

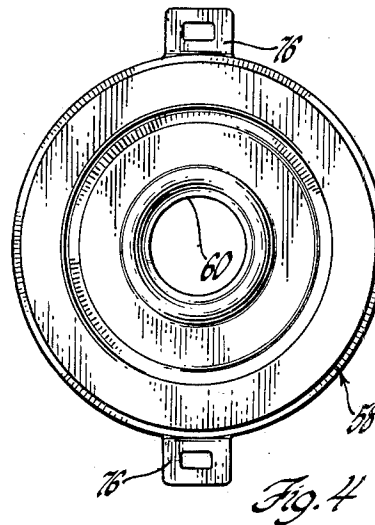
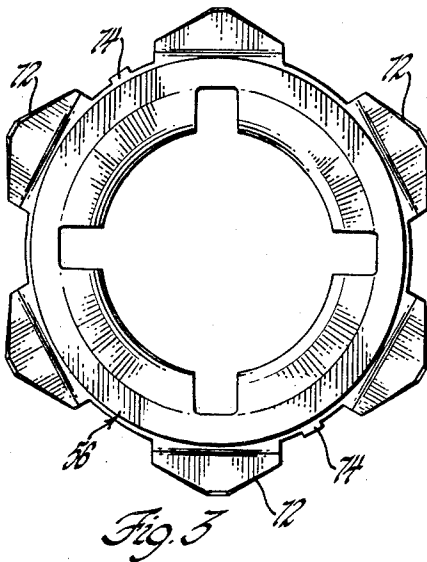
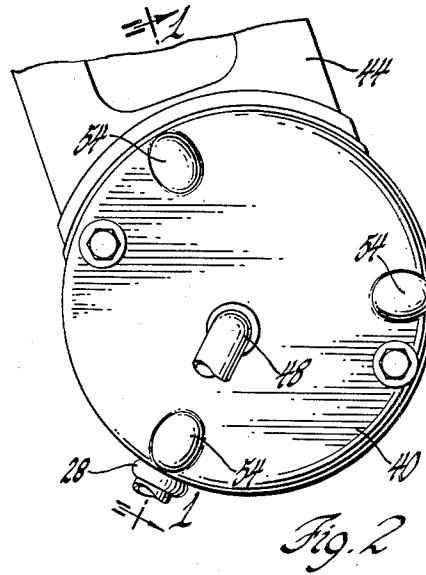
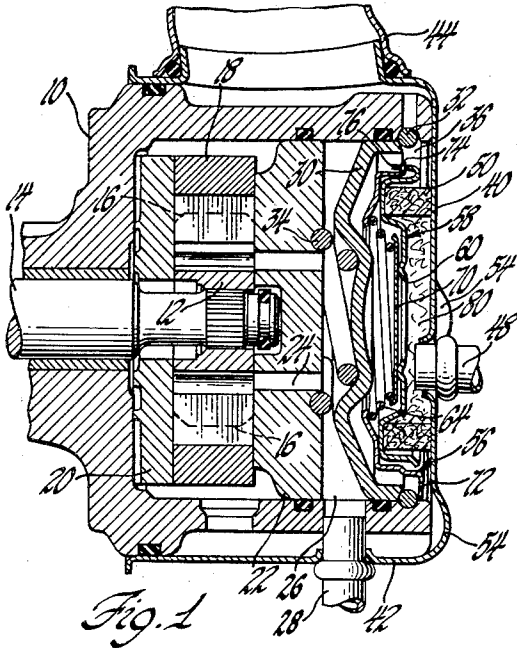
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FILTER FOR FLUID PRESSURE TRANSMISSION DEVICE OR THE LIKE

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1

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FILTER FOR FLUID PRESSURE TRANSMISSION DEVICE OR THE LIKE

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3 Claims. (Cl. 103—220)

This invention relates to a filtering scheme for fluid pressure systems of the type comprising one or more fluid pressure energy translating devices, i.e., one or more pumps or motors.

In its most specific aspect the invention is concerned with the filtering means as applied to a system incorporating a rotary pump having an integral reservoir. A pump of this type will be found described, for example, in copending application Serial No. 762,162, filed September 19, 1958 in the names of Robert P. Rohde, William B. Thompson and Philip B. Zeigler.

It is important to insure the proper working of such a system that provision be made to prevent the entry of dirt and other foreign matter thereto. In the case of systems utilizing the pump of the identified copending application, dependency has been placed on a filter disposed in the discharge conduit of the pump. Such filter has been found inadequate, largely because of the limitations set on its size and shape by its location.

Apart from the dirt problem, difficulty has been experienced with these systems due to turbulence in the reservoir induced by the flow of the return fluid thereto. This flow occurs from a return conduit having a direct connection with the reservoir.

In accordance with the present invention, a filter of greater capacity is employed and the same is located in a special chamber separate from but communicating with the reservoir proper. With the addition of this chamber, it has been found that turbulence in the reservoir is reduced to a minimum with a substantial increase in the effective reservoir capacity.

The invention will be described with reference to the accompanying drawings illustrating a preferred embodiment thereof. In the drawings:

FIGURE 1 is a section on the line 1—1 in FIGURE 2;

FIGURE 2 is an end view of a rotary pump incorporating the invention, the view being taken on the line 2—2 in FIGURE 1;

FIGURE 3 is a detail of one of the parts incorporated in the filter assembly; and

FIGURE 4 is a detail of another part employed in the filter assembly.

