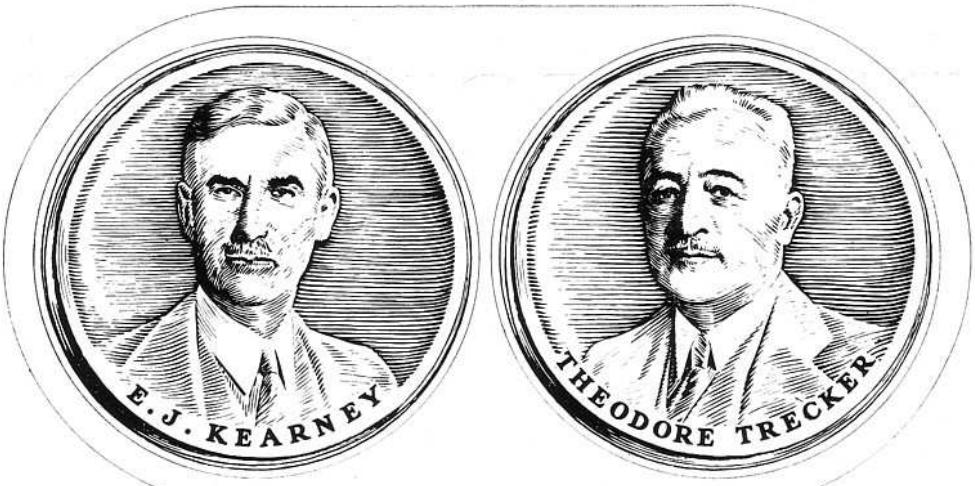
LUBRICATION MANUAL

Milwaukee Milling Machines

KEARNEY & TRECKER CORPORATION · MILWAUKEE, WIS.

BULLETIN No. 32B



KEARNEY & TRECKER

CORPORATION

Milwaukee

MILLING MACHINES

Lubrication of the Following Equipment Is Treated in this Manual

HORIZONTAL KNEE TYPE MACHINES
Manufacturing • Plain
Universal

VERTICAL KNEE TYPE MACHINES
Manufacturing • Plain

BED TYPE MACHINES
Simplex • Duplex
Bridge Type Vertical

OVERARMS • MOTORS
ARBOR SUPPORTS

MILWAUKEE MILLING
ATTACHMENTS

Foreword

PERFECTION of new and better metals has been paralleled by the demand for new and improved tools to machine them rapidly, accurately and economically. This condition has been particularly true in the case of milling machines used in the modern high production shop.

It is a far cry from the old cone pulley millers with hand feeds and open oil holes to the present day high power production machines. The developments have been many toward greater rigidity as exemplified by the double overarm and box section column, greater accuracy and finer workmanship, and longer life due to anti-friction bearings, heat treated alloy steels and more efficient lubrication.

Kearney & Trecker have played an important part in the development along all lines, and especially so in the proper lubrication of bearings, gears and slides. The first MILWAUKEE single pulley, all-gear drive machine had automatic flooded lubrication of all gears and bearings in the column and feed box. The latest knee type MILWAUKEE and the new model production millers embody all that is to be desired in approved methods of automatic lubrication to insure long life and continued service.

We have built the machine to give the service you expect of it. The use of a good lubricant is necessary to insure it. Gargoyle lubricants manufactured by the Socony-Vacuum Oil Company, Inc. are approved as satisfactory for use with MILWAUKEE Milling Machines.

KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN
U. S. A.

INDEX

General Instructions for Lubricating MILWAUKEE Milling Machines

MILWAUKEE knee and column type milling machines are thoroughly lubricated by the latest approved methods. Wherever practical, the oil is distributed from central reservoirs in the column, knee and saddle. Kearney & Trecker have gone the limit in the matter of simplification of oiling, and individual oilers have been confined to table screw reservoir type of bearings at ends of table, handwheels and cranks.

Use Good Grade Oil

When a new machine is to be put in operation, select a good grade of medium bodied oil to fill the lubricant reservoirs. We suggest Gargoyle Vacuoline Oil Heavy Medium (Saybolt Universal Viscosity 300-325 seconds at 100°F.) for this purpose because of its high quality and uniform lubricating properties. We do not wish to imply, however, that other oils will not give satisfactory service.

If economies are attempted by using low priced oils, these will usually be converted into a loss after several months of service have elapsed. The reason is that these products will not provide the needed lubrication and wear will be hastened, the cost of which in terms of repairs greatly exceeding the savings obtained on oil. In addition there is the likelihood of reducing efficiency of the machine itself and lowering its output.

Furthermore, when interior or unsuitable lubricants are used, trouble is apt to be experienced with sludge or deposit formation as a result of chemical deterioration of the oil in service. Circulating systems of the type employed on our milling machines call for a carefully refined lubricant because the rapid rate with which the mechanisms inside the column and knee are flooded acts to mix the oil intimately with air and any impurities or water which may have entered the system. These conditions actively promote breakdown of the oil and loss of lubricating value. The lubricant should, therefore, be of suitable quality to serve without marked deterioration between oil changes.

Operators are particularly cautioned against using heavy oils in the thought that better protection is offered the rubbing surfaces when more viscous products are employed. This is true up to a certain point, but when grades markedly heavier than recommended are installed, the result is power loss, heat generation and reduced effectiveness of lubrication. Heavy oils do not distribute rapidly enough and the increase in fluid friction with their use makes more power necessary to run the machine.

Importance of Regular Filling

There are a number of points on the machine which depend upon regular filling or replenishment for continuous lubrication. Reservoir pockets at various points such as the saddle, table, etc. require filling at intervals as recommended on following pages. The capacity of these oilers provides a margin of safety over the interval specified, but lubrication will cease when the oil is used up.

The oil level in the knee and column reservoirs, also the sliding head on vertical machines, should be inspected regularly and fresh lubricant added as necessary to bring the level up to the prescribed height. Importance of maintaining the proper oil level cannot be overemphasized, because all lubrication will stop if level drops below pump intake pipe.

On the other hand, overfilling will serve no good purpose and if carried too far may prove distinctly harmful and messy. When the level is raised above the correct height on automatically lubricated units, churning will occur which acts to thin down the oil due to the heat generated. Leakage and overflow may also develop if level in the reservoirs is raised too high.

Cleaning Oil Reservoirs

The oil in the column and knee reservoirs (also the reservoir in sliding head on vertical machines) should be removed at regular intervals and the reservoirs cleaned with flushing oil, such as S/V Flowrex Oil C as instructed in detail on following pages.

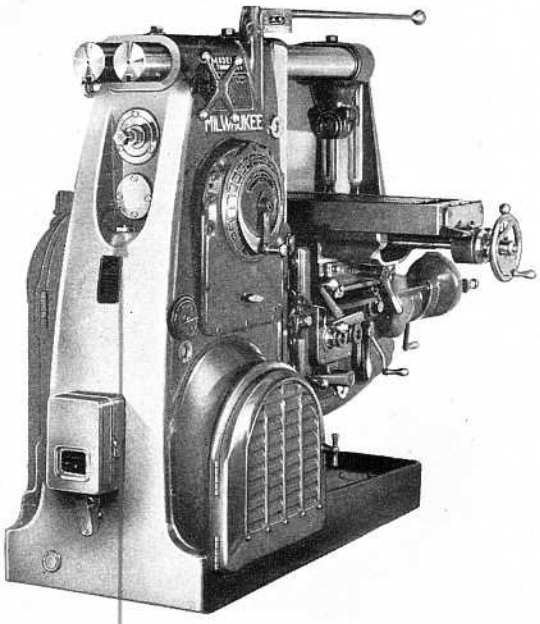
We cannot overemphasize the necessity of periodically flushing out the machines as mentioned above. The oil in a machine tool is subject to heat and wear the same as in an automobile. We only ask that you give your milling machine the same consideration as you would in draining and refilling the crankcase of your car. If this practice is followed, no lubrication difficulties should ever develop in your Milwaukee Milling Machine.

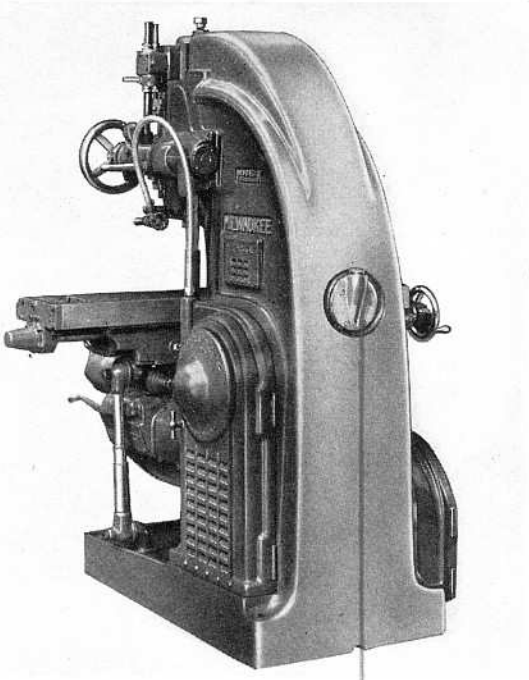
CAPACITIES
Of Lubrication and Coolant Reservoirs

