Dec. 15, 1953 P. K. BORMAN 2,662,230

STOPPER CONSTRUCTION FOR SINK STRAINERS AND THE LIKE

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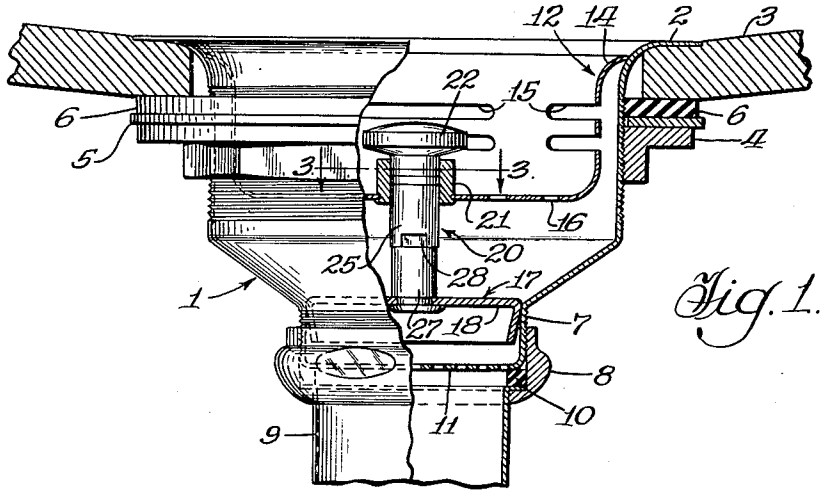


Fig. 1.

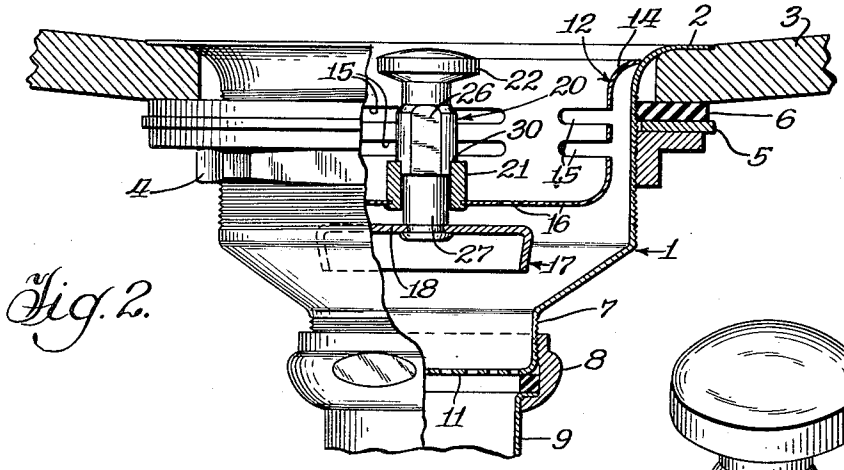


Fig. 2.

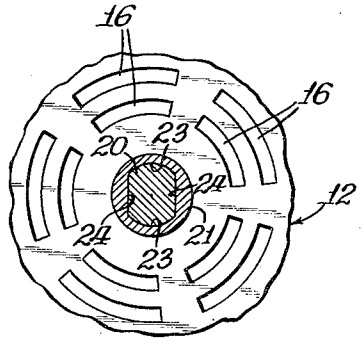


Fig. 3.

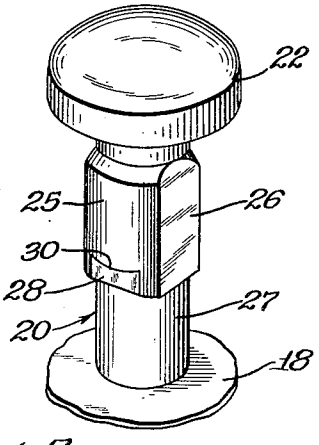


Fig. 4.

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STOPPER CONSTRUCTION FOR SINK STRAINERS AND THE LIKE

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1 Claim. (Cl. 4—287)

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This invention relates to a drain fitting of the type commonly known as a "sink strainer," and is particularly directed to an improved means for supporting a sink stopper in raised position to permit drainage from the sink bowl.

