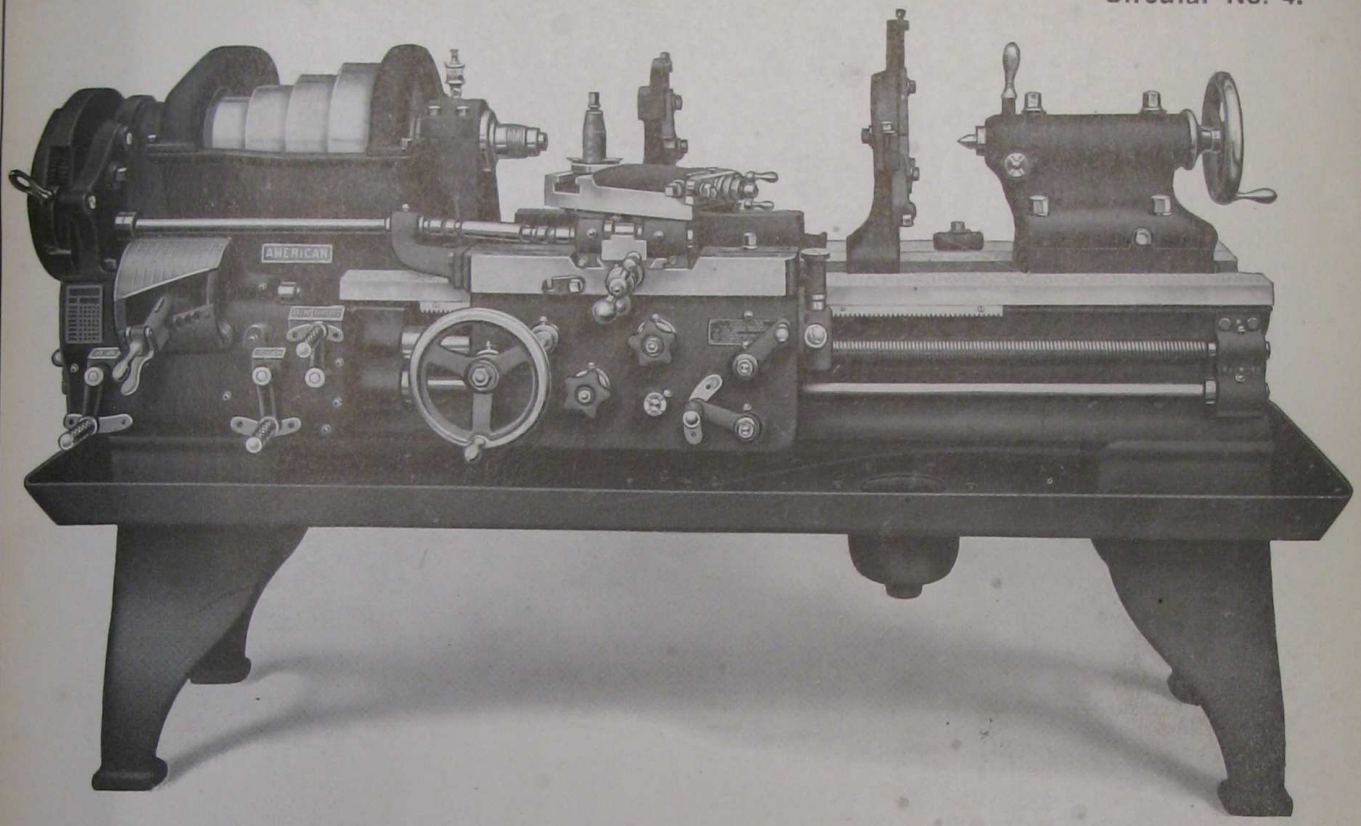
621,94



AMERICAN

High Duty Tool Room Lathe

"American" High Duty Tool Room Lathes are built in five (5) sizes, 14 inch, 16 inch, 18 inch, 20 inch and 24 inch. The basis of these lathes is the regular "American" High Duty Lathe with Patented Drop Vee Bed, Double Plate Apron, Patented Quick-Change Mechanism affording 48 thread and feed changes, Phosphor Bronze Bearings, etc., as described in the circulars covering the standard machines.

The term "Tool Room Lathe" is generally understood to mean a lathe fully equipped with the various attachments, such as the Taper, Draw-in and Relieving Attachments that are required to handle all classes of Tool Room Work. This type of lathe is also usually furnished with a pan for retaining the lubricant which must be used when working on hard steels.

It is not always necessary, however, for a tool room lathe to have all of these attachments, and we are therefore prepared to furnish any one of them separately.

In the following we shall not try to give a description of the entire lathe as that is taken care of by our regular circulars, but shall devote this space to a comprehensive description of the various attachments which are essential to a tool room lathe.

4M-B-4-20

Taper Attachment

The "American" Taper Attachment, shown by the accompanying illustration, 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 a rigid mechanism and accuracy of tapers produced therefrom.

Bolted to and traveling with the carriage, the taper attachment can be instantly thrown into operation at any point along the lathe bed, by simply tightening one binder nut (J) on clamping dog, or can be as easily disengaged by releasing this nut.

When attached for taper work, the sliding shoe is directly connected with bottom slide of the 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.

The Cross Feed Nut is always connected with the tool rest, therefore, it can not fall to one side and out of position.

Nut for engaging the Sliding Shoe is arranged to slide in a slot in the yoke connected with tool rest, and is attached to or released from the 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.

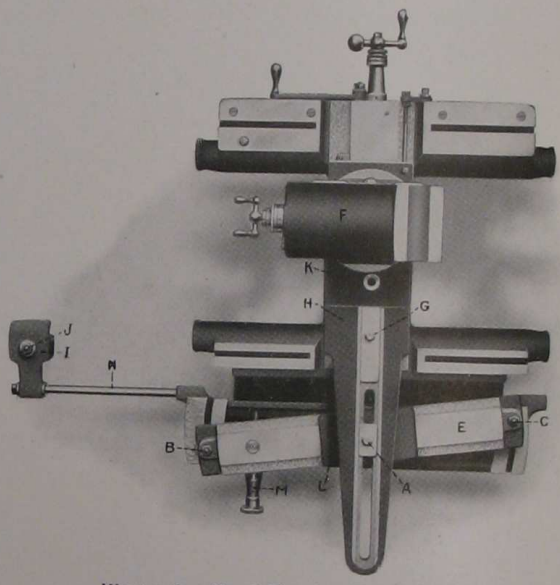


Illustration No. 2 Showing Taper Attachment.

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.

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 a taper attachment, with a small amount of fitting. Complete information relative to such fitting is furnished by us.

Relieving Attachment

Built in Two Types—PLAIN and UNIVERSAL

For Application to 14″, 16″, 18″, 20″, 24″ and 27″ "American" High Duty Lathes

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 plain relieving 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 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.

Let it be understood here that the Universal Attachment is not designed for manufacturing purposes, but is intended for the tool room, which is called upon at various times to produce special jobs of relieving work.

On the other hand, the Plain Attachment, owing to its less complicated design and sturdier construction, is considerably more of a manufacturing equipment. It is, therefore, a wise plan in some instances where there is a great deal of plain or straight relieving to be done, and only an occasional job of end or internal work, to equip the tool room with both types of attachments, inasmuch as they are interchangeable. In this way the plain work which is to be done in quantities can be accomplished by an attachment built especially for that particular work, while the occasional special job can be done on the Universal Attachment.

It is not difficult from the preceding statements to realize the importance of thoroughly considering the work before selecting the attachment. When only plain work is to be done it is absolute folly to buy the Universal Attachment, when a Plain Attachment can be had which is designed especially and solely for that particular purpose, on the other hand, it must be remembered also that the Plain Attachment will not accommodate anything but plain work, consequently no internal or end work can be handled by it.

Universal Relieving Attachment

For Application to 14″, 16″, 18″, 20″, 24″ and 27″ "American" High Duty Lathes

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. Heretofore, all of the relieving attachments on the market have been limited in their capacity for handling different classes of relieving work and to the different types of lathes to which they could be applied, therefore were not universal in their action.

In order to successfully overcome these limitations the New "American" Universal Relieving Attachment has been designed along original lines with the result that this attachment is completely universal in its operation as will be evident from the fact that end and internal relieving can be just as easily performed as straight relieving work, such as relieving cutters, taps, hobs, etc.

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" High Duty Lathe. In other words the application of this relieving attachment is not limited to one type of lathe as are practically all other similar attachments, but can be as easily applied to and operated in connection with a geared head 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.

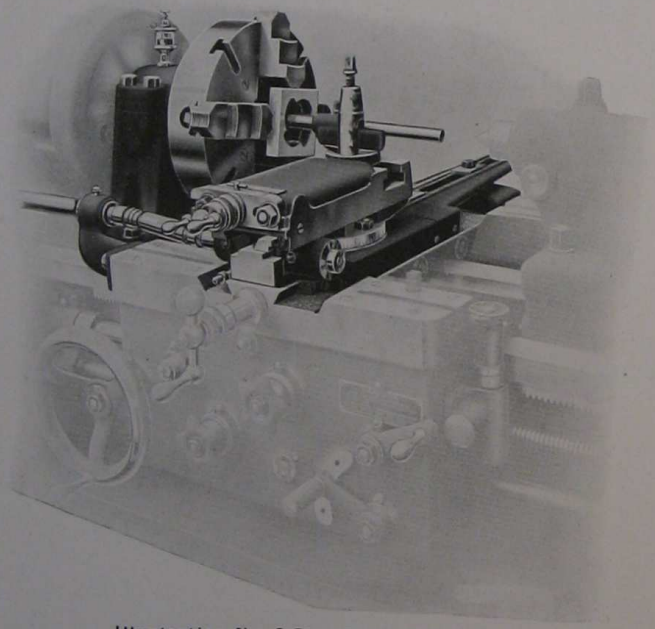


Illustration No. 3 Showing Internal Relief.

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 cams. 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 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 cam 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 rises respectively, 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. On practically all other attachments that can accommodate this class of work, certain changes in, and additions to the regular equipment are necessary to make them operative on internal and end relief work. On the "American" Relieving Attachment, however, aside from the simple adjusting of the tool slide to its proper position, there is absolutely no change or readjustment of the mechanism required.

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.

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.

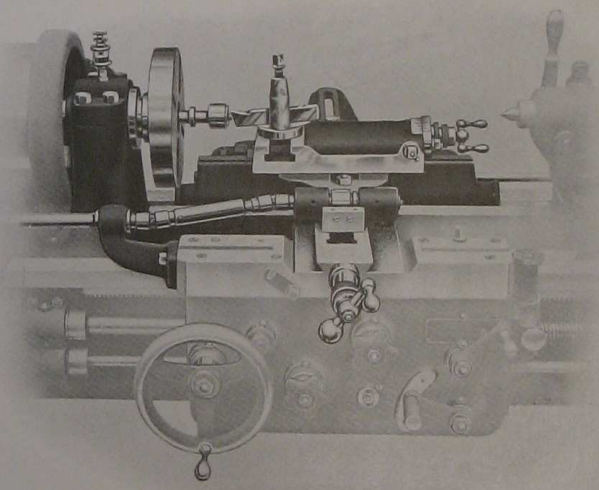


Illustration No. 4 Showing End Relief.

When necessary to relieve taps or hobs having spiral flutes, the "American" 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 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. The compactness of the elements and their proper relation to each other overcome any tendency to chatter or backlash. All gears are securely covered.

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

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 nor 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 intermediate nut block controlled by a cam on the driving shaft. Back lash between the cam and tool has been absolutely eliminated, insuring an accurate reproduction of the cam contour, resulting in the producing of 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.

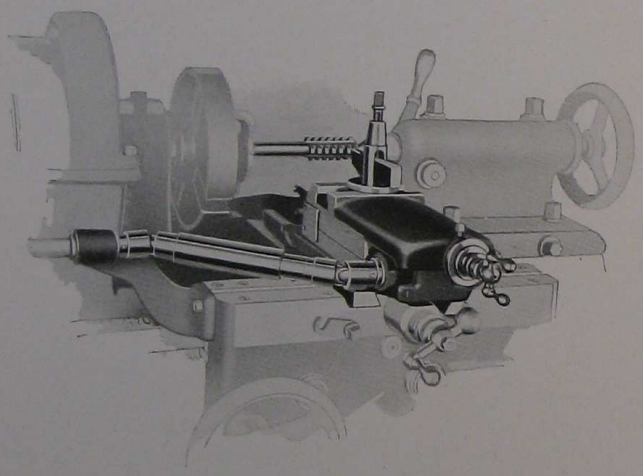


Illustration No. 5 Showing Plain Relieving Attachment.

Passing through the tension strap are two buffer rods which are attached to the nut block, their outing ends being supplied with large bushings which bear against raw-hide 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 $\frac{3}{8}''$ drop, 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 the cam hubs are provided with single tooth clutches which permit the driving shaft to be reversed in direction when returning the carriage for a 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 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 on the Plain Attachment is as follows:

14″ and 16″ Lathes.....0″ to $\frac{9}{16}$″max. cam lobe drop
18″, 20″ and 24″ M. P. Lathes.....0″ to $\frac{5}{8}$″ " " " "
24″ H. P. and 27″ Lathes.....0″ to $\frac{3}{4}$″ " " " "

Only $\frac{3}{8}$″ standard drop is regularly supplied on original cams. Other cams can be supplied by us with drops to suit requirements within the above range.

Draw-in Attachment

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

Illustration No. 6 Showing Drawn-in Bar and Collets.

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 of an inch up to $\frac{7}{8}$ inch diameter on the 14 inch and 16 inch sizes and up to 1 inch diameter on the 18 inch and 20 inch lathes.

OIL PAN.

There is very little to be said in connection with the oil pan, aside from the fact that it is made from sheet iron, its purpose being to catch the waste lubricant and thus prevent it from running onto the floor and being wasted.

