

A. R. SHIPPEY.
DOUBLE ACTING FORCE PUMP.
APPLICATION FILED MAR. 17, 1914.

1,134,918.

Patented Apr. 6, 1915.
3 SHEETS—SHEET 1.

Fig. 1.

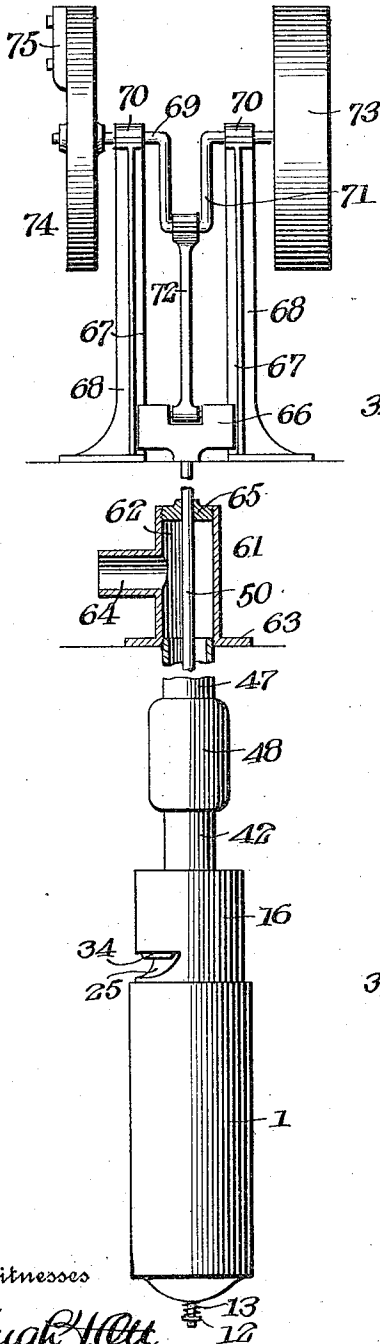


Fig. 4.

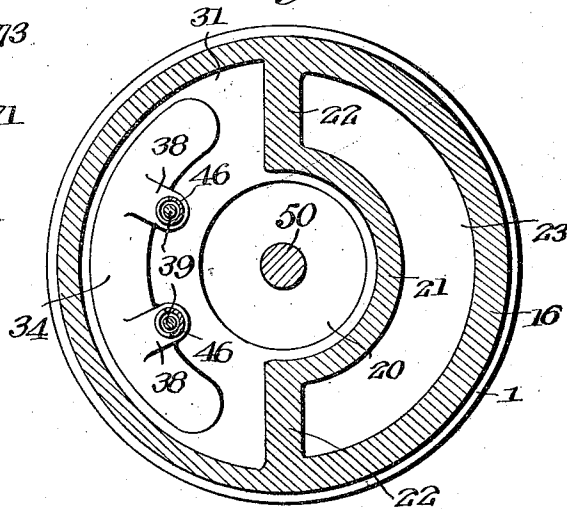
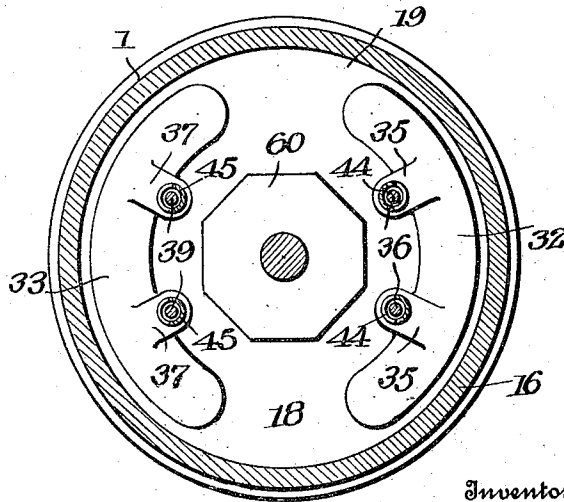


Fig. 5.



