

- [54] WASTE PLUG TURNSTOP
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- [21] Appl. No.: 501,779

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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 310,971, Nov. 30, 1972, abandoned.

- [52] U.S. Cl. 4/287; 4/295
- [51] Int. Cl.² A47K 1/14; E03C 1/26
- [58] Field of Search... 4/286, 287, 293, 295, 288-293; 210/163-165; 49/41, 465

[57] ABSTRACT

A drain fitting of otherwise standard size and configuration has a plurality of indentations forming projections that serve to support a stopper in open position and permit the stopper to move to closed position, the stopper having a guide part provided with a peripheral groove receiving said indentations. The guide part is made of flexible, resilient material and snaps into registering relationship with the indentations.

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15 Claims, 8 Drawing Figures

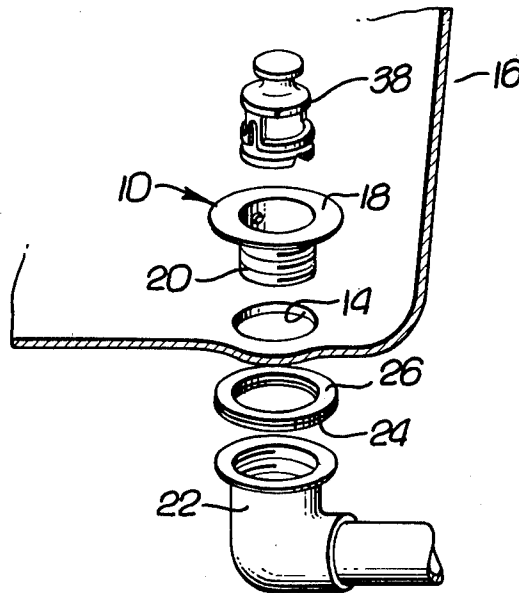


FIG. 1.

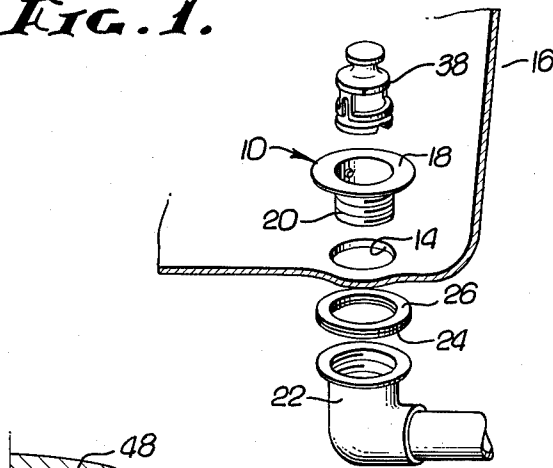


FIG. 2.

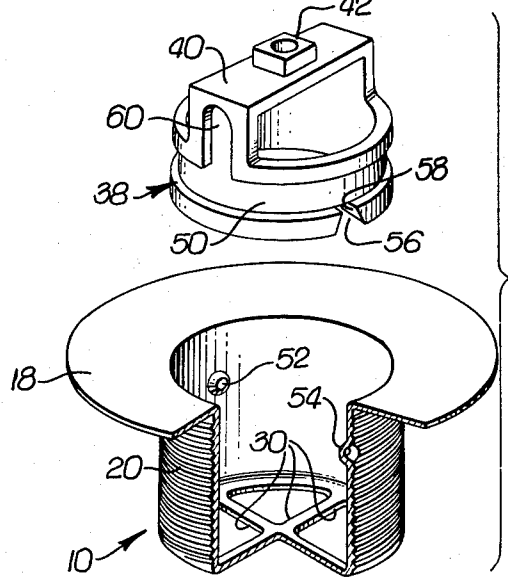


FIG. 3.