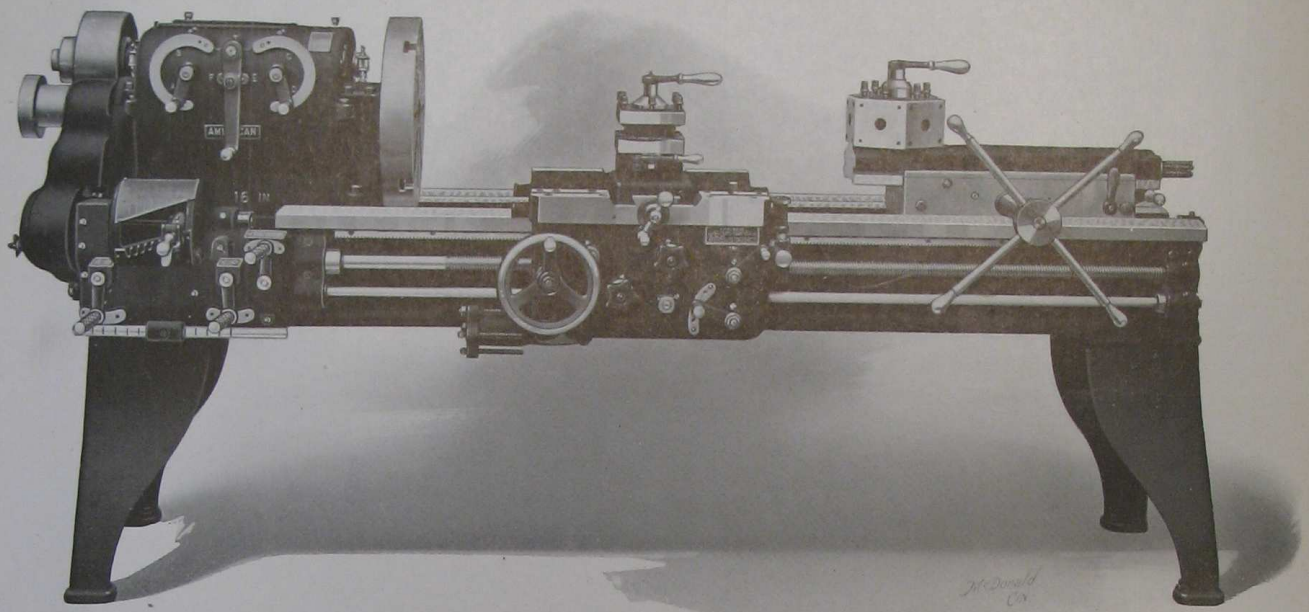
Quality—

The "American" Tool Room Lathe is of very recent design, and embodies a number of original features which are described in our High Duty Lathe Circular. We guarantee the workmanship on these machines to be the very best that intelligent effort, combined with long experience, skilled workmen and a complete jig and tool system can produce, and likewise positively guarantee every piece of metal that enters into the construction of our tools.

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

621.94

Circular No. 100.



AMERICAN

High Duty Lathes in all sizes can be equipped with Turret on Shears, Power Feed, Turret Tool Post, Turret on Carriage and special rests and Tool Holders described in the following:—

PRINCIPAL DIMENSIONS OF TURRET ON SHEARS

	14″	16″	18″	20″	24″M	24″H	27″	30″	36″M	36″H	42″
Length of Bottom Slide	18½	22	25¼	28¾	28¾	32	32	36	36	40	40
Range of 5 feeds	.004 to .080	.004 to .080	.004 to .080	.006 to .100	.006 to .100	.006 to .100	.006 to .100	.008 to .133	.008 to .133	.008 to .133	.008 to .133
Top slide movement with automatic indexing	12 5/16	16 7/8	18 5/16	21½	21½	24	24	26½	24½	29	29
Top slide movement without automatic trip	15 7/8	19 13/16	22 3/32	25 5/8	25 5/8	28 5/8	28 5/8	31 5/8	31 5/8	34 5/8	34 5/8
Diameter of turret holes	1¼	1¼	1½	1¾	1¾	2	2	2½	2½	3	3

Before ordering a lathe we strongly recommend that the purchaser carefully consider the nature of his work and order with the lathe the type of tool holder and rest best suited to his particular requirements. A great many buyers make the mistake of ordering the regular rest and tool holder that comes with the lathe as standard equipment, which, altho' highly efficient for the majority of work, is not always best suited to their purposes. A few extra dollars put into securing the proper equipment on a lathe at the start, often saves the purchaser many times its cost in the end.

THE AMERICAN TOOL WORKS CO.

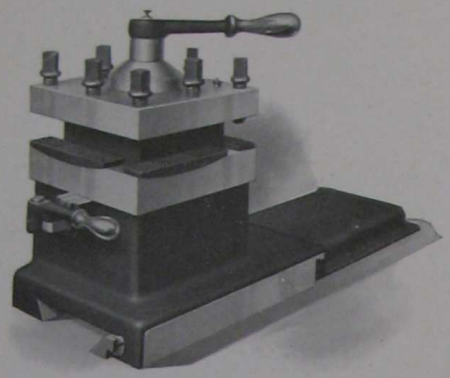
LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

4M-B-4-20

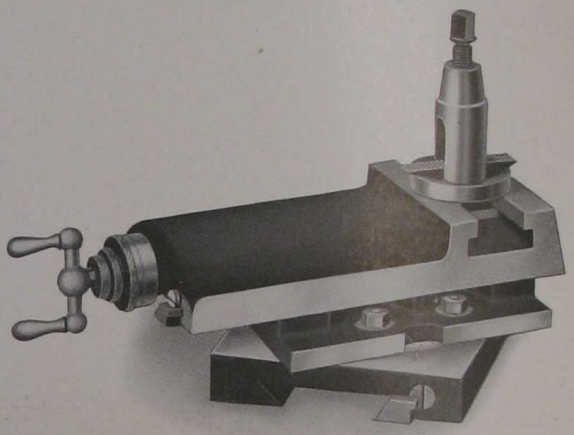
Turret Tool Post



Turret Tool Post. (Fig. 475.)

The four sided Turret Tool Post is mounted on the carriage cross bridge and is interchangeable with the compound rest. Provision is made for holding four tools simultaneously so that by revolving the turret head, suitable tools can be brought into position for performing the successive operations. Consequently the cutting tool does not have to be changed after each operation. The tools are held in position by three hardened set screws for each tool. Heat treated rockers are provided for positioning the tools. The turret head has eight operating positions so that the tools can be set at an angle to the work.

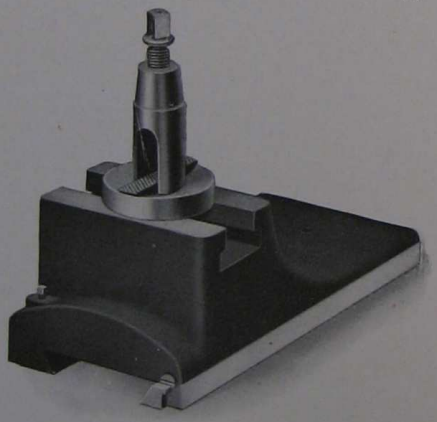
Compound Rest



Compound Rest. (Fig. 500.)

This rest (Fig. No. 500), is regularly supplied on all sizes of "American" Lathes as part of the standard equipment. The top slide can be rotated in a complete circle and swivel is graduated 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 screw is made of hardened tool steel. 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.



Plain Block Rest. (Fig. 504.)

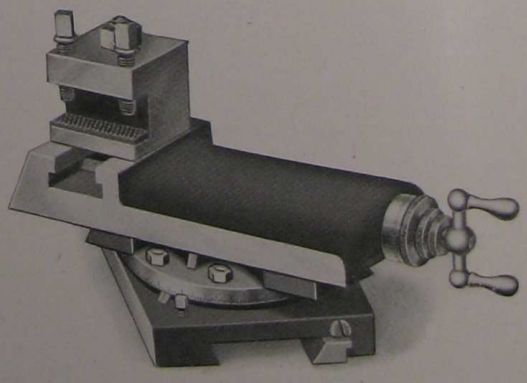
Plain Block Rest

This rest (Fig. No. 504) can be supplied on any size of "American" Lathe in place of the Compound Rest. It is exceedingly rigid and particularly adapted to heavy roughing work and where no angular turning is necessary. It is fitted with full length taper gib, having end-screw adjustment.

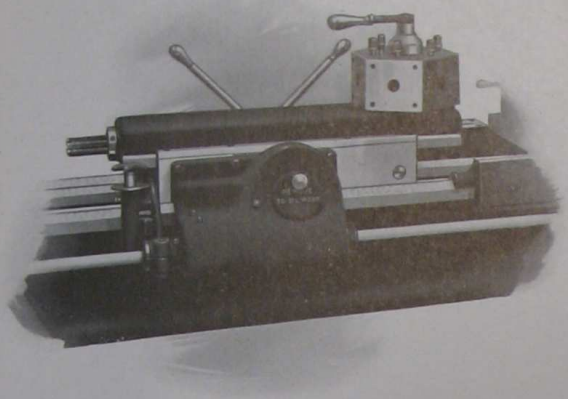
Either the single screw or double screw High Duty tool holder can be used with it.

High Duty, Double Screw Tool Holder

This holder (Fig. No. 501) is made from a steel forging and can be used in connection with any type of rest. It is very rigid and is designed especially for heavy work. Two large tool steel screws are provided for holding the cutting tool which in turn rests on a hardened serated steel rocker, thus providing means for positioning the tool in relation to the work.



High Duty, Double Screw Tool Holder (Fig. 501.)



Turret on Shears with Power Feed. (Fig. 400.)

In addition, or in substitution for the regular compound rest with single screw tool post (four stud tool holder instead of single screw tool post on 36″ Heavy Pattern and 42″ lathes), furnished on "American" Lathes, we are prepared to supply on special order, at additional cost, a great variety of rests and tool holders suitable to practically all requirements.

Turret on Shears

The turret on shears is a standard attachment applied to the lathe bed and is interchangeable with the tailstock. It is furnished for the purpose of handling such work as would otherwise have to be done on a regular turret lathe. We do not recommend this attachment for all turret lathe work, but a great deal of work now done on turret lathes can be more economically handled on a Standard "American" Lathe with turret equipment, especially where there is not sufficient work to keep a turret lathe constantly busy.

The great advantage offered by the Standard Engine Lathe with turret equipment lies in the fact that it can be used both as an Engine Lathe and Turret Lathe. The change from one to the other can be quickly made by simply slipping the turret off of the bed and substituting the tailstock, or vice versa.

The new "American" Turret on Shears is the very latest in design on the market. It is exceptionally heavy and rigid and is guaranteed to bore within .001 part of an inch in 12 inches.

The revolving turret head is hexagon in shape, provision being made for holding simultaneously six different tools, either boring or box tools. Six stops are provided, one for each turret face, so that each tool has an individual depth stop. The top slide of the turret is advanced by a pilot wheel, which on the larger sizes (all above 18 inches) is also used for moving the turret along the bed. On larger sizes (18 inches and up) the pilot wheel is dropped below the top slide, which permits long boring bars and fixtures to be quickly located without interfering with the pilot handles.

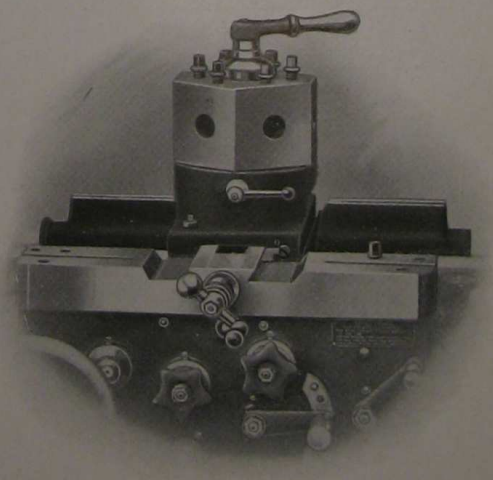
In addition to the hand feed for the turret slide, Power Feed can be supplied when so ordered. The Power Feed (shown by Fig. 400) provides five rates of feed in geometrical progression, obtained by simply turning the star knob shown on the illustration, until the feed indicated on the feed dial comes opposite a fixed pointer. These feeds can be changed while the turret is in operation and can also be instantly thrown in or out by a long lever extending to the front or operating side which controls the starting and stopping of the feed. Adjustable stops are provided so the power feed can be automatically tripped at any predetermined depth.

One of the chief advantages offered by the new "American" Power Feed Attachment is that the five rates of feed provided are absolutely independent of the carriage feed, so that the carriage can be used on one operation at a suitable feed and speed while the turret is working on another at the same time with the feed suitable for that job.

Turrets on shears are usually carried in stock for all size lathes, and although we prefer to apply them here, the purchaser can, by our leaving the turret holes rough bored, apply the turret later. In this event the purchaser must place the turret in position on the lathe and with the finishing tools we loan him, finish bore the holes in the turret faces to make sure they are in absolute alignment with the headstock spindle.

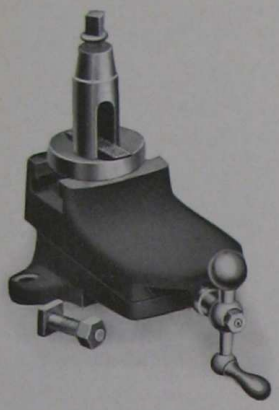
Turret on Carriage

The turret on carriage shown by Fig. No. 450 is hexagon in shape, providing means for holding simultaneously six tools, making unnecessary the changing of tools for each successive operation. It is mounted on the carriage cross bridge, has six operating positions and is interchangeable with the compound rest.



Turret on Carriage. (Fig. 450.)

Full Swing Rest

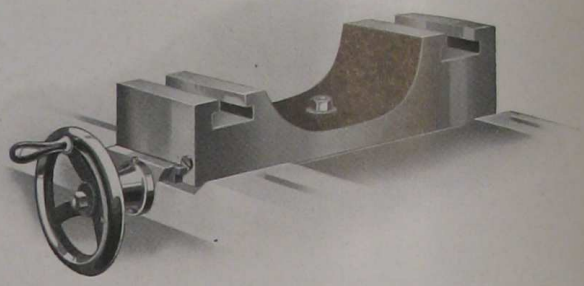


Full Swing Rest (Fig. 502.)

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

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

This rest can be furnished on all sizes of "American" Lathes. From the 14" to the 36" medium pattern sizes, a regular single screw tool post is provided. On the larger sizes, however, the top slide is equipped with a four stud tool holder.

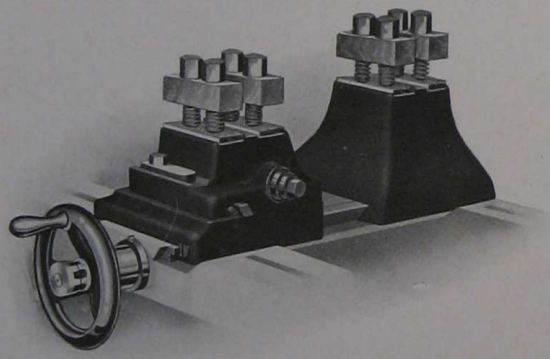


Double Tool Rest on One Slide. (Fig. 509.)

Double Tool Rest on One Slide

This rest (Fig. No. 509) is made from one solid casting and is exceptionally rigid. It is mounted on the cross bridge, is interchangeable with the compound rest and is actuated by the cross feed screw.