MACHINE	COLUMN	KNEE	VERTICAL HEAD	COOLANT RESERVOIR
Model H Horizontal				
1H Manufacturing	2 gallons	2 gallons		5 gallons
1H Plain & Universal	2 gallons	5 quarts		5 gallons
2HL Plain & Universal	2 gallons	5 quarts		5 gallons
2H Manufacturing Plain	3 gallons	7 quarts		5½ gallons
2H Plain & Universal	3 gallons	7 quarts		5½ gallons
3H Plain & Universal	3½ gallons	1½ gallons		7 gallons
4H Plain & Universal	3¾ gallons	1½ gallons		10 gallons
5H Plain & Universal	5 gallons	4 gallons		12 gallons
5HM Plain	5 gallons	4 gallons		12 gallons
Model H Vertical				
1H & 2HL Swivel Head Vertical	2 gallons	5 quarts	Grease	5 gallons
2H Manufacturing Vertical	3 gallons	7 quarts	1 pint	5½ gallons
2H Vertical	3 gallons	7 quarts	1 pint	5½ gallons
3H Vertical	3½ gallons	1½ gallons	2/3 of quart	7 gallons
4H Vertical	3¾ gallons	1½ gallons	1 quart	10 gallons
5H Vertical	5 gallons	4 gallons	3 pints	12 gallons
5HM Vertical	5 gallons	4 gallons	3 pints	12 gallons
Model K Horizontal				
2K-2KM Plain & Universal	3½ gallons	1½ gallons		7 gallons
3K-3KM Plain & Universal	3¾ gallons	1½ gallons		10 gallons
4K Plain & Universal	5 gallons	4 gallons		12 gallons
Model K Vertical				
2K-2KM Vertical	3½ gallons	1½ gallons	2/3 of quart	7 gallons
3K-3KM Vertical	3¾ gallons	1½ gallons	1 quart	10 gallons
4K Vertical	5 gallons	4 gallons	3 pints	12 gallons
Bed Type Machines				
M-Series Simplex	5 gallons in bed			16 gallons
1200 Simplex	8 gallons in bed			21 gallons
1200 Duplex	8 gallons in bed			34 gallons
1800 Simplex	12 gallons in bed			28 gallons
1800 Duplex	12 gallons in bed			40 gallons
1400 Simplex & Duplex	8 gallons in bed			30 gallons
2200 Simplex & Duplex	8 gallons in bed			45 gallons

THE COLUMN

All Knee Type Machines





The column mechanism is force-flood lubricated from a central reservoir. With the motor stopped, fill this reservoir through the filler cap located, as indicated, in the approximate center of the rear column wall. Use a good grade of lubricating oil (S.U.V. 300-325 at 100 degrees F), see page 2.

Fill the reservoir until the lubricant meets the line "HIGH" on the height level gauge, which is located just above the left side motor compartment door.

The upper gauge is a "Sight flow gauge" which acts as a "tell-tale" indicating whether the oil is in circulation.

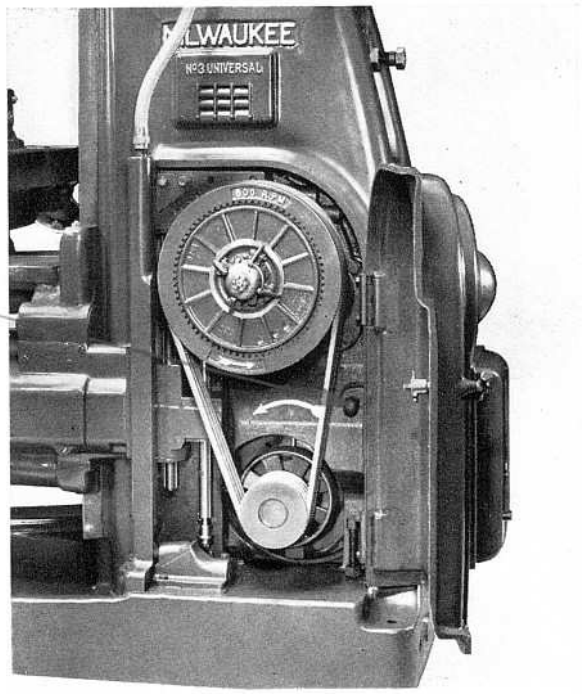
INSPECT FREQUENTLY—DO NOT ADD OIL WHILE THE MOTOR IS IN OPERATION

THE COLUMN

Drain the reservoir, flush with kerosene, and refill with new oil every four months.

Run the machine a maximum of five minutes during the flushing operation.

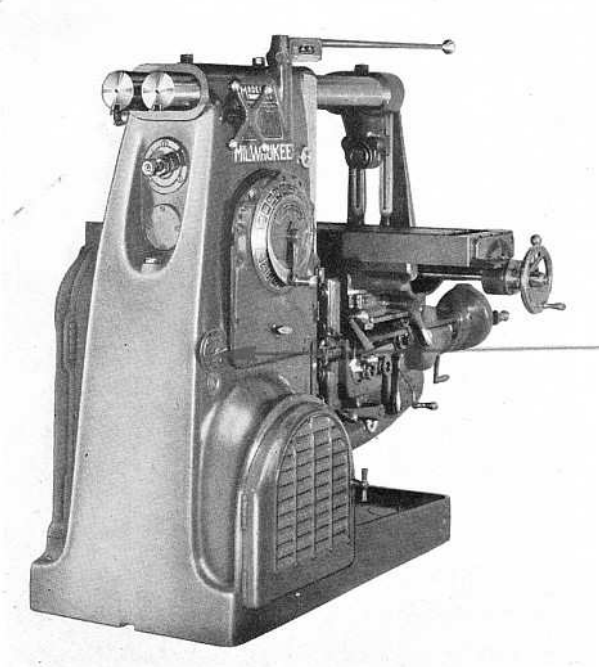
The drain plug is located inside the pulley door on the right side of the machine.



The column of all Milwaukee Knee Type Machines is equipped with an air breather to eliminate condensation on the internal walls.

The knee is also equipped with an air breather for the same purpose.

In this manner the oil is prevented from becoming contaminated with water and sludging, thereby preventing the possibility of clogging the oil passages.



OIL FILTER

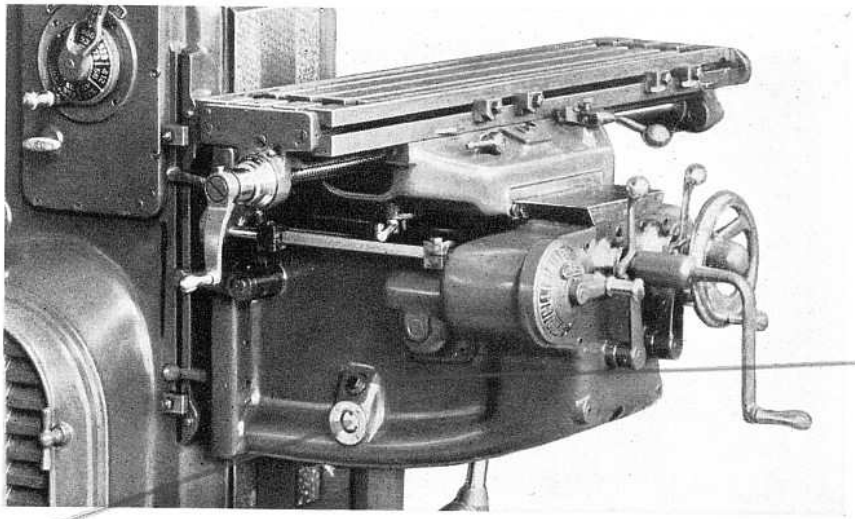
Models 2KM, 2K, 3H, 3KM, 3K, 4H, 4K, 5H and 5HM are equipped with a disc type oil filter.

The filter is cleaned by revolving the winged handle one complete turn. Revolve once daily, to insure purified lubrication.

When the filter handle cannot be turned by hand, it has become clogged and must be removed from the column and washed in some solvent until it turns freely. Jack-screws are provided to facilitate removal of the filter.

The handle cannot be turned too often, as there is nothing to wear out or replace.

THE KNEE



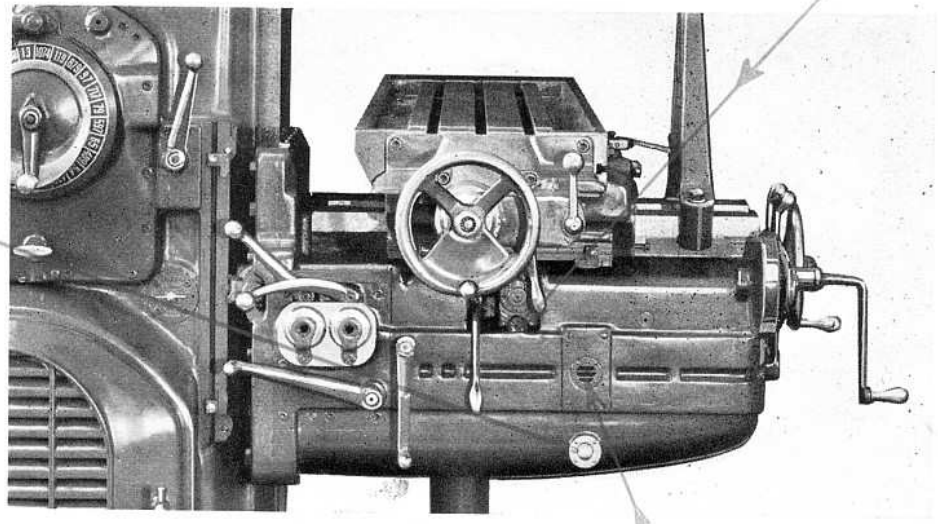
The knee mechanism is force-flood lubricated from a central reservoir. The oil is activated by a gear pump. Use the same good grade of oil as recommended on page 2.

Fill the reservoir through the filler cap, located as indicated, above the level gauge, to the lines cast into the bezel of the gauge.

