(No Model.)

G. P. GLENN.

WATER LIFT.

No. 506,996. Patented Oct. 17, 1893.

Fig 1

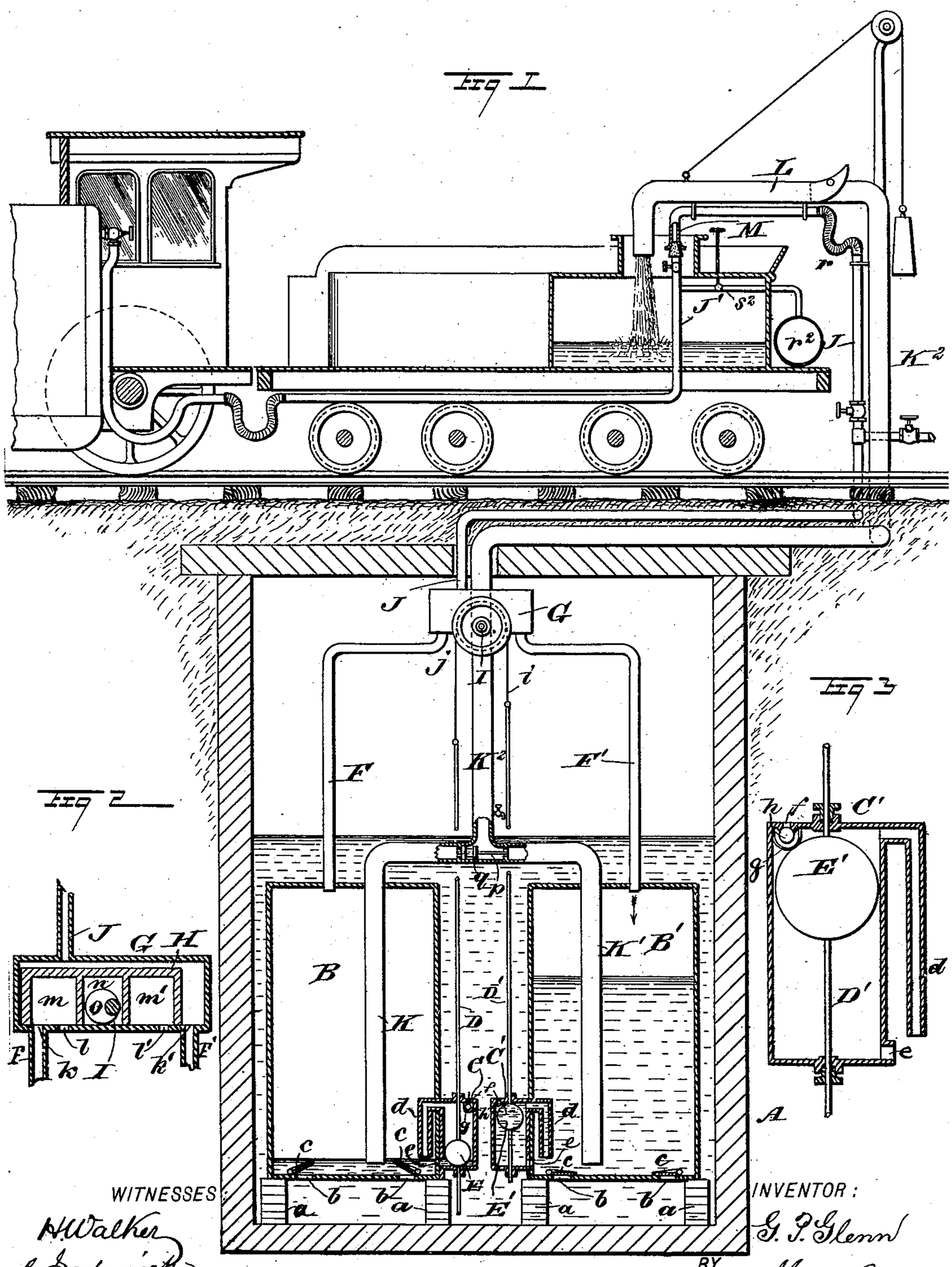

Fig 2

Fig 3

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GEORGE P. GLENN, OF JACKSONVILLE, FLORIDA.

WATER-LIFT.

SPECIFICATION forming part of Letters Patent No. 506,996, dated October 17, 1893.