Provision is made for the application of any kind of tool holder at both front and rear, the kind depending upon the nature of the work to be machined. With this rest one operation can be accomplished with the front rest and the next one completed with the rear rest, thus saving a great deal of time in tool changing, etc.



Double Tool Rests on Independent Slides with Four Stud Tool Holders. (Fig. 510.)

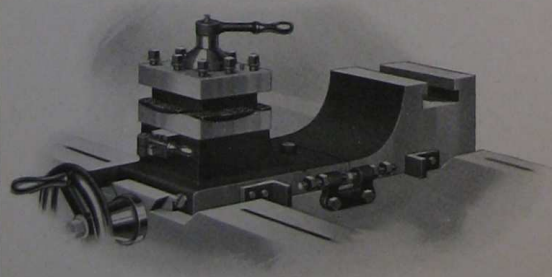
Front and Rear Rests on Independent Slides

This combination (Fig. No. 510), consisting of a front rest adjustable longitudinally or parallel to the Vees and a fixed rear block rest, is very productive and efficient for certain classes of work. These rests are universal in their movements, that is, either rest may be moved in either direction independently of the other, or they may be moved to and from the work simultaneously. A clutch incorporated in the large hand wheel on the cross feed screw regulates the movement of the rests. With this rest, therefore, a front and rear tool may be used on the work at the same time.

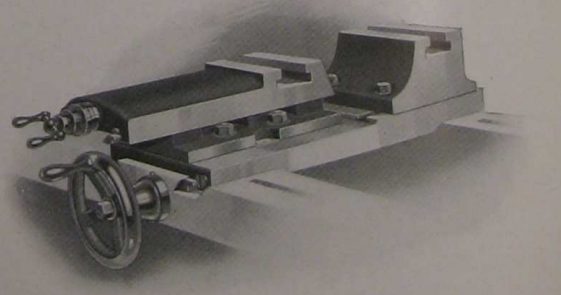
The rests will accommodate any kind of tool holder, those most commonly used being the four stud tool holder shown by the illustration and the Double Screw High Duty Tool Holder shown by Figure No. 501.

Combined Compound and Plain Block Rest

This illustration (Fig. No. 511) shows a combination of front and rear rests that is frequently used. The front rest is the regular compound type (Fig. No. 500) and the rear rest a plain block type mounted on a connection to the compound rest bottom slide, with provision made for adjustment to and from the center. Any type of tool holder may be used with these rests.



Combined Turret Tool Post and Plain Block Rest. (Fig.512.) Showing Single Diameter Stops for Both Rests.

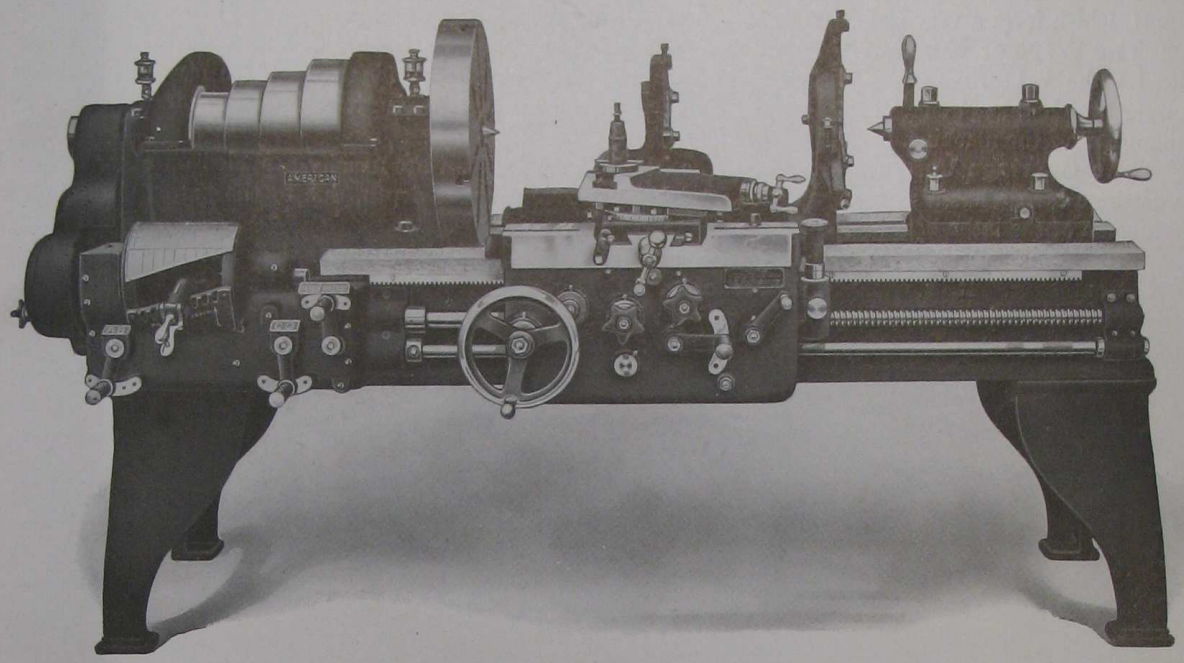


Combined Compound and Plain Block Rests. (Fig. 511.)

62194

14 in. Lathe, Fig. No. 5.
16 in. Lathe, Fig. No. 9.

Circular No. 11.



AMERICAN

14 inch and 16 inch High Duty Lathes

Built in any Length of Bed, from 6 ft. up, advancing by 2 ft. lengths.

	14 in.	16 in.
Swings over Bed	16½ in.	18½ in.
Swings over Compound Rest Slide	11½ in.	12¼ in.
Standard Length of Bed	6 ft.	6 ft.
6-ft. Bed takes between Centers, tailstock flush, Geared Head	37½ in	31 in.
6-ft. Bed takes between Centers, tailstock flush, Cone Head	37½ in.	31 in.
Hole through Spindle to clear bar	1¼ in.	1¼ in.
Size of Tool ordinarily used	½ x 1 in.	⅝ x 1¼ in
Taper of Centers, Morse	3	4
Width of Driving Belt—Geared Head	3 in.	4 in.
Dia. of Driving Pulley— "	10 in.	10 in.
Speed of Driving Pulley, r. p. m. "	390	360
Width of Driving Belt—Cone Head	2½ in.	3 in.
Code Word	LADLE	LAIRD

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

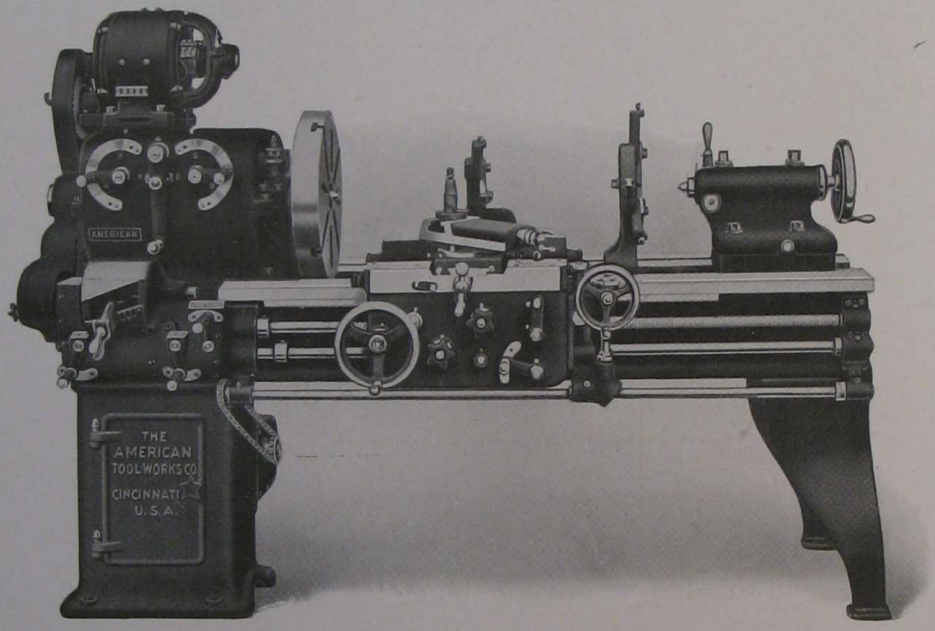
4M-B-4-20

Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart, which form a very rigid construction for resisting the various stresses.

The Ways of the Bed Castings are condensed in the sand, thus producing a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be largely confined to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider, and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened, and is of unusually great depth, due to the patented drop Vee construction of the lathe bed.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of two bolts. Full length taper gibs, having end screw adjustment, are provided on both the cross and compound rest slides, these gibs being placed on the right hand side where they will not receive the thrust of the tool under ordinary working conditions.



Motor Drive thru Patented 8-Speed Geared Head

The Tailstock is of our improved four bolt design on the 16 inch lathe, the rear bolts being carried to the top for convenience in clamping; on the 14 inch lathe two clamping bolts are furnished. 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 affecting its alignment.

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock, and all other shafts, including the lead-screw, are made of a .45% 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.

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 is made in a double wall or box section, giving all important studs and shafts an outboard bearing. The rack pinion is **heat treated**, and provided with teeth of the **stub tooth** type to match feed rack.

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 .45% carbon ground lead screw stock, and is 1¼″ diameter on 14 inch, and 1⅜″ on 16 inch lathe. The maximum variation allowed in chasing these screws is .001″ per lineal foot, and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made with a Brown & Sharpe master screw.

The ¼″ Pitch Lead Screw permits engaging the half nuts at the proper point when chasing all threads, including those having a fractional pitch. This is not only a great saving feature, but is also a safeguard against errors when chasing unit threads.

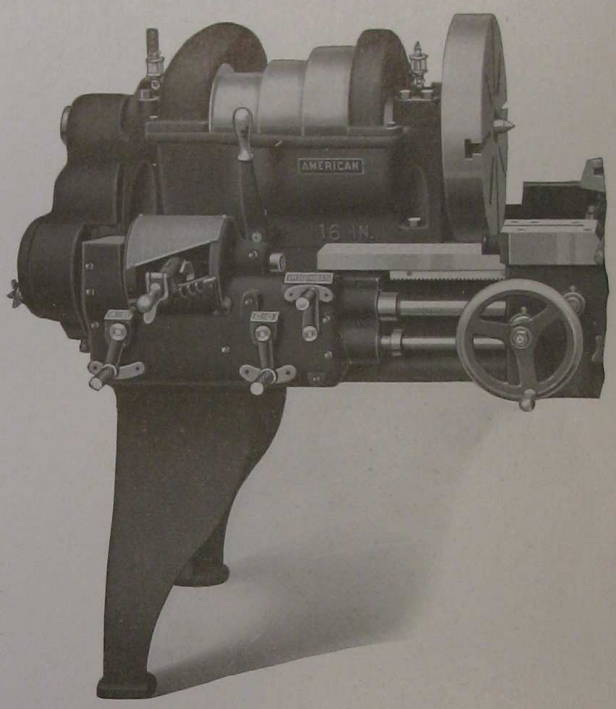
The coarse pitch lead screw and the comparatively low apron ratio required obviate the necessity of speeding up through the quick change gear mechanism for the coarser pitches and feeds. As a matter of fact, no member of the quick change mechanism does at any time run faster than the initial driving 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.

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 the 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and 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 cannot 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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: 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, 64, 72, 80, 88, 92, 96, 104, 112. For additional threads see Auxiliary Quadrant.



Quick Change, Double Back Geared Friction Head.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed, and carries the gears connecting the head with the quick change mechanism. This arrangement permits 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—If properly set up and levelled, "American" Lathes are guaranteed to bore and turn true to within .001 in. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purpose used. We will further guarantee to repair any breakages or damages to the machine due to defective material or faulty workmanship.

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. 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.

Quick Change Double Back Geared Head Lathe—The new "American" Quick Change Double Back Geared Head was designed with the idea of producing a double back geared head lathe with an instantaneous speed change from second back gear to first back gear speeds. This result has been accomplished by incorporating a frictional connection between the back shaft and double back gears, by means of which the head is under control, speeds can be changed instantly, and the head started and stopped. Nine spindle speeds are provided, both forward and reverse, or 18 forward speeds, provided the reverse speeds are not required.

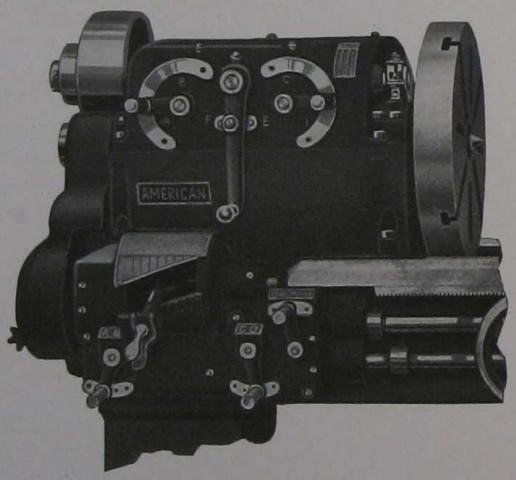
The controlling lever extends to the front of the head where it is always within reach, and operates two very large and powerful friction clutches which **are self adjusting for wear.**

The great advantage offered by this type of head should certainly be appreciated, for it permits the operator to instantly change from a slow to a fast speed, or vice versa, without stopping his lathe to shift gears or belts.

It will also be noted that the walls of the headstock are built up even with the center line of the cone pulley, and consequently provide an unusually rigid connection between the front and rear spindle bearings.

This Quick Change, Double Back Geared Head is a new development on the "American" High Duty Lathe, and represents another step forward in accord with the progressive policy adopted by The American Tool Works Company.

Patented Geared Head provides eight spindle speeds, is very powerfully designed, being particularly adapted to a heavy 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 had from the fact that the greatest speed reduction is at the unusually high ratio of 32.2 to 1 on 14 inch, and 34 to 1 on 16 inch lathe. When arranged for motor drive a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three helical gears. Eight fundamental spindle speeds are obtainable from 12 to 390 R. P. M. on 14 inch, and 10 to 360 R. P. M. on 16 inch lathe. When apron control is furnished the motor can be started and stopped by means of a controller hand wheel conveniently located at the right hand end of carriage, where a dial indicates how the motor is set.



Patented 8-Speed Geared Head, Belt Driven

The Motor Speed can be comparatively high, 700 to 1000 R. P. M., thereby cutting down the size and first cost of same. A pair of sensitive but powerful friction clutches are provided on the driving shaft for starting and stopping, or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customer specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may 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 should be used, whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of motor should be from 1 to 3 horse power on 14 inch, and from 2 to 4 horse power on 16 inch lathe.

Double Friction Countershaft is regularly supplied with all belt driven lathes.