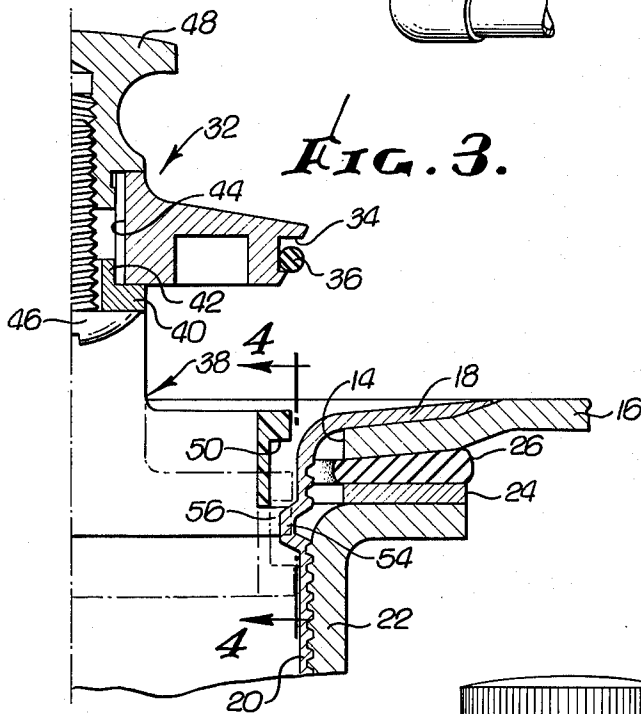


FIG. 4.

