



# Diesel Hammer Inspection Procedures

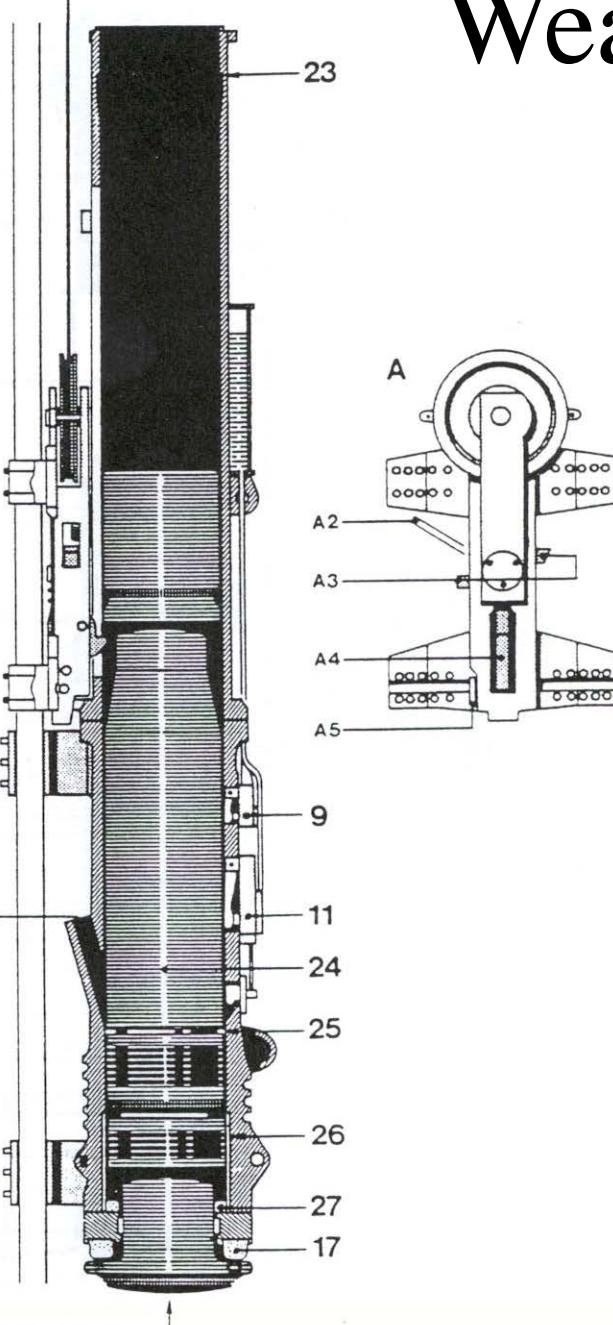
# Why Inspection Is Important.

Each time a diesel hammer is used to drive piles it is subject to wear, tear, and abuse. When it comes back off rent we really do not know what the piston rings or anvil rings look like. Perhaps the crane operator dropped the trip into the hammer while it was driving the last pile on the job.

When you consider all the other wear items, such as the fuel pump and oil pump lever and internal parts, the trip components, the inner cylinder end ring, the rebound ring, the piston and catch rings, it becomes clear that one must consider the end of each job as a time for complete disassembly and inspection of all wear parts.

Lets go through the wear items.

# Wear Items-overview



Piston	Fuel pump components
Anvil	Lube pump components
Piston rings	Trip components
Anvil rings	Cylinder upper
Catch ring	Cylinder sleeve
End Rings	Cylinder extension
Cylinder bore-lower	Guide rails
Cylinder-Upper	Fuel tank
Inner cylinder end ring	
Rubber rebound ring	

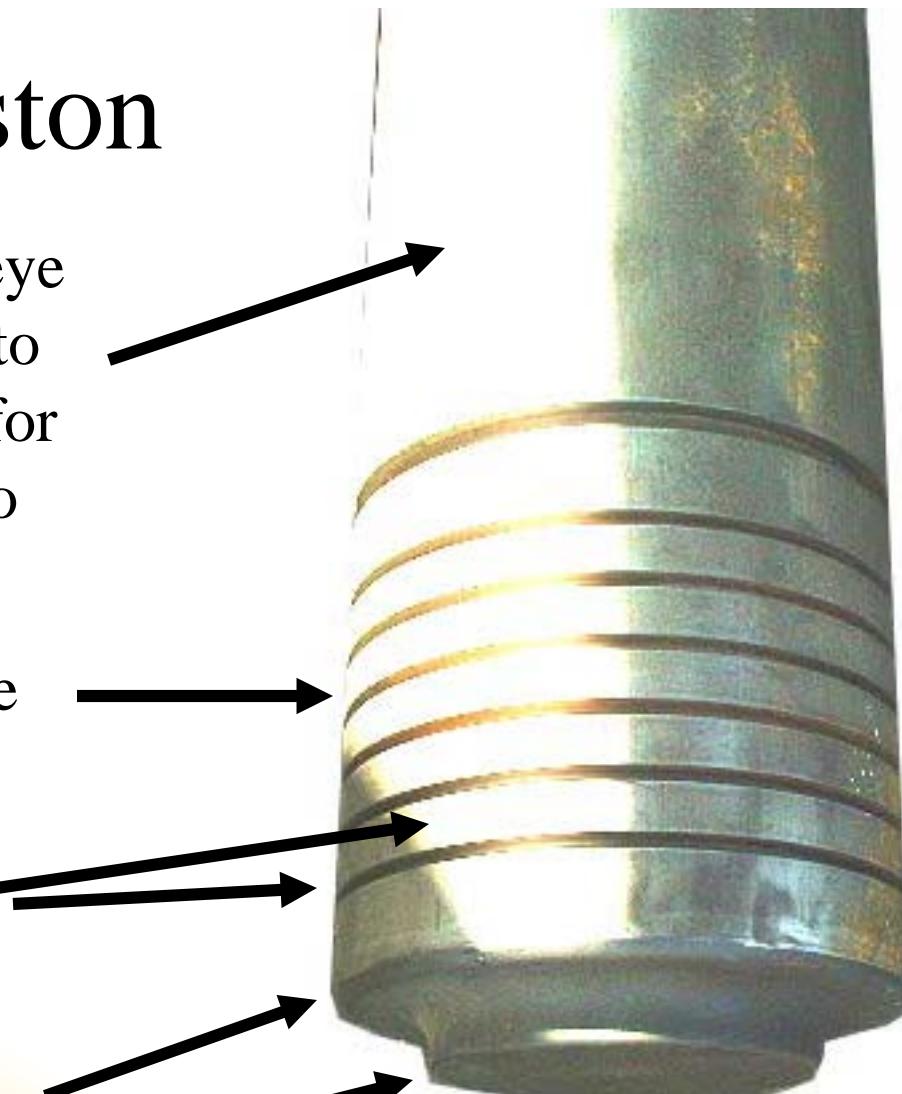
# Wear Items-piston

Go over entire piston with naked eye to check for possible damage due to improper trip engagement. Look for foreign metal that may be seized to piston.

Measure the diameter and compare with acceptable wear limits.

Check ring lands and grooves for damage. Scrape and clean.

Check end for mushrooming from over driving or wear from fuel pump lever.



If the ram point becomes mushroomed then it should be sent back to the factory for re-machining.

# Piston Ring Groove on Upper Cylinder

## Piston Ring Groove on the upper piston:

**D8-22:** If the first ring groove (closest to ram point) is larger than 7 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston ring to fit. Note that the groove of a brand new upper piston is 6 mm.

**D12-42:** If the first ring groove (closest to ram point) is larger than 8 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston ring to fit. Note that the groove of a brand new upper piston is 7 mm.

**D16-32/D19-42:** If the first ring groove (closest to ram point) is larger than 8 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston ring to fit. Note that the groove of a brand new upper piston is 7 mm.

**D25-32/D30-32:** If the first ring groove (closest to ram point) is larger than 11 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston rings to fit. Note that the groove of a brand new upper piston is 10 mm.

For D30 hammers with 8 mm piston rings, if the first ring groove (closest to ram point) is larger than 9 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston rings to fit. Note that the groove of a brand new upper piston is 8 mm.

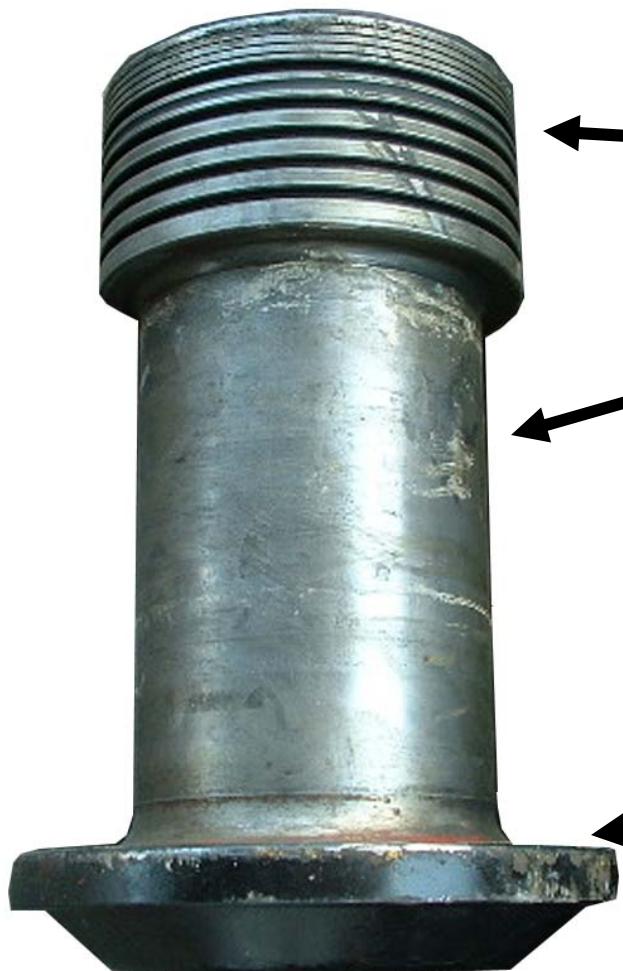
**D36-32/D46-32:** If the first ring groove (closest to ram point) is larger than 11 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston rings to fit. Note that the groove of a brand new upper piston is 10 mm.

**D62-22:** If the first ring groove (closest to ram point) is larger than 13 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston rings to fit. Note that the groove of a brand new upper piston is 12 mm.

**D80-23/D100-13:** If the first ring groove (closest to ram point) is larger than 13 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston rings to fit. Note that the groove of a brand new upper piston is 12 mm.

