

621.98

Drives for "AMERICAN" Crank Shapers

BUILT IN 15 in., 16 in., 20 in., 24 in., 28 in. Sizes.

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

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

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

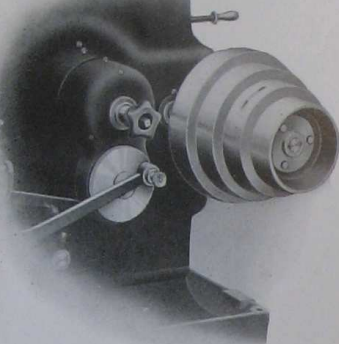
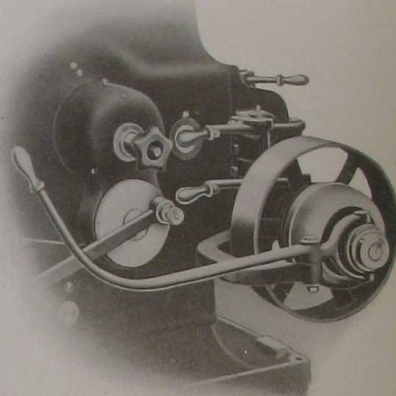


Fig. No. 224.

CONE PULLEY DRIVE

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

The Cone Pulley is supported by a large steel sleeve extending well into the cone, which eliminates the necessity of an out-board support on the pulley and relieves the driving shaft from all belt strain. This sleeve is provided with an efficient automatic oiling arrangement which supplies a continuous flow of oil through the journals. The cone pulley is bronze lined, as is also the steel sleeve in which the driving shaft is journaled.



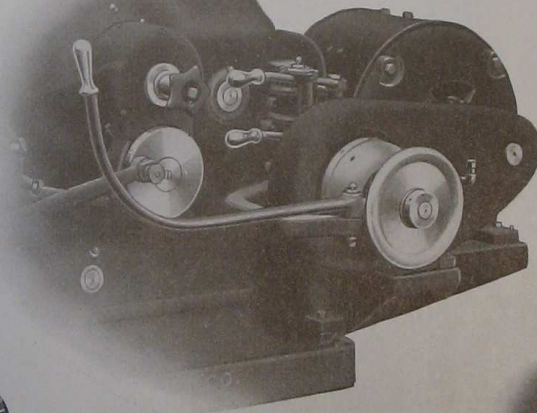
BELT DRIVE "V"

Fig. No. 224-V. Code Word: LING.

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

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

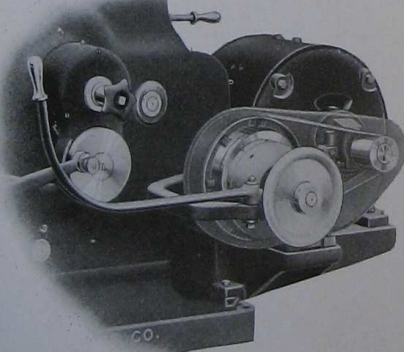
Eight cutting speeds are obtainable when used with the back geared machines.



MOTOR DRIVE "S"

Fig. No. 224-S. Code Word: LOGY.

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

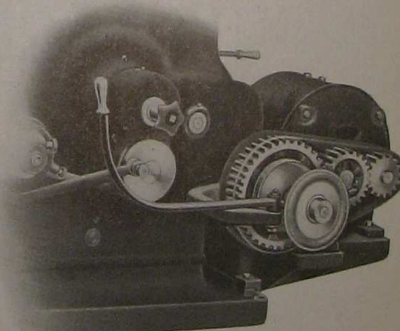


MOTOR DRIVE "U"

Fig. No. 224-U. Code Word: MOCK.

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

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



MOTOR DRIVE "T"

Fig. No. 224-T. Code Word: METER

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

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

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

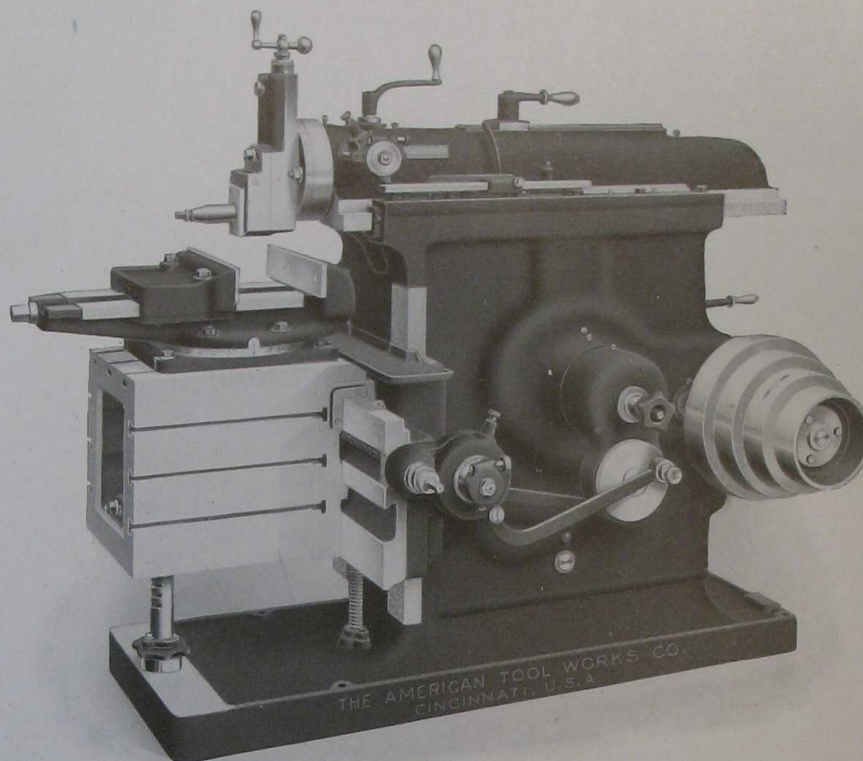
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PAGE D.

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621,98
Code Word—SIFT.

Circular No. 223.



AMERICAN

20-inch Heavy Service Shaper

(Back Geared)

Length of Stroke	20 $\frac{3}{4}$ "
Vertical traverse of Table	15 $\frac{1}{2}$ "
Horizontal travel of Table	24 $\frac{1}{2}$ "
Top surface of Table	14" x 18 $\frac{7}{8}$ "
Side surface of Table	14 $\frac{1}{2}$ " x 16 $\frac{1}{2}$ "
Vise opening	14 $\frac{1}{2}$ "

The working efficiency of any shaper depends primarily upon its ability to perform all classes of work at the highest speeds and coarsest feeds practicable, and at the same time to produce a finished product of dependable accuracy.

To obtain these results a shaper must combine ample power, rigidity and a suitable range of cutting speeds and feeds with a high standard of workmanship. The relative or comparative value, therefore, of a machine of this type must be determined by a careful consideration of these features, both individually and collectively, the ultimate decision being given the machine in which these points are developed to the highest degree.

When designing the new "American" Heavy Service Shaper these conditions were borne constantly in mind, with the consequent result that this new machine is the very latest and highest development in this particular field, in which the objectionable features of former designs have been superseded by new features of proven efficiency.

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The workmanship is of the same high standard that has characterized "American" products for many years past, a complete system of jigs and templates being used, which insures accuracy of the highest standard, as well as the absolute interchangeability of parts. We unqualifiedly guarantee the workmanship and accuracy of "American" Shapers, the limit of error allowed being .001 of an inch up to the full capacity of the machine.

The following description is devoted to the more important and essential points in the construction of "American" Heavy Service Shapers, which merit the most careful consideration. It will show conclusively that neither expense nor intelligent effort has been spared to produce a design which is not only efficient, powerful and substantial, but one that is also so conveniently arranged that it may be operated with a minimum of effort and loss of time.

POWER—One of the first points considered when laying out this new shaper was that of power input. The approximate power a shaper of this size would require for performing the heaviest classes of work was determined, then sufficient extra power added to provide a safe working margin. Consequently this machine is endowed with greater power than will ever be required for the average heavy work, and therefore when doing such work will not be constantly working up to the limit of its capacity. The cone steps are large in diameter and wide of face, being arranged to accommodate a $2\frac{1}{2}$ " belt. The countershaft speeds are exceptionally fast, and the back gear ratios correspondingly high.

STROKES PER MINUTE—Before deciding on the stroke range a very thorough investigation was made to determine the proper cutting speeds for metals of various kinds and lengths. As a result of this investigation a range of 8 strokes from 7.5 to 105 per minute was provided, this range being in geometrical progression, and calculated to give the best results on all classes of work. It will be interesting to note here that, while a wider range could easily have been furnished, it was found that a slower speed than 7.5 is entirely unnecessary, and a faster speed than 105 impracticable on account of the excess of vibration caused by the rapid stroke and the undue wear on the machine. Therefore, by confining this range to productive limits a closer speed increment is obtained, which in turn imparts to the machine a higher working efficiency.

The length of stroke may be easily changed at will without stopping the machine, the device for positioning the stroke being located on the ram near the head, and may be operated while the machine is running. A pointer on the ram traveling along an index shows the length of stroke as set.

