No. 885,165. PATENTED APR. 21, 1908.

A. K. MANSFIELD.

WATER COLUMN.

APPLICATION FILED JULY 21, 1906.

2 SHEETS—SHEET 1.

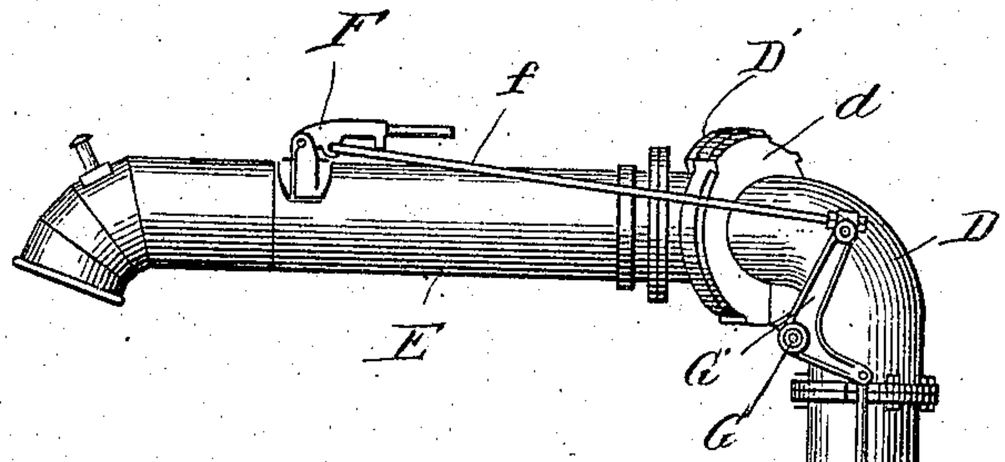


Fig. 2.

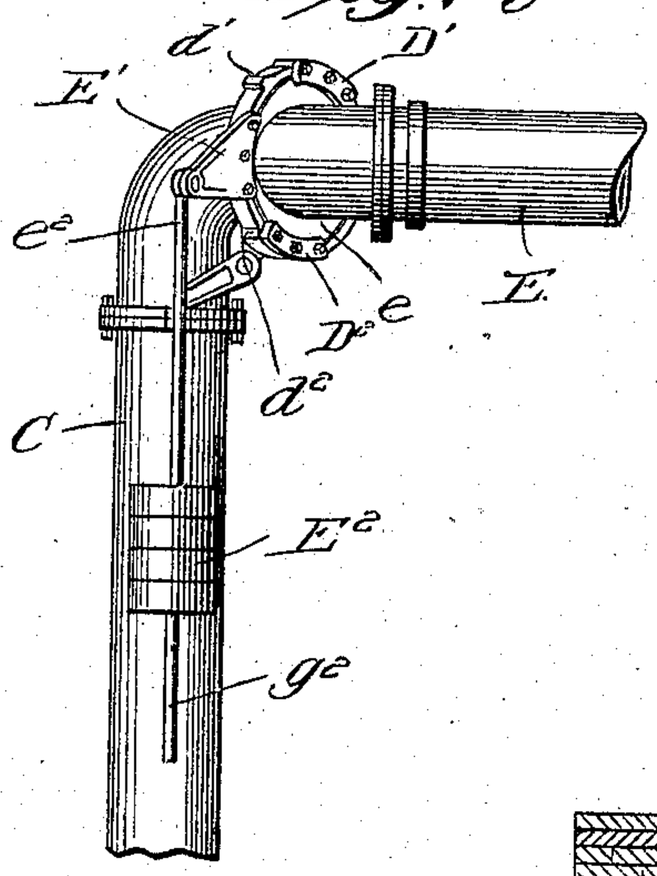


Fig. 1.

