

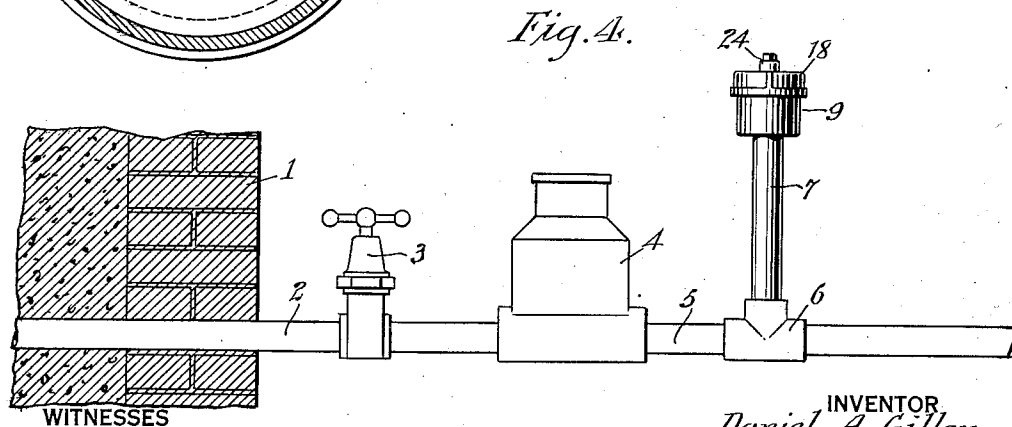
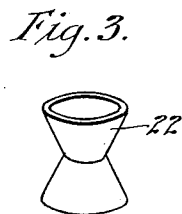
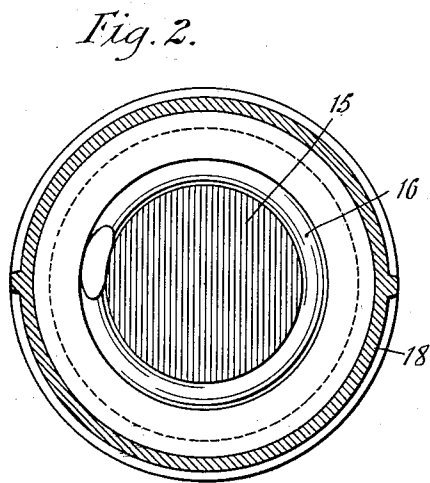
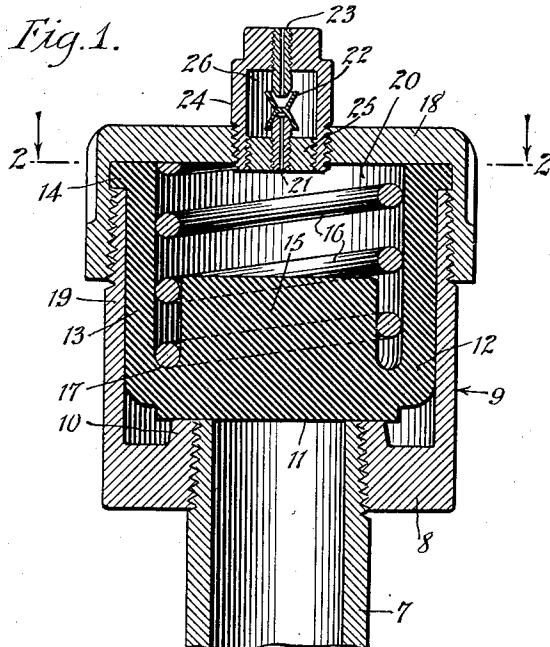
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2,012,872

CUSHION CAP

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WITNESSES

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CUSHION CAP

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2 Claims. (Cl. 137-71)

This invention relates to plumbing fixtures, and particularly to what may be known as an improved cushion cap adapted to be connected to the water supply system of a building, the object being to present a construction which will eliminate or absorb any water hammering in the system.

Another object of the present invention is to provide a cushion cap for absorbing water hammering in a water system, the arrangement being such that there are provided both a cap and a spring cushion to absorb any hammering in the water system.

An additional object, more specifically, is to provide a cushion cap for water systems wherein there is provided a resilient cap formed of rubber or other resilient material for confining air and water to the system and which is arranged with a spring to take care of any hammering or tendency to hammer in the system.

In the accompanying drawing—

Figure 1 is a longitudinal sectional view through a cushion cap disclosing an embodiment of the invention;

Figure 2 is a sectional view through Figure 1 on the line 2-2;

Figure 3 is an enlarged detailed perspective view of a floating closure valve embodying certain features of the invention;

Figure 4 is a view partly in section and partly in elevation illustrating part of a water system extending through a wall and provided with a cushion cap embodying the invention.

Referring to the accompanying drawing by numerals, 1 indicates the wall of a house of any desired kind, and 2 the supply pipe extending from the supply main in the street or other source. A valve 3 of any desired kind may be provided to shut off the water whenever necessary, and also a meter 4 may be used in the usual manner. From meter 4 a pipe 5 leads to the outlets in the house in order to supply water thereto.

Where some or all of the outlets are provided with quick closing valves, as, for instance, spring valves, the system is liable to develop what is known as water hammering which will temporarily increase the pressure in the pipes several times and will produce not only a disagreeable noise but will cause the various connections to leak after a short time. To overcome this objection various means heretofore have been provided with more or less success. However, most of these devices become easily outworn and allow the hammering action to again take place.

In the present invention means have been pro-

vided which will absorb the hammer immediately upon creation thereof so that it usually does not reach a maximum hammering action, thus causing the system to remain quiet and relieving all the valves and fittings of the extra pressure produced by the hammering.

