No. 719,483. PATENTED FEB. 3, 1903.

A. K. MANSFIELD.

RAILROAD WATER COLUMN.

APPLICATION FILED MAR. 3, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.

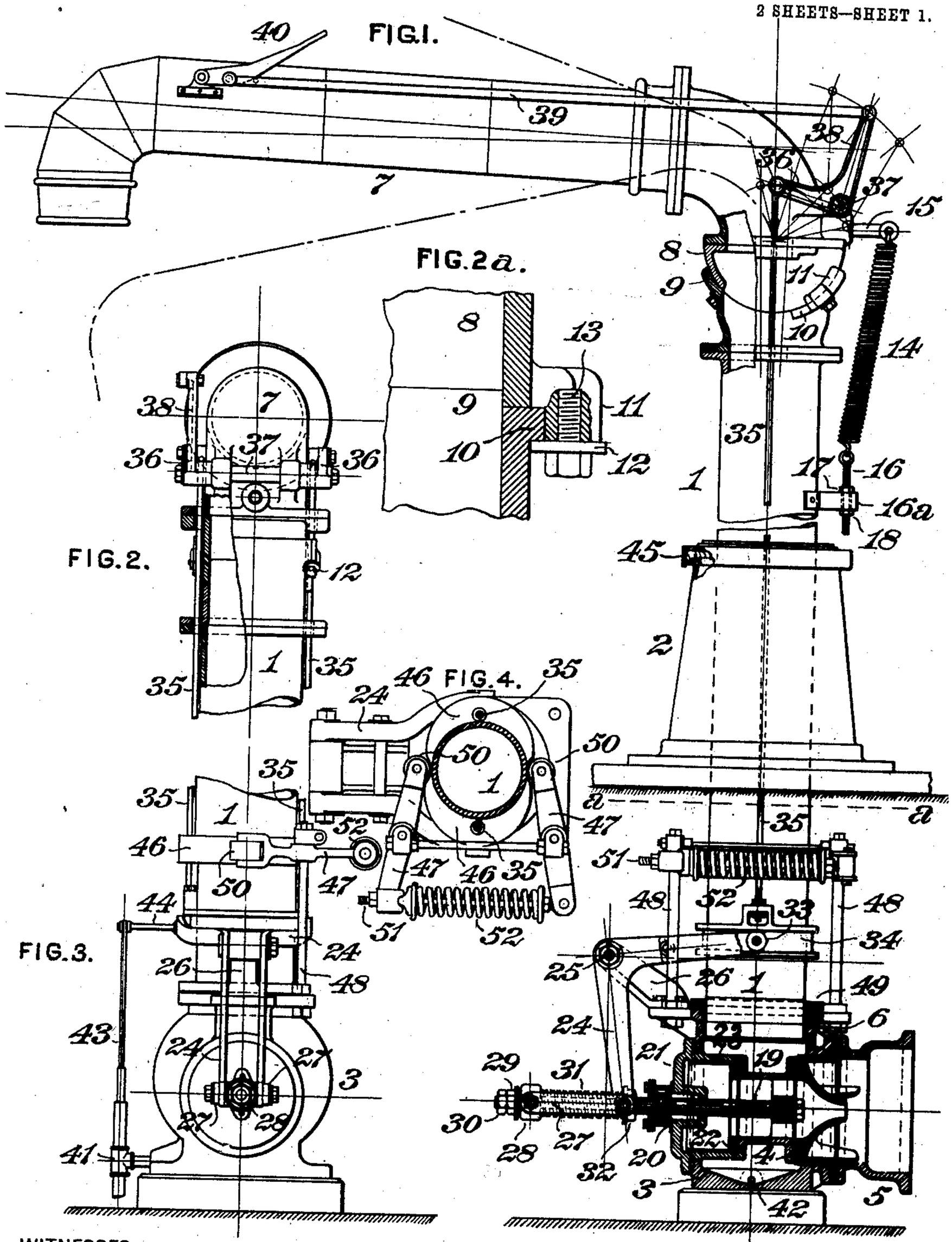

FIG. 2a.

FIG. 2.

FIG. 4.

