W. R. COMINGS.

WASHER AND ATTACHING MEANS THEREFOR.

APPLICATION FILED JAN. 20, 1915.

1,250,433.

Patented Dec. 18, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

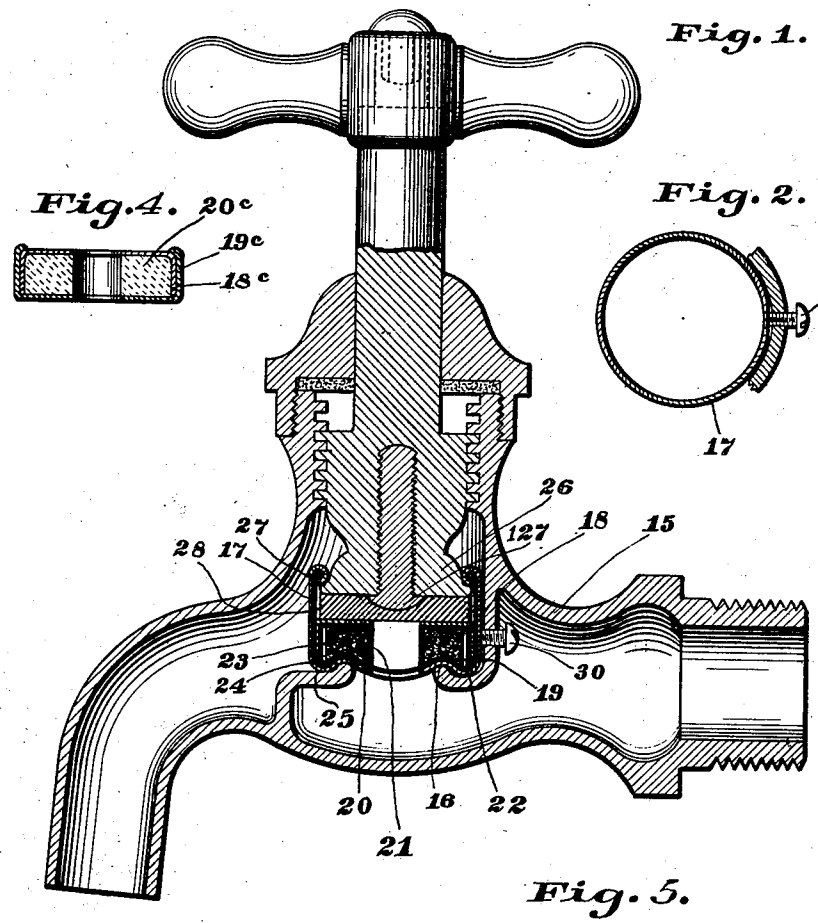


Fig. 4.

Fig. 2.

Fig. 3.

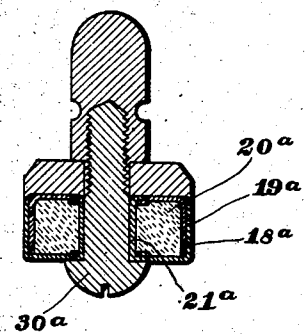
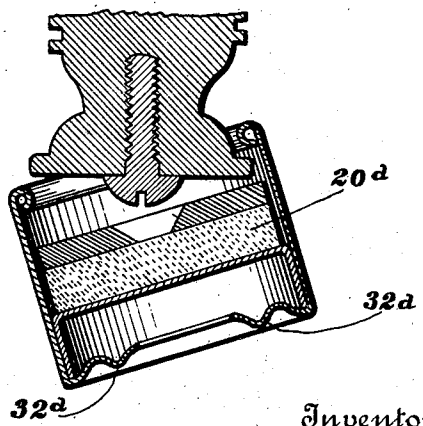


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

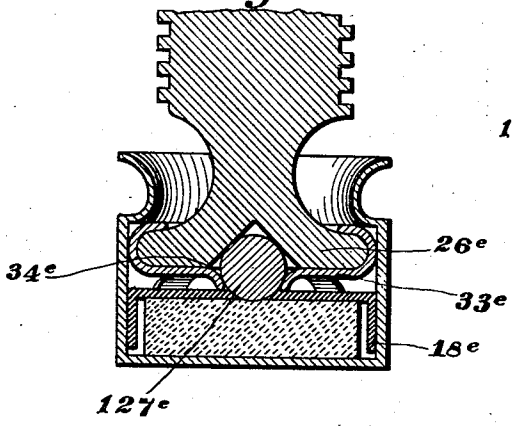


Fig. 7.

