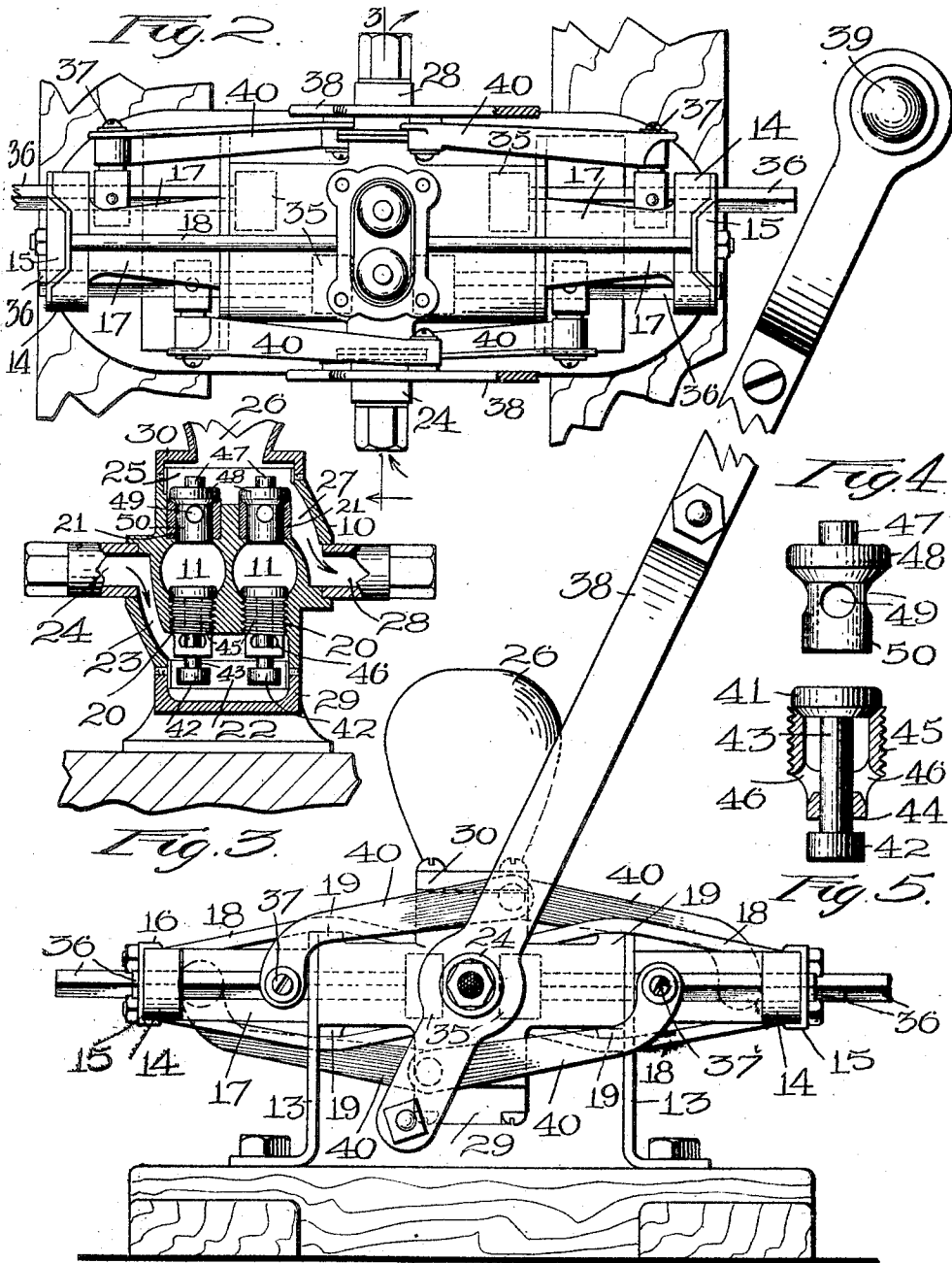


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PUMP.

APPLICATION FILED FEB. 21, 1910.

976,479.

Patented Nov. 22, 1910.



Witnesses:

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Fig. 1.

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976,479.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed February 21, 1910. Serial No. 544,987.

To all whom it may concern:

Be it known that I, MATTI LUOMA, a citizen of the United States, residing at South Gardner, in the county of Worcester and State of Massachusetts, have invented a new and useful Pump, of which the following is a specification.

