(No Model.)

J. O. WADDELL.

CUSHION FOR WATER PIPES.

No. 315,453. Patented Apr. 7, 1885.

Fig. 1.

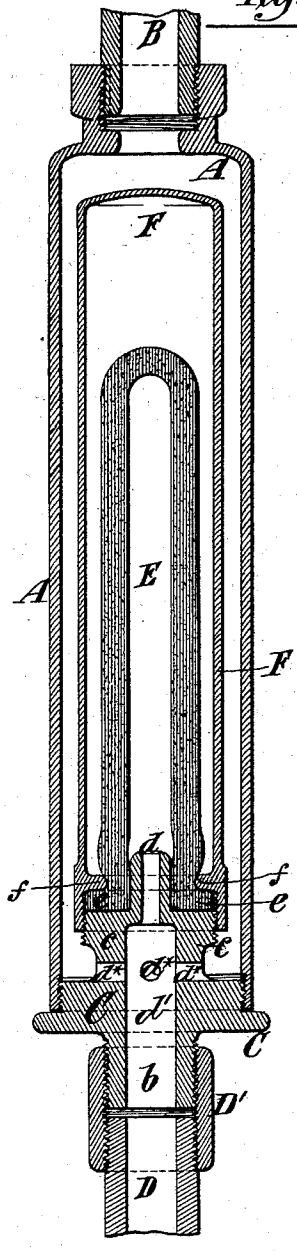
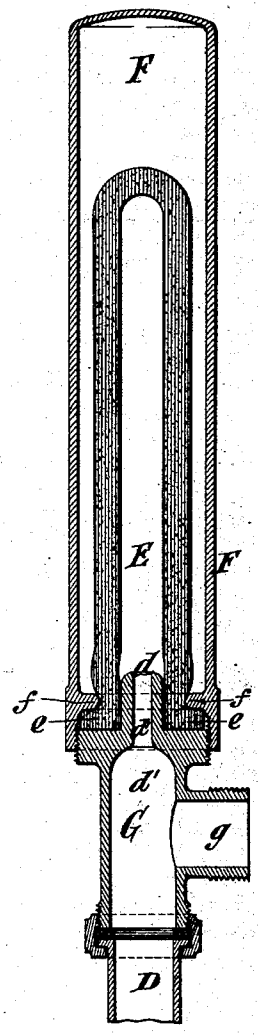


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CUSHION FOR WATER-PIPES.

SPECIFICATION forming part of Letters Patent No. 315,453, dated April 7, 1885.

Application filed June 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES O. WADDELL, of Elizabeth, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Cushions for Water-Pipes, of which the following is a specification.

When a faucet or cock through which water is drawn—as, for example, a sink-faucet or basin-cock—is shut off, the momentum of the flowing water produces a water hammer or shock which is annoying and injurious to the system of water-pipes and connections. The supply-pipe has had attached to it a prolongation made flattened or elliptical in transverse section, and of such metal and degree of thinness that the force of the water when the cock or valve is suddenly closed will cause it to expand or widen the elliptical pipe, and so increase its capacity. It has also been proposed to arrange in the water-pipe a small chamber containing a flexible ball, which fills the chamber and has channels cut in its exterior for the passage of water past it. When the cock or valve is closed, the ball will be compressed by the impact of water and thereby will neutralize and soften the shock.

The object of my invention is to provide a means which will gradually and effectively overcome the momentum of the column or current of water and which will not become inoperative by a short use.

The invention consists in the combination, with a water-supply pipe having an outlet to be controlled by a cock, faucet, or valve, and a nipple or aperture independent of said outlet, of an elastic and expansible pocket the mouth of which is in communication with the said nipple or aperture, and a closed air-chamber, larger than the pocket, surrounding and inclosing said pocket, and in which air will be compressed by the expansion of said pocket.

The invention also consists in the combination, with a water-supply pipe having an outlet to be controlled by a cock, faucet, or valve, and a nipple or aperture independent of said outlet, of an expansible pocket having its mouth in communication with said nipple or aperture, and a tubular casing surrounding the pocket and forming a guard to prevent undue expansion of the pocket.

The invention also consists in other combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of a cushion embodying my invention and adapted to be placed in any line supply-pipe or between a supply-pipe and a cock; and Fig. 2 is a sectional view of a cushion, also embodying my invention and adapted for use on the end of a line of pipe.

Similar letters of reference designate corresponding parts in both figures.

A designates a shell or case (here shown as cylindric) having a pipe or connection, B, secured in an air-tight manner to its upper end. This connection may be the shank of a basin-cock. The lower end of the said shell or case A is screwed or otherwise rigidly secured to a base-piece, C, from which projects a nipple, *b*, which is to be connected with a supply-pipe, D, in any suitable manner—as, for example, by a coupling, D'. The base-piece C has an inwardly or upwardly extending portion or boss, *c*, of smaller diameter, which is externally screw-threaded, and from this extends a nipple, *d*. The passage *d'* through the base-piece C extends upward through the nipple *d*, and communicates by holes *d** with the interior of the case or shell A.