Application filed February 20, 1892. Serial No. 422,276. (No model.)

To all whom it may concern:

Be it known that I, GEORGE P. GLENN, of Fairfield Suburb, Jacksonville, in the county of Duval and State of Florida, have invented a new and Improved Pneumatic Tank-Feeder, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side elevation, partly in section, of my improved water lift as adapted to feeding the tanks of locomotives. Fig. 2 is a longitudinal section of the power-shifting valve; and Fig. 3 is a vertical transverse section of one of the displacement-ball chambers.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to construct a device for lifting water for any purpose, by the application of compressed air, steam or gas from any convenient source; but especially adapted, as illustrated in this case to the feeding of locomotive water tanks by means of compressed air from the air reservoir of the air-brake system or by means of steam from the locomotive boiler.

The invention consists in the particular construction and arrangement of parts as hereinafter fully described and pointed out in the claims.

In the well or reservoir, A, are sunk one or more tanks B, B′, either on piers *a* or suspended from convenient supports above. In the bottom of each tank are formed openings *b*, provided with valves *c*, opening inward.

With the adjacent sides of the tanks are connected the displacement-ball-chambers, C, C′, each of which is provided with a siphon tube, *d*, extending into the tank and downwardly toward the bottom of the same. Below each siphon tube *d*, is an aperture *e*, for establishing a second communication between the tank and the displacement-ball-chamber, and in the top of each ball-chamber, is a vent aperture *f*, below which is a cage *g*, which contains a ball-valve *h*, which is capable of closing the aperture *f*, by floating.

Rods D, D′, extend vertically through the displacement-ball-chambers and each carries a displacement-ball E or E′, whose specific gravity is greater than that of water. The ball rods D, D′ extend upwardly above the surface of the water and are connected with a steel belt, cord or chain *i*, which extends over the valve operating pulley *j*.

In the tops of the tanks B, B′, are inserted compressed air, steam or gas pipes F, F′, which are connected with the valve chest G, through ports *k*, *k′*. In the bottom of the valve chest are formed exhaust ports *l*, *l′*. In the valve chest G, is placed the valve H, having three compartments *m*, *m′* and *n*. In the valve chest G, is journaled a shaft I, upon which, outside of the valve chest is placed the pulley *j*, while on the said shaft inside of the valve chest is secured an eccentric *o*, which revolves about its own axis and vibrates above the shaft, in the compartment *n*, of the valve H. A compressed air, steam or gas supply pipe J, is connected with the upper portion of the valve chest.

In the tanks B, B′, are inserted the discharge pipes K, K′, which are bent at right angles above the tanks and are connected with the discharge pipe K^2, and extend downwardly below the level of the siphon tubes *d*. The horizontal portions of the pipes K, K′, are axially in line, and within is supported a guide *p*, upon which is placed a valve *q*, which is capable of closing either the pipe K or K′.

The pipe K^2, extends under or above the surface of the ground after making a right-angled turn near the top of the well, and is, in this particular application, provided with a pivoted and counterweighted nozzle L, which is adapted to discharge into the locomotive tank.

The compressed air, steam or gas supply pipe J, extends along under or above ground, parallel with the pipe K^2, and is provided, in this case, with a nozzle M, connected with it by a flexible tube *r*, the nozzle M, being attached to the nozzle L, and arranged to connect with the compressed air or steam pipe J′, carried by the tender and taking compressed air from the compressed air reservoir r^2 of the air brake system or steam from the boiler of the locomotive.

When the tank is to be filled, the nozzle L is lowered and the nozzle M is placed in connection with the compressed air or steam pipe J′, the air or steam valve s^2, is opened

and compressed air or steam passes through the pipes J, J′, the valve chest G and the pipe F′, into the tank B′, the valve H being at this time, in the position shown in Fig. 2, that is to say, with the port *k′* open, so as to allow the compressed air or steam to pass through the chest G, and through the pipe F′, and with the port *k* thrown into communication with the exhaust port *l* through the compartment *m* of the valve H. Under these conditions, the water contained by the tank B′ is forced by air or steam pressure through the pipes K′, K² and the nozzle L into the locomotive tank, the valve *q*, opening automatically and closing the pipe K as the water rises in the pipe K′.

