June 17, 1941. G. A. WIKANDER 2,245,887

STOPPER FOR LAUNDRY TUBS, WASHBASINS, AND OTHER RECEPTACLES

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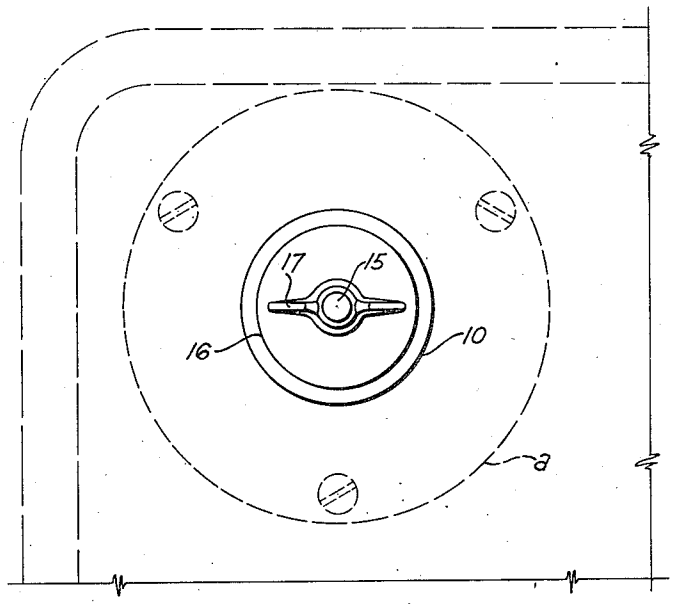


Fig. 1

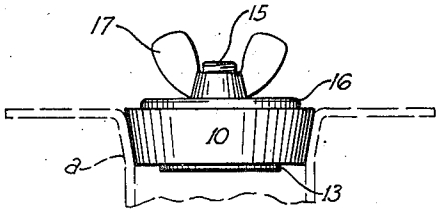


Fig. 2

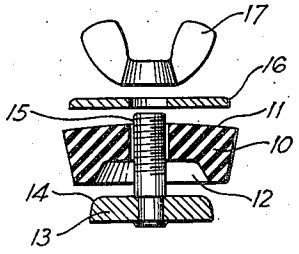


Fig 3

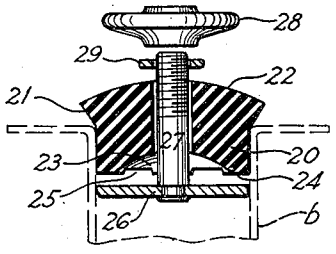


Fig. 4

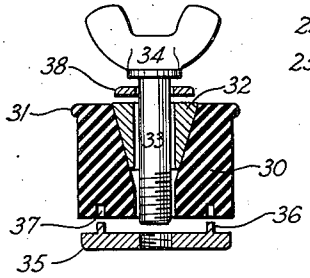


Fig. 5

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STOPPER FOR LAUNDRY TUBS, WASH-BASINS, AND OTHER RECEPTACLES

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5 Claims. (Cl. 4—295)

This invention relates particularly to stoppers or plugs adapted to be used in wash trays, wash basins, sinks, and similar plumbing fixtures or receptacles. It may however be used in connection with the closure for any receptacle in which an ordinary plug might be employed.

More specifically, this invention relates to expansible closure means for receptacles.

An object of this invention is to provide a closure, and particularly a stopper for plumbing fixtures, which will remain securely in place as long as desired. It is a common experience in the use of ordinary stoppers, in laundry tubs, for example, when it is desired to retain water in the tubs for any length of time for the purpose of keeping the laundry in soak, that sudden back pressure in the drain pipe will cause the stopper to be dislodged and thus result in the water being drained out from the wash tub. Such back pressure may occur whenever a quantity of water passes down the same main drain or waste pipe from any other source, particularly from a plumbing receptacle at a higher level than the wash tub.

A more particular object of this invention is to provide a stopper made with a built-in means for expanding the body of the stopper after it has been placed in the drain recess.

Another object is to provide a stopper or closure which is simple and practical and readily adaptable for the uses for which stoppers, plugs, and similar closures may ordinarily be employed.

These objects I attain by making my closure or stopper with a body of rubber or other expansible material, similar to that used for ordinary stoppers for plumbing fixtures, and by providing means for expanding the perimeter of such body after the body has been set in place in the drain or outlet opening. The means by which I attain such expansion of the closure body will be briefly described with reference to the accompanying drawing.

