

*Installation,  
Operation and Maintenance*

**INSTRUCTIONS  
and  
PARTS LIST**

*for*

**Model No. 38**

**Van Norman Ram Type Milling Machines  
Plain, Universal and Special Models**



**VAN NORMAN COMPANY**

Springfield 7, Massachusetts, U. S. A.

INSTALLATION, OPERATION  
AND  
MAINTENANCE INSTRUCTIONS FOR

NO. 38

VAN NORMAN RAM TYPE MILLING MACHINES  
PLAIN, UNIVERSAL AND SPECIAL MODELS

The Van Norman Ram Type Milling Machine is a precision tool, built of the best material obtainable and to the highest degree of accuracy. Each machine and its parts are checked many times during construction for both quality and accuracy. With ordinary care and observance of the suggestions in this booklet your Van Norman Ram Type Milling Machine will give you many years of satisfactory service.

In the general operation of the No. 38 Milling Machine it is important to note that the machine can be used for an exceptionally wide range of milling operations with the minimum of effort on the part of the operator.

In milling operations involved on most jobs where one or a few pieces are required, much time can be saved and the highest degree of accuracy will be assured, by keeping in mind at all times that your Van Norman Ram Type Milling Machine has as an important part of its design, a spindle which can be instantaneously adjusted to any angle between horizontal and vertical. Also, the spindle cutter head is adjustable in or out with respect to the column by means of the ram on which it is mounted; thereby providing added range and adaptability to a wide range of milling operations with the minimum of changes in setups.

Before setting up the piece to be milled it is suggested that the operator carefully analyze the operations to be done in order to position the piece for most advantageous use of the horizontal, vertical and angular adjustments of the cutterhead as well as adjustability of the ram unit.

VAN NORMAN COMPANY  
SPRINGFIELD 7, MASSACHUSETTS, U.S.A.

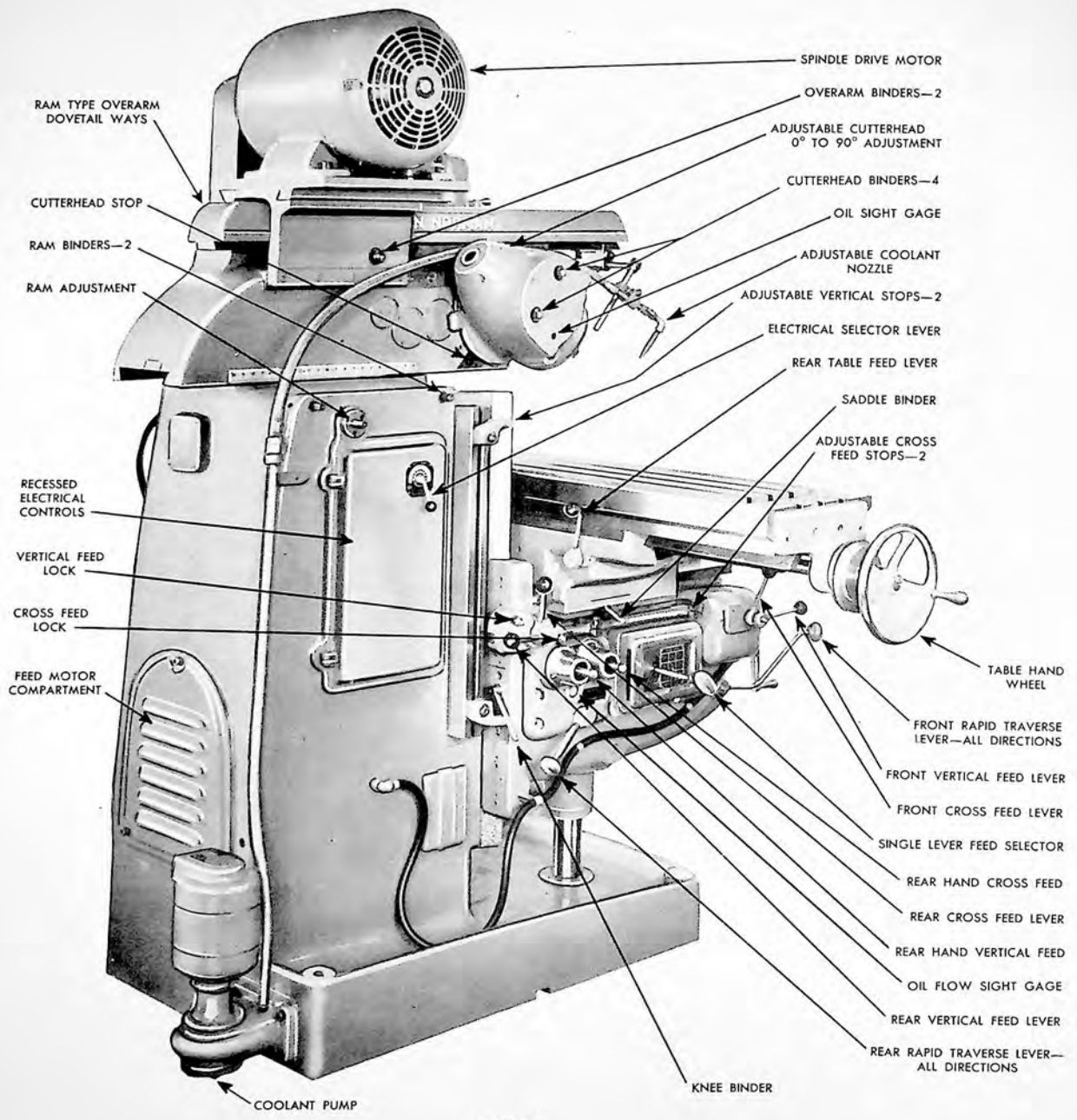
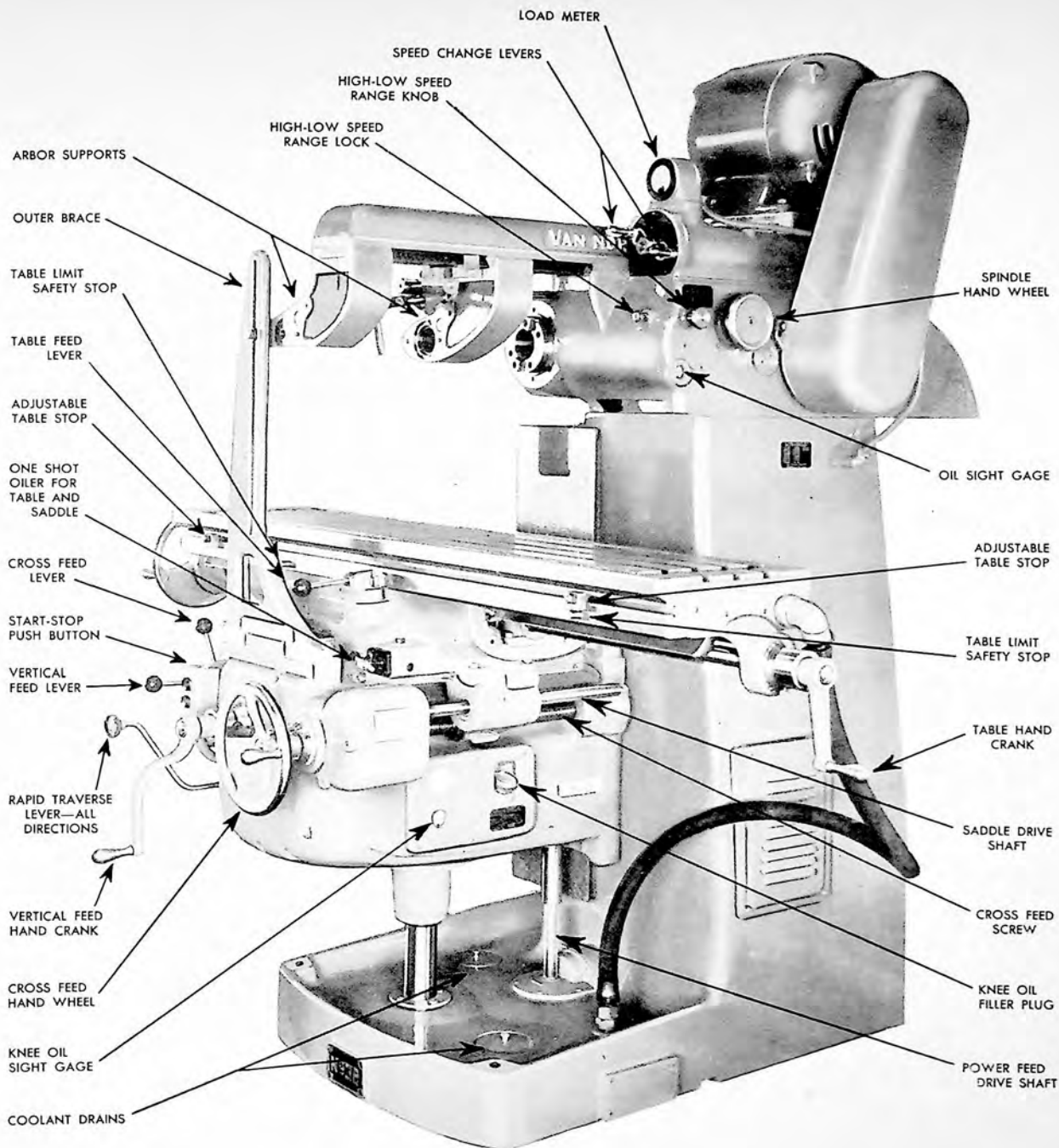


FIGURE 1

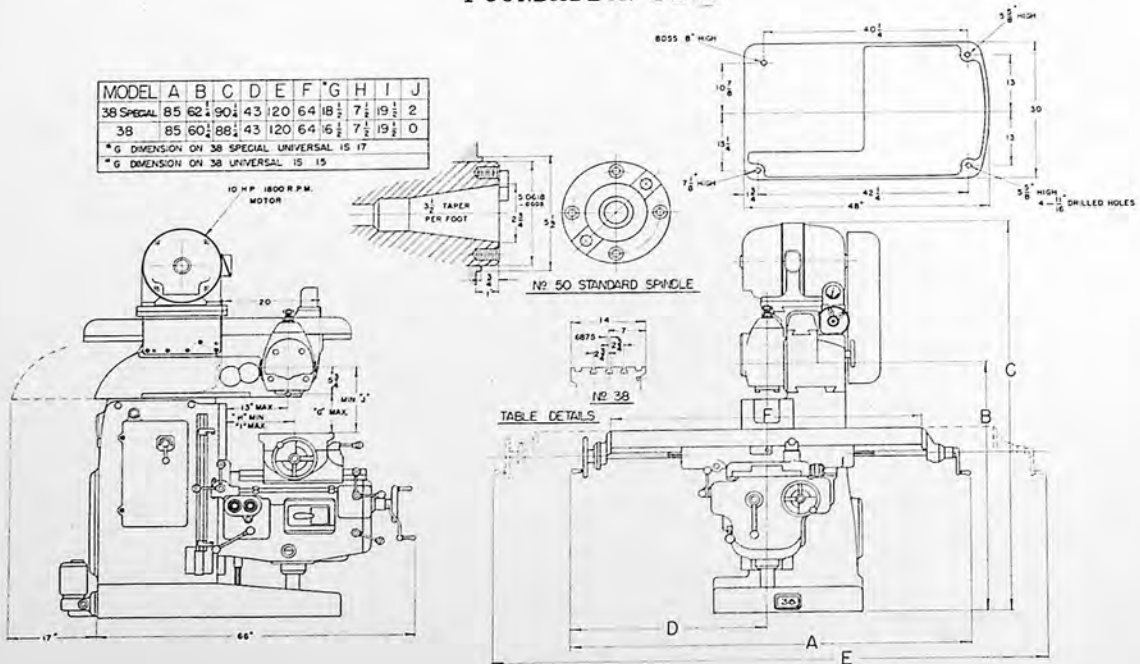




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## FOUNDATION PLAN



## INSTALLATION

### CLEANING AND PREPARATION FOR OPERATION

The machine is shipped with slushing oil on all ways and machine surfaces to prevent rust during shipment. This slushing oil must be washed off with kerosene or other dissolving agent to make sure that all surfaces are free from residue or dust which might accumulate during shipment. Then all slide ways and flat surfaces should be very carefully covered with lubricating oil, after which it is advisable to move the table, saddle and knee by hand so that this oil will thoroughly work onto all surfaces.