**D125-32:** If the first ring groove (closest to ram point) is larger than 14 mm, then all the piston ring groove on the upper piston must be re-machined to allow larger-size piston rings to fit. Note that the groove of a brand new upper piston is 13 mm.

# Wear Items- Anvil



Look for damage to ring lands and grooves



Look for wear on neck of anvil.



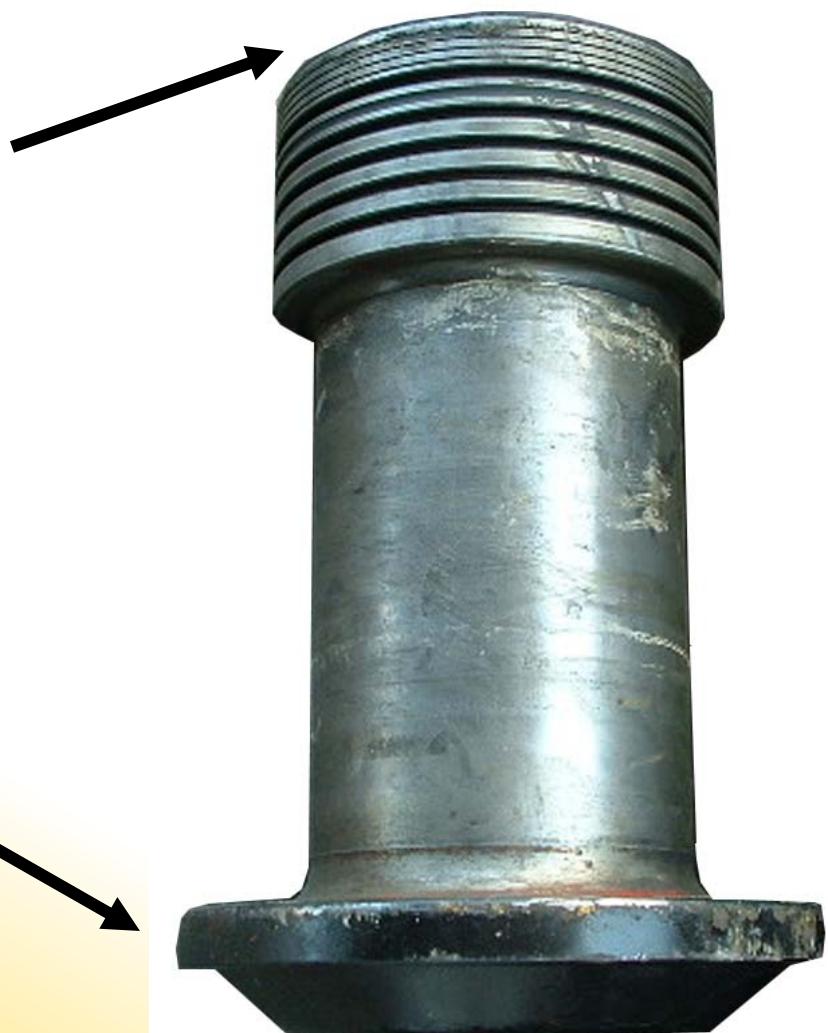
Wear on the neck is not normal.  
A badly worn set of inner cylinder end rings could be the cause.



Look for cracks on lower end

# Wear Items-anvil

Check the top and bottom of the anvil to see if the anvil metal has mushroomed from over driving.



# Wear Items-anvil



Check the top of the anvil for damage from unwanted parts inside the combustion chamber.

Broken piston rings can damage the anvil. Look here for signs.

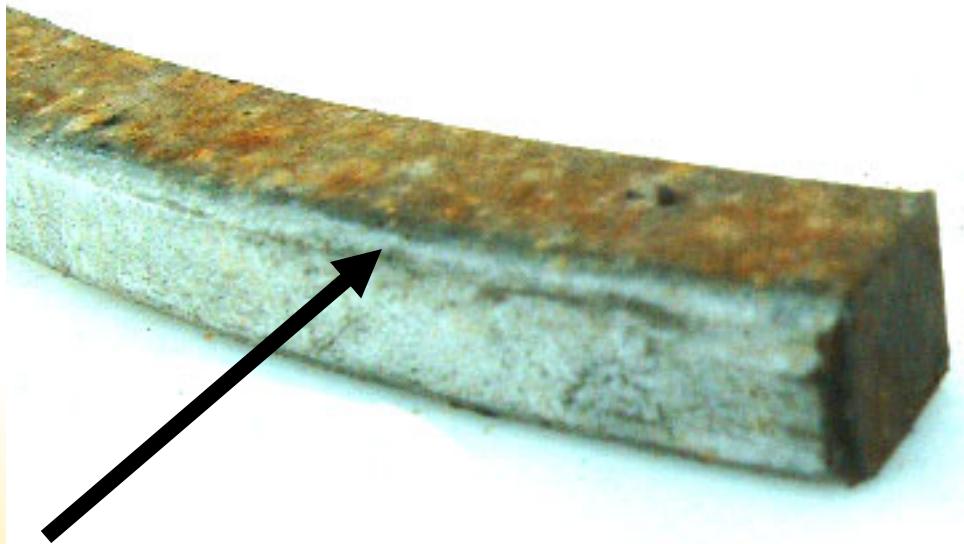
If the anvil surface becomes uneven then it should be sent back to the factory for surface machining.

# Wear Items-Piston Rings



- Check for wear by feeling the edge of the ring. It should be round- not sharp.
- Check for broken rings.
- Check for rings stuck in grooves by improper trip engagement.
- Check for overheating due to lack of oil.
- Check ring gap.
- Check chrome, if flaking off then replace ring.

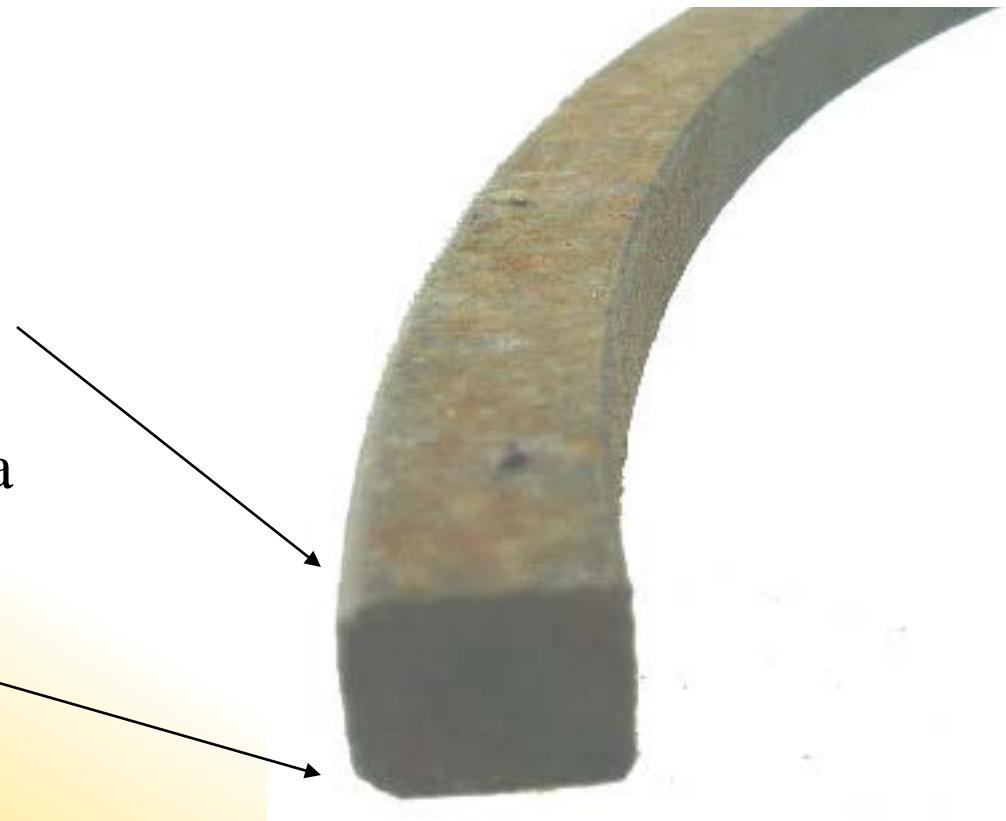
# Wear Items-Piston & Anvil Rings



See how this edge is rounded. If this edge is sharp then it is time to change the rings.

# Wear Items-Piston & Anvil Rings

See how top and bottom edges are rounded. This is a used ring from a D12 but it is in good shape.