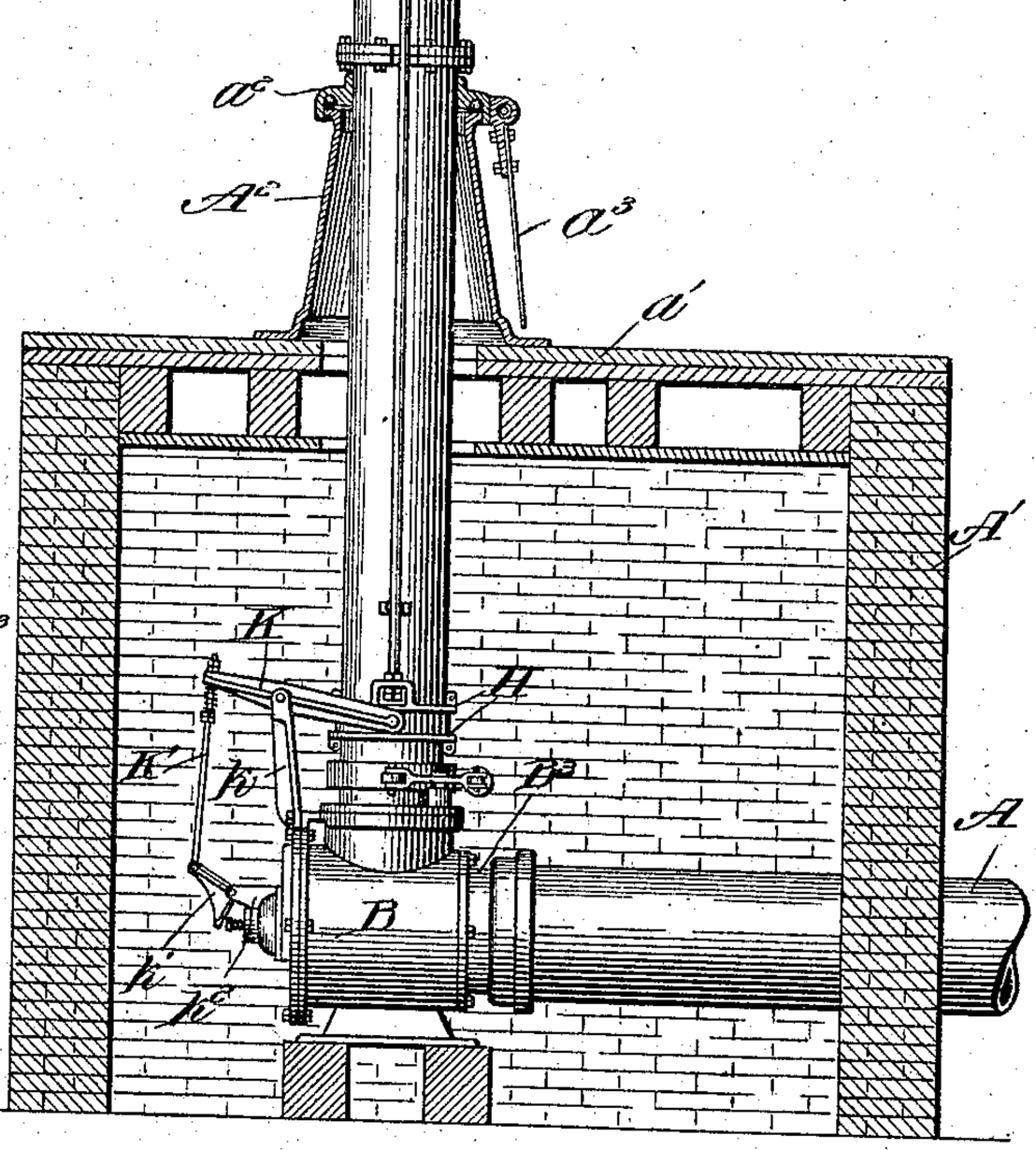
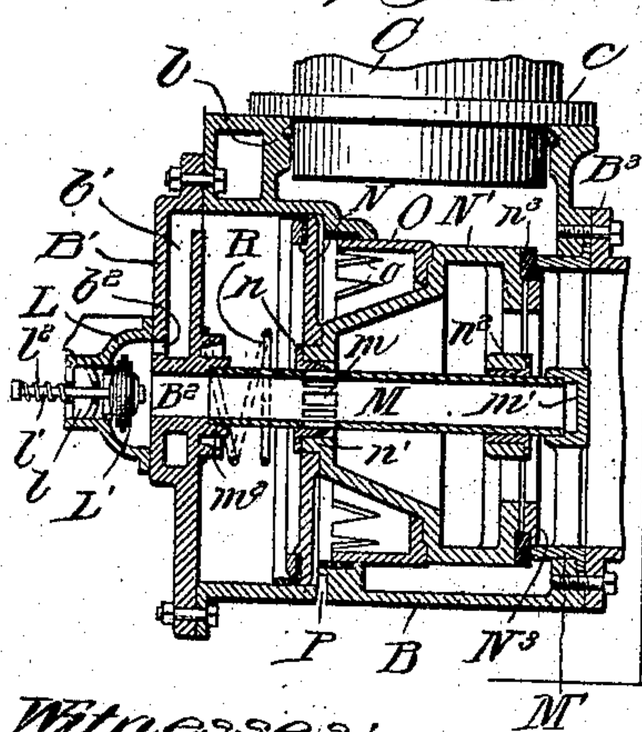


Fig. 3.



