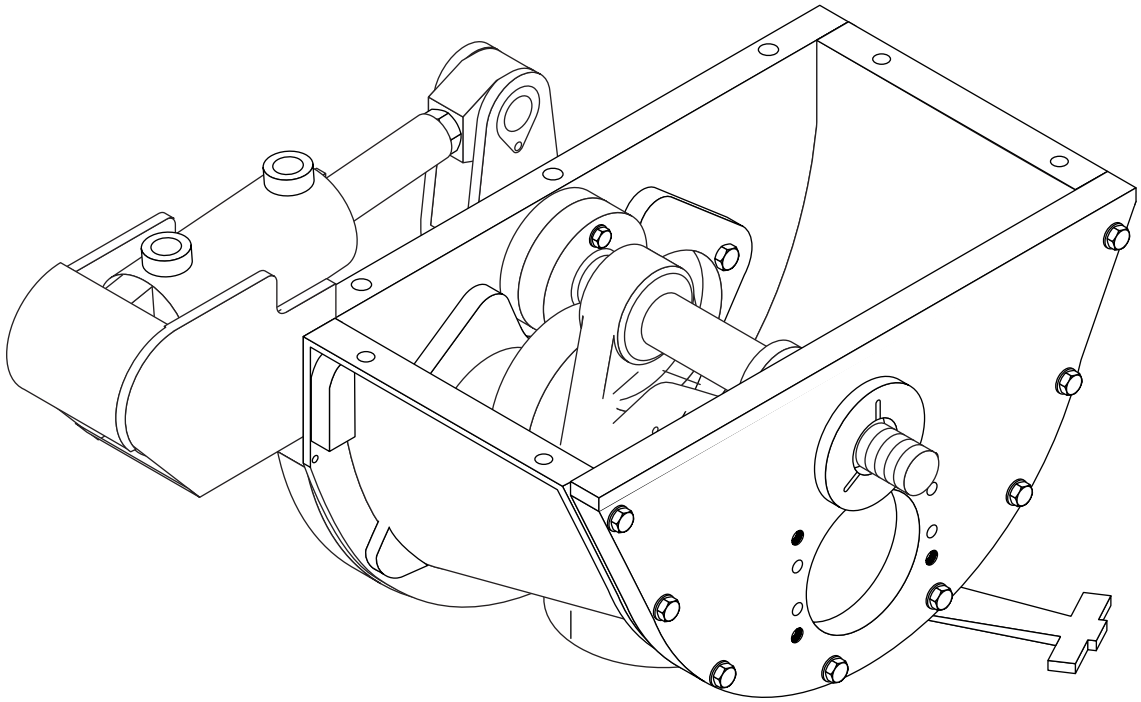
SCHWING AMERICA INC.

SERVICE REPAIR INSTRUCTIONS FOR

THE SMALL "ROCK" VALVE



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REV. 8/09/99

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Small Rock Valve

Safety Instruction

When performing maintenance on Schwing Equipment, the safety regulations must be followed. The observation of these regulations is the responsibility of the maintenance personnel. The following are some supplementary recommendations.

⚠ WARNING

READ FIRST!

1. **WARNING!** Read and understand the operation manual of the machine before attempting any repairs. If in doubt, call the manufacturer. Incorrectly done repairs endanger operational safety of the machine.

2. **WARNING!** Burning hazard! Never work on a hydraulic system with hot oil.

3. **WARNING!** Falling hazard! If you cannot work at ground level, you must use a suitable work platform.

4. **WARNING!** If maintenance work requires that you use a crane, hoist, fork truck, etc., you must read and understand the safety regulations for that equipment.

5. **WARNING!** If working the machine requires that it be operated, and you are not qualified as an operator, you must get someone who is qualified to assist you.

6. **WARNING!** If you will be working in a hidden area inside the machine, protect yourself by taking the key from the ignition and putting a “DO NOT OPERATE” sign on the controls. In the case of electrically driven units, disconnect the main circuit breaker and lock it in the disconnected position.

7. **WARNING!** Never activate the system hydraulics without checking if another workman is in a hidden position. Always yell “CLEAR”, and allow time for response, before starting the prime mover.

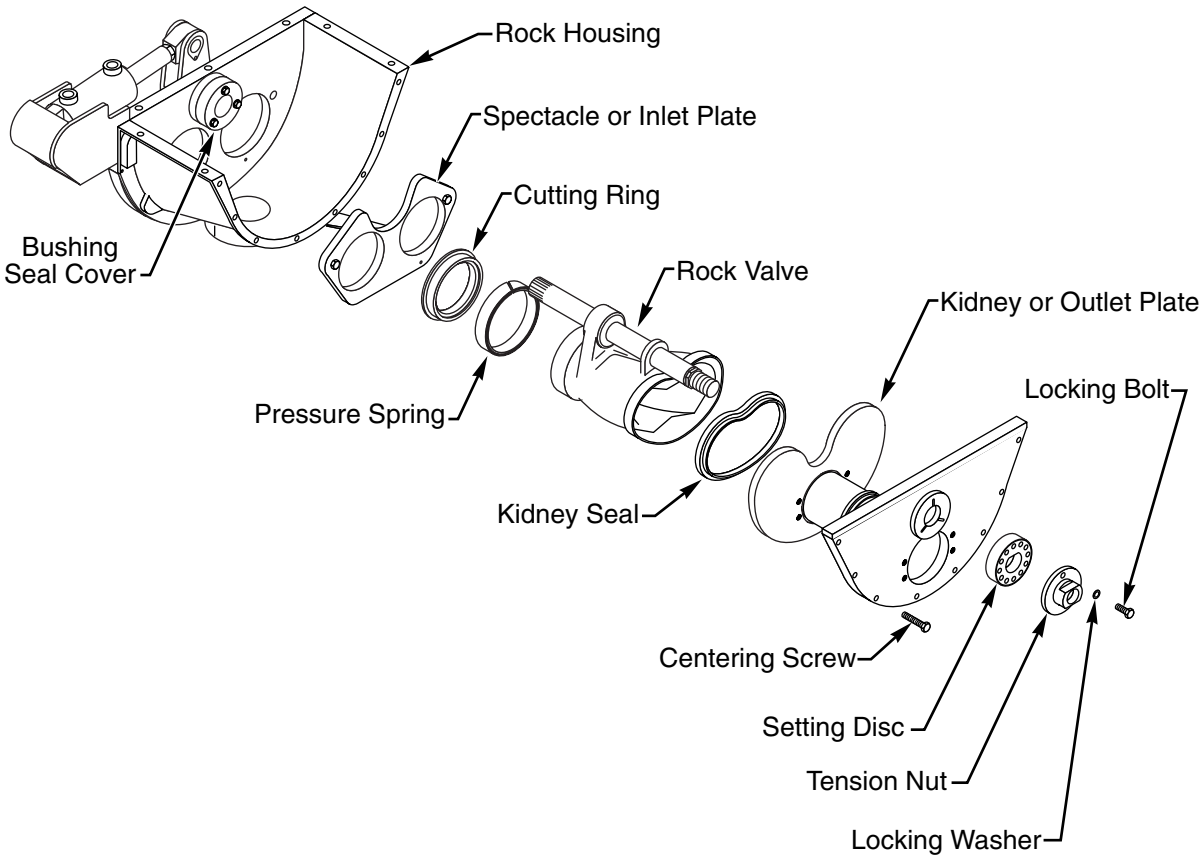
8. **WARNING!** Never use gasoline or diesel fuel as a cleaning solvent. This is critical to remember when cleaning hydraulic oil reservoirs, because gas and diesel fuels are highly explosive, and gasoline or diesel fuel traces left in the oil may ignite when compressed.

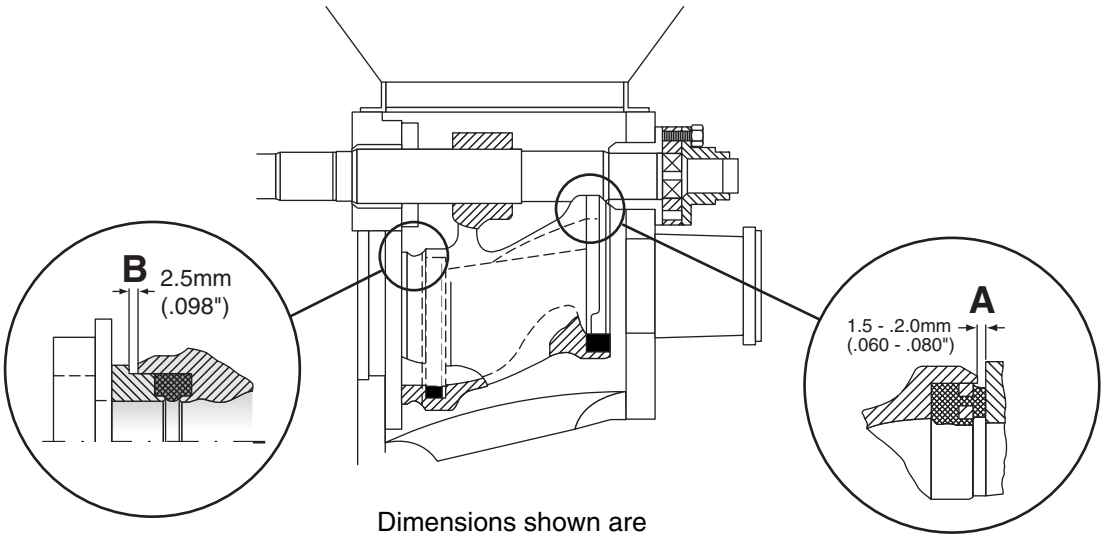
9. **WARNING!** Always use the correct tools for the job. Tools should be kept clean, and in good condition.

10. If you see a co-worker engaging in an unsafe practice, explain the dangers. Safety is always in the hands of those on the job.

11. **WARNING!** Never work on a pressurized hydraulic system. Stop the prime mover and relieve the accumulator circuit (if so equipped) before you open the hydraulic system.