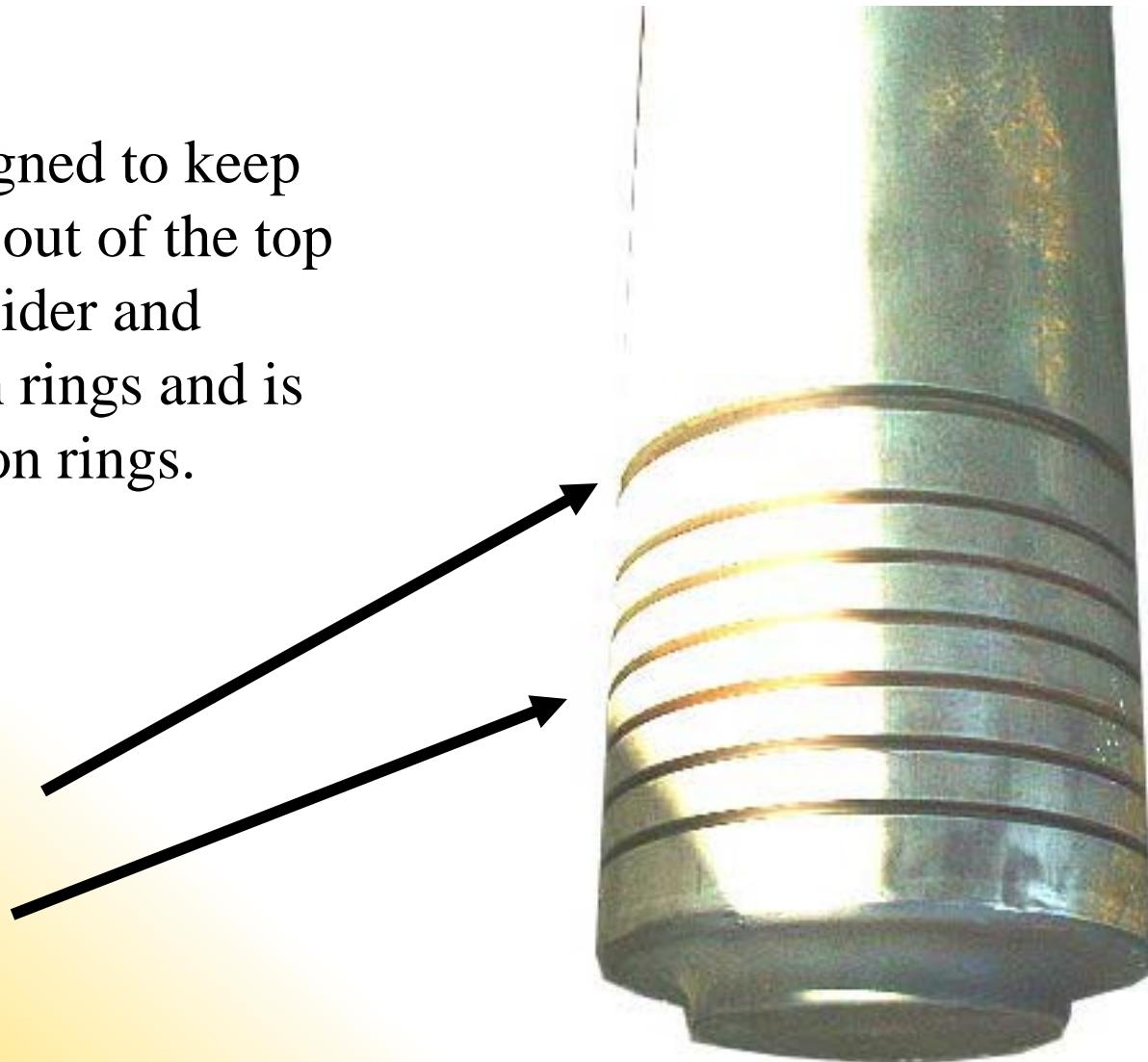


# Wear Items-Catch Ring

The Catch ring is designed to keep the ram from jumping out of the top of the cylinder. It is wider and heavier than the piston rings and is located above the piston rings.

Catch ring goes here

Piston rings go here



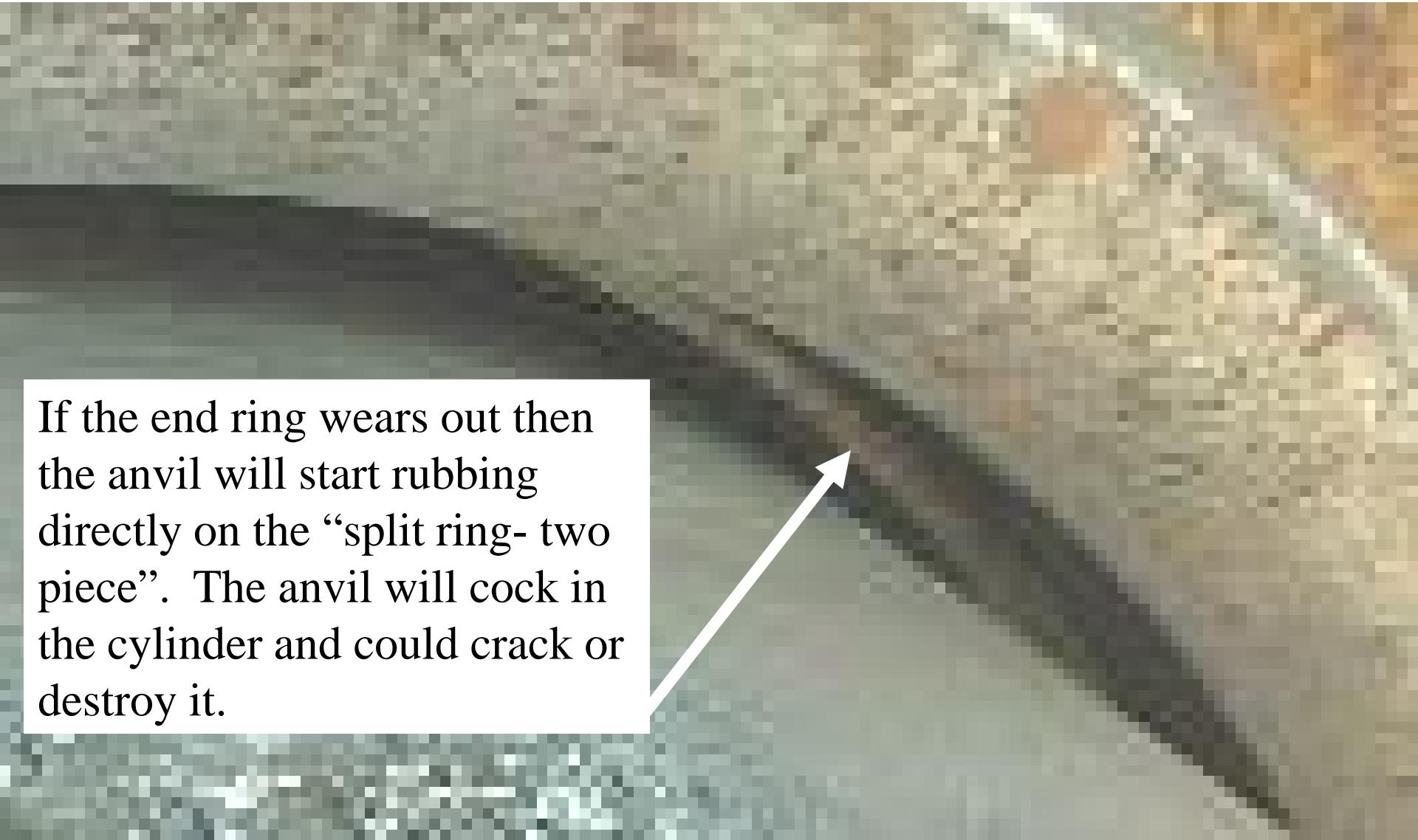
# Wear Items-Catch Ring Groove

# Wear Items-End Rings



If you look close, you can see the inner cylinder end ring. It is made of soft material designed to support the anvil neck but not wear it out. The end ring wears rapidly if not greased.

# Wear Items-Inner Cylinder End Ring



If the end ring wears out then the anvil will start rubbing directly on the “split ring- two piece”. The anvil will cock in the cylinder and could crack or destroy it.

# Wear Items-Inner Cylinder End Ring, Two Piece



# Wear Items-Inner Cylinder End Ring

## APE Wear Items Data Sheet For Diesel Hammers

### Ring 2 PC

The ring 2 pc inside the cylinder end ring 2 pc sticks out toward the center to prevent the cylinder end ring from getting into contact with the anvil, when it is brand new.

If the ring 2 pc is worn to the extent that it is no longer sticking out, then it should be replaced. Otherwise, the cylinder end ring 2 pc will get into direct contact with the anvil.

# Cylinder bore-lower



Check for wear by visual inspection

Using a Micrometer, measure the bore

Check to see if sleeve has shifted

Remove any unwanted metal

See next page for proper measurements

## Lower Cylinder

# Cylinder Bore-Lower

**D8-22:** If the cylinder bore is larger than 252 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 250 mm.

**D12-42:** If the cylinder bore is larger than 302 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 300 mm.

**D16-32/D19-42:** If the cylinder bore is larger than 322 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 320 mm.

**D25-32/D30-32:** If the cylinder bore is larger than 422 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 420 mm.

**D36-32/D46-32:** If the cylinder bore is larger than 502 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 500 mm.

**D62-22:** If the cylinder bore is larger than 552 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 550 mm.

**D80-23/D100-13:** If the cylinder bore is larger than 632 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 630 mm.

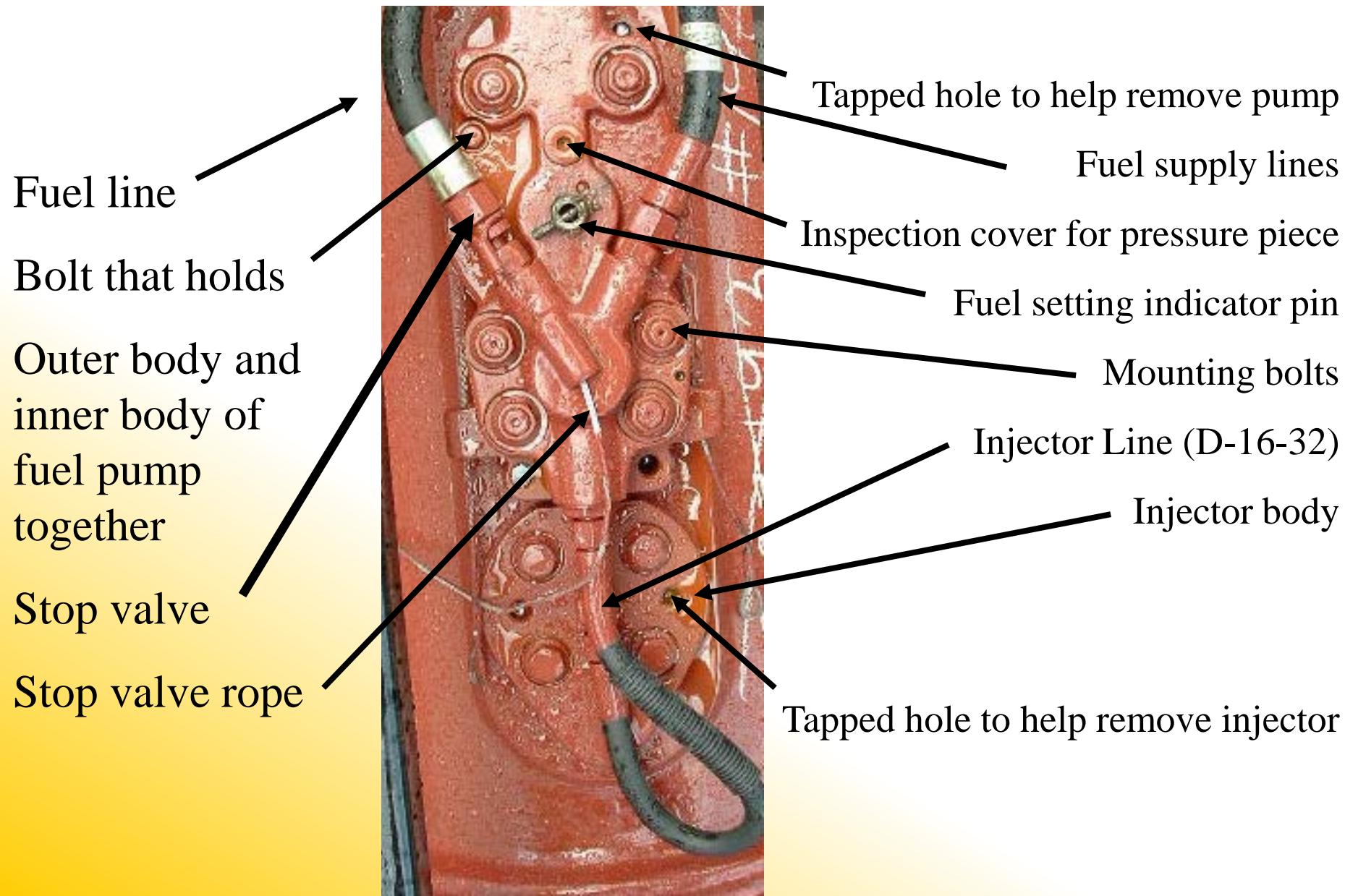
**D125-32:** If the cylinder bore is larger than 722 mm, then replace the lower cylinder. Note that the bore of a brand new lower cylinder is 720 mm.