FIG. 3.

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NO MODEL. 2 SHEETS—SHEET 2.

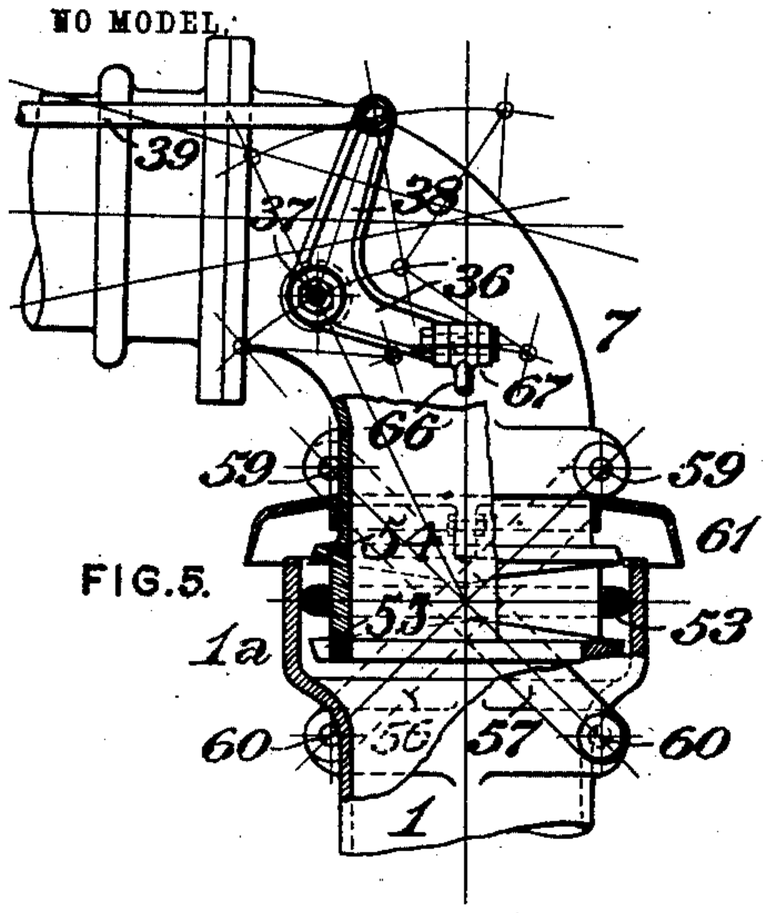


FIG. 5.

