

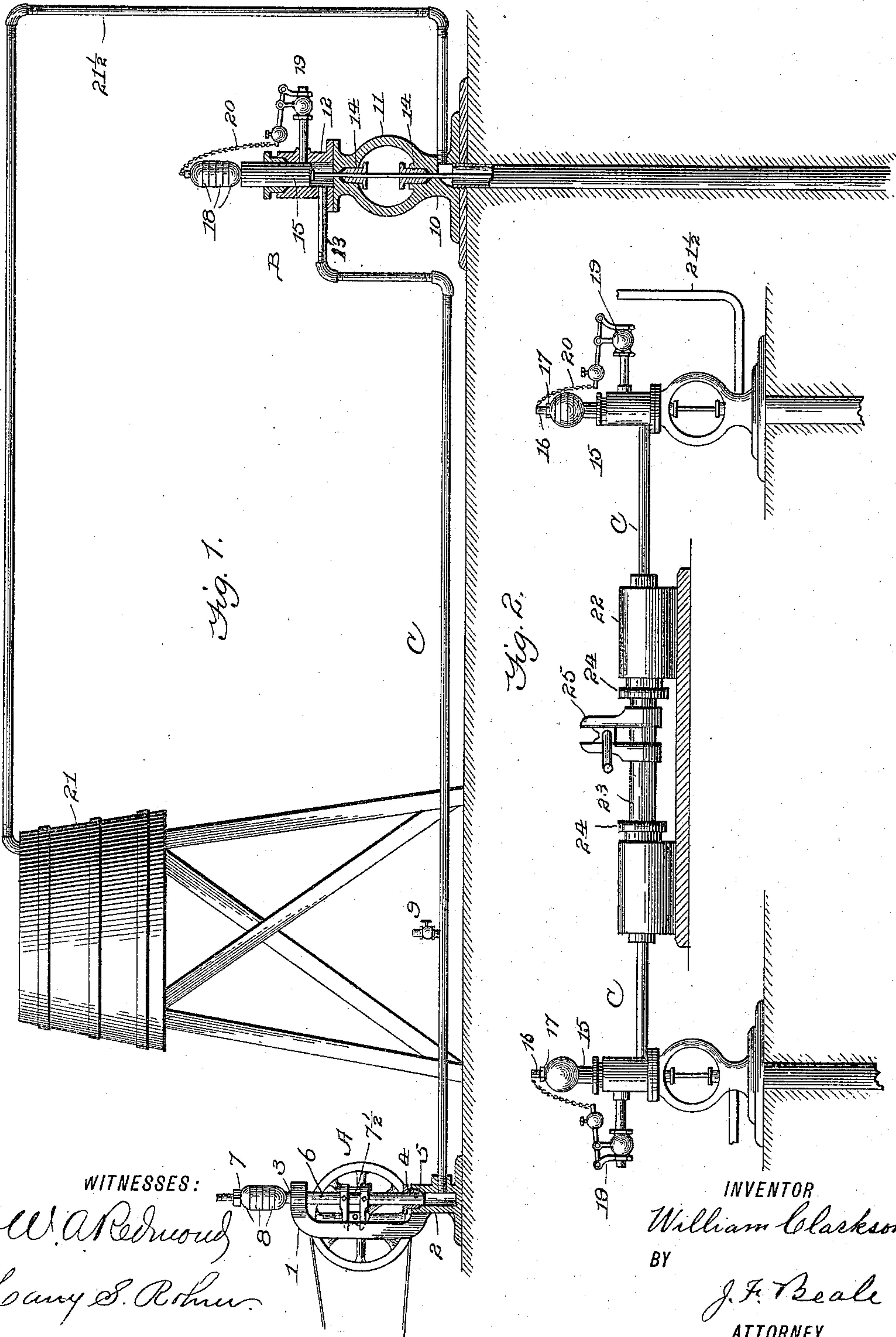
(No Model.)

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HYDRAULIC PUMP.

No. 572,963.

Patented Dec. 15, 1896.



