

May 15, 1928.

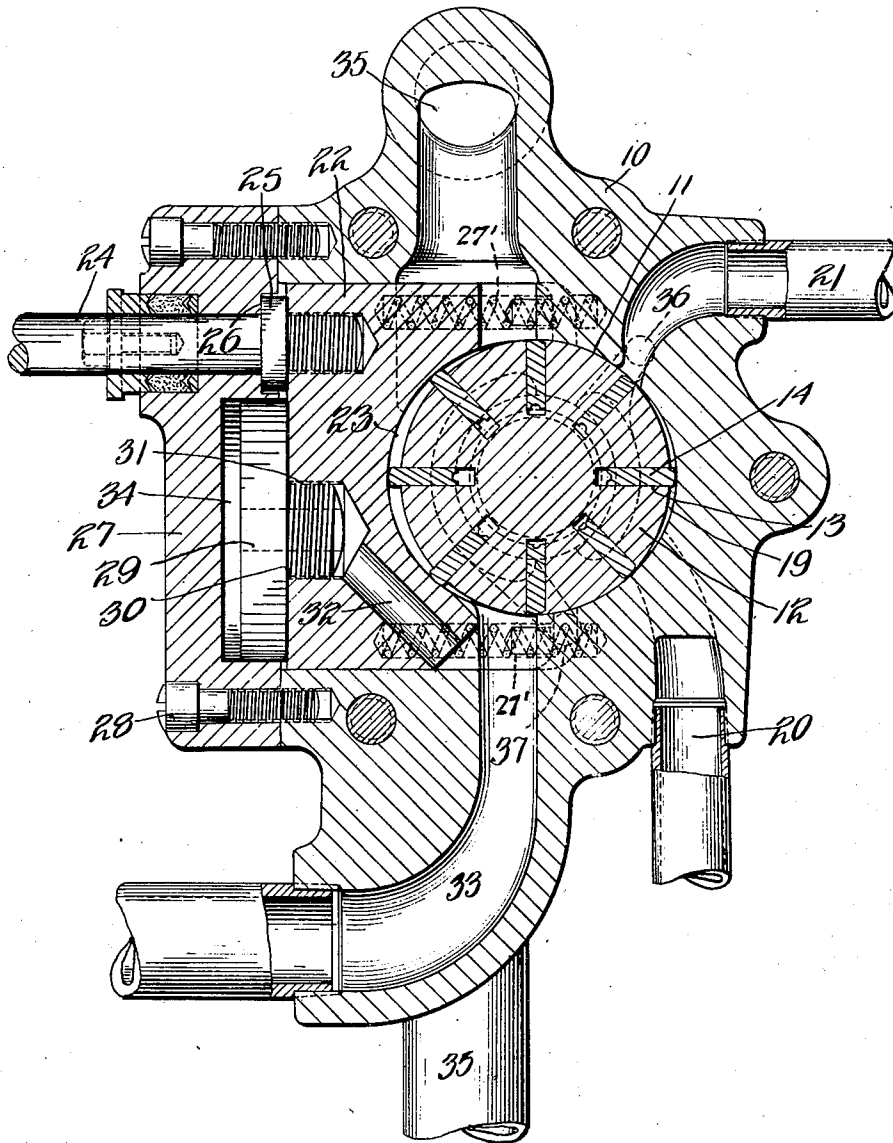
H. E. BALSIGER

1,670,229

COMBINED VARIABLE CAPACITY AND CONSTANT VOLUME PUMP

Filed March 18, 1927

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

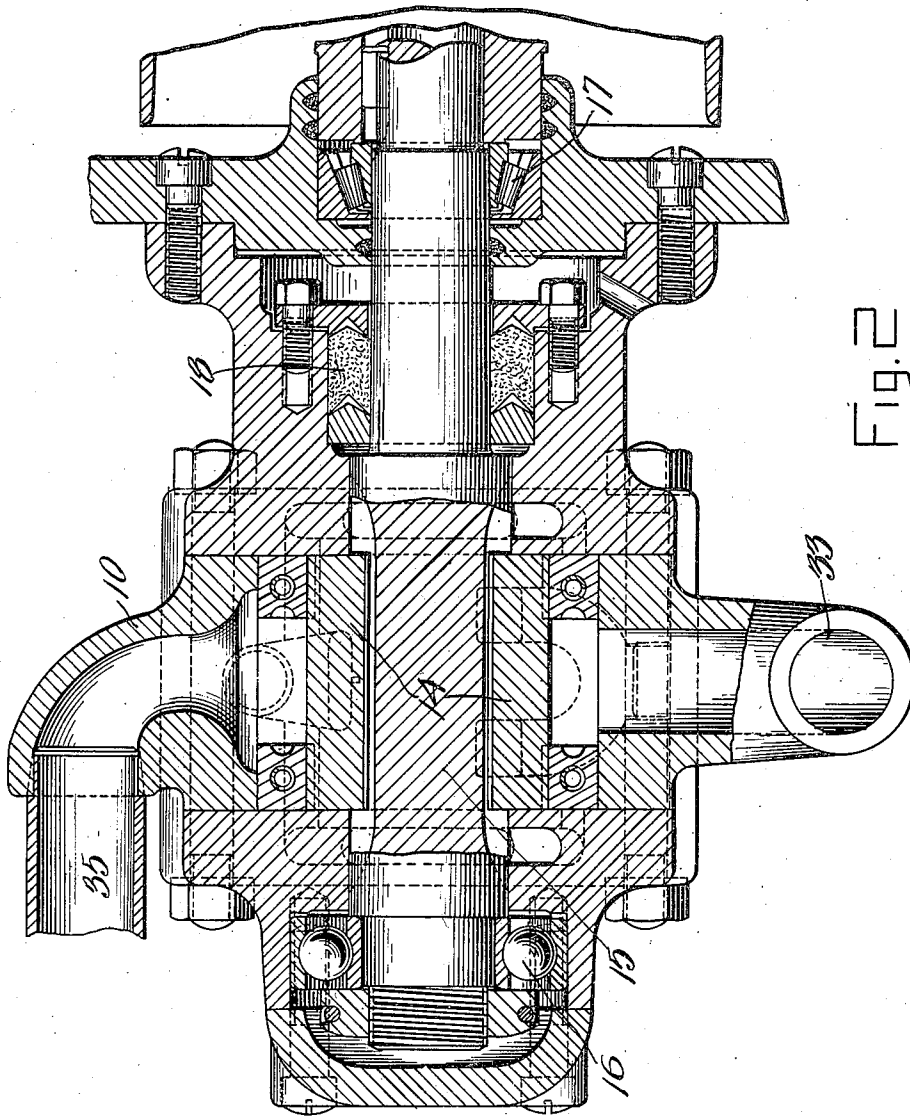