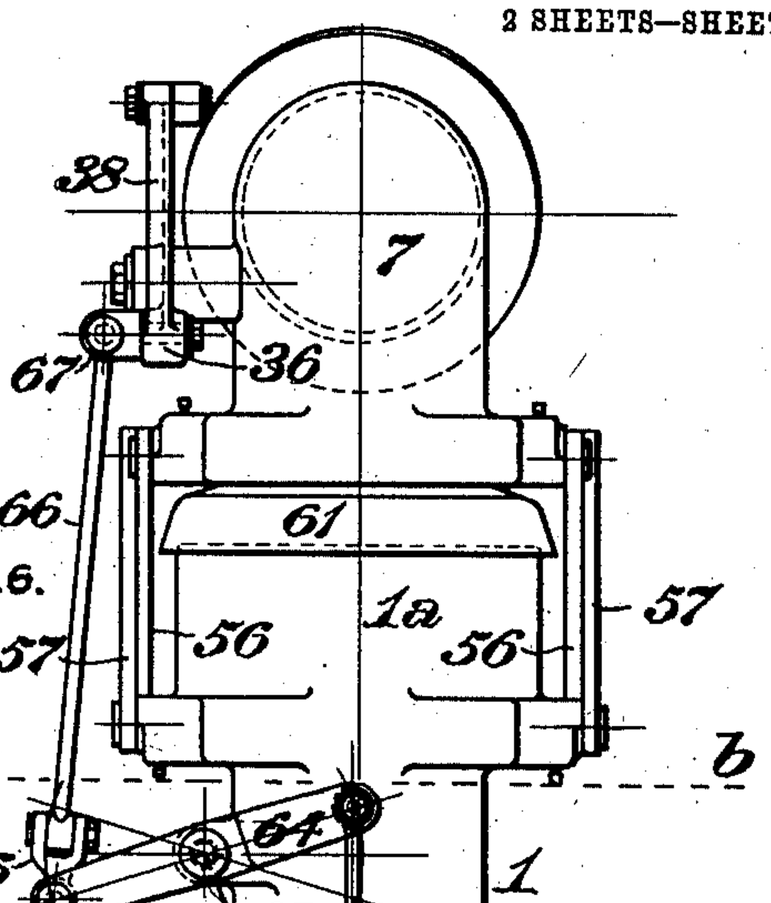


FIG. 6.

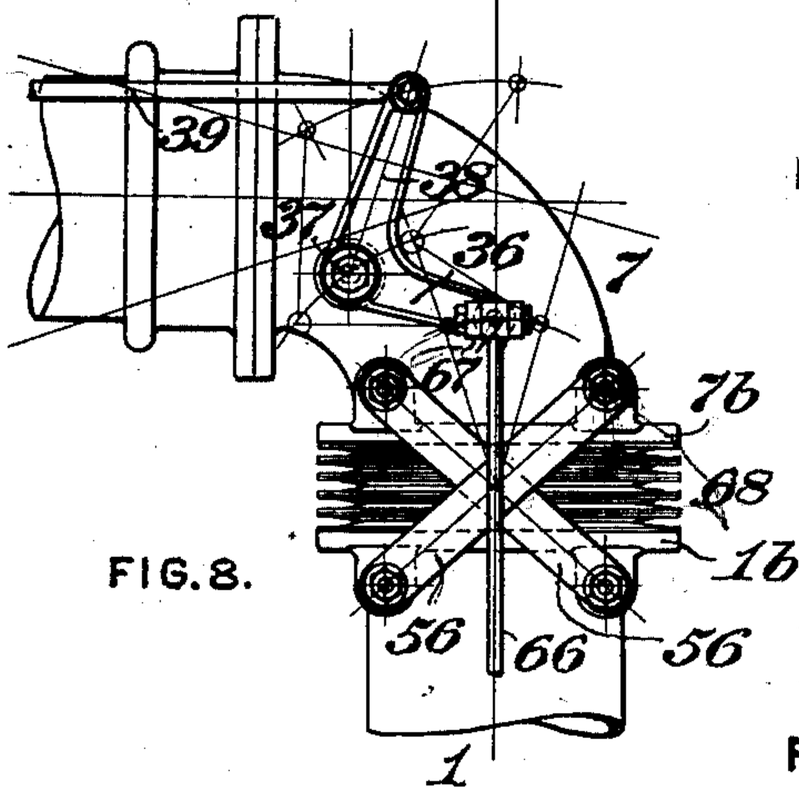


FIG. 8.

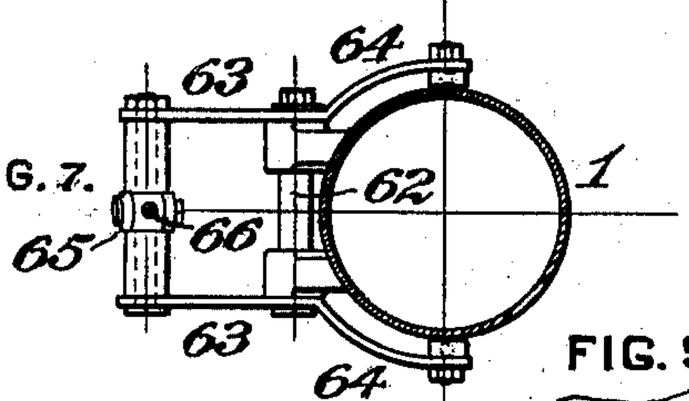


FIG. 7.

FIG. 9.

