Nov. 4, 1958 H. JORDAN 2,858,989

STAINLESS STEEL SINK DRAINAGE SLEEVE WITH STOPPER AND MOUNTING MEANS

Filed May 16, 1955 2 Sheets-Sheet 1

FIG. 1.

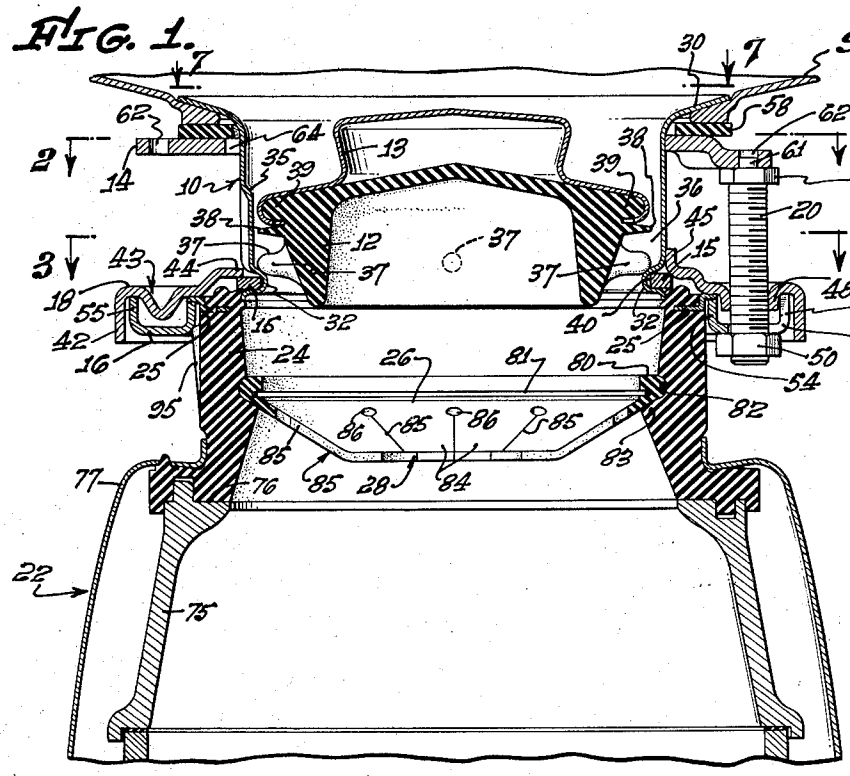


FIG. 1A.

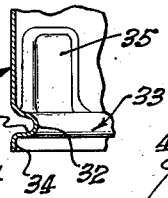


FIG. 2.

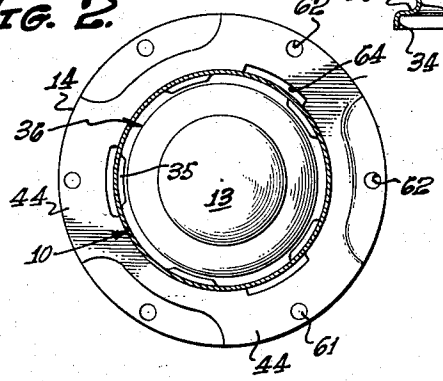


FIG. 3.

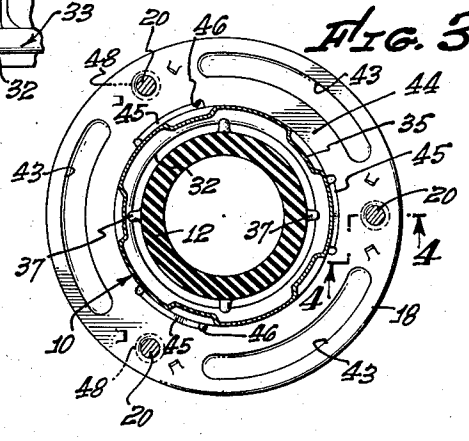
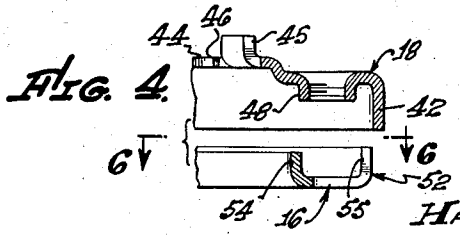


FIG. 4.