# Wear Items-Fuel Pump

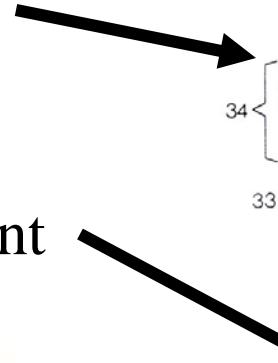


# Wear Items-Fuel Pump-overview

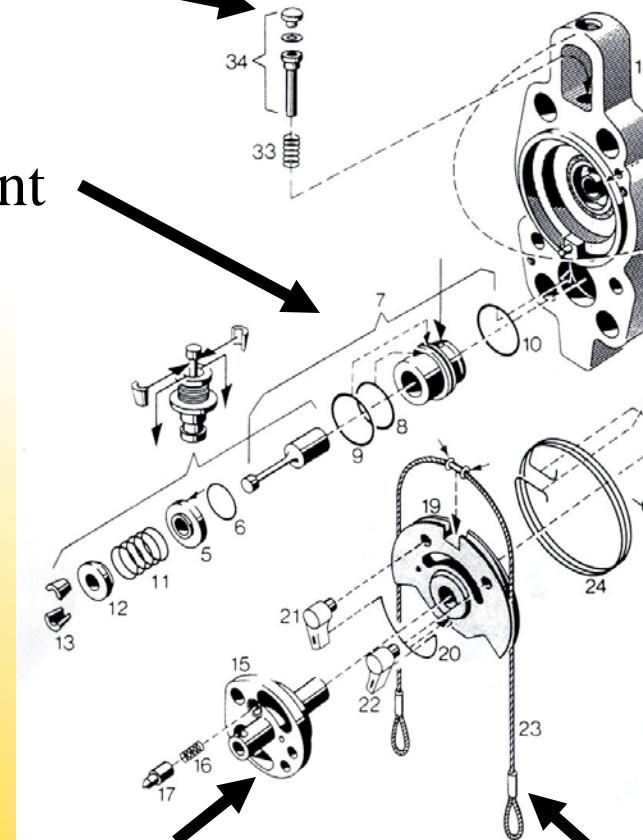


# Wear Items-fuel Pump-Overview

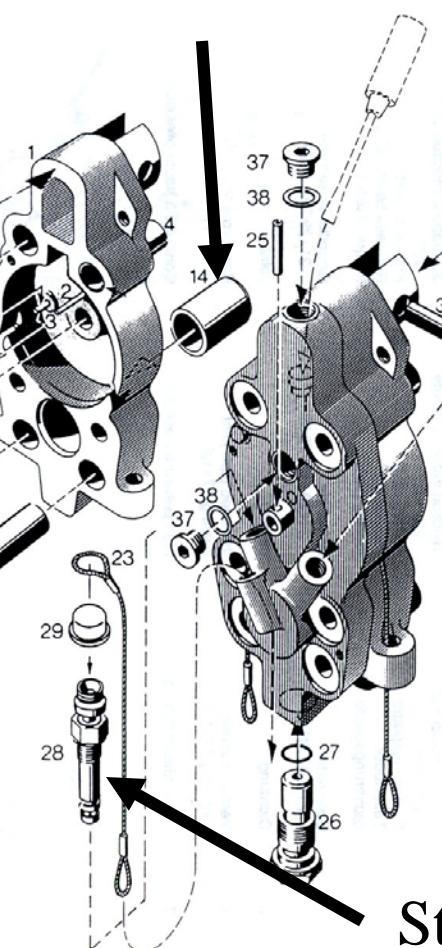
Pressure Piece



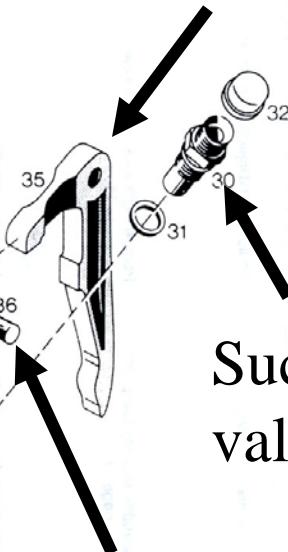
Pump element



Guide Sleeve



Pump Lever



Suction valve

Pump Lever Pin

Switching shaft

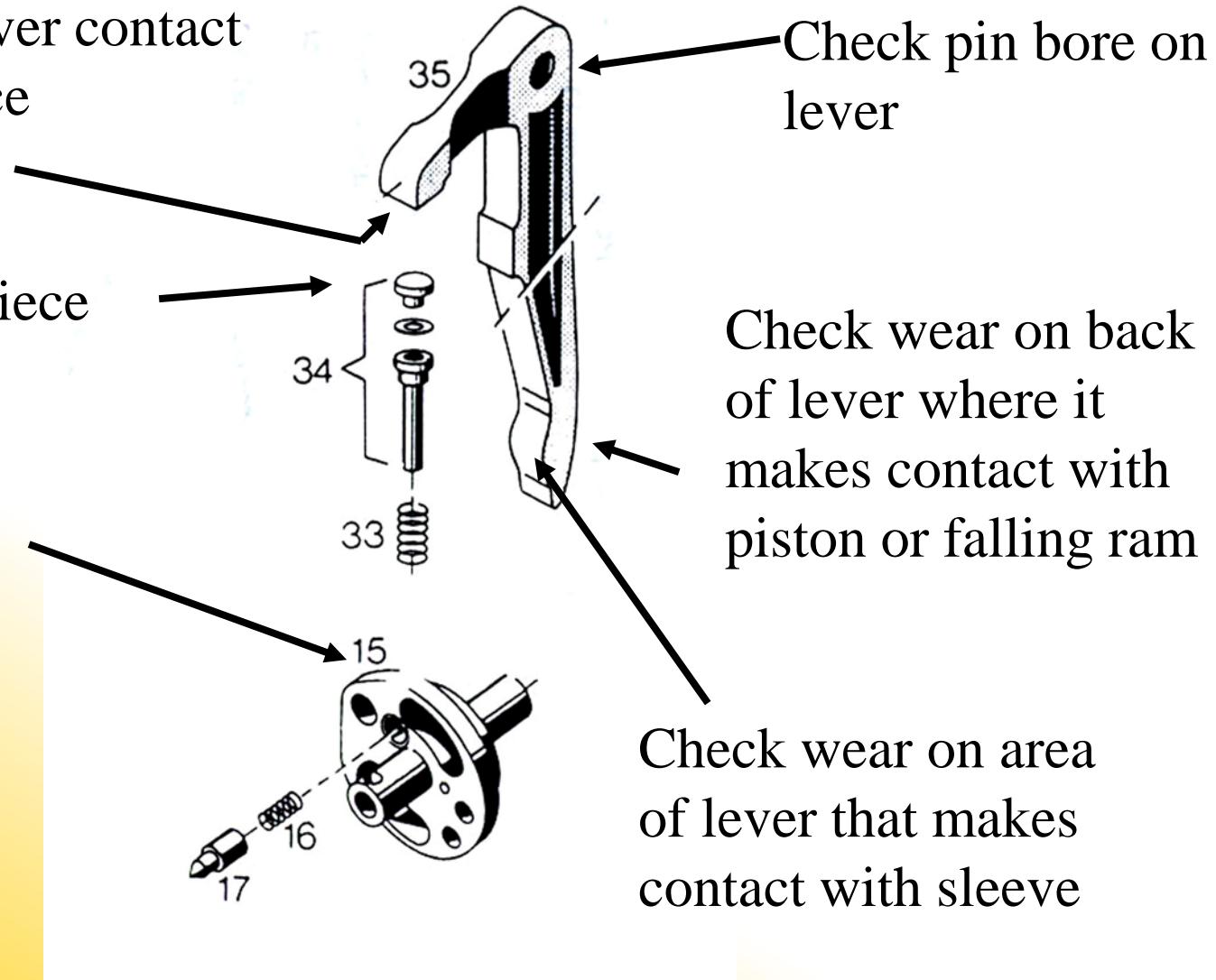
Regulating Rope

Stop Valve

# Wear Items-fuel pump

## Pressure piece, lever, switching shaft

Check wear on lever contact  
with pressure piece



Check pin bore on  
lever

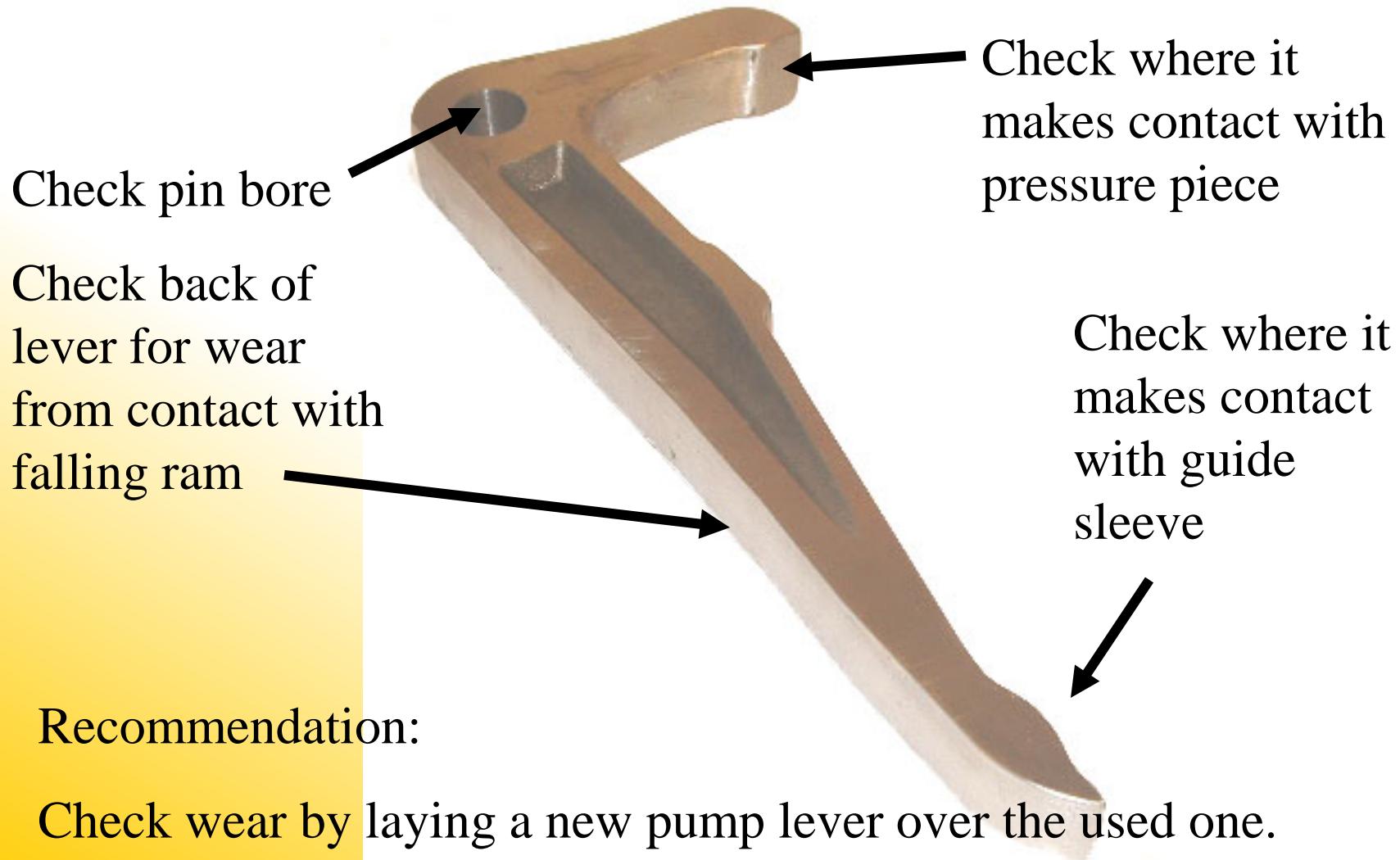
