Peterson MACHINE TOOL INC.

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MODEL

PK447-S

PORTABLE BORING BAR

INSTRUCTION MANUAL
and
SERVICE PARTS LISTING

February 21, 1995

MODEL PK447-S
PORTABLE BORING BAR

This is your complete set-up, operation, and maintenance instruction manual on your Model PK447-S. This manual must be read thoroughly before installing or attempting to operate this machine. Damage to the machine or possible injury could occur as a result of failure to read and understand this manual thoroughly.

CONTENTS PAGE

WARNING

* Electrical power outlets for this machine should be installed by a qualified electrician only and must be grounded in accordance with the national electrical code.

* Read operator's manual carefully before attempting to operate or adjust this machine.

* Keep all shields in place.

* Violation of these safety rules or other improper use of the machine could lead to injury.

INTRODUCTION

CONGRATULATIONS! You are now a proud owner of the world's finest portable cylinder re-boring system.

All parts of the machine are checked many times during manufacture to assure accuracy and interchange-ability. Our engineers constantly strive to improve design features for greater quality, versatility and cost saving advantage to our customers.

If you have any questions regarding operation or service, contact our service staff who will be glad to resolve your problems.

When ordering parts, refer to the exploded view showing the part needed. Locate the item # (of the part shown) in the accompanying parts list with all the information required for ordering i.e. PART #, DESCRIPTION & QUANTITY.

IMPORTANT: Always furnish MODEL and SERIAL NUMBER of machine besides the part information as there are many variations of the same boring machine. When referring to motors, provide full information as will be found on the motor name plate.

We express the hope that this instruction manual will prove a valuable guide in correct utilization of the delivered machine and we assure you that in adhering to all the hints given there in, you will be fully satisfied with the accuracy, output and reliability of the machine. We ask you to pay full attention to the entire contents of this instruction manual. It would fail in its purpose unless all the staff who are using the machine are well acquainted with the content.

MACHINE PREPARATION

Before signing the Bill of Lading and while machine is still in carton, take a few minutes to scan the Boring Bar for any obvious or hidden damage caused by shipment.

Now carefully unpack the Bar and wash off the anti-rust oil or any dirt accumulated during shipment. Kerosene or any approved commercial solvent may be used. **DO NOT USE GASOLINE.**

Select a location which provides a LEVEL foundation, preferably a concrete floor. Ample space should be provided for the operator to run the PK447-s Boring Bar.

Additional electrical devices or special wiring that may be required in your area should be bought locally. Any overload or under-voltage protection devices are not furnished as standard equipment and may be purchased locally.

777-0483
POSITIVE TYPE CYLINDER HOLD-DOWN UNIT FOR PORTABLE BORING MACHINE

OPERATING INSTRUCTIONS:

1. Hold eye bolt assembly in hand inserting it into the cylinder selected for boring. Position (Usually the one next to the cylinder being bored).

2. Insert bar into crankshaft main bearing saddles lengthwise, inserting it into eye in eye-bolt.

3. Hold up eye bolt unit and unscrew until "U" plate can be slipped under eye bolt adjusting head. Insert open end of "U" plate toward cylinder being bored.

4. Screw eye bolt head unit down on "U" plate firmly by hand but not hard enough to bend "U" plate. (This will hold anchor assembly square with mains and cylinder until machine can be anchored.)

5. Next adjust stud to height for your model.

NOTE: A set screw is provided to lock stud so it will hold this height and will not have to be set again. (Refer to Figure #4, page 7.)

6. Anchor your machine using standard procedures.

NOTE: There are two lengths of screws provided for eye bolt assembly. This will give you a full range for small and large blocks.

777-0483
POSITIVE TYPE CYLINDER HOLD-DOWN UNIT FOR PORTABLE BORING MACHINE

UNPACKING:

After removing the Boring Bar from its shipping box, it is suggested you set the box aside for future use. It is a convenient box in which to store the Boring Bar when not in use. It may also be used to protect the Boring Bar when taking the Bar "to the job." The Boring Bar is a precision machine and, as such, care must be taken at all times to prevent accidents which may cause misalignment.

To remove the Bar from the box, remove the box cover, unscrew two bolts, heads of which extend through bottom of shipping box. Lift out the steel plate from inside of the Bar base. Keep this steel plate and the two bolts so that the Bar may be fastened in the box when being transported in your truck or delivery vehicle.

Remove the equipment box and set the shipping box up on end. Place a board in front of the shipping box and slide the Bar out on to this board.

NOTE: Never pull or lift the Boring Bar by means of the drive shaft (9-Figure #3). This drive shaft must be kept straight and it is urged that you never put any undue strain on this shaft. When lifting the Bar, place one hand underneath the Bar and the other near the top of the large column for support. **NEVER LIFT BAR BY MEANS OF DRIVE SHAFT.**

The base of the Bar has been carefully and accurately machined at exact right angles to the Bar. Care should be used when removing or handling the Bar. Do not disfigure the base by placing it on sharp corners, pushing it on cement floors or placing it on anything but a smooth foundation.

After removing the Bar from the shipping box, remove the protective covering of oil from the machine parts by wiping with a clean cloth dampened with a commercial solvent. **NEVER USE GASOLINE.**

NOTE: Check your power input against the motor specification shown on the motor name plate before you turn on the switch. Make sure you have the proper specifications.

NOTE: The Boring Bar motor is equipped with a heavy duty cord. The 3/4 HP motor requires much more current than a 1/4 HP motor. Therefore, defective extension cords and unsafe lighting circuits will not permit the motor to obtain sufficient current to give maximum results. If the motor seems to labor under normal operating conditions call the local electrician to check the input current to the Bar to see if it is sufficient.

IMPORTANT: Defective wiring will seriously damage the Boring Bar motor. Preliminary precautions to assure adequate current input will avoid necessary costly repairs.

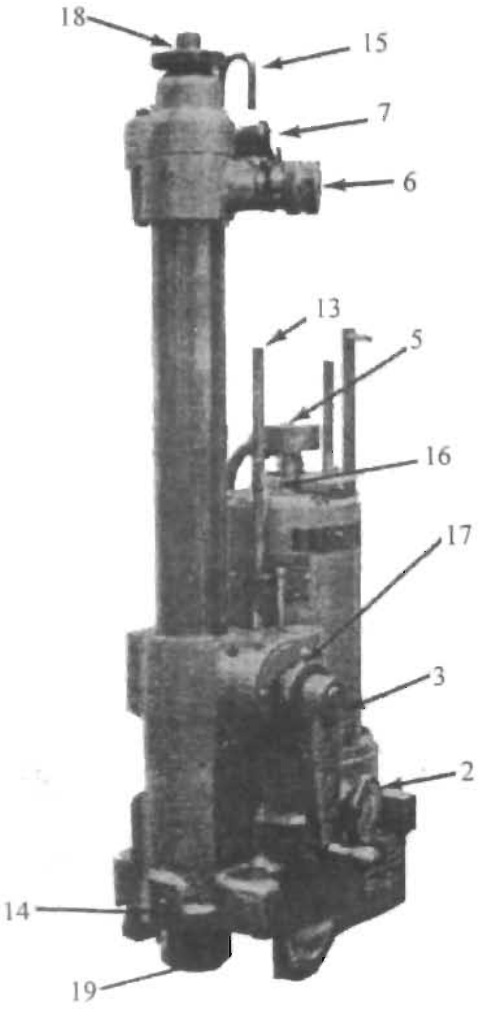


FIGURE 2

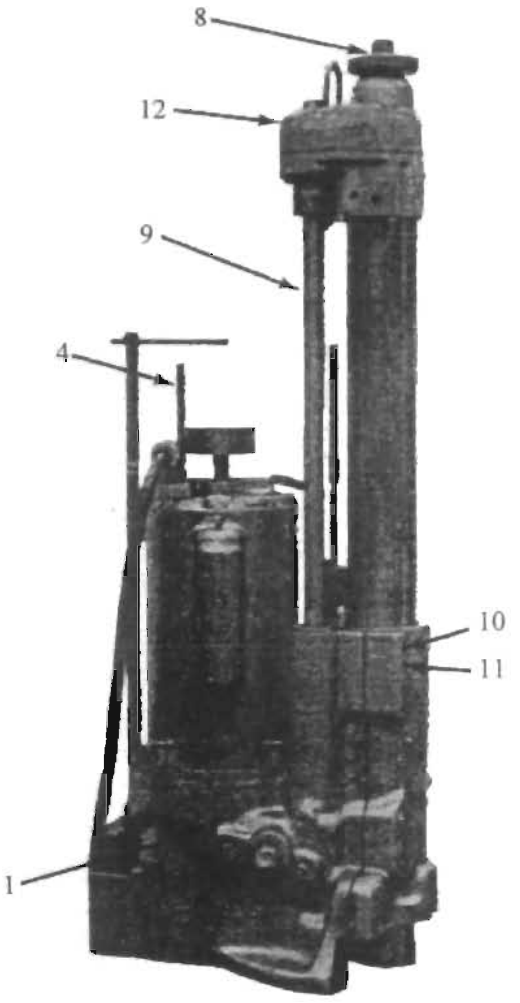


FIGURE 3

1. Oil Level Plug
2. Speed Changing Knob
3. Manual Travel Crank
4. Diamond Lap Stud
5. Diamond Lap
6. Guideshoe Expanding Knob
7. Guideshoe Ratchet Engage Pawl
8. Tool Indicating Knob
9. Drive Shaft
10. Binder Screws
11. Support Screws
12. Upper Gear Case Cover and Gr. Fitting
13. Automatic Shut Off
14. Guideshoe
15. Lifting Hook
16. On-Off Switch
17. Feed Engage Knob
18. Cutter Head Shaft
19. Cutter Head Body

NOTE: Always include Serial Number and Model of Bar when ordering.

LUBRICATION

Your Boring Bar has been thoroughly oiled and greased before shipping. Please note that when reference is made to the right or left side of the Bar the operator is facing the front of the Bar. The front of the Bar is that part of the Bar where the tool holder is inserted in the cutterhead. The right hand side is the crank handle side (Figure #2.)

Greasing and oiling instructions are given on the assumption that the Bar is being used on at least one or two blocks each day. Frequency of greasing for less or greater use will therefore be regulated accordingly.

To Lubricate Gear Train in Gear Case at Top of Bar--On the upper side of the gear case, (12, Figure #3), will be found a grease fitting. The entire upper gear train is lubricated through this fitting. Use Texaco Marfax Heavy Duty No. 3 grease or equivalent. The gear case is filled with grease before leaving the factory and this supply should last for a considerable length of time. The gear case should be filled at all times. It is recommended that once every 120 days a few shots of grease should be applied to fill this gear case. Do not overload it.

