R. STUEHCK.

PUMP.

APPLICATION FILED JUNE 27, 1910.

995,042. Patented June 13, 1911.

Fig. 1.

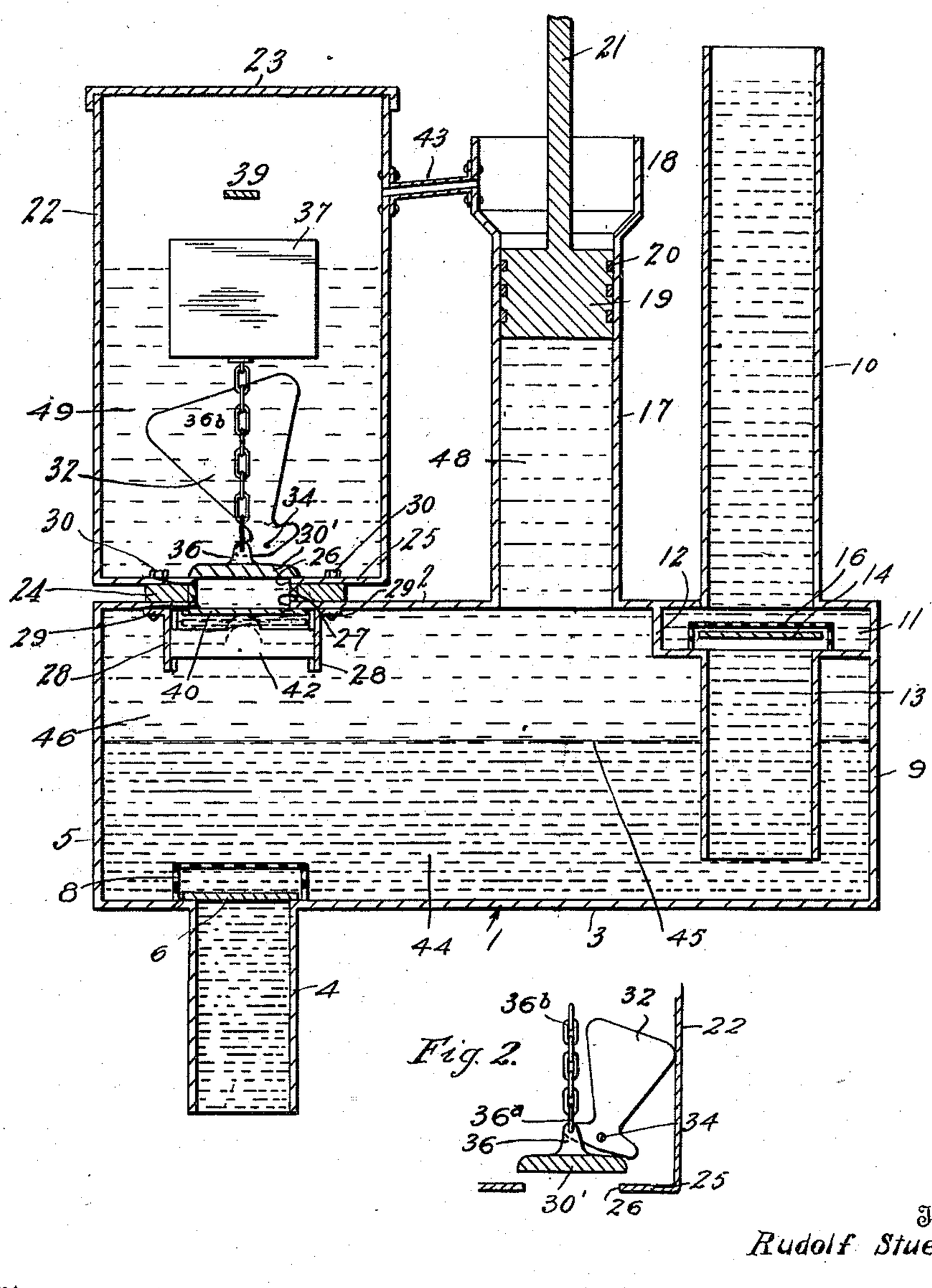

Fig. 2.

Witnesses

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PUMP.

995,042. Specification of Letters Patent. Patented June 13, 1911.

Application filed June 27, 1910. Serial No. 569,158.

To all whom it may concern:

Be it known that I, RUDOLF STUEHCK, a citizen of the United States, residing at Roosevelt, in the county of Klickitat and State of Washington, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to pumps, and particularly to a pump so constructed that the piston thereof operates continuously in a lubricant.

An important object of this invention, is to provide a high pressure pump, which may be operated by the minimum amount of power, which is obtained by so constructing the pump that the friction between the piston head and pump cylinder is greatly reduced.

