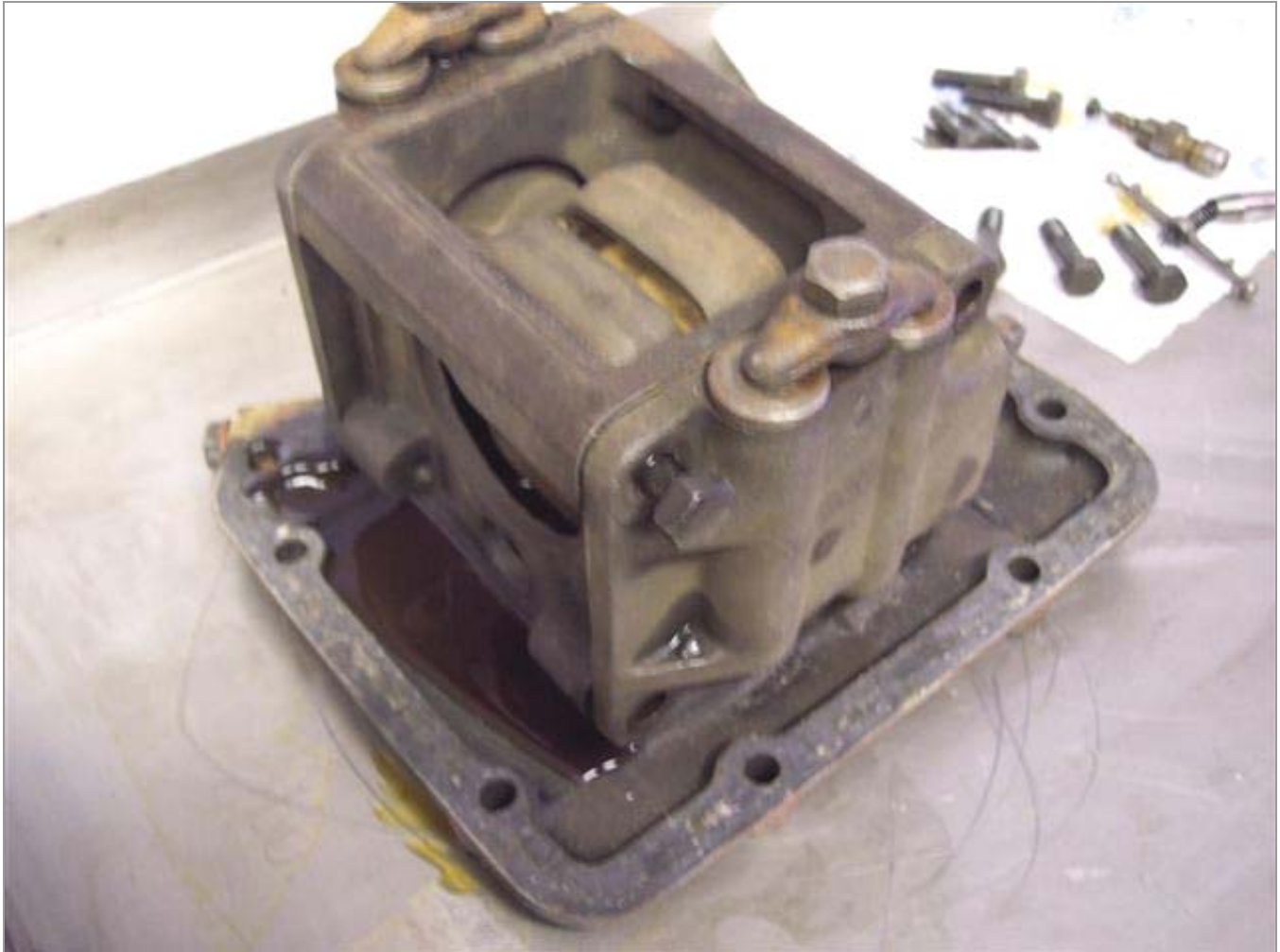


9N Hydraulic Pump Rebuild by Joe Trotter

My 9N had trouble keeping implements from quickly lowering to the ground after pushing in the clutch. I use a loader quite often and found it frustrating when I pushed in the clutch and my six foot blade would drop. I suspected the lift's ram cylinder was leaking, but I wanted to take a look at the pump anyway. The previous owner had not changed the hydraulic fluid in a while as it was foamy yellow/white when I changed it.

When I first pulled the pump it looked normal as seen in the photo. It was hard to tell by looking at it if anything was wrong with it. I decided to take it completely apart to check for wear.



