May 14, 1963 A. A. VOUDY 3,089,654

SINK OUTLET CONNECTION

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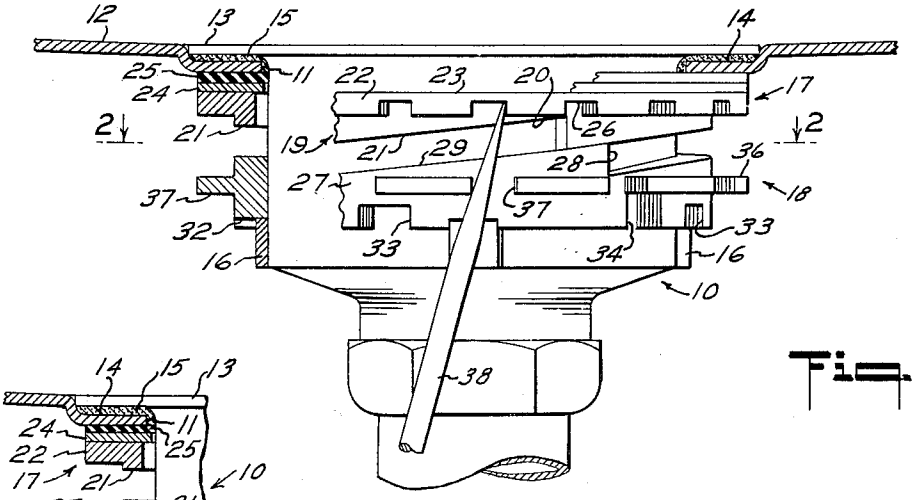


Fig. 1.

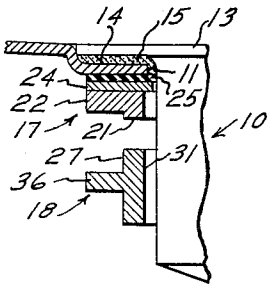


Fig. 4.

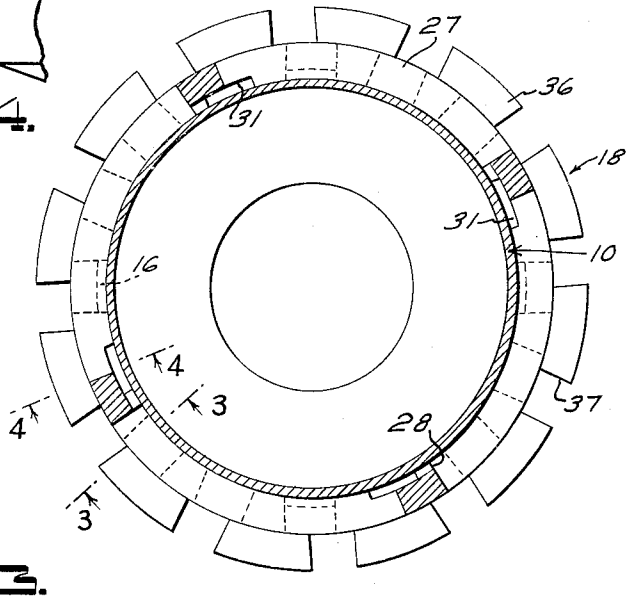
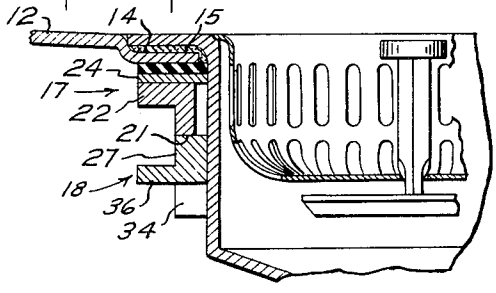


Fig. 2.

Fig. 3.