A further object of this invention is to provide a pump of the above character, embodying a compression chamber partially filled with a lubricant, and automatic means for retaining a constant amount of the lubricant within such chamber.

The final object of this invention, is to provide a high pressure pump, which will be simple in construction, efficient in its operation and cheap to manufacture.

My invention consists generally in the arrangement and combination of parts to be described.

In the accompanying drawings, forming a part of this specification, and in which like numerals are used to designate like parts of the same, Figure 1 is a central vertical cross sectional view through the pump, and Fig. 2 is a side view of the trip-weight and associated valve, said valve being shown in its open position.

In the drawings, wherein is illustrated a preferred embodiment of my invention, the numeral 1 designates a casing, which is preferably constructed square in cross-section and formed of sheet metal. The casing 1 forms a compression chamber, as will be apparent hereinafter. This casing has its upper and lower ends covered by walls 2 and 3 respectively, the latter being provided with an intake pipe 4. This intake pipe is arranged near a side wall 5 of the casing 1. The intake pipe 4 is controlled by a puppet valve 6. This valve is adapted to close the discharge mouth of the intake pipe 4, when the pressure increases within the compression chamber. The puppet valve 6, is arranged within a housing 8, which may preferably be formed of perforated sheet metal, and said puppet valve is guided in its movement by the housing. The top end wall 2 is provided near wall 9, with a vertically disposed discharge pipe 10, which communicates with a small chamber 11, formed by a section of material 12. The chamber 11 is provided with a vertically disposed pipe 13, which in effect is a continuation of the discharge pipe 10. The pipe 13 is controlled by a puppet valve 14, as shown. This valve 14 is arranged within and guided in its travel by a housing 16, preferably formed of perforated sheet metal and suitably secured to the section of material 12. It is to be understood that the chamber 11 has no communication with the interior of the casing 1, except by means of the pipe 13.

The upper wall 2 is provided near its center with a vertically disposed pump cylinder 17, provided at its upper end with a flaring open mouth 18. Within this pump cylinder is mounted to reciprocate, a piston 19 which is cylindrical and provided upon its periphery with annular grooves for the reception of suitable packing strips 20. The piston head 19 is provided with a piston rod 21, which is secured thereto in any desired manner. It is to be understood that the piston rod 21 and its head 19 are to be reciprocated or driven by any desired form of motor.

Disposed above the wall 2, is an oil tank 22, having its upper end covered by means of a lid 23. This oil tank is arranged upon a ring 24, which in turn is disposed upon the wall 2. The tank 22 is provided upon its bottom wall 25 with an opening 26, which is in registration with the opening of the ring 24. The wall 2 is provided with an opening 27 in registration with the opening of the ring 24 and the opening 26. The wall 2 is further provided with a pair of depending brackets 28 arranged in opposition to each other and having their upper ends provided with flanges 29, which are secured to said wall 2 by means of bolts 30, said bolts passing through the ring 24 and the wall 25 of the oil tank 22, whereby said oil tank is securely connected with said wall 2. The opening 26 formed through the wall 25 is controlled by means of a puppet valve 30′, as shown. The valve 30′ is normally held upon its seat to close the opening 26, by virtue of its own weight and a trip-

weight 32. The trip-weight 32 has the shape, as shown, and is pivotally mounted upon a transverse fixed rod 34, which is disposed above said valve 30′. The trip-weight 32 is pivotally connected with an extension 36 of the valve 30′, by means of a link 36ª of a chain 36ᵇ.

Within the oil tank 22, is arranged a float 37, which is connected with the chain 36ᵇ, as shown. This float is limited in its upward movement by a transversely disposed fixed bar 39. A puppet valve 40 is arranged to control the opening 27, as shown, and this valve 40 opens downwardly in an opposite direction to the opening movement of the valve 30′. The valve 40 engages a float 42, which is disposed to operate between the brackets 28 serving as a guide for said float. Said brackets also serve as guides for the valve 40. It is to be understood that the float 37 is to possess sufficient buoyancy to raise the valve 30′ and oscillate the trip-weight 32, so that its center of gravity may be moved to the right of the rod 34, whereby said trip-weight will oscillate to the right until it engages the side of the tank 22, as clearly illustrated in Fig. 2. The float 42 does not interfere with the passage of the fluid from the tank 22 to within the casing 1. The flaring mouth 18 and the upper end of the tank 22 have communication with each other by means of a pipe 43.