In the drawing:

Figure 1 is a plan view showing one form of my improved stopper set in place in the drain of a wash tray, the drain being shown in light broken lines;

Figure 2 is a corresponding side elevation of the expansible stopper in Figure 1 with a portion of the drain shown in broken outline;

Figure 3 is a vertical medial section of the same stopper, but with the component parts separated for the purpose of clarity; and

Figures 4 and 5 are similar sectional views of modified forms of my invention.

Referring first to Figures 1, 2 and 3, the stopper illustrated has a body 10 made of expansible or elastic material, such as rubber, which body, in this form of my invention, is frustro-conical in outer form, but similar in these respects to the bodies of conventional stoppers. The bottom of the stopper body 10 has a frustro-conical recess 12 (see Fig. 3). The stopper includes a metal disc 13, having a rounded top edge 14, designed to engage the inside surface of the recess 12 and means for compressing the body 10 and forcing the disc into the recess. The major diameter of the disc 13 is greater than the major diameter of the recess 12 so that the disc 13 cannot be forced into the recess without stretching the perimeter of the recess, the amount of stretching depending upon the extent to which the disc is forced upwardly into the recess.

An upstanding stud 15 is riveted or otherwise made fast to the disc 13 and extends upward through a concentric hole in the body 10. The upper end of the stud is threaded and the stud is made of sufficient length so that this upper end will project above the top face 11 of the body 10, extend through a metal washer 16, and permit a nut, such for example as the wing nut 17, to be threaded on the upper end of the stud 15.

When the stopper is not in use, and prior to the securing of the stopper in the drainpipe or drain receptacle, the wing nut 17 is loosened sufficiently so that little or no pressure is exerted by the disc 13 on the wall of the recess 12, and the stopper body 10 is thus permitted to remain in its natural shape and retain its natural proportions.

When the stopper is inserted in position in the drain outlet, such as the drain receptacle *a* of Figures 1 and 2, the wing nut 17 is screwed down on the stud 15 to cause the body 10 of the washer to become compressed between the washer 16 and disc 13. This forces the disc 13 upwardly into the frustro-conical recess 12, and this upward movement of the disc 13 into the recess produces a radially-effective wedge action on the lower portion of the body 10 tending to cause the outer perimeter of the body of the stopper to expand. However the expansion of the outer perimeter of the stopper is restrained by the wall of the outlet. The result is a squeezing of the resilient or compressible body of the washer between the disc 13, washer 16 and wall of the drain receptacle, and this results in a tight fit of the stopper in the drain receptacle, depending upon the amount of pressure exerted as a result of the turning of the wing nut 17, making removal of

the stopper practically impossible until the wing nut 17 is first unscrewed sufficiently to reduce this pressure.

In the modified form of my invention shown in Figure 4 the expansible body 20 of the stopper is made with a bottom recess 23 shaped in the form of a spherical segment. The body portion 20 also has a very decided convex top surface 22. The metal base disc 26 in this form of my stopper is made slightly less in diameter than the bottom surface of the stopper body so that the disc will bear on practically the entire bottom area of the annular shoulder 24 surrounding the recess 23. The upstanding stud 27 is rigidly secured to the base disc 26 and extends through a concentric hole in the stopper body and through a washer 29. The upper portion of the stud 27 is threaded to accommodate a suitable nut, such as the wheel nut 28. It is apparent that as the nut 28 is screwed down, causing the bottom disc 26 and the washer 29 to be brought closer together, the body of the stopper tends to be flattened out; but this flattening of the top and bottom of the washer body also tends to produce radial expansion of the body.

In this form of my invention I have found it desirable, although not essential, to provide the annular shoulder 24 surrounding the bottom recess 23 with notches, as at 25, at intervals. These notches render the bottom more flexible and also facilitate the escape of any water caught in the recess when the water is compressed against the metal disc 26.

In Figure 4 I have shown the body 20 of the stopper as substantially cylindrical in outer forms, but with a flare at the top providing an annular shoulder 21 of larger diameter. It is preferable to make the stopper body of this outer shape when the wall of the drain opening is cylindrical, such as the drain indicated by *d* in Figure 4, instead of having the body frustro-conical in shape to conform more closely to the shape of a frustro-conical drain like the drain *a* of Figure 2. The annular shoulder 21 of the body 20 is made of larger diameter than that of the drain to prevent the stopper from descending too deeply into the drain outlet when the stopper is first put in place. Flattening out the stopper body in the manner described, as the screw is tightened, causes the lower portion of the body to press against the cylindrical wall of the drain. While it would be possible to make the outer form of the body 20 frustro-conical in shape and still have the stopper, as a result of the radial expansion of the body, become securely set in place in the drain, the cylindrical form shown in Figure 4, with an upper shoulder or flange, I have found to be more satisfactory in a cylindrically-shaped outlet.