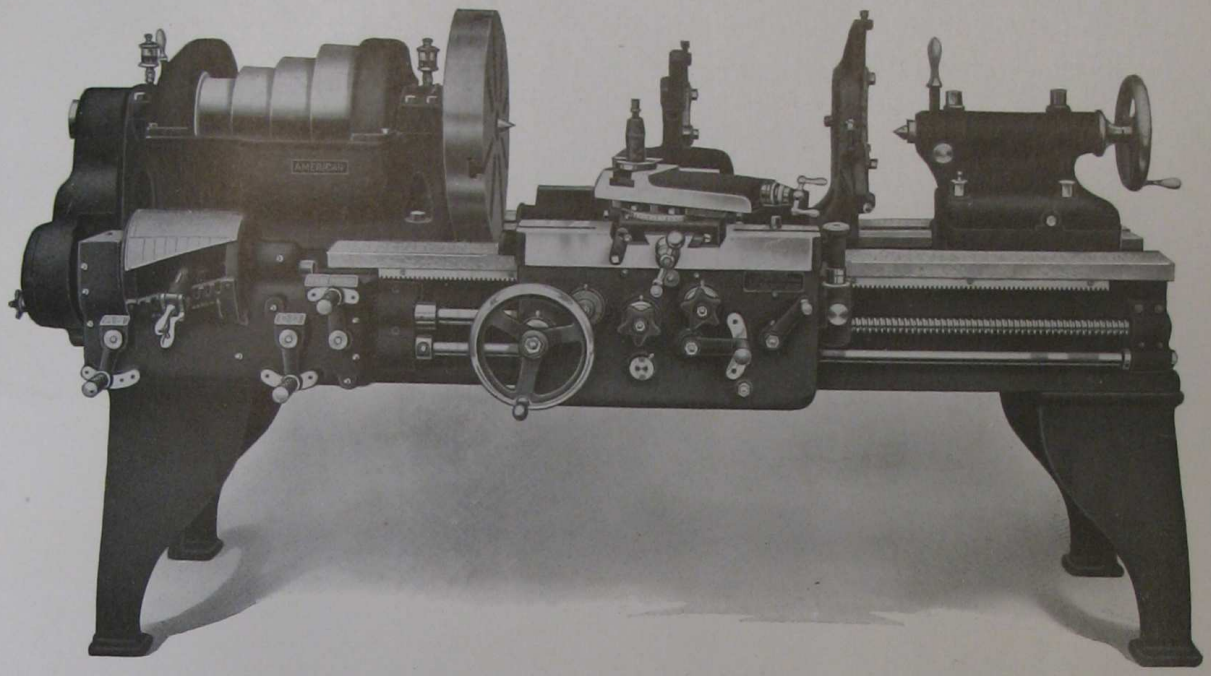
Countershaft Pulleys for 14 inch **cone driven head** are 10 in. diameter for 3 in. belt, with speeds forward 200, reverse 247 R. P. M., and for 16 inch size are 12 in. diameter for 4 in. belt, with speeds forward 187, reverse 232 R. P. M.

Regular Equipment, upon which base price is determined, includes compound and steady rests, also thread dial, countershaft for belt drives, large and small face plates and wrenches. An instruction book is regularly supplied, giving directions for the installation and operation of our machines.

At Extra Cost, we can equip this Lathe with improved **taper, draw-in and relieving attachments, turret on carriage, turret on shears, turret tool post, double back geared head, "patented" geared head** for belt or motor drive, **follow rest, extra gears** and **index plates** for special fine, coarse or metric threads.

621.94

18 in. Lathe, Fig. No. 13. CIRCULAR No. 15.



AMERICAN

18 inch High Duty Lathes.

Built in any Length of Bed, from 6 feet up, advancing by 2 ft. length.

Swings over Bed	20½ in.
Swings over Compound Rest Slide	13¼ in.
Standard Length of Bed	6 ft.
6-ft. Bed takes between Centers, tailstock flush, Geared Head	27 in.
6-ft. Bed takes between Centers, tailstock flush, Cone Head	27 in.
Hole through Spindle to clear bar	1½ in.
Size of Tool ordinarily used	¾ x 1½ in.
Tapers of Centers, Morse	4
Width of Driving Belt—Geared Head	5 in.
Dia. of Driving Pulley— "	12 in.
Speed of Driving Pulley, r. p. m."	330
Width of Driving Belt—Cone Head	3½ in.
Code Word	LAPEL

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

4M-B-5-20

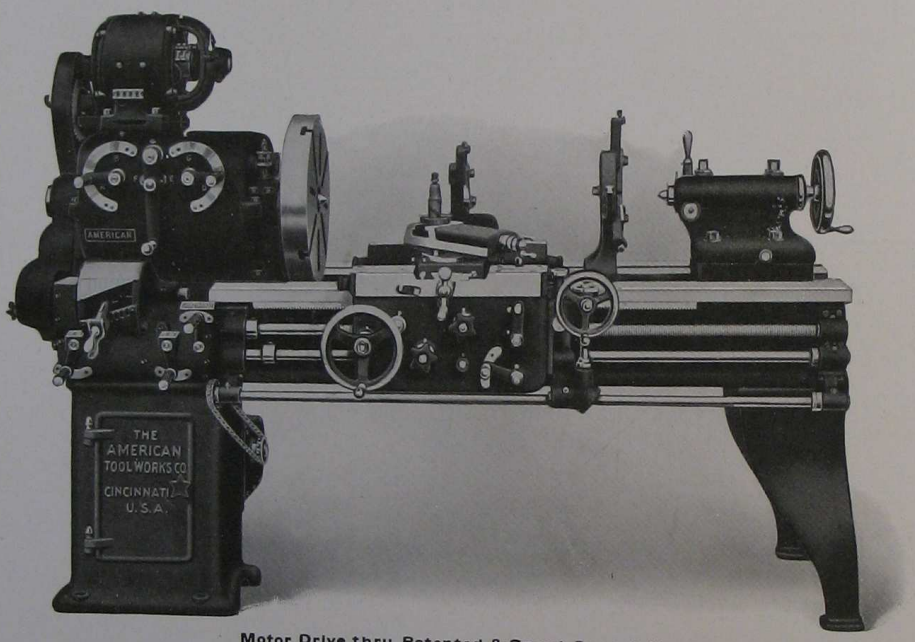
Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart, which form a very rigid construction for resisting the various stresses.

The Ways of the Bed Castings are carefully chilled, which produces a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be largely confined to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened, and is of unusually great depth, due to the patented drop Vee construction of the lathe bed.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of four bolts. Full length taper gibs, having end screw adjustment are provided on both the cross and compound rest slides, these gibs being 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, the rear bolts being 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 affecting its alignment.



Motor Drive thru Patented 8-Speed Geared Head

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock, and all other shafts, including the lead-screw, are made of a .45% carbon special ground stock.

The Spindle Bearings are of high grade phosphor bronze and are equipped with sight feed oil cups. 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.

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 is made in a double wall or box section, giving all important studs and shafts an outboard bearing.

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 .45% carbon ground lead screw stock, and is 1⅝″ diameter. The maximum variation allowed in chasing these screws is .001″ per lineal foot, and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made from a Brown & Sharpe master screw.

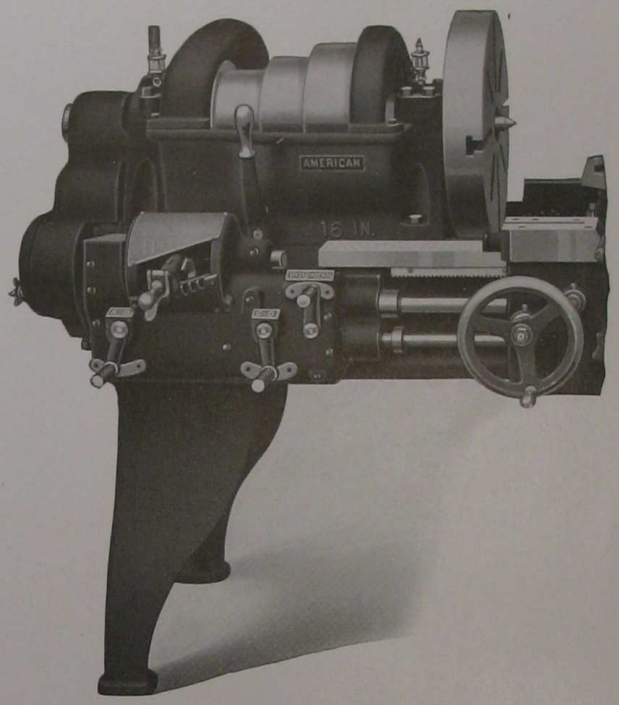
The ½″ Pitch Lead Screw permits engaging the half nuts at the proper point when chasing all threads, including those having a fractional pitch. This is not only a great saving feature, but is also a safeguard against errors when chasing unit threads.

The coarse pitch lead screw and the comparatively low apron ratio required, obviate 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.

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 the 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and 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 cannot be engaged before they are in their proper position for meshing.



Quick Change, Double Back Geared Friction Head.

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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: 1, 1⅛, 1¼, 1⅜, 1$\frac{7}{16}$, 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. For additional threads see Auxiliary Quadrant.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed and carries the gears connecting the head with the quick change mechanism. This arrangement permits 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—If properly set up and levelled "American" Lathes are guaranteed to bore and turn true to within .001 in. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purpose used. We will further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

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. 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.

Quick Change Double Back Geared Head Lathe—The new "American" Quick Change Double Back Geared Head was designed with the idea of producing a double back geared head lathe with an instantaneous speed change from second back gear to first back gear speeds. This result has been accomplished by incorporating a frictional connection between the back shaft and double back gears by means of which the head is under control, speeds can be changed instantly, and the head started and stopped. Nine spindle speeds are provided, both forward and reverse, or 18 forward speeds, provided the reverse speeds are not required.

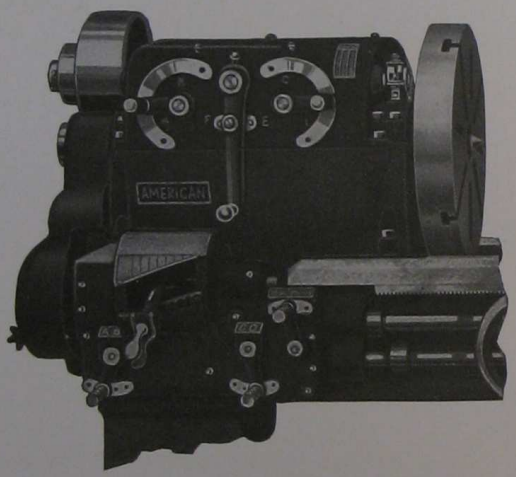
The controlling lever extends to the front of the head where it is always within reach and operates two very large and powerful friction clutches which **are self adjusting for wear.**

The great advantage offered by this type of head should certainly be appreciated, for it permits the operator to instantly change from a slow to a fast speed or vice versa without stopping his lathe to shift gears or belts.

It will also be noted that the walls of the headstock are built up even with the center line of the cone pulley, and consequently provide an unusually rigid connection between the front and rear spindle bearings.

This Quick Change, Double Back Geared Head is a new development on the "American" High Duty Lathe, and represents another step forward in accord with the progressive policy adopted by The American Tool Works Company.

Patented Geared Head provides eight spindle speeds; is very powerfully designed, being particularly adapted to a heavy 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 had from the fact that the greatest speed reduction is at the unusually high ratio of 35 to 1. When arranged for motor drive a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three spur gears. Eight fundamental spindle speeds are obtainable from 9.5 to 330 R. P. M. When apron control is furnished the motor can be started and stopped by means of a controller hand wheel conveniently located at the right hand end of carriage, where a dial indicates how the motor is set.



Patented 8-Speed Geared Head, Belt Driven

The Motor Speed can be comparatively high, 700 to 1000 R. P. M., thereby cutting down the size and first cost of same. A pair of sensitive but powerful friction clutches are provided on the driving shaft for starting and stopping or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customers specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may 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 should be used, whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of motor should be from 3 to 5 horse power.

Double Friction Countershaft is regularly supplied with all belt driven lathes.

Countershaft Pulleys for Single Back Geared Head are 12 in. diameter for 4 in. belt, with speeds forward 168, reverse 211 R. P. M. The pulleys for Quick Change Double Back Geared Head are 12 in. diameter for 4 in. belt, with speeds forward 232, reverse 286 R. P. M.

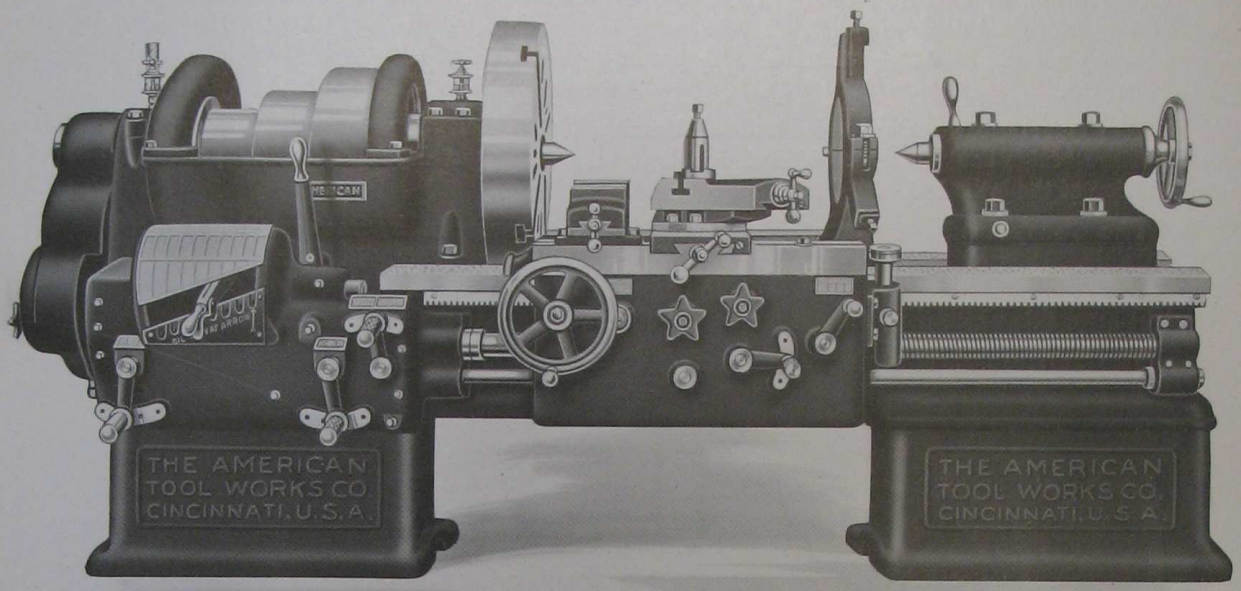
Regular Equipment upon which base price is determined includes compound and steady rests; also thread dial, countershaft for belt drives, large and small face plates and wrenches. An instruction book is regularly supplied giving directions for the installation and operation of our machines.