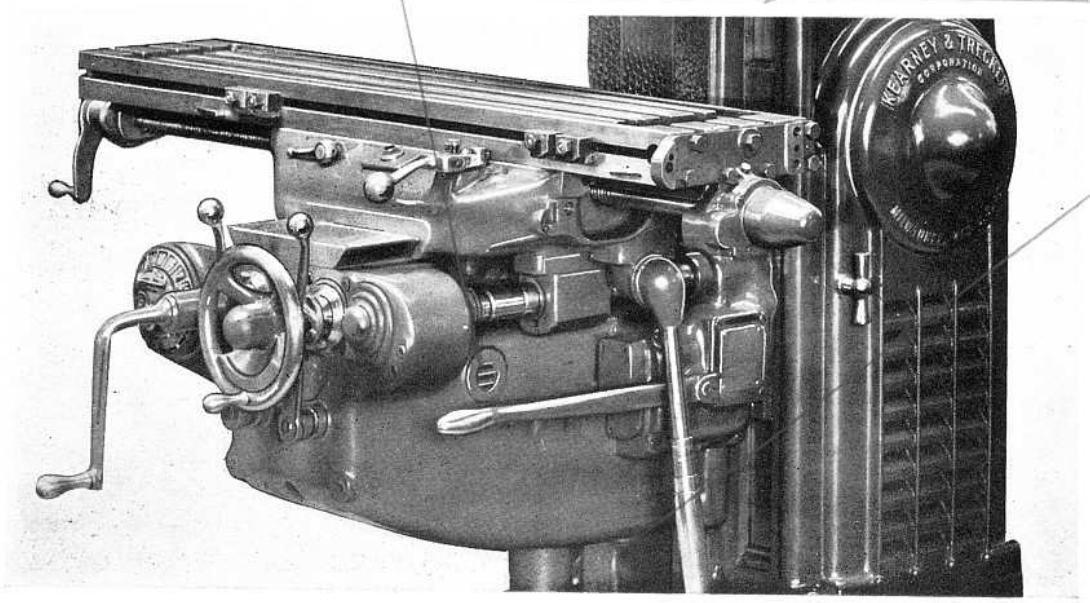
The filler cap on the 4K, 5H and 5HM knees are located in the cored pocket toward the top of the knee.

CHECK THE OIL HEIGHT FREQUENTLY—FILL WHILE MOTOR IS IDLE OR OVERFLOW WILL BE EXPERIENCED

The lubrication gauge is a combination oil level gauge and flow gauge. It indicates the level of the oil in the knee reservoir, and also acts as a "telltale" indicating whether the oil is in circulation.



The knee of all Milwaukee Knee Type Milling Machines is equipped with an air breather to eliminate condensation on the internal walls.



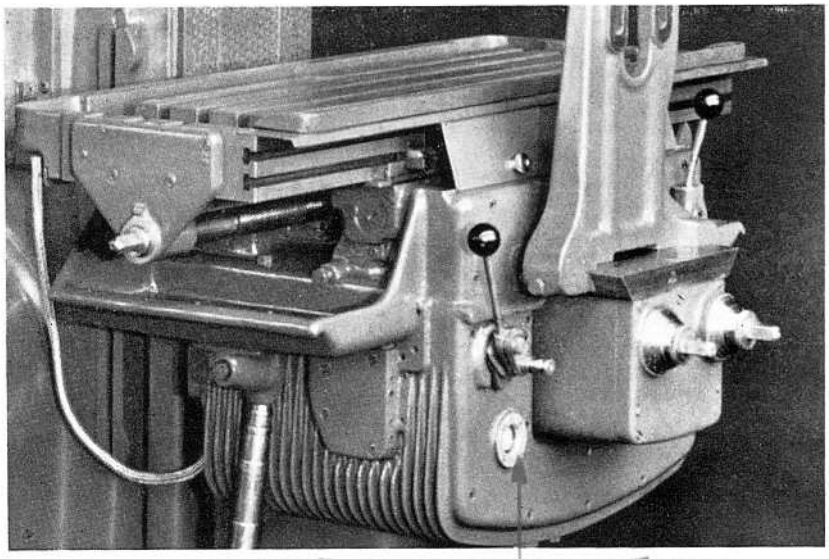
The knee drain plug is on the underside of the knee toward the right rear corner.

Drain the knee, flush with flushing oil, such as S/V Flowrex Oil C, and refill with new oil every four months.

RUN A MAXIMUM OF FIVE MINUTES DURING FLUSHING OPERATION

THE KNEE

1H and 2H Manufacturing Machines



The level gauge is at the lower left front surface.

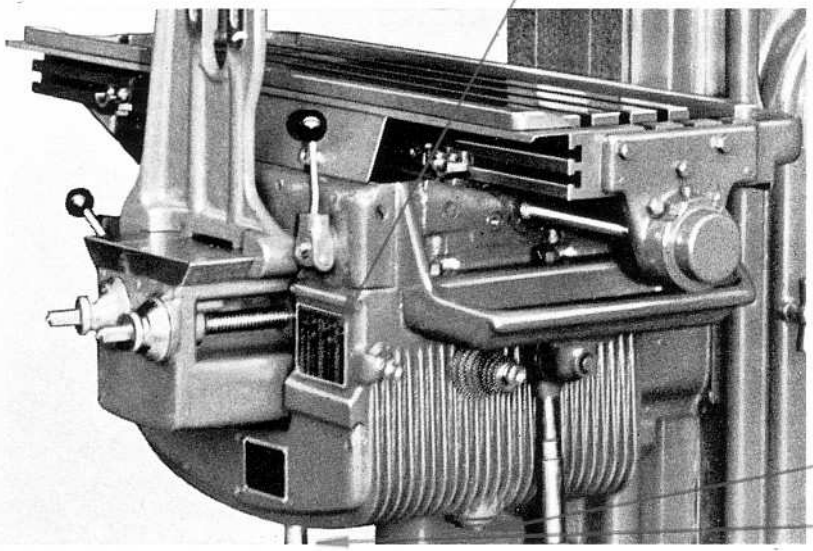
These machines are constructed with a control box fitting around the knee, and resting on the knee ways.

The control box houses all the power activating mechanism for the hydraulic automatic controls, and the longitudinal travel of the table.

It is important that Gargoyle Vacuoline Oil Heavy Medium (S.U.V. 300-325 at 100° F) be used in this unit, to assure its smooth, positive action.

Fill to the proper level as indicated, *while the motor is idle.*

On the pick-off type of control box the oil is introduced through the pick-off gear housing, on the right front surface.

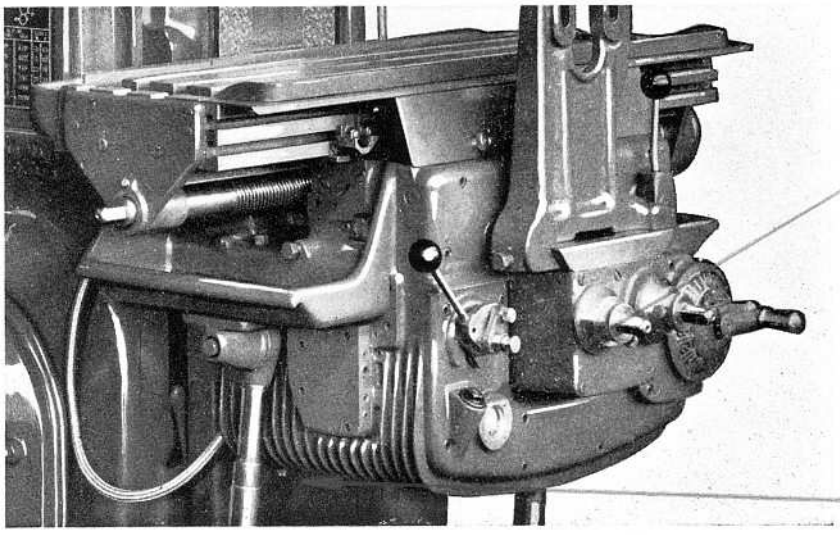


THE CONTROL BOX SHOULD BE DRAINED, FLUSHED WITH FLUSHING OIL, SUCH AS S/V FLOWREX OIL C, AND REFILLED WITH NEW OIL EVERY FOUR MONTHS

NOTE: Make sure to remove the plug at the left rear underside of the control box to drain the flushing kerosene from that cored pocket. Failure to do this will cause dilution of the new oil, which in turn might cause interrupted or "jerky" operation during a cycle of operation.

Clean the screen each time the control box is flushed.

RUN THE MACHINE A MAXIMUM OF FIVE MINUTES DURING THE FLUSHING OPERATION



On the quick-change type of control box the oil is introduced through the filler nozzle, at the side of the level gauge, at the lower left front surface.

The control box drain plug is located at the underside, front center of the unit.

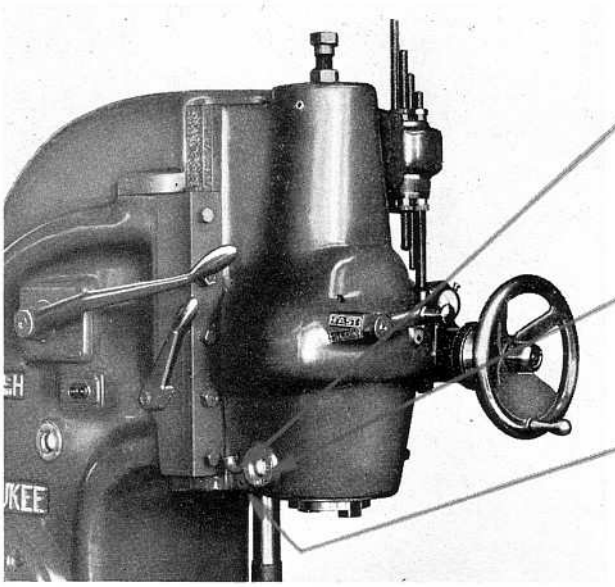
The plug located at the right rear underside of the control box holds the strainer screen.

At the underside, left rear, an additional drain plug is located. This drains a cored pocket which holds approximately one pint of oil.

