

Nov. 4, 1952

P. W. ROBERTS

2,616,441

WATER PIPE DRAINING APPARATUS

Filed Aug. 5, 1949

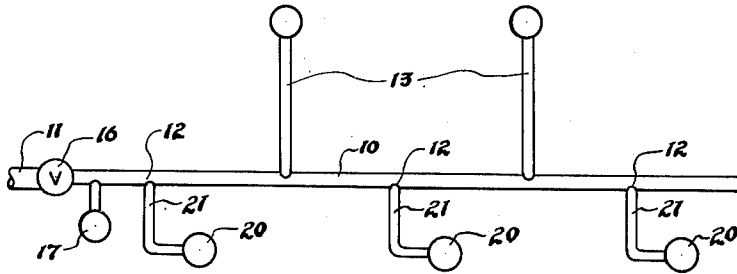


Fig. 1.

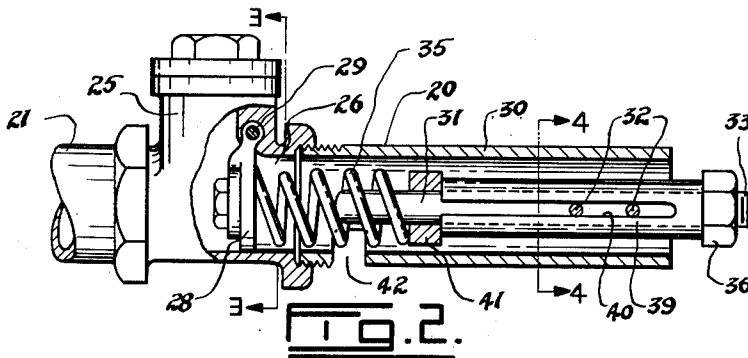


Fig. 2.

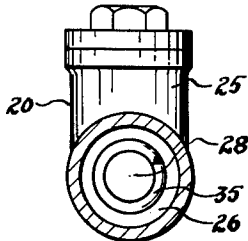


Fig. 3.

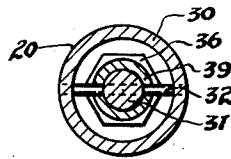


Fig. 4.

INVENTOR
PAUL. W. ROBERTS
BY
Fetherstonhaugh & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE

2,616,441

WATER PIPE DRAINING APPARATUS

Paul W. Roberts, Burnaby, British Columbia,
Canada

Application August 5, 1949, Serial No. 108,755

1 Claim. (Cl. 137—107)

1

This invention relates to apparatus for draining a water pipe extending from a source of supply and which may be exposed to freezing temperatures. In countries subject to freezing temperatures, there are a great many water pipe systems which are not normally protected from the low temperatures. At present, it is common practice to shut the water off from these systems when they are not required or when there appears to be a possibility of a sharp drop in temperature. One type of piping of this nature, is a fire fighting system including hydrants spread throughout a building. In warehouses, piers and the like, the buildings are not heated so that a drop in temperature below freezing is liable to freeze the water in the pipes, causing them to burst. Usually, these systems have a shut-off valve near the point where they connect with the source of supply, such as, the water main. In cold weather, these valves are shut off, but the water remains in the pipes. This means that a substantial drop in temperature results in burst pipes.

The main purpose of this invention is to provide apparatus for automatically draining a water pipe when it is shut off from the source of supply. As this apparatus acts automatically, there is no danger of the system being left with water in it.

The apparatus is described and claimed herein in connection with a water pipe, but it is to be understood that the term "water pipe" is intended to include one or more pipes which may form a complete system.

In order to protect a water pipe from damage due to low temperatures, a shut-off valve is provided between the pipe and its source of supply. A branch pipe is connected to the water pipe at each low point thereof, and a valve chamber is connected to each branch pipe. An outlet is formed in the chamber, and a release valve is provided therein which normally closes the outlet. This valve is retained in closed position by the pressure of the water in the chamber. Suitable means is provided for opening the release valve as the water pressure drops when the shut-off valve is closed.

An example of this invention is illustrated in the accompanying drawings in which,

Figure 1 is a diagrammatic view of a water pipe and the draining apparatus,

Figure 2 is a longitudinal section through the valve apparatus,

Figure 3 is a section taken on the line 3—3 of Figure 2, and

Figure 4 is a section taken on the line 4—4 of Figure 2.

2

Referring more particularly to Figure 1 of the drawings, 10 is a water pipe which is connected to a suitable source of supply, such as a water main 11, and this pipe has one or more relatively low points 12 from which it is to be drained. If this pipe is part of a fire protection system, pipes 13 may extend to hydrants which should be located above the pipe 10.

