May 12, 1931. A. J. GILBERT 1,804,604

PUMP

Filed Aug. 4, 1927

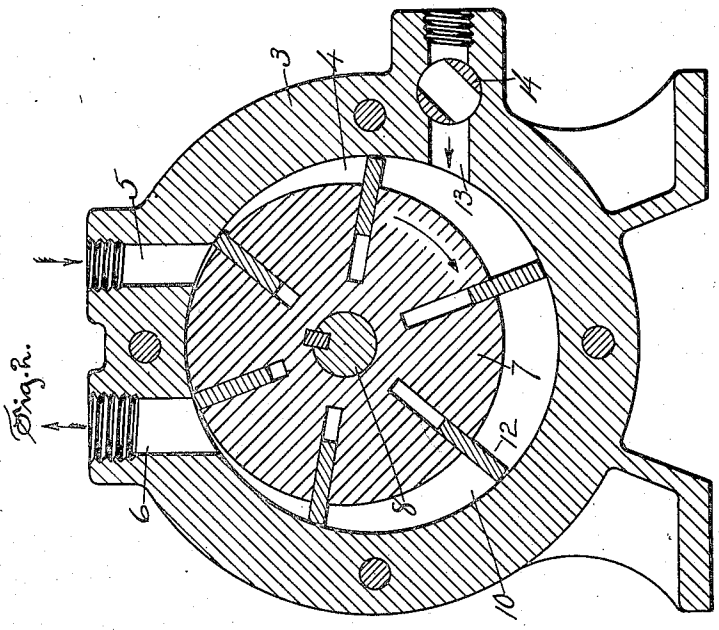

Fig. 2.

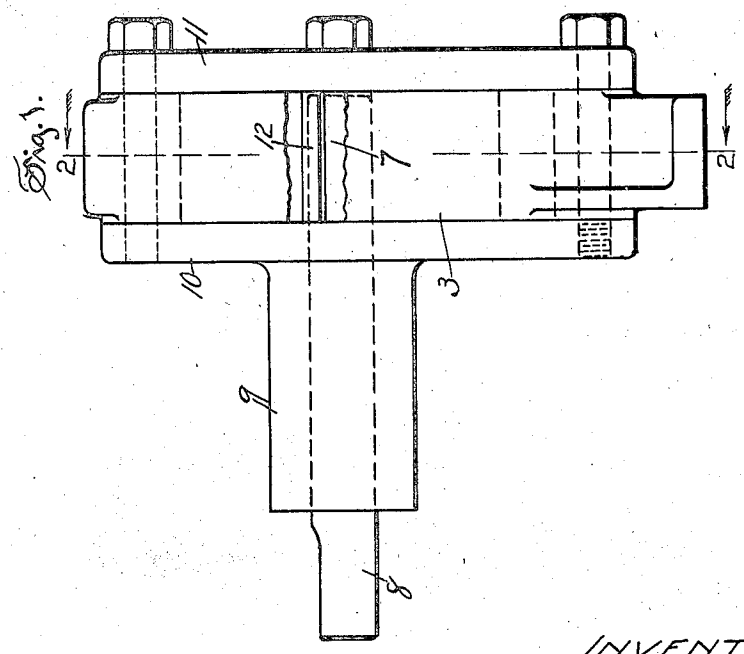

Fig. 1.

INVENTOR
Alfred J. Gilbert
by
Arthur B. Jenkins,
ATTORNEY

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UNITED STATES PATENT OFFICE

ALFRED J. GILBERT, OF WINDSOR, CONNECTICUT, ASSIGNOR TO THE SILENT GLOW OIL BURNER CORPORATION, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT

PUMP

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My invention relates to the class of devices employed more especially for effecting a flow of fluids, and an object of my invention, among others, is the production of a device of this class that shall be simple in construction and particularly efficient in operation, and particularly one in which a high vacuum may be produced without reduction of the discharge capacity.

One form of device embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained, is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of my improved pump with parts broken away to show construction.

Figure 2 is a view in section on a plane denoted by the dotted line 2—2 of Figure 1.

In the accompanying drawings the numeral 3 indicates the case or cylinder of my improved pump that is generally round in cross section and which has a piston chamber 4 therein with an inlet port 5 to said chamber and an outlet port 6 therefrom, these ports being arranged for the attachment of pipes for conducting fluid operated upon by said pump.

The chamber 4 is preferably round in cross section and a piston 7 also round is mounted upon a shaft 8 extending in and eccentric to the chamber 4 and having a bearing in a hub 9 preferably formed integral with a cap 10 secured in any suitable manner to the case 3 to close one side of the chamber 4 therein. A cap 11 is secured to the opposite side of the case to close the opposite side of said chamber.

Vanes 12 are slidably mounted in the piston 7 to project across the chamber 4, these vanes being moved outwardly by centrifugal force and inwardly by contact with the wall of said chamber. These vanes provide chambers constituting means for segregating fluid and conducting it in this condition from one part of the cylinder to another part thereof. The piston 7 passes close enough to the wall of the chamber 4 on one side to form a practical seal at this point and there may be any desired number of vanes 12. The inlet port 5 is preferably smaller than the outlet port 6 and said ports are located in proximity to the sealing point, as shown in Figure 2.