THE VERTICAL HEAD

Vertical Sliding Head

2H, 2KM, 2K, 3H, 3KM, 3K, 4H, 4K, 5H, 5HM MACHINES



Use the same good grade of lubricant (S.U.V. 300-325 at 100° F), see page 2.

The filler cap is located at the lower left corner of the head.

The head has its own central reservoir and a gear type pump to force the oil above the top bearing, thus distributing it over all the gears and bearings.

Fill the reservoir to the line indicated on the sight gauge located at the lower left side of the head.

Drain the head, flush with flushing oil, such as S/V Flowrex Oil C, and refill with new oil every four months.

The drain plug is located just below the filler cap at the lower left side of the head.

The sliding head ways are automatically lubricated by the column lubricating system.

RUN A MAXIMUM OF FIVE MINUTES DURING FLUSHING OPERATION.

Vertical Swivel Head

1H AND 2HL PLAIN AND MANUFACTURING

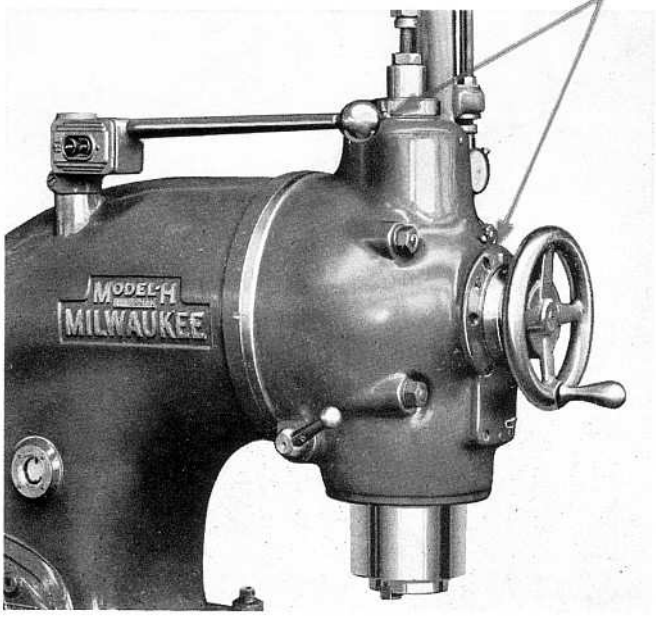
These heads are lubricated with grease and equipped with Alemite-Zerk pressure fittings. Grade recommended to be used is Gargoyle Grease Sovarex No. 1.

"Safe" lubrication of these heads rests mainly with the demands placed upon them in production.

Operating with spindle speeds up to 529 RPM, two to four strokes of the pressure gun to each of the pressure gun fittings once a week, should suffice. If the higher range of speeds is used it is well to lubricate more frequently, but too much grease injected into a mechanism of this design can cause overheating, and a resultant increase in power to operate will be experienced, because of the friction built up from churning the overabundance of lubricant.

A small amount of lubricant frequently is better than a large amount infrequently.

Follow this sequence in lubrication. First—place the nozzle of the gun against the palm of the hand and "stroke" the gun a few times to be sure grease is being extruded. Second—wipe away the first shot from the nozzle to be sure no grit will be carried to the internal parts along with the grease. Third—wipe the pressure fittings clean. Fourth—apply the gun and "stroke" it the required number of times to each pressure fitting.

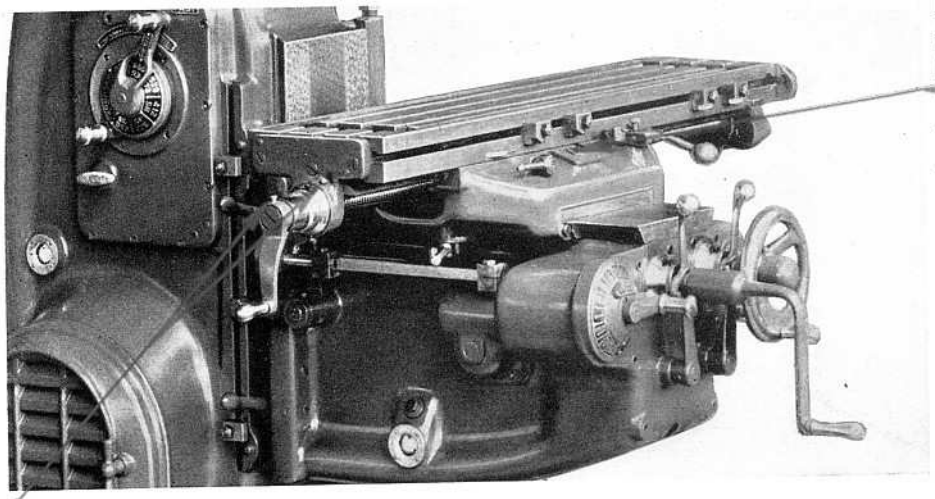


THE NON-ADJUSTABLE AND THE ADJUSTABLE TYPES OF HEAD HAVE TWO ALEMITE-ZERK FITTINGS

THE UNIVERSAL TYPE OF HEAD HAS FOUR ALEMITE-ZERK FITTINGS

THE SADDLE

1H, 2HL, 2H, 3H, 2K, 2KM, 3K, 3KM MACHINES



Fill the lubricant reservoir through filler cap at the front of the saddle DAILY.

Wicks enclosed in copper tubes provide a continuous filtered lubrication to the saddle mechanism, bearings, table lead screw nut, cross feed screw nut, and the saddle ways contacting the knee, and table ways.

The saddle and table mechanism and ways on the 1H and 2H Manufacturing machines receive their lubrication from the reservoir of the control box.

THE GITS OILERS AT EITHER END OF THE TABLE SHOULD BE FILLED DAILY TO LUBRICATE THE BEARINGS AT THE ENDS OF THE TABLE LEAD SCREW

4K, 5H AND 5HM PLAIN, UNIVERSAL AND VERTICAL MACHINES

This saddle and table lubricating system is an automatic pressure type.

The pressure pump is cam operated in conjunction with the table longitudinal directional lever. Each time the directional lever is shifted into a feed position, right or left, a quantity of oil is picked up from the oil reservoir and distributed through the system.

By means of thirteen metering plugs installed at strategic outlets in the system, the oil is fed to points requiring lubrication.

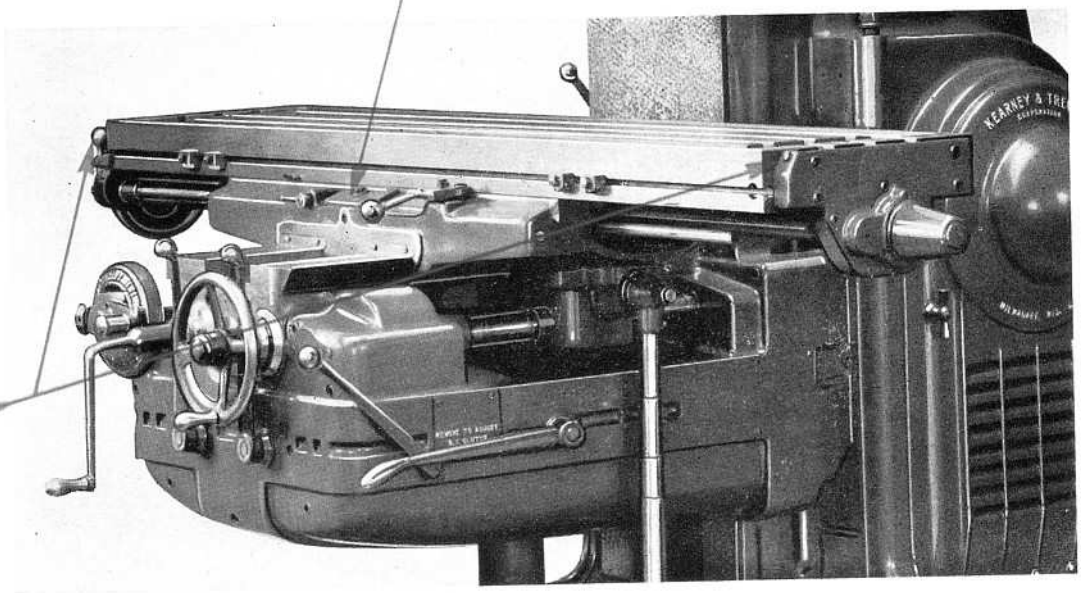
The correct amount of oil is released at each point. The amount of oil is controlled by the orifice in the metering plug. Thus the saddle mechanism, bearings, table lead screw nut, cross feed screw nut, and the saddle ways contacting the knee and table ways receive ample lubrication.

Use the same good grade of oil (S.U.V. 300-325 at 100° F. as described on page 2), and fill the reservoir to the height indicated by the sight gauge on the front face of the saddle.

Replenish the oil as often as it seems necessary by watching the height through the sight gauge.

If machine stands idle for a period as over a week-end, it is well to operate directional lever a few times in order to re-charge lines with oil, as they will have drained off during idle period.