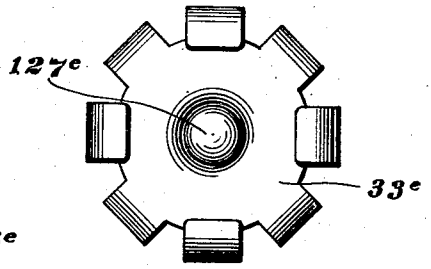


Fig. 9.

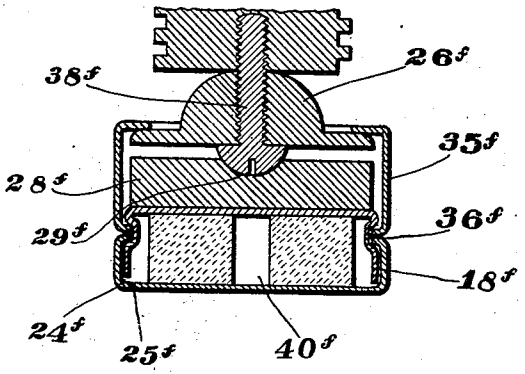


Fig. 8.

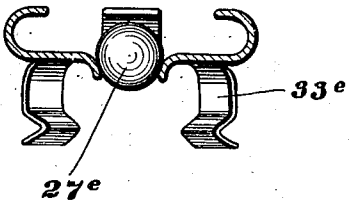


Fig. 10.

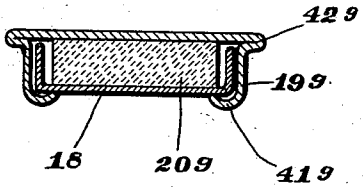
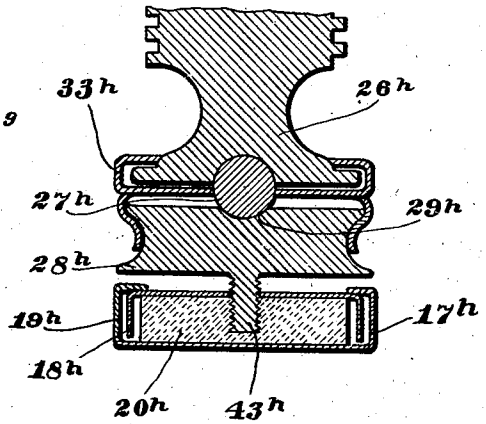


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM RIGHTER COMINGS, OF WIMBLEDON PARK, ENGLAND.

WASHER AND ATTACHING MEANS THEREFOR.

1,250,433. Specification of Letters Patent. Patented Dec. 18, 1917.

Application filed January 20, 1915. Serial No. 3,212.

To all whom it may concern:

Be it known that I, WILLIAM RIGHTER COMINGS, a citizen of the United States, and residing at Wharncliffe, Wimbledon Park, Surrey, England, have invented certain new and useful Improvements in Washers and Attaching Means Therefor, of which the following is a specification.

My invention relates to washers and attaching means therefor, and particularly to washers adapted for use in connection with ordinary steam and water valves.

The object of my invention is to provide washers which shall possess the elastic and pliable qualities of rubber, vulcanized fiber, leather, cork, paper and the like, and at the same time possess the durable wearing qualities of metal.

In carrying out my invention, I preferably provide a washer comprising a metallic casing and an elastic filling member inclosed therein. I contemplate also the provision of means for retaining the elastic filling member under compression, in order that it may be more effective in its operation. I also preferably provide means for limiting the pressure which can be applied to the filling member, and thus limit the radial expansion thereof and the consequent pressure applied to the casing.

I have found it desirable to provide some means whereby the washer may readily be attached to the valve stem, and I have, therefore, provided spring means for accomplishing this result. As shown herein, these spring means are so arranged that the washer may have free swiveling movement relative to the stem, in order that it may compensate for any irregularities in the valve seat or washer.

I have found it desirable also, in certain cases, to provide means for preventing relative rotative movement between the washer and stem, and I have, therefore, illustrated such means herein.

Certain particular constructions which I find to advantageously embody my invention are shown herein. But, it is understood that these embodiments of my invention are intended merely to illustrate, and not to in any way limit the scope of, my invention.

Referring now to the drawing, Figure 1 is a longitudinal sectional view of an ordinary water valve or faucet embodying my invention;

Fig. 2 is a fragmentary sectional view of a portion of the valve illustrated in Fig. 1;

Fig. 3 is a longitudinal sectional view of a slightly different embodiment of my invention, showing a different means for securing the washer to the valve stem;

Fig. 4 is a sectional view of a modified washer embodying my invention;

Fig. 5 is a longitudinal sectional view of a washer embodying my invention, showing the means for connecting the washer to its stem.

