July 24, 1962 L. R. GAJEWSKI ET AL 3,045,600

CONSTANT SPEED VARIABLE VOLUME HYDRAULIC PUMP

Filed Jan. 5, 1960

Fig. 1.

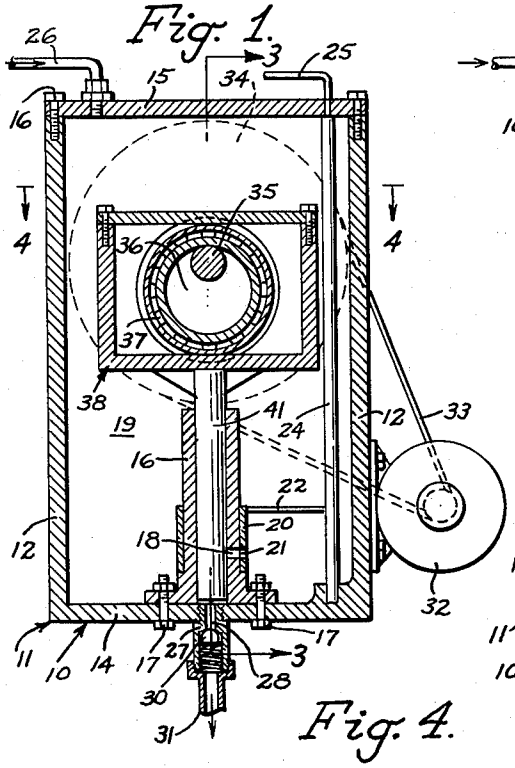


Fig. 2.

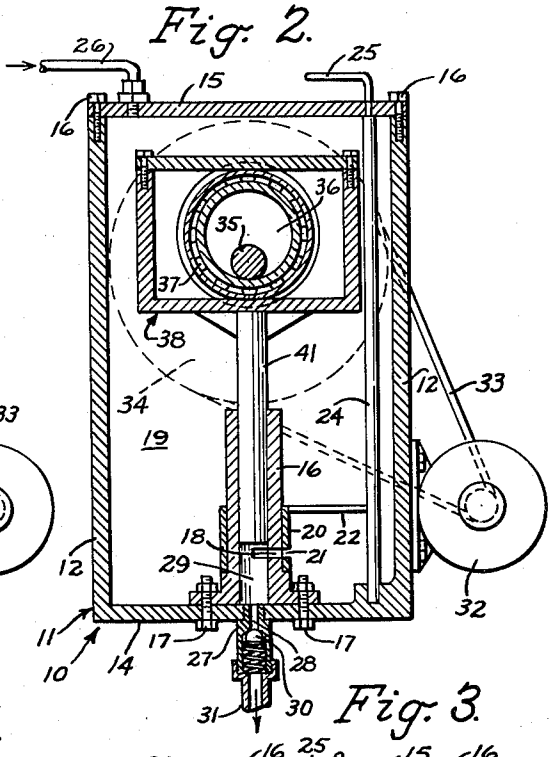


Fig. 4.

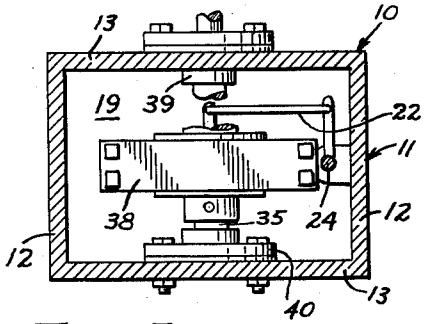


Fig. 3.

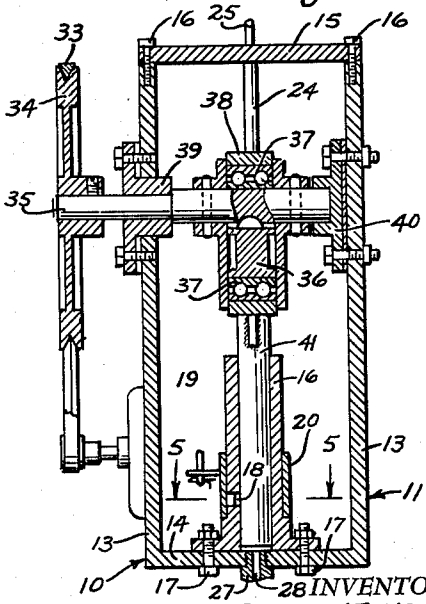
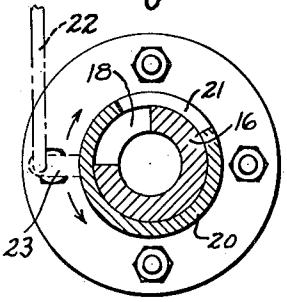


Fig. 5.



INVENTORS
LOREN R. GAJEWSKI
MERVIN GAJEWSKI
BY Victor J. Evans & Co.

