# Rebuilding a Hydraulic Floor Jack

by Phil B on May 1, 2011

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Intro: Rebuilding a Hydraulic Floor Jack

This is a 1 1/4 ton hydraulic floor jack my father passed on to me. He bought it new during the 1970s. It began to leak down a little a few months ago. The lift arm no longer rises when the handle is pumped up and down. (I was able to pull the lift arm up by hand and it settled slowly enough that I could make a photo with the arm partially raised.)

I checked to be sure it was adequately filled with fluid, but that was not the problem. A few months before this problem, there were bubbles coming up through the vents at the filler plug. At that time I raised the lift arm with the handle, released the jack's valve, and let the arm fall slowly several times to purge air from the system. Finally, one day, the lift arm would not rise at all. If filling with fluid and purging air from the system do not restore function, there is probably internal leakage, even though fluid is not leaking from the jack. From what I have read, forty years of service is a reasonable time for a hydraulic jack to operate before it needs a rebuild.

A word of caution: Rebuilding this jack presented several challenges that seemed almost insurmountable at the occurrence of each. Rebuilding this jack was much more difficult than simply replacing a few "O" rings, and it required more than the very few hours some say are required for rebuilding a jack. Further, I had to make several special tools to get the job done. If you want to attempt rebuilding a jack and you are not a member of Instructables, I would encourage you to pick a password and a screenname, and join. Doing that will allow you to download a PDF of this Instructable for printing, or to view at any time later on your computer, assuming you wish to consult what I have done as a guide. Unfortunately, I made some errors I later needed to correct. Those corrections do not show in the PDF, unless you opt for a Pro membership and choose the Custom PDF option. Otherwise, use the on-line version to be sure there are no errors.

When putting fluid into a jack never use anything other than hydraulic jack fluid. Do not use motor oil or brake fluid. Brake fluid makes the seals swell.

At this link you will find one man's description of how he rejuvenated his twenty-five year old jack by flushing its insides with a solvent, letting it dry completely, and filling it with fresh hydraulic jack fluid. It could be worth a try. I did find one manual for a floor jack that said the fluid should be changed every year. The procedure is to place the jack over a large pan, remove the filler plug, turn the jack on its side and let it drain. Then fill it again.

Step 1: Parts Kit

Several firms sell rebuild kits for hydraulic jacks. I found Blackhawk Parts and ordered parts on-line. My jack came with the Fleet brand name. It was sold through NAPA Auto Parts. It should have been easy to find my jack among the listings for Fleet jacks on the Blackhawk Parts web page and order the appropriate rebuild kit, but it was not. So, I sent an e-mail to Blackhawk Parts with the name of the manufacturer and the model number. It is good that I did. The kit I need is not the one I would have thought, but is actually for a Lincoln/Walker jack. Although my jack has the Fleet name, it was actually made by someone else. I paid about $45 for the parts kit, plus $11 shipping. That is a fairly typical price for a rebuild kit.

Some suggest saving money by simply buying a few new "O" rings at a local hardware store, but that would not be a sufficiently complete rebuild. The photo shows the parts kit I received. There are 19 separate parts in the kit, including a number of "O" rings. Some are of neoprene molded to special shapes. There are also some steel balls and copper washers.

I decided not to open the parts kit until I was certain the parts it contains match what I see on my jack as I dismantle it. I will have less difficulty exchanging an unopened parts kit than I would have trying to exchange a kit I had opened, in case the wrong one was shipped to me. In the photo you can also see the paperwork that came with the parts kit. It will help, too, if an exchange were necessary. And, I do not want to risk losing any parts by opening the bag early and having something roll out.
**Step 2: Helps and guidance**

The rebuild kit does not include any instructions. The Blackhawk Parts web page offers a few cautionary and a few safety notes, but no helps on the rebuild procedure for the Saturday mechanic. e-How does offer a step-by-step procedure for rebuilding a hydraulic jack in text, but it is quite general. There is a very helpful link at the e-How page that takes you to a set of photos and some useful notes on critical stages for doing work on a low price imported hydraulic floor jack. Some of these things would be very helpful for the proper assembly, too. Floor jacks are remarkably similar, despite small differences. See the next step for information on helpful videos online.

