

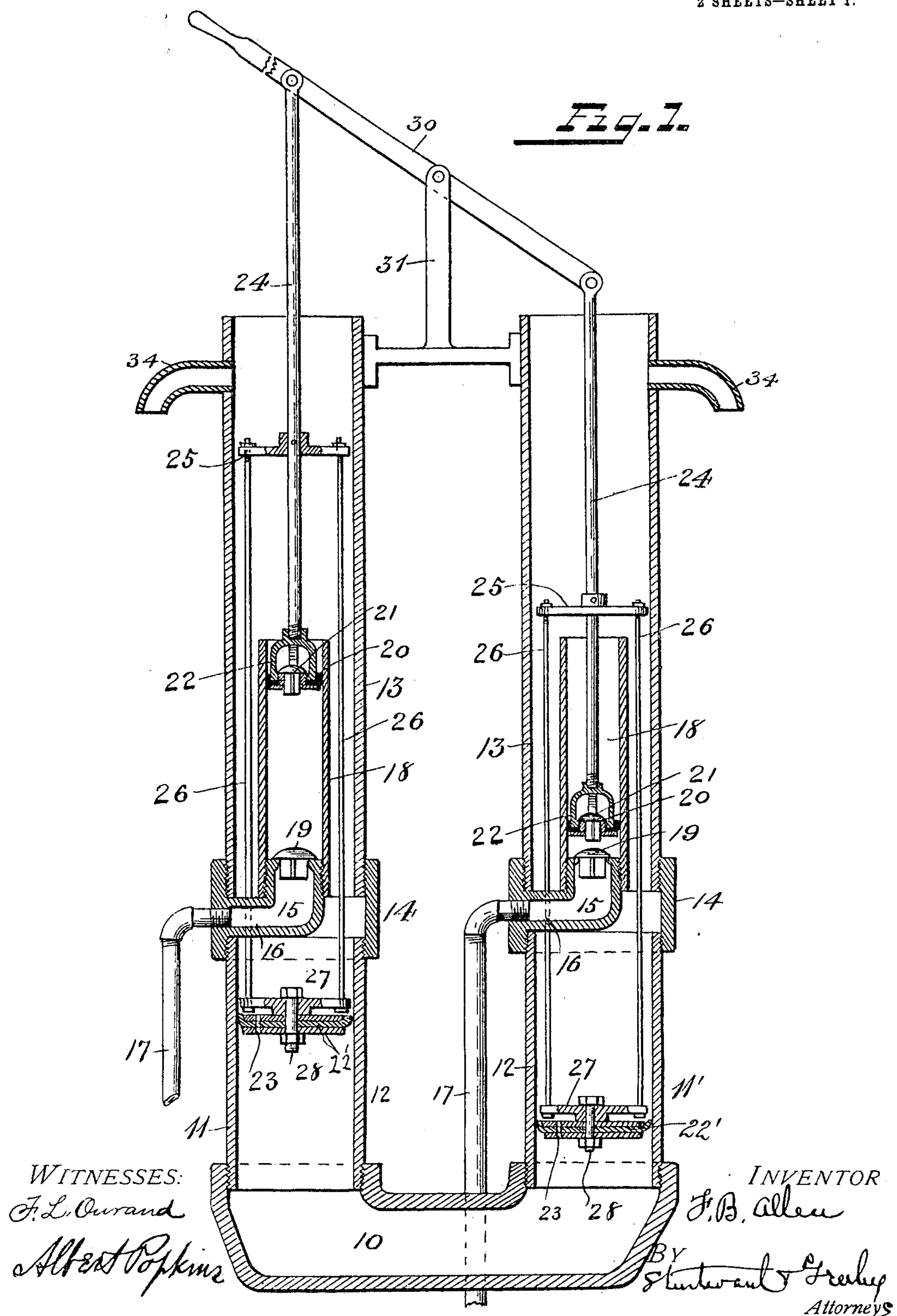
No. 799,214.

PATENTED SEPT. 12, 1905.

F. B. ALLEN.
PUMP.

APPLICATION FILED DEC. 15, 1904.

