

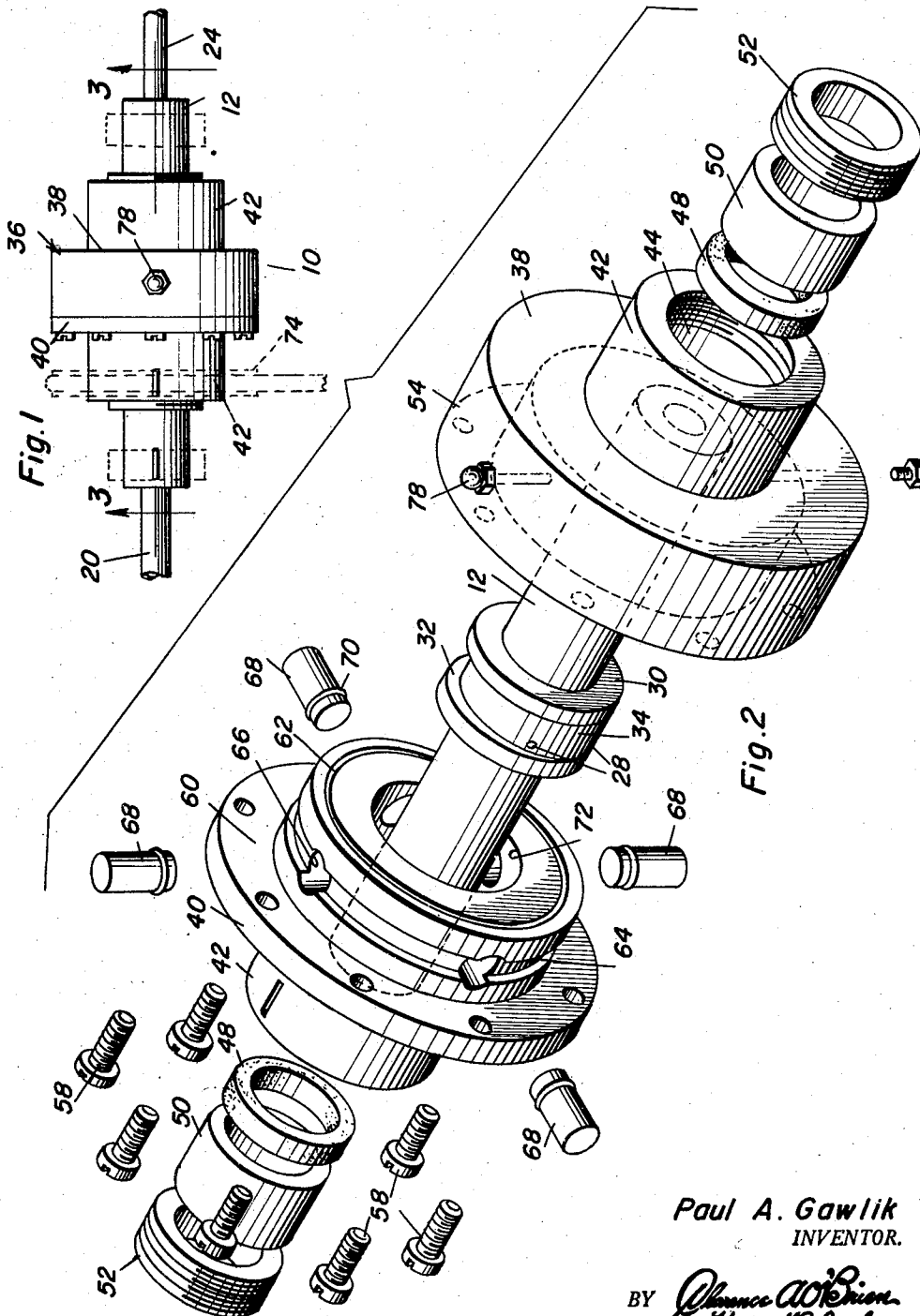
Sept. 2, 1958

P. A. GAWLIK
HYDRAULIC PUMP

2,849,961

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2 Sheets-Sheet 1



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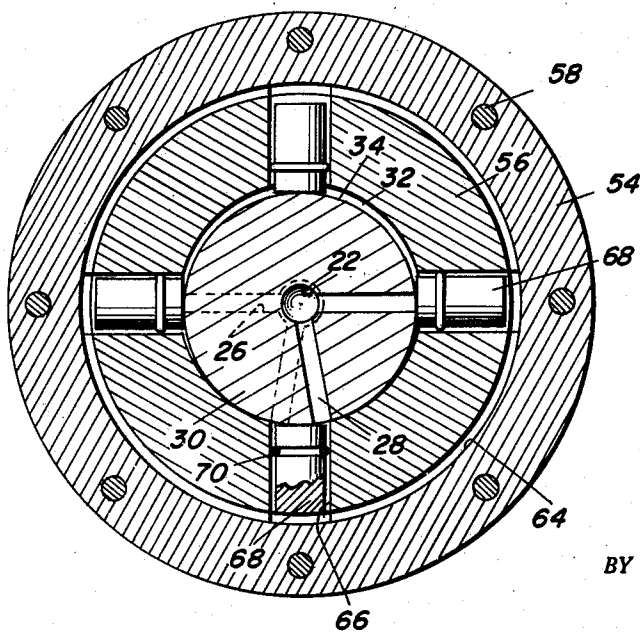
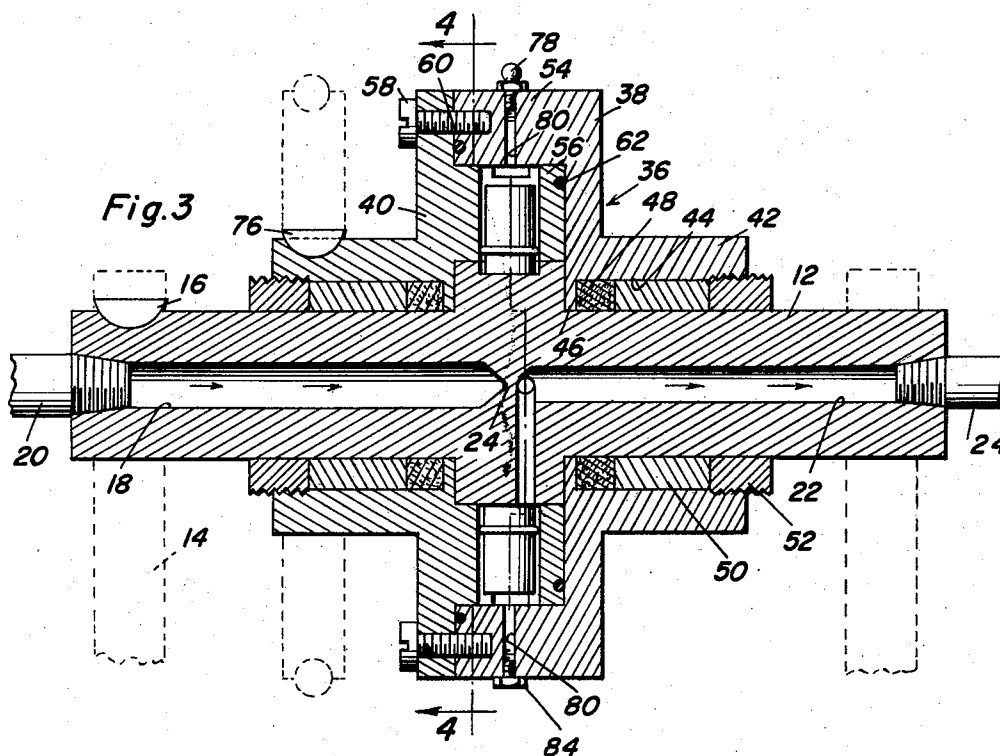
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HYDRAULIC PUMP

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5 Claims. (Cl. 103—121)

This invention generally relates to a pump construction and more particularly to a high pressure type of pump having a minimum of moving parts and requiring a minimum amount of power for operation thereof.

An object of the present invention is to provide a hydraulic pump having a stationary central shaft which is of a particular hollow construction which provides an inlet for fluid at one end and an outlet for pressurized fluid at the other end thereof.

A further object of the present invention is to provide a high pressure type pump including a stationary shaft and a rotatable body together with a stationary eccentric and radially movable vanes mounted in the rotatable body which are associated with the inlet and outlet in the stationary eccentric for pumping fluid from the inlet to the outlet.

Other objects of the present invention will reside in its simplicity of construction, ease of assembly and disassembly, adaptation for its particular purposes and its relatively inexpensive manufacturing cost.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a plan view of the pump of the present invention;

Figure 2 is an exploded group perspective view of the pump illustrating the various elements employed therein;

Figure 3 is a longitudinal, vertical sectional view taken substantially upon a plane passing along section line 3—3 of Figure 1 illustrating the relationship of the elements when assembled; and

Figure 4 is a transverse, vertical sectional view taken substantially upon a plane passing along section line 4—4 of Figure 3 illustrating further structural details of the invention.