Before operating the machine, check all oil levels, and oil and grease in accordance with instructions under the heading, "Lubrication," on pages 15 through 19 of this booklet.

### LEVELING

It is very important that the machine is properly leveled. This should be done by the use of a long spirit level mounted on the table, both longitudinally and transversely. If leveling blocks are used, these should be placed at the four corners of the base, as well as one on each side midway between the rear and front edges. If leveling blocks are not used, the concrete floor should be as smooth as possible, and tapered wedges should be inserted in any openings so that the base receives as much foundation as possible. Lag screw holes are provided for securing the machine to floor after leveling.

### HANDLING

It is very important that the machine be properly lifted because damage may result with improper handling. The best procedure is to use a two-inch rope sling arranged so that one loop is placed under the knee at the front end and a second loop is located under the back of the ram with the ram projecting about four or five inches to the rear of the column. CAUTION: Be sure that the knee binder (Fig. 1) and saddle binder (Fig. 1) are solidly fastened or clamped before raising the machine. Also, make certain that the rope does not touch any levers or projecting portions of the machine which may become sprung out of shape.

It is also advisable to place a cloth or soft rags under the rope to avoid marring the finish of the machine. With the sling in position the machine should be raised slightly to make certain that the balance is correct. If the machine dips one way or the other when raised, the sling should be adjusted to assure correct balance.

#### WIRING AND ELECTRICAL CONTROLS

The wiring diagram on page 7 should be consulted before connecting the machine. A diagram showing where the leads should be connected is also located within the panel door.

If the machine is furnished with electrical equipment, the controls are located within the column on the left-hand side of the column, and a hole is provided for bringing in the power line. It is necessary that the feed motor should operate counter-clockwise when looking at the motor from the sprocket at the front of the motor. This can be observed by opening the door (Fig. 2) at the right side of the column. Another method of checking rotation is by the power feed drive shaft (Fig. 2) which would operate clockwise when looking downward.

The main spindle drive is operated by a reversing motor, and spindle direction is controlled by reversing switch and push button station. A push button station is installed on front of knee in addition to the selector switch on the side of the column to provide both front and rear control of spindle starting and stopping.

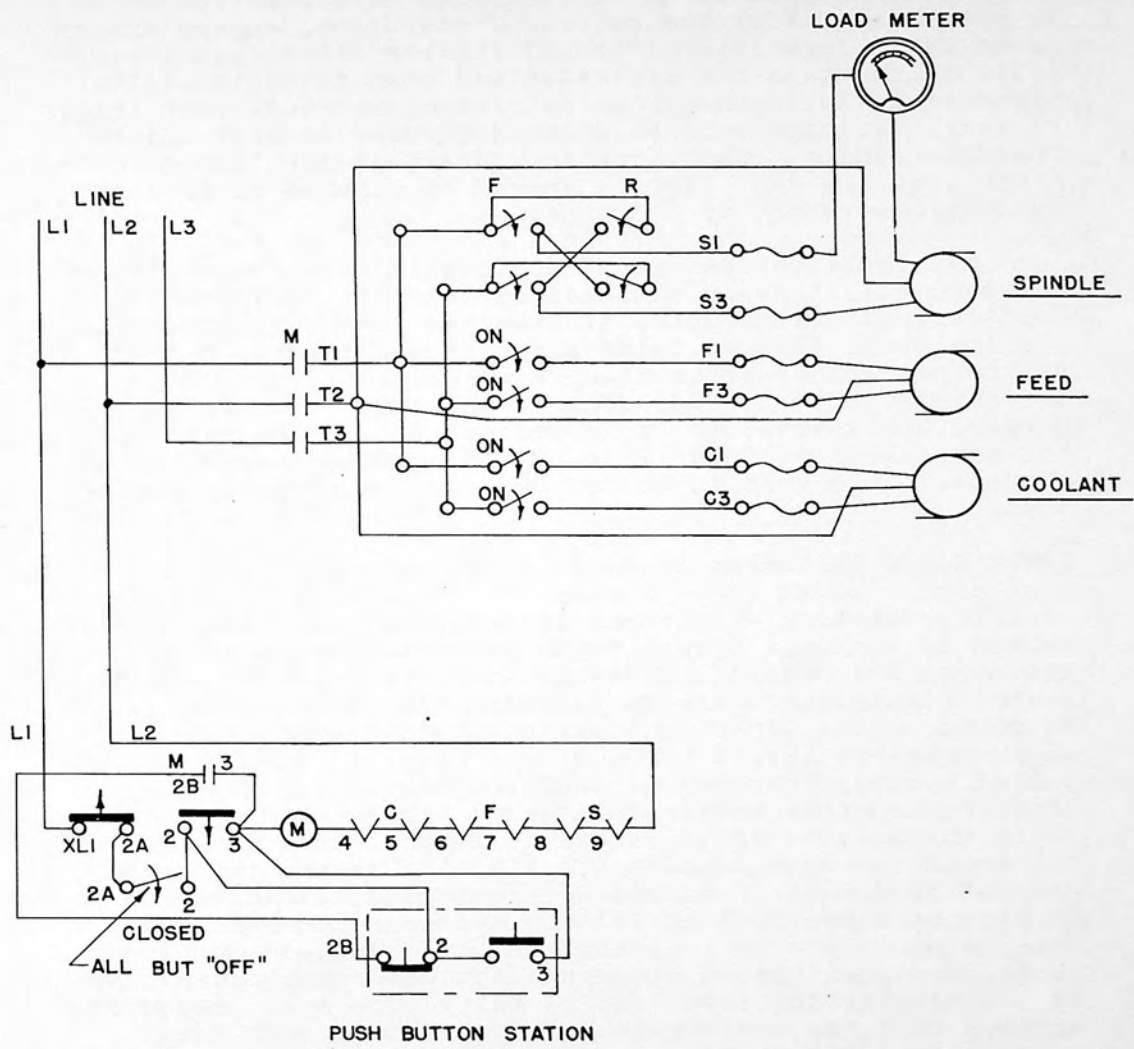
As an additional safety feature, controls when furnished by Van Norman, are wired so that it is not possible to operate the feed motor unless the spindle motor is in operation. This prevents the possibility of damage to the machine or work, which would result if the feed were operated against a stationary cutter.

The selector switch is provided so that the feed motor may be disconnected should it be desired to operate the machine for an extended period without power feeds.

A load meter (Fig. 2) is installed to indicate the percent of full load at which the machine is being operated.

It is suggested that controls, if installed by the user, be connected in the above manner. Wiring diagrams for standard makes of controls are available for this method of control connection, as well as for operating the feed motor and spindle motor independently should this latter method be desired.

# WIRING DIAGRAM





## OPERATION

### POWER FEEDS

The machine is now ready for operation. The motors should be started by means of the push button station. To obtain the feed it is necessary to have the feed motor in operation. With the motors in operation, engage either front table feed lever (Fig. 2) or rear table feed lever (Fig. 1) first in one direction and then in the opposite direction. Next, the front or rear cross feed lever (Fig. 2) and (Fig. 1) should be engaged forward to backward to feed the saddle. Then, the front or rear vertical feed lever (Fig. 2) and (Fig. 1) should be engaged up or down to obtain movement of the knee.

All these levers are directional, i.e., the member to be moved will travel in the direction that the lever is positioned. For example, if standing at the front of the machine it is desired to move the saddle inward, the operator pushes the cross feed lever (Fig. 2) inward. If the saddle is to be fed outward, the same lever is pulled outward. Likewise, if it is desired to elevate the knee, the vertical feed lever (Fig. 2) is positioned upward, whereas if the knee is to be lowered, the lever is pushed down.

### POWER RAPID TRAVERSE

If power rapid traverse is required, the lever so marked is engaged. Power rapid traverse should be operated as follows: If the table is to be rapid traversed to the right, the table feed lever (Fig. 2) should first be moved in the direction desired; then the front or rear rapid traverse levers (Fig. 2) and (Fig. 1) should be pulled upward, causing the table to travel rapidly as long as the rapid traverse lever is held. As soon as the rapid traverse lever is released, it will drop down to the normal position, and the table will resume the normal rate of feed until the feed lever has been disengaged. To disengage the feed it is then necessary to return the feed lever to the neutral position. If desired, however, it is also possible to disengage the power rapid traverse by disengaging the feed control only. The same procedure applies to cross and vertical feeds. The proper feed lever should first be engaged, then the power rapid traverse lever operated for the distance required.

It is a good practice for the operator to engage the various levers for a suitable period of time until he becomes acquainted with all movements. All controls have

been very carefully developed so with their directional feature and ease of operation it is relatively easy to learn the full control of the machine.

#### POWER FEED LOCKS

Sometimes it is necessary to lock one or more of the feed levers so that they cannot be engaged. For instance, to lock the table this can easily be done as follows: If the machine is used for boring and it is desired to lock the table feed only, this is done by positioning the adjustable table stops (Fig. 2) so that they touch each side of the trip lever. When locked in this position, it is impossible for the table feed to be engaged.

To lock out the cross feed it is only necessary to lock the knurled screw (Fig. 1) at the left-hand side of the knee. This screw engages into the cross feed trip rod and secures it so that it cannot be moved in either direction.

The knee or vertical lock screw, located on the left side of the knee just behind and above the rear vertical feed lever (Fig. 1), binds against an internal rack shaft, locking the vertical power controls.