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STAINLESS STEEL SINK DRAINAGE SLEEVE WITH STOPPER AND MOUNTING MEANS

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FIG. 5.

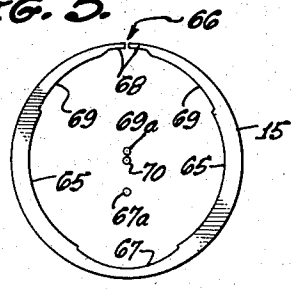


FIG. 8.

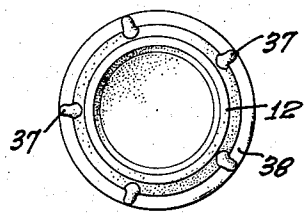


FIG. 9.

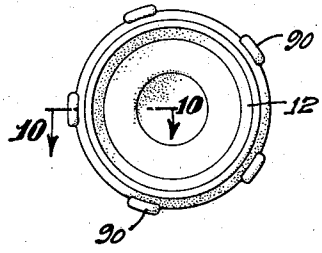


FIG. 6.

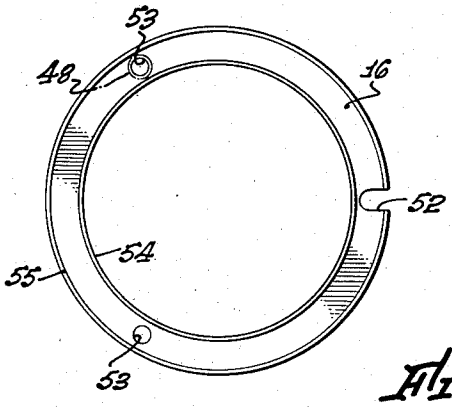


FIG. 11.

FIG. 10.

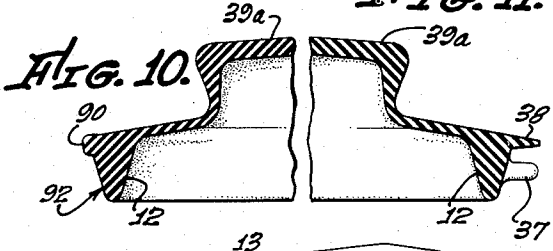


FIG. 7.

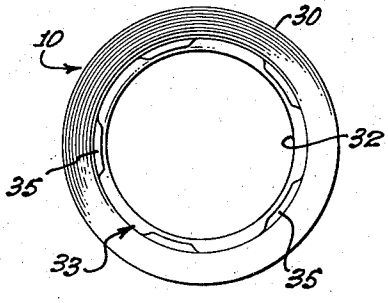
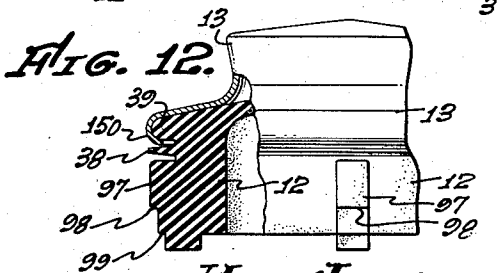


FIG. 12.



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2,858,989

STAINLESS STEEL SINK DRAINAGE SLEEVE WITH STOPPER AND MOUNTING MEANS

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Application May 16, 1955, Serial No. 508,494

6 Claims. (Cl. 241—100.5)

This invention relates to means for suspending a garbage disposal device from the drainage outlet of a kitchen sink or the like, having a relatively large outlet.

One object of the invention is to provide a drainage sleeve or outlet liner which is easy to form, is highly durable and efficient, is easy to mount in the outlet of a sink and is easily shaped at its lower end for attachment of mounting means to carry a disposal device suspended therefrom.

