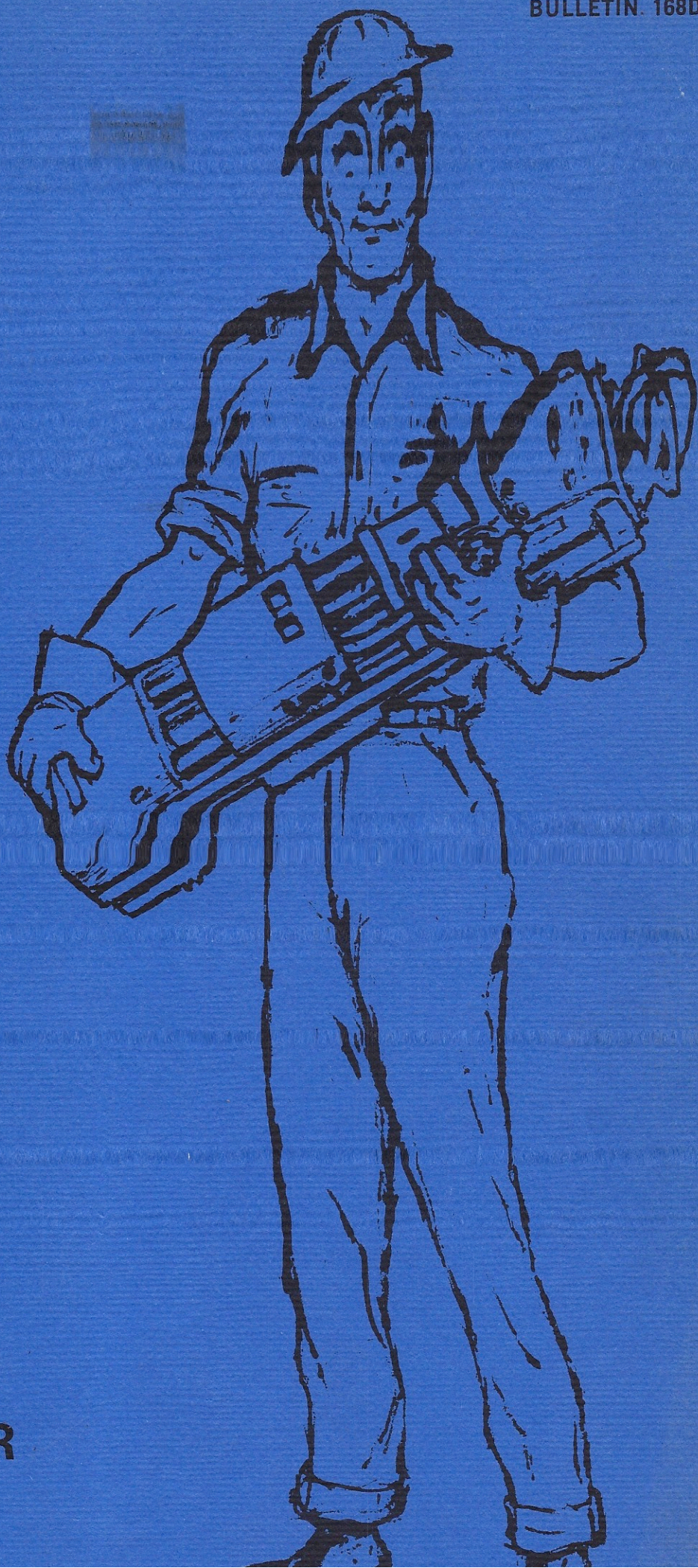


**FIELD
SERVICE
MANUAL**

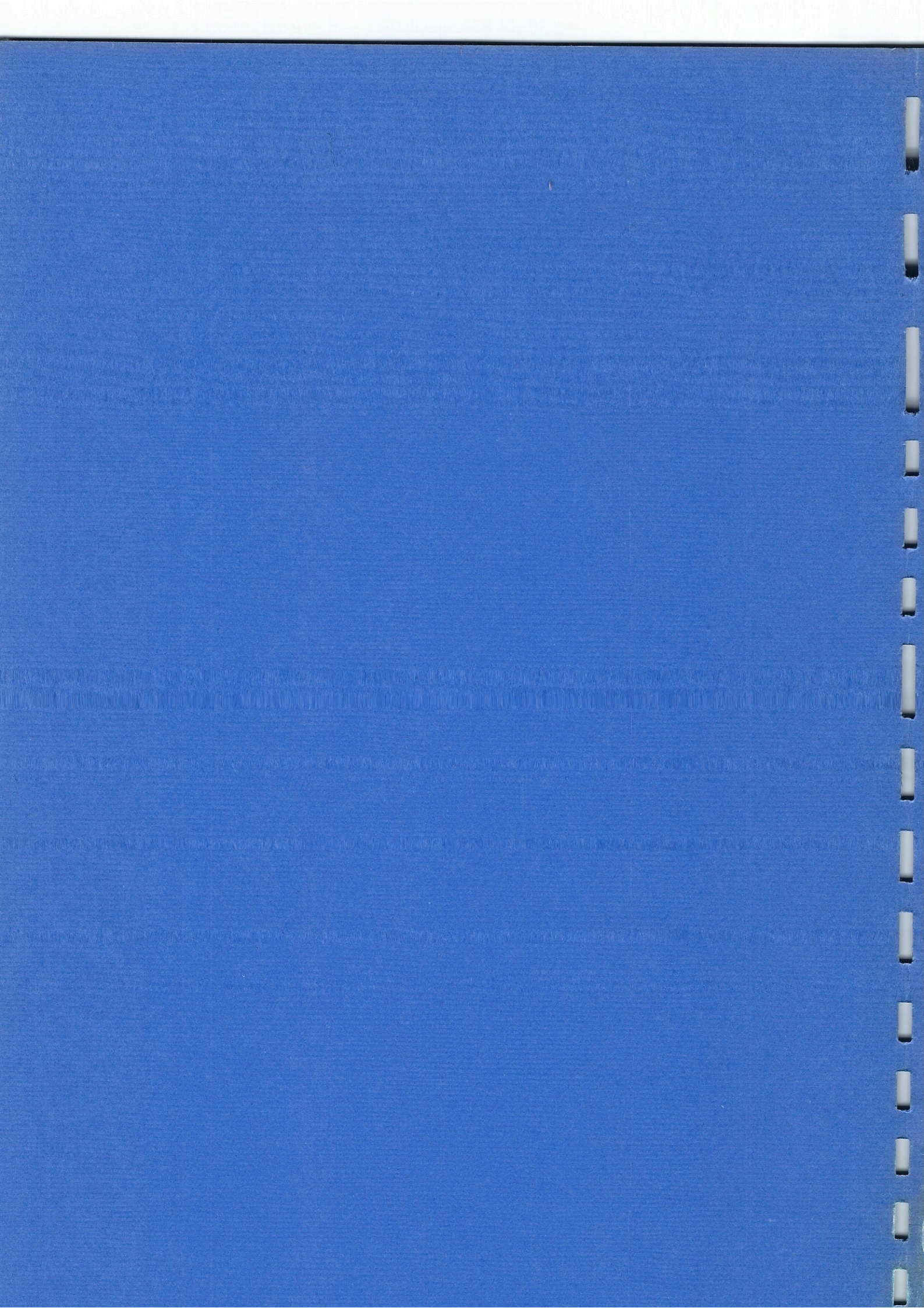


VULCAN

SINGLE-ACTING

PILE

HAMMER





MAINTENANCE

Daily Check

1. Fill Line Lubricator.
2. Check all Steam or Air Connections.
3. Check Hammer in Leaders for Binding.
4. Lubricate all Four Columns.
5. Lubricate Wedges and Slide Bar.
6. Lubricate Piston Rod.
7. Check Ram, Column and Slide Bar Keys.
8. Check all Nuts, Bolts and Cotter Pins.

Whenever the hammer is not in service or is in transit, it is advisable to plug the steam or air inlet, also exhaust outlet and relief ports, with tape in order to prevent the ingress of dirt or foreign matter to the interior of the steam chest and cylinder.

MAINTENANCE & REPLACEMENTS

Cylinder Head

Prior to replacement of the Cylinder Head, check the gasket for any crimping or tears. It is recommended that a new gasket be used rather than reuse of the old one.

Cylinder

To replace the Cylinder, lay the hammer down with the Slide Bar on top:

1. Remove the Cylinder Head and Gasket.
2. Remove the Slide Bar.
3. Remove the Gland Bushing, Packing and Junk Ring.
4. Screw Eye Bolts into the threaded holes provided for them in Piston Head.
5. Place the Hammer in a vertical position.
6. Remove the Ram Keys.
7. Remove the Upper Column Keys.
8. Raise the Piston until the Split Bushing is clear of the Ram.
9. Remove the Split Bushing, Key Ring, and Gland.
10. Remove Piston and Rod.
11. Pick the Cylinder off the Columns.

In reassembling parts on the new Cylinder, reverse the dismantling procedure above. Also refer to the specific instructions contained herein with reference to specific parts.

Piston and Rod FOR NO. 2, 1, 06, 0, OR, 08, 010:

In the Single Acting Type Pile Hammers the simplest method of installing the Piston and Rod is with the Hammer in a vertical position. To install a new Piston and Rod, remove the following parts from the Hammer in the order specified:

1. Cylinder Head.
2. Gland and Bushing.
3. Piston Rod Packing.
4. Junk Ring.
5. Ram Keys.
6. Ram Key Ring.
7. Split Bushing.
8. Old Piston and Rod.

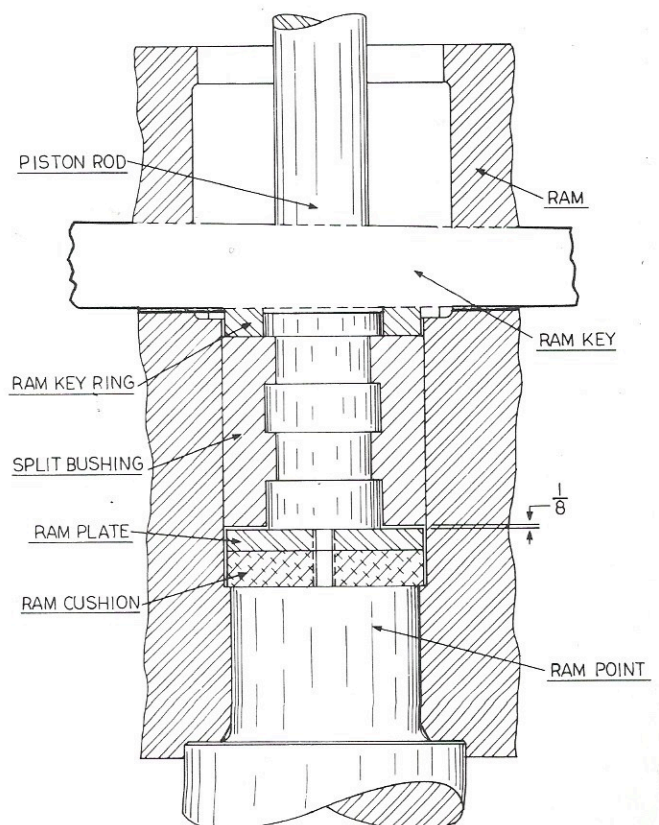
Insert new Piston and Rod fitted with new Piston Rings and reverse the disassembly procedure.

CAUTION — Check Rings for Required Gap:

HAMMER SIZE	RING GAP		HAMMER SIZE	RING GAP	
	Max.	Min.		Max.	Min.
2	.062	.042	08	.099	.077
1	.081	.061	010	.099	.077
106	.081	.061	014	.114	.090
06	.081	.061	016	.114	.090
0	.099	.077	020	.126	.102
OR	.099	.077			

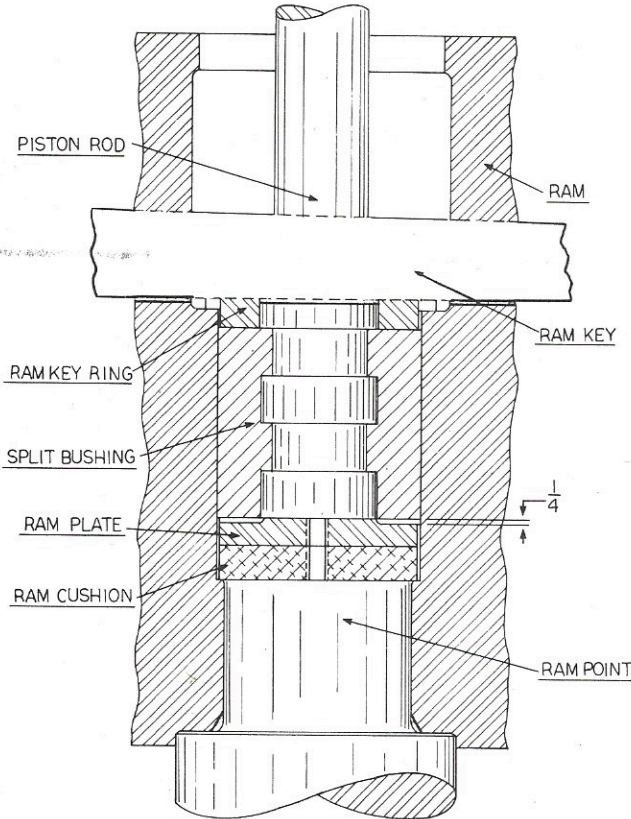
FOR NO. 2, 1, 06:

Assemble so that the end of the Piston Rod projects beyond the Split Bushing and bears on the Ram Plate.



FOR NO. 0, OR, 08, 010:

Assemble so that the raised boss area of the Ram Plate is up. The end of the Piston Rod, not the Split Bushing should rest on the boss area.



four Dowel Pins, align the Ram Retainer Split Ring (7) around the Piston Rod and insert into Segmental Pressure Ring as shown. Securely fasten all hold-down nuts.

FOR NO. 014, 016, 020:

In the Single Acting Type Pile Hammers the simplest method of installing the Piston and Rod is with the Hammer in a vertical position. To install a new Piston and Rod, remove the following parts from the Hammer in the order specified:

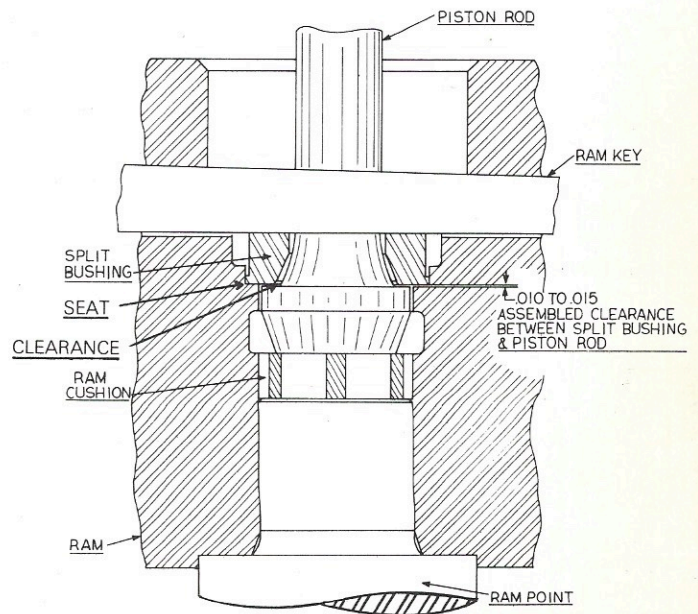
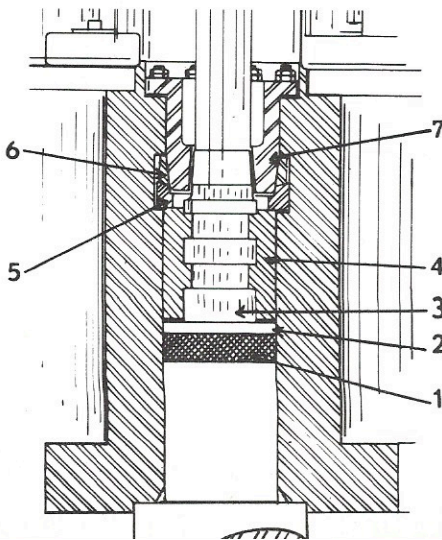
1. Cylinder Head.
2. Gland and Bushing.
3. Piston Rod Packing.
4. Junk Ring.
5. Ram Keys.
6. Split Bushing.
7. Old Piston and Rod.