Sink strainers are almost universally provided with stoppers movable between open and closed positions, and with means intended to maintain the stopper in open position when the sink is being used under normal conditions in which it is desired that there be free drainage from the sink bowl. The means for holding the stopper in raised position range from simple arrangements in which a ledge on the stopper or its stem portion is adapted to seat on a shoulder provided on another element of the strainer assembly, to elaborate latching devices including movable latch bars, two piece stem assemblies and the like, which are intended to overcome the tendency of the simple supporting means to release accidentally as the suspended stopper is vibrated by the water flowing thereover or is accidentally struck by the person working at the sink.

It is therefore an object of my invention to provide an improved stopper for the drain fitting of sinks or the like.

It is another object of my invention to provide a sink strainer and stopper assembly having a simplified means which supports the stopper securely in raised position but permits of immediate release to bring the stopper to closed position when desired.

Other features and advantages of my invention will be apparent from the following detailed description thereof when read in connection with the accompanying drawing showing a presently preferred embodiment, and in which Fig. 1 is a partial sectional elevation of a complete sink strainer embodying my invention, the stopper being shown in closed position; Fig. 2 is a view similar to Fig. 1 but showing the stopper secured in raised position; Fig. 3 is a partial plan view taken in section through the supporting sleeve and stem member on lines 3—3 of Fig. 1; and Fig. 4 is an enlarged perspective of the stopper stem member.

Referring now to Fig. 1, the complete sink strainer includes a relatively conventional arrangement of a body portion secured to the drainage opening of the sink, a crumb cup removably contained within the body portion, and a stopper permanently associated with the crumb cup. The body 1, which per se forms no part of my invention, has been shown as a conventional drawn shell having a flange 2 which is

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drawn into tight engagement with the floor of the sink bowl 3 by a nut 4 operating on the suitably screw-threaded side wall of the body. A metallic body ring 5 is interposed between the face of the nut and a compressible gasket 6. It will be understood that plumber's putty or the like (not shown) may, if desired, be spread between the underside of the flange 2 and the sink bowl prior to making up the nut 4. The body portion tapers as shown to a cylindrical extension 7 threaded to receive the slip nut 8 which draws the flange at the end of the tailpiece 9 upwardly against a gasket 10 which compresses against a lower flange portion of extension 7 to form a watertight joint therewith. I have shown the body portion as having an integral strainer wall 11, but as is well known, removable strainer pieces are frequently encountered. The tailpiece 9, of course, communicates with the usual drainage trap, not shown.

Crumb cup 12 is of substantially less diameter than body 1 and may also be a drawn metal structure. Although other means of supporting the crumb cup are well known, I have illustrated a construction in which a flange 14 at the rim of the cup projects beyond the diameter of the main body wall to suspend the cup from the upper curved wall portion of said body. Foraminations 15, 16 permit free drainage through the sides and bottom of the cup while preventing the passage of larger pieces of food waste which may clog the drain.

The inner wall of the cylinder extension 7 forms a valve seat, and for cooperation therewith the stopper 17 has a valve disk portion 18 formed with an inwardly tapering skirt providing a sloping wall adapted to seat against said inner wall when the stopper is dropped to its Fig. 1 position.

The stopper disk 18 is suitably affixed to a stem 20; a convenient method is by passing a reduced diameter neck through an axial opening in disk 18 and then heading over the end, as clearly evident in the drawing. Permanently affixed to the crumb cup is a sleeve 21 which slidably receives the stem 20. The large diameter head 22 being either integral with or permanently secured to the stem, it will be obvious that the stem must be threaded through the sleeve before the application and securement of the stopper 18. Thereafter the crumb cup and stopper are a permanent assembly.

Attention is now directed to Figs. 3 and 4. The axial bore of sleeve 21 is non-circular; the arcuate ends 23 are joined by the parallel, sym-

metrically arranged flat walls 24. The stem 20 has an upper portion characterized by arcuate walls 25 and the connecting flat walls 26 respectively of such radius and spacing from the stem axis as to permit the stem to slide freely through the similarly shaped sleeve opening. The lower stem portion 27 is preferably cylindrical, having a diameter slightly less than the spacing between flats 24 of sleeve 21; the cylindrical portion is slightly longer than the axial length of sleeve 11 so that the stopper may be lifted by the head to bring the stem portion 27 entirely within the sleeve, whereupon the stem may be rotated therein.

