

No. 616,188.

Patented Dec. 20, 1898.

N. M. HOPKINS.

APPARATUS FOR PREVENTING BURSTING OF WATER PIPES BY FREEZING.

(Application filed Jan. 17, 1898.)

(No Model.)

Fig: 1.

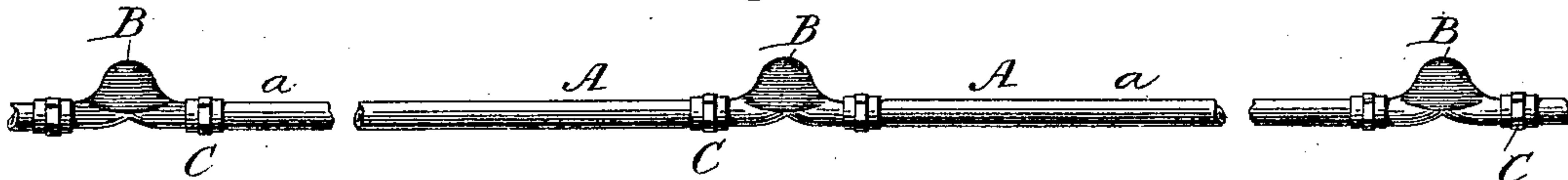


Fig: 2.

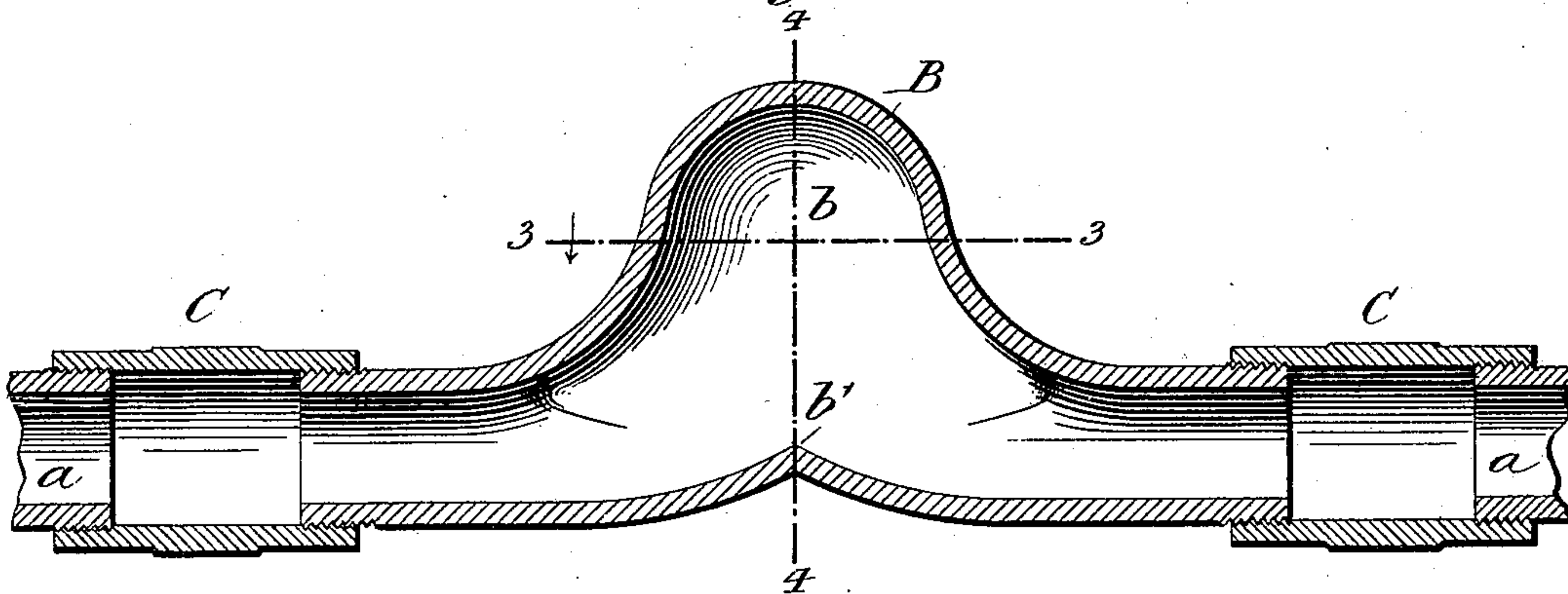


Fig: 3.

