No. 32
HIGH POWER PRECISION
HORIZONTAL BORING
Drilling & Milling
_MACHINE

UNEXCELLED ACCURACY

GIDDINGS & LEWIS MACHINE TOOL CO.
FOND DU LAC, WISCONSIN
U. S. A.
No. 32 Horizontal Boring, Drilling and Milling Machine with 3\(\frac{1}{2}\)" spindle; 2" extra length of bed; 12" heightened column and end support; 30" x 53\(\frac{3}{4}\)" table with brackets giving 48" cross travel, and measuring device
Specifications

Diameter of spindle.................. $3\frac{1}{8}''$ or $3\frac{1}{2}''$
Length of spindle.................. $89\frac{3}{8}''$
Spindle bored to fit Morse taper..... No. 5
Longitudinal travel of spindle...... $50''$ ($2 \times 25''$)
Vertical adjustment of head on column
  with standard column.............. $24''$
  with $12''$ heightened column...... $36''$
Minimum distance from top of table to center of spindle.............. $1\frac{1}{2}''$
Maximum distance from top of table to center of spindle
  with standard column.............. $25\frac{1}{2}''$
  with $12''$ heightened column...... $37\frac{1}{2}''$
Distance top of bed to top of table.... $9\frac{3}{4}''$
Minimum distance from face of spindle sleeve to end support
  with standard table.............. $28''$
  with large table................. $34''$
Maximum distance from face of spindle sleeve to end support
  with standard bed............... $60\frac{1}{2}''$
  with $2'\text{'}$ lengthened bed..... $84\frac{1}{2}''$
  with $4'\text{'}$ lengthened bed..... $108\frac{1}{2}''$
Longitudinal travel of standard table
  with standard bed............... $32''$
  with $2'\text{'}$ lengthened bed..... $56''$
  with $4'\text{'}$ lengthened bed..... $80''$
Longitudinal travel of large table
  with standard bed.............. $26''$
  with $2'\text{'}$ lengthened bed..... $50''$
  with $4'\text{'}$ lengthened bed..... $74''$
Cross travel of standard table........ $30''$
  with special brackets............ $40''$
Cross travel of large table......... $38''$
  with special brackets............ $48''$
Working surface of standard table.... $24'' \times 45\frac{3}{4}''$
Overall size of standard table...... $24'' \times 50''$
Working surface of large table...... $30'' \times 58\frac{3}{4}''$
Overall size of large table.......... $30'' \times 58''$
Range of spindle speeds............ 12 to 225 R.P.M.
Number of spindle speeds in either direction............. 16
Range of feeds per revolution of spindle............. $0.004''$ to $0.253''$
Number of feeds in either direction to all units.......... 16
Speed of driving pulley............. 300 R.P.M.
Size of driving pulley............. $14\frac{1}{2}'' \times 4\frac{1}{2}''$
1200 R.P.M. constant speed motor is recommended
  for machine with $3\frac{1}{8}''$ spindle.... 5 H.P.
  for machine with $3\frac{1}{2}''$ spindle.... 7\frac{1}{2} H.P.
Net weight of standard machine........ 10,000 lbs.
Approximate shipping weight standard machine crated........... 10,500 lbs.
Approximate shipping weight standard machine boxed for export..... 11,500 lbs.
Floor space required for standard machine.................. $14' \times 4\frac{1}{2}'' \times 8' 4\frac{1}{2}''$

The G. & L. Horizontal Boring, Drilling and Milling Machines are built with $2\frac{1}{8}''$, $3\frac{1}{8}''$, $3\frac{1}{2}''$, $4\frac{1}{2}''$ and $5''$ diameter spindle for table type, and $4\frac{3}{4}''$, $5\frac{3}{8}''$ and $6''$ diameter spindle for the floor type machines.
General Description

INTRODUCTION—With the knowledge gained through the continuous manufacture, over a number of years, of Horizontal Boring Machines, we have produced a machine sufficiently heavy and sturdy to drive high speed steel to the limit without the sacrifice of the precision required for accurate tool room work.

BED—The bed is of box design, internally ribbed and with a continuous bottom, and with a three point floor bearing. This type of bed eliminates the necessity of a special foundation. The bed is provided with chip chutes to the rear.

COLUMN—This is a very important part of the machine and is of a box section to withstand all twisting strains and is very large at the base. The bed is cast with a solid tongue that fits into a slot in the column. In addition the column is bolted and dowelled to the bed, thus practically welding these two parts together.

