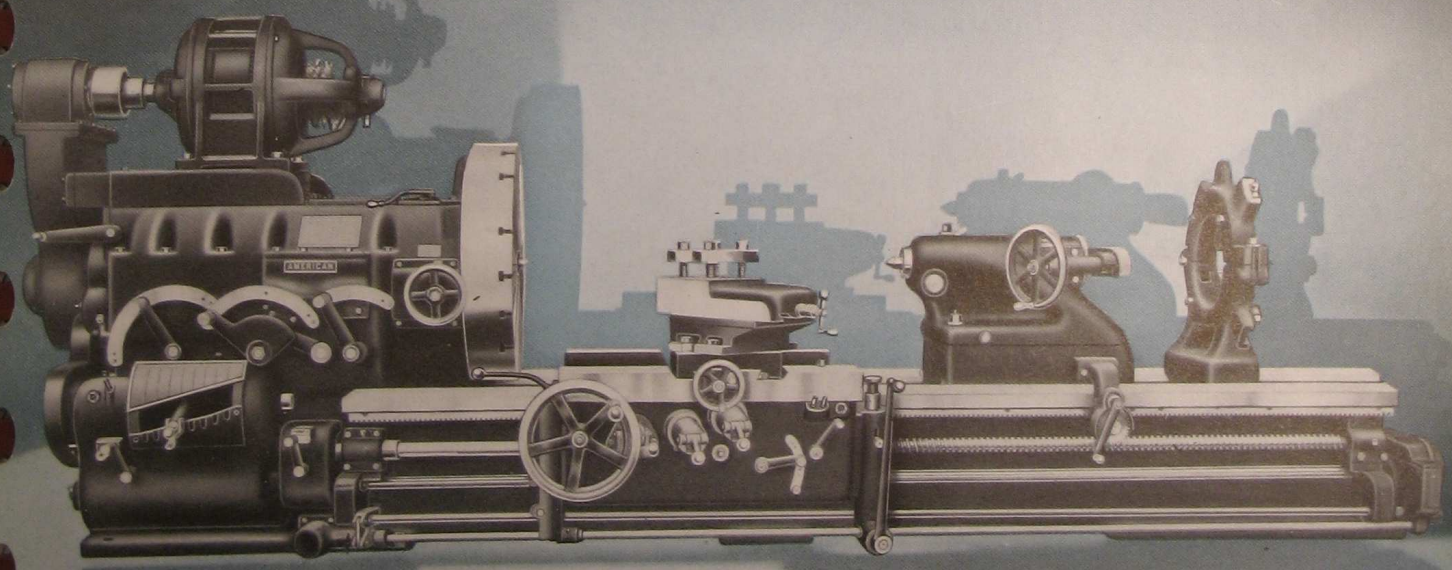
BULLETIN No. 76

"AMERICAN"

Super Productive

36" LATHE

EXTRA HEAVY



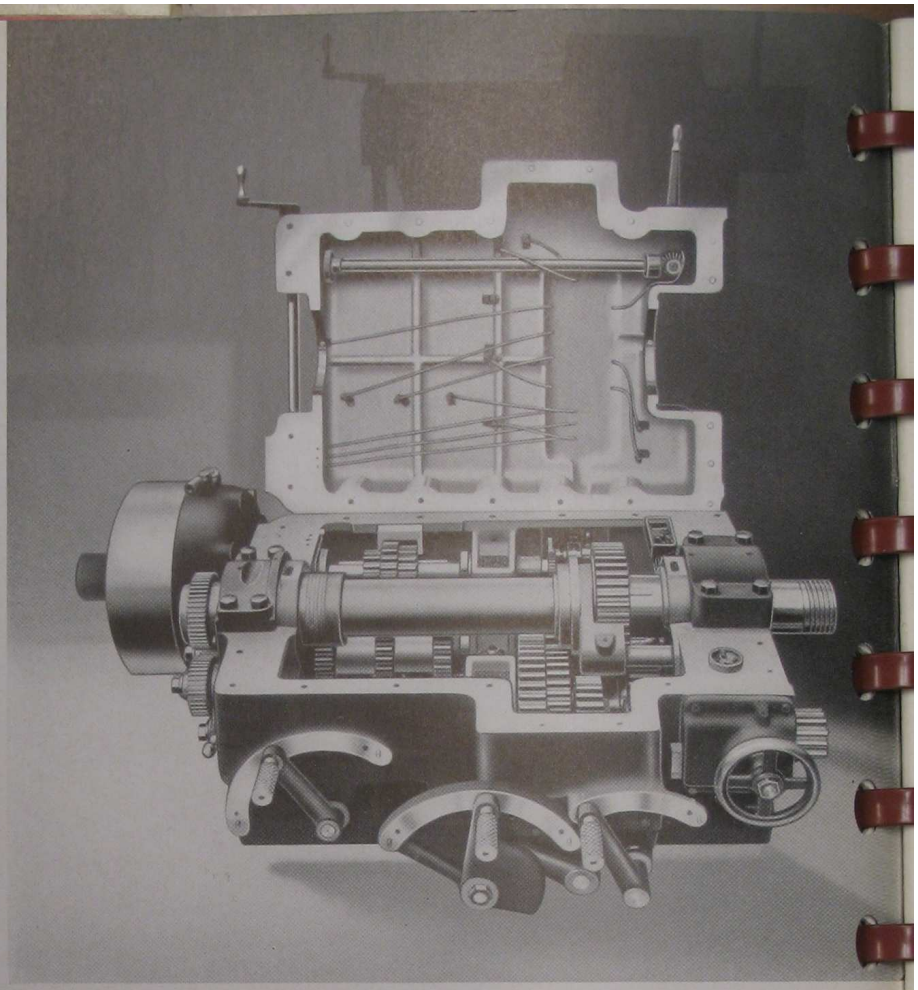
THE AMERICAN TOOL WORKS COMPANY

Lathes Radials Shapers

MAIN OFFICE AND WORKS

CINCINNATI, U.S.A.