Eye bolts screwed into the end of the large diameter Piston facilitates handling of the Piston and Rod.

Prior to reassembling the Ram Keys to attach the lower end of the Piston Rod to the Ram, accurately determine the distance between the Split Bushing Seat and the top of the Ram Cushion. The distance between the Split Bushing Seat and the top of the Ram Cushion should be from .010" to .015" more than the thickness of the flange at the lower end of the Piston Rod. To diminish this distance, or measurement, place a steel shim of the correct thickness underneath the Ram Cushion. If it is necessary to increase this distance, or measurement, remove the Ram Cushion from the Ram and reduce its thickness by lathe turning to the required dimension. With the Ram Keys driven securely into place, the flanged end of the Piston Rod must be free to move laterally with the Split Bushing clamped tightly against its seat, or shoulder, inside the Ram.

FOR NO. 106:

To install the Piston Rod in the Ram, insert the Ram Cushion (1) followed by the Ram Plate (2). Then insert the Piston Rod (3) with the Split Bushing (4) in place around the rod. Place the Segmental Split Bushing Holding Ring (5) in the cast cavity above the rod bushing as shown, install the Segmental Pressure Ring (6). Using



RAM KEYS FOR NO. 2, 1, 06, 0, OR, 08, 010:

If unable to drive the original Ram Keys so that the small end of the Key projects sufficiently on the opposite side of the Ram to expose the pin hole, reduce the thickness of the Ram Cushion .021 for each additional inch that the Ram Key has to be driven. If the Ram Keys drive too far through the Ram, interpose a steel shim of the required thickness between the Ram Plate and the Ram Cushion. Check all alignment and clearances as set forth herein.

FITTING NEW RAM KEYS

Ram Keys are extra long to facilitate fitting. After assembling Piston & Rod as described in the previous paragraphs, drive the Ram Keys tight and cut off any excess Ram Key stock that will interfere with proper hammer operation.

Side Channels

To remove the Side Channels without destroying them for future use, drill away the countersunk head of the channel rivet stud. Then remove the side channel from the hammer by sliding the channel in the jaw toward the cylinder head end of the hammer. To remove the remaining portion of the channel rivet stud, drill a hole into the stud and remove by the use of a backing out tool (Easy-Out). To reinstall the old channels or install new channels, place channel in jaws on hammer and align the holes in the channel with those in the cylinder. Then screw the channel rivet studs into the tapped holes in the cylinder. Torch cut the channel rivet stud at approximately 3/4" above the surface of the channel. Heat the exposed portion of the channel rivet stud with a torch and hot rivet flush with the channel web surface. In case the channel has a tendency to spring away from the cylinder prior to riveting, it may be necessary to hold the channel in place temporarily with a cap screw in one of the holes while riveting the others. After the channel has been riveted to the cylinder there will be two ears extending above the lower portion of the cylinder. With a torch, heat these ears and bend over so that they are flat against that portion of the cylinder where the column keys are fitted.

Column Keys

Both Upper and Lower Column Keys are normally furnished 3/8" oversize in height.

After old keys have been removed, insert new keys and drive in with sledge hammer until tight. At this point measure the distance that the key lacks of being driven to normal position:

- (A) Lower Keys — Flush with inside of cylindrical hole in the center of base.
- (B) Upper Keys — Large end flush with side channel.

For every additional inch the Key must be driven plane or mill 3/64" (.046) from the flat edge of the Key.

All Lower Column Keys must be inserted and driven from the inside of the base. Two keys of the set may be driven by inserting a drift through the opposite key slot in the base or all four keys may be installed with a small hydraulic jack applying a 30 ton pressure.

After key position has been established, mark the location of the column key pinhole and remove the key so this hole may be drilled.

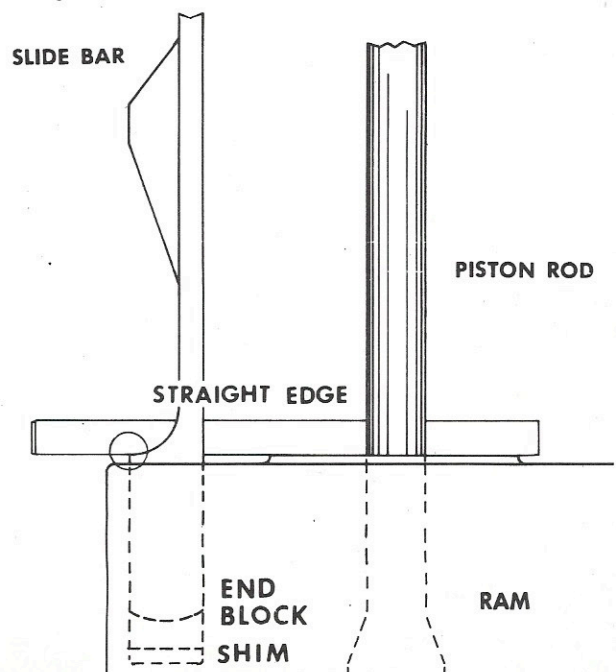
After the keys are driven tight, any excess length projecting INSIDE the base must be cut off so the end of the key is flush with the cylindrical hole in the base. An excessively worn shoulder on a column or corresponding seat may prevent the key from being driven tightly, in which event the shoulder and/or seat must be restored to the original dimensions. Unless the distance between the shoulders on all of the columns is the same and all are in line when the columns are in place, misalignment of the base with the cylinder will result. This will cause binding or scoring of the columns and will materially increase the friction on the reciprocating parts of the hammer. If this condition is not rectified, it may also cause fracturing of the column lug on the cylinder.

Slide Bar

If after installing a new slide bar, the slide bar key is found to be too loose, insert sufficient STEEL shims under the end block to take up the slack. Be sure that the key and key block are of correct width before determining thickness of the shims necessary.

A quick way to check the correct position of the slide bar is shown in the drawing below.

Place a straightedge across the machined boss area of the Ram as shown. The lower edge of the straightedge should be even with the "break" of the round stock of the slide bar as circled in the drawing.



Valve Setting

Particular care must be taken in setting the valve on all models of hammers in order to insure maximum efficiency. Detailed instructions for setting of the valve are contained on pages 19 thru 27. It will be noted that the procedure is the same for all models and the only variation found is in the dimensional aspects.

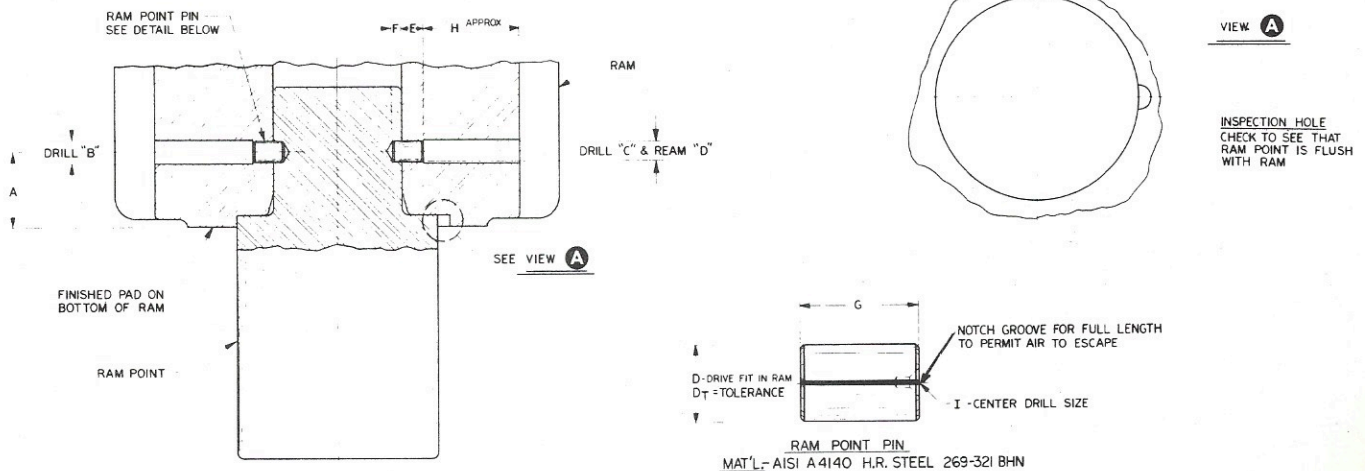
Removing Broken Ram Point

In order to remove a broken point, the side pins (if any) will have to be drilled out before any force is applied to the Ram Point. A force of 50 to 200 tons or even greater may be required against the flat end of the neck of the Ram Point inside the Ram. If sufficient force is not obtainable to press the old point out, drill a series of holes in a cross configuration through the Ram Point neck portion. Do not place these holes closer than 1/4" to the bore into which the Ram Point is fitted. With a torch, burn the metal from between the series of holes drilled. This will relieve the radial pressure on the Ram Point. After this is done, press out the remaining portion of the Ram Point.

Depending on bore condition, it may be necessary to hone or rebore the Ram. This should be done before inserting new Ram Point.

Inserting New Ram Point in Ram

A pressure varying between 50 and 150 tons is usually required to press the Ram Point into the body of the Ram. If the surface of the hole in the Ram has been damaged while removing the old Point, it should be rebored with a smooth finish, the corner should be chamfered slightly larger than the fillet radius on the Ram Point. When fitting the Point to the Ram, the finished diameter of the neck should exceed the finished diameter of the hole in the Ram by .001" for every inch in excess of 50 tons. Before inserting the new Ram Point, lubricate the surface of the hole in the Ram and likewise the surface of the neck of the new Ram Point with Molykote Type G Grease. After the Ram Point is installed, it should be pinned according to the adjacent diagram.



HAMMER SIZE	DIMENSION									
	A	B	C	D	DT	E	F	G	H	I
2	3-1/8	1- 5/16	1- 7/32	1.250	+.002	1-1/4	5/8	1-7/8	4-3/8	#6
1	4-5/8	1-13/16	1-23/32	1.750	+.002	1-3/4	7/8	2-5/8	4	#6
106	4-5/8	1-13/16	1-23/32	1.750	+.002	1-3/4	7/8	2-5/8	4	#6
06	4-5/8	1-13/16	1-23/32	1.750	+.002	1-3/4	7/8	2-5/8	4	#6
08	4-7/8	1-13/16	1-23/32	1.750	+.002	1-3/4	7/8	2-5/8	6	#6
010	4-7/8	1-13/16	1-23/32	1.750	+.002	1-3/4	7/8	2-5/8	6	#6
014	5-1/2	2- 1/16	1-31/32	2.000	+.002	2	1	3	7-3/4	#7
016	5-1/2	2- 1/16	1-31/32	2.000	+.002	2	1	3	7-3/4	#7
020	7	2- 1/16	1-31/32	2.000	+.002	2	1	3	9-1/8	#7



MAINTENANCE

Major Overhaul

Under average operating conditions, it is advisable to completely overhaul Vulcan pile hammers every 400-500 hours of use.

When in need of major overhaul, it is recommended that the hammer be taken to an authorized Vulcan Iron Works Inc. Distributor, who is equipped with the special and necessary tools and equipment to properly overhaul the hammer. In case the address of the local distributor is not known, communicate with the Vulcan Iron Works and this information will be immediately supplied.

After the hammer has been completely disassembled, all parts should be thoroughly cleaned and carefully inspected. Check all clearances with those given in this manual, to determine the extent of wear and whether or not the part or parts need replacing. The success of the overhauling job depends very largely upon the care and cleanliness exercised in the assembly of the hammer. Avoid dirt, grit and foreign matter, and properly oil as assembled.

After complete assembly and check, the hammer should be placed in the leaders and lowered

on a pile to be driven. Allow the hammer to be thoroughly warmed up before starting.

CAUTION — DO NOT USE REPLACEMENT PARTS OTHER THAN THOSE MANUFACTURED BY THE VULCAN IRON WORKS INC. THESE PARTS ARE OBTAINABLE FROM ANY AND ALL DISTRIBUTORS OF THE VULCAN IRON WORKS INC.

How to Order Parts and Assemblies

Refer to the parts drawing in this manual that identifies the part, or assembly, with a number and a line pointing to the part, or assembly. Refer to the name of the part, or assembly, as given in this manual. USE THIS NAME in ordering parts (see pages 9-18).

To expedite the filling of parts orders, the part number MUST be given as well as the PART NAME.

Parts orders should read as follows:

- (A) MODEL AND SERIAL NUMBER of the hammer.
- (B) PART NUMBER AND NAME.
- (C) Quantity required.
- (D) Specific shipping instructions.

WARRANTY

Vulcan Iron Works Inc. warrants these Products to be in accordance with our published specifications or those specifications agreed to by us in writing at time of sale. Our obligation and liability under this warranty is expressly limited to repairing, at our option, within six months after date of delivery, any product not meeting the specifications. WE MAKE NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND MAKE NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE. Our obligation under this Warranty shall not include any transportation charges or costs of installation or any liability from direct, indirect or consequential damage or delay. If requested by us, Products or Parts for which a Warranty Claim is made are to be returned transportation prepaid to our factory. Any improper use, operation beyond rated capacity, substitution of parts not approved by us, or any alteration or repair by others shall void this Warranty.

LUBRICATION CHART

Proper lubrication in Pile Driving Hammers is most important. The specific recommendations shown should be followed. Adhering to good practices in lubrication will result in longer service life for your hammer and lower maintenance costs.

Lubricate Trip where it bears against the Open Steam Chest Head with Lubriplate No. 630 AA Grease or equal.

Swab Piston Rod with Steam Cylinder Oil prior to placing hammer in service and periodically during operation of hammer. When storing hammer, grease Piston Rod with Lubriplate No. 630AA Grease or equal.

Frequently lubricate all four columns above and below the ram with Lubriplate No. 630AA Grease or equal.

Lubricate Head Sheave with Lubriplate No. 630 AA Grease or equal.

