

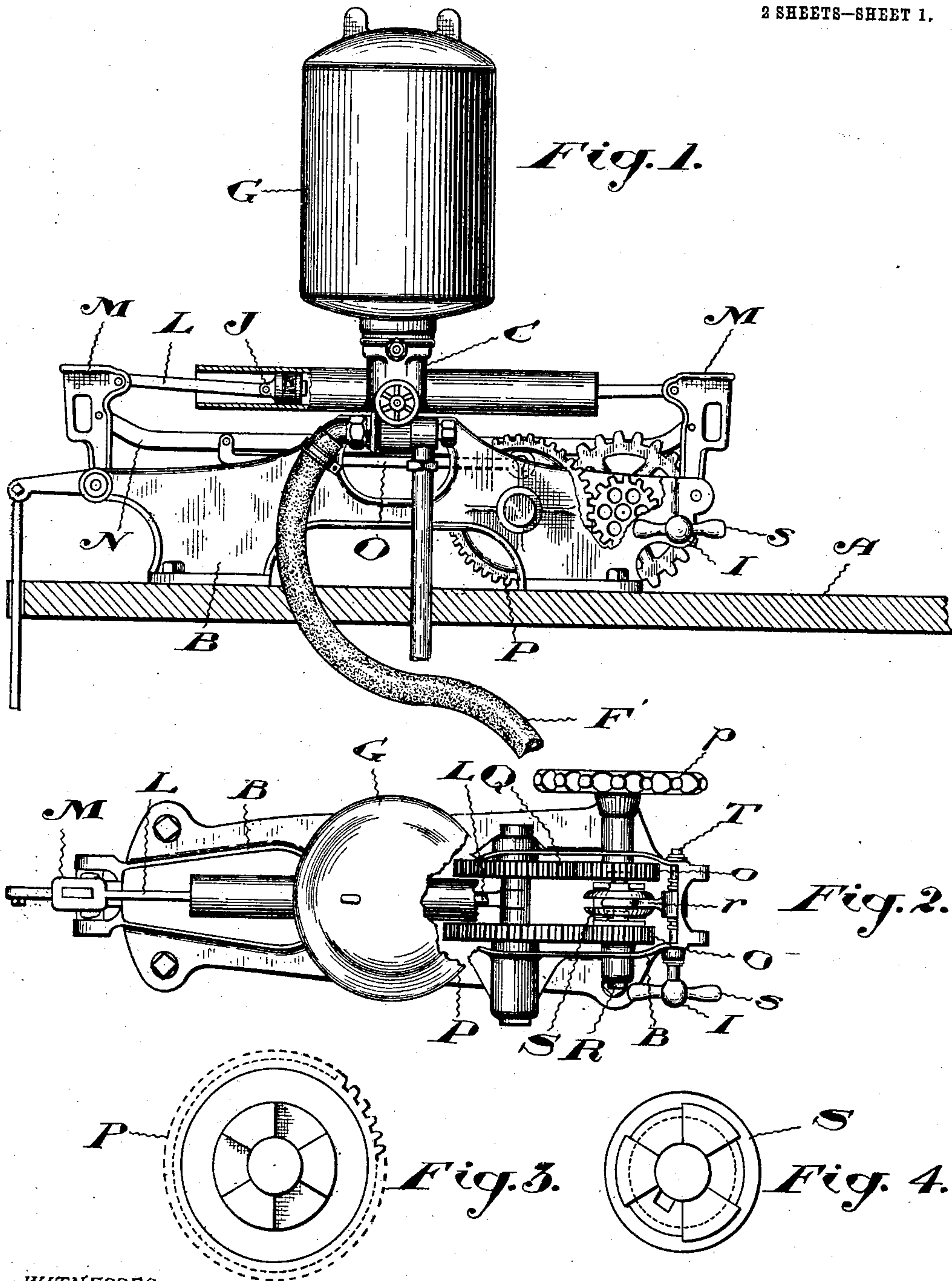
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PUMP.