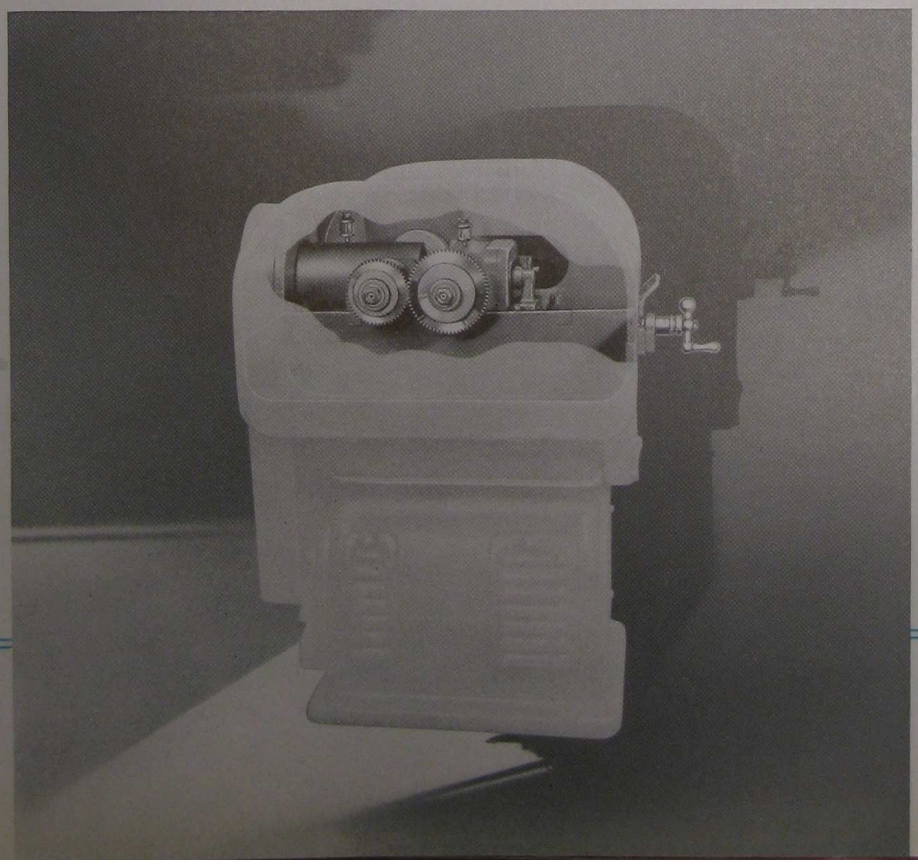
HEADSTOCK 18 SPINDLE SPEEDS



The unit of paramount importance is the headstock. In excellence of design and construction the "American" is outstanding. The "American" geared headstock is simplified to the highest degree. The 18 spindle speeds are obtained through 16 gears, including the face plate internal gear and pinion, without the use of either friction or jaw clutches. All speed changes are made through slip gears, the only ones in operation at any time being those that are actually transmitting power, consequently there are no idle running gears or sleeves in the head to waste power or to stick or seize. Slip gears slide on ground multiple splines.

All gears, including the triple gear and the face plate pinion, are made of a high carbon chrome molybdenum steel, heat-treated and, excepting the large face plate internal gear, are hardened. After hardening, the bores are ground concentric with the pitch diameter by means of a special 4-jaw tooth segment chuck, which equalizes such slight distortion as may occur in the hardening process, thus producing gears, the pitch lines of which will run true within one-half thousandth of an inch, even on the largest gear. The average tensile strength of these gears is approximately 260,000 lbs., and the Brinnell hardness about 385. Our method of treatment produces gears which not only have an extremely hard surface, which will not chip, but also a very tough core, which is practically proof against crystallization.

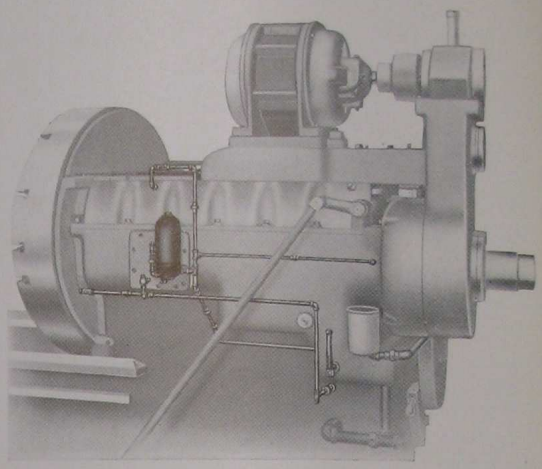
Probably the improvement of greatest importance is the new face plate drive. This new design provides 12 of the 18 spindle speeds through the internal gear face plate drive; only one-third or 6 spindle speeds are transmitted through the spindle gear, consequently for all severe turning operations the drive is through the powerful internal gear in the face plate. This feature cannot be emphasized too strongly. Its value will be better understood by comparing it with other designs, many of which transmit only one-third of the entire speed range through the internal geared face plate. As a consequence other designs are seriously limited as to the diameter of work which can be driven through the internal gear at economical cutting speeds. For example, the highest internal gear speed on the average lathe is approximately 10 R.P.M., while on the new "American" 12 speeds, up to and including 32½ R.P.M. are secured through the internal gear. This maximum internal gear speed of 32½ R.P.M., provides approximately 50′ cutting speed on a 6″ diameter, consequently it follows that all turning operations on diameters 6″ or larger can be performed through the internal gear drive at 50′ or greater cutting speed, the direct drive through the spindle being used only for comparatively light operations at high speeds. On other designs providing maximum internal gear speeds lower than 32½ R.P.M., the smaller work diameters that can be turned on the "American" at economical cutting speeds must be handled either through the direct spindle drive or through the internal gear drive at a much slower and uneconomical cutting speed.