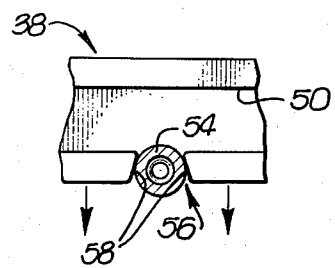
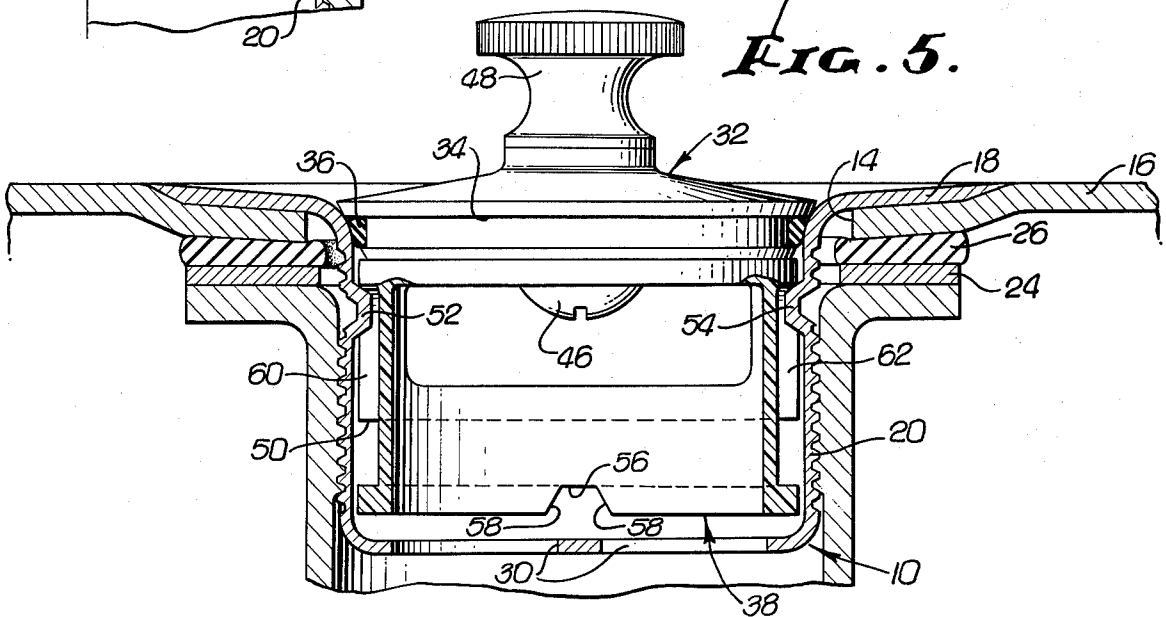
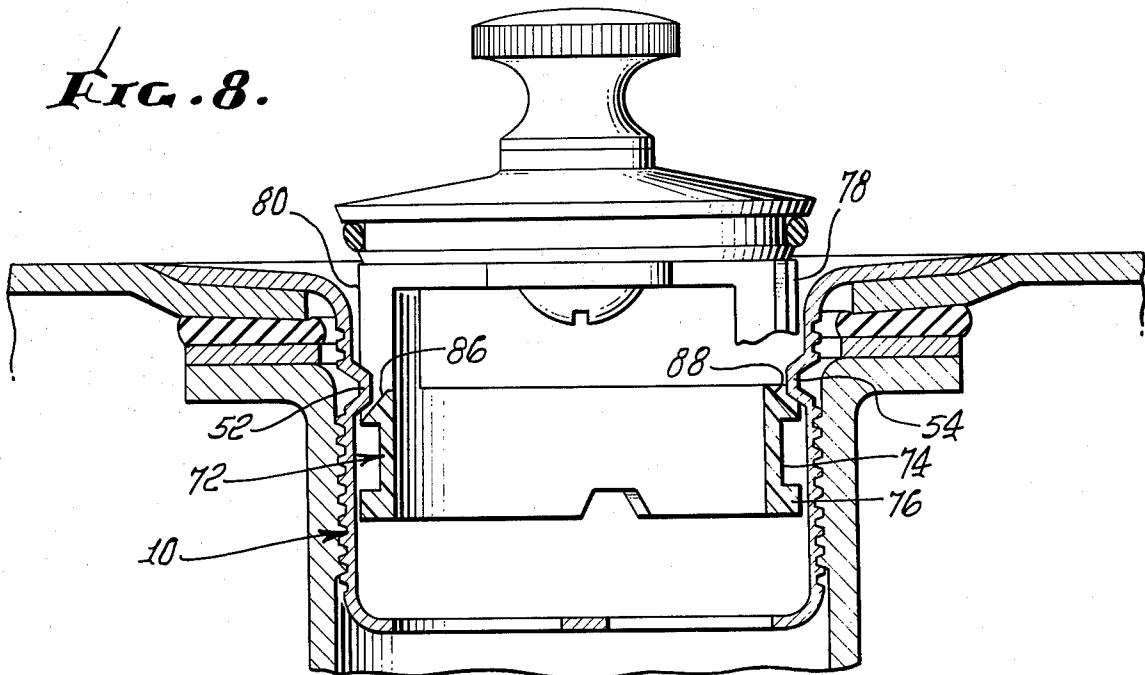
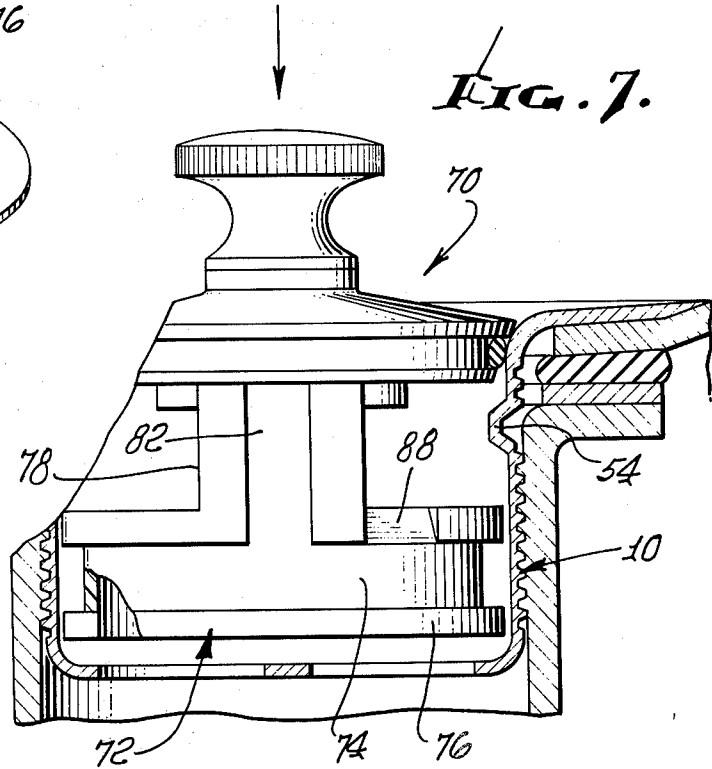
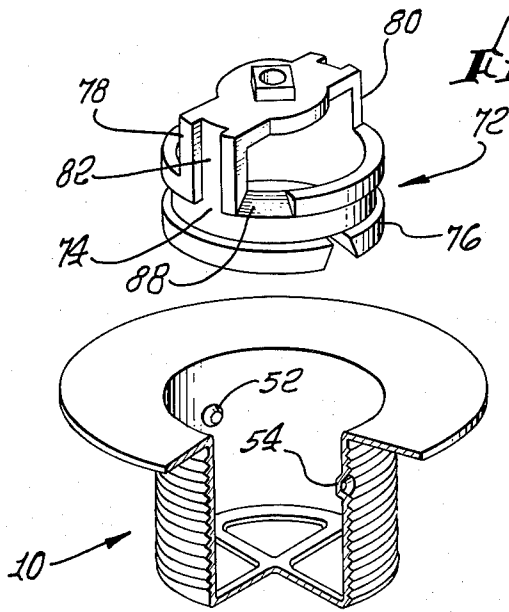