In the operation of my pump it may be assumed that the casing 1 is a little more than half filled with water, as indicated by the numeral 44. The level of the water is indicated by the numeral 45. The remainder of the casing is filled with oil, as indicated by the numeral 46. The oil 46 is also to extend upwardly within the pump cylinder 17, as designated by numeral 48. The oil tank 22 is to be partially filled with oil 49, which is employed to keep the amount of oil in the casing 1 constant. The piston head 19 is now in its uppermost position and the casing 1 has received a fresh supply of water, in a manner to be described. When the piston head 19 is forced downwardly, the oil 48 in the cylinder 17 is forced into the casing 1 and the water within said casing is compressed and urged upwardly through the pipe 13 to raise valve 14. This water now passes the valve 14 and is discharged through the pipe 10. When the piston head 19 is moved upwardly within the cylinder 17, the oil 48 is drawn up after the same and a partial vacuum accordingly created within the casing 1. This partial vacuum causes the valve 14 to move downwardly upon its seat and causes the valve 6 to be moved upwardly, whereby a fresh supply of water is introduced within the casing 1. Ordinarily the valve 40 keeps the opening 27 closed during the downward movement of the piston head 19, while the valve 30′ closes said opening during the upstroke of said piston head. After constant reciprocation of the piston head 19, oil will pass by the same and be collected within the mouth 18 of the casing 17. After a sufficient amount of oil is collected within the mouth 18, the same will pass through the pipe 43 into the oil tank 22. When sufficient oil has entered the tank 22 through pipe 43, to cause the float 37 to rise and elevate the valve 30′ and oscillate the trip-weight 32, the oil in the oil tank 22 may then enter the casing 1. If however, the valve 30′ is acted upon by the float 37, during the upward movement of the piston head 19, the partial vacuum within said casing 1 will prevent the valve 30′ from being unseated. The valve 30′ will then remain seated until the downward movement of the piston head 19, when said valve together with the trip-weight will be moved, whereby the same will assume the position illustrated in Fig. 2. The valve 30′ having been unseated during the downward movement of the piston head 19, the valve 40 will then be seated to prevent oil from passing from the casing 1 into the tank 22. Upon the next upward stroke of the piston head 19, the valve 40 will be lowered and oil will flow from tank 22 to the casing 1. At every down stroke of the piston head 19, the valve 40 will be returned to its seat. After the oil in the tank 22 has thus been withdrawn sufficiently to reduce the buoyancy of the float 37, so that the weight of the valve 30′ will not only move the float 37 downwardly, but also turn the trip-weight, the valve 30′ will be seated, and the trip weight returned to its position as shown in Fig. 1. The function of the trip-weight 32 is to govern the action of the valve 30′.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred embodiment of the same, and that certain changes may be made in the shape, size and arrangement of parts, without departing from the spirit of my invention as set forth in the annexed claims.

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

1. In a pump of the character described, a casing forming a compression chamber, provided with inlet and discharge ports, valves for controlling such ports, a pump cylinder communicating with said compression chamber, a piston disposed within said pump cylinder, said compression chamber being filled with oil and water so that the oil may extend within the pump cylinder to lubricate the piston, an oil tank, means of communication between the same and the pump cylinder, means of communication between said oil tank and compression cham-

ber, a valve for controlling the last named means of communication, and a float for controlling said valve.

2. In a pump of the character described, a casing forming a compression chamber, provided with inlet and discharge ports, valves for controlling such ports, pumping means for coöperation with said compression chamber, an oil tank having means of communication with said pumping means and compression chamber, oppositely opening valves for controlling the communication between said tank and compression chamber, and a float for actuating one of said last named valves.

3. In a pump of the character described, a relatively large casing forming a compression chamber, said casing being normally completely filled with oil and water, inlet and discharge pipes communicating respectively with the lower and upper portions of said casing, the discharge pipe extending within said casing and terminating adjacent the lower portion thereof, a pump cylinder disposed upon the top of said casing and having free communication with the interior of the same, a piston to operate within said pump cylinder, an oil tank disposed upon the top of said casing and having communication with the interior of the same, valves to control the passage of oil from the tank into said casing, and a conduit connecting corresponding ends of the pump cylinder and tank.

4. In a pump of the character described, a relatively large casing forming a compression chamber, being normally completely filled with oil and water, inlet and discharge pipes connected respectively with the lower and upper portions of said casing, the discharge pipe extending substantially vertically within said casing and terminating adjacent the bottom of said casing so as to be always below the level of the oil, a pump cylinder connected with the top of said casing and having a flaring upper end, a piston to operate within said pump cylinder, an oil tank mounted upon said casing and having communication with the interior of the same, a plurality of valves to control such communication, a float and trip-weight connected with one of said valves, and a conduit connecting the flaring upper end of the pump cylinder and the upper portion of said oil tank.

In testimony whereof I affix my signature in presence of two witnesses.

RUDOLF STUEHCK.

Witnesses:
H. M. Cox,
Ray S. Lamoreaux.