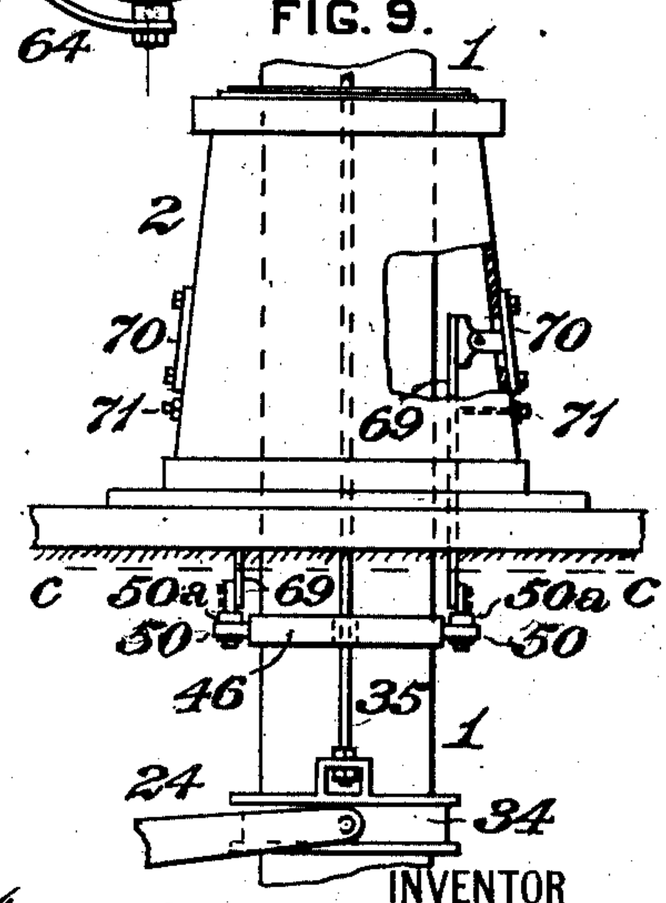
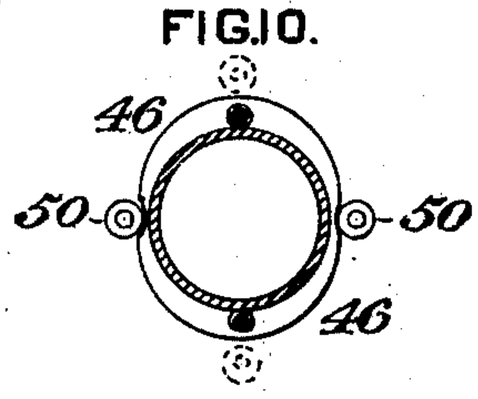


FIG. 10.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALBERT K. MANSFIELD, OF SALEM, OHIO.

RAILROAD WATER-COLUMN.

SPECIFICATION forming part of Letters Patent No. 719,483, dated February 3, 1903.

Application filed March 3, 1902. Serial No. 96,470. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. MANSFIELD, of Salem, in the county of Columbiana and State of Ohio, have invented a certain new and useful Improvement in Railroad Water-Columns, of which improvement the following is a specification.

My present invention relates to water-columns or water-cranes for supplying water to the tenders of locomotive-engines on a line of railroad, and is an improvement upon those for which Letters Patent of the United States Nos. 304,741 and 429,141 were granted and issued to me under dates of September 9, 1884, and June 3, 1890, respectively.

The object of my invention is to provide a joint between the vertical and horizontal pipes of the column, which shall be of simplified construction and of such character as to be completely drained and fully protected against freezing in extremely cold weather, as well as to provide simplified and improved means for counterbalancing the horizontal pipe, maintaining the column in normal position, and actuating the water-supply valve.

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 my invention; Fig. 2, a view, partly in section, of the upper portion of the same as seen from the right of Fig. 1; Fig. 2ª, a sectional view, on an enlarged scale, illustrating the relation of the guide-flanges of the stand-pipe and delivery-pipe; Fig. 3, a view in elevation of the lower portion of the water-column as seen from the left of Fig. 1; Fig. 4, a horizontal section on the line *a a* of Fig. 1; Fig. 5, a view, partly in elevation and partly in section, showing a structural modification of the joint between the stand and delivery pipes; Fig. 6, a view in elevation of the same as seen from the right of Fig. 5; Fig. 7, a horizontal section on the line *b b* of Fig. 6; Fig. 8, a view in elevation showing another structural modification of the joint; Fig. 9, a view, partly in section, of the support or stand of the stand-pipe and of a portion of said pipe, showing a modified form of the automatic cam-adjusting mechanism; and Fig. 10, a horizontal section on the line *c c* of Fig. 9.