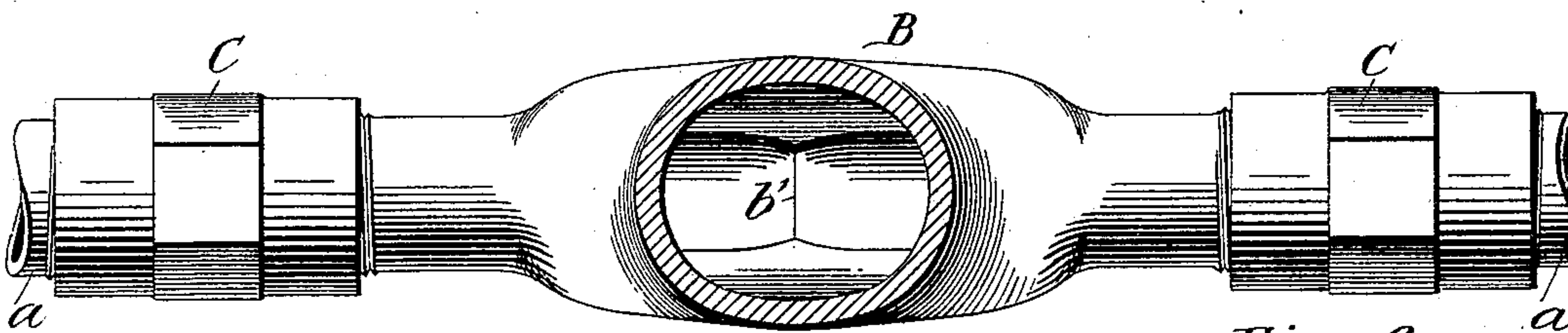


Fig: 5.