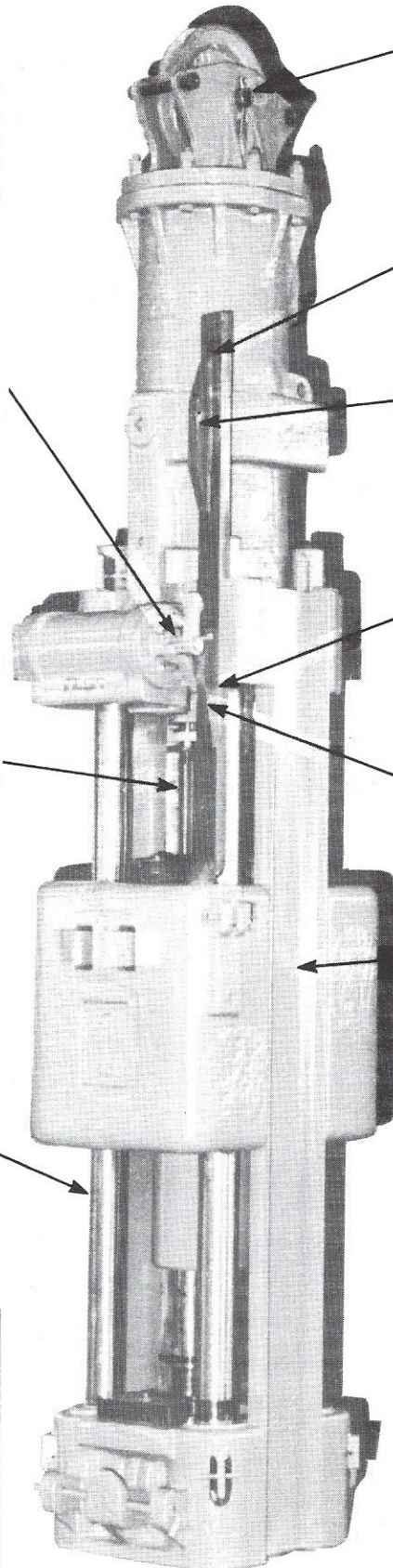
Lubricate wear surfaces of Slide Bar with Lubriplate No. 630AA Grease or equal.

Lubricate flat outer surface of Upper Wedge with Lubriplate No. 630AA Grease or equal.

Lubricate Slide Bar dovetail at lower end of cylinder with Lubriplate No. 630AA Grease or equal.

Lubricate flat outer surface of Lower Wedge with Lubriplate No. 630AA Grease or equal.

Before placing hammer in leads, lubricate Side Channels with Lubriplate No. 630AA Grease or equal.



— NOTE —

The use of hand-operated force feed lubricators is not recommended due to the intermittent feeding characteristics peculiar to this type of lubricator.

— AIR OPERATION —

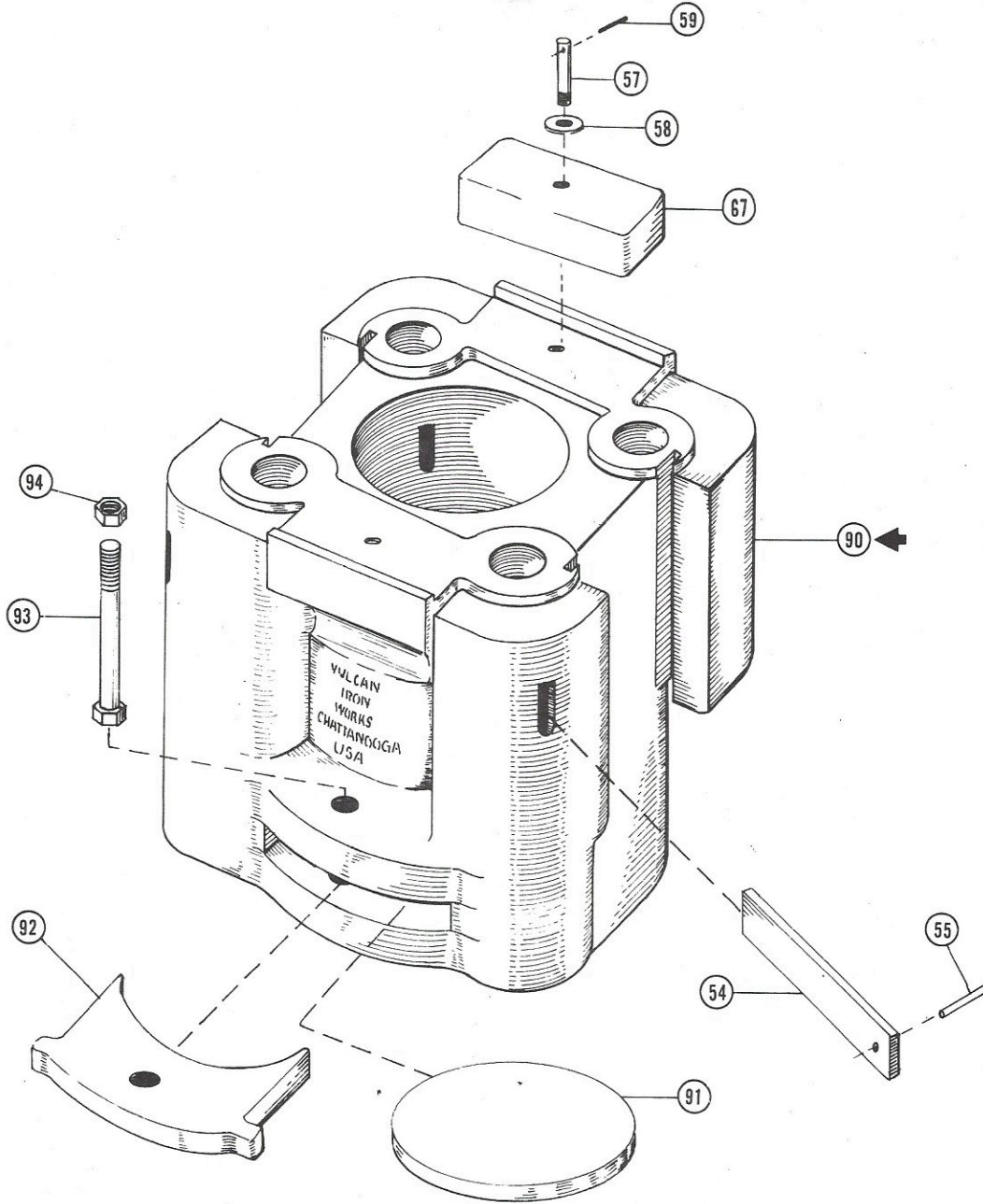
For air operation, it is recommended that a high quality Air Compressor Oil, S.A.E. 10 weight, be used for internal lubrication of the hammer. To obtain proper distribution of the oil in the air introduced into the hammer, it is recommended that a suitable air line oiler be used with the hammer.

— STEAM OPERATION —

For steam operation, it is recommended that the lubricant to be introduced into the steam should be a high-grade Steam Cylinder Oil with at least a ten percent (10%) tallow or lard oil content. To obtain proper distribution of the Steam Cylinder Oil in the steam introduced into the hammer, it is recommended that a suitable line oiler be used in the steam line.



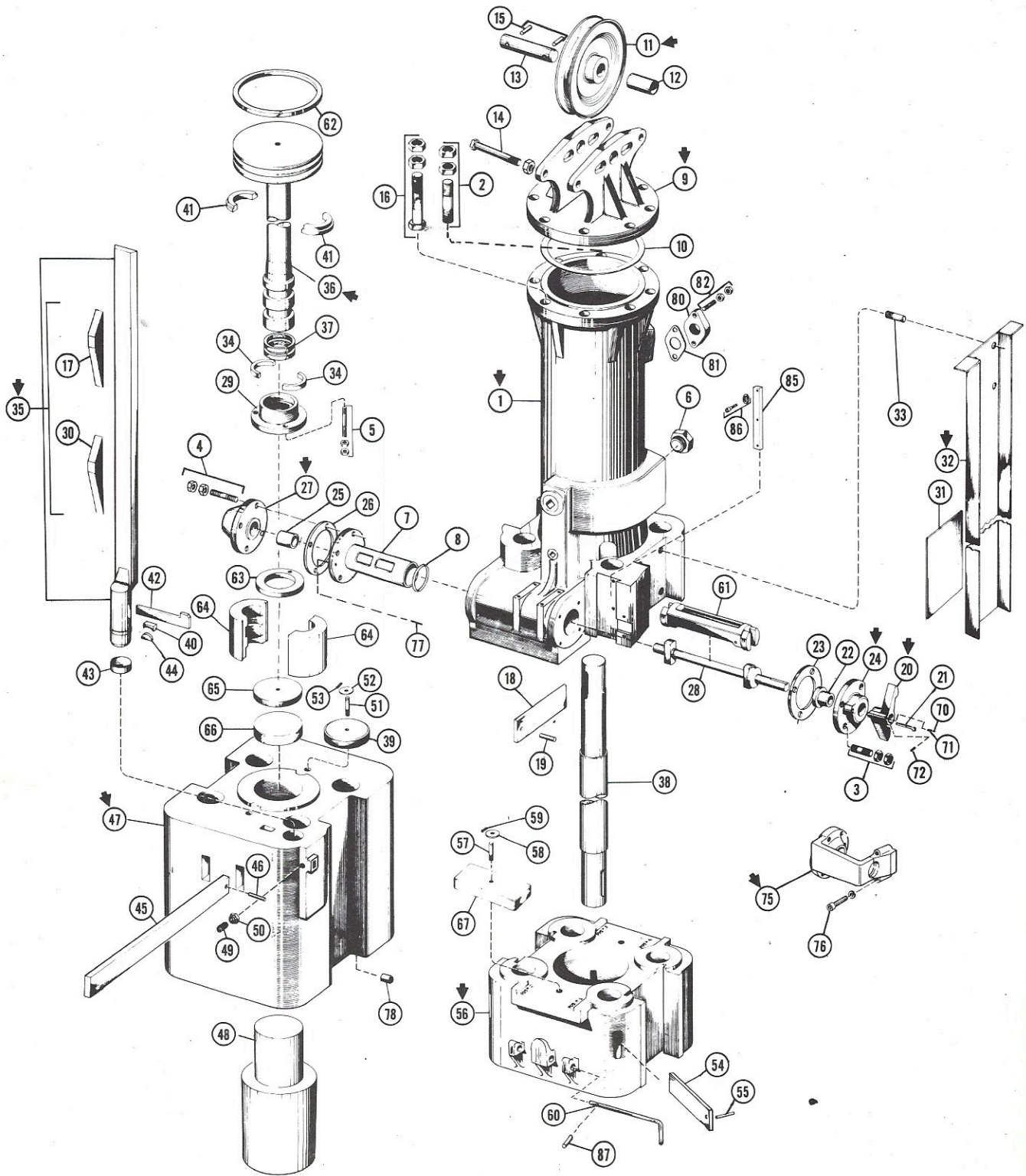
McDERMID BASE 2, 1, 106, 06



REPLACEMENT PARTS LIST

KEY NO.	DESCRIPTION	PART NO. SIZE 2	PART NO. SIZE 1	PART NO. SIZE 106	PART NO. SIZE 06
054	Lower Column Key	01V0304-4	02V0306-4	13V0304-4	03V0306-4
055	Lower Column Key Pin	01V0305-4	02V0307-4	13V0305-4	03V0307-4
057	Lower Bumper Stud	01V0306-2	02V0308-2	13V0306-2	03V0308-2
058	Washer/Bumper Stud	01V0307-2	02V0309-2	13V0307-2	03V0309-2
059	Pin/Bumper Stud	01V0308-2	02V0310-2	13V0308-2	03V0310-2
067	Lower Rubber Bumper	01V0309-2	02V0311-2	13V0309-2	03V0311-2
090	McDermid Base	01V0311-1	02V0313-1	13V0313-1	03V0313-1
091	McDermid Plate	01V0310-1	02V0312-1	13V0312-1	03V0312-1
092	McDermid Door	01V0312-1	02V0314-1	13V0314-1	03V0314-1
093	McDermid Door Bolt	01V0313-1	02V0315-1	13V0315-1	03V0315-1
093	McDermid Door Bolt Nut	01V0314-1	02V0317-1	13V0317-1	03V0317-1
094	Cotter Pin	01V0315-1	02V0316-1	13V0316-1	03V0316-1
← 090	McDermid Base Complete Incl. 54,57,58,59,67,90,91,92,93,94,55	01V0914-1	02V0914-1	13V0919-1	03V0914-1