Another object is to produce such a drainage sleeve from thin stainless steel or similar rustless steel or other strong metal which is so thin, being not over about 0.04 inch in thickness, that it is easily punched, spun or rolled to form an external groove for receiving appropriate mounting means for said disposal device.

Another object of the invention is to provide a drainage sleeve of the indicated nature wherein an inwardly directed bead is formed by the formation of the indicated groove so that such bead may serve as a seat for an appropriate stopper.

An additional object of the invention is to provide a novel, preferably yieldable, stopper or closure structure to co-operate with the mentioned seat.

It is additionally an object of the invention to provide ring means, including split ring means and continuously annular ring means which may be readily mounted upon the lower end of said sleeve, through the medium of said outwardly directed groove for attachment to the upper end of a garbage grinder or similar disposal device to be suspended from the sink through the medium of the drainage sleeve.

Other objects of the invention and various features of construction thereof will become apparent upon reference to the following specification and accompanying drawings wherein certain embodiments are illustrated.

In the drawings:

Fig. 1 is a vertical sectional view showing the thin stainless steel sink sleeve or outlet liner in operative position in a sink opening and supporting one form of garbage grinder housing;

Fig. 1A is a detail;

Fig. 2 is a cross section on a reduced scale taken on the line 2—2 of Fig. 1;

Fig. 3 is a similar cross section taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged sectional detail taken on the broken line 4—4 of Fig. 3 showing two ring parts in exploded position and conforming in general with the corresponding parts at the right of Fig. 1;

Fig. 5 is a plan view of a supporting snap ring employed at the bottom of the stainless steel sleeve;

Fig. 6 is a plan view as indicated by the line 6—6 of Fig. 4 of the underlying clamp ring;

Fig. 7 is a top plan view on a reduced scale of the sink sleeve as indicated by the line 7—7 of Fig. 1;

Fig. 8 is a bottom plan view of the stopper of Fig. 1;

Fig. 9 is a similar bottom plan view of a somewhat modified form of stopper;

Fig. 10 is a fragmentary vertical sectional detail showing a stopper structure as indicated by the line 10—10 of Fig. 9; and

Figs. 11 and 12 are corresponding fragmentary vertical sectional details of modified forms of the stopper structure.

In the drawings, Fig. 1 illustrates the principal features of this improvement in the form of a thin stainless steel outlet liner or drainage sleeve 10 spun or otherwise shaped as required, a yieldable rubber stopper 12 having a metal cap member 13 at the top thereof, a bind ring 14 clamping the sleeve 10 to the sink S which supports the structure, a special snap ring 15 which serves as a supporting ring, a carrying ring or clamp ring 16 which is clamped beneath a co-operating mounting ring 18, through the medium of screw bolts 20 which clamp and bind the rings 14, 15, 16 and 18 in operative position, a disposal device 22 which is suspended from the sleeve 10 through the medium of a resilient, freely-suspending rubber ring-like connecting neck 24, which is tensioned by the weight of the device 22, a flange-like suspension or supporting ring 25 mounted in the rubber ring neck 24 and clamped between the carrying ring 16 and the mounting ring 18, and a flexible splash guard 26, also of rubber, preferably removably mounted in the inner wall of the rubber suspending connecting neck 24 and providing a small central water passage 28.