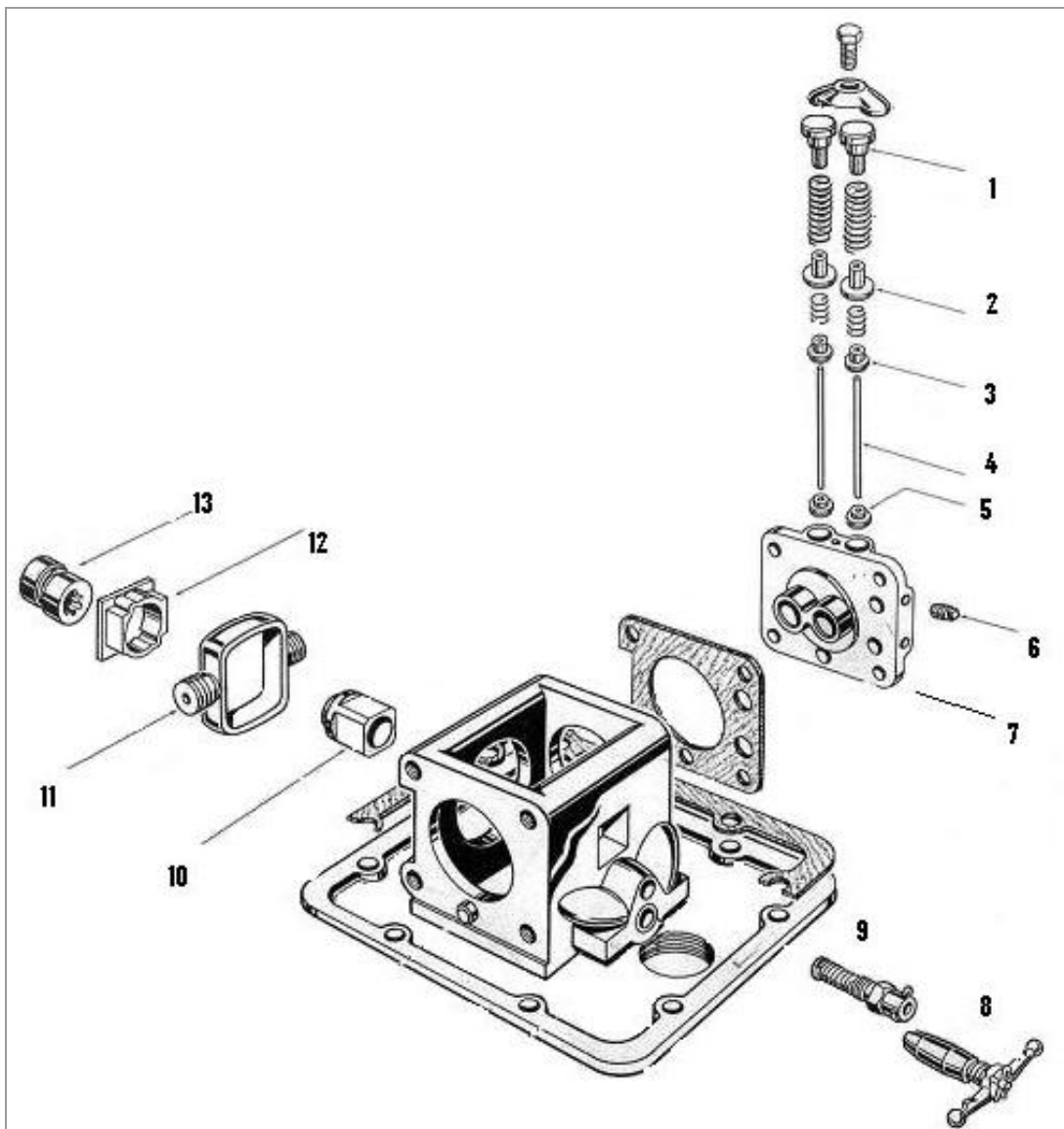
I removed the control valve and the relief valve first.

The control valve just slides out and the relief valve is threaded. Then I pulled off the valve chambers on each side.

