Dec. 1, 1959 S. W. HOLMES 2,915,080

CONTROL MEANS FOR HOT WATER SYSTEMS

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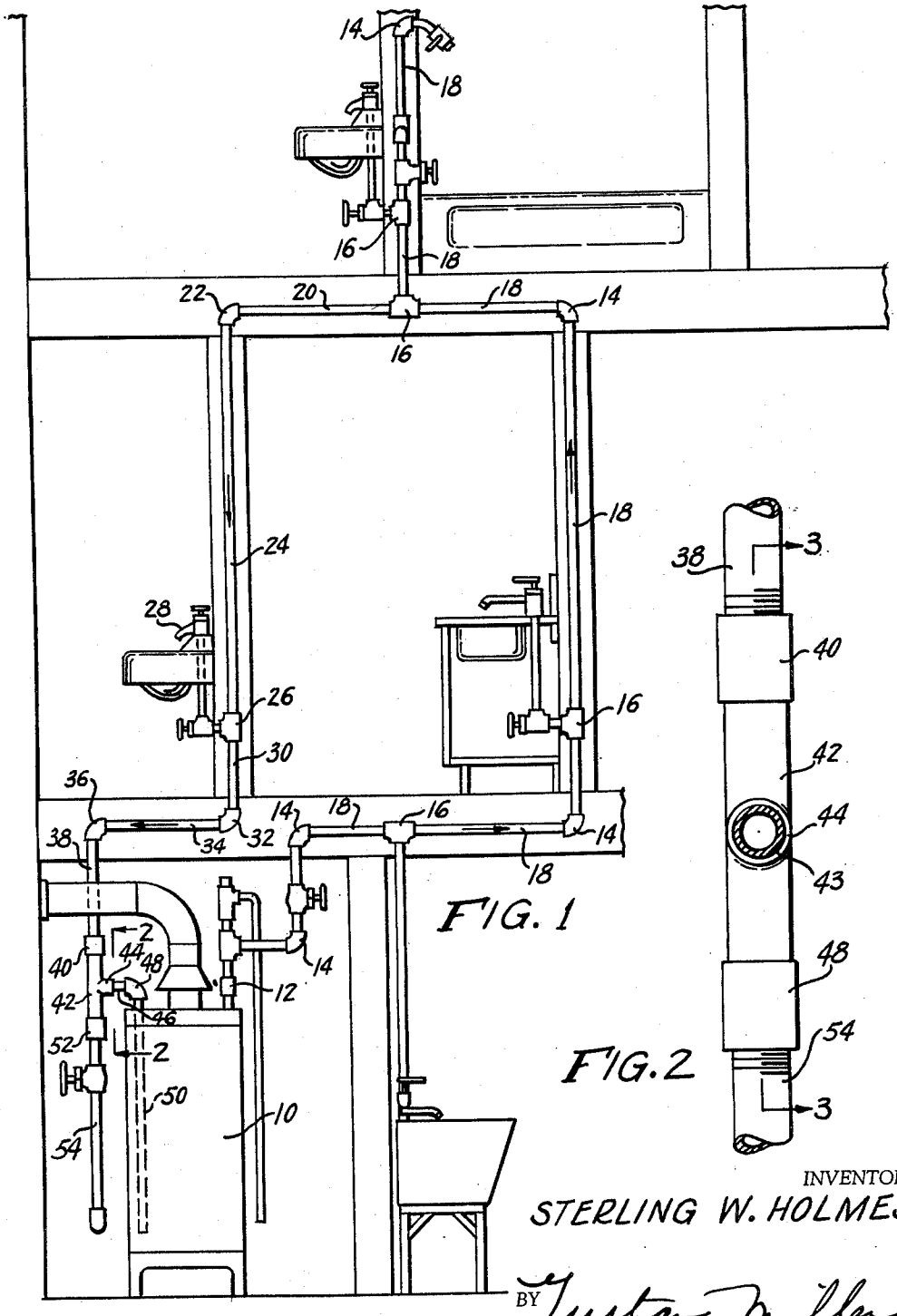