The sink sleeve or outlet liner 10 carries at its top a sloping annular flange 30 bearing upon a corresponding seat of the bottom of the sink S. The lower end of the sleeve 10 is spun or rolled inward to form an annular bead 32 which provides at its upper side an annular seat 33 (Fig. 1A), the lower extremity of the sleeve being substantially in line with the outer sleeve wall as indicated at 34 whereby to engage with the inner edge of the rubber suspending ring 24 to complete a sealing contact as indicated in Fig. 1. Above the bead 32 a plurality of inwardly struck positioning detents 35 is provided (see also Figs. 2 and 7), which are illustrated as being five in number and serve to center the stopper 12 and its cap 13 to provide an annular water passage 36 (Fig. 2) between the main wall of the sleeve 10 and the annular edge of the stopper 12 and its cap 13. The rubber stopper 12 is provided with an annular series of integral rubber projections or retaining fingers 37 which may be, for example, four in number as indicated in Figs. 1 and 3, or five in number as indicated in Fig. 8, or as desired. These fingers 37 may normally be rested upon the seat 33 of the bead 32 so as to hold the stopper in elevated position for the flow of water through the annular passage 36. When desired to retain water in the sink S, the stopper may be forced downward through the medium of the cap 13 to deform the positioning fingers 37 so that they snap below the bead 32, whereupon an annular integral rubber sealing fin 38 comes into sealing engagement with the seat 33. Where the metallic cap 13 is employed to provide a knob for manipulating the stopper, its annular rim folds around an uppermost annular rib 39 which is snapped into the corresponding rolled cap portion. On the other hand, as illustrated in Fig. 11, an integral knob 39a may be provided and the annular rib 39 omitted. In either case, when it is desired to lift the stopper, either to permit flow of water through the passage 36, or to remove the stopper entirely from the sleeve 10, the positioning fingers 37 will be again deformed as the stopper is pulled past the bead 32 to an elevated position.

When the annular bead 32 is formed in the lower end portion of the sleeve 10, there results an outwardly faced annular groove 40 into which groove is snapped the split snap ring 15 illustrated in Fig. 5. The peripheral portion of this ring 15 provides an upwardly facing annular

seat upon which rest inner annular portions of the mounting ring **18**. For the purpose of strengthening the ring **18**, it is provided with a peripheral down-turned annular flange **42** which also encloses the carrying and clamping ring **16** when the parts are assembled as illustrated in Fig. 1. If desired, intermediate portions of the ring **18** between the bolts **20** may be downwardly offset to provide stiffening grooves **43**. For the most part, the inner edge of the ring **18** provides seating portions **44** (Figs. 1 and 3) whose inner edges are flush with the outer main wall of the sleeve **10**, such seating portions 44 overhanging the mentioned upper annular seat of the split snap ring **15**. However, portions of the ring **18** intermediate the seating portions **44** (illustrated as three in number in Fig. 3) are struck up to form upstanding lugs **45** which, at their upper ends, provide inner faces which bear against the outer wall of the sink sleeve **10** to prevent edges of the seating portions **44** from slipping into the groove **40** above the ring **15** and thus causing partial disengagement of the seating portions **44** from the snap ring **15**. The lower portions of the lugs **45** may be such as to bear upon the corresponding edge portions of the ring **15**, as seen at the right of Fig. 1. As seen especially in Fig. 3, the lugs **45** are of sufficient circumferential length to span the narrower struck-up detents **35**, so that the lugs **45** will not fall into the external depressions opposite such detents **35**. In order to insure against tearing of the metal which the lugs **45** are bent up, shallow notches, such as indicated at **46** in Fig. 3, are formed at t he opposite ends of each lug. Opposite each lug **45** there is provided a bolt hole to receive a threaded portion of the respective bolt **20**. In order to provide a sufficient number of thread convolutions, when each hole is punched the metal is directed downward in the form of a boss **48** (Figs. 1 and 4) therearound, the inner wall of this boss being threaded throughout its length and thus providing a good seat for the bolt. The clamp ring **16**, which underlies the mounting ring **18**, is retained in the illustrated clamping position by nuts **50** threaded onto the lower ends of the bolts **20**, the bolt ends being received preferably in one slot **52**, as seen at the right of Figs. 1 and 6, and in two unthreaded holes **53** as also seen in Fig. 6. Thus, when the bolts **20** are positioned in the ring **18** and the clamp ring **16** is drawn up by the nuts **50**, the parts are retained in clamping relationship.