Fig. 2

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Fig. 4

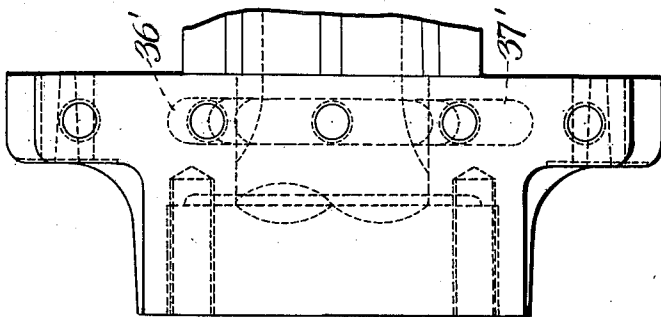
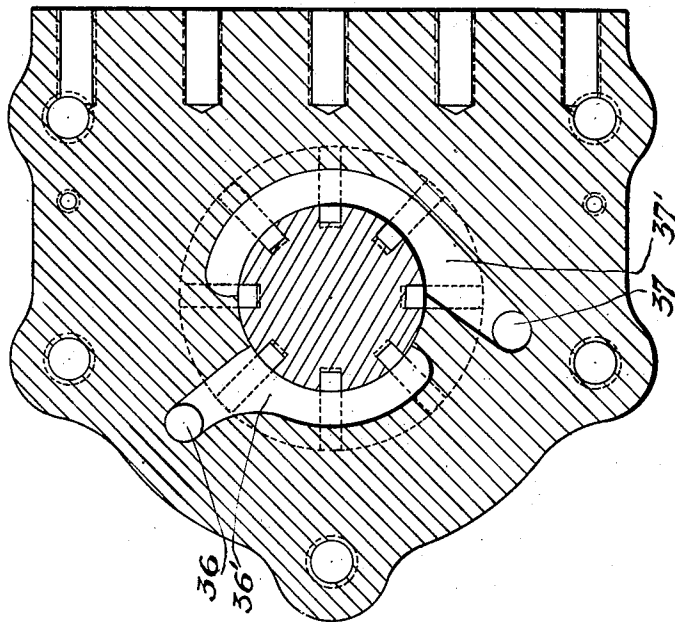


Fig. 3



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Patented May 15, 1928.

