide range gears requires only a moment's time, which again demonstrates the unparalleled convenience, simplicity and range of our quick change gear mechanism.

"CONVERTED" METRIC PITCHES

Because of the metric standards employed by some concerns in this country, and the almost universal use of the metric system abroad, means have been provided for quickly, easily and inexpensively converting the quick change threading and feeding mechanism from the standard English to the Metric System.

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, O., U.S.A.

Index Plate for "converted" metric pitches (Fig. No. 1)

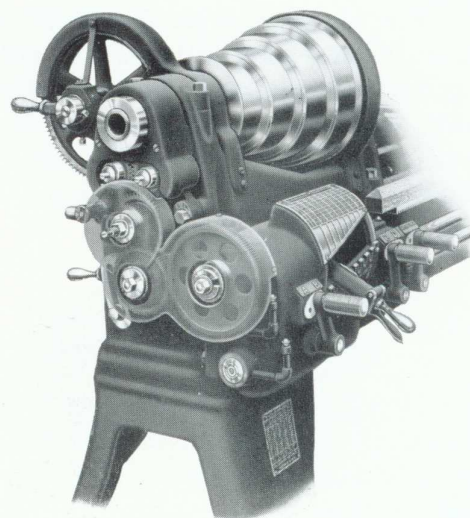
The method of conversion from the English to the metric range is very simple; in fact, the operation of this mechanism is so extremely simple that it is practically impossible to make a mistake in securing the desired pitch. There is absolutely no change made in the regular design of the lathe nor is 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.

After the three transposing gears have been applied to produce one metric pitch, all the other pitches shown on the index plate and enumerated on the following page 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 tumbler lever in the first position as it is shown in accompanying 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.

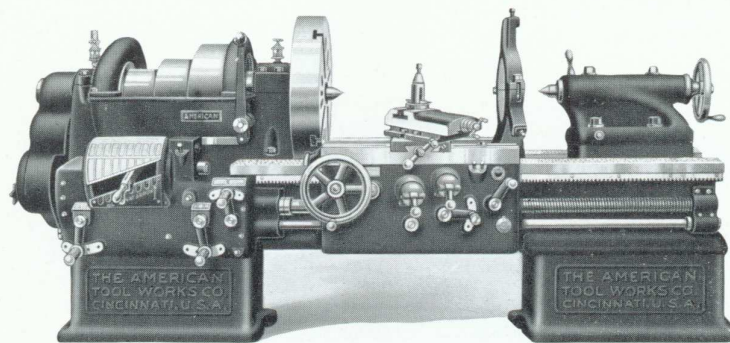
Special threads and pitches not included with the regular range can be obtained by the use of additional compounding gears. However, those regularly provided are considered sufficient for ordinary use.



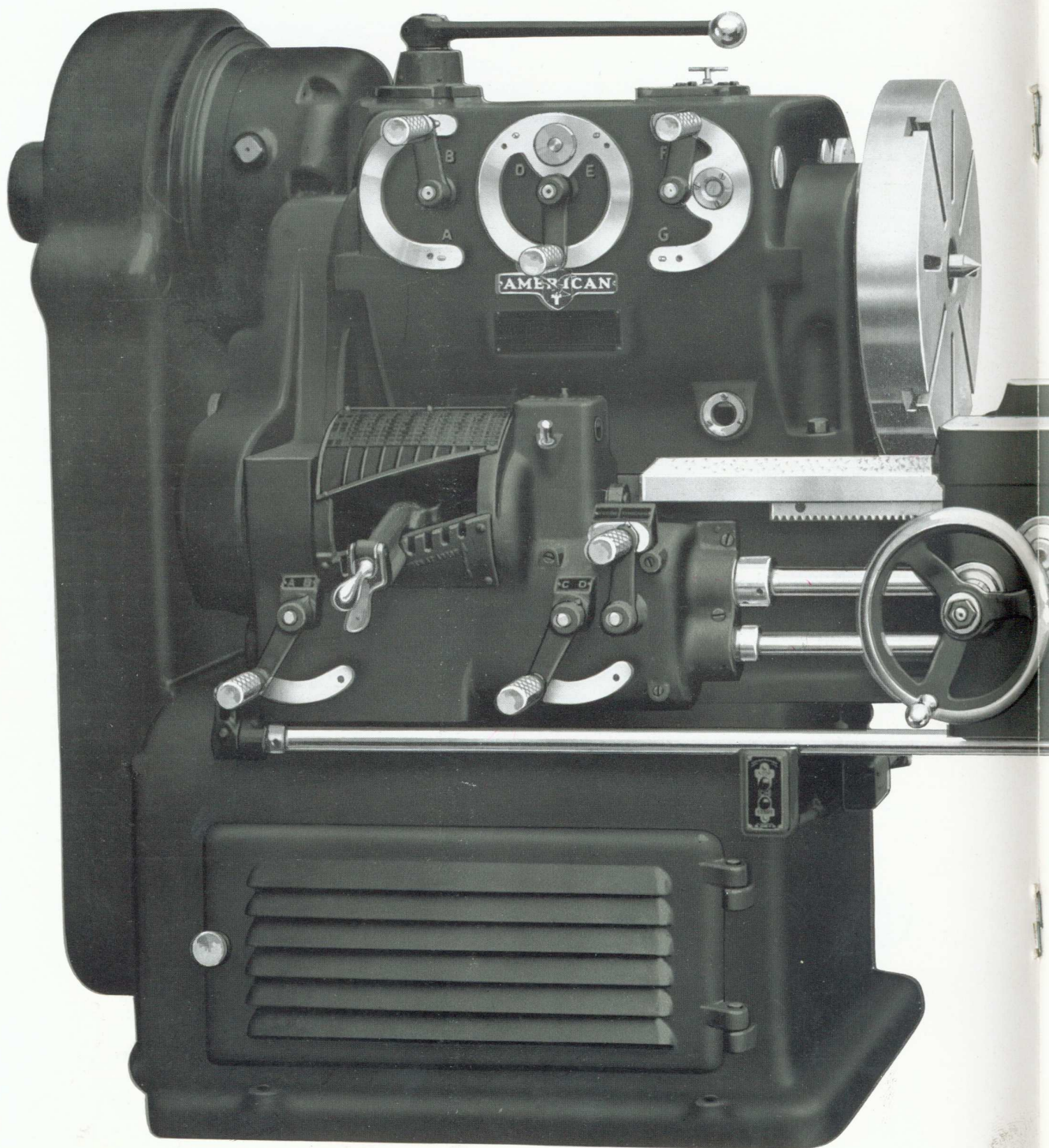
Metric transposing gears in place (Fig. No. 2)

STANDARD RANGE OF "CONVERTED" METRIC PITCHES

12-inch	14-inch	16-inch	18-inch	20-inch	22-inch
.5	.5	.5	.5	.5	.5
.5625	.5625	.5625	.5625	.5625	.5625
.625	.625	.625	.625	.625	.625
.6875	.6875	.6875	.6875	.6875	.6875
.75	.75	.75	.75	.75	.75
.8125	.8125	.8125	.8125	.8125	.8125
.875	.875	.875	.875	.875	.875
.9375	.9375	.9375	.9375	.9375	.9375
1.00	1.00	1.00	1.00	1.00	1.00
1.0625	1.0625	1.0625	1.0625	1.0625	1.0625
1.125	1.125	1.125	1.125	1.125	1.125
1.25	1.25	1.25	1.1875	1.1875	1.1875
1.375	1.375	1.375	1.25	1.25	1.25
1.5	1.5	1.5	1.375	1.375	1.375
1.625	1.625	1.625	1.5	1.5	1.5
1.75	1.75	1.75	1.625	1.625	1.625
1.875	1.875	1.875	1.75	1.75	1.75
2.00	2.00	2.00	1.875	1.875	1.875
2.125	2.125	2.125	2.00	2.00	2.00
2.25	2.25	2.25	2.125	2.125	2.125
2.50	2.5	2.5	2.25	2.25	2.25
2.75	2.75	2.75	2.375	2.375	2.375
3.00	3.00	3.00	2.5	2.5	2.5
3.25	3.25	3.25	2.75	2.75	2.75
3.50	3.5	3.5	3.00	3.00	3.00
3.75	3.75	3.75	3.25	3.25	3.25
4.00	4.00	4.00	3.5	3.5	3.5
4.25	4.25	4.25	3.75	3.75	3.75
4.50	4.5	4.5	4.00	4.00	4.00
5.00	5.00	5.00	4.25	4.25	4.25
5.5	5.5	5.5	4.5	4.5	4.5
6.00	6.00	6.00	4.75	4.75	4.75
6.5	6.5	6.5	5.00	5.00	5.00
7.00	7.00	7.00	5.5	5.5	5.5
7.5	7.5	7.5	6.00	6.00	6.00
8.00	8.00	8.00	6.5	6.5	6.5
8.5	8.5	8.50	7.00	7.00	7.00
9.00	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

