

## 13-inch High Power All Geared Head Quick Change Tool Room Lathe

Code Word—BOND.

### SPECIFICATIONS

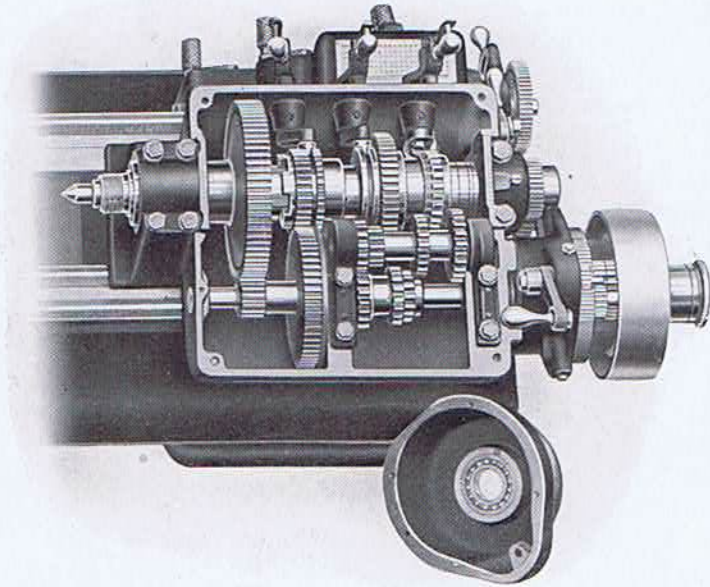
Swing over bed.....	13 $\frac{1}{2}$ "	Leadscrew threads per inch, Acme thread.....	6
Swing over carriage.....	7 $\frac{1}{4}$ "	Width of belt.....	2 $\frac{1}{2}$ "
Distance between centers (6-foot bed tailstock flush).....	38"	Steady rest opening.....	3 $\frac{1}{4}$ "
Distance between centers (tailstock overhung).....	40"	Driving pulley diameter.....	9"
Tailstock spindle travels.....	5 $\frac{1}{4}$ "	Revolutions per minute.....	410
Tailstock spindle diameter.....	1 $\frac{3}{4}$ "	Highest gear ratio.....	42 to 1
Taper of centers.....	No. 3 Morse	Number of spindle speeds.....	12
Front spindle bearing.....	2 $\frac{3}{8}$ "x4"	Minimum and maximum speeds.....	15 to 500 R.P.M.
Rear spindle bearing.....	1 $\frac{13}{16}$ "x3"	Weight on skids (6' bed).....	1850 lbs.
Hole through spindle.....	1 $\frac{1}{8}$ "	Weight crated (6' bed).....	1950 lbs.
Diameter threaded nose.....	2 $\frac{1}{8}$ "	Weight boxed for Ocean shipments.....	2100 lbs.
Number of threads on same.....	7 per inch	Export boxes (6' bed).....	32"x35"x96"
Number of threads and feed changes.....	40	Weight per extra foot of bed.....	100 lbs.
Standard lathe will cut the following threads per inch:		Size of tool.....	1 $\frac{1}{4}$ "x $\frac{3}{8}$ "
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,		Largest diameter held in split chuck.....	$\frac{7}{8}$ "
6 $\frac{1}{2}$ , 7, 8, 9, 10, 11, 11 $\frac{1}{2}$ , 12, 13, 14, 16, 18, 20, 22, 23,		Lathes furnished with 5, 6, 7, 8 and 10-foot beds.	
24, 26, 28, 32, 36, 40, 44, 46, 48, 52 and 56.			

### DESCRIPTION

**THE HEADSTOCK** is a full box section with proper internal ribbing, entirely self contained. All **speed changes are selective** and are made inside of the headstock. It is impossible to throw in two different speeds at one time. The headstock has a 21 $\frac{1}{2}$ " bearing on the bed.

**The friction pulley with brake** is an independent unit and is bolted to the main headstock by means of four bolts. **Reverse in pulley** can be furnished at extra cost. It is equipped with **anti-friction ball bearings** throughout and runs in oil. It transmits the power through three gears to the intermediate shaft, which also runs on ball bearings.

