THE OIL MAZE

Moving oil around outside the engine can be very risky and expensive. Its no wonder that Lycoming has attempted to hang everything on the engine accessory case rather then the firewall.

One of the oil components they hung on the accessory case is the oil filter and temperature control system. There seems to be two standard options on the engines I've seen. These are the oil screen, or the full flow filter. There is also a third option that I'll discuss in a moment.

Lycoming recommends that if you are using the screen, you should change oil and clean the screen every 25 hours. If you are using the full flow filter, change oil and filter every 50 hours. Based on the above statement, I think anyone with common sense, and nonpilots alike, will conclude that the full flow filter does a better job of cleaning the oil.

If your mounting the engine close to the firewall, like in a Long EZ. You don't have an option. You must use the oil screen. There just isn't enough room for the full flow filter. Now there is that third option I told you about. For $795.00 Lycoming sells a remote filter kit. I haven't seen this thing, but 800 bucks will buy a lot of 25 hour oil changes. There had to be another way.

I got the idea for building my own remote filter kit from two sources; 1) I saw a remote oil filter mounted on a Continental powered Vari-EZ at Palo Alto. This person machined an adapter that mounted over the oil cooler pad. It had take off ports for lines going to a remote oil filter. A very nice looking system. 2) Dick Kreidel's informative article in the Long EZ Sq 1 Newsletter, which talked about remote oil filters.

In Dick's article he stressed the fact that "you better know what your doing before you start messing around with oil outside the engine". This warning shouldn't be taken lightly. It doesn't take an imaginative person to figure out what happens when an engine is starving for oil.

The primary purpose of this article is to share what I've learned about the oil system, by showing the approach I've used to mount a full flow remote filter on my Long EZ.

My tutoring on the engine and oil systems began almost immediately after I got my engine. This was an O-320 with a constant speed prop that came off an Apache. The engine had more holes and tubes in it then a person in intensive care. I wasn't sure I'd be able to figure out were they all went or what they were for. The Lycoming service manuals were of general help, but just didn't supply all the answers. There was this great mystery that surrounded the OIL MAZE.

I spent the next 9 months looking at engines. Every time I saw a cowling open, I had to take a peek. Thank goodness I wasn't charged by the hour for the time I spent with mechanics. I was like a sponge. If anyone had anything to say about the O-320, I was all ears. To the best of my knowledge, figure 1 shows how the accessory case was configured when I bought the engine.

Armed with a hand full of plugs and my new found knowledge. I began to reconfigure oil passage holes on the accessory case. There was even a plug about 6 inches up inside the crankshaft that had to be removed (constant speed prop use only). A fellow EAA member told me how to get this one out.

The final configuration for my engine is shown in figure 2. Note the oil manifold block that had to be made. This block was machined out of 6061T6 and mounts on the Temp Control/Screen Filter Pad were the oil screen used to go. This configuration has no oil temperature control, all the oil goes through the cooler for maximum cooling. I was put at ease by several Long EZ owners who stated that "you'll need all the oil cooling you can get".