FIG. 5.





WASTE PLUG TURNSTOP

RELATED APPLICATIONS

This application is a continuation-in-part of previously filed Application Ser. No. 310,971 filed Nov. 30, 1972 entitled Waste Plug Turnstop, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates to plumbing fixtures, and more particularly to waste fittings, such as for use in sinks or bathtubs.

2. Discussion of Prior Art

A number of different means have been used to seal a drain. Perhaps the simplest means is a rubber plug, usually attached to the end of a chain. If not so attached, the plug gets lost; if so attached, the chain breaks sooner or later. Remote control devices have generally been preferred to the plug and chain. These remote control devices are generally of two types, a pop-up type and a trip lever type. The pop-up type utilizes a linkage that terminates in a lever usually located at the overflow fitting. The linkage sometimes binds; is difficult to install and relocate; and takes up flow space in the drain. The trip lever type utilizes a valve mechanism that fits at the corner of a tee, the tee being located somewhat downstream of the fixture outlet and underneath the sink or tub. The drain opening is ordinarily covered by a plate with a dozen or so perforations. This trip lever arrangement is free of the problems mentioned in connection with the pop-up type. However, there are other problems. The user may think that his bath water is in contact with the sewer line. While this is not exactly true, it is true that the short pipe between the fixture outlet and the valve is ordinarily not cleaned regularly; it simply isn't accessible. A pop-up or stopper has no such disadvantages.

Both pop-up and trip lever arrangements are significantly more costly than a simple chain and stopper, a factor that has caused builders to look for solutions other than pop-up and trip lever arrangements, but which are not quite as crude as the tethered stopper. The object is to utilize a mechanism that fits within or is located at the flanged and externally threaded waste fitting used to attach the drain pipe beneath the fixture.

One family of such devices utilizes a center post upon which a stopper is supported, there being a pin and slot arrangement between the stopper and post, the slot having a suitable lateral whereby the plug can be lifted and turned or turned and dropped, respectively to open the drain or to close it. Installation of such devices is sometimes difficult, particularly in positioning set screws located beneath the stopper head. Also, the stopper, supported only on a narrow center post, tends to wobble. Misplaced weight may break the post.