At Extra Cost, we can equip this Lathe with improved **taper, draw-in and relieving attachments, turret** on **carriage, turret** on **shears, turret tool post, double back geared head, "patented" geared head** for belt or motor drive, **follow rest, extra gears** and **index plates** for special fine, coarse or metric threads.

621,94

20 in. Lathe, Fig. No. 26.
24 in. Lathe, Fig. No. 28.

Circular No. 29.



AMERICAN

20 inch and 24 inch Medium Pattern High Duty Lathes

Built in any Length of Bed, from 8 ft. up, advancing by 2 ft. lengths.

	20 in.	24 in.
Swings over Bed	22½ in.	24½ in.
Swings over Compound Rest Slide	14½ in.	17½ in.
Standard Length of Bed	8 ft.	8 ft.
8-ft. Bed takes between Centers, tailstock flush, Geared Head	3 ft. 10 in.	3 ft. 10 in.
8-ft. Bed takes between Centers, tailstock flush, Cone Head	3 ft. 10 in.	3 ft. 10 in.
Hole through Spindle to clear bar	1 1/16 in.	1 1/16 in.
Size of Tool ordinarily used	¾ x 1½ in.	¾ x 1½ in.
Taper of Centers, Morse	4	4
Width of Driving Belt—Geared Head	5½ in.	5½ in.
Dia. of Driving Pulley— "	14 in.	14 in.
Speed of Driving Pulley, r. p. m. "	300	300
Width of Driving Belt—Cone Head	4¼ in.	4¼ in.
Code Word	LABEL	LABOR

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

4M-B-5-20

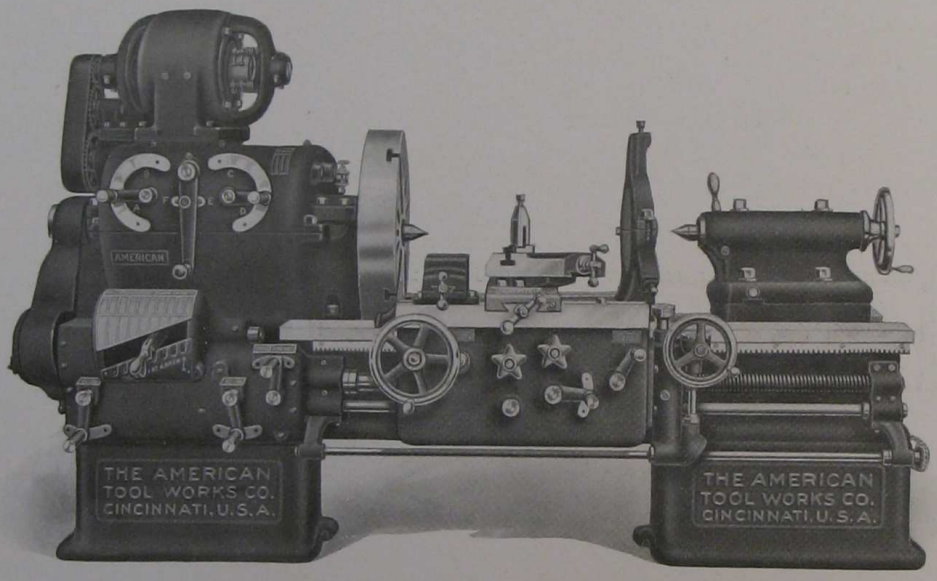
Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart, which form a very rigid construction for resisting the various stresses.

The Ways of the Bed Castings are carefully chilled, which produces a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be largely confined to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened, and is of unusually great depth, due to the patented drop Vee construction of the lathe bed.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of four bolts. Full length taper gibs, having end screw adjustment are provided on both the cross and compound rest slides, these gibs being 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, the rear bolts being 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 affecting its alignment.



Motor Drive thru Patented 8-Speed Geared Head

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock,and all other shafts, including the lead-screw, are made of a .45% 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.

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 is made in a double wall or box section, giving all important studs and shafts an outboard bearing.

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 .45% carbon ground lead screw stock, and is $1\frac{3}{4}''$ diameter. The maximum variation allowed in chasing these screws is .001″ per lineal foot, and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made from a Brown & Sharpe master screw.

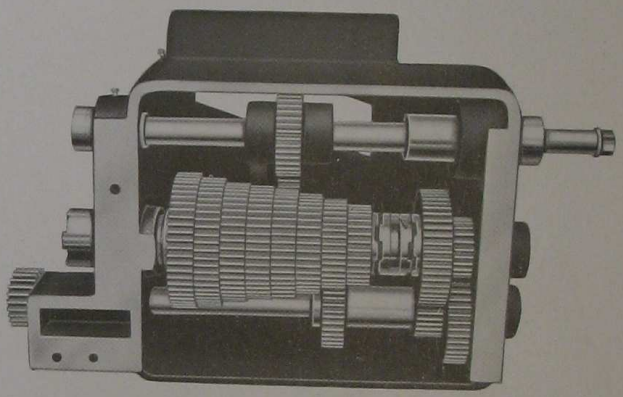
The ½″ Pitch Lead Screw permits engaging the half nuts at the proper point when chasing all threads, including those having a fractional pitch. This is not only a great saving feature, but is also a safeguard against errors when chasing unit threads.

The coarse pitch lead screw and the comparatively low apron ratio required, obviate 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.

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 the 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and 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 cannot be engaged before they are in their proper position for meshing.



Quick Change Gear Box

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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: 1, 1⅛, 1¼, 1⅜, 1$\frac{7}{16}$, 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. For additional threads see Auxiliary Quadrant.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed and carries the gears connecting the head with the quick change mechanism. This arrangement permits 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—If properly set up and levelled "American" Lathes are guaranteed to bore and turn true to within .001 in. in 18 inches. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purpose used. We will further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

Quick Change Double Back Geared Head Lathe.—The new "American" Quick Change Double Back Geared Head was designed with the idea of producing a double back geared head lathe with an instantaneous speed change from second back gear to first back gear speeds. This result has been accomplished by incorporating a frictional connection between the back shaft and double back gears by means of which the head is under control, speeds can be changed instantly and the head started and stopped. Nine spindle speeds are provided, both forward and reverse, or 18 forward speeds, provided the reverse speeds are not required.

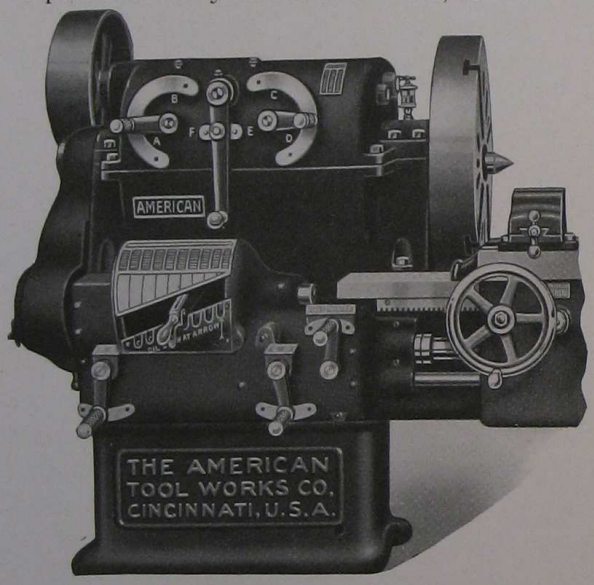
The controlling lever extends to the front of the head where it is always within reach and operates two very large and powerful friction clutches which **are self adjusting for wear.**

The great advantage offered by this type of head should certainly be appreciated, for it permits the operator to instantly change from a slow to a fast speed or vice versa without stopping his lathe to shift gears or belts.

It will also be noted that the walls of the headstock are built up even with the center line of the cone pulley and consequently provide an unusually rigid connection between the front and rear spindle bearings.

This Quick Change, Double Back Geared Head is a new development on the "American" High Duty Lathe and represents another step forward in accordance with the progressive policy adopted by The American Tool Works Company.

Patented Geared Head provides eight spindle speeds; is very powerfully designed, being particularly adapted to a heavy 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 had from the fact that the greatest speed reduction is at the unusually high ratio of 35 to 1. When arranged for motor drive, a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three spur gears. Eight fundamental spindle speeds are obtainable from 8.6 to 300 R. P. M. When apron control is furnished, the motor can be started and stopped by means of a controller hand wheel conveniently located at the right hand end of carriage where a dial indicates how the motor is set.



Patented 8-Speed Geared Head, Belt Driven.

The Motor Speed can be comparatively high, 700 to 1000 R.P.M., thereby cutting down the size and first cost of same. A pair of sensitive, but powerful friction clutches are provided on the driving shaft for starting and stopping, or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customer specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may 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 should be used, whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of motor should be from 5 to 10 horse power.

Double Friction Countershaft is regularly supplied with all belt driven lathes.

Countershaft Pulleys for Double Back Geared Head are 14 in. diameter for 4 in. belt with speeds forward, 220, reverse, 272 R. P. M.

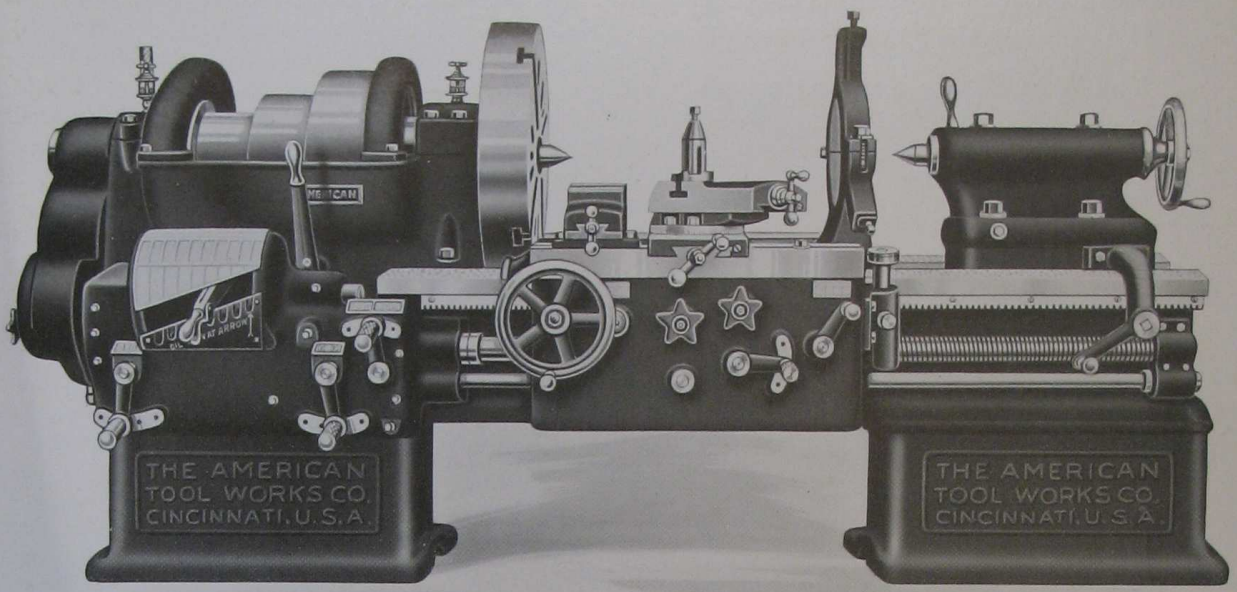
Regular Equipment, upon which base price is determined, includes double back geared head, compound and steady rests, also thread dial, countershaft for belt drives, large and small face plates and wrenches. An instruction book is regularly supplied giving directions for the installation and operation of our machines.

At Extra Cost we can equip this Lathe with improved **taper, draw-in and relieving attachments, turret** on **carriage, turret** on **shears, turret tool post, "patented" geared head** for belt or motor drive, **follow rest, full swing rest, extra gears** and **index plates** for special fine, coarse or metric threads.

62194

24 inch Lathe, Fig. No. 32.
27 inch Lathe, Fig. No. 34.

CIRCULAR No. 33.



AMERICAN

24 inch Heavy Pattern and 27 inch High Duty Lathes

Built in any Length of Bed, from 10 ft. up, advancing by 2 ft. lengths.

	24 in.	27 in.
Swings over Bed	26½ in.	28½ in.
Swings over Compound Rest Slide	17½ in.	20½ in.
Standard Length of Bed	10 ft.	10 ft.
10-ft. Bed takes between Centers, tailstock flush, Geared Head	5 ft.	5 ft.
10-ft. Bed takes between Centers, tailstock flush, Cone Head	5 ft.	5 ft.
Hole through Spindle to clear bar	$2\frac{1}{16}$ in.	$2\frac{1}{16}$ in.
Size of Tool ordinarily used	$\frac{7}{8}$ x $1\frac{3}{4}$ in.	$\frac{7}{8}$ x $1\frac{3}{4}$ in.
Taper of Centers, Morse	5	5
Width of Driving Belt—Geared Head	6 in.	6 in.
Dia. of Driving Pulley— "	16 in.	16 in.
Speed of Driving Pulley, r. p. m."	268	268
Width of Driving Belt—Cone Head	5 in.	5 in.
Code Word	LARCH	LARK

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe, and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

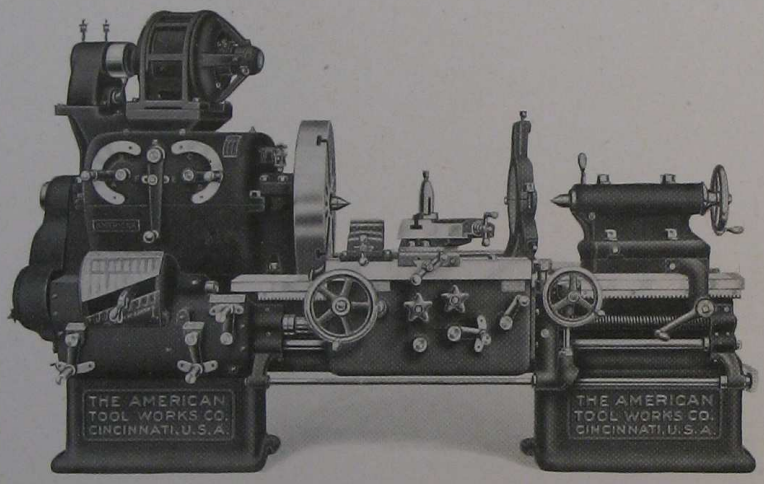
4M-B-5-20

Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart. A rib is carried lengthwise in the center of the bed which has a rack cast integral with it. The tailstock is provided with a pawl which engages this rack for resisting the end thrust when heavy work is being turned.