Witnesses:

Harry L. Gaither

Ruby V. Nash

Inventor:

Albert K. Mansfield

by Lamberton & Wilkinson

his Attorneys

No. 885,165. PATENTED APR. 21, 1908.

A. K. MANSFIELD.

WATER COLUMN.

APPLICATION FILED JULY 21, 1906.

2 SHEETS—SHEET 2.

Fig. 4.

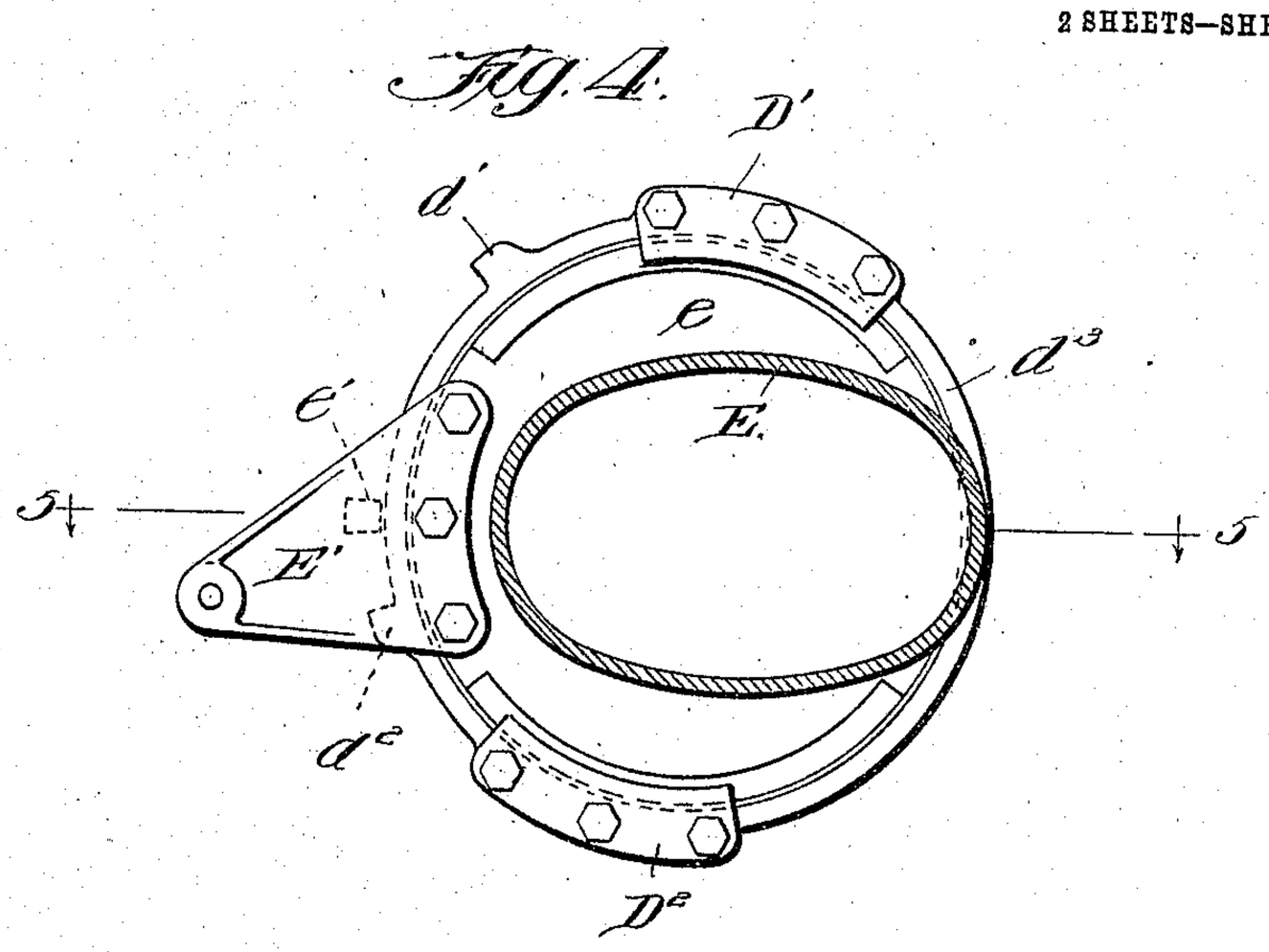
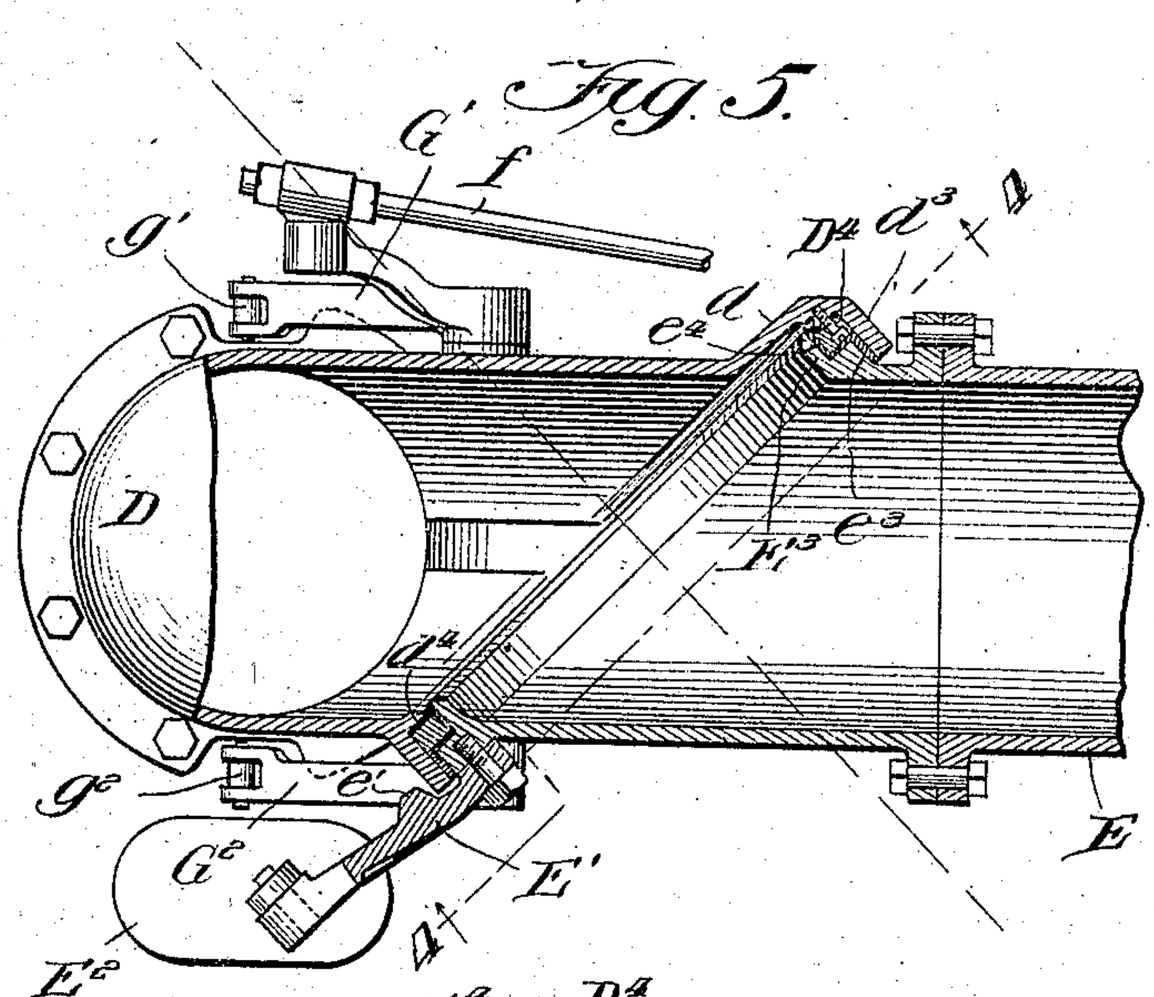