The graphic for this step is an exploded diagram of a hydraulic jack and a list of parts. This one is from a Harbor Freight jack. Diagrams like this one are easy to find on the Internet. Just search for “hydraulic jack manual.” Diagrams like this one help with the names of parts and with a visual understanding of how the parts fit together. You can enlarge images in your browser to see more detail, or save them in PDF and do the same. But, if you are able to watch the videos linked in step 3, you will see how the parts fit together, too. (The day may come when those videos are no longer available on the Internet.)

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**Parts List**

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Qty</th>
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<tbody>
<tr>
<td>1</td>
<td>Valve Block</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Copper Washer</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Cylinder</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>O-Ring</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>O-Ring Washer</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Cap</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Top Nut</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>O-Ring</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Boating Gasket</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Oil Tank</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Oil Plug</td>
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<tr>
<td>19</td>
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<td>U-Coil Bell</td>
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<td>23</td>
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<td>24</td>
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<tr>
<td>25</td>
<td>Pump Link</td>
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</tr>
<tr>
<td>26</td>
<td>Handle</td>
<td>1</td>
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<tr>
<td>27</td>
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<tr>
<td>28</td>
<td>Brass</td>
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</tr>
<tr>
<td>29</td>
<td>Cotter Pin</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>O-Ring</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:** Some parts are listed and shown for illustration purposes only and are not available individually as replacement parts.

**Note:** When ordering, specify which model number the parts will be for.
Step 3: Videos

There are many videos related to hydraulic jacks at YouTube, but most of those are not really very helpful for a rebuild, even though their titles are enticing. A floor jack is a really a bottle jack laid over onto its side and installed inside a frame equipped with casters, a handle, and a lift arm. This video shows how to remove the bottle jack unit from the frame. The floor jack in the video is my Fleet jack with a different name and paint color on it. Some jacks are the least bit different. You may also want to view this video.

If you do not want to rebuild the bottle jack unit yourself, you can use either of these videos to remove the bottle jack unit from the frame of the jack and simply take it to a repair shop near you. The cost of a rebuild at a shop is said to be around $150 to $200 plus parts. The e-How article linked in step 2 contains a word of caution. If your jack is a cheap import, it may not be worth a rebuild. The machining is not always as good as on the older models made in the USA. Further, the correct parts kit may be impossible to get. You may find it more economical simply to buy a new jack. Classic jacks made in the USA are generally considered worth the expense and effort of a rebuild.

This is another video that shows how to dismantle a bottle jack unit. There are some good clues in the video for reassembly.

Videos sometimes disappear from the Internet. Although it may seem redundant, I will also document all steps in this Instructable with photos and text so that anyone using it in the future will have all needed information, even if some of the better videos disappear one day.

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Step 4: Open the jack frame

First photo--The halves of the jack frame will need to be spread to get the bottle jack unit out for repair. Loosen the nuts on the axle for the lift arm considerably, but do not remove them. There is one on each side of the jack frame. The nuts on my jack are 15/16 inch in size.

Second photo--Two bolts on each side hold the body of the bottle jack unit to the frame. Remove all four. (One is partially backed out already.) Although the man in the video from step 3 removed the casters, that is not really necessary to access the bolts on this jack. I did fine without removing the casters.

Third photo--Spread the frame members to remove the handle and its yoke casting. I had to wrestle with this a little and take it in steps. That meant spreading the frame from one side and then the other back and forth until the yoke's pins are free of the frame.

Fourth photo--A universal joint twists to open and close the release valve. The upper end of the universal joint is a piece of hex stock. It fits into a hex socket in the bottom of the handle.

Fifth photo--Lift the jack frame and the bottle jack unit remains on the work surface, even though attached to the lift arm by hinged extensions. Use a pair of pliers to remove the end of the return spring from the pin.

Sixth photo--The rams from the jacks shown in the videos attach to the frame with a cotter pin. On this jack a pin both holds the end of the spring and secures the block in the photo to the top end of the ram. Flip the bottle jack unit over and drive the pin most of the way out with a hammer and a punch.

Seventh photo--This photo gives a view of how the parts are made to hold the ram in the block with the pin that also serves to retain the upper end of the return spring.
Step 5: Drain the jack oil
Place the bottle jack unit into a pan and drain the oil as best you can. On the bottle jack unit in one of the videos it was easy to work the plunger in order to extract more of the oil. The spring on the plunger is too strong for that on this jack. Be aware that additional oil will pour out of the jack in coming steps. Have a pan or newspaper available to catch it and minimize the mess.