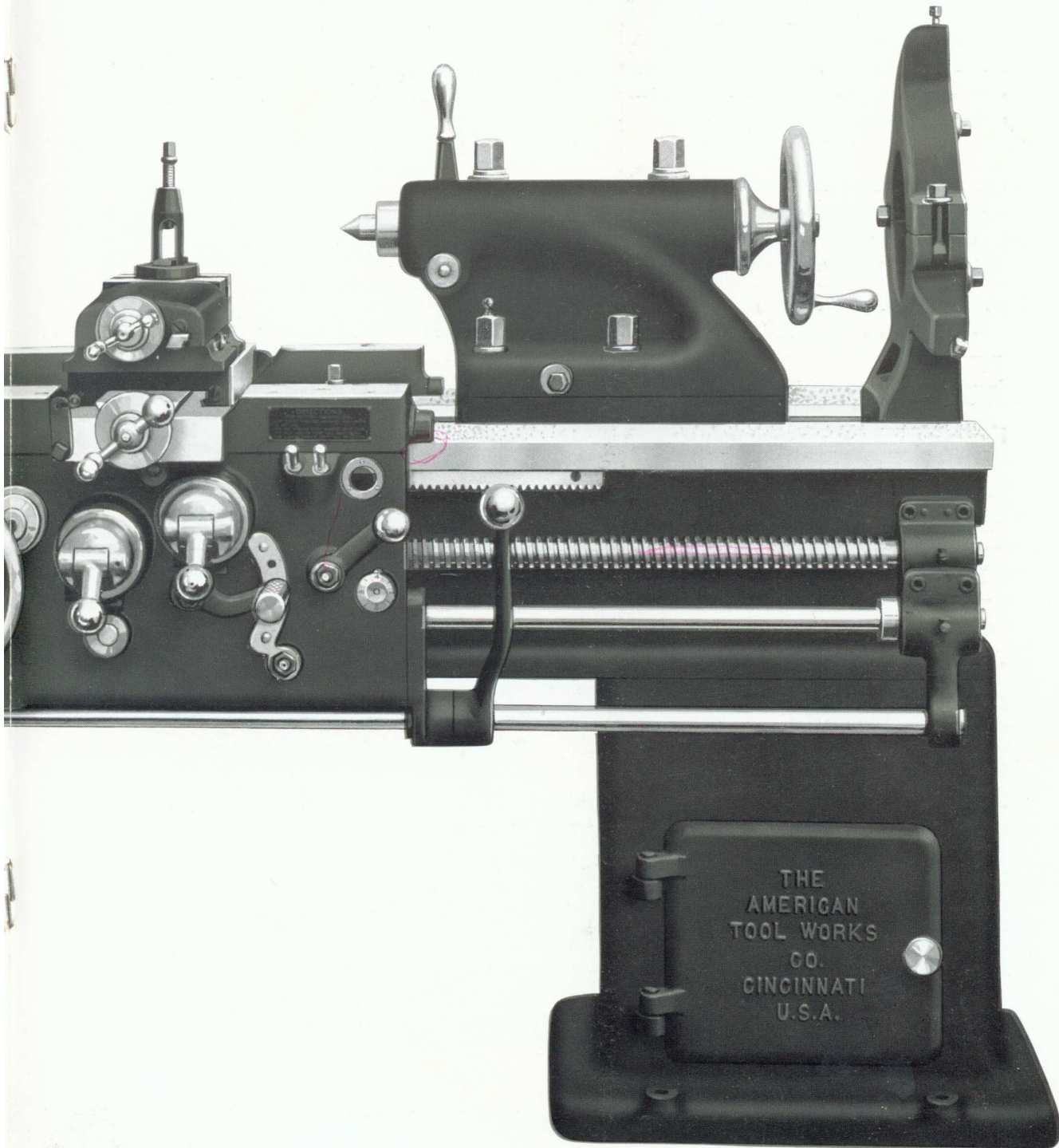


22-inch "American" lathe with double back geared head



"AMERICAN"

PRECISION TOOL ROOM LATHES



METRIC LATHES

"American" Lathes can be furnished in all sizes as complete metric lathes. This type of lathe is equipped with metric pitch leadscrew and special gearing to cut standard metric pitches. It is also equipped with metric cross feed and compound rest screws, metric carriage micrometer stop and with metric graduations on micrometer dials and tailstock spindle.

Except for these changes, "American" metric lathes are identical to our standard lathes, all dimensions being the same on both types.

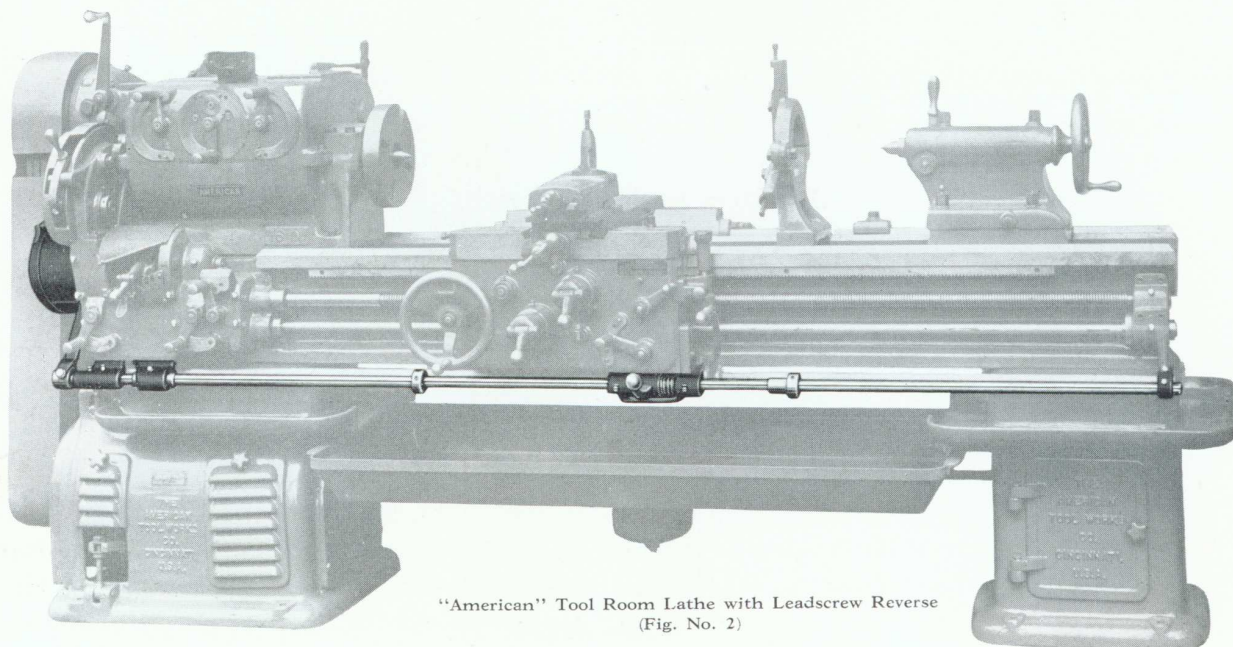
When desired, English or Whitworth transposing gears can be furnished to convert the metric thread and feed range to the English or Whitworth standard.

LEADSCREW REVERSE

Owing to its limited use, leadscrew reversing mechanism is furnished only upon order. This mechanism, by means of a double-faced single-tooth clutch, with its actuating elements controlled through a convenient lever located at the apron, reverses the rotary direction of the leadscrew and feed rod without changing the direction of the spindle rotation. Two stop collars are provided for automatically stopping the carriage travel in either direction. The value of the leadscrew reverse lies in its reversal of the carriage travel, when threading, to return the carriage to the starting position without disengaging the half-nuts from the leadscrew.

THE AMERICAN TOOL WORKS. CO CINCINNATI, U.S.A.													
GEARS ON STUD BOX		PITCHES IN MILLIMETER										HANDLES	
28	80	.25	.3125	.375	.4375	.5	.5625	.625	.6875	.75	.8125	.875	AD
		1	1.125	1.25	1.375	1.5	1.625	1.75	1.875	2	2.125	2.25	AC
		2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.5	5	BC
		5	5.625	6.25	6.875	7.5	8.125	8.75	9.375	10	11	12	AD
56	40	1	1.125	1.25	1.375	1.5	1.625	1.75	1.875	2	2.125	2.25	AD
		2	2.25	2.5	2.75	3	3.25	3.5	3.75	4	4.5	5	BC
		5	5.625	6.25	6.875	7.5	8.125	8.75	9.375	10	11	12	AC
		15	15.625	16.25	16.875	17.5	18.125	18.75	19.375	20	21	22	BC

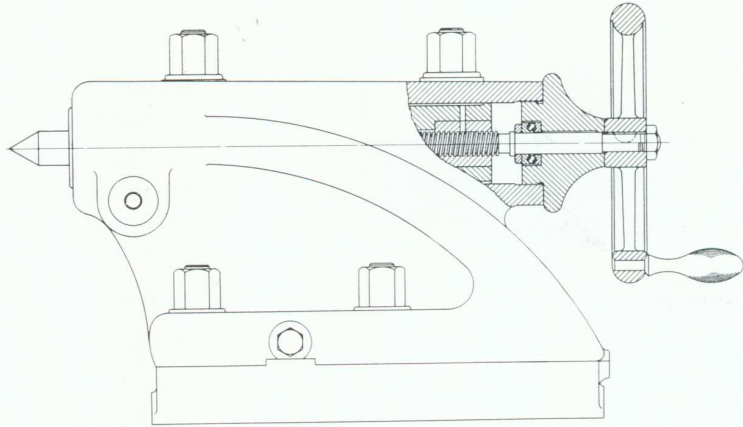
Metric index plate. (Fig. No. 1)



"American" Tool Room Lathe with Leadscrew Reverse
(Fig. No. 2)

TAILSTOCK

The tailstock has an extension barrel, giving clearance to carriage bridge for short work. Except the 12" size which has three bolts, all tailstocks are provided with four clamping bolts for binding securely to the bed, the two rear bolts being carried to the top of the barrel for convenience in clamping. The barrel is solid, the spindle being clamped by a double plug binder which clamps without affecting the spindle alignment. The tailstock screw is provided with a ball thrust bearing for absorbing all thrusts.



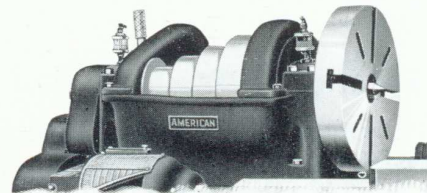
Tailstock. (Fig. No. 1)

COMPOUND REST

The compound rest is extremely rigid. The swivel is rectangular in form and has greater bearing contact with bottom slide than is possible with the circular swivel used on many designs. It is also graduated on both sides to facilitate setting. Full length taper gibs are used on both the compound rest top and bottom slides, and are located on the right-hand side, where they are free from the tool thrust under normal working conditions.

SINGLE BACK GEARED HEAD

This type of 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. Spindle bearings are of the straight cylindrical type.

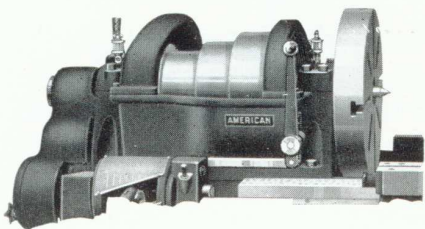


4-step cone, single back geared head. (Fig. No. 2)

DOUBLE BACK GEARED HEAD

"American" 3-step cone double back geared heads, because of their large diameter and wide face cone pulleys and high belt velocity, are unusually powerful. They are of the quick change, friction type, both the first and second back gear speeds being secured through a frictional connection between the back gear shaft and the gears. The advantage of this friction type of head lies in the fact that the change from one back gear range to the other can be made instantaneously,

DOUBLE BACK GEARED HEAD



3-step cone, double back geared head. (Fig. No. 1)

without stopping the lathe, and in the convenient control for starting and stopping through the friction control lever at the front. The frictions used in these heads are exceptionally large and powerful and are self-compensating for wear. Back gear shaft and spindle run in high quality phosphor bronze bearings of straight cylindrical type.

MOTOR DRIVE

The standard type of motor drive consists of either A. C. or D. C., constant speed motor, mounted inside cabinet leg under headstock, and connected to initial driving unit of head, preferably by multiple vee belt, although a flat belt or silent chain may be used. Other types of motor mountings, such as belt, chain or gear connection to driving unit with motor mounted on headstock or on rear of the head-end cabinet leg, can be supplied when desired. All types of motor mountings include a hinged motor plate to permit motor adjustment to compensate for belt stretch. For the maximum horsepower motor recommended for each size lathe see pages 31 and 32.