HEAD—The head is a single casting of heavy design furnishing perfect support to all moving parts. It has a long bearing on the column with an adjustable taper gib and two square lock gibs. The center of the spindle is located as near the face of the column as practical, reducing the overhang to a minimum. The elevating screw is between the face of the column and spindle and in such relation to the guiding ways and the point where the counterweight is fastened as to make the most direct and accurate control of the vertical movement of the head. The elevating screw is supported from the top on a ball thrust bearing. The spindle quick hand movement pilot wheel and hand feed wheel are near the operating end of the head, which allows the operator to stand where he may watch the work and still control the machine at all times.

TAIL SUPPORT—The tail support is a one-piece design, very rigid, with a large bearing surface on the bed. It is moved along the bed with a crank handle by a pinion meshing into the saddle feed screw and clamped in any desired position by lock gibs. The tail support block is guided and clamped on two 45° Vee bearings so that side alignment with the spindle is always maintained. The support block elevating screw is supported from the top on a ball thrust bearing and can be adjusted vertically.

SPINDLE—The spindle is of high grade hammered steel 89% long, and is accurately ground its entire length. It slides in the spindle sleeve in adjustable collet bushings and is driven from the sleeve by long opposed keys. The feed to the spindle is controlled by a strong ram rigidly supported in the head and driven by a rack and pinion that will run out of engagement at either end of the stroke making it impossible for the parts to jam.

SPINDLE SLEEVE—This is a steel forging 23% long. It is very large in diameter and completely spans the ways of the column. It revolves in a conical bearing in a solid bronze box at the front, and at the rear in a cylindrical bearing in an adjustable bronze box. Adjustment can be made to take up wear of the bearings. The thrust is taken by a large diameter thrust bearing and means are provided for taking up end play. Inside each end of the spindle sleeve is a long bronze collet bushing in which the spindle slides. These collet bushings are threaded into the spindle sleeve and are adjustable to take up any wear between them and the spindle, thus eliminating the necessity of re-bushing the spindle sleeve.

This construction permits large milling cutters to be bolted direct to the large flange on the end of the spindle sleeve in a very rigid manner, in which case much heavier work can be done than when the cutter is supported on a taper shank on the end of the spindle.

SPINDLE FEED—The spindle feed is unique in design, having a worm gear drive with a hardened quick acting saw tooth clutch. This clutch is operated by one-fourth turn of the clutch spindle that is fitted directly into the spindle quick hand movement pilot wheel. The worm is made of high carbon steel provided with ball thrust bearing, and has double lock nuts for adjustment. The worm wheel is made of high grade phosphor bronze.

TABLE—The table has great depth to withstand any strain that should be brought to bear upon it and has machined tee slots chilled to insure strength. At each end of the table is a cutting solution trough. It is bored through with an adjustable taper gib the entire length of the table and with square lock gibs to resist any stresses that might be set up when the platen overhangs.

SADDLE—The saddle is very long and heavily ribbed, furnishing a perfect support to the table. The flat bearing surfaces of the saddle to the table and the saddle to the bed are chilled. The gibbing is of the square lock form and with a long narrow guiding edge with taper gib for take-up.

SPEED BOX—The speed box is a self-contained unit that bolts directly to the end of the bed. Through a sliding tumbler and positive clutches eight speeds are obtained. When they are multiplied through the back gears sixteen spindle speeds are obtained ranging from 12 to 225 R.P.M. An internal ratchet gear is arranged in the speed mechanism at the source of the drive running slower than any speed so that when gears are shifted the machine is never without power, thus eliminating shock to the gearing.

The power is transmitted from the speed box in the most direct manner to the spindle through large diameter gears. The back gears are in the head and are engaged and disengaged by one lever with an interlocking device.

FEED UNIT—This unit is self-contained and bolts into the front of the bed. Two levers on the front of the unit control sliding gears and jaw clutches, giving eight changes of feed for each position of the back gears. Through a reversing mechanism the feed to all units may be reversed regardless of the direction the spindle is revolving.

The feed is applicable to the spindle in or out, to the spindle head and tail block up or down, to the saddle along the bed and to the table across the saddle. One lever directly in front of the operator controls the engaging of the feed to the desired unit. The rate of feed is the same to whatever unit it is applied. A safety friction is introduced in the feed mechanism to induce a yielding point that will slip before the mechanism is damaged. This friction is easily adjusted.

RAPID TRAVERSE—Rapid traverse to all the parts having feeds and always in the reverse direction from the feed is easily and simply obtained by moving the feed engaging lever on front of the feed unit in the reverse direction.