Patented Gear-Lapping Machine

AUTOMATIC OILING

The automatic oiling system is the last word in machine tool lubrication. All bearings in the head, including the spindle bearings, are oiled by a pump circulating system, all oil passing through a metal oil filter before reaching the bearings. The same pump that delivers oil to the bearings also supplies a reservoir in the head cover which serves as a distributing tank for supplying oil to the gear teeth. This oil is filtered through felt before passing on to the gear teeth.



Rear of Headstock showing Metal Oil Filter (Fig. No. 1)

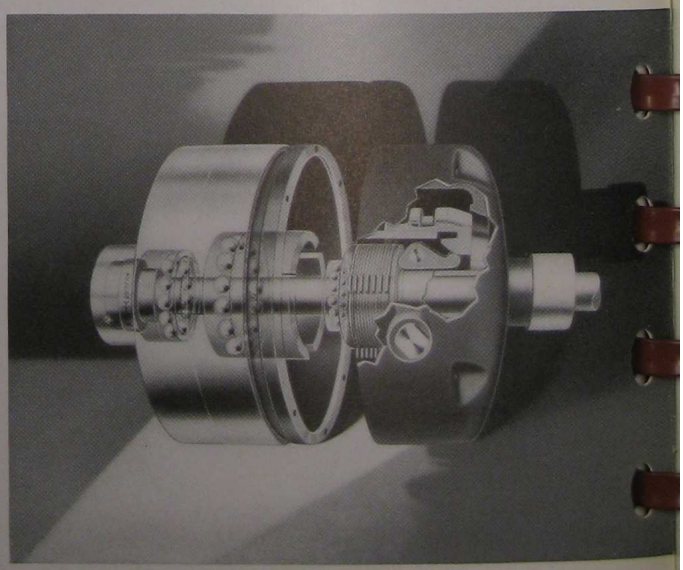
STARTING CLUTCH and BRAKE

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

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

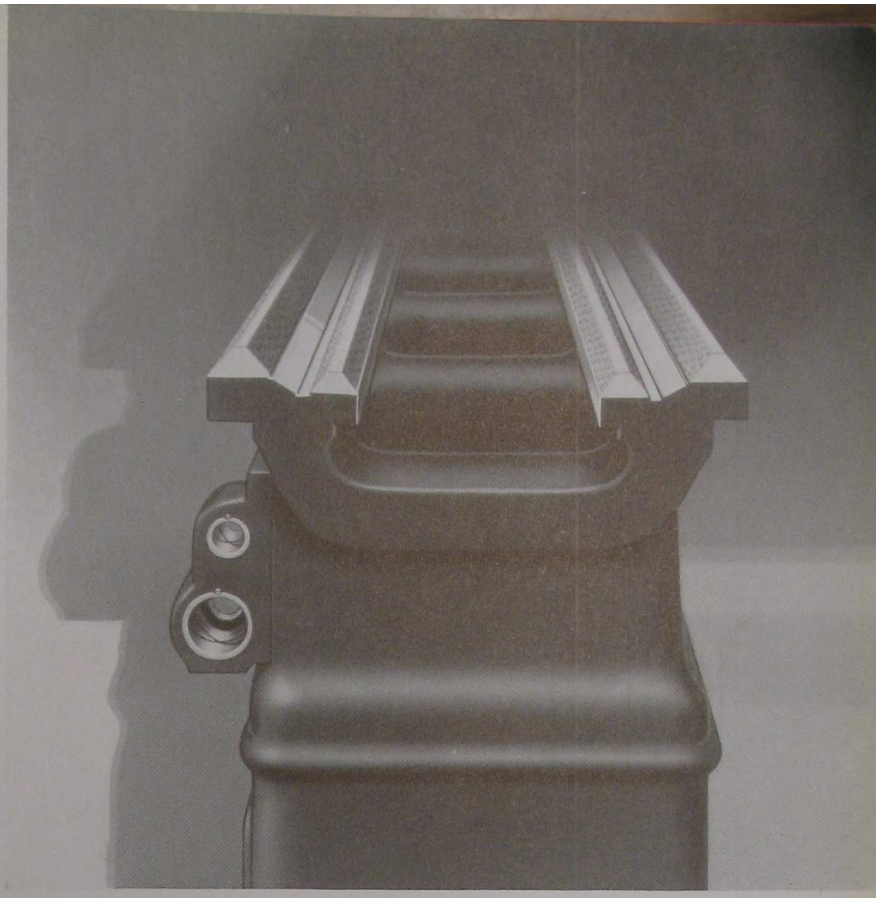
The cone type brake which operates in unison with the clutch is also oiled automatically by means of the head lubricating system and provides adequate braking effort to quickly stop the spindle even at the high speeds now being provided for cutting with cemented carbide tools.

The proportions of the braking elements are much greater than those usually provided in other makes, resulting in a maximum braking action with a minimum of effort and wear.



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

PATENTED 4-VEE BED



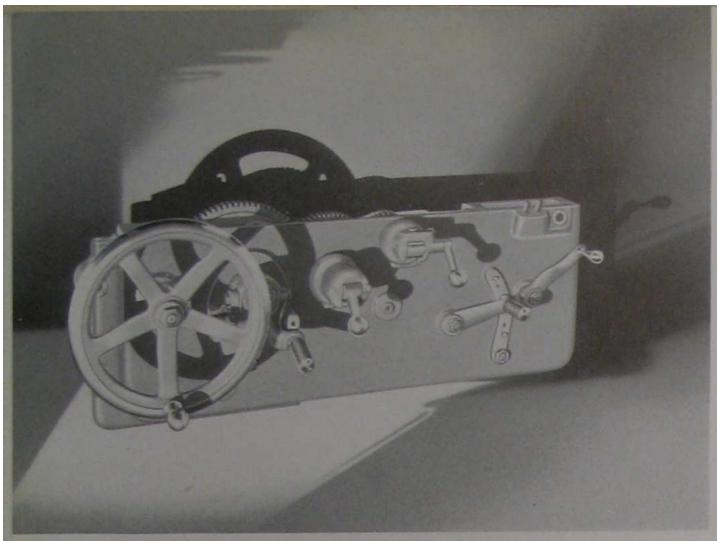
Patented 4-Vee Bed

The bed has been made unusually rigid by increased depth, thicker walls and heavier ribbing. A special mixture is used, containing 80% steel scrap and other ingredients, which produces a semi-steel of approximately 50,000 pounds tensile strength and a scleroscopic hardness of 35 to 38 degrees. The outstanding characteristic of this special metal is the close grained wear-resisting surface it provides for the carriage bearings.