GUARANTEE

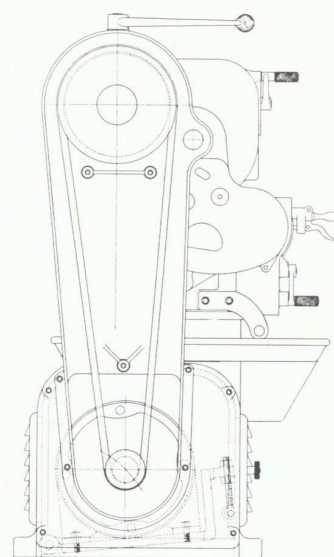
If properly set up and leveled, "American" Tool Room Lathes are guaranteed to bore and turn true within the closest limits demanded by most exacting tool, jig and gauge work. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purpose used. We further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

STANDARD EQUIPMENT

Standard equipment, upon which base price is determined, includes compound and steady rests, thread dial, double friction countershaft for cone drives, large and small face plates and wrenches.

EXTRA EQUIPMENT

At extra cost we can equip these Lathes with improved Taper, Draw-In and Relieving Attachments, Turret on Carriage, Turret on Shears, Turret Tool Post, Special Tool Rests, Double Back Geared Head, "Patented" Geared Head for belt or motor drive, Electrical Apron Control, Countershaft for Geared Heads, Oil Pan, Oil Pump, Follow Rest, Extra Gears and Index Plates for special fine, coarse or metric threads.



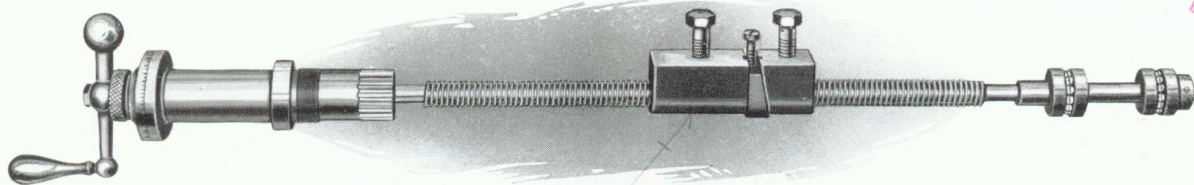
Motor Drive showing motor adjustment. (Fig. No. 2)

"AMERICAN" TU-WAY TAPER ATTACHMENT

There are two distinct types of taper attachments, the yoke type and the telescopic screw type. Each has its advantages and disadvantages, consequently it has been a question in the buyer's mind which type possessed the greater merit.

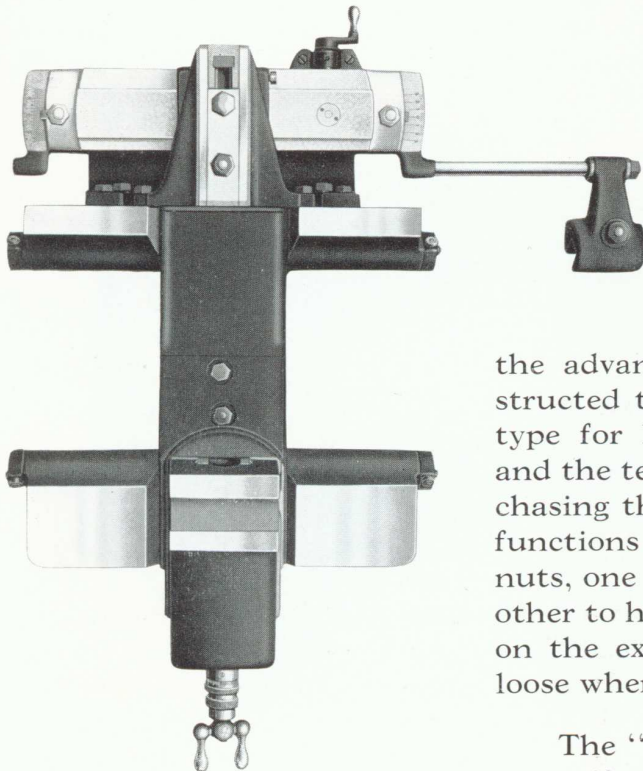
The new "American" Tu-Way Taper Attachment eliminates any doubt by combining the advantages of both types, and eliminating the disadvantages.

The advantage of the yoke type of taper attachment rests in the rigid connection between the bottom slide of the tool rest and the sliding shoe on the swivel bar, thus eliminating the pull of the taper from the cross-feed screw, and insuring for it longer life and greater accuracy. The disadvantage, on the other hand, is in the inability of the operator, when cutting taper threads or boring taper holes, to retain control of the cross-feed screw for additional depths of cut.



Telescopic Cross-Feed Screw and Compensating Nut. (Fig. No. 1)

On the telescopic screw type the condition is just the reverse. When chasing taper threads or boring taper holes the operator has complete control of the cross-feed screw, but on all taper turning the entire pull of the taper is thru the cross-feed screw, which naturally tends toward excessive wear, with its resultant backlash and inaccuracy.



Tu-Way Taper Attachment. (Fig. No. 2)

The "American" Tu - Way Taper Attachment combines all the advantages of both types, and is so constructed that either type may be used; the yoke type for heavy cuts and roughing operations and the telescopic screw type for finishing cuts, chasing threads and boring tapered holes. The functions are selectively controlled by two clamp nuts, one to clamp the yoke to tool rest, and the other to hold the screw journal in a fixed position on the extended rear guide bracket; one being loose when the other is tight.

The "American" Tu-Way Taper Attachment is a self-contained mechanism, carried as a unit

"AMERICAN" TU-WAY TAPER ATTACHMENT

on the rear of the carriage, and so proportioned as to resist the severest stresses, and at the same time excessive weight and bulkiness are strictly avoided. Its convenience of operation recommends it highly to the production departments, where the time element is an important factor, while its unusually high degree of accuracy commends it to the tool room, where accuracy is a prime essential.

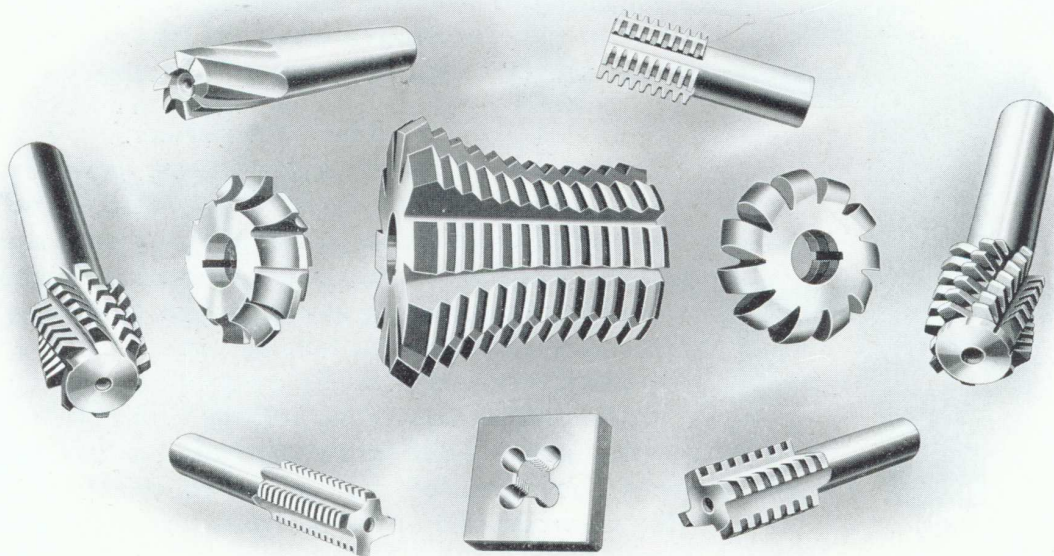
This mechanism can be quickly changed from taper to straight work, or vice versa, by simply loosening one nut and tightening another, while all other adjustments are proportionally simple.

RELIEVING ATTACHMENTS

Before entering into a description of this attachment, attention must be called to the fact that it is built in two types—the Plain and the Universal, each one being designed for certain classes of work; consequently on ordering an attachment of this kind, it is imperative that the characteristics of each type be thoroughly understood, in order that the proper equipment may be secured for the work.

The Plain Relieving Attachment, as its name suggests, is a simple mechanism, designed for external and internal cylindrical work only. Owing to its limited field of action, the plain attachment can be constructed of fewer and larger elements, producing, in consequence, a much more rigid and durable mechanism than the universal type, which must cover in its operation practically the entire field of relieving, including external, end and internal work.

The Universal Relieving Attachment, on the other hand, is designed to perform a great variety of work; in fact, it must be ready when called upon to handle



Examples of work produced by the universal relieving attachment

RELIEVING ATTACHMENTS

any kind of a relieving job. It is, therefore, of necessity a more complicated mechanism than the plain type, which is designed for one class of work only.

The "American" Universal Relieving Attachment, while it is exceptionally free from superfluous parts, nevertheless, owing to the wide field it must cover, has of necessity more sliding elements to wear, more adjustments to make, and less substantial parts to contend with than the plain attachment. It must, therefore, be expected that the Universal Attachment will demand care in handling and more intelligent operation to secure results.

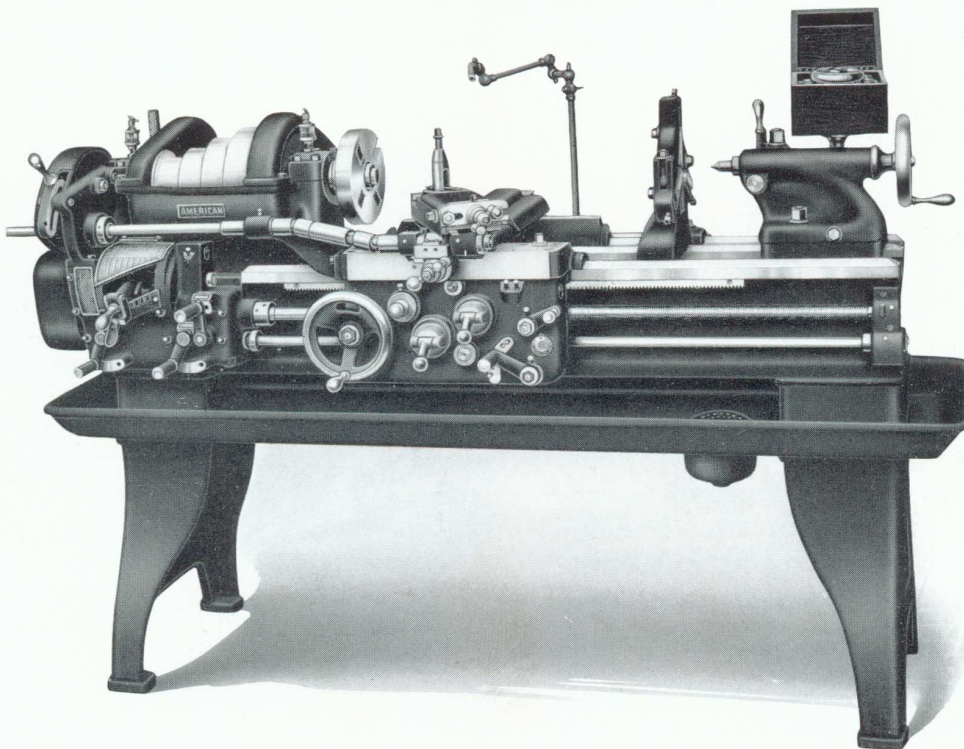
When relieving work such as hobs, taps, and cutters, the spindle speeds should be reduced to about half those regularly furnished.