To Lubricate Cutterhead Bearing--The cutterhead bearing is packed with lubricant at the factory. This grease is retained by means of felt seals which are attached to the lower part of the column. No further lubrication should be needed at this point for approximately six months. To re-lubricate the cutterhead bearing, remove cutterhead body (19, Figure #2) and thoroughly wash out with a commercial solvent, repack with Atlantic Excelsior No. 3 or some similar grease and reassemble.

In disassembling the cutterhead from cutterhead shaft always hold top end of cutterhead shaft (18, Figure #2) with wrench. Insert 1/2" diameter bar to prevent hole collapsing from wrench pressure. To unscrew cutterhead place a piece of round steel in hole directly above tool holder opening in cutterhead. Cutterhead has a right hand thread. As cutterhead is on a taper, it may be necessary to strike steel bar in cutterhead a sharp blow with a hammer while holding wrench at top. Be sure that guideshoes are fully expanded. If not, it will be impossible to remove cutterhead. If guideshoes are jammed or cannot be moved, it will be necessary to loosen the eight screws that secure cutterhead to column.

To Lubricate Feed Mechanism--On the right hand side of the machine there will be found a plate through which the pinion, which controls the up and down movement of the column, is assembled. This part of the feed mechanism is totally enclosed and protected with a cork and steel plate seal. This part of the Boring Bar mechanism is packed with No. 2 Marfax at the factory. No additional lubrication will be needed under ordinary circumstances for several months.

To Repack: Remove 3 button head screws which lock plate to side of Bar. A small amount of grease should be applied into the opening directly under the plate.

LUBRICATION CONTINUED

To Lubricate Lower Gear Box Bearings--The entire motor gear box below the motor is totally enclosed and suitably protected with oil seals. At the factory this gear box is filled with oil up to the filler hole in the base at the rear. This is indicated as point (1, Figure #3). Use No. 50 SAE Grade Oil. In adding oil to this gear box always have machine in a vertical position so that you are assured at all times that the oil is only up to the level of the filler hole.

The upper bearing in the motor is equipped with a pre-lubricated, totally enclosed type of bearing. This bearing as well as the lower bearing of the motor requires no further lubrication.

NOTE: Never use penetrating oils on this Bar at any point. Use only high grade grease and oil as specified.

HOW TO USE THE PK447-S TYPE BORING BAR

Do not use high speed on bores larger than 3-7/8" in diameter **DO NOT SHIFT GEARS WHILE MACHINE IS RUNNING.**

Speeds and Feeds--The PK447-S is equipped with two RPM'S 220 and 375 RPM. These speeds if used at the proper diameter bore give a conservative rate of speed at which Tungsten Carbide can be economically used.

Low Speed: Using the low speed of 220 RPM with a feed of 1-1/2" per minute makes it possible to take out .050" in diameter in any diameter bore within the range of Bar. That is from 2.600 to 5-11/32". In many cases it has been found that in order to get accurate results with the very thin cylinder walls that it is advisable to take four .050" cuts finishing up with one .030" cut and one last cut of .020" in installing sleeves.

High Speed: The high speed of 375 RPM is not to be used on bores larger in diameter than 3-7/8". The removal of metal at high rates of speed is strictly a question of horse-power. The PK447-s is equipped with a 3/4 HP ball bearing, heavy duty, capacitor type motor. While a .007" feed will produce a typical Boring Bar finish, attempts to cut in excess of .040" at high speed on bores up to and including 3-7/8" will overload the motor.

How to Change Feeds and Speeds--On the lower right hand side of the machine indicated as (2, Figure #2) will be found an etched dial. In order to rotate this dial it is in some cases necessary to slightly rotate the lap (5, Figure #2) so that the gears will mesh properly. *Do not under any circumstances attempt to change gears or speeds while the motor is in operation.* The gear change mechanism is equipped with spring plungers which automatically hold the gear change device in mesh. It will be found that the low and high position on the etched knob will be horizontal when the etched knob has been rotated sufficiently far to engage the spring plunger which controls the location of the gears.

HOW TO USE THE BORING BAR CONTINUED

To Engage Feed--The clutch mechanism used on the PK447-S is identical with that of the type used on similar type models of the PK447-S. To engage feed push knob (17, Figure #2) in so that teeth will engage and causes Bar to feed down.

After bore has been completed and to disconnect feed, rotate lap (5, Figure #2) several revolutions in a clockwise direction. After rotating several revolutions stop so that tool indicating knob (8, Figure #3) slot is facing front of bar. This reverse rotation of the lap removes pressure from feed clutch and permits disengaging the feed without any effort. Release guideshoe ratchet (7, Figure #2), turn guideshoe knob (6, Figure #2) clockwise a revolution or so, loosen handle (1, Figure #5), slide bar back, re-tighten handle (1, Figure #5). Pull clutch out engaging same with slots milled in crank handle. Retract bar to normal or starting position.

Crank--The crank is equipped with a spring plunger mechanism permitting the removal of crank during transportation to the job. We recommend before putting the Bar away after having done a job that the crank be pulled off and replaced on the machine with the handle facing the base. A pull on the crank where the rack pinion goes through the casting will compress the spring plunger permitting the removal of the handle. It can be replaced in the reverse position.

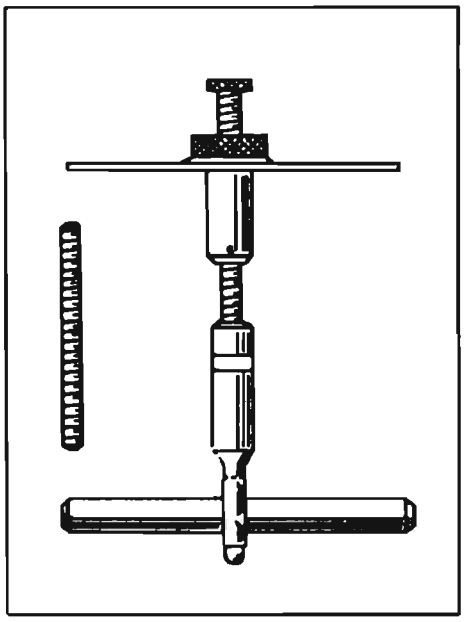


Figure 4

Side view of 777-00483 Cylinder Boring Bar Clamping Device

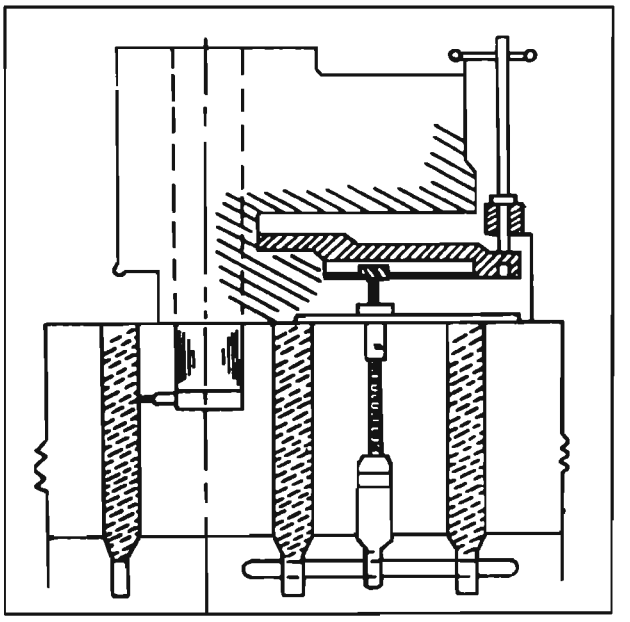


Figure 5

HOW TO USE THE HOLD DOWN ANCHOR

Proper installation of the anchor is vital to good work.

In locking down the Bar always check and note position of (1, Figure #5) which is a side view of clamp assembly. If anchor elevating screw is at proper height above top of block (approx. 2"), clamp and base will appear (Figure #5). Always check and make sure that rod (1, Figure #5) is not wedging against back of motor. Bridge (2, Figure #5) can be moved back slightly so that rod (1, Figure #5) does not contact motor.

Before an actual job is attempted the operator should practice with the Bar on an old junk block to make sure he understands thoroughly all details connected with the use of the Boring Bar and that the Bar bores to the diameter the tool has been set.

CAUTION: When practicing with a PK447-S if you use a block on which other boring bars have been demonstrated, note that they may have bored out only part way down in the cylinder.

Be sure to take a new cut from the top of the cylinder bore without using guideshoes if a partial cut was taken previously.

1. Remove all carbon deposits, dirt, thread burrs, etc., from top of cylinder block. Finally, to make sure the top of the block is thoroughly clean, lightly stroke a file across the top of the block.

2. Measure each cylinder. Determine the maximum amount of metal it will be necessary to remove to clean up the most badly worn cylinder. From this determine the exact diameter you desire to give the finished cylinders. Remember never to bore out just one cylinder. All cylinders must be the same diameter otherwise the motor will be unbalanced.

   Maximum Size Cut--Maximum cut on high speed in .040", that is .020" on each side of diameter of bore. Maximum cut on slow speed is .050", that is .025" on each side of diameter of bore. Do not use high speed on bores larger than 3-7/8".

   After having determined the size to which you are going to bore the cylinder, fasten the proper size shoes on the guideshoe supports. The dimensions of the various size guideshoes are shown on page 20 and top of tool box.

   To change the shoes, lay the Bar on its back (Figure #6) and run the guideshoes below the surface of the Bar base by rotating the crank handle.

   In changing guideshoes always wipe off the bare guide shoes before attaching the new shoes.

When it is necessary to bore with bare guideshoes that is from 2.6000" to 3.080", always screw the small plug screws into the bare guideshoes so that there is no possibility of dirt getting into the hole and preventing the attaching of the guideshoe screws on other occasions.

Position of Guideshoes--In fastening the shoes to the Bar always have the longest portion of the shoe pointing down towards the cutter head (1, Figure #6).

NOTE: Make sure all four shoes are the same size and firmly in place. On the back side of each shoe you will find a size number.

When the guideshoes are properly fastened in place the Bar is ready for centering into block.