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

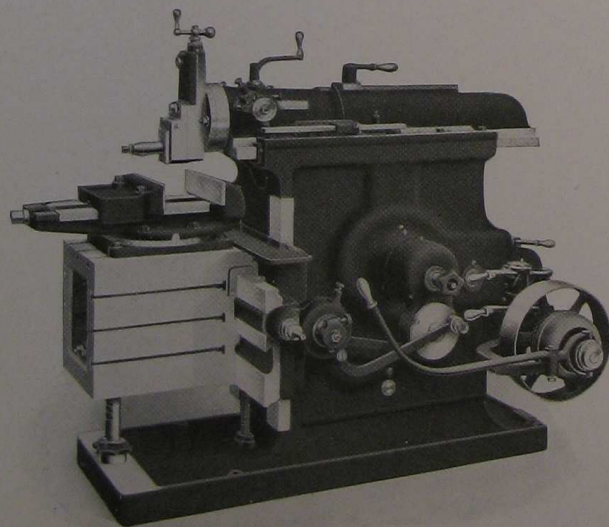
This construction is far superior to that used on other designs in which the Rocker Arm is attached directly to the Ram. With this latter construction the Rocker Arm tends to lift the Ram during the first half of the cutting stroke, and, moreover, requires the Ram to constantly carry the "dead weight" of all the parts, thus causing more rapid wear on the ram bearings, besides consuming more power. This latter design will also cause the work to show all the vibration which takes place in the Rocker Arm. On "American" Shapers the Rocker Arm is made in a complete "U" section for its entire length, and is further strengthened by heavy transverse and cross ribbing. The Ram is very heavy, and is designed for uniform rigidity throughout its entire length of stroke. It is thoroughly braced by internal ribs, and has long wide bearings on column, with *continuous taper gib* having end screw adjustment for taking up the wear.

FULL LENGTH TAPER GIBS—One of the most vital features of "American" Shapers, and one which is absolutely essential to the life and accuracy of any Shaper, is the use of Full Length Taper Gibs for taking up the wear. These gibs are arranged for end screw adjustment, by means of which a perfect full length bearing can be constantly maintained, and the rate of wear kept down to a minimum. The importance of this feature cannot be over-estimated, for the rate of depreciation of a machine tool is directly proportionate to the rate of wear in its bearings.

The Full Length Taper Gib undoubtedly affords a more efficient and convenient method of taking up wear than is provided with flat gibs which require the use of a series of set screws for adjustment. Full length metal to metal contact is impossible with the latter type of gib. Moreover, it is also very difficult to make the necessary adjustment.

With our Full Length Taper Gib construction the degree of accuracy inherent in "American" Shapers positively can be retained throughout the life of the machine, and a full length metal to metal contact is assured at all times.

CROSS FEED is absolutely new, and possesses advantages common only to its own particular design. It is both automatic and variable, providing a nicely graded range of graduated feeds (24 in number) from .006" to .175" per stroke of ram. Feeds can be changed and accurately set while machine is running, by means of a knurled knob conveniently located. The feed is thrown in or out, also reversed, through a



Shaper With Speed Box Drive.

knob on the feed plunger. The reversal of the feed at the opposite end of the ram stroke is accomplished by a plunger in the face of the swinging gear on the bonnet, which engages either one of two holes in opposite sides of the gear. Whether the feed takes place at the beginning or end of the stroke depends upon which hole is engaged by the plunger. All parts of the feed mechanism are compact, and present a neat and symmetrical appearance, while all the gears in this mechanism are securely covered.

An automatic safety device is provided, the connection between the feed mechanism and cross-feed screw being made by means of a fibre adjustable friction. This forms a "Fool Proof" feature which will protect the feed works from damage should the tool accidentally be fed into the cut, or the apron be fed into either end of the cross-rail. This fibre friction can be adjusted to pull the heaviest cut without slippage, and is not subject to atmospheric conditions, temperature, or the action of oil.

RIGIDITY—In order that the unusual power of this shaper may be utilized to advantage, every part of the machine has been designed to produce the greatest rigidity and to easily withstand the severe stresses that the use of this power would impose upon the various parts.

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

BASE is of large proportions, very deep, and strongly ribbed, affording an excellent foundation for the machine. It is of the extension type, with a pad at the end to receive table support. It is of pan construction, both inside and out, to catch oil drippings thus protecting the floor and foundation. Means are provided for draining off the oil collected on the inside.

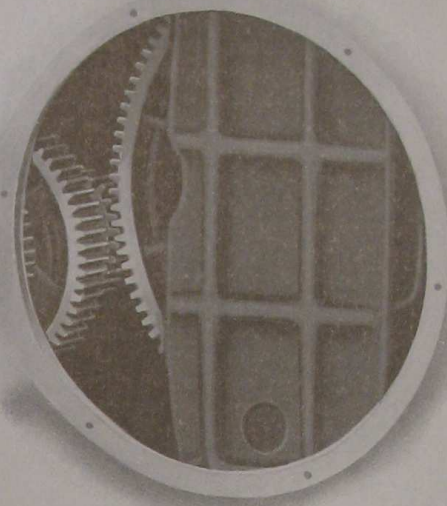
TABLE is made in a complete box section, and is therefore not liable to spring or deflect when heavy work is bolted on its side. The slots are all planed from the solid, the side slots being set in the horizontal plane, thus obviating the possibility of the work bolted to the side dropping down on the base when the clamping bolts are loosened.

The top of the table extends over and bears upon the top of the apron, thus increasing its rigidity, and preventing dirt from working down between the table and saddle. This construction also removes the strain from the clamping bolts, and at the same time adds considerable working surface to the table. In order to further safeguard the bearings of the rail and column a dirt guard of pan construction is fastened to the rail, which catches chips and dirt that might otherwise work into the bearings. Felt wipers are provided on both ends of saddle, which remove the dirt and chips from the top of the rail and at the same time lubricate the surface. This table is firmly fitted to the apron by means of 5 bolts, 3 at the top and 2 at the bottom. The rigidity of this connection is further materially increased by 2 dowel pins extending through the top of the table into the saddle. These pins permanently locate the table in its proper position on the saddle, also greatly increase its rigidity by preventing vibration under a cut.

CROSS RAIL is of box form, very heavy, and strongly ribbed, and, being of exceptional length, gives the table a long horizontal range of travel. Three extra wide bearings for the apron are provided, which insure rigidity at that point. The rail is bolted to the column by clamps and bolts of improved design, which prevent its dropping away when the binder bolts are loosened. A stationary elevating screw of large diameter is provided, a ball thrust bearing being provided on the elevating nut for facilitating the elevation of the rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw.

HEAD is operative at any angle within an arc of 100 degrees, and has convenient and efficient locking device. The down slide is fitted with a continuous taper gib having end screw adjustment for taking up the wear. The down feed is of unusual length, the feed screw having an adjustable graduated collar reading in .001 in. A large tool post is supplied for using holders with inserted bits, and has tool steel tool post screw and tool steel serrated back plate.

TABLE SUPPORT—The table support furnished with this shaper is absolutely new in design, and represents a radical departure from the designs furnished on other makes. It consists of a notched bar supplied with an adjustable nut at the bottom, and is operative throughout the full traverse of the rail. The notches are spaced 1 inch apart and are engaged by a spring plunger after the rail has been properly adjusted, any further adjustment necessary being accomplished through the nut at the bottom of the notched bar which bears on the planed surface of the base. This support is rigid and positive, and provides the further advantage of relieving the rail of the weight of the table and work, thus insuring a high degree of accuracy in the work produced and less wear on the bearings.



Showing Massive Construction of Gears and Rocker Arm.

KEYSEATING CAPACITY—Rocker arm is made double section at the top, which, in connection with the large opening through the column, permits a shaft 4 in. diameter to be passed under the ram for keyseating. Larger shafts may be keyseated by setting over table to allow shaft to pass outside of column, using the head set on an angle.

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

LUBRICATION—Special attention has been paid to the thorough lubrication of all working parts, thereby insuring long life and satisfactory service from the machine. The ram slides are oiled by means of a gravity system, oil reservoirs being provided in the ram and clamps, from which felt wipers take their supply of oil, and distribute it through grooves to the extreme ends of the slides, thus doing away with a multiplicity of oil holes. The felt wipers also effectually strain the lubricant, thus insuring clean oil at all times. Ram slides are provided with felt wipers at the front of the column, assisting in perfect lubrication, also preventing oil from dripping down over the front of the machine. A large quantity of oil is stored in a pocket cast integral with the rocker arm, which, with suitable means for distribution, insures thorough lubrication of the sliding block in the rocker arm. A felt strip inserted in a reservoir in sliding block insures constant lubrication. The sliding block is a hardened steel forging, and the wrist pin has a bronze sleeve which turns in sliding block.

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

ALL SHAFTS are made of crucible steel, and are accurately ground, and all running bearings are bushed, thus providing for easy renewal in case of wear. Bearings for driving pulley and bull wheel are very massive and are cast integral with the column.

THE CONE PULLEY is supported by a large steel sleeve extending well into the cone, which eliminates the necessity of an outboard support on the pulley, and relieves the driving shaft from all belt strain. This sleeve is provided with an efficient automatic oiling arrangement which supplies a continuous flow of oil through the journals. The cone pulley is bronze lined, as is also the steel sleeve in which the driving shaft is journaled.

SPEED BOX—The new speed box, designed especially for the "American" Heavy Service Shaper, is radically different from anything heretofore furnished for the same purpose.

