June 21, 1927.

1,633,270

O. A. OLSEN

COMPRESSION PUMP

Filed Aug. 28, 1925

Fig. 1

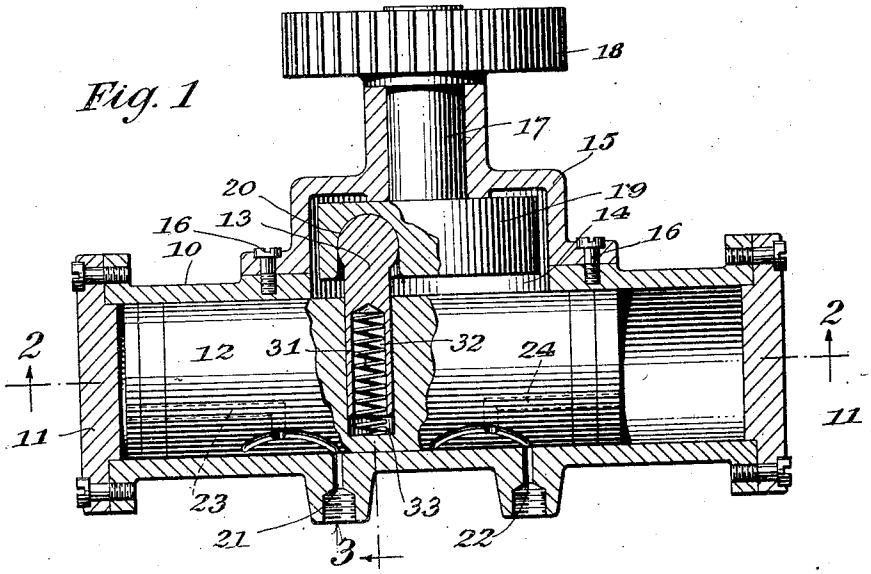


Fig. 2

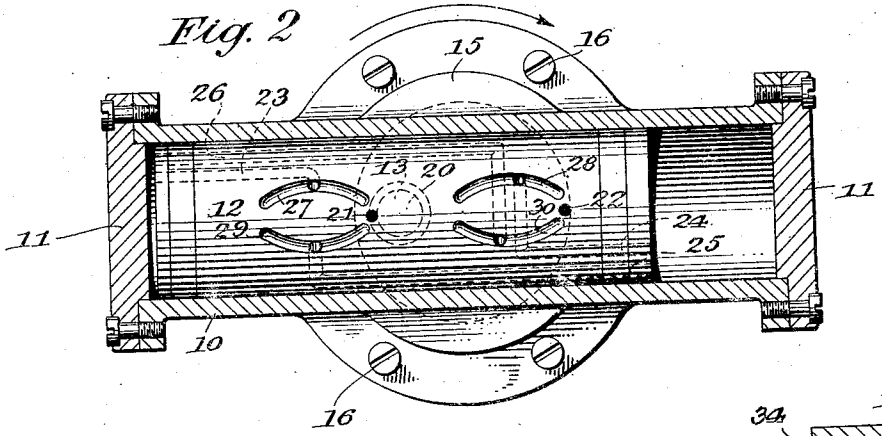


Fig. 3

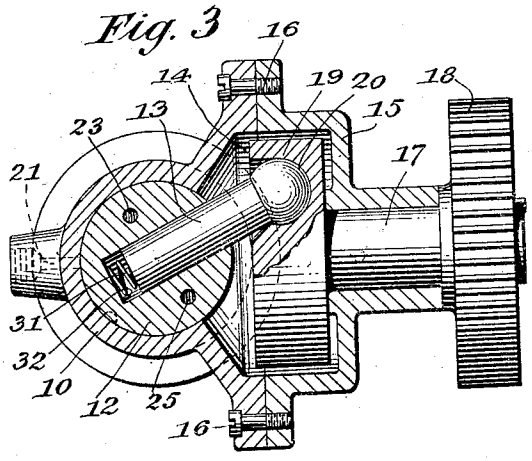
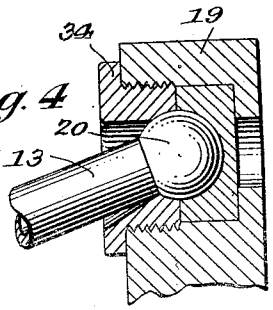


Fig. 4



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UNITED STATES PATENT OFFICE.