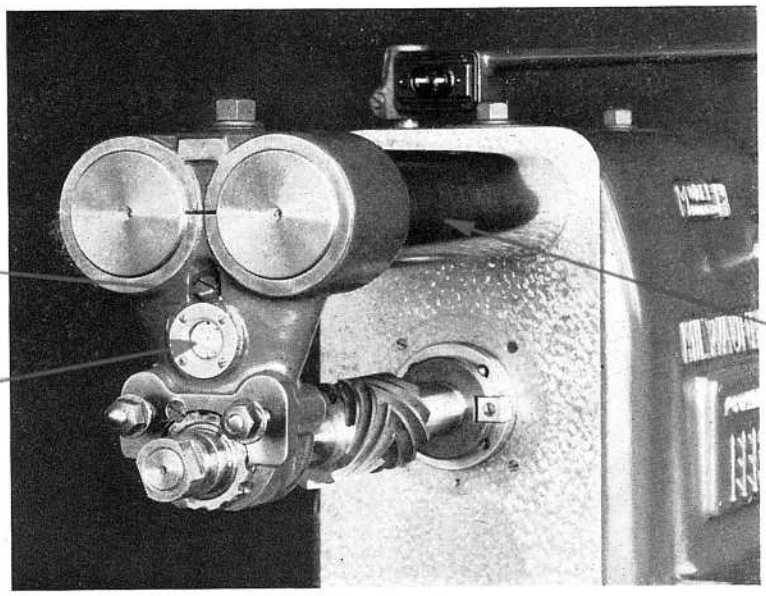
The Gits oilers at either end of the table should be filled DAILY in order to assure ample lubrication to the bearings at each end of the table lead screw.



THE OVERARMS

Keep the overarms clean and lubricated with a thin film of oil to allow for easy adjustment and to prevent corrosion inside the bored holes of the column.

Overarms kept well lubricated contribute to the prevention of marring their surfaces in applying the arbor supports.



ARBOR SUPPORTS

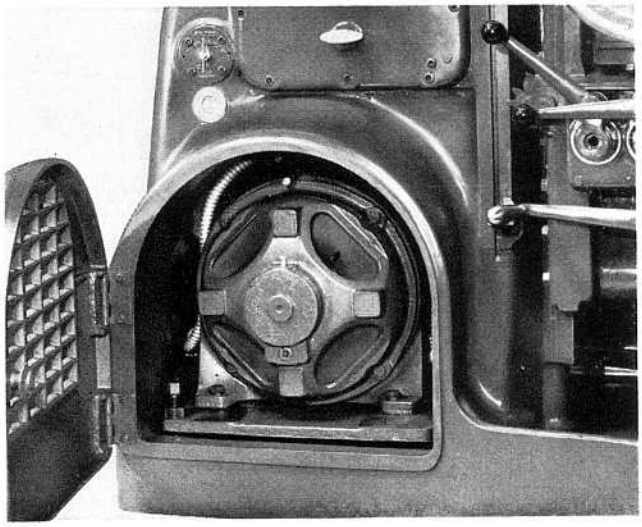
The arbor support has a lubricant reservoir provided with a sight gauge. Through this medium the arbor support bearing is lubricated automatically. Add oil to the reservoir as required.

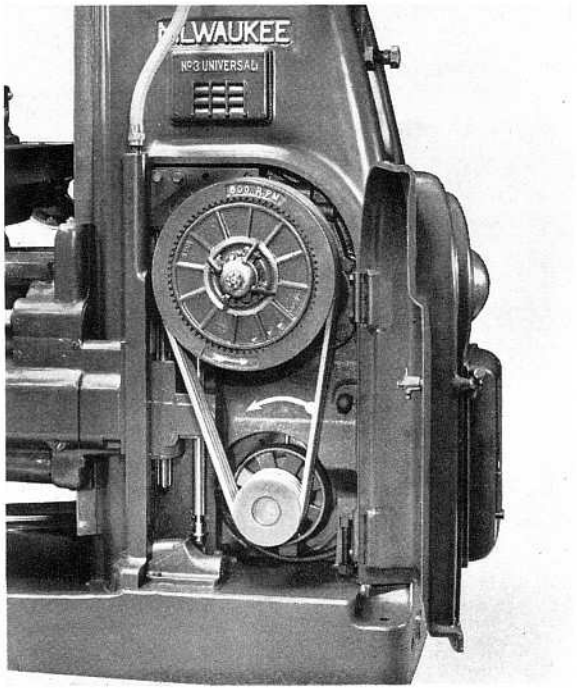
ELECTRIC MOTORS

Knee Type Machines

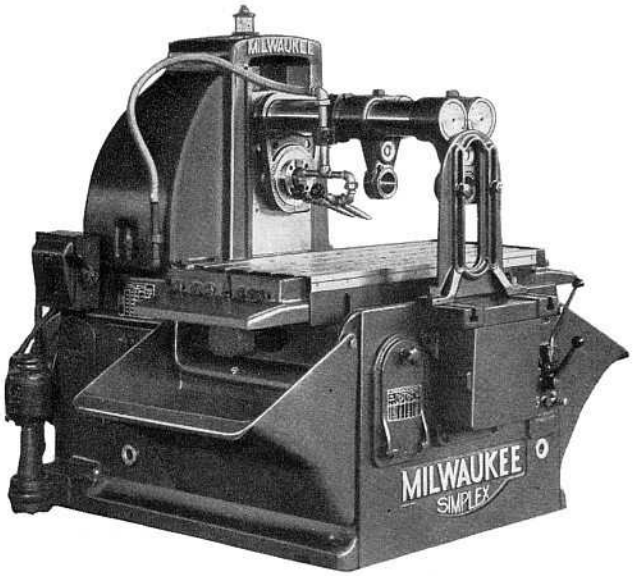
The electric motors in Milwaukee Knee Type machines are mounted crosswise of the column, and large doors are provided on each side of the column allowing easy access to the motor.

Generally speaking two types of bearings are used for mounting the rotor of a motor, namely (1) plain or sleeve type, and (2) grease lubricated anti-friction type. Use the same good grade of oil for sleeve type bearings, and Gargoyle Grease Sovarex No. 1 or its equivalent, for anti-friction type. Follow the motor manufacturer's directions in applying the lubricant.





SIMPLEX AND DUPLEX



MILWAUKEE SIMPLEX
1200-1800 SERIES

1200 AND 1800 SERIES

Bed Directly above the oil level gauge located on the rear left side of the bed is an instruction plate specifying the type of oil that MUST be used to lubricate this machine. It is very important that the correct oil be used. The specifications are Gargoyle Vacuoline Oil Heavy Medium or its equivalent. DO NOT use regular machine oil. To fill the reservoir, open the door directly above the oil level gauge and fill until the level reaches the "High" line on the gauge.

This lubricant takes care of all the lubricating requirements of the bed automatically, including the speed and feed mechanism, table screw, table bearing on the saddle, and all lubrication in the spindle block.

At the top of each upright there is a glass flow gauge which tells instantly if the operating mechanism in the spindle block is receiving its proper lubrication. DO NOT ADD OIL WHILE THE MOTOR IS IN OPERATION as the oil pump functions whenever the motor is running.

Cleaning Bed Lubricant Reservoir

Directly above and to the left of the speed change door located on the rear left side of the bed, there is a small cover plate held in place by fillister head screws. Remove this cover plate and a pipe connection becomes accessible which permits pumping all of the oil out of the bed by merely running the motor which, in turn, operates the lubricating pump.

After the old oil has been pumped out, fill the reservoir with flushing oil, such as S/V Flowrex Oil C, and operate the machine for a maximum of five minutes to flush the internal mechanism. The kerosene or flushing oil can then be pumped out the same as the lubricating oil. The residue should then be drained off through the pipe plug located directly below the guard which protects the machine sheave at the rear of the bed. Refill with new oil. The necessity for flushing the internal mechanism cannot be overemphasized. Flush regularly every four months.

Table Screw Bearings

Fill the manually operated cups DAILY, located at each end of the table to properly lubricate the anti-friction bearings at the ends of the table screw.

Overarms

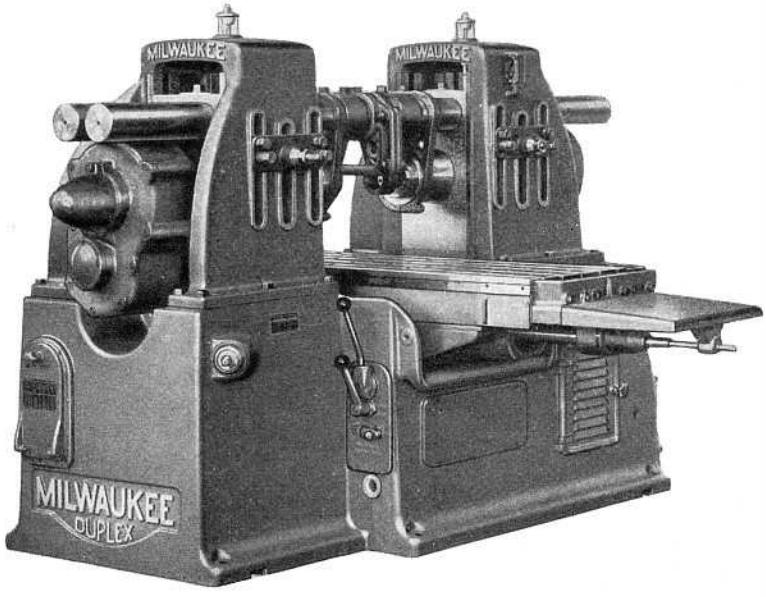
Keep the overarms clean and lubricated with a thin film of oil to prevent corrosion inside the spindle block bored holes. Lubrication of the overarms will materially prevent marring when applying arbor supports.

Arbor Supports

The arbor supports have lubricant reservoir with sight gauge. Automatic lubrication to the arbor support bearing is thus provided. Fill reservoir as required.

The Hydraulic System

An important feature of 1200 and 1800 Series Milwaukee Simplex and Duplex Milling Machines is the presence of an hydraulic system that controls all clutch movements. These include change from rapid traverse to feed, table reversal, return of table in either feed or rapid traverse, automatic reverse in two-way cycles and spindle stop. The same lubricant (Gargoyle Vacuoline Oil Heavy Medium S.U.V. 300-325 at 100° F.) that is used to hydraulically actuate the controls also lubricates the entire machine itself. This lubrication is automatic and no other lubricant is required for these parts.