This invention relates to a pump. While particularly adapted for simple hand fire pumps, and the like, many of the parts are capable of general use in pumps of various kinds and styles.

The principal objects of the invention are to provide a simplified construction of double cylinder pump having four plungers which are operated by a single lever and in which the two plungers in each cylinder are simultaneously moved toward each other on the working stroke; to provide an efficient leverage construction for operating the plungers; to provide an improved form of inlet and outlet for the water, utilizing the journals of the lever for this purpose; to provide an improved form of guides for the plunger rods; to provide strong and inexpensive means for strengthening the guides and casing; and to provide an improved form of valve mechanism.

The invention involves other improvements in details of construction as will appear hereinafter.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a side elevation of a pump constructed in accordance with this invention. Fig. 2 is a plan of the same with the operating lever removed. Fig. 3 is a sectional view on the line 3—3 of Fig. 2. Fig. 4 is an elevation of one of the valves, and Fig. 5 is a central sectional view of the other valve.

The invention is shown as comprising a main casing 10 having longitudinal passages or cylinders 11 therein parallel with each other. At the ends this casing is supported by a pair of brackets 13 fixed to the ends of the casing and extending downwardly therefrom to form legs. These brackets extend outwardly from the ends of the casing to form heads 14. Each head is provided with a plate 15 secured to the end thereof and having lips 16 projecting over the top and bottom. Each of these plates is provided with perforations, the purpose of which will appear hereinafter. The brackets are provided with flanges 17 connecting the

main part of the bracket with the head 14 and having a substantially semi-circular groove therein opening outwardly. The casing and brackets preferably are castings, and the brackets are screwed or other secured to the ends of the main casing. For the purpose of strengthening these parts a pair of tie-rods 18 are cast into the main casing at points near the bottom and top of the two cylinders. These tie-rods extend outwardly to engage lugs 19 with which the casing is provided at the top and bottom of its ends and then extend inwardly into grooves in the heads 14 and through openings in the caps 15. The ends of these rods are screw-threaded and nuts are provided to secure their ends in fixed position.

Communicating with the two cylinders are inlet ports 20 and outlet ports 21. These are located at the center of the casing. The inlet ports extend downwardly from the cylinders and the outlet ports upwardly. The inlet ports are connected with a chamber 22 below the casing which in turn communicates with an inlet passage 23 entering from hollow journal 24 to which an inlet pipe or hose is adapted to be connected. The outlet ports communicate with a chamber 25 which is provided with an air chamber 26 and with a passage 27 communicating with another journal 28 on which the discharge pipe or hose is adapted to be fixed. The chambers 22 and 25 are closed by caps 29 and 30, respectively, adapted to be fixed in a position in any convenient way, suitable packing being employed.

Mounted in the two cylinders are four plungers 35. Each plunger has a plunger rod 36 shown as having a square cross-section and arranged with one edge up. These rods extend out through openings in the brackets 13 and are guided in openings in the plates 15 which they fit. These rods also are protected by the flanges 17 which connect the main part of the bracket with the head 15. On each of the rods is a projecting stud 37.

Pivottally mounted on the two journals 24 and 28 is a lever 38 having a handle 39 by which it is adapted to be operated. This lever extends both above and below the journals and is provided with four links 40. Each of these links is pivoted to the lever either above or below the journal and is pivotally connected with one of the studs 37. The two links at one side of the casing are

connected with the two plunger rods on that side, and one of them extends in one direction from a point below the journal while the other extends in the opposite direction from a point above it. The same is true of the links on the other side but they are reversed; that is, the two upper links extend in opposite directions from the journal. In this way it will be seen that when the lever is operated the two plungers in one cylinder will move toward each other and those in the other cylinder will move away from each other. In this way, double the plunger speed is secured and double the amount of water can be pumped over that which would be possible with a single plunger in each cylinder of the same size and with the plunger working at the same speed.