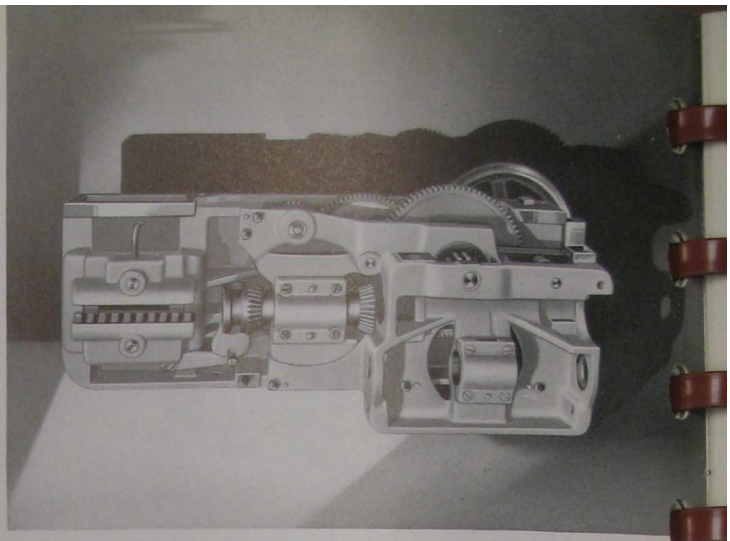
"American" Lathe beds provide 4 large vees for the carriage and tailstock guides, the two inner Vees being dropped below the outer Vees to provide greater swing over the bed and additional carriage bridge thickness. In our opinion, the vee bearing is much easier to keep clean and consequently offers greater resistance to cutting and wear than a flat bearing. When wear does occur, the 4-vee bed wears more evenly than one using a vee and a flat bearing, for it is perfectly obvious that a vee bearing and a flat bearing will not wear equally. The 4-vee bed in providing 2 vee guides for both the carriage and the tailstock insures longer life for their alignments, resulting in the maintenance of accuracy over a longer period of service than is possible with any other type of bed.

APRON

The "American" Lathe apron is a substantial, compact unit using all heat-treated, carefully processed gears and providing outer supports for all studs. The



Double Plate Apron, Front View (Fig. No. 1)



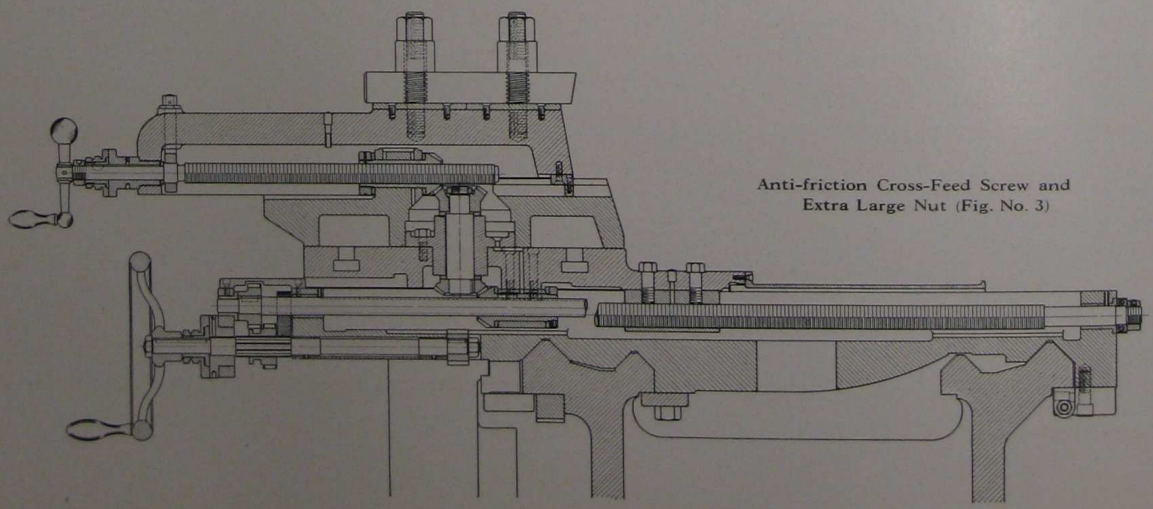
Double Plate Apron, Rear View (Fig. No. 2)

APRON

control for both the cross and longitudinal feeds is through convenient and easily operated drop levers which actuate clutches of the well-known "automobile" control type. The longitudinal friction is the cone type, while the cross feed is through a safety angular tooth type. Both units are held in engagement by a heavy coil spring the same as the automobile clutch and consequently rarely, if ever, require adjustment. Both are disengaged positively and instantly without effort even under the heaviest cuts by means of a cam actuated by the drop type control levers.

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

The oiling of the entire apron is accomplished by means of an instantaneous "one-shot" oiling system. Action of the plunger supplies sufficient oil to distributing reservoir to thoroughly lubricate the apron mechanism for an entire day. The "one-shot" system delivers an adequate supply of oil, but does not supply it in the wasteful abundance of some other systems.

