No. 763,063. PATENTED JUNE 21, 1904.

A. K. MANSFIELD & G. G. GUY.

RAILROAD WATER COLUMN.

APPLICATION FILED SEPT. 21, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.

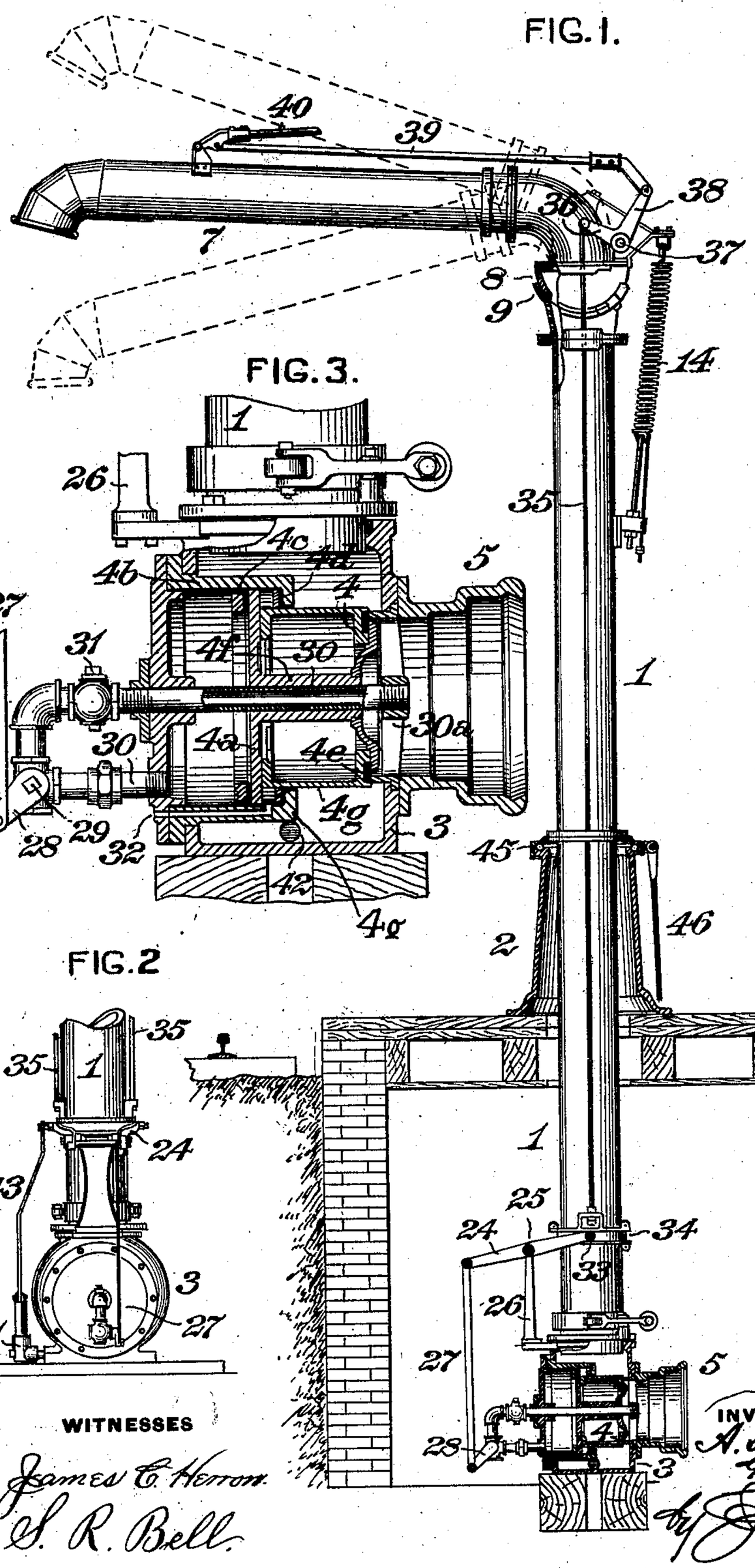

FIG. 3.