MATERIALS—All heavy duty gears and clutches are heat treated. The bearings are high grade bronze. All the castings are made in our own foundry and range from 20 to 30% steel. All tee slots and ways are chilled to insure long life.
Headstock showing spindle take up collet; spindle sleeve flange with keys

End Support showing tail stock and clamp; large table showing extension brackets giving 59" cross travel

Silent chain motor drive application; also showing method of fastening column to bed

<table>
<thead>
<tr>
<th>Size of Table</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>h</th>
<th>NO. OF SLOTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 1/4 x 24&quot;</td>
<td>3&quot;</td>
<td>6&quot;</td>
<td>-</td>
<td>1/8</td>
<td>1/8</td>
<td>1/8</td>
<td>1/8</td>
<td>4</td>
</tr>
<tr>
<td>53 3/4 x 30&quot;</td>
<td>3&quot;</td>
<td>6&quot;</td>
<td>3/8</td>
<td>1/8</td>
<td>1/8</td>
<td>1/8</td>
<td>1/8</td>
<td>6</td>
</tr>
</tbody>
</table>

Tee slot dimensions of table
An Improved Measuring Device for Jig and Precision Miscellaneous Boring

The use of precision machine tools does little to reduce the time spent by the tool maker in laying out and setting up the work. It insures only that the time spent in preparing the job shall not be wasted on inaccurate machining operations.

The G. & L. Horizontal Boring, Drilling and Milling Machine can be supplied with a simple measuring device which eliminates the use of tool makers' buttons and all measuring instruments not included in the device. It consists of one dial indicator, one micrometer head and a set of standard measuring rods for each of the head and table movements.

In the boring of a series of holes the casting is so positioned on the table of the machine that the spindle lines up with the first hole and with sufficient rods in place so the micrometer heads and dial indicators are at zero. To accurately locate the second hole sufficient rods are removed to make up the even inches, the micrometer head being used to take care of the fraction of an inch, corresponding to the hole center distance. The table or head is then moved until the dial indicator again registers zero.

With ordinary precaution it is possible to bore holes on accurate center line dimensions to within even less than a half thousandth of an inch. This is possible because the measuring device is not subject to any stress or strain in moving the units of the machine. It eliminates the possibility of errors always present with other methods of measuring.
Plain revolving table showing indexing holes and bracket; also method of clamping revolving table to machine.

![Image of revolving table and machine tool combination]

**Specifications of Revolving Tables**

<table>
<thead>
<tr>
<th>Size and Description</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>k</th>
<th>For Machines</th>
<th>No. Of Slots</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Inch Diameter Plain</td>
<td>2/6</td>
<td>4 1/2</td>
<td>-</td>
<td>18&quot;</td>
<td>3/4</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/4</td>
<td>1/4&quot;</td>
<td>25 and 32</td>
<td>4</td>
</tr>
<tr>
<td>24&quot; Diameter Plain</td>
<td>2 5/8</td>
<td>5 3/4</td>
<td>-</td>
<td>24&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>25-32-45</td>
<td>4</td>
</tr>
<tr>
<td>Hand Feed</td>
<td>2 5/8</td>
<td>5 3/4</td>
<td>-</td>
<td>24&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>25 and 32</td>
<td>4</td>
</tr>
<tr>
<td>30&quot; Diameter Plain</td>
<td>3 1/2</td>
<td>7&quot;</td>
<td>-</td>
<td>30&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>32 and 45</td>
<td>4</td>
</tr>
<tr>
<td>36&quot; Diameter Plain</td>
<td>4 1/2</td>
<td>8 1/2&quot;</td>
<td>-</td>
<td>36&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>32 and 45</td>
<td>4</td>
</tr>
<tr>
<td>Combination Plain and Hand Feed</td>
<td>4 1/2</td>
<td>8 1/2&quot;</td>
<td>-</td>
<td>36&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>32 and 45</td>
<td>4</td>
</tr>
<tr>
<td>42&quot; Diameter Plain</td>
<td>3 1/2</td>
<td>7 1/2&quot;</td>
<td>7 1/2&quot;</td>
<td>42&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>48&quot; Diameter or Square</td>
<td>3 1/2</td>
<td>7 1/2&quot;</td>
<td>7 1/2&quot;</td>
<td>48&quot;</td>
<td>3/8&quot;</td>
<td>3/16&quot;</td>
<td>4 1/2</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>45</td>
<td>6</td>
</tr>
</tbody>
</table>

* Mounted on Ball Thrust Bearing. + Cannot be furnished with indexing positions.

**Star Feed Facing Head**

3" x 38" auxiliary table furnished same height as machine table.