E designates a long, and as here shown, cylindric pocket or inverted cup of rubber, which is slipped over the nipple *d*, and is provided at the lower and inner end with a flange, *e*.

F designates a tubular casing or cylindric inverted cup, which is provided with an inwardly-projecting flange, *f*, bearing on the flange *e*, and which is screwed upon the boss or portion *c*, thereby forming a hermetical joint between the supply-pipe and the pocket E, and also forming a hermetically-closed air-chamber, F, within which the pressure of air will be increased by the expansion of the pocket or cup E, owing to the water-pressure within it.

As here shown, the casing or air-chamber F is larger than the exterior of the pocket E, and consequently will form a guard to sup-

port the latter and prevent injurious expansion thereof under heavy water-pressure. When the cork or faucet which is connected with the upper end or outlet connection B of the shell or case A is suddenly closed, the momentum of column or current of water causes it to enter forcibly into the pocket E and to expand the latter, and the expansion of the pocket is resisted both by the natural elasticity thereof, and by the pressure of the air surrounding it, and which constantly increases as the pocket expands. The gradually-increasing opposing forces overcome the momentum of the column or current and obviate any water-hammer.

In the example of my invention shown in Fig. 2, G designates a connection somewhat resembling a T-fitting, and which is constructed with an upwardly-projecting nipple, *d*, at the upper end. Over this nipple is slipped an elastic and expansible pocket, E, provided with a flange, *e*, at its end. The pocket is securely held by a casing or shell, F, which is provided with a flange, *f*, bearing on the flange *e*, and which is screwed tightly upon the piece G. The casing or shell F forms a hermetically-closed air-chamber, wherein air is compressed by the expansion of the pocket E. If the shell or casing F be made of such size that the pocket E in expanding fills the shell, the latter limits the expansion of the pocket and serves as a guard to prevent injurious expansion of the pocket E, as before described. The base portion or piece G is provided with a side outlet-opening, *g*, to which a bath, sink, or other cock or faucet on a line of pipe is to be connected in any suitable manner. When the said cock or faucet is closed, the momentum of the water column or current causes the water to flow into and expand the pocket E, and the momentum is thereby gradually overcome without any injurious shock or jar.

One great advantage of my improved cushion is that it may be used in any suitable position, either vertical or horizontal.

I am aware that it is not new to provide an air-chamber with a hollow ball of india-rubber which entirely fills the air-chamber when expanded, and, by the pressure of water, is compressed or reduced in volume, thereby compressing the air within the ball; and I am also aware that it is not new to provide a spherical air-chamber with a rubber diaphragm dividing it into two parts, air being compressed in one part by the pressure of water in the other part. I do not desire to include in my invention what I have above described as in the prior state of the art.

My expansible pocket is of an elongated form, and has a comparatively small mouth, whereby it may be readily secured upon a nipple or over an aperture on the supply-pipe, and an air-tight communication may be readily established between its interior and the supply-pipe. This renders it easy of application to and adapted for general use with the water-service pipes of dwelling-houses.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a water-supply pipe having an outlet to be controlled by a cock, faucet, or valve, and a nipple or aperture independent of said outlet, of an elastic and expansible pocket the mouth of which is in communication with the nipple or aperture, and a closed air-chamber, larger than the pocket, surrounding and inclosing said pocket, and in which air will be compressed by the expansion of said pocket, substantially as and for the purpose herein described.

2. The combination, with a water-supply pipe having an outlet to be controlled by a cock, faucet, or valve, and a nipple or aperture independent of said outlet, of an elastic and expansible pocket having its mouth in communication with said nipple or aperture, and a tubular casing surrounding the pocket and forming a guard to prevent undue expansion of said pocket, substantially as and for the purpose herein described.

3. The combination, with a water-supply pipe having an outlet to be controlled by a cock, faucet, or valve, of an elastic and expansible pocket in communication with the supply-pipe, and an air-chamber inclosing the said pocket and securing the latter in air-tight communication with the supply, substantially as herein described.

4. The combination, with a base-piece with which the supply-pipe is to be connected, a nipple projecting upward therefrom, and an outlet to be controlled by a cock, faucet, or valve, of the flanged pocket E, made of elastic material and capable of expansion, and the air-chamber F, screwed to the said base-piece and serving to secure the said pocket upon the nipple and to said base-piece, substantially as herein described.

5. The combination of the base-piece C, with which the supply-pipe is to be connected, the elastic pocket E, and air-chamber F, connected in an air-tight manner with said base-piece, said pocket being in uninterrupted communication with the supply-pipe, and the external shell or casing, A, connected with the base-piece, communicating through the base-piece with the supply-pipe, and having an outlet to be controlled by a cock, faucet, or valve, all substantially as herein described.

JAMES O. WADDELL.

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