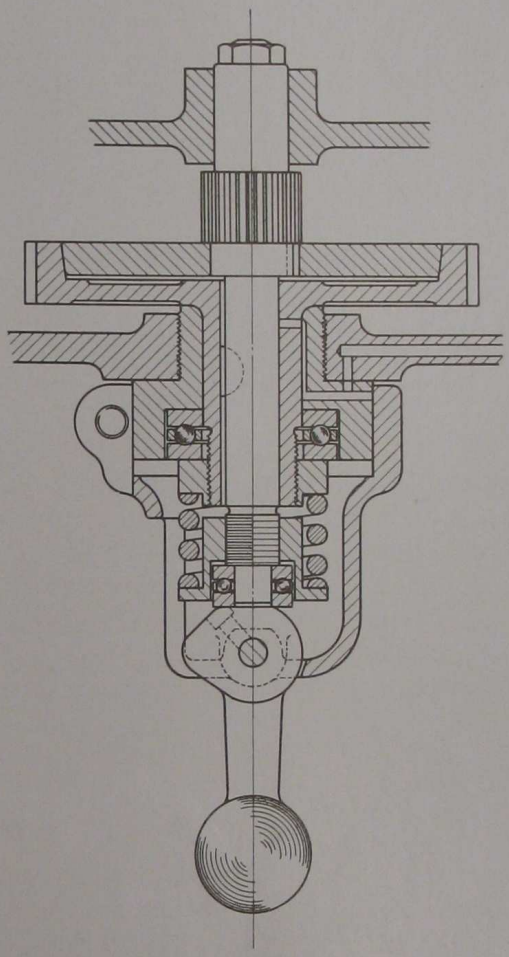


Anti-friction Cross-Feed Screw and Extra Large Nut (Fig. No. 3)

CARRIAGE

The carriage construction is one of the outstanding "American" features. It is unusually rigid, offering the greatest resistance to the cutting thrusts, yet is surprisingly easy in its movement along the bed.

It has three vee bearings on the bed. This design provides a very large bearing area for the carriage and insures long maintenance of original alignments and equal wear on all bearings. Due to the patented Drop Vee Bed, the carriage bridge can be made very deep which, coupled with its large area of contact on the wide angle bed vees, accounts, in a large measure, for its strength and rigidity. The dovetail has been materially increased in width, giving the compound rest a most substantial mounting which, coupled with its very wide bearing on the widened bridge, provides a substantiability of mounting rarely encountered in other makes.

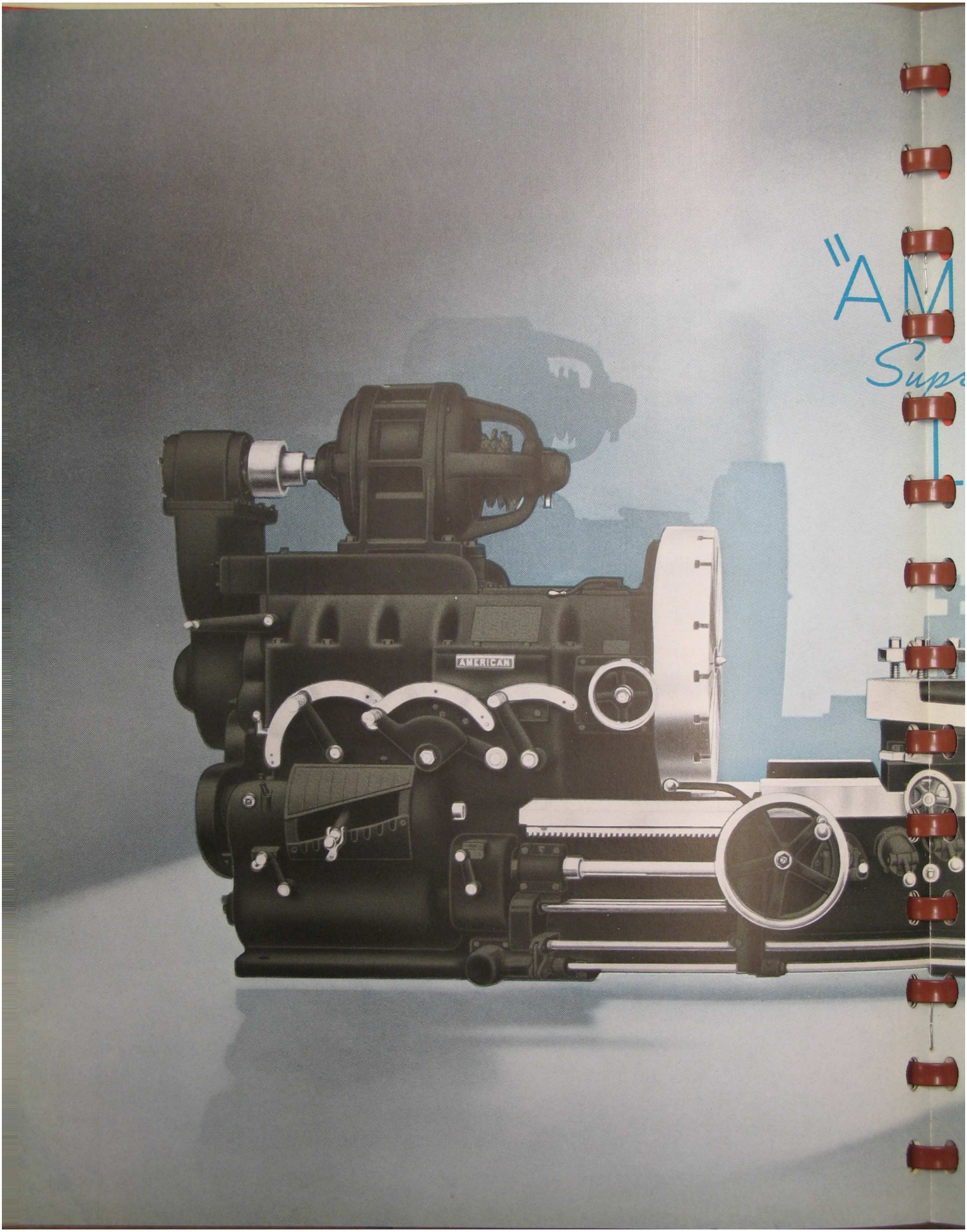


Longitudinal Feed Clutch

Both the carriage vees and the cross slide are adequately lubricated by means of an approved "one-shot" oiling system which functions instantaneously and, at same time, prevents the oil drip and waste encountered in many automatic systems.

