

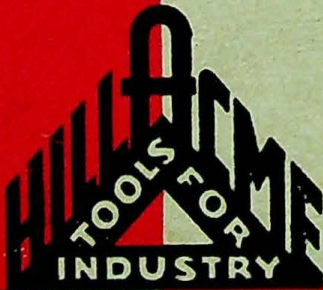
HARRY N. LEAVE
MOORE MACHINERY CO.
7th & CARLETON STS.
BERKELEY 10, CALIF.
THornwall 3-1638

HILL

Hydraulic

SURFACE GRINDERS

The
HILL ACME
Company



HILL DIVISION: GRINDING AND POLISHING MACHINES, HYDRAULIC
SURFACE GRINDERS • ACME MACHINERY DIVISION: FORGING
THREADING AND TAPPING MACHINES • CANTON DIVISION:
ALLIGATOR SHEARS, BILLET SHEARS • CLEVELAND KNIFE
DIVISION: METAL CUTTING KNIVES AND SHEAR BLADES

1201 WEST 65th STREET • CLEVELAND 2, OHIO



HILL

Hydraulic

SURFACE GRINDERS

THE COMPANY BEHIND THE PRODUCT!

• Over seventy-five years of precision tool manufacture plus an ever expanding sales and production record are your assurance that HILL Surface Grinders will perform as represented. HILL "Open Side" Hydraulic Surface Grinders were first developed in our own plant to meet our own high precision standards. Their steady acceptance by industry for close

tolerance finishes on all types of ferrous and non-ferrous materials over the past twenty years is evidence of their practical application to modern precision production methods. We maintain a complete engineering design and consulting staff which is at your disposal in solving YOUR particular grinding problems. We urge you to take advantage of these facilities.



THE HOME OF HILL GRINDERS

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING
• THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES

HILL

OPEN SIDE HORIZONTAL SPINDLE HYDRAULIC SURFACE GRINDER

GENERAL DESCRIPTION

• The "Hill" low pressure 100% hydraulic system is operated by a "Vane" type rotary pump which supplies oil under pressure to two opposed pistons providing a variable table speed up to 100 ft. per minute. Adjustable stops are furnished to determine the length of stroke and there are safety stops to prevent over-running. All gears are eliminated and the method of reverse is automatic or manual. A separate motor provides force feed lubrication to the table ways.

Our Horizontal Spindle Machine is equipped with an efficient and unique double pumping system in the Hydraulic Drive for operating the table and cross feed, by which it is possible to operate the table or cross feed independently, thus permitting the grinding wheel to be dressed by power.

The Cross Feed on the Horizontal Spindle Grinder is 100% Hydraulic and set for constant feed. The featured operational work feed is our "Hill" oscillating style which provides constant wheel travel at variable speeds across the work at all times. This constant feed keeps the wheel dressed longer, preventing wheel marks or streaking. In addition, the spindle can likewise be manually operated, or locked in place for form or contour grinding.

The Main Drive Motor is of the Can type built integrally with hardened, ground, and lapped alloy steel spindle, dynamically balanced. This spindle is carried by an adjustable alloy bronze sleeve front bearing, and the rear bearing is an extra heavy precision preloaded double ball bearing unit with full provision to take care of radial and end thrust. The specially designed, bronze bushed bearing, originated by us and proven out in service, should operate indefinitely without an adjustment being necessary, due to the fact that we use force feed lubrication and special features incorporated in the bearing for a close precision fit and still retain the freedom of the spindle from seizing.

Power rapid traverse is supplied through a separate 1 HP motor located in the base of the column, for raising and lowering the wheel head, and final accurate adjustment is made by manual control.

Each Horizontal Spindle Grinder is fitted with two (2)

spring tension needle bearing stabilizers. They are located on the saddle (above and below) on the back of the grinder, and they ride directly on the flame hardened ground surface of the column. The effect of these stabilizers is to maintain perfect alignment of the spindle at all times, as the grinding wheel moves across the work to the extreme position. All of our Horizontal Spindle Grinders with 18", 24", 30" and 36" wide tables are furnished with the upper and lower stabilizers as described. In addition, each grinder is fitted with a long tapered steel gib located at the rear of the front column way. The gib is adjustable and supplements the stabilizers in maintaining alignment.

Our Grinders are equipped with a complete coolant system for wet grinding including pump, piping, and large capacity storage tank fitted with baffle plates for filtration.

Provision has been made for simple, ample and thorough lubrication of the grinder. Each machine is equipped with a Bijur one-shot system which effectively reaches 24 of the principal points requiring lubrication.

"Hill" Hydraulic Surface Grinders are furnished with motors located in permanent position and push-button stations conveniently located for the operator. Each Grinder will be completely wired in our shop before shipment, requiring only hookup to the power lines in customer's plant. All starters will be assembled in one central box located in the recessed column.

In offering our Grinders, we wish to emphasize the following outstanding features which have been accepted by the trade as representing the best in Heavy Duty Grinder design and operation:

Massive construction.	Permanent accuracy.
Wide speed variation.	Absence of vibration.
100% Hydraulic Table Drive.	Openside convenience.
Simplified Controls.	

With each grinder, we furnish certified foundation plans and a complete Maintenance and Operating Manual with assembly drawings showing the principal mechanical, hydraulic and electrical assemblies.

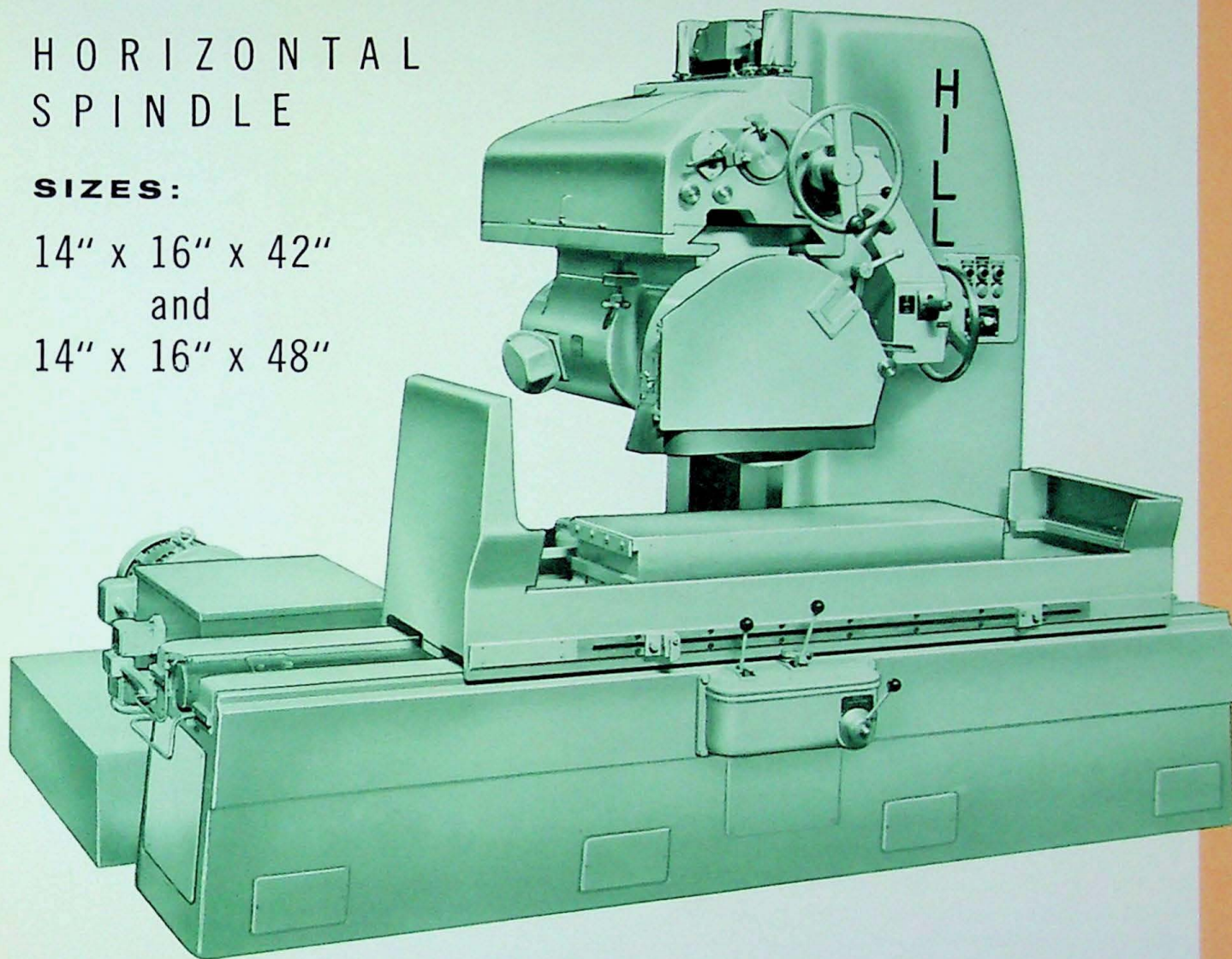
HILL HORIZONTAL GRINDER

**100% HYDRAULIC DRIVE FOR
TABLE AND CROSS FEEDS...**

HORIZONTAL
SPINDLE

SIZES:

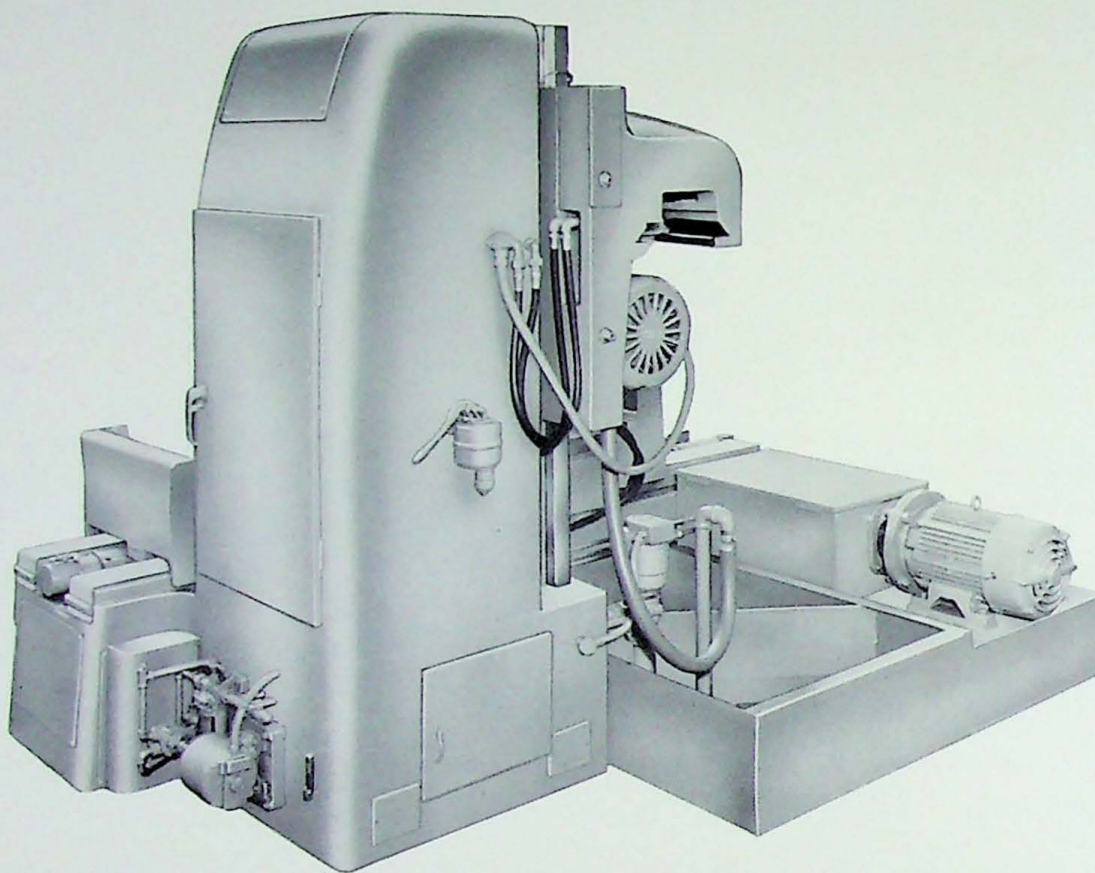
14" x 16" x 42"
and
14" x 16" x 48"



• HILL Horizontal Spindle Heavy Duty precision surface grinder with dynamically balanced built-in spindle motor, hydraulic or manual cross-feed. Rapid traverse and hand wheel with micrometer feed for wheel head control. Operating controls instantly accessible. For grinding flats, angles, irregular and special shaped surfaces while maintaining extremely close tolerances with a superior finish.

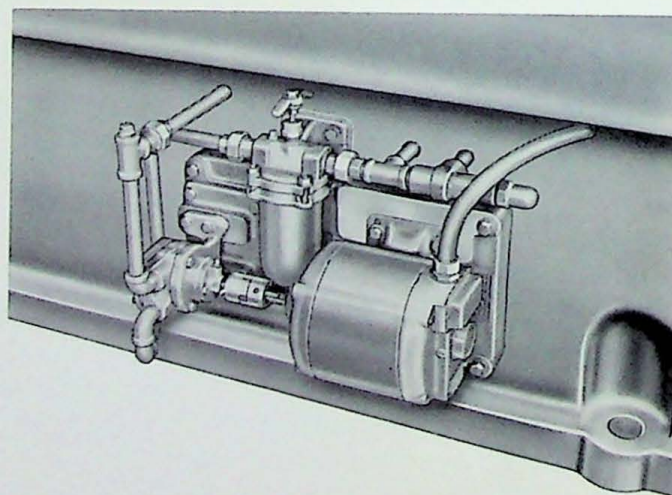
HILL

HORIZONTAL GRINDER (REAR VIEW)



• A force feed lubrication system is provided for lubricating the table and bed ways and also the front spindle bearing. Oil is pumped from a reservoir through the Puro-later unit and through a relief valve which is set at the proper operating pressure. The entire unit is mounted on the outside of the bed in the rear of the grinder where it is easily accessible for adjustments.

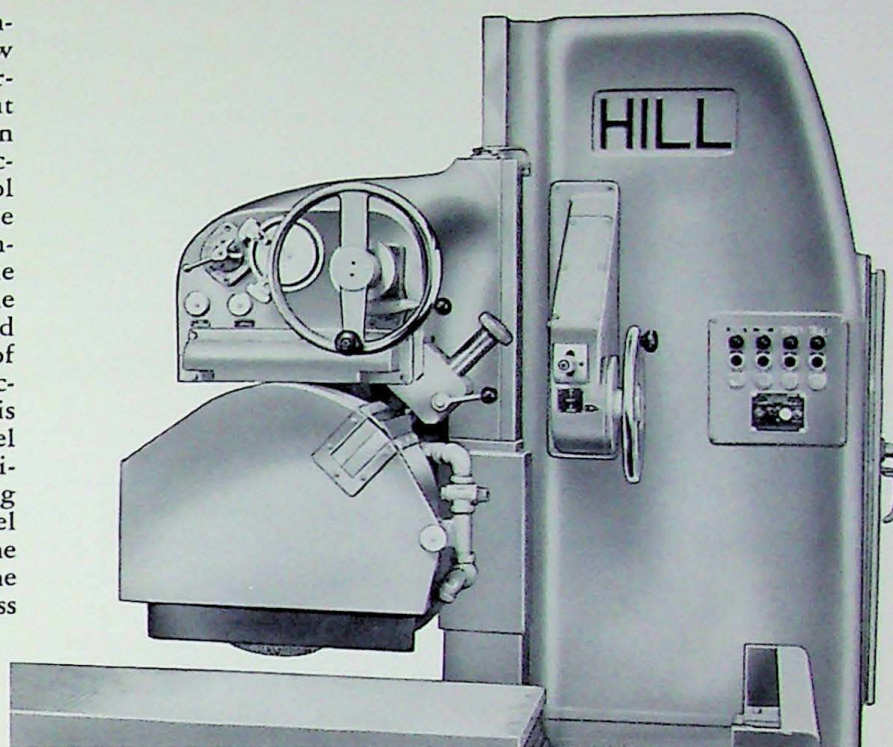
The lubrication system is also complete with a sensitive pressure switch which automatically safeguards the ways and front spindle bearing from lack of lubrication.



HILL

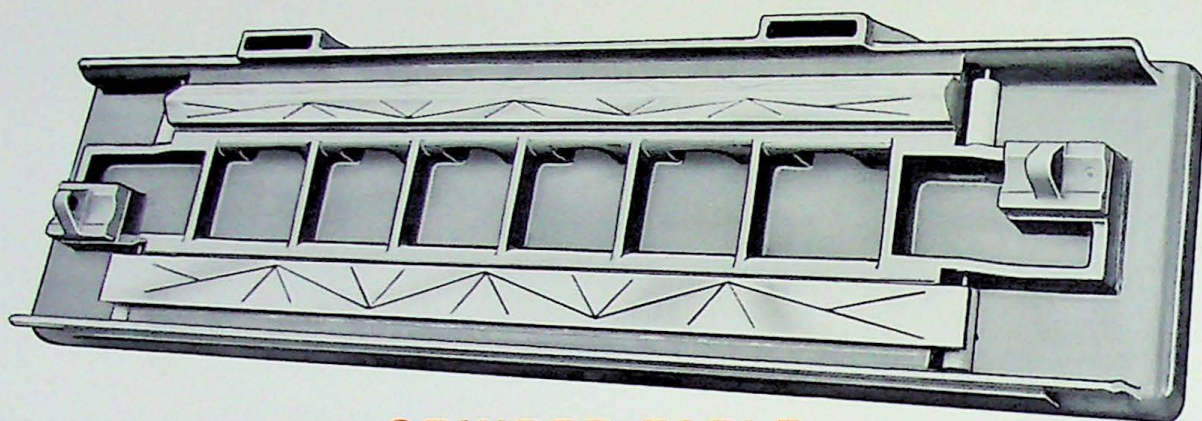
OPERATOR'S CONTROL STATION

• The operator's controls have been simplified and grouped together just below average shoulder height permitting the operator to feed the head into the work without bending over. The reduction in lost motion and operator fatigue is obvious. The electrical push buttons, as well as the Neutrol Demagnetizing station are at arm level on the column, away from the possibility the contamination from coolant and dust. All of the grinding head controls are mounted on the end of the saddle. The head may be traversed across the work either manually, by means of the large diameter hand wheel, or automatically with the hydraulic cross feed system. This grinder is furnished with a built-in wheel dresser as standard equipment, mounted directly on the saddle for "in-position" dressing of the wheel. The operator can dress the wheel at any time regardless of the position of the head by simply traversing the wheel past the diamond dresser, using the hydraulic cross feed mechanism.