Step 6: Open the bottle jack unit
The first photo shows the ram and ram nut (or tank nut, also top nut) at the end of the bottle jack. Most ram nuts are hexagonal. This one has two slots for a special spanner wrench. In the video from step 3 showing a man taking the ram nut off of a bottle jack, the ram nut came loose quite easily. On my jack the nut was stuck on very hard. I placed the bottle jack unit into my vise and tried to loosen the ram nut with a very large pipe wrench. I only did a little cosmetic damage to the nut. It would not loosen. I soon realized that my workbench and vise were not equal to the task, either.

Second photo--I decided to make a special tool. Unfortunately for those without welders, making that tool required welding.

The third photo shows the tool in use. Check the yellow text boxes. My vise did not have enough leverage to hold the bottle jack unit, so I bolted it upright into the jack frame and used the jack frame as my own long bar for leverage. In order to make that work, I planted my foot against the end of the frame that is not shown in the photo. I had to strike very hard with a 16 ounce ball peen hammer, but after about five or six strikes, the ram nut began to move. My tool worked and I was able to loosen the ram nut with the ram for removal from the bottle jack unit.

Image Notes
1. The pipe was notched on both sides to receive the 1/4 inch steel. Then I welded it in place from the outside of the pipe.
Image Notes
1. Hold the top of the tube with one hand here.
2. Press the working end of the wrench onto the ram nut so it mates with the slots in the ram nut. The end of the tube fits over the round nut to keep the tool in place.
3. Strike hard with a hammer here to loosen. Strike on the other side when it is time to assemble the jack and you need to tighten the ram nut.

Step 7: Further disassembly
First photo--Unscrew the ram nut until it and the ram can be pulled from the bottle jack unit. The ram nut simply pulls off of the top end of the ram.

The outer shell of the oil tank appears to be securely fastened to the base of the bottle jack unit, but it is not. Press against its side and it tips off to one side immediately. There will be some oil that runs out onto the work surface. Put down some newspaper or a pan to catch it.

Second photo--Pull the wire mesh oil filter from the iron base and set it aside where it cannot be harmed.

Third photo--Unscrew the universal joint assembly for the release valve. Insert a magnetic tool and pull out the cone-shaped plug. The hole from which it came is visible behind the magnet tool.

Fourth photo--Place the bottle jack unit in a vise and use a wrench to remove the plunger mechanism. I had to tap on the end of the wrench with a hammer to loosen it. On my jack a 1 inch wrench was required.
Step 8: Safety overload and check valves

Move your cursor over the text boxes in the first photo for part names, etc. The cylinder would normally be removed for a rebuild. But, this one is stuck very tightly. Remember how much difficulty there was in removing the ram nut in step 6. It screws to the cylinder, so the cylinder should be difficult to remove, too. It is not as easy as the video linked in step 3. I tried, but could not get it to loosen. There actually are no "O" rings or seals below the cylinder on this jack. Removing it does not give access to any removable parts. I did notice some oil at the bottom of the cylinder appears dirty.

There are two metal plugs in the body of the bottle jack unit. Two large screws are below them. See the text boxes again. This site warns NEVER EVER to open these. It also has a diagram of what is inside. (Scroll down to the middle of the web page.) The author's concern is that the small balls in the valves can be lost, and the jack would become useless. Get a shallow cardboard box with no holes in the bottom or a large pan and work inside of either one. If any balls roll away, they will be contained inside the box or the pan. Also, extra balls are included in my kit. Even if the balls were not included in the kit, precision steel balls can be purchased at a bicycle shop in a series of sizes. Check the link in this paragraph for the sizes normally used. The ball sizes in my jack are: 5/16 inch (7.94mm), 7/32 inch (5.55mm), and 5/32 inch (3.96mm). I measured them with a caliper through the plastic parts bag. I want to do as complete a rebuild as possible. Dirt may have found its way into the passageways where the balls are. The balls could also have rough surfaces through years of use.

If I turn the jack body back and forth I can hear metal balls rolling inside passageways. I drilled a hole in the center of each of the metal plugs. Then I inserted a slightly larger sheet metal screw into the hole until the threads bound against the hole I drilled. I placed a pair of pliers under the head of the screw and pounded against the pliers with a hammer to pull the metal plug out of the jack's body. I repeated the process with the other plug. New plugs are included in the parts kit.