Referring first to FIGURE 1, the numeral 10 denotes the body of the rotary pump. Within such body is a rotor 12 driven by a shaft 14 and carrying vanes 16. As described in the previously identified copending application, these vanes, as the rotor turns, are caused to reciprocate by a cam ring 18 against which the tips of the vanes bear. The rotor, vanes and cam ring are confined between a thrust plate 20 and a pressure plate 22. The latter has therein a pair of discharge passages 24 opening to a pressure chamber 26 in turn opening to a discharge passage 28. A closure plate 30 with which the pump body 10 delineates a pressure chamber 26 is held in abutting relation to a snap ring 32 by force of a spring 34 reacted by the pressure plate 22. A second chamber or cavity 36 is delineated by the closure plate 30 in conjunction with the pump body and a wall 40 of a reservoir 42 which encircles the pump body and which is formed to accommodate a return tube 48 extending from the system served by the pump. Fluid is initially introduced into the reservoir through a filler tube 44 which may be of any desired length.

2

An annular filter element 50 will be seen abutting the inner surface of the wall 40 in encircling relation with respect to the end of the return tube 48. Normally the return fluid passes radially through the filter material into the cavity 36 which communicates with the reservoir via channels 54 (FIGURES 2 and 3) formed in the wall 40. Except for these channels it will be understood that the wall 40 lies tightly against the annular end of the pump body 10.

Due to the capacity of the cavity 36 and the dimensioning of the channels 54, the fluid enters the reservoir at a relatively low velocity and gives rise to substantially no turbulence.

The annular filter element 50 is located and is held in place by a retainer 56 acting on the filter element through a valve seat member 58 having an aperture 60 therein. This aperture is normally closed by a disc valve 70 which is loaded by a spring 64 reacted by the retainer.

As shown in FIGURE 3, retainer 56 is a stamping formed with a plurality of radial projections 72 and 74. Projections 72 are in the nature of leaf springs operating (FIGURE 1) to bias the retainer in the direction toward the filter element 50. The ends of these projections will be noted as abutting the snap ring 32 which retains the cover member 30.

Projections 74 are functional with relation to perforated tangs 76 (FIGURE 4) carried by the valve seat member 58. As illustrated by FIGURE 1, the tangs 76 at assembly are bent over to embrace the projections 74 thereby to positively secure the two parts, that is, retainer 56 and valve seat member 58 to each other.

The purpose of the valve 70 is to allow for free flow of the return fluid to the reservoir 42 should the filter element 50 become clogged or should the fluid, normally a mineral oil, become so cold and hence viscous that it will not flow through the filter. Under either of the indicated conditions a pressure develops at 80 causing the valve 70 to become displaced against the resistance of the spring 64. The opening of the valve permits uninhibited flow of return fluid into the cavity 36 and thence into the reservoir via the channels 54.

What is claimed is:

1. A pump assembly comprising a reservoir surrounding the body of the pump mechanism, such body having a cavity confining the pumping parts, a plate member closing said cavity and with a portion of said body delineating a second cavity outward of the plate member, said plate member being held against axial outward displacement by abutment means associated with said body, said last cavity being closed by a wall of said reservoir, said wall abutting the end of said body and having therein a port and a channel located radially outward of said port communicating said second cavity and said reservoir, an annular filter element surrounding said port within said second cavity and abutting said wall inward of said channel, a valve seat member fitted over and abutting said filter element, said valve seat member having an aperture therein located within the annulus of said filter element, a disc valve disposed over the opening in said valve seat member and a retainer member fitted over and positively connected to said valve seat member serving to react a spring normally maintaining said valve in its position whereat said opening is closed, said retainer member having a plurality of peripheral lugs engaging said abutment means and serving by spring tension to maintain the abutting relation of said filter element and said wall and the abutting relation of said valve seat member and said filter element.

2. A fluid pressure transmission device having a fluid container in enveloping relation thereto, a wall of such container with a portion of the transmission device providing a cavity for the reception of fluid, a port in said wall

3

through which fluid is introduced into said cavity, a filter element surrounding said port within said cavity and abutting said wall, a valve seat member spaced from said wall within said cavity by said filter element and having abutting relation with the latter, said valve seat member having an opening therein, retainer means within said cavity maintaining the abutting relation of said valve seat member and said filter element and the abutting relation of said filter element and said wall, a valve disposed over the opening in said valve seat member and held in such position by spring means reacted by said retainer means, said spring means being adapted to yield at a predetermined fluid pressure, passage means formed by the distortion of said wall radially outward of said filter element whereby fluid passing said filter element has ingress to said container, and passage means whereby fluid passing said opening on displacement of said valve has ingress to said first-mentioned passage means and hence to said container.

3. A pump assembly comprising a reservoir surrounding the body of the pump mechanism, such body having a cavity confining the pumping parts, a plate member closing said cavity and with a portion of said body delineating a second cavity outward of the plate member, said last cavity being closed by a wall of said reservoir, said wall

4

abutting the end of said portion of said body and having therein a port and a channel located radially outward of said port communicating said second cavity and said reservoir, an annular filter element surrounding said port within said second cavity and abutting said wall radially inward of said channel, a valve seat member within said second cavity spaced from said wall by said filter element and having abutting relation with the latter, said valve seat member having an opening therein, retainer means within said second cavity maintaining the abutting relation of said valve seat member and said filter element and the abutting relation of said filter element and said wall, a valve disposed over the opening in said valve seat member and normally held in such position by spring means reacted by said retainer means, and passage means whereby fluid passing said opening on displacement of said valve has ingress to said channel and hence to said container.

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