

J. W. BUTLER.
 CUT-OFF FOR WATER SYSTEMS.
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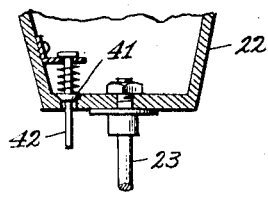
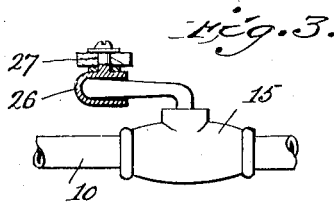
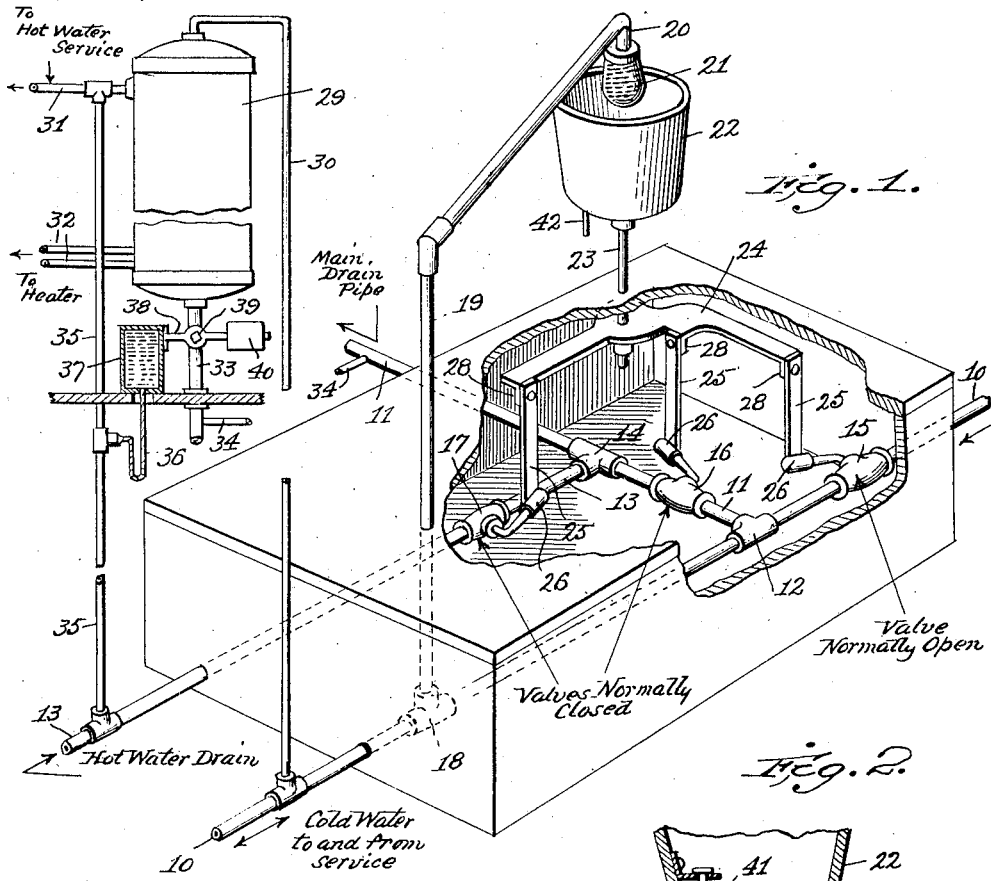
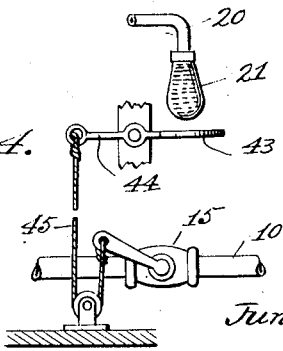


Fig. 4.



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CUT-OFF FOR WATER SYSTEMS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JUNIUS W. BUTLER, citizen of the United States, residing at Roseboro, in the county of Sampson and State of North Carolina, have invented certain new and useful Improvements in Cut-Offs for Water Systems, of which the following is a specification.

This invention relates to cut-off devices for automatically cutting off the flow of water when the temperature decreases to the freezing point and thus preventing the freezing of the water in the supply pipes, and has for one of its objects to provide a device of this character of improved construction and increased efficiency and utility.

