No. 722,749. PATENTED MAR. 17, 1903.

L. J. PHELPS.

PUMP.

APPLICATION FILED OCT. 1, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

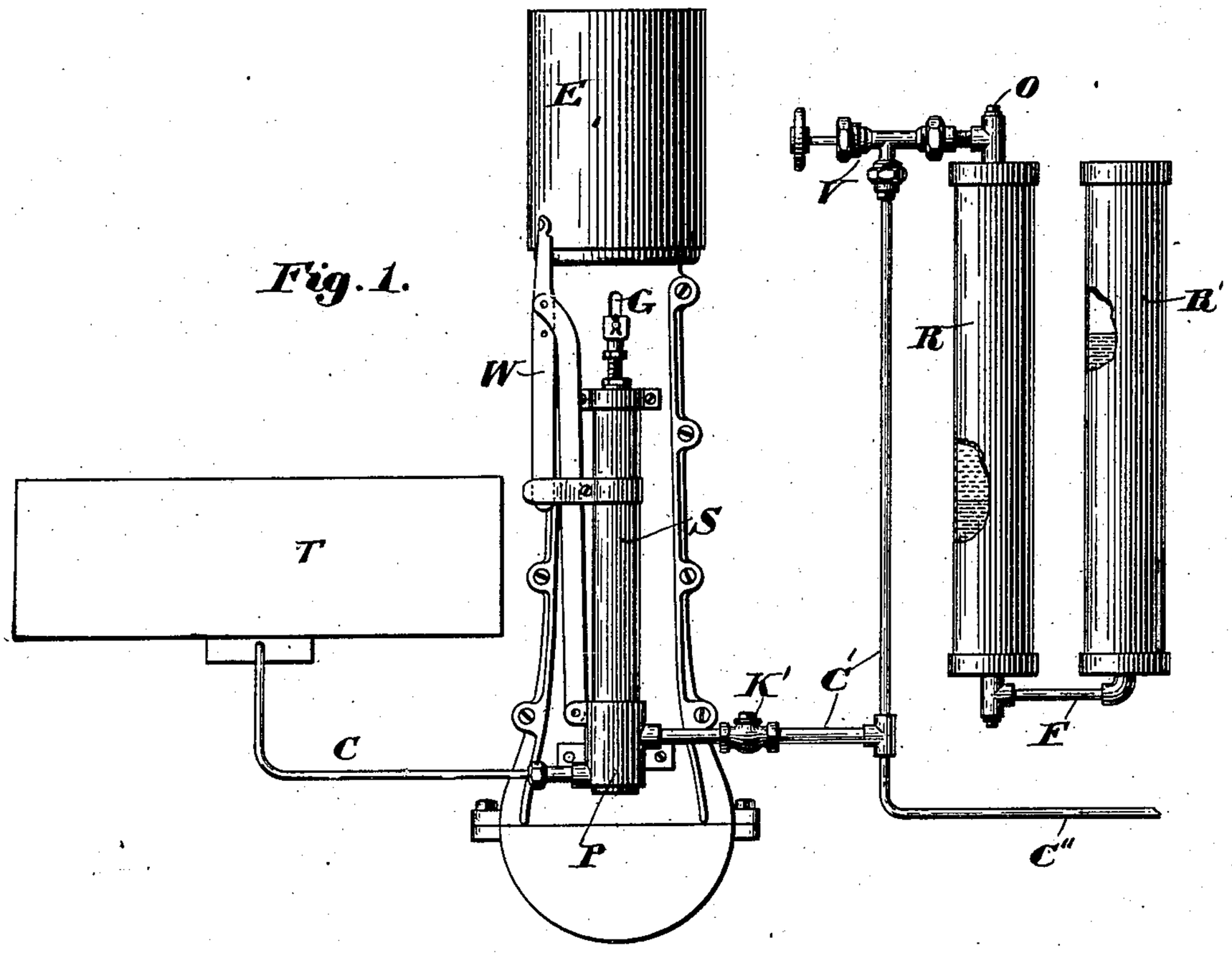
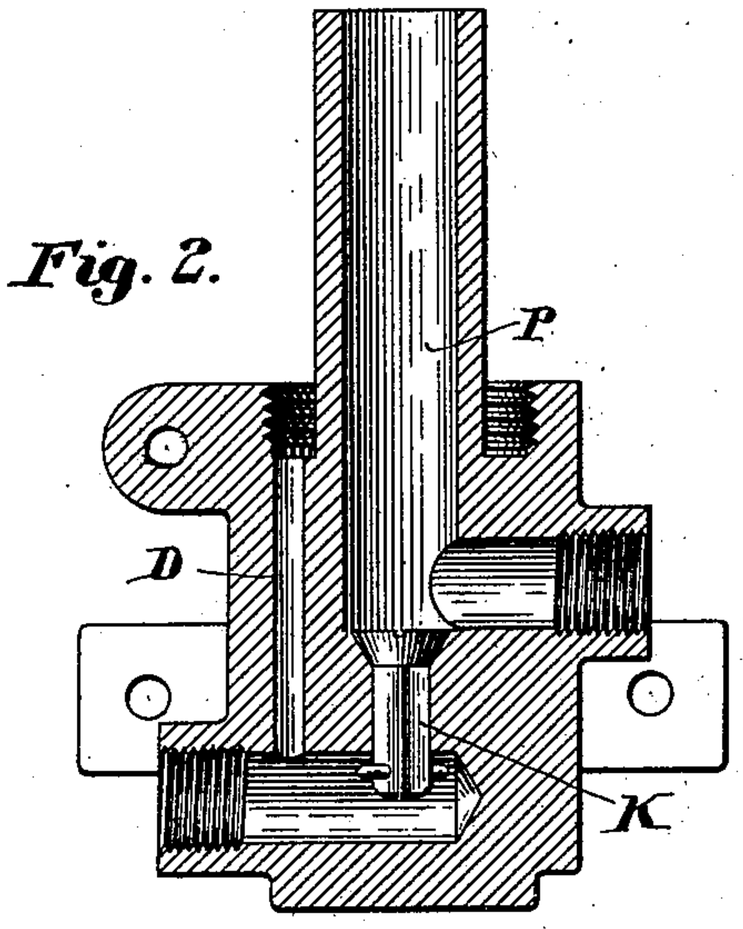