#### POWER FEED STOPS

Since all the stops referred to are adjustable, it is possible to set them for disengaging the various feed as may be desired. For example, if a part should be set up so that the inward cross feed is applied, it is possible to automatically disengage this feed by adjustable cross feed stops (Fig. 1). This will assure the saddle stopping at a given position repeatedly.

When it is desired to rapid traverse the table up to a given position for the starting or a cut and then re-engage the feed, the adjustable table stops (Fig. 2) can be positioned to suit. The dog will disengage the feed from power rapid traverse; then to engage, it is merely necessary to raise the table feed lever (Fig. 2) and then position the lever to re-engage the normal feed. If it is then necessary to disengage the feed at a given position, extra dogs should be secured.

#### POWER SAFETY STOPS

All the moving members are provided with safety stops which are not to be removed or adjusted. On the table, the table limit stops are located (Fig. 2) at each end of table. For the cross feed the adjustable stops act as safety stops

because they cannot be removed from the trip rod, and likewise their movement is limited so that they cannot be adjusted beyond the feed range of the saddle. For the vertical elevation the stops cannot be removed beyond the fixed pins. At no time should the vertical trip dogs be removed from the T-slot.

#### HAND FEEDS

The cross hand adjustment is by means of the cross feed hand wheel in front of the machine (Fig. 2) or the cross feed hand crank at the left rear of the knee (Fig. 1). The vertical hand adjustment is by means of the hand cranks at the front and rear of the machine (Fig. 2) and Fig. 1). The table can be moved longitudinally by means of the hand wheel at the left of the table or the crank at the right-hand end of the table. Large graduated dials are provided for all hand movement adjustments. These dials can be reset by thumb screws provided on each dial.

#### SAFETY DEVICES

The feed drive mechanism in the knee is provided with an automatic type safety clutch which will disengage in the event an excessive load or obstruction is encountered. For example, if something should lodge between the saddle and column while the cross feed was engaged, this clutch will automatically disengage and will make a clicking sound which will continue until the excess load is removed. This clutch, located in the knee, is permanently set and needs no adjustment.

#### SPINDLE SPEED CHANGES

When changing the spindle speed, it is necessary first to stop the motor by means of the push button station or selector switch. Then the desired spindle speed is obtained by operation of the speed change levers (Fig. 2). These are of the direct reading type and are positioned so that the proper letter and number combination for the desired speed appear in the openings in the levers. At each position, however, there are two spindle speeds shown, one of which is the high range, and the other the low range. The high-low shifter is on the side of the ram directly below the speed change levers (Fig. 2). To move the high-low shifter the knob in front of the ram is pulled out and held. This releases the high-low lever and it may now be pushed in if the low range is wanted or pulled outward if the high range is desired. After positioning, the knob in front should be released. This automatically locks the high-low shifter in place. All sliding gears have been chamfered so that the

teeth will slide between each other as desired. Occasionally, however, these teeth may line up in such a way so that their edges come on "dead center," in which case it would be necessary to rotate the spindle hand wheel (Fig. 2) slightly so that the proper meshing of the gears can be obtained. After the proper speed selection has been obtained from these levers, the motor is again started. In event that the spindle is to rotate in opposite direction, this is accomplished by the selector switch control on the panel door.

#### POWER FEED CHANGES

To obtain the table feed desired, the single lever feed selector (Fig. 1) should be moved sideways or vertically so that the pointer coincides with the table feed desired on the feed plate. Each position of the feed plate has two feed rates, one of which is for the high range and the other for the low range. If the low range is desired the lever handle should be rotated downward in a clockwise rotation. If the high range is wanted, this lever handle is rotated upward or anti-clockwise. It should be remembered that the feed rates as indicated are for the table. The cross feed rate is 75% of that indicated for the table and the vertical feed rate is 40%.

It is possible to change the feed rate while the machine is in operation. This is done by rotating the handle to a true horizontal position and then moving it sideways or up and down as may be desired. Then when the feed has been selected, this handle can be rotated in either direction, which will then engage either the high or low series clutch located inside the knee.

#### RAM

The ram is solidly locked to the column by means of two eccentric binders (Fig. 1). To adjust the ram in or out on the column, it is very essential that these eccentric binders be rotated, by the hand crank furnished, to the neutral position, which can very easily be determined by rotation of the binder shafts until the movement is "free," after which the ram can be moved in either direction by rotation of the ram adjustment (Fig. 1). After the ram has been properly positioned, the binders can be rotated in either direction to lock the ram in position.

#### CUTTERHEAD

To adjust the cutterhead from horizontal to a vertical position or any desired angle in between, the same



hand crank is used to loosen the four head binders (Fig. 1). The head can then be rotated by hand to the angle desired indicated by the graduations of the flange. The head then is locked by tightening the binder bolts securely.

#### OVERARM

To adjust the ram type overarm (Fig. 1) the same crank handle is used to release the overarm binders (Fig. 1). After the overarm has been positioned as desired, these binders should be tightened securely. The same procedure applies to the arbor support.

#### UNIVERSAL SADDLE

To adjust the table on models equipped with universal saddle to desired angular position, loosen hollow-hex head screws on underside of lower saddle unit, one at right front, one at left rear, until they drop entirely clear of the upper swivel unit. Then loosen the three swivel saddle binders, two on front face and other on rear face of lower saddle unit. The table then can be revolved to the desired angular position and the table locked by means of the swivel binders.

When the table is used in normal operating position (0 degree angularity) the table should be revolved to the normal position after which the hollow-hex head locking bolts on underside of saddle are engaged in the threads of the upper saddle unit and securely fastened. It is also advisable to secure the swivel saddle binders. For extreme accuracy in setting the table to "0" position, use an indicator.

The swivel saddle units on all Van Norman Universal models have broad extensions to the right and left of the swivel ring, which give added support to the swivel members assuring maximum rigidity for all angular settings of the table.

## PERIODIC MACHINE ADJUSTMENTS

### SPINDLE BEARINGS

CAUTION: The spindle bearings used in the head comprise two tapered roller bearings located at the front and rear ends of the spindle. The tapered bearings have been properly adjusted and are provided with suitable preload for average conditions before leaving the factory. This adjustment is made after the spindle has been properly run in and thoroughly tested so that the machine is shipped ready for operation. Very seldom is any further adjustment required, but should it be necessary to alter the preload or to provide further adjustment, this can be done by removing the rear cap through which the adjusting nut can be either tightened or loosened as desired and again locked. It is suggested that this adjustment be made while the head is in the vertical position to avoid the necessity for draining the lubricant. We do not deem any further adjustment necessary and suggest that no alterations be made without having a very thorough knowledge of bearing loads and operating conditions.

### GIBS

The table, saddle and knee are adjusted in the normal way, but should not be readjusted without a thorough knowledge of function. These gibs are properly adjusted when leaving the factory and should not be readjusted unless absolutely necessary. The table gib is adjusted by means of two shouldered screws located on each end of the saddle. By loosening one and tightening the other, the taper gib may be adjusted as needed.

The taper saddle gibs likewise are adjusted by shouldered screws located at the front and rear edges. The knee gib which is of the double angle type is solidly clamped in position, but can be adjusted by means of five spreader screws located in the gib itself. To tighten the gib the holding screws should first be loosened slightly. Next, the spreader screws should be moved a very slight amount, all equally, after which the holding screws should then be solidly locked in position.

### TABLE FEED SCREW

The table feed screw has two nuts by which any adjustment is made. To get at these nuts it is necessary to

remove the feed screw bearing brackets from each end of the table and slide the table off the machine. The nut on the right side is fixed and any adjustment is made by loosening the cap holding the left nut. A pin may then be inserted in anyone of the many holes around the flange of the nut and the nut turned until the end play is from .002" to .005". After completing the adjustment the cap should again be tightened.

#### SADDLE FEED SCREW

The saddle feed screw is adjusted by means of an adjustable nut in the front end of the bracket carrying the screw under the saddle. To adjust, the check nut should first be loosened and then the feed screw nut may be turned until the end play is from .002" to .005". After making the desired adjustment the check nut should again be tightened.

#### RAPID TRAVERSE CLUTCH

The rapid traverse clutch is of multiple disc type. Should it be necessary to adjust for any reason, this may be done by removing the cover on right side of the knee to gain access to the clutch. Instructions for adjustment are shown on plate mounted on the cover.

## LUBRICATION

Lubrication of this machine has been very thoroughly developed so that a minimum of attention is required. However, it is absolutely essential that inspection be made at necessary intervals.

In all units where oil is specified unless otherwise indicated, we recommend a good grade oil with a viscosity of approximately 300 S.U.V. (Seybolt Universal Viscositymeter) at 100° Fahrenheit. This viscosity is approximately comparable to S.A.E. 30.

It is recommended that the oil be drained from the ram and knee every four months. The reservoir should then be cleaned with a light flushing oil. The machine may be run up to five minutes with this flushing oil, after which it should be drained and the reservoir refilled to the proper level with the recommended lubricant.

### CUTTERHEAD

The front bearings in the cutterhead are lubricated from the supply of oil in the ram and require no further attention. The rear bearing should be lubricated every four weeks with grease through the alemite-zerk fitting provided. A high quality anti-friction bearing grease should be used.

If the cutterhead is operated continuously in a vertical position the rear bearing should be lubricated at least once each week with high temperature grease. (E. F. Houghton's Cosmolube #1 Grease or equal).

### TABLE AND SADDLE

The table and saddle mechanism, as well as saddle and table ways, are lubricated by means of a single shot oiling device (Fig. 2) located in the front of the saddle. By pulling the plunger the necessary oil is distributed to these surfaces. This plunger should be operated every hour or two depending upon the use of the machine. The oil reservoir holds sufficient oil for several weeks' operation. An oil cup is located on the saddle bracket at the right side of the knee for lubricating the cross feed screw.



## TABLE FEED SCREW BEARING

The grease fitting, located in the bracket at the left end of the table, should be replenished with a good grade anti-friction bearing grease approximately every four weeks. The feed screw bearing at right end of table is of grease seal type and requires no attention.

## RAM

An oil sight glass (Fig. 2) is provided on the right front side of the ram for inspection of the oil level. When the ram gears are stationary, the oil level should be at the center of the sight glass. When necessary, the oil may be replenished through the oil plug in the top of the ram immediately behind the speed selector case. Oil can be drained by removing plug located on the underside of ram near front. The capacity of the ram is about 4 quarts.

## KNEE

Inspection of the oil level in the knee is made through the sight glass (Fig. 2) located on the right side of the knee. The oil filler plug is conveniently located right beside the oil sight. A drain plug is located on the underside of the knee. The capacity of the knee is about 16 quarts.