DESCRIPTION

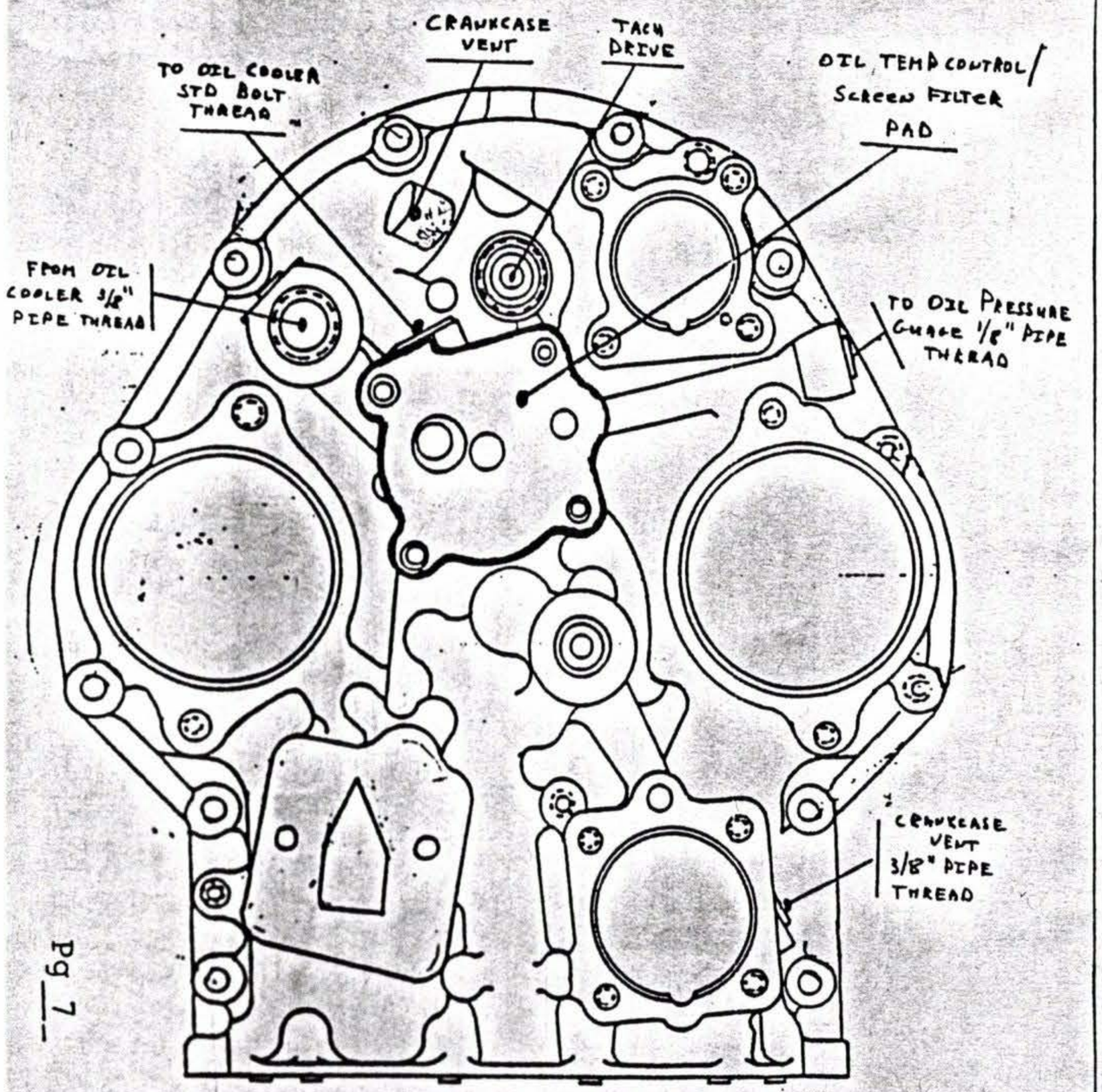
Figure 4. Oil is picked up by the pump and feed out through the center hole on the oil filter pad. The manifold block routes the oil back into the left hole were it goes up the passage and out through the hose. The oil then goes through the cooler, through the filter, and back to a fitting on the oil manifold. The oil passes through the manifold to the right hole on the filter pad were it is distributed to the engine.

I sense oil temperature at what used to be the hole were oil went to a cooler. The point were I am sensing, the oil has not been cooled yet. I may change this at a latter date but right now my thought is that I will be reading the worst case oil supply temperature.

I have two other fittings on the manifold, both are oil pressure. One is the output to the cooler/filter and the other is the input from the cooler/filter. I want to observe pressure losses through the cooler/filter during my test phase. After which I'll select one for the cockpit guage and plug the other.

