June 29, 1971 A. J. HIERTZ 3,588,928

COMBINED DRAIN STRAINER AND STOPPER

Filed Sept. 11, 1969 3 Sheets-Sheet 1

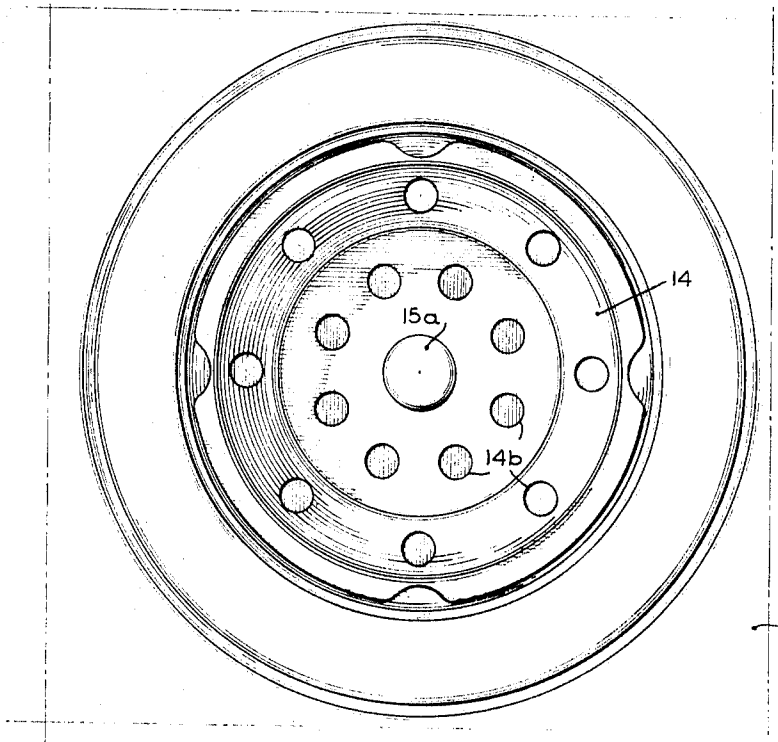


FIG. 1

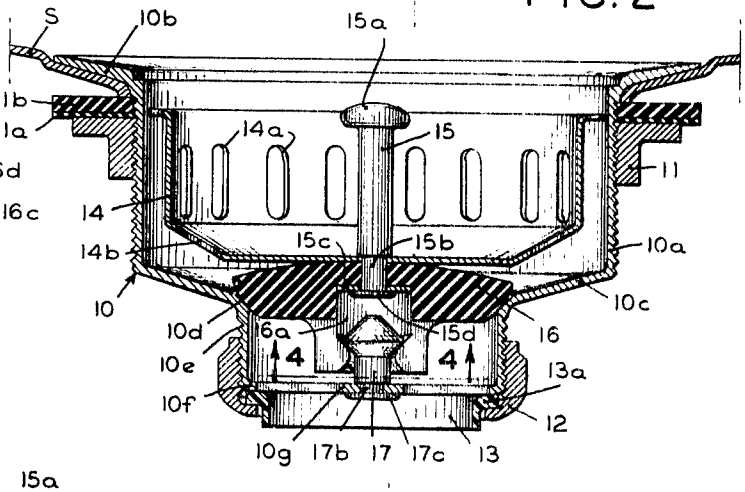


FIG. 2

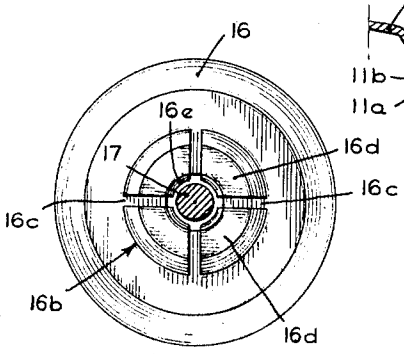


FIG. 4

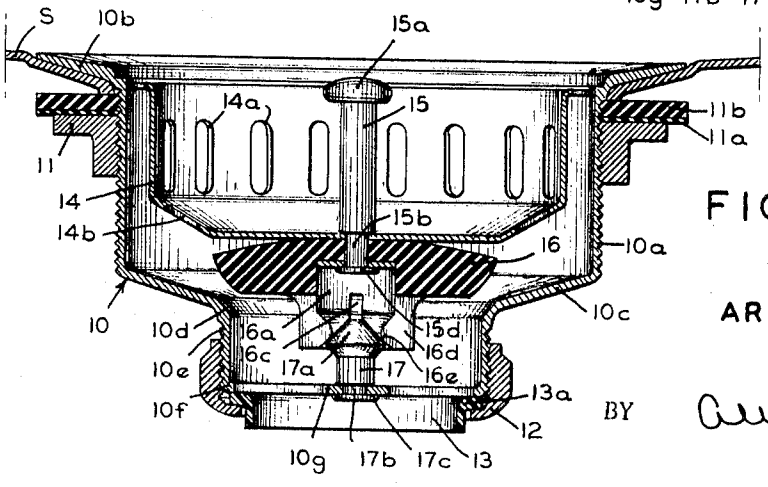


FIG. 3