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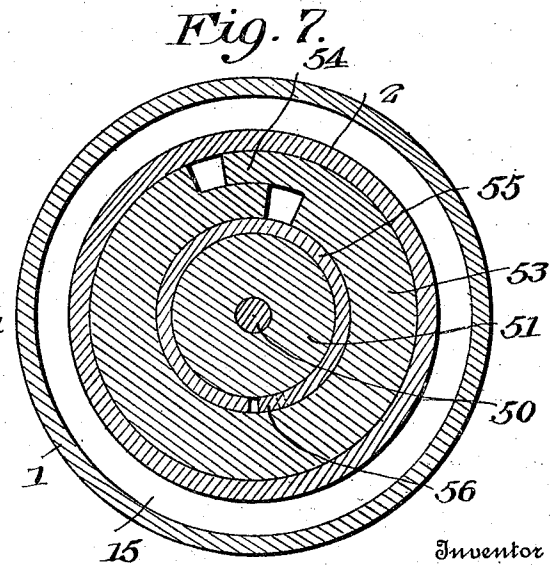
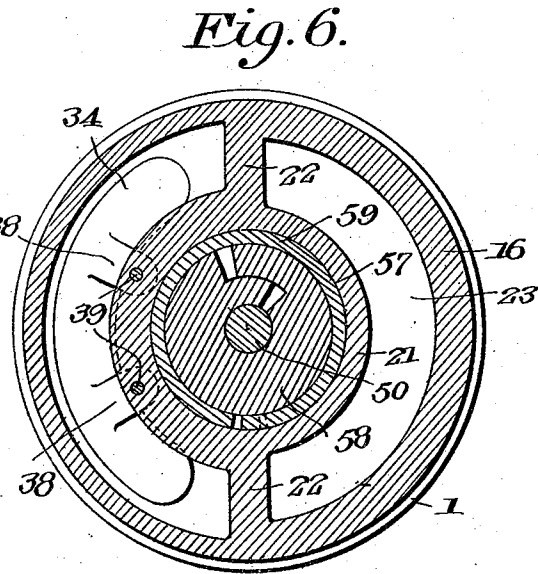
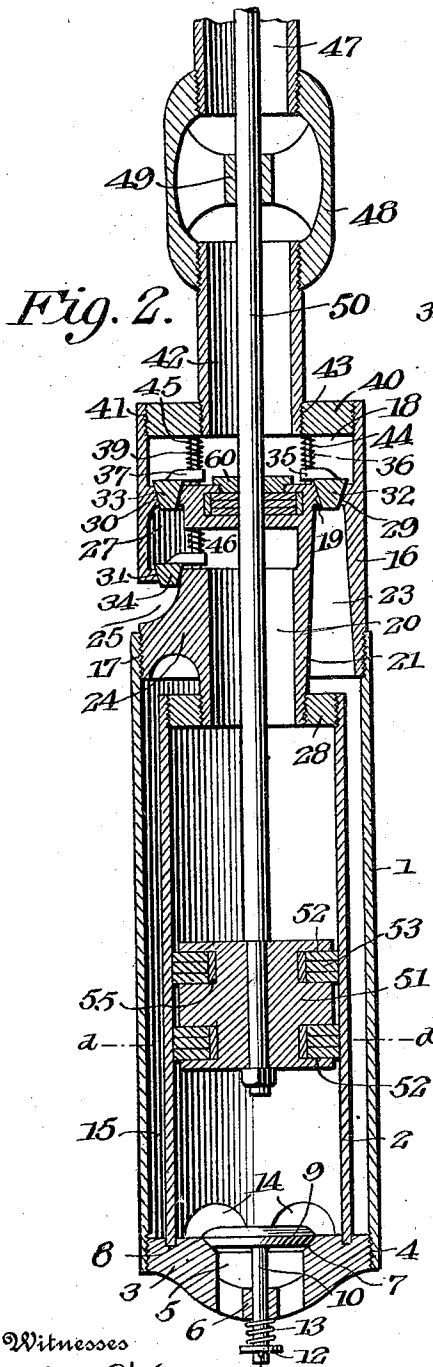
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3 SHEETS-SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 3.