## KNEE LUBRICATING PUMP (Fig. 3)

The oil pump, used for lubricating the internal mechanism within the knee, is of the plunger type and is attached to the underneath side of the knee housing, towards the rear wall. This oil pump has only one moving part, ... the plunger, which is operated by means of an eccentric for the down stroke and a helical spring mounted within the plunger, for the upward stroke. When the plunger rises, the inlet ball check opens while the outlet ball check closes, thus permitting oil to fill up the displacement area of the plunger cylinder. When the plunger is forced down, however, the inlet ball check closes and the outlet ball check opens, so that the oil within the pump is forced through the outlet pipe under pressure.

From the outlet pipe, oil is distributed to vital parts within the knee, although one direct connection is made with a sight glass located in the cover at the left rear side of the knee, so that when the pump is in operation the oil flow is clearly visible through the sight glass.

Should the oil flow stop, while the knee is in operation, the machine should be shut off, immediately, and an

examination of the pump should be made. Usually, the only reason for failure would result from either dirt or some foreign matter getting into the oil lines or ball checks, or through possible failure of the plunger spring. Examination of these ball check sleeves can be made by merely removing them from the under side of pump body. The plunger spring can be removed at the same time the inlet ball check sleeve is taken out.

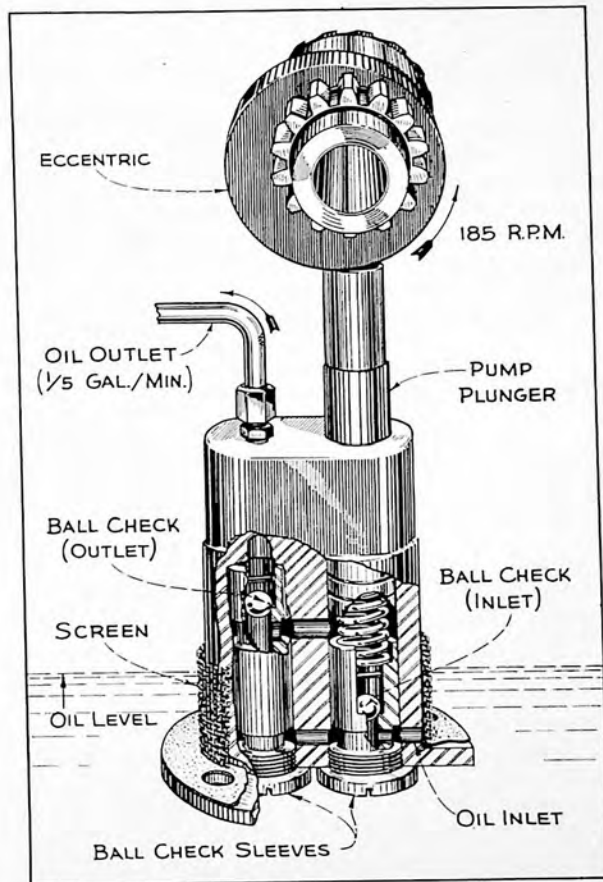


FIGURE 3

#### KNEE BEARING FACE

The knee bearing face on the column should be lubricated by means of an oil can at least once a day.

#### POWER FEED DRIVE

The bearings and gears for the power feed drive transmission located in the base of the machine at the front of the column should be greased approximately every four weeks with a good grade anti-friction bearing grease by means of the grease fitting provided.

#### FEED DRIVE CHAIN

The feed drive chain located in the column is provided with an oil reservoir which may be seen by removing the cover on the right-hand side of the column. Oil should be placed in the reservoir so that the slinger dips in the surface to a depth of approximately  $1/4$ " ; care should be taken to see that Sprocket and Chain are ABOVE oil level. This slinger carries oil to the chain guard from where it drips on the chain, thus providing ample lubrication. This oil level should be checked every four to six weeks. Use a good grade oil with an approximate S.U.V. of 85 secs. at  $210^{\circ}$  F.

#### MISCELLANEOUS LUBRICATION

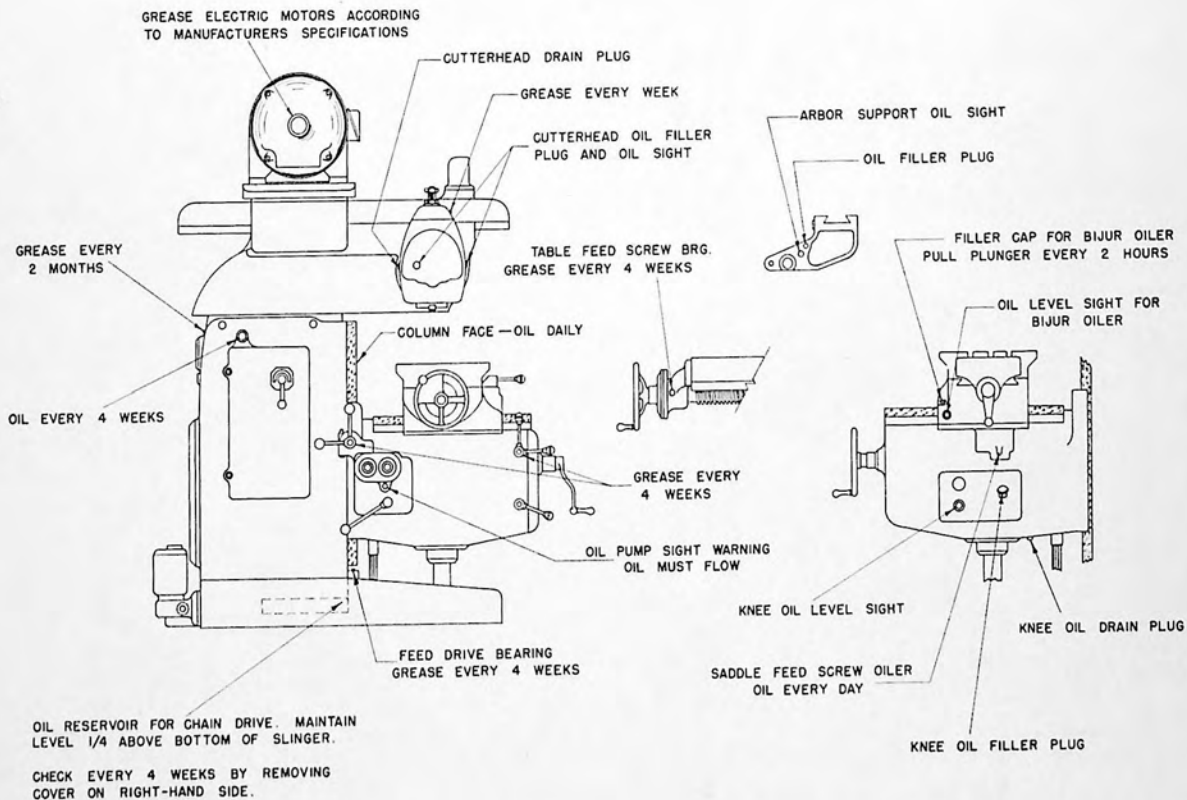
A ball oiler is provided for lubricating ram adjustment (Fig. 1) (crank square). A few drops of light oil applied through the provided ball oiler about once every four weeks will be ample.

A grease fitting is provided at the back of the column for lubricating the ram rack and pinion. This should be replenished every two months with a good grade anti-friction bearing grease.

Grease fittings are provided on the front and rear directional hand controls for the saddle and knee. These should be greased every four weeks with a good grade anti-friction bearing grease.

The arbor supports are provided with an oil reservoir which holds sufficient oil for several weeks' lubrication. The reservoir is filled by removing plug and filling with oil until the sight gauge is completely covered. To lubricate the arbor bushing it is then merely necessary to occasionally push the pin plunger which permits a drop or two of oil to pass through an oil hole directly to the arbor bushing.

Both the feed and spindle drive motors should be lubricated every six months or as specified by the electrical manufacturers.





INSTRUCTION FOR  
ORDERING REPLACEMENT PARTS FOR  
NO. 38

VAN NORMAN RAM TYPE MILLING MACHINES  
PLAIN, UNIVERSAL AND SPECIAL MODELS

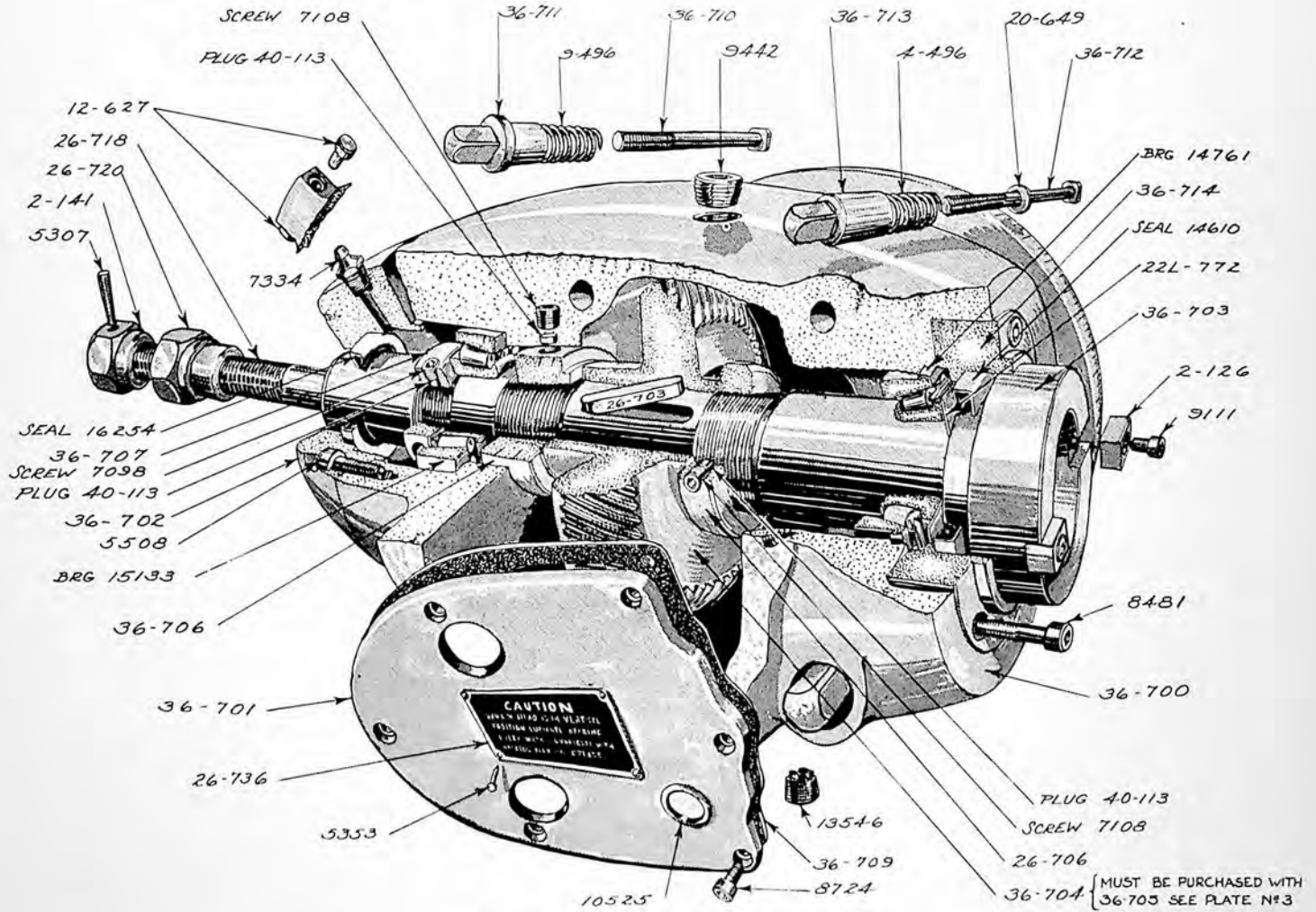
The following pages contain full information to enable users of No. 38 Ram Type Milling Machines to order replacement parts with the minimum of effort.

