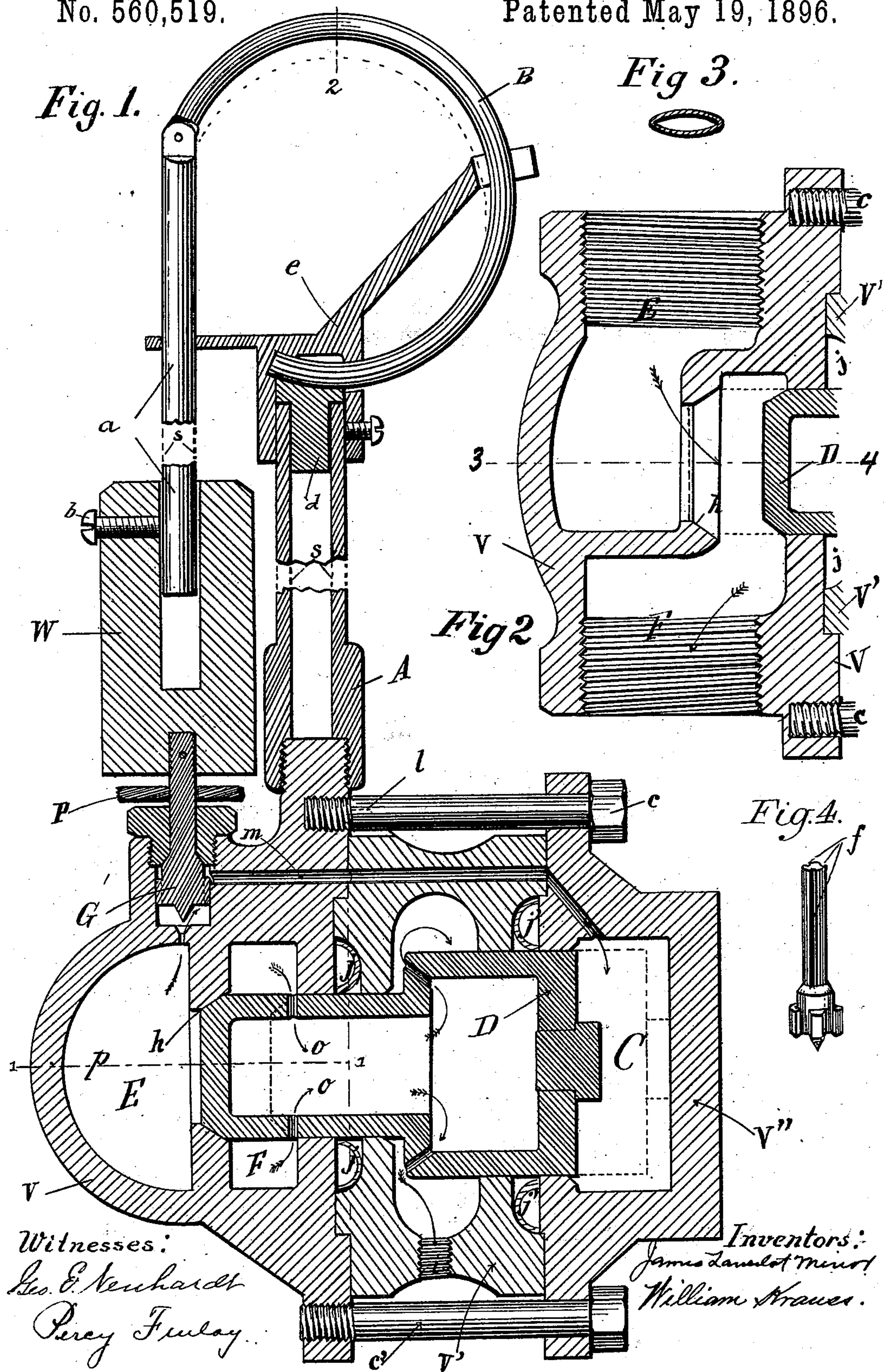


J. L. MINOR & W. KRAUSS.
STOP AND WASTE COCK.

Patented May 19, 1896.



UNITED STATES PATENT OFFICE.

JAMES LANCELOT MINOR AND WILLIAM KRAUSS, OF MEMPHIS, TENNESSEE.

STOP AND WASTE COCK.

SPECIFICATION forming part of Letters Patent No. 560,519, dated May 19, 1896.

Application filed October 19, 1894. Serial No. 526,404. (No model.)

To all whom it may concern:

Be it known that we, JAMES LANCELOT MINOR and WILLIAM KRAUSS, citizens of the United States, residing in Memphis, in the county of Shelby and State of Tennessee, have invented an Automatic Stop and Waste Cock for Water-Pipes, of which the following is a specification.

The object of our invention is to prevent the bursting of water-pipes by freezing in severe weather.

Our invention relates to a stop and waste cock acting automatically in such a manner as to turn off water and open "waste" when the temperature at the surface of the ground falls to a point just below the freezing-point (for water) and to reverse the stop-cock when the temperature again rises to a point just above the freezing-point, (for water,) thus making the operation of the stop and waste cock in freezing weather entirely automatic instead of intrusting it to the watchfulness of human beings.