For rigidly securing the carriage to the bed, clamps are provided at the front and rear with an adjustable gib at the rear for maintaining the proper contact with the bed vees.

The compound rest and cross-feed screws are very large in diameter, are made from heat-treated alloy steel and have large, easily read micrometer dials. The cross-feed screw is equipped with ball thrust bearings and an extra large cross-feed nut.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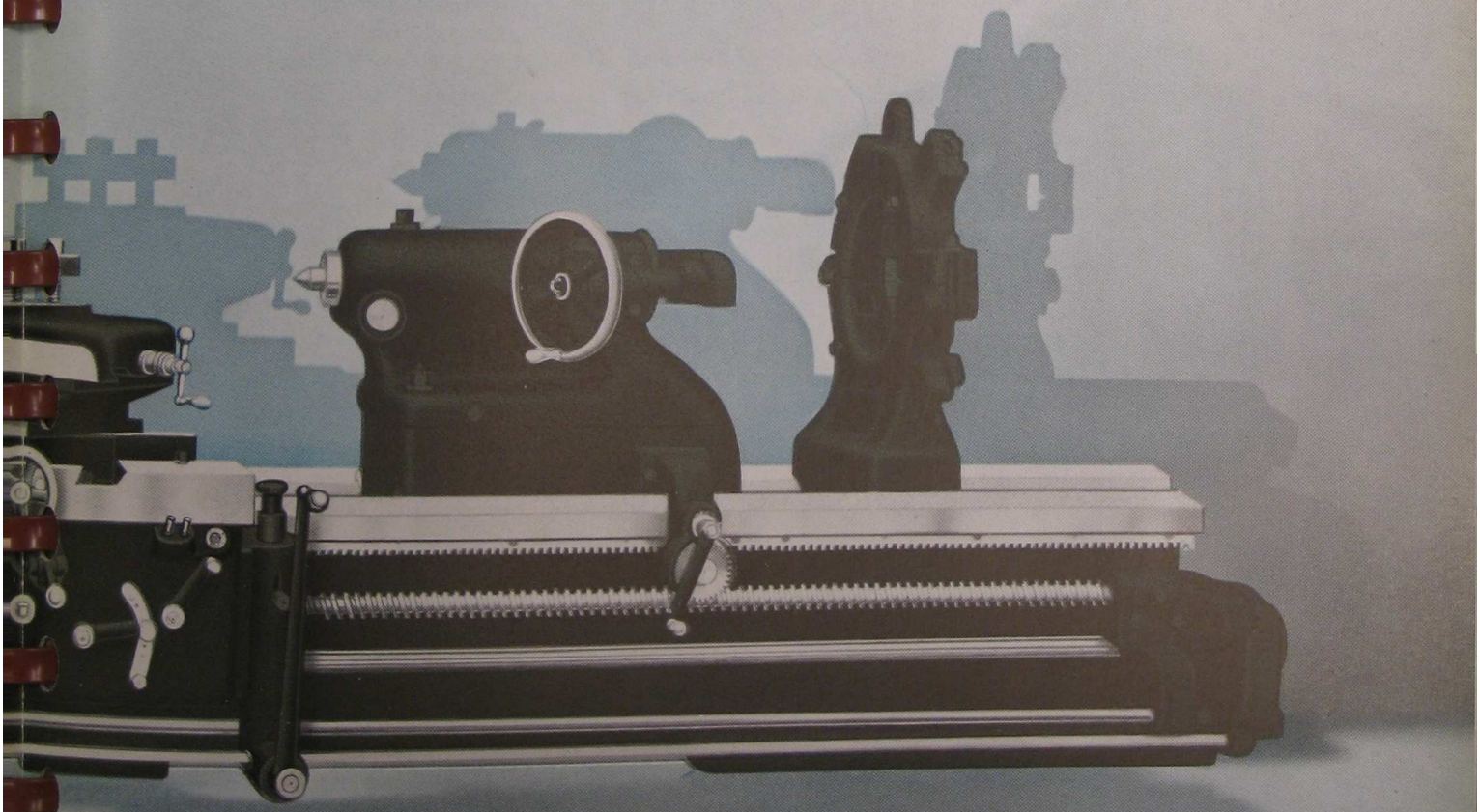


QUICK CHANGE GEAR MECHANISM

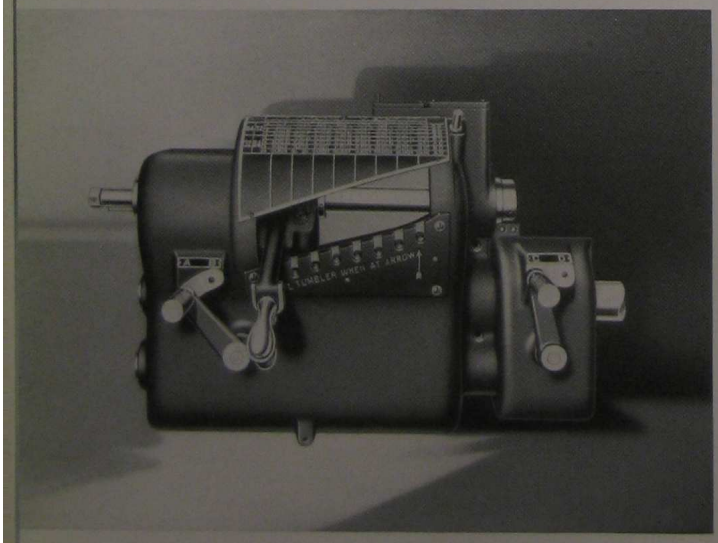
Every standard thread ordinarily used is provided by the "American" quick change mechanism. It has an unusually wide range, yet is simple in design and easy to operate. Only 17 gears are used, all of which are steel and 10 of which are cone and tumbler gears cut with 20° cutters to produce a pointed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

Provision is made for cutting the following range of 48 threads: $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{23}{32}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, $1\frac{7}{16}$, $1\frac{1}{2}$, $1\frac{5}{8}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, $2\frac{7}{8}$, 3, $3\frac{1}{4}$, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$, $5\frac{3}{4}$, 6, $6\frac{1}{2}$, 7, 8, 9, 10, 11, $11\frac{1}{2}$, 12, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28.