APPLICATION FILED FEB. 7, 1906.

898,471.

Patented Sept. 15, 1908.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

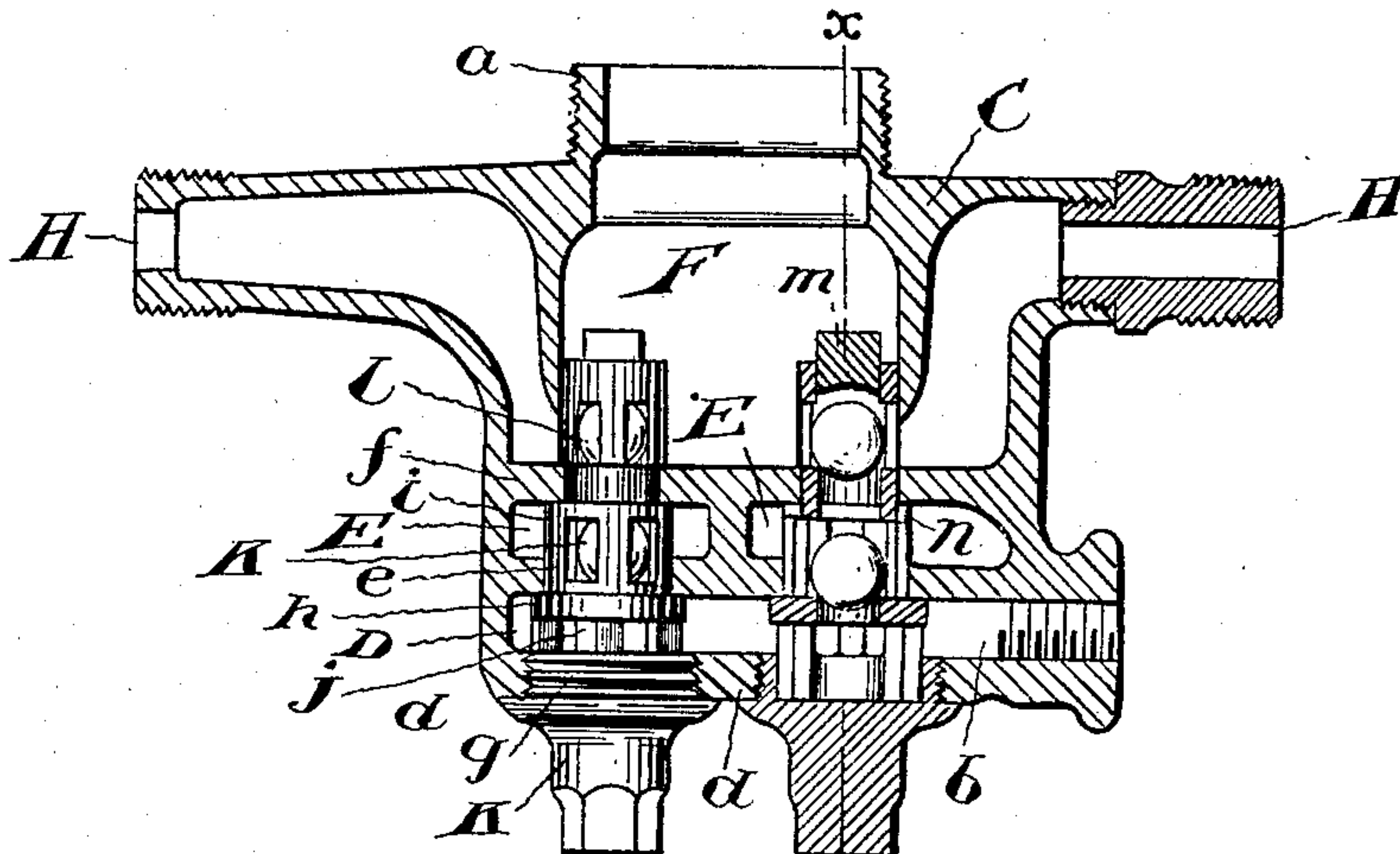


Fig. 5.