FIG. 1

FIG. 2

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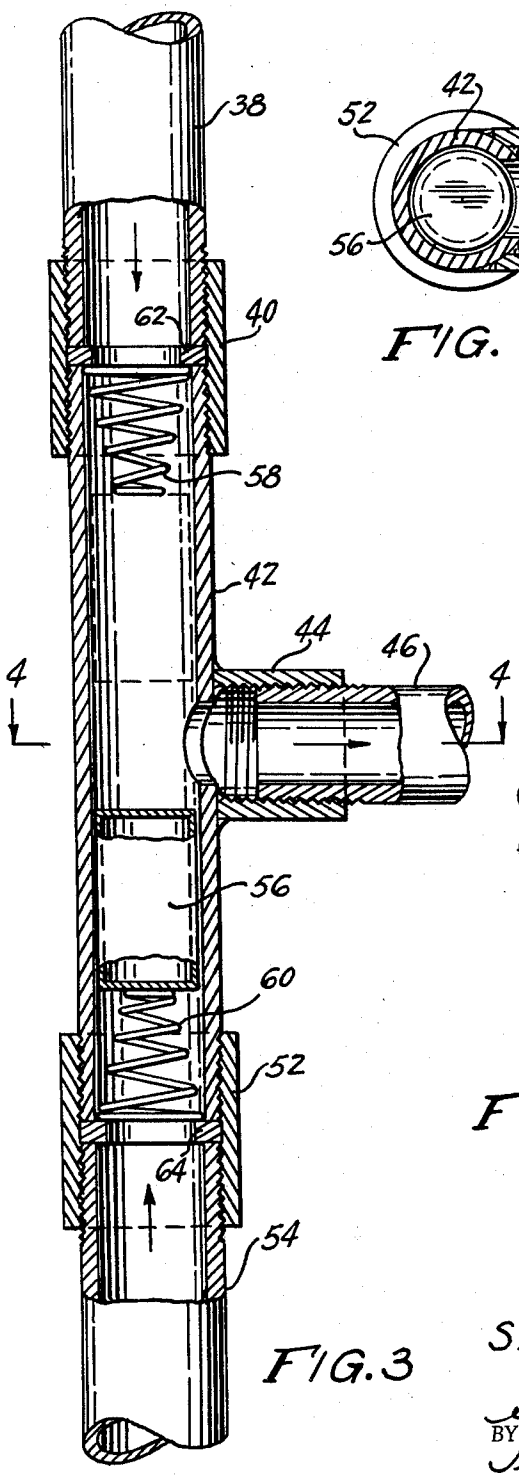


FIG. 3

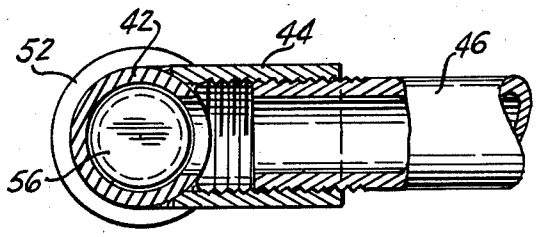


FIG. 4

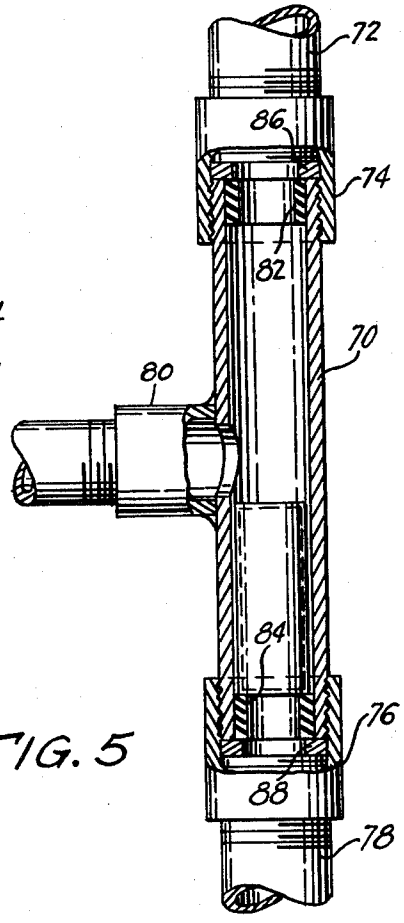


FIG. 5

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United States Patent Office 2,915,080 Patented Dec. 1, 1959

2,915,080

CONTROL MEANS FOR HOT WATER SYSTEMS

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Application April 1, 1958, Serial No. 725,585

4 Claims. (Cl. 137—112)

This invention relates to a control means for hot water systems, and it particularly relates to a control means which automatically prevents cold water from backing up the return line to the faucet.

It has always been a problem to keep cold water from backing up the hot water return line when the hot water faucet has been opened. Consequently, when the faucet is next opened, the first gush of water is sometimes ice-cold and this cold water must be allowed to run out before the hot water can come through. This is, of course, not only a tragic waste of water but is annoying and even discomforting to the user, especially in the shower or bath.

It is, therefore, one object of the present invention to provide a hot water system where hot water is instantly available whenever the hot water faucets are opened.

Another object of the present invention is to provide a water system having a control means, which is both automatic and quiet, for maintaining hot water available at the hot water faucets at all times.

Another object of the present invention is to provide a water system having simple and easily-installed means for keeping hot water available at the hot water faucets at all times.

Other objects of the present invention are to provide an improved hot water system, of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, this invention consists in the details of construction and combination of parts as will be more fully understood from the following description, when read in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevational view of a water system containing a control means embodying the present invention.