The carrying ring **16** is preferably cup-shaped in cross-section, such shape being provided by an inner annular upstanding flange **54** (Figs. 1 and 6) and an outer annular upstanding flange **55**. As seen especially in Fig. 1, the inner flange **54** is shorter than the outer flange **55** so that the exposed portion of the flange-like suspension ring **25** vulcanized in the rubber neck **24** is clamped between such flange **54** and the adjacent ring portion **18** at the time that the upper edge of the outer annular flange **55** is clamped against the under side of the corresponding portion of the mounting ring **18**. By these means the rubber suspending neck **24**, which supports the disposal device **22** is securely suspended in anchored position by the rings **16** and **18** and the bolts **20**. In order to tension and seal the upper end of the sink sleeve **10** in the drain opening in the bottom of the sink S, the metallic bind ring **14** is forced up against a rubber or similar sealing ring **58** by means of the upper ends of the bolts **20** which are integrally headed at **60** for rotation of the bolts independently of the nuts **50**. For centering purposes the upper end of each bolt **60** is reduced to a small stud **61** to enter a corresponding small opening **62** in the overlying portion of the ring **14**. To accommodate different sink dimensions and other dimensions, portions of the ring **14** may be offset downward, as seen at the right of Fig. 1 and as indicated at Fig. 2, intermediate portions as seen at the left of Fig. 1 and also in Fig. 2 being in the general plane of the ring. Thus, the ring **14** may be rotated as required with respect to the bolts **20**, as a consequence of which, where three bolts **20** are employed, six holes **62** will be provided. Additionally, alternating portions of the ring **14** in the flat areas opposite the respective holes **62** are notched out at **64** to accommodate, if desired, the upstanding lugs **45** during initial installation procedure, the ring **14** being eventually elevated toward the sealing ring **58** and rotated about 60° to the position illustrated, whereupon the bolts **20** are set as previouslv described to compress the sealing ring **58**.

The snap ring **15**, which is particularly illustrated in Fig. 5, is especially shaped to provide for snapping it over the lower extremity **34** of the sleeve **10** so that it will enter and snap into the external groove **40**. Larger portions of the ring **15**, as indicated at **65**, conform in curvature with the inner wall of the groove **40** to engage therewith when in operative position, the ring being split to provide a small gap **66** to permit springing of the ring into place. The portion of the ring opposite from the gap **66** is somewhat cut out at **67** on an arc centered at **67***a* to facilitate catching of the ring at one end adjacent the gap **66** and at the cut-out **67** so that the opposite end of the ring on the high side may be spread with a tool over the respective portion of the lower end **34** of the sleeve **10**. To facilitate such passage of the mentioned opposite end of the ring **15**, short portions **68** at gap **66** are considerably narrowed on the inner side of the ring at each end and adjacent portions **69** are tapered off therefrom on an arc centered at **69***a* which slightly spaced from the ring center indicated at **70**.

By means of this structure, the ring **15** is readily installed in the groove **40** after locating the sleeve **10** and rings **14** and **18** by positioning one-half the ring **15** in one side of the groove **40** with the cut-out or notch **67** caught over the extremity **34** of the sleeve, the free end of the ring **15** being then sprung over the remaining portion of the sleeve **10** by any convenient tool such as a screw driver. Since the parts **65** engage the bottom of the groove **40** thereby preventing compression of the ring **15** the peripheral portions of the ring **15**, being in the form of a true circle, provide a continuous seat for the inner edge portions **44** of the mounting ring **18** as the latter is accurately positioned by the upstanding positioning lugs **45**. The rubber suspending ring **24** is therefore properly retained through the medium of its metallic support ring **25** which is clamped between the mounting ring **18** and the clamp ring **16** through the agency of the nuts **50** on the bolts **20**.

As illustrated, the lower end of the rubber suspending neck **24** is secured to the upper end of a section **75** of a garbage grinder housing either by being vulcanized thereto at **76** or by being clamped thereon by an outer spring member **77**, or both.