← Indicates parts normally stocked as an assembly



← Indicates parts normally stocked as an assembly



REPLACEMENT PARTS LIST 2, 1, 06, 08, 010

KEY NO.	DESCRIPTION	PART NO. SIZE 2	PART NO. SIZE 1	PART NO. SIZE 06	PART NO. SIZE 08	PART NO. SIZE 010
←001	Cylinder Complete Incl. 1,2,3,5,7,8,4,16,6	01V0900-1	02V0900-1	03V0900-1		
←001	Cylinder Complete Incl. 1,2,3,4,5,6,7,8,85,86				04V0930-1	05V0931-1
←001	Cylinder Only Incl. 1,7,8	01V0916-1	02V0919-1	03V0918-1		
←001	Cylinder Only Incl. 1,6,7,8,85,86				04V0929-1	05V0930-1
←009	Cylinder Head Complete Incl. 9,11,12,13,14,15	01V0910-1	02V0909-1	03V0909-1	04V0909-1	05V0910-1
←011	Head Sheave Incl. 11,12	01V0909-1	02V0924-1	03V0923-1	04V0923-1	05V0924-1
←020	Trip Complete Incl. 20,70,71,72	01V0915-1	02V0911-1	03V0911-1	04V0911-1	05V0912-1
←024	Open Steam Chest Head Incl. 24,22	01V0901-1	02V0901-1	03V0901-1	04V0916-1	05V0915-1
←027	Blind Steam Chest Head Incl. 27,25	01V0902-1	02V0902-1	03V0902-1	04V0902-1	05V0902-1
←032	Side Channel Compl. Incl. 32,31,33	01V0911-2	02V0912-2	03V0912-2	04V0912-2	05V0911-2
←032	Side Channel Compl. Incl. 32,31,33 Old Style	01V0925-2	02V0917-2			
←035	Slide Bar Complete Incl. 35,17,30,44	01V0907-1	02V0907-1	03V0907-1	04V0907-1	05V0907-1
←035	Slide Bar Complete Incl. 44 Nylon	01V0908-1	02V0908-1	03V0908-1	04V0908-1	05V0908-1
←036	Piston & Rod Complete Incl. 36,37,62	01V0903-1	02V0903-1	03V0903-1	04V0903-1	05V0903-1
←047	Ram Complete Incl. 47,48,39,43,49,50,51,52,53,78	01V0905-1	02V0905-1	03V0905-1	04V0905-1	05V0905-1
←047	Ram Only Incl. Babbitt		02V0927-1	03V0926-1	04V0925-1	05V0926-1
←056	Base Complete Incl. 55,56,57,58,59,60,67,54	01V0906-1	02V0906-1	03V0906-1	04V0906-1	05V0906-1
002	Cylinder Head Stud	01V0101-2	02V0101-2	03V0101-2	04V0101-12	05V0101-12
002	Cylinder Head Stud Nut — Jam	01V0102-2	02V0102-2	03V0102-2	04V0102-12	05V0102-12
002	Cylinder Head Stud Nut — Full	01V0103-2	02V0103-2	03V0103-2	04V0103-12	05V0103-12
003	Open Steam Chest Head Stud	01V0104-4	02V0104-4	03V0104-4	04V0104-4	05V0104-4
003	Open Steam Chest Head Stud Nut — Jam	01V0105-4	02V0105-4	03V0105-4	04V0105-4	05V0105-4
003	Open Steam Chest Head Stud Nut — Full	01V0106-4	02V0106-4	03V0106-4	04V0106-4	05V0106-4
004	Blind Steam Chest Head Stud	01V0107-4	02V0107-4	03V0107-4	04V0107-4	05V0107-4
004	Blind Steam Chest Head Stud Nut — Jam	01V0108-4	02V0108-4	03V0108-4	04V0108-4	05V0108-4
004	Blind Steam Chest Head Stud Nut — Full	01V0109-4	02V0109-4	03V0109-4	04V0109-4	05V0109-4
005	Stuffing Box Stud	01V0110-3	02V0110-3	03V0110-3	04V0110-3	05V0110-3
005	Stuffing Box Stud Nut — Jam	01V0111-3	02V0111-3	03V0111-3	04V0111-3	05V0111-3
005	Stuffing Box Stud Nut — Full	01V0112-3	02V0112-3	03V0112-3	04V0112-3	05V0112-3
006	Cylinder Pipe Bushing		02V0113-1	03V0113-1	04V0113-1	05V0113-1
007	Cylinder Valve Liner	01V0113-1	02V0114-1	03V0114-1	04V0160-1	05V0160-1
008	Cylinder Valve Liner O-Ring Gasket	01V0114-1	02V0115-1	03V0115-1	04V0115-1	05V0115-1
009	Cylinder Head — Standard	01V0129-1	02V0130-1	03V0130-1	04V0133-1	05V0133-1
010	Cylinder Head Gasket	01V0116-1	02V0117-1	03V0117-1	04V0117-1	05V0117-1
012	Head Sheave Bushing	01V0138-1	02V0135-1	03V0135-1	04V0137-1	05V0137-1
013	Sheave Pin	01V0139-1	02V0136-1	03V0136-1	04V0138-1	05V0138-1
014	Cross Cylinder Head Bolt	01V0140-2	02V0137-2	03V0137-2	04V0139-2	05V0139-2
014	Cross Cylinder Head Bolt Nut	01V0141-2	02V0138-2	03V0138-2	04V0140-2	05V0140-2
015	Sheave Pin - Cotter	01V0142-2	02V0139-2	03V0139-2	04V0141-2	05V0141-2
016	Cylinder Head Bolt	01V0143-6	02V0140-6	03V0140-6		
016	Cylinder Head Bolt Nut — Full	01V0144-12	02V0141-12	03V0141-12		
017	Upper Wedge	01V0207-1	02V0207-1	03V0207-1	04V0207-1	05V0207-1
018	Upper Column Key	01V0302-4	02V0304-4	03V0304-4	04V0304-4	05V0304-4
018	Upper Column Key — Oversize		02V0318-4	03V0318-4	04V0312-4	05V0312-4
019	Upper Column Key Pin	01V0303-4	02V0305-4	03V0305-4	04V0305-4	05V0305-4
021	Trip Key	01V0147-1	02V0142-1	03V0142-1	04V0142-1	05V0142-1
022	Open Steam Chest Head Bushing	01V0118-1	02V0119-1	03V0119-1	04V0119-1	05V0119-1
023	Open Steam Chest Head Gasket	01V0120-1	02V0121-1	03V0121-1	04V0124-1	05V0124-1
025	Blind Steam Chest Head Bushing	01V0122-1	02V0123-1	03V0123-1	04V0126-1	05V0126-1
026	Blind Steam Chest Head Gasket	01V0123-1	02V0124-1	03V0124-1	04V0127-1	05V0127-1
028	Valve Stem	01V0124-1	02V0125-1	03V0125-1	04V0128-1	05V0128-1
029	Gland	01V0125-1	02V0126-1	03V0126-1	04V0129-1	05V0129-1
030	Lower Wedge	01V0208-1	02V0208-1	03V0208-1	04V0208-1	05V0208-1
031	Bottom Plate — Side Channel	01V0501-2	02V0501-2	03V0501-2	04V0501-2	05V0501-2
033	Channel Rivet Stud	01V0502-8	02V0502-8	03V0502-8	04V0502-12	05V0502-12
034	Gland Bushing	01V0126-1	02V0127-1	03V0127-1	04V0130-1	05V0130-1
036	Piston & Rod	01V0400-1	02V0400-1	03V0400-1	04V0400-1	05V0400-1
037	Piston & Rod Packing	01V0401-2	02V0401-2	03V0401-2	04V0401-3	05V0401-3
038	Column	01V0301-4	02V0303-4	03V0303-4	04V0303-4	05V0303-4
039	Upper Rubber Bumper	01V0224-2	02V0224-2	03V0224-2	04V0224-2	05V0224-2
040	Slide Bar Key Block	01V0211-1	02V0211-1	03V0211-1	04V0211-1	05V0211-1
041	Junk Ring	01V0127-1	02V0128-1	03V0128-1	04V0131-1	05V0131-1

4178, 25

← Indicates parts normally stocked as an assembly



REPLACEMENT PARTS LIST 2, 1, 06, 08, 010

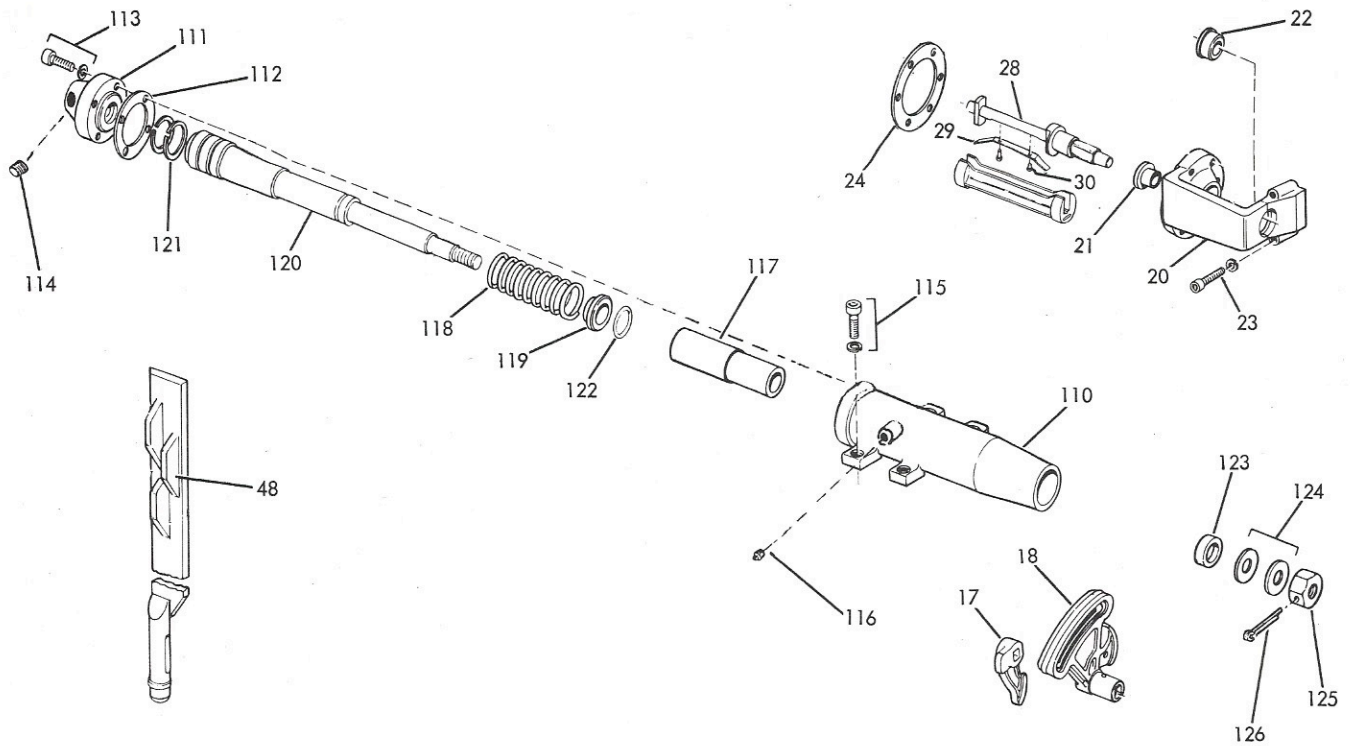
KEY NO.	DESCRIPTION	PART NO. SIZE 2	PART NO. SIZE 1	PART NO. SIZE 06	PART NO. SIZE 08	PART NO. SIZE 010
042	Slide Bar Key	01V0213-1	02V0213-1	03V0213-1	04V0213-1	05V0213-1
043	Slide Bar End Block	01V0214-1	02V0214-1	03V0214-1	04V0214-1	05V0214-1
044	Slide Bar Key Block Seat	01V0212-1	02V0212-1	03V0212-1	04V0212-1	05V0212-1
045	Ram Key	01V0205-2	02V0205-2	03V0205-2	04V0205-2	05V0205-2
046	Ram Key Pin	01V0206-2	02V0206-2	03V0206-2	04V0206-2	05V0206-2
048	Ram Point	01V0201-1	02V0201-1	03V0201-1	04V0201-1	05V0201-1
049	Set Screw for Slide Bar Key	01V0203-2	02V0203-2	03V0203-2	04V0203-2	05V0203-2
050	Lock Nut for Set Screw — Jam	01V0204-2	02V0204-2	03V0204-2	04V0204-2	05V0204-2
051	Upper Bumper Stud	01V0217-2	02V0217-2	03V0217-2	04V0217-2	05V0217-2
052	Washer/Bumper Stud	01V0218-2	02V0218-2	03V0218-2	04V0218-2	05V0218-2
053	Pin/Bumper Stud	01V0219-2	02V0219-2	03V0219-2	04V0219-2	05V0219-2
054	Lower Column Key	01V0304-4	02V0306-4	03V0306-4	04V0306-4	05V0306-4
054	Lower Column Key — Oversize		02V0319-4	03V0319-4	04V0313-4	05V0313-4
055	Lower Column Key Pin	01V0305-4	02V0307-4	03V0307-4	04V0307-4	05V0307-4
056	Base	01V0300-1	02V0300-1	03V0300-1	04V0300-1	05V0300-1
057	Lower Bumper Stud	01V0306-2	02V0308-2	03V0308-2	04V0308-2	05V0308-2
058	Washer/Bumper Stud	01V0307-2	02V0309-2	03V0309-2	04V0309-2	05V0309-2
059	Pin/Bumper Stud	01V0308-2	02V0310-2	03V0310-2	04V0310-2	05V0310-2
060	Lock Bar		02V0301-2	03V0301-2	04V0301-2	05V0301-2
061	Valve	01V0128-1	02V0129-1	03V0129-1	04V0132-1	05V0132-1
062	Piston Ring	01V0402-2	02V0402-2	03V0402-2	04V0402-2	05V0402-2
062	Piston Ring — Std. Oversize*	01V0403-2	02V0403-2	03V0403-2	04V0403-2	05V0403-2
063	Ram Key Ring	01V0221-1	02V0221-1	03V0221-1	04V0221-1	05V0221-1
064	Split Bushing	01V0215-1	02V0215-1	03V0215-1	04V0215-1	05V0215-1
065	Ram Plate	01V0222-1	02V0222-1	03V0222-1	04V0222-1	05V0222-1
066	Ram Cushion	01V0216-1	02V0216-1	03V0216-1	04V0216-1	05V0216-1
067	Lower Rubber Bumper	01V0309-2	02V0311-2	03V0311-2	04V0311-2	05V0311-2
070	Set Screw — Ball Nose Spring Loaded Pin	01V0131-1	02V0132-1	03V0132-1	04V0135-1	05V0135-1
071	Ball Nose Spring Loaded Pin	01V0130-1	02V0131-1	03V0131-1	04V0134-1	05V0134-1
072	Trip Set Screw	01V0150-1	02V0152-1	03V0152-1	04V0159-1	05V0159-1
077	Cylinder Valve Liner Dowel Pin	01V0115-1	02V0116-1	03V0116-1	04V0116-1	05V0116-1
078	Ram Point Pin	01V0202-2	02V0202-2	03V0202-2	04V0202-2	05V0202-2
080	Pipe Flange	01V0145-1				
081	Pipe Flange Gasket	01V0146-1				
082	Pipe Flange Stud	01V0132-2				
082	Pipe Flange Stud Nut — Full	01V0133-2				
082	Pipe Flange Stud Nut — Jam	01V0134-2				
085	Dovetail Insert				04V0149-1	05V0149-1
086	Dovetail Insert Fastener Bolt				04V0150-3	05V0150-3
086	Dovetail Insert Fastener Bolt Lock Washer				04V0151-3	05V0151-3
087	Lock Bar Pin		02V0302-2	03V0302-2	04V0302-2	05V0302-2

NON CURRENT

← 001	Cylinder W/O Steam Belt Complete Incl. 1,2,3,4,5,7,8,23,75,76,22				04V0900-1	05V0900-1
← 001	Cylinder W/O Steam Belt Only Incl. 1,7,8,22,75,76				04V0917-1	05V0918-1
← 001	Cylinder with Steam Belt Complete Incl. 1,7,8,2,3,4,5				04V0928-1	05V0929-1
← 001	Cylinder with Steam Belt Only Incl. 1,7,8,6				04V0927-1	05V0928-1
← 007	Cylinder Valve Liner				04V0114-1	05V0114-1
← 075	Open Steam Chest Head Guard — Fabricated Incl. 75, 22				04V0901-1	05V0901-1
← 076	Bolt for Outboard Bearing Guard				04V0120-2	05V0120-2
← 076	Open Steam Chest Head Guard Washer				04V0121-2	05V0121-2
080	Pipe Flange					05V0144-1
081	Pipe Flange Gasket					05V0145-1
082	Pipe Flange Stud					05V0146-4
082	Pipe Flange Stud Nut — Full					05V0147-4
082	Pipe Flange Stud Nut — Jam					05V0148-4