Fig. 2.



Witnesses:
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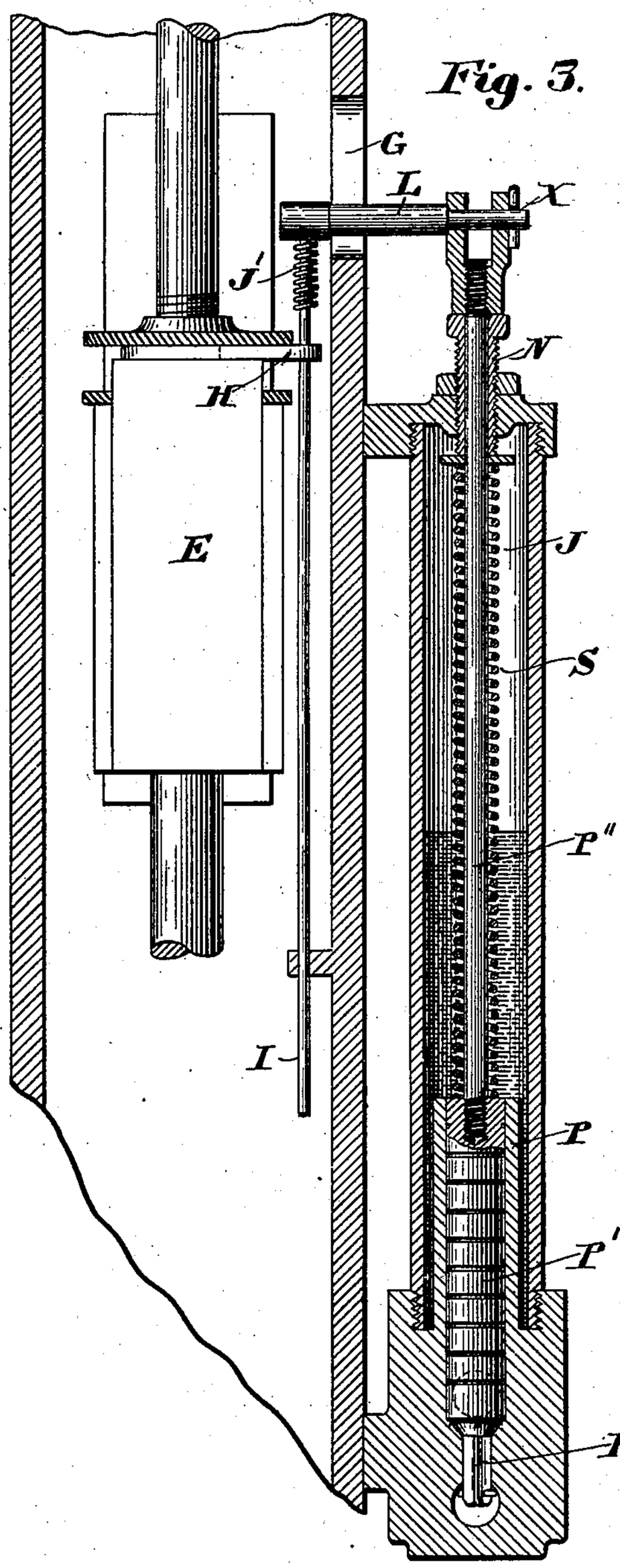
NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

