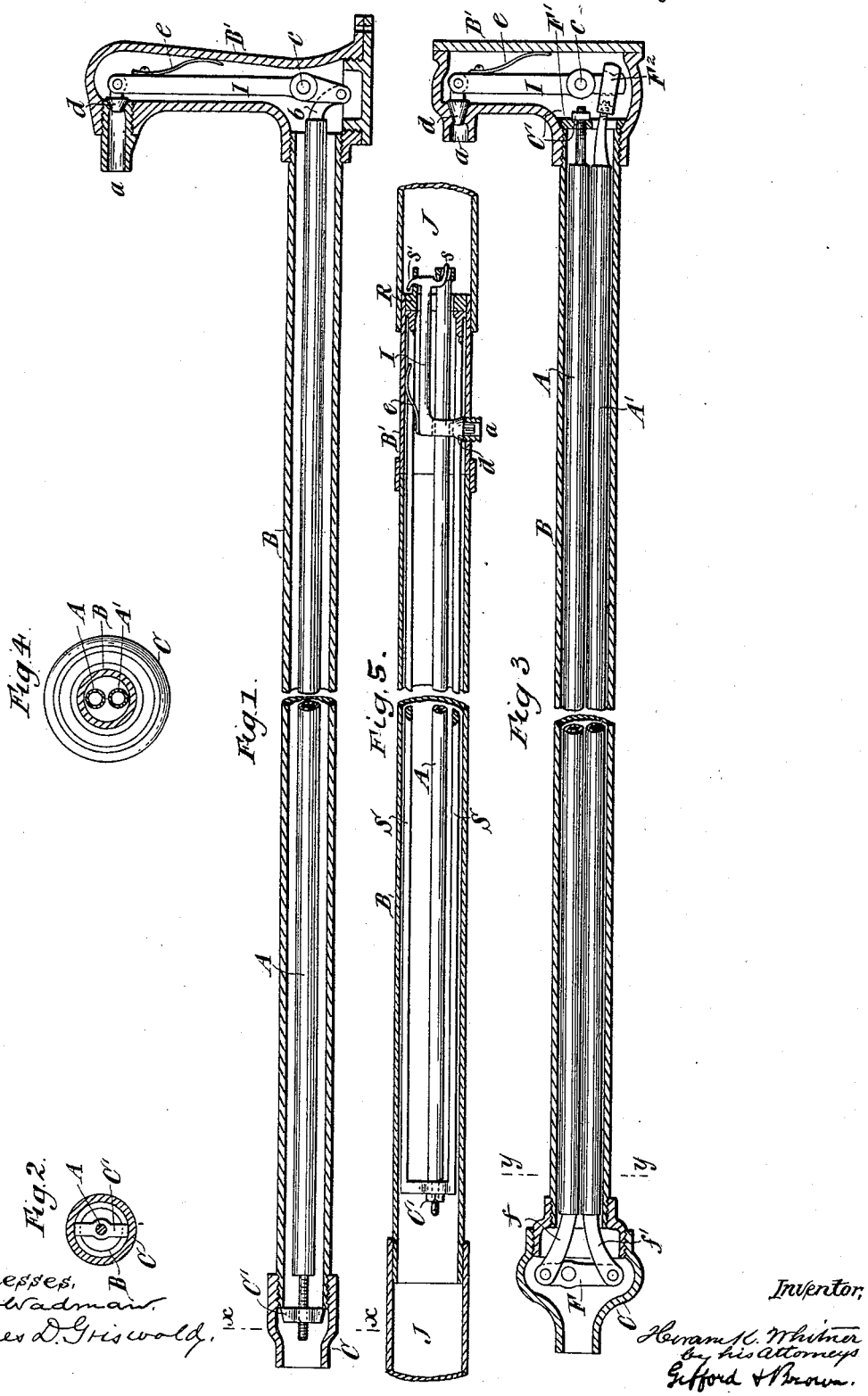
(No Model.)

H. K. WHITNER.

CUT-OFF TO PREVENT FREEZING IN WATER PIPES.

No. 386,098. Patented July 10, 1888.



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UNITED STATES PATENT OFFICE.