SPECIFICATIONS

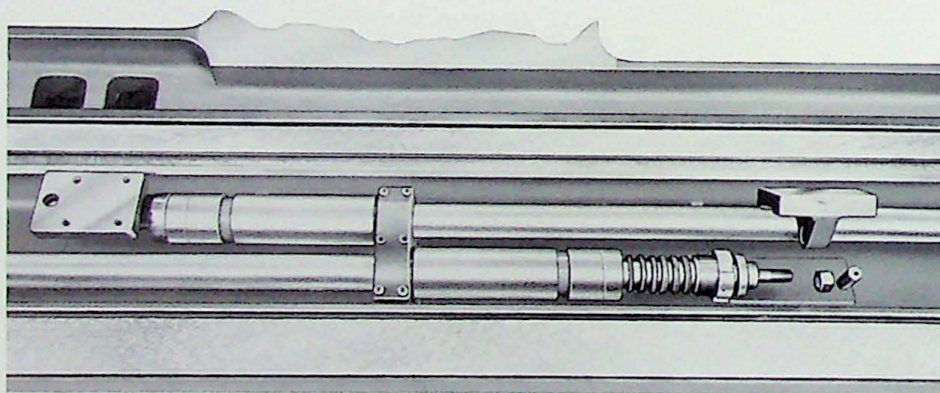
BED	Alloy casting. One 4" flat way, one 3¼" "V" way.		
TABLE	Alloy casting, machined "T" slots. Speeds variable up to 100 fpm. Distance, floor to top of table — 28".		
COLUMN	Alloy casting. Long, wide bearing surfaces, flame hardened and ground.		
WHEEL HEAD SLIDE	Alloy casting. Two bearing surfaces 12" x 39". Horizontal slide 15" x 38". Bearing surfaces ground.		
HYDRAULICS	Vane type pumps, 21 gpm, Table, 5 gpm — Crossfeed. 75 gal. capacity tank.		
GRINDING WHEEL	Standard 20" dia., 3" face, 10" bore. Clearance between wheel and table — 16".		
COOLANT	Complete with pump, valves, etc., and 90 gal. capacity baffled tank.		
ELECTRICS	J.I.C. Standards. 15 HP main spindle (larger available) — 5 HP Hydraulic; 1 HP wheel head; ½ HP coolant; ½ HP Lub. — Full coverage magnetic chuck with Neutrol control.		
STANDARD EQUIPMENT	Built-in wheel dresser, one grinding wheel, guards, wrenches.		
	MACHINE SIZE	OVERALL DIMENSIONS	WEIGHT
	14" x 16" x 42" 14" x 16" x 48"	87" high, 72" wide, 128" long 87" high, 72" wide, 140" long	19,800# 21,600#



GRINDER TABLE

• The HILL grinder table is an alloy casting substantially ribbed with the weight properly distributed for permanent accuracy and normalized to eliminate warpage. Proper oil grooving reduces wear on the ways. The front way is flat, 5" wide, and the rear way is a 4" "V" shape. A piston bracket, shown at each end of the table, is attached to the hydraulic cylinders for actuat-

ing the table. At both ends of each way is a large roller over which pass heavy duty canvass way covers. These completely cover the exposed bed ways and afford excellent protection against any foreign matter. At the rear of the table are two large coolant outlets allowing the coolant to quickly return to the main trough in the bed and then to the coolant tank.



METHOD OF TABLE DRIVE

• Here are the two opposed single acting hydraulic cylinders which actuate the table. Note that all gears have been eliminated. Reversing of the table is either automatic or manual. This view also shows the simplicity of changing the Chevron packing in the stuffing box. The piston, being a solid turned ground polished

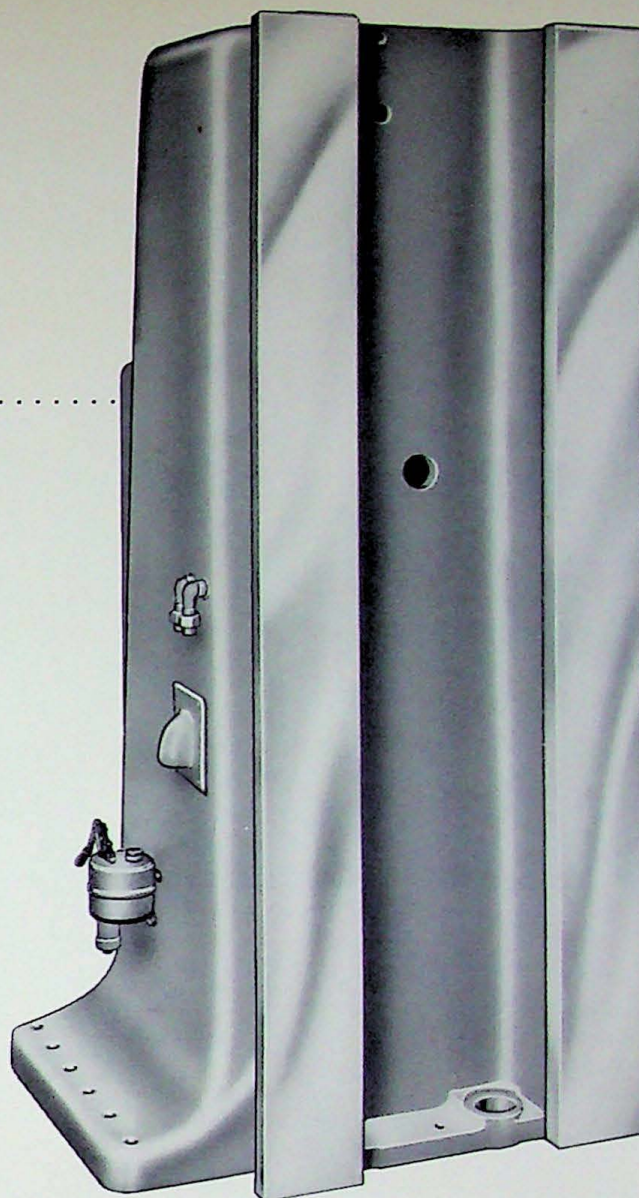
alloy shaft requires no maintenance. As there are no piston rings, the Chevron packing is the only item to be maintained.

The front cylinder shows the bronze packing gland opened to expose the Chevron packing and the klosure.

THE COLUMN

• The HILL Horizontal Spindle column is a heavily ribbed alloy casting of massive proportions with unusually wide and long *ground* bearing surfaces to give ample support for the wheel head and to maintain perfect alignment, thus insuring permanent accuracy. The bearing surfaces are *flame hardened and specially ground* to produce a criss-cross finish. This criss-cross finish produces hundreds of tiny pockets for retaining oil, thereby guaranteeing extremely long life to the surface.

On the left side of the column is a Bijur pump which operates the "One-Shot" lubrication system reaching all necessary points on the column ways and the saddle ways.



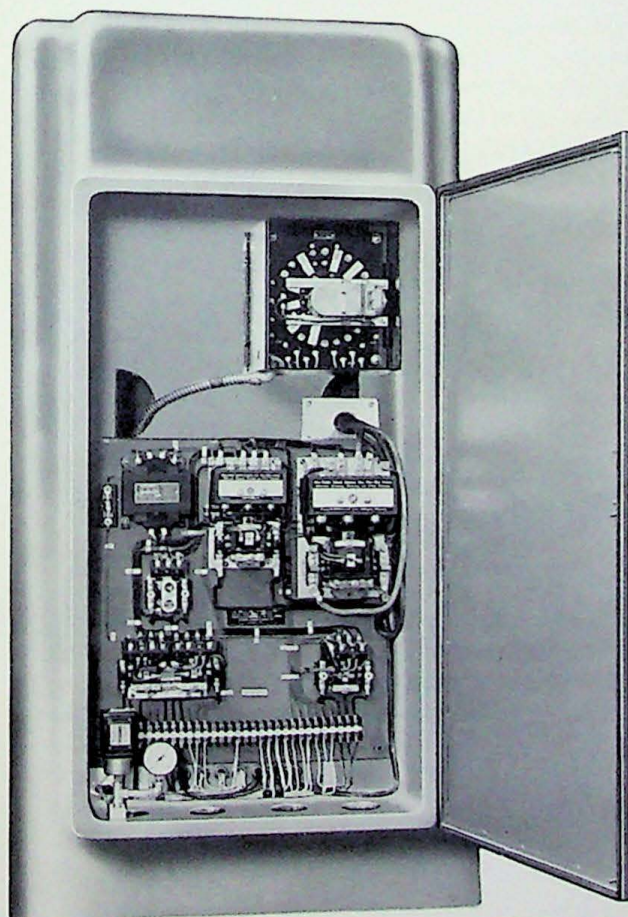
ELECTRICAL CONTROL PANEL

• The electrical starter and control panel is recessed into the rear of the main column behind a dust-proof door and is readily accessible at all times. Each grinder is completely wired in our shop before shipment, requiring only hook-up to power lines in the customer's plant.

In the lower left hand corner of this control box is a pressure switch and pressure gauge which will automatically disconnect the table drive motor and main spindle motor if for any reason the lubricating pressure should fall below a safe limit.

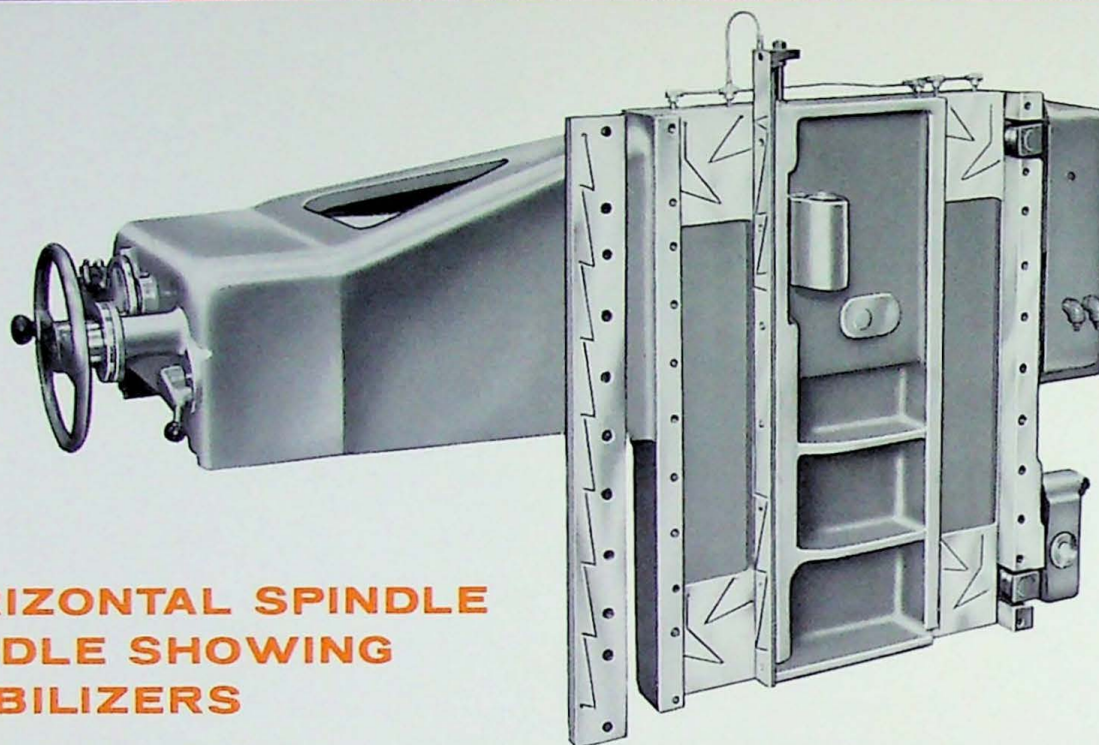
Also mounted in this recess is the neutral demagnetizing unit used for the operation of the magnetic chuck. This unit is shown in the upper right hand corner.

J.I.C. electrical standards are available if required.



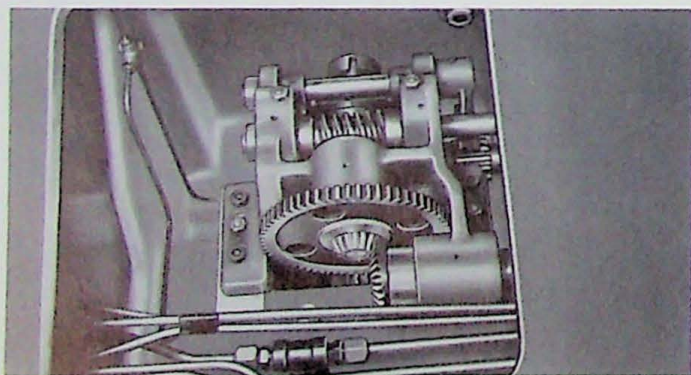
HILL

HORIZONTAL SPINDLE GRINDER DETAILS OF CONSTRUCTION



HORIZONTAL SPINDLE SADDLE SHOWING STABILIZERS

• The Horizontal Spindle saddle, on which the spindle motor and wheel head are mounted, is a heavily ribbed alloy casting which is normalized before finish machining. Note the stabilizers at the top and bottom of the right hand way. These control the necessary clearance for oil film between the saddle and the column. These stabilizers are spring loaded, cam follower type bearings and keep the saddle in perfect alignment at all times, supplementing the taper gib that is shown projecting above the saddle. Note also that the center portion of the saddle ways and the center section of the adjustable tapered gib are undercut to insure perfect contact with the column ways indefinitely. This is an exclusive HILL feature that eliminates the necessity of future rebuilding of this assembly.



The oil grooves are also worth attention. Note that the oil is introduced at the top, through the Bijur "One Shot" system, and travels down through the grooves into pockets. These pockets retain the oil, rather than allowing it to run directly through, insuring proper lubrication. The hold down caps, one of which is shown on the left of the photo, are flame hardened and ground for long life.

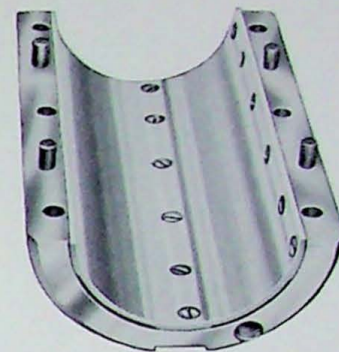
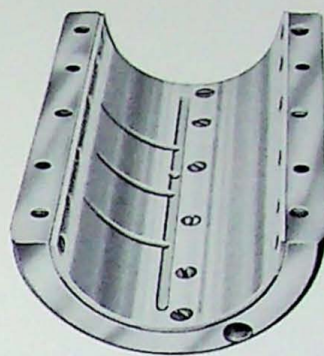
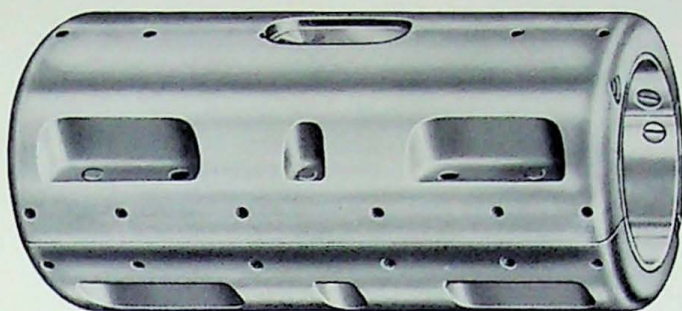
At the extreme left is a hand wheel used for manual feeding for face grinding, or grinding down into a slot. The lever immediately to the right of this hand wheel engages the manual or hydraulic control of the grinding head as the case may be. At the center of the saddle is the extra large bronze alloy nut through which the rail raise screw travels to elevate or lower the saddle on the column.

MANUAL CROSS-FEED MECHANISM

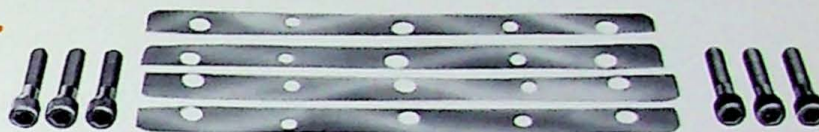
• In addition to hydraulic cross-feed operation, provision is also made for manual cross-feed operation. This manual control consists of a hand wheel mounted on the front of the saddle which reciprocates the wheel head by means of worm gear mechanism, spur pinion and rack. The mechanism, as shown above, is located within the saddle and may be removed as a unit for bench servicing. The large gear and the small bevel gears rotate the trip plate on the front end of the saddle. This trip plate adjusts the length of the cross-feed stroke.

HILL

HORIZONTAL FRONT SPINDLE BEARING

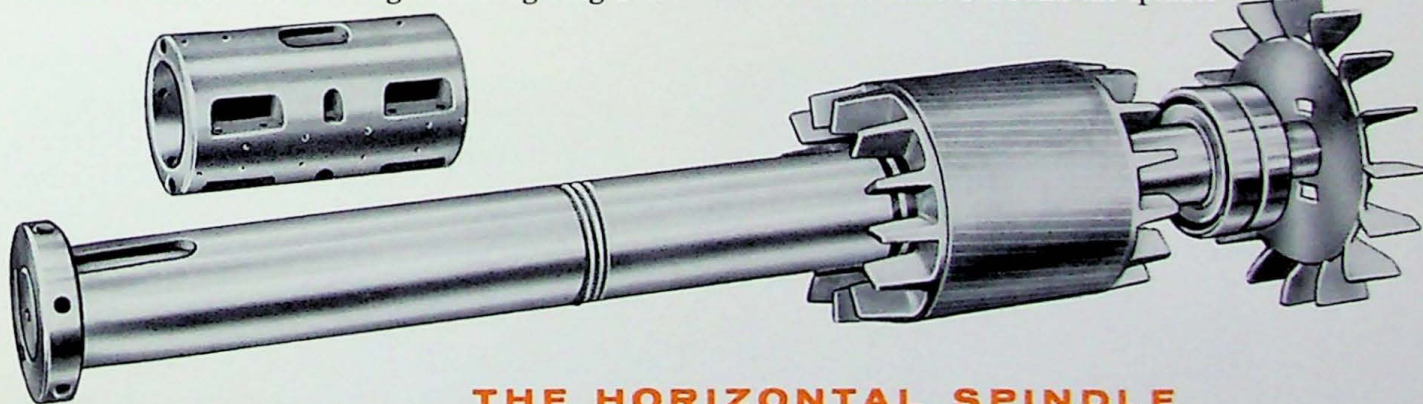


An exclusive Hill feature



• The front spindle bearing is a specially designed, alloy bronze lined, oil wedge, film type bearing engineered by the HILL ACME CO. and proven in the field to operate indefinitely. An alloy bronze bushing is fastened to a semi-steel casting with brass screws. The bronze bushing is undercut lengthwise in four equidistant locations on the outside diameter to allow for spindle expansion. (Darker areas in photo show undercut sections.) A perfect bearing surface is established in the I.D. of the bronze directly opposite the undercut sections. Oil is forced into specially designed concave relief areas which act as oil wedges assuring long bear-

ing life. Clearance adjustments, if necessary, are made by removing shims. Hardened dowel pins guide the two halves together to their original position. The bottom half of the bearing has an oil return slot shown at the edge of the half section on the outside diameter. Note that there are NO oil grooves in this bottom half or in the quarter half of the top section. The shaft rotation spreads the oil film from the oil distribution grooves to the perfect bearing surfaces. Any additional oil grooves would act as scrapers and be detrimental to the oil film formed around the spindle



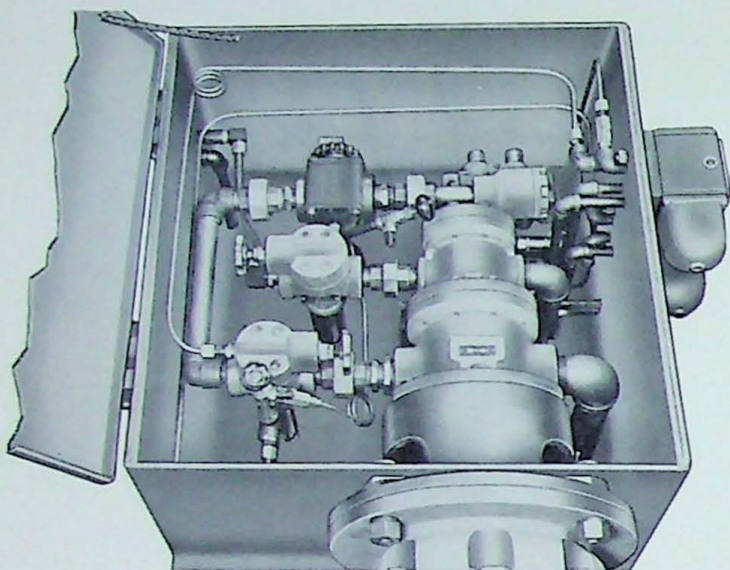
THE HORIZONTAL SPINDLE

• The dynamically balanced main drive motor spindle and rotor is an integral unit with a hardened, ground and lapped, alloy steel spindle. The spindle is supported in the front by an adjustable alloy bronze, oil wedge, film type bearing. The rear bearing is an extra

heavy, precision preloaded, double ball bearing unit with ample provision for radial and end thrust, eliminating all end play of the spindle and grinding wheel. The main spindle motor is a totally enclosed, fan cooled type with direct spindle drive of 1200 R.P.M.