Fig. 6 is a longitudinal sectional view of a stem and washer, showing means which I employ to permit free swiveling movement between the washer and the stem;

Figs. 7 and 8 are views of the spring clip shown in Fig. 6; and

Figs. 9, 10 and 11 are longitudinal sectional views illustrating other embodiments of my invention.

Referring particularly to Fig. 1, 15 indicates a valve or faucet, of any desired type. Formed within the valve casing is the valve seat 16, with which the valve or washer 17 coöperates. This washer, as shown, comprises a metallic casing composed of the telescopic members 18 and 19. The metallic casing incloses an elastic filling member, indicated at 20, which is preferably held under compression, within the casing. As illustrated in Fig. 1, the washer 20 is held under compression by the portions 18, 19 of the casing.

As a means for protecting the elastic filling member and thus adding to its life, I preferably provide the portions 18, 19 of the casing with a non-corrodible lining, indicated at 22. It is to be noted also, with reference to Fig. 1, that the filling member 20 is smaller than the interior of the casing member, whereby an annular space 23 is left between the exterior of the filling member and the interior of the casing, to allow for any radial expansion which may result from pressure applied to the washer. I preferably make use also of some means for limiting the relative movement of the telescopic members 18, 19, and, as shown in Fig. 1, this means comprises the edge or rim 24, of one of the telescopic members in coöperation

with the adjacent portion 25 of the other telescopic member.

As a means for conveniently securing the washer to the valve stem, I have provided the stem with a rounded end 26, with which the spring tongues 27, integral with the telescopic member 19, coöperate. In order to facilitate the swiveling movement of the washer with relation to the valve stem, in order to permit the washer to aline itself properly upon the seat 16, I provide some spherical-shaped member, such as the spherical-headed screw 127, and I interpose between the washer and the stem a thrust washer, such as 28, provided with a spherical-shaped depression 29, which coöperates with the spherical-shaped member 127.

As shown in Figs. 1 and 2, I provide means, such as the set screw 30, mounted in a portion of the valve casing 15 and coöperating with a flattened side of the washer to prevent relative rotative movement between the washer and casing.

From the above, it is apparent that I have provided a washer in which the elastic filling member is held under compression within the telescopic casing, and in which the parts are so arranged that the pressure that can be supplied to the filling member, and hence the radial or bursting pressure that can be applied to the casing is limited.

There are many other constructions which embody my invention, as shown in the other figures of the drawing. In Fig. 3, for example, a slightly different form of washer and stem is shown, in which the filling member 20^a is held under compression by the telescopic members 18^a and 19^a and the tubular rivet 21^a. This figure also illustrates a positive means, such as the screw 30^a, for securing the washer to the stem.

In Fig. 4, I have shown a washer in which the filling member 20^c is constantly held under compression by the telescopic casing 18^c, 19^c, alone.

The washer shown in Fig. 5 is somewhat different from the washer disclosed in Fig. 1, since the elastic filling member is not adjacent the bearing surface of the washer, but is removed therefrom a considerable extent, as clearly shown, the ends 32^d of one of the telescopic members being the portions of the washer which coöperate with the valve seat. The filling member 20^d shown in this drawing operates, however, in a somewhat similar manner to the filling members above described, and the means for attaching the washer to the valve stem is substantially identical with that employed in the washer shown in Fig. 1.

In Fig. 6, I have shown a slightly different means for attaching the washer to the stem and permitting free swiveling movement therebetween. This embodiment includes a spring clip 33^e adapted to be detachably secured to the rounded end 26^e of the valve stem. The end of the valve stem is preferably recessed as at 34^e to receive the spherical member 127^e, which is held in position by the spring clip 33^e. This spherical member coöperates with a recess in one of the telescopic members 18^e of the washer. This washer is secured to the valve stem in a manner similar to that employed in the case of the embodiment shown in Fig. 1.

In Fig. 9, I have shown a slightly different means for connecting the washer to the valve stem, this means comprising a circular member 35^f, separate from the washer casing and coöperating with the rounded end of the valve casing and with an annular groove 36^f formed in the inner telescopic member 18^f. The rounded end 26^f of the stem may be integral therewith or connected thereto by some such means as the spherical-headed screw 38^f, the head of which coöperates with a depression 29^f, in the thrust washer 28^f, interposed between the washer and stem.

As in the embodiment shown in Fig. 1, the pressure that can be applied to the filling member is limited by the co-action between the edge 24^f of the inner telescopic member and the face 25^f of the outer telescopic member. The filling member shown in this figure is not only of less diameter than the interior of the telescopic members, but is provided with a central opening 40^f, which permits of a certain amount of radial expansion of the filling member without applying a corresponding amount of radial or bursting pressure to the washer casing.