2 SHEETS—SHEET 1.

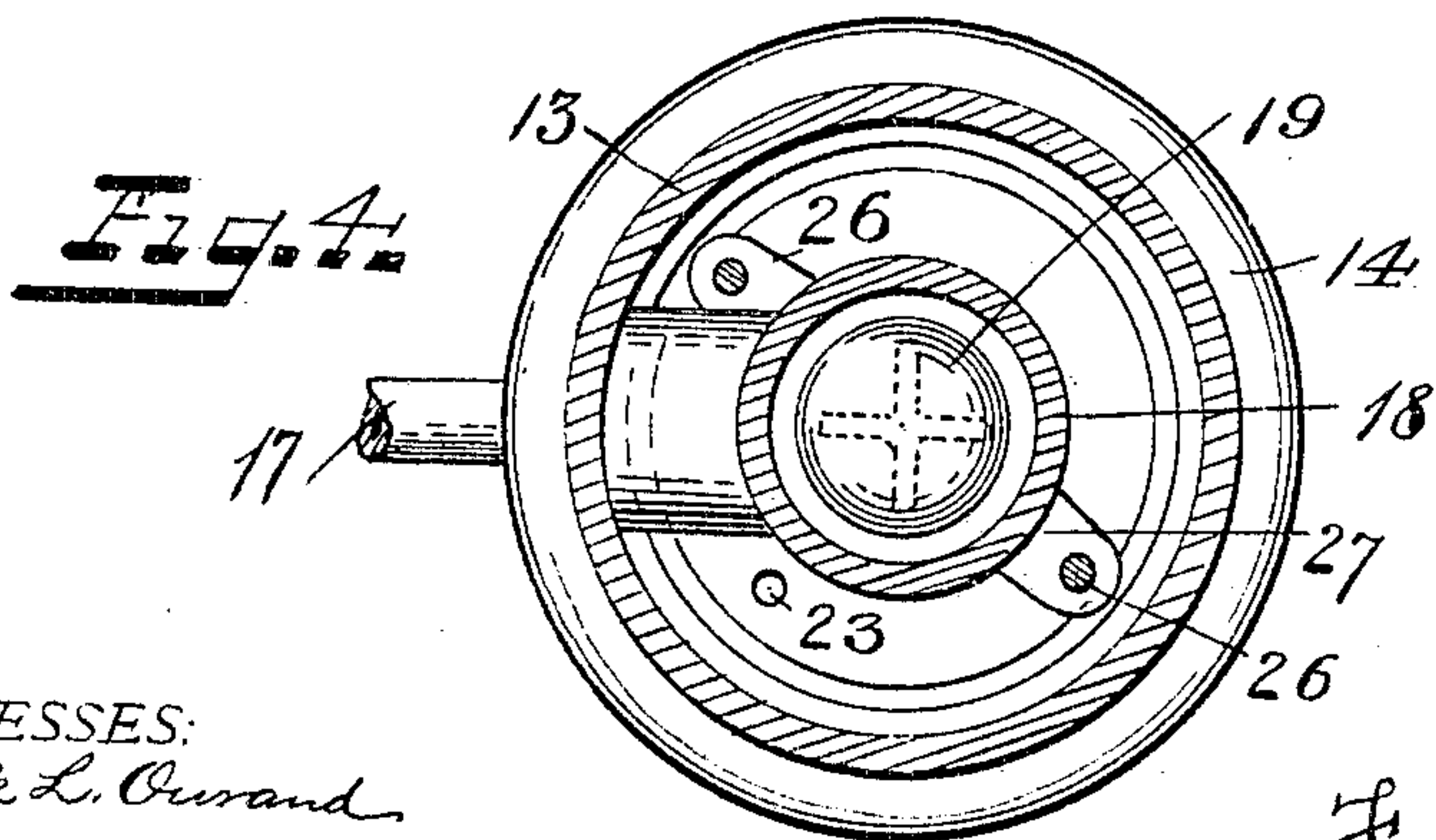