As shown by the illustration, this speed box is a complete unit which is absolutely and quickly interchangeable with the cone pulley drive unit; consequently a cone pulley driven shaper can be readily converted to speed box drive without any complications whatever any time after shipment, and vice versa.

This unit is located in its proper position on the column by means of dowel pins, and is held firmly in place by 6 large bolts.

The speed box drive provides 4 changes of speed, which combined with the back gear drive produces a total of 8 different cutting speeds for the ram. The speed changes in the box are accomplished while the machine is running by means of 7 heat treated steel gears, the teeth of which are machine rounded to facilitate meshing, and two operating levers which are located so the operator can handle them without effort.

One of the features of this mechanism that should certainly appeal to the prospective buyer is the fact that there is not a loose running part in the whole speed box. Every gear is tight on its shaft, consequently the oiling troubles common to practically all other mechanisms of this kind are absolutely eliminated. All shafts are of crucible steel, are of large diameter, and are given a large center bearing, which materially increases their rigidity and reduces the over-hang of the gears. All shaft bearings are phosphor bronze bushed, and are oiled by means of an efficient gravity oiling system, a recessed bushing being used, which forms a retainer for the oil, which in turn is fed to the bearing by means of a strip of felt placed in a slot cut lengthwise in the bushing. This felt not only filters the lubricant, but regulates its flow and prevents it from running out and being wasted. A return oil groove cut in the bushing also tends to keep the oil circulating to and fro in the bearing, thus preventing its escape.

To further insure the efficiency of this mechanism it has been designed so as to be oil-tight, to permit the transmission to run in oil. Thus a very quiet and long lived drive is provided.

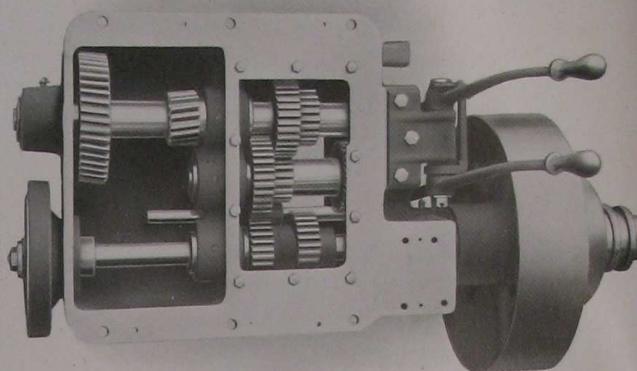
A long friction lever, extending well to the front of the machine for operating convenience, controls a large diameter friction incorporated in the driving pulley, by means of which the machine can be started or stopped instantly. Acting in unison with the friction clutch is a friction brake located on the opposite side of the box, which stops the ram instantly when the friction clutch is thrown out.

COUNTERSHAFT has tight and loose pulleys 14 in. diameter by $3\frac{1}{2}$ in. face for cone drive, and $14 \times 4\frac{1}{4}$ for speed box drive. Speed of countershaft for cone drive, 340 R. P. M.; for gear box drive, 360 R. P. M.

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

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

For description of shaper attachments see special circular.

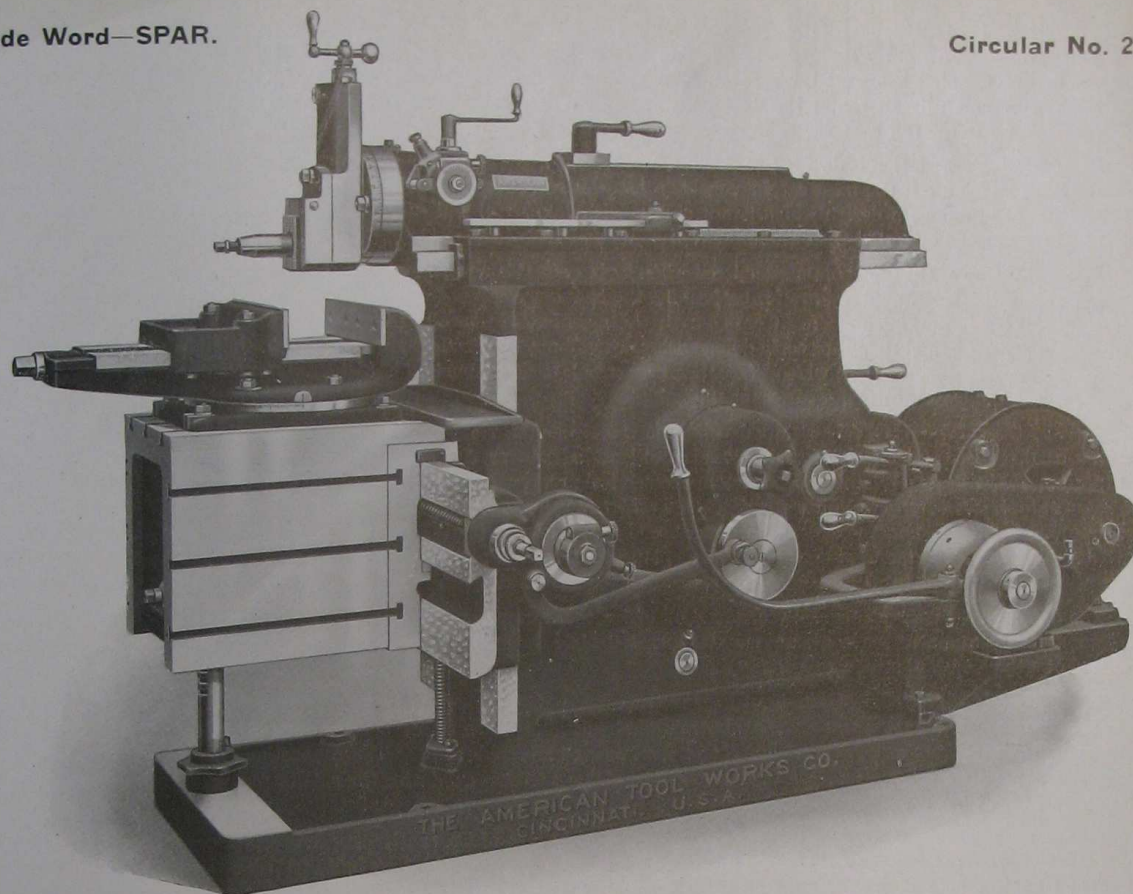


Interior of 4 Change Speed Box.

62198

Code Word—SPAR.

Circular No. 225.



AMERICAN

24-inch Heavy Service Shaper

(Back Geared)

Length of Stroke.....	24 $\frac{3}{4}$ "
Vertical traverse of Table.....	16"
Horizontal travel of Table.....	30"
Top surface of Table.....	16" x 22"
Side surface of Table.....	17 $\frac{1}{2}$ " x 17"
Vise opening.....	16"

The working efficiency of any shaper depends primarily upon its ability to perform all classes of work at the highest speeds and coarsest feeds practicable, and at the same time to produce a finished product of dependable accuracy.

To obtain these results a shaper must combine ample power, rigidity and a suitable range of cutting speeds and feeds with a high standard of workmanship. The relative or comparative value, therefore, of a machine of this type must be determined by a careful consideration of these features, both individually and collectively, the ultimate decision being given the machine in which these points are developed to the highest degree.

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POWER—One of the first points considered when laying out this new shaper was that of power input. The approximate power a shaper of this size would require for performing the heaviest classes of work was determined, then sufficient extra power added to provide a safe working margin. Consequently this machine is endowed with greater power than will ever be required for the average heavy work, and therefore when doing such work will not be constantly working up to the limit of its capacity. The cone steps are large in diameter and wide of face, being arranged to accommodate a 3" belt. The countershaft speeds are exceptionally fast, and the back gear ratios correspondingly high.

STROKES PER MINUTE—Before deciding on the stroke range a very thorough investigation was made to determine the proper cutting speeds for metals of various kinds and lengths. As a result of this investigation a range of 8 strokes from 6.5 to 90 per minute was provided, this range being in geometrical progression, and calculated to give the best results on all classes of work. It will be interesting to note here that, while a wider range could easily have been furnished, it was found that a slower speed than 6.5 is entirely unnecessary, and a faster speed than 90 impracticable on account of the excess of vibration caused by the rapid stroke and the undue wear on the machine. Therefore, by confining this range to productive limits a closer speed increment is obtained, which in turn imparts to the machine a higher working efficiency.

The length of stroke may be easily changed at will without stopping the machine, the device for positioning the stroke being located on the ram near the head, and may be operated while the machine is running. A pointer on the ram traveling along an index shows the length of stroke as set.

