

(No Model.)

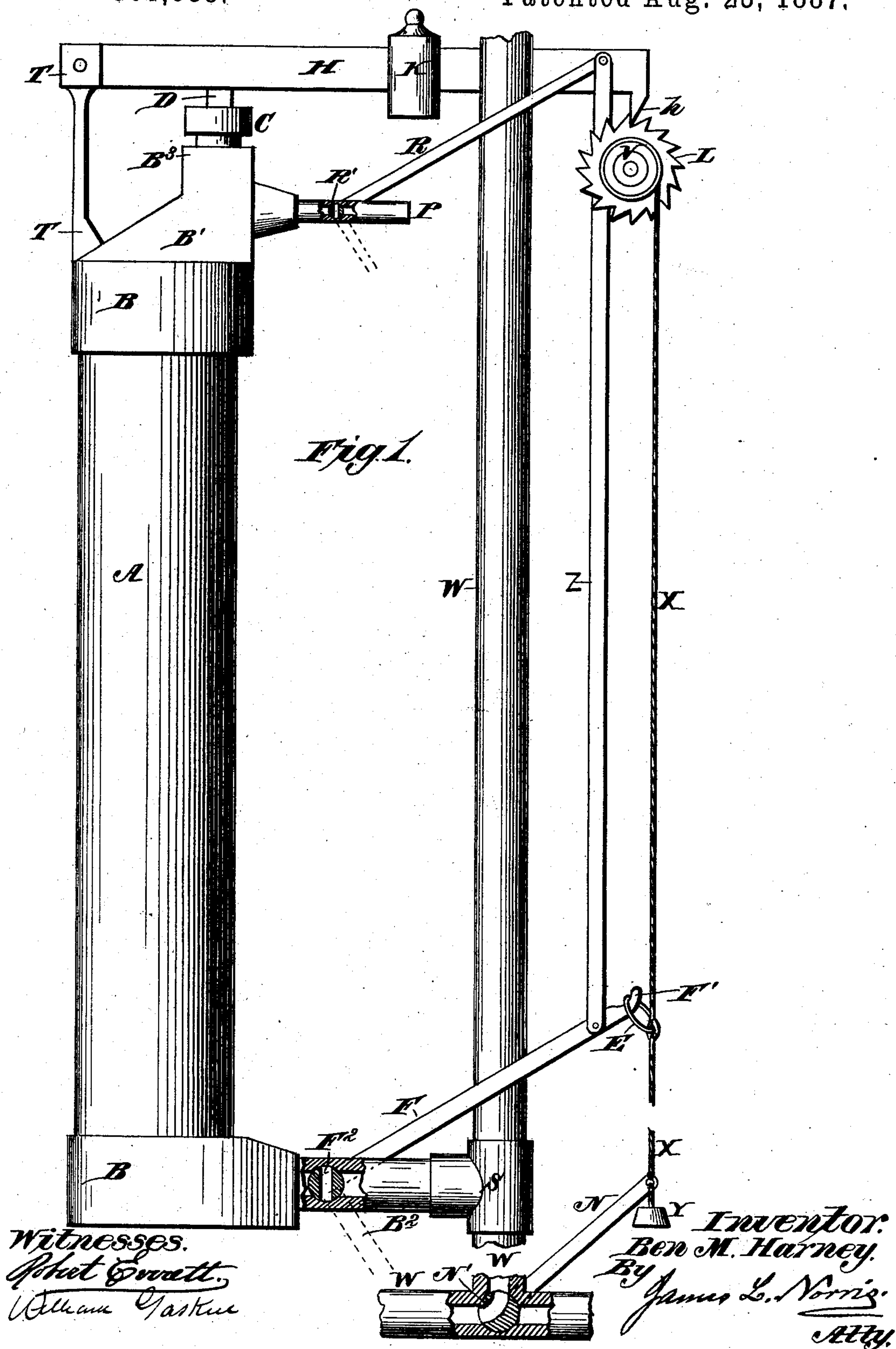
B. M. HARNEY.

2 Sheets—Sheet 1.

# ANTI FREEZING DEVICE FOR WATER PIPES.

No. 368,888.

Patented Aug. 23, 1887.