MILWAUKEE DUPLEX
1200-1800 SERIES

BED TYPE MACHINES

Oil Filter

Simplex and Duplex machines in the 1200 and 1800 Series are equipped with an oil filter having a replaceable cartridge. This cartridge should be changed along with the oil when the oil shown through the sight flow gauge becomes discolored. Under normal operating conditions discoloration may appear every ten to twelve weeks.

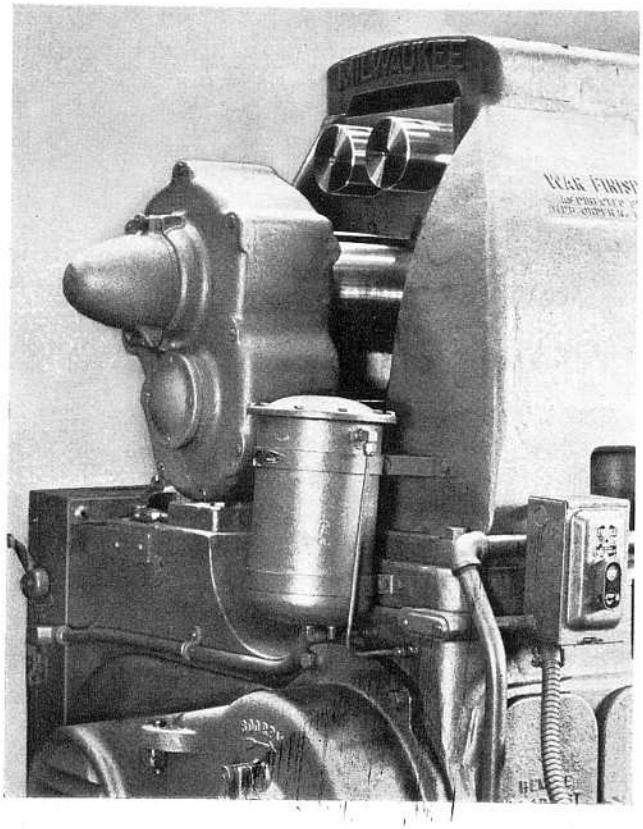
Cartridges may be obtained from Kearney & Trecker or from the Honan-Crane Corporation, Lebanon, Ind. The filter number, necessary for the correct cartridge size, is stamped on the filter unit.

The manner of changing the cartridge is simple and can be accomplished by following the procedure outlined below:

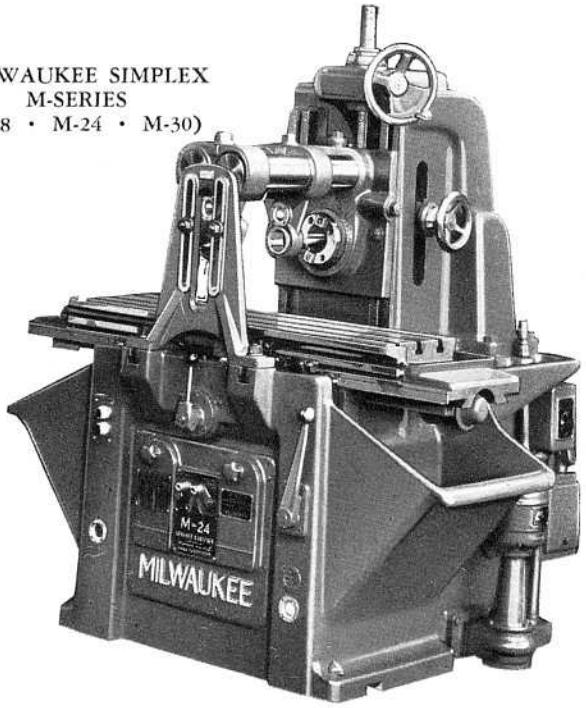
1. Remove cover;
2. Remove center tube nut and lift out used cartridge;
3. Remove spacer tube and replace lower center tube gasket;
4. Insert new cartridge;
5. Renew center tube nut gasket; replace nut and tighten securely.

IMPORTANT: The outlet tube of this element is sealed at each end to keep out dirt. Do not remove cork seals until ready to install.

The illustration below shows the position of the oil filter on 1200 and 1800 Series Simplex and Duplex machines. The filter unit is mounted to the machine just above the motor compartment.



MILWAUKEE SIMPLEX
M-SERIES
(M-18 · M-24 · M-30)



M-SERIES (Simplex Only)

Bed

The main oil reservoir is located in the bed of the machine. From this source the entire machine is automatically lubricated. To fill reservoir remove the brake adjustment cover on the right side of the machine and pour oil through opening until level meets "High" line on sight gauge at lower right, front side of the bed.

The reservoir capacity is approximately five gallons and the oil specifications are Gargoyle Vacuoline Oil Heavy Medium or its equivalent. DO NOT use regular machine oil, or add oil while the motor is in operation, as the oil pump functions whenever motor is running. It is important that oil containers used to fill reservoir are absolutely clean. Care in this respect will aid in maintaining trouble-free machine operation.

This lubricant takes care of all the lubricating requirements of the bed automatically, including the speed and feed mechanism, table screw, table bearing on the saddle, and all lubrication in the spindle block.

Cleaning Bed Lubricant Reservoir

Under normal operating conditions the oil in the machine should be changed every four months. To drain the lubricant reservoir, remove the brake adjusting cover in the same manner as when filling the sump. Through an opening at the top a pipe line is extended with a pipe plug at the end; remove plug and start motor to pump oil from reservoir.

After the oil has been pumped out, fill the reservoir with flushing oil, such as S/V Flowrex Oil C, and operate the machine for a maximum of five minutes to flush the internal mechanism. The kerosene or flushing oil can then be pumped out the same as the lubricating oil.

The residue should then be drained off through the pipe plug located directly below the guard which protects the machine sheave at the rear of the bed. Refill with new oil.

The necessity for flushing the internal mechanism cannot be overemphasized. Flush regularly every four months.

NOTE: For lubrication of table screw bearings, overarms and arbor supports, refer to page 12.

MIL-WAUKEE-MIL
SIMPLEX AND DUPLEX MACHINES
1400 AND 2200 SERIES

Bed

Directly below the table control levers on the right front of the bed is a hinged door marked "Feed Change" below which there is an oil gauge showing the correct level for the lubricant reservoir.

The reservoir is filled by opening the feed change door. Use a good grade of lubricating oil, Gargoyle Vacuoline Oil Heavy Medium (S.U.V. 300-325 at 100° F) or its equivalent.

From this reservoir all lubrication is automatically cared for, including the speed and feed mechanism, table screw, table bearing on the saddle, and the lubrication for the spindle block. At the top of each upright there is a glass flow gauge which tells instantly if the operating mechanism in the spindle block is receiving its proper lubrication.

DO NOT ADD LUBRICANT WHILE THE MOTOR IS IN OPERATION, as the pressure pump operates whenever the motor is running.

Cleaning the Bed Lubricant Reservoir

Directly below the oil level gauge is a pipe plug which is used to drain the oil from the reservoir in the bed. After the oil has been drained, fill the reservoir with flushing oil such as S/V Flowrex Oil C and operate the machine for a MAXIMUM of five minutes during the flushing operation.

Drain off the flushing oil, and refill with new oil. Perform this operation every four months.

Table Thrust Bearings and Table Ways

Fill the manually operated lubricant cups DAILY, located at each end of the table, to properly lubricate the anti-friction bearings at the ends of the table screw.

The ways on all machines up to and including 5 feet of travel are automatically lubricated. Machines with table feeds of 7, 9 and 11 feet have in addition to the automatic feature, auxiliary oilers located approximately two feet from front and rear end. Lubricate these daily.

Overarms

Keep the overarms clean and lubricated with a thin film of oil to prevent corrosion inside the spindle block bored holes and to facilitate the adjustment in setting up. Lubrication will also materially prevent marring the overarms when applying the arbor supports.

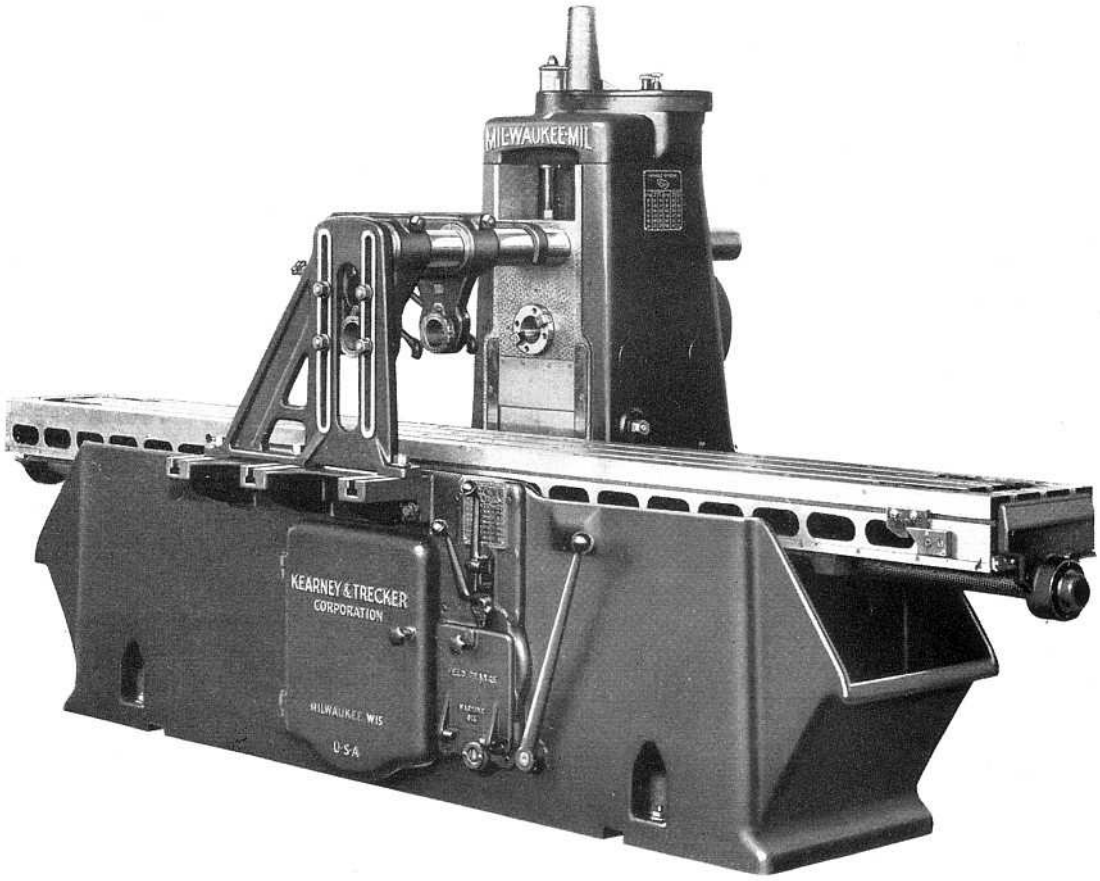
Arbor Supports

The arbor supports have a lubricant reservoir for automatic lubrication of the arbor support bushings. Add oil to the reservoir as required.