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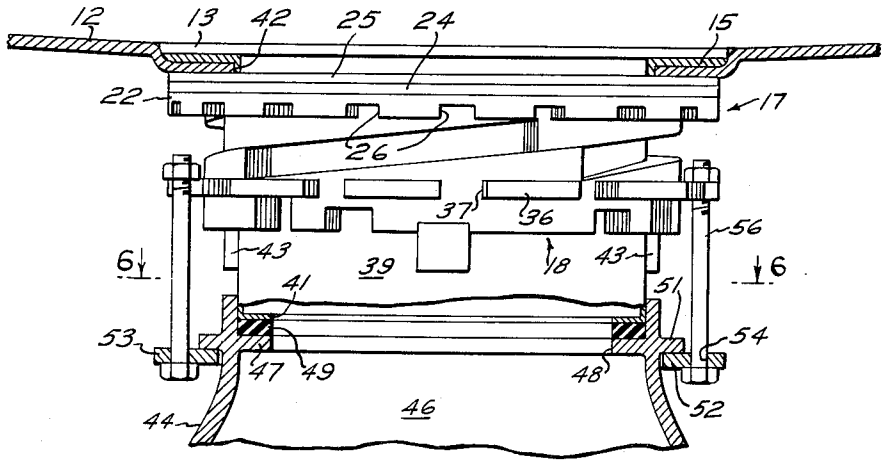


Fig. 5.

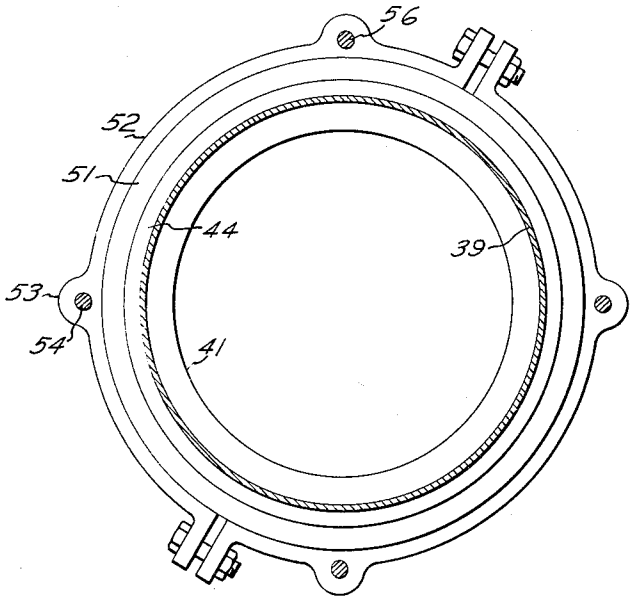


Fig. 6.

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SINK OUTLET CONNECTION

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The present invention relates to improvements in plumbing fixtures in general, and is particularly directed to an improved outlet connection for sinks.

In the installation of sink strainers, garbage disposal attachments, and the like to the outlet of a sink, it has long been the practice to retain such fixtures in the hole provided at the bottom of the sink as by means of a lock nut. More particularly the strainer or other fixture is conveniently provided with a flange at its upper end to engage through the medium of putty an upper surface of the sink bottom. The fixture is then clamped to the sink by the lock nut cooperable through a washer and rubber gasket with a lower surface of the sink and coacting with external screw threads on the portion of the fixture extending downwardly through the hole in the sink. In the installation of the sink outlet fixture in the above noted manner, a long handled wrench must necessarrily be employed to tighten the lock nut into close clamping engagement with the sink bottom to ensure an adequate seal. As is nearly always the case, the sink bottom is disposed within the close confines of an under-the-sink cabinet or other enclosure which renders the sink outlet relatively inaccessible. The nut tightening procedure, by virtue of the clumsy wrench handle projecting outwardly therefrom in the close quarters beneath the sink, is consequently difficult and time consuming. Furthermore, inasmuch as the handle of the wrench is to one side of the nut and fixture, there is a severe tendency in the application of force to the handle for the fixture to be urged off center. Where the fixture is not centered in the hole, the effectiveness of the seal is lessened and leaks are likely to develop.