HILL

OIL TANK FOR 100% HYDRAULIC DRIVE



- The HILL 100% hydraulic pumping system is a low pressure, quiet, and dependable unit operated by two Vickers balanced "Vane" type rotary pumps on the same shaft but with two completely separate circuits.

The 75 gallon steel tank is independent from the machine proper except for two $\frac{3}{4}$ " lines connected to the table cylinders and two small lines connected to the cross feed cylinder. This separation of the tank from the grinder insures there is no heat transfer from the hydraulic oil to the machine proper. Solenoid valves on the tank quietly operate the control valves located within the tank.

Simplicity and accessibility to the double pumping arrangement is immediately evident. The large pump with proper valves is for the operation of the table only, while the small pump and relief valve are for the cross feed movement. This double pumping system allows for operation of the table or cross feed independently, thus permitting dressing of the grinding wheel by hydraulic power.

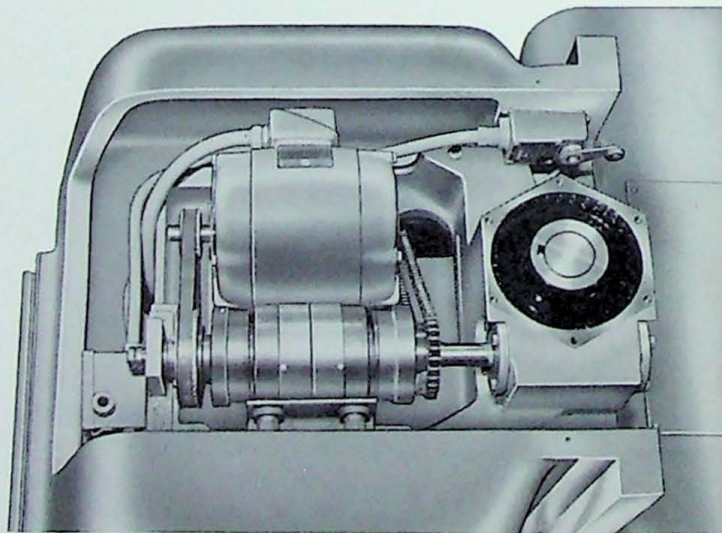
Each pumping system is complete with speed control valves to vary either table speed or cross feed travel speed.

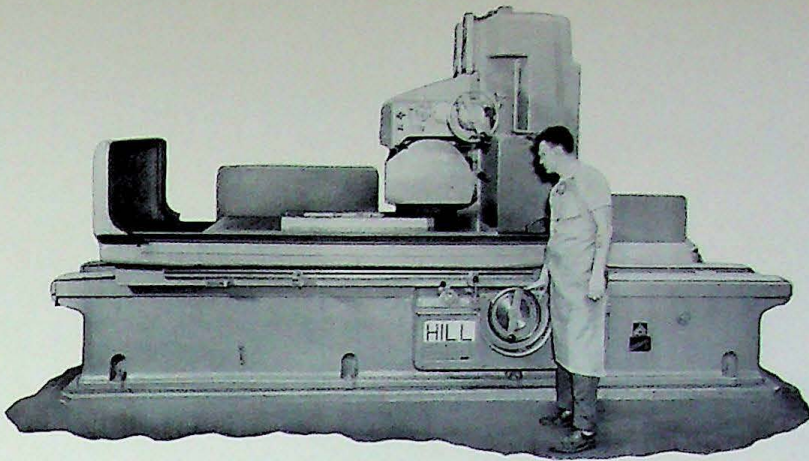
A baffle plate separates the pump intake area from the discharge area thus keeping the aerated oil from mixing with the air free oil on the intake side. This insures smooth table and cross feed operation.

A semi-steel pump adapter connects the motor to the pump and insures perfect alignment between these units at all times.

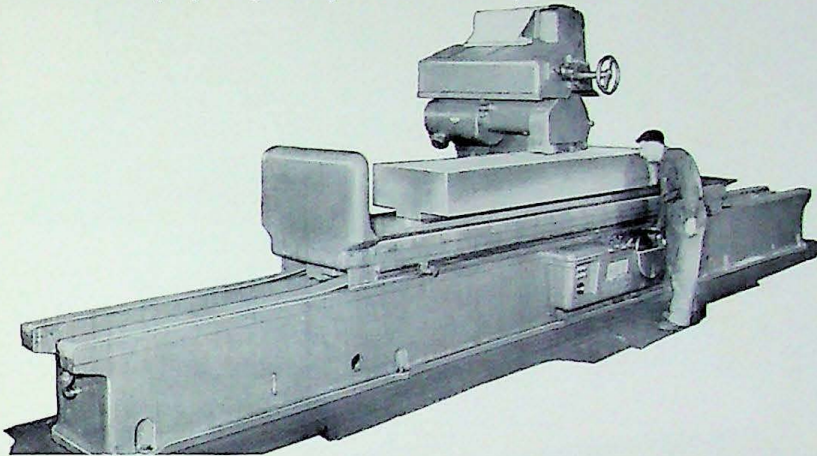
ELECTRIC CLUTCH FOR WHEELHEAD RAPID TRAVERSE

- Power rapid traverse is supplied through a separate 1 HP 1800 RPM TE motor located at the top of the main column. This motor drives the over-size steel rail-raise screw through two magnetic clutches and a worm gear box. When the lever switch on the front of the grinder is actuated, one clutch is energized, raising or lowering the head as required. The second clutch automatically disengages the micrometer manual feed handwheel to eliminate all flywheel effect and to protect the operator. When using the fine-feed handwheel, the motor is automatically clutched out. The rail raise mechanism is protected by a built-in safety device which eliminates the possibility of damage should the head accidentally be power-fed into the work. As the alloy bronze nut and screw are in tension, all possibility of backlash is eliminated. This entire mechanism may be readily removed as a unit for servicing.



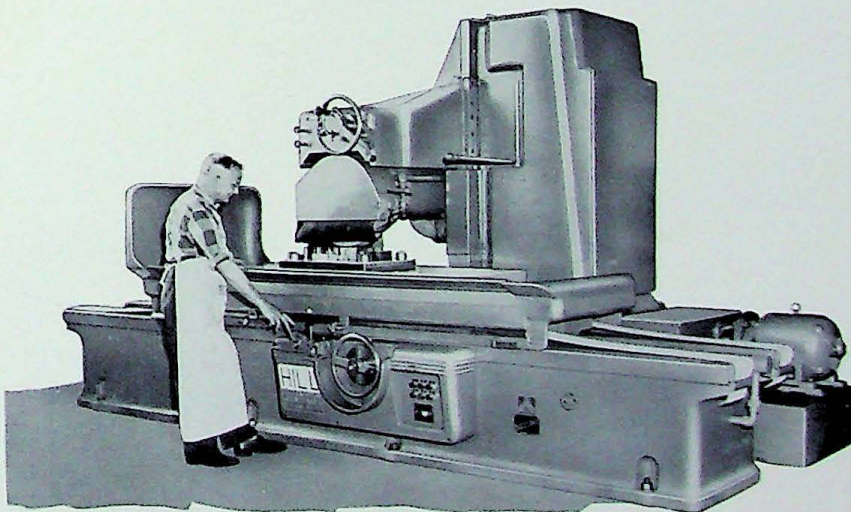


36" x 24" x 72" "Hill" Horizontal Spindle Hydraulic Surface Grinder
General purpose grinding in machine shops and tool room work.



24" x 30" x 156" "Hill" Horizontal Spindle Hydraulic
Surface Grinder Grinding 15,000 lbs. steel die block.

FOR A VARIETY OF FINISHING OPERATIONS

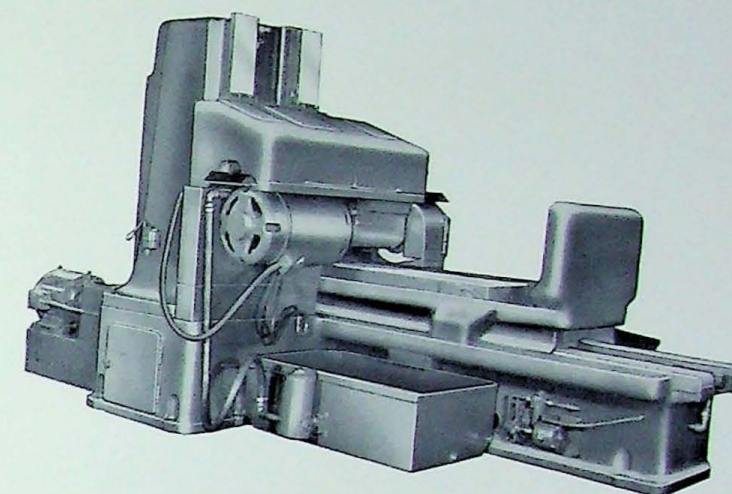


24" x 24" x 72" "Hill" Horizontal Spindle Hydraulic Surface Grinder
. . . Grinding lamination dies to the highest degree of accuracy.

HILL HORIZONTAL GRINDER

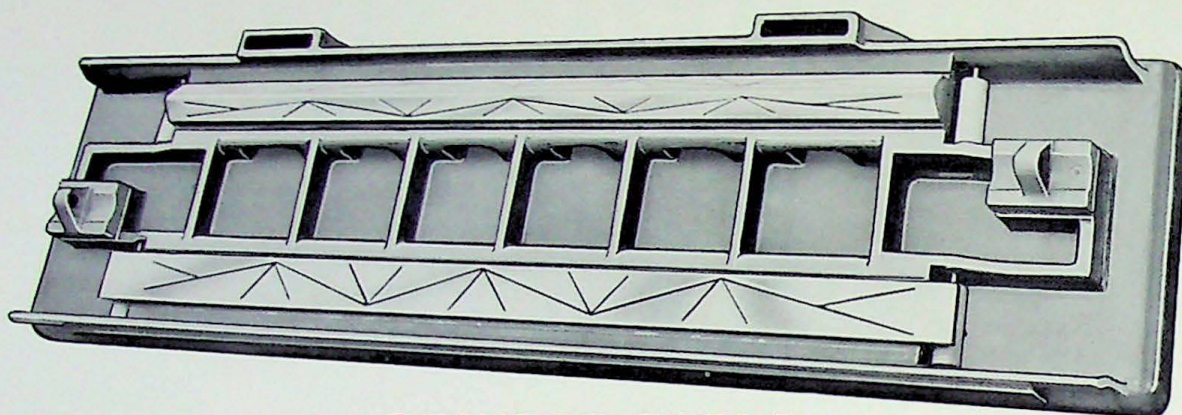
100% HYDRAULIC DRIVE FOR
TABLE AND CROSS FEEDS...

18" x 18" x 72" HORIZONTAL



Rear View Hill Horizontal
Spindle Surface Grinder

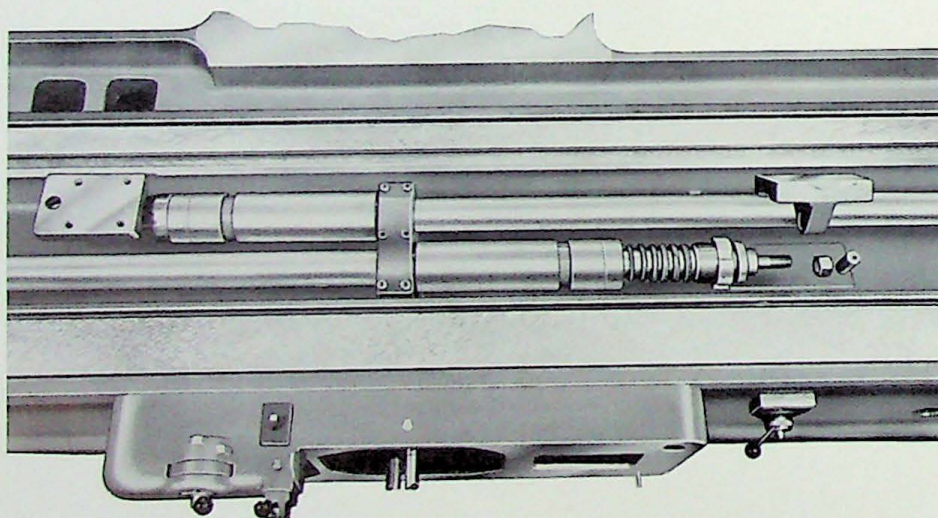
• HILL Horizontal Spindle Heavy Duty precision surface grinder with dynamically balanced built-in spindle motor, hydraulic or manual cross-feed. Rapid traverse and hand wheel with micrometer feed for wheel head control. Operating controls instantly accessible. For grinding flats, angles, irregular and special shaped surfaces while maintaining extremely close tolerances with a superior finish.



GRINDER TABLE

• The HILL grinder table is an alloy casting substantially ribbed with the weight properly distributed for permanent accuracy and normalized to eliminate warpage. Proper oil grooving reduces wear on the ways. The front way is flat, 5" wide, and the rear way is a 4" "V" shape. A piston bracket, shown at each end of the table, is attached to the hydraulic cylinders for actuat-

ing the table. At both ends of each way is a large roller over which pass heavy duty canvass way covers. These completely cover the exposed bed ways and afford excellent protection against any foreign matter. At the rear of the table are two large coolant outlets allowing the coolant to quickly return to the main trough in the bed and then to the coolant tank.



METHOD OF TABLE DRIVE

• Here are the two opposed single acting hydraulic cylinders which actuate the table. Note that all gears have been eliminated. Reversing of the table is either automatic or manual. This view also shows the simplicity of changing the Chevron packing in the stuffing box. The piston, being a solid turned ground polished

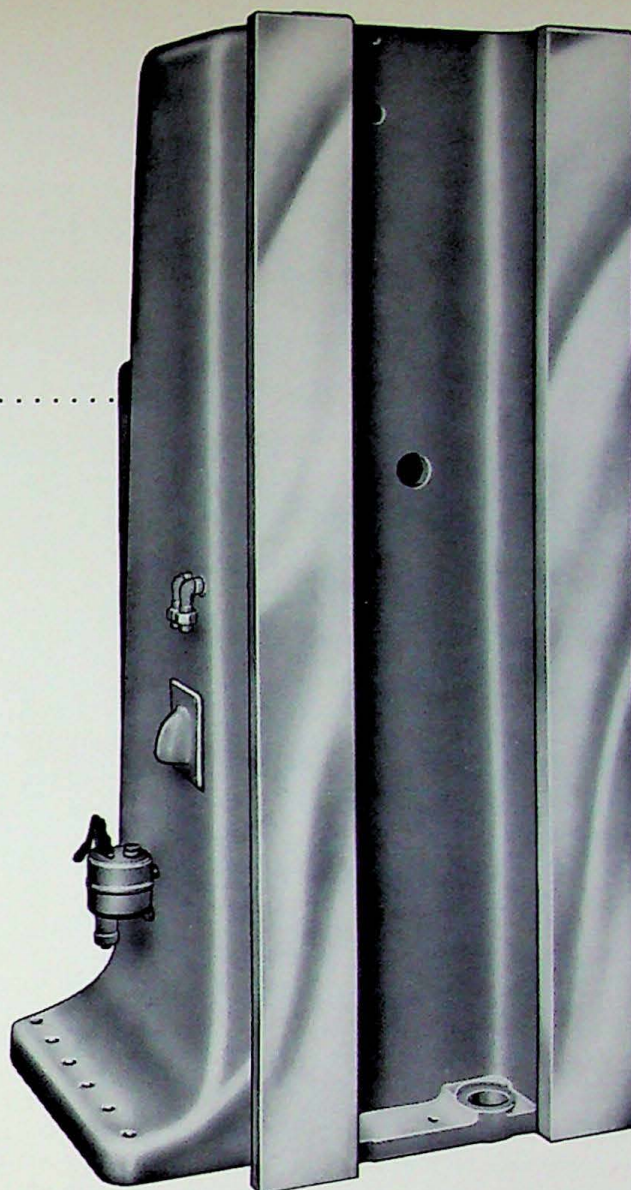
alloy shaft requires no maintenance. As there are no piston rings, the Chevron packing is the only item to be maintained.

The front cylinder shows the bronze packing gland opened to expose the Chevron packing and the closure.

THE COLUMN

• The HILL Horizontal Spindle column is a heavily ribbed alloy casting of massive proportions with unusually wide and long *ground* bearing surfaces to give ample support for the wheel head and to maintain perfect alignment, thus insuring permanent accuracy. The bearing surfaces are *flame hardened and specially ground* to produce a criss-cross finish. This criss-cross finish produces hundreds of tiny pockets for retaining oil, thereby guaranteeing extremely long life to the surface.

On the left side of the column is a Bijur pump which operates the "One-Shot" lubrication system reaching all necessary points on the column ways and the saddle ways.



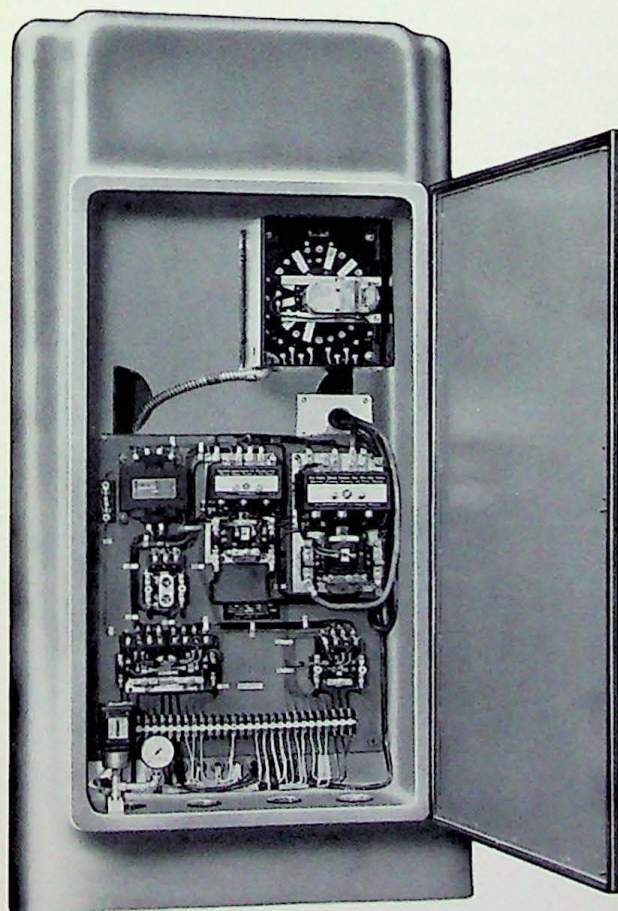
ELECTRICAL CONTROL PANEL

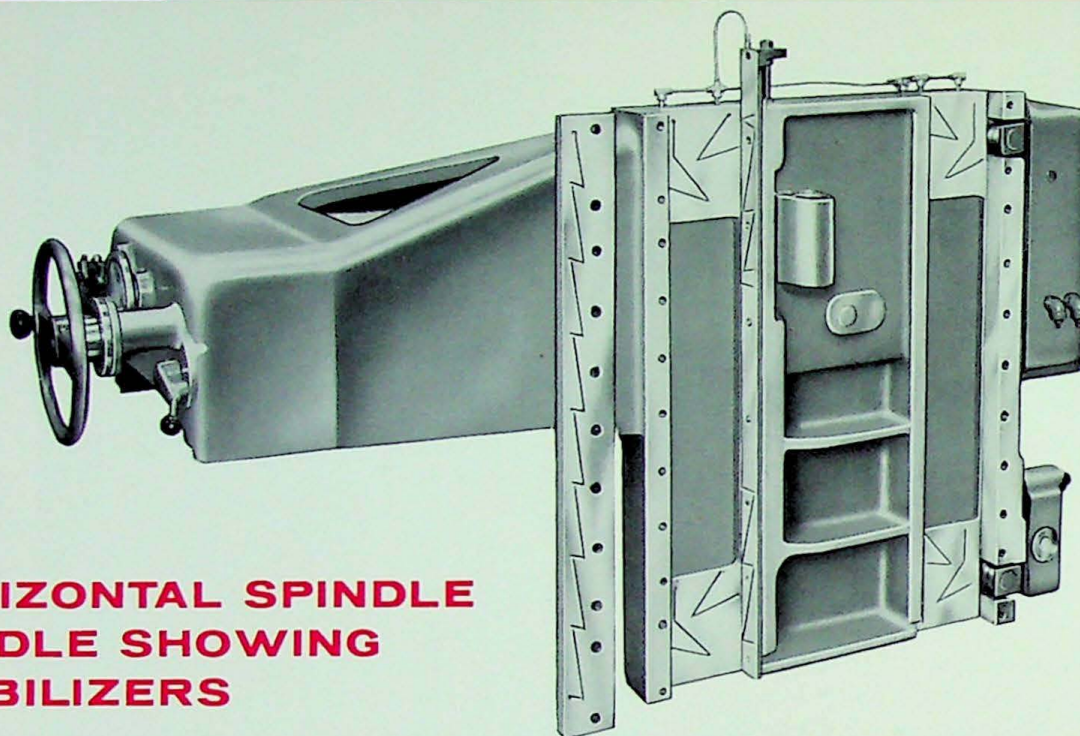
• The electrical starter and control panel is recessed into the rear of the main column behind a dust-proof door and is readily accessible at all times. Each grinder is completely wired in our shop before shipment, requiring only hook-up to power lines in the customer's plant.