Fig. 5.



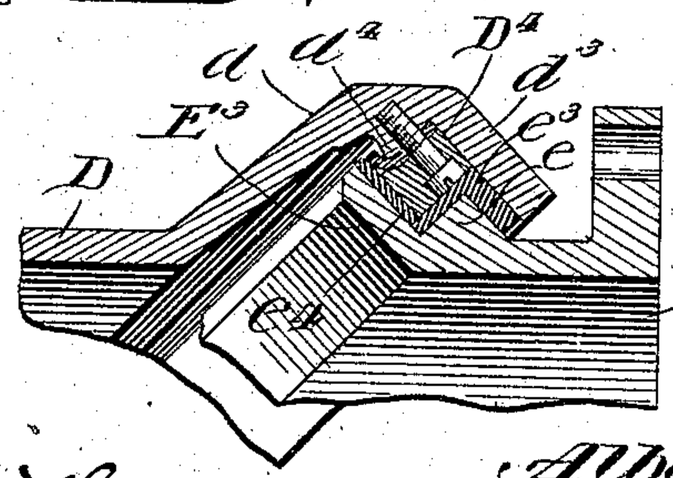


Fig. 6.

Witnesses:

Harry S. Gaither.

Ruby V. Nash.

Inventor:

Albert K. Mansfield

by Lamberton & Wilkinson

his attorneys

UNITED STATES PATENT OFFICE.

ALBERT K. MANSFIELD, OF BATAVIA, ILLINOIS.

WATER-COLUMN.

No. 885,165. Specification of Letters Patent. Patented April 21, 1908.

Application filed July 21, 1906. Serial No. 327,134.

To all whom it may concern:

Be it known that I, ALBERT K. MANSFIELD, a citizen of the United States, residing at Batavia, county of Kane, State of Illinois, have invented a certain new and useful Improvement in Water-Columns, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to water columns and more particularly to water columns adapted to be located adjacent a railroad track to supply water to the tenders of locomotives.

Railroad water columns as usually constructed comprise a vertical stand-pipe to the upper end of which is connected a laterally projecting delivery-pipe adapted to be swung vertically into and out of position to supply water to a locomotive tender.

When the stand-pipe and delivery-pipe are connected by a pair of elbows pivotally jointed together so that they will revolve relative to each other on a horizontal axis, the joint faces being in a vertical plane, then the flow of water, which makes two quarter turns, one in a vertical plane and the other in a horizontal plane, tends to cause the stand-pipe to revolve about its vertical axis due to the reaction or centrifugal force of the water while making its horizontal turn. In addition to this the reaction at the delivery end of the spout due to the one quarter turn tends to throw the spout upward. This well known construction employing a double elbow at the joint permits the use of a simple, cylindrical packed joint but introduces in addition to the objection named, the further objection that the flow of water is retarded because of the double turn; and furthermore introduces the expense of a double fitting.

The primary object of my invention is to provide a joint between the stand-pipe and the delivery-pipe of a water column which will permit the delivery-pipe to be readily swung relatively to the stand-pipe, which will at all times be fluid tight, which will not be so worn by usage as to permit leakage, and in which water will not accumulate to freeze and thereby interfere with the movement of the delivery-pipe.

A further object of my invention is to provide a joint between the stand-pipe and the delivery-pipe of a water column in which there will be no re-action of the water in a direction to rotate the stand-pipe about its vertical axis, and in which the tendency of the water to lift the delivery pipe will be reduced to a minimum without interfering with the free movement of the delivery-pipe when the water is cut off.

A further object of my invention is to provide between the vertical stand pipe and the laterally projecting delivery pipe of a water column a simple and efficient joint which may be conveniently and effectively packed, and which will permit the free end of the delivery pipe to be raised or lowered without producing an objectionable variation in the direction of the stream discharged from said delivery pipe.

A still further object of my invention is to provide a railroad water-column which will be simple in construction, comparatively inexpensive in manufacture, and efficient in operation.

The embodiment of my invention herein disclosed may be generally described as comprising a vertical stand-pipe, a laterally projecting delivery pipe pivotally connected to the top of the stand-pipe by a joint the plane of which is inclined to and intersects the axial line of the delivery-pipe, a counterbalance for the delivery-pipe, a water-supply valve controlled by hydraulic pressure, a spring for imparting to said valve an initial closing movement, and means controlled by the valve to permit water to drain from the stand-pipe when the valve is closed.

My invention will be more fully described hereinafter with reference to the accompanying drawings in which the same is illustrated as embodied in a convenient and practical form, and in which

Figure 1 is a side elevational view, partly in section; Fig. 2 an elevational view of the opposite side of the united portions of the stand-pipe, and delivery pipe; Fig. 3 an enlarged sectional view of the water-supply valve; Fig. 4 a sectional view on line 4—4 Fig. 5; Fig. 5 a sectional view on line 5—5 Fig. 4; and Fig. 6 an enlarged sectional view through the joint uniting the elbow and the delivery pipe.

The same reference characters are used to

designate the same parts in the several figures of the drawings.

Reference letter A indicates a water-supply pipe extending into a pit A′ and is rotatably supported upon the casing of the supply valve.

A^2 indicates a stand mounted upon the top a' of the pit and surrounding the stand-pipe. Anti-friction-balls are preferably interposed between the top of the stand A^2 and a collar a^2 on the stand-pipe.

a^3 indicates a lever for rotating the stand-pipe.