The foregoing inadequacies and disadvantages of sink outlet connections are overcome by the present invention which provides improved clamping means for sink outlet fixtures and the like whereby the installation is accomplished without necessitating a wrench and in a relatively accessible and rapid manner.

It is therefore an object of the present invention to provide an improved sink outlet connection which is facilitated from a location substantially directly below the fixture as opposed to locations laterally thereof.

Another object of the invention is the provision of retaining means for sink outlet fixtures and the like which requires only a handy tool such as a screw driver to facilitate its installation.

It is still another object of the present invention to provide a strainer or other sink outlet fixture having clamping means for their sealed retention in the hole of a sink without displacement of the fixture off-center during installation.

Yet another object of the present invention is the provision of clamping means for sink outlet fixtures which are readily adjustable to use with sinks of varied thickness.

It is a further object of this invention to provide a novel clamp ring arrangement for exerting a clamping force against a surface by a rotary screw-like action achieved without actual screw threads.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing

made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

FIGURE 1 is an elevational view of a sink strainer partially in section with clamping arrangement in accordance with the present invention.

FIGURE 2 is a sectional view taken at line 2—2 of FIGURE 1.

FIGURE 3 is a fragmentary sectional view taken at line 3—3 of FIGURE 2.

FIGURE 4 is another fragmentary sectional view similar to FIGURE 3 taken at line 4—4 of FIGURE 2.

FIGURE 5 is an elevational view partially in section of a garbage disposal unit attached to a sink with a clamping arrangement in accordance with the present invention.

FIGURE 6 is a sectional view taken at line 6—6 of FIGURE 5.

Considering now the invention in some detail and referring to the illustrated forms thereof in the drawings, there is provided an improved connection for the attachment of strainers, disposals, and other fixtures to the outlet of a sink or the like. The improved connection is seen to include generally a pair of clamping rings of novel configuration for concentric coaction with the flanged end of a pipe fixture, such as an outlet fixture of a sink, to clamp a surface, such as the bottom of a sink, between the rings and flange. More particularly, the distal ring relative to the flange is arranged for motion restrictive engagement with the fixture whereas the proximal ring is rotatable thereabout. The rings are provided with camming surfaces in respective abutment for effecting upon rotation of the proximal ring axial translation of same relative to the flange. A releasable clamping action is thereby facilitated between the rings and flange. A principal advantage in the clamping arrangement of the present invention is gained by the provision of circumferentially spaced notches or equivalent openings to facilitate the clamping effecting rotation of the rotatable ring by means of a handy tool such as a screw driver from a relatively accessible location substantially longitudinally of the rings. The tool is merely braced in one of the notches of the fixed ring with the end of the tool engaging a notch of the rotatable ring. Rotation of the latter ring is then effected by leverage of the tool relative to the fulcrum provided by the notch in the fixed ring. The clamping action is thereby effected by other than a wrench or other special tool difficult and clumsy to use in a limited working space such as usually exists in the areas where outlet fixtures are installed.

As regards more particularly the structural details of the sink outlet connection, same is embodied in FIGURES 1 through 4 as an outlet connection for a sink strainer. As illustrated therein, a substantially conventional sink strainer **10** extends through an opening **11** provided at the bottom of a sink **12**. The strainer is provided with a flange **13** at its upper end which is seated within a conformed annular recess **14** concentrically surrounding the opening **11**. In addition a layer of putty **15** is preferably interposed between the flange and recess to facilitate a water tight seal therebetween.