We have endeavored to simplify the identification and selection of such parts through the use of sketches of parts for each major unit of the machine. In addition to the sketches, each part is named and identified by its corresponding part number.

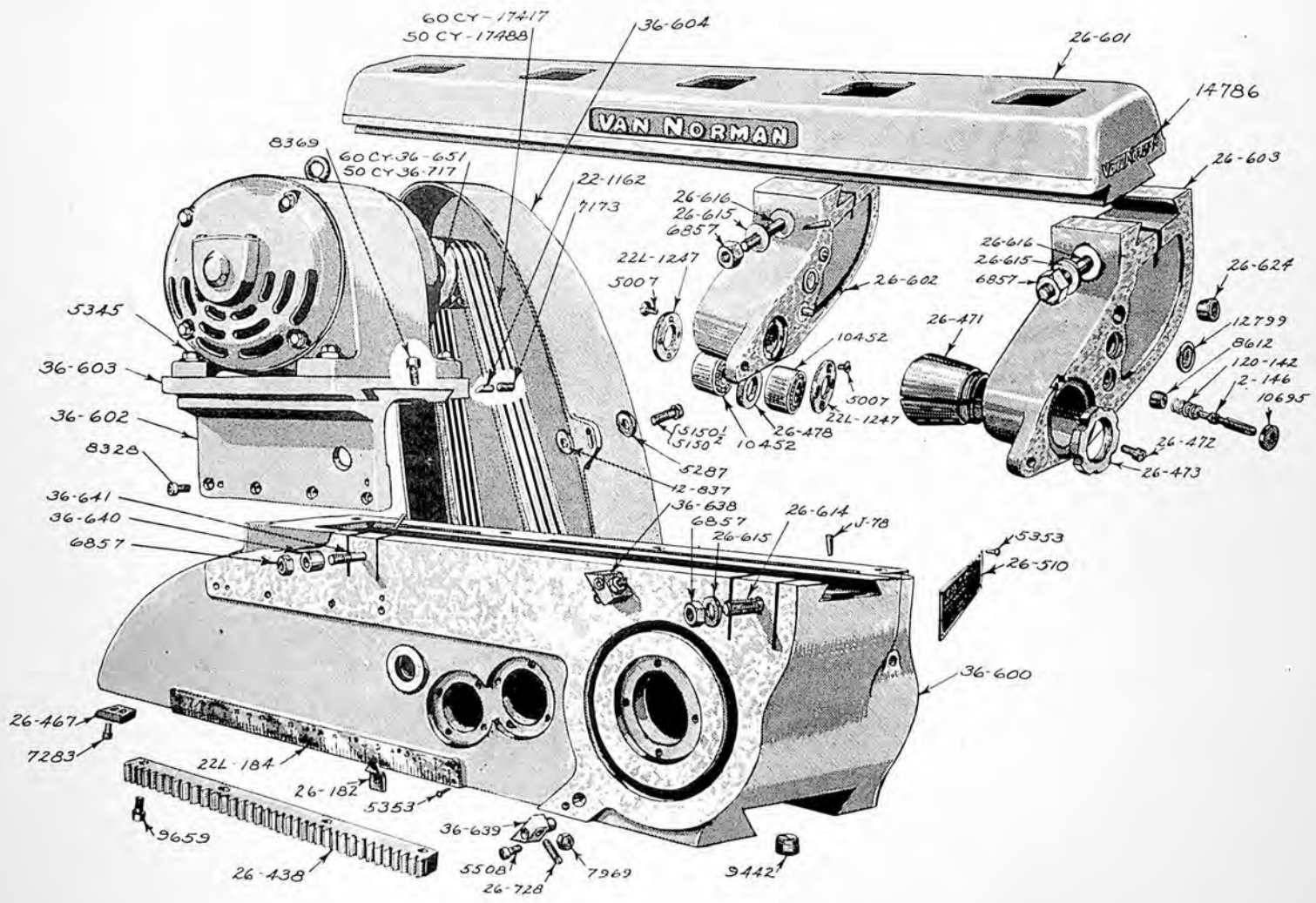
It is important that in any correspondence with the factory regarding parts, the model and serial numbers of machines should be given. The serial number is stamped on the front face of the column near the top of all Van Norman Milling Machines.

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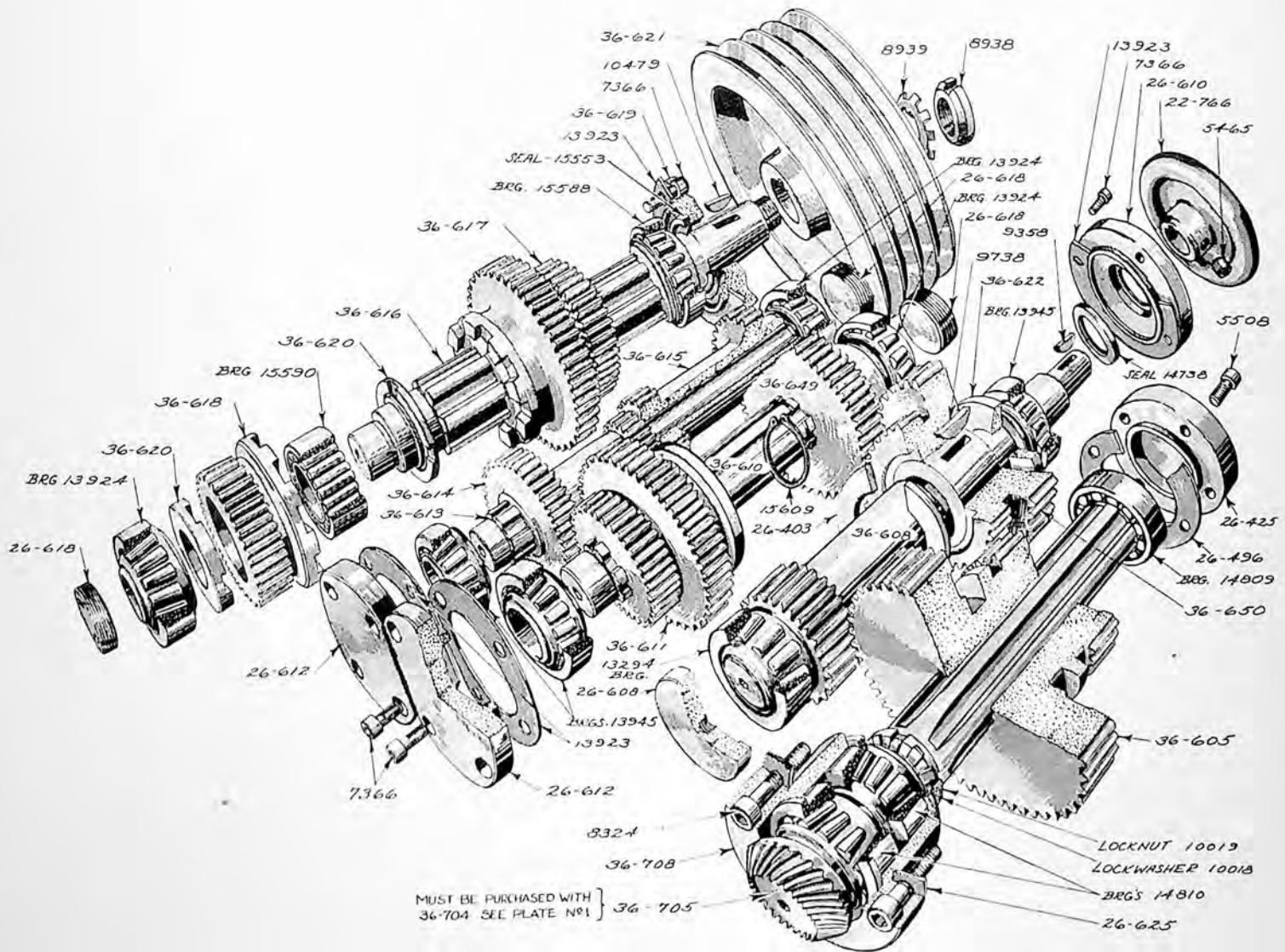
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CUTTERHEAD DETAILS PLATE NO.1