Fig. 10 shows a slightly modified form of means for retaining the elastic filling member under compression and for limiting the pressure that can be applied thereto. As shown in this figure, the elastic filling member 20^g is of less diameter than the interior of the inner telescopic member 18^g, and is held under compression by the flange 41^g, formed upon the outer casing member 19^g. At the top of this casing there is provided a circular flange 42^g, which may be utilized in connecting the washer to the stem.

In Fig. 11, I have shown means somewhat similar to those shown in Fig. 6 for permitting a free swiveling movement of the washer with relation to the stem. The means shown in this figure comprise a spring clip 33^h, adapted to be detachably connected at one end to the rounded end 26^h of the stem, and at the other end to engage a circumferential groove provided in the thrust washer 28^h. The thrust washer, in addition to this, has a screw stud 43^h for attaching the seating washer 17^h. In practice, the seating washer has a hole in the center sufficiently large to enable the washer to be very easily pushed over the screw stud.

When the compression of the washer takes place in use the expansion of the filling member causes it to close up the elastic material around the screw and hold it firmly in position on the thrust washer, and it can then be readily removed by unscrewing it. The groove in the thrust washer is also so shaped that the tendency of the spring clip is always to hold it straight, in axial alinement with the valve spindle, and to return it to this position whenever it has been rocked or deflected. Instead of the screw stud 43h, any suitable means may be employed for attaching the washer to the thrust washer. For instance, a cup and ball fastener, such as is used on gloves, may be employed, the ball being formed upon the thrust washer in place of the screw stud and the cup being held in the washer. In such an arrangement the washer may be easily attached to the thrust washer by pressing the two together, and may be removed therefrom by inserting a knife blade, or other suitable instrument, between the two and prying them apart.

The washers which I have shown and described herein are readily seen to be of great advantage over the washers now in common use. Because of the provision of the elastic filling member within the washer I obtain the efficient operation of the washer, as in the case of elastic or rubber washers, and at the same time I do away with the disadvantage of such washers, in that they possess but little durability. The spring means for connecting the washer to the stem is also of importance, since it greatly facilitates the assemblage of the parts and the replacing of the washers. The means for permitting a relative swiveling movement between the stem and washer effects a perfect alinement of the washer with respect to its seat at all times. The wear upon my washers is reduced to a minimum by reason of the provision of means for preventing the washers from turning with respect to the valve seats.

Other advantages derived from the use of my improved washers should be obvious to those skilled in the art, and I wish it understood that I do not wish to limit myself to the particular embodiments of my improvements as disclosed herein, since obviously many changes may be made therein without departing from the spirit of my invention.

What I claim is:

1. In a device of the character described, a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing being constructed and arranged to normally hold said filling member under compression and provided with means for limiting and controlling the pressure applied to the filling member.

2. In a device of the character described, a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing being constructed and arranged to normally hold said filling member under compression and provided with means integral therewith for limiting and controlling the pressure applied to the filling member.

3. In a device of the character described, a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing being constructed and arranged to normally hold said filling member under compression, said filling member being so proportioned and shaped with regard to the casing that there is sufficient space within the casing to allow for the radial expansion occasioned by the compression.

4. In a device of the character described, a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing comprising a pair of telescopic members adapted to normally retain the filling member under compression.

5. In a device of the kind described, a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing comprising a pair of telescopic members adapted to normally retain the filling member under compression, and provided with means for limiting the relative movement thereof, thereby limiting the pressure that can be applied to said filling member.

6. In a device of the character described, a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing being constructed and arranged to normally hold said filling member under compression, the interior of said casing being provided with a lining of non-corrodible material.

7. In a device of the character described, a valve stem, a washer and spring means adapted to detachably connect said washer and stem without the use of any special tools.

8. In a device of the character described, a valve stem, and a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing comprising a pair of telescopic members adapted to retain the filling member under compression, one of said telescopic members being provided with a spring means adapted to coöperate with the valve stem to detachably secure the washer thereto.

9. In a device of the character described, a valve stem, a washer comprising a metallic casing, and a moldable filling member inclosed therein, said casing comprising a pair of telescopic members, one of said telescopic members being provided with a spring means and adapted to coöperate with the valve stem to detachably secure the washer thereto and a substantially spherical shaped mem-

ber interposed betwen the washer and stem to facilitate relative axial movement therebetween.

10. In a device of the character described, a valve stem and a washer comprising a metallic casing and a moldable filling member inclosed therein, said casing comprising a pair of telescopic members, one of said telescopic members being provided with a spring means, adapted to coöperate with the valve stem to detachably secure the washer thereto.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM RIGHTER COMINGS.

Witnesses:

H. D. JAMESON,

ORLANDO J. SMITH.