Conventionally, sink strainers are clamped to the sink bottom by means of a lock nut threadably engaging the casing of the strainer and tightened into clamping engagement with the under surface of the sink bottom. As noted hereinbefore, such a connection is disadvantageous in that the space available within which to manipulate a wrench for tightening the nut is usually limited. In addition during the tightening of the nut with a wrench, there is a severe tendency for the strainer to be pulled off center relative to the sink opening such that leaks are likely to develop therebetween. Hence to overcome these difficulties, I dispense with the usual threads about the strain-

er body for engaging the lock nut and replace same with a plurality of circumferentially spaced radially projecting lugs **16** about the bottom of the strainer body for coaction with upper and lower clamping rings **17** and **18** of novel configuration. The rings encircle the body of the strainer **10** above the lugs **16** and coact therewith to provide a clamping action against the sink bottom which may be readily effected by means of a small handy tool. More particularly, upper ring **17** has an inner diameter which is sufficiently larger than the outer diameter of the strainer body that the ring may be readily slipped coaxially over the lugs **16** from the bottom end of the body of strainer **10**. The ring **17** is provided with a downwardly projecting rim **19** which is preferably formed coextensive with the central opening of same. The rim **19** includes a continuous succession of serrations **20** defining a plurality of like circumferentially adjacent inclined camming surfaces **21**. In the preferred embodiment four camming surfaces, each extending through 90 degrees of arc, are provided, however, other numbers of camming surfaces may as well be employed. In addition ring **17** is best outwardly flanged as shown generally at **22** to provide a flat enlarged upper bearing face **23** for bearing against, for example, a metal washer **24** and rubber washer **25** interposed between the upper ring and under surface of the bottom of sink **12**. At the underside of flange **22** there are provided a plurality of radial notches **26** for facilitating rotation of the ring in a manner subsequently described.

As regards the lower ring **18**, it is to be noted that same is formed with an upwardly projecting rim **27** at its top face conformed to the rim **19** of the upper ring **17** and arranged for end abutment with the camming surfaces **21** thereof. More particularly, the rim **27** is provided with a plurality of circumferentially adjacent serrations **28** defining a continuous succession of inclined camming surfaces **29** substantially identical to camming surfaces **21** of the upper ring and complementary thereto. Rotation of the upper ring relative to the lower ring, with the respective camming surfaces **21** and **29** thereof in abutting engagement hence causes the surface **29** to ride up or down on the surface **21** resulting in longitudinal translation of the upper ring **17** relative to the lower ring **18**. A substantially screw like action is consequently effected between the rings which produces translation of the upper ring by an amount substantially equal to the maximum depth of serrations **20**, **28** upon rotation of the upper ring through the angular extent of same. Such screw-like action is effected without the provision of actual screw threads.

In order that the above-described screw-like action may be effected, it will be appreciated that the lower ring **18** must be locked against rotation about the body of sink strainer **10**. To this end, the lower ring is provided with a central opening having a diameter only slightly larger than that of the strainer body. A plurality of longitudinal grooves **31** are formed in the inner periphery of the ring conforming to the lugs **16** of the strainer body to facilitate passage of the ring longitudinally over the lugs from the bottom of the strainer body. In addition, at the under side of the ring there is provided a plurality of sets of notches **32**, **33**, and **34** of graded depth and equally spaced circumferentially thereabout for motion restricting engagement by lugs **16**. The number of sets corresponds to the number of lugs **16** such that the notches of the respective sets are simultaneously engaged by the lugs. It is particularly important to note that by means of the graded depths of the notches of each set, the distance of the ring from the flange **13** of the strainer may be correspondingly varied. This facilitates locking of the lower ring **18** to the strainer body at substantially the same distance from the undersides of sink bottoms of different thicknesses. With a relatively thin sink of, for example, steel, the ring **18** is locked closer to the flange **13** than in the case of a thick sink of, for example, cast iron. The distance between the ring and underside of the sink bottom in both instances is substantially the same. The distance is sufficiently small that a tight clamping action can be produced within the limits of longitudinal displacement of the upper ring **17** as rotated relative to the lower ring **18**. Thus where the sink bottom is of thin steel, the lower ring **18** upon being placed over the strainer body is rotated into a position wherein the set of shallow notches **32** are engaged by the lugs **16**. Where the sink bottom is of thick cast iron, the ring **18** is rotated into a position wherein the set of deep notches **34** are engaged by the lugs **16**. In both cases, the displacement of the upper ring **17** as effected by rotation of same relative to the lower ring **18** and fixed by the dimensions of the camming surfaces **21** and **29** of such rings is sufficient to urge the washers **24** and **25** against the sink bottom and tightly clamp the strainer to the bottom of the sink.