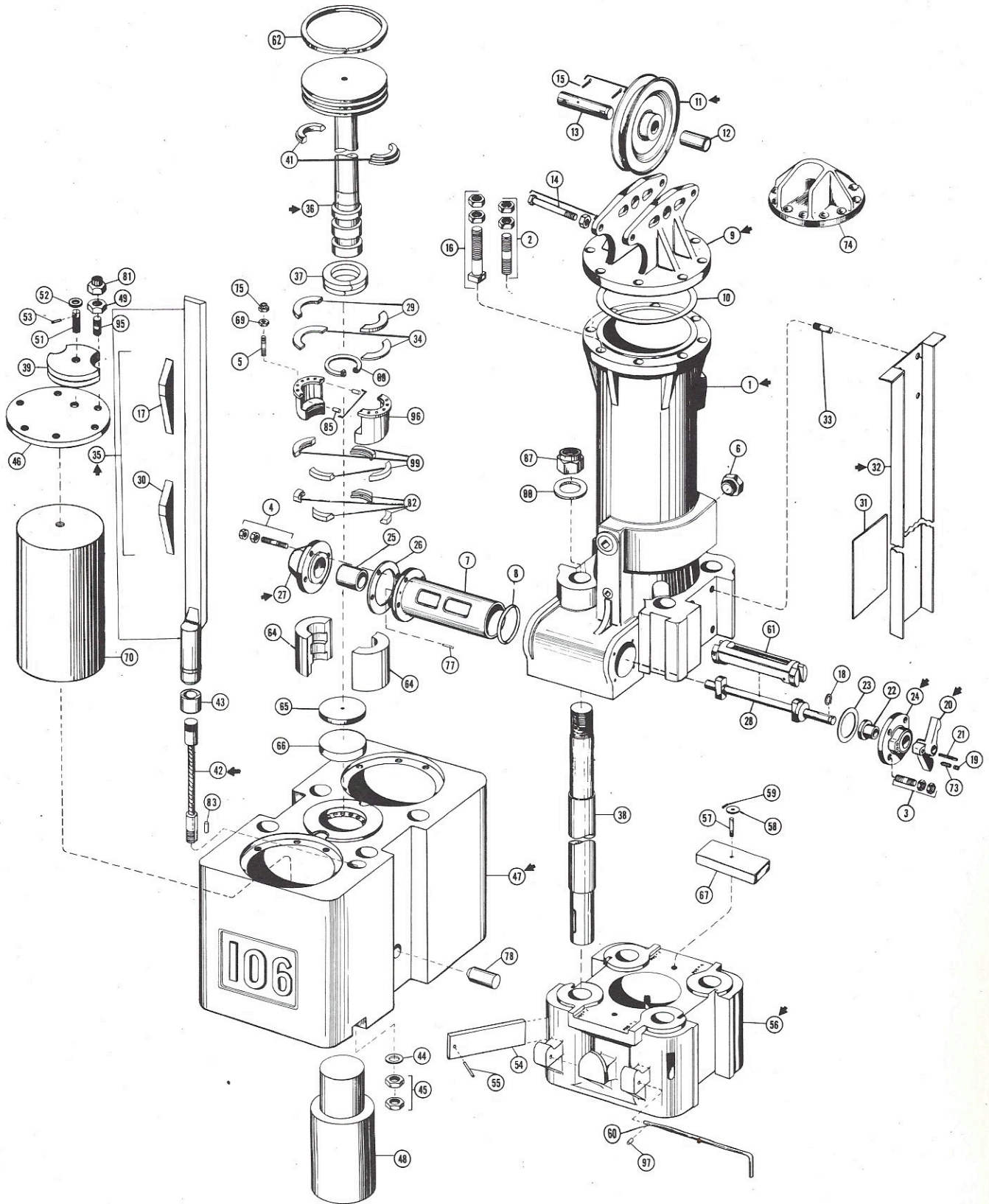
*Standard Oversize Piston Rings are carried in stock 3/32" over standard size. Any other oversize rings shall be considered as special.

← Indicates parts normally stocked as an assembly



Key No.	Description	Part No. Size 08	Part No. Size 010	Part No. Size 014	Part No. Size 016	Part No. Size 020
017	Fixed Trip	04J0701-1	05J0701-1	06J0701-1	07J0701-1	08J0701-1
018	Movable Trip	04J0700-1	05J0700-1	06J0700-1	07J0700-1	08J0700-1
020	Open Steam Chest Head Bracket	04J0723-1	05J0723-1	06J0723-1	07J0723-1	08J0723-1
021	Open Steam Chest Head Inboard Bushing	04J0724-1	05J0724-1	06J0724-1	07J0724-1	08J0724-1
022	Open Steam Chest Head Outboard Bushing	04J0725-1	05J0725-1	06J0725-1	07J0725-1	08J0725-1
023	Open Steam Chest Head Bracket - Bolt	04J0726-2	05J0726-2	06J0726-2	07J0726-2	08J0726-2
023	Open Steam Chest Head Bracket - Washer	04J0727-2	05J0727-2	06J0727-2	07J0727-2	08J0727-2
024	Open Steam Chest Head Gasket	04J0729-1	05J0729-1	06J0729-1	07J0729-1	08J0729-1
028	Valve Stem - Trip Shifting	04J0731-1	05J0731-1	06J0731-1	07J0731-1	08J0731-1
029	Valve Spring			06J0732-1	07J0732-1	08J0732-1
030	Valve Spring Rivet			06J0733-1	07J0733-1	08J0733-1
110	Cylinder - Trip Shifting	04J0702-1	05J0702-1	06J0702-1	07J0702-1	08J0702-1
111	Cylinder Head - Trip Shifter	04J0708-1	05J0708-1	06J0708-1	07J0708-1	08J0708-1
112	Cylinder Head Gasket - Trip Shifter	04J0709-1	05J0709-1	06J0709-1	07J0709-1	08J0709-1
113	Cylinder Head Cap Screws	04J0710-4	05J0710-4	06J0710-4	07J0710-4	08J0710-4
113	Cylinder Head Cap Screws Washers	04J0711-4	05J0711-4	06J0711-4	07J0711-4	08J0711-4
114	Cylinder Head Pipe Plug	04J0712-1	05J0712-1	06J0712-1	07J0712-1	08J0712-1
115	Cylinder Bolts	04J0703-4	05J0703-4	06J0703-4	07J0703-4	08J0703-4
115	Cylinder Bolt Washers	04J0704-4	05J0704-4	06J0704-4	07J0704-4	08J0704-4
116	Cylinder Pipe Plug	04J0707-1	05J0707-1	06J0707-1	07J0707-1	08J0707-1
117	Cylinder Sleeve - Trip Shifter	04J0720-1	05J0720-1	06J0720-1	07J0720-1	08J0720-1
118	Compression Spring	04J0721-1	05J0721-1	06J0721-1	07J0721-1	08J0721-1
119	Compression Spring Seat	04J0722-1	05J0722-1	06J0722-1	07J0722-1	08J0722-1
120	Piston - Trip Shifting	04J0713-1	05J0713-1	06J0713-1	07J0713-1	08J0713-1
121	Piston Rings	04J0714-2	05J0714-2	06J0714-2	07J0714-2	08J0714-2
122	Piston Seal O-Ring	04J0715-1	05J0715-1	06J0715-1	07J0715-1	08J0715-1
123	Piston Collar	04J0716-1	05J0716-1	06J0716-1	07J0716-1	08J0716-1
124	Piston Washers	04J0717-2	05J0717-2	06J0717-2	07J0717-2	08J0717-2
125	Piston Nut	04J0718-1	05J0718-1	06J0718-1	07J0718-1	08J0718-1
126	Cotter Key For Piston Nut	04J0719-1	05J0719-1	06J0719-1	07J0719-1	08J0719-1
←	110 Vari-Cycle Cylinder Compl.	04J0900-1	05J0900-1	06J0900-1	07J0900-1	08J0900-1
←	020 Open Steam Chest Head Bracket Compl.	04J0901-1	05J0901-1	06J0905-1	07J0905-1	08J0905-1
←	028 Valve Stem Compl.	04J0902-1	05J0902-1	06J0906-1	07J0906-1	08J0903-1
←	048 Slide Bar Nylon Compl. Incl.	04J0903-1	05J0903-1	06J0902-1	07J0902-1	08J0910-1
←	048 Slide Bar Compl. Steel			06J0901-1	07J0901-1	08J0909-1

← Indicates parts normally stocked as an assembly



← Indicates parts normally stocked as an assembly

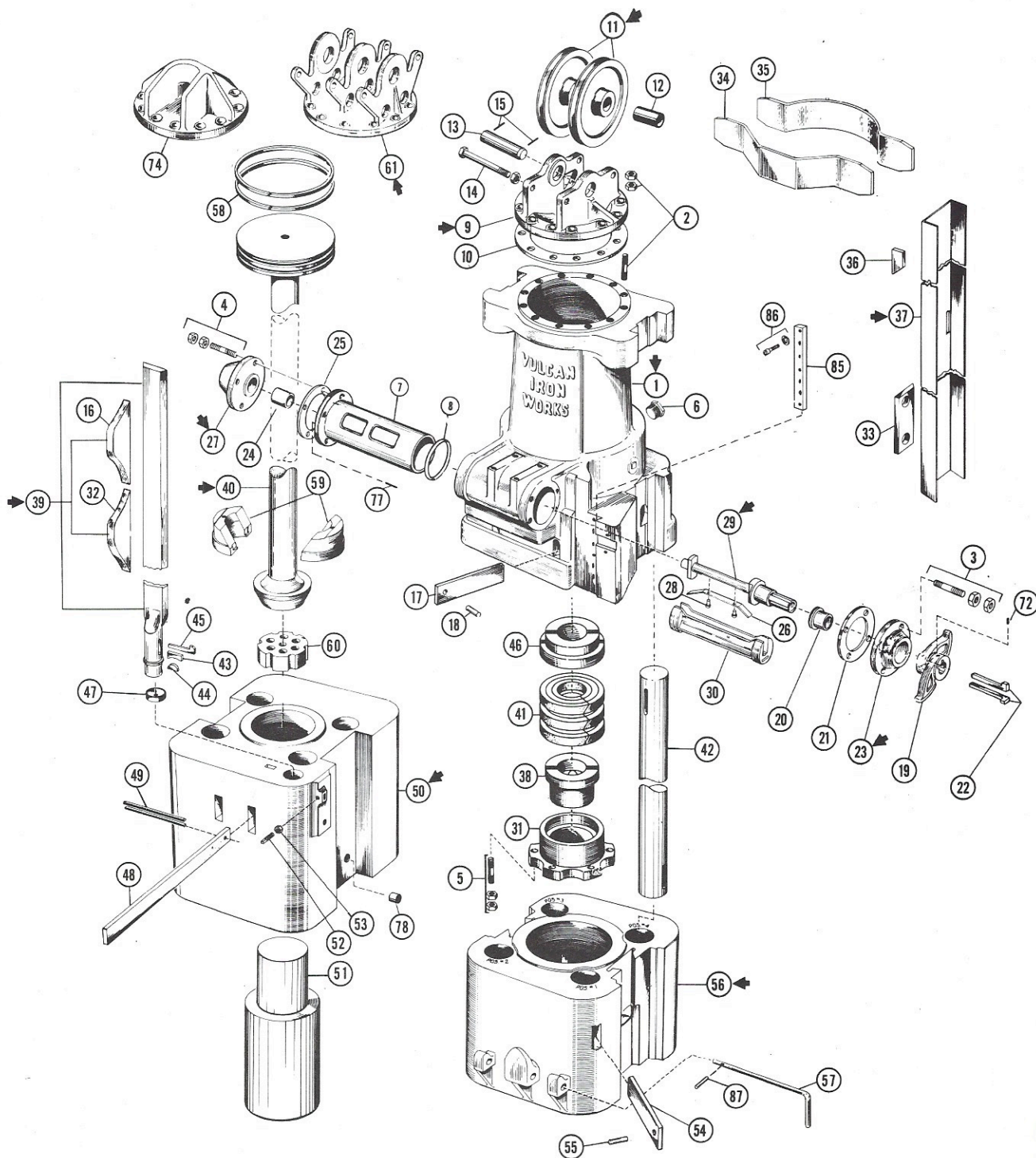


REPLACEMENT PARTS LIST 106

KEY NO.	DESCRIPTION	PART NO.
← 001	Cylinder Complete Incl. 1,2,3,4,6,7,8,16	13V0900-1
← 001	Cylinder Only Incl. 1,7,8	13V0918-1
← 009	Cylinder Head Complete Incl. 9,11,12,13,14,15	13V0908-1
← 011	Head Sheave Complete Incl. 11,12	13V0909-1
← 020	Trip Complete Incl. 20,19,73	13V0912-1
← 024	Open Steam Chest Head Incl. 24,22	13V0901-1
← 027	Blind Steam Chest Head Incl. 27,25	13V0902-1
← 032	Side Channel Complete Incl. 32,31,33	13V0910-2
← 035	Slide Bar Complete Incl. 37,17,30,	13V0906-1
← 035	Slide Bar Nylon Complete Incl. 35,17,30	13V0907-1
← 036	Piston & Rod Complete Incl. 36,37,62	13V0903-1
← 042	Slide Bar Cable Tie Complete Incl. 42,44,45,83	13V0913-1
← 047	Ram Complete Incl. 47,39,43,46,48,49,51, 52,53,81,95	13V0916-1
← 047	Ram Only Incl. 47,39,43,46,49,51,52,53,70,81,95	13V0915-1
← 047	Ram Complete Incl. 47,39,43,46,48,49,51, 52,53,70,81,95	13V0917-1
← 047	Ram Only Incl. 47,39,43,46,49,51,52,53,81,95	13V0914-1
← 047	Ram Complete Incl. 47,48	13V0904-1
← 056	Base Complete Incl. 56,54,55,57,58,59,60,67,97	13V0905-1

KEY NO.	DESCRIPTION	PART NO.	KEY NO.	DESCRIPTION	PART NO.
002	Cylinder Head Stud	13V0101-2	039	Upper Rubber Bumper	13V0214-2
002	Cylinder Head Stud Nut - Jam	13V0102-2	041	Junk Ring	13V0128-1
002	Cylinder Head Stud Nut - Full	13V0103-2	043	Slide Bar End Block	13V0207-1
003	Open Steam Chest Head Stud	13V0104-4	044	Washer For Cable Tie Slide Bar	13V0218-1
003	Open Steam Chest Head Stud Nut - Jam	13V0105-4	045	Slide Bar Cable Tie - Nut - Jam	13V0217-2
003	Open Steam Chest Head Stud Nut - Full	13V0106-4	046	Retaining Cap	13V0224-2
004	Blind Steam Chest Head Stud	13V0107-4	048	Ram Point	13V0201-1
004	Blind Steam Chest Head Stud Nut - Jam	13V0108-4	049	Retaining Cap Stud Nuts - Jam	13V0226-12
004	Blind Steam Chest Head Stud Nut - Full	13V0109-4	051	Upper Bumper Stud	13V0210-2
005	Ram Retainer Split Ring Studs	13V0220-12	052	Washer/ Bumper Stud	13V0211-2
006	Cylinder Pipe Bushing	13V0110-1	053	Pin/ Bumper Stud	13V0212-1
007	Cylinder Valve Liner	13V0111-1	054	Lower Column Key	13V0304-4
008	Cylinder Valve Liner O-Ring Gasket	13V0112-1	055	Lower Column Key Pin	13V0305-4
009	Cylinder Head - Standard	13V0114-1	056	Base	13V0300-1
010	Cylinder Head Gasket	13V0115-1	057	Lower Bumper Stud	13V0306-2
011	Head Sheave	13V0130-1	058	Washer/ Bumper Stud	13V0307-2
012	Head Sheaving Bushing	13V0131-1	059	Pin/ Bumper Stud	13V0308-2
013	Sheave Pin	13V0132-1	060	Lock Bar	13V0301-2
014	Cross Cylinder Head Bolt	13V0133-2	061	Valve	13V0129-1
014	Cross Cylinder Head Bolt Nut	13V0134-2	062	Piston Rings	13V0402-2
015	Sheave Pin - Cotter	13V0135-2	064	Split Bushing	13V0208-1
016	Cylinder Head Bolt	13V0136-6	065	Ram Plate	13V0213-1
016	Cylinder Head Bolt Nut - Full	13V0137-12	066	Ram Cushion	13V0209-1
017	Upper Wedge	13V0203-1	067	Lower Rubber Bumper	13V0309-2
018	Snap Ring - Valve Stem	13V0139-1	069	Ram Retainer Nut - Jam	13V0231-12
019	Set Screw - Ball Nose Spring-Loaded Pin	13V0124-1	070	Weight Insert	13V0221-2
021	Trip Key	13V0138-1	073	Ball Nose Spring-Loaded Pin	13V0123-1
022	Open Steam Chest Head Bushing	13V0117-1	074	Bar Type Cylinder Head	13V0150-1
023	Open Steam Chest Head Gasket	13V0119-1	075	Ram Retainer Nut - Lock Nut	13V0230-12
025	Blind Steam Chest Head Bushing	13V0121-1	077	Cylinder Valve Liner - Dowel Pin	13V0113-1
026	Blind Steam Chest Head Gasket	13V0122-1	078	Ram Point Pin	13V0202-2
028	Valve Stem	13V0127-1	081	Retainer Cap Locknut	13V0227-12
029	Split Packing Ring	13V0146-1	082	Ram Retainer Segmental Split Bushing	13V0228-1
030	Lower Wedge	13V0204-1	083	Cable Fitting - Dowel Pin	13V0229-1
031	Bottom Plate - Side Channel	13V0501-2	085	Ram Retainer Split Ring Dowel Pin	13V0222-4
033	Channel Rivet Stud	13V0502-8	087	Column Nuts	13V0310-4
034	Split Gland Spare Washer	13V0147-1	088	Column Washer	13V0311-4
034	Split Gland Spare Washer	13V0148-1	089	Snap Ring - Stuffing Box	13V0141-1
036	Piston & Rod	13V0400-1	095	Retaining Cap - Studs	13V0225-12
037	Piston & Rod Packing	13V0401-1	096	Ram Retainer Split Ring	13V0219-1
038	Columns	13V0303-4	097	Lock Bar Pin	13V0302-2
			099	Ram Retainer Segmental Pressure Ring	13V0223-1