In the practice of my invention I provide a vertical stand-pipe 1, which 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 freely in a properly-packed stuffing-box 6, provided with a gland 49 on the top of the water-supply valve-casing.

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 joint formed at the upper end of the latter. The joint between the stand-pipe and delivery-pipe is preferably, as in the instance exemplified, a cylindrical one, this form presenting the substantial advantage of enabling outside trunnions to be dispensed with, as the delivery-pipe turns and bears directly upon the stand-pipe, and its axis is preferably located approximately in line horizontally with the discharge-opening of the delivery-pipe. The delivery-pipe 7 is curved downwardly adjoining its inner end through an arc of ninety degrees, and a semicylindrical rocker 8 is fixed to its lower end, the axis of said rocker intersecting that of the stand-pipe 1. The rocker 8 is provided with an opening through which communication is maintained between the stand-pipe and the delivery-pipe in any and all positions of the latter and for convenience of construction is preferably, as shown, made in a separate section from the delivery-pipe and suitably secured thereto. The upper end of the stand-pipe 1 is bored out truly to form a semicylindrical seat or bearing 9, in and on which the rocker 8 turns and rests, and is also, to facilitate machining it, preferably made as a separate section of the stand-pipe and secured thereto in the ordinary manner. It will be seen that such up-

ward and downward movements of the delivery-pipe as may be made to suit tender-tanks of different heights are made about a horizontal axial line intersecting the vertical axis of the stand-pipe—*i. e.*, the common axis of the rocker and its seat or bearing. The rocker 8 and its bearing 9 are maintained in normal operative relation and the delivery-pipe guided in its movements about the axial line of the rocker by guide-flanges 10, which are formed on the ends of the seat or bearing 9 and are finished on a radius of curvature concentric with that of the faces thereof on which the rocker rests, said flanges abutting against correspondingly-curved flanges 11 on the ends of the rocker and being maintained in contact therewith by collars or washers 12 on bolts 13, which are tapped into the flanges 11. The bolts 13 are set so as to maintain the fixed and movable members in normal operative relation without imposing undue frictional resistance to the movement of the latter.

In order to counterbalance the overhanging weight of the delivery-pipe 7, it is connected on the side of the rocker farther from its discharge end to the stand-pipe 1 by a helical counterbalance-spring 14, the upper end of which is coupled to an arm or stud 15, projecting from the rocker, and the lower end to a bolt 16, which passes freely through a lug 16ª, bolted to the stand-pipe, and is provided with nuts 17 18 above and below the lug, by which the tension of the spring may be adjusted as desired. The spring is preferably of such tension as to return the delivery-pipe to and maintain it in normal horizontal position after the release of manual power by which it has been moved to a higher or lower position for the delivery of water to a tender-tank.

The water-supply valve 4, which is of the lift or puppet type and is provided with ordinary guide-wings, is fitted to move horizontally toward and from its seat in the valve-casing 3 and is fixed upon a stem 19, passing through a properly-packed stuffing-box 20 in a removable head 21, which closes the end of the valve-casing opposite that to which the nozzle 5 for the supply-main is connected. The valve is, as in Letters Patent No. 429,141 aforesaid, approximately balanced or slightly underbalanced by a hydraulic packing 22, fitted in its periphery and working in a cylinder 23, which is of less diameter than the valve, and may be, as shown, made integral with the head 21.