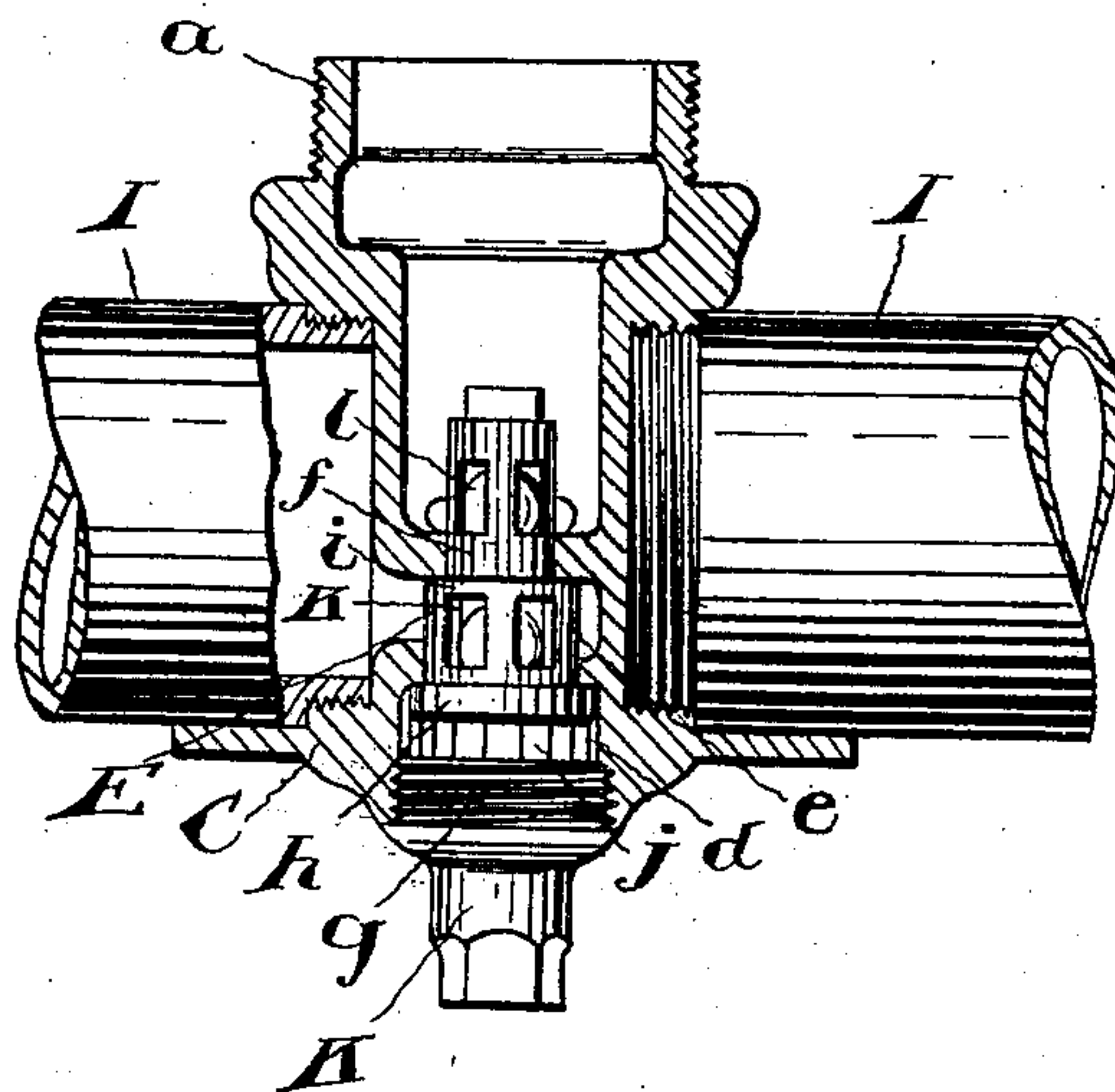


Fig. 6.