The previously mentioned splash guard **26**, which is of flexible rubber, is desirably formed with a rim portion **80** which may be reinforced with a spring ring **81** and is snapped into a groove **82** lying above a supporting shoulder **83** of the suspending ring **24**. The flexible diaphragm portion of the splash guard **26** is in the form of a plurality of yieldable segments **84** formed by slits **85** which may terminate in round punched holes **86** which prevent tearing. The previously mentioned opening **28** which provides for normal flow of water preferably has an area approximating about one tenth to one eighth of the cross-sectional area of the internal diameter of the rubber ring **24**, so that noises from the underlying grinding apparatus, when operating, might be blocked by a normal flow of water past the elevated stopper **12**, or through the steel sleeve **10** if the stopper is completely removed. For the insertion of large pieces of waste to be ground, the segments **84** yield readily to permit their passage.

One form of stopper is shown in Fig. 1 where only four supporting projections **37** are employed, and in Fig. 8 where five such projections **37** are indicated to conform with the inwardly struck detents **35** of the

sleeve 10. The rubber stopper 12 may be further modified as indicated in Fig. 9 to eliminate the projections 37, and in this case the metal cap 13 is also omitted, the previously mentioned integral knob 39*a* being used instead. Here the upper rim portion of the stopper member 12 is provided with a series of radially projecting supporting lugs 90 which correspond in number with the inwardly struck detents 35 of the sleeve 10 and are adapted to rest upon the tops of such detents to permit the passage of water between the main wall of the sleeve 10 and the periphery of the stopper 12, the stopper being rotatable to align the lugs 90 with the spaces between the detents 35 so that the stopper may be lowered to rest upon the upwardly facing seat 33 of the bead 32. In this case the underlying annular sealing lip 38 may be retained or, as seen in Fig. 10, the main annular wall of the stopper will be positioned and sloped off as indicated at 92 so as to enter the space within the bead 32 and engage the inwardly facing wall of the bead 32 in sealing relationship. As illustrated in Fig. 11 and as previously described, a stopper structure with an integral knob 39*a* like that of Fig. 10 may be used where the projections 37 are employed and the annular sealing lip 38 is retained at any appropriate position above the deformable projections 37.

With respect to materials of which various members of the present construction are produced, the various stoppers are made of such rubber that the body portions 12 possess sufficient rigidity to maintain substantially the shape shown, this including the integral knob 39*a* when used, while at the same time the narrow or finger-like projections 37 will support the stoppers of Figs. 1 and 11 in drainage position while being at the same time deformable to be pressed past the inner annular bead 32 for seating of the fin or lip 38 on such bead 32, such annular lip or fin being capable of supporting the stopper under any head of water ordinarily encountered in a sink. The rubber of these stoppers is also of such character that the broad lugs 90 of the stopper of Fig. 9 resting upon the tops of the detents 35 effectively support the respective stopper in elevated position and are movable to a seating position at the annular contact line 92, indicated in Fig. 10, merely by rotation of the lugs 90 to positions intermediate the detents 35. Instead of the finger type projections 37 of Figs. 1 and 11, vertically elongated projections or short vertical ribs 97 may be used below the lip 38 in Fig. 12. These projections 97 are stepped at 98 so that the resultant outstanding shoulder will rest upon the annular bead 32 to hold the stopper 12 in elevated position for water flow. The lower end portions may be further stepped inwardly at 99 to serve better as guide means. For stopping water flow, the stopper is forced downward, thereby compressing the upper portions of the projections inward, until the sealing lip 38 engages the annular seat 33 of the bead 32. A uniform seal is assured by bearing of the lip 38 against the under side of the overlying rolled rim 100 of the cap member 13. The projections 97, thus compressed, center the stopper 12.