Check pressure piece

Check switching  
shaft

Check wear on back  
of lever where it  
makes contact with  
piston or falling ram

Check wear on area  
of lever that makes  
contact with sleeve

# Wear Items-Fuel Pump Lever

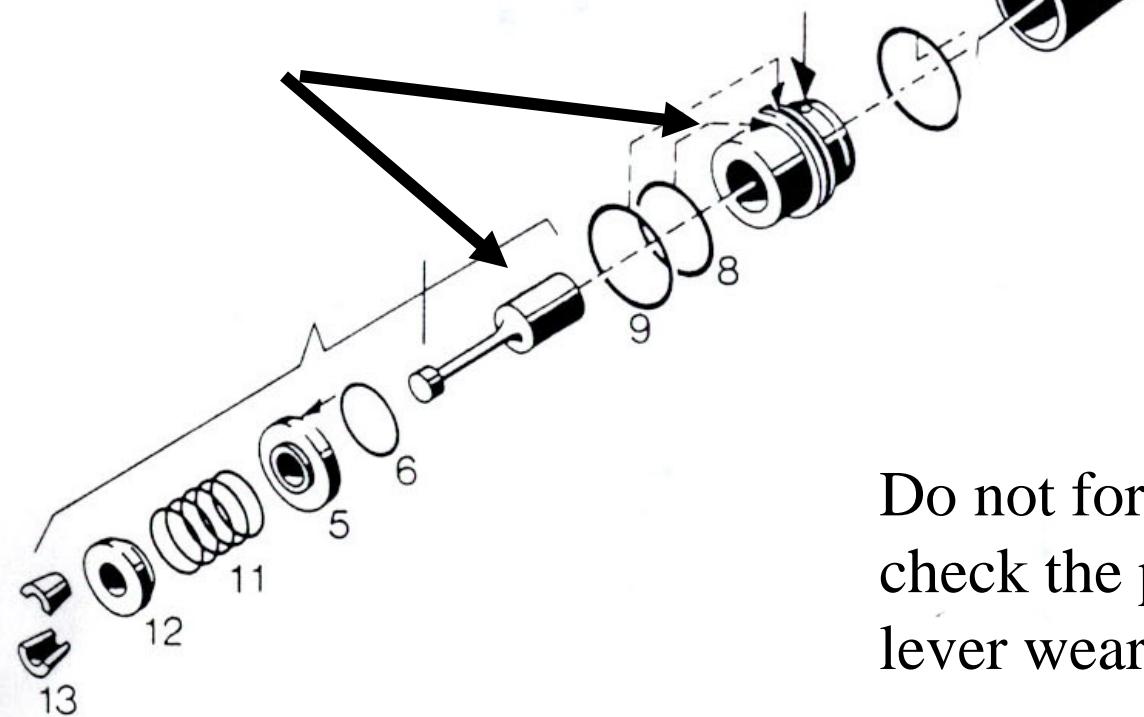


# Wear Items-Fuel Pump

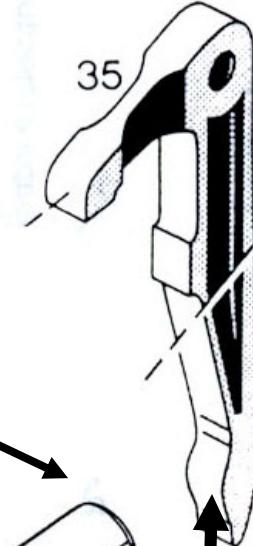
## Guide sleeve and element

Check Guide sleeve where it rubs against the pump lever

Check the pump element for wear. It should be a very tight fit between the piston and cylinder



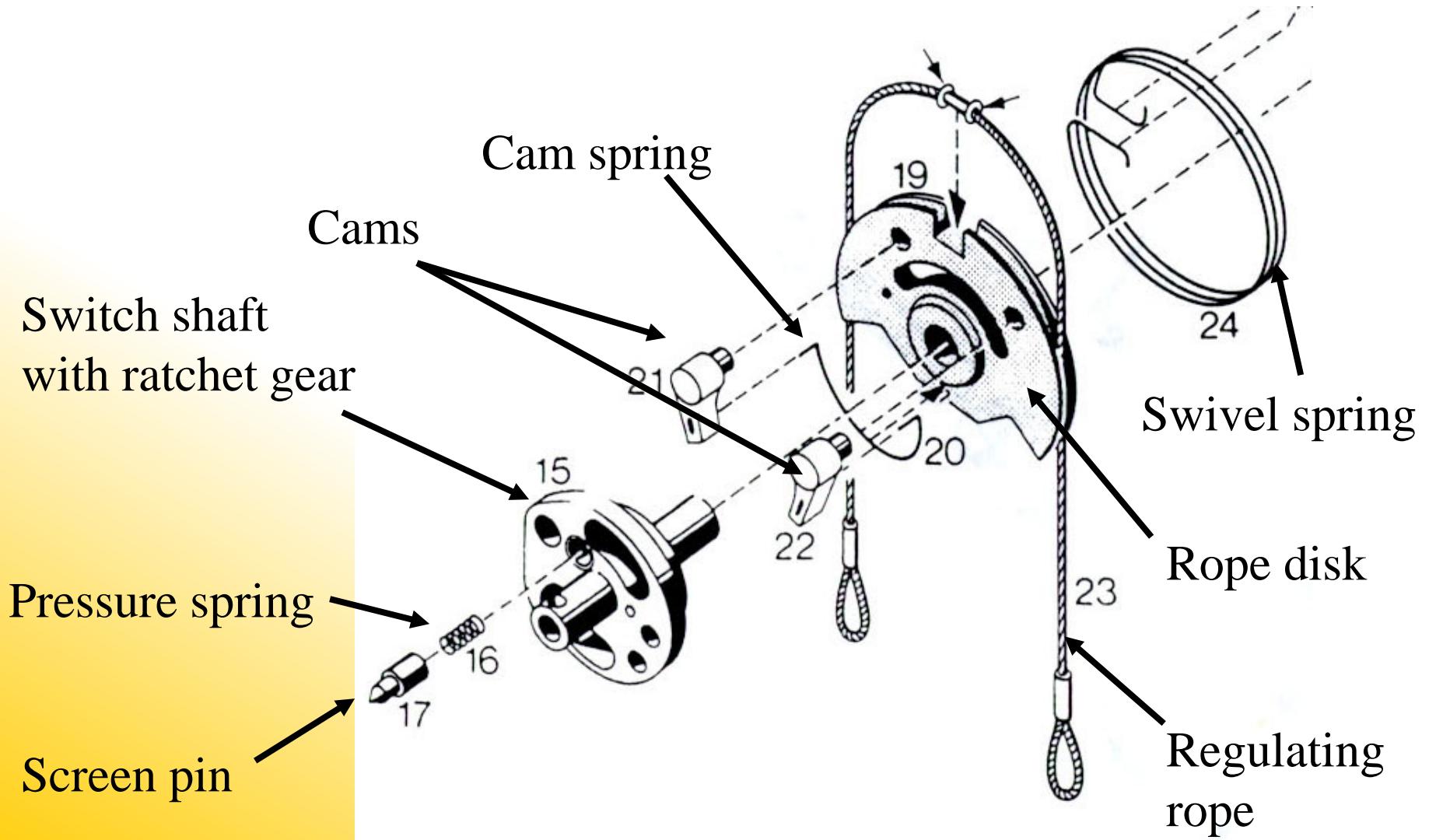
Do not forget to check the pump lever wear here.