In order to obtain this condition, on belt drives, the countershaft is fitted with an additional slow speed pulley, while on motor driven machines a two-speed motor is recommended for the most satisfactory operation of the attachment.

UNIVERSAL RELIEVING ATTACHMENT

The function of the Universal Relieving Attachment is to relieve or back off the flutes of rotary cutters, taps, reamers, end mills, hollow mills, dies, etc.

In order to accommodate the entire range of requirements, the new "American" Universal Relieving Attachment has been designed along original lines, resulting in a completely universal attachment, as will be evident from the fact



16-inch "American" tool room lathe equipped with universal relieving attachment.

UNIVERSAL RELIEVING ATTACHMENT

that end and internal relieving can be just as easily performed as straight relieving work, such as relieving cutters, taps and hobs.

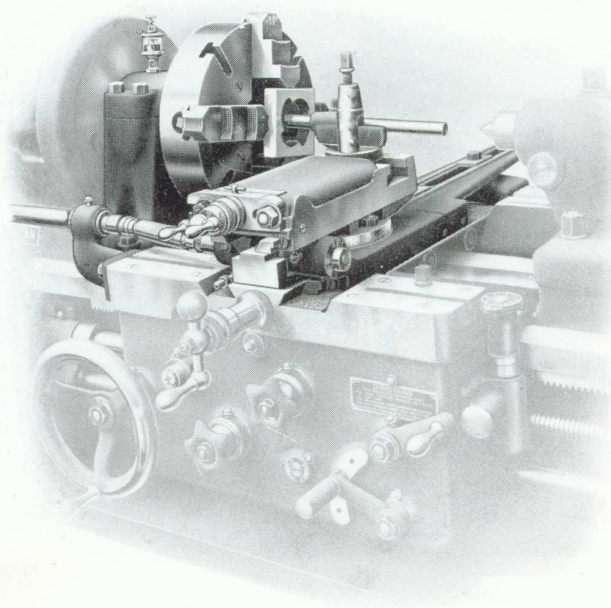
In addition, this new design has eliminated the many objectionable features common to other makes, such as numerous shafts, mitre gears, racks, etc., and as a result the new "American" Universal Relieving Attachment is very simple and efficient in its design, only a few parts being used to accommodate a very wide range of work and to provide an unusually direct drive.

One of the important features of this new attachment is that it can be used with any type of "American" Tool Room Lathe. It can be as easily applied to and operated in connection with a geared head belt or motor driven lathe, as it can with a cone head lathe.

The change gear mechanism is supported by a bracket located at the front of the headstock on top of the quick change gear box. The gear train has a small quadrant which carries the change gears, and which is used to disengage the drive when not required. Power is taken from a spur gear located on the end of the spindle and is transmitted thru the change gear mechanism to the driving shaft, which extends thru the supporting bracket on the quick change gear box and is journaled at the other end in a suitable bracket fastened to the left wing of the carriage. Between this bracket and the tool rest are located the universal or knuckle joints which permit cross movement to the tool slide.

The driving shaft revolves constantly in one direction until the direction of the spindle rotation is reversed, at which time the driving shaft ceases to reciprocate the tool slide. This feature is of great value, for by means of it the tool slide will remain stationary when the direction of the carriage travel is reversed, while the half-nuts are engaged. By means of this same feature the tool can be withdrawn from the work and run back for a new cut, as is the practice in tap and hob making, without any waste motion of the parts and with absolute safety to the work. This feature alone represents a very important advance in the development of the Relieving Attachment, and greatly increases the efficiency of this mechanism.

To obtain this condition a clutch connection is used between the cam and the driver which is



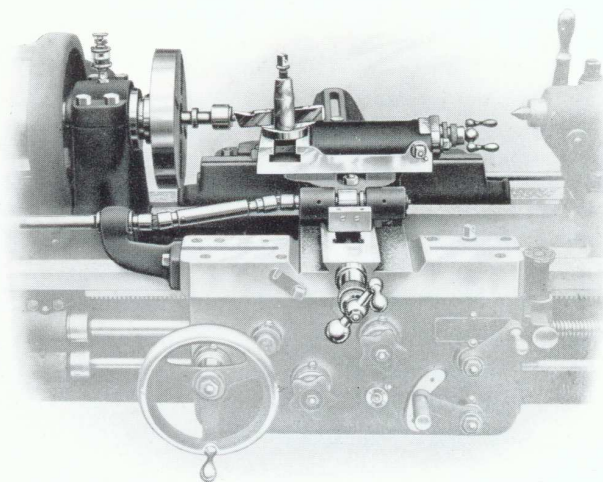
Internal relief

UNIVERSAL RELIEVING ATTACHMENT

operative in one direction only, therefore, when the cam is set for operating in one direction, the reversal of the driving shaft will cause the clutch, which is held in engagement by a spring, to be withdrawn from the cams, with the result that the cam will remain stationary and consequently will impart no motion to the tool slide.

In order to obtain the entire range shown on the index plate, three cams, of one, two and four lobes, are provided in addition to the change gears. These cams run in an oil bath, are carried on the cam shaft which is located directly in front of the tool slide, and can be very readily interchanged when desired. It will be noted by reference to the index plate, that the most commonly used reliefs are obtained by making the slightest changes. Probably the most important and valuable feature of this new attachment is that which permits the tool slide to be operated at every 30 degrees, thus providing twelve (12) operating positions within a circle. It is this feature that permits of relieving side cutters, end mills, and numerous jobs that heretofore could only be done by hand.

Very convenient means are provided on this attachment for obtaining the various degrees of relief for either external or internal work. The adjustment takes place at the front of the tool slide thru a thumb-screw, while a graduated scale indicates the depth of the relief as set.



End relief

As a further proof of the adaptability of this attachment, it can be applied and operated absolutely independently of the taper attachment. In other words, as far as the relieving attachment itself is concerned, a taper attachment is not required, except when taper work is to be handled.

A standard compound rest is furnished in addition to the special relieving rest, the use of which, for general turning purposes, we strongly recommend, for naturally the constant use of a precision tool for rough work will impair its accuracy, and unfit it for high-grade tool room work.

As the compound rest is readily interchangeable with the special tool slide of the relieving attachment, only a few moments are required to make the change.

When necessary to relieve taps or hobs having spiral flutes, the "American" Universal Relieving Attachment can be easily arranged to handle such work by the simple addition of extra gears.

The parts used in the construction of the "American" Universal Relieving Attachment are of the very best material for the service required. The cam yoke

UNIVERSAL RELIEVING ATTACHMENT

is forged. The cams, cam shoe and crank members are of tool steel, hardened and ground. The index bar in top slide is of forged steel, all the shafts and gears are well proportioned, and the entire mechanism is free from trappy construction.

One of the chief advantages of the "American" Relieving Attachment lies in the fact that any backlash in gears, cams, keyways or universal joints has no effect on the work, because the cam is located on the tool rest with a positive drive connection between the cam and the cutting tool. All gears are securely covered.

The "American" Universal Relieving Attachment can be applied to any current model "American" Lathe, below the 30" size, after the machine has left our factory, the application requiring only a slight amount of work by the purchaser.

Relieving Attachments—Plain and Universal Models

Size of Lathe		12"	14"	16"	18"	20"	22"			
Maximum work diameter.....		3"	5"	6 $\frac{1}{8}$ "	8"	9"	9"			
Maximum Depth of Relief Obtainable	Univ'l	$\frac{1}{8}$ "	$\frac{1}{8}$ "	$\frac{5}{32}$ "	$\frac{3}{16}$ "	$\frac{7}{32}$ "	$\frac{7}{32}$ "			
	Plain	$\frac{7}{16}$ "	$\frac{9}{16}$ "	$\frac{9}{16}$ "	$\frac{5}{8}$ "	$\frac{5}{8}$ "	$\frac{5}{8}$ "			
Number of Cams	Univ'l	†3 fundamental cams, 1-2-4 lobes, with fixed drop only.								
Regularly supplied.	Plain	*3 Standard Cams, 1-2-4 lobes, $\frac{1}{4}$ " or $\frac{3}{8}$ " drop, other drops special to order.								
Number of flutes in work.....		2 11	3 12	4 14	5 16	6 18	7 20	8 22	9 24	10 24
Weights of attachments.....		150	175	190	225	250	250			

†Depths of relief are adjustable, using a fixed cam drop.

*Depths of relief are fixed. Must use separate cam for each variation in depth of relief. On 12", 14" and 16" lathes cams have $\frac{1}{4}$ " drop, on larger sizes cams have $\frac{3}{8}$ " drop, unless otherwise ordered.

PLAIN RELIEVING ATTACHMENT

The purpose of the Plain Relieving Attachment is to relieve the flutes of cutters, reamers, hobs, taps and internal work as dies, etc., where the work requires neither side, angular or end relief.

To secure an attachment capable of handling this work economically and on a manufacturing basis, the "American" Plain Relieving Attachment was designed with much more liberal proportions and with greater rigidity than the average relieving attachment. It consists primarily of a top and bottom slide and an

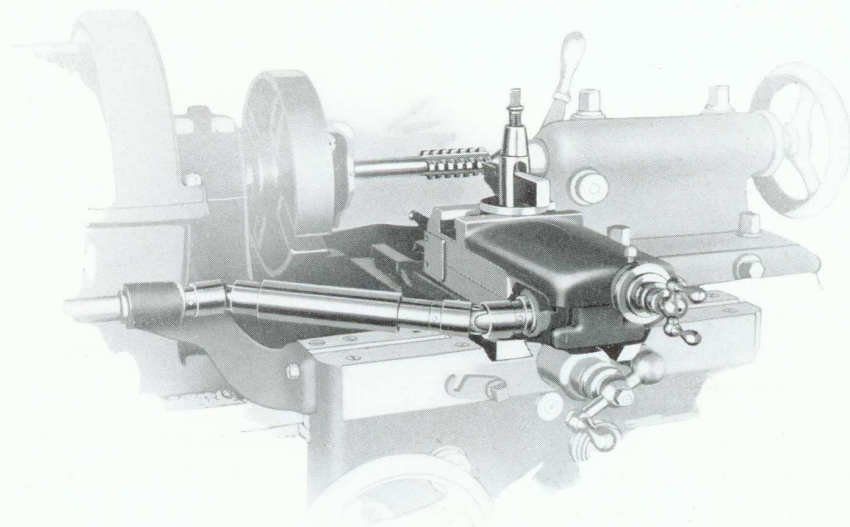
PLAIN RELIEVING ATTACHMENT

intermediate nut block controlled by a cam on the driving shaft. Backlash between the cam and tool has been absolutely eliminated, insuring an accurate reproduction of the cam contour, resulting in producing sharp edges on the work.