A further modified form in which my stopper may be made is illustrated in Figure 5. The body of the stopper in this case may be either cylindrical or frustro-conical, whichever is preferred. In Figure 5 I show the body 30 as cylindrical and therefore provide an annular shoulder or rounded flange 31 at the top. In this modified form of my invention the recess in the body of the stopper is at the top instead of at the bottom. The recess is frustro-conical and is adapted to receive a correspondingly-shaped metallic expander 32. This expander is made with a central channel through which the screw 33 may freely be passed. The screw 33 has a shouldered and winged head 34 and the bottom is threaded to engage a metal disc 35. In order to prevent the disc 35 from turning with the screw 33, the disc is provided with one or more upstanding pins or lugs 36 which enter corresponding cavities 37 formed in the bottom surface of the stopper body; and thus act to lock the disc against any rotation independent of the stopper body. When the stopper is assembled, the bottom end of the screw 33, extending through the disc 35, is preferably burred in order to prevent the bottom disc from becoming detached from the screw if the latter should inadvertently be unscrewed too far in loosening the stopper body.

As apparent, rotation of the winged screw 33 in the proper direction causes the threaded end of the screw to descend through the bottom disc 35, thereby forcing the washer 38, which is interposed between the shouldered head of the screw and the top of the expander 32, and the bottom disc 35 to be brought closer together. This in turn forces the expander 32 downwardly into the narrowing cavity of the body 30, resulting in producing radial expansion in the body.

Various other modifications in the means by which my stopper might be given the desired radial expansion might be made without departing from the principles of my invention. I have found, however, that in order to provide for satisfactory radial expansion in the body of the stopper, in the manner indicated, it is quite important to have a concentric cavity which, in combination with adjustable means for exerting pressure on the body, will result in causing the wall of the body around the cavity to tend to spread radially. The means which I have illustrated for producing this expansion of the body is suggestive only, and it is not my intention to limit my invention otherwise than as set forth in the attached claims.

I claim:

1. In a stopper of the character described, a body composed of resilient expansible material, said body having top and bottom faces, said top face being convex, a concentric cavity located in the bottom face, a central channel extending from said cavity through said body to the top face, a bottom disc and a top disc bearing against bottom and top faces of said body respectively the perimeter of said bottom disc being larger than the perimeter of said bottom cavity, and adjustable screw means extending through said central channel so arranged as to be capable of forcing said discs towards each other, whereby to produce radial expansion of said body.

2. A stopper of the character described comprising a body composed of rubber, said body being circular in cross-section and having top and bottom faces, said top face being convex, a concentric cavity located in the bottom face, a central channel extending from the top of said cavity through said body to the top face, a bottom disc, an upstanding stud connected to said bottom disc and extending upward through said cavity and said channel and above the top face of said body, a washer-like disc and an adjustable nut on the upper end of said stud, whereby the turning of said nut in one direction will cause said body to be compressed between said upper and lower discs, flattening said upper and lower faces and thereby radially extending the perimeter of said body.

3. The combination set forth in claim 2 with the wall of said body around said cavity being notched.

4. In a stopper of the character described, a body composed of resilient expansible material,

said body having a convex top face, means for flattening said top face when said stopper is in place in a drain outlet whereby to produce expansion of the perimeter of said body, said means including a pair of discs adjacent the top and bottom of said body respectively, the diameter of said bottom disc being only slightly less than the diameter of said bottom face, and an adjustable screw extending through said body connecting said discs and capable of forcing said discs towards each other.

5. In a stopper of the character described, a body composed of resilient expansible material, said body having a convex top face, a cavity located in the bottom face, means for pressing down the center portion of said body when said stopper is placed in position in a drain outlet, whereby to cause expansion of the perimeter of said body, said means including a pair of members adjacent the top and bottom of said body respectively, said bottom member having a perimeter larger than the perimeter of said cavity, and screw means extending through said body connecting said members and capable of forcing said members towards each other.

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