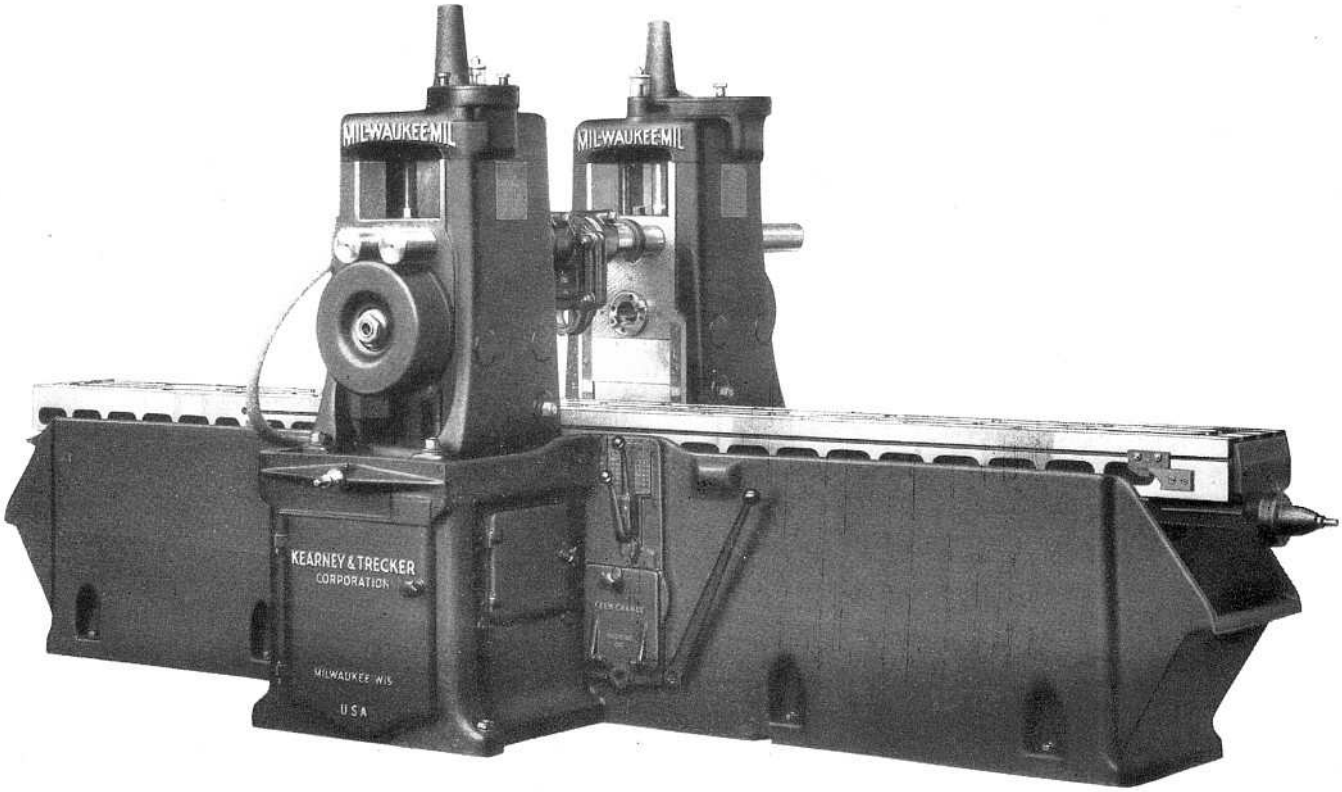
Electric Motor

Doors allowing easy access to the motor bearing ends are located at the rear end side of the machine. Follow the motor manufacturer's instructions for correct lubrication.

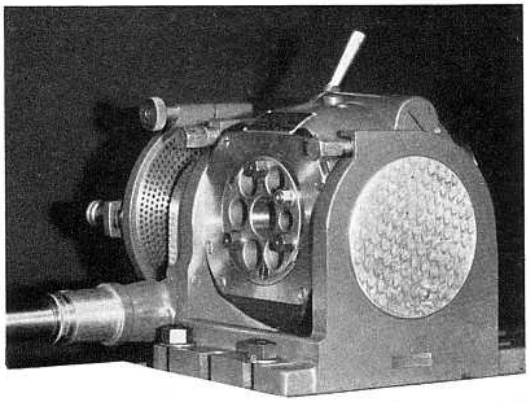
SIMPLEX MIL-WAUKEE-MIL



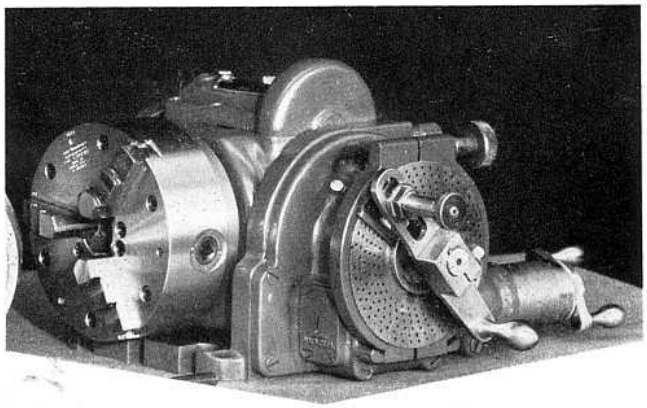
DUPLEX MIL-WAUKEE-MIL



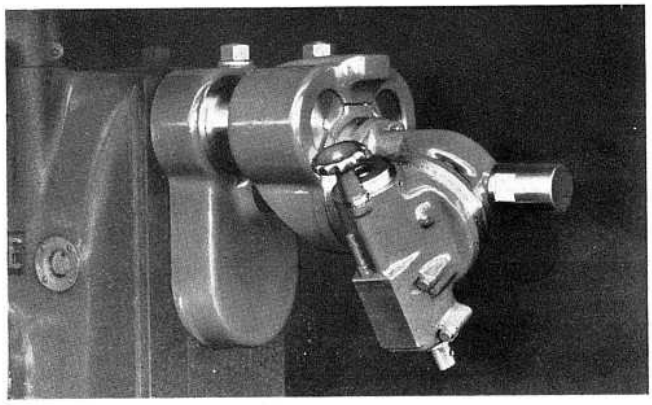
ATTACHMENTS FOR MILWAUKEE



The Hypoid Type K Dividing Head has two oil fillers. One is located at the top of the spindle housing. Keep filled to the level of the test plug on the scraped "flowered" surface. The other is located at the top of the worm housing. Keep filled to the level of the test plug in the plate at the lower front of the worm housing.



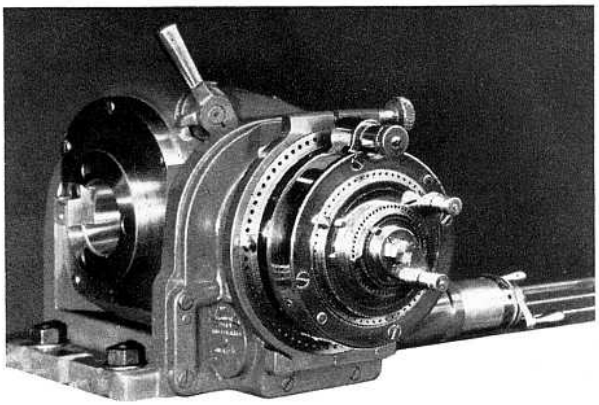
The Model H Dividing Head is equipped with four Gits Oilers. Two at the top of the worm housing to lubricate the worm and indexing shaft, and two at the top of the spindle housing to lubricate the secondary worm bushing and the worm adjusting thrust bearing. Fill the large Gits oiler on the worm housing to the level of the test plug on the plate at the front of the primary worm housing.



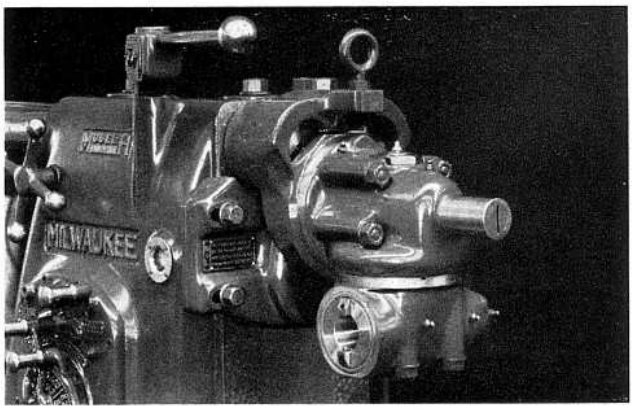
The Light High Speed Universal Milling Attachment runs on "greased for life" ball bearings. The internal gears are packed with Gargoyle Grease Sovarex No. 1, at assembly.