As hereinbefore stated this pump is capable of producing a high vacuum without reducing the discharge capacity. If the inlet be restricted sufficiently to produce a high vacuum this would lessen the amount of air passing through the pump. In order to offset this result a relief port 13 is extended into the chamber 4 from the outer atmosphere and this is located at a sufficient distance from the inlet 5 so that at least two vanes will be in contact with the inner wall of the cylinder between the ports 5 and 13. As the piston is rotated the space created between these two ports by the vanes in that region produces a high vacuum at the inlet port 5, if a suitable restriction is placed in that inlet, as by reducing its size or otherwise. A valve 14 is placed in the port 13 by means of which the amount of air entering through this port may be regulated to any desired amount, and in this way the amount of discharge of the pump through the outlet port 6 may be regulated to suit any condition desired.

The operation and advantages of a pump constructed in accordance with my invention will be seen from an explanation of a particular purpose for which the embodiment of my invention shown in the drawings was designed and to which it is put. That purpose is supplying oil and air for oil burners. The port, 5, is connected with an oil supply and the port, 13, as has been explained opens to the atmosphere and through it air is supplied. Thus, both oil and air are drawn into the pump and passing through the cylinder are thoroughly mixed so that the fuel mixture passes out of the outlet, 6. The desired high vacuum is produced to cause the flow of oil into the cylinder through the inlet port, 5, by the movement of the vanes between port 5, and port, 13, which vanes are so relatively spaced that at no time can there be direct communication between port, 5, and port, 13, and hence, air flowing through port, 13 into the cylinder cannot reduce or affect the high vacuum thus produced. There is a

reduction of intensity of the suction or vacuum only when the space between two adjacent vanes is in communication with the air inlet 13. The result is that while the pump produces the high vacuum for sucking oil into the cylinder that is accomplished without any reduction of the discharge capacity of the pump and the pump works to full capacity upon the mixed oil and air. That portion of the cylinder into which the air flows through port, 13, has greater capacity or volume than that through which the vanes pass in producing the high vacuum. It will be evident that the port, 13, supplies the air which adds to the volume of fluid passing through the pump that enables the pump to act to its full capacity notwithstanding the reduction of volume flowing through the port, 5, necessary to give the high vacuum.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim—

1. A pump comprising a case, a piston rotatably mounted in said case, vanes slidably mounted in said piston, a plurality of independent ports for flow of different fluids from different sources in the same direction with respect to the chamber in the case, such ports leading to portions of the chamber of small and large volume, respectively, and means for rotating said piston.

2. A pump comprising a case, a piston rotatably mounted in said case, vanes slidably mounted in said piston, a pair of independent ports for flow of different fluids from different sources in the same direction with respect to the chamber in the case, such ports leading to portions of the chamber of small and large volume, respectively, the distance between said pair of ports being sufficient to accommodate two of said vanes, and means for rotating said piston.

3. A pump comprising a case having a chamber with parts of small and large volume, a piston rotatably mounted in said case, vanes slidably mounted in said piston, a pair of independent inlet ports for supply of different fluids from different sources to the chamber within the case and the inlet ports leading respectively to the parts of small and large volume of the case, an outlet port from said chamber, said vanes being located so that the space between the inlet ports will accommodate at least two of said vanes, and means for rotating said piston.

4. A pump comprising a case having a chamber with parts of small and large volume having a pair of inlet ports for supply of different fluids from different sources and an outlet port, the inlet ports being each smaller than the outlet port, a piston rotatably mounted in the case and the inlet ports leading respectively to the parts of small and large volume of the case, vanes slidably mounted in said piston and located such a distance apart that at least two will be located between said inlet ports, and means for rotating said piston.

5. A pump comprising a case, a piston located in said case, vanes slidably mounted in said piston, a plurality of independent ports for flow of different fluids from different sources in the same direction with respect to the chamber in the case, such ports leading to portions of the chamber of small and large volume, respectively, a valve located in one of said ports, and means for rotating said piston.

6. A pump having rotary fluid impelling means, a chamber in which such means rotate, a plurality of spaced apart fluid inlets leading into such chamber at different points in the travel of the impelling means therein, and a single outlet from said chamber the chamber having a portion of less volume between the inlet ports than beyond them, the impelling means comprising pistons that reach to the interior wall of the chamber and which are spaced apart a less distance than the distance between the inlet ports.

7. A pump comprising a case, a piston rotatably mounted in the case to create a chamber of varying capacity in different parts thereof, said case having inlet ports opening to different parts of said chamber, vanes mounted in the piston and movable radially thereof, the distance between the vanes being less than the interval between said ports, and means for rotating said piston.

8. A pump comprising a case having a chamber round in one plane, a piston round in cross section but smaller in diameter than the diameter of said chamber, said piston being mounted to touch one side of the chamber, said chamber having inlet ports opening thereinto at different points, vanes mounted in said piston and movable radially thereof, the distance between the vanes being less than the interval between said inlet ports, thereby creating a chamber movable from one port to the other with constantly increasing capacity, and means for rotating the piston.

ALFRED J. GILBERT.