Another object of the invention is to provide a simply constructed device which may be applied without material structural changes to water systems of various kinds, and which will not interfere with the flow of the water under normal conditions, but which will automatically cut off the water and likewise provide for the drainage of the water which remains in the supply pipes in event of the temperature falling below the freezing point.

With these and other objects in view, the invention consists in certain novel features of construction as hereinafter shown and described, and then specifically pointed out in the claims.

The improved apparatus may be applied to water conductors of various forms and sizes, but it is designed more particularly for use in connection with the ordinary water supply of residences, but it will be understood that the improved apparatus may be employed without material structural change to water supply pipes of a different character, and it is not desired therefore to limit the invention in any manner in this respect.

For the purpose of illustration the improved device is shown applied to an ordinary water supply for a residence, and includes a hot-water tank of the type which may be connected to a furnace or range and having an individual valve operating device connected thereto for automatically opening the draining valve of the tank when the water is drained from the pipes of the hot-water system.

The objects of the invention are accom-

plished by the means illustrated in the accompanying drawing, in which—

Figure 1, is a perspective view showing the improved apparatus applied to a water system of a residence.

Figs. 2 and 3 are detail sectional views of operating parts of the device, and Fig. 4, is a modified form of valve operating mechanism.

Similar reference numerals in all of the figures of the drawing designate like parts.

Referring to the drawing, 10 designates the main water supply pipe, 11 is the drain pipe connected to the supply pipe at 12, and 13 is the hot water drain pipe connected to the main drain pipe 11 at 14.

In the supply pipe 10 is a cut-off valve located between the drain pipe 11 and the source of water supply, said valve being normally open, and in the drain pipe 11 is a normally closed drain valve 16 for the purpose of draining the cold water from the house system, and in the hot water drain pipe 13 is located a normally closed drain valve 17 for the purpose of draining the hot water from the system. These three valves 15, 16 and 17 are preferably positioned in close relation to each other so that they can be operated simultaneously by a single means and be inclosed in the usual service box as shown in the drawing.

Connected to the main supply pipe at 18 between the house service and the cut-off valve 15 is a flood-pipe 19 which preferably extends upwardly through the service box and is provided with a depending terminal 20 which is preferably closed by a glass receptacle or bulb 21. It will thus be seen that when the system contains water, the flood pipe and its glass terminal will also be filled. This receptacle or bulb 21 can be made of any suitable material, such as thin metal, porcelain or like material, or in fact any material in which the water contained therein will freeze quicker than in the pipes of the system, the object being to provide a fragile receptacle which will break when the water freezes therein and at the same time strong enough to resist the pressure of the water in the system under normal conditions.

It is one of the particular objects of the invention, to provide an operating means

for the valves 15, 16 and 17, which in turn is operated by water flowing from the system or from the source of supply when the fragile receptacle is broken by the freezing of the water therein which will release the water through the flood-pipe. This operating means consists of a water receiver 22 mounted on a standard 23 having a spider 24 on its lower end, and links 25 pivoted to said spider and the handles of the valves 15, 16 and 17. Said water receiver is positioned adjacent the fracturable end of the flood-pipe, preferably below the same, in position to receive the water released from the flood-pipe, and the said water receiver is of a size to contain sufficient water the weight of which will operate the valves. The water receiver is also located in position to receive the full force of the water flowing from the flood-pipe, so that both the weight of the water in the receiver and the force of the flow are utilized to operate the valves. The handles of the valves 15, 16 and 17 are preferably set in respect to the valves so as to lie in inclined positions to the horizontal in both their closed and open positions, to avoid a dead center position which would handicap the successful operation of the device.

As shown in detail in Fig. 3, the lower ends of the links 25 are connected to the ends of the valve handles through the medium of the cups or sockets, each of which is provided with a pivot pin 27 upon which the lower end of the link is pivoted, the upper ends of the links being preferably pivoted to depending lugs on the spider 24.

To drain other parts of the water system in the house which contain trapped water, such as closet and hot water tanks, an individual automatic operating mechanism is provided for each water holder, and the same is connected to either main drain pipe and is caused to operate upon the withdrawal of the water from the drain pipe to which it is connected. In the drawing is shown a hot water tank 29 which has a cold water connection 30 to the main supply pipe 10, a hot water connection 31 to the house service, also suitable connections 32 to a heater, and a drain-pipe connection 33, which in turn is connected to the main drain pipe 11 by a pipe 34. Another drain pipe connects pipes 31 and 13, and this drain-pipe 35 is connected by a flexible pipe 36 which in turn is connected to a water receptacle 37 which is mounted on one end of a lever 38 mounted on the drain valve-stem 39 and provided with a counter balancing weight at its other end. When the system is normally full of water the receptacle 37 is also full of water supplied from the system through the flexible pipe 36, and when the water is withdrawn from the system, the water is also drawn from the

receptacle 37, and the weight of the water being released therefrom, the counter-balancing weight operates the lever 38 and turns the drain valve to open position to release the water from the tank to the main drain pipe 11 through the pipes 33 and 34.