INVENTOR
ARTHUR J. HIERTZ

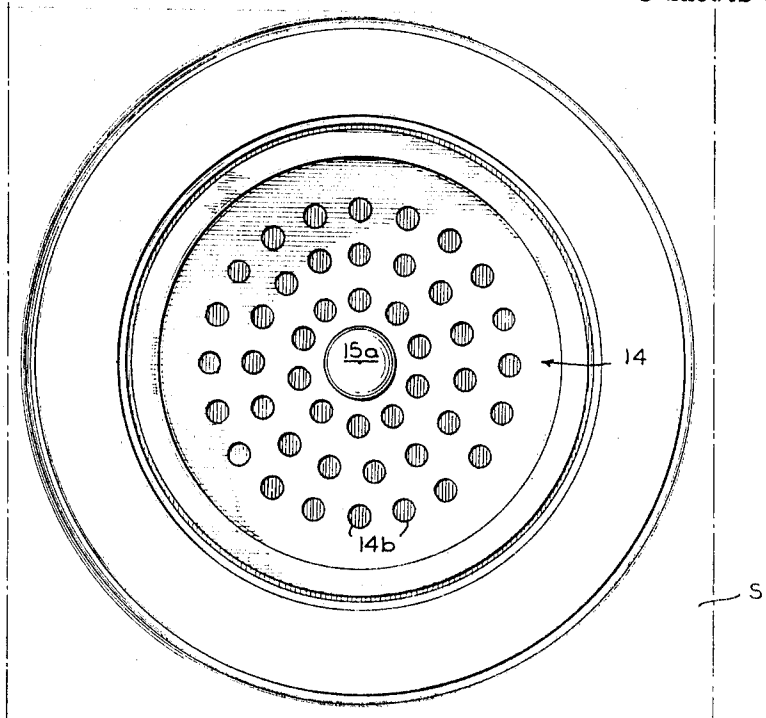
BY Arthur J. Hiertz Jr.
ATTORNEY

June 29, 1971 A. J. HIERTZ 3,588,928

COMBINED DRAIN STRAINER AND STOPPER

Filed Sept. 11, 1969 3 Sheets-Sheet 2

FIG. 5



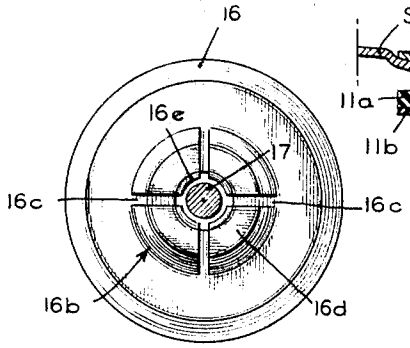


FIG. 8

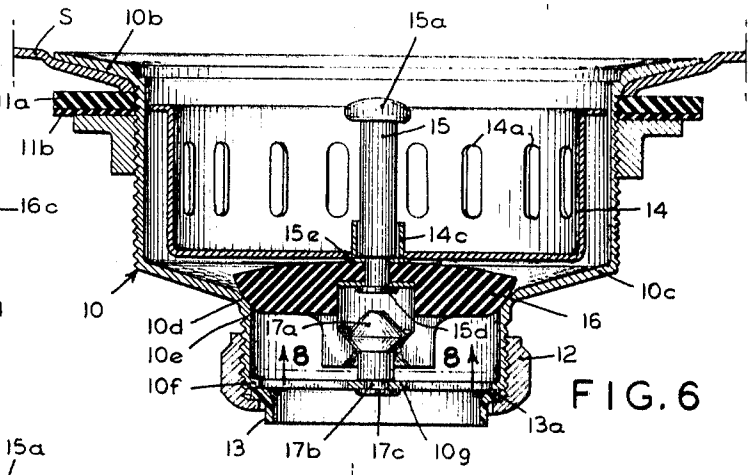