A bell-crank 24, which for convenience of construction and connection is preferably made in two sections located on opposite sides of the valve-stem 19 and connected by socket-bolts, as shown, is pivoted by a pin or bolt 25 at its angle to a bracket 26, which is bolted to the top of the valve-casing 3. The double lower arm of the bell-crank 24 is coupled to the inner ends of a pair of horizontal links 27, the outer ends of which are coupled to a collar 28, which is fitted to slide freely on the valve-stem and to abut, when moved by the bell-crank, against an adjusting-nut 29, which engages a thread on the valve-stem adjacent to its outer end and is preferably held in position by a lock-nut 30. A helical valve-spring 31, which surrounds the valve-stem, abuts at one end against the inner face of the collar 28 and at the other against the outer face of an adjusting-nut 32, engaging a thread on the valve-stem adjacent to the stuffing-box 20, by which nut the tension of the valve-spring 31 may be varied as desired. It will be seen that the spring 31, which is so adjusted as to counterbalance the valve 4 and hold it to its seat, will yield and permit the valve to be unseated by any excess of pressure in the supply-main, upon the release of which by the resultant passage of water from the supply-main to the stand-pipe 1 it will return the valve to and maintain it in contact with its seat, thereby cutting off the flow of water from the main. The two sections of the upper arm of the bell-crank 24 are curved outwardly and 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, unseat the water-supply valve 4 for the delivery of water from the main through the pipe 7, and upon the release of the lever the spring 31 will reseat the valve.

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 44 on the upper arm of the bell-crank 24, the drain-valve being opened by the downward movement of said arm in the closure of the supply-valve 4 and closed by the upward movement of said arm in the opening of the supply-valve. It will be seen that the arc of traverse of the ends of the arms 36 in the movement of the delivery-pipe about the axis of the rocker 8 so nearly approaches a straight line as not to cause the valve 4 to be affected by such movement.

In order to maintain the stand-pipe in its normal position—*i. e.*, that in which the connected delivery-pipe 7 stands parallel with the railroad-track—and to return it to such position after it has been turned for the supply of water to a tender, a cam 46 is formed or fixed upon the stand-pipe 1 at a point above the collar 34 and between it and the tubular supporting-stand 2. The cam 46 is

substantially elliptical in form, its smaller diameter, which is equal or about equal to that of the stand-pipe, being in a plane transverse to the track and its larger diameter in a plane parallel therewith. The vertical rods 35, which connect the sliding collar 34 with the arms of the upper horizontal shaft 37, pass freely through openings in the projecting portions of the cam. Two horizontal cam-levers 47 are journaled on vertical standards 48, secured to the stuffing-box 6, which packs the joint between the lower end of the stand-pipe and the valve-casing 3. The levers 47 abut at one end through the intermediation of friction-rollers 50 on the periphery of the cam 46 and are coupled at their opposite ends by a rod 51, around which is coiled a helical spring 52, which acts with a constant tendency to force the adjacent ends of the levers away from each other, and consequently to maintain the rollers on their opposite ends in contact with the cam. It will be seen that under this construction the rollers will stand on the greater diameter of the cam when the stand-pipe is turned into position which brings the delivery-pipe into a plane transverse to the track, and that when the delivery-pipe is released from being held in such position the spring will cause the rollers to press upon the cam and turn the stand-pipe into and hold it in its normal position parallel with the track, in which position they abut against the cam on its smaller diameter, as shown in Fig. 4. The standards which support the cam-levers may be applied in either of two positions, either as shown or at right angles thereto, which enables the delivery-pipe to be pointed as desired. A substantial advantage of the cam mechanism above described results from its location above the sliding collar, which is enabled to be brought close to the valve-casing and to be used with a correspondingly smaller bell-crank.