In the lower left hand corner of this control box is a pressure switch and pressure gauge which will automatically disconnect the table drive motor and main spindle motor if for any reason the lubricating pressure should fall below a safe limit.

Also mounted in this recess is the neutral demagnetizing unit used for the operation of the magnetic chuck. This unit is shown in the upper right hand corner.

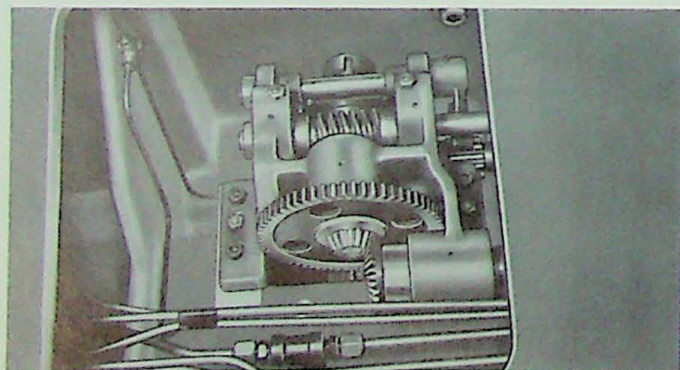
J.I.C. electrical standards are available if required.





HORIZONTAL SPINDLE SADDLE SHOWING STABILIZERS

• The Horizontal Spindle saddle, on which the spindle motor and wheel head are mounted, is a heavily ribbed alloy casting which is normalized before finish machining. Note the stabilizers at the top and bottom of the right hand way. These control the necessary clearance for oil film between the saddle and the column. These stabilizers are spring loaded, cam follower type bearings and keep the saddle in perfect alignment at all times, supplementing the taper gib that is shown projecting above the saddle. Note also that the center portion of the saddle ways and the center section of the adjustable tapered gib are undercut to insure perfect contact with the column ways indefinitely. This is an exclusive HILL feature that eliminates the necessity of future rebuilding of this assembly.



The oil grooves are also worth attention. Note that the oil is introduced at the top, through the Bijur "One Shot" system, and travels down through the grooves into pockets. These pockets retain the oil, rather than allowing it to run directly through, insuring proper lubrication. The hold down caps, one of which is shown on the left of the photo, are flame hardened and ground for long life.

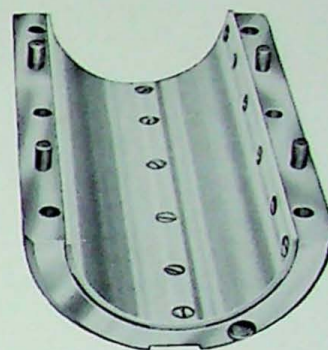
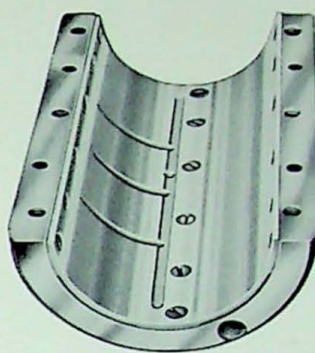
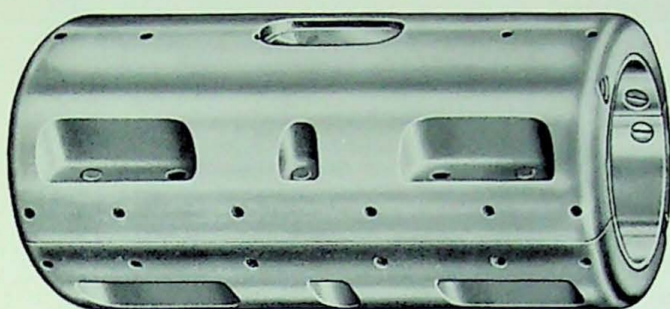
At the extreme left is a hand wheel used for manual feeding for face grinding, or grinding down into a slot. The lever immediately to the right of this hand wheel engages the manual or hydraulic control of the grinding head as the case may be. At the center of the saddle is the extra large bronze alloy nut through which the rail raise screw travels to elevate or lower the saddle on the column.

MANUAL CROSS-FEED MECHANISM

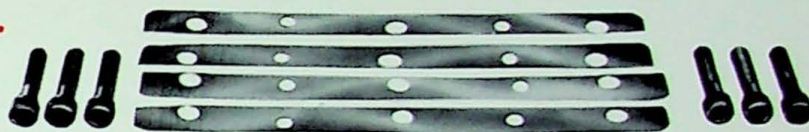
• In addition to hydraulic cross-feed operation, provision is also made for manual cross-feed operation. This manual control consists of a hand wheel mounted on the front of the saddle which reciprocates the wheel head by means of worm gear mechanism, spur pinion and rack. The mechanism, as shown above, is located within the saddle and may be removed as a unit for bench servicing. The large gear and the small bevel gears rotate the trip plate on the front end of the saddle. This trip plate adjusts the length of the cross-feed stroke.

HILL

HORIZONTAL FRONT SPINDLE BEARING

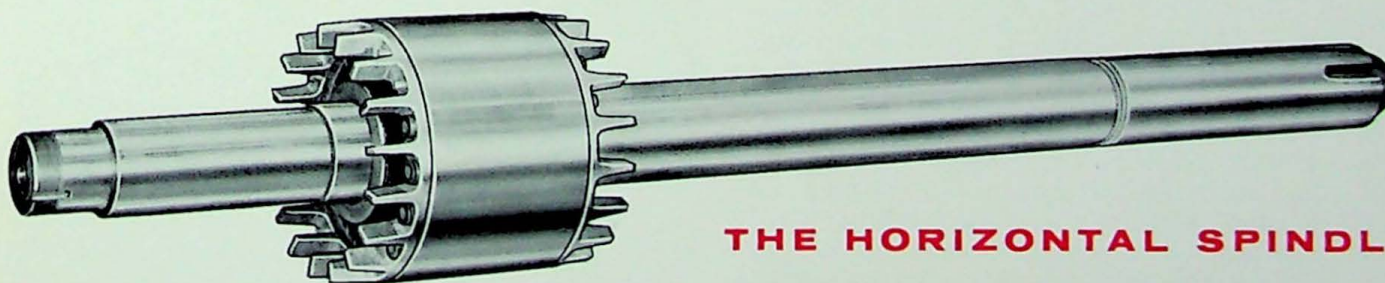


An exclusive Hill feature



• The front spindle bearing is a specially designed, alloy bronze lined, oil wedge, film type bearing engineered by the HILL ACME CO. and proven in the field to operate indefinitely. An alloy bronze bushing is fastened to a semi-steel casting with brass screws. The bronze bushing is undercut lengthwise in four equidistant locations on the outside diameter to allow for spindle expansion. (Darker areas in photo show undercut sections.) A perfect bearing surface is established in the I.D. of the bronze directly opposite the undercut sections. Oil is forced into specially designed concave relief areas which act as oil wedges assuring long bear-

ing life. Clearance adjustments, if necessary, are made by removing shims. Hardened dowel pins guide the two halves together to their original position. The bottom half of the bearing has an oil return slot shown at the edge of the half section on the outside diameter. Note that there are NO oil grooves in this bottom half or in the quarter half of the top section. The shaft rotation spreads the oil film from the oil distribution grooves to the perfect bearing surfaces. Any additional oil grooves would act as scrapers and be detrimental to the oil film formed around the spindle



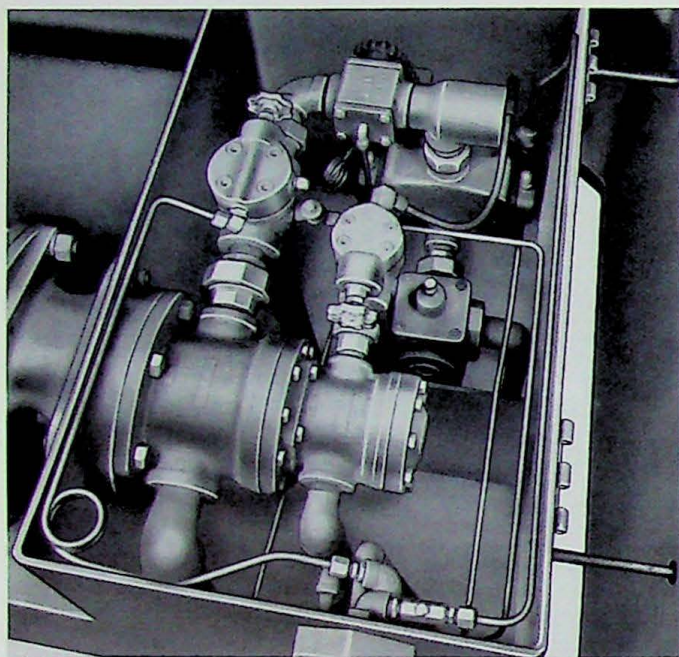
THE HORIZONTAL SPINDLE

• The dynamically balanced main drive motor spindle and rotor is an integral unit with a hardened, ground and lapped, alloy steel spindle. The spindle is supported in the front by an adjustable alloy bronze, oil wedge, film type bearing. The rear bearing is an extra

heavy, precision preloaded, double ball bearing unit with ample provision for radial and end thrust, eliminating all end play of the spindle and grinding wheel. The main spindle motor is a totally enclosed, fan cooled type with direct spindle drive of 1200 R.P.M.

HILL

OIL TANK FOR 100% HYDRAULIC DRIVE



- The HILL 100% hydraulic pumping system is a low pressure, quiet, and dependable unit operated by two Vickers balanced "Vane" type rotary pumps on the same shaft but with two completely separate circuits.

The 75 gallon steel tank is independent from the machine proper except for two 1" lines connected to the table cylinders and two small lines connected to the cross feed cylinder. This separation of the tank from the grinder insures there is no heat transfer from the hydraulic oil to the machine proper. Solenoid valves on the tank quietly operate the control valves located within the tank.

Simplicity and accessibility to the double pumping arrangement is immediately evident. The large pump with proper valves is for the operation of the table only, while the small pump and relief valve are for the cross feed movement. This double pumping system allows for operation of the table or cross feed independently, thus permitting dressing of the grinding wheel by hydraulic power.

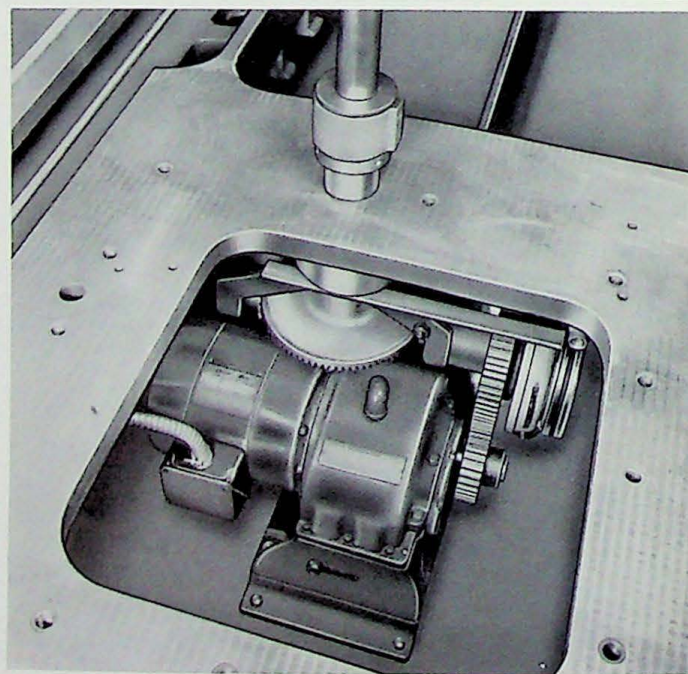
Each pumping system is complete with speed control valves to vary either table speed or cross feed travel speed.

A baffle plate separates the pump intake area from the discharge area thus keeping the aerated oil from mixing with the air free oil on the intake side. This insures smooth table and cross feed operation.

A semi-steel pump adapter shown outside the tank on the left side connects the motor to the pump and insures perfect alignment between these units at all times.

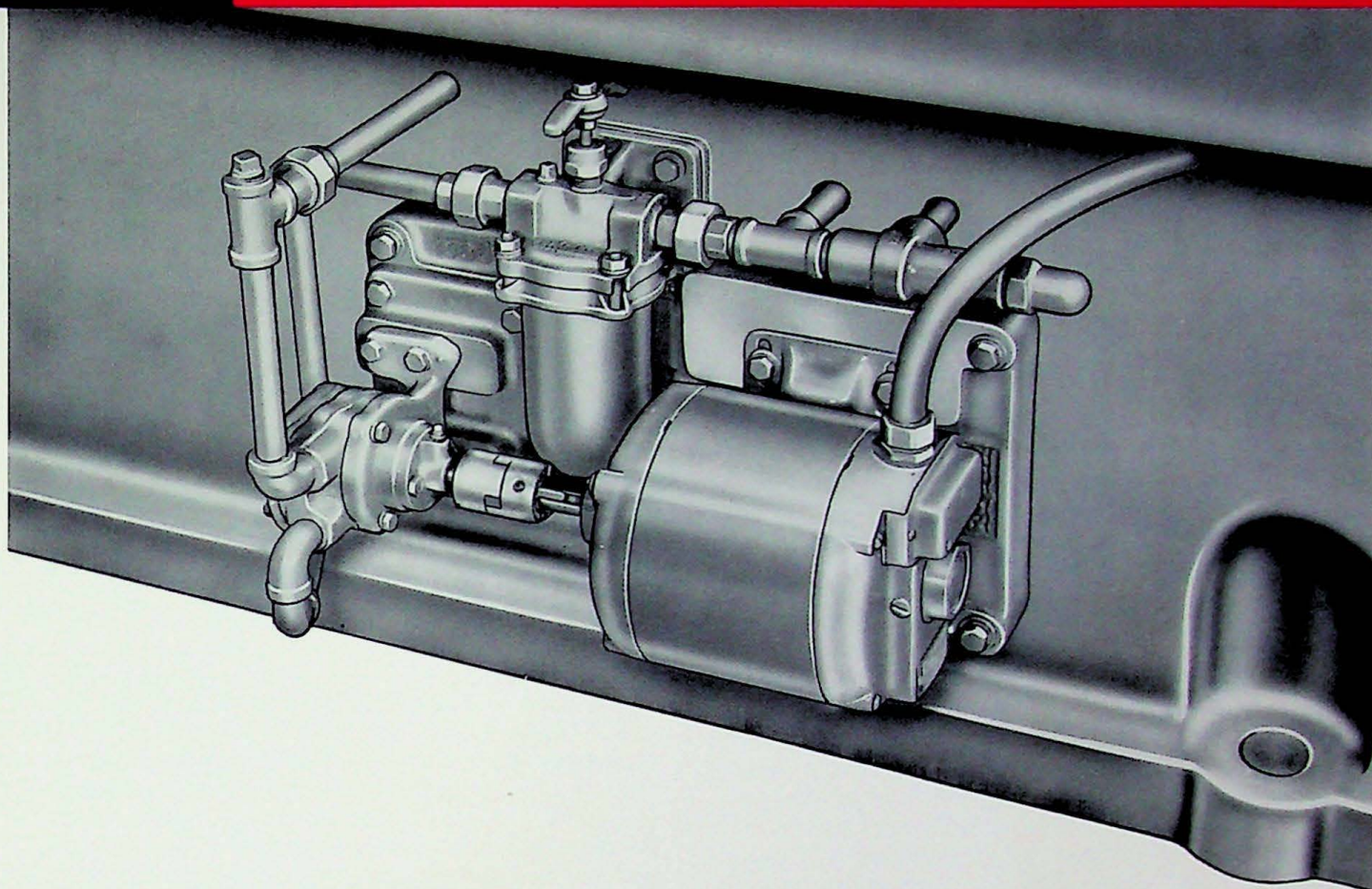
ELECTRIC CLUTCH FOR WHEEL HEAD RAPID TRAVERSE

- A simple and adequate power rapid traverse for raising and lowering the grinding head is supplied through a separate 1 HP gear motor located in the base of the machine beneath the column. This motor rotates a set of spur gears connected to a gear shaft and a large bevel gear, shown in the photo, which in turn rotates the rail raise screw partly shown at the top of the photo. The gear shaft which turns the bevel gear is also connected to the hand wheel on the front of the machine. This manual feed with its micrometer reading is for final accurate adjustment. As it is necessary to disconnect the motor so that there will be no flywheel effect when the manual feed is used, the disconnect action is accomplished by means of an electric clutch shown in the upper right hand corner of the clutch compartment. A lever, mounted on the front control box, operates this gear motor and electric clutch simultaneously, for rapid traverse.



HILL

FORCE FEED LUBRICATING SYSTEM



• A force feed lubrication system is provided for lubricating the table and bed ways and also the front spindle bearing. Oil is pumped from a reservoir through the Purolator unit and through a relief valve which is set at the proper operating pressure. The entire unit is mounted on the outside of the bed in the

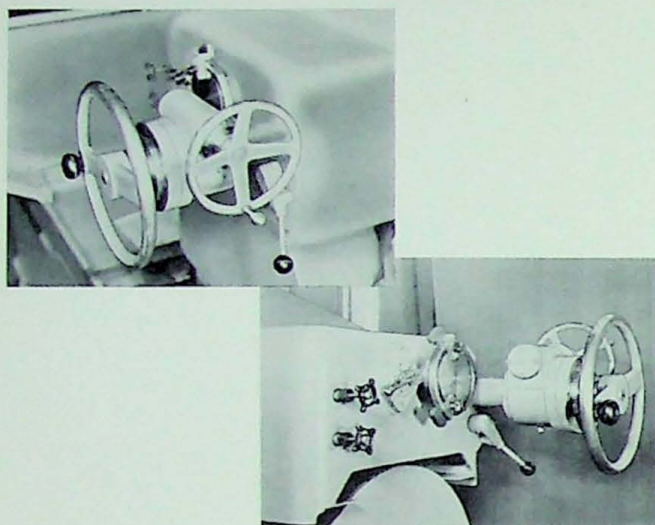
rear of the grinder where it is easily accessible for adjustments.