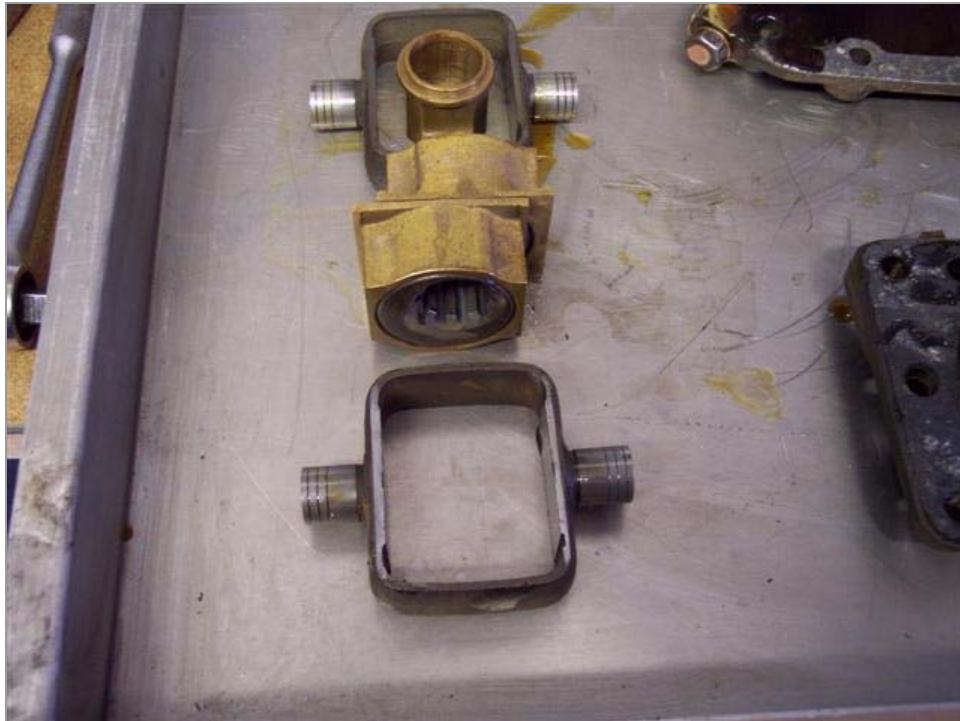
The valve chambers have small valves in them called inlet and outlet valves. They are spring loaded and the face of the valves seat in the valve chambers bore, (more on that later).

Here are the parts of a 9N hydraulic pump:

1. Plug
2. Outlet Valve
3. Inlet Valve
4. Valve Guide
5. Socket
6. Pipe Plug
7. Valve Chamber Body
8. Control Valve
9. Relief Valve
10. PTO Shaft Bushing
11. Pump Piston (also called a scotch yoke)
12. Cam Block
13. Pump Cam



With the pump apart you can see wear on parts that move. Here is a photo of the pump piston assembly:



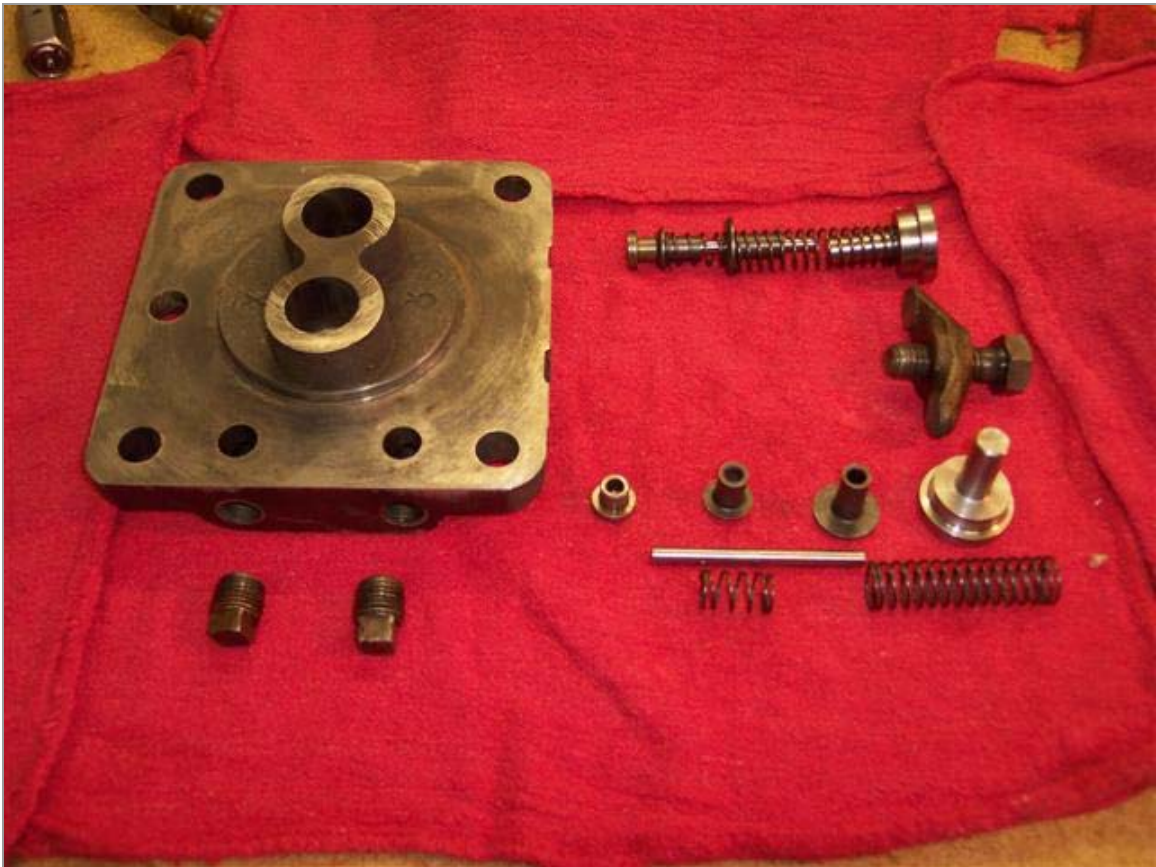
You can see wear on the face of the pump piston (scotch yoke) where the brass cam block rides. It also has wear on the inside of the pump piston.