← Indicates parts normally stocked as an assembly



← Indicates parts normally stocked as an assembly



REPLACEMENT PARTS LIST 014, 016, 020

Key No.	Description	Part No. Size 014	Part No. Size 016	Part No. Size 020
← 001	Cylinder Complete Incl. 1,2,3,4,5,6,7,8	06V0900-1	07V0900-1	08V0900-1
← 001	Cylinder Only Incl. 1,7,8	06V0914-1	07V0914-1	08V0914-1
← 009	Cylinder Head Complete Incl. 9,11,12,13,14,15	06V0909-1	07V0909-1	
← 011	Head Sheave Incl. 11,12	06V0919-2	07V0919-2	08V0919-2
← 019	Trip Complete Incl. 19,70,71,72	06V0931-1	07V0931-1	08V0931-1
← 023	Open Steam Chest Head Incl. 23,20	06V0901-1	07V0901-1	08V0901-1
← 027	Blind Steam Chest Head Incl. 27,24	06V0902-1	07V0902-1	08V0902-1
← 029	Valve Stem Complete Incl. 29,26,28	06V0908-1	07V0908-1	08V0909-1
← 037	Side Channels Complete Incl. 37,33	06V0913-2	07V0913-2	08V0913-2
← 039	Slide Bar Complete Incl. 16,32,39,44	06V0907-1	07V0907-1	08V0907-1
← 039	Slide Bar Nylon Complete Incl. 39,32,44,16	06V0910-1	07V0910-1	08V0908-1
← 040	Piston & Rod Complete Incl. 40,41,58	06V0903-1	07V0903-1	08V0903-1
← 050	Ram Complete Incl. 50,51,52,53,47	06V0905-1	07V0905-1	08V0905-1
← 050	Ram Only Incl. Babbitt	06V0921-1	07V0921-1	08V0921-1
← 056	Base Complete Incl. 56,57,54,55	06V0906-1	07V0906-1	08V0906-1
← 061	Cylinder Head Complete Incl. 61,11,12,13,14,15			08V0910-1
002	Cylinder Head Stud	06V0101-12	07V0101-12	08V0101-12
002	Cylinder Head Stud Nut - Jam	06V0102-12	07V0102-12	08V0102-12
002	Cylinder Head Stud Nut - Full	06V0103-12	07V0103-12	08V0103-12
003	Open Steam Chest Head Stud	06V0104-6	07V0104-6	08V0104-6
003	Open Steam Chest Head Stud Nut - Jam	06V0105-6	07V0105-6	08V0105-6
003	Open Steam Chest head Stud Nut - Full	06V0106-6	07V0106-6	08V0106-6
004	Blind Steam Chest Head Stud	06V0107-6	07V0107-6	08V0107-6
004	Blind Steam Chest Head Stud Nut - Jam	06V0108-6	07V0108-6	08V0108-6
004	Blind Steam Chest Head Stud Nut - Full	06V0109-6	07V0109-6	08V0109-6
005	Stuffing Box Stud	06V0110-6	07V0110-6	08V0110-8
005	Stuffing Box Stud Nut - Jam	06V0111-6	07V0111-6	08V0111-8
005	Stuffing Box Stud Nut - Full	06V0112-6	07V0112-6	08V0112-8
006	Cylinder Pipe Bushing	06V0113-1	07V0113-1	08V0113-1
007	Cylinder Valve Liner	06V0117-1	07V0117-1	08V0114-1
008	Cylinder Valve Line O-Ring Gasket	06V?118-1	07V0118-1	08V0115-1
009	Cylinder Head - Standard	06V0136-1	07V0136-1	
010	Cylinder Head Gasket	06V0121-1	07V0121-1	08V0118-1
012	Head Sheave Bushing	06V0140-2	07V0140-2	08V0137-2
013	Sheave Pin	06V0141-1	07V0141-1	08V0138-1
014	Cross Cylinder Head Bolt	06V0142-2	07V0142-2	
014	Cross Cylinder Head Bolt Nut	06V0143-2	07V0143-2	
014	Cross Cylinder Head Stud			08V0139-2
014	Cross Cylinder Head Stud Nut			08V0140-4
015	Sheave Pin - Cotter	06V0144-2	07V0144-2	08V0141-2
016	Upper Wedge	06V0207-1	07V0207-1	08V0207-1
017	Upper Column Key	06V0304-4	07V0304-4	08V0304-4
018	Roll Pin For Upper Column Key	06V0305-4	07V0305-4	08V0305-4
019	Trip	06V0122-1	07V0122-1	08V0119-1
020	Open Steam Chest Head Bushing	06V0123-1	07V0123-1	08V0120-1
021	Open Steam Chest Head Gasket	06V0125-1	07V0125-1	08V0122-1
022	Trip Key	06V0145-2	07V0145-2	08V0142-1
024	Blind Steam Chest Head Bushing	06V0127-1	07V0127-1	08V0124-1
025	Blind Steam Chest Head Gasket	06V0128-1	07V0128-1	08V0125-1
026	Valve Spring	06V0129-1	07V0129-1	08V0126-1
028	Valve Spring Rivet	06V0130-1	07V0130-1	08V0127-1
030	Valve	06V0135-1	07V0135-1	08V0132-1
031	Gland	06V0132-1	07V0132-1	08V0129-1
032	Lower Wedge	06V0208-1	07V0208-1	08V0208-1
033	Bottom Plate - Side Channel	06V0501-2	07V0501-2	08V0501-2
034	Belly Band - Front	06V0502-1	07V0502-1	08V0502-1
035	Belly Band - Rear	06V0503-1	07V0503-1	08V0503-1
036	Channel Stop Block	06V0504-8	07V0504-8	08V0504-8
038	Gland Bushing	06V0133-1	07V0133-1	08V0130-1
040	Piston & Rod	06V0400-1	07V0400-1	08V0400-1
041	Piston & Rod Packing	06V0401-3	07V0401-3	08V0401-3
042	Column	06V0303-4	07V0303-4	08V0303-4
043	Slide Bar Key Block	06V0211-1	07V0211-1	08V0211-1
044	Slide Bar Key Block Seat	06V0212-1	07V0212-1	08V0212-1
045	Slide Bar Key	06V0213-1	07V0213-1	08V0213-1
046	Junk Ring	06V0134-1	07V0134-1	08V0131-1

← Indicates parts normally stocked as an assembly



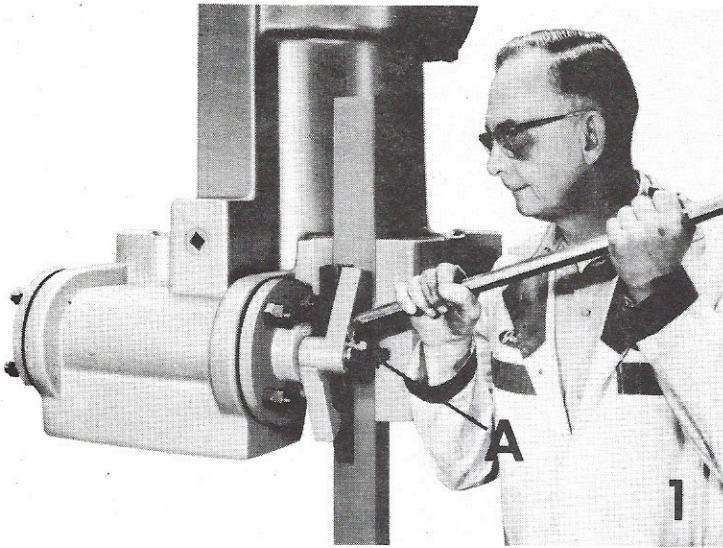
REPLACEMENT PARTS LIST 014, 016, 020

Key No.	Description	Part. No. Size 014	Part No. Size 016	Part No. Size 020
047	Slide Bar End Block	06V0214-1	07V0214-1	08V0214-1
048	Ram Key	06V0205-2	07V0205-2	08V0205-2
049	Ram Key Pin	06V0206-2	07V0206-2	08V0206-2
051	Ram Point	06V0201-1	07V0201-1	08V0201-1
052	Set Screw For Slide Bar Key	06V0203-2	07V0203-2	08V0203-2
053	Lock Nut For Set Screw - Jam	06V0204-2	07V0204-2	08V0204-2
054	Lower Column Key	06V0306-4	07V0306-4	08V0306-4
055	Lower Column Key Pin	06V0307-4	07V0307-4	08V0307-4
056	Base	06V0300-1	07V0300-1	08V0300-1
057	Lock Bar	06V0301-2	07V0301-2	08V0301-2
058	Piston Rings	06V0404-2	07V0404-2	08V0404-2
058	Piston Rings - Standard Oversize*	06V0405-2	07V0405-2	08V0405-2
059	Split Bushing	06V0215-1	07V0215-1	08V0215-1
060	Ram Cushion	06V0216-1	07V0216-1	08V0216-1
061	Cylinder Head - Standard			08V0133-1
072	Trip Set Screw	06V0146-1	07V0146-1	08V0152-1
074	Cylinder Head - Bar Type	06V0120-1	07V0120-1	08V0117-1
077	Cylinder Valve Liner Dowel Pin	06V0119-1	07V0119-1	08V0116-1
078	Ram Point Pin	06V0202-2	07V0202-2	08V0202-2
085	Dovetail Insert	06V0114-1	07V0114-1	08V0144-1
086	Dovetail Insert Bolt	06V0115-8	07V0115-8	08V0145-7
086	Dovetail Insert Bolt Washer	06V0116-8	07V0116-8	08V0146-7
087	Lock Bar Pin	06V0302-2	07V0302-2	08V0302-2

*Standard Oversize Piston Rings are carried in stock 3/32" over standard size.
Any other oversize rings shall be considered as special.

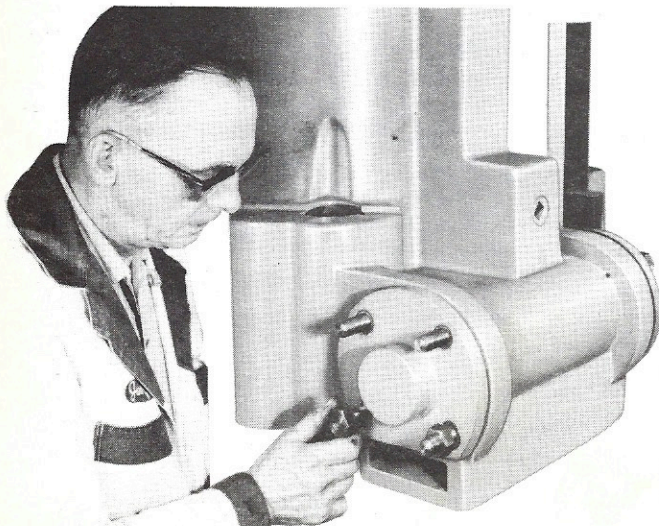
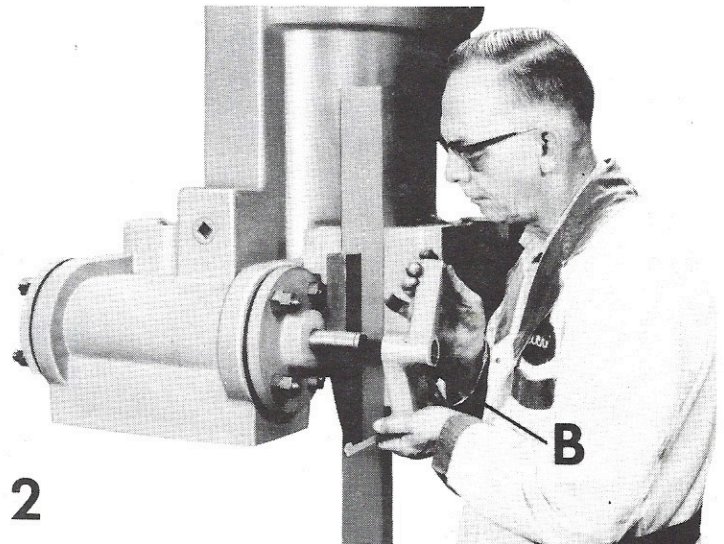
INSTRUCTIONS FOR SETTING VALVE

Hammers Without Valve Liners

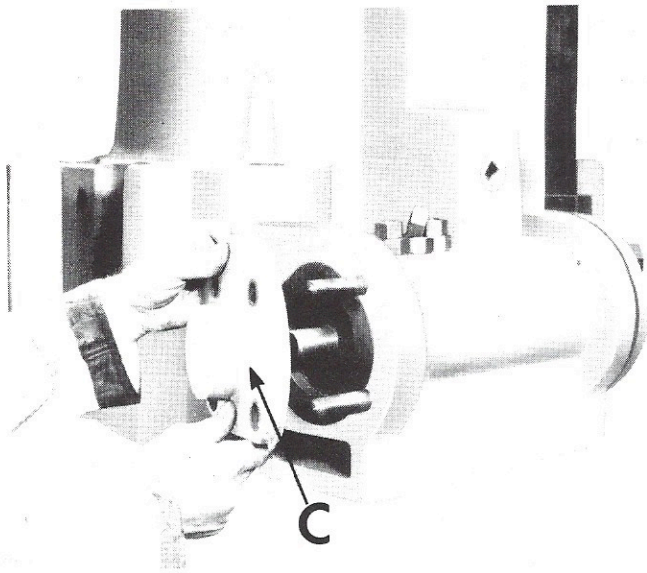


Loosen set screw and remove trip key, A, from trip and valve stem at open steam chest head end of steam chest (as shown in Figure 1).

Remove trip, B, from valve stem
(as shown in Figure 2).