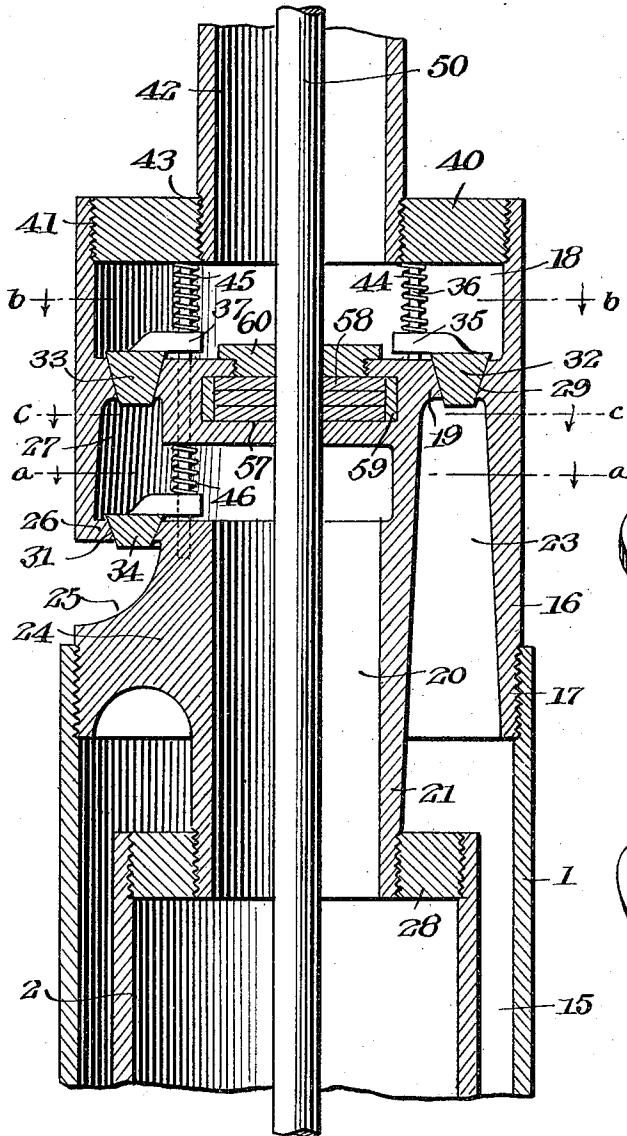


Fig. 8.

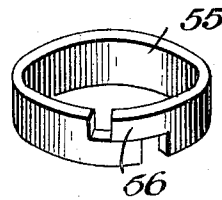


Fig. 9.

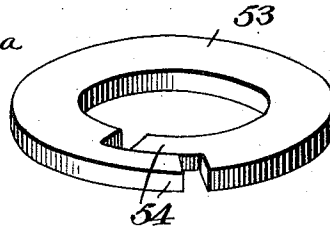
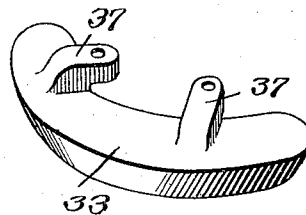


Fig. 10.



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UNITED STATES PATENT OFFICE.

ALBERT R. SHIPPEY, OF LOS ANGELES, CALIFORNIA.

DOUBLE-ACTING FORCE-PUMP.

1,134,918.

Specification of Letters Patent.

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Application filed March 17, 1914. Serial No. 825,329.

To all whom it may concern:

Be it known that I, ALBERT R. SHIPPEY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Double-Acting Force-Pumps, of which the following is a specification.

This invention relates to improvements in pumps and especially with reference to improvements in double acting force pumps in which water is taken into the pump cylinder and forced upwardly therefrom both by each up stroke and by each down stroke of the pump plunger or piston, the object of the invention being to provide an improved pump of this character which is cheap and simple, is strong and durable, the parts of which may be readily assembled and disassembled and may be readily kept in repair.

The invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is a side elevation of the upper portion of a pump constructed in accordance with my invention, the pump head being shown in section. Fig. 2 is a vertical sectional view of the operating parts of my improved pump. Fig. 3 is a detail sectional view, on a larger scale of the pump head and associated parts. Fig. 4 is a detail transverse sectional view of the same on the plane indicated by the line *a—b* of Fig. 3. Fig. 5 is a similar view on the plane indicated by the line *b—b* of Fig. 3. Fig. 6 is a similar view on the plane indicated by the line *c—c* of Fig. 3. Fig. 7 is a similar view on the plane indicated by the line *d—d* of Fig. 2.