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

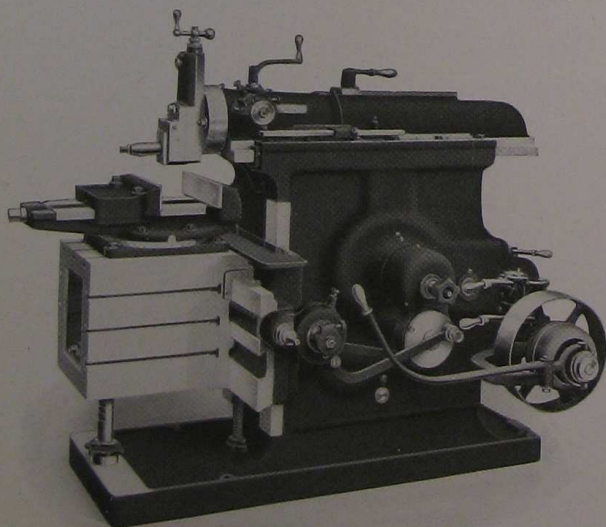
This construction is far superior to that used on other designs in which the Rocker Arm is attached directly to the Ram. With this latter construction the Rocker Arm tends to lift the Ram during the first half of the cutting stroke, and, moreover, requires the Ram to constantly carry the "dead weight" of all the parts, thus causing more rapid wear on the ram bearings, besides consuming more power. This latter design will also cause the work to show all the vibration which takes place in the Rocker Arm. On "American" Shapers the Rocker Arm is made in a complete "U" section for its entire length, and is further strengthened by heavy transverse and cross ribbing. The Ram is very heavy, and is designed for uniform rigidity throughout its entire length of stroke. It is thoroughly braced by internal ribs, and has long wide bearings on column, with *continuous taper gib* having end screw adjustment for taking up the wear.

FULL LENGTH TAPER GIBS—One of the most vital features of "American" Shapers, and one which is absolutely essential to the life and accuracy of any Shaper, is the use of Full Length Taper Gibs for taking up the wear. These gibs are arranged for end screw adjustment, by means of which a perfect full length bearing can be constantly maintained, and the rate of wear kept down to a minimum. The importance of this feature cannot be over-estimated, for the rate of depreciation of a machine tool is directly proportionate to the rate of wear in its bearings.

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With our Full Length Taper Gib construction the degree of accuracy inherent in "American" Shapers positively can be retained throughout the life of the machine, and a full length metal to metal contact is assured at all times.

CROSS FEED is absolutely new, and possesses advantages common only to its own particular design. It is both automatic and variable, providing a nicely graded range of graduated feeds (24 in number) from .008" to .200" per stroke of ram. Feeds can be changed and accurately set while machine is running, by means of a knurled knob conveniently located. The feed is thrown in or out, also reversed, through a



Shaper With Speed Box Drive.

knob on the feed plunger. The reversal of the feed at the opposite end of the ram stroke is accomplished by a plunger in the face of the swinging gear on the bonnet, which engages either one of two holes in opposite sides of the gear. Whether the feed takes place at the beginning or end of the stroke depends upon which hole is engaged by the plunger. All parts of the feed mechanism are compact, and present a neat and symmetrical appearance, while all the gears in this mechanism are securely covered.

An automatic safety device is provided, the connection between the feed mechanism and cross-feed screw being made by means of a fibre adjustable friction. This forms a "Fool Proof" feature which will protect the feed works from damage should the tool accidentally be fed into the cut, or the apron be fed into either end of the cross-rail. This fibre friction can be adjusted to pull the heaviest cut without slippage, and is not subject to atmospheric conditions, temperature, or the action of oil.

RIGIDITY—In order that the unusual power of this shaper may be utilized to advantage, every part of the machine has been designed to produce the greatest rigidity and to easily withstand the severe stresses that the use of this power would impose upon the various parts.

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

BASE is of large proportions, very deep, and strongly ribbed, affording an excellent foundation for the machine. It is of the extension type, with a pad at the end to receive table support. It is of pan construction, both inside and out, to catch oil drippings thus protecting the floor and foundation. Means are provided for draining off the oil collected on the inside.

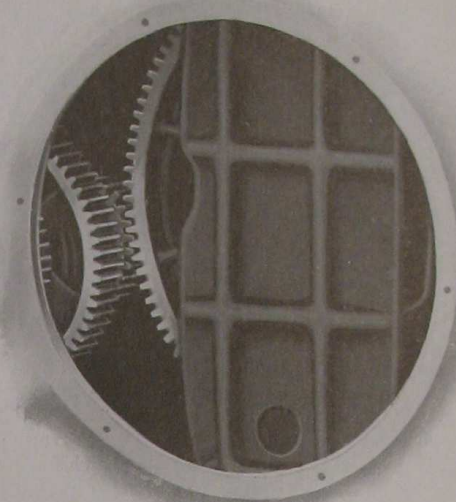
TABLE is made in a complete box section, and is therefore not liable to spring or deflect when heavy work is bolted on its side. The slots are all planed from the solid, the side slots being set in the horizontal plane, thus obviating the possibility of the work bolted to the side dropping down on the base when the clamping bolts are loosened.

The top of the table extends over and bears upon the top of the apron, thus increasing its rigidity, and preventing dirt from working down between the table and saddle. This construction also removes the strain from the clamping bolts, and at the same time adds considerable working surface to the table. In order to further safeguard the bearings of the rail and column a dirt guard of pan construction is fastened to the rail, which catches chips and dirt that might otherwise work into the bearings. Felt wipers are provided on both ends of saddle, which remove the dirt and chips from the top of the rail and at the same time lubricate the surface. This table is firmly fitted to the apron by means of 5 bolts, 3 at the top and 2 at the bottom. The rigidity of this connection is further materially increased by 2 dowel pins extending through the top of the table into the saddle. These pins permanently locate the table in its proper position on the saddle, also greatly increase its rigidity by preventing vibration under a cut.

CROSS RAIL is of box form, very heavy, and strongly ribbed, and, being of exceptional length, gives the table a long horizontal range of travel. Three extra wide bearings for the apron are provided, which insure rigidity at that point. The rail is bolted to the column by clamps and bolts of improved design, which prevent its dropping away when the binder bolts are loosened. A stationary elevating screw of large diameter is provided, a ball thrust bearing being provided on the elevating nut for facilitating the elevation of the rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw.

HEAD is operative at any angle within an arc of 100 degrees, and has convenient and efficient locking device. The down slide is fitted with a continuous taper gib having end screw adjustment for taking up the wear. The down feed is of unusual length, the feed screw having an adjustable graduated collar reading in .001 in. A large tool post is supplied for using holders with inserted bits, and has tool steel tool post screw and tool steel serrated back plate.

TABLE SUPPORT—The table support furnished with this shaper is absolutely new in design, and represents a radical departure from the designs furnished on other makes. It consists of a notched bar supplied with an adjustable nut at the bottom, and is operative throughout the full traverse of the rail. The notches are spaced 1 inch apart and are engaged by a spring plunger after the rail has been properly adjusted, any further adjustment necessary being accomplished through the nut at the bottom of the notched bar which bears on the planed surface of the base. This support is rigid and positive, and provides the further advantage of relieving the rail of the weight of the table and work, thus insuring a high degree of accuracy in the work produced and less wear on the bearings.



Showing Massive Construction of Gears and Rocker Arm.

KEYSEATING CAPACITY—Rocker arm is made double section at the top, which, in connection with the large opening through the column, permits a shaft 4 in. diameter to be passed under the ram for keyseating. Larger shafts may be keyseated by setting over table to allow shaft to pass outside of column, using the head set on an angle.

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

LUBRICATION—Special attention has been paid to the thorough lubrication of all working parts, thereby insuring long life and satisfactory service from the machine. The ram slides are oiled by means of a gravity system, oil reservoirs being provided in the ram and clamps, from which felt wipers take their supply of oil, and distribute it through grooves to the extreme ends of the slides, thus doing away with a multiplicity of oil holes. The felt wipers also effectually strain the lubricant, thus insuring clean oil at all times. Ram slides are provided with felt wipers at the front of the column, assisting in perfect lubrication, also preventing oil from dripping down over the front of the machine. A large quantity of oil is stored in a pocket cast integral with the rocker arm, which, with suitable means for distribution, insures thorough lubrication of the sliding block in the rocker arm. A felt strip inserted in a reservoir in sliding block insures constant lubrication. The sliding block is a hardened steel forging, and the wrist pin has a bronze sleeve which turns in sliding block.

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

ALL SHAFTS are made of crucible steel, and are accurately ground, and all running bearings are bushed, thus providing for easy renewal in case of wear. Bearings for driving pulley and bull wheel are very massive and are cast integral with the column.

THE CONE PULLEY is supported by a large steel sleeve extending well into the cone, which eliminates the necessity of an outboard support on the pulley, and relieves the driving shaft from all belt strain. This sleeve is provided with an efficient automatic oiling arrangement which supplies a continuous flow of oil through the journals. The cone pulley is bronze lined, as is also the steel sleeve in which the driving shaft is journaled.

SPEED BOX—The new speed box, designed especially for the "American" Heavy Service Shaper, is radically different from anything heretofore furnished for the same purpose.

As shown by the illustration, this speed box is a complete unit which is absolutely and quickly interchangeable with the cone pulley drive unit; consequently a cone pulley driven shaper can be readily converted to speed box drive without any complications whatever any time after shipment, and vice versa.

This unit is located in its proper position on the column by means of dowel pins, and is held firmly in place by 6 large bolts.

The speed box drive provides 4 changes of speed, which combined with the back gear drive produces a total of 8 different cutting speeds for the ram. The speed changes in the box are accomplished while the machine is running by means of 7 heat treated steel gears, the teeth of which are machine rounded to facilitate meshing, and two operating levers which are located so the operator can handle them without effort.