LUCIUS J. PHELPS, OF MELROSE, MASSACHUSETTS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 722,749, dated March 17, 1903.

Application filed October 1, 1901. Serial No. 77,183. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS J. PHELPS, a citizen of the United States, and a resident of Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to improvements in pumps for delivering liquids under a uniform pressure; and the object of my invention is to provide a pumping system particularly adapted to delivering hydrocarbon to the burners of small boilers, such as are commonly used on automobiles, overcoming the objectionable features heretofore experienced of leaking at the stuffing-box of the pump and the absorption of air by the hydrocarbon, which occurs when the hydrocarbon comes in direct contact with the air-cushion. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the entire system. Fig. 2 is a vertical sectional view of the pump barrel and connections. Fig. 3 is a vertical sectional view of the pump-barrel at right angles to the section shown in Fig. 2, showing also the pump piston or plunger in position, showing also in section the stand-pipe inclosing the pump and the connections with the engine by which the pump is operated.

Similar letters refer to similar parts throughout the several views.

Referring now to Fig. 1, T is a tank containing the supply of hydrocarbon. S is a stand-pipe of somewhat greater height than the tank T and is secured to the side of the engine E in such a position that its upper end shall be above the level of the upper side of the tank T and its lower end, carrying the pump and valves, shall be below the level of the bottom of the said tank. By means of the pipe C and the opening D, Fig. 2, the tank T and the stand-pipe S are in free communication, so that the hydrocarbon will remain constantly at the same level in the tank and stand-pipe. R and R′ are two cylindrical receivers connected together at their lower ends by the pipe F. The upper end of the receiver R is connected, by means of the pipe C′, with the delivery-port of the pump P. K and K′ are check-valves of well-known construction, which allow the hydrocarbon to flow through the pump P and the pipes C and C′ to the receiver R, but prevent its return. V is a valve for closing the connection between the pump and receiver. P is the pump, which consists of a cylindrical barrel, within which the pump-piston P′ moves freely. The pump-rod P″ passes up through the stand-pipe S, terminating in a forked connection X, to which is attached a lever L at right angles thereto. The lever L extends through a slot G in the engine-casing in such a position that the arm H, attached to the cross-head of the engine, will strike it at each upward movement, thereby lifting the pump-piston P′. The spring J′ acts as a buffer to relieve the shock of contact of the arm H with the lever L and is held in position by the guiding-rod I. Surrounding the piston-rod P″ is a spring J, adapted to depress the piston P′. The tension of the said spring may be adjusted by the screw N. W, Fig. 1, is a lever for operating the pump by hand when the engine is not running.