Figs. 5 to 7, inclusive, illustrate a structural modification in which the joint between the stand-pipe and the delivery-pipe is, as in the instance first described, made on the stand-pipe, but in which the bearing of the movable member on and its articulation to the fixed member are effected by means which differ in detail from those of the former instance. In this case the downwardly-turned portion of the delivery-pipe 7 at its end adjoining the stand-pipe 1 is prolonged, so as to extend into a bowl or enlarged section 1^a at and adjoining the upper end of the stand-pipe. The opening between the delivery-pipe and the bowl is closed by an elastic packing-ring 53, of circular section, which prevents the escape of water, while permitting the desired movement of the delivery-pipe, and is held in position, with the capacity of rolling slightly, by upper and lower double-inclined peripheral flanges 54 55 on the delivery-pipe. The delivery-pipe is coupled to the stand-pipe by two pairs of crossed links 56 57, which are pivoted to pins 59 and 60, fixed on the delivery-pipe and on the stand-pipe, respectively, the pairs of links being located on opposite sides of the delivery-pipe and in planes parallel with the vertical central plane thereof. The ingress of foreign matter to the bowl 1^a and packing-rim 53 is prevented by a hood or downwardly-turned circumferential flange 61 on the delivery-pipe. Under the above construction the delivery-pipe is, as in the instance first described, movable about a horizontal line intersecting the vertical axis of the stand-pipe 1, the axial line of the movement of the delivery-pipe being in this instance a line passing through the points of intersection of the crossed coupling-links 56 57. Movement is transmitted from the connecting-rod 39 of the operating-handle to the rods 35, which raise and lower the sliding collar 34, before described, through a shaft 37, journaled on the delivery-pipe and carrying bell-crank lever-arms 36 38, as in the former instance. The shaft 37 is, however, in this case provided with only one lower arm 36, which arm is turned away from instead of toward the discharge end of the delivery-pipe and is coupled to the rods 35 through the intermediation of a rock-shaft 62, journaled on the stand-pipe and carrying pairs of oppositely-projecting arms 63 64. The arms 63 are coupled by a swivel or universal joint 65 to the lower end of a rod 66, the upper end of which is coupled by a swivel or universal joint 67 to the lower arm 36 of the shaft 37. The opposite arms 64 of the rock-shaft are coupled directly to the rods 35. This construction enables the movement of the delivery-pipe to be effected without disturbance of the sliding collar 34 and the connected water-supply valve.

The modified form shown in Fig. 8 differs from that last above described only in the particular that instead of providing the stand-pipe with an end bowl and having the lower end of the delivery-pipe projecting into the stand-pipe and provided with a packing-ring and retaining-flanges the adjacent ends of the stand-pipe and delivery-pipe are provided with circumferential flanges 1^b and 7^b, respectively, and said flanges are connected by a flexible conduit-section 68, which is preferably composed of leather or rubber rings riveted together in accordion or bellows form, as shown. The interposition of the flexible section admits of the movements of the delivery-pipe without requiring the employment of packing to prevent leakage.

The automatic cam mechanism shown in Figs. 9 and 10 accords with that shown in Figs. 1, 3, and 4 and previously described in the particular of being located above the sliding collar 34, through which the water-supply valve is actuated, and of correspondingly admitting of the employment of a smaller bell-crank. In lieu, however, of using pivoted cam-levers and an intermediate spring, as in the construction of Figs. 1, 3, and 4, the roll-

ers 50 are in this instance journaled on blocks 50ª, and each roller is pressed up to the surface of the cam 46 by a flat spring 69, the lower end of which is secured to the adjacent block 50ª and the upper end connected, preferably by a pivot, to a plate 70, fitting over an opening in the wall of the stand or support 2 of the stand-pipe and secured removably thereto. The tension of the springs 69 may be varied as desired by set-screws 71, engaging threads in the wall of the stand 2 and bearing at their inner ends on the springs. The relation of the cam and rollers to the stand-pipe and the operation of the mechanism in returning the stand-pipe to and maintaining it in normal position are similar to the corresponding features of the construction first described.

In constructions known in the art prior to my invention the delivery-pipe has been connected to the stand-pipe by a joint in order to admit of movement of the former relatively to the latter; but so far as my knowledge and information extend the joint has always heretofore been formed in or in the line of the horizontal delivery-pipe. The provision of a joint in the vertical stand-pipe, which is a distinguishing and characteristic feature of my present invention, attains the substantial advantage of insuring complete drainage of water and where a cylindrical joint is employed of enabling trunnions and trunnion-bearings to be dispensed with. By locating the axis of the joint substantially in line horizontally with the discharge-opening of the delivery-pipe the versed sine of the arc described by the outer end of the delivery-pipe is reduced to the minimum, and the movement of the discharge-opening away from the central plane of the track in being raised or lowered is correspondingly reduced.