Rock Valve Parts Identification and Clearance Specifications



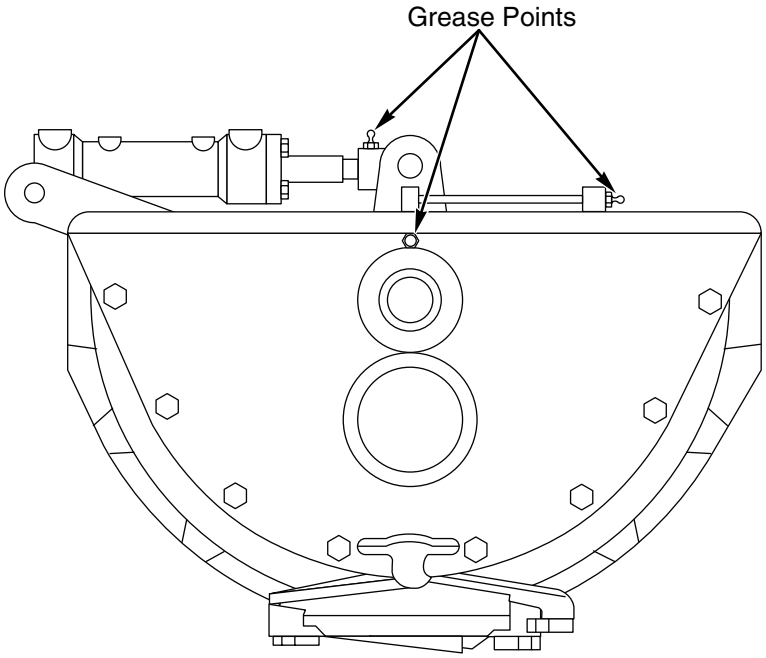


Dimensions shown are with all new wear parts.

When Dimension B exceeds 8mm (.315") the cutting ring is worn out

Small Rock Valve Lubrication Points

Use a grease gun with the recommended grease listed in the chart below. Locate the grease points, clean the grease fitting before filling it, and inject grease until you see old grease displaced by the new grease. Lubricate the grease points at 8 hour intervals and whenever the machine work is completed for the day.

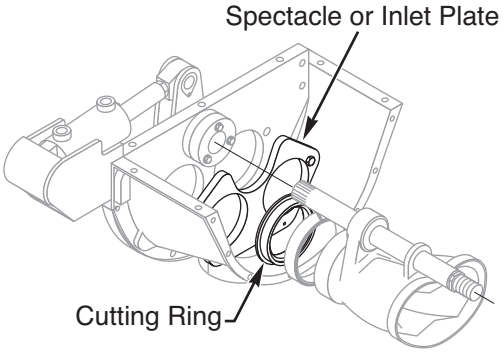


Minimum Specifications for grease.
Lithium base high-pressure grease KP 2 K per DIN 51502.

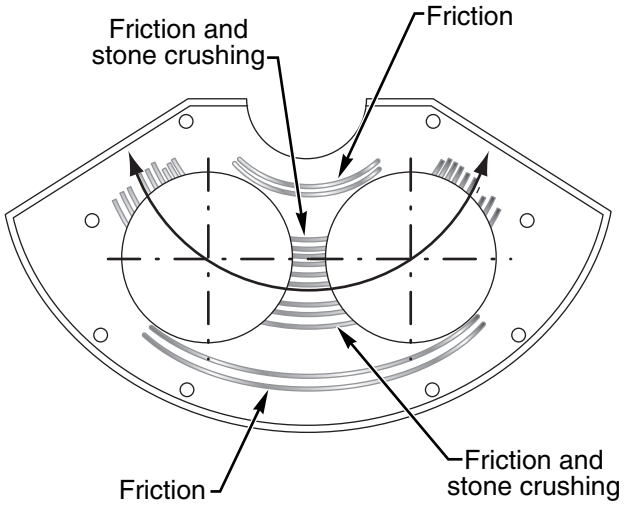
BP	Energrease LS2
MOBIL	Mobilith AW 2
SHELL	Alvania grease R2
TEXACO	Multifak 20
ARAL	HLP 2
ESSO	Beacon 2
OPTIMAL	Olitsa longtme 2EP

Lengthening the Service Life of the Spectacle Plate and Cutting Ring

Conditioned by outside influences (material variations), as well as by differing work strains on partial sections, the cutting ring and the housing lining wear out unequally.



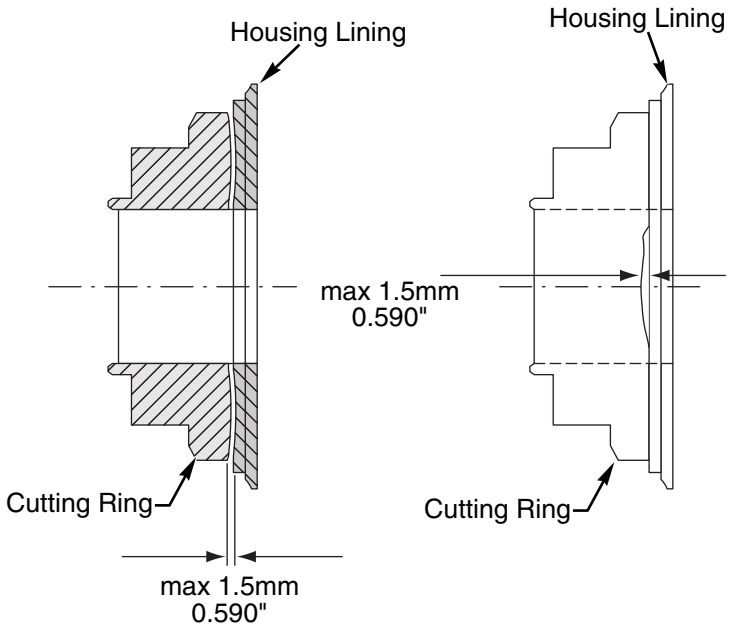
The grooves resulting from operation are irrelevant as long as the armouring is not worn out completely.

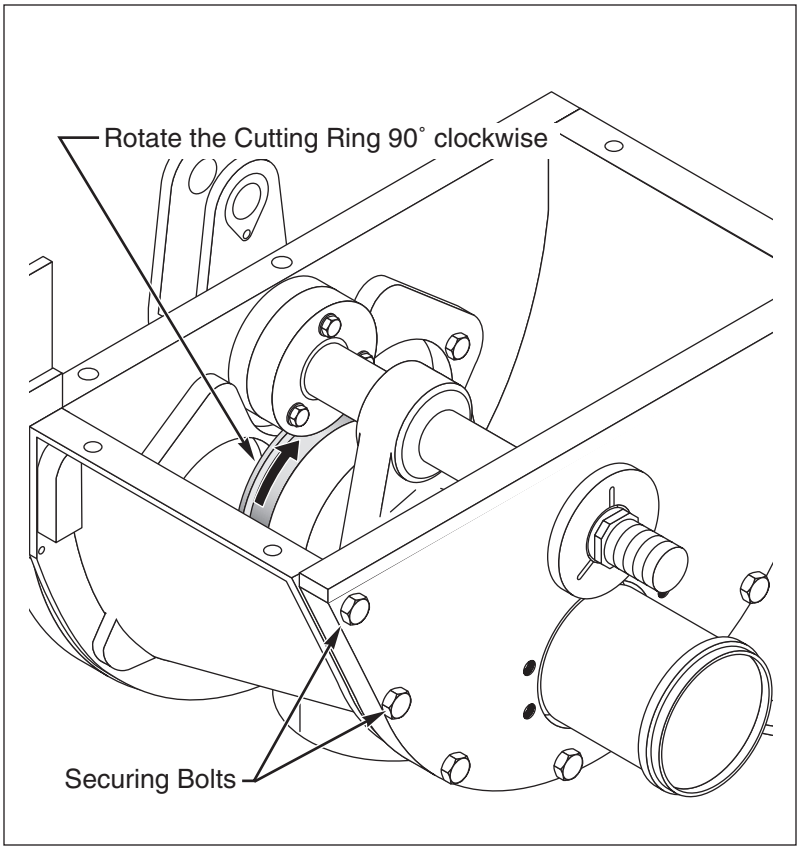


To ensure uniform wear and, thus, **considerably longer service lives**, we recommend the following:

1. Move the Rock Valve to the left and right end position once a week after thorough cleaning, and check the condition of both the Cutting Ring and the Housing Lining.

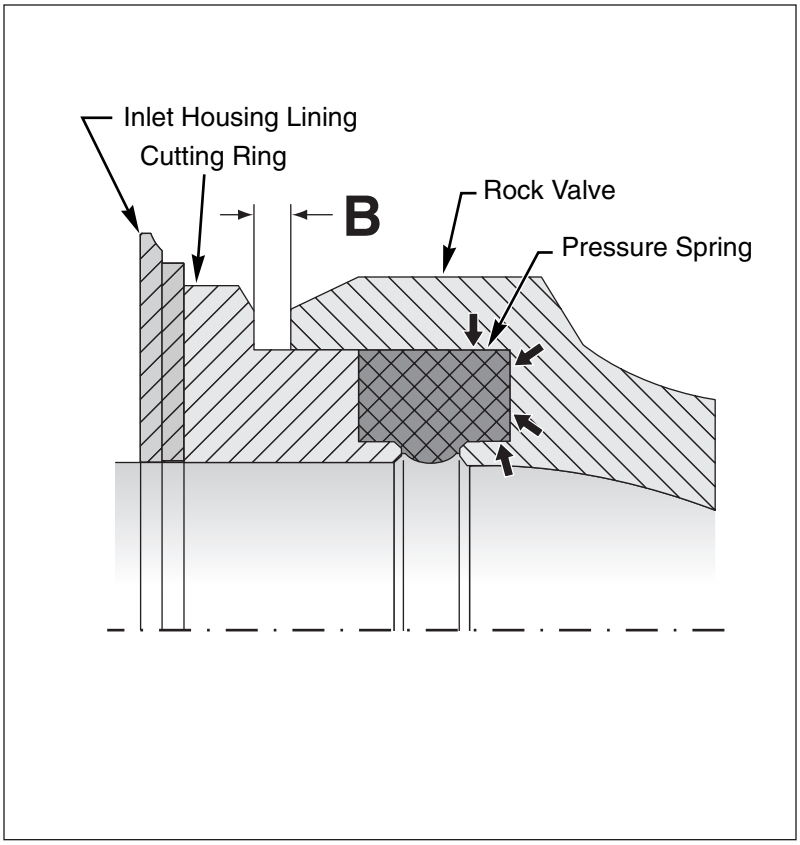
2. Turn the Cutting Ring 90 degrees when there is a clearance greater than 1.0mm-1.5mm (.0393”-.0590”) between the Cutting Ring and the Housing Lining.





Check for the gap at several points along the Cutting Ring circumference, and always turn the Cutting Ring in the same direction.

It is only necessary to loosen the Securing Bolts of the Housing Cover approximately 10mm (.3937") in order to release the Pressure Spring and turn the Cutting Ring.