In operation, assuming that the system is full of water with the drain valves 16 and 17 closed and supply valve 15 open, and with the fragile receptacle 21 preferably in an exposed position with respect to the balance of the system, a freezing temperature will first freeze the water in the fragile receptacle and cause the same to burst. This condition will open the end of the flood-pipe and water will then flow into the water receiver 22 and when sufficient weight shall have accumulated, water receiver 22 will descend carrying the spider 24 and its links 25 and consequently operating the valves 15, 16 and 17. This operation will close the main supply valve 15 and thus cut off the supply of water to the system, and will open the drain valves 16 and 17, and thereby open the cold and hot water pipes to the main drain pipe. As shown in the drawing, the draining of the water from the hot water pipes will cause the operation of the individual controller and thus open the drain valve of the hot water tank.

Preferably water receiver 22 is provided with a valve 41 in its bottom, said valve being spring held to closed position and provided with a depending stem 42 which is adapted to contact with the service box and open the valve when the water receiver reaches its lowermost position. This operation will drain any water remaining in the water receiver after the valves are operated. Thus it will be observed that this invention will drain any and all parts of a water system including the water receptacles of the operating mechanism.

In the modified form shown in Fig. 4 of the drawing, the force only from the released water from the flow-pipe will contact with the disk 43 of the pivoted lever 44 and operate the valve by pulling on the flexible connection 45.

Having thus fully described the invention, what is claimed is:—

1. In a water system, a water supply pipe, a drain pipe connected thereto, a valve in said supply pipe between said drain pipe and the source of water supply, a normally closed valve in said drain pipe, a flood-pipe connected to said supply pipe between said drain pipe and the house system, a glass water receptacle closing one end of said flood-pipe, and means for operating said valves in the drain and supply pipes, said means embodying a water receiver mounted to receive water from the flood-pipe after the fragile receptacle bursts and operable

downwardly by the weight of the water flowing thereinto, a spider connected to said water receiver and operable downwardly therewith, and connections between said spider and the handles of said valves, the downward movement of said water receiver operating the drain valve to open position and the supply valve to a closed position.

2. In a water system, a water supply pipe, a drain pipe connected thereto, a valve in said supply pipe between said drain pipe and the source of water supply, a normally closed valve in said drain pipe, a hot water drain pipe connected to the main drain pipe beyond the drain pipe valve, a drain valve in said hot water drain pipe, a flood-pipe connected to the supply pipe between the main drain pipe and the house system, a fragile receptacle closing one end of said flood-pipe, a spider connected to all of said valves and operated by the water flowing from the flood-pipe after the fragile receptacle bursts, the downward movement of said spider operating to open both said hot water drain valve and the main drain valve, and close the valve in the supply pipe.

3. In a water system, a water supply pipe, a drain pipe connected thereto, a valve in said supply pipe between said drain pipe and the source of water supply, a normally closed valve in said drain pipe, a flood-pipe connected to the supply pipe between the main drain pipe and the house system, a fragile receptacle closing one end of the

flood-pipe, means operated by the flow of water from the flood-pipe after the fragile receptacle has burst for automatically operating the drain and supply valves, a water tank connected to the house system, and a separate drain controller for said water tank automatically operated when the water is drained from the house system.

4. In a water system, supply and drain pipes having control valves therein, the supply valve being normally open and the drain valve being normally closed, a flood-pipe connected to the supply pipe, means for closing one end of said flood-pipe and constructed to burst under freezing temperature, operating means connected to the supply and drain valves for closing and opening the same respectively, said means being automatically operated by the flow of water from the flood pipe after its closing means has burst, a water tank connected to the house system of pipes, a normally closed drain valve connected to said water tank, a separate controller for the drain valve of the water tank, said controller embodying a lever having a weight at one end and a water container at its other end connected to the pipe system of the house to retain it full of water when the system is full, whereby when the water is drained from the system through the main drain pipe, the separate controller opens the tank drain valve.

In testimony whereof I affix my signature.

JUNIUS W. BUTLER.