FIG. 6

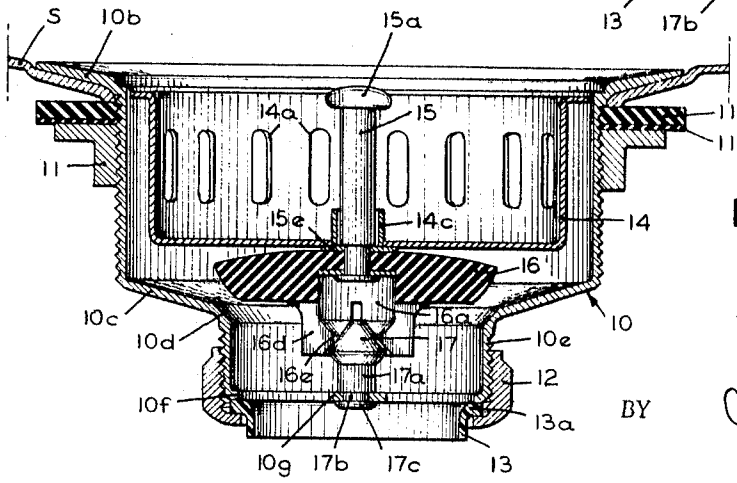


FIG. 7

INVENTOR

ARTHUR J. HIERTZ

BY

ATTORNEY

June 29, 1971 A. J. HIERTZ 3,588,928

COMBINED DRAIN STRAINER AND STOPPER

Filed Sept. 11, 1969 3 Sheets-Sheet 3

FIG. 9

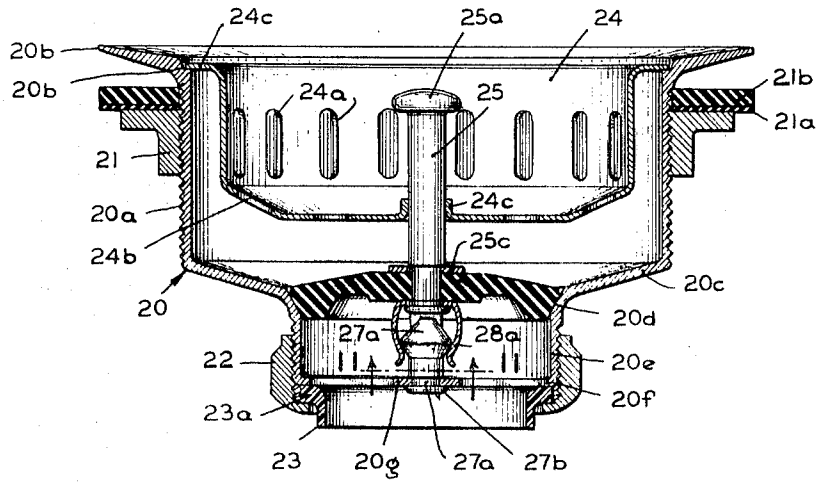
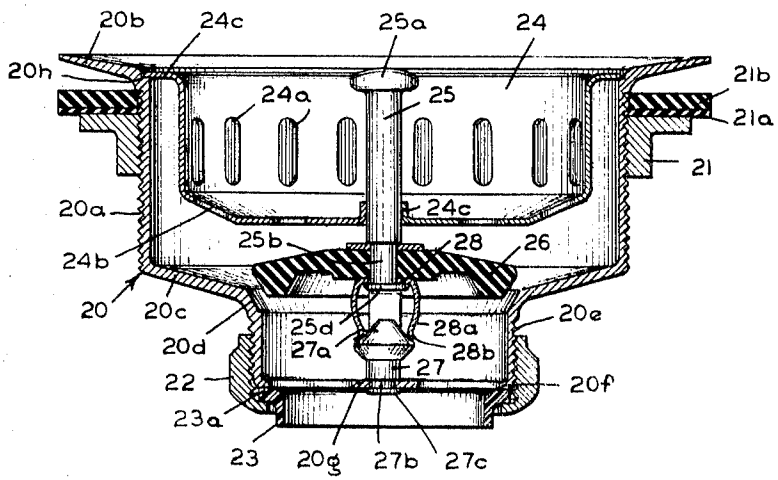