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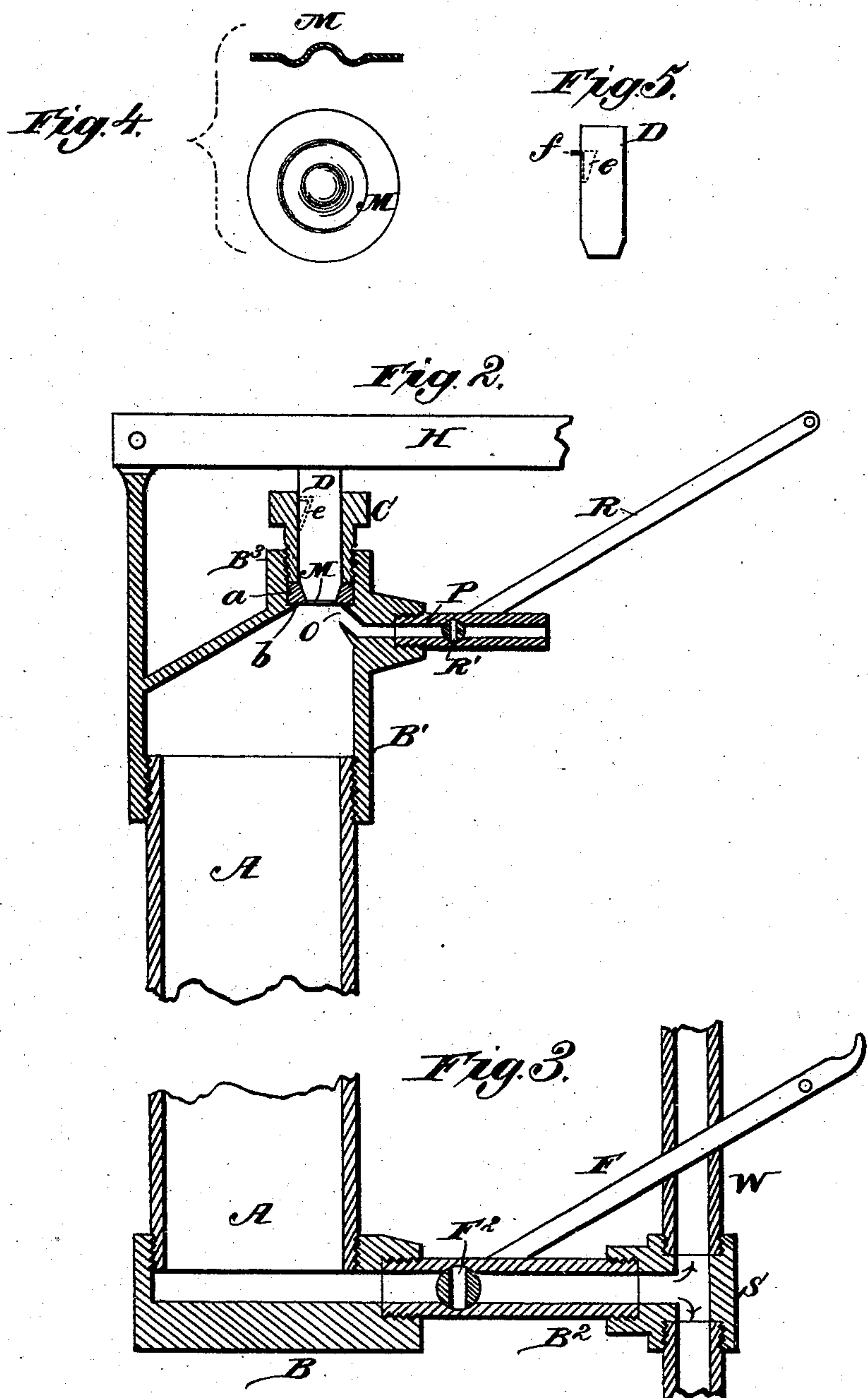
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ANTI FREEZING DEVICE FOR WATER PIPES.

No. 368,888.

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Witnesses.  
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# UNITED STATES PATENT OFFICE.