The lubrication system is also complete with a sensitive pressure switch which automatically safeguards the ways and front spindle bearing from lack of lubrication.



HILL

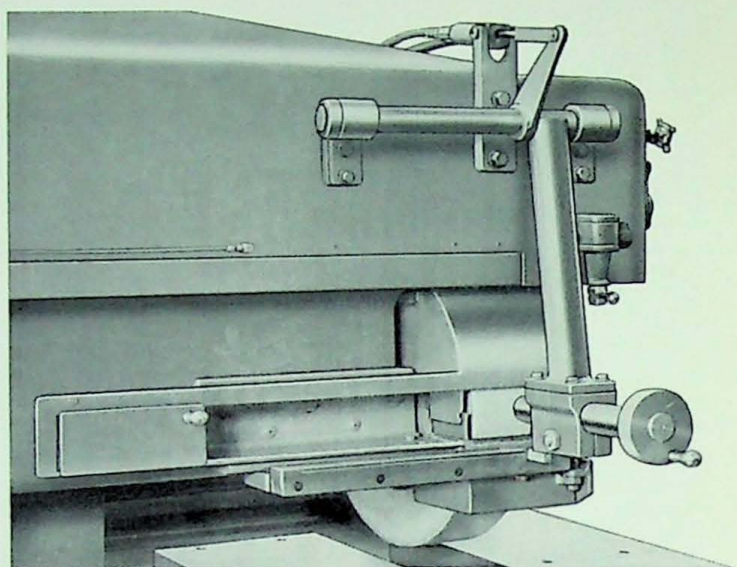
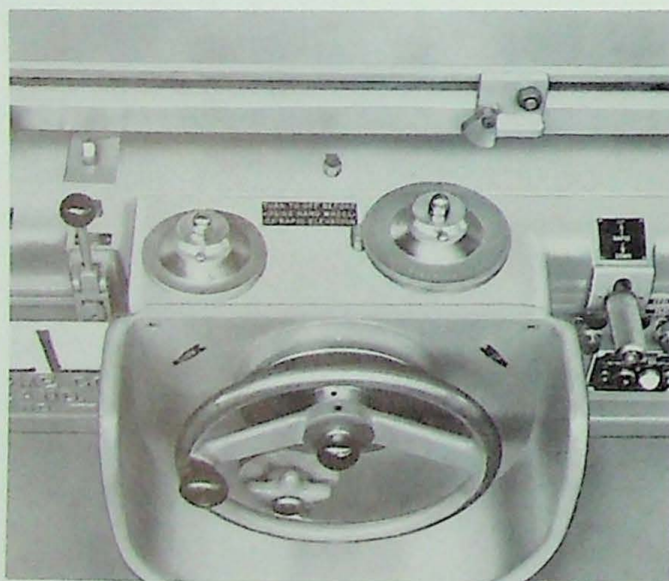
HORIZONTAL SPINDLE GRINDERS AUXILIARY ITEMS



AUXILIARY CROSS FEED ATTACHMENT

(For Extreme Precision Adjustment)

• While the standard HILL fully automatic cross feed coupled with the manual handwheel control is sufficiently accurate and reliable for almost all grinding applications, — when even greater precision is desired we can supply an Auxiliary Cross Feed Attachment embodying a special reduction unit with vernier dial. This auxiliary unit is especially valuable when grinding on the side or "face" of the wheel to extremely close tolerances as in slots, grooves, etc. The unit may be engaged or disengaged at will.



DIAMOND WHEEL DRESSER

• The HILL diamond wheel dresser is mounted on the upper saddle and is guided by a hardened ground rail mounted on the wheel head. The diamond holder is forced against the guide rail by a cylinder, shown on the top of the saddle, keeping a constant tension against the guide rail and insuring perfect alignment between the diamond and grinding wheel at all times. Setting of the diamond for proper wheel dressing is accomplished by means of vernier adjustment.

AUXILIARY AUTOMATIC DOWN FEED FOR HORIZONTAL SPINDLE GRINDER

• The Down Feed on The Horizontal Spindle Grinder is manually operated, which, based on our wide experience in grinding, gives the best results for general purpose grinding operations. However, if required for relatively long run production type work, we can equip the Grinder with our Automatic Down Feed Unit which has graduations for setting the range of feed between .00025" to .003" at each reversal of the Cross Feed. The unit when operating will automatically remove stock within a range of .001" to .062" at which point the feed is automatically disengaged and a run-out or dusting of the work continues. If more than .062" is to be removed, then the unit can be reset for additional removal of stock, if necessary.

This Automatic Down Feed Unit has proved itself in years of satisfied customers' use to be virtually fool proof and free of maintenance.

BED — Alloy Casting, Box Type, Heavy Cross Ribbed Design. Width: 18", 24", 30" table — 6' 4½". 36" table — 6' 8¾". Length: Approximately twice the length of the table. Center Distance between ways: 18½". Width of Ways: One Flat Way, 5". One "V" Way, 4". Forced Feed Lubrication to both ways.

TABLE DIMENSIONS AND SPEED — Heavily Ribbed, Alloy Casting with two, three or four machined ¾" "T" slots (depending upon table size and requirement). The working surface of the table is 18", 24", 30" or 36" wide, and from 5 ft. to 20 ft. long as required. Variable table speeds up to 90 feet per minute. Distance from floor to top of table is 32".

WHEEL HEAD VERTICAL SLIDE — Alloy casting of heavy ribbed construction having two bearing surface areas 14" x 42". Taper gib is provided for take-up. Horizontal Spindle Slide is 18" x 42" long with two "V" shape bearing areas 4½" x 54" (57" long on 36" wide machine). The ways are machined and precision ground. Power rapid traverse is provided for raising and lowering wheel head.

WHEEL SPINDLE — Hardened, ground and lapped Alloy Steel Spindle (dynamically balanced), mounted in one adjustable alloy bronze sleeve bearing, and one extra heavy preloaded precision Duplex Ball Bearing. Forced Feed Lubrication is provided for front spindle sleeve bearing.

Size of bearings for 25 HP Motor:

Front Bearing: 4" dia. x 10" long.

Rear Bearing: 3" dia. Ball Bearing.

HYDRAULIC SYSTEM — "Vane Type" Rotary Hydraulic Pumps. Capacity 30 gal. per minute for table drive and 5 gal. per minute for motor cross feed. Method of Reversing Table: Automatic and Manual. Oil Tank: 75 gallon capacity.

GRINDING WHEEL SIZE AND CLEARANCE — Standard 20" dia. x 4" face, 10" dia. hole. Can also furnish 2" or 6" face wheels depending upon service. Clearance between 20" dia. grinding wheel and table top is 18" on 18" wide table, 24" on 24" wide table, 24" on 30" wide table and 24" on 36" wide table.

COOLANT SYSTEM — Welded Steel Tank (see table) gallon capacity — depending on size of machine — with baffleplates for filtration of coolant liquid. Centrifugal pump of 35 gallon capacity at 6 ft. head per minute. Flared type nozzle, and flow controlled by shut-off valve.

5' 0" — 125 Gal.

6' 0" — 160 Gal.

7' 0" — 190 Gal.

8' 0" — 190 Gal.

9' 0" — 210 Gal.

10' and up — 210 Gal.

MOTORS — Spindle Motor, Built-in Type, 25 HP, 1200 RPM, Totally-Enclosed, Fan-Cooled.

Hydraulic Pump Motor, 7½, 10 or 15 HP, depending on length of table, 1200 RPM. Ball Bearing Type.

Wheel Head Raising and Lowering Motor, 1 HP, 191 RPM, Ball Bearing Gearmotor.

Coolant Pump Motor, built integral with pump, 1/3 HP, 1800 RPM, Ball Bearing Type.

Ways Lubricating Pump Motor, 1/3 HP, 1800 RPM, direct connected with pump. Ball Bearing Type.

Speeds indicated are for 220/440/550 Volt — 60 Cycle, 2 or 3 Phase, A.C.

TABLE LENGTH	TABLE WIDTH			
	18"	24"	30"	36"
5'	7½ HP	7½ HP	7½ HP	10 HP
6'	7½ HP	7½ HP	7½ HP	10 HP
7'	7½ HP	7½ HP	7½ HP	10 HP
8'	7½ HP	7½ HP	10 HP	10 HP
9'	10 HP	10 HP	10 HP	10 HP
10'	10 HP	10 HP	10 HP	15 HP
11'	10 HP	10 HP	15 HP	15 HP
12'	10 HP	10 HP	15 HP	15 HP
13'	10 HP	10 HP	15 HP	15 HP
14'	15 HP	15 HP	15 HP	15 HP
& OVER				

STANDARD EQUIPMENT — One grinding wheel, wheel mounting hub, wheel guard, splash guards, necessary wrenches, base levelling wedges and a diamond tool holder without diamond.

FLOOR SPACE

Overall Controlling Dimensions, (including extreme travel of Table at both ends):

	18" Table Width Length	24" Table Width Length	30" Table Width Length	36" Table Width Length
5 Ft.	7'2" x 15'3"	7'8" x 15'3"	8'5" x 15'3"	10'0" x 15'3"
6 Ft.	7'2" x 17'3"	7'8" x 17'3"	8'5" x 17'3"	10'0" x 17'3"
7 Ft.	7'2" x 19'3"	7'8" x 19'3"	8'5" x 19'3"	10'0" x 19'3"
8 Ft.	7'2" x 21'3"	7'8" x 21'3"	8'5" x 21'3"	10'0" x 21'3"
9 Ft.	7'2" x 23'3"	7'8" x 23'3"	8'5" x 23'3"	10'0" x 23'3"
10 Ft.	7'2" x 25'3"	7'8" x 25'3"	8'5" x 25'3"	10'0" x 25'3"
11 Ft.	7'2" x 27'3"	7'8" x 27'3"	8'5" x 27'3"	10'0" x 27'3"
12 Ft.	7'2" x 29'3"	7'8" x 29'3"	8'5" x 29'3"	10'0" x 29'3"
13 Ft.	7'2" x 31'3"	7'8" x 31'3"	8'5" x 31'3"	10'0" x 31'3"
14 Ft.	7'2" x 33'3"	7'8" x 33'3"	8'5" x 33'3"	10'0" x 33'3"
15 Ft.	7'2" x 35'3"	7'8" x 35'3"	8'5" x 35'3"	10'0" x 35'3"
16 Ft.	7'2" x 37'3"	7'8" x 37'3"	8'5" x 37'3"	10'0" x 37'3"
17 Ft.	7'2" x 39'3"	7'8" x 39'3"	8'5" x 39'3"	10'0" x 39'3"
18 Ft.	7'2" x 41'3"	7'8" x 41'3"	8'5" x 41'3"	10'0" x 41'3"
20 Ft.	7'2" x 45'3"	7'8" x 45'3"	8'5" x 45'3"	10'0" x 45'3"

Note: When Grinders are equipped with Automatic Down Feed Unit, the overall width is increased 10½".

HEIGHT

18" Clearance	7'9"			
24" Clearance	8'3"	8'3"	8'3"	8'3"
30" Clearance	8'9"	8'9"	8'9"	8'9"
36" Clearance			9'3"	9'3"

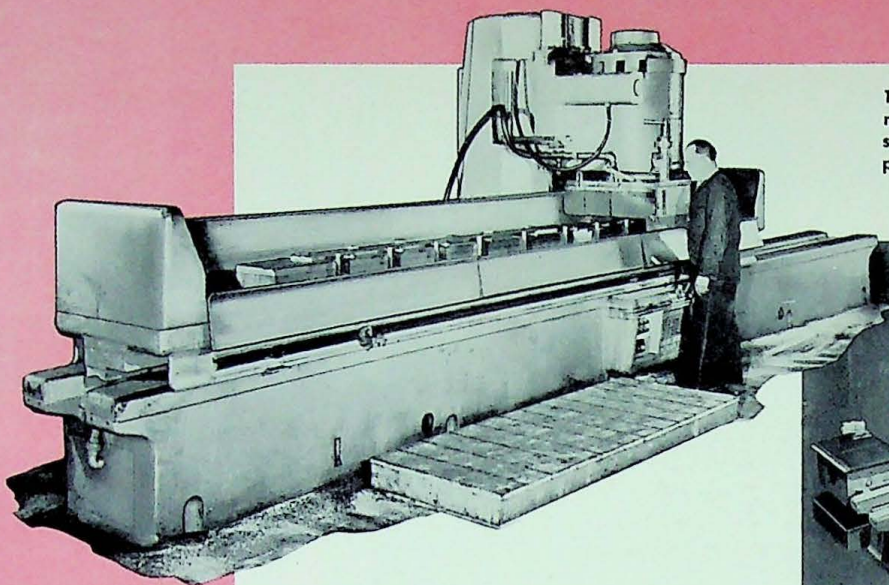
APPROXIMATE SHIPPING WEIGHT

5 Ft.	30500	32500	36000	43,000#
6 Ft.	32500	34500	37500	44,000#
7 Ft.	34500	36500	39500	45,000#
8 Ft.	35500	38000	40500	47,500#
9 Ft.	37500	39500	42500	49,000#
10 Ft.	39500	42500	44000	50,500#
11 Ft.	41500	44500	46000	52,000#
12 Ft.	43500	46000	47500	54,000#
13 Ft.	45500	47000	49000	55,500#
14 Ft.	46500	48500	50500	57,000#
15 Ft.	48500	50000	52500	59,000#
16 Ft.	49500	51500	54500	60,700#
17 Ft.	51000	53500	57000	62,500#
18 Ft.	55500	58500	59500	64,000#
20 Ft.	59500	62500	63500	68,000#

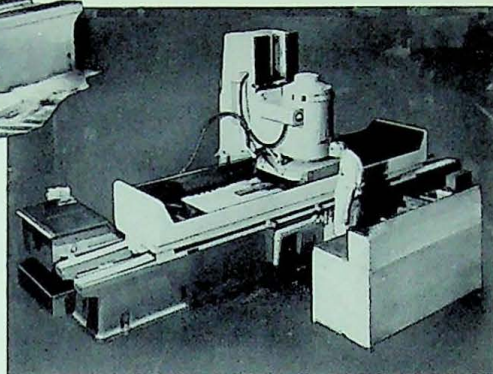
ELECTRIC WIRING — "Hill" Hydraulic Surface Grinders are furnished with motors located in permanent position and push button stations conveniently located for the operator. Each Grinder will be completely wired in our shop before shipment, requiring only hookup to the power lines in customer's plant. All starters will be assembled and mounted in one central box located on

the column.

The only exceptions are when Direct Current motors and controls are used, and in cases where reduced voltage controls are required. In both of these instances, the controls are very large in size and the mounting of them on the column of the Grinder would be impractical.



18" x 18" x 144" HILL Vertical Spindle with magnetic chuck grinding hardened steel shear blades in East Coast manufacturing plant.

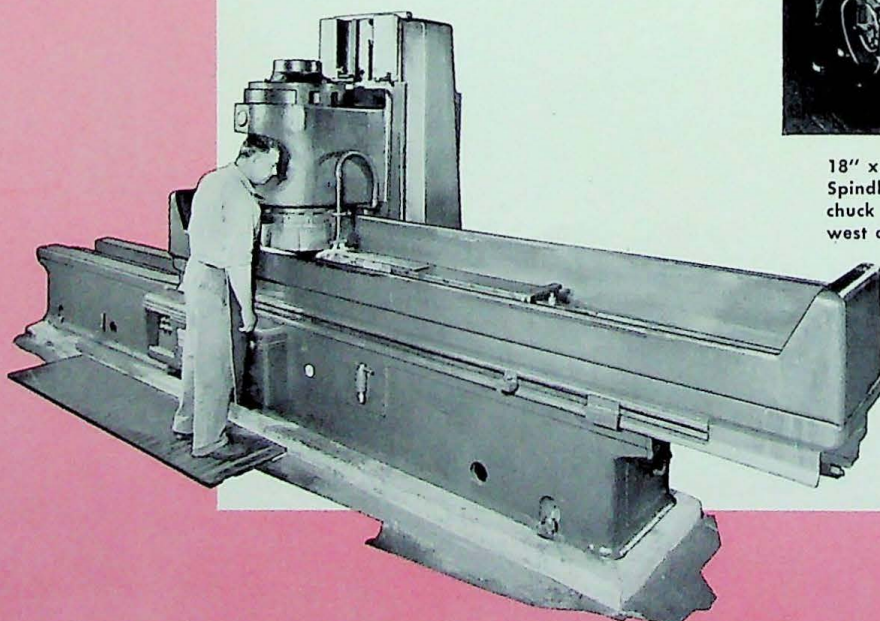


30" x 30" x 96" HILL Vertical Spindle grinding die blocks to close tolerances in large aircraft plant.

VARIED APPLICATIONS OF VERTICAL SPINDLES



18" x 18" x 60" HILL "Openside" Vertical Spindle Grinder with 18" x 60" magnetic chuck grinding steel shim plates in a large west coast steel mill.

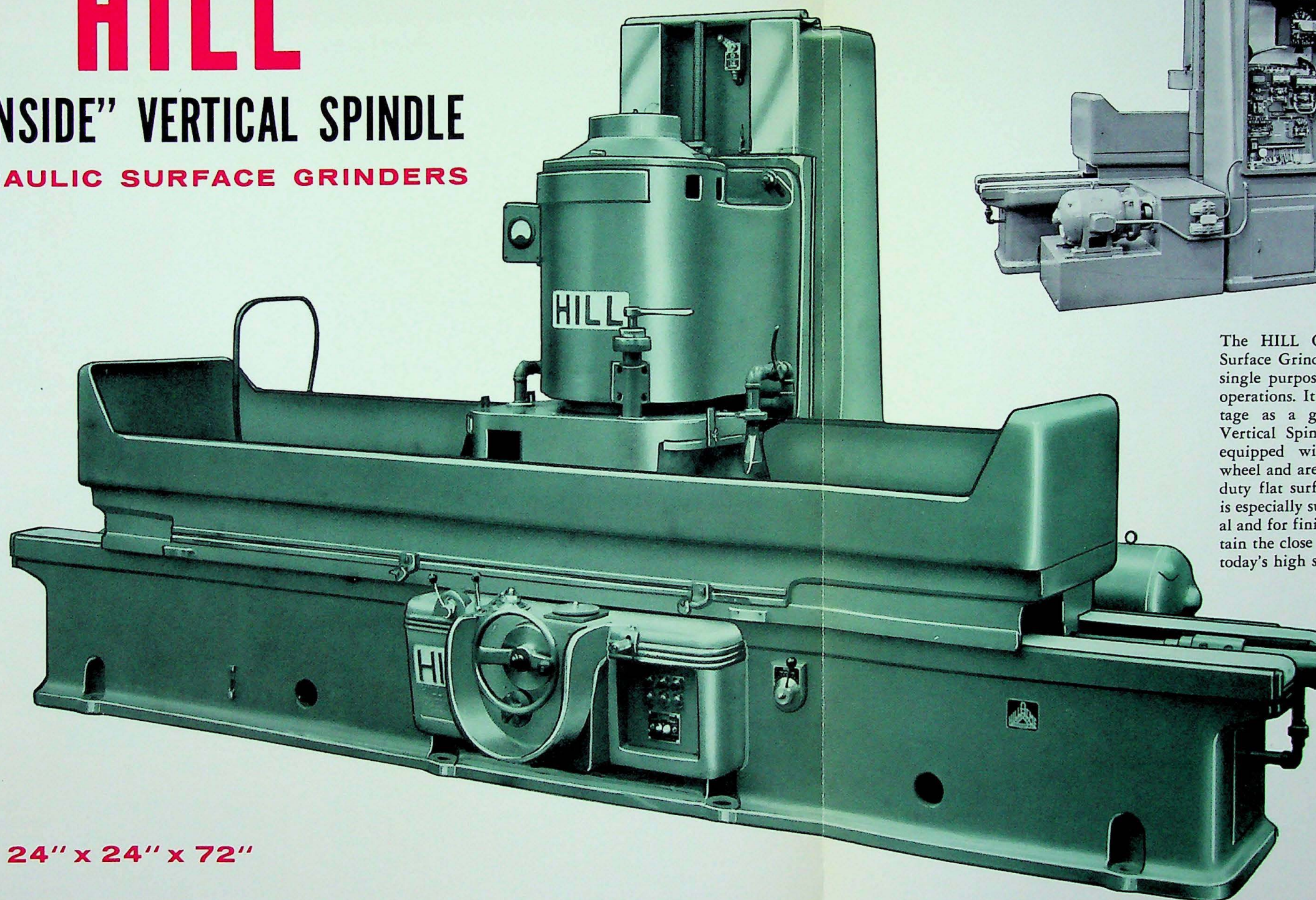


24" x 24" x 84" HILL Vertical Spindle Grinder putting fine finish and accurate parallelism on woodworking jointers for Ohio manufacturer.