The tank B, having previously been emptied in a manner similar to that just described, by the pressure of water in the well, the exhaust is driven through the pipe F and valve chest G, and the water enters through the openings *b* and fills the tank B more rapidly than B′ can be emptied. As the tank B fills, water enters the ball-chamber C, displacing the air or steam which passes out through the aperture *f*, and as soon as the ball chamber is full of water, the valve *h*, closes the aperture *f*, and the displacement balls E, E′, being of equal size and of equal specific gravity, will hang in equilibrium over the pulley *j*, until the tank B′ is emptied. As the latter tank becomes empty, the water in the ball-chamber C′ flows out into the said tank B′, and thus the equilibrium between the balls E and E′ is destroyed and the ball E′ pulling downward with a force equal to the weight of water now displaced by E, lifts the ball E to the upper end of the ball-chamber C and itself drops to the lower end of ball-chamber C′, thus turning the pulley *j* and shaft I, shifting the valve H by means of the eccentric *o*, thus allowing the air or steam to escape from the tank B′, through the pipe F′, port *k′* and exhaust port *l′*, while the compressed air or steam from the locomotive passes through the valve chest G, port *k* and pipe F into the tank B, forcing the water through the pipes K, K² and nozzle L, as in the other case, at the same time, shifting the valve *q* so as to open pipe K and close pipe K′. In this manner the tanks B and B′ are emptied of and filled with water alternately.

In Figs. 1 and 3, the balls or cylindrical solids E, E′, together with the chambers inclosing them and all moving attachments connected therewith and with each other, constitute a power shifting motor apparatus which is operated by the alternate displacement of a portion of the water admitted to said chambers, alternately, by the action of the self same motor apparatus.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a water elevating system and with a forcing apparatus having a valved eduction pipe, the combination of a pair of forcing tanks each furnished with upwardly lifting induction valves and adapted to receive and discharge water and a forcing element alternately, a branched discharge pipe extending upwardly from the bottom of each tank, a hinged and weighted discharge nozzle terminal to said discharge pipe, an automatic check valve in each branch of said discharge pipe, a supply pipe inserted in the top of each of said tanks, a valve chest connected with said supply pipes, a power shifting valve operating within said valve chest, a third supply pipe connected with said valve chest, a jointed supply nozzle terminal to said third supply pipe and adapted to make a close piston-like connection with the eduction pipe of said forcing apparatus, a pair of valve vented chambers connected one with each of said forcing tanks by an L-shaped pipe and a communicating aperture and adapted to receive and discharge water and a forcing element alternately, a pair of solids located one within each of said vented chambers and having a specific gravity greater than that of water, a pair of rods passing axially one through each of said solids and extending piston like one through each of said chambers, a pair of belts winding partially around a pulley in opposite directions and connecting with two adjacent ends of said rods, and a pulley engaging with said belts and carrying upon its shaft a valve shifting eccentric, substantially as specified.

2. In a water elevating system, the combination of a pair of forcing tanks adapted to receive and discharge water and a forcing element alternately, a pair of valve vented chambers connected one with each of said forcing tanks by an L-shaped pipe and a communicating aperture and adapted to receive and discharge water and a forcing element alternately, a pair of displacement solids located one within each of said chambers and fastened axially one to each of a pair of rods passing piston-like one through each of said chambers, a power shifting valve, and a valve operating mechanism intermediate between said valve and said rods, substantially as specified.

3. In a valve actuating apparatus, the combination of a pair of valve vented chambers, each adapted to receive and discharge water and a forcing element alternately, a pair of displacement solids operating one within each of said chambers and having a specific gravity greater than that of water, a pair of rods passing axially one through each of said solids and extending piston like one through both ends of each of said chambers, a pair of belts winding partially around a pulley in opposite directions and connecting with two adjacent ends of said rods, and a pulley engaging with said belts and carrying upon its shaft a valve shifting eccentric, substantially as specified.

4. In a water elevating system and with a forcing apparatus having a valved eduction pipe, the combination of a tank adapted to

receive and discharge water and a forcing element alternately and provided with upwardly opening induction valves, a discharge pipe extending upwardly from the bottom of said tank, an automatic check valve in said discharge pipe, a hinged and weighted discharge nozzle attached to the same, a supply pipe entering the top of said tank, a supply nozzle attached to said supply pipe by a flexible joint, and an elastic beveled gasket located in the mouth of said supply nozzle and adapted to make a close piston like connection with the eduction pipe of said forcing apparatus, substantially as specified.

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Witnesses:
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