At the upper end of the stand-pipe is an elbow D which forms a continuation of the stand-pipe while its laterally projecting portion is connected to a delivery pipe E. The elbow and delivery-pipe are united by a joint so that the delivery-pipe may rotate relatively to the elbow in a plane intersecting and inclined to an axial line of the delivery-pipe. The joint is formed by means of a circular flange d fixed to and surrounding the end of the elbow and engaging a circular flange e around the end of the delivery-pipe. The outer edge of the flange d is provided with a ring d^3, which surrounds the flange e. Secured to the flange d adjacent the ring d^3 is a clamp ring D^4 which clamps between the same and the flange d a hydraulic cup-shaped packing d^4. The packing d^4, is preferably made of rubber inasmuch as rubber tends to cling to the adjacent surfaces and is not shriveled by the weather. Rubber is further preferable as it requires no shaping, its elasticity permitting the packing to conform to the surfaces between which it is interposed. Between the ring E^3 on the flange e and the clamp ring D^4 is a washer e^4 preferably made of brass to prevent rusting, while a suitable packing e^3, also preferably made of brass angular in cross-section is interposed between the flange e on the end of the delivery pipe and the surrounding rings d^3, and D^4, on the end of the elbow D.

In order that the united ends of the elbow and delivery-pipe may be retained in rotative engagement with each other plates D′ and D^2 are secured to the ring d^3 and overlie the outer surface of the flange e. The plates D′ and D^2 may be secured to the rings d^3 in any suitable manner, as by means of screws.

In order that the weight of the delivery-pipe may be counter-balanced a bracket E′ projects laterally from and is rigidly secured to the flange e from which depends a rod e^2 carrying weights E^2. The rotation of the delivery-pipe is limited by means of stops d', and d^2 formed on the periphery of the ring d^3 which are engaged by a lug e' on the bracket E′.

Pivotally mounted upon the delivery pipe is a lever F for operating the water-supply valve. A rod f connects the lever F with the upper arm of a bell-crank lever G′. The bell-crank lever is fixed upon a short shaft G journaled beneath the elbow D. A crank arm G^2 corresponding to the lower arm of the bell-crank lever, is fixed to the end of the shaft G on the opposite side of the elbow. Rods g' and g^2 are pivotally connected to the lower arm of the bell-crank lever and the crank arm G^2 respectively, and are connected at their lower ends on opposite sides of the stand-pipe to a collar H having a circumferential groove therein. The collar is fitted to slide vertically upon the stand-pipe and is engaged by a yoke at the end of a lever K, the latter being fulcrumed upon a bracket k secured to the valve casing B. Operatively connected with the end of the lever K is a rod K′ the lower end of which is pivotally connected to a bell-crank lever k' fulcrumed upon a bracket k^2. The bracket k^2 may conveniently project from a cap L secured to the outer surface of the head B′ of the valve casing.

Located within the cap L and controlling an exhaust-port therethrough is a valve L′ the stem l' of which projects through the cap and is adapted to be engaged by the bell-crank lever k' to unseat the valve. A spring l^2 surrounding the valve stem normally seats the valve. A passage b' is formed in the head B′ and connects the chamber in the adjacent end of the valve casing with a port b^2 leading to the interior of the cap L.

M′ designates a valve seat through which water is adapted to flow from the supply conduit A to the stand-pipe C. The seat M′ is provided with a flange projecting between the valve casing and the adjacent end of the coupling B^3 to which the end of the conduit A is connected. A tube M is supported at one end within a socket m' carried concentrically within the valve-seat M′. The opposite end of the tube M is supported within a flange m^2 on the inner surface of the head B′ of the casing. The tube M alines with a passage B^2 extending through the head B′ and communicating with the interior of the cap L.

N′ designates the valve for controlling the flow of water to the stand-pipe through coöperation with the valve-seat M′. In order to insure a tight joint a gasket n^3 is secured to the end of the valve by a clamping ring N^3. The valve N′ is mounted concentrically around the tube M and is supported thereon by a hub n^2 and by a ring n. The ring n surrounds a series of ports m through the tube M and is adapted to open and close the same when the valve reciprocates upon the tube M.

N designates a piston located within a chamber of the valve casing adjacent the head B′. The piston surrounds and is secured to the reduced portion of the valve N′ within which is secured the ring n. Carried by the valve N′ is a ring O having a series of

notches *o* in the edge thereof adjacent the inner surface of the piston N. A drain port P leads from the valve casing at a point intermediate of the piston N and the adjacent edge of the ring O.

R designates a spring interposed between the piston N and the head B′ of the casing, the tension of which tends to seat the valve N′.