One of the features of this mechanism that should certainly appeal to the prospective buyer is the fact that there is not a loose running part in the whole speed box. Every gear is tight on its shaft, consequently the oiling troubles common to practically all other mechanisms of this kind are absolutely eliminated. All shafts are of crucible steel, are of large diameter, and are given a large center bearing, which materially increases their rigidity and reduces the over-hang of the gears. All shaft bearings are phosphor bronze bushed, and are oiled by means of an efficient gravity oiling system, a recessed bushing being used, which forms a retainer for the oil, which in turn is fed to the bearing by means of a strip of felt placed in a slot cut lengthwise in the bushing. This felt not only filters the lubricant, but regulates its flow and prevents it from running out and being wasted. A return oil groove cut in the bushing also tends to keep the oil circulating to and fro in the bearing, thus preventing its escape.

To further insure the efficiency of this mechanism it has been designed so as to be oil-tight, to permit the transmission to run in oil. Thus a very quiet and long lived drive is provided.

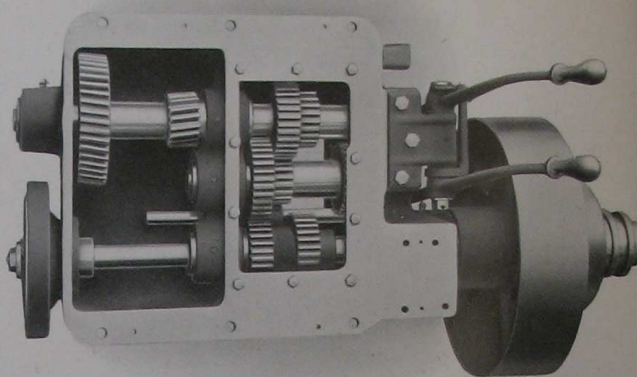
A long friction lever, extending well to the front of the machine for operating convenience, controls a large diameter friction incorporated in the driving pulley, by means of which the machine can be started or stopped instantly. Acting in unison with the friction clutch is a friction brake located on the opposite side of the box, which stops the ram instantly when the friction clutch is thrown out.

COUNTERSHAFT has tight and loose pulleys 14 in. diameter by $4\frac{1}{4}$ in. face for cone drive, and 14"x5" for speed box drive. Speed of countershaft for cone drive, 325 R. P. M.; for gear box drive, 365 R. P. M.

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

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

For description of shaper attachments see special circular.



Interior of 4 Change Speed Box.

621.98

Tables and Vises for "AMERICAN" Crank Shapers.



Fig. No. 224-E.
Mold Makers' Vise
For 16 in., 20 in., 24 in. and 28 in. sizes.
Code Word: KIN.

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

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

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

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

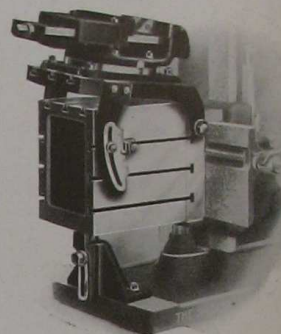


Fig. No. 224-F.
Tilting Top for Box Table
For 15 in., 16 in., 20 in., 24 in. and 28 in. sizes.
Code Word: LENT.

This consists of an auxiliary table hinged to the saddle and clamped at any angle by segments on both sides. Graduated scale is provided on front segment for accurate setting. This top may be applied to any plain box table. Tables for 20 in., 24 in. and 28 in. sizes are provided with elevating screws similar to No. 217-B.

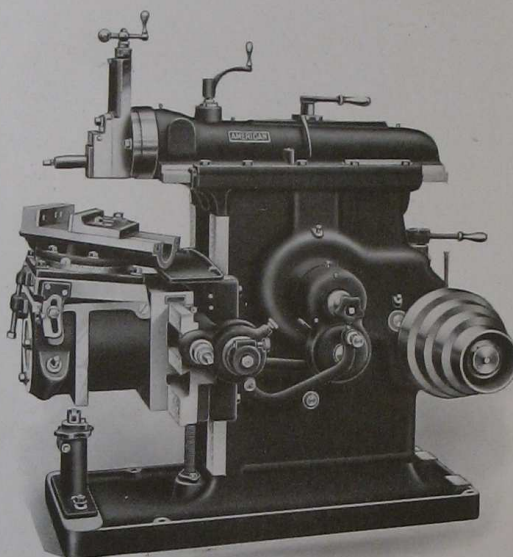


Fig. No. 217-B.
Universal Table and Vise
For 15 in., 16 in., 20 in., 24 in. and 28 in. sizes.
Code Word: UNIT.

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

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

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

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

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

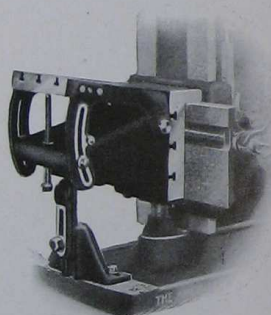


Fig. No. 224-D.
Mold Makers' Tilting Table
For 20 in., 24 in. and 28 in. sizes.
Code Word: LENCE.

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

This table is interchangeable with regular plain box table.

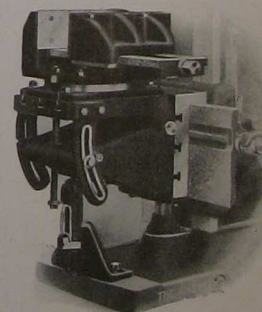


Fig. No. 224-K.
Mold Makers' Vise and Table
(Combined.)
For 20 in., 24 in. and 28 in. sizes.

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

THE AMERICAN TOOL WORKS CO.

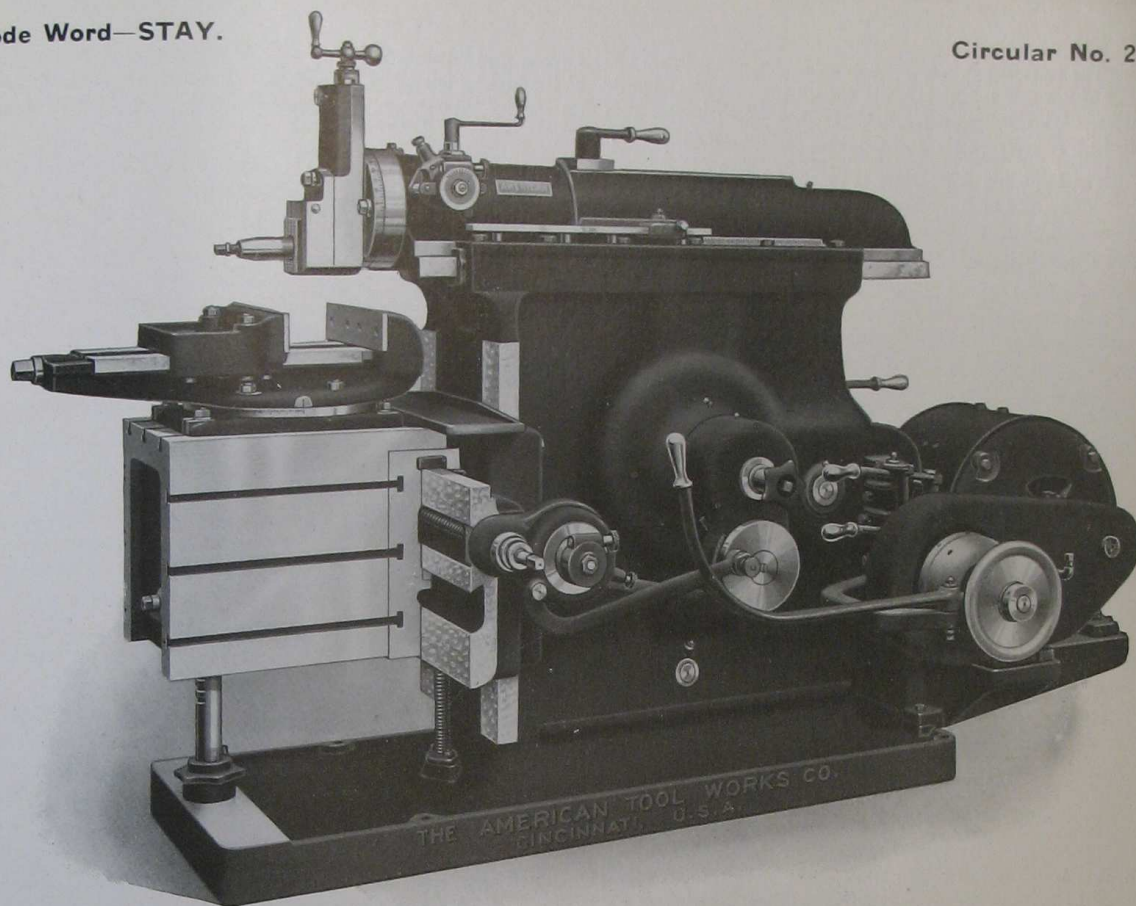
LATHES, PLANERS, SHAPERS, RADIAL DRILLS

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

621,98

Code Word—STAY.

Circular No. 227.



AMERICAN

28-inch Heavy Service Shaper (Back Geared)

Length of Stroke.....	28 $\frac{3}{4}$ "
Vertical traverse of Table.....	16"
Horizontal travel of Table.....	30"
Top surface of Table.....	16" x 22"
Side surface of Table.....	17 $\frac{1}{2}$ " x 17"
Vise opening.....	16"

The working efficiency of any shaper depends primarily upon its ability to perform all classes of work at the highest speeds and coarsest feeds practicable, and at the same time to produce a finished product of dependable accuracy.