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CUT-OFF TO PREVENT FREEZING IN WATER-PIPES.

SPECIFICATION forming part of Letters Patent No. 386,098, dated July 10, 1888.

Application filed January 27, 1887. Serial No. 225,710. (No model.)

To all whom it may concern:

Be it known that I, HIRAM K. WHITNER, of New York, in the county and State of New York, have invented a certain new and useful Improvement in Apparatus for the Prevention of Freezing of Water in Water-Service Pipes, of which the following is a specification.

My invention relates to that class of devices whereby a vent is opened in a water-service pipe to cause a flow of water upon the occurrence of a temperature sufficiently low to endanger the freezing of the water in the pipes. It also involves the closing of such vent upon the restoration of the temperature of the water to a degree whereby freezing is not imminent.

I will describe my improvement, which I designate a hydrothermostat, in detail, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a longitudinal section of apparatus embodying my improvement. I have shown it as partly broken away to save space. Fig. 2 is a transverse section taken on the plane of the line *x x*, Fig. 1. Fig. 3 is a longitudinal section of apparatus of modified form embodying my improvement, also partly broken away to save space. Fig. 4 is a transverse section thereof taken on the plane of the dotted line *y y*, Fig. 3. Fig. 5 is a longitudinal section of another modification.

Similar letters of reference designate corresponding parts in all the figures.

Referring first to the example of my improvement illustrated in Figs. 1 and 2, A designates an expansible and contractible bar, which may be of any suitable metal—as, for instance, zinc. I prefer that it should be round. It is inclosed in a tube, B, also of metal, but is of less diameter than the interior of said tube. The tube B has secured to it near one end a coupling-piece, C. This coupling is intended to be connected in any suitable manner with a water-service pipe in a building. The end of the bar A adjacent to the coupling-piece C is screw-threaded for a distance, and a nut, C′, engages therewith. This nut is bar-shaped, as shown more clearly in Fig. 2, and its ends abut against the end of the tube B. Its shape admits of the passage of water from the service-pipe into the tube B freely. By rotating this nut the thermostat may be properly adjusted. Near its other end the tube B has secured to it a cock, B′, which cock, as shown, is provided with a port, *a*. The end of the bar A adjacent to the cock has connected to it or formed with it an arm-like portion, *b*. The other end of this arm-like portion is pivotally connected to one end of a lever, I, which lever is fulcrumed upon a pin or stud, *c*, extending between the side walls of the shell of the cock. The other end of the lever has pivotally connected to it a valve, *d*. This valve, which may have an outer coating of rubber, leather, or similar material, is adapted to close the inner end of the port *a* of the cock. A spring, *e*, secured, as shown, to the lever I, near one end of latter, and, bearing at the other against the inner surface of the shell of the cock, tends to force said valve to its seat. This form of my improvement may advantageously be arranged with the tube B vertical. When the temperature of the water in the tube B approaches a point where freezing will ensue, the expansible and contractible bar contracts, and thereby operates the lever I, causing the valve *d* to be lifted from its seat. Water will then flow freely from the service-pipe through the tube B and out at the port of the cock, which latter may be connected in any suitable manner with a waste-pipe. As water of higher temperature circulates through the tube B, the bar A will again expand, causing the closing of the port of the cock, and necessarily checking the flow of water. It will remain in this condition until the temperature of the water in the tube B approaches the freezing-point, when the bar A will be again operated to cause a flow of water, and so on at intervals.

In the example of my improvement illustrated in Figs. 3 and 4 I have shown two expansible and contractible bars, A A′, arranged in the tube B. The bar A has a portion, *f*, extending into the coupling-piece C. This portion *f* is connected, as shown, to the short arm of a lever, F, fulcrumed upon a pin extending between the side walls of the coupling-piece. The long arm of the lever F is similarly connected to a portion, *f′*, of the bar A′. The other end of the bar A is screw-threaded, and extends through a hole in a cross-bar, F′, resting near its ends upon the end of the tube B. A nut, C′, on the screw-threaded end of the rod A beyond the bar F′ may be operated to adjust the bars A A′. The bar A′ at its other end is screw-threaded, and extends

through a longitudinal slot in the bar F'. Such screw-threaded end of the bar A' engages a tapped hole in a link, F², which link has formed in it a longitudinal slot, through which extends the adjacent end of the lever I. By the use of two expansible and contractible bars, arranged as described, a very powerful action is produced upon the lever I.