1,670,229

UNITED STATES PATENT OFFICE.

HAROLD E. BALSIGER, OF WAYNESBORO, PENNSYLVANIA, ASSIGNOR TO LANDIS TOOL COMPANY, OF WAYNESBORO, PENNSYLVANIA, A CORPORATION.

COMBINED VARIABLE-CAPACITY AND CONSTANT-VOLUME PUMP.

Application filed March 18, 1927. Serial No. 176,455.

My invention relates to pumps for supplying pressure fluid to a plurality of mechanisms and it is an object of the invention to provide means whereby a single pump may be used to deliver a constant flow of fluid to one or more mechanisms and at the same time supply a variable flow of pressure fluid to other mechanisms each supply of fluid being independent of the other. This object is attained by means of a rotary pump having two pumping chambers. One of said chambers has a constant volume at all times while the other pumping chamber may be increased or decreased in volume by suitable mechanism to vary the volumetric output of this chamber.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a sectional elevation of the device,

Figure 2, a transverse sectional elevation,

Figure 3, a transverse sectional elevation of the left hand end plate, and

Figure 4, a front elevation of said end plate,

This invention consists of a combined variable and constant capacity pump with a single impeller common to both.

The construction and operation of the variable side of the pump has been described in a co-pending application of Harold E. Balsiger and Amos P. Steiner, Serial No. 122,197, filed July 13, 1926.

The construction of the combined device is fundamentally the same as that described in the above mentioned application except that a portion of the inner surface of the pump body is machined to form a constant volume pumping chamber, and has inlet and discharge ports connected therewith.

The pump consists of a casing 10 having a chamber 11 in which is mounted a cylindrical piston 12 having radial slots 13 therein for receiving pumping vanes 14. The piston is secured upon a shaft 15 mounted in suitable bearings 16 and 17 in the casing and is driven by any source of power not shown. Suitable packing material 18 prevents leakage around the shaft. One side of the chamber 11 is machined out to provide between the rotor 12 and the pump casing 10 a crescent-shaped chamber 19 as shown in Fig. 1. Suitable ports 20 and 21

furnish inlet and outlet passages for this pumping chamber. The side of the casing approximately opposite the chamber 19 is chambered to provide for the reception of a block 22. This block has an inner surface cut to provide between the inner end of the block and the cylindrical piston 12 a crescent-shaped chamber 23 having outlet and inlet ports 33 and 35. The block is held in place by means of a rod 24 threaded in the block 22 and having a flange 25 resting against the shoulder 26 of the cover plate 27. Compression springs 27' seated in bores in the casing 10 and in the block 22 urge the block outward. They hold the block against back lash when the pump is stopped and pressure removed from the inner side of the block. The said cover plate is fastened to the casing 10 of the pump by means of bolts or screws 28. A piston 29 having a small screw portion 30 threaded in a bore 31 in the sliding block 22 balances the sliding block and facilitates its movement. A port 32 in communication with the discharge outlet 33 of the pump, admits fluid pressure to the chamber 34 above the piston 29, and acts to balance the sliding block against the pressure on its inner surface.

As fully described in the co-pending application above referred to, the block 22 may be moved toward and from the rotary piston by rotation of the shaft 24 by means of a hand wheel thereon not shown. Movement of the sliding block 22 from and toward the pumping chamber will increase or decrease the space 23 to vary the capacity of the pump.

As shown in Figs. 1, 3 and 4, the inner ends of slots 13 in the rotary piston 12 are in communication with arcuate grooves 36' in the end plates which connect through ports 36 with the discharge side of the pump in the constant volume chambers, and with arcuate grooves 37' in the end plates which connect through port 37 to pressure on the discharge side of the variable volume pumping chamber to provide pressure fluid against the inner ends of the vanes 14 to force them against the inner surface of the bore 11 to provide a fluid seal between the vanes and the inner surface of the bore 11.