The cam operates against a hardened plate attached to the steel nut block mounted in a planed seat on the bottom slide, and is constructed so as to place the nut block and top slide screw in tension under the cutting stroke. The nut for the top slide screw is made of bronze and is attached to the top of the nut block, while the top slide screw connects the block with the top slide. At the inner end of the top slide is fastened a steel strap, to which is secured a tension spring bolt of sufficient dimensions to insure smooth operation and long service. One end of the tension spring bears against a lug on the bottom slide, while the other end bears against the head of the bolt.

Passing through the tension strap are two buffer rods which are attached to the nut block, their outer ends being supplied with large bushings which bear against rawhide cushions inserted in the bottom slide. The rods have lock nuts on the outer ends to provide the proper adjustment for the buffer bushes to suit any change in cam lobe height or wear on the buffer pads. These buffer cushions absorb the shock and eliminate the noise.

Three cams are supplied with this attachment, which, together with the change gears, produce the entire range shown on the index plate. On this attachment the regular cam lobes are supplied with drops per table on page 26, and any desired rate of relief must be obtained by inserting another cam of the required drop. This is one of the principal points of difference between the plain and universal attachments, and on account of the elimination of the set-over yoke in top slide and the crank members, the results must be obtained through the cams. The tool steel cams having one, two and four lobes, are hardened and ground. The ends of cam hubs are provided with single tooth clutches which permit the driving shaft to be reversed in direction when returning the carriage for new cut, without moving tool slide during the return interval. A clutch sleeve on the driving shaft engages the clutch tooth on one end of the cam. The cam clutches are cut right and left, and this permits of reversing the cam for internal work when



Cylindrical relief

PLAIN RELIEVING ATTACHMENT

spindle direction is reversed. The cam shaft can be easily removed for the changing of the cams.

The change gear mechanism is supported by a bracket located at the front of the headstock on top of the quick change gear box. The gear train has a small quadrant which carries the change gears, and which is used to disengage the drive when not required. Power is taken from a spur gear located on the end of the spindle and is transmitted thru the change gear mechanism to the driving shaft, which extends thru the supporting bracket on the quick change gear box and is journaled at the other end in a suitable bracket fastened to the left wing of the carriage. Between this bracket and the tool rest are located the universal or knuckle joints, which permit cross movement to the tool slide.

This attachment can be used independently of, or in conjunction with, the taper attachment, as the conditions may require.

The range of depths of relief possible on the plain attachment is as follows:

12" Lathe	0" to $\frac{7}{16}$ "	14" and 16" Lathes	0" to $\frac{9}{16}$ "
18", 20" and 22" Lathes	0" to $\frac{5}{8}$ "		

SUB-HEAD

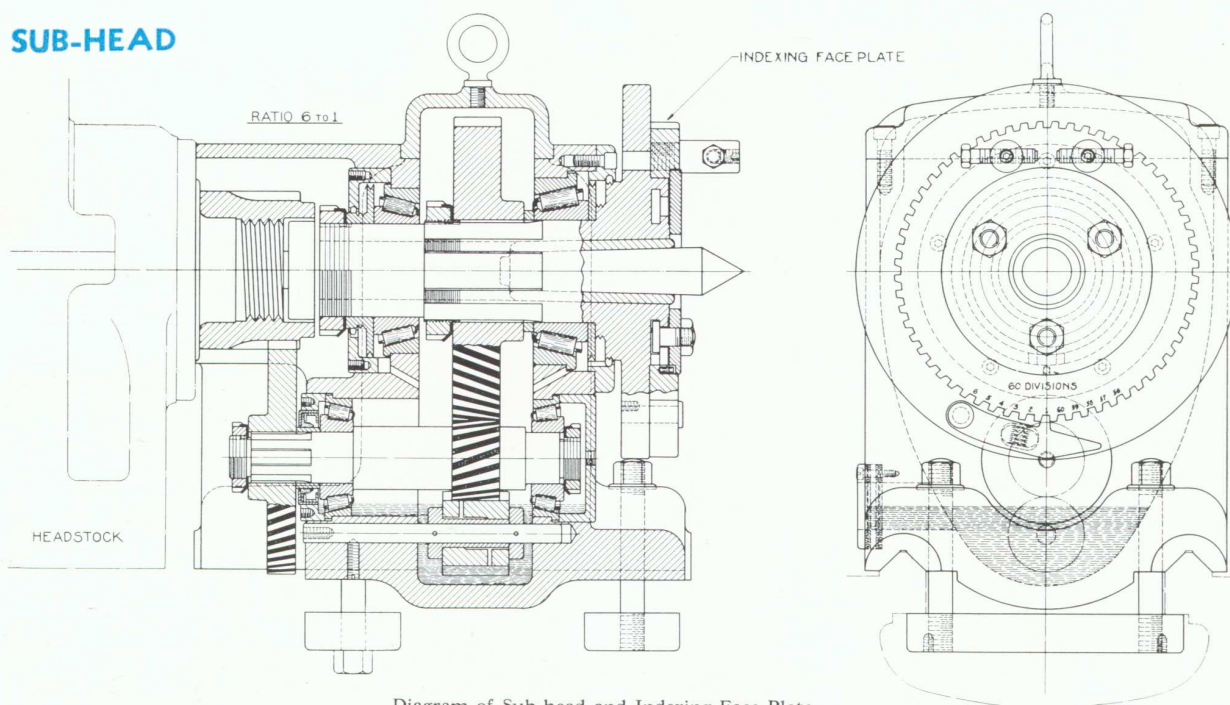


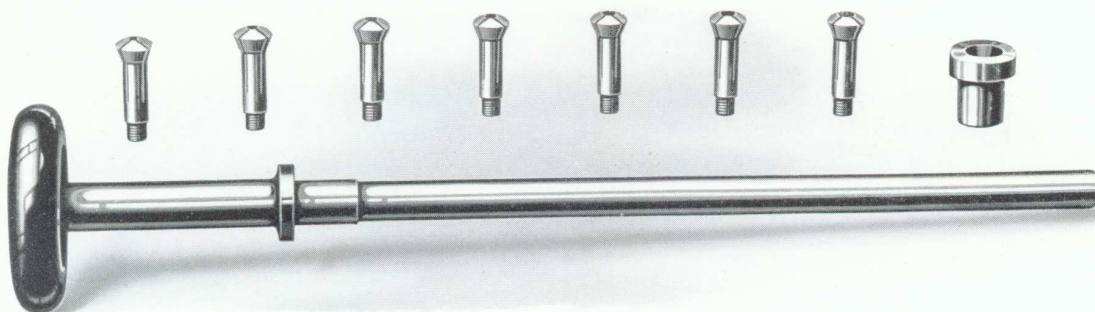
Diagram of Sub-head and Indexing Face Plate.

The Sub-Head or speed reducer, as it is sometimes called, is a valuable unit for relieving operations, coarse worm cutting and the chasing of long leads. This attachment which is fitted directly to the spindle nose and securely clamped to the bed provides a speed reduction of 6 to 1, resulting in the very slow work speeds required for such operations.

SUB-HEAD

This unit also functions as an indexing face plate, being suitably marked for the chasing of multiple threads. This entire unit is anti-friction mounted, is provided with accurately hobbed and machine-lapped helical gears, automatic lubrication, and may be quickly applied and removed as desired.

DRAW-IN ATTACHMENT (Tube Type)



Draw-in attachment and collet. (Fig. No. 1)

The Draw-in Attachment is a very simple mechanism, consisting of a long hollow steel bar, a hardened and ground steel taper bush and as many collets as are necessary for holding different diameters of work.

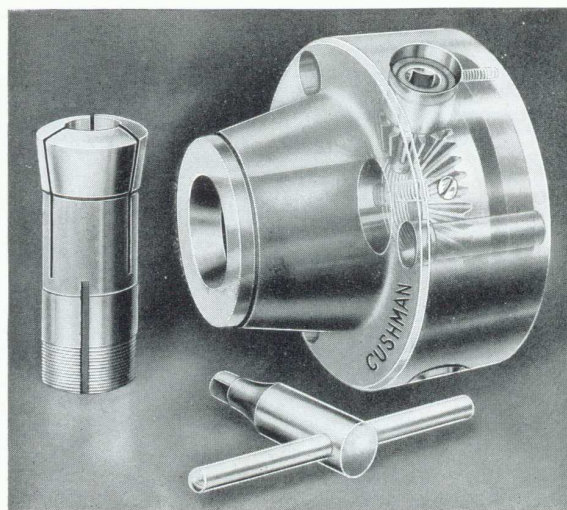
The hollow bar which extends thru the spindle has a wooden hand wheel at one end and is threaded internally at the other. The hardened and ground bush fits into the spindle nose and the collets are placed in this bush, the threaded end extending thru and being engaged by the thread chased on the inside of the bar. The stock which is to be turned, is passed thru the bar from the head end of the lathe, and is gripped in the collet or chuck. The turning of the hand wheel, in one direction or the other, causes the collet to either engage or disengage the work. Collets can be furnished for holding stock from the smallest fraction up to $\frac{7}{8}$ " diameter on the 12", 14" and 16" sizes, and up to 1" diameter on the larger sizes.

NOSE-TYPE COLLET CHUCK

This attachment is a self-contained unit, secured to the spindle nose, and arranged to hold a series of collets with a capacity equal to diameter of spindle hole.

MICROMETER CARRIAGE STOP

The micrometer carriage stop furnished as an extra on the "American" Tool Room Lathe is provided for accurately locating the carriage or tool with relation to the work. It is a positive stop, which is used in connection with hand feed only, and must not be used in combination with power feed.

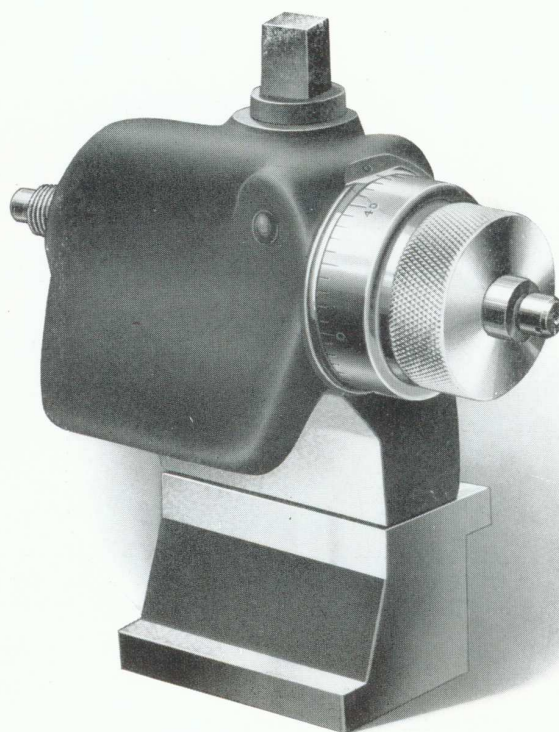


Nose-type collet chuck (Fig. No. 2)

MICROMETER CARRIAGE STOP

This mechanism consists of a body casting carrying an adjusting screw with knurled knob, and a micrometer collar graduated for fine adjustments of the screw. A combination clamp permits the stop to be used on either front or rear Vee of bed, the clamp being reversed to fit the bed shape, while a binder screw secures the stop in place.