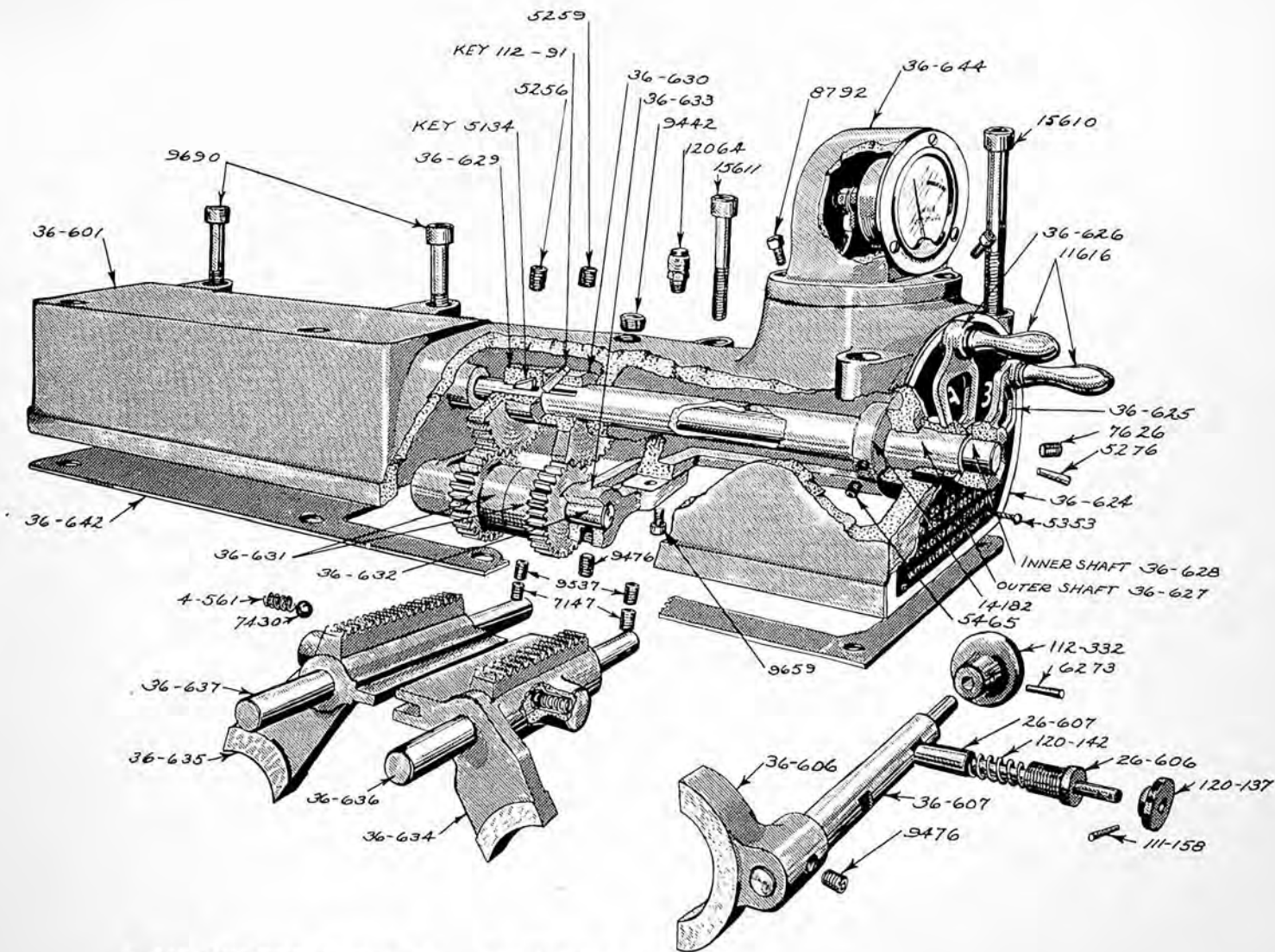


RAM DETAILS PLATE NO.2

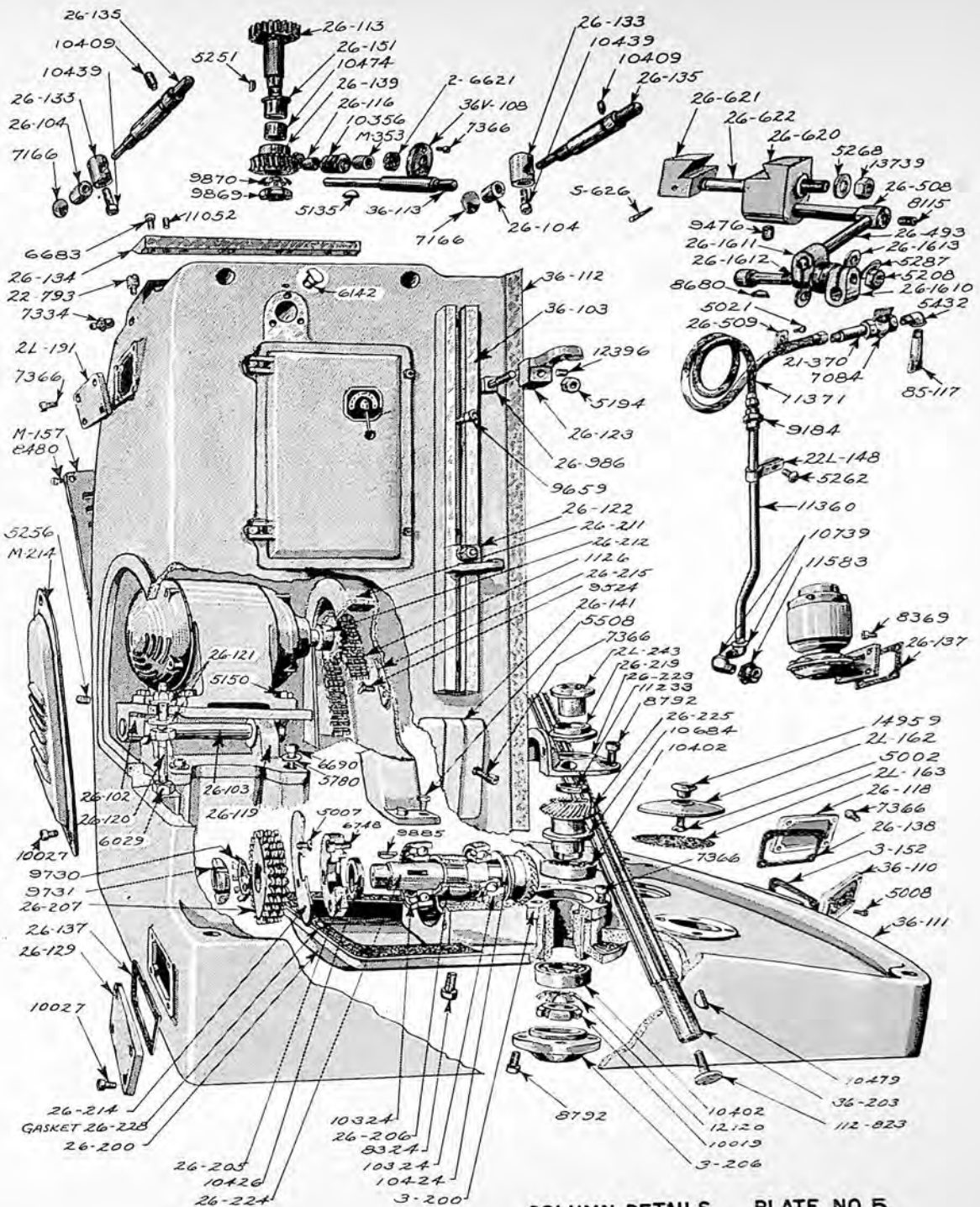


RAM GEARING DETAILS PLATE NO. 3





RAM SHIFTER DETAILS PLATE NO. 4



