F. L. GOULD.

PUMP.

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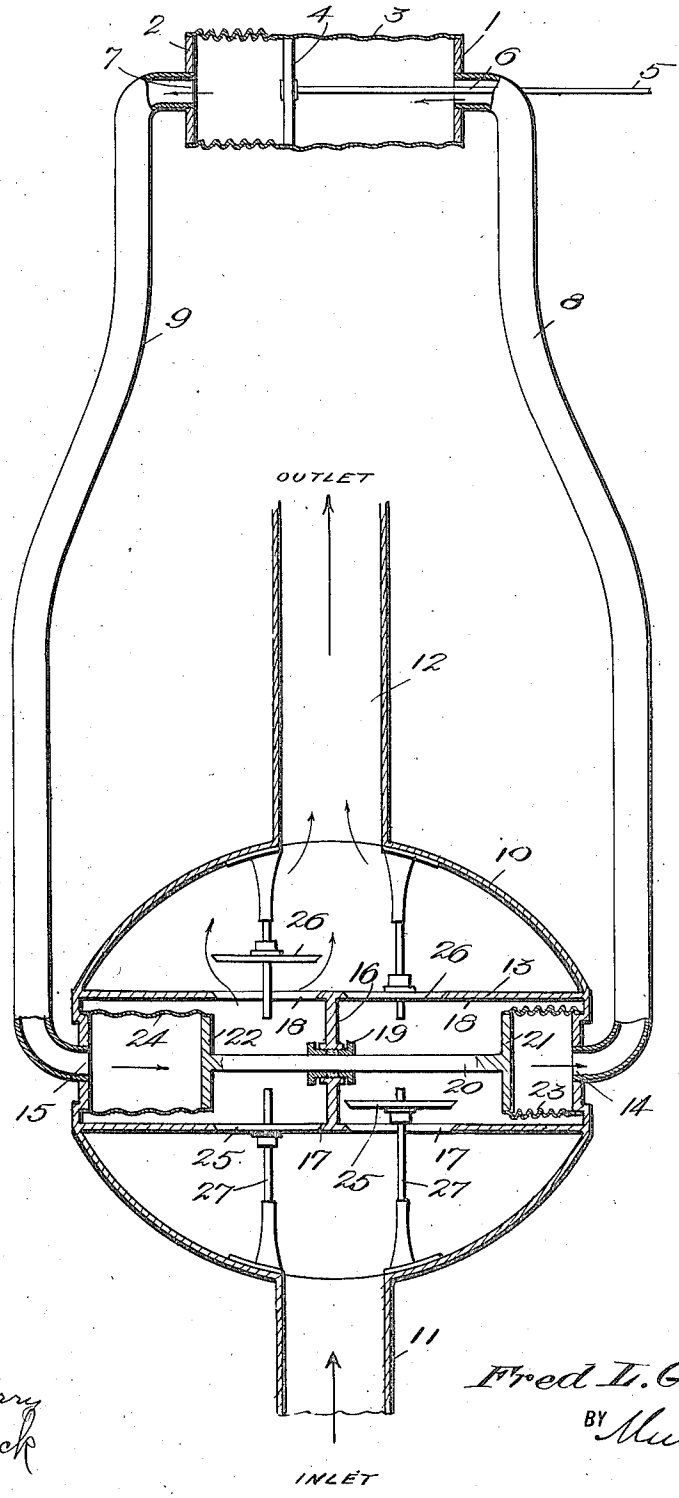

WITNESSES

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PUMP.

1,256,127. Specification of Letters Patent. Patented Feb. 12, 1918.

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To all whom it may concern:

Be it known that I, FRED L. GOULD, a citizen of the United States, and a resident of Reno, in the county of Washoe and State of Nevada, have invented a certain new and useful Improvement in Pumps, of which the following is a specification.

My invention is an improvement in pumps, and has for its object to provide a pump especially adapted for use as a central station pump to give impulse to one or more outlying pumps, or for use in series, to lift water through various successive stages, wherein use is made of a column of fluid as an agent of transmission of impulse from the power generator to the water lift cylinders.