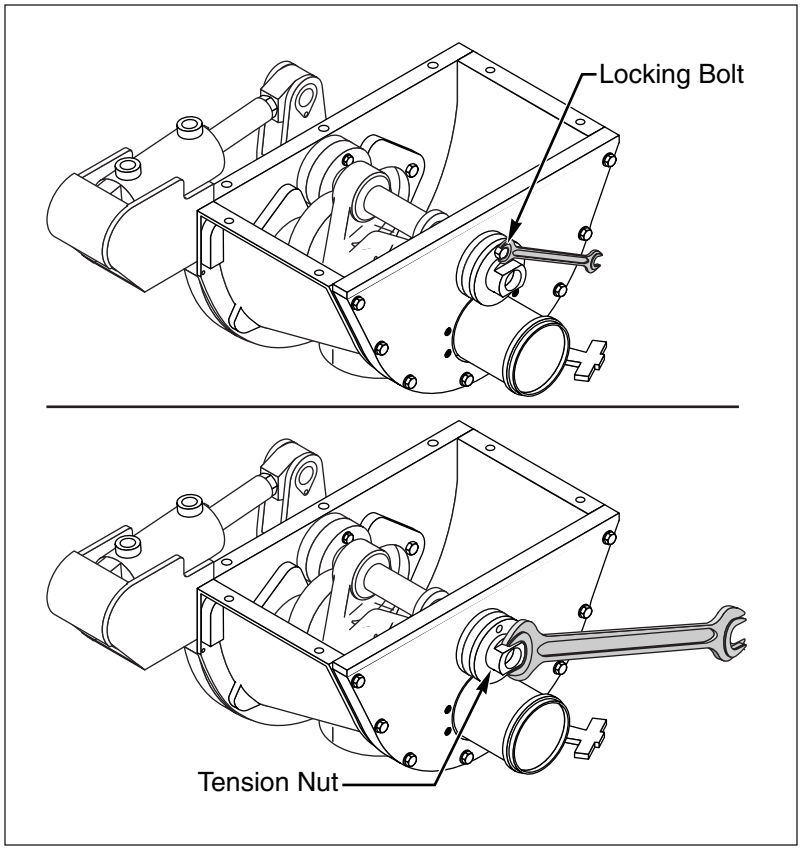


3. Check the distance between the Cutting Ring and the Rock after each turn of the Cutting Ring. If it exceeds 8mm (.315"), the pretension of the Pressure Spring is not enough to correctly press the worn cutting ring up against the Spectacle Plate. In this case, the Cutting Ring has to be replaced

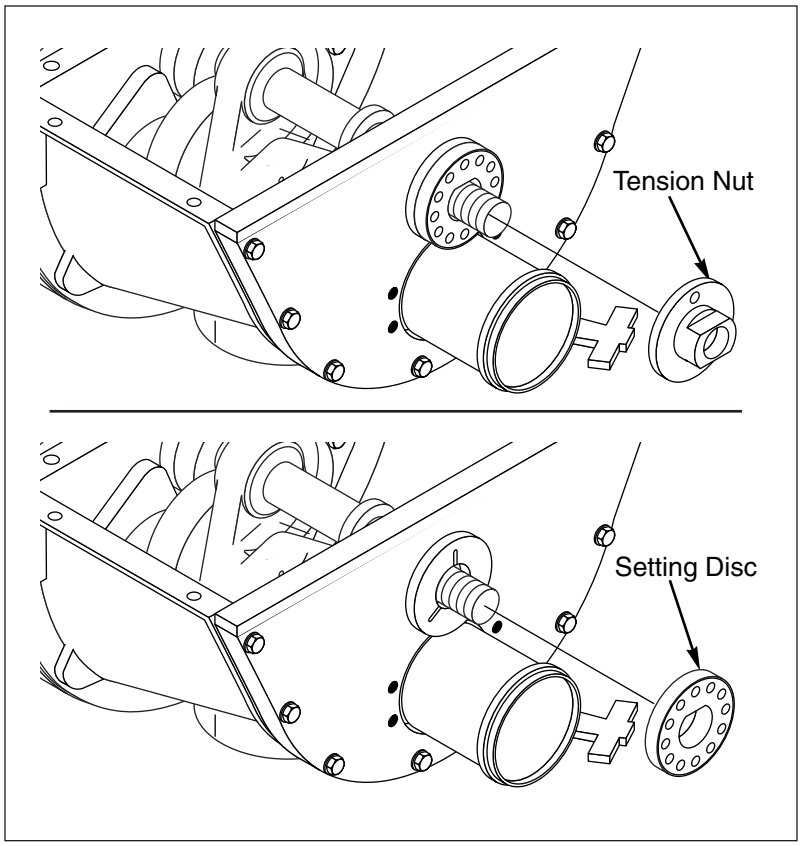
Rebuilding the Rock Valve

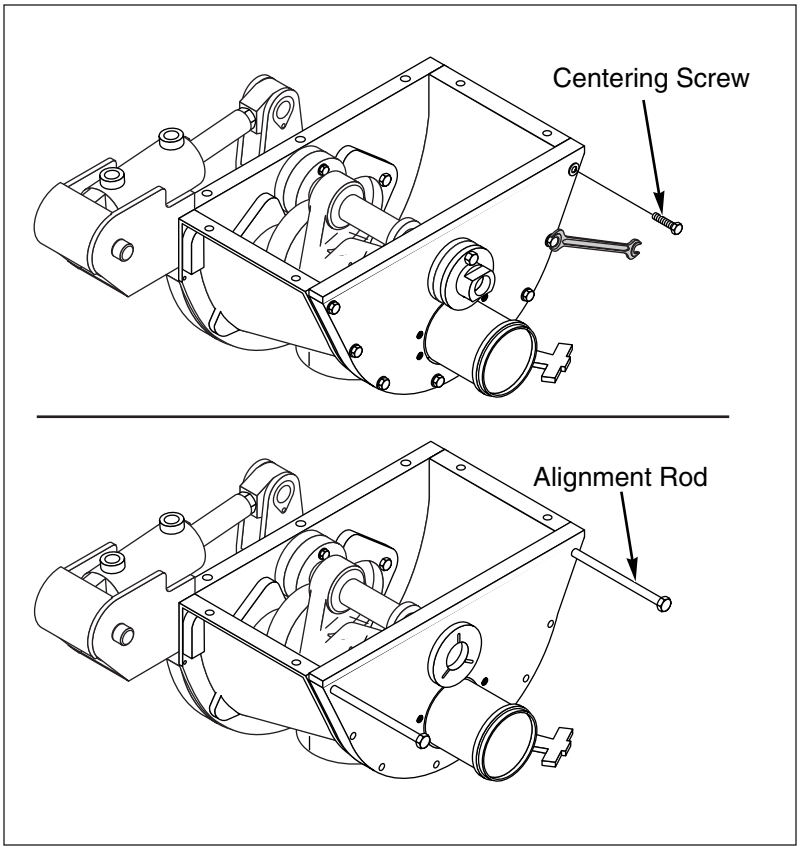
1. Remove the Locking Bolt from the Tension Nut.
2. Loosen the Tension Nut.

NOTE: It's ok to remove the Tension Nut with a wrench, but it must never be tightened more than hand tight



3. Remove the Tension Nut.
4. Remove the Setting Disc

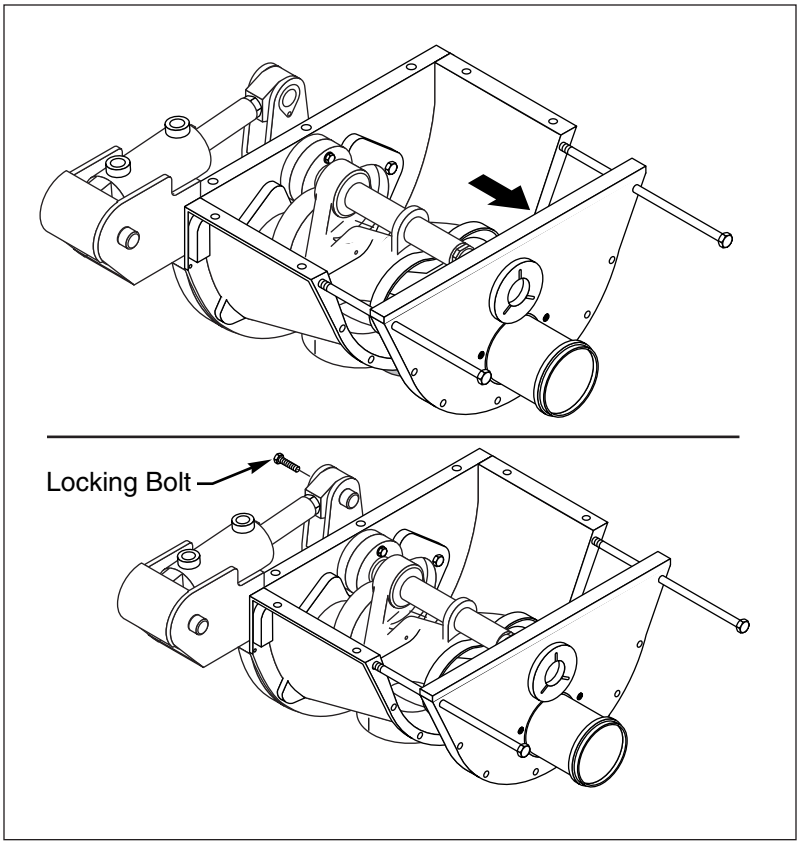




5. Remove the special Centering Screws
   - SAI Part #10069857.

NOTE: It is important that these Centering Screws get installed in the same holes upon reassembly.