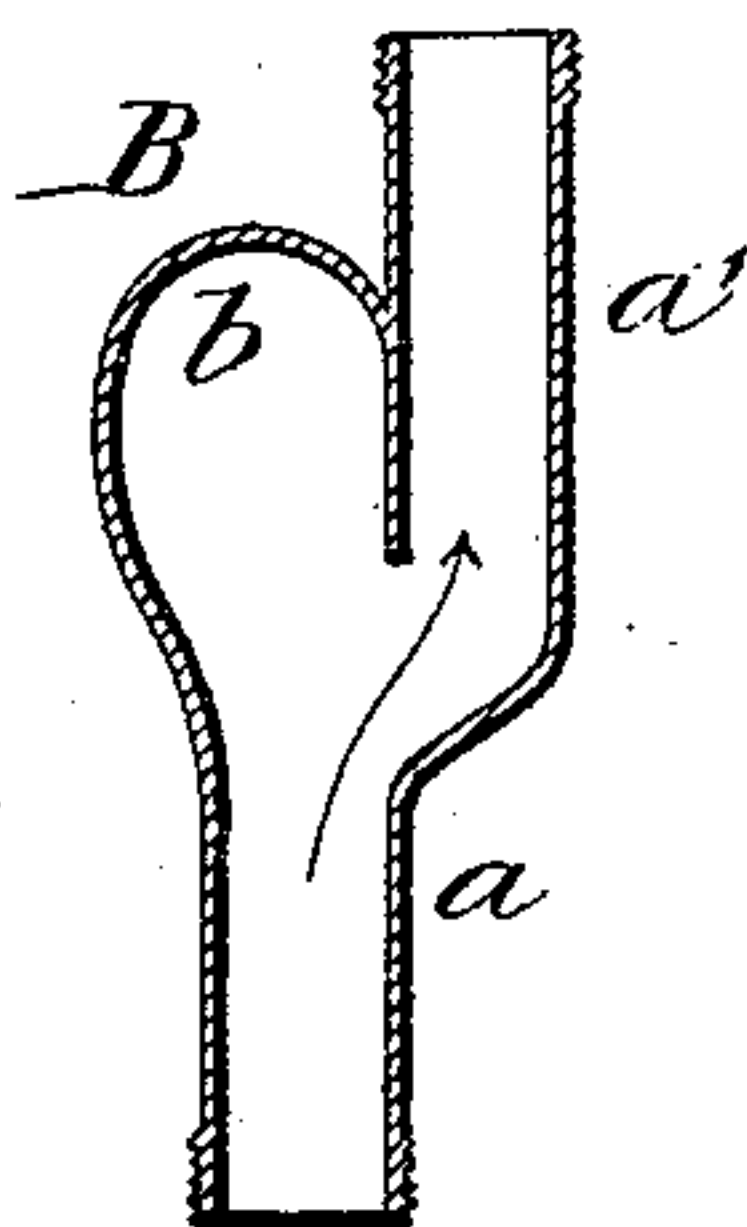


Fig: 4.