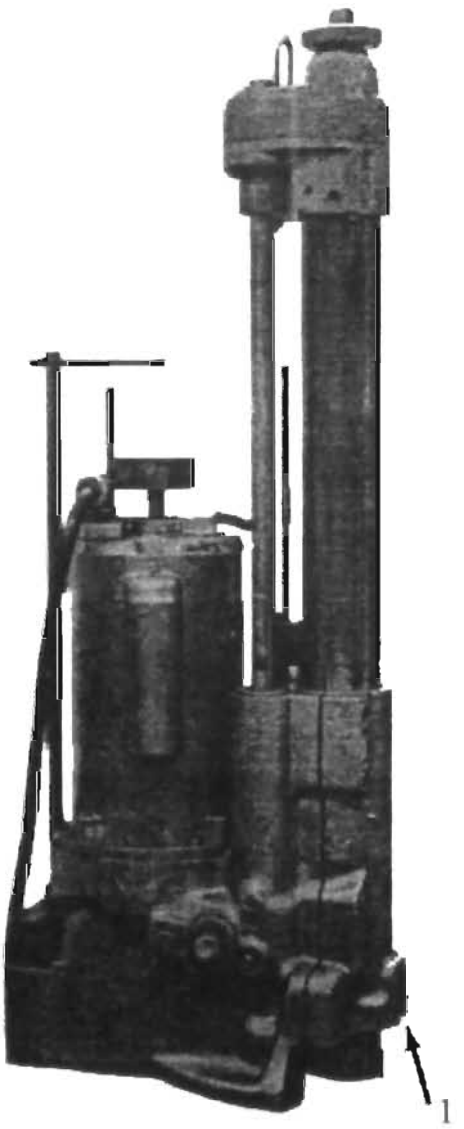


Figure 6

HOW TO BORE A HOLE

Where to Center--Place the Bar on top of the block, contract the guideshoes until they are slightly smaller in diameter than the hole being bored. The guideshoes are contracted by rotating knob (6, Figure #2) in a counter-clockwise direction. Turn the crank handle to lower the guideshoes into the cylinder where you want to center. One of the features of this machine is that you can center at the top, bottom or middle of the cylinder at will. The bottom of the cylinder will show the least wear of any place in the cylinder. In trying to take out as little metal as possible, center in the maximum wear area.

Installing Clamp--Now take the hold down clamp and slide it into the Bar so that the anchor adjustment screw goes into the T-slot in the bottom of the hold down clamp. If the elevating screw in the anchor is at the proper height the side view of the machine will look like (Figure #5).

After anchor clamp has been securely locked in place, release guideshoes being sure to retract the obstruction. Retract column to its top position.

CAUTION: Do not force the handle to bring the Bar to its top position; rather, slow down or ease the handle up the last inch of Bar travel to avoid a "snap" or "bang".

SETTING THE TOOL TO SIZE

The Special Micrometer furnished with the Boring Bar is calibrated in steps of .050" rather than .025" as are standard micrometers. This method gives a micrometer which reads in inches as well as thousandths to any predetermined diameter and eliminates the necessity of adding or subtracting.

Setting the Tool Holder--In inserting tool holder in micrometer always have the cutting tool end of the tool holder against the micrometer anvil with top side of tool holder facing up (Figure #8). The end of the tool holder with the screw in it should always be against the rotating or movable micrometer spindle. In adjusting the tool holder to size, the screw on the side of the tool holder is first backed off approximately 1/4 turn. In the equipment box you will also find a small rod, one end of which fits into the holes in the tool holder adjusting screw. This permits the adjusting of the screw without the necessity of using your fingers in very close quarters. Do not attempt to screw the tool holder adjusting screw into the spindle of the micrometer spindle up to bear against it. If the proper measurement is not obtained back off the micrometer thimble and readjust the tool holder screw and then recheck. This method prevents the possibility of jamming the carboloy tip into the micrometer anvil developing a groove in the micrometer which will cause errors. The tool holder is now set to size. Insert in the cutterhead opening of the Bar with the part of the tool holder marked "top" facing upwards. In order to extract the tool holder from the cutterhead the tool extractor hook in the equipment box will have to be used. This hook fits into a hole drilled into the bottom side of the tool holder. In pushing the tool holder in always check to be sure it is definitely snapped into place against the anvil in cutterhead.

SETTING THE TOOL TO SIZE CONTINUED

On page 20 specifications are given indicating which of the two tool holders supplied are used on any diameter bore.

Always set the automatic stop (13, Figure #2) so that it will shut off the switch at the desired depth. Be sure the Allen screw is tightened sufficiently so the pressure on top of the stop will throw the ball switch. Attach the electric cord to the current outlet and start the motor.

On the right hand side of the machine between the crank handle and the main casting will be found a machined collar called the feed engage collar (17, Figure#2). Push this collar in toward the Bar so that it meshes with the drive. This will cause the Bar to feed down when the motor is revolving.

HOW TO USE THE GUIDESHOES

How to Expand Guideshoes--When the cutter has cut down into the cylinder to a distance where the screw in the guideshoe is just disappearing in the cylinder, by means of the outer knurled knob (6, Figure #2), expand the guideshoes slowly and evenly until you feel them contacting the newly cut cylinder wall. Continue to exert pressure by means of the outer knurled knob until the Bar has traveled down about an inch or more, or until you feel definitely that the guideshoes are contacting and entirely free and clear of any dust or chips which might have accumulated between them and the cylinder wall. When you feel that the guideshoes are firmly set against the cylinder, hold the outer knob with the left hand and with the right, engage the pawl (7, Figure #2) with the ratchet on the inner knob and turn the inner knob until you feel a definite resistance. In this connection it may take a little practice for you to get the "feel" on how to properly expand the guideshoes. A little practice will make you proficient in this respect.

When to Expand Guideshoes--Please note (Figure #7). On the right hand side of this figure you will see illustrated the correct way, as described previously, of expanding the guideshoes. On the left hand side of this figure you will note the incorrect way. In as much as the bottom part of the guideshoes have no support, you are liable to jam the guideshoe in the cylinder if you expand the guideshoe blades the wrong way as illustrated. Wait until the screw head is down flush with the top of the newly cut metal.

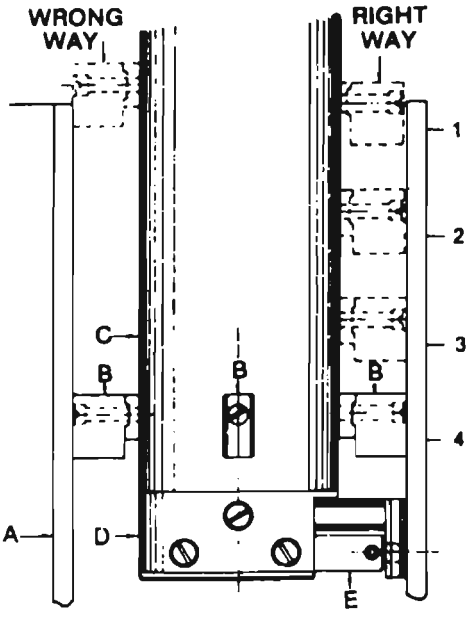


Figure 7

"1" Shows correct position of guideshoes "B" when beginning to expand. Do not expand with a jerk. There will be chips or fine particles of metal between the faces of the guideshoes and the wall of the cylinder. By gradually expanding at "2" these particles will be nearly pushed out and at "3" the guideshoes will be in clean contact with the wall. Turn the inner knob until the ratchet "clicks" three to five times. This will keep gentle pressure on the guide shoes. The cutter in holder "E" in revolving head "D" will then be firmly supported as at "4" throughout the deepest holes.

In this connection please remember that many cylinders are chamfered on an angle so that while one of the shoes may be in proper position for expansion, due to this chamfer, it may be necessary to wait until that particular shoe has entirely disappeared before one of the other shoes is in proper position at its point of contact. Be sure hole is being cut all the way around and, for the total length of the bore, before expanding guideshoes. Exception to this is Detroit diesel blocks, Models 71 and 92 Series. On these engine blocks the guideshoes should not be expanded until the shoes are into the top of the lower section of the air box. **Do not expand until all four shoes are in proper position.**

Correct expansion of the guide shoes is of utmost importance. The guideshoes are the secret of the extreme accuracy enjoyed by users of PK447-S Boring Bar. It is only by practice that you will get that "*feel*" when you know that guideshoes are firmly and snugly against the cylinder wall without having too little or too much pressure.

Size of Cut--Please note that in doing sleeve work we recommend several cuts of .050" until there is less than .050" to be removed. Follow the above instructions up to this point for sleeve work. On the last cut of less than .050" it is recommended that the cut be made in two cuts rather than one and that you refrain from engaging the inner or rachet knob, but rather hold the outer knob with your hand, without additional pressure, all the way down through the cylinder so that there will be no expansion of the guideshoe due to either an extremely thin wall giving or the possibility of the tool bit breaking through the cylinder wall.

When the automatic stop shuts off the motor the cylinder has been completely bored. Turn the lap in a clockwise direction until the notch in the top of the cutterhead shaft is in front of the Bar indicating the tool holder is also in the front of the Bar. Rotating the lap serves two purposes. It decreases the pressure on the clutch so that it can be disengaged very easily. If the lap is not rotated it will be found very difficult to disengage the clutch.

HOW TO USE THE GUIDESHOES CONTINUED

Disengage the inner knob from the pawl and ratchet controlling the spring tension on knob (6, Figure #2). Turn knob (6) approximately 1/2 revolution in a counter-clockwise direction. Now loosen the anchor screw handle and lightly press the bar back towards the back end of the Bar which will force the tool bit away from the cylinder wall. Re-tighten the clamp, rotate the knob (6) an additional 1/2 turn and engage the clutch with the crank and bring the cutterhead to the top of the block.

NOTE: Do not under any circumstances return the cutterhead to the top of the block without following this procedure unless sleeving. You will scratch the cylinder wall by dragging the Tungsten Carbide against the cylinder wall.

With the tool holder extractor or hook remove the tool holder.

NOTE: Always remove the tool holder from cutterhead before re-centering Bar and before putting the Bar away after having completed the job.

THE TOOL BIT

Sharpening the Cutting Edge--The proper upkeep of the tool bit is without question the most important instruction for you to remember. The tool bit is composed of Tungsten Carbide, a composition of materials molded under high pressure and heat treated, making a metal of extreme hardness and high cutting qualities but quite brittle. When properly sharpened, Tungsten Carbide presents a very fine edge with a resulting fine finish. For best results the edge must be kept sharp and very smooth. If allowed to dull unduly it will require considerable additional sharpening and wearing away of the tool and chances of the tool bit being ruined if it is allowed to go too long without proper sharpening.