FIG. 2

WITNESSES

James C. Herron.

S. R. Bell.

INVENTORS

A. K. Mansfield.

George G. Guy.

by Thornton Bell.

Att'y.

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NO MODEL. 2 SHEETS—SHEET 2.

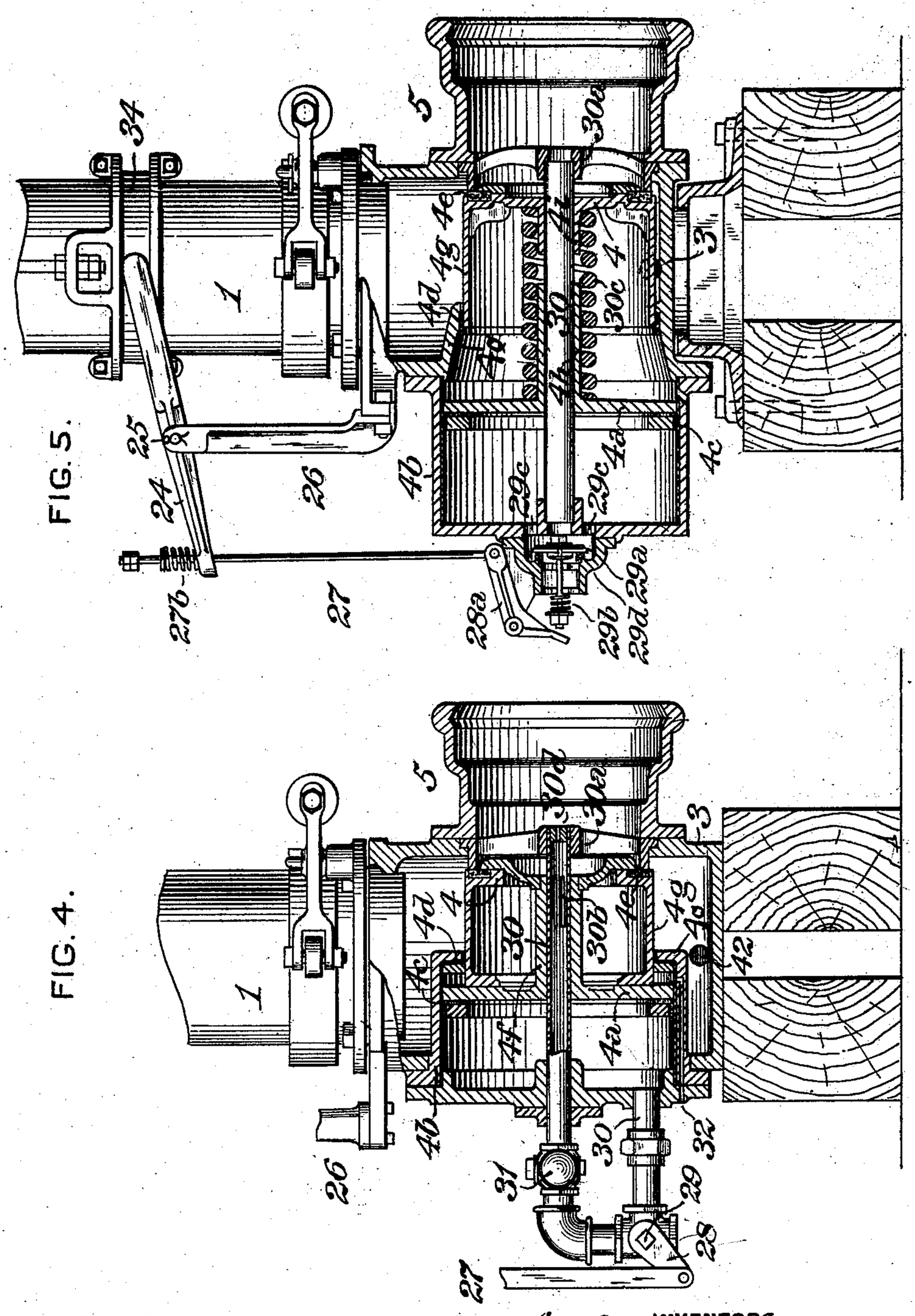

FIG. 5.