WITNESSES:

W. A. Redmond  
Harry S. Rohrer

INVENTOR

William Clarkson

BY

J. F. Beale  
ATTORNEY.

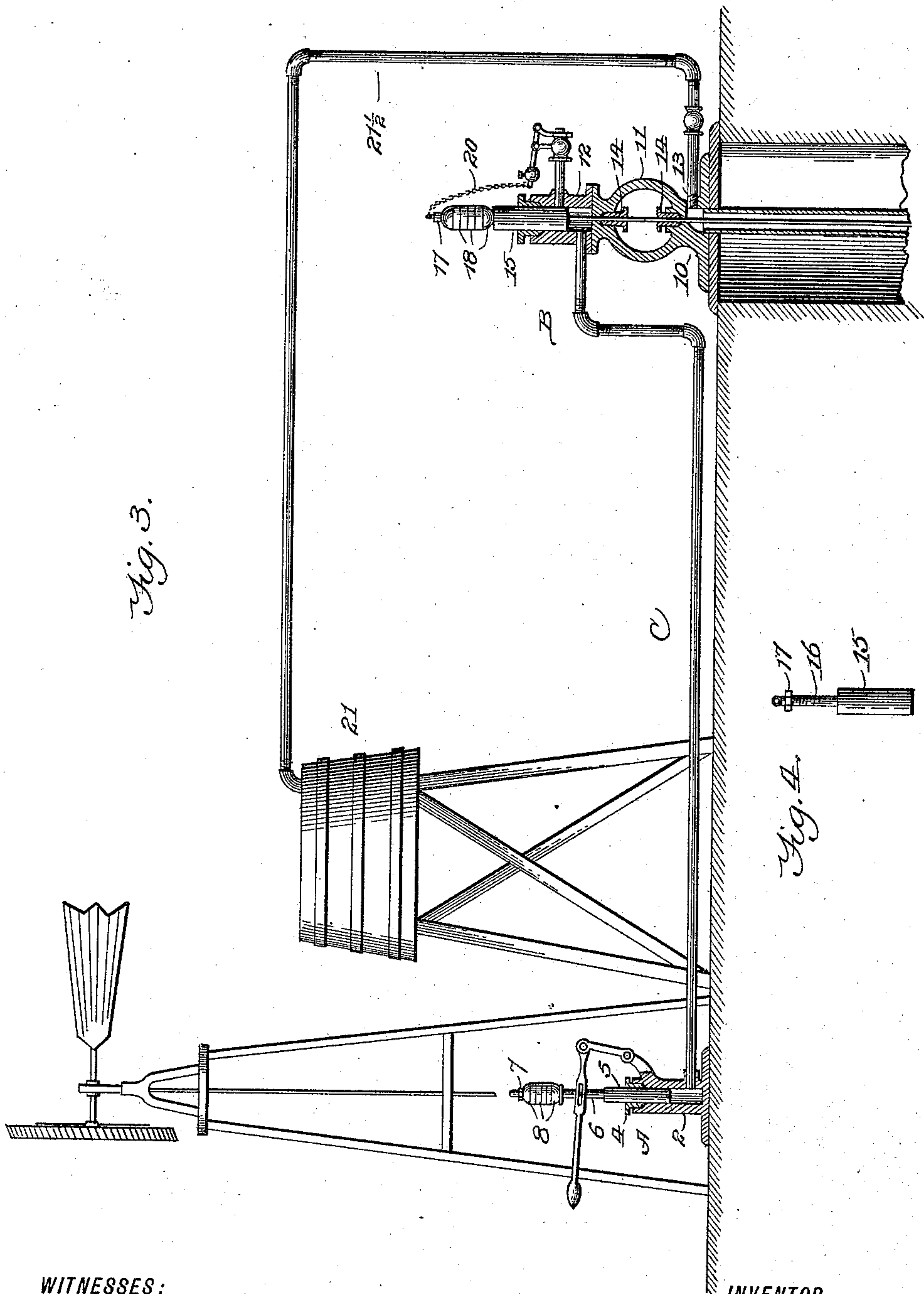
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# UNITED STATES PATENT OFFICE.

WILLIAM CLARKSON, OF CLEBURNE, TEXAS.

## HYDRAULIC PUMP.

SPECIFICATION forming part of Letters Patent No. 572,963, dated December 15, 1896.

Application filed May 12, 1896. Serial No. 591,209. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM CLARKSON, a citizen of the United States, residing at Cleburne, in the county of Johnson and State of Texas, have invented certain new and useful Improvements in Hydraulic Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to pumps, and more particularly to my improved method of pumping shown and described in an application for patent filed by me in the United States Patent Office March 4, 1896, Serial No. 581,771.

It is now my object to provide novel means for economizing power, facilitating the operation of the pump, and means for adapting my system of pumping to meet requirements when there is much difference in elevation between the driving and pumping ram.

My present invention chiefly consists in providing adjustably-weighted plungers for the two rams and weighting the driving-ram plunger sufficiently to balance the weight of the pumping-ram plunger and its attachments plus the weight or a part of the weight of water to be lifted from the well, while the latter is weighted sufficiently to insure the return flow of the liquid in the pressure-pipe upon the up or return stroke of the former.