The operation is as follows: I first remove the plug O above the receiver R and through the opening fill the cylinder R with water or a mixture of water and glycerin to prevent freezing. The liquid will flow through the pipe F and rise in the receiver R′ until the pressure of air above the liquid balances the weight of the liquid in the receiver R. When the receiver R is filled to overflowing, I replace the plug O. I now fill the tank T with hydrocarbon, a small portion of which will flow through the pipe C and rise to its level in the stand-pipe S. I then raise the lever W, catching its hooked end into the fork of the pump piston-rod X, Fig. 3, and raise the piston, drawing in hydrocarbon through the check-valve K under the piston. Upon releasing the lever the spring J forces the piston downward, driving the hydrocarbon through the check-valve K′ and pipe C′ into the upper end of the receiver R, the extremity of the pipe C″ being closed and the valve V being open. The hydrocarbon entering the upper part of the receiver R and being of less specific gravity than the sealing liquid forces an equal volume of the sealing liquid through the pipe F and into the receiver R, and if the operation be repeated it is clear that the hydrocarbon will continue

to flow into the receiver R, forcing the sealing liquid into the receiver R′ until the compressed air in the upper part of the receiver R′ reaches a predetermined pressure gaged by the tension of the spring J, after which the piston P′ will remain in an elevated position until a portion of the hydrocarbon be drawn off through the delivery-pipe C″. Should the piston P′ leak slightly, the hydrocarbon would not be wasted, but retained within the stand-pipe to be used over again. The operation of lifting the pump-piston is performed by the engine when in action by the means heretofore described.

For simplicity of construction I have shown the connection D from the stand-pipe entering the supply-pipe C near the check-valve K; but it is clear that it may be an independent pipe connecting directly the stand-pipe S and the tank T without departing from the principles of my invention.

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

1. The combination, with a pump, means for maintaining a predetermined pressure upon the same in the direction of its delivery-stroke, and a delivery-pipe connected to said pump, of a pneumatic cushioning device in communication with the delivery-pipe, said cushioning device consisting of a pair of communicating chambers with an interposed liquid seal.

2. The combination, with a pump, yielding means for maintaining a predetermined pressure upon the same in the direction of its delivery-stroke, and a delivery-pipe for said pump, of a cushioning device in communication with said delivery-pipe, said cushioning device consisting of a plurality of communicating chambers with an interposed liquid seal.

3. The combination, with a cylinder, a piston movable in said cylinder, positive means for moving said piston in one direction, yielding means for moving said piston in the opposite direction, and a delivery-pipe connected to said cylinder, of a cushioning device in communication with said delivery-pipe, said cushioning device having a plurality of communicating chambers with an interposed liquid seal.

4. The combination, with a pump, a delivery-pipe connected therewith, positive means for actuating said pump in the direction of its suction-stroke, and yielding means for actuating the same in the opposite direction, of a pneumatic cushioning device in communication with the delivery-pipe, said cushioning device consisting of a pair of cylinders having an interposed liquid seal which is inert with relation to the fluid delivered by the pump.

5. The combination with a pump, yielding means for maintaining a predetermined pressure upon said pump in the direction of its delivery-stroke, and a delivery-pipe connected therewith, of a pair of receiving-cylinders connected at their lower extremities and partially filled with a sealing liquid and means for connecting the upper portion of one cylinder with the delivery-pipe.

6. The combination with a pump, yielding means for maintaining a pressure upon said pump in the direction of its delivery-stroke, means for regulating said pressure, and a delivery-pipe connected with said pump, of a pair of receiving-cylinders connected at their lower extremities and partially filled with a sealing liquid, and means for connecting the upper portion of one cylinder with the delivery-pipe.