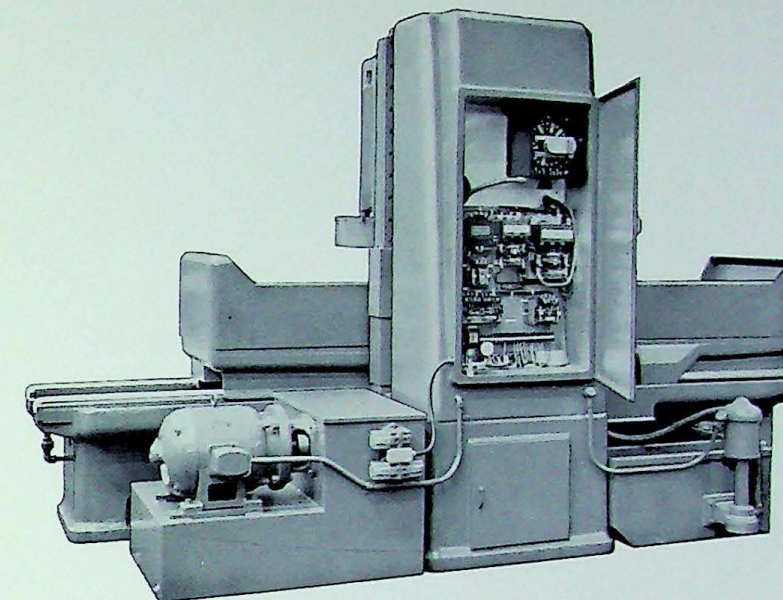
HILL

"OPENSIDE" VERTICAL SPINDLE

HYDRAULIC SURFACE GRINDERS



SIZE: 24" x 24" x 72"



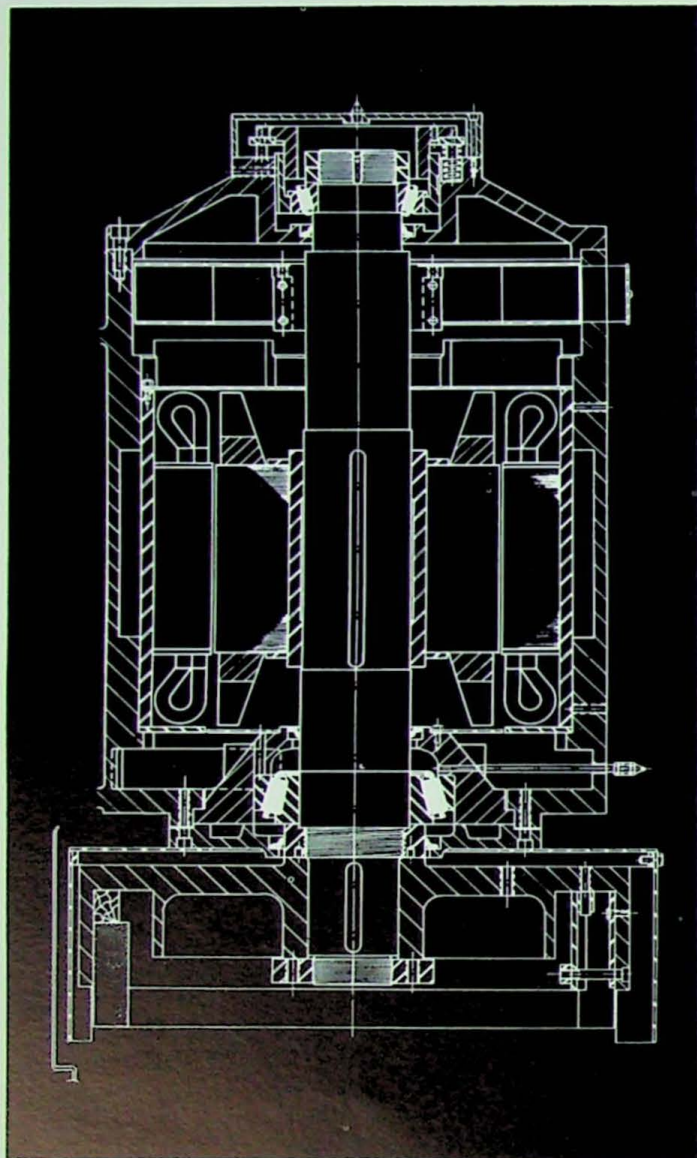
The HILL Openside Vertical Spindle Surface Grinder is an ideal machine for single purpose grinding and production operations. It can also be used to advantage as a general utility tool. HILL Vertical Spindle grinders are regularly equipped with a segmental grinding wheel and are especially suited for heavy duty flat surface grinding. This grinder is especially suited for rapid stock removal and for finishing operations will maintain the close tolerances required to meet today's high standards.



HILL

VERTICAL SPINDLE GRINDER

MOTOR ASSEMBLY

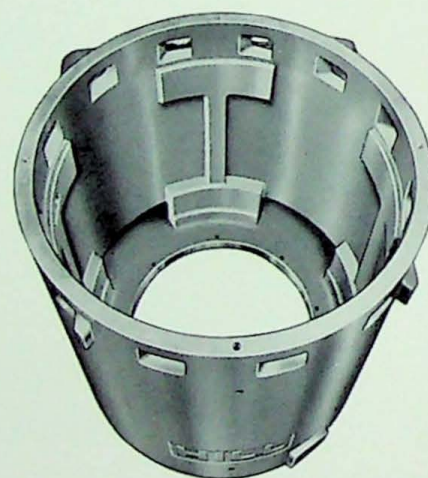
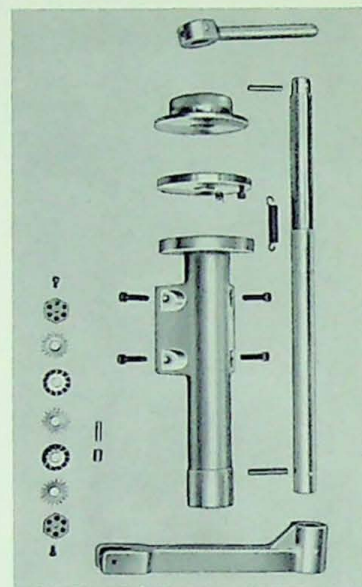


• The sectional view shows the dynamically balanced rotor and alloy steel spindle of the main motor supported by two large capacity Timken Roller Bearings. Around the top note the positive and unique method of applying preload to the bearing by spring pressure to support the spindle and grinding wheel thus eliminating any possible quiver or end play and to insure extra long bearing life. This is a special feature of the HILL Vertical Spindle Grinder.

Normally a 40 HP 600 RPM motor is furnished, however 50, 60, 75 and 100 HP are available if required.

VERTICAL SPINDLE WHEEL DRESSER

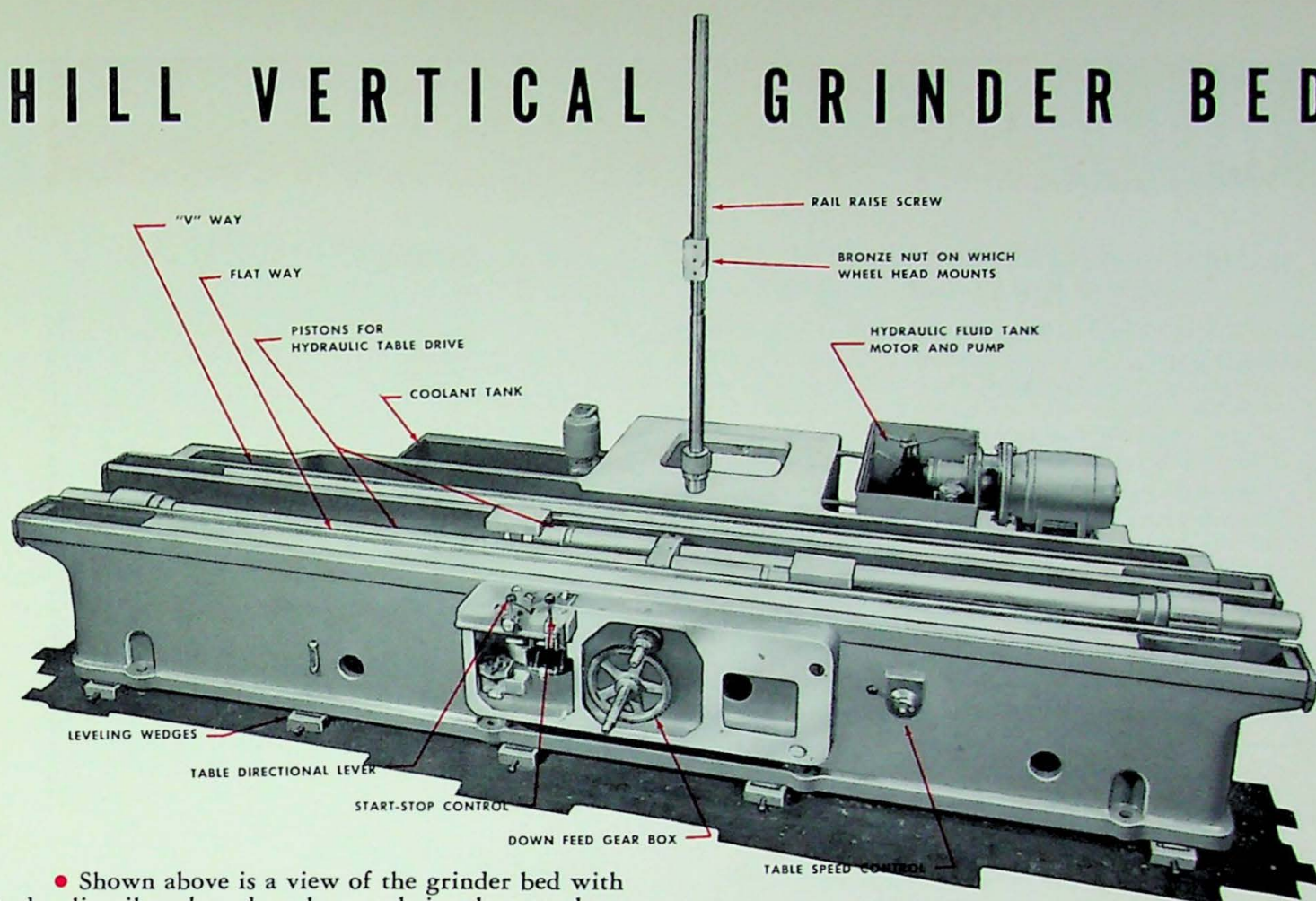
• This photograph shows every part that is used in a wheel dresser unit for the Vertical type grinder. It shows the sequence of the Star and corrugated cutters that are mounted into the slot of the dresser arm. During a grinding operation the material being ground has a tendency of clogging the grinding wheel. It is then necessary to use this dresser to remove the material that is embedded in the grinding wheel by passing the cutters across the wheel. This opens up the wheel and produces new sharp cutting edges so that faster stock removal can be obtained. This unit is permanently mounted on the right side of the vertical motor housing.



MOTOR HOUSING

• The wound stator portion of the main spindle motor is supported by the machined pads inside the housing. The motor is totally enclosed fan cooled and to insure cleanliness clean dry air is brought into the housing through a duct at the bottom and to the rear. The air duct originates at the back of the housing between the motor and vertical column. The air is circulated around the stator and exhausted through openings around the top of the housing. This unique circulation insures clean dry air and longer motor life.

HILL VERTICAL GRINDER BED



• Shown above is a view of the grinder bed with hydraulic oil tank and coolant tank in place to show relative positions of each unit.

The important parts have been labeled for quick identification.

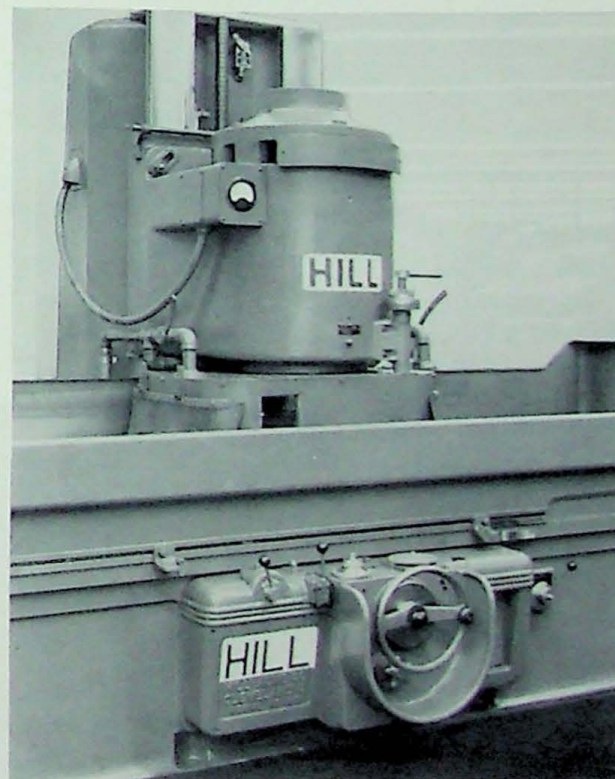
This photo also shows the two opposed single acting hydraulic pistons and cylinders employed for the smooth table operation.

The easy accessibility to parts inside the front control box is shown by the removal of the front control box cover. This cover is secured to the box by six easily removed screws. Note the start-stop and reversing valve levers remain in position when cover is removed.

• At the *RIGHT* is shown a close up of the controls and main spindle motor of the vertical spindle grinder. This machine is equipped with an automatic downfeed unit accounting for the extra dials on top the control box and the extra handle behind the feed handwheel.

This photo shows the close proximity of the operating controls to the operator's position during the grinding operation. The controls are simplified consisting of a start-stop lever and a reversing lever on the left side of the control box with the table speed control on the right side. The grinding head feed handwheel is located in the middle.

NOTE also the grinding wheel dresser on the motor housing to the right of the HILL and the percent of load meter to the upper left of the motor all within close proximity to the operator's position.



HILL

VERTICAL SPINDLE GRINDER

HILL VERTICAL SPINDLE HYDRAULIC TANK

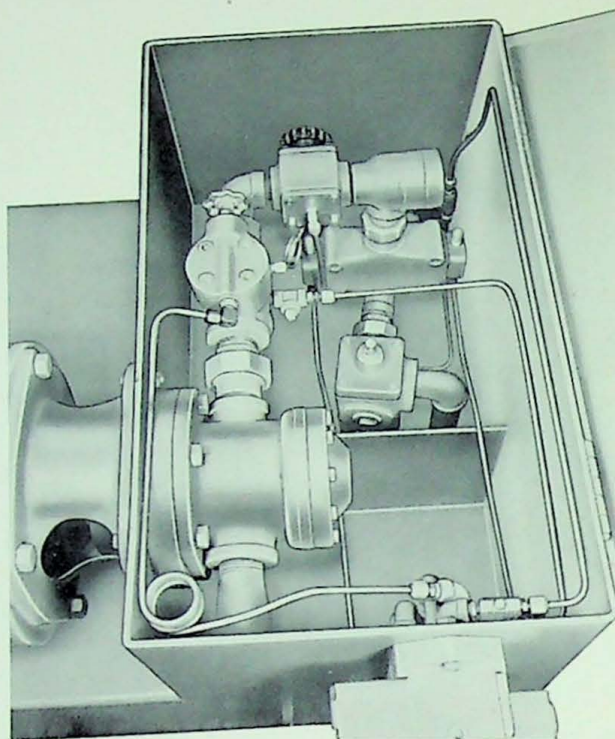
• The quiet, dependable, low pressure, hydraulic pumping unit for the vertical spindle grinder is contained in a 75 gallon steel tank separate from the machine proper and consists of a "Vickers Balanced Vane" type rotary pump together with the necessary valves and speed controls.

The start-stop and directional control valves are remotely controlled by solenoid valves located on the side of the tank. This type valve eliminates all hydraulic lines in the grinder bed except the 1" lines connected to each cylinder.

A single speed control valve located in the hydraulic tank and mechanically operated from the front control panel in the machine instantly provides the table speed desired by the machine operator.

A Baffle Plate separates the aereated cylinder discharge oil from the pump intake area insuring smooth operation.

The hydraulic pump motor located outside the tank is connected to the pump by a semi-steel pump adapter insuring positive alignment at all times.

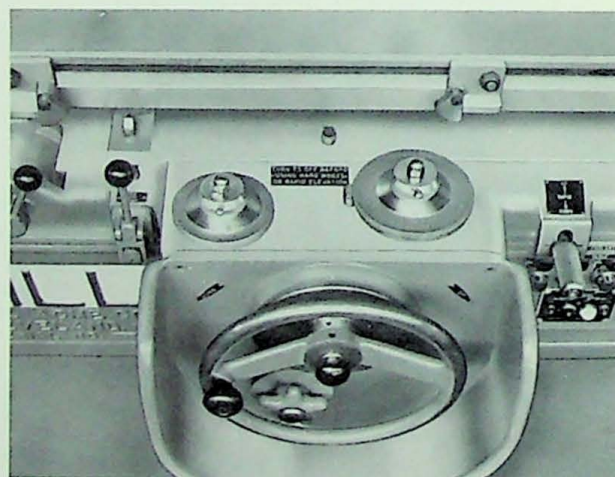


AUXILIARY EQUIPMENT

AUTOMATIC DOWN FEED FOR VERTICAL SPINDLE GRINDER

• The automatic down feed unit has graduations for setting the range of feed between .00025" to .003" at each reversal of the table. This unit can be set to remove any predetermined amount of stock within a range of .001" to .062" at which point the feed is automatically disengaged and a run-out or dusting of the work continues. If more than .062" stock is to be removed the unit can be reset for additional removal of material.

This automatic down feed is an advantage in repetitive production operations. In such case the operator can readily familiarize himself with the amount of stock it is possible to remove per pass and the amount of wheel breakdown for a given amount of stock removed.



BED — Alloy Casting, Box Type, Heavy Cross Ribbed Design. Width: 18" & 24" table — 5' 9½". 30" table (50 HP motor) 6' 2½". Length: Approximately twice the length of the table. Center Distance between Ways: 18½". Width of Ways: One Flat Way, 5". One "V" Way, 4". Forced Feed Lubrication to both ways.

TABLE DIMENSIONS AND SPEED — Heavily Ribbed, Alloy Casting with two, three or four machined ¾" "T" slots (depending upon table size and requirement). The working surface of the table is 18", 24" or 30" wide, and from 5 ft. to 20 ft. long as required. Variable table speeds up to 90 feet per minute. Distance from floor to top of table is 32".

VERTICAL COLUMN — Alloy casting of rugged construction with long and wide bearing surfaces precision ground and fitted for perfect alignment.

WHEEL HEAD VERTICAL SLIDE — Alloy casting of heavy ribbed construction having two bearing surface areas 14" x 45". Taper gib is provided for take-up. Adjustable wheel head furnished for concave grinding, if required. Rapid power traverse is provided for raising and lowering wheel head.