To obtain these results a shaper must combine ample power, rigidity and a suitable range of cutting speeds and feeds with a high standard of workmanship. The relative or comparative value, therefore, of a machine of this type must be determined by a careful consideration of these features, both individually and collectively, the ultimate decision being given the machine in which these points are developed to the highest degree.

When designing the new "American" Heavy Service Shaper these conditions were borne constantly in mind, with the consequent result that this new machine is the very latest and highest development in this particular field, in which the objectionable features of former designs have been superseded by new features of proven efficiency.

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

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

The workmanship is of the same high standard that has characterized "American" products for many years past, a complete system of jigs and templates being used, which insures accuracy of the highest standard, as well as the absolute interchangeability of parts. We unqualifiedly guarantee the workmanship and accuracy of "American" Shapers, the limit of error allowed being .001 of an inch up to the full capacity of the machine.

The following description is devoted to the more important and essential points in the construction of "American" Heavy Service Shapers, which merit the most careful consideration. It will show conclusively that neither expense nor intelligent effort has been spared to produce a design which is not only efficient, powerful and substantial, but one that is also so conveniently arranged that it may be operated with a minimum of effort and loss of time.

POWER—One of the first points considered when laying out this new shaper was that of power input. The approximate power a shaper of this size would require for performing the heaviest classes of work was determined, then sufficient extra power added to provide a safe working margin. Consequently this machine is endowed with greater power than will ever be required for the average heavy work, and therefore when doing such work will not be constantly working up to the limit of its capacity. The cone steps are large in diameter and wide of face, being arranged to accommodate a 3" belt. The countershaft speeds are exceptionally fast, and the back gear ratios correspondingly high.

STROKES PER MINUTE—Before deciding on the stroke range a very thorough investigation was made to determine the proper cutting speeds for metals of various kinds and lengths. As a result of this investigation a range of 8 strokes from 6.5 to 90 per minute was provided, this range being in geometrical progression, and calculated to give the best results on all classes of work. It will be interesting to note here that, while a wider range could easily have been furnished, it was found that a slower speed than 6.5 is entirely unnecessary, and a faster speed than 90 impracticable on account of the excess of vibration caused by the rapid stroke and the undue wear on the machine. Therefore, by confining this range to productive limits a closer speed increment is obtained, which in turn imparts to the machine a higher working efficiency.

The length of stroke may be easily changed at will without stopping the machine, the device for positioning the stroke being located on the ram near the head, and may be operated while the machine is running. A pointer on the ram traveling along an index shows the length of stroke as set.

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

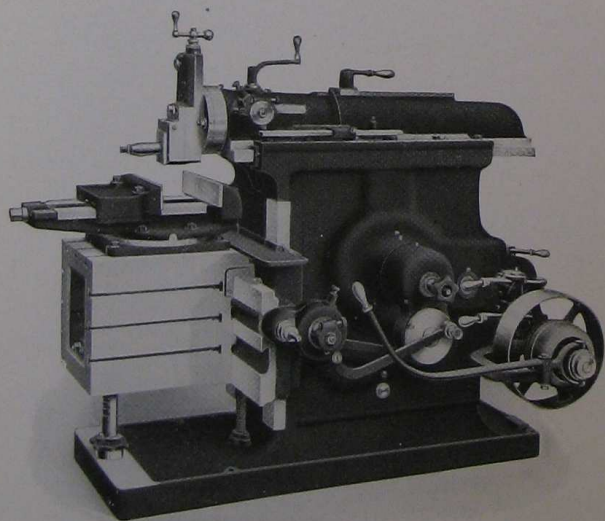
This construction is far superior to that used on other designs in which the Rocker Arm is attached directly to the Ram. With this latter construction the Rocker Arm tends to lift the Ram during the first half of the cutting stroke, and, moreover, requires the Ram to constantly carry the "dead weight" of all the parts, thus causing more rapid wear on the ram bearings, besides consuming more power. This latter design will also cause the work to show all the vibration which takes place in the Rocker Arm. On "American" Shapers the Rocker Arm is made in a complete "U" section for its entire length, and is further strengthened by heavy transverse and cross ribbing. The Ram is very heavy, and is designed for uniform rigidity throughout its entire length of stroke. It is thoroughly braced by internal ribs, and has long wide bearings on column, with *continuous taper gib* having end screw adjustment for taking up the wear.

FULL LENGTH TAPER GIBS—One of the most vital features of "American" Shapers, and one which is absolutely essential to the life and accuracy of any Shaper, is the use of Full Length Taper Gibs for taking up the wear. These gibs are arranged for end screw adjustment, by means of which a perfect full length bearing can be constantly maintained, and the rate of wear kept down to a minimum. The importance of this feature cannot be over-estimated, for the rate of depreciation of a machine tool is directly proportionate to the rate of wear in its bearings.

The Full Length Taper Gib undoubtedly affords a more efficient and convenient method of taking up wear than is provided with flat gibs which require the use of a series of set screws for adjustment. Full length metal to metal contact is impossible with the latter type of gib. Moreover, it is also very difficult to make the necessary adjustment.

With our Full Length Taper Gib construction the degree of accuracy inherent in "American" Shapers positively can be retained throughout the life of the machine, and a full length metal to metal contact is assured at all times.

CROSS FEED is absolutely new, and possesses advantages common only to its own particular design. It is both automatic and variable, providing a nicely graded range of graduated feeds (24 in number) from .008" to 200" per stroke of ram. Feeds can be changed and accurately set while machine is running, by means of a knurled knob conveniently located. The feed is thrown in or out, also reversed, through a



Shaper With Speed Box Drive.

knob on the feed plunger. The reversal of the feed at the opposite end of the ram stroke is accomplished by a plunger in the face of the swinging gear on the bonnet, which engages either one of two holes in opposite sides of the gear. Whether the feed takes place at the beginning or end of the stroke depends upon which hole is engaged by the plunger. All parts of the feed mechanism are compact, and present a neat and symmetrical appearance, while all the gears in this mechanism are securely covered.

An automatic safety device is provided, the connection between the feed mechanism and cross-feed screw being made by means of a fibre adjustable friction. This forms a "Fool Proof" feature which will protect the feed works from damage should the tool accidentally be fed into the cut, or the apron be fed into either end of the cross-rail. This fibre friction can be adjusted to pull the heaviest cut without slippage, and is not subject to atmospheric conditions, temperature, or the action of oil.

RIGIDITY—In order that the unusual power of this shaper may be utilized to advantage, every part of the machine has been designed to produce the greatest rigidity and to easily withstand the severe stresses that the use of this power would impose upon the various parts.

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

BASE is of large proportions, very deep, and strongly ribbed, affording an excellent foundation for the machine. It is of the extension type, with a pad at the end to receive table support. It is of pan construction, both inside and out, to catch oil drippings thus protecting the floor and foundation. Means are provided for draining off the oil collected on the inside.

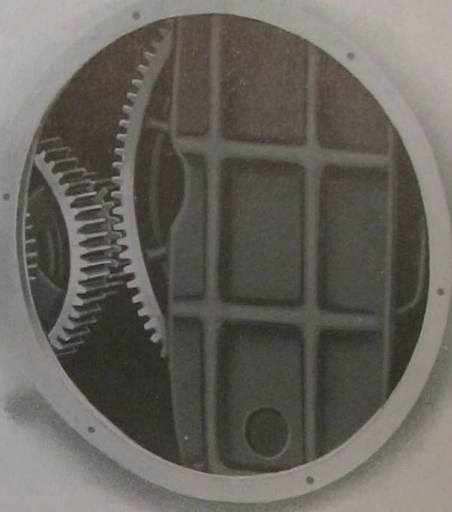
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The top of the table extends over and bears upon the top of the apron, thus increasing its rigidity, and preventing dirt from working down between the table and saddle. This construction also removes the strain from the clamping bolts, and at the same time adds considerable working surface to the table. In order to further safeguard the bearings of the rail and column a dirt guard of pan construction is fastened to the rail, which catches chips and dirt that might otherwise work into the bearings. Felt wipers are provided on both ends of saddle, which remove the dirt and chips from the top of the rail and at the same time lubricate the surface. This table is firmly fitted to the apron by means of 5 bolts, 3 at the top and 2 at the bottom. The rigidity of this connection is further materially increased by 2 dowel pins extending through the top of the table into the saddle. These pins permanently locate the table in its proper position on the saddle, also greatly increase its rigidity by preventing vibration under a cut.

CROSS RAIL is of box form, very heavy, and strongly ribbed, and, being of exceptional length, gives the table a long horizontal range of travel. Three extra wide bearings for the apron are provided, which insure rigidity at that point. The rail is bolted to the column by clamps and bolts of improved design, which prevent its dropping away when the binder bolts are loosened. A stationary elevating screw of large diameter is provided, a ball thrust bearing being provided on the elevating nut for facilitating the elevation of the rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw.