After every cylinder has been bored the tool holder should be examined with a magnifying glass and if it is found that any cylinder material has adhered to the tool bit at point 5, (Figure 13) it should be removed with an abrasive hone with which the tool box is equipped. This hone should be occasionally dipped in kerosene and kept free of grease or other foreign substances which prevent it from cutting free. If it becomes grooved it can be dressed flat by laying it against the side of practically any abrasive wheel.

On the top of the motor will be found a diamond disc lap (5, Figure #2) on which all of the tools are sharpened. This lap should at all times be free from burrs of any kind and should be kept clean and well lubricated with Tungsten Carbide Lapping Compound.

Do not under any circumstances permit anyone to use disc for anything other than the sharpening of tool bits. Do not use pressure in sharpening.

THE TOOL BIT (CONT'D)

After the lap plate becomes worn and no longer cuts freely it must be replaced. To remove lap, loosen screw in outside diameter of lap and lift off motor shaft. The illustration (Figure #14) indicates the proper position of the tool holder in the lapping fixture. Do not hold tool in one position on lap. Always oscillate back and forth so that you will be constantly presenting a different part of the lap tool edge. Occasionally oscillate back and forth so that you will be constantly presenting a different part of the lap to tool edge. Occasionally check lapping stud (4, Figure #3) to be sure that it is at absolute right angles to the face of lap.

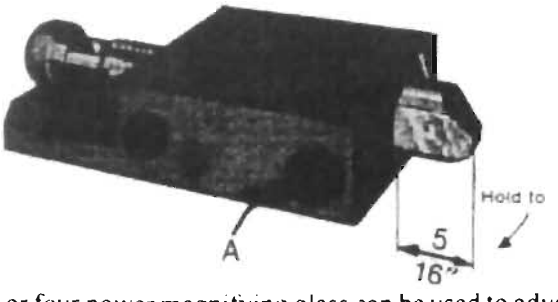
Adjusting the Tool Bit--Before setting the tool holder to size, adjust the tool bit so that it protrudes 5/16" from the face of the holder (Figure #8). Always re-sharpen tool bit after locking in tool holder to be assured cutting angles are correct. Be sure all faces of tool bit cleanup during the lapping operation.

In boring ordinary cast iron Cylinder Blocks, the friction set up by spring "B" is sufficient to hold the Tool Holder in position as shown in (Figure #11).

Many special alloys encountered in special boring applications require a rigidly locked Tool Holder. The Tool Holder can be locked into position by tightening screw ("C", Figure #11) with an ordinary screw driver.

In adjusting friction screw for conventional boring, back off screw ("C", Figure #11) until there is only a sufficient amount of tension on this screw to keep it in contact with locking gib ("A", Figure #11).

The tool bit must never protrude in excess of 5/16" from the front of the tool holder. Anvil block ("A", Figure #11) can contact back of tool holder and cause tool holder to cut over-size when tool is set to minimum diameter. If tool holder does not snap into position when inserting, investigate. Use extreme caution when inserting tool at 2.550 and 4.000 which are possible points of interference. At diameters listed above, it is advisable to reduce amount tool protrudes from tool holder to 9/32". After re-setting tool in tool holder, always check to be sure top of tool bit is at absolute right angles to top of tool holder. This can be accomplished by re-sharpening.



A three or four power magnifying glass can be used to advantage to check for irregularities in the tool bit edges which might affect the finish obtained.

Figure 8

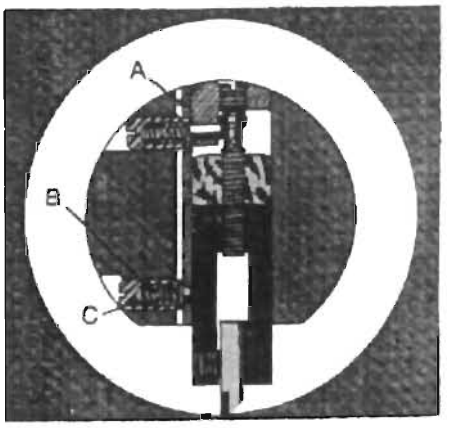


Figure 11

THE TOOL BIT (CONT'D)

Approximately every thirty days the hole through the center of the Boring Bar should be blown out with a high pressure air hose and commercial cleaning solvent to remove greasy chips which may have adhered to the inside of the cutterhead shaft.

ANGLES TO BE SHARPENED--Face ("1", Figure #13) can be used to chamfer newly bored cylinders.

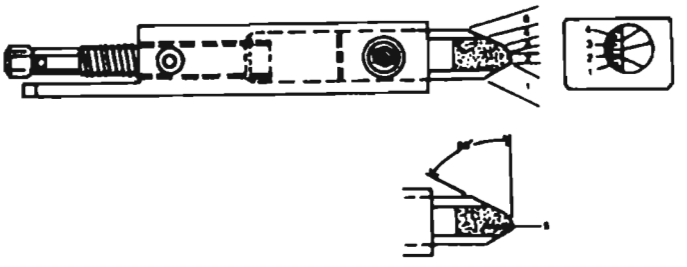
Face must be sharp or jagged finish will be obtained.

Face "2" must not exceed 3/32".

A good magnifying glass will disclose conditions undetected with the naked eye.

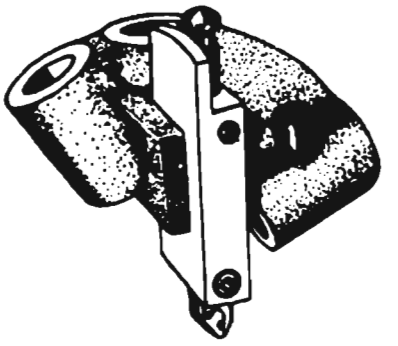
Face "6" must be sharpened as shown so that it does not allow the steel backing to contact diamond lap. Tungsten Carbide only should contact diamond lap so that tool bit will be able to protrude through the chip remover hood.

When filing face "6", do not remove too much steel or file too sharp an angle. The Tungsten Carbide must be well supported.



1 — Cutting or roughing edge, 2 — Finishing edge, 3 — Relief to control width of #2, 4 — Does nothing, but must be ground down free hand so that tool bit can protrude through hood, 5 — Top of tool bit.

Figure 13



Position of Tool 777-00179 in Tool Holder ready to be lapped for ordinary cast iron boring.

Figure 14

HOW TO ADJUST MICROMETER

In continuous use, the boring bar micrometer may get out of order.

The outside micrometer you have should be checked regularly with a gauge block to be assured of their accuracy. As a check on the boring bar micrometer, place the tool holder in the special micrometer and set to 3" size. Then measure the tool holder from end of Tool Bit to end of "*size adjustment screw*". This should be exactly 2.500". This distance can be checked at any point as follows: Take the special micrometer setting at any given point, divide by two and add one inch. This will give the proper distance from the tip of tool bit to the end of adjusting screw. For instance, if the tool holder is set in the special micrometer at 4" then the tool holder length is 3", i.e.: 4" divided by 2 equals 2" plus 1" equals 3". One method of checking for accuracy is to bore a trial hole on an old cylinder block. Let us assume for example that tool bit is set at exactly 4.00". Upon checking the bored hole with inside micrometers it is found the hole bored is 4.002". **NOTE:** Always check inside micrometer with outside micrometer. Place the tool holder back into the PK447-S micrometer. Rotate the barrel of the micrometer so that the micrometer reads 4.002". No attempt should be made to use size blocks of any kind as the Tungsten Carbide tool wears a groove into the micrometer anvil into which the size block would not fit and an erroneous setting would be obtained.

HOW TO ADJUST BASE CASTING SPLIT BEARING

You will note that the left hand side of the base casting is split at top and bottom. Four large Allen screws and four small Allen screws ("10, 11" Figure #3) are used for holding and adjusting purposes.

NOTE: NEVER TOUCH THIS ADJUSTMENT UNLESS ABSOLUTELY NECESSARY.

You will be able to determine when it is necessary to make an adjustment at this point if the bar begins to chatter, leave ridges in the finish or when the column drops because the adjustment has loosened or is improperly made. Make sure that chatter is not caused by failure to have guideshoes properly adjusted to support the Bar when making cuts, or tool bit is too wide (2, Figure #13). The large Allen screws are called binder screws and the small ones are called support screws. Please note that the support screws are not to be touched during the first adjustment. As a matter of fact, it will take a considerable amount of wear to make it necessary to touch the support screws at all. Please remember that the adjustment of this base casting is a very delicate operation and that the adjustments should never be tampered with unless absolutely essential. A very slight turn on one of the screws may be sufficient to bind the column so that it will not feed up and down.

HOW TO ADJUST BASE CASTING SPLIT BEARING (CONT'D)

When it is necessary to adjust, do so in the following manner:

Clamp the Bar on top of a cylinder block so that it will be rigid and so that you can feed the column down through the cylinder by hand for the full travel of the bar. Place wrench in the first binder screw, that is, the first large screw from the bottom of the base. With the right hand run the Bar up and down and with the left hand just barely tighten the bottom binder screw until a definite drag is felt. Now repeat this with the second from the bottom binder screw. The Bar should fit snugly in place without a great deal of effort being necessary to feed the Bar up and down. Always adjust the two bottom binder screws first and then if additional binding is necessary, slightly tighten the top binder screw, and then the third from the bottom binder screw. The Bar should feed up and down freely and with a certain amount of drag against it. Please remember that the binder screws should not be turned more than a sufficient amount to just barely move the screw. After the Bar has been used for some time after the first adjustment, it may be again necessary to adjust these screws. This second adjustment should not be necessary for a considerable length of time after the first adjustment. When it is felt necessary to make this second adjustment, however, you may find take-up on any one or all of the binder screws will not give sufficient tension.

If it becomes necessary to make a major adjustment to the base casting split bearing, this is the recommended procedure. Lay the boring bar on its back on a bench with the crank towards you. Loosen the small support screws on the four large binder screws. Now loosen the four binder screws. The column should move up and down free in the casting. Tighten the bottom binder screw until there is an extreme drag on the column. Tighten the support screw for this binder screw until the column moves up and down with just a slight drag. Repeat this procedure on the third set of screws from the bottom, then proceed to the second set of screws from the bottom, and finish off at the top set of screws on the split bases casting. When making these adjustments, be sure to traverse the column the total length so as to even out the wear or taper in the column.

Remember that the PK447-S is a light, fast and accurate piece of precision machinery. Take care of it, oil it, and use it properly as described. Do not overload it and, above all--stop a minute before turning on the switch and think over the steps you have taken to make sure every-thing is just right. The PK447-S is built of the finest material by expert precision workmen. It will give you years of hard, faithful, money-making service if you do your part.