ATTORNEYS

United States Patent Office 3,045,600 Patented July 24, 1962

3,045,600

CONSTANT SPEED VARIABLE VOLUME HYDRAULIC PUMP

Loren R. Gajewski and Mervin Gajewski, Alexander, N. Dak.

Filed Jan. 5, 1960, Ser. No. 535
4 Claims. (Cl. 103—37)

This invention relates to a pump, and more particularly to a pump for hydraulic fluid.

The object of the invention is to provide an improved constant speed variable volume hydraulic pump wherein flow or volume of liquid through the pump can be varied without the necessity of varying the speed of the pump.

Another object of the invention is to provide a constant speed variable volume hydraulic pump wherein a person can vary the flow of or volume of liquid through the pump without varying the speed, the pump being easy and inexpensive to operate and because of the limited number of working parts, the pump is relatively trouble free and requires very little maintenance and wherein the pump can be used wherever hydraulic pressure is required, as for example on an arbor press.

A further object of the invention is to provide a constant speed variable volume hydraulic pump which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

FIGURE 1 is a vertical sectional view taken through the constant speed variable volume hydraulic pump of the present invention showing the piston and its associated parts in lowered position.

FIGURE 2 is a view similar to FIGURE 1 but showing the piston and its associated parts in raised position.

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 1.

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 1.

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 3.

Referring in detail to the drawings, the numeral 10 indicates a constant speed variable volume hydraulic pump of the present invention which is shown to comprise a hollow housing 11, and the interior of the housing as indicated by the numeral 19 provides a space for or reservoir for holding a quantity of hydraulic fluid which is to be pumped. The housing 11 comprises upstanding spaced apart walls 12 and 13 as well as a horizontally disposed bottom wall 14 and the top wall 15 which may be fastened in place by means of securing elements 16.

Positioned within the lower portion of the housing 11 is a barrel 16, and the barrel 16 has its lower end fastened to the bottom wall 14 in any suitable manner, as for example by means of securing elements 17. The barrel 16 is provided with an inlet port or aperture 18 for a purpose to be later described.

Rotatably mounted on the barrel 16 is a sleeve 20 which is provided with a port or opening 21, and the port 21 is mounted for movement into and out of registry with the aperture 18 as the sleeve 20 is rotated. The sleeve 20 thus constitutes a rotary valve which is adapted to be rotated by means of a link 22 which is pivotally connected to the sleeve 20 as at 23. The link 22 is adapted to be connected to an actuating rod 24 which may have a hand grip 25 on its upper end. Thus, by rotating the rod 24 by means of the handle 25, the link 22 will shift the sleeve 20 so that the port 21 can be arranged at the desired position with respect to the aperture 18 in order to control the amount of hydraulic fluid which is sucked into the ports

21 and 18. As shown in the drawings the interior of the barrel 16 is hollow so that the hydraulic fluid can pass downwardly therethrough.

The numeral 26 indicates a conduit which is adapted to be used for conveying or supplying hydraulic fluid in a suitable source of supply or location to the interior of the housing 11. The numeral 27 indicates a fitting which has a port or passageway 28 therein that communicates with the lower end of the passageway 29 in the barrel 16. The fitting 27 has mounted therein a spring pressed check valve 30, and the numeral 31 indicates an outlet conduit which is adapted to lead to a suitable location as for example to an arbor press which is to be supplied with the hydraulic fluid under pressure.

There is further provided an outside power source 32 which may constitute an electric motor or the like, and the motor 32 serves to operate an endless belt or chain 33 which is trained over a flywheel 34, and the flywheel 34 is mounted on the outer end of a drive shaft 35. The numeral 36 indicates a cam which is connected to the inner portion of the shaft 35 FIGURE 3, and a bearing assembly 37 surrounds the cam 36, the bearing assembly being positioned within a cage or case 38. The shaft 35 is supported in bearings 39 and 40.

From the foregoing, it is apparent that there has been provided a constant speed variable volume hydraulic pump, and in use with the parts arranged as shown in the drawings, it will be seen that when the motor 32 is energized or actuated, the belt 33 will be moved or turned so as to rotate the flywheel 34. Since the flywhel 34 is connected to the shaft 35, the shaft 35 will rotate so as to turn the cam 36. As the cam 36 turns, it will move the cage 38 up and down in the housing 11 and since the cage 38 is fastened to the upper end of the piston 41, the piston 41 will move up and down continuously. The piston 41 is slidably mounted in the bore or passageway 29, of the barrel 16, and with the valve 26 set so that its port 21 registers with the port 18, it will be seen that on the upstroke of the piston 41, hydraulic fluid will be sucked in through the ports 21 and 18 and then into the passageway 29 within the barrel 16. Then, on the downstroke the piston 41 will force this hydraulic fluid down through the passageway 28 and past the check valve 30 and out through the conduit 31 so that the hydraulic fluid under pressure can be supplied to any suitable location, as for example to an arbor press or other member which is being actuated. By manually moving the handle 25, the rod 24 can be rotated so as to shift the links 22 and since the links are connected with the sleeve 20, it will be seen that the sleeve 20 can be positioned at different locations in order to control the effective size of the inlet port 18.