FIG. 10



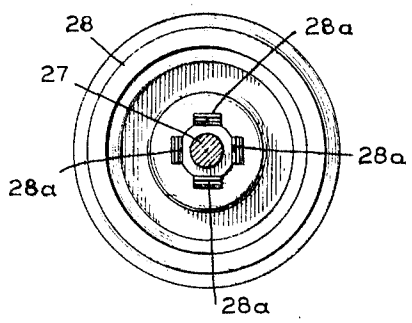


FIG. 11

INVENTOR

ARTHUR J. HIERTZ

BY

ATTORNEY

United States Patent Office 3,588,928
Patented June 29, 1971

3,588,928

COMBINED DRAIN STRAINER AND STOPPER

Arthur J. Hiertz, Moultrie, Ga., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Sept. 11, 1969, Ser. No. 857,077
Int. Cl. A47k 1/14
U.S. Cl. 4—287 6 Claims

ABSTRACT OF THE DISCLOSURE

A combined sink strainer and stopper assembly with resilient means carried by the strainer basket and engageable with rigid means carried by the strainer housing for securing the stopper in drain closing position upon depression of the strainer basket assembly.

The present invention relates to a combined sink strainer and stopper assembly which may be utilized conveniently in the drain opening of a conventional sink, basin or the like. The assembly includes a housing providing operative connection between the sink and drain pipe, a perforated refuse retaining container or basket receivable within said housing, a resilient stopper carried beneath the basket and intended for engagement with a valve seat formed in the housing adjacent the lower extremity thereof to effectively present drainage from said sink, and resilient means associated with said stopper for engagement with rigid upstanding means mounted upon the bottom wall of the housing for securely retaining the stopper in drain closing position upon downward movement or depression of the strainer basket assembly.

The assembly may be manufactured with particular economy and installed with ease, requiring no special tools or skilled labor.

No specific alignment or association is required as between the strainer basket and the housing; the assembly is self-aligning without any necessity for axial orientation and drain closing is accomplished effectively by simple vertical depression, with upward movement of the basket assembly disengaging the stopper retaining means and permitting free drainage.

Further objects and advantages of the invention will be readily apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a top plan view of a novel sink strainer and stopper assembly, the sink being illustrated fragmentarily;

FIG. 2 is a vertical sectional view taken through the sink strainer and stopper assembly, illustrating the sink stopper in drain closing position;

FIG. 3 is a vertical sectional view, similar to FIG. 2 but illustrating the strainer basket and stopper in elevated or normal draining position;

FIG. 4 is a transverse detail sectional view taken on the line 4—4 of FIG. 2;

FIG. 5 is a top plan view, similar to FIG. 1, of a modified form of the invention;

FIG. 6 is a vertical sectional view of the strainer and stopper assembly shown in FIG. 5, illustrating the stopper in drain closing position;

FIG. 7 is a vertical sectional view, similar to FIG. 6, illustrating the strainer basket and stopper assembly in elevated or normal draining position;

FIG. 8 is a transverse sectional view taken on the line 8—8 of FIG. 7;

FIG. 9 is a vertical sectional view, similar to FIGS. 2 and 6, and illustrating a still further modified form of the invention, the basket and stopper being shown in drain closing position;

FIG. 10 is a vertical sectional view through the sink strainer and stopper assembly of FIG. 9, illustrating the stopper in elevated or normal draining position; and

FIG. 11 is a transverse detail sectional view taken on the line 11—11 of FIG. 9.

As shown in the drawings, a portion S of a sink, basin, or the like is provided with the conventional drain opening within which the strainer and stopper assembly housing of the present invention is received. This assembly includes a tubular member, housing or shell **10** provided with an annular flange **10***b* which rests upon a complementarily inclined depressed portion provided in the sink S. The tubular shell **10** also includes an externally threaded strainer basket receiving portion **10***a* and a locking nut **11**, engaging washers **11***a* and **11***b*, to provide a fluid-tight joint with the bottom wall surface of the sink, basin, or the like, S.