Fig. 2 is a view taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a view taken on line 4—4 of Fig. 3.

Fig. 5 is a sectional view somewhat similar to Fig. 3 but showing a modified form of construction.

Referring now in greater detail to the drawings wherein similar reference characters refer to similar parts, there is shown in Fig. 1 a hot water system comprising a hot water tank 10 provided with an outlet pipe 12 connected through suitable elbow connections 14 and T-connections 16 to various hot water conduits 18 which are, in turn, connected to various corresponding outlets such as sink faucets, bathtub faucets, shower heads, etc. in the standard manner.

A hot water return pipe 20 is connected to the upper T-coupling 16 at one end and, at its other end, it is connected, through an elbow 22, to a pipe 24 having a T-coupling 26 interposed therein for supplying hot water to a sink faucet 28. A pipe 30 is connected to the other end of T-coupling 26, this pipe 30 being also connected, at its opposite end, to an elbow 32. A pipe 34 is connected between elbow 32 and an elbow 36 to which is connected one end of return line 38.

The return line 38 is connected, through a coupling 40, to the upper end of a tubular valve housing 42. Intermediate its ends, the housing 42 is provided with an internally threaded nipple 44 in which is threaded the externally-threaded connector pipe 46. The pipe 46 is connected, through an elbow 48, to an inlet pipe 50 in the tank 10. At its lower end, the housing 42 is connected, through a coupling 52, to a cold water inlet pipe 54. The pipe 54 is connected to a source of cold water, not shown.

Within the housing 42 is provided a float valve 56, of metal or the like, which is adapted to be displaced in one direction or the other longitudinally of the housing 42 by a differential pressure of the water between the upper and lower portions of the housing 42. The movement of this float valve 56 is kept noiseless by means of a pair of check springs 58 and 60, one at each end of the housing. Each spring 58 and 60 is mounted on a respective ring or washer, indicated at 62 and 64; these washers being retained in position between the upper and lower ends respectively of the housing 42 and the corresponding pipes 38 and 54, by the respective pipe couplings 40 and 52 (as best shown in Fig. 3).

In operation, when the outlet end of the system, above the return line 38, is closed by the closing of all faucets, etc., the pressure of the hot water which is thereby cut off from the faucets and which return through return line 38 overbalances the pressure of the cold water entering through pipe 54. As a result, the valve 56 is moved past the nipple 44 against the lower spring 60, in the manner indicated in full line in Fig. 3. In this position of the valve, the returning hot water flows back through nipple 44 and its associated piping into the tank 10, while, at the same time, the valve 56 prevents inflow of cold water. When the faucets are re-opened, hot water will immediately start to flow from the hot water line.

When the faucets are opened and the hot water remaining in the return line flows out, this immediately unbalances the pressure in housing 42 so that cold water entering through pipe 54 forces the valve 56 upwardly against spring 58, as indicated in dotted outline in Fig. 3. In this position, the flow of hot water through the return line 38 to the tank 10 is closed off while, at the same time, additional cold water flows through pipe 54 to the tank 10 to be heated and then sent through the system.

In Fig. 5, there is shown a slightly modified form of the invention whereby all parts of the system are substantially similar and wherein the housing 70 is similar to housing 42 and is similarly connected to a return pipe 72 by a coupling 74 at its upper end, and by a coupling 76 to a cold water inlet pipe 78 at its lower end. It is also similarly provided with an intermediate opening to which is connected a nipple 80 similar to nipple 44. However, it differs from the first-described form of the invention by being provided with resilient sleeves, made of rubber or the like, as indicated at 82 and 84, in place of the springs 58 and 60. The sleeves 82 and 84 also are mounted on respective washers 86 and 88 retained in position between the respective ends of the housing 70 and the corresponding connected pipes by means of the respective couplings 74 and 76. A float valve 90 of metal or the like, similar to valve 56, is provided in housing 70.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. In a hot water system having a hot water tank, piping connecting said tank to hot water outlet means, return means for returning unused hot water from said hot water outlet means to said tank, and inlet means for conveying cold water to said tank, a valve means interposed between said return means and said inlet means for connecting only one of said inlet means or said return means to said tank at one time, said valve means comprising a valve housing having fluid connection at one end with said return means, a fluid connection at its opposite end with said inlet means for conveying cold water and an intermediate fluid connection with said tank, and a float valve in said valve housing movable from a position between one end of said housing and said intermediate fluid connection to a position between

the opposite end of said housing and said intermediate fluid connection.

2. The system of claim 1 wherein resilient cushioning means for said float valve are provided at each end of said housing.

3. The system of claim 1 wherein a coil spring is positioned within said valve housing at each end thereof.

4. The system of claim 1 wherein a resilient sleeve is provided internally of said valve housing at each end thereof.

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