The parts can be made of any suitable material and in different shapes or sizes.

It is to be noted that when the cam is in the down position the piston is also at the bottom of the barrel, and when the cam is in the up position the piston 41 is just slightly above the intake port. This is an important aspect of the present invention. The hydraulic fluid is arranged in the reservoir 19 and may be replenished when the quantity drops below a predetermined level. On the present invention inlet control means in the nature of a control valve is provided and the present invention will operate under heavy pressure in hydraulic operation and the cost of making the pump is quite low and the present invention does away with the variable displacement which requires considerable repair and also eliminates the inlet check valve since the constant speed variable volume hydraulic pump uses the constant speed variable volume instead of a variable displacement.

The purpose of the present invention is to provide a constant speed variable volume hydraulic pump which will enable the operator to vary the flow or volume of

liquid through the pump without varying the speed of the pump and the pump consists primarily of a piston, barrel, inlet port, rotary sleeve valve or other suitable type, check valve, outlet, cam shaft and anti-friction bearing mounted cam ring, control shaft, control links, flywheel, motor or engine, a drive belt or chain, a pump housing and fluid reservoir and a cam cage.

In operation, there is utilized the principle of variable size inlet ports with the vacuum induced by the piston 41 during its upward cycle causing the fluid to flow into the cylinder or area 29. The fluid volume to the outlet check valve 30 is controlled by the inlet port control valve. Alternatives to the basic construction would incorporate horizontally opposed, vertical opposed, multiple in line or radial cylinder arrangement but all would employ the basic principle of inlet control. The piston or pistons may also be actuated by means of a cam and return spring or springs or a crankshaft and connecting rod arrangement instead of the cam cage system.

Some of the advantages of the present invention are that the pump will enable the operator to vary the flow or volume of liquid through the pump without varying the speed and the pump is relatively inexpensive to operate as well as being inexpensive to make. Because of the limited number of working parts, it is particularly trouble free and requires little maintenance and the pump is useful wherever hydraulic pressure is required as for example it can be used on an arbor press.

Minor changes, in shape, size and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

What is claimed is:

1. In a constant speed variable volume hydraulic pump, a hollow housing including spaced apart wall members, a bottom wall and a top wall, a hollow barrel mounted in said housing and connected to said bottom wall, there being an inlet aperture in said barrel, a sleeve rotatably mounted on said barrel and provided with a port which is mounted for movement into and out of registry with said aperture, manually operated rod and link means for rotating said sleeve, a fitting depending from said bottom wall and having a check valve therein; an outlet conduit connected to said fitting, a power source arranged externally of said housing, a flywheel driven by said power source, a shaft connected to said flywheel, a piston slidably mounted in said barrel, and bearing and cam means operatively connecting said shaft to said piston.

2. In a constant speed variable volume hydraulic pump, a hollow housing including spaced apart wall members, a bottom wall and a top wall, a hollow barrel mounted in said housing and connected to said bottom wall, there being an inlet aperture in said barrel, a sleeve rotatably mounted on said barrel and provided with a port which is mounted for movement into and out of registry with said aperture, manually operated rod and link means for rotating said sleeve, a fitting depending from said bottom wall and having a check valve therein; an outlet conduit connected to said fitting, a power source arranged externally of said housing, a flywheel driven by said power source, a shaft connected to said flywheel, a piston slidably mounted in said barrel, and bearing and cam means operatively connecting said shaft to said piston, said means comprising a cam connected to said shaft, a bearing assembly surrounding said cam, and a cage surrounding said bearing assembly, said cage being fastened to the upper end of said piston.

3. In a constant speed variable volume hydraulic pump, a hollow housing providing in its interior a hydraulic fluid reservoir, a barrel in said housing provided with an inlet port, a piston slidably mounted in said barrel, power operated cam means for reciprocating said piston in said barrel, a rotary sleeve mounted on said barrel and having a port mounted for movement into and out of registry with the port in said barrel, said sleeve providing a valve, and manually operated rod and link means for rotating said sleeve valve.

4. In a constant speed variable volume hydraulic pump, a hollow housing providing in its interior a hydraulic fluid reservoir, a barrel in said housing provided with an inlet port, a piston slidably mounted in said barrel, power operated cam means for reciprocating said piston in said barrel, a rotary sleeve mounted on said barrel and having a port mounted for movement into and out of registry with the port in said barrel, said sleeve providing a valve, and manually operated rod and link means for rotating said sleeve valve, the means for actuating the piston including a cam, whereby when the cam is in the down position, the piston is at the bottom of the barrel, and when the cam is in the up position the piston is just slightly above the intake port.

References Cited in the file of this patent

UNITED STATES PATENTS

261,019	Meyrick	July 11, 1882
409,773	Davey	Aug. 27, 1889
906,234	Jackson	Dec. 8, 1908
1,680,460	Langdon	Aug. 14, 1928
2,853,211	Chase	Sept. 23, 1958

FOREIGN PATENTS

313,250	Italy	Mar. 18, 1933