FIG. 4.

WITNESSES

James C. Herron.

S. R. Bell.

INVENTORS

A. K. Mansfield

George G. Guy

By Strawbridge & Lee, Att'y

No. 763,063. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

ALBERT K. MANSFIELD, OF SALEM, OHIO, AND GEORGE G. GUY, OF BATAVIA, ILLINOIS.

RAILROAD WATER-COLUMN.

SPECIFICATION forming part of Letters Patent No. 763,063, dated June 21, 1904.

Application filed September 21, 1903. Serial No. 173,938. (No model.)

To all whom it may concern:

Be it known that we, ALBERT K. MANSFIELD, of Salem, in the county of Columbiana and State of Ohio, and GEORGE G. GUY, of Batavia, in the county of Kane and State of Illinois, have jointly invented a certain new and useful Improvement in Railroad Water-Columns, of which improvement the following is a specification.

Our invention relates to water-columns or water-cranes for supplying water to the tenders of locomotive-engines on a line of railroad of the class in which the water-supply valve is operated by hydraulic pressure.

The object of the invention is to provide, in connection with a valve of such character, means whereby it will be so supported and actuated as to be easily and effectively operated and its tight closure will be insured.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side view, partly in section, of a water-column, illustrating an embodiment of our invention; Fig. 2, a view in elevation of the lower portion thereof as seen from the left; Fig. 3, a vertical central section, on an enlarged scale, through the casing of the water-supply valve; and Figs. 4 and 5, similar views illustrating modified forms thereof.

Our invention is herein exemplified as applied in a water-column which, otherwise than as to the water-supply valve 4 and its accessories, hereinafter described, accords substantially in its general features of construction with that set forth in Letters Patent of the United States No. 719,483, granted and issued to Albert K. Mansfield under date of February 3, 1903. As in said Letters Patent, a vertical stand-pipe 1 is suitably guided and supported, as, for example, through the intermediation of antifriction-balls 45, on a tubular stand 2, fixed to a suitable bed or base adjacent to a line of railroad-track above a pit or subjacent space in which is located the casing 3 of a horizontally-moving water-supply valve 4, which casing is provided with a nozzle 5 at one of its ends for connection with a water-supply main. The stand-pipe 1 is open at each of its ends, and at and adjoining its lower end it is fitted to turn in a properly-packed stuffing-box at the top of the water-supply-valve casing 3.

A horizontal delivery-pipe or gooseneck 7, the outer end of which is downwardly curved so as to present a horizontal discharge-opening and which may, if desired, be provided with a flexible discharge-pipe, is connected, with the capacity of movement in a vertical plane, to the stand-pipe 1 by a suitable joint formed at the upper end of the latter. The joint in the instance exemplified comprises a semicylindrical rocker 8, fixed to the inner end of the delivery-pipe 7, said rocker resting and turning on a semicylindrical seat or bearing 9, fixed to the top of the stand-pipe 1, as in Letters Patent No. 719,483 aforesaid. The overhanging weight of the delivery-pipe 7 is counterbalanced by a helical counterbalance-spring 14, connected at its upper end to the delivery-pipe and at its lower end to the stand-pipe 1.

The water-supply valve 4, which is of the lift or puppet type, is fitted to move horizontally toward and from a seat in the valve-casing 3, and when closed upon said seat it is caused to make a water-tight joint therewith by a suitable packing-ring 4^e. A piston 4^a, connected with and of greater diameter than the valve 4, is fitted to traverse in a cylinder 4^b within the valve-casing and is caused to make a water-tight joint therewith by a packing-ring or cup-leather 4^c. The inner end of the cylinder 4^b is partially closed by an annular head 4^o, having a central opening of smaller diameter than the bore of the cylinder, this head being provided for the purpose of protecting the piston from the pressure of the water when flowing through the stand-pipe 1. A central hub or sleeve 4^f, formed upon the piston 4^a, is secured to the valve 4, and a cylindrical shell 4^g extends from the valve to the piston, said shell passing freely through the opening in the inner head 4^o of the cylinder 4^b and being made water-tight at its joint therewith by a packing-ring 4^d. The central hub 4^f of the piston fits and traverses with the piston and valve lon-