This is a photo of the end of the pump cam where it rides against the PTO shaft bushing. As the pump pistons move back and forth the pump cam turns to rotate the PTO shaft to power implements such as a brush hog, or a post hole auger.

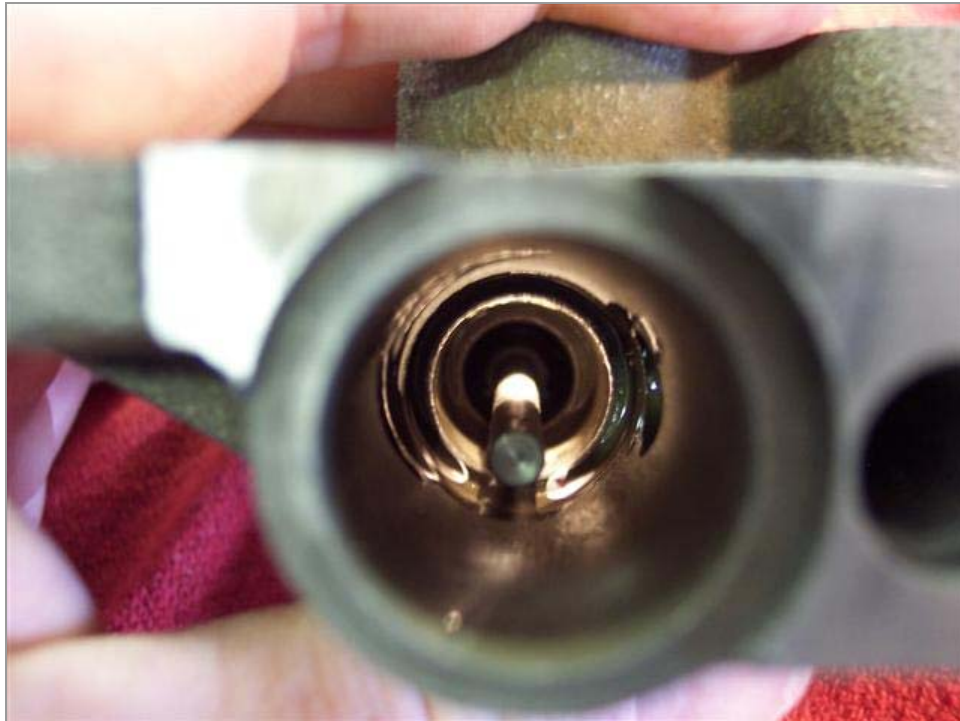


This next photo shows the valve chamber body ready for the new parts. I decided to replace the inlet, and outlet valves and their associated springs and so forth. The inlet and outlet valves seat in the bores of the valve chamber body. They have angles machined onto them that seat in the bore against their respective bore diameter. I did find it odd that the inlet and outlet valves were tapered but the bores in the valve bodies were not. My old inlet and outlet valves were well worn on the taper. I looked inside the bore where they seat and did not see or feel any major wear or major burrs. The FO-4 manual does not give tolerances for the bores in the valve chamber. I had to make a judgment call so I did not replace the valve chamber bodies.

The two pipe plugs in the bottom left of the photo are for plugging the holes the factory machined in the valve body casting. I took the whole assembly apart to clean it thoroughly. The only problem I ran into was getting the sockets (# 5) out. I tried a pencil but it would only pull them so far. I had to reach inside the bore and grab them with some needle nose pliers. I let the disassembled valve body soak in diesel fuel to soften up any remains of crud that might be in them. I blew them out with compressed air and then put them in very hot soapy water in the kitchen sink (don't tell my wife). I blew them out again and sprayed a little lubricant in the bores and assembled the replacement parts. Prior to assembly I lapped the face of the sockets on a sharpening stone to make sure that they were flat.