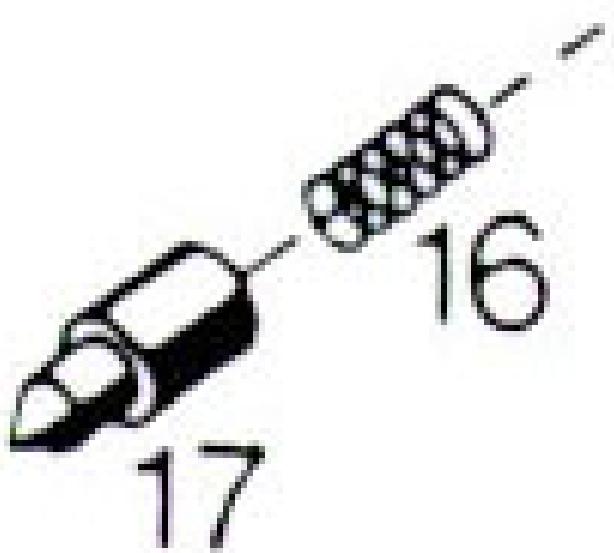
# Wear Items-Fuel Pump

# Wear Items-fuel Pump

## Regulating Rope-overview of wear points

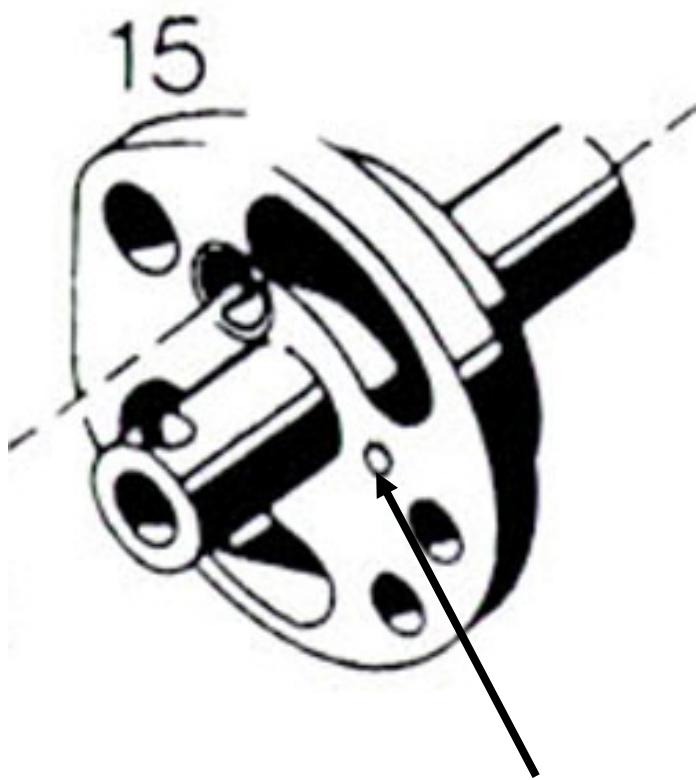


# Wear Items-Fuel Pump Screen pin with spring



The screen pin and spring must be cleaned and lubricated or the ratchet will not work. The spring has been known to collapse or lose its ability to spring back. The pin has been known to break or become dull and useless. Clean and coat with a light coat of high temperature grease.

# Wear Items-Fuel Pump Switch shaft with gear

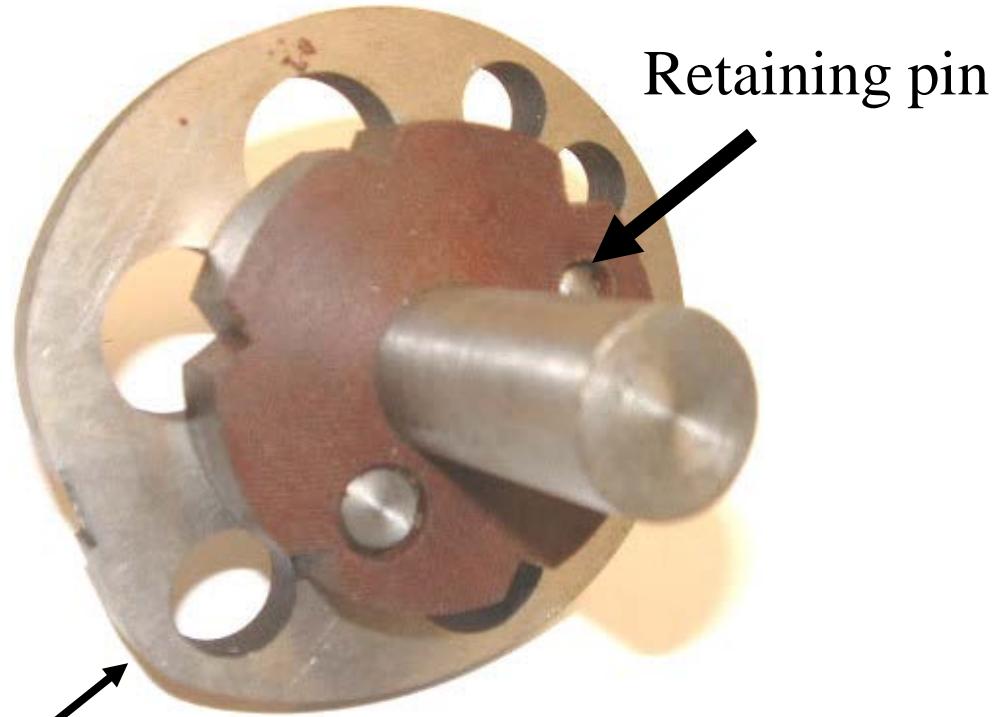


The switch shaft is a cam that increases or decreases fuel. On the back side (not shown) there is a ratchet gear that is made of micarta material. The ratchet is held in place with a small pin. If this pin breaks, the ratchet will not rotate the cam.

Retaining pin

# Wear Items-Fuel Pump Switching shaft with cam

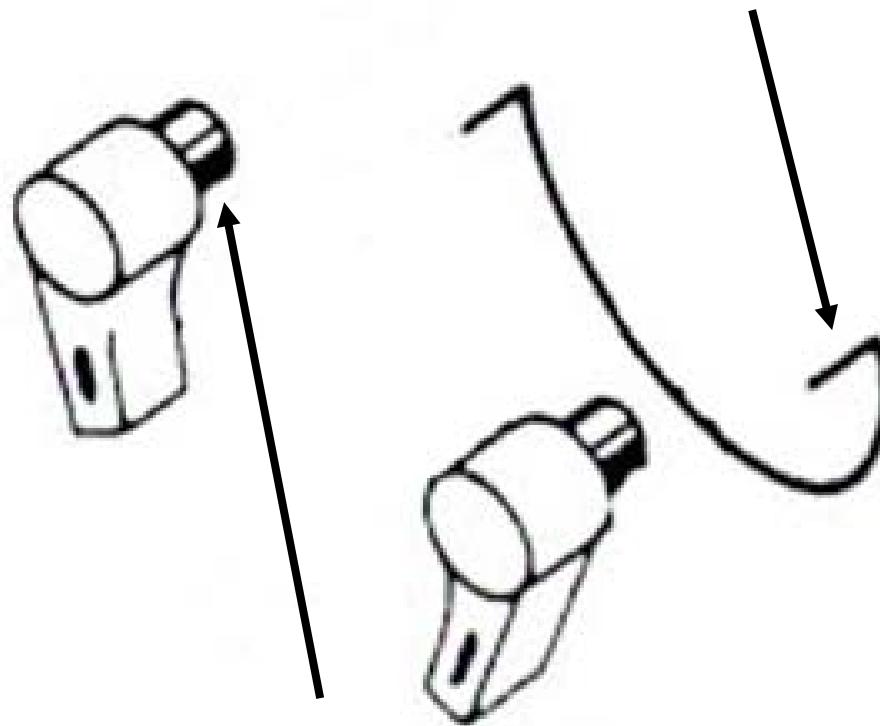
The micarta cam is the heart of the four position fuel pump. Check the cams for wear. This cam is held in position via a pin. Check to make sure this pin is ok. Try to turn the ratchet one way while turning the shaft another. It must be solid.



Outer diameter is cam that changes fuel settings.

# Wear Items-Fuel Pump cams with spring

Watch for this end  
to break off

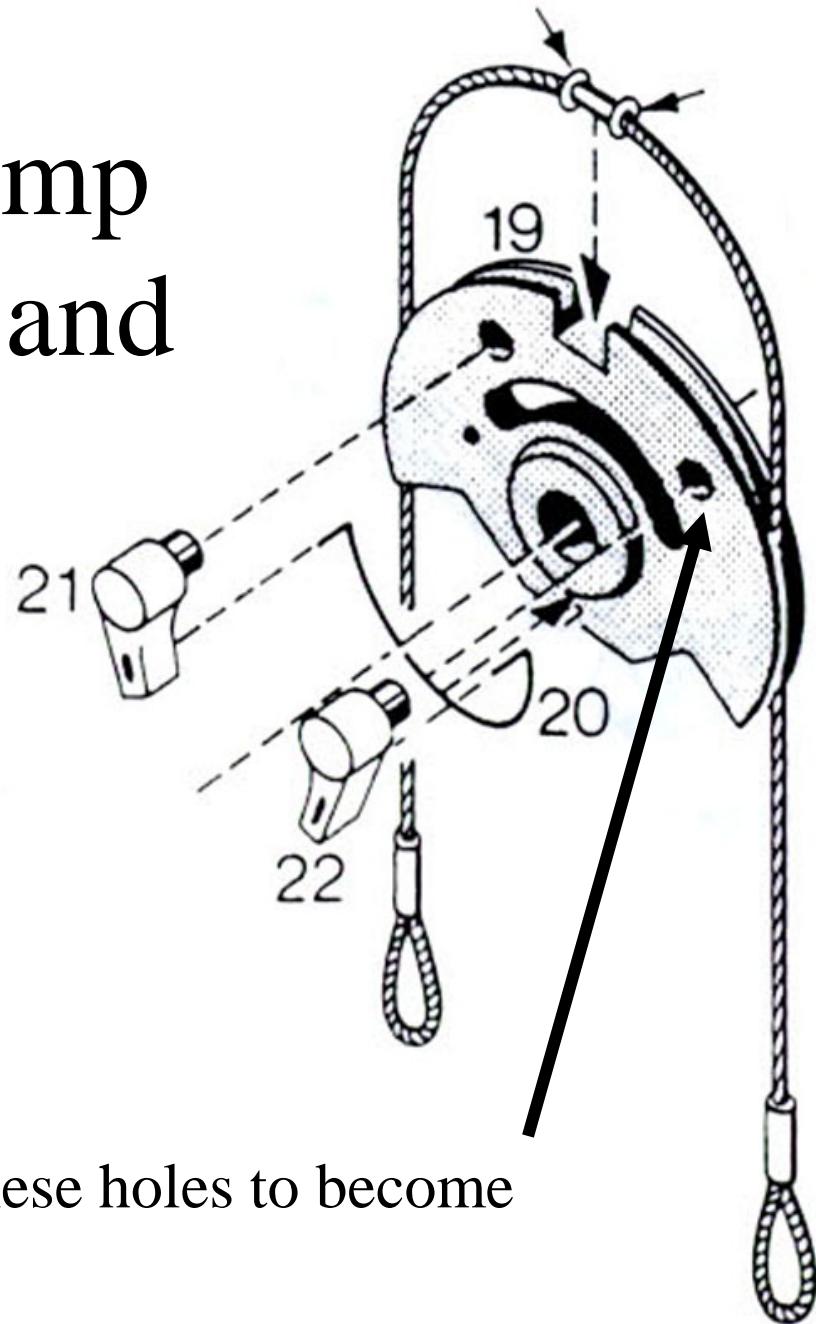


Watch for this to get sloppy in the  
hole it fits into on the rope disc.