In the embodiment of my invention I provide an outer cylinder 1 and an inner cylinder 2 the latter being shorter than the former and being arranged concentrically therein and spaced therefrom. The bottom 3 of the outer cylinder is threaded in the lower end thereof as at 4 and is provided with a central intake opening 5 which has a spider shaped guide 6 in its lower portion and at the upper end of which and around the same is formed a downwardly tapered valve seat 7. The lower end of the inner cylinder 2 is fitted in an annular groove 8 in the upper side of the bottom 3. A lower inlet valve 9 is downwardly tapered and is adapted to close downwardly on the seat 7 and to open upwardly therefrom and this

valve has a central depending stem 10 which operates in and projects below the guide 7. A stop pin 11 passes through an opening in the lower portion of the valve stem 10. A washer 12 bears on said stop pin. A coiled spring 13 is placed on the lower portion of said valve stem, its upper end bearing against the guide 6 and its lower end bearing on the said washer. The inner cylinder 2 has its lower end provided with openings 14 to establish communication between the interior of said inner cylinder and the space 15 between the inner and outer cylinders.

A cylindrical head 16 is threaded at its lower end in the upper end of the outer cylinder 1 as at 17. This head has a cylindrical chamber 18 in its upper end the bottom of which is formed by a diaphragm 19. A cylindrical opening 20 is in the center of the head, extending downwardly from the said diaphragm, the annular wall 21 of the said opening being connected by vertical outstanding webs 22 with the outer wall of the head and thereby forming a semi-annular duct 23 in one side of said head. A wall 24 of the head on the side opposite said semi-annular duct is thickened, is formed in its outer side with an intake recess 25 thereby providing a horizontal web or wall 26 forming the upper side of said recess and above said horizontal web or wall is a chamber 27 which communicates with one side of the opening 20 at the upper end of said opening. The lower end of the annular wall 21 is threaded in a reducer 28, the said reducer being threaded in the upper end of the inner cylinder 2 and hence forming the head of said inner cylinder. The diaphragm 19 has a substantially semi-annular valve opening and seat 29 the walls of which converge downwardly, this valve seat and opening being at the upper end of the duct 23. In the opposite side of the diaphragm is a similar valve seat and opening 30 immediately above the chamber 27. The horizontal wall 26 which forms the bottom of the chamber 27 is provided with a similar valve seat and opening 31. Upwardly opening valves 32—33—34 are respectively provided for the openings 29—30—31 and their sides converge downwardly so that said valve is adapted to fit snugly in said openings. The valve 32 has lugs 35 on its inner side which overhang the diaphragm 19 and are provided with openings through which extend vertical guide pins 36 the lower ends

of which are fitted in openings in the diaphragm, said pins extending upwardly in the chamber 18. The valves 33—34 are respectively provided on their inner sides with lugs 37—38 having openings through which extend vertically arranged guide pins 39 said guide pins being common to said valves 33—34, extending through openings in the diaphragm and having their lower ends fitted in openings in the upper end of the wall 24. A reducer 40 is threaded in the upper end of the head 16 as at 41 and forms the top of the chamber 18, the lower section 42 of the delivery pipe being threaded in the said reducer as at 43. Coiled springs 44 on the guide pins 36 bear downwardly on the valve 32 to assist in closing the latter and similar springs 45—46 on the guide pins 39 respectively bear downwardly on the valves 33—34.

The upper section 47 of the delivery pipe is connected to the lower section 42 by a coupling 48 in the ends of which said delivery pipe sections are threaded and the said coupling has a spider shaped centrally arranged guide 49 for the rod 50 of the plunger or piston 51 which operates in the inner cylinder 2. The piston is provided with annular grooves 52 in which are radially expansible leather washers 53 each of which is open on one side and has overlapping segmental members 54 at said opening and within said leather washers are metallic expansion rings 55 each of which is open on one side and has overlapping members 56. The said expansion rings coact with the washers to take up the wear of the latter and hence the piston is effectively packed in the inner cylinder and leakage around the piston is prevented. The diaphragm 19 is formed with an annular box 57 in which are leather packing rings 58 which are pressed around the rod 50 by a metallic compression ring 59 which is also placed in said box. A cap 60 is threaded in an opening in the upper side of the box 57 and keeps the packing washers in place and permits their removal and repair when necessary. A pump head 61 is attached to the upper end of the delivery pipe and comprises a vertical cylindrical body 62 having a base 63 and provided on one side with a spout 64 to which a hose or the like may be connected if desired.