The stop screw can be used at either end, which permits of placing the stop at any point on front or rear Vee, and at either end of carriage wings.

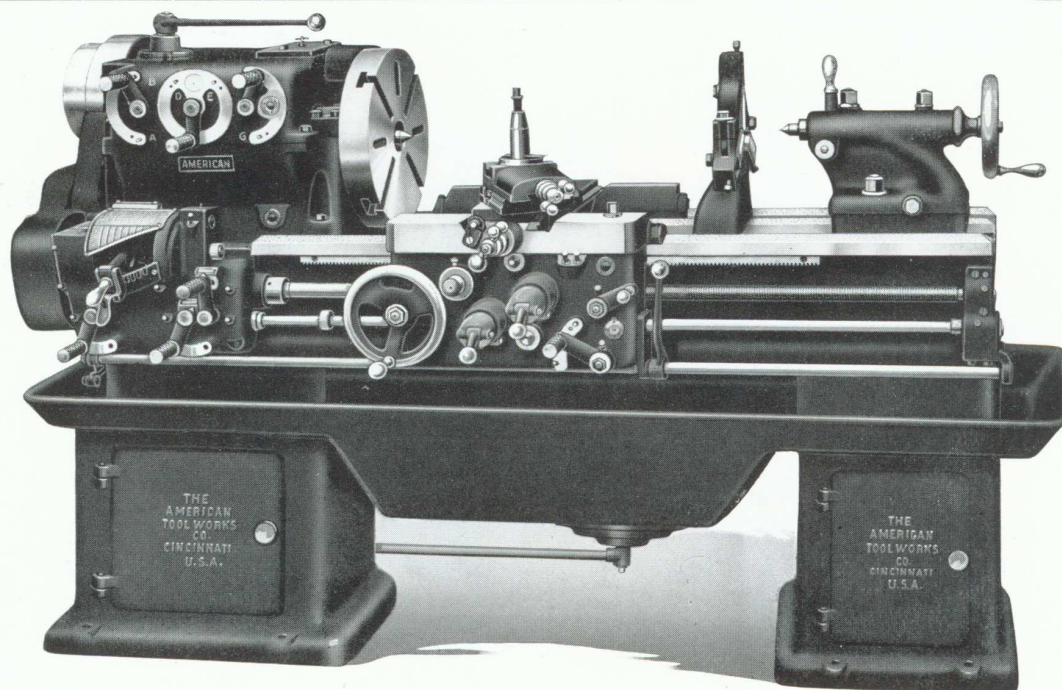


Micrometer carriage stop (Fig. No. 1)

OIL PAN

There is very little to be said in connection with the oil pan. It is a neat, well made sheet iron pan with sloping sides and beaded edges, its purpose being to catch the chips and waste cutting lubricant.

Size of Lathe	12"	14"	16"	18"	20"	22"
Weight of pan. Base length bed . . .	107 lbs.	115 lbs.	180 lbs.	195 lbs.	297 lbs.	297 lbs.
Weight of pan 24" (2 ft.) additional length	35 lbs.	38 lbs.	34 lbs.	41 lbs.	52 lbs.	52 lbs.



"American" Belt Driven Geared Head Tool Room Lathe with New Drop Type Oil Pan (Fig. No. 2)

SPECIFICATIONS

SPECIFICATIONS COMMON TO ALL LATHES REGARDLESS OF TYPE OF HEADSTOCK

SIZE OF LATHE		12-inch	14-inch	16-inch
Swing	Over bed.....	14 1/2"	16 1/2"	18 1/2"
	Over carriage bridge.....	9 1/2"	11 3/8"	12 1/2"
	Over taper attachment.....	8 1/4"	10 1/8"	10 3/8"
Distance Between Centers	Tailstock, flush (base machine).....	30"	30"	30"
	Tailstock, overhung (base machine).....	33"	33 1/2"	33 1/2"
Quick Change Gear Box	Range of threads per inch.....	2 to 112	2 to 112	2 to 112
	Range of feeds per inch (number of cuts).....	8 to 448	8 to 448	8 to 448
	Range of feeds per spindle revolution.....	.002" to .125"	.002" to .125"	.002" to .125"
	Number of thread and feed changes.....	48	48	48
Tailstock	Length of base.....	12"	13"	14"
	Spindle, diameter.....	2"	2 1/8"	2 1/2"
	Spindle, travel.....	5 3/4"	6 1/2"	7 1/4"
Carriage	Length.....	17 1/2"	18 5/8"	22 1/8"
	Bridge width.....	6 1/8"	7 1/8"	7 3/8"
Spindle hole, diameter.....		1 1/4"	1 1/2"	1 3/4"
Centers, Morse taper.....		No. 3	No. 3	No. 4
Leadscrew, diameter and threads per inch.....		1 1/8" x 6 Thd.	1 1/4" x 4 Thd.	1 3/8" x 4 Thd.
Steady rest, capacity, maximum standard.....		4"	5"	6"
Follow rest, capacity.....		3"	3"	3 3/4"
Compound rest, top slide travel.....		3"	4"	5 1/4"
Large face plate, diameter.....		12 1/2"	15"	17"
Tool post, takes tool with shank (maximum size).....		1/2" x 1"	1/2" x 1"	3/8" x 1 1/4"

SPECIFICATIONS FOR 12-SPEED GEARED HEAD LATHES ONLY

Spindle	Largest motor recommended..... H.P.		5	7½	10	
	Front bearing, taper type (diameter x length).....		3¼" x 4"	3⅝" x 4⅛"	4⅛" x 4⅝"	
	Rear bearing (diameter x length).....		1½" x 2⅜"	2⅝" x 2¾"	2⅝" x 3¼"	
	Nose diameter and threads per inch (threaded type).....		2⅜"—6 Thd.	2⅜"—6 Thd.	2¾"—4 Thd.	
	Flange diameter (flanged type).....		6¼"	8¼"	8½"	
Driven Pulley	Diameter and face.....		10¾" x 2¾"	10¾" x 3¼"	10¾" x 4¼"	
	Speed R. P. M.....		340	370	370	
Spindle Speeds	Normal range—sleeve bearing spindle.....		12 to 450	10 to 397	10 to 354	
	Normal range—Timken bearing spindle.....		19 to 725	17 to 675	16 to 580	
Weight—Belt Drive	Net (base machine)..... pounds		1750	2300	2850	
	Crated (base machine)..... pounds		2050	2650	3250	
	Boxed (base machine)..... pounds		2650	3400	3900	
Weight—Motor Drive	Net (base machine)..... pounds		2400	3000	3700	
	Crated (base machine)..... pounds		2700	3350	4100	
	Boxed (base machine)..... pounds		3400	4200	5000	
Weight, each additional 24" between centers..... pounds			170	220	275	
Cubic Feet	Shipped	Knocked Down	Base machine, boxed.....	78	94	110
		Each additional 24" between centers.....		21	23	26
	Shipped	Assembled	Base machine, boxed.....	130	165	180
		Each additional 24" between centers.....		34	38	42

SPECIFICATIONS FOR DOUBLE BACK GEARED CONE PULLEY LATHES ONLY

Spindle	Front bearing, cylindrical type (diameter x length).....	2 3/8" x 3 3/4"	2 3/4" x 4"	3" x 5"	
	Rear bearing (diameter x length).....	1 1/8" x 2 3/4"	2 1/8" x 3"	2 1/8" x 3 1/4"	
	Nose diameter and threads per inch (threaded type).....	2 3/8"—6 Thd.	2 3/8"—6 Thd.	2 3/8"—6 Thd.	
	Flange diameter (flanged type).....	6 1/4"	8 1/4"	8 3/4"	
Cone Pulley	Number of steps.....	3	3	3	
	Width of each step.....	2 3/8"	3 1/8"	3 1/8"	
	Diameters, maximum and minimum.....	9"—5 1/8"	10 1/2"—7 1/8"	13"—8 1/8"	
Back gear ratios.....		3.54:1 & 12.7:1	3.29:1 & 11:1	3.44:1 & 11.73:1	
Range of spindle speeds (normal).....		13.5 to 405	16.3 to 400	14.3 to 380	
Weight	Net (base machine)..... pounds	1500	2100	2600	
	Crated (base machine)..... pounds	1750	2350	2950	
	Boxed (base machine)..... pounds	2300	2975	3600	
	Each additional 24" between centers..... pounds	170	220	275	
Cubic Feet	Shipped Knocked Down	Base machine, boxed.....	67	88	96
		Each additional 24" between centers.....	18	22	24
	Shipped Assembled	Base machine, boxed.....	120	140	162
		Each additional 24" between centers.....	30	35	37

SPECIFICATIONS FOR SINGLE BACK GEARED CONE PULLEY LATHES ONLY

Spindle	Front bearing, cylindrical type (diameter x length).....	2 3⁄8" x 3 3⁄4"	2 3⁄4" x 4"	3" x 5"	
	Rear bearing (diameter x length).....	1 1⁄2" x 2 3⁄4"	2 1⁄8" x 3"	2 1⁄8" x 3 1⁄4"	
	Nose diameter and threads per inch (threaded type).....	2 3⁄8"—6 Thd.	2 3⁄8"—6 Thd.	2 3⁄8"—6 Thd.	
	Flange diameter (flanged type).....	6 1⁄4"	8 1⁄4"	8 1⁄4"	
Cone Pulley	Number of steps.....	4	4	4	
	Width of each step.....	2 3⁄8"	2 3⁄8"	3 1⁄8"	
	Diameters, maximum and minimum.....	9" — 4 1⁄8"	10 1⁄2" — 5 1⁄4"	13" — 6.4	
Range of spindle speeds (normal).....		11.3 to 436	10 to 400	8.8 to 380	
Back gear ratio.....		8.1:1	10:1	10.44:1	
Weight	Net (base machine)..... pounds	1500	2100	2600	
	Crated (base machine)..... pounds	1750	2350	2950	
	Boxed (base machine)..... pounds	2300	2975	3600	
	Each additional 24" between centers..... pounds	170	220	275	
Cubic Feet	Shipped	Base machine, boxed.....	67	88	96
	Knocked Down	Each additional 24" between centers.....	18	22	24
	Shipped	Base machine, boxed.....	120	140	162
	Assembled	Each additional 24" between centers.....	30	35	37