A shut-off valve 16 is provided in the pipe 10 preferably near the main 11. An air valve 17 of any suitable construction may be provided in the pipe adjacent a shut-off valve, although this is not absolutely necessary. One or more drain valves 20 are provided, each being connected to the pipe 10 by a branch pipe 21. These valves are connected to the water pipe at low points thereof in order to be sure that water would drain towards the valves. Figures 1 to 4 illustrate one form of drain valve 20. This device consists of a chamber 25 which is connected to the water pipe 10 by a branch pipe 21. This chamber has an inlet through which water from the pipe may enter the chamber, and an outlet 26 formed therein. A release valve is provided in the chamber for normally closing the outlet. In this example, a release valve 28 is hingedly mounted at 29 in the chamber and is normally retained in closed position over the outlet by the pressure of the water in the chamber. Suitable means is provided for opening the valve as soon as the water pressure drops below a predetermined point. This takes place when the shut-off valve 16 is closed.

In this example, a tube 30 extends outwardly from the chamber 25 over the outlet 26. A rod 31 extends longitudinally of the tube and is fixedly mounted therein by any suitable anchoring means, such as, by means of pins 32 which extend through the tube and the rod. This rod is threaded at its outer end as at 33, and said outer end preferably extends beyond the end of the tube. A spring 35 is mounted on this rod and bears against the release valve 28. A nut 36 is threaded on the outer end of the rod and is adapted to be turned to adjust the pressure on the spring. In this example, an elongated sleeve 39 is mounted on the rod and extends between the rod and the spring. The sleeve is provided with slots 40 through which the anchoring pins 32 extend. These slots may open outwardly at the inner end of the sleeve in order to facilitate the assembly of the device. If desired, a bearing 41 may be placed on the rod between the spring and the sleeve in order to prevent the former from being caught in the open ended slots of the latter. An additional outlet 42 is located in the

bottom of the pipe 30 adjacent the outlet 26. This is to stop rust from being washed into the sleeve 39 and preventing it from sliding on the rod 31.

In use, the nut 36 of each drain valve 20 is turned until the pressure of the spring 35 on the valve 28 is a little less than the lowest pressure usually encountered in the water pipe 10. As the pressure in the chamber 25 is the same as that in the water pipe, the release valve is normally retained in its closed position. When the temperature drops to a point where there is danger of the water in the pipe freezing, the shut-off valve 16 is closed. This shuts the water pipe and each valve chamber 25 off from the pressure of the main so that there is a considerable drop in the pressure in the chamber. At this time, the pressure of the spring 35 is sufficient to open the release valve, and this allows the water to drain from the outlet 26 of the chamber 25 and through the outlet 41 of the tube 30. As long as the valve 16 is closed, the release valve will remain open so that the pipe 12 will be drained. These drain valves not only open automatically, but they also close automatically. As soon as the valve 16 is opened, the water pipe and the drain valves are filled with water at the pressure of the main and this closes each release valve 28.

If the air valve 17 is employed, it is opened as soon as the drain valve is closed so that the pipe will be drained a little faster than it otherwise would. The air valve is closed when the shut-off valve is opened.

The drain valve 20 is very easily adjusted to suit the pressure of any water system. When the nut 36 is turned in one direction, the sleeve 39 is moved inwardly to compress the spring 35. This may be done until the valve 28 is opened slightly, which is indicated by a leakage of water through the tube 30. Then the nut may be backed off just sufficiently to permit the release valve to close, and the device is set for operation.

An important feature of this drain apparatus is its simplicity. It is practically impossible for it to go out of operation. The valve 28 hangs substantially in a vertical plane from its hinge

point so that it naturally tends to close. It is hardly likely that any dirt will rest between the valve and its seat. However, if this did take place, there would be a leakage of water through the chamber outlet and the release of pressure would enable the spring 35 to open the valve. In these circumstances, the valve usually opens and closes a few times and this dislodges any foreign matter which may be caught therein.

What I claim as my invention is:

Apparatus for draining a water pipe extending from a source of supply and which may be exposed to freezing temperatures, comprising a valve chamber having an inlet formed therein to be connected to a water pipe and through which water from said pipe may enter the chamber said chamber having an outlet formed therein, a release valve hingedly mounted in the chamber normally retained in closed position over the outlet by the pressure of water in the chamber, a tube extending outwardly from the chamber over the outlet, a rod extending longitudinally of the tube and beyond the outer end thereof, said rod being threaded at its outer end, anchoring means between the tube and rod to hold the latter in position, a spring on the rod bearing against the release valve, a nut threaded on the outer end of the rod, and a sleeve on the rod extending between the nut and spring, said sleeve having slots therein through which the anchoring means extend, and said spring being adapted to open the release valve when the water pressure in the chamber drops below a predetermined point.

PAUL W. ROBERTS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
569,943	Shirley	Oct. 20, 1896
580,294	Stone	Apr. 6, 1897
2,204,757	Henze	June 18, 1940
2,275,472	Samiran	Mar. 10, 1942