The second photo shows the bottle jack unit's body, but inverted so it was easier to hold while operating the camera. The metal plugs have been removed. Both holes have a large screw inside them. The one on the right is recessed so far that it is not visible. It is the safety overload valve. This valve protects the jack's seals from

failing under a load heavier than the jack's rating. When the safe range of the jack is exceeded, the safety overload valve opens like a pressure regulator to allow oil to return to the tank rather than entering the chamber for the ram. This screw has to be set so the safe level of pressure is not exceeded. In order to do that at home, I carefully turned this screw and counted by half-turns until it bottomed out. My screw was set to 1 3/4 turns above or looser than the bottoming out point. When it is time for reassembly, I will turn the screw gently until it bottoms out, then I will back it off 1 3/4 turns. The safety overload valve should then be set very close to the original factory calibration. One author noted that some jacks fail because the safety overload screw unscrews itself, which sets the jack's lifting ability to a much lower threshold, and the arm may not lift what you want to jack. I found this screw turned with enough resistance that it is not likely to shift its position by itself. That same author also said most safety overload screws are about two turns looser than the bottoming out point.

The third photo shows the parts for the safety overload valve in the order in which they are inserted. A new ball is included in the parts kit.

The fourth photo shows another special tool I made. The screw for the check valves is quite tight. I tried the largest screwdriver I had (3/8 inch wide blade) with a wrench on its square shank. The blade on the screwdriver broke! The screw slot is 1/2 inch across the diameter of the screw and almost 1/8 inch wide. I bought a short bolt 5/8 inch in diameter. It is #8 on the hardness scale. Near the end I ground the diameter down until it fit nicely inside the recess for the screw. I kept a cup of cold water near my grinding wheel to avoid softening the bolt with heat. I ground a rough profile by sight. I moved the bolt to a vise and finished cutting the profile of the screw slot by means of a hand file. I checked the dimensions with a digital caliper. When my improvised screwdriver fit the screw and its slot, I tapped on the bolt's head to be certain it had fully seated in the slot. I used a wrench on the bolt head and the screw came out with no difficulty, at all. I had tried to buy a large screwdriver, but could find none this large. This improvised solution cost me $1.65 for the bolt and a few minutes of time.

The fifth photo shows what was behind the check valve screw. See the text boxes for ball sizes.
4. Screw plug--The side without the slot has a recess in it and the spring fits into that recess. The spring should find the recess on its own and fall into it without any extra effort or precautions.
5. Safety overload screw hole
6. Plunger hole
7. Release valve hole
8. Check valves hole. Notice that the screw cap for this hole is not deeply recessed like the screw for the safety overload valve.

Image Notes
1. Ball--7/32 inch in diameter. This one was recreated in MS Paint because it did not come out at first, even though I inserted my magnet tool again to check for it. When I turned the bottle jack unit over to drain any remaining oil, it ran out and rolled across the floor. I lost it. Had I followed my own advice about working inside a box or a pan, that would not have happened. There is a new ball in the parts kit.
2. Square stock for a spacer
3. Ball--5/16 inch
4. Round, weighted spacer
5. Screw plug

Step 9: The Plunger
It is difficult to compress the spring in the plunger and remove the "C" retaining ring. Care must also be taken not to scratch the machined end near the threaded end of the plunger body. This smooth end is the only seal. There is no washer or "O" ring. See the text boxes on the first photo.

I dismantled the plunger because I was not certain if it would fly apart when I removed the nut from the threaded pin in the second photo. I could probably have removed the old seal without dismantling the plunger, but the threaded pin, nut, washer, and seal would have been retracted about 1 inch into the plunger body, and it would have been difficult to pry the seal out of the plunger body without compressing the spring in the plunger.

I made a special tool for assembling the plunger body again. See it and how it is used in the second and third photos at step 10.
**Step 10: Clean the bottle jack unit's passageways**

The first photo shows a paper towel I pressed into the cylinder and rotated with a screwdriver without letting the screwdriver touch the sides of the cylinder. (Be careful not to scratch the inside of the cylinder. A 1/2 inch dowel pin would have been a safer tool to use.) Jack fluid is clear. The towel shows how much dirt was in my jack's oil. In addition to sopping up some dirty oil still in the cylinder, I poured a little clean jack oil into the openings and passageways. Most of it collected in the opening for the plunger. At first this oil was cloudy. After a few tries, it was clear. I think this should adequately clean the jack so that it can be reassembled.