6. Install the alignment rods
   - SAI Part #30309007



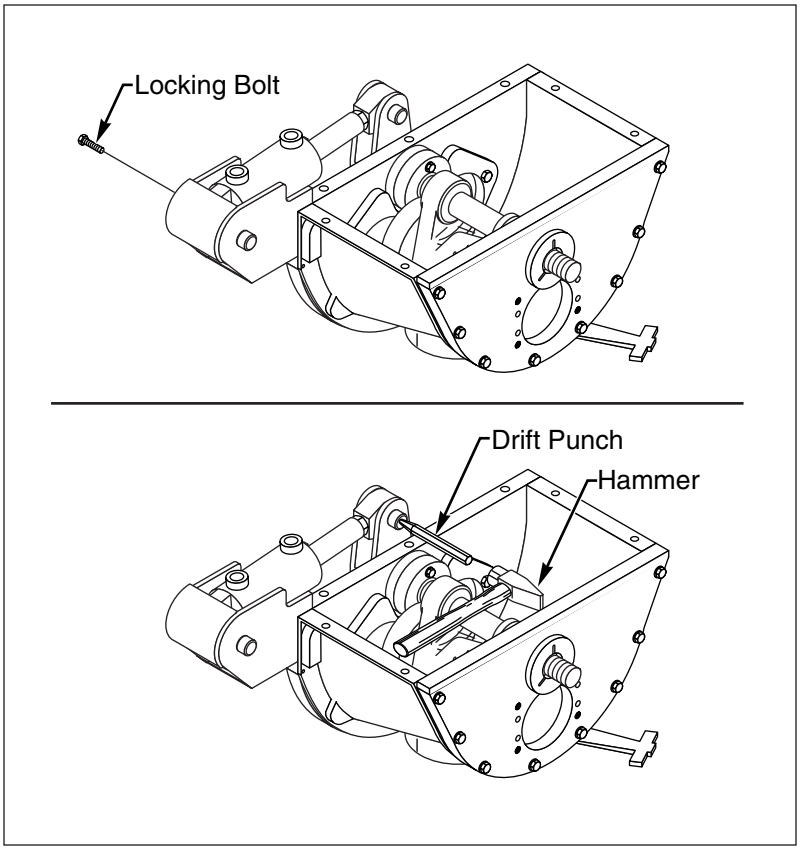
7. Slide the rear housing cover back slightly.

NOTE: Some versions of the Rock Valve have a sealing cord under the cover.

8. Remove the Locking Bolt for the Cylinder Pin on the Slewing Yoke

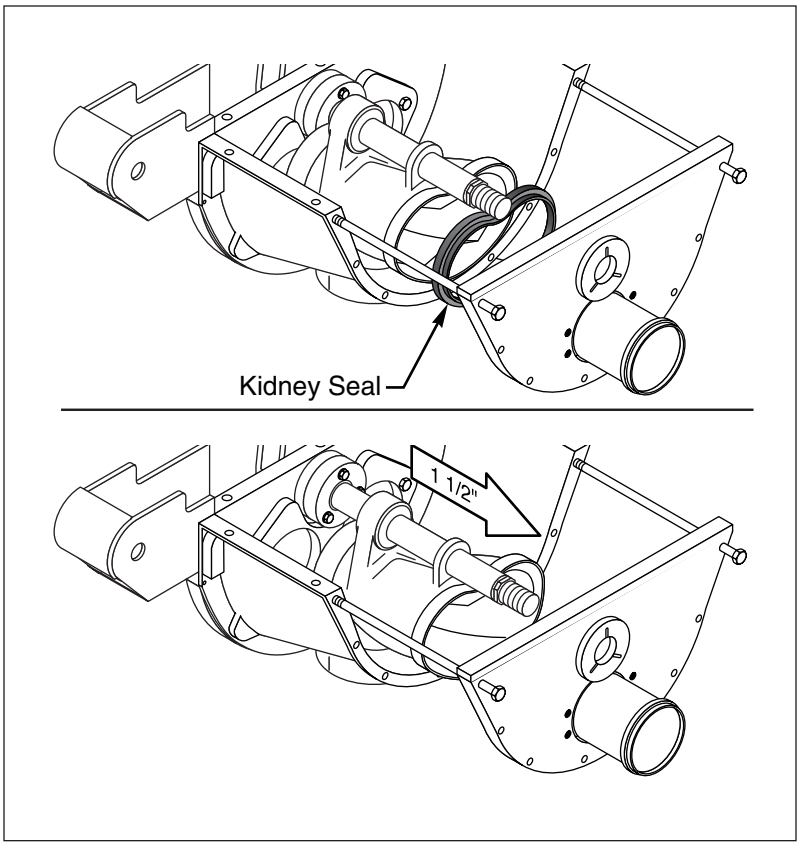
9. Remove the Locking Bolt for the Cylinder Pin on the barrel end of the cylinder.

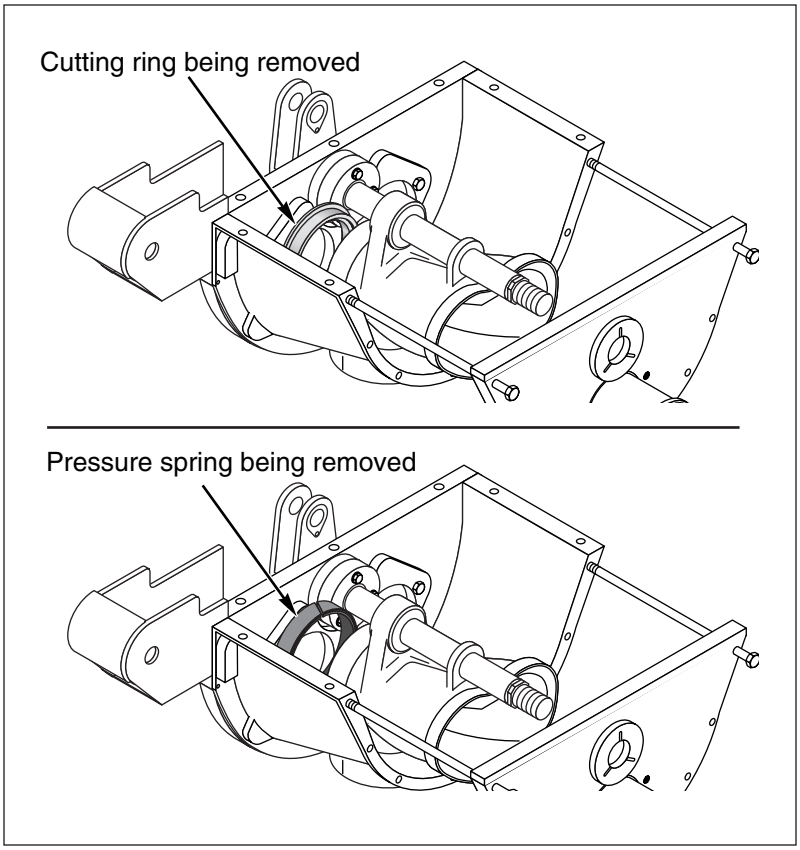
10. Using a drift pinch and a hammer, drive the Cylinder Pins out and remove the hydraulic cylinder.



11. With the Rear Cover Housing moved back, remove the Kidney Seal for inspection or replacement.

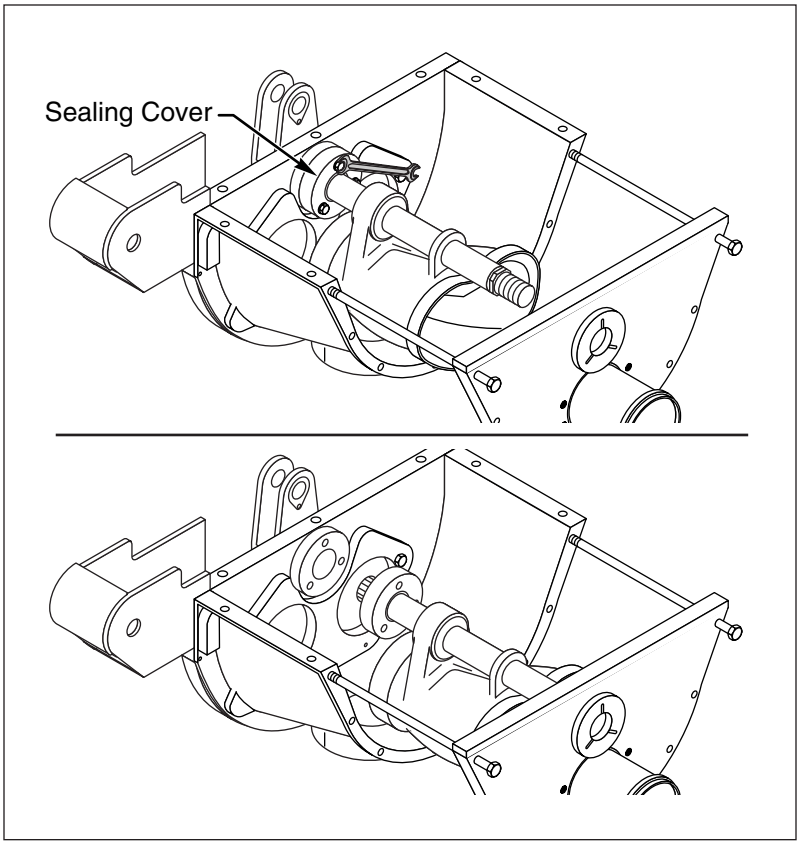
12. Slide the Rock back about 1.5 inches





13. Remove the Cutting Ring

14. Remove the Pressure Spring



15. Loosen the bolts and slide the Sealing Cover back on the Rock Shaft.

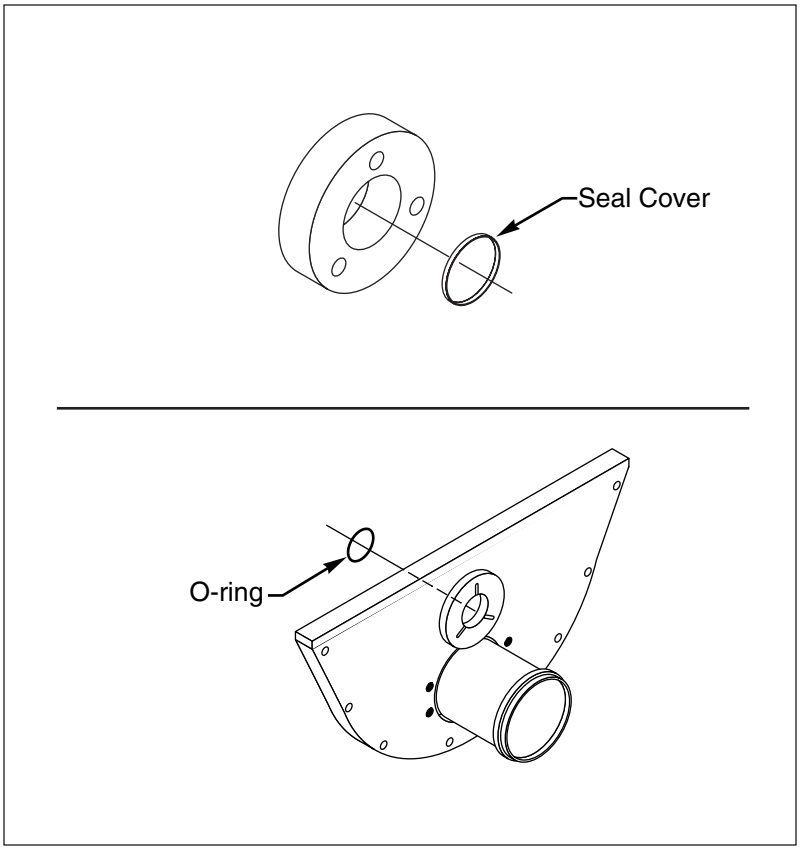
16. Carefully remove the Rock Valve from the housing.