As to the thin stainless steel of which the sleeve 10 is made, and of which preferably the metal cap 13 of the stopper 10 of Fig. 1 is made, this is a thin rustless steel which in practice commonly has a thickness of about .037 inch or if desired within a range of about 0.025 to 0.04 inch so that it may be readily stamped, spun and otherwise conveniently formed as required and as indicated. Thus, when a truly stainless steel is employed for the purpose of producing the sleeve 10, and likewise the cap 13, a highly desirable, very durable and thoroughly efficient structure is simply and inexpensively produced, in contrast to the production operations required in normal sink sleeves, especially for large sink drainage openings employed in connection with garbage disposal devices, wherein the materials used have thicknesses of about 0.1 inch or in specific connections 0.093 inch. From the foregoing, it is very apparent that valuable sink outlet and stopper arrangements have been produced by this invention which provide moderately simple and very efficient stopper devices conveniently cooperating with the easily spun inwardly extending bead structure 32 supporting any of the stoppers in open or sealed position as the case may be, the external groove of the bead providing on its lower side an upwardly directed supporting face to carry the split ring 15 from which the disposal device is suspended, such supporting face, as seen in Fig. 1A, being generally flat to provide an adequate seat for he ring. Also, to facilitate installation, upper outer wall portions of the rubber suspending neck 24 are provided with spaced shallow detents 95 above which the carrying ring 16 may be snapped and held in position while installing the bolts 20.

I claim as my invention:

1. In combination in means for suspending a disposal device from a sink: a thin-walled metallic sleeve having an integral supporting flange at its upper end and having adjacent its lower end an inwardly spun integral annular bead providing an outwardly faced annular groove; a snap ring disposed in said groove and extending radially outward beyond said sleeve; and annular mounting ring means borne upon peripheral portions of said snap ring and carrying outlying means for connection with a disposal device to support the latter, said mounting ring means being provided with a plurality of upstanding lugs spaced around the inner edge of said mounting ring means to engage with outer wall portions of said sleeve for positioning the mounting ring means to prevent inner edge portions thereof from entering said outwardly faced groove.

2. In combination in means for suspending a disposal device from a sink: a thin-walled metallic sleeve having an integral supporting flange at its upper end and having adjacent its lower end an inwardly spun integral annular bead providing an outwardly faced annular groove; a snap ring disposed in said groove and extending radially outward beyond said sleeve; annular mounting ring means borne upon peripheral portions of said snap ring; an annular suspension ring underlying said mounting ring means, the mounting ring means having a depending exteral annular flange within which the suspension ring fits; peripheral means for attachment to an underlying disposal device to suspend the same; and clamp means connecting said suspension ring to said mounting ring means and clamping said peripheral attachment means therebetween.

3. In combination in means for suspending a disposal device from a sink: a sleeve to be carried at a sink drainage opening and having adjacent its lower end an external groove presenting an upwardly directed external supporting face; and a split ring in said groove and resting on said face, said ring extending from said groove and providing an upwardly directed supporting face to receive supported means thereon, said ring being a spring ring having substantial transverse width at opposite supporting sides, its end portions adjacent its split being narrowed transversely on their inner edges to receive the end of an installation tool, whereby one narrowed end is easily placed in said groove and the other end sprung into said groove by said tool.

4. A combination as in claim 3 wherein said split ring is transversely narrowed for a distance on its side opposite said split and narrowed ends, whereby a more yieldable portion which is engageable about an edge portion of said groove opposite said ends is provided.

5. In combination in means for suspending a disposal device from a sink: a sleeve to be carried at a sink drainage opening and having adjacent its lower end an external groove presenting an upwardly directed external supporting face; and a split ring in said groove and resting on said face, said ring extending from said groove and providing an upwardly directed supporting face to receive supported means thereon, said split ring being a spring ring

having substantial transverse cross-sectional widths, its end portions adjacent its split being narrowed transversely on their inner sides to accept the end of an installing tool, whereby one narrowed end is easily placed in said groove and the other end sprung into such groove by said tool.

6. In combination in means for suspending a disposal device from a sink at the drainage opening thereof: a drainage sleeve adapted to be supported in said opening, said sleeve having an inwardly directed annular seat at its lower end for a stopper, and having a plurality of inwardly struck parallel vertical detents extending upwardly from said seat and spaced apart around the periphery thereof, said detents extending into said sleeve; outwardly directed annular supporting means at the lower end of said sleeve adapted to carry a suspended disposal device; and a stopper having sealing means to engage said seat, said sealing means having an external diameter small enough to pass said detents upon insertion into said sleeve and without engagement therewith.

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