Inspect the seats in the bottle jack unit's body for signs of rust and pitting. The seats need to be clean and smooth. When I let sunlight shine into the recesses where there are seats, I saw more dirt. I used a wooden dowel rod to scrape and break loose any dirt I could find. I poured some jack oil into the holes to flush the dirt away.

Second photo--Clean the groove that receives the tank's outer shell. It has some brown dried oil residue. Something brass would be ideal. It would be tough enough to remove the residue, but would not scratch the machined surface. Someone said jack oil is a vegetable oil. The oil residue is certainly like what I have seen in the kitchen from vegetable oils.
**Step 11: Assemble the plunger**

I kept the bag of parts inside the same shallow pan in which I assembled the bottle jack unit. This is so I am less likely to lose parts, especially the steel balls.

**First photo**—This shows the plunger body and the plunger parts. At the left three leather seals are shown. My jack does not use these. Several different parts came in more than one version. I think the same parts kit is sold for several similar, but different jacks. I have some parts I will not use on my jack. In the center area of the parts are the steel washer and the locking nut. The other two parts at the right are the old seal I removed. It has an oily sheen. Just below it is the replacement part my jack requires.

**Second photo**—Coat the new neoprene seal with fresh jack oil. During the installation of all parts, double check for any grit or dirt sticking to the oily parts and remove it before the installation of that part. Install the new neoprene seal, rounded end first. Install the steel washer and the locking nut. I will discuss how tight to tighten the locking nut after treating how to install the spring assembly onto the plunger body. I made a special tool for putting the plunger assembly back together. It is made from steel wire about 1/8 inch in diameter. The wire came from stubs of concrete reinforcement wire broken off from a friend's foundation for his new garage.

The **third photo** shows how this special tool is used. I chucked this tool in my small drill press. The circle of wire at the end of the tool fits over the top of the cap for the plunger assembly. The two straight pieces welded crosswise allow the quill of the drill press to exert pressure downward and to collapse the spring so the "C" ring can be attached. Notice that the bottom end of the plunger body presses against wood so the smooth machined surface is not scratched. I used an adjustable pliers to close the "C" ring. My drill press has limited adjustment. I used a couple of pieces of wood on the drill's base in order to achieve the desired distance between the chuck and the surface supporting the smooth end of the plunger.

Now tighten the locking nut (mentioned in connection with the **first photo** in steps. Push the plunger down and let the spring cause it to return. Tighten the nut more and more until the plunger appears it may become sluggish to return. Back the nut off just a little.

Check the plunger for dust and particles of wood. Thread the plunger into the base of the bottle jack unit. Tighten with a wrench and hit the wrench several times with a hammer to make a good seal, since there is no "O" ring or copper washer to make the seal.
Image Notes
1. Superfluous leather seals
2. Original steel washer
3. Locking nut with a nylon insert
4. Old neoprene seal
5. New neoprene seal--This is the one my jack needs.

Image Notes
1. Three pieces ganged together rather than only two for a better fit in a drill chuck with three jaws.

Image Notes
1. One of two crosswise pieces to press down on the spring cover to collapse the spring. The other piece on the other side is shorter. Both were merely scraps.
2. Spring cover
3. Drill chuck
4. Wood blocks shimmed to fit the space needed between the chuck and the blocks.
Step 12: The release valve
First photo--I have a dental pick I can use to remove old seals. This "O" ring shows cracks from age when stretched a little. Match the new "O" ring from the parts kit to the old "O" ring. Coat it with jack oil. Install the new "O" ring.

Second photo--Install the conical metal seal in the hole for the release valve. The pointed end goes in first. Tamp on it with a small screwdriver to make sure it seats at the bottom of the hole. Thread the release valve into the hole.

Step 13: Check valves and safety overload valve
First photo--The hole for the check valves has a copper sealing washer inside it. The old washer is barely visible in the hole. Note its color. A new copper washer is supplied in the parts kit. The old washer has compressed to fit very tightly. There is no good way to remove it. I did not want to fill the passageways in my jack with copper shavings from digging it out in pieces. I decided simply to place the new washer on top of what is left of the old washer. (This photo was made before the plunger and the release valve were installed.)