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

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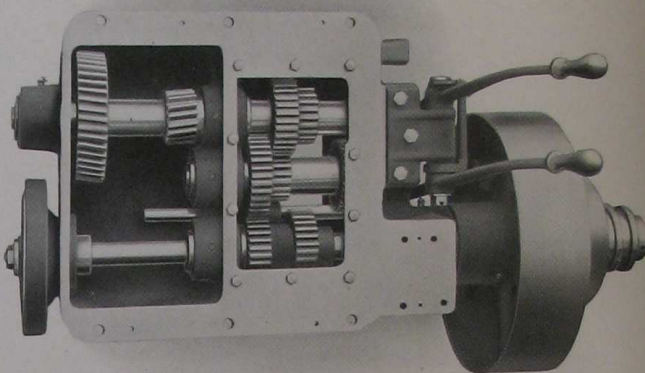
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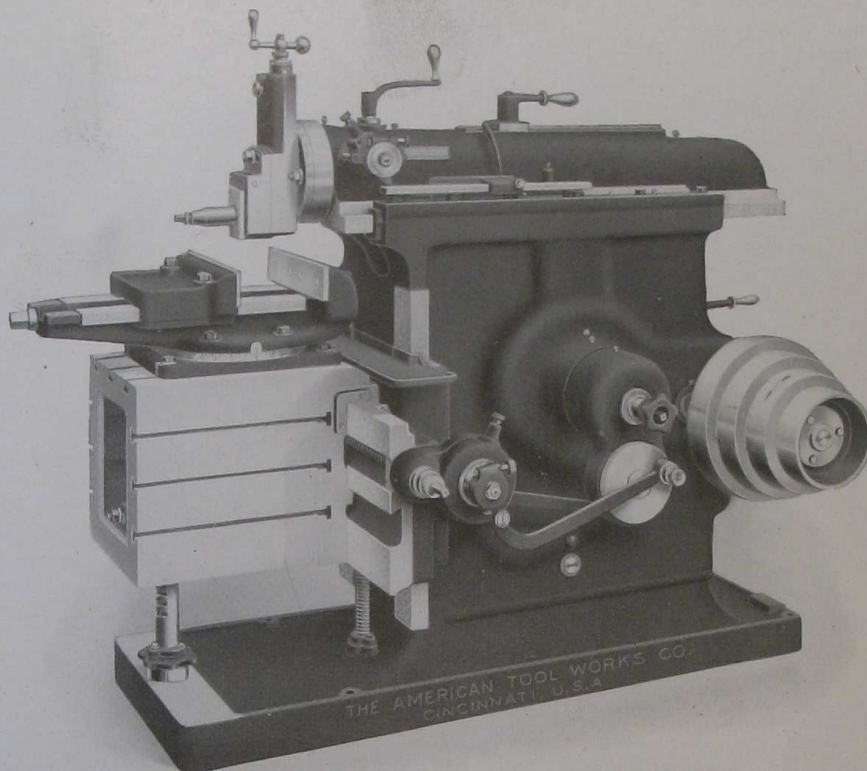
For description of shaper attachments see special circular.



Interior of 4 Change Speed Box.

Code Word—SEAL.

Circular No. 218.



AMERICAN

16-inch Heavy Service Shaper

(Back Geared)

Length of Stroke.....	16 $\frac{3}{4}$ "
Vertical traverse of Table.....	15"
Horizontal travel of Table.....	22"
Top surface of Table.....	13" x 16 $\frac{1}{2}$ "
Side surface of Table.....	13 $\frac{1}{2}$ " x 15"
Vise opening.....	12"

The working efficiency of any shaper depends primarily upon its ability to perform all classes of work at the highest speeds and coarsest feeds practicable, and at the same time to produce a finished product of dependable accuracy.

To obtain these results a shaper must combine ample power, rigidity and a suitable range of cutting speeds and feeds with a high standard of workmanship. The relative or comparative value, therefore, of a machine of this type must be determined by a careful consideration of these features, both individually and collectively, the ultimate decision being given the machine in which these points are developed to the highest degree.

When designing the new "American" Heavy Service Shaper these conditions were borne constantly in mind, with the consequent result that this new machine is the very latest and highest development in this particular field, in which the objectionable features of former designs have been superseded by new features of proven efficiency.

THE AMERICAN TOOL WORKS CO.

LATHES, PLANERS, SHAPERS, RADIAL DRILLS

MAIN OFFICES AND WORKS

CINCINNATI, U. S. A.

The workmanship is of the same high standard that has characterized "American" products for many years past, a complete system of jigs and templates being used, which insures accuracy of the highest standard, as well as the absolute interchangeability of parts. We unqualifiedly guarantee the workmanship and accuracy of "American" Shapers, the limit of error allowed being .001 of an inch up to the full capacity of the machine.

The following description is devoted to the more important and essential points in the construction of "American" Heavy Service Shapers, which merit the most careful consideration. It will show conclusively that neither expense nor intelligent effort has been spared to produce a design which is not only efficient, powerful and substantial, but one that is also so conveniently arranged that it may be operated with a minimum of effort and loss of time.

POWER—One of the first points considered when laying out this new shaper was that of power input. The approximate power a shaper of this size would require for performing the heaviest classes of work was determined, then sufficient extra power added to provide a safe working margin. Consequently this machine is endowed with greater power than will ever be required for the average heavy work, and therefore when doing such work will not be constantly working up to the limit of its capacity. The cone steps are large in diameter and wide of face, being arranged to accommodate a $2\frac{1}{2}$ " belt. The countershaft speeds are exceptionally fast, and the back gear ratios correspondingly high.

STROKES PER MINUTE—Before deciding on the stroke range a very thorough investigation was made to determine the proper cutting speeds for metals of various kinds and lengths. As a result of this investigation a range of 8 strokes from 8 to 121 per minute was provided, this range being in geometrical progression, and calculated to give the best results on all classes of work. It will be interesting to note here that, while a wider range could easily have been furnished, it was found that a slower speed than 8 is entirely unnecessary, and a faster speed than 121 impracticable on account of the excess of vibration caused by the rapid stroke and the undue wear on the machine. Therefore, by confining this range to productive limits a closer speed increment is obtained, which in turn imparts to the machine a higher working efficiency.

The length of stroke may be easily changed at will without stopping the machine, the device for positioning the stroke being located on the ram near the head, and may be operated while the machine is running. A pointer on the ram traveling along an index shows the length of stroke as set.

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

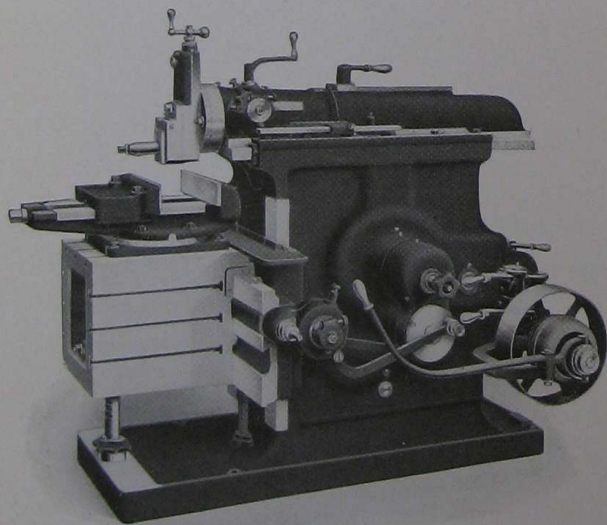
This construction is far superior to that used on other designs in which the Rocker Arm is attached directly to the Ram. With this latter construction the Rocker Arm tends to lift the Ram during the first half of the cutting stroke, and, moreover, requires the Ram to constantly carry the "dead weight" of all the parts, thus causing more rapid wear on the ram bearings, besides consuming more power. This latter design will also cause the work to show all the vibration which takes place in the Rocker Arm. On "American" Shapers the Rocker Arm is made in a complete "U" section for its entire length, and is further strengthened by heavy transverse and cross ribbing. The Ram is very heavy, and is designed for uniform rigidity throughout its entire length of stroke. It is thoroughly braced by internal ribs, and has long wide bearings on column, with *continuous taper gib* having end screw adjustment for taking up the wear.

FULL LENGTH TAPER GIBS—One of the most vital features of "American" Shapers, and one which is absolutely essential to the life and accuracy of any Shaper, is the use of Full Length Taper Gibs for taking up the wear. These gibs are arranged for end screw adjustment, by means of which a perfect full length bearing can be constantly maintained, and the rate of wear kept down to a minimum. The importance of this feature cannot be over-estimated, for the rate of depreciation of a machine tool is directly proportionate to the rate of wear in its bearings.

The Full Length Taper Gib undoubtedly affords a more efficient and convenient method of taking up wear than is provided with flat gibs which require the use of a series of set screws for adjustment. Full length metal to metal contact is impossible with the latter type of gib. Moreover, it is also very difficult to make the necessary adjustment.

With our Full Length Taper Gib construction the degree of accuracy inherent in "American" Shapers positively can be retained throughout the life of the machine, and a full length metal to metal contact is assured at all times.

CROSS FEED is absolutely new, and possesses advantages common only to its own particular design. It is both automatic and variable, providing a nicely graded range of graduated feeds (24 in number) from .006" to .150" per stroke of ram. Feeds can be changed and accurately set while machine is running, by means of a knurled knob conveniently located. The feed is thrown in or out, also reversed, through a



Shaper With Speed Box Drive.

knob on the feed plunger. The reversal of the feed at the opposite end of the ram stroke is accomplished by a plunger in the face of the swinging gear on the bonnet, which engages either one of two holes in opposite sides of the gear. Whether the feed takes place at the beginning or end of the stroke depends upon which hole is engaged by the plunger. All parts of the feed mechanism are compact, and present a neat and symmetrical appearance, while all the gears in this mechanism are securely covered.