The operation of my improved water column is as follows. The delivery-pipe E is swung into position relatively to the locomotive tender by applying an upward or downward pressure thereto. Pressure applied to the delivery-pipe rotates the flange *e* thereon with respect to the flange *d* on the end of the elbow D of the stand-pipe. When the delivery-pipe has been swung into the desired position pressure is applied to the hand lever F which through the connecting rod *f* oscillates the bell-crank lever G′ thereby lifting the rods *g′* and *g²* and with them the collar H. The upward movement of the collar H oscillates the lever K which in turn oscillates the bell-crank lever *k′* causing the latter to engage the valve stem *l′* and unseat the valve L′. The unseating of the valve L′ permits the water to escape from the space intermediate of the piston N and casing head B′ through the passage *b′*, port *b²* and exhaust passage *l* of the cap L. The pressure of the water upon the valve N′ forces the latter towards the left in Fig. 3 thereby permitting the water to flow past the seat M′ to the stand-pipe C. The water passes upwardly through the stand-pipe to the delivery-pipe E and thence to the tender of the locomotive. As the water in passing from the vertical to horizontal direction makes only a quarter turn in a vertical plane there is no tendency to rotate the stand-pipe about its vertical axis. The tendency of the water passing through the delivery-pipe to lift the same relatively to the stand-pipe is reduced to a minimum owing to the pressure of the water forcing the packing *d⁴* tightly against the packing-ring *e⁴*. When the water is cut off there is no pressure forcing the packing *d⁴* against the packing ring *e⁴*, and consequently the delivery-arm may be readily turned relatively to the stand-pipe.

When a sufficient quantity of water has been delivered to the tender the lever F is thrown downwardly to the position shown in Fig. 1 thereby forcing downwardly the collar H through the medium of the connecting rods and bell-crank lever. The downward movement of the collar oscillates the bell-crank *k′* away from the valve stem *l′* thereby permitting the valve L′ to be seated by the tension of the spring *l′*. This movement of the valve L′ uncovers the end of the passage B² so that water flows through the ports *m* into the tube M thence through the passage B², port *b²*, and passage *b′* to the piston chamber. The area of the piston being greater than the area of the valve N′ exposed to the pressure of the water, the piston and valve are moved towards the right so that the valve engages the seat M′ and cuts off the supply of water to the stand-pipe.

The spring R which is compressed by the movement of the piston incident to opening the valve, serves to impart an initial closing movement of the valve thereby insuring a quick closing of the valve. The ports *m* through the tube M are gradually restricted by the ring *n* as the valve is closed so that the flow of water to the piston chamber gradually diminishes thereby preventing the valve being forced against its seat with such power as to injure the parts thereof.

When the valve is closed, as shown in Fig. 3, water from the stand-pipe drains through the notches *o* in the ring O and thence through the port P leading from the space between the piston F and ring O. Danger of water remaining in the stand-pipe is thereby avoided.

When the valve is open the notches in the ring O are covered so that access of the water to the drain port ceases. It will be noted that the large bearing surface afforded by the ring O serves materially to support and stiffen the valve.

It will be observed by reference to Fig. 5 that the upper end of the bell-crank lever G′ to which the end of the rod *f* is connected alines with the axis of rotation of the delivery-pipe E. The movement of the delivery-pipe consequently does not effect in any wise the valve mechanism as the distance between the hand lever F and bell-crank lever G′ remains constant in all positions of the delivery-pipe.

From the foregoing description it will be observed that I have invented an improved water-column the delivery-pipe of which is connected to the stand-pipe by a simple and practical joint, in which the water-supply valve is quickly closed, and in which the water remaining in the stand-pipe after the closing of the valve is efficiently drained.

It will be further observed that in my improved joint there is no surface which is alternately exposed to the water passing through the column, and alternately covered by a coöperating surface and consequently there is no danger of water freezing upon a surface which must move relatively to another surface.

It will further be observed that, by reason of the peculiar construction and arrangement of the joint between the delivery pipe and the stand pipe, it is possible to manipulate the delivery pipe so as to raise and lower its outer end within the desired limits without seriously varying the direction of the stream which issues from the end of the delivery pipe.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a water column, the combination with a vertical stand pipe, of an elbow secured to and forming part of said stand-pipe, a laterally projecting delivery pipe pivotally connected to said elbow by a joint, said joint comprising members relatively rotatable in a plane intersecting and inclined to the axial line of the delivery pipe and approximately parallel to the axis of the stand pipe.

2. In a water column, the combination with a vertical stand pipe, of a laterally projecting delivery pipe, relatively rotatable cooperating flanges formed on the adjoining ends of said pipes, the engaged surfaces of said flanges being in a plane which intersects and is inclined to the axial line of one of said pipes and is approximately parallel to the axis of the vertical pipe, and means for uniting said flanges to permit relative rotary movement.