At the bottom of each arcuate wall 25 I provide substantially identical flats 28. Said flats are equal chords of the respective arcuate walls 25 and are parallel to each other. They may be relatively short in axial dimension. Being chordal, the length of the flats 28 will be determined by the fact that their spacing one from the other is slightly less than the spacing between the flat walls 24, 24, of sleeve 21. It will be seen that the arcuate wall portions 25 provide ledges 30 above the respective flats 28. I prefer to have the under surface of the respective shoulders normal to the surface of the respective flats 28, although other angular relationships are satisfactory. When the stopper is raised from the Fig. 1 position to bring the flat portions 28 entirely above the sleeve 21 and then is rotated a quarter turn to bring said flats into alignment with the flat wall portions 24, the stopper may be dropped to the Fig. 2 position in which the stopper is suspended from the shoulder portions 30. The stopper is then in a position permitting rapid drainage from the sink. The engagement of the respective flat walls 24 and 28 prevents the rotation of the stem into a position in which the shoulders could disengage from the upper edge of sleeve 21, and the weight of the stopper assembly is such that it will not jump out of the Fig. 2 position even under abnormal conditions of use. When the stopper is again to be seated it is only necessary to lift the stem by the head 22 until it is in a position to be rotated relative to the sleeve 21 and then to rotate the stem until its arcuate walls 25 are in registry with the arcuate wall portions 23 of the sleeve, whereupon the stopper may be released to drop to Fig. 1 position.

It will of course be evident that the important characteristics of the sleeve bore and the upper stem portion are that considered in cross section, they each have a major axis and a minor axis, represented respectively by the minimum dimension between the surfaces 23 terminating the major axis and the minimum dimension between the surfaces 24 terminating the minor axis, said dimensions in each case passing through the geometrical axis of the sleeve. Considered on this basis, the dimensional relationship above set out may be applied to any non-circular cross sectional shape; for example, an oval, or an elongated rectangle. It is only necessary to have a lower stem portion of maximum transverse dimension less than the minor axis, and to have the flats or indentations 28 spaced apart slightly less than the minor axis length and presenting frontal surfaces similar to the frontal surfaces of the wall portions 24. The illustrated shape is advantageous because it lends itself well to cold heading processes in manufacture, and the bore of sleeve 21 is not weakened at the intersection of the respective faces 23 and 24, as might be the condition if a rectangular shape were chosen.

The clearance between the respective walls of the sleeve 21 and the stem 20 in their various relative positions is not critical. I prefer clearance values which are "easy" and permit the stem to be lifted within the sleeve without binding in the sleeve and causing the crumb cup to lift also.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

I claim:

In a sink strainer or the like having a cylindrical body portion for securement about the drainage opening of a sink, means providing a valve seat at the discharge end of said body and means for affixing said discharge end to a waste conduit: the combination of a foraminated crumb cup having means for engaging with said body portion to removably support said cup well above the base of said body portion; a relatively short upstanding sleeve fixed to the bottom of said cup to provide a passage through said cup bottom coaxial with said valve seat, the wall of said sleeve being uninterrupted and formed to provide an axial passage characterized by diametrically opposite arcuate wall portions of equal radius and length and diametrically opposite mutually parallel flat wall portions interconnecting the respective ends of said arcuate portions; a stopper adapted to engage said valve seat means; a stem fixed to said stopper and extending axially therefrom, said stem having a lower cylindrical portion of greater length than said sleeve and a diameter less than the flat-to-flat dimension of said sleeve passage and an upper stem portion integral therewith and having a cross sectional shape similar to said sleeve passage and sized to fit slidably within said passage, said upper stem portion having at the base of each of its arcuate wall portions an indentation providing a flat locking wall beneath an overhanging shoulder, said locking walls being mutually parallel, in symmetrical relation to the axis of said sleeve, and spaced apart slightly less than the flat-wall spacing of said sleeve; whereupon with the major and minor axes of the stem in registry with the corresponding axes of the sleeve, the stem may be dropped therethrough to valve-seat closing position, or the stem may be raised until its cylindrical portion is wholly within the sleeve passage, rotated to align the locking walls of said stem with the flat walls of said sleeve and then lowered to seat the shoulders of said stem upon the upper edge of said sleeve with the locking walls in close parallel relation to the flat walls of said sleeve, in which position the stem is maintained with its stopper spaced from the valve seat.

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