The Ways of the Bed Castings are carefully chilled, which produces a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be confined largely to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened, and is of unusually great depth, due to the patented drop Vee construction of the lathe bed.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of four bolts. Full length taper gibs, having end screw adjustment are provided on both the cross and compound rest slides, these gibs being placed on the right hand side where they will not receive the thrust of the tool under ordinary working conditions.



Motor Drive thru Patented 8-Speed Geared Head

The Tailstock is of our improved four bolt design, the rear bolts being carried to the top for convenience in clamping. The tailstock spindle is clamped in positionby means of a double plug binder which is so constructed as to se curely clamp the spindle at any positionwithout affecting its alignment.

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock,and all other shafts, including the lead-screw, are made of a .45% 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.

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 is made in a complete double wall or box section, giving all studs and shafts an outboard bearing. The rack pinion can be withdrawn from the rack when cutting threads, consequently all possibility of chatter or vibration is avoided, when cutting coarse pitch screws.

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 .45% carbon ground lead screw stock, and is 2″ diameter. The maximum variation allowed in chasing these screws is .001″ per lineal foot, and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made from a Brown & Sharpe master screw.

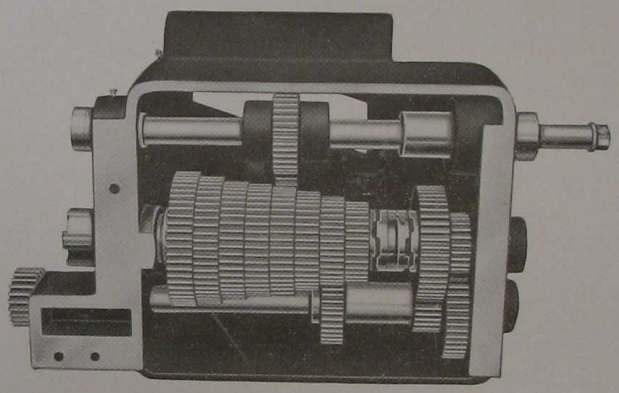
The ½″ Pitch Lead Screw permits engaging the half nuts at the proper point when chasing all threads, including those having a fractional pitch. This is not only a great saving feature, but is also a safeguard against errors when chasing unit threads.

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.

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 the 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and 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 cannot be engaged before they are in their proper position for meshing.



Quick Change Gear Box

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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1 7/16, 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. For additional threads see Auxiliary Quadrant.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed and carries the gears connecting the head with the quick change mechanism. This arrangement permits 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—If properly set up and levelled "American" Lathes are guaranteed to bore and turn true to within .001 in. in 18 inches. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purpose used. We will further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

Quick Change Double Back Geared Head Lathe.—The new "American" Quick Change Double Back Geared Head was designed with the idea of producing a double back geared head lathe with an instantaneous speed change from second back gear to first back gear speeds. This result has been accomplished by incorporating a frictional connection between the back shaft and double back gears by means of which the head is under control, speeds ca be changed instantly and the head started and stopped. Nine spindle speeds are provided, both forward and reverse, or 18 forward speeds, provided the reverse speeds are not required.

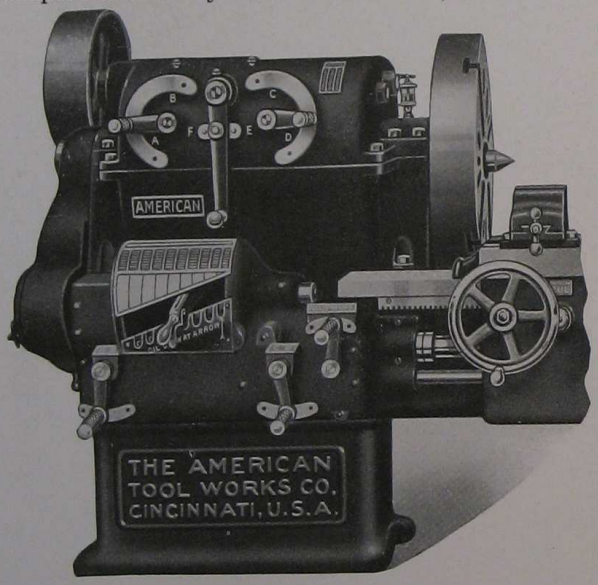
The controlling lever extends to the front of the head where it is always within reach and operates two very large and powerful friction clutches which **are self adjusting for wear.**

The great advantage offered by this type of head should certainly be appreciated, for it permits the operator to instantly change from a slow to a fast speed or vice versa without stopping his lathe to shift gears or belts.

It will also be noted that the walls of the headstock are built up even with the center line of the cone pulley and consequently provide an unusually rigid connection between the front and rear spindle bearings.

This Quick Change, Double Back Geared Head is a new development on the "American" High Duty Lathe and represents another step forward in accordance with the progressive policy adopted by The American Tool Works Company.

Patented Geared Head provides eight spindle speeds; is very powerfully designed, being particularly adapted to a heavy 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 had from the fact that the greatest speed reduction is at the unusually high ratio of 36.22 to 1. When arranged for motor drive, a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three spur gears. Eight fundamental spindle speeds are obtainable from 7.4 to 260 R. P. M. When apron control is furnished, the motor can be started and stopped by means of a controller hand wheel conveniently located at the right hand end of carriage where a dial indicates how the motor is set.



Patented 8-Speed Geared Head, Belt Driven.

The Motor Speed can be comparatively high, 700 to 1000 R. P. M., thereby cutting down the size and first cost of same. A pair of sensitive, but powerful friction clutches are provided on the driving shaft for starting and stopping, or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customer specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may 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 should be used, whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of motor should be from 7½ to 15 horse power.

Double Friction Countershaft is regularly supplied with all belt driven lathes.

Countershaft Pulleys for Double Back Geared Head are 16 in. diameter for 5 in. belt with speeds forward, 200, reverse, 249 R. P. M.

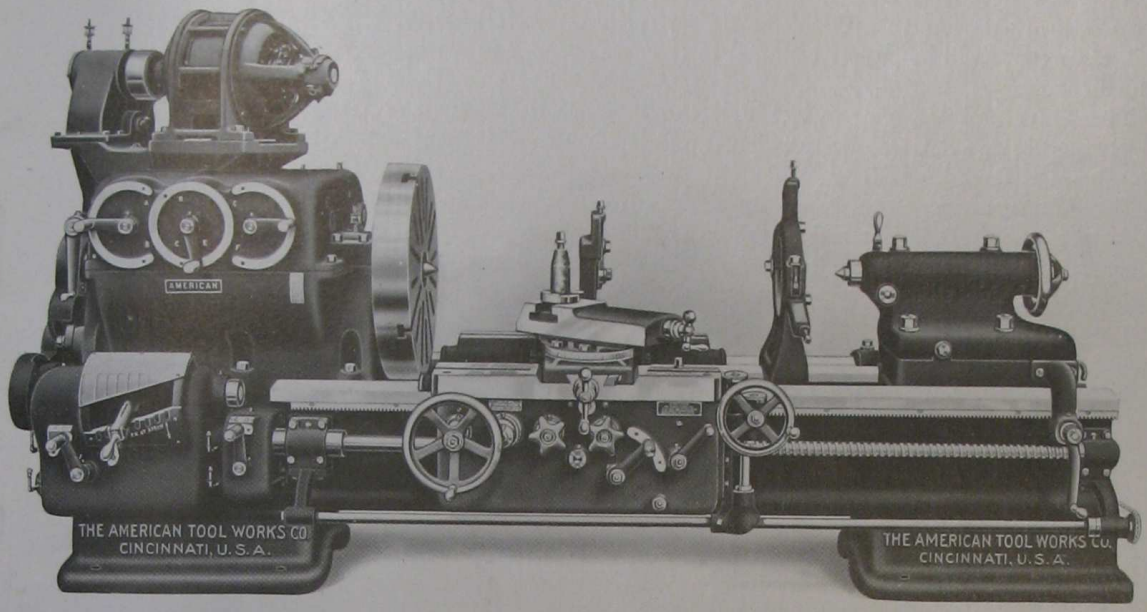
Regular Equipment, upon which base price is determined, includes double back geared head, compound and steady rests, also thread dial, countershaft for belt drives, large and small face plates and wrenches. An instruction book is regularly supplied giving directions for the installation and operation of our machines.

At Extra Cost we can equip this Lathe with improved **taper attachment, turret** on **carriage, turret** on **shears, turret tool post, "patented" geared head** for belt or motor drive, **follow rest, full swing rest, extra gears** and **index plates** for special fine, coarse or metric threads.

621.94

30 in. Lathe, Fig. No. 40.
36 in. Lathe, Fig. No. 46.

Circular No. 42.



AMERICAN

30 inch and 36 inch Medium Pattern High Duty Lathes

Built in any Length of Bed from 10 ft. up, advancing by 2 ft. lengths

	30 in.	36 in.
Swings over Bed	34½ in.	36½ in.
Swings over Compound Rest Slide	25 in.	28¼ in.
10-ft. Bed takes between Centers, tailstock flush, Geared Head	4 ft. 3 in.	4 ft. 3 in.
10-ft. Bed takes between Centers, tailstock flush, Cone Head	4 ft. 3 in.	4 ft. 3 in.
Hole through Spindle to clear bar	$2\frac{9}{16}$ in.	$2\frac{9}{16}$ in.
Size of Tool ordinarily used	1 in. x 2 in.	1 in. x 2 in.
Tapers of Centers, Morse	5	5
Width of Driving Belt—Geared Head	6 in.	6 in.
Dia. of Driving Pulley— "	18 in.	18 in.
Speed of Driving Pulley, r. p. m. "	260	260
Width of Driving Belt—Cone Head	6 in.	6 in.
Code Word	LIMIT	LINEN

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe, and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

4M-B-5-20

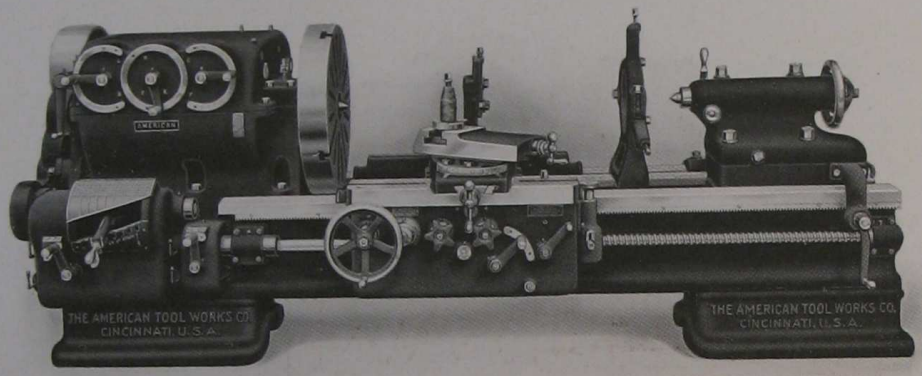
Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart which form a very rigid construction for resisting the various stresses.

The Ways of the Bed Castings are carefully chilled, which produces a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be largely confined to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened and is of unusually great depth, due to the patented drop Vee construction of the lathe bed.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of four bolts. Full length taper gibs, having end screw adjustment are provided on both the cross and compound rest slides, these gibs being 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, the rear bolts being 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 affecting its alignment.



Belt Drive thru Patented 12-Speed Geared Head.

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock, and all other shafts, including the lead-screw, are made of a .45% carbon special ground stock.

The Spindle Bearings are phosphor bronze and 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.

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 is made in a complete double wall or box section, giving all studs and shafts an outboard bearing. The rack pinion can be withdrawn from the rack when cutting threads, consequently all possibility of chatter or vibration is avoided, when cutting coarse pitch screws.

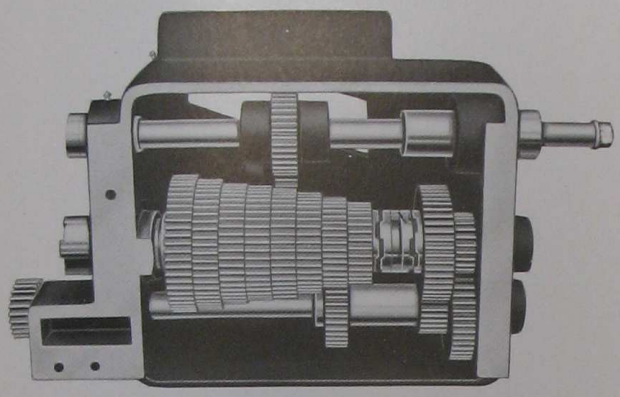
A Thread Dial is regularly furnished, thus obviating the necessity of using a backing belt or a reversing motor for thread cutting. The thread dial is placed at the right of the apron and can be readily disengaged from the lead screw when not in use.

The Lead Screw is made from .45% carbon ground lead screw stock, and is 2¼″ in diameter. The maximum variation allowed in chasing these screws is .001″ per lineal foot and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made from a Brown & Sharpe master screw.

The 1″ Pitch Lead Screw permits engaging the half nuts at any point when chasing all threads excepting those having a fractional pitch. This is not only a great time saving feature, but is also a safeguard against errors when chasing unit threads.

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.

Steel Gearing—All gears in the entire quick change gear mechanism are regularly made from .045 carbon steel. The apron gearing is also made of the same material with the exception of two large gears which are made from steel castings.



Quick Change Gear Box.

The Cone Gears of the quick change gear mechanism are cut with 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and stronger section than the 14½ degree tooth.

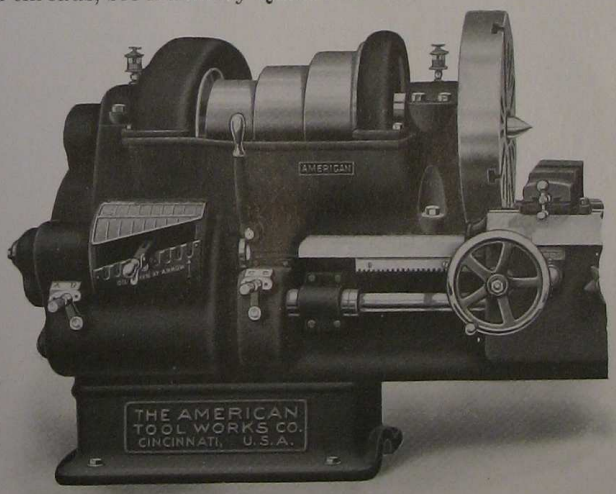
The Tumbler Lever of the quick change mechanism is cast steel and is bronze bushed. It is guided into its respective positions by means of a slotted plate attached to the front of the box. Consequently, the gears cannot be engaged before they are in their proper position for meshing.