These cams are part of the ratchet system that locks into place for each fuel setting. The spring gets weak and will not lock the cams into place. The cams fit into the rope disc and those holes get sloppy and cause the system to not lock into place. Replace this spring when rebuilding pump.

# Wear Items-Fuel Pump rope disc with cams and spring

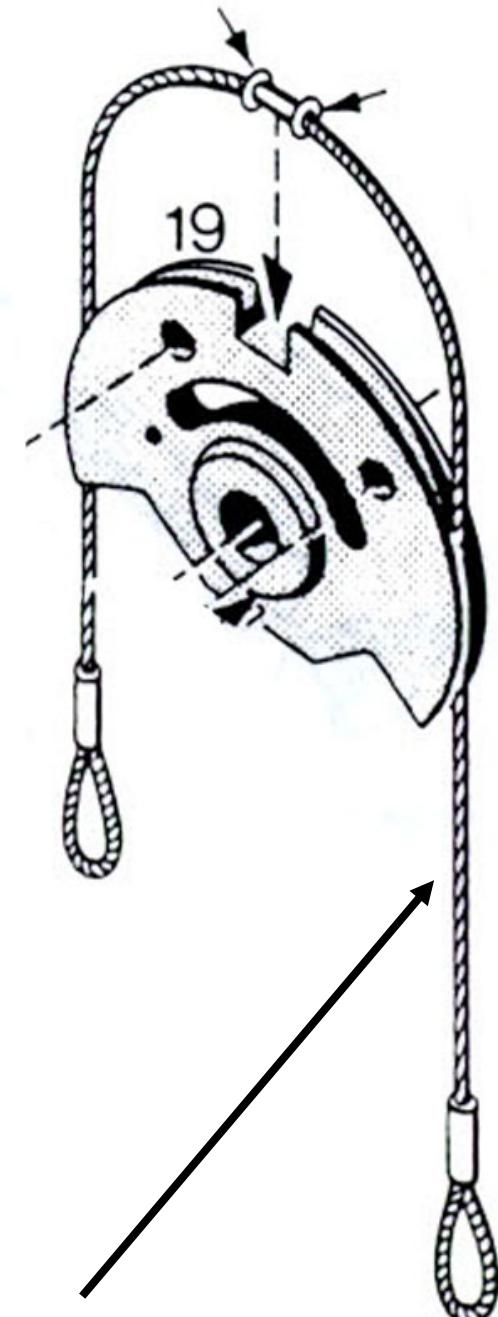
The two cams fit into the rope disc. The holes will wear out and cause the cams to wobble and fit sloppy in the holes. Replace when necessary.



Watch for these holes to become  
sloppy.

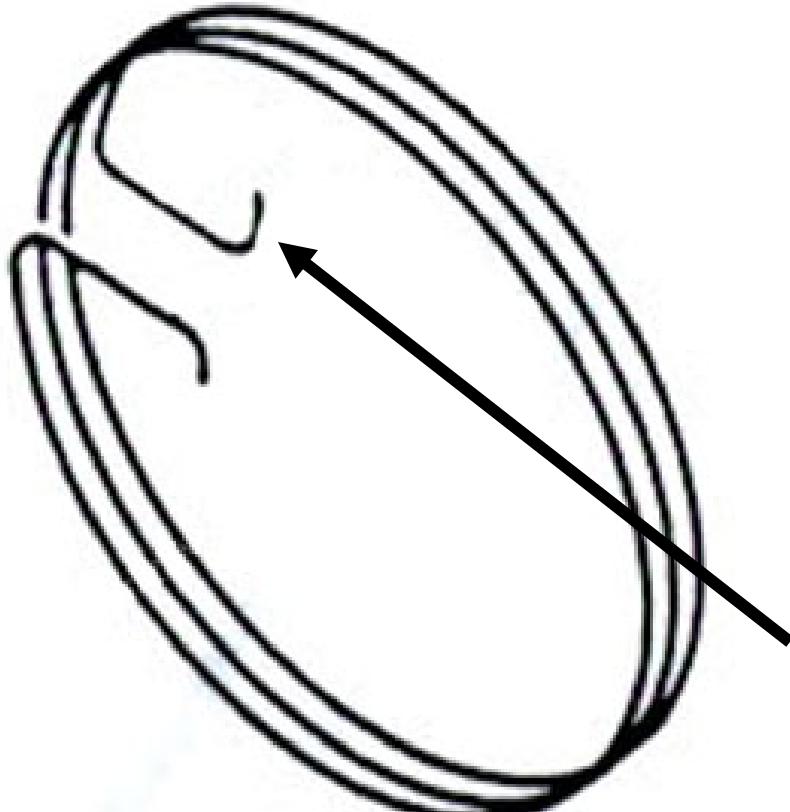
# Wear Items-Fuel Pump regulating rope

The regulating rope must be checked for broken wires. Check the ends where the loops are formed. Inspect the top where the rope is locked into the regulating disc. Watch for cheap replacement rope that appears thinner in diameter. Put a light coat of high temperature grease on the rope.



Check for  
broken wires

# Wear Items-Fuel Pump swivel spring



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The swivel spring can break at the ends and become useless. The whole pump will not ratchet if this spring is broken at the ends.

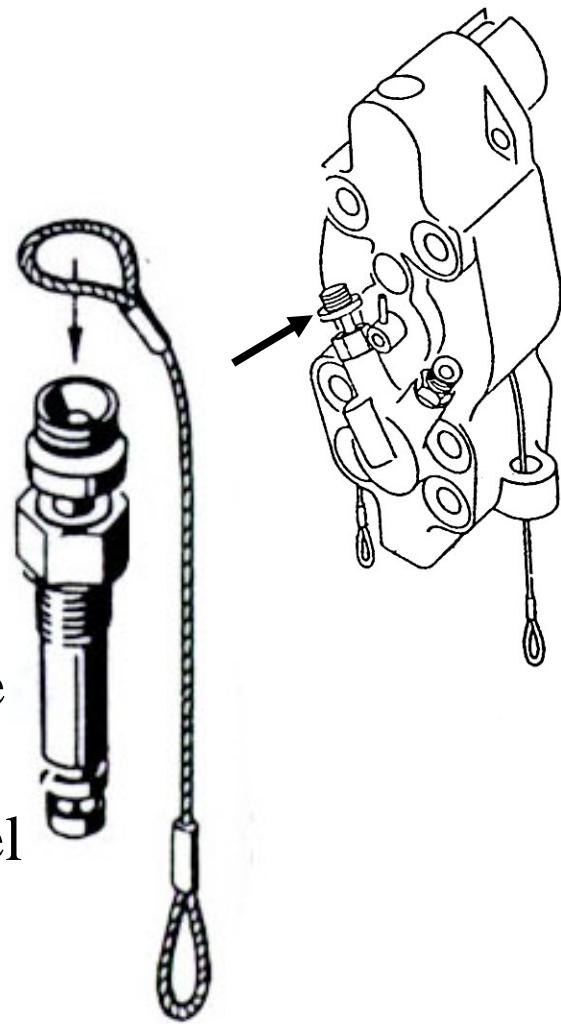
Look for broken tips of  
the spring

# Wear Items-Fuel Pump Stop Valve

The stop valve is a fitting that is mounted in the front of the fuel pump.

The stop valve is a check valve when you do not pull on the rope.

Fuel from the pump cannot go up the fuel line when the pump is working. If you pull the rope, the check valve will divert the pump fuel to tank.



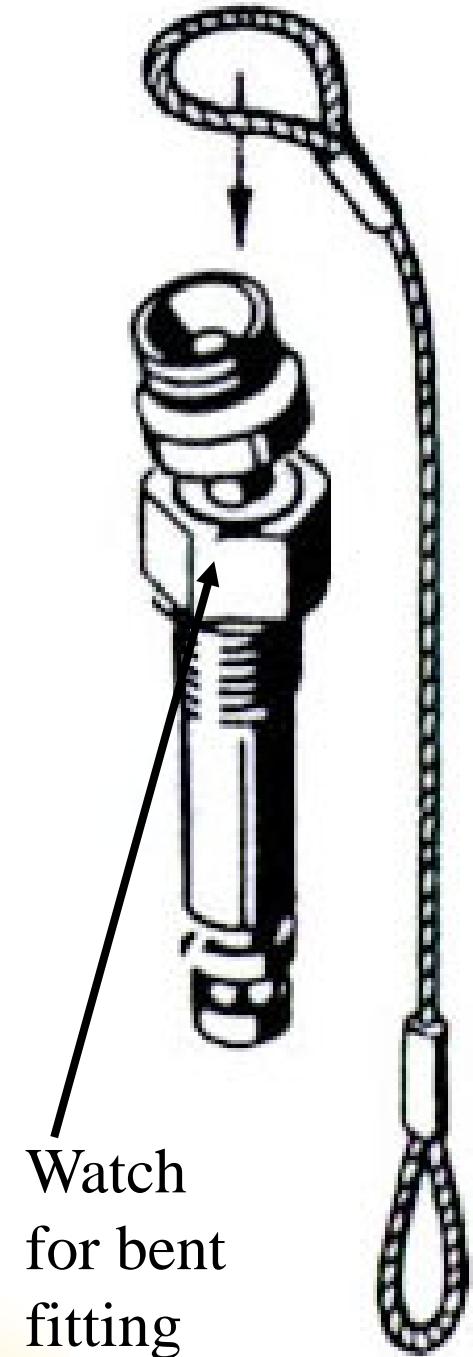
# Wear Items-Fuel Pump stop valve

The stop valve is a fuel line. It can get struck by the pile line headache ball and bend line shown.