Adjacent its lower extremity, the strainer basket receiving portion **10***a* is provided with an inwardly directed and downwardly inclined portion **10***c* which terminates in a valve seat **10***d*, the shell **10** including an externally threaded depending tubular portion **10***e* of reduced diameter which is provided with an inwardly directed flange **10***f* at the lower extremity thereof, this flange including a spider **10***g* to permit free drainage therethrough. A lock nut **12** is provided whereby the outwardly flanged upper extremity **13***a* of a drain pipe **13** is securely locked against the inturned flange **10***f* of the strainer assembly.

The strainer basket or strainer **14** is removably received within the portion **10***a* of the shell or housing and is of conventional configuration, being provided with spaced slots **14***a* in the peripheral wall thereof and spaced apertures **14***b* in the bottom wall to permit free drainage of liquid therethrough while at the same time insuring retention within the strainer basket of particles of waste material.

The strainer basket **14** is provided with a centrally located post, post member or knob **15** which includes an enlarged head portion **15***a*, to make for convenient grasping and manipulation, and a lower portion **15***b*, desirably of reduced diameter, which depends through a suitable centrally located aperture in the bottom wall of the strainer basket. The stopper **16** is secured upon the depending extremity **15***b*, in intimate relationship with respect to the bottom surface of the strainer basket **14**, in any desired manner. Preferably, the stopper **16** is produced from resilient material, such as rubber or the like, is provided with a centrally located aperture through which the reduced portion **15***b* of the post **15** depends; and includes a recess **16***a* within which a washer **15***c* may be received, the extremity of the reduced portion **15***b* being peened over as indicated at **15***d* to securely lock the strainer basket and stopper in assembled relationship.

The stopper **16** is provided on the bottom surface thereof with a preferably integral tubular portion **16***b* of reduced diameter and this tubular portion or extension is slotted diametrically as indicated at **16***c* to create a plurality of depending fingers **16***d*, each of which includes an inwardly directed cam surface **16***e* provided for a purpose to be described more fully hereafter.

A stopper aligning and retaining post, **17** is rigidly mounted upon the spider **10***g* in any desired manner. As shown in the drawings, particular reference being had to FIGS. 2 and 3 thereof, the retaining post **17** includes an enlarged head portion **17***a* and a lower portion **17***b* of reduced diameter which is received within a suitable aperture located centrally of the spider **10***g*, the extremity of the portion **17***b* being peened over as indicated at **17***c* so as to securely lock the retaining post in assembled relationship.

The strainer basket and stopper assembly are illustrated in FIG. 4 in opened or draining position with the locking fingers **16***d* resting upon the enlarged head portion **17***a* of the stopper retaining post **17** and with the stopper **16** well

elevated above the valve seat **10***d*. When it is desired to close the sink or basin, and prevent drainage therethrough, the strainer basket and stopper assembly are depressed vertically to the position illustrated in FIG. 2 of the drawings where the enlarged cam surfaces **16***e* of the resilient locking fingers **16***d* will have engaged and passed over the enlarged head portion **17***a* of the stopper aligning and retaining post **17**, thereby guiding the stopper **16** to compressive engagement with the valve seat **10***d* so as to create a fluid-proof seal therewith, thus effectively preventing drainage from the sink or basin. Lifting of the strainer basket and stopper assembly to free the stopper fingers **16***a* from the retaining post **17** is all that is required to restore drainage conditions.

It will be noted that, in the form of the invention described hereabove, the strainer basket and stopper constitute a unitary and rigid assembly. In distinction, in the modified form of the invention illustrated in FIGS. 5 through 8 of the drawings, the strainer basket is free to rotate upon or to be moved vertically with respect to the operating post or knob **15** to which the stopper **16** is secured. Thus, the housing or shell **10** as well as the stopper **16** and the stopper aligning and retaining post **17** are identical as described in detail hereabove and no further discussion thereof is believed to be required.