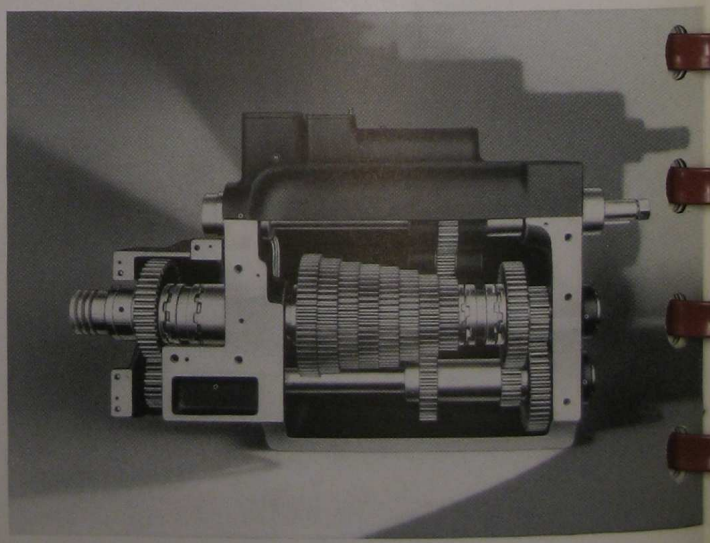
The 48 feeds provided cover a range of $3\frac{1}{3}$ to 200 cuts per inch, each feed rate being approximately 1/7th as coarse as its corresponding thread.

LEADSCREW

The leadscrew is $2\frac{1}{2}$" in diameter, 1 thread per inch. It is made from a high carbon special screw stock, which is ground to size before machining. The

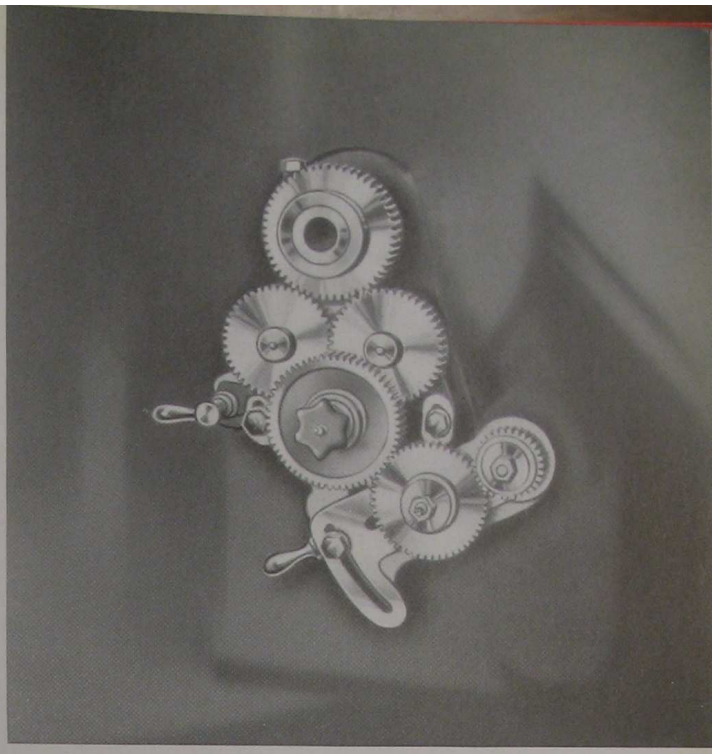


(Fig. No. 1)



(Fig. No. 2)

Quick Change Gear Box, front and rear views



Quadrant Construction

LEADSCREW

threads are first roughed out to within .015″ of their finished size, after which the screw is laid aside to season. It is then finished from a master screw in a special leadscrew lathe, and is guaranteed to be accurate to within a limit of .001″ per foot for its entire length.