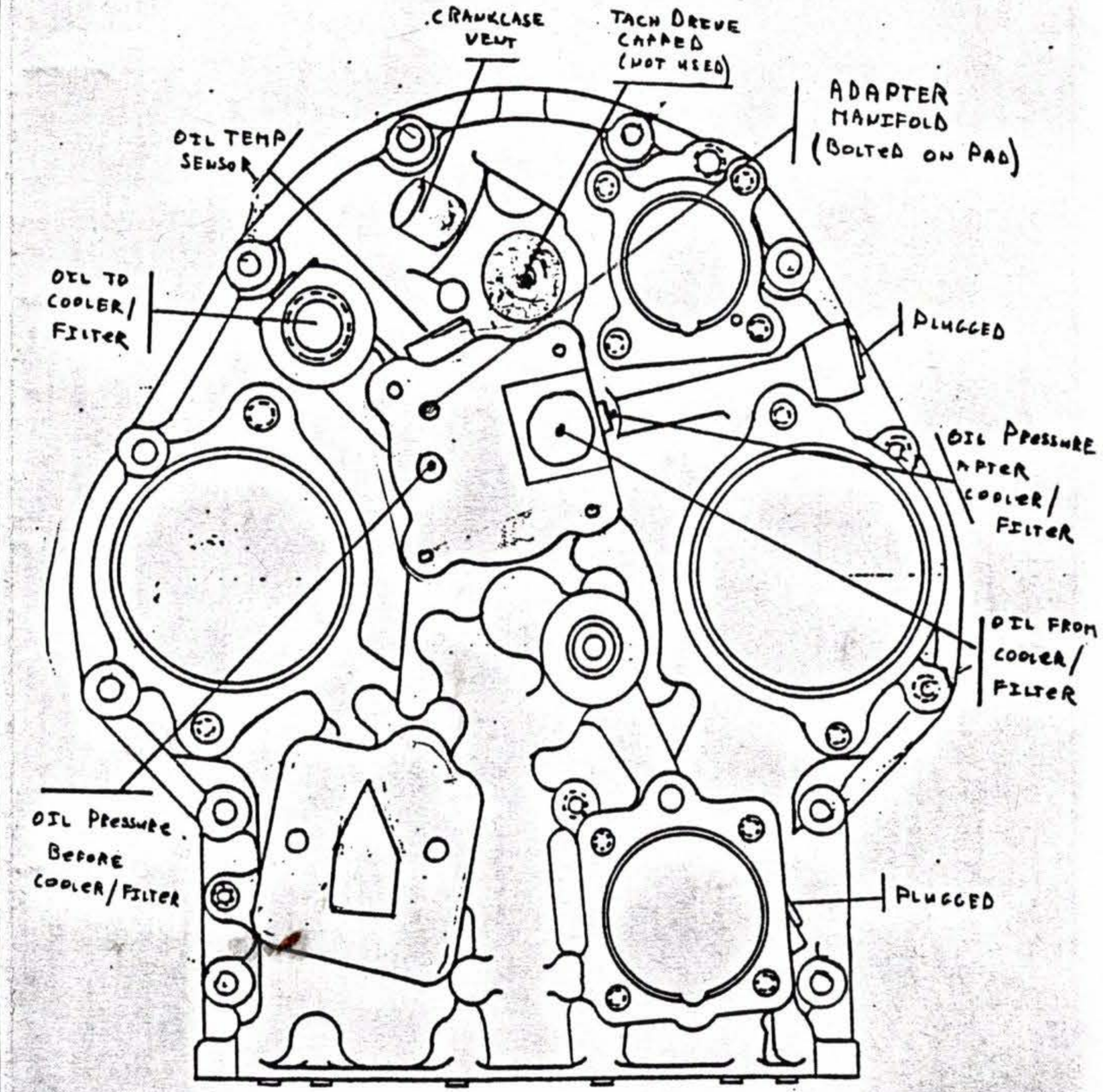
In closing, I'd like to say that the screen filter would have worked just fine. A number of reasons prompted this modification, remote filter, no messy hard to get screws out screen, maximum oil flow through cooler. If you really have your heart set on a remote filter and your not willing to bet your life on your abilities to perform this modification. Then talk to Lycoming about their remote kit.