The upper portion of the plunger rod 50 passes through a guide opening in the center of the top 65 of the head and to the upper end of the said rod is attached a cross head 66 which engages vertical guides 67 on the opposing sides of a pair of standards 68. A shaft 69 is mounted in bearings 70 on the upper ends of the standards 68 and is provided at a point between the said standards with a crank 71. A pitman 72 is connected to the crank and to the cross head. On one

end of the shaft is a driving pulley 73 and on the other end thereof is a fly wheel 74 which has a weight 75 on the side opposite the crank, this weight serving to counter-balance the pump piston or plunger and its connections and thereby reducing the power required to operate the pump and also causing the pump plunger or piston to deliver its strokes regularly and evenly.

The operations of my improved pump are as follows:—On each up stroke of the piston the valve 9 is opened and water is drawn into the lower end of the inner cylinder 2. The water in the said inner cylinder above the piston 51 is also by the up stroke of the piston forced upwardly through the opening 20 and the chamber 27, causing the valve 33 to be raised and the water passes through the opening 30 and up into the delivery pipe. On each down stroke of the piston the valve 33 closes and the valve 34 is caused to open so that water enters through the opening 31 and passes into the chamber 27 and therefrom through the opening 20 into the upper portion of the inner cylinder. The down stroke of the piston also causes the valve 9 to close and the valve 32 to open so that the water in the lower end of the inner cylinder is forced through the opening 14 into the outer cylinder and upwardly through the outer cylinder and the opening 29 into the chamber 18 of the head 16 and into and up through the delivery pipe.

Having thus described my invention, I claim:—

1. A double acting pump comprising inner and outer cylinders the former having an upwardly opening valve in the bottom and said inner cylinder having openings in its wall, a piston arranged to reciprocate in the inner cylinder, a head at the upper end of the outer cylinder, the said head being provided with a diaphragm forming a valve chamber in the upper end of the head the said head being further provided with a central opening leading to the inner cylinder, a valve chamber in said head communicating with said opening, and said head also having a duct communicating with the outer cylinder and with one side of the diaphragm and out of direct communication with said opening, a pair of upwardly opening valves in the first-named valve chamber and coacting with openings and valve seats with which said diaphragm is provided and an upwardly opening valve in the second named valve chamber and arranged to open and close the water inlet opening with which the wall of said valve chamber is provided.

2. A double acting pump comprising inner and outer cylinders the former having an upwardly opening valve in the bottom and said inner cylinder having openings in its wall, a piston arranged to reciprocate in the

inner cylinder, a head at the upper end of the outer cylinder, the said head being provided with a diaphragm forming a valve chamber in the upper end of the head the
5 said head being further provided with a central opening leading to the inner cylinder, said head also having a valve chamber communicating with said opening, and said head also having a duct communicating with
10 the outer cylinder and with one side of the diaphragm and out of direct communication with said opening, a pair of upwardly opening valves in the first-named valve chamber and coacting with the openings and valve
15 seats with which said diaphragm is provided and an upwardly opening valve in the second named valve chamber and arranged to open and close the water inlet opening with which the wall of said valve chamber is provided,
20 the said head being further provided with an annular wall forming said opening and the said inner cylinder having a head for a reducer in its inner end in which said annular wall is threaded.

25 3. A double acting pump comprising inner and outer cylinders the former having an upwardly opening valve in the bottom and said inner cylinder having openings in its wall, a piston arranged to reciprocate in the
30 inner cylinder, a head at the upper end of the outer cylinder, the said head being provided with a diaphragm forming a valve

chamber in the upper end of the head, the said head being further provided with a central opening leading to the inner cylinder, a valve chamber communicating with
35 said opening and said head also having a duct communicating with the outer cylinder and with one side of the diaphragm and out of direct communication with said opening, a pair of upwardly opening valves in the first-named valve chamber
40 and coacting with the openings and valve seats with which said diaphragm is provided and an upwardly opening valve in the second named valve chamber and arranged to open and close the water inlet opening with which the wall of said valve chamber
45 is provided, the said head being further provided with an annular wall forming said opening and the said inner cylinder having a head for a reducer in its inner end in which said annular wall is threaded, a reducer threaded in the upper end of the head
50 and forming the top of the first named valve chamber and a delivery pipe threaded in said reducer.

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

ALBERT R. SHIPPEY.

Witnesses:

F. W. LYON,
C. E. HATTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."