Another family of such devices utilizes a screw threaded arrangement whereby the stopper spins up and down. The structure is satisfactory, but spinning the stopper up and down may prove to be a bother. The structure necessary to stop the plug from spinning off its support may be complicated.

Still another family of such devices utilizes a push-cam mechanism: step on the stopper once, and it closes; step on it again, and the stopper opens. The mechanism is much that incorporated in many ball point pens. One difficulty is that this mechanism takes

a considerable amount of room in the flanged waste fitting, retarding flow and creating the problem of entraining foreign particles.

The object of the present invention is to provide an extremely simple device free of the foregoing difficulties that nevertheless fits in the flanged waste fitting, and that has the following characteristics:

1. The flow through the flanged drain fitting is not restricted in any manner.
2. The stopper is supported in an extremely simple and stable manner without requiring any mechanism at all to be added to the flanged waste fitting.
3. The stopper is installed by a simple snap action, without the use of set screws or the like.
4. The drain is opened by a simple lift and turn movement of the stopper, and closed by a simple turn and drop movement.

Another object of the present invention is to provide a waste plug device normally supported in open position by an upper rim of a peripheral groove resting upon simple indentations or other projections of the flanged drain fitting but nevertheless protected from damage should the plug be accidentally engaged and forced downwardly. Such accidental engagement might occur, for example, when a person steps into a bathtub, or while showering, accidentally engages the plug.

SUMMARY OF THE INVENTION

In order to accomplish the foregoing objects, I provide a flanged waste fitting made of spun brass or the like to provide a supporting flange resting about the edges of the tub, basin or tray opening. The threaded portions of the fitting are provided with two dimples or indentations forming projections for supporting the waste plug. The waste plug has two essential parts. The first part comprises a closure. The second part is a cage attached to and extending downwardly from the closure for cooperation with the projections of the waste fitting. The cage has two legs extending downwardly from the closure part. The lower ends of the legs support a ring, the upper portion of which has a peripheral groove within which the projections are accommodated. The legs provide recesses extending through the upper rim of the groove to align with the projections whereby the plug can be dropped into sealing position. The lower rim of the groove has restricted openings to the groove to allow the projections to snap into position as the plug is initially installed. To the untutored, the plug seems to be permanently installed, a feature helpful to prevent its being dislodged by inquisitive or mischievous young children. At the same time the plug can readily be removed simply by exerting an upward thrust on the plug as it is rotated whereby the restricted openings, by feel, can be located and whereby the cage can thereupon be disengaged.

The upper rim of the groove supports the plug in a normal open position. In this position, the hand or foot of the user may impose a seemingly destructive force upon the upper rim of the groove. Instead of reinforcing the groove to ensure that the projections remain in the groove, the ring deliberately is allowed to flex inwardly whereby the ring passes downwardly. The cage is readily repositioned by turning the plug counterclockwise until the projections engage the cage legs at which place they will encounter cams operative upon further lifting and turning movement to snap the projections back in the groove.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the invention will be made with reference to the accompanying drawings wherein like numerals designate corresponding parts in the several figures. These drawings, unless otherwise indicated, are to scale.

FIG. 1 is an exploded view illustrating the manner in which the flanged waste fitting and plug are installed.

FIG. 2 is an enlarged exploded isometric view of the operative liftturn portions of the turnstop device, a portion of the flanged fitting being broken away and shown in section.

FIG. 3 is a fragmentary axial sectional view showing the plug about to be snapped into position, the phantom lines indicating the plug installed.

FIG. 4 is an enlarged detail sectional view taken along a plane corresponding to 4 — 4 of FIG. 3.

FIG. 5 is an axial sectional view similar to FIG. 3 but illustrating the plug in closed position.