NOTE: The Slewing Yoke will be removed from the shaft at this time. It may bind up, so you will have to pry or tap the yoke with a hammer to remove it. Upon reassembly, refer to the previous section in this manual regarding installation of the Slewing Yoke for the proper yoke alignment procedure.

NOTE: In the event that the Rock Shaft Bushings require replacement, proceed to steps 19 &20.

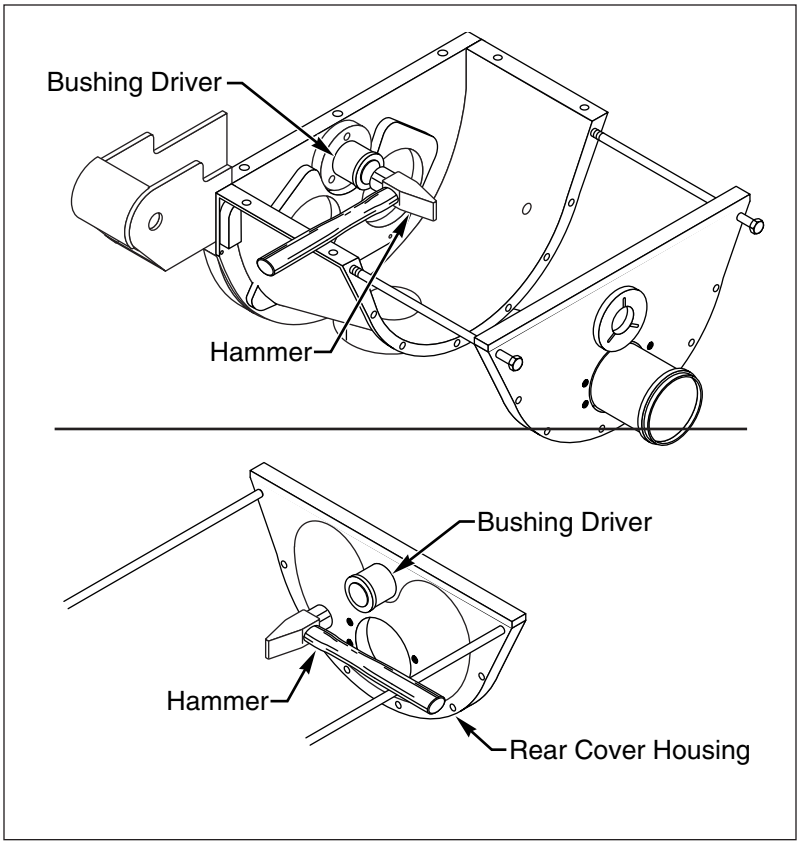
17. Remove the Seal Cover from the Rock Slewing Shaft and remove the O-ring.

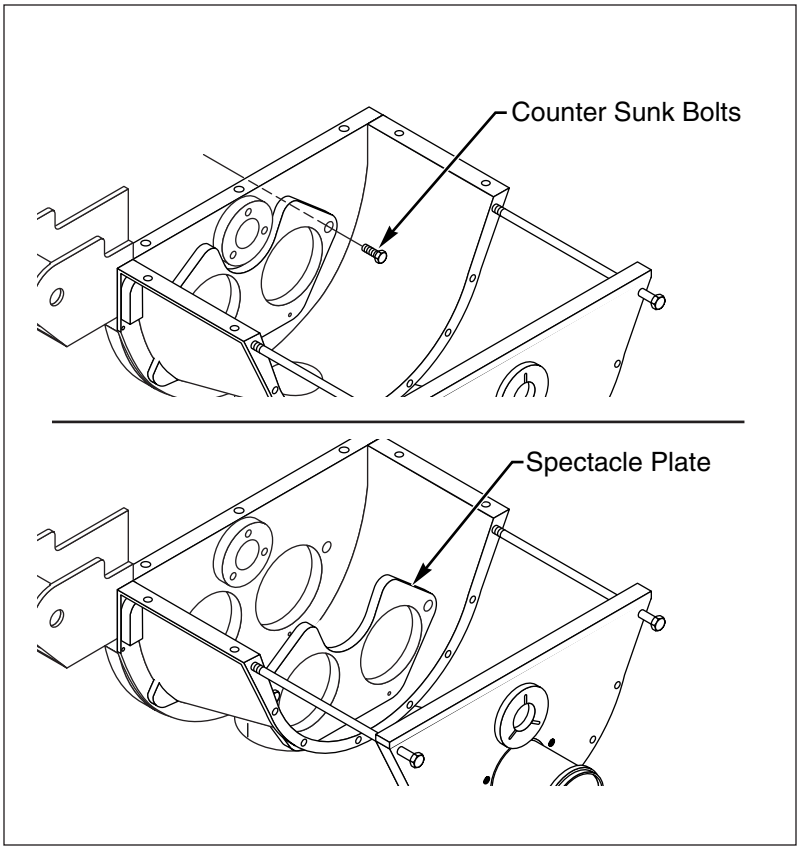
18. Remove the O-ring from the groove of the Rock shaft bushing on the Rear Cover Housing.



19. Using the correct size bushing driver, drive the old Rock shaft bushing out of the front cover of the Rock housing.

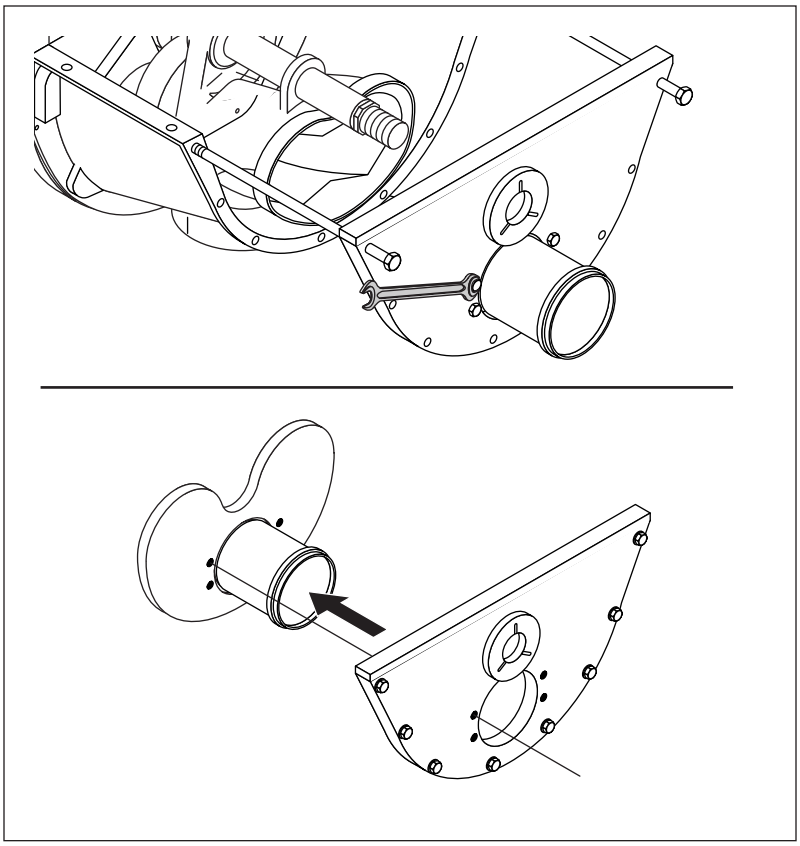
20. Using the correct size bushing driver, drive the old Rock Shaft Bushing out of the Rear Cover Housing.





21. Remove the two bolts attaching the Spectacle Plate to the Front Cover.

22. Carefully remove the Spectacle Plate from the Rock Housing.



23. Remove the four bolts from the rear cover that attach the Kidney Plate to the rear cover.

NOTE: On some versions of the Rock Valve, these four bolts are under the delivery pipe. The delivery pipe will have to be unbolted to gain access.

24. Remove the Kidney Plate.

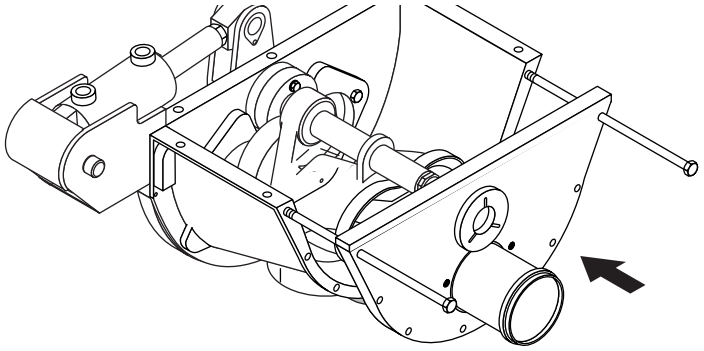
NOTE: The Kidney Plate should have a smooth, mirror-like finish, free of any scratches, gouges, or wear grooves.

NOTE: Before reassembly, make sure that all components are thoroughly cleaned.

25. Reassemble the Rock Valve assembly in the reverse order that it was disassembled. Slide the cover back in place.

NOTE: Upon reassembly, generously grease the Kidney Seal, Kidney Plate, Cutting Ring and the Spectacle Plate. This is important, because after you have assembled the Rock and done some necessary adjustment, you are going to have to shift the Rock several times before making the final adjustments.