Second photo--Install the parts in the order shown in this photo from step 8. (The release valve and the plunger are not shown in this photo.) Use the new balls from the parts kit. Do all of this inside a pan or shallow cardboard box so none of the balls are lost if one gets away from you. Tamp the parts down with a small screwdriver so they settle down as far as possible in their hole. Carefully start the screw plug with a screwdriver. It is easy to crossthread. Use the special screwdriver made from a hardened bolt to tighten the screw plug with a wrench.

Note on ball sizes: Initially I made a mistake in the text boxes showing the sizes of the balls and where they are placed. The check valve balls are 7/32 inch and 5/16 inch in size. The safety overload valve uses a 5/32 inch ball. I corrected the text boxes, but if you depend on the PDF of this Instructable, it may not be updated to reflect the correction, unless you have a Pro membership and download the Custom PDF. That version of the PDF does contain all corrections.

Third photo--Install the parts shown in this photo from step 8. Drop the new ball into the hole. Insert the spring into the open end of the cap and drop both into the hole. Insert the screw plug. Carefully turn the screw plug until the valve assembly bottoms out. Back it off 1 3/4 turns.

I chose not to install the metal plugs that close the valve holes yet in case I would need to open one of the valves during testing of the jack to correct a problem.

Image Notes
1. Check valve hole
2. Safety overload hole

Image Notes
1. Ball--7/32 inch in diameter. This one was recreated in MS Paint because it did not come out at first, even though I inserted my magnet tool again to check for it. When I turned the bottle jack unit over to drain any remaining oil, it ran out and rolled across the floor. I lost it. Had I followed my own advice about working inside a box or a pan, that would not have happened. There is a new ball in the parts kit.
2. Square stock for a spacer

3. Ball--5/16 inch
4. Round, weighted spacer
5. Screw plug

Image Notes
1. Ball--5/32 inch
2. Cap
3. Spring
4. Screw plug--The side without the slot has a recess in it and the spring fits into that recess. The spring should find the recess on its own and fall into it without any extra effort or precautions.
5. Safety overload screw hole
6. Plunger hole
7. Release valve hole
8. Check valves hole. Notice that the screw cap for this hole is not deeply recessed like the screw for the safety overload valve.

Step 14: Ram seal
First photo--The dental pick is too weak to remove the ram seal on the bottom end of the ram. I used a small screwdriver. Notice how the seal cracks and breaks after forty years. Remove the nylon collar behind the seal and clean away any fragments.

Second photo--The parts kit includes three ram seals. Two of them appear to match the old seal in the first photo. One of the seals that appear to be a match is 1/10 of an inch too large in diameter. Check the opening of the cylinder with a caliper and use the seal that most closely matches it. The new ram seals are not very pliable. I had to press down on the ram while it was positioned over the hole in the seal. That got it started. Then I could wrestle the seal onto the ram the rest of the way.

Third photo--The open portion of the cup-like seal should point toward the bottom of the ram and of the jack.

Clean away any gritty pieces of dirt. Coat the new seal with jack oil.
Step 15: Insert the ram into the cylinder

Coat the inside of the cylinder with jack oil before inserting the ram. You should be able to pull the ram up and push it down with your hand. A seal too large in size makes the ram very difficult to install and to move.

Be careful. Never use a hammer on the top end of the ram. On my jack I learned the hard way that it is cast iron and chips will break off of it.
Step 16: Attach the tank shell and the ram nut.

First photo--Insert the wire mesh oil filter into the hole from which it came.

Second photo--Clean the tank shell, both on the edges that mate to make a seal and inside. I found quite a bit of dirt inside mine. The dirt had not entered the jack from the outside, but appeared to be residue that had formed from changes in the oil. I applied some jack oil to the inside of the tank and wiped it with a clean paper towel. I did this several times until I could no longer feel anything gritty with my fingertips.

Third photo--Clean the ram nut. Replace the neoprene seal ring inside the narrower opening. See the left text box. Clean the mating surface where the nut seals with the tank shell. See the right text box. Place the nut over the ram and begin turning it down as far as you can by hand.

Fourth photo--This photo was also used in step 6 to illustrate removal of the nut. Strike on the other side of the arm to tighten.
**Step 17: Bolt the bottle jack unit into the frame**
Retrace what you did in step 4, but in reverse, to bolt the bottle jack unit back into the jack's frame. (The photo is from that step.) While the bolts are still loose, put the handle's yoke in place.