SPECIAL DIAMOND LAP

A special diamond lap plate is provided as standard equipment on the PK447-S Bar. This plate has several carats of diamond dust mixed into its top surface for about 1/16" deep. This type of lap should not be confused with ordinary impregnated type of cast iron lap and is not rechargeable.

IMPORTANT: Read carefully before dressing No. VN 777-00454 Diamond Lap Assembly with special No. VN 07318 Honing Stick.

Because of the nature of the bond, satisfactory operation of metal bonded diamond wheels requires that they be dressed frequently. How often this must be done, can best be determined by experience.

The Abrasive Dresser Stick shipped with the bar has been prepared especially for use on No. VN 777-00454 Diamond Lapping Assembly. Its use will not remove the diamond particles but merely erode the bond between the particles, allowing them to project from the surface to provide a freer cutting action. Keep lap well lubricated with Lapping Oil at all times (Part VN 09342).

HOW TO CLEAN LAP CUTTING FACE

1. Wipe excess oil off wheel face before dressing.

2. Dress the wheel face with a No. VN 07318 Honing Stick (shipped with the Bar) applying light hand pressure for about 3 or 4 seconds or until wheel face appears clean. Apply the stick in the center of the wheel face, rolling the stick in an upward motion to the edges. This will avoid excessive wheel wear on the outer corners.

3. Proceed with tool sharpening.

CHECKING FOR SLEEVE INTERFERENCE

Always thoroughly check the top of the block before attempting to bore dry type inserted sleeves. If the sleeves to be bored protrude, they must be filed flush with the top of the cylinder block. The boring bar must sit flat on top of the cylinder block if the holes are to be bored square with the crankshaft.

NOTE: If sleeve protruded above top of block before boring, do not file sleeves flush but put ground shim stock under boring bar base to give clearance over the top of the sleeves.

LOCKING THE TOOL HOLDER

In boring ordinary cast iron cylinder blocks, the friction set up by spring "B" is sufficient to hold the tool holder in position (Figure #11).

PK447-S BORING BAR

Short Tool Holder 777-00177
Long Tool Holder 777-00178
Carboloy Tool Bits 777-00179

Range of Tool holder shown on chart on inside of equipment box supplied with Boring Bar.

Figure #15 shows the complete cutterhead assembly of your Boring Bar.

When ordering new jaws (No. 3) order a new spacer (No. 1) also. "Mike-up" the old jaws and old spacer and scroll (No. 2). Next, "Mike-up" new jaws and new spacer and scroll grind new spacer to original "jaw-spacer combination" fit.

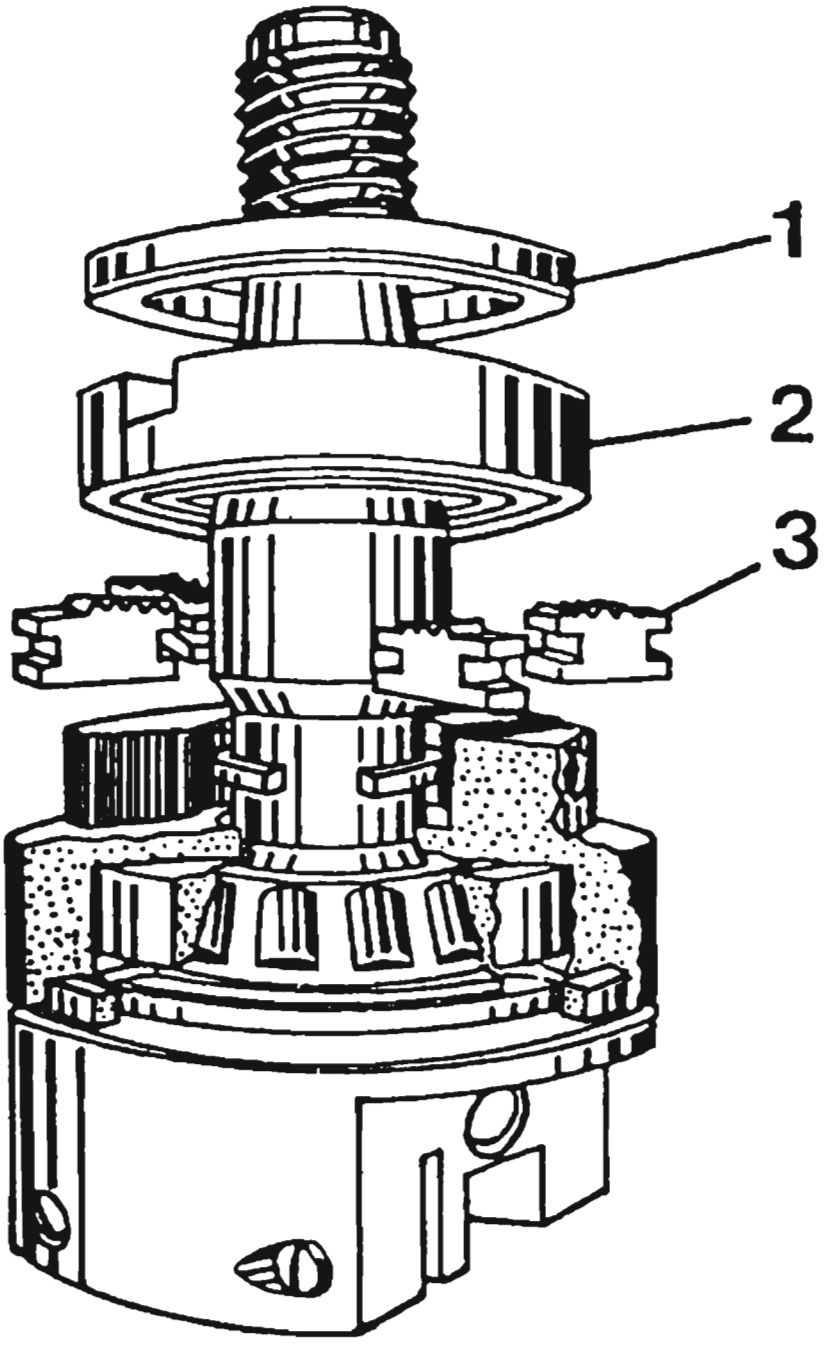


FIGURE 15

SERVICE PARTS LISTING
VN 777-07192 STANDARD EQUIPMENT BOX (Page 21)

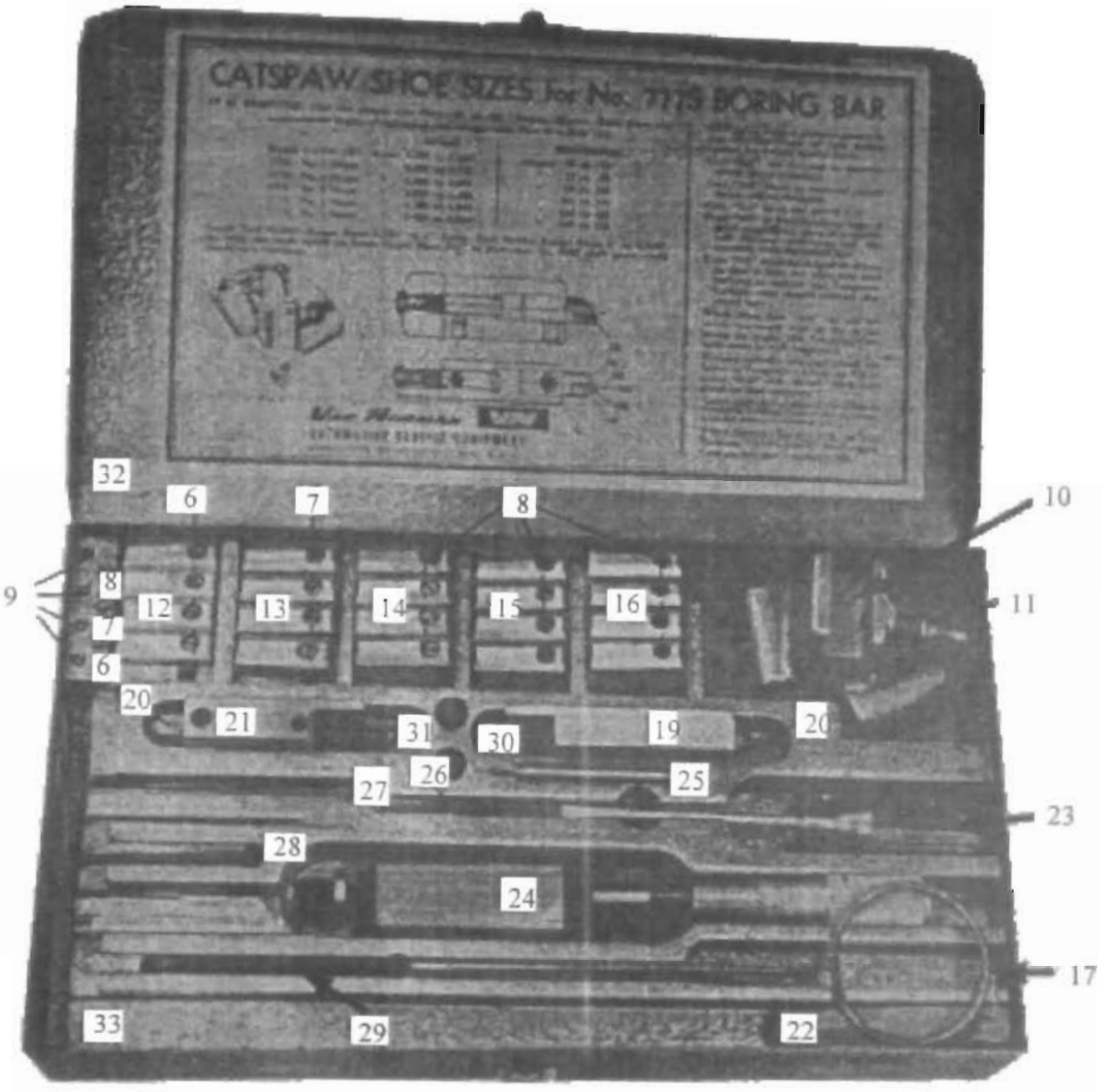
No.	Part #	Description	Qty.
1.	VN 777-00087	Screw	1
2.	VN 777-00088	Nut	1
3.	VN 777-00006	Clamp Bridge	1
4.	VN 777-00005	Clamp	1
5.	VN 777-00483	Anchor Assembly	1
6.	VN 800-00114	Screw	5
7.	VN 800-00115	Screw	5
8.	VN 800-00116	Screw	13
9.	VN 800-00148	Screw	4
10.	VN 777-00193	Lapping Fixture	1
11.	VN 41783	Screw	1
12.	VN 777-00401	No. 1 Guideshoe (4 req.)	4
13.	VN 777-00402	No. 2 Guideshoe (4 req.)	4
14.	VN 777-00403	No. 3 Guideshoe (4 req.)	4
15.	VN 777-00404	No. 4 Guideshoe (4 req.)	4
16.	VN 777-00405	No. 5 Guideshoe (4 req.)	4
17.	VN 800-00158	Tool Holder Extractor	1
18.	VN 09342	Lapping Oil	1
19.	VN 777-00178	Tool Holder (Large)	1
20.	VN 777-00179	Tool Bit	2
21.	VN 777-00177	Tool Holder (Small)	1
22.	VN 07318	Honing Stick	1
23.	VN 07119	Screw Driver	1
24.	VN 28046	Micrometer	1
25.	VN 800-00119	Pin For Setting Tool	1
26.	VN 09592	3/32" (2.38mm) Allen Wrench	1
27.	VN 05378	1/8" (3.18mm) Allen Wrench	1
28.	VN 05316	5/32" (3.95mm) Allen Wrench	1
29.	VN 05413	1/4" (6.35mm) Allen Wrench	1
30.	VN 800-00154	Micrometer Screw	1
31.	VN 777-00180	Micrometer Screw	1
32.	VN 800-00138	Box	1
33.	VN 777-00192	Core	1