In the example of my improvement shown in Figs. 3 and 4 I prefer to construct the coupling C in two sections, as shown, whereby the arrangement and adjustment of the parts are facilitated.

In the example of my improvement illustrated in Fig. 5 the lever I is shown as extending backwardly within the cock and approximately parallel with the expansible and contractible bar. Near one end it is provided with two reversely-extending hooked portions, *s s'*. The portion *s* extends loosely through a suitable aperture in the bar A near the adjacent end thereof, and the portion *s'* extends loosely through a corresponding aperture formed in a portion of a metal ring, R, which ring is secured by screw-threads or otherwise to the interior of the shell of the cock. It will be readily seen that when the bar A contracts or expands it will cause the lever I to be rocked on its fulcrum in the ring R. Near its other end the lever is bent at approximate right angles to its length, and such bent portion, as shown, is provided with a transverse aperture, through which extends the thermostat. This, however, is not wholly essential, as the lever might be bent in such manner as to extend about the thermostat. This bent portion need only constitute in effect a part of the lever, and need not be made integral therewith—as, for instance, the said aperture might be of such length that the longitudinal portion of the lever would extend through it. In this example of my improvement, as also in that shown in Fig. 1, I have shown the nozzle constituting the port of the cock as having a screw-threaded connection with the shell of the cock. By this means provision is afforded for moving the valve-seat inwardly or outwardly and thus varying the length of throw which may be imparted to the lever by the bar A, as desired. In this example also the tube or receptacle B and the cock are shown as connected up in the service-pipe, and constitute in effect a section of the service-pipe.

S designates pieces of wood, glass, or similar material, which are capable of but slight expansion and contraction during variations in temperature. I have shown but two such pieces, the same being in the shape of rods; but I may use any desired number; or a tube, which shall surround and inclose the thermostat within the tube B, may be used. These rods S are rigidly secured at one end to the ring R and at the other end to the bar A. The rods S, being practically non contractible or expansible, operate to prevent contraction or expansion of the bar A in the direction of the length of the tube B, at or near the point where the connection is made between the rods S and the bar A. Increased contraction or expansion will therefore occur at or near the end of the bar A, which is connected to the lever I, whereby a wider range of movement of the lever is attained and its rapidity of movement facilitated. These rods S constitute an abutment for the bar A, at one end of the latter.

It will be observed that by using an abutment of the nature and arrangement shown and described the position of the abutment will not be altered by possible contraction or expansion of the tube B, as would be the case were the abutment for the bar A secured directly to the tube B.

All the examples of my improvement shown may be placed in any desired relation to the service-pipe and waste-pipe, and will preferably be arranged at the point of greatest exposure in the building which is farthest from the street-main.

It will be seen that by my improvement variations in temperature of the water only cause the opening of the valve, whereby a flow of water ensues which counteracts the tendency to freeze. All waste of water, other than sufficient to counteract such tendency, is therefore avoided.

My improvement is simple, direct in action, and compact, while it may be readily shipped or sold as an article of merchandise or plumber's supply.

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

1. The combination, with a water-service pipe, of a tube connected therewith, a contractible and expansible bar arranged in said tube, a cock provided with a port connected with said tube, a lever connected to said bar and arranged in the cock, and a valve connected to the lever, substantially as described, whereby variations of temperature in the water in the tube will cause said bar to operate the lever to open the port of the cock and cause a flow of water from the service-pipe or to cause the closing of said port and a stoppage of flow of the water.

2. The combination of a water-service pipe, a receptacle for water connected therewith, a contractible and expansible bar arranged in said receptacle, a cock provided with a port connected with said receptacle and arranged approximately in line therewith, a lever connected with said bar and arranged in the cock, and having a portion extending approximately parallel therewith and another portion at right angles thereto, a valve connected to the lever, and an approximately non-contractible and non-expansible abutment for said bar arranged in the receptacle and extending into the cock, substantially as specified.

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