To replenish this supply, remove the 1/8" slotted plugs, insert a Zerk fitting and grease with the Zerk gun furnished with the unit. Do not fill too full as an overabundance of grease may cause overheating.

The driving gears are lubricated through the Zerk fitting on the right side of the drive bracket.



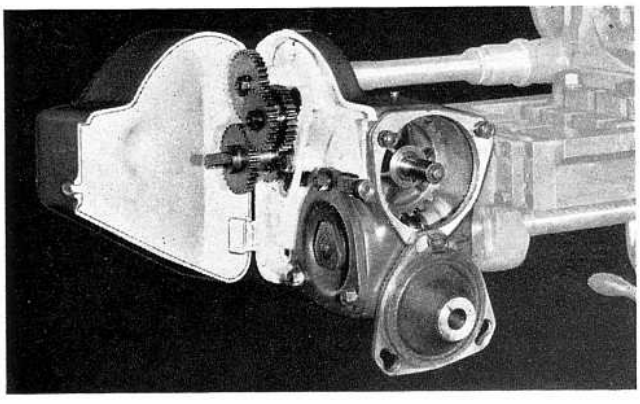
The Astronomical Dividing Head Attachment is packed with Gargoyle Grease Sovarex No. 1, when assembled. If at any time repacking is necessary remove the Allen Head plug located on the periphery, insert a Zerk fitting and add the necessary amount of lubricant with the pressure gun.



The Standard High Speed Adjustable Universal Milling Attachment is lubricated with oil and grease. The bearings in the drive bracket are greased with Gargoyle Grease Sovarex No. 1, through two Zerk fittings. Oil is used to lubricate the head, through six Zerk fittings.

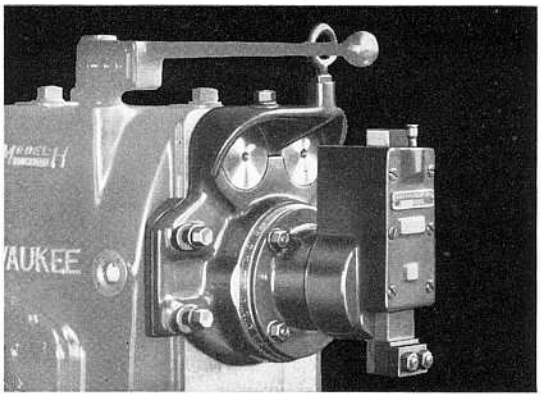
Two Zerk pressure guns are furnished with the head, one to be used with grease, one pound of which is also furnished, and one to be used with oil (this gun is etched "OIL").

If the head is used for a continuous period, lubricate once each week or as often as seems necessary according to the demands placed upon it in production.



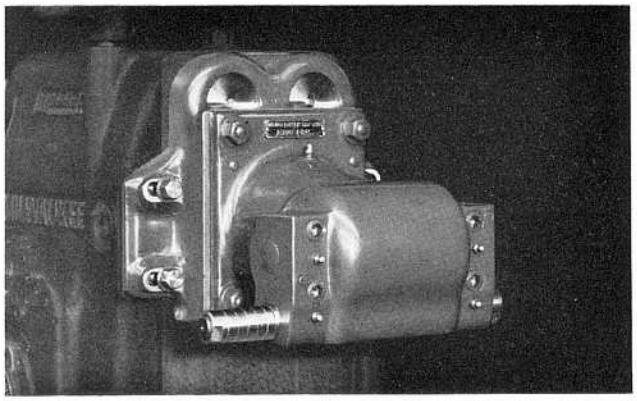
The Low Lead Attachment has eleven Gits Oilers, six under the large cover and five on the outside surfaces. Oil daily when used.

MILLING MACHINES



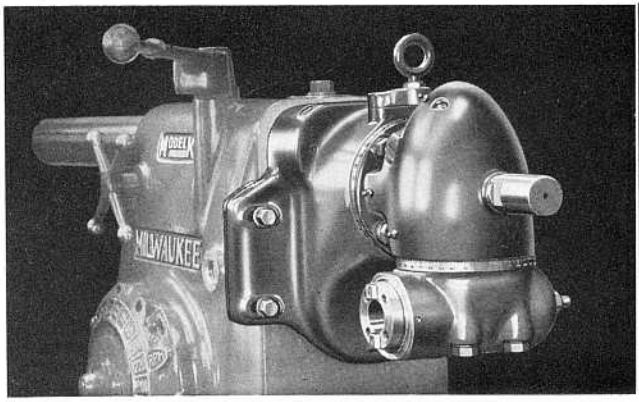
The Model H Slotting Attachment, 0-2½" stroke, has three Gits Oilers. One at the top of the front cover lubricates the ram, one at the top of the connecting rod to lubricate that member, and one at the top of the drive block housing (just back of the ram housing), to lubricate the drive block. Oil daily when in use.

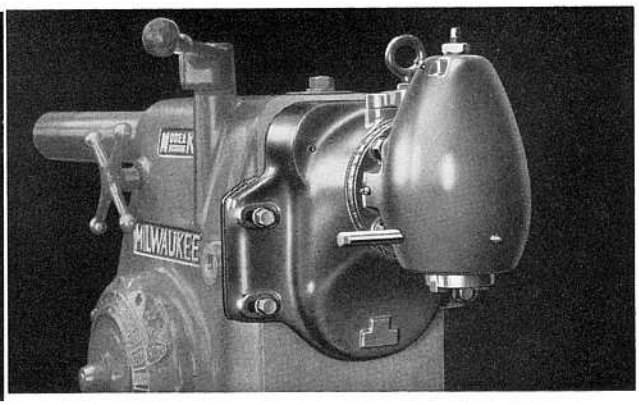
The Model K Slotting Attachment, 0-4" stroke, has seven Gits Oilers on the external surfaces, and one on the connecting rod. Oil daily when in use.



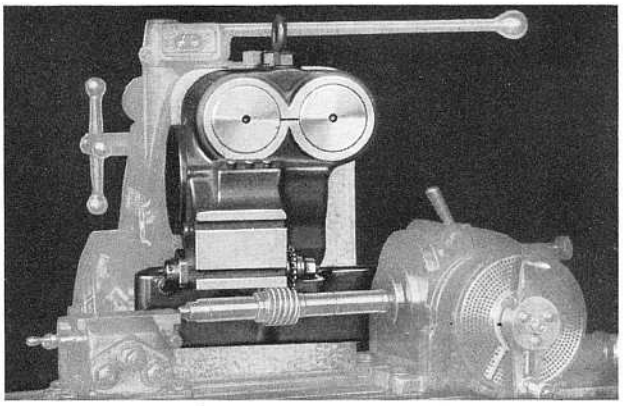
The Rack Milling Attachment as used on the 1H, 2HL, and 2H machines are lubricated with Gargoyle Grease [redacted] through five Zerk fittings. Sovarex No. 1.

The Rack Milling Attachment as used on 3H, 4H, and all KM and K Models is lubricated with a good grade of oil, through five Gits Oilers.

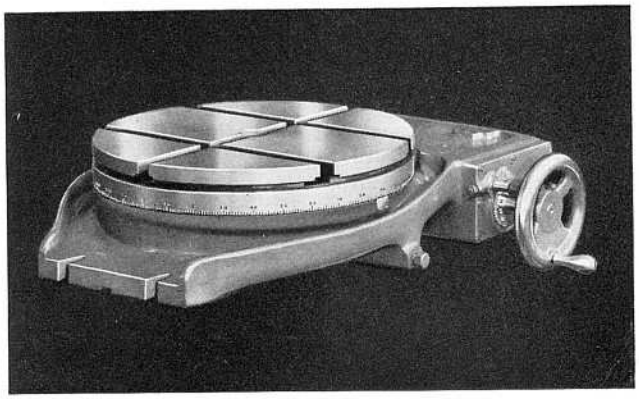




The Standard and Heavy Duty Vertical and Universal Milling Attachments are lubricated with Gargoyle Grease [redacted] Sovarex No. 1, A Zerk pressure gun and one pound of this grease is furnished. Replenish the supply of grease once each month, or as often as seems necessary by the demands placed upon the unit.



The three Gits Oilers on the angular surface below the left overarm hole provide all the lubrication requirements of the Thread Milling Attachment.



All Rotary Tables have a central oil reservoir. The filler cap is located toward the front of the right hand "hold-down" bracket. Watch the oil level through the filler hole, and replenish as necessary.

Note: For all points on attachments taking oil use a good grade of medium bodied oil (S.U.V. 300-325 seconds at 100° F) such as Gargoyle Vacuoline Oil Heavy Medium. *See page 2.*

Since 1898

DOING ONE JOB AND DOING IT WELL!

At the inception of its business, the Kearney and Trecker Corporation manufactured a variety of machine tool products—lathes, boring bars, grinders, and other special machines. Realizing that to excel, the company would have to concentrate its efforts in the manufacture of a single product, a policy of exclusive confinement to the design and building of superior milling machines was decided upon. For more than 40 years this program of concentration has been in effect and today, by reason of this specialized experience, *Milwaukee Milling Machines* are being built well abreast of current needs and in full anticipation of tomorrow's demands through the incorporation of advanced milling machine design and construction.

KEARNEY & TRECKER CORPORATION

MILWAUKEE, WIS., U. S. A.

No. 24B

Printed in the United States of Amer