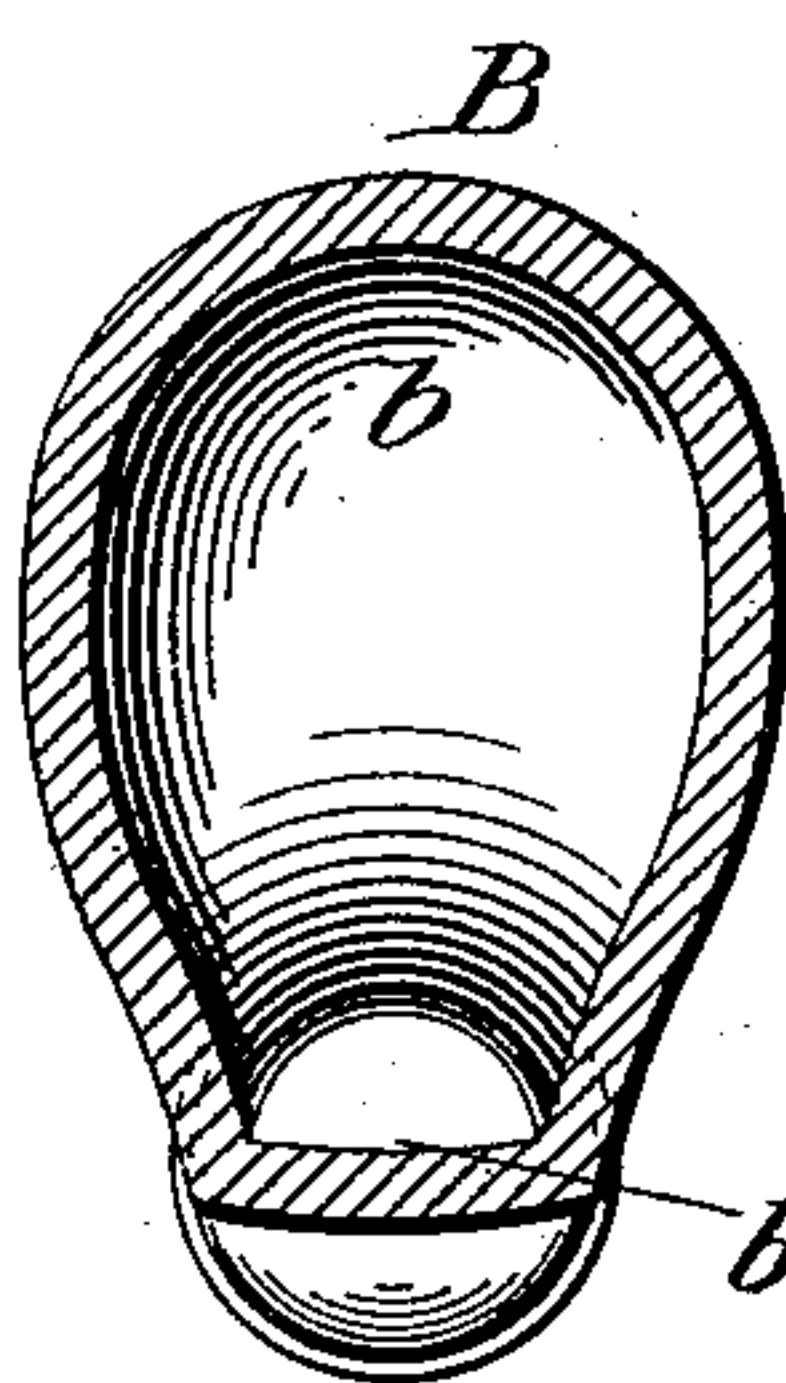
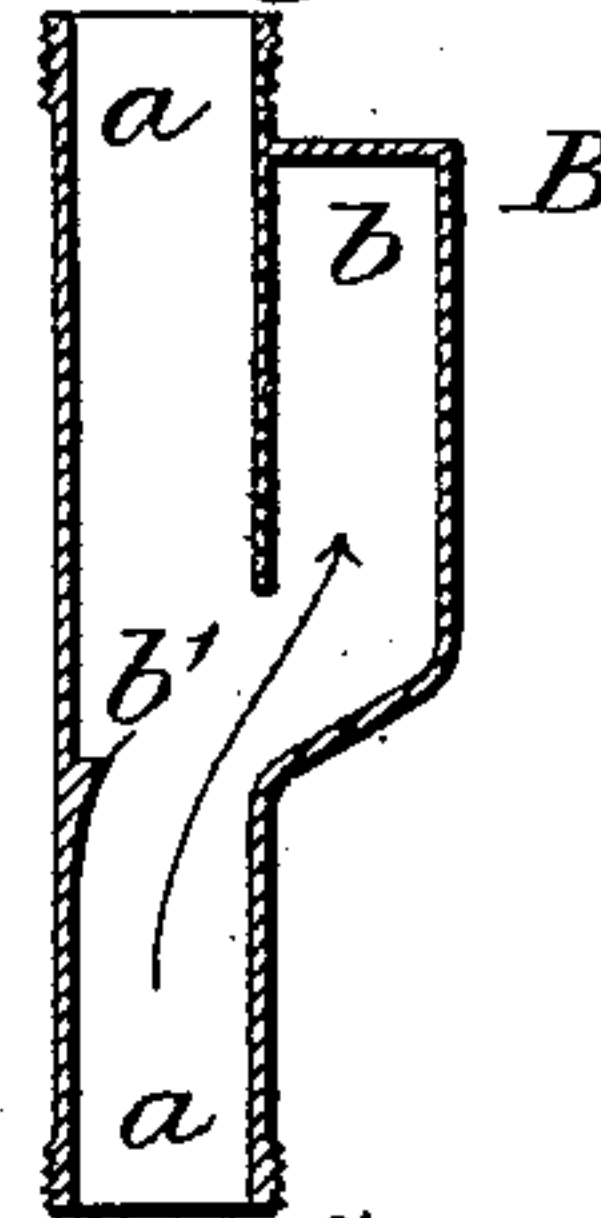


Fig: 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PREVENTING BURSTING OF WATER-PIPES BY FREEZING.

SPECIFICATION forming part of Letters Patent No. 616,188, dated December 20, 1898.

Application filed January 17, 1898. Serial No. 666,923. (No model.)

To all whom it may concern:

Be it known that I, NEVIL MONROE HOPKINS, a citizen of the United States, residing in the city of Washington, District of Columbia, have invented certain new and useful Improvements in Apparatus for Preventing the Bursting of Water-Pipes by Freezing, of which the following is a specification.