The operation of my pump is as follows:

Upon rotation of the piston 12 fluid is drawn in through inlet passage 20 into the crescent-shaped chamber 19 of the pump

and by means of the vanes 14 is expelled with a constant flow for a given speed of the pump through the outlet port 21 to the place of consumption. In like manner fluid is drawn through inlet port 35 into the crescent-shaped chamber 23 and delivered through outlet port 33 to the place of consumption in any desired volume dependent upon the position of the block 22. By a slight rotation of the shaft 24 the block 22 may be moved by a threading action from or toward the periphery of the piston 12 to increase or decrease the volume of the crescent-shaped chamber 23 and hence the volumetric output of the pump. The flange 25 prevents axial movement of the shaft 24 when the latter is rotated to move the block inward. The springs 27' assist in moving the block outward when the shaft is rotated in the reverse direction.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of my invention, and I, therefore, do not limit myself to what is shown in the drawings and described in the specification, but only as set forth in the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. A duplex pump having a single casing and a single rotor with two pumping chambers, one adapted to deliver a constant volume of fluid exteriorly of the casing and the other adapted to be increased or decreased whereby it may deliver a variable volume of fluid independently of the delivery from the constant volume chamber, substantially as set forth.

2. A rotary pump comprising a casing, a rotary piston mounted therein, a portion of the inner surface of the casing being hollowed out to provide a crescent-shaped pumping chamber between the casing and the rotor with inlet and outlet ports connected therewith, a second pumping chamber opposite the first-named pumping chamber having inlet and outlet passages entirely independent of the passages or ports in said first named chambers and means for changing the volumetric capacity of the second-named chamber, substantially as set forth.

3. A combined constant delivery and variable capacity pump comprising a casing, a rotor therein, a pumping chamber on one side of said rotor formed between the rotor and the casing with inlet and outlet ports connected therewith, a chamber on the opposite side of said rotor with inlet and outlet ports connected therewith, the ports in one chamber being entirely independent of the ports in the other, a sliding block forming a portion of the second chamber, means for moving the said sliding block radially

in the pump chamber for changing the volumetric capacity of the said second-named chamber whereby at a given speed of operation the volume of fluid delivered from the first-named chamber will remain constant and the volume delivered from the second-named chamber may be varied, substantially as set forth.

4. A rotary pump comprising a casing, a rotary piston mounted therein, slidable vanes mounted in said piston, a crescent-shaped pumping chamber at one side of said piston formed between the piston and the inner casing wall having inlet and outlet ports connected therewith, a second crescent-shaped pumping chamber on the other side of said piston, a sliding block forming the other side of said chamber, inlet and outlet ports for the second named pumping chamber, the inlet and outlet ports of the second pumping chamber being independent of those of the first chamber, and means for moving the said block toward and from the piston whereby the volume of the said second-named chamber may be increased or decreased to deliver a variable volume of fluid, substantially as set forth.

5. A duplex pump comprising a single casing and a rotor mounted therein having radial slots, a block provided with a curved inner surface and slidably mounted in said casing, pumping vanes reciprocally mounted in said slots, the casing having a portion cut away on one side to provide a pumping chamber, inlet and outlet ports connected to said chamber, the opposite side of said casing having a pumping chamber provided between the periphery of the rotary piston and the curved surface of the sliding block, inlet and outlet ports for the last named chamber, the inlet and outlet ports of the first named chamber being independent of those of the last named chamber, and means for moving the said block toward and from the said piston, substantially as set forth.

6. A pump comprising a casing having a pumping chamber with the side opposite therefrom cut away to form a second pump chamber, a sliding block mounted therein, means for moving the said block toward and from a rotor mounted in the casing, means for balancing the pressure on opposite sides of the block whereby movement of the sliding block may be facilitated, inlet and outlet ports to the respective pumping chambers, the ports to one chamber being entirely independent of the ports to the other chamber, substantially as set forth.

In witness whereof, I have hereunto set my hand at Waynesboro, Pennsylvania, this 15th day of March, A. D. nineteen hundred and twenty-seven.

HAROLD E. BALSIGER.