My invention also consists in providing a pumping system for a series of two wells, or any multiple of two, whereby the weighted plungers on the pumping-rams shall counter-balance through the medium of separate liquid columns and exert an equal gravity-pressure upon opposite ends of a single power-plunger.

My invention further consists in providing a motor for operating a pump-rod designed especially to dispense with valves, valve-cages, or other impedimenta to the flow of liquid in the pressure-pipe and its ingress and egress to motor-cylinders; also, in providing a driving-ram adapted for independent connection with an engine by a belt or other means and operated by a cross-head attached to the power-plunger; also, in providing means whereby the pressure exerted upon the liquid in the pressure-pipe is alternately high and low, the high pressure being

utilized to elevate the pump or sucker rod and the low pressure to lower said rod gradually and insure the return flow of the liquid. 55

My invention further consists in the parts and combination of parts, as hereinafter set forth.

My invention is particularly valuable in a country where water is scarce or scattered and accumulated in either deep or shallow wells, which are widely separated or located at a distance from the power-station; also, as a means for pumping and conveying water from a series of wells to a settlement or town where a series of pumps are used to produce a continuous supply of water to a reservoir. 60 65

In the accompanying drawings, forming a part of this specification, Figure 1 is a view showing means for carrying out my improved method of pumping. Fig. 2 is a diagrammatic view showing means for elevating water from two wells and balancing the pumping-ram plungers through independent columns of water. Fig. 3 is a diagrammatic view showing the application of wind-wheel and hand-power to operate my pumping system. Fig. 4 is a detail. 70 75

Referring more particularly to the drawings, A denotes the driving-ram, B the pumping-ram, and C a pipe containing oil or water, which is confined in said pipe and cylinders between the plungers of the two rams. 80

The driving-ram, as shown in Fig. 1, is adapted to be operated by a belt. It is constructed with a standard 1, having a cylinder 2 cast integral with its base. The standard 1 extends upwardly above said cylinder and is turned inwardly over the same. 85

3 denotes a perforation in the upper portion of the standard, directly over and in line with the bore of said cylinder. 4 denotes a stuffing-box in the upper end of said cylinder. 5 denotes a plunger entering the upper end of said cylinder and provided with a stem 6, which plays through the perforation 3. Said stem is screw-threaded at its upper end and provided with a clamping-nut 7. 90 95

8 denotes a series of weights, the upper and lower ones of which are hemispherical in shape and the intermediate ones disk-shaped. Said weights are formed with central perforations which register with the stem 6 and are secured in place thereon by the nut 7. 100



7½ denotes an adjustable cross-head secured to said plunger and is of substantially the same construction as that shown in my patent of April 25, 1893, No. 496,294.

9 denotes a pump for supplying water or oil to the pipe C.

The pumping-ram is constructed with a base 10, an open yoke 11, and a cylinder 12, preferably cast in one piece. The base is provided with a branch pipe 13, connecting the supply-pipe and pump-barrel.

14 denotes two stuffing-boxes arranged in vertical alinement in the upper and lower part of the yoke 11.

15 15 denotes a plunger connected to the pump or sucker rod and entering the upper end of the cylinder 12. 16 denotes a stem connected to the upper end of said plunger and projecting above the same. It is screw-threaded and provided with a clamping-nut 17.

18 denotes weights similar in construction to the weights 8. 19 denotes a safety-valve arranged in the upper portion of said cylinder and connected by a chain 20 to the upper end of the stem 16, as shown in Fig. 1.

21 denotes the reservoir, and 21½ the supply-pipe for same.

In Fig. 2 I show my system of pumping as applied to two or more wells, in which I dispense with weighted plungers for the driving-ram and utilize or set off the weight of one pumping-ram plunger and its connections against the weight of the other, employing two columns of water separated by two cylinders having a common plunger, which, when at rest, is balanced or has an equal pressure of water upon each end. In this figure 22 denotes two cylinders arranged end to end and having a plunger 23 common to both and entering the adjacent or inner ends of said cylinders. 24 denotes stuffing-boxes for said cylinders. C denotes the two pipes connecting the outer ends of said cylinders with the pumping-ram cylinders. 25 denotes a cross-head secured to said plunger about midway of its length.

The construction of the pumping-rams for the two wells is substantially the same as before described. The wells are shown as about on a level and of equal depth, in which case the plungers are equally weighty, and the weight, including the connections of the plungers, as, for example, the weight of the pump or sucker rod, must always be sufficient to force the water or oil in either pipe back to its normal position upon the retreat of the corresponding end of the power-plunger. In case there is a difference in elevation between the two wells or where one well is deeper than the other the weight upon the pumping-ram plungers should be adjusted accordingly, so that in all cases the two plungers will counterbalance, or nearly so.