I claim as my invention and desire to secure by Letters Patent—

1. In a railroad water-column, the combination of a vertical stand-pipe, with a substantially horizontal delivery-pipe articulated thereto by a joint yielding only in a vertical plane, said joint being located below the axial line of the delivery-pipe and concentric with the axial line of the stand-pipe.

2. In a railroad water-column, the combination of a vertical stand-pipe, a substantially horizontal delivery-pipe, a yielding joint connecting the two pipes below the longitudinal axis of the delivery-pipe, and means restraining said joint from yielding in any but a vertical plane.

3. In a railroad water-column, the combination of a vertical stand-pipe mounted to turn on its vertical axis, a substantially horizontal delivery-pipe mounted on said stand-pipe so as to always turn therewith, said pipes being connected by a joint located below the longitudinal axis of the delivery-pipe and on the axis of the stand-pipe.

4. In a railroad water-column, the combination of a vertical stand-pipe mounted to turn on its vertical axis, a substantially horizontal delivery-pipe mounted to turn only in a vertical plane on said stand-pipe, the joint between said pipes being below the longitudinal axis of the delivery-pipe and around the axis of the stand-pipe.

5. In a railroad water-column, the combination of a vertical stand-pipe revoluble only on its vertical axis, a substantially horizontal delivery-pipe mounted to turn on said stand-pipe around a joint below the longitudinal axis of the delivery-pipe, and means restraining said delivery-pipe from movement relative to the stand-pipe except in a vertical plane.

6. In a railroad water-column, the combination of a vertical stand-pipe having a cylindrical seat or bearing at its upper end, a horizontal delivery-pipe having a cylindrical end rocker fitting said seat or bearing, abutting guide-flanges formed on the seat and on the rocker, and adjustable connections for maintaining said guide-flanges in operative relation.

7. In a railroad water-column, the combination of a vertical stand-pipe, a horizontal delivery-pipe articulated thereto to swing in a vertical plane, and means normally holding said delivery-pipe substantially horizontal and automatically returning it to the horizontal position both from points above and points below the horizontal, whereby said delivery-pipe may be depressed for low engines, and raised for high ones.

8. In a railroad water-column, the combination of a vertical stand-pipe, a horizontal delivery-pipe articulated thereto to swing in a vertical plane, and a spring normally holding said delivery-pipe substantially horizontal and automatically returning it to the horizontal position both from points above and points below the horizontal, whereby said delivery-pipe may be depressed for low engines, and raised for high ones.

9. 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, and which is open at its top to the stand-pipe, and at one end to a water-supply main, a supply-valve fitted to move horizontally in said chest and control communication between the supply-main and stand-pipe, a collar fitted to slide on the stand-pipe, a bell-crank lever journaled on a fixed support above the valve-chest and having its opposite arms coupled directly to the stem of the supply-valve and to the sliding collar, respectively, and connections for moving the sliding collar longitudinally on the stand-pipe.

10. 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 collar fitted

to slide on the stand-pipe, connections through which longitudinal movement is imparted to the sliding collar and from said collar to the supply-valve, a cam fixed on the stand-pipe above the sliding collar and provided with openings for the passage of the operating connections of said collar, a roller abutting on the surface of the cam, and a spring bearing on the roller and maintaining it in operative relation to the cam.

11. 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 collar fitted to slide on the stand-pipe, connections through which longitudinal movement is imparted to the sliding collar and from said collar to the supply-valve, a cam fixed on the stand-pipe above the sliding collar and provided with openings for the passage of the operating connections of said collar, a roller journaled in a block and abutting on the surface of the cam, and a flat or plate spring connected at one end to the cam-journal block and at the other to a fixed support or abutment.

12. 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 collar fitted to slide on the stand-pipe, connections through which longitudinal movement is imparted to the sliding collar and from said collar to the supply-valve, a cam fixed on the stand-pipe above the sliding collar and provided with openings for the passage of the operating connections of said collar, a roller journaled in a block and abutting on the surface of the cam, a flat or plate spring connected at one end to the cam-journal block and at the other to a fixed support or abutment, and an adjusting-screw engaging a thread on a fixed support and bearing on the spring.

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