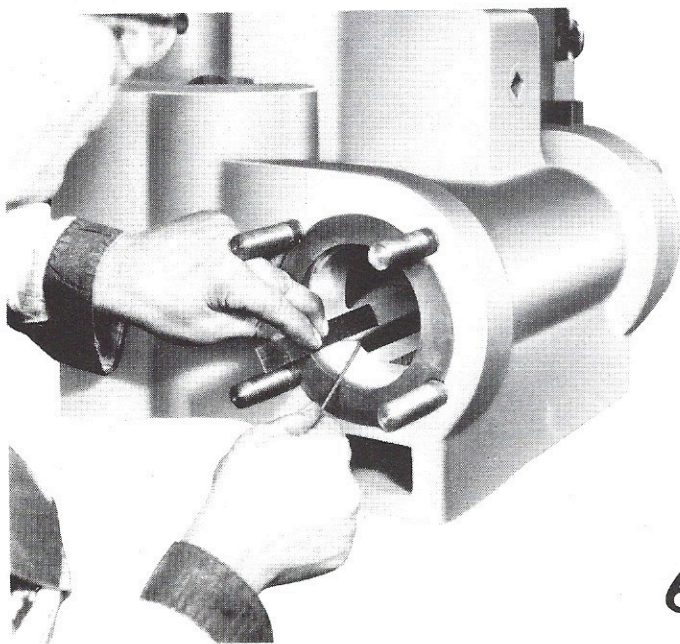
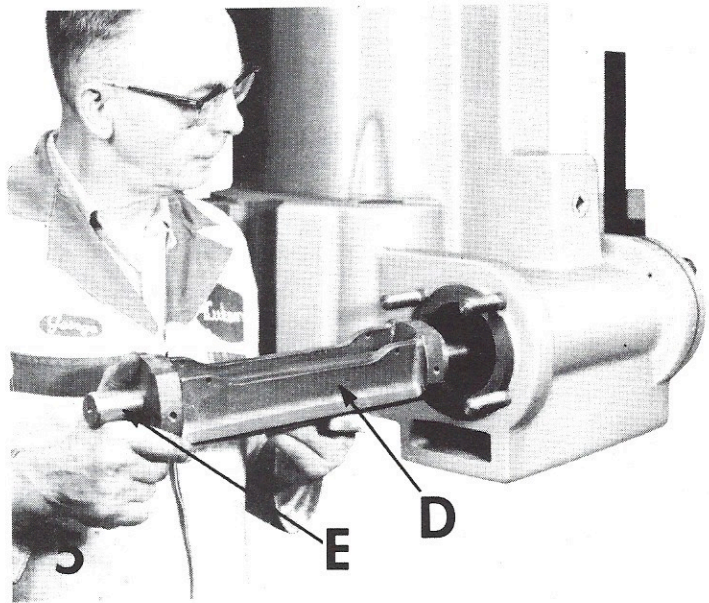
Remove nuts from studs at blind steam chest end of the steam chest (as shown in Figure 3).



Remove blind steam chest head, C (as shown in Figure 4).

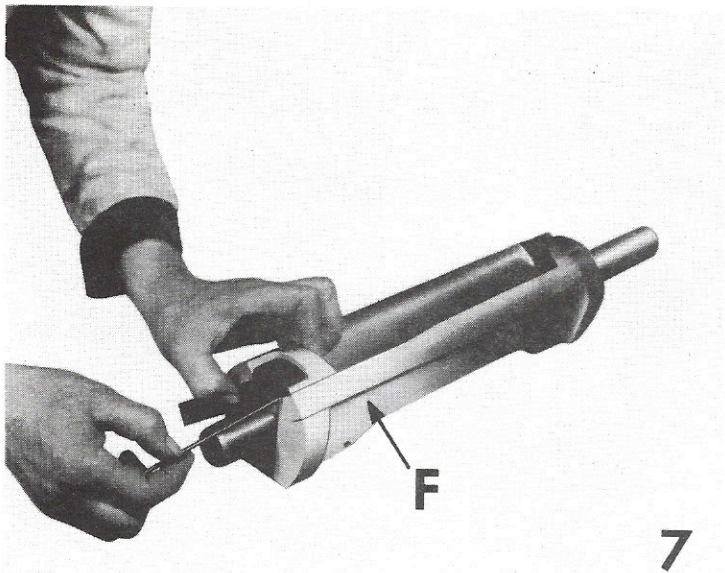
4

Then remove the valve and valve stem, D and E, respectively, from the steam chest (as shown in Figure 5).



Apply layout die, either blue or white, to the inside of the steam chest at the blind head end (as shown in Figure 6). Inside of the steam chest are two ports. Utilizing a 12" rule and a scribe, extend the inside edges of the port shown to the outer end of the steam chest (as shown in Figure 6).

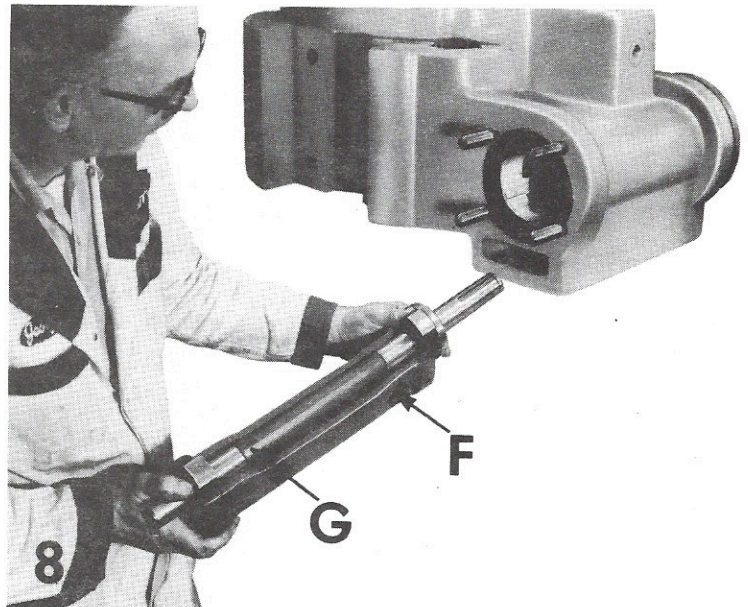
6



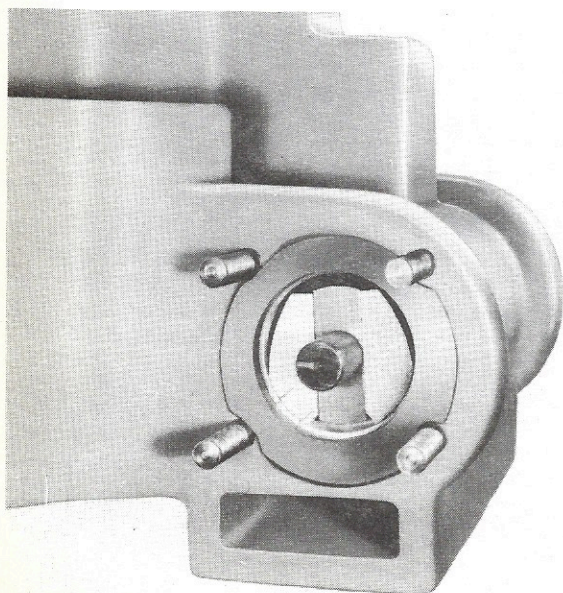
Apply layout die, either blue or white, to the end of the valve, F, toward the blind steam chest head end. Extend the valve lip edges to the end of the valve and transcribe these lines so they are extended onto the end of the valve (as shown in Figure 7).

7

Reassemble valve, F, and valve stem, G, as shown and reinstall in the steam chest (as shown in Figure 8).

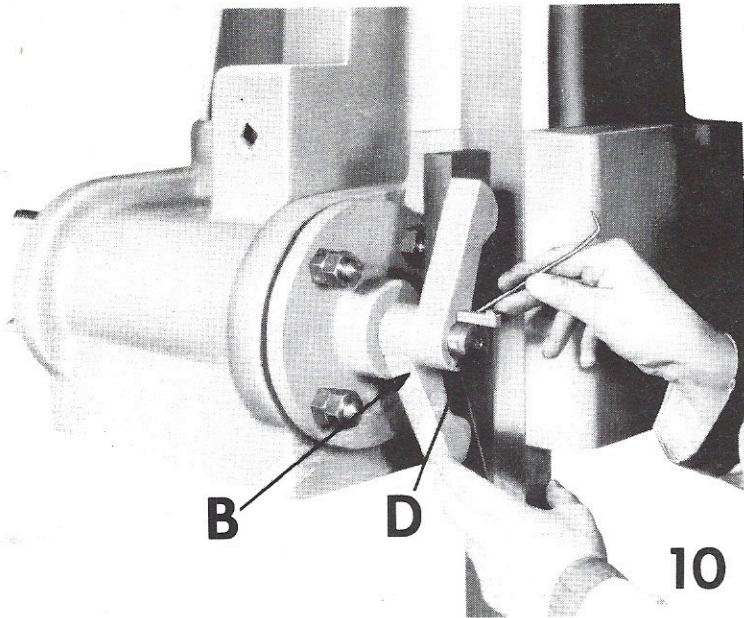


8



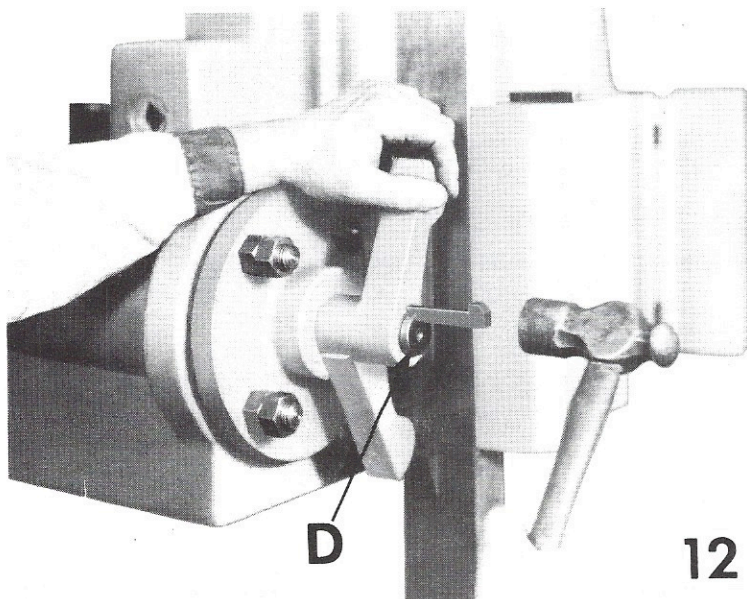
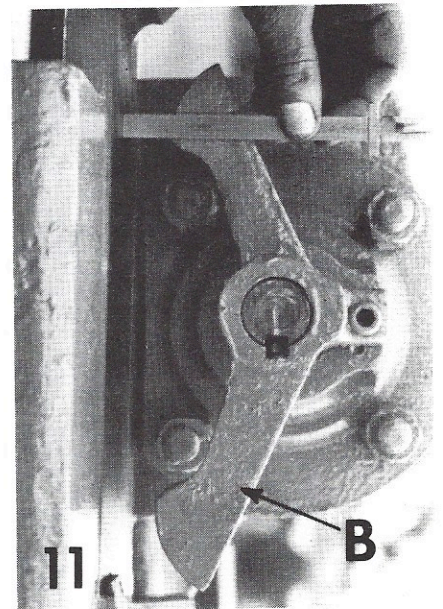
After reinstalling valve and valve stem, centralize as equally as possible the two lines scribed in the steam chest between the two lines scribed in the end of the valve (as shown in Figure 9). Care should be taken to insure that the overlap on either side is as equal as possible.

9



After completing the operation in Figure 9, slide the trip, B, onto the valve stem, D, and locate the legs of the trip an equal distance from the slidebar as shown in Figure 11. Then scribe onto the valve stem the keyway location corresponding to the keyway provided in the trip shown in Figure 10. Remove the valve stem and mill the keyway where indicated.

The legs of the trip, B, are to be an equal distance from the slide bar flat to properly time the hammer (as shown in Figure 11).



After keyway has been milled in valve stem, D, reinstall trip on valve stem and install trip key (as shown in Figure 12).



INSTRUCTIONS FOR SETTING VALVE WITH CYLINDER VALVE LINER

Valve Liners are standard equipment on all models of Vulcan Hammers listed below starting with and subsequent to the serial numbers shown after the hammer model.

Single-Acting Hammers:

- | | |
|---------------|---------------|
| #2 — FG5335 | #010 — FG5240 |
| #1 — FG5280 | #014 — FG5345 |
| #06 — FG5465 | #016 — FG4075 |
| #106 — FI6180 | #020 — FH5190 |
| #08 — FG5205 | #030 — FH5645 |

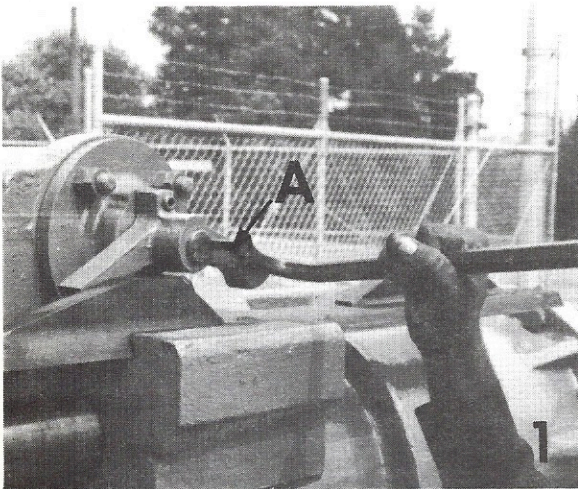
Differential Hammers:

- | | |
|--------------|---------------|
| 30C — FH5520 | 80C — FG4040 |
| 50C — FG5150 | 140C — FF3005 |
| 65C — FG5300 | 200C — FH5570 |

The letters in the first part of the Hammer Serial Number indicate the year of manufacture. The year of manufacture can be determined by matching the last two digits in the year with the following letter-number code:

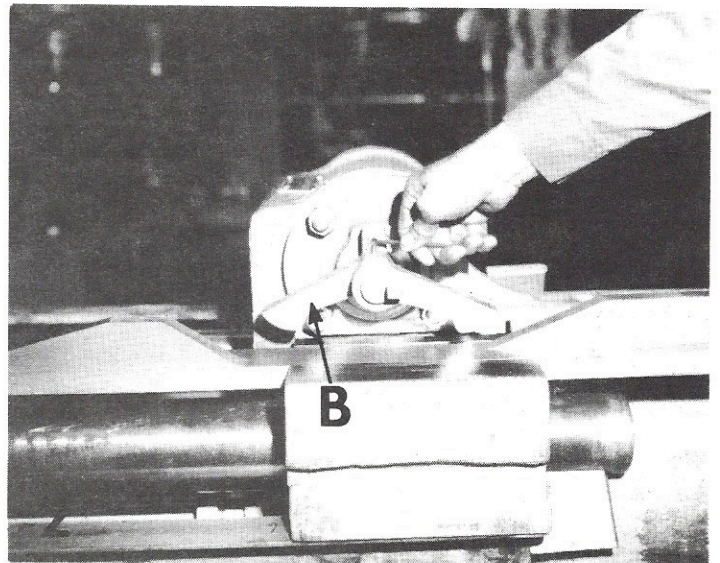
- | | | | |
|-------|-------|-------|-------|
| A — 1 | D — 4 | G — 7 | J — 0 |
| B — 2 | E — 5 | H — 8 | |
| C — 3 | F — 6 | I — 9 | |

For example, FF is 19“66”, FG would be 19“67” and GC is 19“73”,

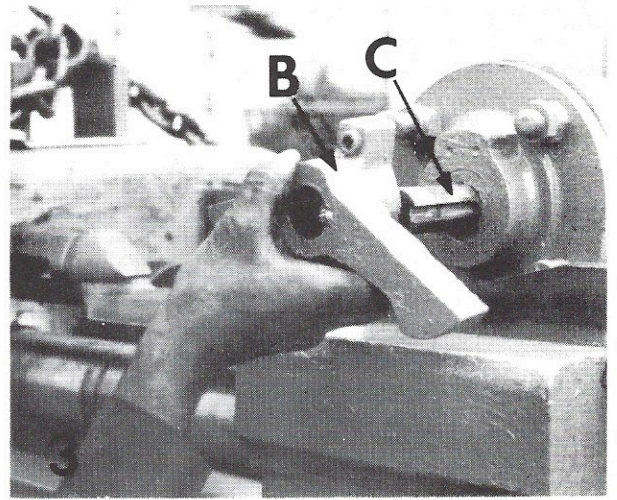


Remove trip key, A, from trip and valve stem at open steam chest head end of steam chest (as shown in Figure 1).