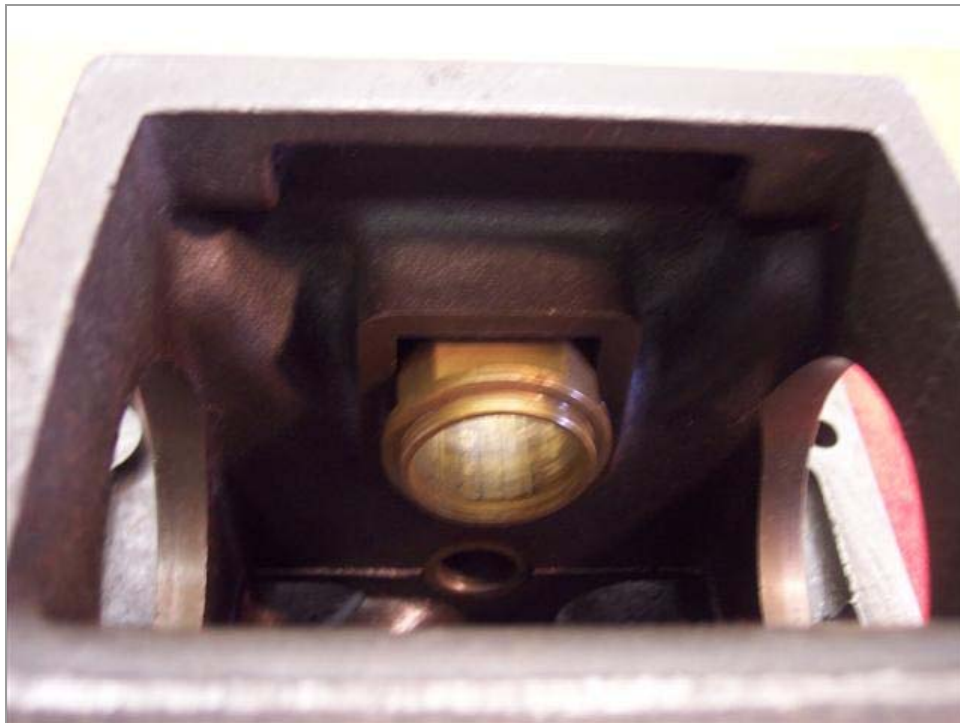
This photo is of one of the valve chamber bores. I have the socket and guide already in it. You can see somewhat of a burr where the outlet valve seats on its bore. I had no way of machining it, so I left it as-is.



This photo shows the valve chamber assembled. You can see the valve guide and spring through the holes where the piston from the pump piston rides.



This is a photo of the pump body. I already have the PTO shaft bushing installed; it is a loose fit. The FO-4 manual gives a tolerance of .0015-.006 for the PTO shaft clearance inside this bushing. I had .009 on mine and made the call to leave it as-is. When assembling the pump piston assemblies, it is important to make sure the pump cam-face seats in the bearing. It takes some wiggling of the pump piston assemblies when putting them into the pump body to get it to seat. You have to have three hands to do it. I chose to set my pump body on its side with a short 2X4 under it for a third hand.



With the pump piston assemblies placed in the pump body you can bolt the valve chamber bodies to the pump housing. Just be patient and don't forget to put the gasket on aligned with all the correct holes.



After a little frustration it all lines up. You should be able to put a couple of fingers in the pump can and turn it, mine turned freely. I had used a little light oil during assembly on all the moving parts.



Here is my completed 9N hydraulic pump. It wasn't nearly as hard to overhaul as I thought.

I would like to say thank you to the folks on the N Tractor Club web site (<http://www.ntractorclub.com>). I asked a lot of questions and received great advice. It is my hope that by documenting my 9N rebuild, I can pass knowledge on to others.



Another view of the rebuilt pump:



I thought I would show you how my pump housing looked when I pulled it. Apparently someone had broken the test port and brazed it up. The cap screw to plug the test port was close to stripping and I knew when I put it back together it would be a “Murphy’s Law” for me, so I fixed it.



John Smith told me that I could tap it deeper with a 1/2-20tpi tap. I went in a little over 3/4-inch and used a 3/4-inch long bolt and fiber washer to replace the old 1/2-inch cap screw. The brazing looked a little messy so I cleaned it up. I won't be able to see it after I reinstall the pump, but I like the results.



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