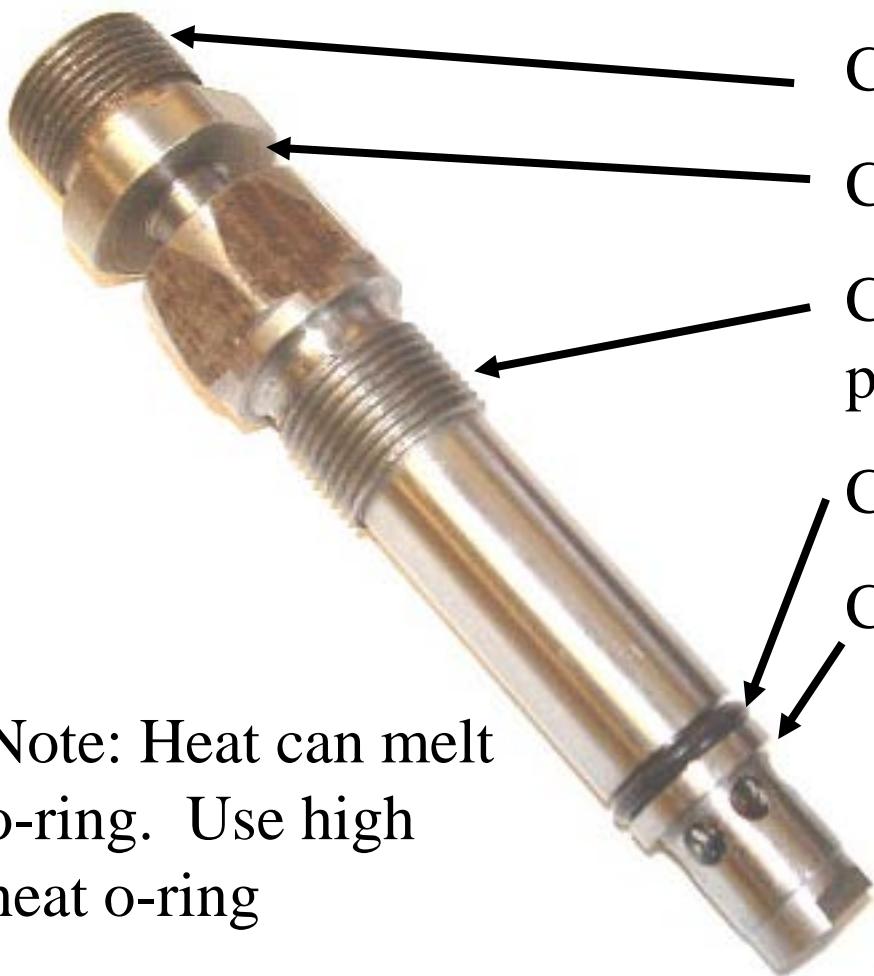
The pile crew can also damage the fitting and bend it while handling the hammer.

The hammer can roll over during shipment and bend this fitting.

If the fitting is bent you might have trouble stopping the hammer or the hammer may not run right due to a proper flow of fuel.



# Wear Items-Fuel Pump Stop valve



Note: Heat can melt o-ring. Use high heat o-ring

Check the fuel line fitting threads

Check to see if the valve is bent

Check the threads that go into the pump body

Check the o-ring

Check the check valve

Note: the hammer will not shut off if the o-ring is bad.

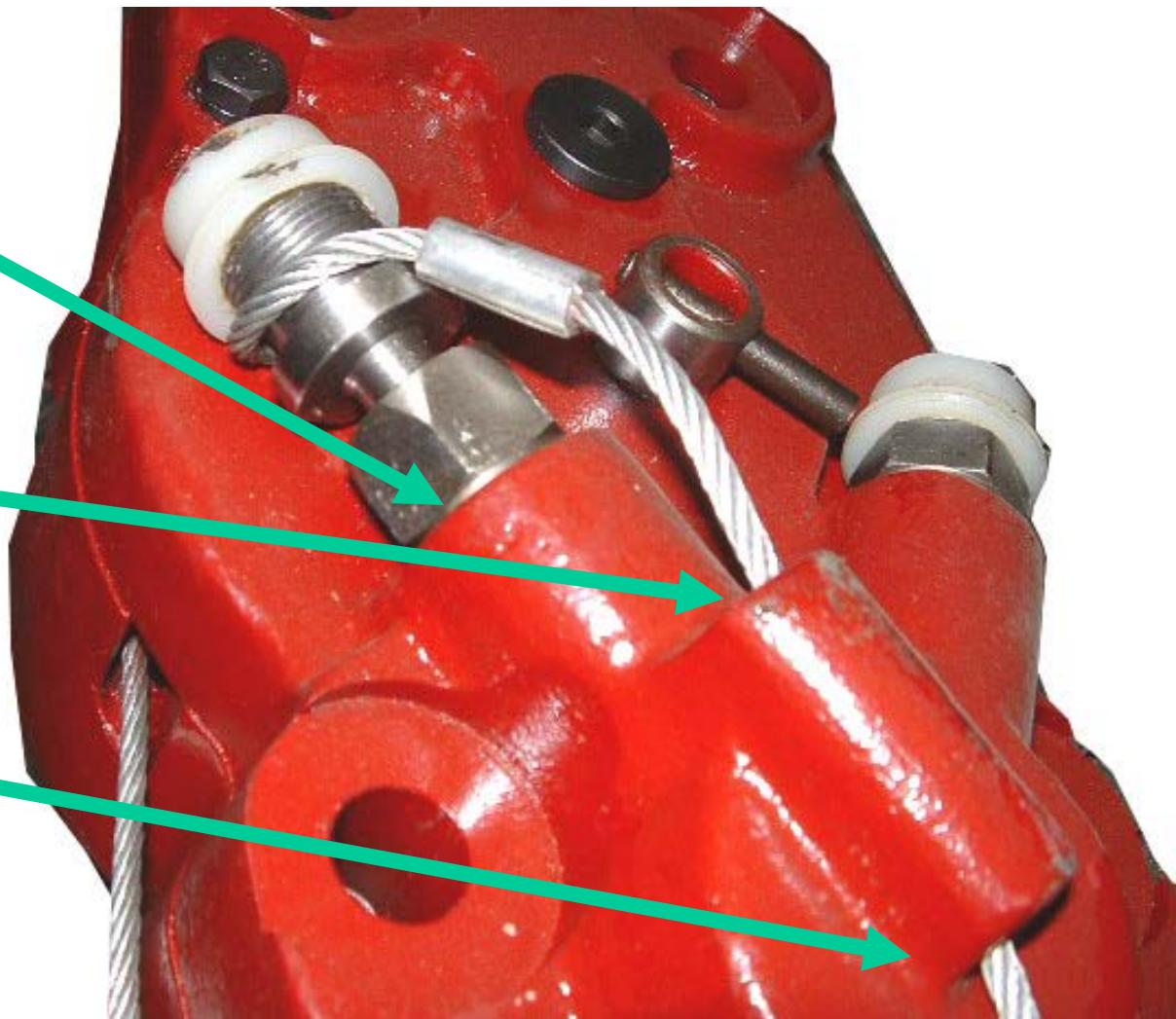
Put a light coat of grease on all parts.

# Wear Items-Fuel Pump Stop Valve

Check threads in pump body.

Remove sharp edges that can cut the regulating rope.

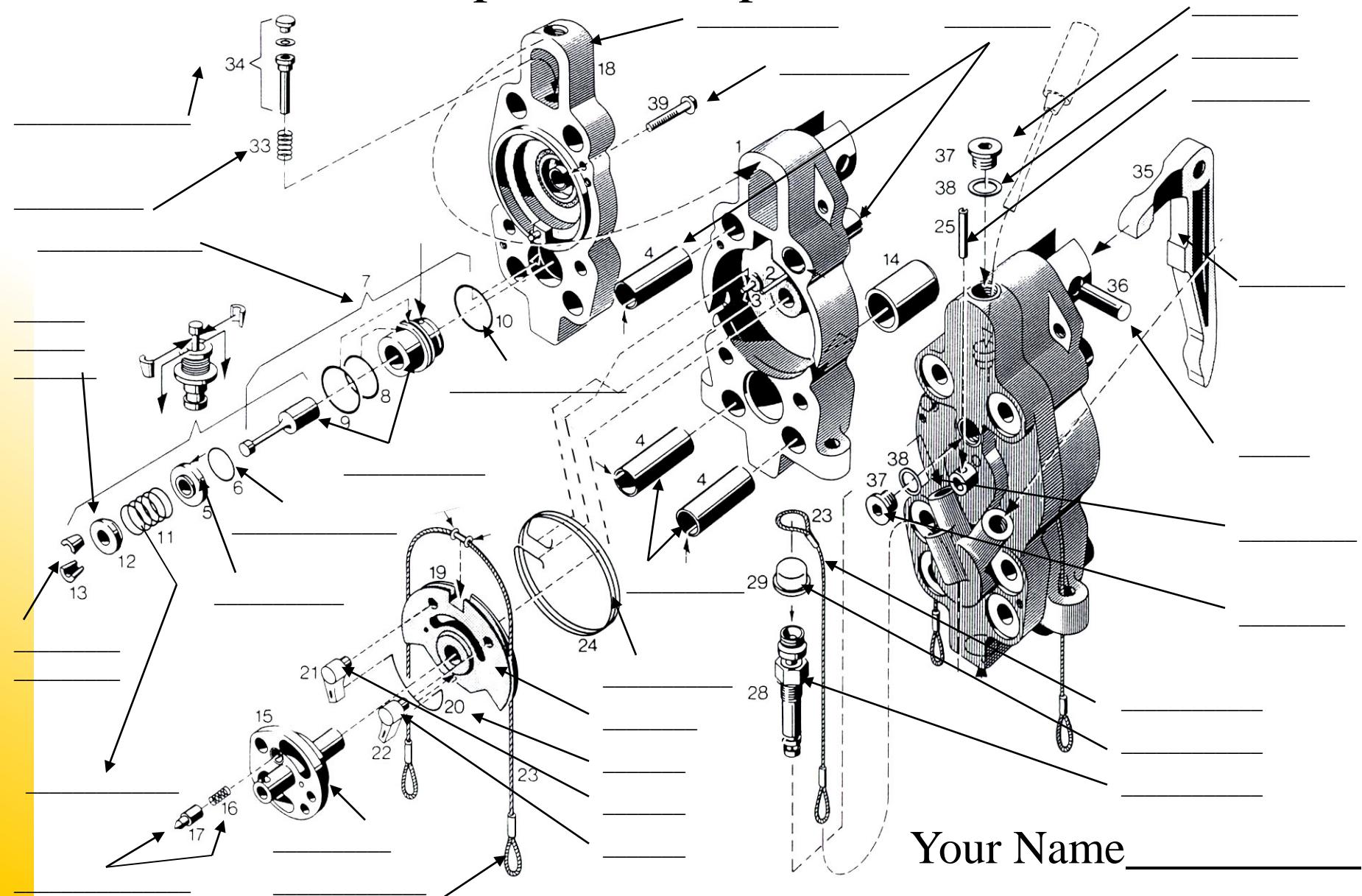
Use a small air grinder to remove burrs.



# Fuel Pump Components- test



Name each part. Some parts named twice.



# Fuel Pump Components