OSWALD A. OLSEN, OF BRIDGEPORT, CONNECTICUT.

COMPRESSION PUMP.

Application filed August 28, 1925. Serial No. 53,080.

This invention relates to a compression pump for pumping fluids, and an object of the invention is to provide a double acting compression pump wherein there is a ported piston providing the valve means rendering the structure operative.

A further object is to provide in the pump, a ported pump piston adapted to alternately afford communication between each end of the pump cylinder and an induction and an eduction port.

A further object is to provide in the pump, a ported pump piston adapted to have movements of reciprocation and oscillation in the pump cylinder, and means for imparting said movements to said piston, the whole arranged to afford communication at each limit of the pumping stroke between an end of the pump cylinder and an induction port and the opposite end of the pump cylinder and an eduction port, whereby upon each full stroke of said piston, a charge of fluid is removed from an end of the pump cylinder and forced into an eduction port, while a charge is drawn from an induction port to the opposite end of said cylinder.

With the above objects in view, as well as others which will appear as the specification proceeds, the invention comprises the construction, arrangement and combination of parts as now to be fully described and as hereinafter to be specifically claimed, it being understood that the disclosure herein is merely illustrative and means in no way in a limiting sense, changes in details of construction and arrangement of parts being permissible so long as within the spirit of the invention and the scope of the appended claims.

In the accompanying drawing forming a part of this specification,

Fig. 1 is a longitudinal sectional view of the improved compression pump, disclosing the left end of the cylinder exhausted and the right end thereof filled;

Fig. 2 is a sectional view on line 2—2 in Fig. 1;

Fig. 3 is a sectional view on line 3 in Fig. 1; and

Fig. 4 is an enlarged detail of a slight modification.

With respect to the drawing and the numerals of reference indicated thereon, 10 indicates a compression cylinder having heads 11, 11, and containing a piston 12 adapted to reciprocate and oscillate therein.

The mechanism for imparting both of its movements to the piston is best shown in Figs. 2 and 3, and consists of a wrist pin 13 fixed to the piston preferably at its midlength and projecting radially through an opening 14 in the side of the cylinder. This opening is covered by a casing 15 secured to the cylinder at 16, and in the casing is a shaft 17 having at one end a gear 18 and at its other end a crank plate 19 with which the wrist pin is connected, as by the ball and socket joint 20. Clearly, rotation of the gear 18 causes the crank plate 19 to rotate, and, through the instrumentality of the wrist pin, the piston is given movements of reciprocation and oscillation in the compression cylinder 10.

The compression cylinder has an induction port 21, and an eduction port 22. The piston 12 has, at its left hand end, an induction port 23 communicating with the left hand end of the pump cylinder and adapted to communicate with the induction port 21 of the cylinder, and has, at its right hand end, an eduction port 24 communicating with the right hand end of the pump cylinder and adapted to communicate with the eduction port 22 of said cylinder. Also, the piston has, at its right hand end, an induction port 25 communicating with the right hand end of the pump cylinder and adapted to communicate with the induction port 21 of said cylinder, and has, at its left hand end, an eduction port 26 communicating with the left hand end of the pump cylinder and adapted to communicate with the eduction port 22 of said cylinder.

As will be more clear from Figs. 1 and 2, the ports 23, 24, 25 and 26 terminate in grooves, denoted 27, 28, 29 and 30, respectively, in the surface of the pump piston, and these grooves bear to each other the relation very clearly disclosed in Fig. 2. That is to say, assuming that the parts of the compressor are as disclosed in Figs. 1 and 2, and the gear 18 is rotated, in the direction of the arrow in Fig. 2, to give the piston a full stroke toward the right, at the commencement of said stroke, the induction port 21 of the cylinder comes into communication with the induction port 23 of the piston, while the eduction port 22 of said cylinder comes into communication with the eduction port 24 of said piston, and the relation of the ports as described remains throughout the full stroke of the piston, as will be understood. As a consequence, the fluid at