As illustrated, the strainer basket **14** is provided with a centrally located sleeve portion **14***c* within which the post **15** is received, minimal clearance being provided so that, if desired, the strainer basket may be either elevated or moved in a rotative direction with respect to the post **15**. The remaining structural differences in this form of the invention over that disclosed in FIGS. 1 through 4 of the drawings is that a washer **15***e*, or the like, is positioned upon the reduced portion **15***d* of the post **15**, upon the upper surface of the stopper **16**, whereby, in assembled relationship, the stopper is compressed to an appropriate degree between the opposed washers **15***e* and **15***c*. With this structural relationship the strainer basket **14** rests upon the upper surface of the washer **15***e* and depression of the post **15** engages the depending fingers **16***d* of the stopper **16**, when drainage closure is desired, and this is accomplished without necessarily moving the strainer basket in a downward direction. Further, where the head **15***a* of the post **15** is separable from the post, detachment of the strainer basket for possible replacement of either basket or washer, or for any other purpose, may be accomplished with particular facility.

In the further modified form of the invention illustrated in FIGS. 9 through 11 of the drawings, the strainer and stopper assembly comprises a tubular member or shell **20** provided with an annular flange **20***b* which rests upon a complementarily conformed or inclined depressed portion provided in the sink, basin, or the like S. The tubular shell **20** includes an externally threaded strainer basket receiving portion **20***a* and an appropriate locking nut **21**, engaging washers **21***a* and **21***b*, and creates a fluid-tight joint with the bottom wall surface of the sink S, or the like, in the conventional manner as is well known in this art.

The lower extremity of the strainer basket receiving portion **20***a* marges into an inwardly directed and downwardly inclined portion **20***c* which terminates in a valve seat **20***d*, the shell **20** also including an externally threaded depending tubular portion **20***e*, of reduced diameter and extending downwardly from the valve seat, which is provided with an inwardly directed flange **20***f* at the lower extremity thereof, this flange constituting a spider **20***g* to permit free drainage therethrough. A lock nut **22** is provided whereby the outwardly flanged upper extremity **23***a* of a drain pipe **13** is securely locked against the inturned flange **20***f* of the strainer assembly as is well known in this and related arts.

The strainer basket **24** is removably received within the portion **20***a* of the housing and is of substantially conventional configuration being provided with spaced slots **24***a* in the peripheral wall thereof and spaced apertures **24***b* in the bottom wall to permit free drainage of liquid therethrough while at the same time insuring retention therein of particles of waste material.

The strainer basket is provided with an outwardly extending annular flange **24***c* at the upper surface thereof and this flange seats upon a shoulder **20***h* provided in the annular flange **20***b* of the shell or housing **20**.

The strainer basket **24** is further provided with a centrally located sleeve portion **24***c* through which the stopper control post **25** extends, the basket **20** sliding freely upon this control post which includes an enlarged head portion **25***a*, to make for convenient grasping and manipulation, and a lower portion **25***b*, desirably of reduced diameter, which extends through a centrally located aperture in the stopper **26**.

Preferably the stopper is produced from resilient material, such as rubber or the like, and a stopper aligning element **28**, which may be produced from any suitable material including metal and constitutes a plurality of depending and spaced spring fingers **28***a*, mounted upon the reduced extremity **25***b* of the control post **25**. As shown in the drawings, a washer **25***c* may be provided above the stopper **26**, the reduced extremity of the control post **25** extending through this washer, the stopper, and also the aligning element **28** and being peened over as indicated at **25***d* to securely lock these parts in assembled relationship.

A stopper retainng post **27** is rigidly mounted upon the spider **20***g*, substantially centrally thereof, in any desired manner. As illustrated, the retaining post **27** includes an enlarged head portion **27***a* and a lower portion **27***b* of reduced diameter which is received within a suitable aperture located centrally of the spider **20***g*, the extremity of the reduced portion **27***b* being peened over as indicated at **27***c* so as to securely lock the retaining post in assembled relationship.

The strainer basket and stopper assembly are illustrated in opened or draining position with the spring fingers **28***a* resting upon the enlarged head portion **27***a* of the stopper retaining post **27** and with the stopper **26** elevated well above the valve seat **20***d*. When it is desired to close the sink or basin, and prevent drainage therethrough, the post **25** is depressed vertically to the position illustrated in FIG. 9 of the drawings where the cam surfaces **28***b* of the spring fingers **28***a* will have engaged and passed over the enlarged head portion **27***a* of the stopper aligning and retaining post **27**, thereby effectively guiding the stopper **26** to compressive engagement with the valve seat **20***d* so as to create a fluid-proof seal therewith, thus effectively preventing drainage from the sink or basin. Lifting of the control post and stopper assembly to free the spring fingers **28***a* from the retaining post **27** is all that is required to restore drainage conditions.