gitudinally on a pipe 30, the inner end of which is open to the supply-main nozzle 5 and is fixed in an open frame or spider 30^a in the valve-casing. The pipe 30 passes through a head which closes the outer end of the cylinder 4^b and is extended downwardly and inwardly, through the interposition of suitable return-bends or elbows, to a connection with the cylinder-head below its center, the end of the pipe opening into the cylinder 4^b. One or more drain-passages 32 lead from the cylinder 4^b on the inner side of the piston to the exterior of the valve-casing. A regulating-cock 31, located in the pipe 30 exterior to the cylinder 4^b and adjustable by hand, enables the flow of water through said pipe to be regulated as desired to effect the prompt closure of the supply-valve 4.

A controlling valve or cock 29 is fitted in the pipe 30 exterior to the cylinder 4^b, said valve having an arm 28, through which it is operated, fixed upon one of its ends. The arm 28 is coupled by a rod or link 27 to the outer arms of a pair of double-armed levers 24, which are pivoted by a pin 25 on a stand 26, fixed to the top of the valve-casing 3. The upper or inner arms of the levers 24 carry upon their ends rollers 33, engaging a circumferential groove on a collar 34, which is fitted to slide vertically on the stand-pipe 1 and is coupled by rods 35 to arms 36 on a horizontal shaft 37, which is journaled on the delivery-pipe 7 adjacent to the rocker 8. The shaft 37 carries an upwardly-projecting arm 38, which may, as shown, be made integral with one of the arms 36, and the arm 38 is coupled by a rod 39 to an operating-lever 40, which is journaled on the delivery-pipe 7 near its outer end, so as to be readily accessible by the fireman of a locomotive when it is desired to supply water to a tender-tank. Upward movement of the operating-lever 40 will, through the connections above described, close the controlling-valve 29, whereupon the pressure in the water-supply main and nozzle 5 will unseat the water-supply valve 4 and water will be supplied through the stand-pipe 1 to the delivery-pipe 7. When it is desired to cut off the water-supply, the operating-lever 40 is moved downwardly into the position shown in Fig. 1, thereby, through the connections described, opening the controlling-valve 29 and admitting water through the pipe 30 to the left-hand side of the piston 4^a. Said piston being of larger diameter than the water-supply valve 4, the pressure exerted upon the piston will move it to the right, closing the valve 4 and holding it seated so long as the controlling-valve 29 remains open. Water which may leak into the space at the right of the piston escapes therefrom through the drain-passage 32.

A drain-valve 41, which controls a discharge-passage 42 in the bottom of the valve-casing 3, is connected by a rod 43 with a stud on the inner arm of one of the levers 28, the drain-valve being opened by the downward movement of said arm in the closure of the controlling-valve 29 and closed by the upward movement of said arm in the opening of the controlling-valve.

It has been developed in practice that under considerable heads the water-supply valve will sometimes be closed with undue and objectionable force, and we have therefore provided means for preventing such action, examples of which are illustrated in Figs. 4 and 5. As shown in Fig. 4, longitudinal slots 30^b (or equivalently a plurality of holes) are formed in the pipe 30, terminating at such a distance from the seat of the valve 4 as to be gradually closed or nearly closed in and by the closure of the valve, and a perforated plug 30^d is inserted in the end of the pipe adjoining the supply-main. The perforation of the plug 30^d is of sufficient diameter to supply leakage past the piston 4^a, but not so large as to admit a sufficient volume of water to cause shock. The closing pressure on the left-hand side of the piston is opposed by the pressure of water from the supply-main admitted to its opposite side through the slots 30^b, which, as before stated, are gradually closed in the closure of the valve, the result being to effect an easy and quiet seating of the latter.