Referring now specifically to the drawings, the numeral 10 generally designates the hydraulic pump of the present invention which includes an elongated hollow cylindrical shaft 12 having support members 14 associated therewith together with keys 16 rigidly securing the shaft 12 to the support members 14 thus precluding rotation of the shaft 12.

One end of the shaft 12 is provided with a longitudinal passage 18 which is screw threadedly connected to an inlet pipe 20. The other end of the shaft 12 is provided with a longitudinal passage 22 connected to a discharge pipe 24. It is noted that the passage 22 may be smaller than the passage 18 since the passage 22 will be under pressure. A central transverse portion 24 is provided for separating the passage 18 from the passage 22. The passage 18 is communicated with two radially extending passageways 26 while the passage 22 is communicated with the pair of radially extending passageways 28 as illustrated in Figure 4. The passageways 26 and 28 are in a centrally disposed cylindrical enlarged portion 30

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having a cam groove 32 therein thus forming an eccentric 34 on the shaft 12 which is stationary. The inlet passageways 26 are disposed at slightly less than right angles to each other. The outlet passageways 28 are also disposed at slightly less than right angles to each other and one of the passageways 26 is diametrically opposite to one of the passageways 28 while the other passageways 26 and 28 are adjacent to each other but disposed on opposite sides of a line disposed perpendicularly to the longitudinal axis of either of the diametrically opposed passageways 26 and 28.

A cylindrical body generally designated by the numeral 36 is rotatably mounted on the shaft 12 and includes a first part 38 and a second part 40 each of which are provided with a longitudinally extending cylindrical portion 42 having a tubular recess 44 defined by an inwardly extending flange 46 which engages the side edges of the cylindrical enlarged portion 30 on the shaft 12. Disposed in each tubular portion 44 is an annular sealing gasket 48, a cylindrical bearing member 50 and a retaining nut 52, which may be employed for compressing the packing 48 and also retaining the bearing 50 in position.

The first member 38 is provided with a cylindrical lateral projection 54 telescoping over an inwardly extending portion 56 on the second portion 40. The second portion 40 is secured to the laterally extending portion 54 by a plurality of cap screws 58 together with a suitable sealing ring 60 disposed at the line of juncture therebetween. Also, a sealing ring 62 is disposed between the inner surface of the laterally extending portion 56 and the first member 38. The laterally extending portion 56 of the second member 40 is provided with an annular groove 64 extending completely therearound and also is provided with a plurality of radially extending bores or passageways 66 for receiving a plurality of vanes or cylindrical pins 68 each of which is provided with an O-ring seal 70 for engagement with the side walls of the passages 66 for sealing relation thereto. The interior of the member or portion 56 is concentric and provides a tubular portion or cylindrical portion 72 for closely receiving the outer surface of the cylindrical enlargement 30 on the shaft 12 wherein the cam groove 32 is in registry with the passageways 66 so that the pins 68 may ride on the cam surface 34 during rotation of the housing 36 which may be caused by a V-belt pulley designated by the numeral 74 which is keyed to the cylindrical boss 42 on the first member 40 by a key 76. It will be understood that either a V-belt or a sprocket gear or any other drive mechanism may be employed for rotating the housing 36 in relation to the shaft 12. At the upper end of the housing 36 is provided a grease fitting 78 communicating with a passageway 80 which communicates with the groove 64 and at the bottom of the housing 36 is a passageway 82 having a drain plug 84 therein for permitting drainage of the oil groove 64.

In the initial beginning of operation of the pump, the bleed plug 84 is removed and the entire oil groove and the adjacent areas of the passageways 66 are filled with oil or a very light grease thus balancing the pins or vanes 68 in the passageways 66 so that the pins will be urged inwardly against the cam surface 34 throughout the rotation thereof. In other words, the pins or vanes 68 will always ride against the cam surface 34 of the cylindrical enlargement 30 on the shaft 12. Fluid or liquid will be picked up from the inlet passage 18 and passageways 26 into the area between the cam surface 34 and the interior of the tubular portion 72. As the cam surface 34 approaches contact with the interior of the tubular portion 72, the fluid or liquid will be forced outwardly through the discharge passageways 28. Thus, a high pressure may be obtained and by pressurizing the oil within the oil groove 64, the pressure obtained may be

varied. In order to disassemble the device, it is only necessary to open the bleed valve and turn the pump one complete revolution for urging the pins or vanes outwardly to a position equal to the major diameter of the cylindrical portion 30 of the shaft 12.