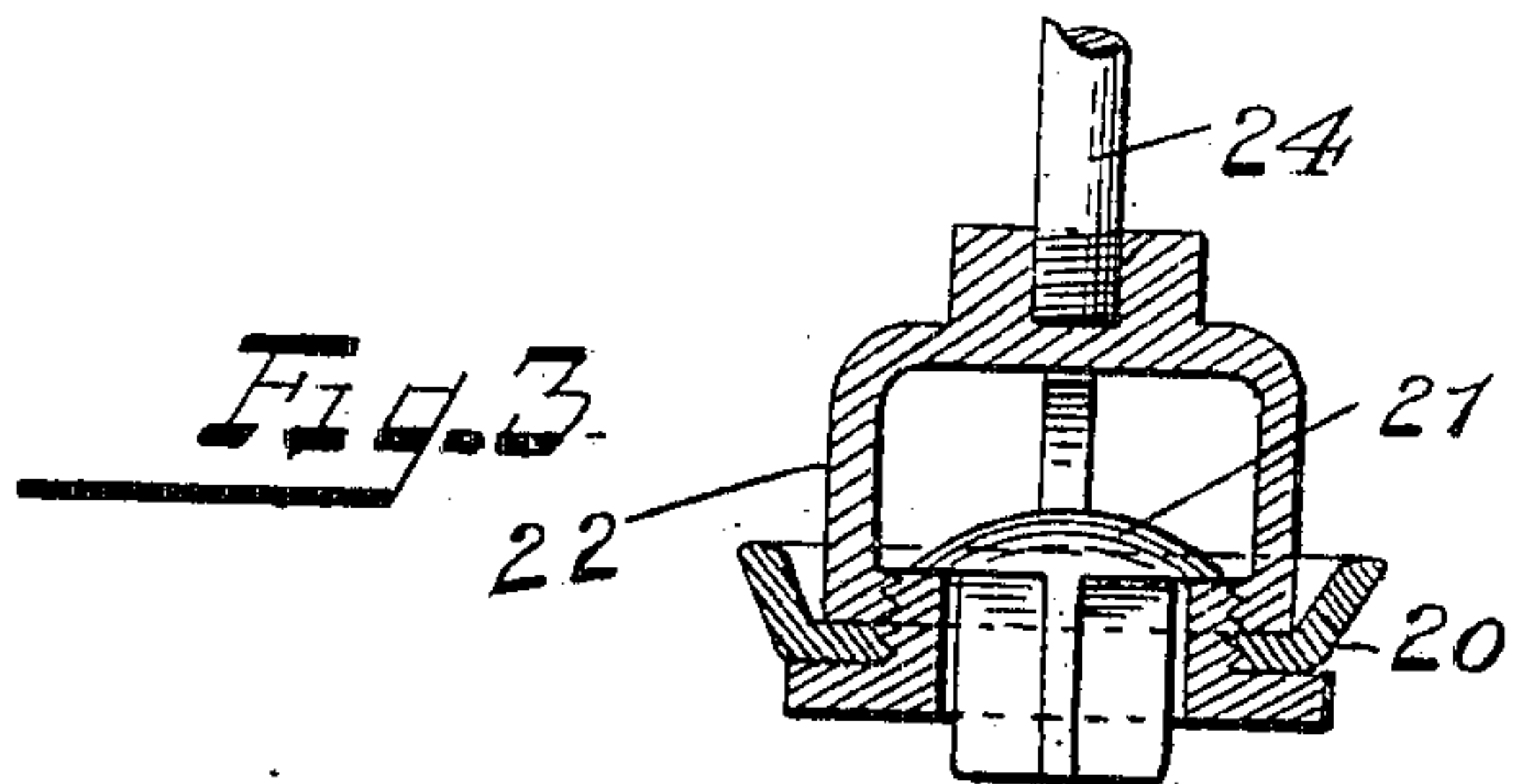
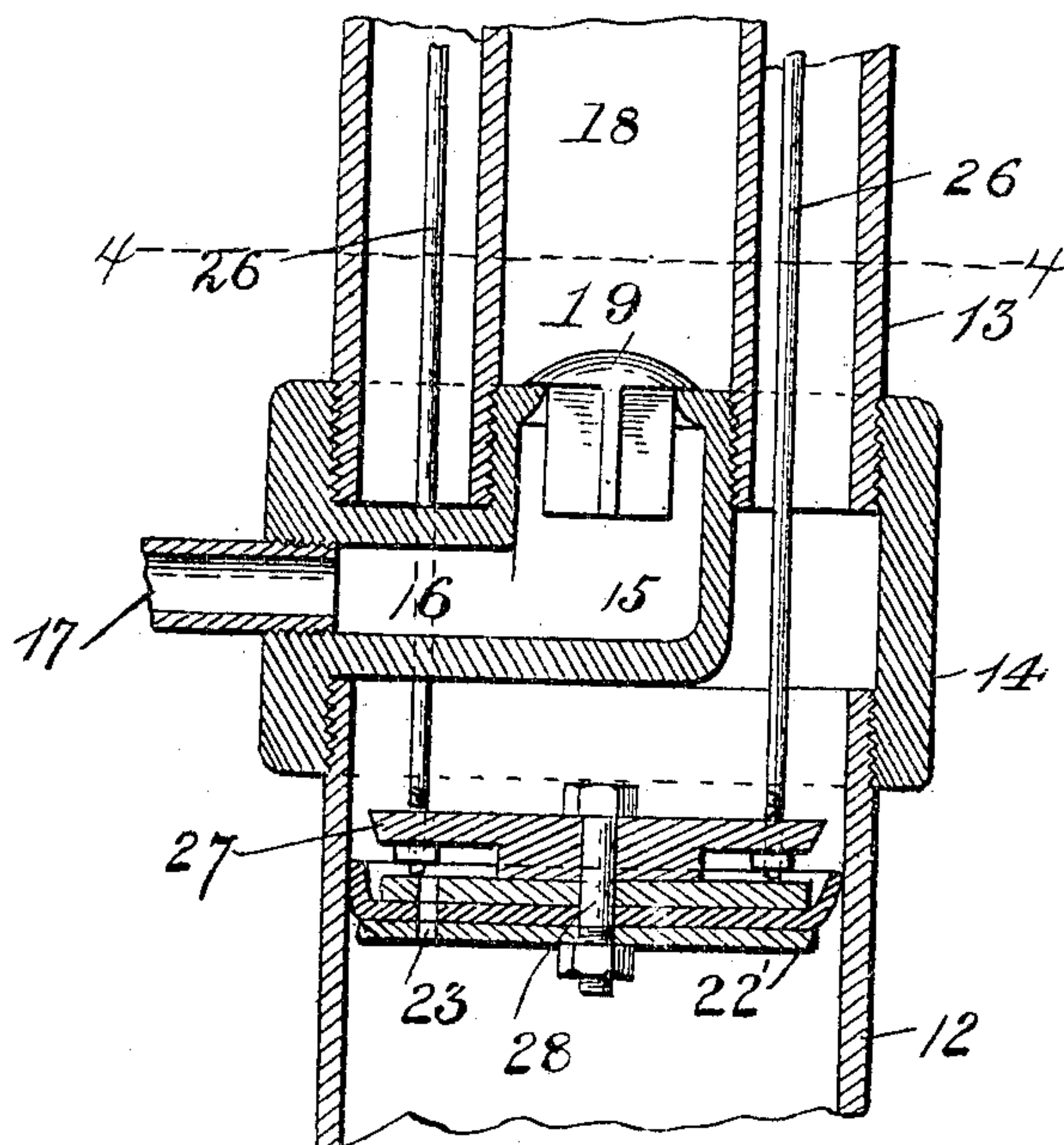