Considering now the means whereby clamping rotation of the upper ring **17** is facilitated by a handy tool instead of the usual clumsy wrench, the lower ring **18** is outwardly flanged as shown generally at **36**. A plurality of radially extending notches **37** are circumferentially spaced about the flange **36**. These notches in cooperation with the notches **26** provided at the underside of flange **22** of upper ring **17** facilitate rotation of the upper ring into tight clamping engagement with the sink bottom by means of a handy tool such as a screw driver **38**. More specifically, initially the rings **17** and **18** are placed upon the strainer body, the lower ring is locked against rotation by engagement of an appropriate one of the sets of notches **32**, **33**, **34** with lugs **16** in the manner previously described. The upper ring **17** is rotated by hand relative to the fixed lower ring **18** into loose clamping engagement with the washers **24** and **25** bearing against the underside of the sink bottom. Thereafter, tight clamping engagement is facilitated as by means of screw driver **38**. The screw driver **38** is braced in one of the notches **37** in flange **36** of the lower fixed ring **18** with the tip of the screw driver engaging one of the notches **26** provided in flange **22** of the upper rotatable ring **17**. The screw driver is then brought to bear against the side of the notch **37** and force is applied to the handle of the tool. The screw driver hence functions as a lever with the notch **37** serving as fulcrum and leverage being applied at the notch **26** of the upper ring **17** in a direction to further rotate same into tight engagement with the underside of the sink. It is particularly important to note that the leverage required in the clamping of the sink strainer **10** to the bottom of the sink by means of the rings **17** and **18** of the present invention is effected with the screwdriver **38**, or equivalent handy tool, substantially parallel to the strainer body. The screwdriver moreover, is closely spaced from the strainer body and only a slight lateral excursion of the screwdriver handle is required in producing sufficient leverage to effect a tight clamping action. The clamping of the strainer to the sink by means of rings **17** and **18** may hence be readily effected even in locations where the working space is limited. Inasmuch as the leverage required in the attainment of a tight connection is applied to the ring **17** at a position closely radially spaced from the strainer, the tendency for the strainer to be urged off center during the tightening procedure is substantially eliminated.

As mentioned previously, the clamping rings **17** and **18** of the present invention may be similarly advantageously employed in the connection of other outlet fixtures to a sink in addition to strainers. Garbage disposals are readily connected to a sink, for example, as depicted in FIGURES 5 and 6 of the drawing. As shown therein, a disposal inlet body **39** extends through the hole **11** in the bottom of sink **12**. The body **39**

is of generally cup shaped configuration with a large central opening 41 in its bottom end and an outwardly flared annular flange 42 at its upper end. The flange 42 is seated within the recess 14 in the upper surface of the sink bottom upon a layer of putty 15 in like manner as the sink strainer 10 previously described. In addition circumferentially spaced radially projecting lugs 43 are provided at the lower end of the inlet body 39 similar to the lugs 16 of the strainer. The lugs 43 coact with the clamping rings 17 and 18 of the present invention to rigidly connect the inlet body 39 to the sink bottom in identical fashion to that described previously relative to the strainer.