FIG. 6 is a pictorial view similar to FIG. 2 but illustrating the modified form of the present invention.

FIG. 7 is a fragmentary axial sectional view illustrating the plug accidentally positioned with the projections above the groove rim.

FIG. 8 is an axial sectional view similar to FIG. 7 but showing the plug rotated to position the indentations in alignment with resetting cams.

DETAILED DESCRIPTION

The following detailed description is of the best presently contemplated mode of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention since the scope of the invention is best defined by the appended claims.

Structural and operational characteristics attributed to forms of the invention first described shall also be attributed to forms later described, unless such characteristics are obviously inapplicable or unless specific exception is made.

In FIG. 2 there is illustrated a flanged waste fitting 10 made of thin malleable material that fits into the opening 14 (FIG. 1) of a bathtub 16 or other plumbing fixture, all in a conventional manner. The flange 18 of the fitting engages about the edges of the opening 14 and is clamped in place by an ell 22 that engages the threaded shank of the fitting. One or more gaskets 24 and 26 are interposed between the parts as desired.

In the present instance the waste fitting provides sector shaped openings 30 that are small enough to serve as a trap.

A plug 32 (FIG. 5) has a closure part that fits into the waste fitting 10 to seal the opening. For this purpose the closure part has a peripheral groove 34 in which a compressible O-ring 36 is accommodated.

The plug 32 is guided and supported in the fitting by the aid of a cage or guide 38 (FIG. 2) located beneath the closure part.

The guide in the present instance is made as a separate part, but could be formed as a unit with the closure part. In the present instance, the cage is made of molded plastic, such as Delrin, and the closure part is made of metal.

The operative element of the guide is a ring or band suspended by the aid of the legs of an inverted U-shaped bar 40. The top of the bar has an apertured pro-

jection (square in this instance) that fits the lower end of an opening 44 in the plug 32. A screw 46 extends upwardly through the lug 42 and threadedly engages a cap 48 that fits into the top end of the opening. The parts thus comprise an assembled unit.

The guide 38 is slightly flexible and is resilient. By changing the thickness of some parts of the guide to ensure flexibility at critical areas, the guide could be made of metal material. The guide ring or band has a peripheral groove 50 (FIG. 2) into which fit indentations 52 and 54 of the waste fitting 10.

The indentations 52 and 54 are formed on diametrically opposite sides of the threaded shank 20 by punching inwardly, interrupting the threads. The cooperative engagement with the ell 22 nevertheless remains the same. Separate pins or lugs are not required.

The indentations 52 and 54 snap into groove 50 when the guide 38 is pushed into the fitting 10. The indentations 52 and 54 pass through restricted slots 56 (FIGS. 2 and 3) the upper ends of which open at the lower rim of the groove 50. The sides 58 of the slots are tapered so that the lower ends of the slots are in effect larger than the diameters of the indentations 52 and 54. Accordingly, the slots form seats for the indentations preparatory to insertion into the groove 50. The upper ends of the slots are narrower than the effective diameters of the indentations 52 and 54. Accordingly, in order to cause the indentations to pass into the groove 50, the edges at the top of the slots must flex, all as diagrammatically illustrative in FIG. 4. The assembled arrangement is shown in phantom lines in FIG. 3.

When the indentations 52 and 54 are in the groove 50 (phantom lines in FIG. 3) the upper rim of the groove 50 rests upon the indentations 52 and 54. This determines an elevated position of the plug 32. Yet the plug is free to rotate about the axis of the waste fitting. However, at one angular position of the guide, the guide is permitted to fall. For this purpose, two recesses 60 and 62 are formed respectively on the legs of the U-shaped bar 40. The lower ends of the recesses open at the top rim of the groove so that the recesses can slide over the indentations 52 and 54. The upper ends of recesses 60 and 62 are high enough so that they do not stop the downward movement of the plug. Instead, downward movement is limited by engagement of the O-ring 36 with the waste fitting.