In the drawings is shown a diagrammatic view of an embodiment of the invention.

In the present embodiment of the invention, the pump consists of two portions, namely, the controlling element and the controlled element. The controlling element consists of a cylinder composed of heads 1 and 2 which are connected by a cylindrical casing 3 of flexible material, as for instance, leather or the like. Within this cylinder is arranged a piston or plunger 4 which is connected by a stem 5 with suitable operating mechanism, not shown, for reciprocating the piston or plunger in the cylinder. Each of the heads 1 and 2 has a port 6 and 7 respectively, which are connected by pipes 8 and 9 respectively with the controlled apparatus to be described.

The said apparatus comprises a casing 10 having an inlet 11 at its bottom and an outlet 12 at its top, the said inlet and outlet being in alinement, as shown. Transversely of the casing is arranged a cylinder 13, the said cylinder dividing the casing 10 into upper and lower portions, and the pipes 8 and 9 open into the ends of the cylinder through ports 14 and 15 respectively.

The cylinder 13 is divided into two portions by the transverse partition or diaphragm 16, and each portion of the cylinder has an inlet port 17 and an outlet port 18, the inlet ports being in the under side of the cylinder, while the outlet ports are in the upper side. The partition 16 is provided with a central stuffing box 19 through which extends the stem or piston rod 20 having connected with each end thereof a head 21 and 22 respectively. These heads 21 and 22 are connected to the adjacent ends of the cylinder 13 by flexible tubular casings 23 and 24 and the ports 14 and 15 open into the chambers formed by these tubular casings 23 and 24 and the heads 21 and 22.

Each of the ports 17 is provided with a valve 25 and each of the ports 18 is provided with a valve 26, the said valves coacting with the ports. Each of the valves 25 and 26 is provided with a stem 27 around which the valve is slidably mounted, the stems 27 being connected with the casing 10 in such manner as to serve as guides for the valves. The valves are check valves controlled by the flow of liquid from the pump casing 10.

In use the pipes 8 and 9, the casing 3, and the chambers formed by the casings 23 and 24, are filled with a suitable fluid to be used as the transmission agent, namely air or other compressible fluid. When the plunger 4 is moved toward the head 2 of the casing 3, as indicated in the drawing, the fluid in the end of the casing 3 adjacent to the head 2, in the pipe 9, and in the casing 24, will be driven toward port 14 and away from the diaphragm 16, thus creating a partial vacuum in the end of the cylinder 13 adjacent to the head 21. Water or other liquid to be lifted will open the port 25 and the port 17, and rush into said ports and into this portion of the cylinder. The expansion of the casing 22—24 at the other end of the cylinder will drive any liquid that may be therein through the adjacent port 18, and the said expansion of the casing 22—24 will close the valve 25 of the port 17. When the plunger 4 is moved toward the head 1, the capacity of the chamber at the right of the partition 16 will be lessened, while the capacity of the chamber at the left of the partition will be increased. The liquid in the chamber at the right will close the valve 25 and will open the valve 26, and a continuation of the reciprocating movement of the plunger 4 will drive a steady stream of liquid through the outlet 12. The improved pumps may be arranged in series to lift the water or other liquid by successive stages, and a number of pumps may be connected with the central cylinder 3.

I claim:—

A pump comprising a flexible casing, a plunger dividing the casing into like compartments, a second casing remotely situated from the flexible casing and having an

inlet and an outlet, a cylinder dividing the second casing into compartments in communication with the inlet and outlet thereof, respectively, said cylinder being divided by a centrally disposed transverse partition into end compartments, each having a valve controlled inlet and a valve controlled outlet in communication with the respective inlet and outlet compartments of the second casing, a stem slidingly mounted in the partition of the cylinder and having a head at each end, a flexible casing connecting each of the heads of the stem with a head of the cylinder, and pipes connecting the heads of the cylinder with the respective compartments of the first mentioned flexible casing.

FRED LINCOLN GOULD.