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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1$\frac{7}{16}$, 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. For additional threads, see Auxiliary Quadrant.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed and carries the gears connecting the head with the quick change mechanism. This arrangement enables 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.



3-Step Cone, Double Back Geared Head.

Guaranteed Accuracy—If properly set up and levelled "American" Lathes are guaranteed to bore and turn true to within .001 in. The material entering into their construction is also guaranteed in every essential to be the very best obtainable, for the purposes used. We will further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

Quick Change Double Back Geared Head Lathe.—The new "American" Quick Change Double Back Geared Head was designed with the idea of producing a double back geared head lathe with an instantaneous speed change from second back gear to first back gear speeds. This result has been accomplished by incorporating a frictional connection between the back shaft and double back gears by means of which

the head is under control, speeds can be changed instantly and the head started and stopped. Nine spindle speeds are provided, both forward and reverse, or 18 forward speeds, provided the reverse speeds are not required.

The controlling lever extends to the front of the head where it is always within reach and operates two very large and powerful friction clutches which **are self adjusting for wear.**

The great advantage offered by this type of head should certainly be appreciated, for it permits the operator to instantly change from a slow to a fast speed or vice versa without stopping his lathe to shift gears or belts.

It will also be noted that the walls of the headstock are built up even with the center line of the cone pulley and consequently provide an unusually rigid connection between the front and rear spindle bearings.

This Quick Change, Double Back Geared Head is a new development on the "American" High Duty Lathe and represents another step forward in accord with the progressive policy adopted by The American Tool Works Company.

Patented Geared Head provides twelve spindle speeds from 6 to 260 R P. M. This head is very powerfully designed, 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 had from the fact that the greatest speed reduction is at the unusually high ratio of 43.3 to 1. At the normal countershaft speed, the belt will deliver approximately 15 horse power which is far in excess of the power heretofore provided on any lathe of this size or swing. When arranged for motor drive, a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three steel herringbone gears. When apron control is furnished, the motor can be started and stopped by means of a controller hand wheel conveniently located on the right end of carriage where a dial indicates how the motor is set.

The Motor Speed can be comparatively high, 700 to 1000 R. P. M., thereby cutting down its size and first cost. A sensitive, but powerful friction clutch is provided on the driving gear for starting and stopping, or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customer specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may 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 should be used; whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of Motor should be from 10 to 20 Horse Power.

Double Friction Countershaft is regularly supplied with all belt driven lathes.

Countershaft Pulleys for **belt driven geared head** are 20 in. diameter for 6 in. belt, with speeds forward, 260, reverse 312 R. P. M. Pulleys for **double back geared head** are 20 in. diameter for 6 in. belt, with speeds forward 175, and reverse 220 R. P. M.

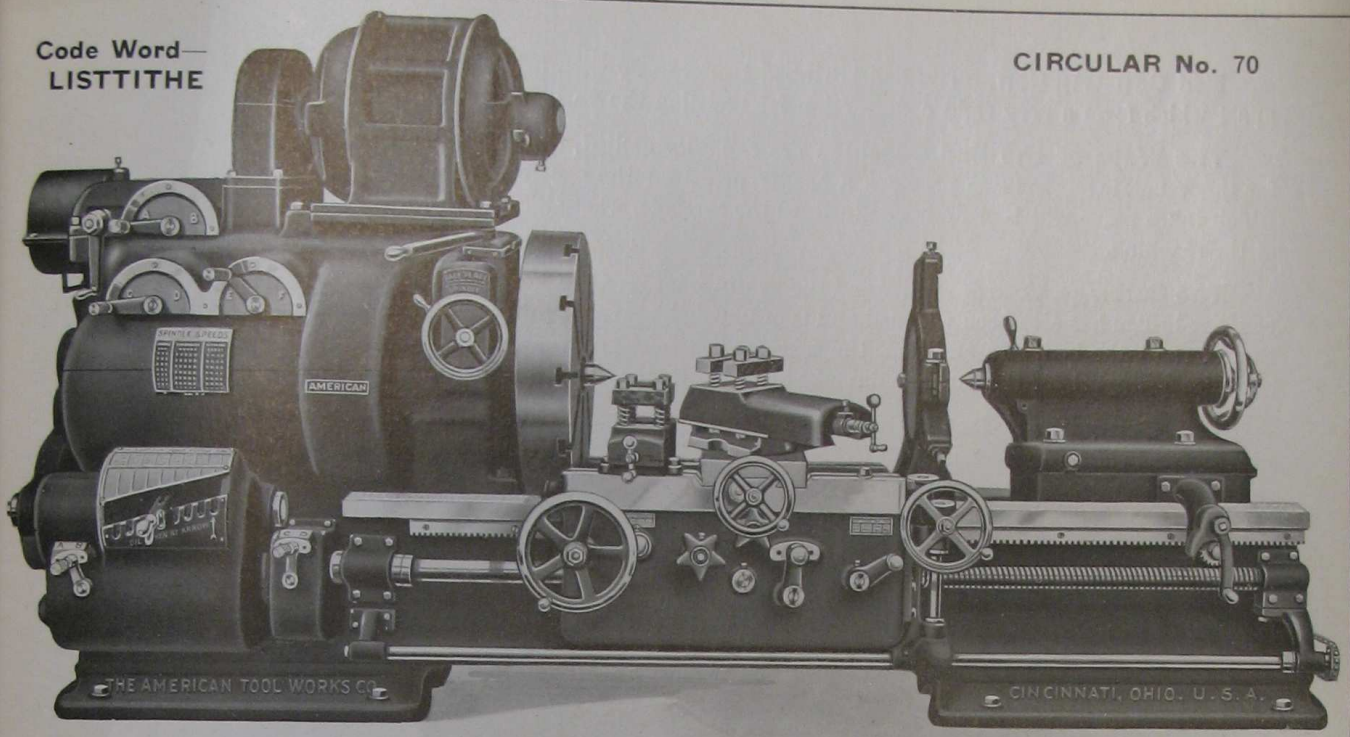
Regular Equipment, upon which base price is determined, includes double back geared head, compound and steady rests, thread dial, countershaft for belt drives, large and small face plates and wrenches. An instruction book is regularly supplied giving directions for the installation and operation of our machines.

At Extra Cost, we can equip this Lathe with improved **taper attachment, turret** on **carriage, turret** on **shears, turret tool post, "patented" geared head** for belt or motor drive, **follow and full swing rests, extra gears** and **index plates** for special fine, coarse or metric threads.

621.94

Code Word—
LISTTITHE

CIRCULAR No. 70



AMERICAN

36-inch High Duty Lathe

(Heavy Pattern)

Built in any Length of Bed, from 12 ft. up, advancing by 1 ft. lengths.

Swings over Bed	37¾ in.
Swings over Compound Rest Slide	23⅜ in.
Standard Length of Bed	12 ft.
12-ft. Bed takes between Centers, tailstock flush, Geared Head	5 ft. 1½ in.
12-ft. Bed takes between Centers, tailstock flush, Cone Head	5 ft. 1½ in.
Hole through Spindle to clear bar	2 9/16 in.
Size of Tool ordinarily used	1 in. x 2 in.
Taper of Centers, Morse	No. 6
Power Angular Feed to Compound Rest	15 in.
Width of Driving Belt—Geared Head	6 in.
Dia. of Driving Pulley— "	20 in.
Speed of Driving Pulley, r.p.m. "	475
Width of Driving Belt—Cone Head	5½ in.

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

4M-B-4-20

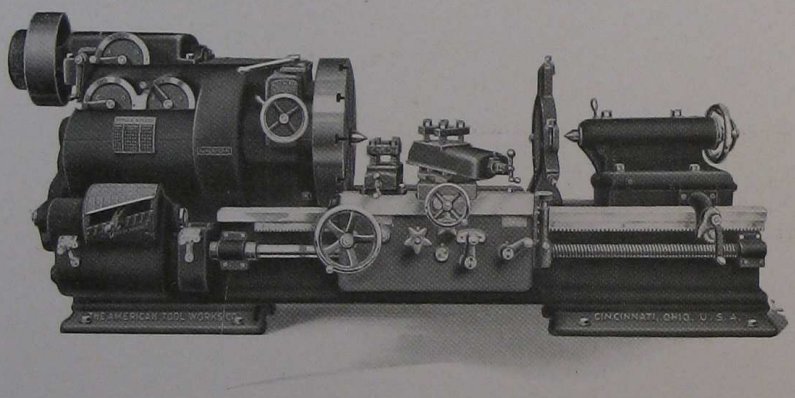
Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart which form a very rigid construction for resisting the various stresses.

The Ways of the Bed Castings are carefully chilled, which produces a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be largely confined to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened and is of unusually great depth, due to the patented drop Vee construction of the lathe bed. In addition, the carriage bridge is given a bearing on the front tailstock Vee, which provides a support for the carriage directly in line with the thrust from the cutting tool.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of four bolts. Full length taper gibs, having end screw adjustment are provided on both the cross and compound rest slides, these gibs being 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, the rear bolts being 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 affecting its alignment.



Belt Drive thru Patented 16-Speed Geared Head.

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock, and all other shafts, including the leadscrew, are made of a .45% 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.

A Standard Thrust Bearing is provided which consists 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 is made in a complete double wall or box section, giving all studs and shafts an outboard bearing. The gears are made from steel forgings and the rack pinion is hardened and of the stub tooth type. The rack pinion can be withdrawn from the rack when cutting threads, consequently all possibility of chatter or vibration is avoided, when cutting coarse pitch screws.

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 .45% carbon ground lead screw stock, and is 2½″ in diameter. The maximum variation allowed in chasing these screws is .001″ per lineal foot and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made with a Brown & Sharpe master screw.

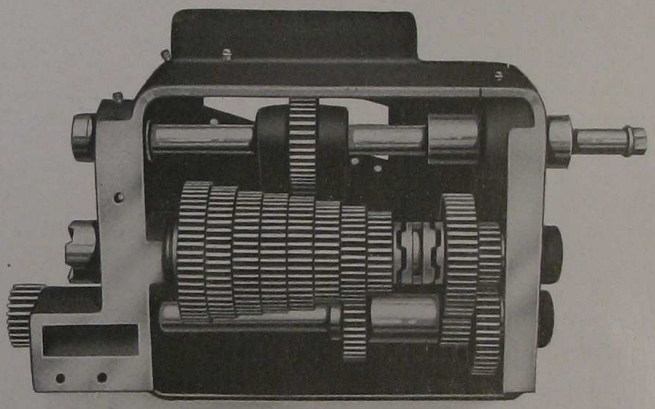
The 1″ Pitch Lead Screw permits engaging the half nuts at any point when chasing all threads excepting those having a fractional pitch. This is not only a great time saving feature, but is also a safeguard against errors when chasing unit threads.

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.

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 the exception of two large gears which are made from steel castings.

The Cone Gears of the quick change gear mechanism are cut with 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and 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 cannot be engaged before they are in their proper position for meshing.



Quick Change Gear Box.

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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1 7/16, 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. For additional threads see Auxiliary Quadrant.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed and carries the gears connecting the head with the quick change mechanism. This arrangement enables 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—If properly set up and levelled "American" Lathes are guaranteed to bore and turn true to within .001 in. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purposes used. We will further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

Triple Geared Head provides four open belt speeds, four single back geared speeds and four triple geared speeds. The triple geared speeds are obtained through the face plate drive, the internal gear being cut integral with the face plate. The face plate pinion is made solid with the triple gear shaft, and is of high carbon chrome, nickle steel, heat treated. It is engaged and disengaged with the face plate gear by means of a hand wheel conveniently located at front of the head.

Patented Geared Head provides sixteen spindle speeds, eight of which are obtained through the spindle drive, the other eight through the face plate drive. This head is very powerfully designed, 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 had from the fact that the greatest speed reduction thru the face plate drive is at the unusually high ratio of 202 to 1. At the normal countershaft speed, the belt will deliver from 30 to 35 horse power which is far in excess of the power heretofore provided on any lathe of this size or swing. When arranged for motor drive, a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three steel, herringbone gears. Sixteen fundamental spindle speeds are obtainable from 2 to 150 R. P. M. When apron control is furnished, the motor can be started and stopped by means of a controller hand wheel conveniently located on the right end of carriage where a dial indicates how the motor is set.

The Motor Speed can be comparatively high, 700 to 1000 R. P. M., thereby cutting down its size and first cost. A sensitive, but powerful friction clutch is provided on the driving gear for starting and stopping, or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

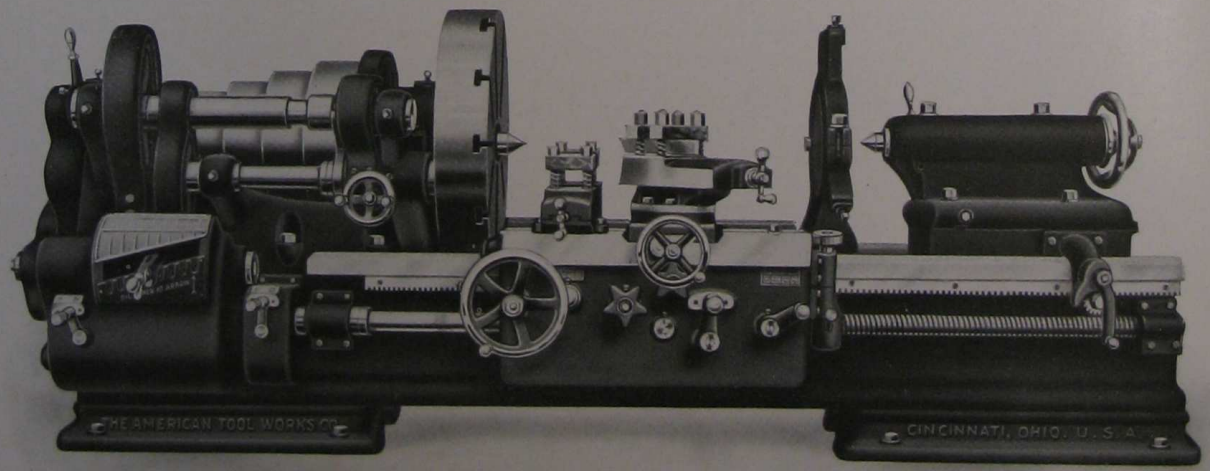
The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customer specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may be supplied. The services 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 should be used, whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of motor should be from 15 to 30 Horse Power.

Double Friction Countershaft is regularly supplied, with all belt driven lathes.

Countershaft Pulleys for Belt Driven Geared Head are 20 in. diameter, for 8 in. belt with speeds forward, 270, reverse 350 R. P. M. Pulleys for **triple geared head** are 20 in. diameter for 6 in. belt, with speeds forward, 150, reverse 180 R. P. M.