GUIDESHOE SIZES FOR PK447-S BORING BAR

It is essential that the proper size shoes be on the guideshoe jaws. Sizes given are actual limits of expansion and contraction.

	INCHES	MILLIMETERS
Bare Guideshoes	(from) 2.600 to 3.080	(from) 65 to 78
No. 1 Shoes	(from) 3.030 to 3.550	(from) 77 to 90
No. 2 Shoes	(from) 3.500 to 4.020	(from) 89 to 102
No. 3 Shoes	(from) 3.970 to 4.490	(from) 101 to 114
No. 4 Shoes	(from) 4.420 to 4.940	(from) 113 to 125
No. 5 Shoes	(from) 4.850 to 5.343	(from) 123 to 136

No. VN 777-00177 Small Holder, range 2.550" to 4" (6.38cm to 10cm)
No. VN 777-00178 Large Holder, range 4" to 5.350" (10cm to 13.38cm)


CATSPAW SHOE SIZES for No. 7775 BORING BAR
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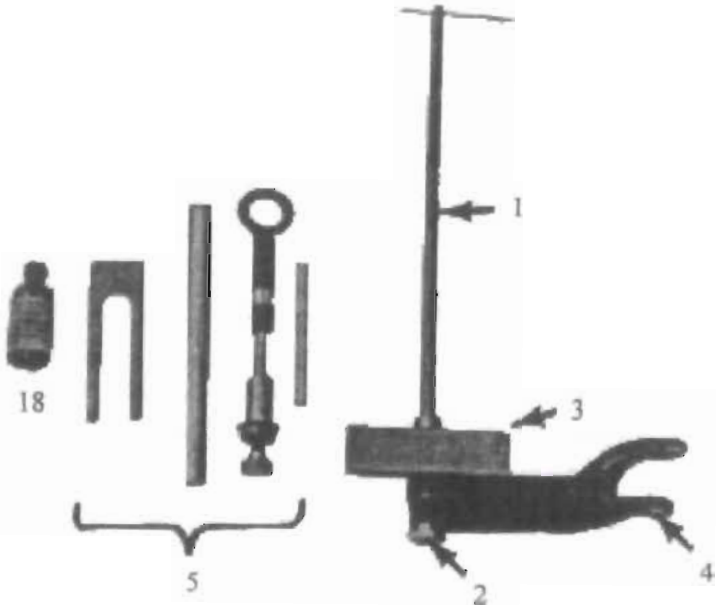
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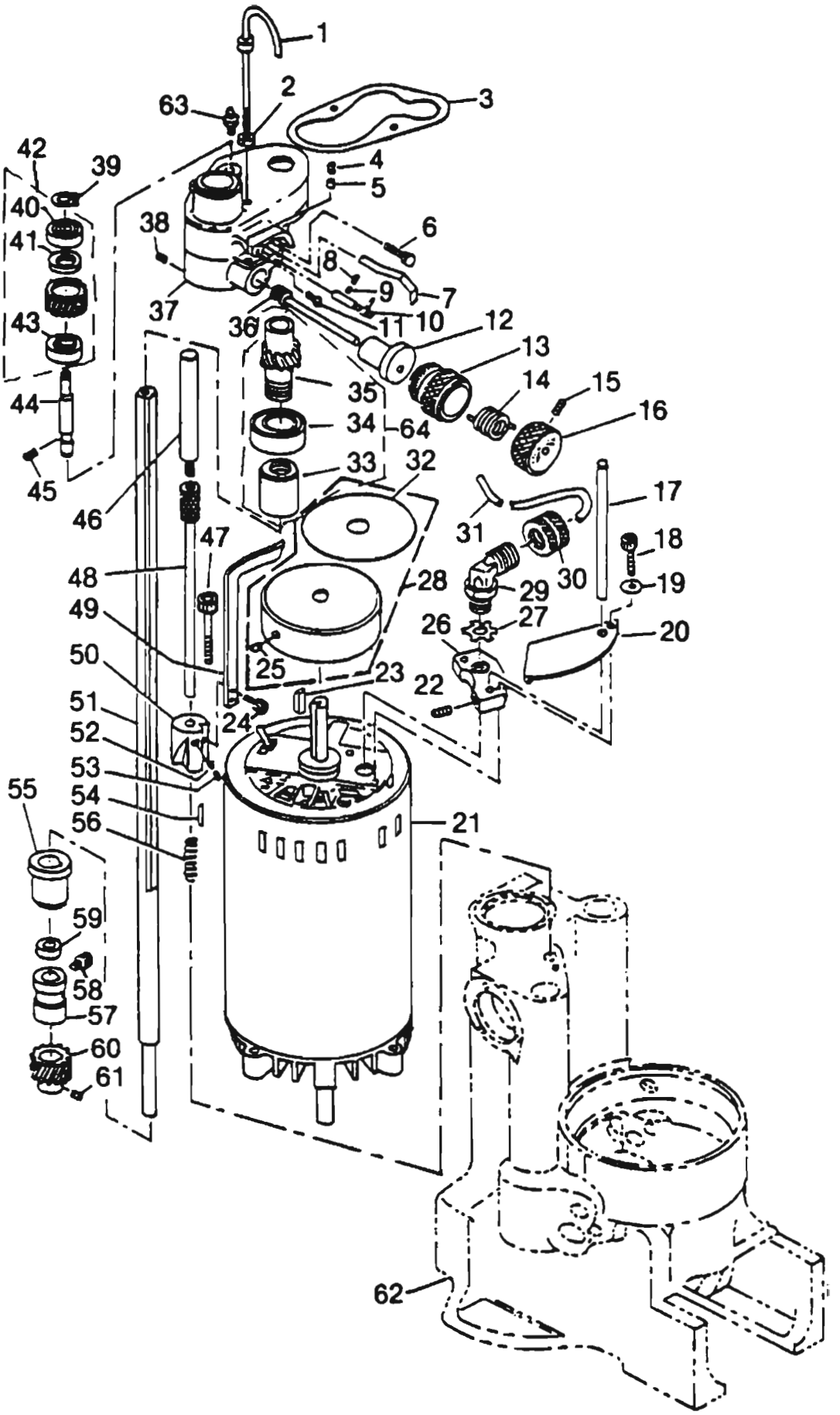
SERVICE PARTS LISTING
PK447-S BORING BAR (UPPER HALF) (Page 24)

No.	Part #	Description	Qty.
1.	VN M-351	Lifting Hook	1
2.	VN 09064	Nut	1
3.	VN 777-00029	Gasket	1
4.	VN 26153	Screw	1
5.	VN 111-681	Plug	1
6.	VN 40896	Screw	1
7.	VN 944-151	Spring	1
8.	VN 26153	Screw	1
9.	VN 111-681	Plug	1
10.	VN 944-150	Cam	1
11.	VN 05021	Screw	1
12.	VN 900-144	Bushing	1
13.	VN 900-70	Knob	1
14.	VN 800-173	Spring	1
15.	VN 13892	Screw	1
16.	VN 900-38	Setting Knob	1
17.	VN 777-00469	Stud	1
18.	VN 15245	Screw	1
19.	VN 06593	Washer	1
20.	VN 777-00491	Grit Guard	1
21.	VN 777-00467	3/4 HP 60 HZ Single Phase Motor	1
	VN 777-00471	3/4 HP 50 HZ Single Phase Motor	--
22.	VN 24231	Screw	--
23.	----------	Key comes with item #21	--
24.	VN 09294	Screw	1
25.	VN 15216	Screw comes with item #28	1
26.	VN 777-00486	Plate	1
27.	VN 08577	Locknut	1
28.	VN 777-00454	Diamond Lap Assembly	1
29.	VN 41367-1	90° Fitting	1
30.	----------	Part of item #29	--
31.	VN 41352-5	Cord Set	1
32.	VN 570-00095	Diamond Plate	1
33.	VN 777-00152	Nut	1
34.	VN 09090	Bearing	1
35.	VN 777-00135	Gear (L.H. Thread)	1
36.	VN 777-00027	Pinion	1
37.	VN 777-00200	Cover	1
38.	VN 09195	Screw	1
39.	VN 40783	Retaining Ring	1

SERVICE PARTS LISTING
PK447-S BORING BAR (LOWER HALF) (Page 24)