BENJAMIN M. HARNEY, OF LOUISVILLE, KENTUCKY, ASSIGNOR TO THE  
WATER PIPE PROTECTION COMPANY, OF SAME PLACE.

## ANTI-FREEZING DEVICE FOR WATER-PIPES.

SPECIFICATION forming part of Letters Patent No. 368,888, dated August 23, 1887.

Application filed October 5, 1886. Serial No. 215,409. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN M. HARNEY, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of

5 Kentucky, have invented certain new and useful Improvements in Frost-Guards for Automatically Discharging the Water in the Service-Pipes of Buildings and Preventing Freezing, of which the following is a specification.  
10 The object of my invention is to provide a simple and reliable means of preventing freezing in the water-service pipes of buildings by automatically discharging and cutting off water from such pipes upon a fall of temperature  
15 to about or slightly above the freezing-point. This object is accomplished by the mechanism illustrated in the annexed drawings, in which—

Figure 1 is an elevation of my improved  
20 apparatus for preventing the freezing of water-distributing pipes. Fig. 2 is a sectional elevation of the upper part of the apparatus. Fig. 3 is a similar view of the lower part of the apparatus. Figs. 4 and 5 are detail views,  
25 hereinafter referred to.

In carrying my invention into effect I provide a cylinder, A, preferably made of copper or other suitable metal, and having a base or lower head, B, and a cap or upper head, B',  
30 made of brass and formed, respectively, as shown in Figs. 2 and 3. This cylinder A is placed in a vertical position and its base B connected by a tube, B<sup>2</sup>, with a T-coupling, S, on a water-distributing pipe, W, that is connected with the water-main or supply-pipe.  
35

The upper cylinder head or cap, B', has the form of an oblique cone, with an opening, O, on its top closed by a diaphragm, M, Figs. 2 and 4, of india-rubber or other elastic material. In one side of the cap B', beneath the elastic diaphragm M, is an air-inlet through a tube, P, that is suitably connected to one side of the cap, as shown in Figs. 1 and 2. Above the opening O in the cap B' is a tubular pro-  
45 longation or neck, B<sup>3</sup>, and in the bottom of this tubular neck is placed a washer, a, that rests on the edges of the elastic diaphragm M and holds it in contact with an annular shoulder, b, formed in the top of the conical cap.  
50 The washer a is beveled internally, as shown in Fig. 2, and is held in place by an elongated

flanged and externally-threaded nut, C, that is screwed into the tubular neck B<sup>3</sup> after the diaphragm M and washer a have been placed in position. This nut C also serves as a sleeve  
55 for a short rod or plunger, D, that is connected to a lever, H, which is fulcrumed to the upper end of a standard, T, projecting up from one side of the cap. The lower end of the rod D is beveled, as shown in Figs. 2 and  
60 5, to fit the beveled inner face of the washer a, the lower face of the rod being flush with the under side of the washer, and is thus supported in contact with the elastic diaphragm M without bearing thereon, so that the weight  
65 of the rod D and connected lever H will be sustained by the washer when the rod is at its lowest point. In one side of the rod D is an inclined notch, e, in which is arranged a spring, f, that is retained within said notch while the rod D is  
70 in a lowered position; but when the rod rises sufficiently to cause the notch e to clear the top of the nut C the spring f projects above the flanged nut and bears thereon to sustain the  
75 rod D out of contact with the elastic diaphragm.

On the lever H is an adjustable or sliding weight, K, and at the end of said lever is a tooth or detent, h, to engage the teeth of a ratchet-wheel, L, mounted on one side of a  
80 pulley, V, as shown in Fig. 1.

The pulley V has wound thereon a cord, X, the lower end of which carries a weight, Y, and is connected near said weight to the operating-lever N of a waste and cut-off cock, N',  
85 in a water-supply pipe or main, W', that communicates with the distributing-pipe W, as shown in Fig. 1, or in any other convenient manner. To the cord X is attached a ring, E, that connects with the hooked end F' of a  
90 lever, F, that operates a water-cock, F<sup>2</sup>, in the tube B<sup>2</sup> at the base of the cylinder A, and this lever F is detachably connected by means of a rod, Z, to a lever, R, that operates an air-cock, R', in the air-inlet tube P at the upper  
95 end of the cylinder. By detaching the rod Z the levers F and R can be operated independently by hand.