The gears on the intermediate shaft transmit the power through two sliding gears keyed to the sleeve on spindle, making six direct speeds available when the clutch is thrown in. Six further speeds are available through the back gear, making a total of twelve.



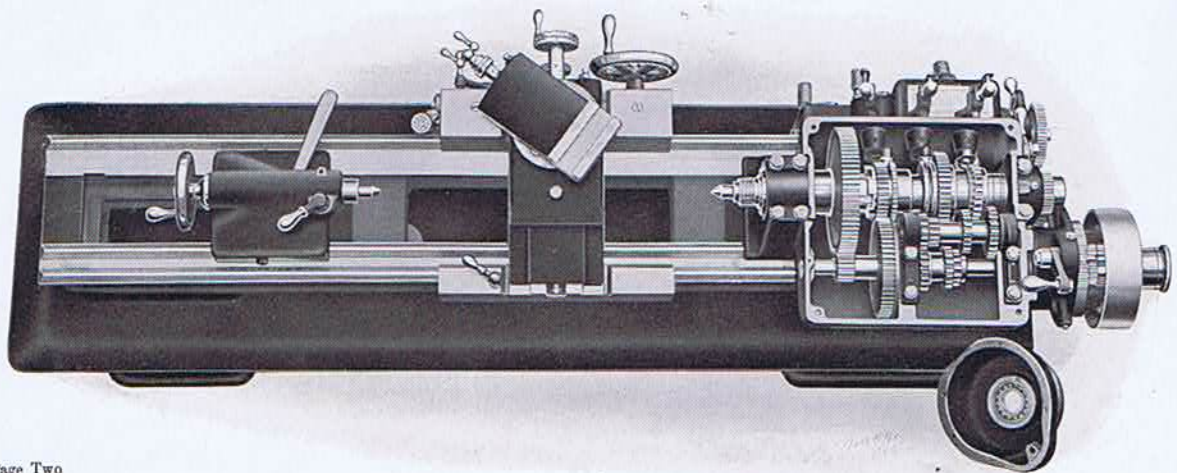
All gears including the back gears and the face gear are made of special alloy, oil hardening chrome nickel steel and all clash gears are oil hardened. Stopping, starting and reversing in the pulley are done by means of **apron control**. All the gears in the headstock run in oil, which insures automatic lubrication. The front cap is bolted down with four bolts, which is unusual for lathes of this size, and insures absolute rigidity when taking heavy cuts.