An automatic safety device is provided, the connection between the feed mechanism and cross-feed screw being made by means of a fibre adjustable friction. This forms a "Fool Proof" feature which will protect the feed works from damage should the tool accidentally be fed into the cut, or the apron be fed into either end of the cross-rail. This fibre friction can be adjusted to pull the heaviest cut without slippage, and is not subject to atmospheric conditions, temperature, or the action of oil.

RIGIDITY—In order that the unusual power of this shaper may be utilized to advantage, every part of the machine has been designed to produce the greatest rigidity and to easily withstand the severe stresses that the use of this power would impose upon the various parts.

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

BASE is of large proportions, very deep, and strongly ribbed, affording an excellent foundation for the machine. It is of the extension type, with a pad at the end to receive table support. It is of pan construction, both inside and out, to catch oil drippings thus protecting the floor and foundation. Means are provided for draining off the oil collected on the inside.

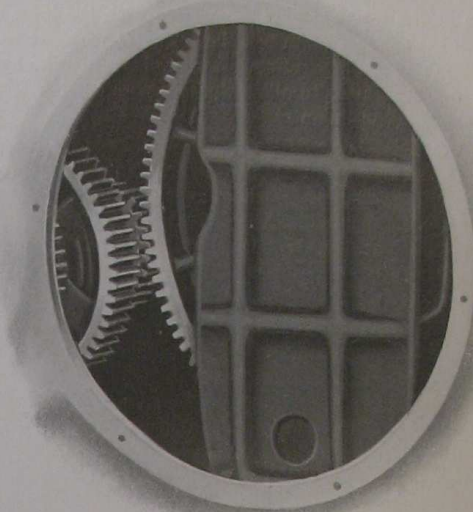
TABLE is made in a complete box section, and is therefore not liable to spring or deflect when heavy work is bolted on its side. The slots are all planed from the solid, the side slots being set in the horizontal plane, thus obviating the possibility of the work bolted to the side dropping down on the base when the clamping bolts are loosened.

The top of the table extends over and bears upon the top of the apron, thus increasing its rigidity, and preventing dirt from working down between the table and saddle. This construction also removes the strain from the clamping bolts, and at the same time adds considerable working surface to the table. In order to further safeguard the bearings of the rail and column a dirt guard of pan construction is fastened to the rail, which catches chips and dirt that might otherwise work into the bearings. Felt wipers are provided on both ends of saddle, which remove the dirt and chips from the top of the rail and at the same time lubricate the surface. This table is firmly fitted to the apron by means of 5 bolts, 3 at the top and 2 at the bottom. The rigidity of this connection is further materially increased by 2 dowel pins extending through the top of the table into the saddle. These pins permanently locate the table in its proper position on the saddle, also greatly increase its rigidity by preventing vibration under a cut.

CROSS RAIL is of box form, very heavy, and strongly ribbed, and, being of exceptional length, gives the table a long horizontal range of travel. Three extra wide bearings for the apron are provided, which insure rigidity at that point. The rail is bolted to the column by clamps and bolts of improved design, which prevent its dropping away when the binder bolts are loosened. A stationary elevating screw of large diameter is provided, a ball thrust bearing being provided on the elevating nut for facilitating the elevation of the rail. This screw enables the machine to be set on a concrete or other floor without requiring a hole through same to accommodate the travel of the screw.

HEAD is operative at any angle within an arc of 100 degrees, and has convenient and efficient locking device. The down slide is fitted with a continuous taper gib having end screw adjustment for taking up the wear. The down feed is of unusual length, the feed screw having an adjustable graduated collar reading in .001 in. A large tool post is supplied for using holders with inserted bits, and has tool steel tool post screw and tool steel serrated back plate.

TABLE SUPPORT—The table support furnished with this shaper is absolutely new in design, and represents a radical departure from the designs furnished on other makes. It consists of a notched bar supplied with an adjustable nut at the bottom, and is operative throughout the full traverse of the rail. The notches are spaced 1 inch apart and are engaged by a spring plunger after the rail has been properly adjusted, any further adjustment necessary being accomplished through the nut at the bottom of the notched bar which bears on the planed surface of the base. This support is rigid and positive, and provides the further advantage of relieving the rail of the weight of the table and work, thus insuring a high degree of accuracy in the work produced and less wear on the bearings.



Showing Massive Construction of Gears and Rocker Arm.

KEYSEATING CAPACITY—Rocker arm is made double section at the top, which, in connection with the large opening through the column, permits a shaft 4 in. diameter to be passed under the ram for keyseating. Larger shafts may be keyseated by setting over table to allow shaft to pass outside of column, using the head set on an angle.

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

LUBRICATION—Special attention has been paid to the thorough lubrication of all working parts, thereby insuring long life and satisfactory service from the machine. The ram slides are oiled by means of a gravity system, oil reservoirs being provided in the ram and clamps, from which felt wipers take their supply of oil, and distribute it through grooves to the extreme ends of the slides, thus doing away with a multiplicity of oil holes. The felt wipers also effectually strain the lubricant, thus insuring clean oil at all times. Ram slides are provided with felt wipers at the front of the column, assisting in perfect lubrication, also preventing oil from dripping down over the front of the machine. A large quantity of oil is stored in a pocket cast integral with the rocker arm, which, with suitable means for distribution, insures thorough lubrication of the sliding block in the rocker arm. A felt strip inserted in a reservoir in sliding block insures constant lubrication. The sliding block is a hardened steel forging, and the wrist pin has a bronze sleeve which turns in sliding block.

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

ALL SHAFTS are made of crucible steel, and are accurately ground, and all running bearings are bushed, thus providing for easy renewal in case of wear. Bearings for driving pulley and bull wheel are very massive and are cast integral with the column.

THE CONE PULLEY is supported by a large steel sleeve extending well into the cone, which eliminates the necessity of an outboard support on the pulley, and relieves the driving shaft from all belt strain. This sleeve is provided with an efficient automatic oiling arrangement which supplies a continuous flow of oil through the journals. The cone pulley is bronze lined, as is also the steel sleeve in which the driving shaft is journaled.

SPEED BOX—The new speed box, designed especially for the "American" Heavy Service Shaper, is radically different from anything heretofore furnished for the same purpose.

As shown by the illustration, this speed box is a complete unit which is absolutely and quickly interchangeable with the cone pulley drive unit; consequently a cone pulley driven shaper can be readily converted to speed box drive without any complications whatever any time after shipment, and vice versa.

This unit is located in its proper position on the column by means of dowel pins, and is held firmly in place by 6 large bolts.

The speed box drive provides 4 changes of speed, which combined with the back gear drive produces a total of 8 different cutting speeds for the ram. The speed changes in the box are accomplished while the machine is running by means of 7 heat treated steel gears, the teeth of which are machine rounded to facilitate meshing, and two operating levers which are located so the operator can handle them without effort.

One of the features of this mechanism that should certainly appeal to the prospective buyer is the fact that there is not a loose running part in the whole speed box. Every gear is tight on its shaft, consequently the oiling troubles common to practically all other mechanisms of this kind are absolutely eliminated. All shafts are of crucible steel, are of large diameter, and are given a large center bearing, which materially increases their rigidity and reduces the over-hang of the gears. All shaft bearings are phosphor bronze bushed, and are oiled by means of an efficient gravity oiling system, a recessed bushing being used, which forms a retainer for the oil, which in turn is fed to the bearing by means of a strip of felt placed in a slot cut lengthwise in the bushing. This felt not only filters the lubricant, but regulates its flow and prevents it from running out and being wasted. A return oil groove cut in the bushing also tends to keep the oil circulating to and fro in the bearing, thus preventing its escape.

To further insure the efficiency of this mechanism it has been designed so as to be oil-tight, to permit the transmission to run in oil. Thus a very quiet and long lived drive is provided.

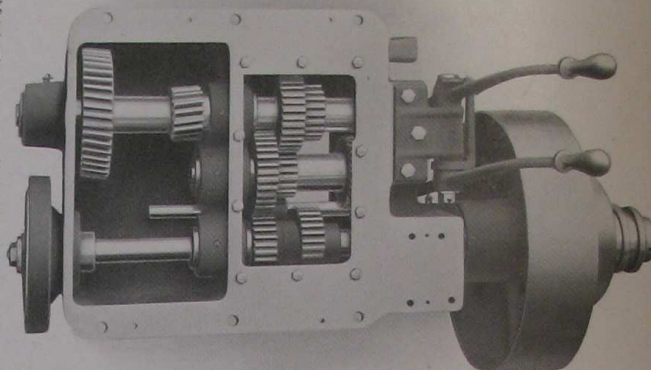
A long friction lever, extending well to the front of the machine for operating convenience, controls a large diameter friction incorporated in the driving pulley, by means of which the machine can be started or stopped instantly. Acting in unison with the friction clutch is a friction brake located on the opposite side of the box, which stops the ram instantly when the friction clutch is thrown out.

COUNTERSHAFT has tight and loose pulleys 14 in. diameter by $3\frac{1}{2}$ in. face for cone drive, and $12 \times 4\frac{1}{4}$ in. for speed box drive. Speed of countershaft for cone drive, 320 R. P. M.; for gear box drive, 390 R. P. M.

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

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

For description of shaper attachments see special circular.



Interior of 4 Change Speed Box.