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No. 898,471.

Specification of Letters Patent.

Patented Sept. 15, 1908.

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To all whom it may concern:

Be it known that I, WILLIAM HENRY HEARD, of the city of London, in the county of Middlesex and Province of Ontario, Canada, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The object of my invention is to devise a powerful, simple, durable and efficient pump particularly adapted for spraying purposes, and it relates more particularly to the arrangement of two plunger tubes diametrically opposite one another on the one valve chest, the valves being contained in casings removable through one side of the chest, substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a front elevation of a spray pump constructed in accordance with my invention. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of one of the gear pinions. Fig. 4 is a similar view of the clutch. Fig. 5 is a vertical section through the valve chest. Fig. 6 is a vertical section on the line, $x-y$, in Fig. 5.

In the drawings like letters of reference indicate corresponding parts in the different figures.

Referring particularly to Fig. 1, A is the top of the tank to which the frame B of the pump is secured. On this frame is suitably mounted the valve chest C, shown more particularly in Figs. 5 and 6. The valve chest is formed as a unitary casting, and comprises the suction chamber D, with two completely separated intermediate chambers E and the pressure chamber F. The top of the pressure chamber F is provided with a screw threaded collar a for the purpose of attaching the air chamber G. One or more discharge pipes H also lead off from the pressure chamber F. A suction opening b is formed in one side of the suction chamber D for connection with a suction pipe, as hereinafter described. Each side of the valve chest is provided with a screw threaded collar c into which are screwed the plunger tubes I, one at each side of the chest diametrically opposite one another, and preferably with their axes alined. Each plunger tube is provided with a suitable plunger J. In the bottom of the suction chamber are provided two screw threaded openings d , one below each of the chambers E. In the bottom of each of these chambers E is formed an opening e , and

in the bottom of the pressure chamber F are formed two openings f .

It will be seen from Fig. 5 that each of the openings d is in line with one of the openings e and one of the openings f and that the openings progressively decrease in diameter from the openings d to the openings f .

K are two valve casings. Each valve casing comprises a screw plug g , adapted to close one of the openings d , a valve seat h adapted to fit one of the openings e and the valve seat i adapted to fit one of the openings f . The casing is also provided with apertures j communicating with the chamber D, apertures k communicating with the chamber E, and apertures l communicating with the chamber F. Each valve seat has an opening therein normally closed by a ball valve as shown. The upper ball is held in place by the screw plug m , while the lower one is prevented from lifting out by the valve seat above it. As a matter of construction I prefer to form the casing in two parts screwed together at n . This enables the casing to be easily constructed, and permits of the insertion of the lower ball, as the aperture in the upper end of the lower part of the casing is made of a suitable size for that purpose. It will be seen from this construction that the valve casings are readily inserted and removed as a whole, so that all the valves of the pump are quickly and easily got at for repairs. The simplicity of the construction is also a great advantage in manufacturing the apparatus. The course of the liquid being pumped through the valve chest and valves will be readily understood from Figs. 5 and 6.

A very important part of my invention is the arrangement of the single valve chest containing all the valves, with the plungers arranged opposite one another and communicating with the independent chambers E. This arrangement not only possesses great simplicity, but the arrangement of the plunger tubes permits of the mechanism for operating the plungers being arranged in a very simple and effective manner. Each plunger has pivoted thereto a plunger rod L, and these plunger rods are pivotally connected with the rock arms M pivoted on the frame of the machine at opposite ends thereof. These rock arms below the plunger rods are pivotally connected to the bar N. From this construction it follows that if a longitudinally

reciprocating motion be given to the bar N that the plungers will be simultaneously operated in the same direction, so that while one plunger is being forced inward for the pressure stroke, the other is being drawn out for the suction stroke and vice versa.