Water is known to expand suddenly and with great force by eleven one-hundredths of its bulk when it freezes, and we utilize this expansive force in the following manner: A hollow transversely-flattened preferably brass arc is filled with water and hermetically sealed. One end of this arc is securely fastened to a stationary support, while the other end is attached to a valve in a specially-constructed stop and waste cock. When the water in the arc freezes, its expansion causes the two ends to separate. As one end is stationary, the other or valve end moves, carrying the valve with it. This valve is part of a stop and waste cock constructed upon hydraulic principles in such a manner that the lifting of the valve allows water to flow into a chamber, thereby pressing up a piston so as to cut off the water in service-pipe from the pipes in the building and open a waste for drainage of pipes in the building, so they can empty themselves, before freezing, of their contents. When ice in the arc thaws, the whole mechanism is reversed.

The arc is placed above the hydraulic valve. The diameter of the arc is small, its walls are thin, and being exposed the water in it will freeze more quickly than the water in "house-pipe."

The hydraulic valve is placed in the ground below the freezing-level and connects "main" with house-pipe.

The accompanying drawings or diagrams will more fully explain the invention and objects to be accomplished.

Figure 1 is a vertical section of the apparatus. Fig. 2 is a horizontal section of that portion of it shown in Fig. 1 between points 1 and 1. Fig. 3 is a transverse section of arc B shown in Fig. 1 at line 2. Fig. 4 is valve G of Fig. 1 more in detail.

Similar letters refer to similar parts in the different views on the diagrams.

The various parts as given or shown in the diagrams show substantially size and proportions of such parts when in use.

B represents the arc, which is flattened transversely, (see Fig. 3,) so that increase of bulk of its contents causes its two ends to separate. It is filled with water and sealed. It may be placed above or just beneath the ground-level, as the degree of exposure to cold may demand, and is protected against injury by a suitable casing. We prefer to mount it, as shown, upon a tubular support A, resting upon plug *d*, and being firmly held in position by cap *e*, which is shaped to give suitable support to arc and act as a guide to *a*, which may be a rod, as shown, or some flexible material, in which latter case this guide is just above W. *a* is detachable from B. The length of *a* and A varies according to the distance of arc B from main. This unknown length is represented on drawings by dotted lines *s s*.

The screw *b* holds *a* in position after its length has been accurately adjusted.

The hydraulic valve consists of the three segments V V' V''. They are shouldered and joined together at the annular spaces *j* and *j'*, and are securely fastened in this position by four bolts *c c c' c'*. Passing through these three segments is a hollow cylindrical piston D. At the top of segment V is a two-seated winged valve G, (shown in perspective in Fig. 4,) which affords communication either between chamber C and valve-space E, through bore *m*, or the outside, through grooves *f*, of Fig. 4, and under felt pad P, which protects the valve from dust, &c. W represents a weight which connects valve G with arc B by means of rod *a*. To insure accurate fitting

of piston and prevent leakage, cup-shaped collars, of leather or other suitable material, are used. They are placed in the annular spaces j and j' , the castings V , V' , and V'' coming apart at these points for this purpose.

The water passes through openings or holes in D , situated so as to drain water from F , (which connects with house-pipes,) as soon as the piston D reaches the seat h , thus cutting off house-pipe from main. These openings must pass the collar in j during its distension by water-pressure in E . To prevent injury to the collar by this, the outer edge of the openings is beveled. Similar openings afford exit from D to i .

Fig. 2 shows hydraulic valve when open, the arrows indicating the course of the water. Space E connects with main, and space F with house-pipe. The line 3 4 indicates point at which the vertical section, Fig. 1, is taken.

Fig. 1 of the diagram shows position of the parts of the invention when water in arc B is frozen. The movable part of the arc is raised and with it a , W , and G , with all of which it is connected. The valve is raised, by the force exerted by the water in the arc as it freezes, aided by the water-pressure in E , against the upper seat, closing the whole against the outside. As the valve is raised the pressure from the main forces water from E , as indicated by arrows, between the wings of said valve, into and through bore m and into chamber C .

The diameter of piston D being much greater in chamber C than it is in F , it follows that piston D must move in the direction of E until it is arrested at h , when the difference between pressure and resistance is still further increased as the surface of D exposed to the pressure in E is less than it was in F in the drawing, one inch, as against one and one-quarter inch in F . Space F and house-pipe are now cut off from main and water drains through the inside of piston D , as indicated

by arrows, escaping finally through i , which is threaded for connection with sewer, if desired. This i is not vertically above c' , as diagram would show, but just to one side of it. When the ice in B melts, B relaxes and assumes the position indicated by a dotted line shown under upper arm of B in diagram. As B relaxes, W presses G down firmly on its under seat, cutting off flow from E to C . The water from C may now escape through grooves f , Fig. 4, and thus the pressure in C is removed. The pressure in E now returns piston D to position shown in Fig. 2 and indicated by dotted lines in Fig. 1. The openings indicated by arrows o being now past the collar in j , the waste is cut off.

We claim—

The combination, in a water-supply system, of a main, house-pipe, drain-outlet, hydraulic valve having a water-passage from between main valve-seat and water-main to a pressure-chamber, a pressure-chamber, a piston-valve for opening and closing communication between main and service pipe, said piston-valve having openings for communication between house-pipe and drain-outlet when closed against the main, cupped collars to prevent leakage, a two-seated winged valve for controlling the flow through water-passage from between valve-seat and main to pressure-chamber, a weight for holding the said two-seated valve closed against the pressure in main, a rod or other device for connecting said weight and two-seated valve and an expansible arc adapted to actuate said two-seated valve and a congealable fluid in said arc, substantially as described.

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Witnesses:

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