COLUMN DETAILS PLATE NO.5

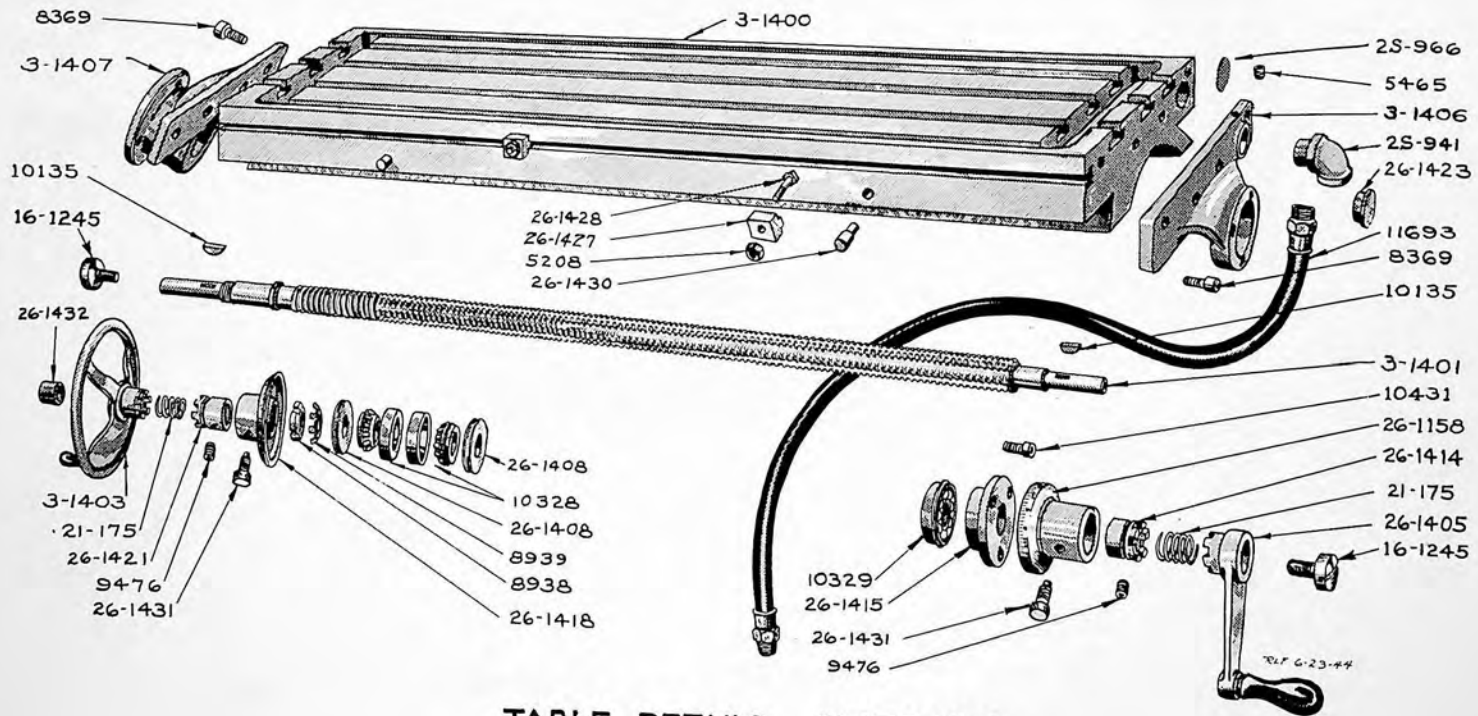
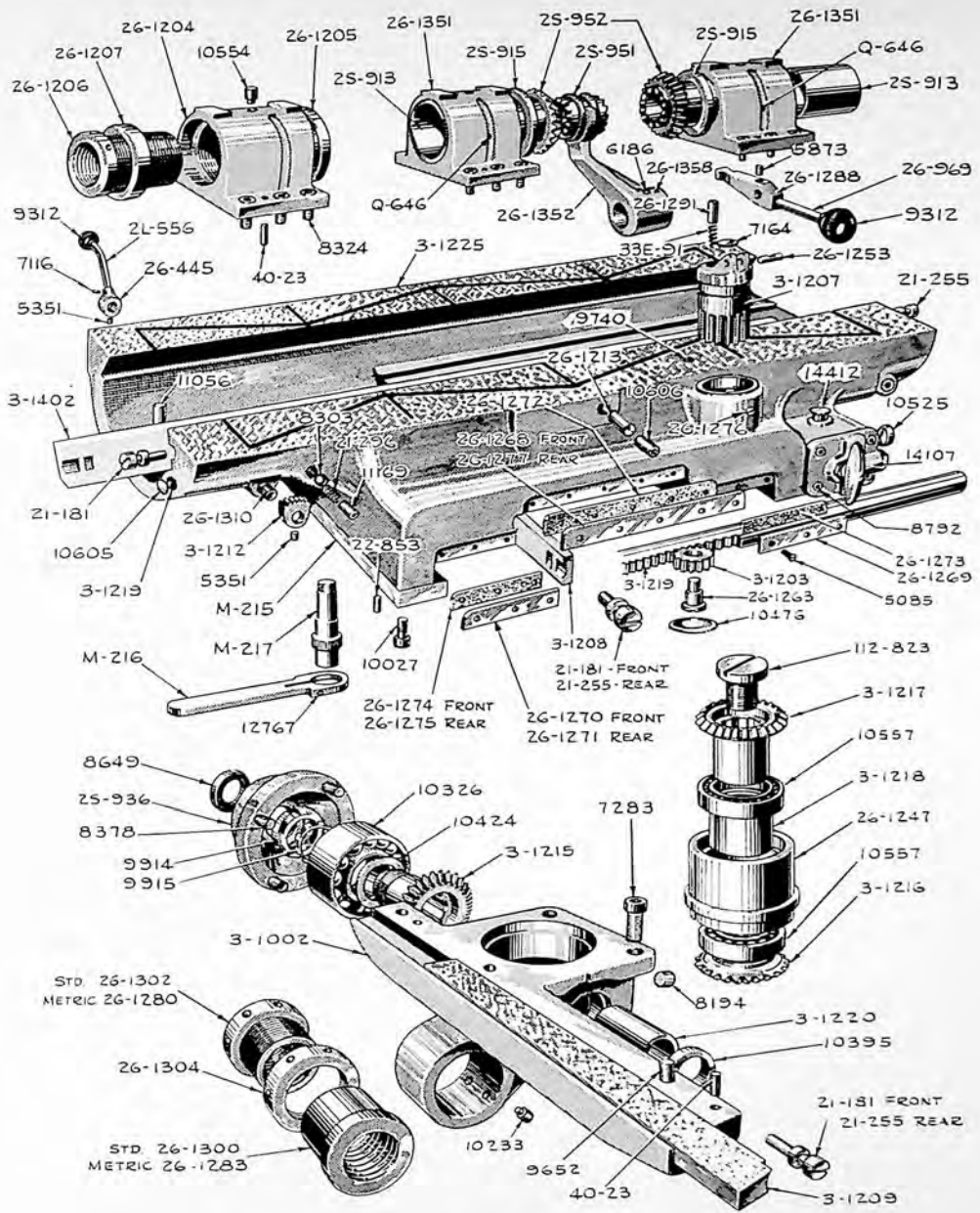
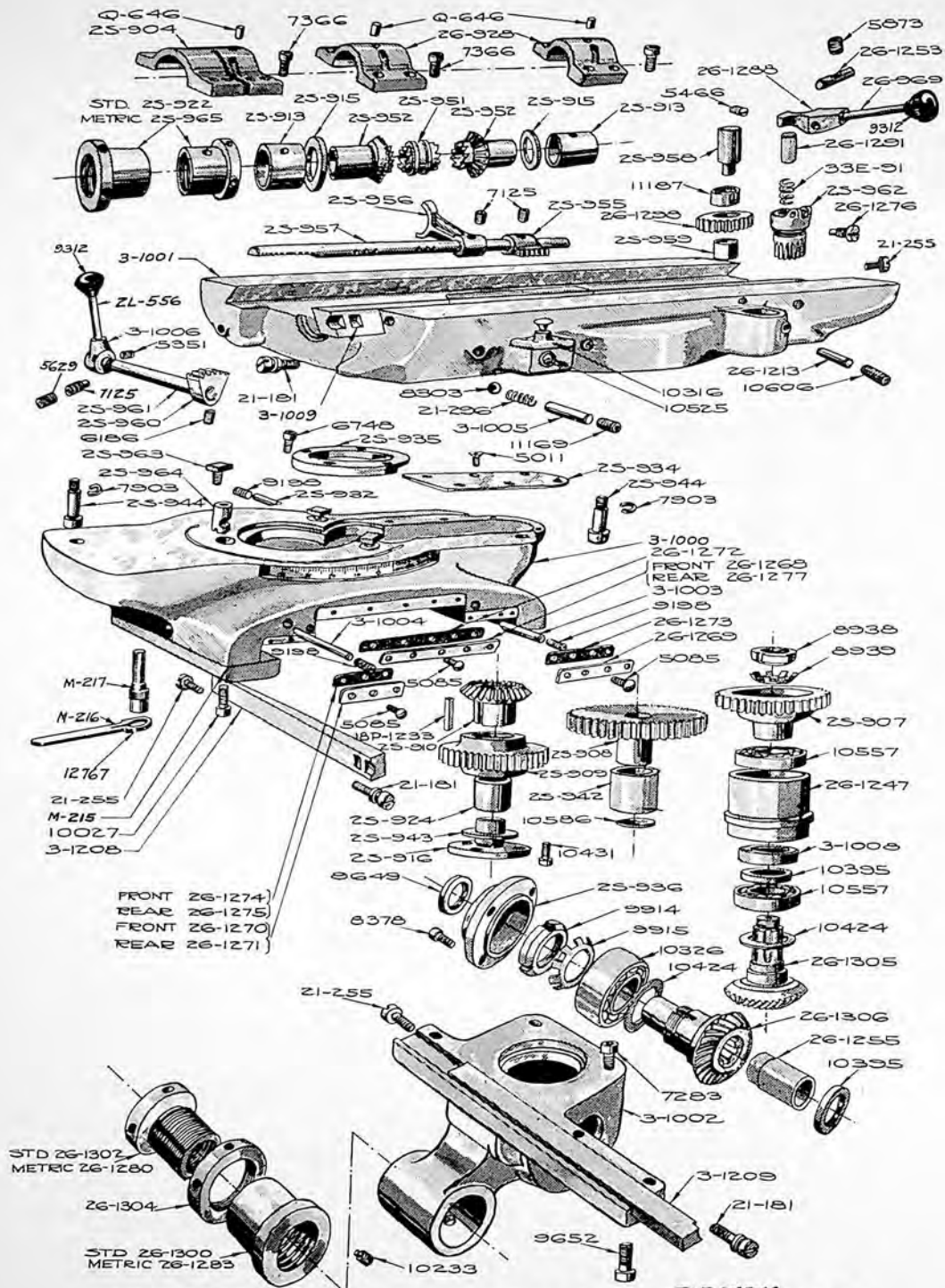