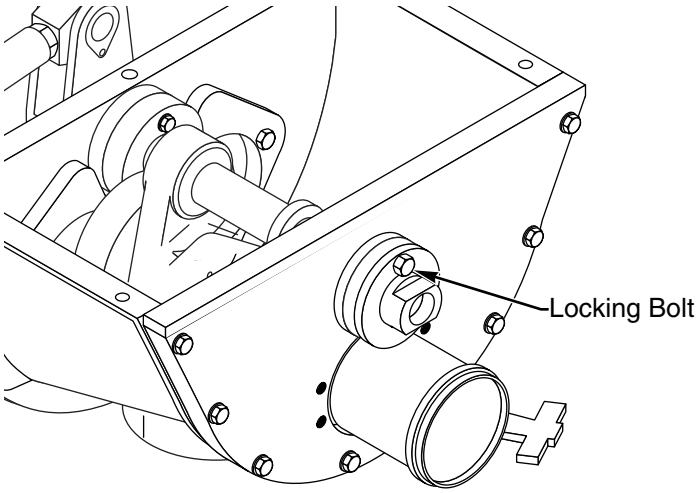
26. Adjust the Tension Nut, which is tightened only hand tight. If the Locking Bolt shown can be installed in the Setting Disc freely, then do so. If the hole in the Tension Nut does not align with the thread hole in the Setting Disc, loosen the Tension Nut to the previous hole, and install the Locking Bolt.

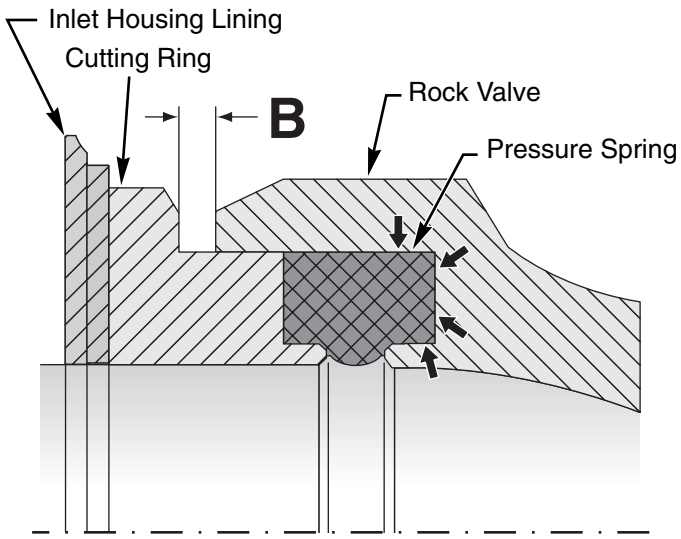


NOTE: Check to make sure that the proper clearance is obtained between the Rock Valve and the Cutting Ring and between the Rock Valve and the Kidney Plate. If the Rock components are worn, the dimensions may be larger that specified.

If the dimensions are too small, loosen the Adjusting Nut and pry the Rock Valve in the direction needed. Stroke the unit several times, and recheck the dimensions. If the dimensions are correct, reinstall the Tension Nut and re-adjust.

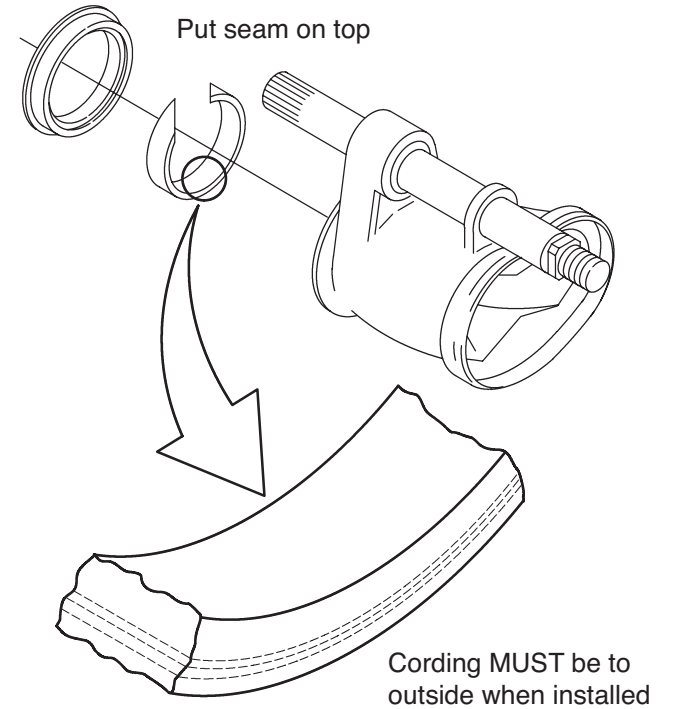
IMPORTANT! At no time should you operate the Rock Valve without first lubricating the outlet wear plate. Spraying the plate with water or oil will usually be adequate prior to start-up for pumping. Moving the kidney seal against a dry plate will cause excessive wear and premature failure.





Mounting a New Pressure Spring

If the Pressure Spring has to be replaced, remove the old spring and clean the vacant area thoroughly to clear it of concrete residue. If dust and residue is ignored, the new spring cannot be installed correctly, and the flow of concrete could pull it out of the groove. Furthermore, the high pretension resulting from reassembling with concrete residue in the area of the spring leads to premature wear of the Cutting Ring and Housing Lining.



NOTE: <u>Slightly</u> grease the new Pressure Spring when installing it. The same applies to the Kidney Seal. Do not use too much grease, because grease accumulating in the spring chamber operates as a spacer, increasing the spring pretension.

Although these components will withstand a great deal of hard usage, the Pressure Spring and Kidney Seal should be inspected whenever the Cutting Ring is replaced.

Determining Wear on the Kidney Seal & Housing Lining - Outlet Side

Replace the kidney seal if any of the following conditions exist:

- A considerable formation of cracks are found in the areas marked by arrows. This problem is very rare.
- The lip is completely worn to the point that the pressure relief grooves are no longer recognizable.
- The distance indicated by “M” of the released kidney seal does not exceed 30mm (1.1875").

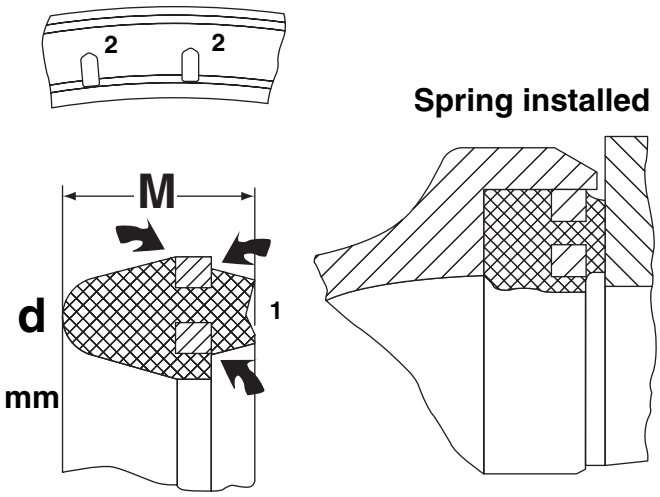


Figure 1

Replace the outlet housing lining (kidney plate) only if scores deeper than 1.5mm are found in the area that contacts the kidney seal. You can measure this by placing a steel ruler across the kidney plate in several places and using a depth gauge to determine the gap.

NOTE: Outside of the area that contacts the Kidney Seal, you may detect scores that are due to aggregate particles stuck between the Rock Valve and the Kidney Plate. (See fig. 2 and fig. 3) <u>THESE SCORES DO NOT MATTER IN THE LEAST!</u>

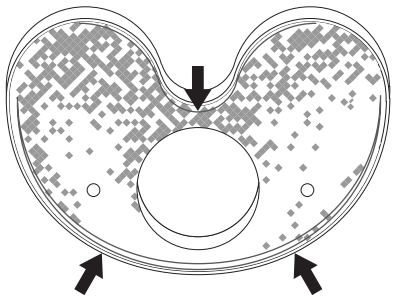


Figure 2

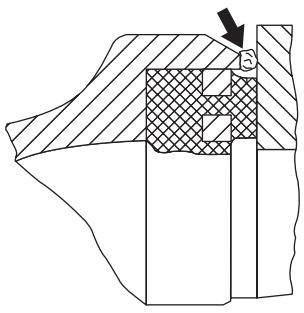
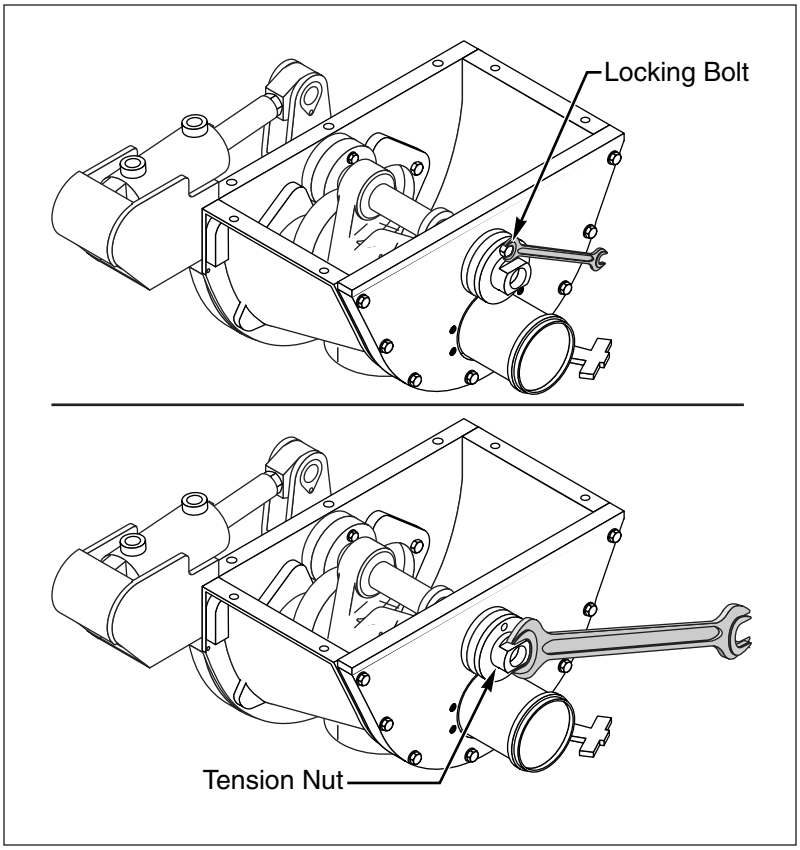