WHEEL SPINDLE — Hardened and precision ground Alloy Steel Spindle mounted in two Timken Heavy Duty Roller Bearings designed for grease lubrication. Size of bearings for 40 HP, 50 HP, or 60 HP Motor:

Lower Bearing: 5½" dia.

Upper Bearing: 4" dia.

HYDRAULIC SYSTEM — "Vane Type" Rotary Hydraulic Pump. Capacity 30 gal. per minute. Method of Reversing Table: Automatic and Manual. Oil Tank: 75 gallon capacity.

GRINDING WHEEL SIZES AND CLEARANCE — Nine standard abrasive segments, (Hill special design) 7⅞" x 2" x 7¼" required for our own 26" Quick-Acting Wheel Chuck, eight for the 23" chuck and eleven for the 32" chuck. Clearance between 26" chuck and table top is 18" on 18" wide table, 24" on 24" wide table, and 24" on 30" wide table, using 32" diameter chuck.

COOLANT SYSTEM — Welded Steel Tank — (see chart) gallon capacity depending on size of machine — with baffleplates for filtration of coolant liquid. Centrifugal pump of 35 gallon capacity at 6 ft. head per minute. Flared type nozzle, and flow controlled by shut-off valve.

5'0" — 95 gal.

6'0" — 125 gal.

7'0" — 160 gal.

8' and 9' — 190 gal.

10' and up — 210 gal.

MOTORS — Spindle motor, built-in type, 600 RPM, totally enclosed, fan cooled. A 40 HP motor is normally furnished but if surfaces to be ground exceed 24", then a 50 HP motor, or if necessary, a 60 HP motor or larger may be supplied.

Wheel head raising and lowering motor — 1 HP, 191 RPM, ball bearing gearmotor.

Coolant pump motor — built integral with pump, 1/3 HP, 1800 RPM, ball bearing type.

Ways lubricating pump motor — 1/3 HP, 1800 RPM, connected directly with pump, ball bearing type.

Hydraulic pump motor — 1200 RPM, ball bearing type, motor sizes shown on chart below.

Speeds indicated are for 220/440/550 volts, 60 cycle, 2 or 3 phase, A.C.

Table Length	Table Width		
	18"	24"	30"
5' 6' 7'	7½ HP	7½ HP	7½ HP
8'	7½ HP	7½ HP	10 HP
9' 10'	10 HP	10 HP	10 HP
11' 12' 13'	10 HP	10 HP	15 HP
14' and over	15 HP	15 HP	15 HP

LUBRICATION — Bijur one-shot system to 21 points for thorough lubrication of the grinder.

STANDARD EQUIPMENT — One set of grinding blocks, wheel guard, splash guards, necessary wrenches, base leveling wedges, wheel dresser and power calibrator for main spindle motor.

FLOOR SPACE

Overall Controlling Dimensions, (including extreme travel of Table at both ends). For a 50 or 60 HP. Motor use the dimensions of the 30" Table.

	18" Table		24" Table		30" Table	
	Width	Length	Width	Length	Width	Length
5 Ft.	6'5"	x 19'3"	6'5"	x 19'3"	7'3"	x 19'3"
6 Ft.	6'5"	x 21'3"	6'5"	x 21'3"	7'3"	x 21'3"
7 Ft.	6'5"	x 23'3"	6'5"	x 23'3"	7'3"	x 23'3"
8 Ft.	6'5"	x 25'3"	6'5"	x 25'3"	7'3"	x 25'3"
9 Ft.	6'5"	x 27'3"	6'5"	x 27'3"	7'3"	x 27'3"
10 Ft.	6'5"	x 29'3"	6'5"	x 29'3"	7'3"	x 29'3"
11 Ft.	6'5"	x 31'3"	6'5"	x 31'3"	7'3"	x 31'3"
12 Ft.	6'5"	x 33'3"	6'5"	x 33'3"	7'3"	x 33'3"
13 Ft.	6'5"	x 35'3"	6'5"	x 35'3"	7'3"	x 35'3"
14 Ft.	6'5"	x 37'3"	6'5"	x 37'3"	7'3"	x 37'3"
15 Ft.	6'5"	x 39'3"	6'5"	x 39'3"	7'3"	x 39'3"
16 Ft.	6'5"	x 41'3"	6'5"	x 41'3"	7'3"	x 41'3"
17 Ft.	6'5"	x 43'3"	6'5"	x 43'3"	7'3"	x 43'3"
18 Ft.	6'5"	x 45'3"	6'5"	x 45'3"	7'3"	x 45'3"
20 Ft.	6'5"	x 49'3"	6'5"	x 49'3"	7'3"	x 49'3"

Note: When Grinders are equipped with Automatic Down Feed Unit, the overall width is increased 10½".

HEIGHT

18" Clearance	8'3"		
24" Clearance	8'9"	8'9"	8'9"
30" Clearance	9'3"	9'3"	9'3"

APPROXIMATE SHIPPING WEIGHT

5 Ft.	30500	32500	36000
6 Ft.	32500	34500	37500
7 Ft.	34500	36500	39500
8 Ft.	35500	38000	40500
9 Ft.	37500	39500	42500
10 Ft.	39500	42500	44000
11 Ft.	41500	44500	46000
12 Ft.	43500	46000	47500
13 Ft.	45500	47000	49000
14 Ft.	47000	48500	50500
15 Ft.	48500	50000	52500
16 Ft.	49500	51500	54500
17 Ft.	51000	53500	57000
18 Ft.	55500	58500	59500
20 Ft.	59000	62500	63500

ELECTRIC WIRING — "Hill" Hydraulic Surface Grinders are furnished with motors located in permanent position and push button stations conveniently located for the operator. Each Grinder will be completely wired in our shop before shipment, requiring only hookup to the power lines in customer's plant. All starters will be assembled and mounted in one central box located on

the column.

The only exceptions are when Direct Current Motors and controls are used, and in cases where reduced voltage controls are required. In both of these instances, the controls are very large in size and the mounting of them on the column of the Grinder would be impractical.

HILL

MAGNETIC CHUCKS



• All Grinders can be equipped with rectangular magnetic chucks up to the capacity of the table. Each magnetic chuck is complete with Neu T Rol demagnetizing unit and if direct current is not available Rectifier units of the proper size can be supplied to change

the A.C. current to the proper D.C. current.

The Neu T Rol demagnetizing unit is complete with a control station which is located on the front of the grinder bed with the regular motor pushbuttons.

TABLE OF MAGNETIC CHUCKS AND COMPONENTS

CHUCK SIZE W. X L.	MODEL NEUTROL REQUIRED	TOTAL WATTS CHUCK & NEUTROL	MODEL RECTIFIER REQUIRED
12 x 60"	G-750	785	P
12 x 72"	G-750	880	P
12 x 84"	G-1000	1180	P5
12 x 96"	G-1000	1280	P5
12 x 108"	G-1000	1400	P5
12 x 120"	H-1500	1720	R2
12 x 132"	H-1500	1815	R2
12 x 144"	H-1500	1870	R2
12 x 156"	H-1500	2010	R2
12 x 168"	H-2000	2360	R3
12 x 180"	H-2000	2460	R3
12 x 192"	H-2000	2560	R3

CHUCK SIZE W. X L.	MODEL NEUTROL REQUIRED	TOTAL WATTS CHUCK & NEUTROL	MODEL RECTIFIER REQUIRED
12 x 204"	H-2000	2650	R3
12 x 216"	H-2000	2750	R3
12 x 240"	S-2000	2940	R3
18 x 60"	G-1000	1250	P5
18 x 72"	G-1000	1400	P5
18 x 84"	H-1500	1800	R2
18 x 96"	H-1500	1950	R2
18 x 108"	H-1500	2050	R2
18 x 120"	H-2000	2500	R3
18 x 132"	H-2000	2650	R3
18 x 144"	H-2000	2800	R3
18 x 156"	S-2000	2950	R3

TABLE OF MAGNETIC CHUCKS AND COMPONENTS - CONT'D

CHUCK SIZE W. X L.	MODEL NEUTROL REQUIRED	TOTAL WATTS CHUCK & NEUTROL	MODEL RECTIFIER REQUIRED
18 x 168"	S-2000	3100	R3
18 x 180"	T-45C	3750	R50
18 x 192"	T-45C	3900	R50
18 x 204"	T-45C	4000	R50
18 x 216"	T-45C	4150	R50
18 x 240"	T-45C	4400	R50
24 x 60"	H-1500	1560	R2
24 x 72"	H-1500	1686	R2
24 x 84"	H-1500	1840	R2
24 x 96"	H-2000	2250	R3
24 x 108"	H-2000	2450	R3
24 x 120"	S-2000	2620	R3
24 x 132"	S-2000	2750	R3
24 x 144"	T-45C	3375	R50
24 x 156"	T-45C	3530	R50
24 x 168"	T-45C	3750	R50
24 x 180"	T-45C	3840	R50
24 x 192"	T-45C	4000	R50
24 x 204"	T-45C	4150	R50
24 x 216"	T-45C	4320	R50
24 x 240"	W-75C	5630	R75
30 x 60"	H-1500	1920	R2
30 x 72"	H-2000	2275	R3
30 x 84"	H-2000	2510	R3
30 x 96"	S-2000	2625	R3
30 x 108"	S-2000	3010	R3

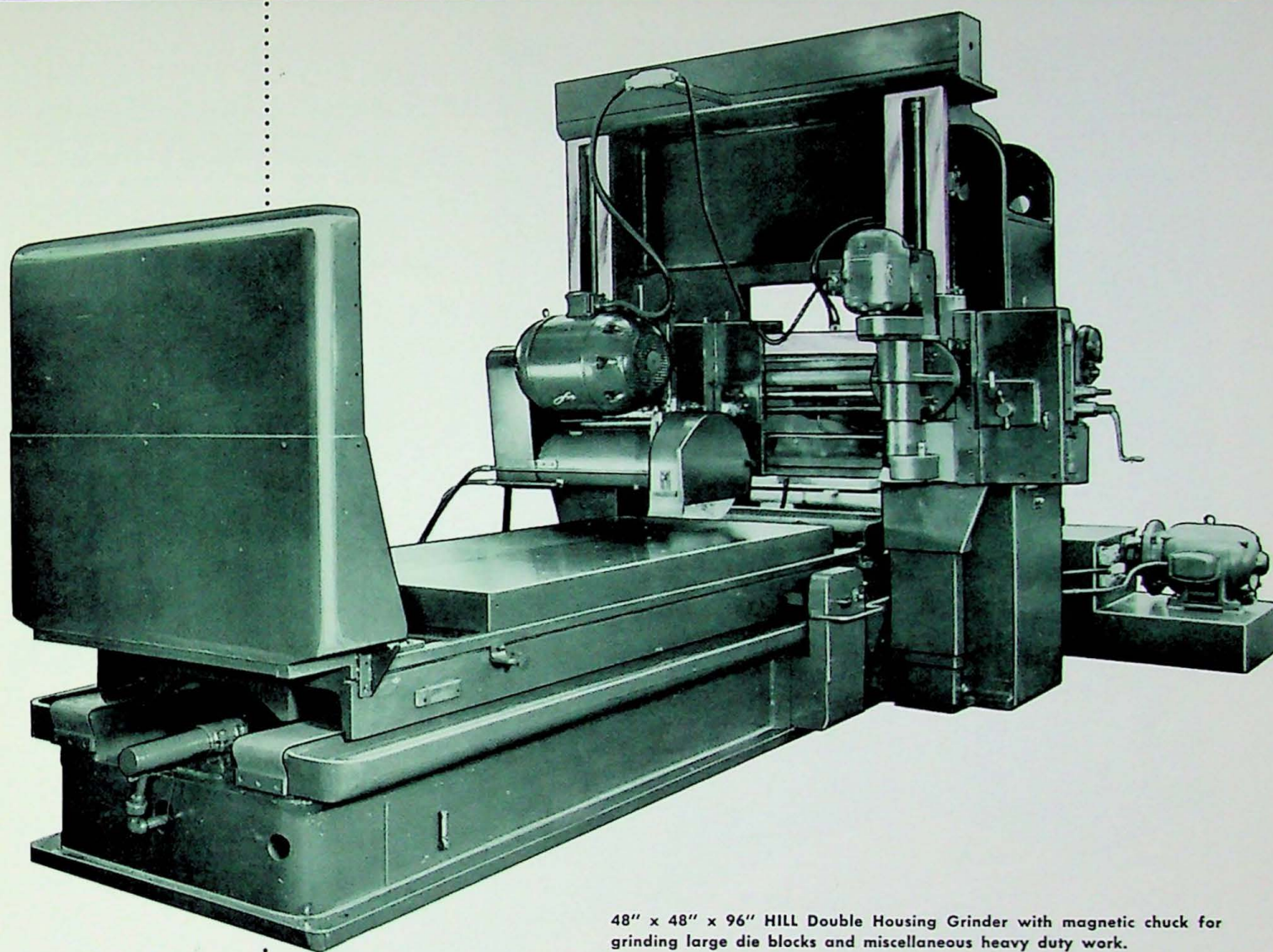
• The normal spacing between poles of the standard rectangular magnetic chuck is approximately 1" and the normal holding power over 100 pounds per square inch.

CHUCK SIZE W. X L.	MODEL NEUTROL REQUIRED	TOTAL WATTS CHUCK & NEUTROL	MODEL RECTIFIER REQUIRED
30 x 120"	T-45C	3850	R50
30 x 132"	T-45C	3950	R50
30 x 144"	T-45C	4050	R50
30 x 156"	T-45C	4290	R50
30 x 168"	T-45C	4525	R50
30 x 180"	W-75C	5640	R75
30 x 192"	W-75C	5750	R75
30 x 204"	W-75C	6110	R75
30 x 216"	W-75C	6220	R75
30 x 240"	W-75C	6700	R75
36 x 60"	H-2000	2100	R3
36 x 72"	H-2000	2320	R3
36 x 84"	S-2000	2550	R3
36 x 96"	T-45C	3275	R50
36 x 108"	T-45C	3490	R50
36 x 120"	T-45C	3700	R50
36 x 132"	T-45C	3920	R50
36 x 144"	T-45C	4160	R50
36 x 156"	W-75C	5370	R75
36 x 168"	W-75C	5590	R75
36 x 180"	W-75C	5830	R75
36 x 192"	W-75C	6050	R75
36 x 204"	W-75C	6260	R75
36 x 216"	W-75C	6490	R75
36 x 240"	W-10M	7920	R100

If extremely thin material or very small pieces are to be ground we would recommend the use of the BAR-POLE type magnetic chuck. In this unit the holding power is greater and the pole spacing is very small. Details can be supplied on request.

HILL

DOUBLE HOUSING SURFACE GRINDER (EXTRA HEAVY DUTY)



48" x 48" x 96" HILL Double Housing Grinder with magnetic chuck for grinding large die blocks and miscellaneous heavy duty work.

• The HILL Double Housing, Planer Type, Horizontal Spindle Hydraulic Surface Grinder is a custom built precision tool for grinding close tolerances on work over 36" wide. It has proven to be exceptionally efficient in finishing large die blocks, lathe bed ways, press plates and in regrinding machine tool ways, press platens, etc.

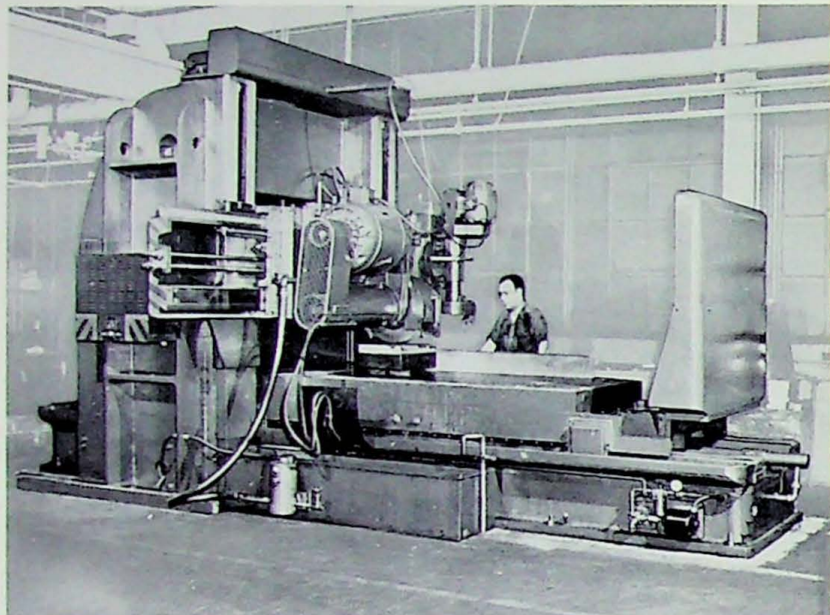
Table and cross feed are 100% hydraulic insuring

smooth trouble-free operation. General construction features are the same as the standard HILL "Open Side" grinders. The auxiliary swiveling type grinding head complete with 2 HP motor, worm wheel type adjustment for angular positioning, as shown on the accompanying photographs, is optional equipment. This grinder is furnished with or without the rectangular magnetic chuck.

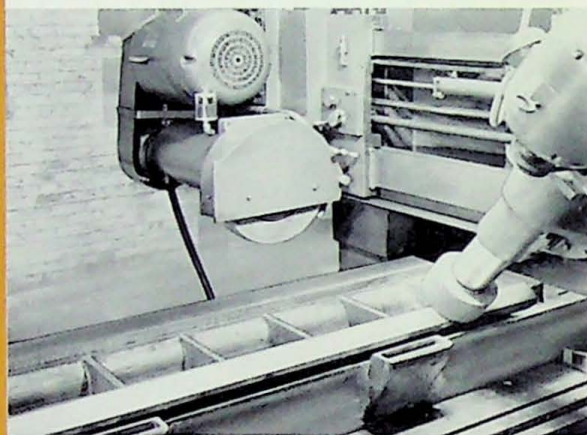
HILL

SPECIFICATIONS

HILL DOUBLE HOUSING HORIZONTAL SPINDLE GRINDER



Rear view of 48" x 48" x 96" HILL Double Housing Planer Type Surface Grinder with 48" x 96" (sectional) rectangular magnetic chuck.



48" x 48" x 144" HILL Double Housing Horizontal Spindle Grinder with auxiliary head for cup wheel grinding of bed ways. Note the criss cross pattern left by the grinding wheel. Thousands of tiny oil pockets hold the lubricant insuring long life and accuracy for this ground surface.

WIDTH OF TABLE — 48" to 84" between housings.

CLEARANCE BETWEEN TOP OF TABLE AND BOTTOM OF WHEEL — 30" to 48".

TABLE LENGTH — 8' to 20'.

MAIN SPINDLE MOTOR — 25 HP, 1200 RPM (Totally enclosed fan cooled type) V-belt drive to grinding spindle. (Larger motors on request.)

HYDRAULIC PUMP MOTOR — 20 HP, 1200 RPM TEFC.

RAPID TRAVERSE MOTOR — 2 HP, 190 RPM.

COOLANT PUMP MOTOR — 1/3 HP, 1800 RPM (Built integral with pump).

WAYS LUBRICATING PUMP MOTOR — 1/3 HP, 1800 RPM.

TABLE DRIVE — 100% Hydraulic through two opposed pistons with variable speeds.

CROSS FEED DRIVE — 100% hydraulic, with variable speeds up to 10 ft. per minute, or manual feed.

VANE-TYPE ROTARY HYDRAULIC PUMP with manual and automatic control for reversing table.

One 20" x 4" or 6" grinding wheel, wheel mounting hub, wheel guard, splash guards, necessary wrenches, base leveling screws and diamond tool holder without diamond.

Forced Feed Lubricating system with motor-driven pump. Filter and reservoir for complete coolant system for wet grinding including coolant tank of suitable capacity.