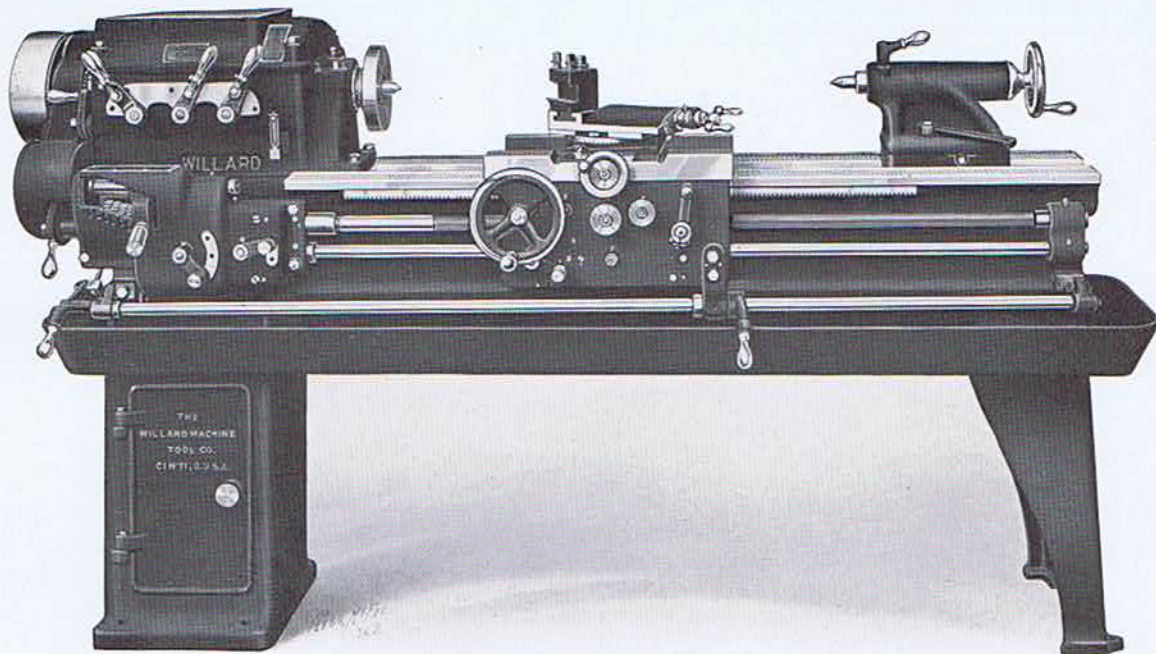
**The Spindle** is chrome nickel steel forged and bored from the solid. It is ground to accurate standard sizes and guaranteed to be interchangeable. Its bearings are made of phosphor bronze; two thrust collars are provided. The spindle has recently been improved by providing a pilot  $\frac{1}{16}$ " greater in diameter than the threaded portion and  $\frac{3}{4}$ " long,

and also by providing a shoulder 3" in diameter next to the bearing. These new features insure greater accuracy and interchangeability when fixtures are mounted on face plate for manufacturing purposes and insure rigidity for chucks and face plates.

**Motor Drive Arrangement.** The motor is mounted on the headstock or on back of cabinet leg and the drive is transmitted to the pulley through belt and ball bearing idler pulley belt tightener. Any standard make of motor of 2 or 3 H. P. can be used, either direct or alternating current. A speed of 1200 R. P. M. is recommended, but any other speed can be used within reasonable limits. A cast iron guard covers pulleys and belt.

**THE BED**—All the beds of the Willard lathes are made of the finest gray iron obtainable and the whole top surface, that is, the V's and the flats are chilled. This insures almost no wear on the bed, but instead, all of the wear comes on the carriage. The V's are unusually wide and the tops of the V's are rounded off somewhat to prevent bruising when laying tools on same. Even though the carriage should wear after several years of use, the alignment of the lathe is not disturbed anywhere along the bed. The width and depth of the bed are of unusual dimensions in lathes of this size and strong ribs





## 13-inch High Power All Geared Head Quick Change Engine Lathe

(Without Pan) Code Word—BOAST

### SHIPPING INFORMATION

Weight on skids (6' bed).....	1700 lbs.	Weight boxed for ocean shipment.....	1950 lbs.
Weight crated (6' bed).....	1800 lbs.	Export boxes (6' bed) .....	26" x 30" x 84"

are provided to insure the necessary rigidity. The sides of the beds are planed to receive the lead-screw bearings and the quick change box; the bearing pads on the beds are grooved to receive the tongue strips of the quick change box and lead-screw bearings and this insures permanent alignment.

**THE RACKS** are in one piece, made of high carbon steel, dowel-pinned and screwed to the bed.

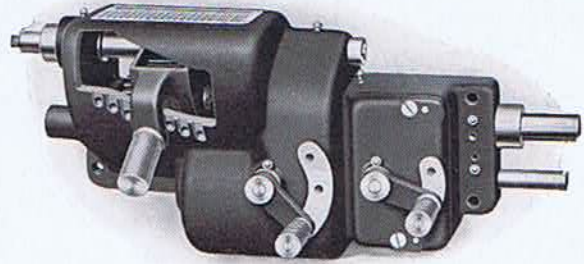
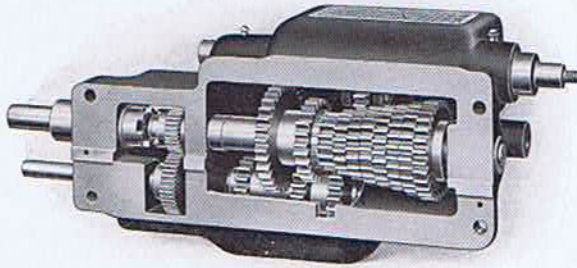
**THE CARRIAGE** is 7½" wide across the bed, giving an unusually stiff foundation for the tool, as can be seen from the top view in this circular. The **bottom slide is taper gibbed** to the carriage. Both are properly scraped to bearings and the carriage is provided with a protector against the chips.