F. B. ALLEN
PUMP.

APPLICATION FILED DEC. 15, 1904.

2 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

Frank L. O'Rand

Albert Popkin

INVENTOR

Frank B. Allen

BY

Stewart & Greeley
Attorneys

UNITED STATES PATENT OFFICE.

FRANK B. ALLEN, OF SALT LAKE CITY, UTAH.

PUMP.

No. 799,214.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed December 15, 1904. Serial No. 236,966.

To all whom it may concern:

Be it known that I, FRANK B. ALLEN, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake, State of Utah, have invented certain new and useful Improvements in Pumps, of which the following is a description, reference being had to the accompanying drawings and to the figures of reference marked thereon.

This invention relates to pumps, and has for its principal object to provide a device which may be operated with minimum power and which will discharge water continuously when in operation.

A further object of the invention is to provide a novel form of water-balanced pump in which two connected columns of water are reciprocated alternately in opposite directions, a volume of water being added to and discharged from each column at each reciprocation.

With these and other objects in view, as will appear when the nature of the invention is more fully disclosed, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and more fully pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of a water-balanced pump constructed in accordance with the invention. Fig. 2 is a similar view of a portion of the same on an enlarged scale. Fig. 3 is a sectional view of one of the smaller pistons. Fig. 4 is a sectional plan view on the line 4 4 of Fig. 2.

Similar numerals of reference denote corresponding parts throughout the several figures of the drawings.

The base 10 is hollow and forms a passage between the two circulating-pipes 11 11', which have a threaded connection therewith, or the parts may be provided with bolting-flanges, as desired. Each pipe is preferably formed in two sections 12 13, connected by an intermediate casing 14, which is usually formed of cast metal.

The casing 14 is provided with an inner cylinder 15, concentric with the wall of the casing and held in place by an inwardly-extending tubular portion 16, which forms a water-inlet and is connected to the supply-pipe 17. To the upper portion of the cylinder 15 is screwed or otherwise secured the lower end of a pumping-cylinder 18, which has an open upper end, and this cylinder may for convenience be formed of a short length of pipe of appropriate

diameter. The pumping-cylinder is concentric with the tube-section 12, and a clear annular water-space is formed between the two. At the top of the cylinder 15 a seat is formed for the reception of a water-inlet valve 19, which will open to admit water, but will close to prevent the escape of any water from the pumping-cylinder.