Regular Equipment, upon which base price is determined includes 4 step cone, triple geared head, compound and steady rests, thread dial, countershaft for belt drives, large face plate and wrenches. An instruction book is regularly supplied giving directions for the installation and operation of our machines.

At Extra Cost, we can equip this Lathe with improved **taper attachment, turret** on **carriage, turret** on **shears, turret tool post, "Patented" Geared Head** for belt or motor drive, **follow and full swing rests, extra gears** and **index plates** for special fine, coarse or metric threads.

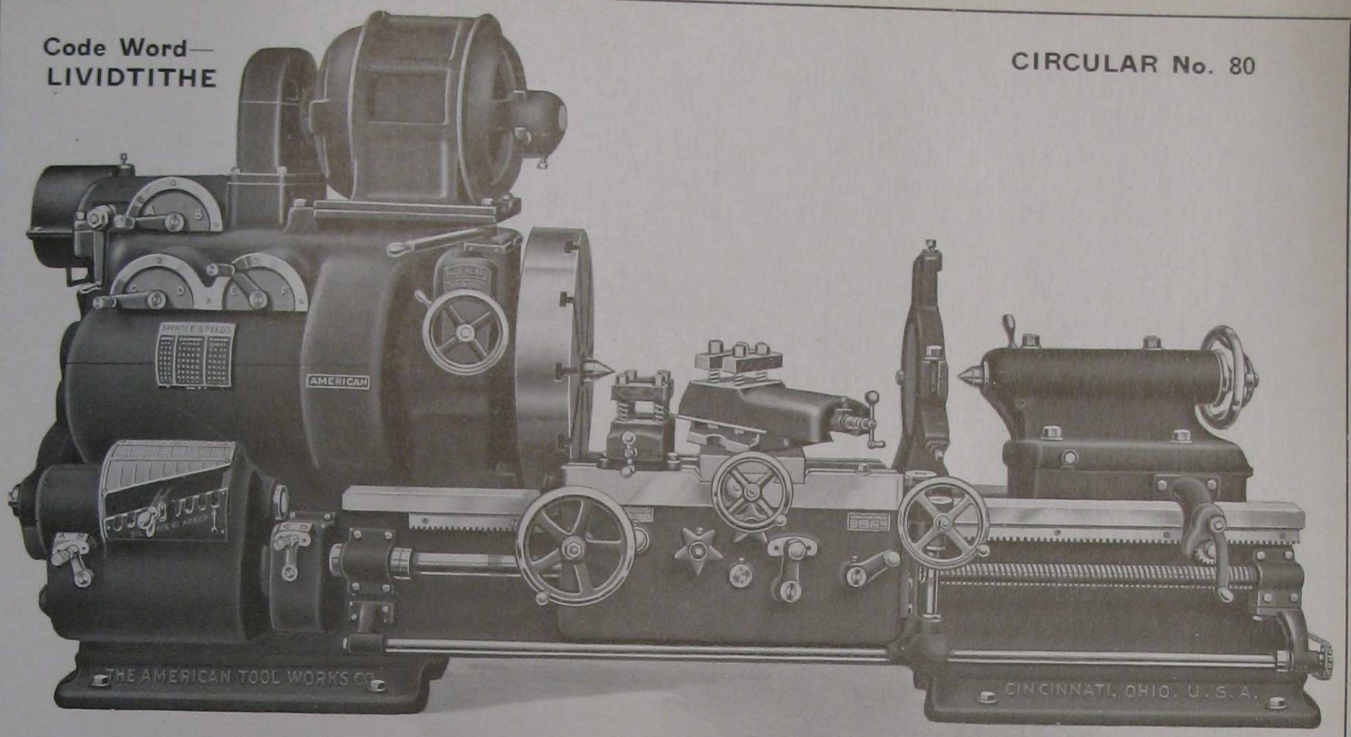


4 Step Cone Triple Geared Head.

621.94

Code Word—
LIVIDTITHE

CIRCULAR No. 80



AMERICAN

42-inch High Duty Lathe

Built in any Length of Bed, from 12 ft. up, advancing by 1 ft. lengths.

Swings over Bed	43 in.
Swings over Compound Rest Slide	30⅝ in.
Standard Length of Bed	12 ft.
12-ft. Bed takes between Centers, tailstock flush, Geared Head	5 ft. 1½ in.
12-ft. Bed takes between Centers, tailstock flush, Cone Head	5 ft. 1½ in.
Hole through Spindle to clear bar	2 9/16 in.
Size of Tool ordinarily used	1 in. x 2 in.
Taper of Centers, Morse	No. 6
Power Angular Feed to Compound Rest	15 in.
Width of Driving Belt—Geared Head	6 in.
Dia. of Driving Pulley— "	20 in.
Speed of Driving Pulley, r.p.m. "	405
Width of Driving Belt—Cone Head	5½ in.

The following description covers the very latest and most complete development in modern High Duty Lathes. The machine described herein has been designed to supply the demand for a more efficient engine lathe and contains a number of features absolutely new to lathe design.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

4M-B-4-20

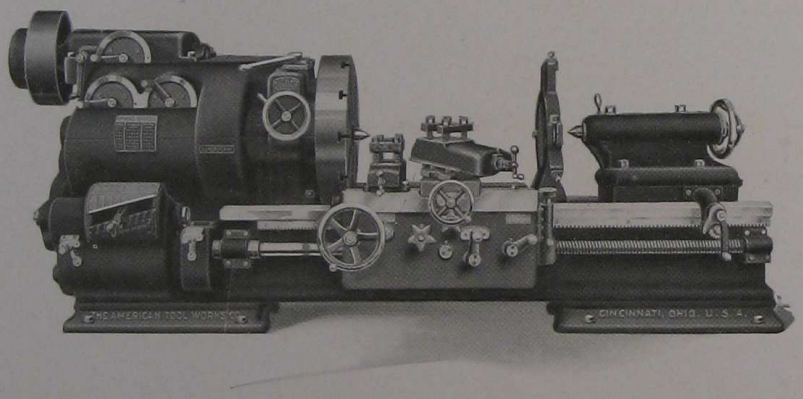
Bed Construction. The bed is ribbed transversely with heavy double walled cross girths spaced 2′ apart which form a very rigid construction for resisting the various stresses.

The Ways of the Bed Castings are carefully chilled, which produces a hard, close grained metal for the V bearings. As this provides a harder metal on the shears than on the carriage bearings, the wear which takes place will be largely confined to the carriage, where it will not impair the accuracy or alignment of the machine.

The Carriage Vees are wider and the bearings longer than are usually provided on other makes. The carriage bridge has also been widened and is of unusually great depth, due to the patented drop Vee construction of the lathe bed. In addition, the carriage bridge is given a bearing on the front tailstock Vee, which provides a support for the carriage directly in line with the thrust from the cutting tool.

The Compound Rest is rigidly designed, the swivel having full surface contact of square base with bottom slide. It is clamped to the cross slide by means of four bolts. Full length taper gibs, having end screw adjustment are provided on both the cross and compound rest slides, these gibs being 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, the rear bolts being 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 affecting its alignment.



Belt Drive thru Patented 16-Speed Geared Head.

The Headstock Spindle is made from a special .75% carbon hammered crucible steel spindle stock, and all other shafts, including the leadscrew, are made of a .45% 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.

A Standard Thrust Bearing is provided which consists 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 is made in a complete double wall or box section, giving all studs and shafts an outboard bearing. The gears are made from steel forgings and the rack pinion is hardened and of the stub tooth type. The rack pinion can be withdrawn from the rack when cutting threads, consequently all possibility of chatter or vibration is avoided, when cutting coarse pitch screws.

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 .45% carbon ground lead screw stock, and is 2½″ in diameter. The maximum variation allowed in chasing these screws is .001″ per lineal foot and they are guaranteed to be within this limit. These screws are chased by means of a special lead screw made with a Brown & Sharpe master screw.

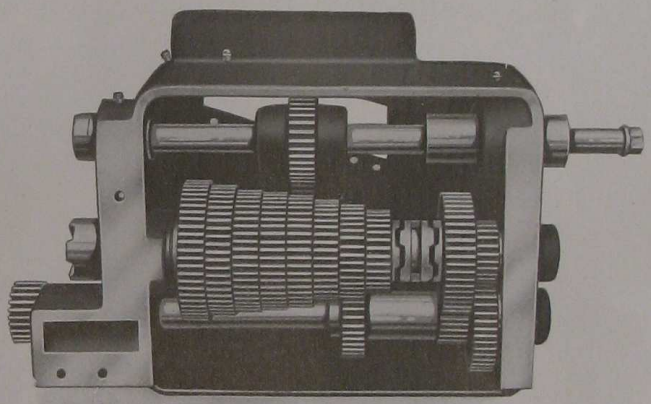
The 1″ Pitch Lead Screw permits engaging the half nuts at any point when chasing all threads excepting those having a fractional pitch. This is not only a great time saving feature, but is also a safeguard against errors when chasing unit threads.

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.

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 the exception of two large gears which are made from steel castings.

The Cone Gears of the quick change gear mechanism are cut with 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 to use in a tumbler gear mechanism, as it permits instantaneous engagement of the gears without clashing. The pointed tooth also has a wider and 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 cannot be engaged before they are in their proper position for meshing.



Quick Change Gear Box.

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 also much more accessible for any necessary attention than where it is incorporated in the bed under the headstock. It provides a range of 48 threads and feeds, all of which are listed on a direct reading index plate located above the tumbler lever. Provision is made for cutting the following threads: ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1$\frac{7}{16}$, 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. For additional threads see Auxiliary Quadrant.

All compounding in the feed box is done by means of taper jaw clutches which can 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.

Auxiliary Quadrant—While these new pattern lathes are provided with an unusually wide range for thread cutting and feeding, provision for applying extra change gears is also made by means of an auxiliary quadrant. This is located on the end of the bed and carries the gears connecting the head with the quick change mechanism. This arrangement enables 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—If properly set up and levelled "American" Lathes are guaranteed to bore and turn true to within .001 in. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purposes used. We will further guarantee to repair any breakages or damage to the machine due to defective material or faulty workmanship.

Triple Geared Head provides four open belt speeds, four single back geared speeds and four triple geared speeds. The triple geared speeds are obtained through the face plate drive, the internal gear being cut integral with the face plate. The face plate pinion is made solid with the triple gear shaft, and is engaged and disengaged with the face plate gear by means of a hand wheel conveniently located at front of the head.

Patented Geared Head provides sixteen spindle speeds, eight of which are obtained through the spindle drive, the other eight through the face plate drive. This head is very powerfully designed, 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 had from the fact that the greatest speed reduction thru the face plate drive is at the unusually high ratio of 202 to 1. At the normal countershaft speed, the belt will deliver from 30 to 35 horse power which is far in excess of the power heretofore provided on any lathe of this size or swing. When arranged for motor drive, a constant speed motor either of the direct or alternating current type is located on the top of the patented geared head, and connected to the main driving shaft through three herringbone gears. Sixteen fundamental spindle speeds are obtainable from 2 to 150 R. P. M. When apron control is furnished, the motor can be started and stopped by means of a controller hand wheel conveniently located on the right end of carriage where a dial indicates how the motor is set.

The Motor Speed can be comparatively high, 700 to 1000 R. P. M., thereby cutting down its size and first cost of same. A sensitive, but powerful friction clutch is provided on the driving gear for starting and stopping, or slightly moving the gears in head, to facilitate making speed changes without shock to the parts or interfering with the motor speed.

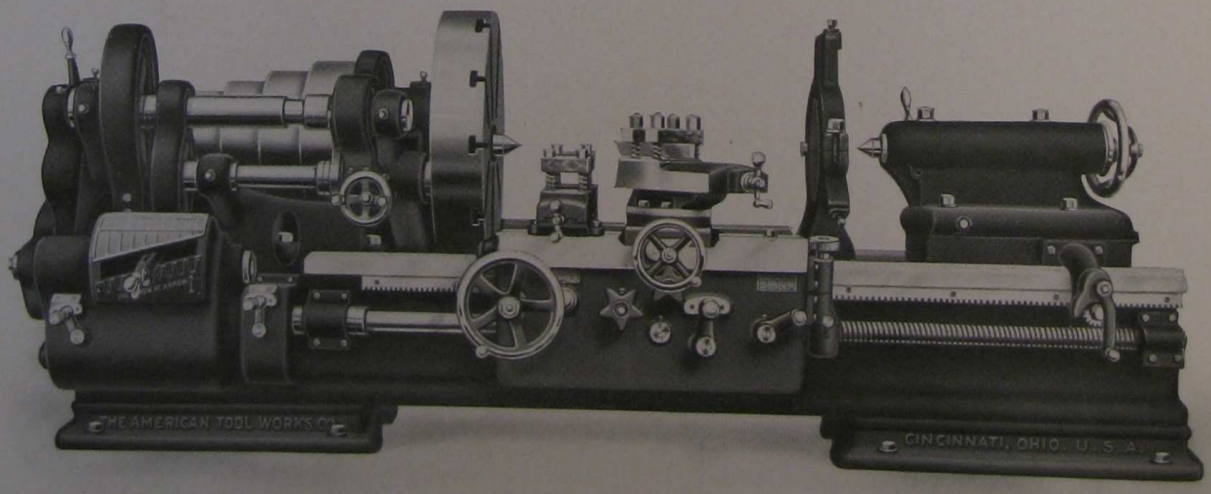
The Size of the Motor depends entirely upon the nature of the work to be handled. We prefer to have customer specify the size of the motor desired after having made a thorough investigation of the uses to which the lathe is to be put, so that a motor of proper horse power may be supplied. The services 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 should be used, whereas, if it is intended only for a general line of work, a motor of normal horse power will be amply sufficient. Size of motor should be from 15 to 30 Horse Power.

Double Friction Countershaft is regularly supplied, with all belt driven lathes.

Countershaft Pulleys for Belt Driven Geared Head are 20 in. diameter, for 8 in. belt with speeds forward, 270, reverse 350 R. P. M. Pulleys for **triple geared head** are 20 in. diameter for 6 in. belt, with speeds forward, 130, reverse 155 R. P. M.

Regular Equipment, upon which base price is determined includes 4 step cone, triple geared head, compound and steady rests, thread dial, countershaft, large face plate and wrenches. An instruction book is regularly supplied giving directions for the installation and operation of our machines.

At Extra Cost, we can equip this Lathe with improved **taper attachment, turret** on **carriage, turret** on **shears, turret tool post, "Patented" Geared Head** for belt or motor drive, **follow and full swing rests, extra gears** and **index plates** for special fine, coarse or metric threads.



4 Step Cone Triple Geared Head.