**THE COMPOUND REST**—The **top slide** is a steel casting and no breakage is possible. It is **taper gibbed**. The **swivel** is bolted to the bottom slide by means of two bolts and a steel plate. No T slots are cut in the swivel, the full surface being given to the bearing. The **bottom slide** is graduated for any angle up to 90 degrees. The **dials** of both the cross feed screw and the compound rest screw are graduated in thousandths of an inch, and the diameters of the dials are large enough to make the graduations easily read. The top slide will clear the cross screw dial in any position.

**THE APRON GEARS** are all steel or malleable iron. Where steel would run on steel, the gears are bronze bushed. Proper **interference** is provided to avoid the throwing in of both feeds, or either one of the feeds and the half-nut at the same time. The apron casting besides being screwed on to the carriage is consolidated by two dowel-pins. These two pins take the vibration from the screws, avoiding their loosening up. Reverse is provided in apron as part of standard equipment.

**THE TAIL STOCK** is of an extremely rigid design. It is clamped to the bed by a single bolt. The **spindle** is of annealed tool steel. The barrel is not split. A plug clamp locks the spindle in perfect alignment at all times.

**THE QUICK CHANGE GEAR BOX** is a unit mechanism, bolted on to the bed. All the gears and clutches are steel, being made from the bar or forgings. There is such strength as to make all feed changes possible while the lathe is running



under cut. All the gears are entirely protected from chips and dust. There is no gear running on a stud, all shafts being supported on both ends. 40 different positive feeds are available for turning.

**THE LEAD-SCREW** is of special high carbon lead-screw stock, chased to a standard size on a special lead-screw lathe. A special **precision master lead-screw** is kept in reserve to cut new screws for the lead-screw lathe as soon as any error is detected in the pitches. The half-nuts are chased from the solid and are then split, and are never in use except when chasing.

**THREAD CUTTING**—A **chasing dial** is provided which will allow the operator to catch any thread at the beginning of each successive cut.

**THE PAN** is made of sheet steel welded on one end. Between the bed and the pan two pads are provided to give proper chip room between the pan and the bed. The two cabinet legs provide ample room for keeping tools and change gears belonging to the lathe.

**EQUIPMENT**—The lathe is regularly furnished with large and small face plates, compound rest, steady rest, power cross-feed, and necessary wrenches. The tool room lathe is furnished regularly with pan and two cabinet legs. Lathes will be furnished with **metric lead screws** if desired. When Standard Lathe is equipped with quick change box and Metric lead screw or English lead screw and transposing gear the following **Metric Pitches** can be cut with the aid of only three change gears: m/m, .5, .75, 1, 1.25, 1.5, 1.75, 2, 2.25, 2.5, 3, 3.5, 4, 4.5, 5, 6, 7, 8, 9, 10, 12, 14 and 16.

**EXTRAS**—Motor, Motor Drive Arrangement, Electrical Equipment, Reverse in Pulley, Jack Shaft, Follow Rest, Taper Attachment, Draw in Attachment and Collets and Relieving Attachment will be supplied at extra cost. All standard lathes are made to receive these parts at any time.

At slightly increased cost these lathes can also be made in the **gap style**, which gives a swing of 21" for a distance of 6½" from the face plate. With gap filler piece in place, the lathes are equally as convenient to operate as any standard engine lathe.

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**THE WILLARD MACHINE TOOL CO., Inc.**  
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