In the modification shown in Fig. 5 the valve and piston are separated one from the other and a spring 30^c is interposed between and bears at its opposite ends against the valve and piston, respectively. A hub or sleeve 4^h, which fits on the pipe 30, is formed on the piston 4^a, and a similarly-fitting sleeve 4^i is formed on the valve 4, said separate and unconnected sleeves being substituted for the single connecting-sleeve 4^f, before described and shown. In operation the closing force applied to the piston is transmitted to the valve through the spring 30, and being largely absorbed by the resistance of said spring the valve is caused to seat quickly and without shock. The slots and perforated plug shown in Fig. 4 may, if desired, be used in connection with the separate piston and valve above described to effect very quiet closure.

Fig. 5 also illustrates a modified form of controlling-valve. The pipe 30 in this instance terminates at the outer end or head of the cylinder 4^b, and a valve-casing 29^d is secured to said head and surrounds the open end of the pipe 30. The interior of the valve-casing 29^d communicates with the cylinder 4^b by ports 29^c, and communication between said cylinder and the pipe 30 is governed by a controlling-valve 29^a, which is of the lift or puppet type and works between two seats, one at the end of the pipe 30 and the other in the valve-casing 29^d. The valve 29^a is normally held to the latter seat by a spring 29^b, thereby establishing communication between the pipe 30 and cylinder 4^b and admitting pressure to

the left-hand side of the piston 4ª, by which the water-supply valve 4 is held to its seat. When it is desired to open the water-supply valve 4, the controlling-valve 29ª is shifted so as to seat at the end of and close the pipe 30 and to release pressure from the left-hand side of the piston 4ª through the ports 29ᶜ to the exterior of the cylinder, whereupon the pressure in the supply-main will unseat the water-supply valve and supply water to the delivery-pipe, as in the instance first described. The seating of the controlling-valve to perform this function is effected by means of a bell-crank lever 28ª, which is pivoted on the valve-casing 29ᵈ in position to permit its lower arm to be pressed against the stem of the controlling-valve, and its upper arm is coupled to a vertical rod or stem 27. The stem 27 is adapted to be raised by a double-armed lever 24, which is pivoted by a pin 25 to a stand 26, fixed on the top of the valve-casing 3. The outer end of the lever 24 is coupled to the stem 27 through the intermediation of a spring 27ᵇ, and the inner ends are provided with rollers which engage a circumferential groove in a collar 34, fitted to slide on the stand-pipe 1 and connected to an operating-lever 40, as in the instance first described.

The stand-pipe 1 may be moved out of and into its normal position—*i. e.*, that in which the connected delivery-pipe 7 stands parallel with the railroad-track—by any suitable known means—as, for example, a hand-lever 46, pivoted to the stand-pipe above the tubular stand 2.

We claim as our invention and desire to secure by Letters Patent—

1. In a railroad water-column, the combination of a vertical stand-pipe, a horizontal delivery-pipe articulated thereto, a valve-chest in which the stand-pipe is fitted to turn, a supply-valve working in said chest and controlling communication between the stand-pipe and a water-supply main, a cylinder, connected to the valve-chest and of greater diameter than the supply-valve, a head partially closing the inner end of said cylinder, a piston fitting said cylinder and adapted to impart closing movement to the supply-valve, a cylindrical shell fixed to the supply-valve, said shell being of smaller diameter than the piston and working through the inner head of the cylinder, a pipe leading from the supply-main to the cylinder, a valve controlling said pipe, an operating-lever, and connections from said lever to said valve.

2. In a railroad water-column, the combination of a vertical stand-pipe, a horizontal delivery-pipe articulated thereto, a valve-chest in which the stand-pipe is fitted to turn, a supply-valve working in said chest and controlling communication between the stand-pipe and a water-supply main, a cylinder, connected to the valve-chest and of greater diameter than the supply-valve, a head partially closing the inner end of said cylinder, a piston fitting said cylinder and adapted to impart closing movement to the supply-valve, a cylindrical shell fixed to the supply-valve, said shell being of smaller diameter than the piston and working through the inner head of the cylinder, a pipe leading from the supply-main to the cylinder, a controlling-valve governing said pipe, a collar fitted to slide on the stand-pipe, and connections through which the controlling-valve is actuated by the longitudinal movement of said collar.