No.	Part #	Description	Qty.
40.	VN 11294	Bearing	1
41.	VN 777-00134	Ring	1
42.	VN 777-00133	Gear Assembly	1
43.	VN 11294	Bearing	1
44.	VN 777-00462	Stud	1
45.	VN 05465	Screw	1
46.	VN 905-30	Rod Extension	1
47.	VN 10492	Screw	1
48.	VN 777-00458	Rod	1
49.	VN 777-00457	Finger 3-7/8" long for Lesson Motor	1
	VN 777-00460	Finger 5-1/4" long for U.S.A. GE Motor	-
	VN 777-00463	Finger 4-1/2" long for Canadian GE Motor	-
50.	VN 777-00455	Cam	1
51.	VN 777-00068	Vertical Drive Shaft	1
52.	VN 111-633	Plug	1
53.	VN 05873	Screw	1
54.	VN 777-00456	Pin	1
55.	VN 777-00106	Bushing	1
56.	VN D-168	Spring	1
57.	VN 777-00461	Bushing	1
58.	VN 10409	Screw	1
59.	VN 777-00094	Washer	1
60.	VN 777-00025	Gear	1
61.	VN 9211	Screw	1
62.	VN 777-00450	Body (Ref.)	1
63.	VN 07082	Grease Fitting	1
64.	VN 777-7135	Gear Assembly	1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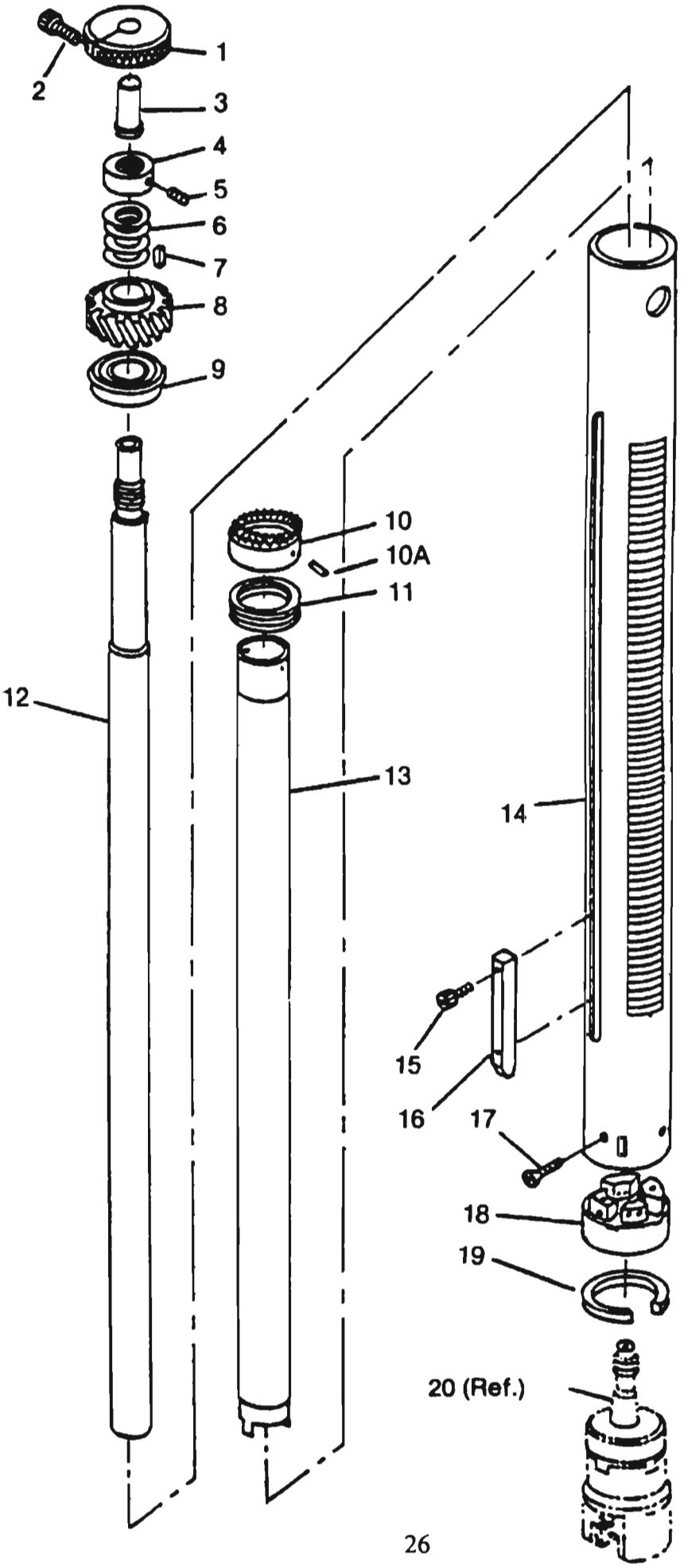
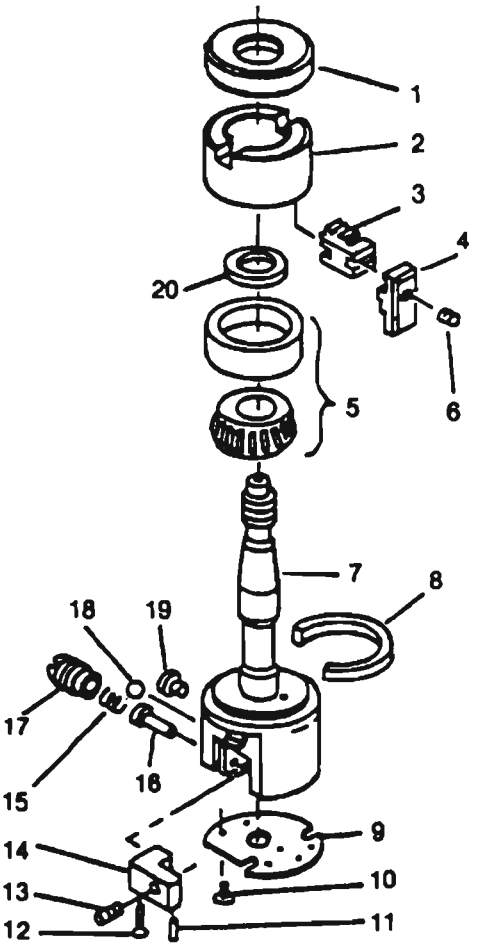
SERVICE PARTS LISTING
PK447-S BORING BAR (COLUMN ASSEMBLY) (Page 26)

No.	Part #	Description	Qty.
1.	VN 777-00202	Knob	1
2.	VN 07257	Screw	1
3.	VN 13529	Bushing	1
4.	VN 777-00201	Collar	1
5.	VN 05873	Screw	1
6.	VN 777-00038	Spring	1
7.	VN 05135	Key	1
8.	VN 777-00136	Gear	1
9.	VN 09089	Bearing	1
10.	VN 777-00026	Crown Gear	1
10A.	VN 2-2137	Pin	2
11.	VN 777-00062	Bearing	1
12.	VN 777-00185	Cutterhead Shaft	1
13.	VN 777-00065	Actuating Tube	1
14.	VN 777-00141	Column	1
15.	VN 05036	Screw	1
16.	VN 777-00416	Key	1
17.	VN 900-00024	Screw	1
18.	VN 777-00182	Closure Ring	1
19.	VN 900-00060	Felt	to fit
20.	----------	Cutterhead (Ref.)	--



SERVICE PARTS LISTING
PK447-S BORING BAR (CUTTERHEAD ASSEMBLY)

No.	Part #	Description	Qty.
1.	VN 777-00064	Thrust Washer	1
2.	VN 777-00071	Scroll	1
3.	VN 777-01841	Contact Jaw (Set of 4)	1
4.	----------	Followers (See Extra Equip.)	--
5.	VN 07342	Cone & Cup Assembly	1
6.	----------	Set Screw comes with item #4	--
7.	VN M-176	Cutterhead Body	1
8.	VN 777-00093	Felt	to fit
9.	VN 777-00168	Cutterhead Cap	1
10.	VN 05002	Screw	5
11.	VN 17751	Pin	2
12.	VN 05258	Screw	1
13.	VN 777-00464	Set Screw	2
14.	VN 777-00165	Anvil	2
15.	VN 777-00174	Spring	3
16.	VN 777-00173	Detent	1
17.	VN 777-00175	Screw	3
18.	VN 05386	Ball	1
19.	VN 777-00176	Micro Plug	1
20.	VN 777-00183	Jaw Stop Ring	1

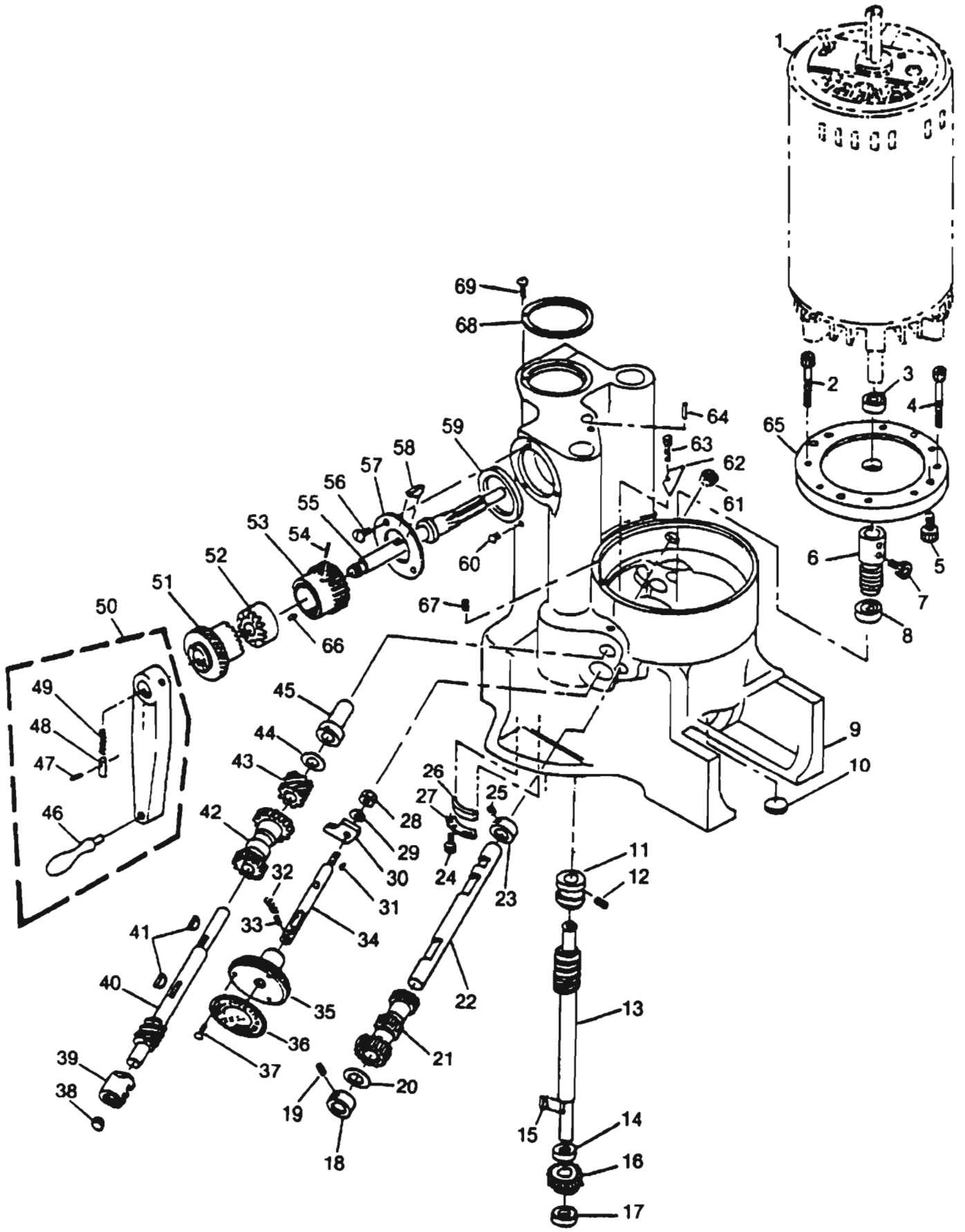


SERVICE PARTS LISTING
PK447-S BORING BAR (LOWER HALF) (Page 30)