The foregoing is considered illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A pump comprising a stationary shaft having an inlet passage and an outlet passage separated by a transverse central portion, said shaft having radial passageways communicating the periphery thereof with the inlet and outlet passages, a rotatable housing journaled on said shaft, said housing including a plurality of radial bores with radially movable vanes mounted therein, pressure means disposed exteriorly of the vanes for urging the same inwardly against the periphery of the shaft, said shaft having a cam surface in engagement with the inner ends of the radial vanes for imparting radial movement thereto and said housing including a cylindrical portion associated with the eccentric portion of the shaft whereby the radial vanes in constant contact with the shaft will cause fluid to be picked up from the inlet passage and discharged to the outlet passage said vane being of cylindrical configuration and having a sealing ring concentrically mounted about same, whereby said pressure means is sealed exteriorly of the vanes.

2. A pump comprising a stationary shaft having an inlet passage and an outlet passage separated by a transverse central portion, said shaft having radial passageways communicating the periphery thereof with the inlet and outlet passages, a rotatable housing journaled on said shaft, said housing including a plurality of radial bores with radially movable vanes mounted therein, pressure means disposed exteriorly of the vanes for urging the same inwardly against the periphery of the shaft, said shaft having a cam surface in engagement with the inner ends of the radial vanes for imparting radial movement thereto and said housing including a cylindrical portion associated with the eccentric portion of the shaft whereby the radial vanes in constant contact with the shaft will cause fluid to be picked up from the inlet passage and discharged to the outlet passage, said means for urging the vanes inwardly including an annular groove on the exterior of the portion of the housing having the radial bores therein, pressurized oil disposed in said groove and engaging the outer ends of the vanes thus urging the vanes inwardly for constant engagement with the cam surface of the shaft.

3. A pump comprising a stationary shaft having an inlet passage and an outlet passage separated by a transverse central portion, said shaft having radial passageways communicating the periphery thereof with the inlet and outlet passages, a rotatable housing journaled on said shaft, said housing including a plurality of radial bores with radially movable vanes mounted therein, pressure means disposed exteriorly of the vanes for urging the same inwardly against the periphery of the shaft, said shaft having a cam surface in engagement with the inner ends of the radial vanes for imparting radial movement thereto and said housing including a cylindrical portion associated with the eccentric portion of the shaft whereby

the radial vanes in constant contact with the shaft will cause fluid to be picked up from the inlet passage and discharged to the outlet passage, said shaft having a cylindrical enlarged portion with the cam surface being formed thereon, said housing including a first part and a second part detachably connected together and engaging opposite surfaces of the enlarged portion of the shaft.

4. A pump comprising a stationary shaft having an inlet passage and an outlet passage separated by a transverse central portion, said shaft having radial passageways communicating the periphery thereof with the inlet and outlet passages, a rotatable housing journaled on said shaft, said housing including a plurality of radial bores with radially movable vanes for urging the same inwardly against the periphery of the shaft, said shaft having a cam surface in engagement with the inner ends of the radial vanes for imparting radial movement thereto and said housing including a cylindrical portion associated with the eccentric portion of the shaft whereby the radial vanes in constant contact with the shaft will cause fluid to be picked up from the inlet passage and discharged to the outlet passage, said means for urging the vanes inwardly including an annular groove on the exterior of the portion of the housing having the radial bores therein, pressurized oil disposed in said groove and engaging the outer ends of the vanes thus urging the vanes inwardly for constant engagement with the cam surface of the shaft, said groove having an oil inlet fitting at the top thereof and an air bleed at the bottom thereof for permitting admission of oil under a predetermined pressure for determining the maximum pressure output of the pump due to the force exerted on the outer end of the radially movable vanes.

5. A pump comprising a stationary shaft having an inlet passage and an outlet passage separated by a transverse central portion, said shaft having radial passageways communicating the periphery thereof with the inlet and outlet passages, a rotatable housing journaled on said shaft, said housing including a plurality of radial bores with radially movable vanes mounted therein, pressure means disposed exteriorly of the vanes for urging the same inwardly against the periphery of the shaft, said shaft having a cam surface in engagement with the inner ends of the radial vanes for imparting radial movement thereto and said housing including a cylindrical portion associated with the eccentric portion of the shaft whereby the radial vanes in constant contact with the shaft will cause fluid to be picked up from the inlet passage and discharged to the outlet passage, said shaft having a cylindrical enlarged portion with the cam surface being formed thereon, said housing including a first part and a second part detachably connected together and engaging opposite surfaces of the enlarged portion of the shaft, said means for urging the vanes inwardly including an annular groove on the exterior of the portion of the housing having the radial bores therein, pressurized oil disposed in said groove and engaging the outer ends of the vanes thus urging the vanes inwardly for constant engagement with the cam surface of the shaft.

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