Figure 3



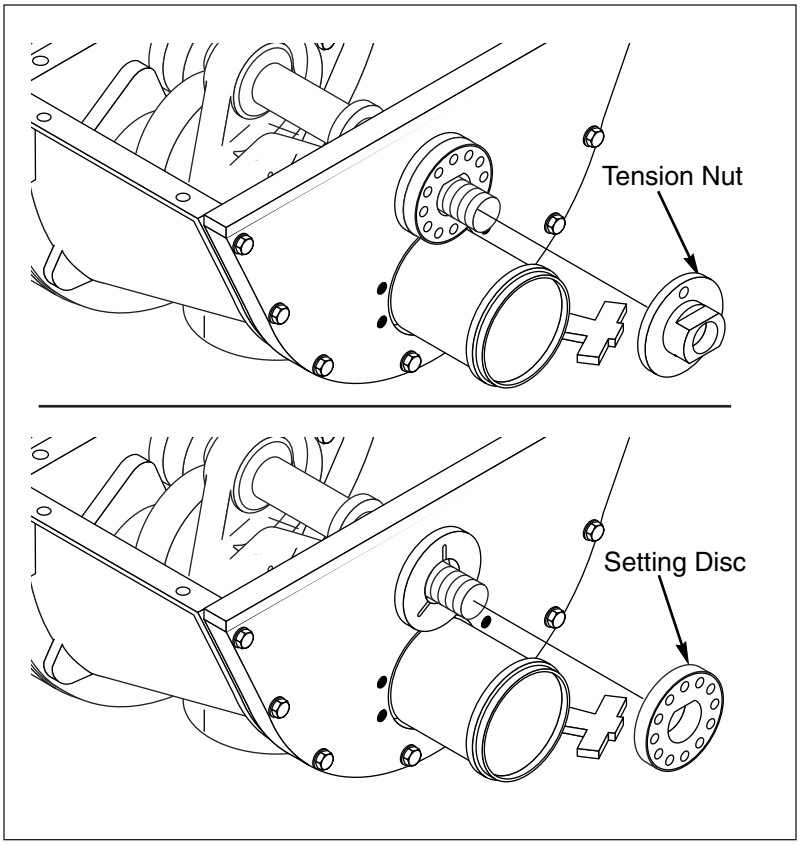
Replacement of Cutting ring and Kidney seal

CAUTION! Under no circumstances should you allow the kidney seal to be run with a dry hopper. This will destroy the kidney seal and is the primary cause of premature wear encountered at the outlet side of the Rock Valve. If you will be repairing the Rock or troubleshooting a problem, always fill the hopper with water to the top of the Rock Valve before switching.

1. Remove the Locking Bolt from the Tension Nut.

2. Loosen the Tension Nut.

NOTE: It's ok to remove the Tension Nut with a wrench, but it must never be tightened move than hand tight.



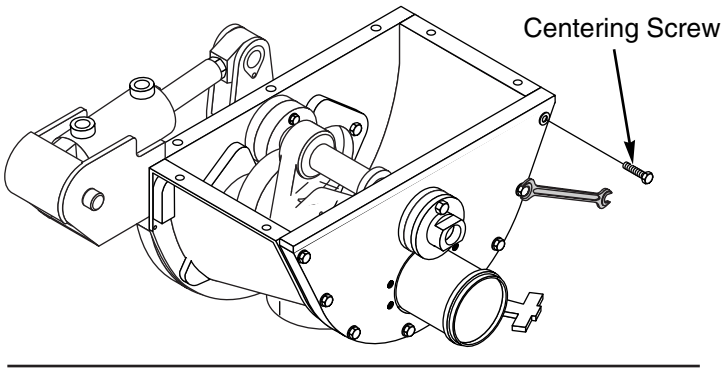
3. Remove the Tension Nut.

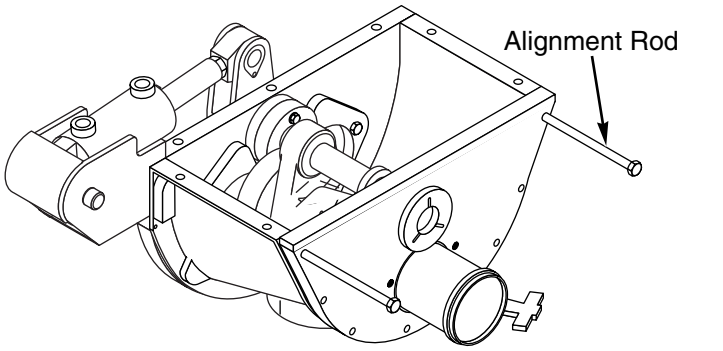
4. Remove the Setting Disc.

5. Remove the special Centering Screws
   • SAI Part #10069857

NOTE: It is important that these centering screws get installed in the same holes upon reassembly.

6. Install the Alignment Rods
   • SAI Part #30309007.

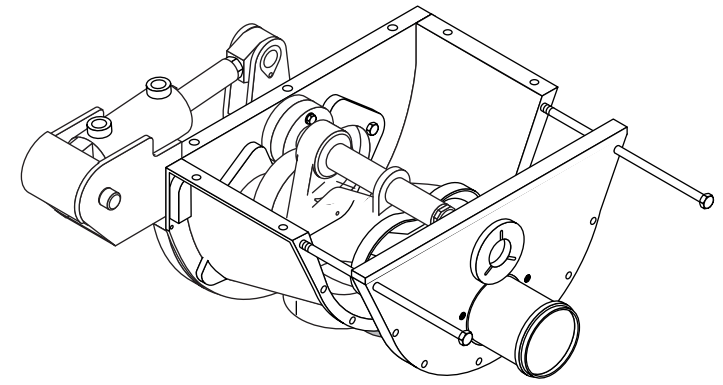


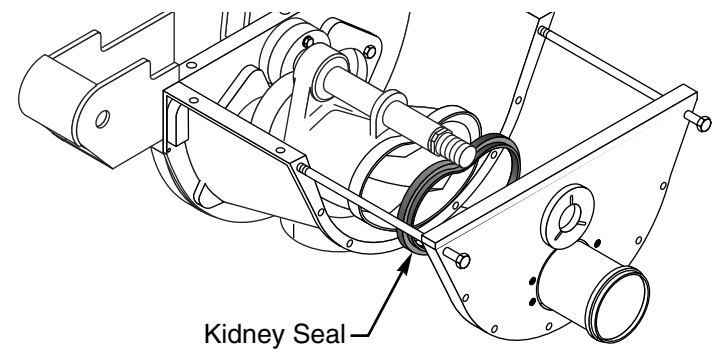


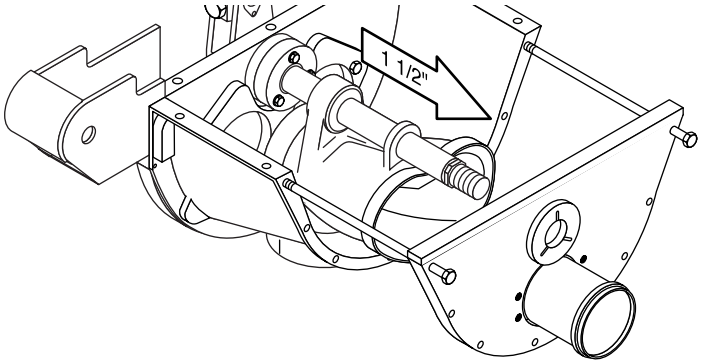
7. Slide the rear housing cover back slightly.

NOTE: Some versions of the Rock Valve have a sealing cord under the cover.

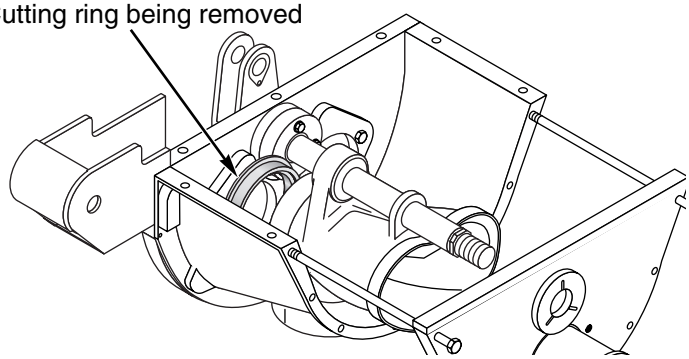
8. Remove the Kidney Seal for inspection, and replace it if necessary. See the previous section of this manual entitled *Determining Wear on the Kidney Seal and Housing Lining--Outlet Side* for reference.







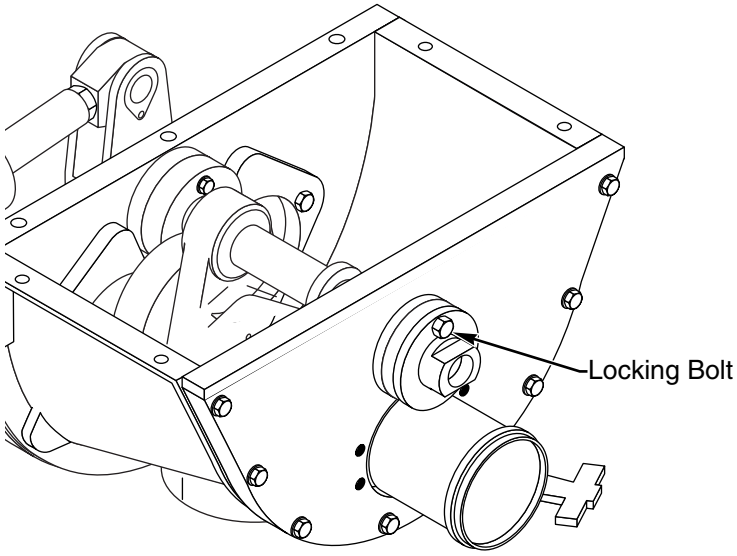
Cutting ring being removed



9. Slide the Rock Valve back about 1.5 inches, and carefully remove the cutting ring.

NOTE: If you are going to turn the Cutting Ring, you only have to move the Rock back far enough to allow you to loosen the ring and turn it 90 degrees. To determine if your Cutting Ring needs to be turned, refer to the previous section of this manual entitled *Lengthening the Service Life of the Spectacle Plate & Cutting Ring*.