As shown in Figure 4 a T-fitting 6 is interposed in pipe 5 and the standpipe 7 is connected to the T-fitting. The standpipe at the upper end is screwed into the bottom 8 of the cushion cap 9, shown particularly in Figure 1. As illustrated in Figure 1 the bottom 8 interiorly is provided with an annular flange 10 which acts as a seat for the lower surface 11 of a resilient cup 12. The cup 12 may be made of any desired material but it has been found that a good grade of rubber answers the purpose in an efficient manner. The construction shown in Figure 1 is made from rubber and is provided with a comparatively thick wall 13 merging into an annular flange 14 at the upper end and at the lower end into a central upstanding lug 15 around which part of the spring 16 fits. One end of spring 16 fits against the surface 17 of the cup 12, while the other end fits against the cap 18, which cap is of metal and screwed onto the side wall 19 of the device. Preferably the cup 12 by reason of its own action and also by reason of the action of the spring 16 presses against the seat 10 with some appreciable pressure. In many places it is desirable that the pressure normally be about 35 lbs. per square inch, but this pressure may be varied widely without departing from the spirit of the invention. However, when the cup 12 is pressing against the seat 10 with a 35 lb. pressure per square inch it will be necessary for the pressure in pipe 7 to be greater than 35 lbs. before the cup 12 will move upwardly against the action of spring 16.

In ordinary water systems it has been found occasionally that the pressure will increase up to 200 lbs. per square inch for an instant during the hammering action. When the pressure increases in this manner or even to a less extent, the cup 12 will move upwardly to relieve or absorb this pressure and, consequently, prevent any real hammering in the system. It will be understood that when the device is first mounted pipe 7 is filled with air and, consequently, when the water is turned on this air is confined so that if there should be any attempt at hammering in the system the air in pipe 7 will take care of the small hammering action and absorb the same. But if the hammering action should reach an extent where it produces a pressure greater than

35 lbs. per square inch, the cup 12 will begin to move away from its seat in absorbing this extra pressure.

From Figure 1 it will be noted that above the lug 15 there is an appreciable space in which air is confined. When the bottom part of the cup moves upwardly this air is brought under compression and assists the spring in resisting the upward movement of the bottom of the cup, thus assisting in taking care of extreme water hammering conditions or, rather, extreme rises in pressure in the pipe.

When the pressure in chamber 20 increases to an appreciable extent the air will pass through the small passageway 21 and against the floating valve 22, but if the pressure is increased rather suddenly the valve 22 will move up quickly so that the upper part will engage the seat formed at the lower end of the pipe 23. The pipe carrying the passageway 21 and pipe 23 are both carried by the hollow plug 24, which also carries the plug member 25, thus forming the chamber 26. This construction is of particular value when the device becomes old and the rubber cup 12 begins to leak. This does not take place usually for about five or six years or more, but eventually it will occur. When the water leaks through the cup into the chamber 20 it will pass through the small passageway 21 and quickly raise valve 22 so that none of the water can escape through pipe 23. However, as soon as the pressure decreases, valve 21 quickly falls and the downward movement of the lower part of the cup 12 will produce a slight rarefaction, whereupon air will rush into the chamber 26. By this means there is almost always a supply of air in chamber 26, even when the cup 12 is leaking. However, the action of the parts when functioning fully is to absorb the rise in pressure in the water system and thereby prevent actual hammering as the cushioned air in pipe 7 and the resilient action of cup 12 with its spring 16 will permit a flow of water into pipe 7 sufficient to take care of the instant rise in pressure caused by the quick closing valve or some other attachment.

As soon as the rise in pressure has been taken care of, the parts will again reassume their former positions and the usual pressure will be maintained in the water system. It will be evident that at any time the cushion cap 9 may be removed from pipe 7 and a new one substituted. When this is done the valve 12 is preferably shut

off and, if desired, any water in pipe 7 may be removed so that when a new cushion cap is provided there will be a new supply of air in the pipe.

I claim:

1. A cushion cap including a hollow body having an aperture in the bottom, a cup positioned in order to close said aperture, a spring holding the cup in a given position, a cover member secured to the body for holding the spring and cup in place, a vent plug carried by said cover, said vent plug having a chamber and a pair of pipes extending therein, and a float valve arranged between said pipes, said pipes each having a valve seat coacting with the float valve so that the float valve may at one time close one pipe and at another time close another pipe, while in a third position it may float at an intermediate point between the pipes.

2. A cushion cap for water supply systems, comprising a hollow cylindrical body adapted to be connected to said system, said body being open at both ends, one of said ends acting as an open top and the other as a bottom, said bottom being formed with an inwardly extending flange acting as a valve seat, a resilient cylindrical rubber cup positioned in said body, said cup having a closed end and an open end formed with an outwardly extending annular flange overlapping the top of said body, said closed end normally resting on said valve seat, said cup having an annular wall merging into said outwardly extending flange and a centrally positioned boss extending upwardly from said closed bottom whereby an annular groove is provided between said wall and said boss, a removable cover for the top of said body, said cover normally pinching the flanged extension on said cup against the top of said body, and a coil spring formed tubular positioned to surround said boss with one end pressing against said cover and the other against that part of the cup at the bottom of said groove for normally and resiliently holding the closed bottom of the cup against said seat, whereby when air under pressure acts on said closed end of said cup and forces the same away from said seat, said annular wall will have a tendency to bulge outwardly against said body for forming a tight contact therewith so that no air can pass said cup.

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