LARGE SCALE MODEL RAILWAY ENGINEERING

Some Thoughts on building a pump

With this issue I have completed all of the drawings for the steam pump based on the Van Brocklin design. I thought that a few notes of explanation and some suggestions would be in order at this time.

First let it be said that extra care must be taken to assure that the runout of all of the various parts of the cylinder assemblies are not excessive. There are many parts that the piston rods must pass through with relatively tight clearances. The pistons and rods must slide freely if the pump is to work. If the rods stick on hangup with light hand pressure it will only get worse as the pump gets hot. Also the two spacers between the cylinders must be exactly the same length so the cylinders do not cock.

Another area that needs some attention is the O-ring fits. It is critical that there is just enough searce on the rings to prevent them from leaking but not enough to cause excessive friction. My recommendation for the O-ring seats is to first ream the .187 rod bore and then use a .312 counterbore with a tight fitting .187 pilot to make the counterbores for the O-ring. The edges of the counterbore must be honed down slightly with a honing stone to reduce the resultant hole to the required .308/.311 diameter. Use a scrap of brass to test the hole diameter as the tool diameter is reduced. I use counterbores for the check ball seats as you get a good square flat seat for the ball to sit on. It is usually not even necessary to seat the ball with a light tap.

All gaskets should be 1/64 inch thick and be made from a premium gasket material. There is not a lot of material around the cylinder port and bolt holes and paper type gaskets tend to weaken and blow out.

Valve setting is quite simple. When one piston is at the top of its cylinder, its valve should open the bottom port and when the piston is at the bottom of the cylinder the top port should be open an like amount. Adjust the valve lever up and down on the piston rod so that the valve opening is the same. The valve rod set screw should be tightened on the flat that was machined on the piston rod. The valve itself should be able to lift off the steam cylinder to let condensed steam escape during startup.

A displacement lubricator is required in the steam line to the pump to supply lubrication to the steam end. Water lubricates the other end.

The check valves on the water cylinder should be free to lift .020 to .030 to allow free flow of water. If all is well the pump should deliver about .2 gal/min. and run on 15psi of air pressure.

Some addition ideas on fixturing some of the pump parts were discussed in an article by Steve Vitkovits in the March 1986 issue of Live Steam. Thanks to Dave Black for bringing this article to my attention. Good luck on this project.
ORING #1 5/16 X 3/16 VITON (8 RECD)
ORING #2 13/16 X 5/8 VITON (2 RECD)
ORING #3 1/2 X 3/8 VITON (2 RECD)

CHECK VALVES
1/4 STAINLESS (4)
3/16 STAINLESS (4)

1/8" GASKETS ON ALL JOINTS
SEAL ALL PLUGS AND CAPS

PIKE LAKE & EASTERN

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PUMP ASSEMBLY MP-111
PIKE LAKE & EASTERN
Harford Shops

MATERIAL: BRASS

DO NOT SCALE DRAWING
TOLERANCES
UNLESS OTHERWISE SPECIFIED
MINUS .005 INCHES
INCHES: .0005 INCHES
DECIMALS: .001 INCHES

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