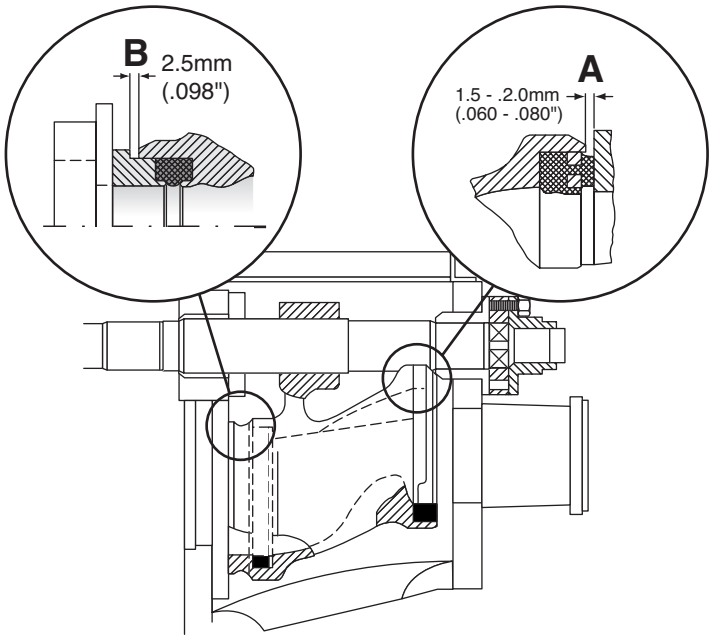
10. Make sure that all parts are thoroughly cleaned, and reassemble in reverse order. Slide the Rock cover back into place, and secure it with bolts.



11. Adjust the Tension Nut, which is tightened only hand tight. If the Locking Bolt shown can be installed in the Setting Disc freely, then do so. If the hole in the Tension Nut does not align with the thread hole in the Setting Disc, loosen the Tension Nut to the previous hole, and install the Locking Bolt.

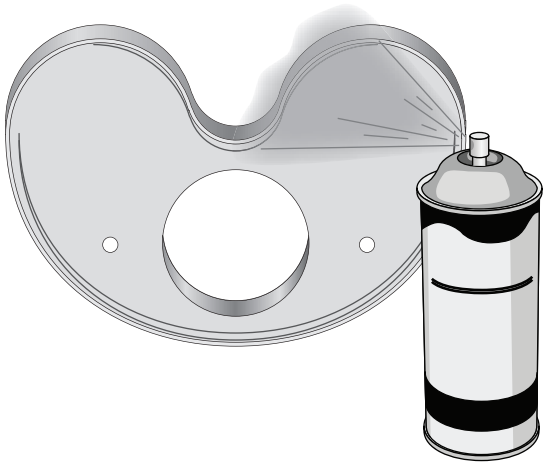
NOTE: Check to make sure that the proper clearance is obtained between the Rock Valve and the Cutting Ring and between the Rock Valve and the Kidney Plate. If the Rock components are worn, the dimensions may be larger that specified.

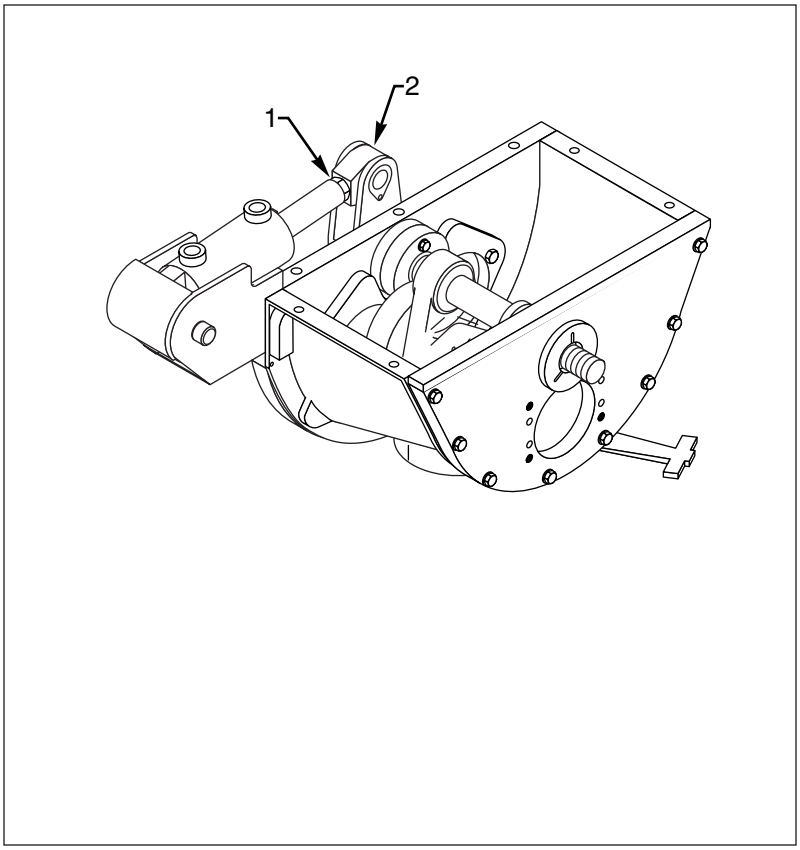
If the dimensions are too small, loosen the Adjusting Nut and pry the Rock Valve in the direction needed. Stroke the unit several times, and recheck the dimensions. If the dimensions are correct, reinstall the Tension Nut and re-adjust.



Dimensions shown are with all new wear parts.
When Dimension B exceeds 8mm (.315") the cutting ring is worn out

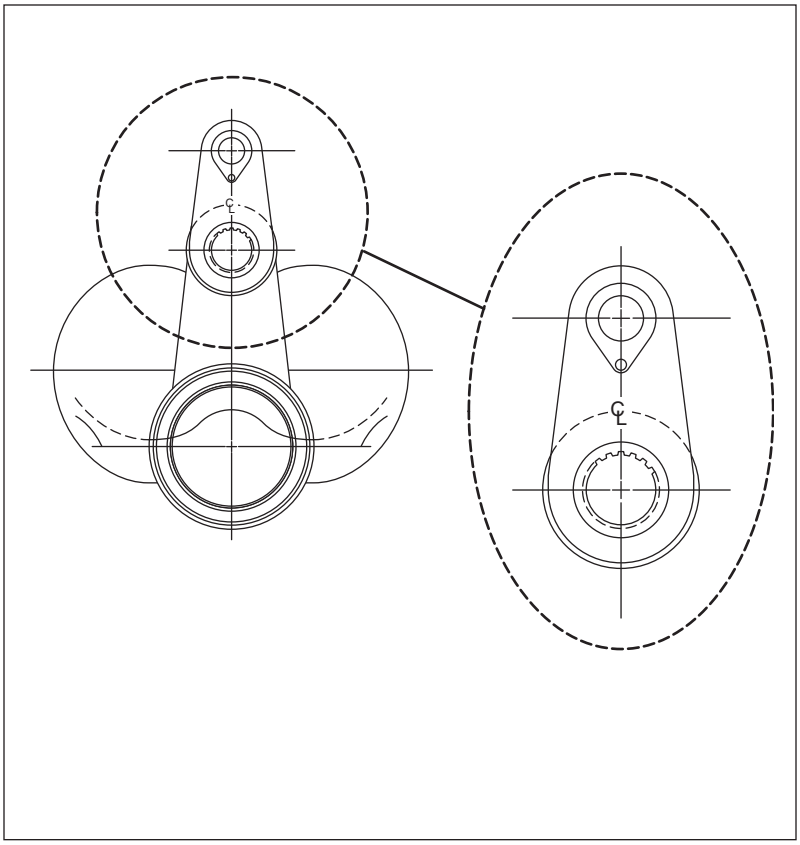
IMPORTANT! At no time should you operate the Rock Valve without first lubricating the outlet wear plate. Spraying the plate with water or oil will usually be adequate prior to start-up for pumping. Moving the kidney seal against a dry plate will cause excessive wear and premature failure.





Adjustment of the Slewing Cylinder and Installation of the Slewing Yoke

Please be advised that there is no possible adjustment to align the Rock Valve with the material cylinder openings. Our service personnel have been made aware that some maintenance personnel have been unscrewing the slewing yoke to compensate for the Rock missing the holes while shifting. This is absolutely NOT to be done! By unscrewing the slewing yoke, you risk tearing off the threads on the end of the cylinder rod, which would cause immediate breakdown of the unit.



These units were designed to have no adjustment. If you replace a shifting cylinder or a slewing yoke, you must make sure it is screwed the full distance on the threads and then locked down. If you do notice that the Rock is missing the material cylinder openings, you must check to see where the problem may be (i.e., articulated bearings, shifting cylinder (internal), or Rock slewing lever may need adjustment).

Please call the Schwing Service Department at (651) 429-0999 with any questions regarding this matter.

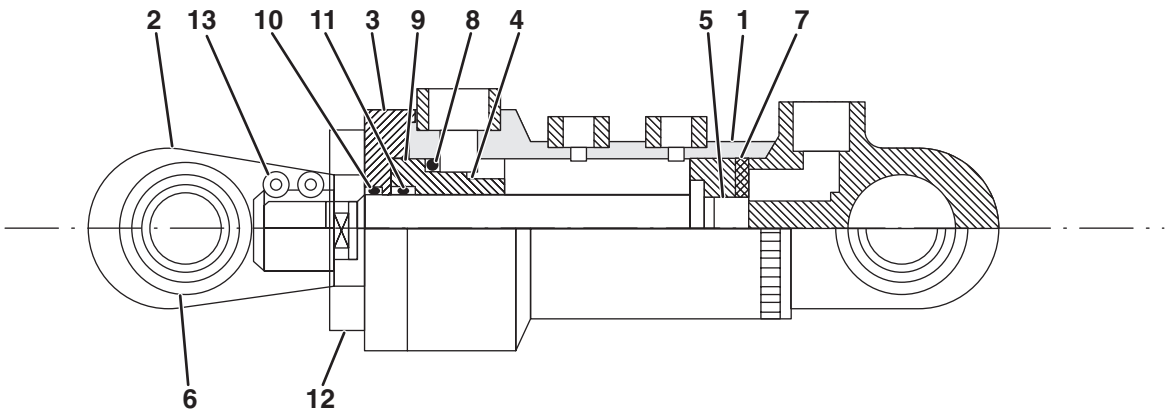
Slewing Yoke Timing

(Viewed From Cylinder End)

The slewing yoke is installed properly when the center line of the hydraulic cylinder rod is in line with the center line of both the slewing shaft and the inlet or cutting ring.

Rock Slewing Cylinder

IMPORTANT! Due to the various applications of the small style Rock Valve, a variety of seals and sealing materials are used. Please consult the parts manual for the specific machine you are working on for the correct parts, which may differ from what has been illustrated here.



1. Cylinder Pipe
2. Rod Eye
3. Tension Ring
4. Guide Bushing
5. Piston and Rod Assembly
6. Articulated Bearing
7. Piston Rings
8. O-Ring
9. Snap Ring
10. Rod Scraper Seal
11. Rod Seal
12. Tension Ring Bolt
13. Clamping Bolt