**Step 18: Fill with fluid**
I used about 20 ounces of jack fluid. Around 12 ounces was used to fill the jack. The rest was used for cleaning and flushing the bottle jack unit. The fill hole is 1/4 inch in diameter. Even though the bottles for the jack oil have a pointed end, some spurts out while trying to get the bottle end to the hole, and it makes a mess. Get a funnel with a very narrow end. This is one I made specifically for this job from some sheet metal.

I filled the reservoir in small steps. The jack's release valve was open. Occasionally I pumped the yoke for the handle. When oil was at the level below the plug hole, I pulled the lift arm up and let it fall two or three times. This is to draw oil through the jack. I pumped the yoke between five and ten times to remove any air lock in the check valves. I checked the oil level again a couple of times. Then I returned the reservoir cap. The reservoir cap appears to be open, but actually has a small felt filter inside it.

**Update:** After using my jack a few times, it tends to throw off extra oil through the felt filter in the reservoir cap. I do not have the original instructions for this jack, so I do not know exactly what the recommended fill level is for it. From what I have read, some jacks are to be filled to the bottom of the hole while the floor jack is level on a floor. Others vary between just covering the cylinder with oil to slightly below the fill hole. At first I thought I might have a leak, but it was just the jack throwing off extra oil.
Step 19: Troubleshooting and conclusions

My jack worked as it should immediately. The real test is to lift something heavy with the jack. I left the jack in this position for a few minutes. It did not leak down that I could see. Now I can use a hammer to tap the metal caps into the holes for the safety overload valve and for the check valves. I will check the fluid level again after I have used the jack several times. I will also watch for signs of leakage. It is also a good idea to oil or grease all moving parts on the jack now and regularly in the future.

Troubleshooting—What do you do if you have rebuilt your jack, but it still does not work under load? Be certain the oil level is correct. Here are instructions on properly filling a floor jack. The jack could be air locked. This site says to open the release valve and pump the handle rapidly 10 to 15 times in that case. Here is a link to a document on troubleshooting hydraulic systems, like a jack. If necessary, check to be certain all check valve balls were installed properly. Check for leaks.

Conclusions—I did not find any clearly damaged seals in my jack, other than cracks in an “O” ring on part of the release valve, but it was a non-critical part. I did find dirt in the oil. I expect the seals were just old and less efficient. It feels good to have my jack working again, especially since it once belonged to my father. Rebuilding a hydraulic floor jack was much more difficult and a lot more work than I expected from information I had gathered before I began. I found some parts were not as easy to remove as I expected from videos and other helps that I linked earlier in this Instructable, and I had to make several special tools. I first had to develop those in my mind. Then I had to design them and build them with materials I already had. Fortunately, I have a welder and was able to do that without too much difficulty.

I can easily understand why many suggest a person ought simply buy a cheap jack and replace it with another when it fails. I have a hard time doing that, no matter how much financial sense it might make. That seems like the waste of a good tool containing numerous carefully machined parts. An imported floor jack comparable in capacity to mine lists for around twice the cost of the parts kit I bought, sometimes even less than twice the cost of the parts kit. I do not know if my Fleet jack will last longer than an import jack.

Knowing all I know now, I might suggest flushing out old jack oil every decade and replacing it with fresh, clean fluid. Even then, I am not sure draining the old fluid and refilling the jack with new fluid would have removed all of the dirt I found. Some of it was in places that seemed to hold the dirty oil in that particular place. The oil in the reservoir had always appeared clear and clean. Still, neoprene seals used in hydraulic jacks do harden or crack and will fail to seal properly in time.

Owning and using a hydraulic jack is often a necessity. But, it has costs over time. Those costs mean the eventual repair or replacement of a jack. If you choose to repair your jack, you have the option of doing it yourself or of taking it to a shop. If you choose to do it yourself, you will learn a lot, but it may require more of your time and be more difficult than you expected. If you take it to a shop, there will be a cash outlay that will likely be a fair amount greater than the cost of a new imported jack.

Several times I feared I had ruined a vital part on my jack, or was about to do so, simply because I was without knowledge and experience related to rebuilding a floor jack. It is my hope that this Instructable will enable others who wish to do so to rebuild a hydraulic jack with confidence and without some of the near mishaps I experienced. I wish someone had published this before I began to rebuild my jack. It would have saved me time and trouble.