SPECIFICATIONS

SPECIFICATIONS COMMON TO ALL LATHES REGARDLESS OF TYPE OF HEADSTOCK

SIZE OF LATHE		18-inch	20-inch	22-inch
Swing	Over bed.....	20 1/2"	22 1/2"	24 1/2"
	Over carriage bridge.....	13 1/4"	14 1/2"	17 3/8"
	Over taper attachment.....	11 1/4"	12 7/8"	15 3/4"
Distance Between Centers	Tailstock, flush (base machine).....	30"	48"	48"
	Tailstock, overhung (base machine).....	34"	52 1/2"	52 1/2"
Quick Change Gear Box	Range of threads per inch.....	1 to 56	1 to 56	1 to 56
	Range of feeds per inch (number of cuts).....	8 to 448	8 to 448	8 to 448
	Range of feeds per spindle revolution.....	.002" to .125"	.002" to .125"	.002" to .125"
	Number of thread and feed changes.....	48	48	48
Tailstock	Length of base.....	16"	19"	19"
	Spindle, diameter.....	2 7/8"	3 1/8"	3 1/8"
	Spindle, travel.....	9"	12"	12"
Carriage	Length.....	25"	27"	27"
	Bridge width.....	8 1/2"	9 1/8"	9 1/8"
Spindle hole, diameter.....		1 1/8"	1 3/4"	1 3/4"
Centers, Morse taper.....		No. 4	No. 4	No. 4
Leadscrew, diameter and threads per inch.....		1 5/8"-2 Thd.	1 3/4"-2 Thd.	1 3/4"-2 Thd.
Steady rest, capacity, maximum standard.....		7"	8"	8"
Follow rest, capacity.....		4 1/4"	4 3/4"	4 3/4"
Compound rest, top slide travel.....		6"	7 1/4"	7 1/4"
Large face plate, diameter.....		19"	21"	21"
Tool post, takes tool with shank (maximum size).....		3/4" x 1 1/2"	3/4" x 1 1/2"	3/4" x 1 1/2"

SPECIFICATIONS FOR 12-SPEED GEARED HEAD LATHES ONLY

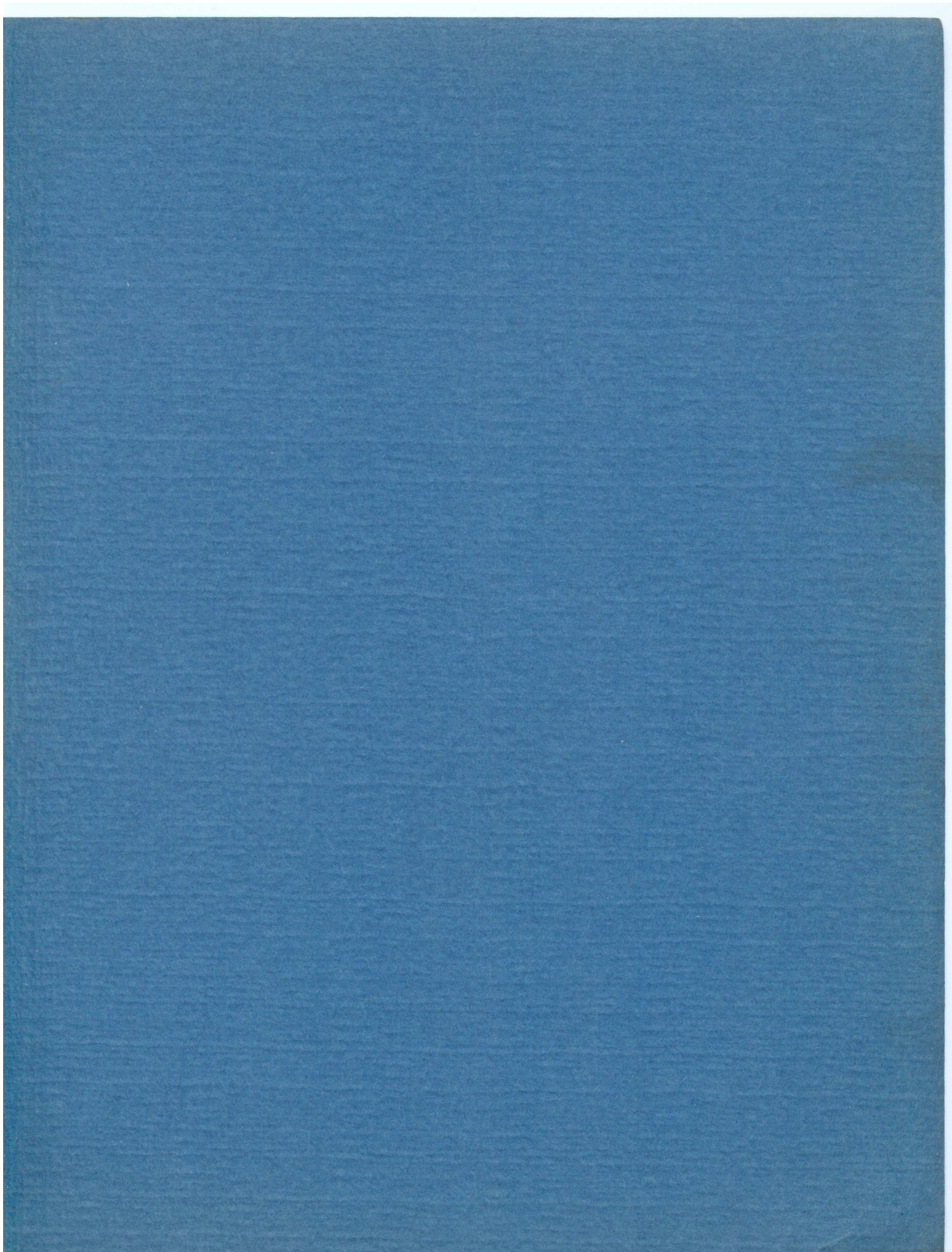
Spindle	Largest Motor recommended.....H.P.	15	20	20
	Front bearing, taper type (diameter x length).....	4 5/8" x 5 5/8"	5 1/8" x 5"	5 1/8" x 6"
	Rear bearing (diameter x length).....	2 3/4" x 3 3/4"	3" x 4 1/8"	3" x 4 1/8"
	Nose diameter and threads per inch (threaded type).....	3"-4 Thd.	3 3/8"-3 Thd.	3 3/8"-3 Thd.
	Flange diameter (flanged type).....	8 1/4"	8 1/4"	8 1/4"
Driven Pulley	Diameter and face.....	15" x 5 3/8"	15" x 5 3/8"	15" x 5 3/8"
	Speed R. P. M.....	350	340	340
Spindle Speeds	Normal range—sleeve bearing spindle.....	8 to 342	8 to 320	8 to 320
	Normal range—Timken bearing spindle.....	13 to 550	12 to 500	12 to 500
Weight—Belt Drive	Net (base machine).....pounds	3950	5400	5500
	Crated (base machine).....pounds	4350	5800	5900
	Boxed (base machine).....pounds	5200	7200	7300
Weight—Motor Drive	Net (base machine).....pounds	5100	6500	6600
	Crated (base machine).....pounds	5650	7000	7000
	Boxed (base machine).....pounds	6500	8500	8600
Weight, each additional 24" between centers.....pounds		325	400	400
Cubic Feet	Shipped			
	Knocked Down	Base machine, boxed.....	128	207
		Each additional 24" between centers.....	30	45
	Assembled			
Shipped	Base machine, boxed.....	200	260	278
	Each additional 24" between centers.....	46	48	48

SPECIFICATIONS FOR DOUBLE BACK GEARED CONE PULLEY LATHES ONLY

Spindle	Front bearing, cylindrical type (diameter x length).....	3 1/4" x 5 1/2"	3 3/8" x 6 1/8"	3 3/4" x 6 1/8"
	Rear bearing (diameter x length).....	2 3/8" x 3 3/4"	2 3/4" x 4 1/8"	2 3/4" x 4 1/8"
	Nose diameter and threads per inch (threaded type).....	2 3/4"-4 Thd.	3"-4 Thd.	3"-4 Thd.
	Flange diameter (flanged type).....	8 1/4"	8 1/4"	8 1/4"
	Number of steps.....	3	3	3
Cone Pulley	Width of each step.....	4 1/8"	4 5/8"	4 5/8"
	Diameters, maximum and minimum.....	14 1/8" x 9 1/8"	16"-10 1/2"	16"-10 1/2"
Back gear ratios.....		3.465:1 & 12.08:1	3.5:1 & 12.55:1	3.5:1 & 12.55:1
Range of spindle speeds (normal).....		12.7 to 352	11.5 to 335	11.5 to 335
Weight	Net (base machine).....pounds	3500	5000	5100
	Crated (base machine).....pounds	3900	5450	5550
	Boxed (base machine).....pounds	4700	6500	6600
	Each additional 24" between centers.....pounds	325	400	400
Cubic Feet	Shipped			
	Knocked Down	Base machine, boxed.....	122	196
		Each additional 24" between centers.....	27	30
	Assembled			
Shipped	Base machine, boxed.....	194	230	240
	Each additional 24" between centers.....	40	45	45

SPECIFICATIONS FOR SINGLE BACK GEARED CONE PULLEY LATHES ONLY

Spindle	Front bearing, cylindrical type (diameter x length).....	3 1/4" x 5 1/2"		
	Rear bearing (diameter x length).....	2 3/8" x 3 3/4"		
	Nose diameter and threads per inch (threaded type).....	2 3/4"-4 Thd.		
	Flange diameter (flanged type).....	8 1/4"		
	Number of steps.....	4		
Cone Pulley	Width of each step.....	3 1/8"		
	Diameters, maximum and minimum.....	14 1/8"-7"		
Range of spindle speeds (normal).....		6.72 to 348		
Back gear ratio.....		12:1		
Weight	Net (base machine).....pounds	3500		
	Crated (base machine).....pounds	3900		
	Boxed (base machine).....pounds	4700		
	Each additional 24" between centers.....pounds	325		
Cubic Feet	Shipped			
	Knocked Down	Base machine, boxed.....	122	
		Each additional 24" between centers.....	27	
	Assembled			
Shipped	Base machine, boxed.....	194		
	Each additional 24" between centers.....	40		



THE AMERICAN TOOL WORKS COMPANY
CINCINNATI, U. S. A.

LATHES - RADIALS - SHAPERS

SYRACUSE SUPPLY Co.

SYRACUSE
ROCHESTER BUFFALO

MAXIMUM METAL CUTTING SPEEDS

These cutting speeds are largely compiled from actual shop records. They are substantially higher than manufacturers of the cutting tools themselves recommended. This is because the cutting tools were used on the latest type of machines available. The results clearly show the economies possible with late type machines properly tooled. Purchase of new tools alone will not obtain these results. Proper holding of the work, mounting the cutting tools and careful selection and application of coolant are important.

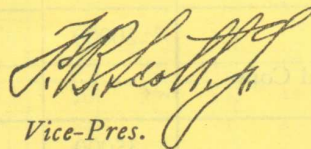
The shape and rigidity of the piece governs to considerable extent the speed of the cut. Generally pieces of heavy sections can be machined fastest.

It is significant that in every instance except on a large vertical boring mill the peak results were obtained on the machines equipped with anti-friction bearings.

We wish to thank the shop superintendents, tool engineers, and foremen who have so generously helped us in securing this data.

In compiling this information we have endeavored to show what is and can be accomplished by the proper use of modern equipment.

The economic advantage to be obtained by the installation of new equipment is best shown by comparing these results with your present shop records.


Vice-Pres.