In practice the groove 50 may comprise two segments terminating at the recesses 60 and 62 whereby the position of alignment of the indentations with the recesses 60, 62 is automatically determined.

To the user unaware of the specific mechanism, the plug apparently cannot be removed. One aware of the specific mechanism merely rotates the plug while a slight upward force is exerted. A resistance is felt when the indentations engage the slots. Then a further upward tug causes removal as the indentations slip past the slots. The plug is easily operated by a turn and lift or turn and drop motion. Complicated linkages are avoided. The mechanism is the ultimate in simplicity.

MODIFIED FORM

In the form illustrated in FIGS. 6, 7 and 8, a plug 70 is provided that is similar to the plug 32 of the previous form. The cage part 72 of the plug is likewise made of flexible and resilient plastic material such as Delrin. The cage 72 has a groove 74 extending peripherally of a ring 76 which is suspended from two legs 78 and 80

of the cage 72. Recesses, slots or grooves 82 are formed in the legs 78 and 80 in order to allow the plug normally to drop to its closed position. In the present instance, the drop grooves 82 are open at their upper ends.

With the plug in its open position with the projections 52 and 54 engaged by the upper rim 84 at the groove 72, a downward thrust upon the plug, if sufficiently large, will cause the upper rim of the groove to bow inwardly and pass beneath the indentations 52 and 54 as illustrated in FIG. 7. The indentations are preferably conical in order to allow this snap movement without damage to the parts.

In order to reposition the plug 70 on the projections 52 and 54, two cam surfaces 86 and 88 are provided. These cam surfaces engage beneath the projections 52 and 54 when the plug is rotated to its counterclockwise to a limit as determined by the arms 78 and 80 (FIG. 8). Then by lifting upwardly on the plug, the cams 86 and 88 cause the upper rim to bow or to flex inwardly by reaction with the projections 52 and 54. Finally the projections 52 and 54 snap into the groove 74 and a proper cooperative relationship between the plug and the fitting 10 is re-established.

If desired, the entire top rim at the groove 74 could be formed frusto-conically such that lifting of the plug at any position would re-establish the cooperative relationship. However, a counterclockwise movement of a rotary part for upward movement is natural. Without instructions, re-establishment of the cooperative relationship almost automatically occurs.

Intending to claim all novel, useful and unobvious features shown or described, I claim:

1. In a waste apparatus for plumbing fixtures:
 - a. a drain fitting having a generally tubular part adapted to extend through an opening in a tub or other plumbing fixture;
 - b. means forming a plurality of indentations extending inwardly of said tubular part;
 - c. a stopper adapted to engage said fitting to close the said opening, said stopper having a guide;
 - d. said guide being made at least in part of flexible and resilient material, and having a peripheral groove adapted to receive said indentations with the upper rim of said groove, by engagement with said indentations, determining an upward open position of said stopper; said guide also having recesses adjoining the said upper rim and operative at certain angular positions of said guide to allow said guide and said stopper to drop to closed position;
 - e. a resilient part of said guide having slots extending downwardly from the lower rim of said groove to allow insertion and removal of said indentations from said groove by exertion of downward and upward force on said guide, said slots being restricted relative to the size of said indentations so that placement and removal of said guide is accomplished by snap action.
2. The waste apparatus as set forth in claim 1 in which said slots are tapered so that the said slots normally seat on said indentations preparatory to insertion of said indentations into said peripheral groove.
3. The waste apparatus as set forth in claim 1 in which said tubular part of said drain fitting is exteriorly threaded for cooperation with a plumbing part below said tub or fixture, said indentations being formed by punching inwardly at the threaded portion of said tubular part.

4. The waste apparatus as set forth in claim 1 in which said indentations are two in number and located on opposite sides of said tubular part.

5. The waste apparatus as set forth in claim 1 in which said drain fitting is, except for said indentations, a standard drain fitting.