The course of the water through the pump is as follows: It enters the journal 24, passes along the passage 23 into the chamber 22. In one of the cylinders the plungers are approaching each other so as to cause compression. This acts on the upper surface of a valve 41 on that side and holds the valve closed. On the other side the plungers are moving away from each other so as to cause suction which permits the water to raise the gravity valve 41 on that side until a collar 42 on the bottom of the valve stem 43 encounters a stop 44. This permits the water to enter one of the cylinders. This stop 44 is mounted on a bushing 45 which is screwed into the port. The bushing is provided with an enlarged passage and with openings 46 communicating with them to permit the water to pass through. In this cylinder the upper port is closed by a hollow gravity valve 48 having a projection 47 on the top and openings 49 to permit the water to be discharged from it when the pressure forces it up into the position with the projection 47 engaging the roof of the cap 30. The valve 48 has a skirt 50 for guiding it in the port. During the operation of the pump the openings 46 connected with the cylinder in which the pistons are receding from each other will remain closed while the one connected with the other cylinder will be opened by the force of the water so as to permit the water to flow into the chamber 25 and rise in the air chamber 26. The water is discharged through the passage 27 and journal 28. A pump constructed in accordance with the principles of this invention is a practicable and efficient one for fire purposes and many other uses and is capable of discharging a relatively large volume of water for the size of the pump.

While I have illustrated and described a preferred embodiment of the invention, I am aware that many modifications can be made in the same by any person skilled in the art without departing from the scope of the invention as expressed in the claims.

Therefore I do not wish to be limited to the details of construction herein shown and described, but

What I do claim is:—

1. In a pump, the combination of a single casing having two parallel horizontal cylinders therein, a plunger at each end of each cylinder, a bracket projecting out from each end of the casing, an independent slide rod for each plunger, said slide rods being guided by said brackets, a lever pivoted to swing about a horizontal axis passing through the cylinders and between the plungers, and means connected with said lever for simultaneously moving the plunger at one end of the cylinder and the plunger at the opposite end of the other cylinder in the same direction, and for moving the other two plungers in the opposite direction.

2. In a pump, the combination of a casing having a cylinder therein, a plunger in the cylinder, having a guide rod projecting outwardly therefrom from the end of the cylinder, means on said guide rod for operating the plunger, a bracket on the end of the casing projecting outwardly therefrom and having a guide for said guide rod, said bracket being removably secured to the end of the casing, and tie-rods secured to said casing projecting from the center thereof to the end of the casing, then projecting beyond the end of the casing and connected with the end of said bracket.

3. In a pump, the combination of a casing having a cylinder therein, a bracket fixed to the end of said cylinder and having a downwardly extending leg for supporting the casing, a plate on the end of the bracket having a guide passage therethrough axially in alinement with said cylinder, a plunger in the cylinder having a rod thereon fitting said passage, and tie-rods connected with said casing and with said plate.

4. In a pump, the combination of a cylinder, a plunger in the cylinder, a lever, means connected with said lever for moving the plunger, a hollow journal on said casing on which the lever is pivoted, said casing having a passage therein communicating with said journal and with the cylinders for conducting water through the journal.

5. In a pump, the combination of a casing having two cylinders therein, plungers in said cylinders, a pair of journals extending from opposite sides of the casing in alinement, said journals being hollow, a lever pivoted on said journals and connected with said plungers for operating the same, said casing having passages therein each communicating with one of said hollow journals and both communicating with each cylinder, and valves for said passages for permitting water to flow from one passage to each cylinder alternately and then to the other passage.

6. In a pump, the combination with a casing having a cylinder therein, and two hollow journals projecting from opposite sides of the casing, the casing having passages communicating with said journals and with the cylinder, of valves for said passages for permitting the water to flow from one passage to the cylinder and from the cylinder to the other passages, a plunger for said cylinder, and a lever journaled on said journals for operating the plunger.

7. In a pump, the combination of a casing, having two parallel cylinders therein, four plungers, two in each cylinder, plunger rods connected with said plungers and projecting outwardly from the ends of the cylinder, journals on opposite sides of the cylinder, a lever pivoted on said journals, projecting above and below the same, and hav-

ing two arms, one on each side of the casing, a pair of links one connected with each arm above the casing, one extending in one direction from the handle and the other in the other and connected with two of said plunger rods, and another pair of links pivoted to the handle below the journal, extending in opposite directions therefrom, and connected with the other two plunger rods, the two links on each side of the casing extending in opposite directions from the journal.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses:

MATTI LUOMA.

Witnesses:

KLAUS A. HAMMLA,
JOHN H. PUTNAM.