3. In a water column, the combination with a vertical stand pipe, of a laterally projecting delivery pipe pivotally connected to the stand pipe by a joint, said joint comprising members relatively rotatable in a plane intersecting and inclined to the axial line of said delivery pipe, and approximately parallel to the axis of the vertical pipe, means for limiting the movement of said delivery pipe relatively to said stand pipe, and means for balancing the weight of said delivery pipe.

4. In a water-column, the combination with a vertical stand-pipe, of a laterally projecting delivery-pipe, relatively rotatable coöperating flanges on the adjoining ends of said pipes, the engaged surfaces of which are in a plane which intersects and is inclined to the axial line of said delivery-pipe, means for uniting said flanges to permit relative rotary movement, a bracket secured to the flange on said delivery pipe, and means connected to said bracket to counter-balance the weight of said delivery-pipe, a lug on said bracket, and stops on the flange of said stand-pipe located in the path of said lug to limit the movement of said delivery pipe.

5. In a water-column, the combination with a vertical stand-pipe, of a laterally projecting delivery-pipe, relatively rotatable coöperating flanges on the adjoining ends of said pipes, the engaged surfaces of which are in a plane which intersects and is inclined to the axial line of said delivery pipe and parallel to the axis of the vertical pipe, a ring on the periphery of one of said flanges, surrounding the other flange, and plates secured to said ring overlying the outer surface of the inclosed flange.

6. In a water-column, the combination with a vertical stand-pipe, of a laterally projecting delivery-pipe, pivotally connected to the stand-pipe by a joint comprising members relatively rotatable in a plane intersecting and inclined to the axial line of said delivery pipe, valve mechanism for supplying water to said stand-pipe, a lever pivotally mounted upon said delivery-pipe, and operative connections interposed between said lever and said valve mechanism comprising means whereby the valve mechanism will be unaffected by the movement of the delivery pipe relatively to the stand-pipe.

7. In a water-column, the combination with a vertical stand-pipe, of a laterally projecting delivery pipe pivotally connected to the stand-pipe by a joint comprising members relatively rotatable in a plane intersecting and inclined to the axial line of said delivery pipe, valve mechanism for supplying water to said stand-pipe, a hand lever pivotally mounted upon the delivery pipe, a bell-crank lever pivoted to the stand-pipe, means connecting said bell-crank lever with said valve mechanism, and connecting means uniting said hand lever with said bell-crank lever at a point alining with the axis of rotation of the delivery-pipe relatively to the stand-pipe.

8. In a water column, the combination with a stand-pipe, of a laterally projecting delivery pipe pivotally connected to the stand pipe by a joint comprising members relatively rotatable in a plane intersecting and inclined to the axial line of one of said pipes and parallel with the axis of the other pipe, and means for automatically resisting the tendency of the reaction of the water to raise the delivery pipe.

9. In a water column, the combination with a vertical stand-pipe, of an elbow forming part of and having one end projecting laterally from said stand-pipe, the end of said elbow being cut away in a plane parallel to the vertical axis of the stand-pipe and at an angle of 45 degrees to the horizontal axis of the elbow, a delivery pipe having one end adjacent the end of said elbow, a cylindrical packing between the end of the elbow and the delivery pipe, and means for locking said elbow and said delivery pipe together so as to permit relative rotary movements.

10. In a water column, the combination with a vertical stand-pipe having an elbow forming part thereof and projecting laterally therefrom, the end of said elbow being cut away on a plane parallel to the vertical axis of the stand-pipe and at an angle of 45 degrees to the horizontal axis of the elbow, a delivery pipe having one end formed to engage with the end of the elbow, a cylindrical flange on the delivery pipe surrounding the end of the elbow and having its axis perpendicular to the plane of the end of the elbow, packing between said flange and the

elbow, and means for locking said elbow and said delivery pipe together so as to permit relative rotary movements.

11. In a water column, the combination with a vertical stand-pipe having an elbow forming part thereof and projecting laterally therefrom, the end of said elbow being cut away on a plane parallel to the vertical axis of the stand-pipe and at an angle of 45 degrees to the horizontal axis of the elbow, a delivery-pipe having one end abutting against the end of the elbow a cylindrical packing between said elbow and said delivery-pipe and having its axis perpendicular to the plane of the end of said elbow, and means for locking said elbow and said delivery pipe together so as to permit relative rotary movements.

In testimony whereof, I sign this specification in the presence of two witnesses.

ALBERT K. MANSFIELD.

Witnesses:

GEO. L. WILKINSON,

HARRY S. GAITHER.