In the pumping-cylinder is a piston or plunger 20, having a valve-seat for an upwardly-opening valve 21, and said piston carries a valve-cage 22 of the usual type to limit opening movement of said valve.

In the lower section 12 of the tube 11 is a piston or plunger 22', having a small leakage-opening 23 for the passage of water.

The upper plunger 20 is secured to a rod 24, and to the latter is keyed or bolted a cross-bar 25, that is connected by two or more bars or rods 26 to a second bar 27. The cross-bar 27 is secured to the piston 22' by a bolt 28, so that both pistons work simultaneously as the main rod 24 is reciprocated.

The two rods 24 extend out through the upper ends of the circulating-pipes 11 11' and are connected for mutual movement to an operating-lever 30, pivoted to a standard 31, that is located midway between the two rods. The lever may be operated manually or by power, and at each movement one rod is elevated and the other depressed.

The operation of the pump is as follows: The two pistons of the pipe 11 have just ceased their upward movement and the corresponding pistons of the pipe 11' have ceased downward movement. On the upstroke of piston 20 the valve 19 was raised and water flowed into the left cylinder 18. When the movement is reversed and the left pistons move down, the valve 21 opens and the piston 20 passes down, leaving the water above the piston. At the same time upward movement of the right-hand piston 20 causes water to flow into the cylinder under atmospheric pressure. A second upstroke of the left-hand pistons closes valve 21 and the water in the cylinder flows over the top thereof and falls through the annular space outside the cylinder, being caught by the lower piston 22'. This movement continues and water gradually leaks through the two passages 23 until the connecting-passage in the base is filled and the water-level reaches the tops of the two tubes 11 11' or discharge-spouts 34, near the top thereof. Having now acquired two connected columns of water of equal height, further

movement will in each instance result in the lowering of one column and the raising of the other, the quantity of water discharged at each movement being equal to the volume added at each movement, or, in other words, the volume of one of the cylinders 18. The connected columns balance each other, and the movement will therefore be uniform and the discharge practically continuous, while the pump may be operated with a minimum expenditure of energy.

Having thus described my said invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pump, a pair of tubes connected together at their lower ends, pumping-cylinders on the tubes, water-inlets leading to the cylinders and mechanically connected, pistons disposed in the tubes and cylinders and movable to effect upward movement of the columns of water alternately in said tubes, substantially as described.

2. In a pump, a pair of connected tubes having top discharges, pistons in said tubes, means for moving said pistons in opposite directions respectively, thereby to cause the connected columns of fluid to reciprocate, and means for adding to each tube a volume of fluid and for discharging an equal volume at each reciprocation.

3. In a pump, a pair of tubes connected at their lower ends, pistons in said tubes, pumping-cylinders within the tubes, pistons in said cylinders, the upper ends of the cylinders communicating with the tubes, a water-inlet for each cylinder, and means for connecting all of the pistons for mutual movement.

4. In a pump, a pair of tubes connected at their lower ends, pistons in said tubes, said pistons having leakage-openings, open-top pumping-cylinders in the tubes, each of the cylinders having a water-inlet at its lower end, a suction inlet-valve in each cylinder, means for connecting each pumping-piston to the piston of its encircling tube, and means for connecting the pairs of pistons for mutual movement in opposite directions respectively.

5. The combination in a pump, of a hollow base, a pair of sectional tubes having their lower ends connected thereto, a casing interposed between the sections of each tube, a pumping-cylinder carried by the casing and arranged concentrically with the tube, a suction inlet-valve in the cylinder, a perforated piston in the lower section of each tube, a valved piston in each pumping-cylinder, an operating-rod for each pumping-piston, means for connecting each pumping-piston to the piston of its encircling tube, and a pivoted lever connecting the rods for mutual movement in opposite directions respectively.

6. In a pump, a pair of concentric cylinders, a discharge-pipe leading from the outer cylinder, a fluid-inlet leading to one end of the inner cylinder and the opposite end of said cylinder being in free communication with the outer cylinder, and a pair of connected pistons one in each of said cylinders.

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

FRANK B. ALLEN.

Witnesses:

JAMES THOMSON,
NELLIE KIRK.