By winding the cord X on the pulley V, and thus raising the lever N, water will flow in  
100 from the main and fill the distributing-pipes throughout the building, and by lowering the



levers F and R while disconnected from the cord X water will also flow into the cylinder or reservoir A at the bottom, while the open air-passage P at the top will permit the free entrance and exit of air. When the reservoir A is filled, the lever R is raised by hand to close the air-cock in the inlet-tube P; but the water-cock in tube B<sup>2</sup> is left open, the connecting-rod Z between the levers F and R having been detached. The sliding weight K on the lever H is then adjusted until it nearly or quite counterbalances the pressure of water in the cylinder and holds the ratchet L and detent *h* in engagement, the rod D being then in a lowered position within the sleeve-nut C and directly over the diaphragm M, or very nearly in contact therewith.

On the approach of cold weather or a fall of temperature to about 45° Fahrenheit, the water-cock in tube B<sup>2</sup> is closed by raising the lever F, and said lever F is then connected by the ring E to the cord X and by the rod Z to the lever R of the closed air-cock. As the temperature continues to fall the cylinder or reservoir A and the water contained therein first contracts to a certain extent, and then at about 39° the water commences to expand with a continued fall of temperature until at 33° its volume will be about .000327 greater than the capacity of the reservoir. The compressed fluid will distend the elastic diaphragm M, that being the point of least resistance, and thus automatically raise the rod D and weighted lever H, thereby releasing the ratchet-pulley V and enabling the weighted cord X to descend and open the connected air-cock R' and water-cock F<sup>2</sup>. At the same time the two-way waste-cock N' is turned in such a manner as to cut off its communication with the inlet end of the main W' and establish communication between its waste end and the pipe W, thereby emptying the reservoir A and distributing-pipes, cutting the water off, and preventing freezing. When the levers F and R reach their lowest positions, the hook F' will become disengaged from the ring E on cord X, and so enable the cord to descend further under the action of its weight Y, and thereby move the waste or cut-off cock alone, should further movement thereof be necessary.

When the rod D has been forced up by the expansion of the contents of reservoir A, the spring *f* will be released and pass over the

top of the sleeve-nut C, in which it was previously confined, and the lever H will thus be held in position so that it will not fall back and engage its tooth *h* in the moving ratchet-pulley, with a consequent interruption to the operation of the apparatus. At any time the cord X can be rewound on the pulley V, the spring *f* be compressed into its place in the notch *e*, and the apparatus be reset for further operation.

What I claim as my invention is—

1. The combination, with a water-service pipe, W, of a water-reservoir, A, having at its upper end an air-passage, P, an opening, O, and an elastic diaphragm, M, placed over said opening, the tube B<sup>2</sup>, connecting the reservoir and water-service pipe, cocks located in the water-tube B<sup>2</sup> and air-passage P, levers F R, for actuating said cocks, the connecting-rod Z, the weighted lever H, having detent *h*, the rod D, connected to said lever and resting on the elastic diaphragm, the ratchet-pulley V, and the weighted cord X, wound on said pulley and connected with the lever F, substantially as described.

2. The combination of the water-pipes W W', the reservoir A, having air-inlet pipe P, opening O, and elastic diaphragm M, the washer *a*, sleeve-nut C, rod D, weighted lever H, connected to said rod and provided with a detent, *h*, cocks located in the air-pipe P and water-pipes B<sup>2</sup> W', levers R F N, for actuating said cocks, the ratchet-pulley V, and the weighted cord X, wound on said pulley and connected with the air and water cocks, substantially as described.

3. The combination, with water-distribution pipes and a reservoir, A, connected with said pipes and provided at its upper end with an air-passage, P, an opening, O, and a tubular neck, B<sup>3</sup>, of the elastic diaphragm M, the beveled washer *a*, the sleeve-nut C, the rod D, having a beveled lower end, the weighted lever H, connected to said rod and provided with detent *h*, the ratchet-pulley V, and a weighted cord wound on said pulley and connected with levers for actuating cocks in the air-passage P and water-pipes, substantially as described.

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Witnesses:

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