John B. Mc Avoy



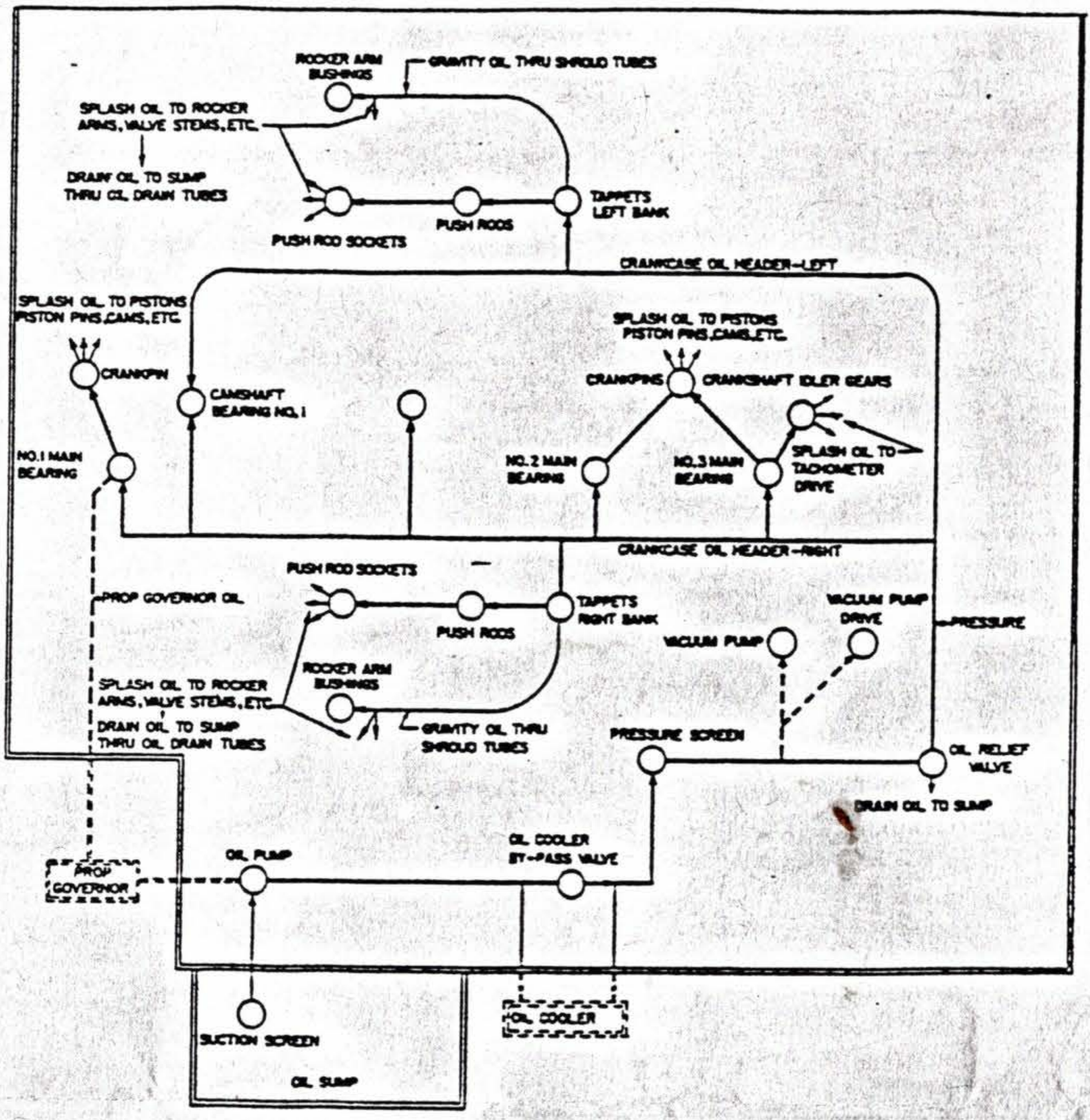
CONFIGURATION AS PURCHASED - O-320 A2A

FIGURE 1



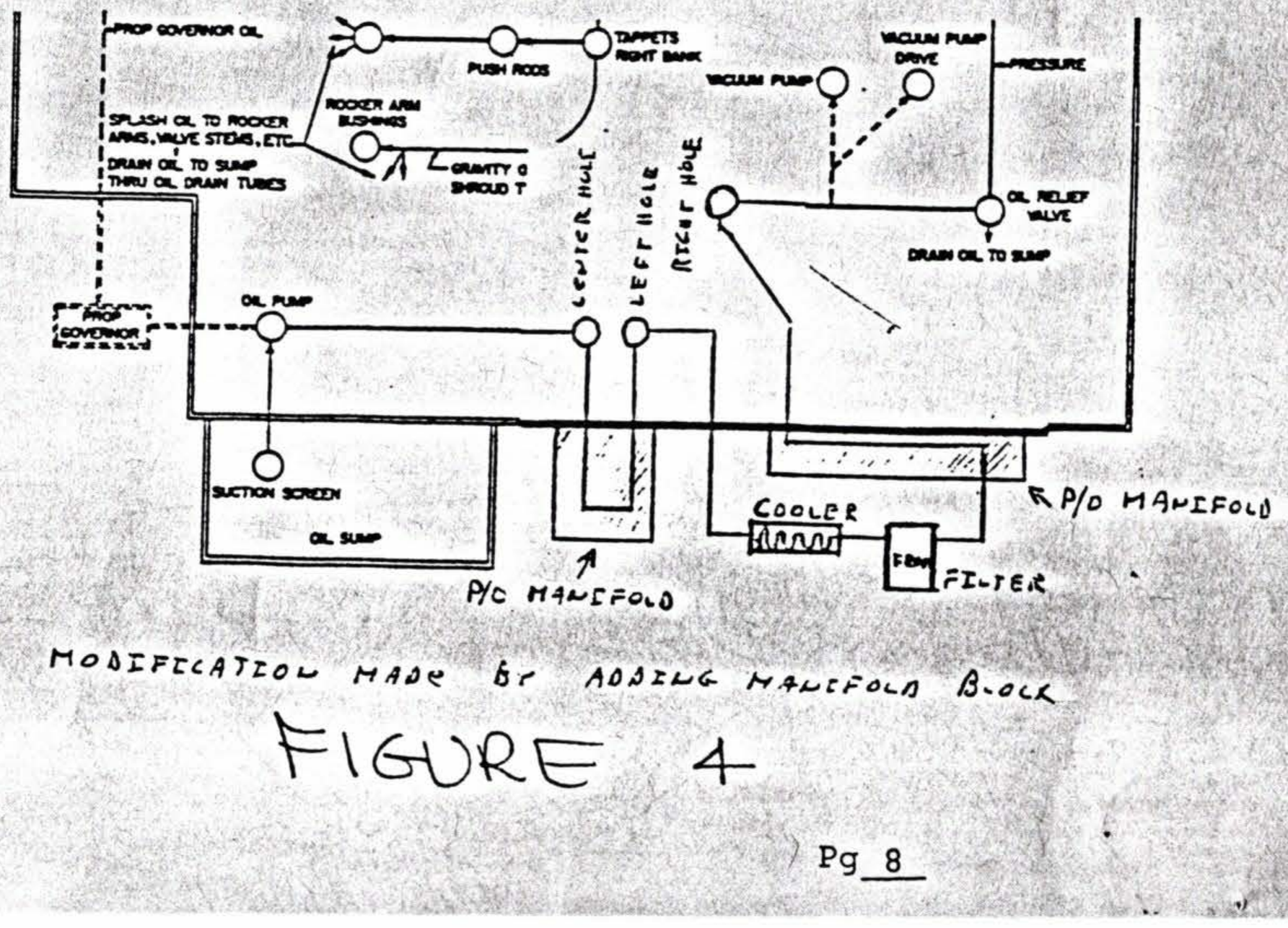
CONFIGURATION AFTER MODIFICATION

FIGURE 2



LYCOMING OIL DIAGRAM

FIGURE 3



MODIFICATION MADE BY ADDING MANIFOLD BLOCK

FIGURE 4