PRODUCTION CUTTING TOOLS

CUTTING CHART

MATERIAL	Tensile Strength	Tungsten Carbide Tantalum Carbide Ft. per Min.			High Speed Steel Ft. per Min.		
		Dry	Wet	Type of Coolant	Dry	Wet	Type of Coolant
Cast Iron	18000	250			90		
Average Brinell 150-170	26000	275			110		
C. I. up to 1½% Nickel	20000	275			70		
Brinell 170-195	28000	300			80		
C. I. up to 1% Cr. 3½% Ni.	30000	210			65		
Brinell 200-210	36000	230			70		
Semi Steel. 20 to 30% Steel Scrap with 2% Si. or Better	30000	175			62		
Brinell 170-195	36000	200			72		
Steels							
Bessemer Screw Stock	70000		220	Cutting Oil		160	Cutting Oil
S. A. E. #1112	90000		230			170	
Free Cutting Bessemer Screw Stock	70000		240	Cutting Oil		175	Cutting Oil
High Sulphur Content	90000		260			185	
#2 Bessemer High Sulphur	70000		270	Cutting Oil		165	Cutting Oil
	90000		300			175	
Ultra Cut High Manganese, Same Machinability as #2 Bessemer	90000		270	Cutting Oil		180	Cutting Oil
	110000		300			200	
Open Hearth Screw Stock	70000		250	Cutting Oil		135	Soda Compound
S. A. E. #1120	85000		260			145	
Soft Forging Steel	63000		240	Soda Compound		110	Soda Compound
S. A. E. #1020 Low Sulphur For Carburizing	80000		250			120	
	95000		200	Soda Compound		80	Soda Compound
S. A. E. #1045	125000		240			90	
Alloy Steels 3½% Ni.	80000		165	Soda Compound		110	Soda Compound
S. A. E. #2315 for Gear Blanks	115000		175			120	
Chrome Ni. up to .90 Cr. and 1.5 Ni. S. A. E. #3120 For Heat Treated Bolts and Gear Blanks	80000		140	Soda Compound		90	Soda Compound
	110000		160			100	
Aluminum							
Pure Cast Aluminum #43	19000		400	Kerosene & Lard Oil		220	Kerosene & Lard Oil
			Up			230	
Commercially Hard Temper Aluminum #2 SH.	24000		200	Kerosene & Lard Oil		130	Kerosene & Lard Oil
			250			140	
Dural High Tensile #17 ST.	58000		275	Soluble Oil		190	Soluble Oil
			300			200	
Copper							
Copper One-Half Hard Com- mercial	31000		180	Soluble Oil		100	Soluble Oil
			200			120	
Brass							
Brass, Cast Yellow	20000		400	Soluble Oil	200		
			600		220		
Brass One-Half Hard Com- mercial			250	Soluble Oil	135		
			300		165		
Bronze							
Bronze, Gun Metal	35000		200	Soluble Oil		130	Soluble Oil
			220			150	
Bronze, Phosphor	50000		160	Soluble Oil		95	Soluble Oil
			180			115	

MACHINE TOOLS

SPEED CHART

IN REVOLUTIONS PER MINUTE

Surface Feet Per Minute

Dia.	30	40	50	60	70	80	100	125	150	175	200	250	300	400	500	700	900
$\frac{1}{16}$	1833	2445	3056	3667	4278	4889	6112	7641	9169	10714	12224	15281	18337	24450	30562	42787	55012
$\frac{1}{8}$	917	1222	1528	1833	2139	2445	3056	3820	4584	5348	6112	7640	9168	12224	15280	21392	27504
$\frac{3}{16}$	611	815	1019	1222	1426	1630	2037	2546	3056	3565	4074	5092	6111	8148	10185	14259	18333
$\frac{1}{4}$	458	611	764	917	1070	1222	1528	1910	2292	2674	3056	3820	4584	6112	7640	10696	13752
$\frac{5}{16}$	367	489	611	733	856	978	1222	1528	1833	2139	2444	3055	3666	4888	6110	8554	10998
$\frac{3}{8}$	306	408	509	611	713	815	1019	1274	1527	1784	2036	2548	3057	4076	5095	7133	9170
$\frac{7}{16}$	262	349	437	524	611	699	874	1092	1311	1530	1748	2185	2622	3496	4370	6118	7866
$\frac{1}{2}$	229	306	382	459	535	611	764	955	1146	1337	1528	1910	2292	3056	3820	5348	6876
$\frac{3}{4}$	153	203	254	306	357	408	508	635	762	889	1016	1270	1524	2032	2540	3556	4572
1	115	153	191	229	267	306	382	477	573	668	764	955	1146	1528	1910	2675	3439
$1\frac{1}{4}$	92	123	153	183	214	245	306	382	459	536	612	764	918	1224	1530	2142	2754
$1\frac{1}{2}$	76	102	128	152	178	204	254	318	382	446	508	636	764	1016	1272	1778	2286
$1\frac{3}{4}$	65	87	109	133	153	175	218	272	328	382	436	544	656	872	1088	1527	1962
2	57	76	95	115	134	153	191	239	287	334	382	477	573	764	955	1337	1719
$2\frac{1}{4}$	51	68	84	100	119	136	170	212	256	297	340	424	510	680	848	1190	1530
$2\frac{1}{2}$	46	61	76	92	107	122	153	190	230	268	306	382	459	612	764	1070	1377
$2\frac{3}{4}$	42	56	70	83	97	112	139	174	208	244	278	348	416	556	696	972	1248
3	38	51	64	76	89	102	127	159	191	223	254	318	382	509	637	891	1146
$3\frac{1}{2}$	33	44	54	66	76	88	109	136	164	191	218	272	328	436	546	764	984
4	29	38	48	57	67	76	96	119	143	167	191	239	286	381	477	668	858
$4\frac{1}{2}$	25	34	42	51	59	68	85	106	128	148	172	212	254	340	424	594	762
5	23	31	38	46	53	61	76	95	115	134	153	191	229	306	382	535	687
$5\frac{1}{2}$	21	28	34	42	48	56	69	86	104	122	138	174	208	278	348	486	624
6	19	25	32	38	45	51	64	80	95	111	127	159	191	255	318	446	573
7	16	22	27	33	38	44	55	68	82	95	109	136	164	218	273	382	492
8	14	19	24	29	33	38	48	60	72	84	96	119	143	191	239	334	429
9	13	17	21	25	29	34	42	53	64	74	86	106	127	170	212	297	381
10	11	15	19	23	26	30	38	48	57	67	76	95	115	153	191	267	344
11	10	14	17	21	24	28	35	43	52	61	69	87	104	138	174	243	312
12	10	13	16	19	22	26	32	40	47	56	63	80	96	127	160	223	286
13	9	12	15	18	21	24	29	37	44	51	59	73	88	118	147	206	264
14	8	11	14	16	19	22	27	34	41	48	55	68	82	109	136	191	246
15	8	10	13	15	18	20	25	32	38	45	51	64	76	102	127	178	228
16	7	10	12	14	17	19	24	30	36	42	48	60	72	95	119	167	216
17	7	9	11	13	16	18	22	28	34	39	45	56	67	90	112	157	201
18	6	8	11	13	15	17	21	27	32	37	42	53	64	85	106	149	192
20	6	8	10	11	13	15	19	24	29	33	38	48	57	76	95	134	172
22	5	7	9	10	12	14	17	22	26	30	35	43	52	69	87	122	156
24	5	6	8	9	11	13	16	20	24	28	32	40	47	63	80	110	143
26	4	6	7	9	10	12	15	18	22	26	29	37	44	59	73	103	132
28	4	6	7	8	10	11	14	17	20	24	27	34	41	55	68	95	123
30	4	5	6	8	9	10	13	16	19	22	25	32	38	51	64	89	114
35	3	4	5	7	8	9	11	14	16	19	22	27	33	44	55	76	99
40	3	4	5	6	7	8	10	12	14	17	19	24	29	38	48	67	86

GRINDING MACHINES AND WHEELS

RECOMMENDED WHEEL SPEEDS IN SURFACE FEET

Per Minute

Cylindrical grinding	5,500- 6,500	Knife grinding	3,500- 4,500
Internal grinding	2,000- 6,000	Hemming cylinders	2,100- 5,000*
Snagging, offhand grinding (vitrified wheels)	5,000- 6,000	Wet tool grinding	5,000- 6,000
Snagging, (rubber and Bakelite wheels)	7,000- 9,500	Cutlery wheels	4,000- 5,000
Surface grinding	4,000- 5,000	Rubber, shellac and Bakelite cutting-off wheels	9,000-16,000

**This higher speed is recommended only where suitable bearings are employed.*

MAXIMUM PERIPHERAL SPEEDS

[EXTRACT FROM SAFETY CODE—1930]

These speeds shall not be exceeded except upon the distinct recommendation of the grinding wheel manufacturer for each specific case, and then only if the user maintains his equipment in a condition satisfactory to the wheel manufacturer.

TYPES OF WHEELS	Vitrified and Silicate Bonds			Organic Bonds		
	Soft	Med.	Hard	Soft	Med.	Hard
Type 1—Straight Wheels Type 4—Taper Wheels	F.P.M. 5,500	F.P.M. 6,000†	F.P.M. 6,500	F.P.M. 6,500	F.P.M. 8,000	F.P.M. 9,500
Types 5 and 7—Recessed Wheels	5,500	6,000†	6,500	6,500	8,000	9,500
Type 2—Cylinder Wheels	4,500	5,500	6,000	6,000	8,000	9,500
Dovetail Wheels Types 11 and 12—Dish and Flaring Cup Wheels Type 13—Saucer Wheels	4,500	5,500	6,000	6,000	8,000	9,500
Type 6—Deep Recessed Cup Wheels	4,500	5,000	5,500	6,000	7,500	9,000
Coping Wheels (Solid and Steel Centers)				6,000	7,500	9,000
Type 1—Cut-off Wheels (Ordinary)					10,000	12,000
Type 1—Cut-off Wheels (Special) (Depending on <i>Stability and Design</i> of Machine)						12,000 to 16,000

Maximum speeds indicated are based on the strength of the wheels and not on their cutting efficiency. Best speeds may sometimes be considerably lower.

†On Precision machines, vitrified and silicate wheels in medium grades may be operated at 6,500 peripheral feet per minute.

HIGH LIGHTS

One Radial Drill, 4 men—three setting up, one operating:—Result four times the work from a single investment. A new bed plate may be all you need.

A toolroom lathe is no longer a complicated machine for making mineral wool. Good lathes are both accurate and productive.

The new 4 and 8 spindle automatic screw machines with anti-friction bearings can be run from 20% to 30% faster with the same cutting tools and give the same tool life.

Individual drill heads with power feed make excellent chucking machines on some jobs. Have you considered Kingsbury?

Automatic Hydraulic Turret lathes can be set up almost as quickly as the old hand operated type and one man runs two or more, and they have been used for light broaching as well.

Hydraulic grinders are not only fast but they save themselves by cushioning all reciprocating motions and give infinite range of control.