Remove set screw from trip, B (as shown in Figure 2).

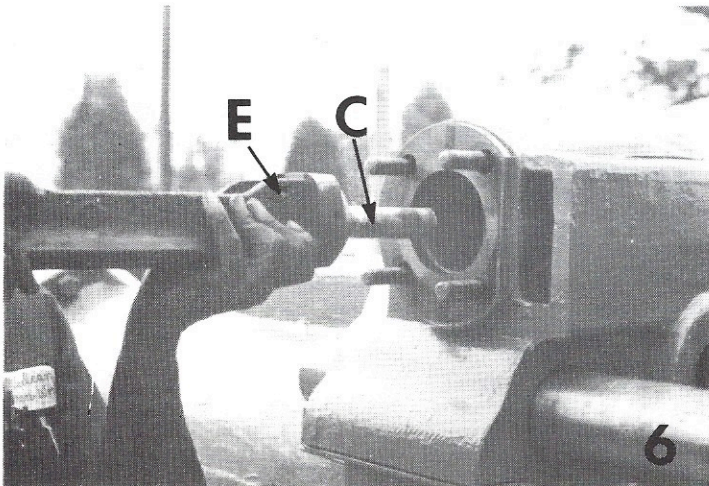
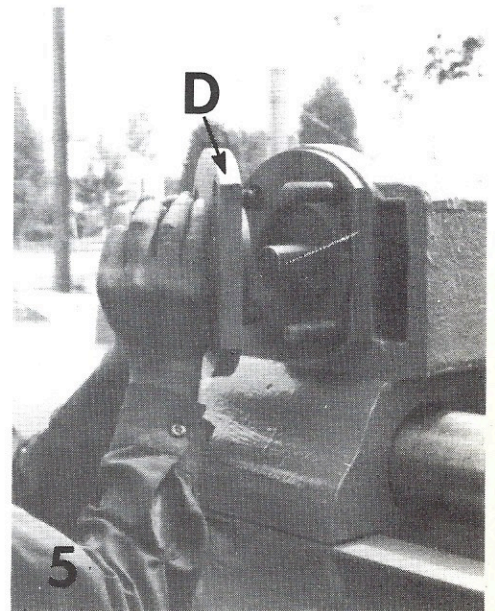


Remove trip, B, from valve stem, C (as shown in Figure 3).

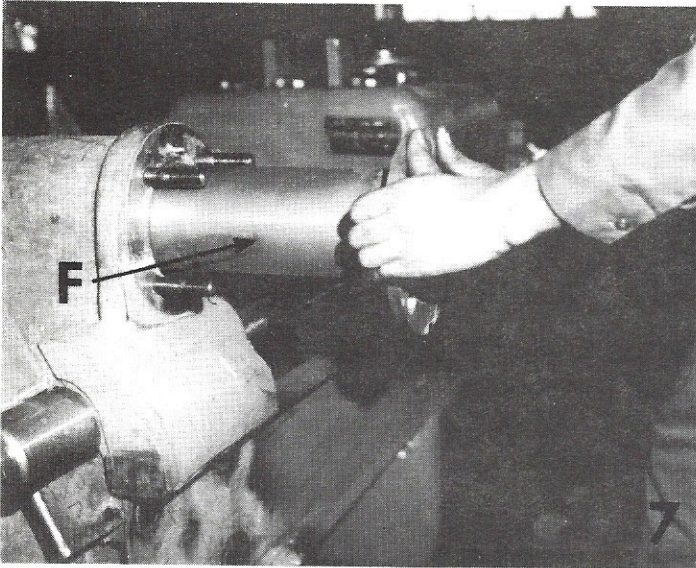


Remove nuts from studs at blind steam chest head end of the steam chest (as shown in Figure 4).

After removal of nuts from studs at blind steam chest head end of the steam chest, remove blind steam chest head, D (as shown in Figure 5).

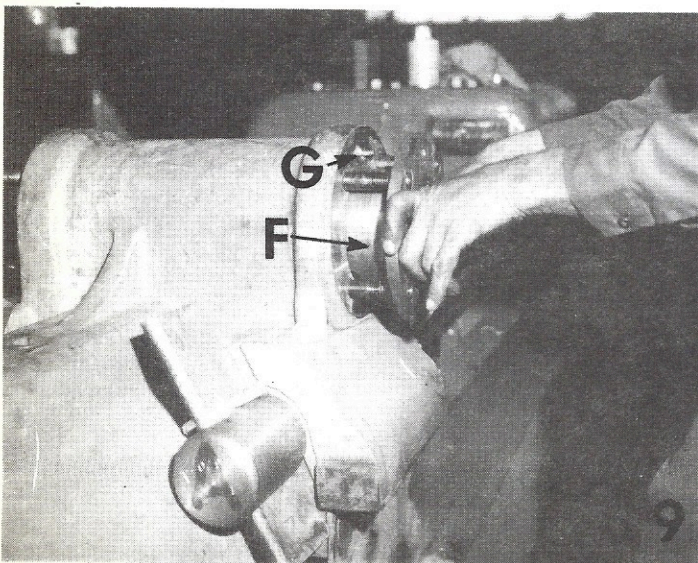


Then remove the valve and valve stem, E and C, respectively, from the steam chest (as shown in Figure 6).

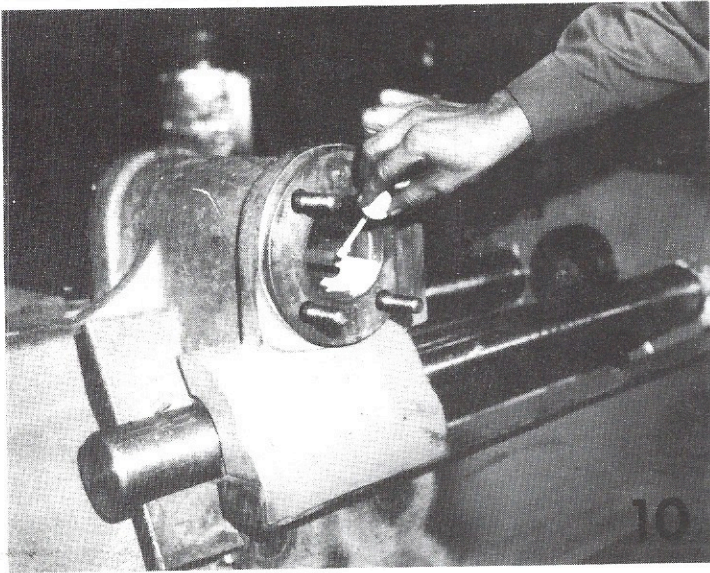


Then remove the old cylinder valve liner, F (as shown in Figure 7).

Install cylinder valve liner "O" ring gasket, on the new cylinder valve liner (as shown in Figure 8).

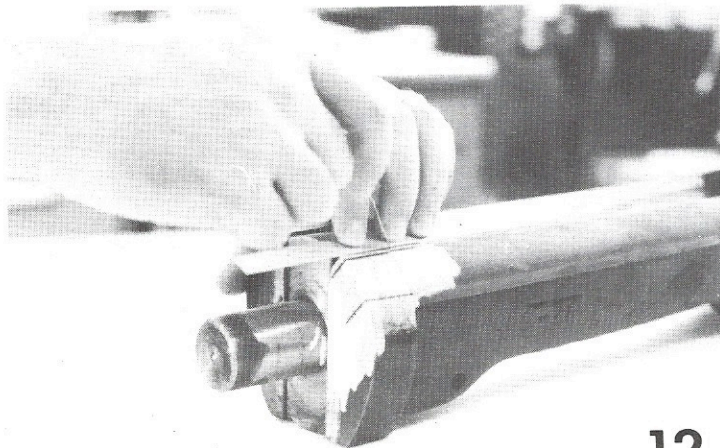
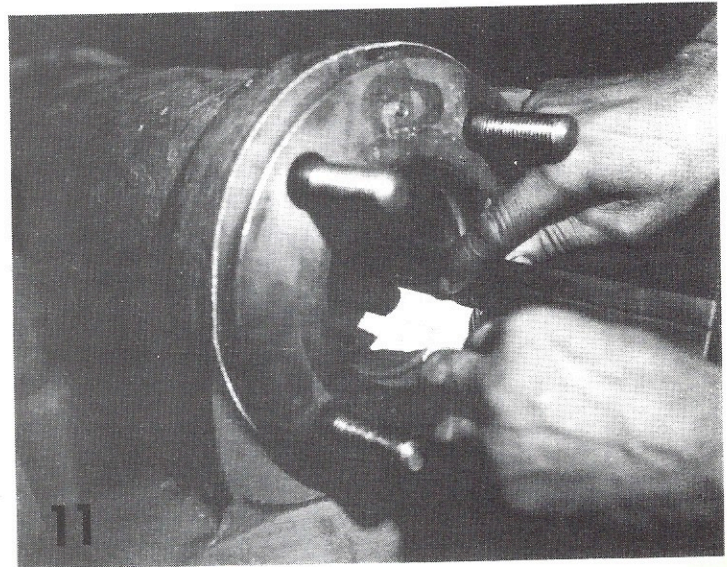


Then install cylinder valve liner, F, into the steam chest bore, making sure the dowel pin, G, lines up with the hole in the cylinder valve liner (as shown in Figure 9).



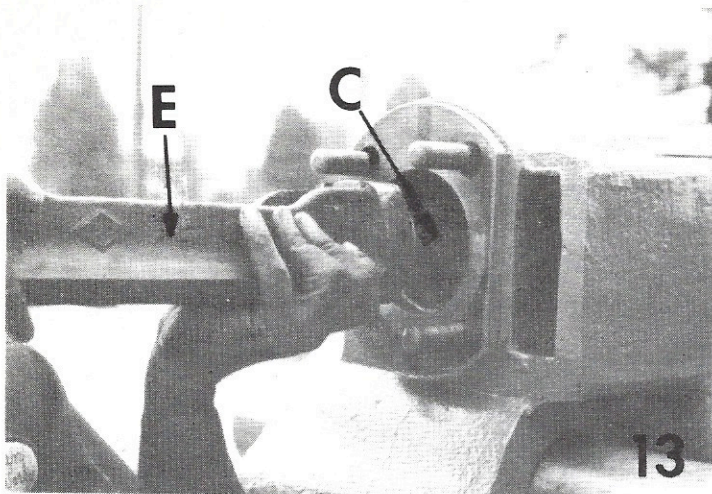
Apply layout die, either purple or white, to the inside of the steam chest at the blind head end (as shown in Figure 10).

Utilizing a straightedge and a scribe extend the inside edges of the port shown to the outer edge of the steam chest (as shown in Figure 11).



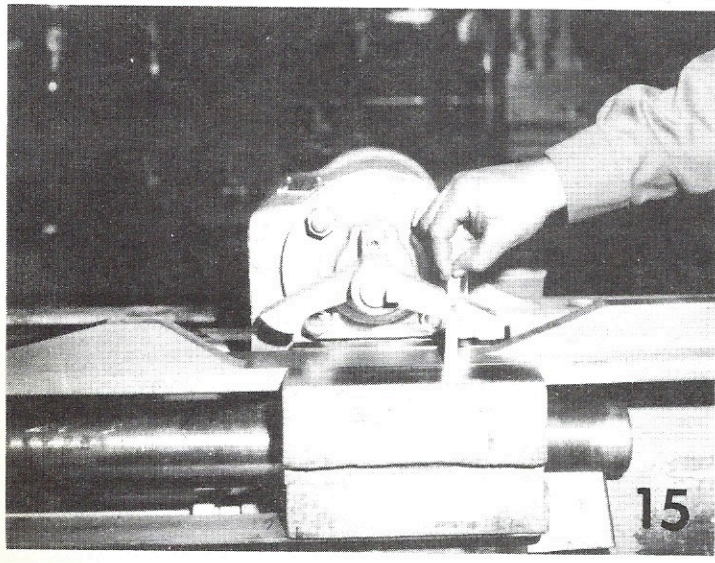
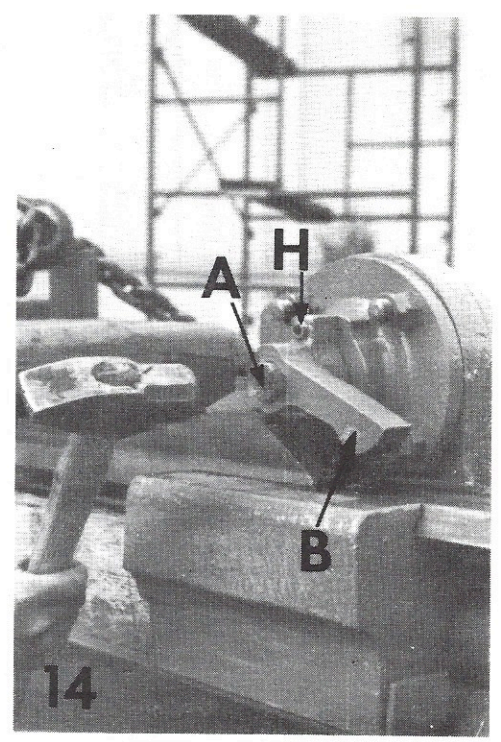
Apply layout die, either purple or white, to the top and end of the valve which is adjacent to the blind steam chest head end of the steam chest. Extend the valve lip edges to the end of the valve and transcribe these lines so they are extended onto the end of the valve (as shown in Figure 12).

12



Reassemble valve, E, and valve stem, C, and reinstall in the steam chest (as shown in Figure 13).

Reinstall trip, B, trip key, A, and set screw, H (as shown in Figure 14).



Set the trip legs an equal distance from the slide bar flat (as shown in Figure 15).

After setting the trip legs, check to see if the scribed lines on the valve and cylinder valve liner match. The lines on the valve should equally overlap the lines on the cylinder valve liner. If this cannot be done, remove the 1/4" dowel pin, rotate the cylinder valve liner until the valve legs do overlap. Then drill a new hole for the dowel pin above or below the present hole.

After this has been done, reinstall blind steam chest head and secure with nuts. Before reassembling it is advisable to install new gaskets.