In order to carry out my invention in the most efficient manner, I have invented certain novel combinations, constructions, and organizations of instrumentalities hereinafter set forth, and specifically designated in the claims at the end of this specification.

The accompanying drawings show several convenient and effective devices for practicing my invention in the best way now known to me.

Figure 1 represents a view in elevation of a horizontal pipe provided with several of what I term my "improved expansion chambers or joints;" Fig. 2, a vertical central longitudinal section through one such expansion chamber or joint with its couplings and pipes; Fig. 3, a plan view of the above-named parts with the expansion-chamber in section on the line 3 3 of Fig. 2, and Fig. 4 a vertical central cross-section through the expansion-chamber on the line 4 4 of Fig. 2. Figs. 2, 3, and 4 are on an enlarged scale. Fig. 5 represents a central longitudinal section through a vertical pipe, having the expansion-chamber in line with the inlet-pipe and with the outlet-pipe in a different axial plane or line from the inlet. Fig. 6 represents a central longitudinal section through a straight pipe, having a laterally-arranged expansion-chamber.

Figs. 1 to 4, both inclusive, show sections of a horizontally-arranged pipe A, connected at suitable intervals with the expansion-chamber B by the usual screw-couplings C or other suitable connections. These expansion-chambers B are shown as constructed with domes *b*, extending laterally above the axial line of the conduit or pipe to constitute chambers to contain air. The bottom or opposite face of the expansion-chamber is provided with an inwardly or upwardly projecting transverse flange or rib *b'*, forming a double inclined plane, Fig. 2, to deflect the expanding ice laterally or vertically in the ex-

pansion-chamber. This rib or flange greatly facilitates lateral deflection of the ice and relieves the pressure on the pipe. I have obtained the best results by making the rib extend entirely across the side of the chamber or pipe. I have also obtained better results by enlarging the expansion-chamber laterally both horizontally and vertically, as shown in Fig. 3, so that the chamber shall be larger than the pipe in both directions.

I have found in practice that a pipe one inch in diameter and five feet long will when the water therein is frozen cause a column of ice about two inches long to be forced out of the tube. This result, considered in connection with the well-known law of the rate of expansion of water in freezing, affords a basis for readily calculating the amount of space to be provided and the necessary capacity of the expansion-chamber. I have produced effective results with a one-inch pipe provided with expansion-chambers at intervals of five feet.

Figs. 5 and 6 show my invention as adapted to vertical pipes. In Fig. 5 it will be seen that the inlet and outlet pipes *a a'* of the conduit are arranged in different planes, and the expansion-chamber B is arranged in the line of the inlet-pipe *a*. This organization enables me to dispense with the deflecting-flange *b'*, hereinbefore described, as the column of water is deflected laterally, while the expansion is longitudinal in the pipe *a* below the dome B, while the expansion in the pipe *a'* is taken up by the next dome above. (Not shown in the drawings, however.) The deflecting-flange *b'* is, however, necessary in the modification shown in Fig. 6, as the pipe is straight or continuous, and the expansion-chamber B is arranged on one side of the pipe, as in Figs. 1, 2, 3, and 4, instead of being in the direct line of the inlet-pipe, as in Fig. 5.

I have described my invention with reference to the straight, horizontal, or vertical pipes shown in the drawings; but the organization is obviously equally applicable to pipes curved in any desired direction or inclined at any desired angle.

What I claim herein as new and as of my own invention is—

1. The combination of a water-pipe, an ex-

pansion-chamber connected therewith and a transverse rib or flange therein to deflect the freezing water or ice laterally.

- 5 2. The combination of a water-pipe, a separate expansion-chamber opening thereinto, and a deflecting flange or rib in the pipe opposite the mouth of the expansion-chamber.

In testimony whereof I have hereunto subscribed my name.

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Witnesses:

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