TABLE DETAILS PLATE No 6

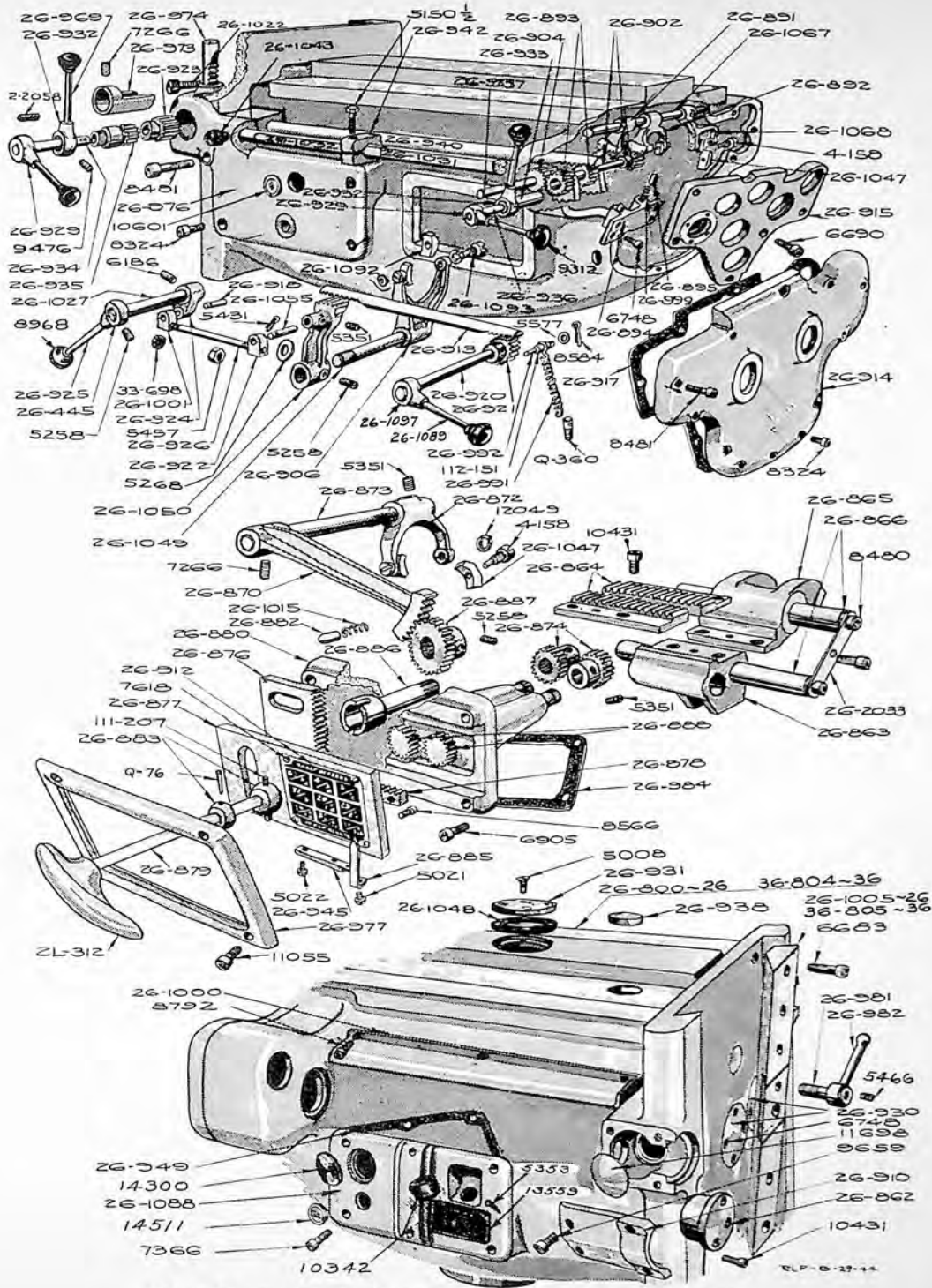


SADDLE DETAILS PLATE N<sup>o</sup> 7

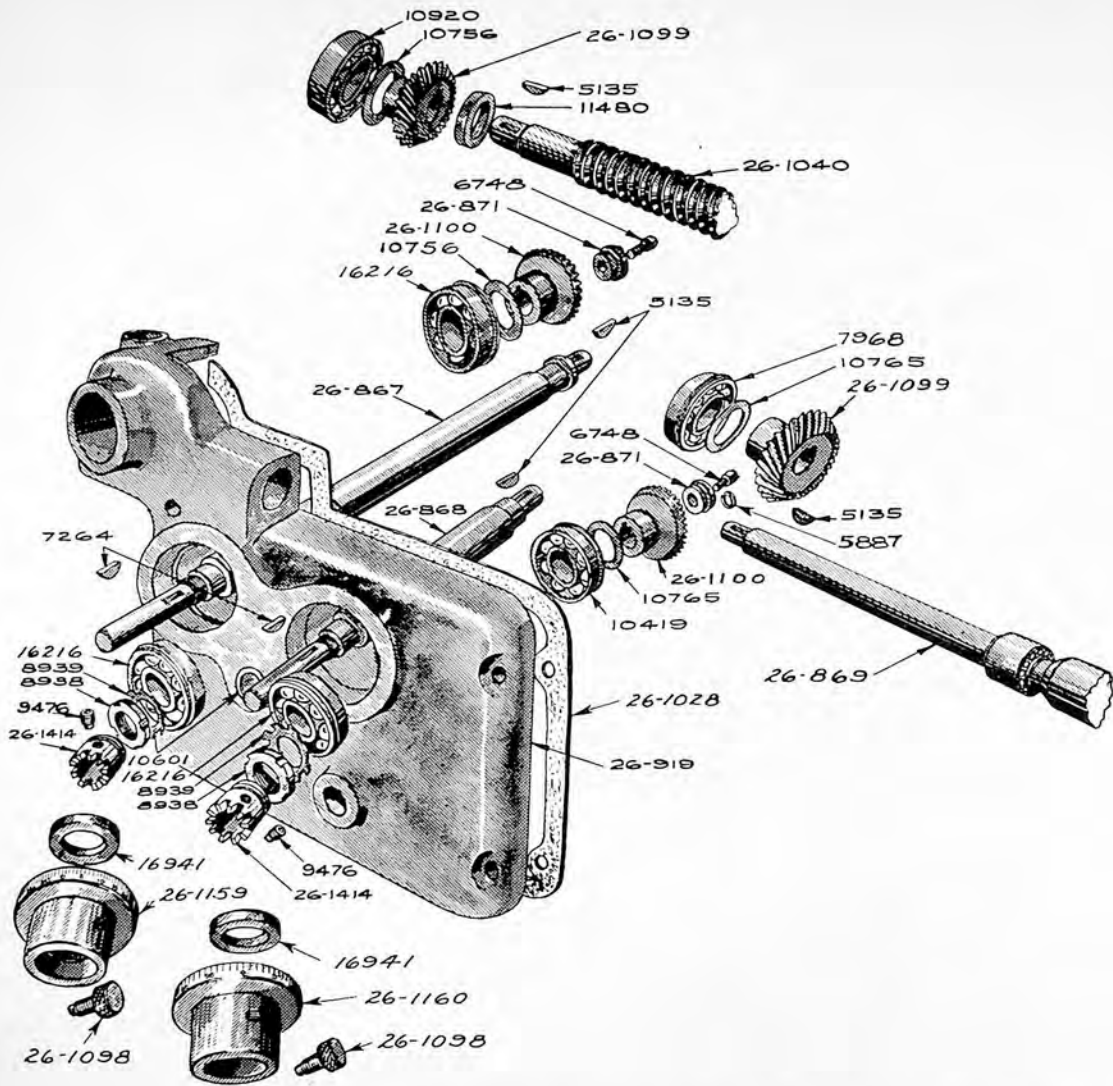




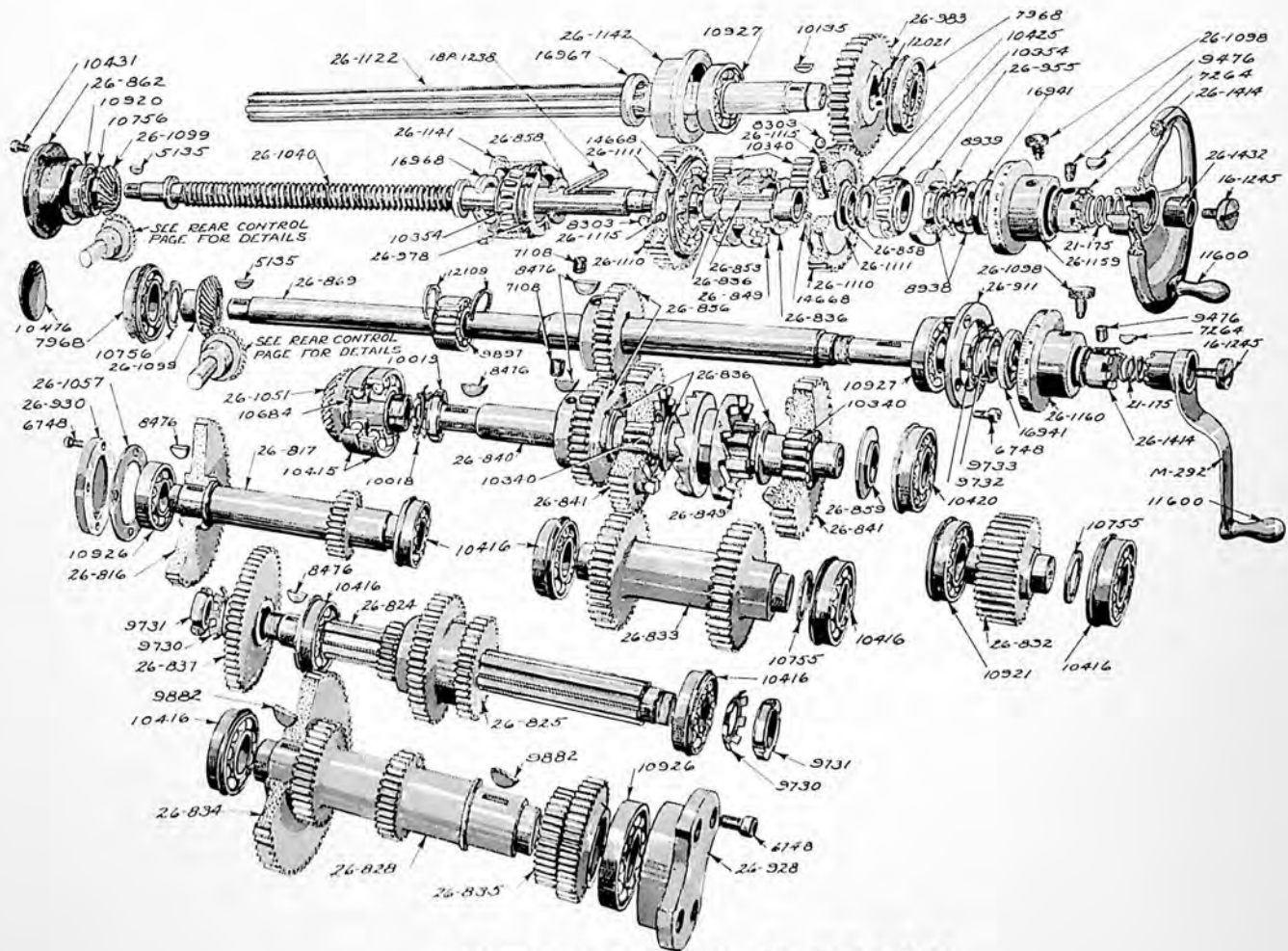
UNIVERSAL SADDLE DETAILS PLATE No 8



KNEE AND CONTROLS PLATE No 9

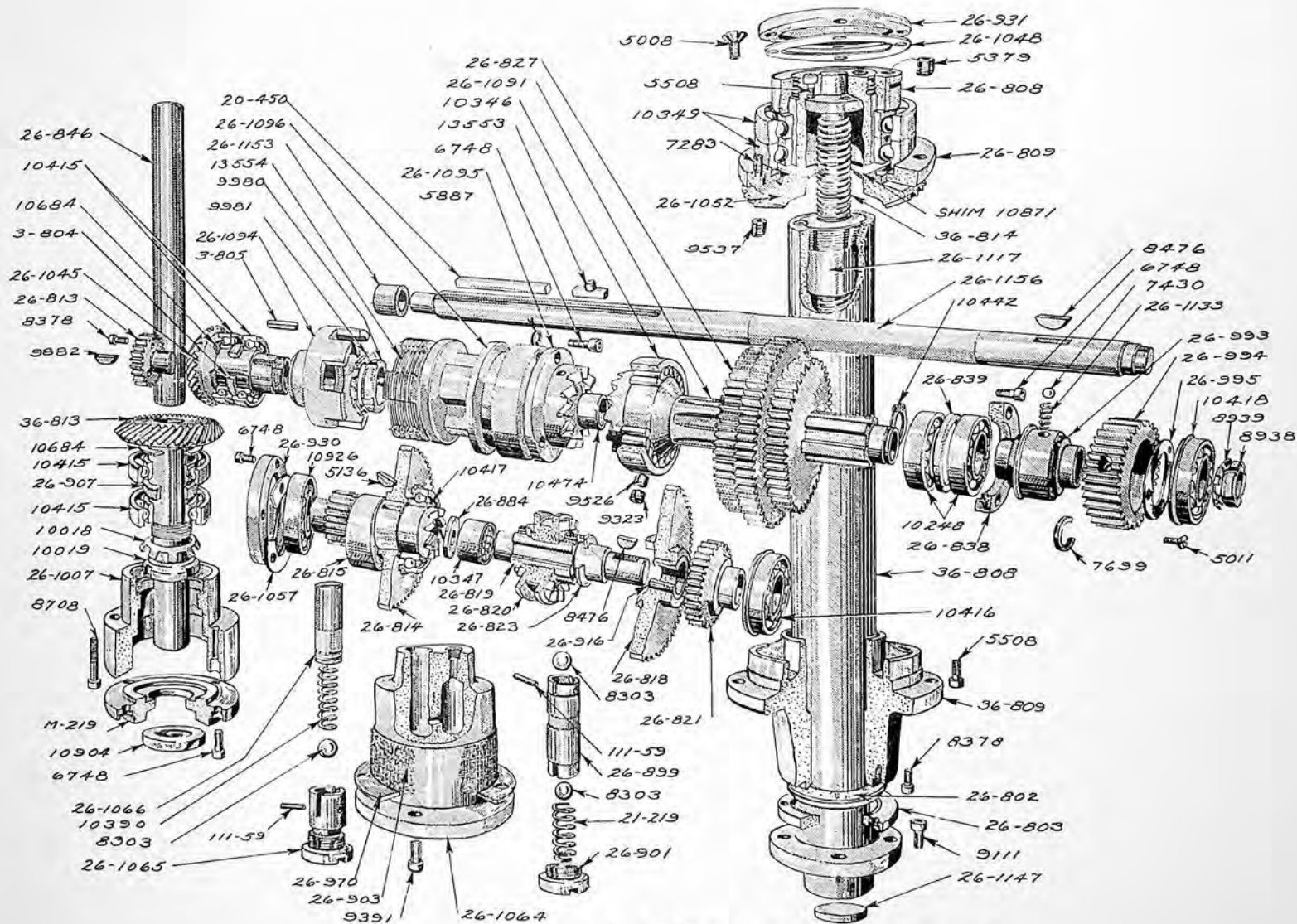


KNEE REAR CONTROLS PLATE №10



KNEE GEARING PLATE № 11





KNEE GEARING PLATE №12