6. In a waste apparatus for plumbing fixtures:

- a. a drain fitting having a generally tubular externally threaded deformable thin-walled part adapted to extend through an opening in a tub or other plumbing fixture;
- b. means forming a plurality of non-annular indentations punched inwardly at said externally threaded part;
- c. a stopper adapted to engage said fitting to close the said opening, said stopper having a guide part;
- d. said guide part having a peripheral groove adapted to receive said indentations with the upper rim of said groove, by engagement with said indentations, determining an upward open position of said stopper; said guide part also having recesses adjoining said upper rim and operative at certain angular positions of said guide to allow said guide and said stopper to drop a closed position;
- e. said guide having slots extending downwardly from the lower rim of said groove to allow insertion and removal of said indentations from said groove.

7. The waste apparatus as set forth in claim 6 in which said drain fitting, except for said indentations, is a standard drain fitting.

8. In a waste apparatus for plumbing fixtures:

- a. a drain fitting having a generally tubular deformable thin-walled part adapted to extend through an opening in a tub or other plumbing fixture;
- b. means forming a plurality of indentations extending inwardly of said tubular part;
- c. a stopper adapted to engage said fitting to close the said opening, said stopper having a guide part;
- d. said guide part having a peripheral groove adapted to receive said indentations with the upper rim of said groove, by engagement with said indentations, determining an upward open position of said stopper; said guide also having recesses adjoining said upper rim and operative at certain angular positions of said guide to allow said guide and said stopper to drop to closed position;
- e. said guide having slots extending downwardly from the lower rim of said groove to allow insertion and removal of said indentations from said groove, said slots being located at intermediate positions along the length of said groove whereby the positions of said slots are not detectable with said stopper in place except by rotating said stopper while exerting an upward thrust thereon.

9. The combination as set forth in claim 8 in which said groove is endless.

10. In a waste apparatus for plumbing fixtures:

- a. a drain fitting having a generally tubular deformable thin-walled part adapted to extend through an opening in a tub or other plumbing fixture;
- b. means forming a plurality of angularly spaced indentations projecting inwardly of said tubular part;
- c. a stopper adapted to engage said fitting to close said opening, said stopper having a guide part;
- d. said guide part including a ring suspended from said stopper by a plurality of legs, said ring having peripheral groove means adapted to receive said

indentations with the upper rim of said groove, by engagement with said indentations, determining an upward open position of said stopper;

e. said legs having recesses extending through said upper rim of said groove and alignable with said indentations to allow said stopper to drop to closed position;

f. said guide having slots extending through the lower rim of said groove and alignable with said indentations to allow insertion and removal of said stopper and guide.

11. The waste apparatus as set forth in claim 10 in which said drain fitting has peripheral threads for engagement with a nut member thereby to secure said fitting at said opening, said indentations being located at the threads and forming depressions on the outer side of said tubular part.

12. The waste apparatus as set forth in claim 10 in which said guide is made of flexible, resilient material whereby the said upper rim of the ring groove means may snap downwardly past said indentations upon ex-

ertion of a downward force upon said stopper when said leg recesses are non-aligned with said indentations; said ring having cam means operative upon exertion of upward force upon said stopper to reseal said indentations in said ring groove, whereby said guide is neither mutilated or broken by accidental engagement and whereby said guide is readily repositioned.

13. The waste apparatus as set forth in claim 12 in which said cam means are located in alignment with said indentations upon counterclockwise movement of said stopper to a limit determined by engagement of said indentations with the sides of said legs.

14. The waste apparatus as set forth in claim 13 in which the lower rim slots are restricted for snap insertion and removal of said stopper.

15. The waste apparatus as set forth in claim 14 in which the groove means is a singular endless channel, the lower rim slots being angularly offset from said leg recesses whereby the slots are located by turning the stopper while an upward thrust is imposed thereon.

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