For the purpose of operating the bar N, I pivot thereon the pitman O, the other end of the pitman being suitably connected to a crank disk P preferably formed as a gear wheel. Opposite the crank disk P, and axially in line therewith, is a crank disk Q of different diameter to the crank disk P, and also formed as a gear wheel. The crank disk Q is also pivotally connected with the end of the pitman O preferably by a wrist pin common to the crank disks P and Q. With these two gear crank disks mesh the gear pinions *o*, journaled side by side on the same shaft R. This shaft is journaled in the frame of the pump and has a sprocket wheel *p*, or any suitable driving pulley, secured thereto. This sprocket wheel may be driven from any suitable engine, or geared to the axle of a cart.

Between the pinions *o* I provide a clutch S slidable on, but rotating with the shaft in the ordinary manner. The faces of this clutch, and the faces of the pinions *o* are shaped to engage one another in any ordinary manner, such, for example, as by the projections and recesses shown in Figs. 3 and 4, representing side views respectively of one of the pinions and clutch. The clutch may be shifted by means of the shifter *r*, which engages a groove in the clutch in the ordinary manner. The shifter has a nut formed thereon, through which is screwed the threaded spindle T journaled in the frame of the pump, and provided with a handle *s*, by means of which they may be operated. Thus by turning the spindle T, either of the pinions *o* may be brought into driving connection with the shaft. As these pinions are of different sizes, and mesh with gears of different diameters, the pitman O may be operated at different speeds to give fast or slow motion to the plungers of the pump as desired. Thus by means of this change speed gear, the speed of the engine relative to the speed of the pump may be varied to suit the running of the engine or the demands of the pump.

What I claim as my invention is:

1. In a pump having two plunger-tubes provided with plungers and extending from a common chest diametrically opposite one another, the combination of two plunger rods pivoted on the plungers; two rock arms pivotally connected with the plunger rods and to the frame of the pump; and a bar pivotally connected to each rock arm, substantially as described.

2. In a pump having two plunger-tubes provided with plungers and extending from a

common chest diametrically opposite one another the combination of two plunger rods pivoted on the plungers; two rock arms pivotally connected with the plunger rods and to the frame of the pump; a bar pivotally connected to each rock arm; a crank disk journaled on the frame; and a connecting rod pivotally connected with the bar and crank disk, substantially as described.

3. In a pump having two plunger-tubes provided with plungers extending from a common chest diametrically opposite one another the combination of two plunger rods pivoted on the plungers; two rock arms pivotally connected with the plunger rods and to the frame of the pump; a bar pivotally connected to each rock arm; a crank disk journaled on the frame; a connecting rod pivotally connected with the bar and crank disk; and change speed gearing adapted to drive the crank disk, substantially as described.

4. In a pump having two plunger-tubes provided with plungers and extending from a common chest diametrically opposite one another, the combination of two plunger rods pivoted on the plungers; two rock arms pivotally connected with the plunger rods and to the frame of the pump; a bar pivotally connected to each rock arm; a toothed crank disk journaled on the frame; a connecting rod pivotally connected with the bar and crank disk; a second gear crank disk of different diameter to the first crank disk journaled in line beside the first and having a common wrist-pin therewith; a driving shaft; two pinions loose on the driving shaft; and a clutch between them adapted to put either of them in driving connection with the shaft, substantially as described.

5. In a pump having two plunger-tubes provided with plungers and extending from a common chest diametrically opposite one another, the combination of two plunger rods pivoted on the plungers; two rock arms pivotally connected with the plunger rods and to the frame of the pump; a bar pivotally connected to each rock arm; a toothed crank disk journaled on the frame; a connecting rod pivotally connected with the bar and crank disk; a second gear crank disk of different diameter to the first crank disk journaled in line beside the first and having a common wrist-pin therewith; a driving shaft; two pinions loose on the driving shaft; a clutch between them adapted to put either of them in driving connection with the shaft; a shifter for the clutch carrying a nut; and a threaded spindle journaled in the frame and on which the nut is screwed, substantially as described.

London, Ont. 2nd February, 1906.

WILLIAM HENRY HEARD.

Signed in the presence of—

HENRY S. CULVER,
P. M. DUNHAM.