The driving or motor ram shown in Fig. 1 is utilized for operating a single pumping-ram. This motor-ram is especially adapted

to be connected to an engine by a belt and is designed to dispense with the necessity heretofore of supplying a separate pump or engine employing steam or compressed air and requiring much more expensive construction. Where this ram is at about the same level with the pumping-ram, its plunger is weighted sufficiently to equal the combined weight of the pumping-ram plunger, pump or sucker rod, and a portion if not the entire weight of water lifted at each stroke of the sucker-rod. The weight upon the pumping-ram plunger must always be sufficient to cause the return flow of the liquid in pipe C upon the upstroke of the power-plunger. When there is a difference in elevation between the two rams, the weights are so adjusted that sufficient weight is placed on the plunger of the lower ram to meet the additional weight of the column of liquid in the pipe C and insure its return flow. It is evident that the driving-power is thus employed, first, in lifting the water from the well, and, secondly, in lifting the weight of the power-plunger. Therefore about an equal amount of power is exerted by the engine in effecting the down as well as the up stroke of the power-plunger.

In some instances it may be advantageous to have the weights of the two plungers so adjusted that the power-plunger should weigh about the same as the pumping-plunger plus the weight of the pump-rod. In such case the driving power is chiefly exerted upon the downstroke of the power-plunger. It is evident that as the pressure in the pipe C is instantly relieved upon the completion of the upstroke of the pump-plunger, the downstroke of this plunger is effected by gravity only, affording a gradual and easy descent of the sucker-rod without exerting any pressure or crowding of the pump-valve upon the receding water in the pump-barrel. This is an important feature of my invention, as it prevents the pump choking, produces a greater vacuum, and requires less power to operate.

Another important feature of my invention is the arrangement of rams A and B with their connecting pipe, by which I confine a liquid column in the cylinders 2 and 12 and pipe C between two plungers and, without employing valves, provide for the reciprocating action of said plungers, the ingress and egress of the column of liquid into said cylinders and back and forth in said pipe.

The object in providing a safety-valve for the cylinder 12 is to prevent the hydraulic pressure driving the plunger out of the same when too much water is supplied in the pipe C. It is so arranged that before the lower end of the plunger can reach the top of the cylinder the chain will lift the safety-valve and relieve the pressure. The safety-valve also serves the purpose of an air-outlet. In Fig. 3 I have shown a driving-ram adapted to be operated by a wind-wheel or hand-



power. Any suitable means may be employed for detachably connecting the plunger to wind-wheel.

5 The operation of my system of pumping is as follows: The plunger in the ram A being raised, water is fed into the feed-pipe until the pipe C and cylinder 2 are filled. The ram A is then set in motion and its plunger forced down, driving the liquid out of the cylinder and forcing the column of liquid in the pipe C against the plunger in the pumping-ram, raising the same and lifting the pump or sucker rod. The power-plunger having completed its downward stroke then ascends and 10 the pressure on the pump-plunger being relieved it gravitates to its normal position, lowering at the same time the pump-rod. Where my system is employed in pumping two or more wells, the operation is substan- 15 tially the same, though in this case I dispense with weighted plungers for the driving-ram and use a horizontal plunger and set of cylinders, as above described, equalizing the pressure of the liquid columns on opposite 20 ends of said plunger by the weighted plunger of the two pumping-rams.

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

30 1. In a pumping apparatus the combina-

tion with a cylinder and adjustably-weighted plunger working therein and connected to a pumping-piston, of a second cylinder and an adjustably-weighted plunger working there- 35 in, a connection containing a liquid column between the fluid-spaces of said cylinders such that said weighted plungers and their connected parts may counterbalance each other, and devices for applying pressure to said liquid column for lifting the piston-ac- 40 tuating plunger, substantially as described.

2. A hydraulic pump consisting of two cyl- 45 inders arranged in horizontal alinement and having a horizontal plunger between them common to both, separate pipes connecting each of said cylinders with an upright cylin- 50 der provided with a plunger having detachable weights and said weighted plungers adapted to counterbalance each other through the medium of a liquid column contained in said pipes and cylinders and bearing upon opposite ends of said horizontal plunger, sub- 55 stantially as shown and described.

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

WILLIAM CLARKSON.

Witnesses:

D. TEUELGE,  
O. L. BISHOP.