SPECIAL THREADS

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

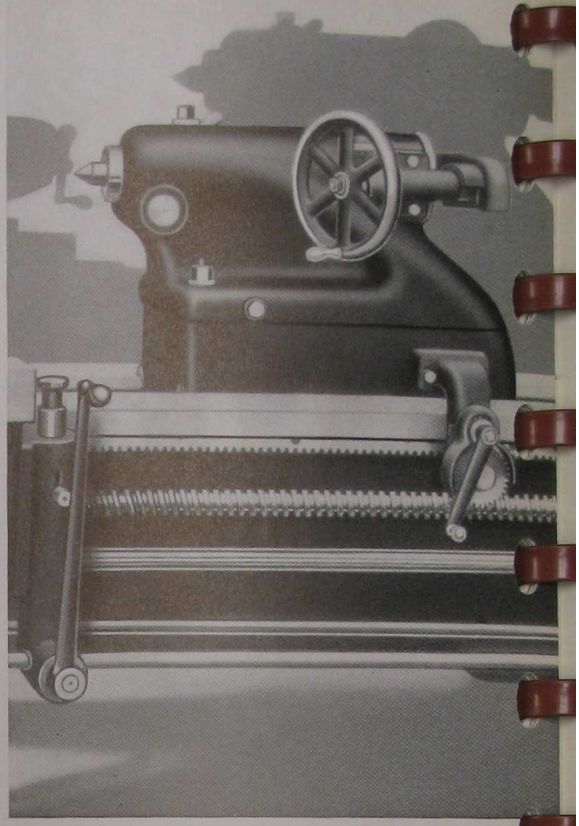
ONE-SHOT OILING

for quick change gear box

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

TAILSTOCK

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



Heavy Duty Tailstock

COMPOUND REST

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

MECHANICAL APRON CONTROL

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

THREAD DIAL

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

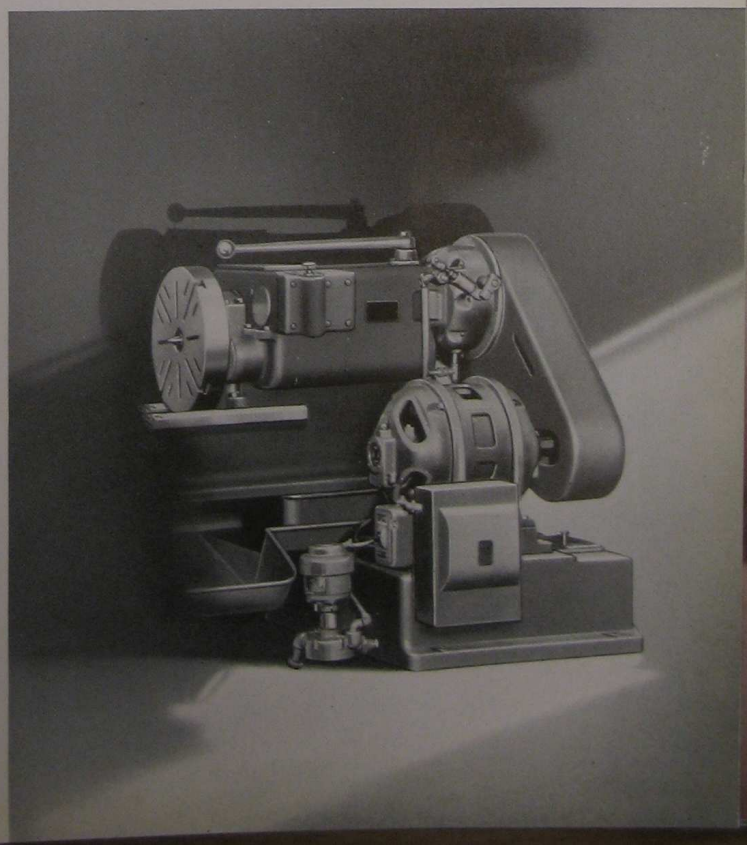
Guaranteed Accuracy. If properly set up and leveled, "American" Lathes are guaranteed to bore and turn true within .001 inch. The material entering into their construction is also guaranteed in every essential to be the very best obtainable for the purpose used. We guarantee to repair any breakages or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

POWER RAPID TRAVERSE FOR CARRIAGE

Power Rapid Traverse to the carriage is a very desirable feature on long bed lathes, and especially for turning long shafts. THIS POWER RAPID TRAVERSE MECHANISM IS NOT REGULARLY FURNISHED, BUT IS OFFERED AS AN ATTACHMENT. It can be applied either when the machine is built, or at any time after installation, as the carriage mechanism is regularly arranged to receive it.

MOTOR DRIVE

The standard type of motor drive consists of either A. C. or D. C., constant speed motor, mounted on top of the headstock, and connected to initial driving unit of head, preferably by multiple vee belts, although a flat belt or silent chain may be used. Other types of motor mountings, such as belt, chain or gear connection to driving unit with motor mounted on headstock or on a pedestal attached to the rear of the head-end cabinet leg,



Back Mounted Motor Drive

MOTOR DRIVE

can be supplied when desired. When maximum size motors are used, it is often desirable, because of their size, to mount them on a substantial pedestal bolted to the headstock leg. This pedestal also serves as a sump for the cutting lubricant and a support for the coolant pump. This mounting is recommended particularly when very large motors are used. All types of motor mountings include a hinged or adjustable motor plate to permit motor adjustment to compensate for belt stretch. For the maximum horse-power motor recommended, see specifications, page 15.

STANDARD EQUIPMENT

Standard equipment regularly furnished with lathe includes compound rest with power angular feed to top slide, steady rest, thread dial, large face plate and wrenches.

EXTRA EQUIPMENT

At extra cost we can equip these lathes with improved Taper Attachment, Special Tool Rests, Electrical Apron Control, Power Rapid Traverse for Carriage, Countershaft for Geared Heads, Oil Pan, Oil Pump, Follow Rest, Extra Gears and Index Plates for special fine, coarse or metric threads.

SPECIFICATIONS

SIZE OF LATHE		36-inch
Swing	Over bed	40½"
	Over carriage bridge	27½"
	Over taper attachment	24½"
Distance Between Centers	Tailstock, flush (base machine)	60"
	Tailstock, overhung (base machine)	66"
Quick Change Gear Box	Range of threads per inch	½ to 28
	Range of feeds per inch (number of cuts)	3⅓ to 200
	Range of feeds per spindle revolution	.005" to .300"
	Number of thread and feed changes	48
Tailstock	Length of base	28½"
	Spindle, diameter	6½"
	Spindle, travel	18½"
Carriage	Length	48½"
	Bridge width	18"
Motor	Largest motor recommended	40 H.P.
Spindle	Front bearing, cylindrical type (diameter x length)	9" x 12¾"
	Rear bearing, cylindrical type (diameter x length)	5" x 8¾"
	Nose diameter and threads per inch	5⅞"—2 Thd.
	Hole diameter	2⅝"
Driven Pulley	Diameter and face	24" x 6⅜"
	Speed R. P. M.	425
Spindle Speeds	Normal range	1.8 to 157
Centers, Morse taper		No. 6
Leadscrew, diameter and threads per inch		2½"—1 Thd.
Steady rest, capacity, maximum standard		2" to 16"
Follow rest, capacity		6¾"
Compound rest, top slide travel (manual or power)		15"
Large face plate, diameter		39"
Tool post, takes tool with shank (maximum size)		2" x 2"
Weight—Belt Drive	Net (base machine) pounds	26800
	Crated (base machine) pounds	27800
	Boxed (base machine) pounds	30800
Weight—Motor Drive	Net (base machine) pounds	27600
	Crated (base machine) pounds	28600
	Boxed (base machine) pounds	31600
Weight, each additional 24" between centers	pounds	1850
Cubic Feet Shipped Knocked Down	Base machine, boxed	600
	Each additional 24" between centers	56