the right hand end of the compression cylinder is forced out through the port 22, via the port 24 and the groove 28, while fluid is drawn into the left hand end of the compression cylinder via the induction port 21, the groove 27, and the induction port 23. Now, upon the reverse movement of said piston, the induction port 21 of the cylinder immediately comes into communication with the induction port 25 of the piston, while the eduction port 22 of said cylinder comes into communication with the eduction port 26 of said piston, and this relation of the ports as described remains throughout the full stroke of the piston. As a consequence, the fluid at the left hand end of the compression cylinder is forced out through said eduction port 22, via the port 26, the groove 30, while fluid is drawn into the right hand end of the compression cylinder via the induction port 21, the groove 29 and the port 25. Clearly, for approximately the full stroke of the piston in either direction the fluid is both being forced from the compression cylinder through the eduction port, and drawn into said compression cylinder through the induction port. That is to say, with the present arrangement, the piston is working at full capacity during approximately its full stroke.

It will be evident that the pump could be actuated in ways different from that shown. For instance, the gear 18 could be a handle for manually operating the piston, or the shaft 18 could be attached directly to a motor.

The wrist pin may be associated with the piston 12 in any suitable or convenient manner. In the drawing I have disclosed a spring 31 situated in an opening 32 in the wrist pin and engaging the piston as at 33 in such manner as to provide yielding pressure upon the wrist pin tending to nicely hold the ball of said pin to the socket of the crank plate, as will be clear. In Fig. 4 I have shown a nut 34 threaded into the crank plate and arranged about the ball of the wrist pin to better insure its position.

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

1. A compression pump comprising a cylinder having an induction port and an eduction port, a piston in said cylinder, and means for reciprocating and oscillating the piston in said cylinder, the piston having an induction port communicating with one end of the cylinder and adapted to communicate with the induction port of the cylinder, and also having an eduction port communicating with the opposite end of the cylinder and adapted to communicate with the eduction port of the cylinder during the whole period while the induction ports of the cylinder and piston before mentioned are in communication.

2. A compression pump comprising a cylinder having an induction port and an eduction port, a piston in said cylinder, and means for reciprocating and oscillating the piston in said cylinder, the piston having an induction port communicating with one end of the cylinder and adapted to communicate with the induction port of the cylinder, and also having an induction port communicating with the opposite end of the cylinder and adapted to communicate with the induction port of the cylinder, an eduction port communicating with one end of the cylinder and adapted to communicate with the eduction port of the cylinder, and an eduction port communicating with the opposite end of the cylinder and adapted to communicate with the eduction port of the cylinder, the whole arranged so that during the whole stroke of the piston an induction port thereof is in communication with one end of the cylinder as well as with the induction port of the cylinder while an eduction port is in communication with the opposite end of the cylinder as well as with the eduction port of the cylinder.

3. The combination as specified in claim 2, wherein each induction and eduction port of the piston terminates in a groove in the surface of the piston, a groove of an induction port of said piston affording communication between induction ports of said piston and cylinder and a groove of an eduction port of said piston affording communication between eduction ports of said piston and cylinder during approximately the whole of each stroke of said piston.

4. A compression pump comprising a cylinder having an induction port and an eduction port, a piston in the cylinder, and means for reciprocating and oscillating the piston in said cylinder, the piston having an induction port communicating with one end of the cylinder and adapted to communicate with the induction port of the cylinder, an induction port communicating with the opposite end of the cylinder and adapted to communicate with the induction port of the cylinder, an eduction port communicating with one end of the cylinder and adapted to communicate with the eduction port of the cylinder during the whole period while an induction port of the piston is in communication with the induction port of the cylinder, and an eduction port communicating with the opposite end of the cylinder and adapted to communicate with the eduction port of the cylinder during the whole period while a different induction port of the piston is in communication with the induction port of the cylinder, said piston ports and cylinder ports being arranged relatively to each other so that during practically the entire stroke of the piston an in-

duction port thereof is in communication with an end of the cylinder as well as with the induction port of the cylinder while an eduction port is in communication with the opposite end of the cylinder as well as with the eduction port of the cylinder.

5. The combination as specified in claim 4, wherein each port of the piston terminates in a curved groove in the surface of the piston, a groove of an eduction port of said piston affording communication between induction ports of said piston and cylinder and a groove of an eduction port of said piston affording communication between eduction ports of said piston and cylinder during approximately the whole of each of both the to and fro strokes of said piston.

Signed at Bridgeport, in the county of Fairfield, and State of Connecticut, this 26th day of August, A. D., 1925.

OSWALD A. OLSEN.