Grinder furnished complete with standard motors and controls located in permanent position. Pushbutton stations conveniently located for the operator, and all starters assembled and mounted in one central control box located on column.

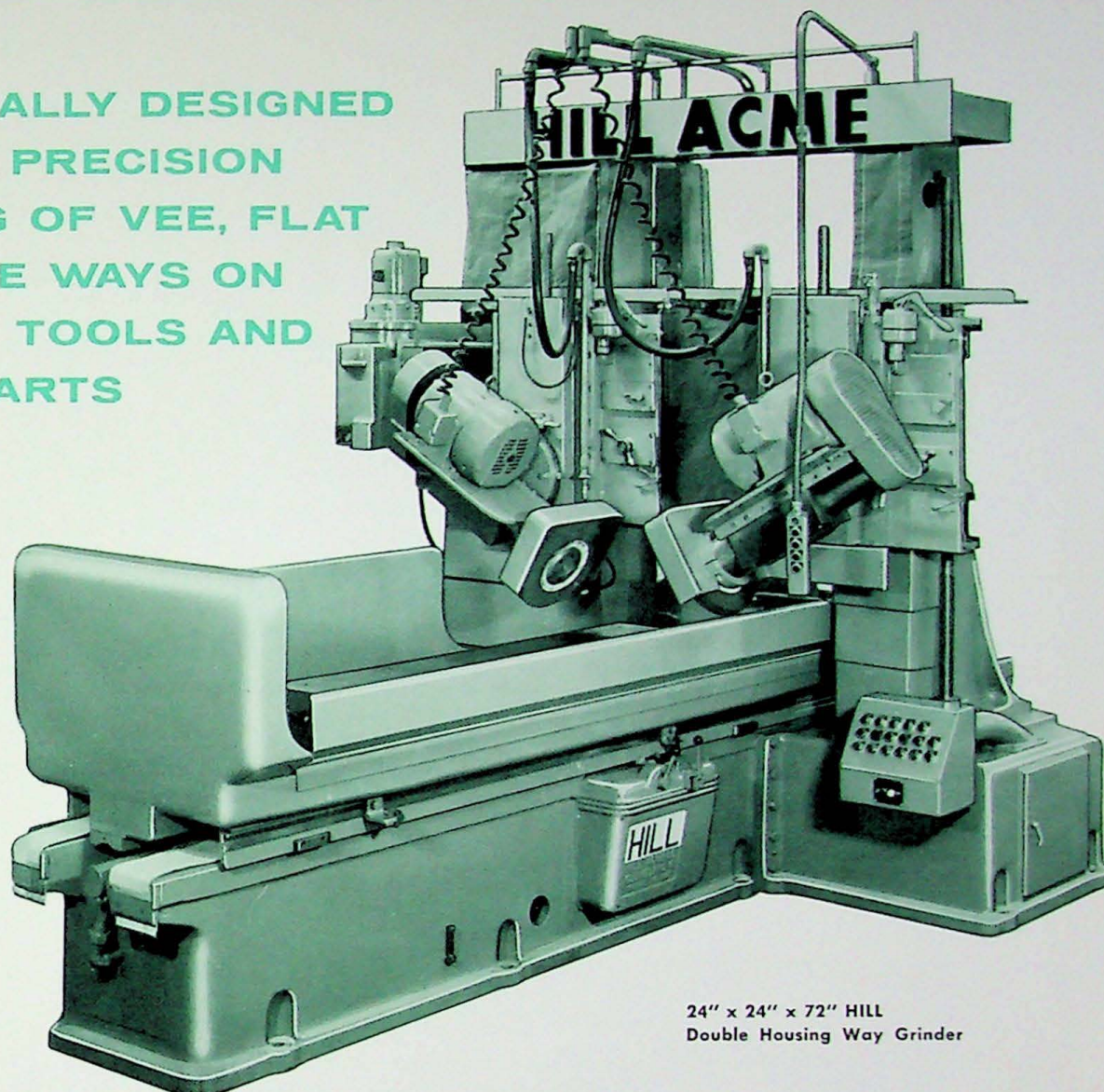
Grinder completely wired in shop before shipment and given a run-in test, requiring only hookup to the power lines in customer's plant.

This extra heavy duty HILL Double Housing Surface Grinder may also be built as a Vertical spindle type machine with up to 125 HP main spindle motor.

HILL

DOUBLE HOUSING WAY GRINDER

SPECIFICALLY DESIGNED
FOR THE PRECISION
GRINDING OF VEE, FLAT
OR ANGLE WAYS ON
MACHINE TOOLS AND
FITTED PARTS



24" x 24" x 72" HILL
Double Housing Way Grinder

GENERAL CONSTRUCTION

- The Hill Way Grinder is of unusually rigid construction with a heavily ribbed semi steel bed supporting two massive semi steel columns. Extra wide, flame hardened and ground ways on the vertical columns carry the cross rail which is fitted with Nitralloy liners on the rail ways and has been normalized to eliminate stress and distortion. The hydraulically operated table is heavily ribbed underneath to insure permanent accuracy and rides on accurately machined Vee and Flat ways. Every structural unit of this grinder is designed to insure vibration-free operation and permanent accuracy.

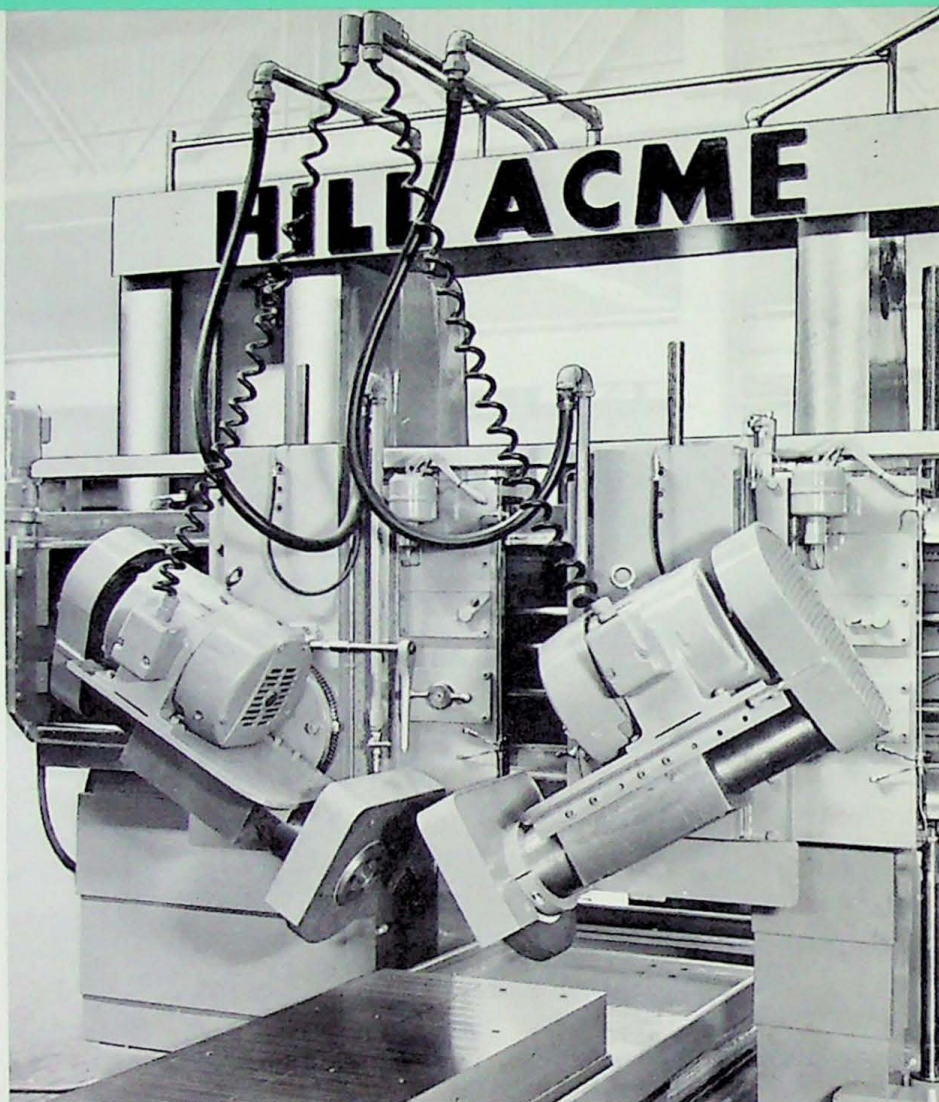
TWIN HEAD ADVANTAGES

- Each grinding head is independently operated and can be used in either a horizontal or vertical position or at any angle in between. Each head is calibrated, both vertically and horizontally, for fast, accurate positioning. With this arrangement both Vee and Flat ways on a machine tool bed can be ground simultaneously with the full power of the 5 HP motors directed to the fast removal of stock. The peripheral speed of the grinding wheels can be readily changed so that various sizes and types of grinding wheels may be employed. The rear grinding wheel head is arranged to reciprocate hydraulically to obtain extreme accuracy on wide surfaces.

HILL

DOUBLE HOUSING WAY GRINDER

ACCESSIBLE CONTROLS



This view is as the operator sees the machine. Note that each grinding head and saddle are independently lubricated with Bijur One-Shot systems. The magnetic chuck is clearly shown. The ratchet handle above the left hand grinding head operates the worm and gear for moving the head to the desired grinding angle.

• The "START" and "STOP" push buttons for the spindle motors, the hydraulic table motor, the ways lubricating and coolant pump motors are all concentrated in the bank of push buttons at the operator's right hand. On the same bank are the "UP" and "DOWN" push buttons for raising and lowering the cross rail as well as the Neu-T-Rol control for the magnetic chuck.

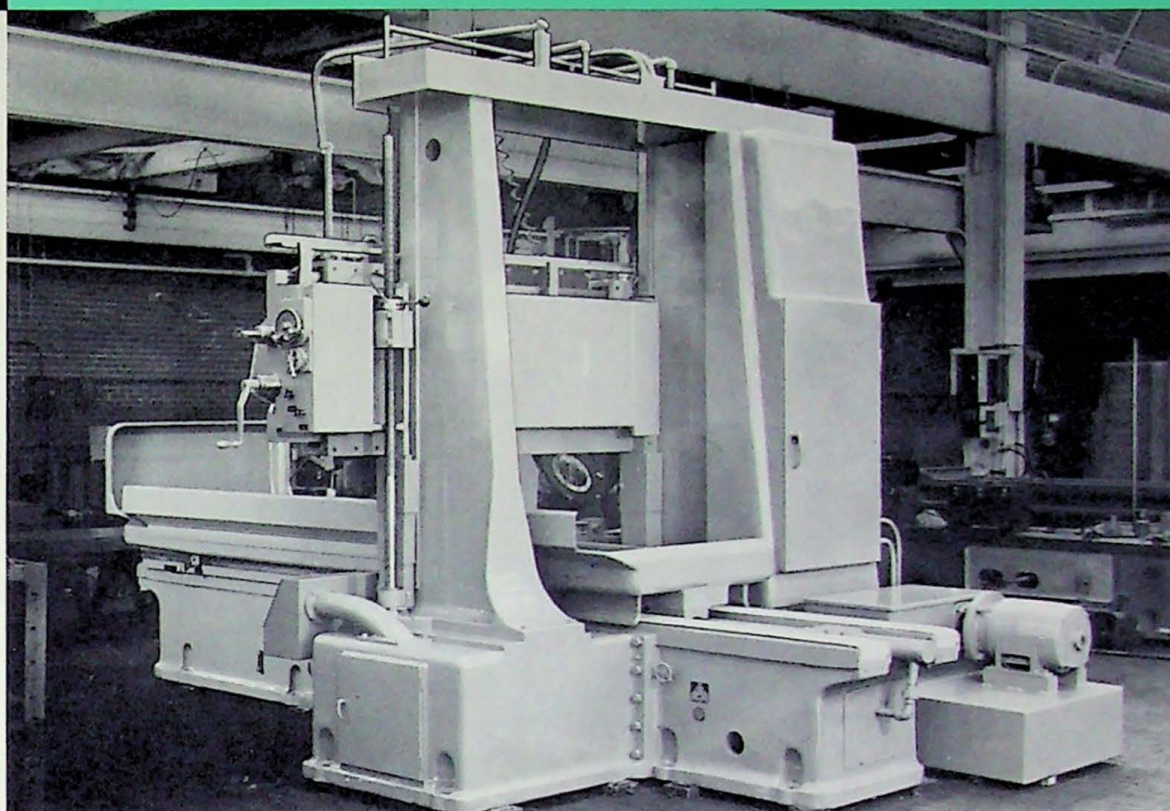
The "START-STOP" and "TABLE DIRECTION"

levers for the variable speed hydraulically operated table are mounted on the top of the control box. The push buttons on the pendant control, instantly accessible, govern the "TO" and "FROM" rapid traverse of the saddles and the "UP" and "DOWN" movement of the grinding head slides in their saddles. Adequate safety devices are provided to prevent machine damage through human error. The levers for the manual control of each head and its saddle are within easy reach of the operator.

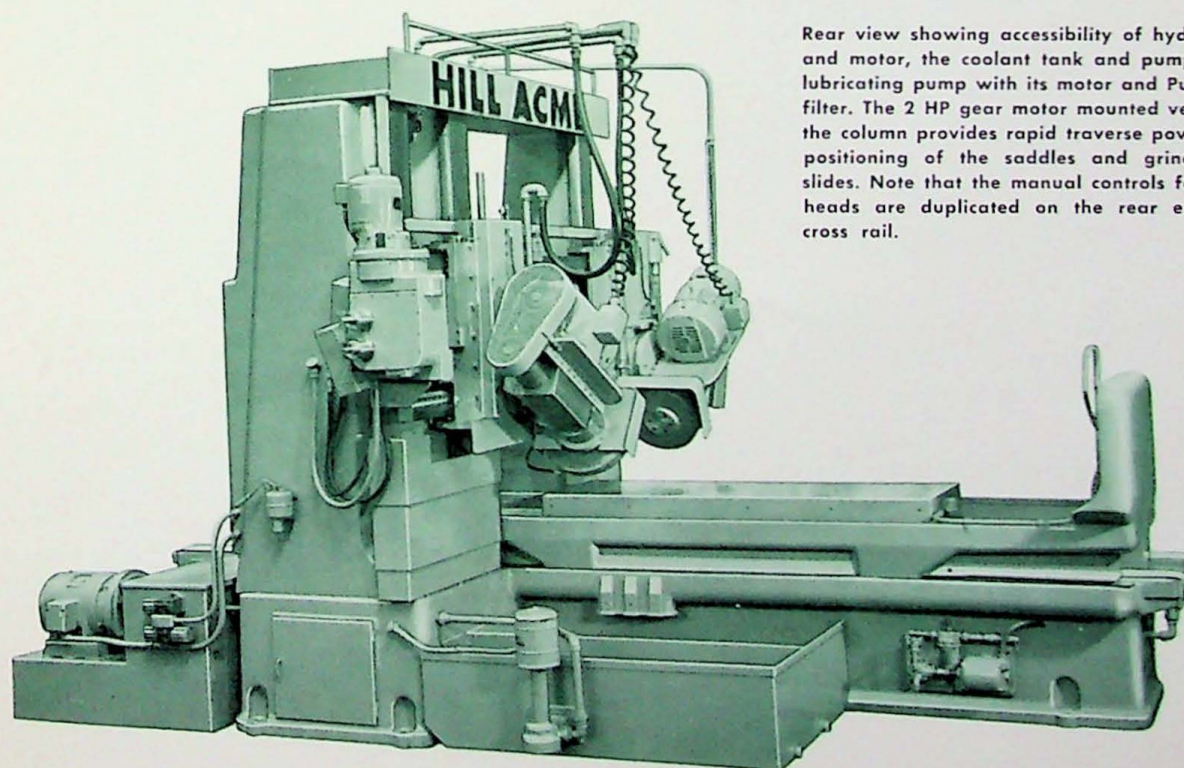
HILL

DOUBLE HOUSING WAY GRINDER DETAILS OF CONSTRUCTION

MASSIVE
DOUBLE
COLUMN



View showing massive double column construction. Electrical controls are located in panel behind the access door in the large column. Note the canvas way covers which protect the bed ways, assuring long life and accuracy.



Rear view showing accessibility of hydraulic unit and motor, the coolant tank and pump, and the lubricating pump with its motor and Puralator oil filter. The 2 HP gear motor mounted vertically on the column provides rapid traverse power for the positioning of the saddles and grinding head slides. Note that the manual controls for the two heads are duplicated on the rear end of the cross rail.

HILL

STANDARD MACHINE SPECIFICATIONS THE "HILL" DOUBLE HOUSING WAY GRINDER

WIDTH OF TABLE — 24" — 30" — 36" (additional width if necessary)

CLEARANCE BETWEEN COLUMNS — Approx. 38" — 48" — 58" (additional as needed)

CLEARANCE BETWEEN TOP OF TABLE AND BOTTOM OF WHEEL — 48" on all.

TABLE LENGTH — 72" to 240".

TWO (2) GRINDING SPINDLE MOTORS — 2 or 5 HP with V-Belt drive to Grinding Spindle. (additional HP if required)

One (1) Hydraulic Pump Motor — 7½ HP — 10 HP or 15 HP.

One (1) Rail Raise Motor — 1 HP.

One (1) Coolant Pump Motor — 1/3 HP.

One (1) Ways Lubricating Pump Motor — 1/3 HP.

One (1) Grinding Head Saddle and Slide Rapid Traverse Motor — 2 HP.

TABLE DRIVE — 100% hydraulic through two opposed pistons with variable speeds up to 100 feet per minute. Vane-Type Rotary Hydraulic Pump with manual and automatic control for reversing table.

CROSS FEED DRIVE for Rear Saddle — either 100% hydraulic, with variable speeds up to 10 feet per minute, or manual feed.

CROSS FEED DRIVE for Front Saddle—manual feed only.

RAPID TRAVERSE SPEEDS:

Grinding Head Slides — Vertical feed — 2¼" per minute.

Grinding Head Saddles — Cross Feed — 41" per minute.

Cross Rail — Vertical Feed — 5¼" per minute.

The wheel spindles of the two grinding wheels are mounted in (2) roller bearings in the rear, and (2) angular thrust ball bearings in the front.

Each saddle is equipped with a Bijur one-shot lubrication system which effectively reaches 24 points on each one. The third Bijur system located on the larger column reaches the 18 other points on the machine requiring lubrication.

Forced feed Way Lubricating system with motor-driven pump.

Filter and Reservoir for complete coolant system for wet grinding, including coolant tank of suitable capacity.

Grinder furnished complete with standard motors and controls located in permanent position. Pushbutton stations conveniently located for the operator in control panel and pendant. All starters assembled and mounted in one central box located on column.

Grinder completely wired in shop before shipment and given a running test, requiring only hookup to the power lines in customer's plant.

FLOOR SPACE

Overall Controlling Dimensions (including extreme travel of Table at both ends):

	24" Table Width Length	30" Table Width Length	36" Table Width Length
6 Ft.	11'2" x 17'3"	12'5" x 17'3"	13'8" x 17'3"
8 Ft.	11'2" x 21'3"	12'5" x 21'3"	13'8" x 21'3"
10 Ft.	11'2" x 25'3"	12'5" x 25'3"	13'8" x 25'3"
12 Ft.	11'2" x 29'3"	12'5" x 29'3"	13'8" x 29'3"
14 Ft.	11'2" x 33'3"	12'5" x 33'3"	13'8" x 33'3"
16 Ft.	11'2" x 37'3"	12'5" x 37'3"	13'8" x 37'3"
18 Ft.	11'2" x 41'3"	12'5" x 41'3"	13'8" x 41'3"
20 Ft.	11'2" x 45'3"	12'5" x 45'3"	13'8" x 45'3"

HEIGHT

The height of any of these Grinders all of which have 48" clearance is 10'7".

275
425
700
1050
2100
4250