7. The combination with a storage-tank, of a stand-pipe, a pump-cylinder disposed in the bottom of the stand-pipe, a piston within the cylinder, a passage communicating between the storage-tank and the lower portion of the cylinder, another passage communicating between the storage-tank and the stand-pipe above the cylinder in such manner that a supply of liquid will be maintained in the stand-pipe, whereby said piston will at all times be below the level of the liquid in the stand-pipe and thus be surrounded by a liquid packing.

8. The combination with a storage-tank, of a stand-pipe, an unobstructed passage communicating between the storage-tank and the stand-pipe in such manner that a supply of liquid will be maintained in the latter at the same level as in the storage-tank, a pump-piston arranged in the stand-pipe below the level of the liquid therein whereby said piston will at all times be surrounded by a liquid packing, a valved passage communicating between the storage-tank and the stand-pipe below the piston, means for maintaining a predetermined yielding pressure upon the piston in the direction of its delivery-stroke, and positive means actuating said piston in the direction of its suction-stroke.

9. The combination with a storage-tank, a stand-pipe communicating therewith in such manner that a supply of liquid will be maintained in the latter, a pump-piston arranged in the bottom of the stand-pipe below the level of the liquid therein whereby said piston will at all times be surrounded by a liquid packing, means for maintaining a predetermined yielding pressure upon the piston in the direction of its delivery-stroke, positive means for actuating said piston in the direction of its suction-stroke, and a delivery-pipe, of a pair of sealed receiving-cylinders connected at their lower ends, and means for connecting the upper portion of one cylinder with the delivery-pipe.

10. The combination, with a storage-tank, a stand-pipe, a pump-cylinder disposed in the bottom of the stand-pipe, a piston within the cylinder, a passage communicating between the storage-tank and the lower portion of the cylinder, and another passage communicating between the storage-tank and the interior of the stand-pipe above the cylinder in such

manner that a supply of liquid will be maintained in the stand-pipe whereby said cylinder will at all times be below the level of said liquid and thus be surrounded by a liquid packing, of a cushioning device in communication with the delivery-pipe from said pump.

11. The combination, with a storage-tank, a stand-pipe, an unobstructed passage communicating between the storage-tank and the stand-pipe in such manner that a supply of liquid will be maintained in the latter at the same level as in the storage-tank, a pump-piston arranged in the bottom of the stand-pipe below the level of the liquid therein whereby said piston will at all times be surrounded by a liquid packing, a valved passage communicating between the storage-tank and the stand-pipe below the piston, means for maintaining a predetermined yielding pressure upon the piston in the direction of its delivery-stroke, and positive means actuating said piston in the direction of its suction-stroke, of a pneumatic cushioning device in communication with the delivery-pipe.

12. The combination, with a storage-tank, a stand-pipe, a pump-cylinder disposed in the bottom of the stand-pipe, a piston within the cylinder, a passage communicating between the storage-tank and the lower portion of the cylinder, and another passage communicating between the storage-tank and the interior of the stand-pipe above the piston in such manner that a supply of liquid will be maintained in the stand-pipe whereby said piston will at all times be below the level of said liquid and thus be surrounded by a liquid packing, of a pair of sealed cylinders connected at their lower ends, and means for connecting the upper portion of one cylinder with the delivery-pipe.

13. The combination with a storage-tank, a stand-pipe, an unobstructed passage communicating between the storage-tank and the stand-pipe in such manner that a supply of liquid will be maintained in the latter at the same level as in the storage-tank, a pump-piston arranged in the bottom of the stand-pipe below the level of the liquid therein whereby said piston will at all times be surrounded by a liquid packing, a valved passage communicating between the storage-tank and the stand-pipe below the piston, means for maintaining a predetermined yielding pressure upon the piston in the direction of its delivery-stroke, and positive means actuating said piston in the direction of its suction-stroke, of a pair of receiving-cylinders connected at their lower extremities and partially filled with a sealing fluid, and a connection between the upper portion of one cylinder and the delivery-pipe.

Signed at Melrose, in the county of Middlesex and State of Massachusetts, this 18th day of September, A. D. 1901.

LUCIUS J. PHELPS.

Witnesses:
SAMUEL K. DINGLE,
FREDERICK W. PAINE.