No.	Part #	Description	Qty.
1.	----------	Motor (Ref.)	--
2.	VN 11348	Screw	1
3.	VN 08637	Seal	1
4.	VN 11345	Screw	7
5.	VN 08955	Screw	4
6.	VN 777-00453	Worm	1
7.	VN 06739	Screw	2
8.	VN 25400	Bearing	1
9.	VN 777-00450	Body	1
10.	VN 07164	Plug	1
11.	VN 777-00041	Bushing	1
12.	VN 05258	Screw	1
13.	VN 777-00017	Vertical Worm Shaft	2
14.	VN 09095	Seal	1
15.	VN 06724	Key	1
16.	VN 777-00024	Worm Gear	1
17.	VN 777-00040	Thrust Washer	1
18.	VN 13987	Collar	1
19.	----------	Set Screw comes with item #18	--
20.	VN 26961	Thrust Washer	1
21.	VN 777-00137	Triple Gear	1
22.	VN 777-00037	Shaft	1
23.	VN 13987	Collar	1
24.	VN 07187	Screw	4
25.	----------	Screw comes with item #23	--
26.	VN 777-00114	Felt	4
27.	VN 900-00076	Segment	4
28.	VN 07314	Screw	1
29.	VN 05888	Washer	1
30.	VN 777-00013	Shoe	1
31.	VN 08559	Key	1
32.	VN T-97	Spring	1
33.	VN 777-0080	Pin	1
34.	VN 777-00012	Shifter Shaft	1
35.	VN 777-00053	Knob	1
36.	VN 777-00055	Plate	1
37.	----------	Screws come with item #36	--
38.	VN 07162	Plug	1
39.	VN 777-00042	Bushing	1

SERVICE PARTS LISTING
PK447-S BORING BAR (LOWER HALF) (Page 30)

No.	Part #	Description	Qty.
40.	VN 777-00016	Shaft	1
41.	VN 09358	Key	2
42.	VN 777-00018	Shifter Gear	1
43.	VN 777-00157	Drive Gear	1
44.	VN 09583	Washer	1
45.	VN 777-00459	Bushing	1
46.	VN 08447	Handle	1
47.	VN 05353	Pin	1
48.	VN 777-00101	Detent	1
49.	VN LMB-17	Spring	1
50.	VN 777-00100	Crank Assembly	--
51.	VN 777-00099	Knob	1
52.	VN 777-00098	Clutch	1
53.	VN 777-00097	Drive Gear (Included in VN 777-00098)	1
54.	VN 111-00221	Pin	1
55.	VN 777-00142	Pinion	1
56.	VN 05020	Screw	3
57.	VN 777-00015	Retaining Ring	1
58.	VN 09358	Key	1
59.	VN 777-00049	Ring	1
60.	VN 14191	Button	1
61.	VN 40781	Plug	1
62.	VN 777-00481	Plate	1
63.	VN 777-00500	Screw	2
64.	VN 777-00456	Pin	1
65.	VN 777-00452	Plate	1
66.	VN 09358	Key	1
67.	VN 26153	Screw	1
68.	VN 777-00051	Ring	1
69.	VN 07187	Screw	3
70.	VN 777-00012A	Shifter Shaft Assembly	1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Peterson MACHINE TOOL INC.

800-255-6308

KI

800-835-3528

Effective September 1, 2000

Peterson Machine Tool, Inc. & Kansas Instruments Statement of Policies

Peterson Machine Tool, Inc. & Kansas Instruments, hereinafter referred to as PMT/KI, desires to fill your order with 100% accuracy. To do this, we must have the proper information. Below are listed several items of information that we must have in order to fill your order properly.

1. Please order machines by MODEL NUMBER from current price sheet.
2. Make certain that you SPECIFY THE PROPER PHASE AND VOLTAGE. Many machines are wired for 230 volt, 3 phase power as standard equipment. If you are in doubt, consult with an electrician to verify that you have the correct voltage/phase available.
3. On Cleaning Tanks and Spraycleans, SPECIFY THE HEAT SOURCE, whether it is to be electric-heated, or gas-heated. In the case of gas heat, make certain to specify either natural gas or LP gas. Gas-fired units will be shipped set up for natural gas unless specified otherwise.
4. Specify and list the OPTIONAL ACCESSORIES that you will need for your operation. If you are in doubt as to your needs, we suggest you consult with the PMT/KI factory representative.
5. If you have a preference, SPECIFY THE ROUTING that you desire. Please advise us of any special delivery instructions that will make your job of receiving your machine easier for you.

FREIGHT POLICY: Prices are F.O.B. Factory or Warehouse location.

STANDARD PMT/KI LIMITED WARRANTY:
Products manufactured by PMT/KI are warranted to be free from defects in workmanship and material for a period of one year from the date of shipment with the exception of expendable wear parts (e.g. airless blast thrower-blades, housing, feed gate and tumbler fixtures; dust bags and gloves; and electric heating elements) which are warranted for a period of 90 days from date of shipment. All claims must be made in writing for such defects within the stipulated time periods. Our liability under this warranty shall be limited to the repair or replacement, of parts or equipment which, upon inspection by PMT/KI, are found to be defective.

This warranty does not cover damage or defects caused by carelessness of the operator, misuse, abuse or abnormal use which in any way impairs the proper functioning of the equipment or by the use or addition of parts not manufactured by PMT/KI or its suppliers. Any modifications made to the equipment by the purchaser may void this warranty.

Integral parts not manufactured by PMT/KI such as electric motors, switches, pumps, etc., used in our equipment, are warranted under the warranties extended by the original manufacturers. PMT/KI assumes no liability under such warranties and shall not be responsible for the repair or replacement of such parts without express authorization from the original manufacturer. Proper steps have been taken to provide protection against injuries to operators of PMT/KI equipment under normal usage.

THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE

PMT/KI cannot assume any responsibility for damage or loss after shipment is turned over to common carrier. Carefully inspect all shipments immediately upon receipt. Report any damage both verbally and in writing to the carrier and PMT/KI immediately. PMT/KI will cooperate in any way possible to assist the purchaser in collection of his claim. Keep a written record of names, dates, times, phone numbers and items discussed.

PMT/KI reserves the right to make changes, without notice, in materials, colors, design and accessories included with units.

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

FIELD SERVICE AND OPERATING INSTRUCTIONS:

All PMT/KI products are backed by a network of field representatives who are capable of providing "first line" machine service, as well as any training that may be required. PMT/KI field representatives will instruct on the use of all purchased units as soon as possible after delivery. Further instruction, by PMT/KI factory personnel, needed due to changes in personnel can also be arranged at the current rate of $70.00 per hour, plus expenses. All rates quoted are rates in effect at the time of this printing and are subject to change at any time. You should contact PMT/KI to obtain a current rate. Additionally, all training and rates quoted pertain to the continental U.S. (48 states) and Canada. Rates for work performed outside these areas will be quoted upon request.

In addition to this network of field representatives, PMT/KI maintains a staff of qualified factory service specialists who are available for telephone consultation and may be scheduled for in-the-field service as deemed necessary.

Out-of-warranty service and/or machine reconditioning, done by factory personnel, will be charged the current rate of $70.00 per hour, plus actual travel and living expenses. (Daily labor charge not to exceed $560.00 per day). "Travel time to and from factory" is considered "work time" for billing purposes.

VIOLATION OF SAFETY CAUTION & WARNING DECALS AFFIXED TO MACHINES CAN LEAD TO INJURY.

ALWAYS GIVE MODEL AND SERIAL NUMBER OF MACHINE WHEN ORDERING PARTS.

Each PMT/KI salesman is experienced in the servicing of PMT/KI equipment. If at any time during the warranty period, a PMT/KI machine should fail to function properly, advise us at the factory and we will have our representative call as soon as possible. If it is necessary to return equipment to us for repairs, we will so advise you. See "Returned Merchandise" below.

No charge will be made for service or parts when installed either at the factory or in the field if the machine is in the warranty period and upon inspection we find defective materials or workmanship. Service provided by any individual not representing PMT/KI must be pre approved. Likewise, no charge will be made for operating instructions provided the machine is in warranty period and operating instructions have not previously been provided on this machine.

Contact us before returning any equipment as we may be able to help you either by phone or having our representative visit your facility.

RETURNED MERCHANDISE:
No merchandise is to be returned without the express written authorization of PMT/KI. Returned merchandise must be shipped transportation prepaid and insured with machine parts properly oiled or greased to prevent rust and properly crated. PMT/KI may deduct 10% restocking fee for any items returned.

ALL CLEANING CHEMICALS AND SLUDGE MUST BE REMOVED BEFORE SHIPMENT OR THE MACHINE WILL BE REFUSED UPON ARRIVAL AT ANY PMT/KI FACILITY. ANY MERCHANDISE RETURNED DAMAGED OR LOST IN SHIPMENT IS THE RESPONSIBILITY OF THE CUSTOMER.

TERMS: No cash discounts are allowed when charging on credit cards.
Machines: (not used) For those customers who want to pay cash, terms are "2% 10 days, Net 30" from invoice date. Orders for new machines are allowed a 3% cash discount when PMT/KI receives full payment before shipping. Low cost financing is available if credit is approved.
Parts: Terms are "1% 10 days, Net 30" from the invoice date. If credit is not established, please include payment with order or authorize C.O.D. or credit card terms. All payments must be in U.S. dollars. Finance charges up to the maximum allowable by law may be charged for late payment.

NOTE: Any other terms must be approved in advance by PMT/KI management.

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