3. In a railroad water-column, the combination of a vertical stand-pipe, a horizontal delivery-pipe articulated thereto, a valve-chest in which the stand-pipe is fitted to turn, a supply-valve working in said chest and controlling communication between the stand-pipe and a water-supply main, a cylinder, connected to the valve-chest and of greater diameter than the supply-valve, a head partially closing the inner end of said cylinder, a piston fitting said cylinder and adapted to impart closing movement to the supply-valve, a cylindrical shell fixed to the supply-valve, said shell being of smaller diameter than the piston and working through the inner head of the cylinder, a pipe leading from the supply-main to the cylinder, a controlling-valve governing said pipe, an operating-lever, a collar fitted to slide on the stand-pipe, connections through which longitudinal movement is imparted to the collar by the operating-lever, and connections through which the controlling-valve is actuated by the longitudinal movements of the collar.

4. The combination of a supply-main, a valve-chest communicating therewith, a cylinder connected to said valve-chest, a pipe fixed in the valve-chest and leading from the supply-main to said cylinder, a controlling-valve governing said pipe, a piston fitted to traverse on said pipe in said cylinder, and a supply-valve, of smaller diameter than said piston, and actuated, as to its closing movements, thereby, said supply-valve controlling communication between the supply-main and valve-chest and being fitted to traverse upon said pipe.

5. The combination of a supply-main, a valve-chest communicating therewith, a cylinder connected to said valve-chest, a head partially closing the inner end of said cylinder, a pipe fixed in the valve-chest and leading from the supply-main to said cylinder, a controlling-valve governing said pipe, a piston fitted to traverse on said pipe in said cylinder, a supply-valve, of smaller diameter than said piston, controlling communication between the supply-main and valve-chest, a central sleeve fitting freely on said pipe and fixed to the supply-valve, and a cylindrical shell fixed to the supply-valve and fitting an opening in the inner head of the cylinder in which the piston traverses.

6. The combination of a supply-main, a valve-chest communicating therewith, a cylinder connected to said valve-chest, a pipe fixed in the valve-chest and leading from the supply-main to said cylinder, a controlling-valve governing said pipe, a piston fitted to traverse on said pipe in said cylinder, a supply-valve of smaller diameter than said cylinder, said supply-valve controlling communication between the supply-main and valve-chest and being fitted to traverse upon said pipe, and means for imparting closing movement to the supply-valve by the piston.

7. The combination of a supply-main, a valve-chest communicating therewith, a cylinder connected to said valve-chest, a pipe fixed in the valve-chest and leading from the supply-main to said cylinder, a controlling-valve governing said pipe, a piston fitted to traverse on said pipe in said cylinder, a supply-valve of smaller diameter than said cylinder, said supply-valve controlling communication between the supply-main and valve-chest and being fitted to traverse upon said pipe, means for imparting closing movement to the supply-valve by the piston, and means for reducing shock in the action of the piston upon the supply-valve.

8. The combination of a supply-main, a valve-chest communicating therewith, a cylinder connected to said valve-chest, a pipe fixed in the valve-chest and leading from the supply-main to said cylinder, a controlling-valve governing said pipe, a piston fitted to traverse on said pipe in said cylinder, a supply-valve of smaller diameter than said cylinder, said supply-valve controlling communication between the supply-main and valve-chest and being fitted to traverse upon said pipe, and a spring interposed between the piston and supply-valve and transmitting closing movement to the latter from the former.

ALBERT K. MANSFIELD.
GEORGE G. GUY.

Witnesses as to A. K. Mansfield:
K. L. WEBSTER,
CORA V. PRICHETTE.
Witnesses as to George G. Guy:
KATHERINE O'CONNOR,
ANDREW BARR.