It will be understood that, in this modified form of the invention, opening and closing of the drain may be accomplished without any required disturbance of the strainer basket; however, complete elevation of the control post **25** will carry the strainer basket therewith.

There have thus been described strainer and stopper assemblies of the character with which we here are concerned which constitute vast improvements over prior art practices, may be produced with particular economy, may be installed with ease and without any requirement for skilled labor, and provide an efficiency of operation heretofore unknown in this field.

It will be obvious to those skilled in this art that various changes may be made in the invention without departing from the spirit and scope thereof and the invention is not considered limited by that which is shown in the drawings and described in the specification and reference therefore is had to the claims for summaries of the essentials of the invention and of the novel features of construction and novel combinations of parts for all of which protection is desired.

What is claimed is:

1. A combined drain strainer and stopper assembly, operating means for securing said strainer and stopper in assembled relationship and permitting manual movement of the strainer and stopper assembly from an upper open position to a lower drain-closing position, and upwardly directed stopper aligning and retaining means, said stopper being produced from resilient material and having a centrally located recess in the lower surface thereof, an integral tubular portion of reduced diameter depending from said stopper in surrounding relationship with respect to said centrally located recess, said tubular portion being diametrically slotted to provide a plurality of resilient fingers whereby depression of said strainer and stopper assembly will engage said resilient fingers with said stopper aligning and retaining means thereby aligning said stopper into drain-closing engagement with a valve seat and with the upper extremity of the stopper aligning and retaining means being received within the centrally located recess in said stopper.

2. A combined drain strainer and stopper assembly as set forth in claim 1 where said operating means extends through centrally located and aligned apertures in said strainer and stopper and each of said resilient fingers has an inwardly directed cam surface which frictionally engages said aligning and retainng means when said strainer and stopper is in drain-closing position.

3. A drain strainer and stopper assembly comprising a tubular housing having a strainer-receiving portion at the upper end thereof, a downwardly inclined portion terminating in a valve seat beneath said strainer-receiving portion, said tubular housing terminating at the lower extremity thereof in a tubular portion of reduced diameter; stopper aligning and retaining means mounted centrally of said tubular portion of reduced diameter, adjacent the lower extremity thereof; a strainer removably supported in said strainer-receiving portion; a post member mounted centrally of said strainer and extending therethrough; a stopper produced from resilient material secured to the lower extremity of said post member, said stopper being movable into drain-closing position relative to said valve seat, the lower surface of said stopper being provided with a centrally located recess; an integral tubular portion of reduced diameter depending from said stopper in surrounding relationship with respect to said centrally located recess, said tubular portion being diametrically slotted to provide a plurality of resilient fingers, each of said resilient fingers including an inwardly directed cam surface for engagement with the upper extremity of the stopper aligning and retaining means whereby depression of said post member will engage said resilient fingers with said stopper aligning and retaining means thereby aligning said stopper into drain-closing engagement with respect to said valve seat with the upper extremity of the stopper aligning and retaining means entering into the centrally located recess in said stopper.

4. A drain strainer and stopper assembly as set forth in claim 3 where said strainer is fixedly secured to said post member.

5. A drain strainer and stopper assembly as set forth in claim 3 where said strainer is free for vertical or rotative movement on said post member.

6. A drain strainer and stopper assembly as set forth in claim 3 where the lower extremity of said tubular portion of reduced diameter on said tubular housing is provided with an inwardly directed flange constituting a spider, said stopper aligning and retaining means is an upstanding post having an enlarged head portion, and each of said resiliet fingers has an inwardly directed cam surface which passes over said enlarged head portion upon depression of said stopper into drain-closing position and frictionally engages said upstanding post.

References Cited

UNITED STATES PATENTS

1,136,201	4/1915	Adams	16—38
1,760,659	5/1930	Pasman	4—287
1,859,821	5/1932	Ebinger	4—292
			4—287X
2,090,299	8/1937	Kuhnle	4—287
2,438,302	3/1948	Simcich	210—162
			4—286X
3,027,569	4/1962	Lantz et al.	4—287

FOREIGN PATENTS

1,031,993	6/1966	Great Britain	4—286

LAVERNE D. GEIGER, Primary Examiner

D. B. MASSENBERG, Assistant Examiner