With such connection of the inlet body 39 of the disposal to the sink by means of clamping rings 17 and 18, a simplified sealed connection of housing 44 which encloses the comminuting chamber 46 of the disposal to the inlet body 39 is also facilitated. More particularly, the housing 44 is provided with an annular seat 47 in its upper end face encircling a central inlet opening 48 to the comminuting chamber 46. The seat 47 is of appropriate diameter to receive the base of the inlet body 39 with the respective openings 41 and 48 of same being thereby in registry. To facilitate a water tight seal between the body 39 and housing 44 a rubber O-ring 49 is interposed between the base of the body and seat 42. In addition, a collar 51 is provided at the upper end of the housing 44 and a split ring 52 is clamped about the housing in end abutment with the underside of the collar. The split ring 52 is provided with a plurality of circumferentially spaced radially projecting lugs 53 having bolt holes 54 therethrough. To accomplish the connection, a plurality of bolts 56 are merely placed in appropriate ones of the notches 37 of the lower clamp ring 18 with the bolt heads abutting the top face of flange 36 and the ends of the bolts extending longitudinally downward through the bolt holes 54 of the split ring 52. Nuts 57 are then threadably engaged upon the bolts 56 and tightened against the lugs 53 to draw the split ring 52 snugly against the collar 51. The housing 44 and body 39 are thereby forced together to compress the O-ring 49 therebetween and establish a water tight seal.

What is claimed is:

1. In a clamping arrangement for securing a fixture to the outlet of a sink, said fixture having flanged end for engagement with the upper surface of a sink bottom and a body extending downwardly through the outlet, the combination comprising a plurality of circumferentially spaced lugs peripherally substantially integrally secured to the body of said fixture, an upper ring disposed concentrically about said body above said lugs and rotatable about said body, said ring having a downwardly projecting rim with a continuous succession of serrations therein defining a plurality of like circumferentially adjacent inclined camming surfaces, said ring having an outwardly flared annular flange at its upper end with a plurality of radial grooves in the under surface thereof, and a lower ring having a plurality of longitudinal grooves in the inner periphery thereof for passage of the ring over said lugs, said lower ring having a plurality of notches in the underside thereof for engagement by said lugs, said lower ring having an upwardly projecting rim at the upper side thereof with a continuous succession of serrations in the rim defining a plurality of like circumferentially adjacent camming surfaces complementary to said camming surfaces of the upper ring and in end abutment therewith, said lower ring having a radially projecting flange with a plurality of radial notches therein.

2. In a clamping arrangement as defined by claim 1, the combination further defined by said plurality of radial grooves in the undersurface of said lower ring are grouped in sets of graded depth, said sets corresponding in number and circumferential spacing to said lugs.

3. An improved sink outlet connection comprising a sink strainer with a flanged upper end in engagement with the upper surface of a sink bottom and a body extending downwardly through the outlet of the sink, said body having substantially integrally connected thereto a plurality of circumferentially spaced radially projecting lugs at the lower periphery thereof, an upper ring having an inner radius greater than the outer radius of said lugs and disposed concentrically about said body, said ring having a downwardly projecting rim with a continuous succession of serrations therein defining a plurality of like circumferentially adjacent inclined camming surfaces, said ring having an outwardly flared annular flange at its upper end with a plurality of radial grooves in the under surface thereof, washers disposed concentrically about said body and interposed between the upper surface of the flange of said upper ring and the undersurface of said sink bottom, and a lower ring having a diameter substantially equal that of said body and formed with a plurality of longitudinal grooves in the inner periphery thereof for passage of the ring over said lugs, said lower ring having a plurality of equally circumferentially spaced notches of graded depth in the underside thereof for engagement by said lugs, said lower ring having an upwardly projecting rim at the upper side thereof with a continuous succession of serrations therein defining a plurality of like circumferentially adjacent camming surfaces complementary to the camming surfaces of said upper ring and in end abutment therewith, said lower ring having a radially projecting flange with a plurality of radial notches therein, said upper ring being rotated relative to said lower ring into tight clamping engagement with said washers and the underside of the bottom of said sink.

4. An improved sink outlet connection comprising a garbage disposal including an inlet body and a comminuting chamber housing, said body having a flanged upper end in engagement with the upper surface of the bottom of a sink and extending through the outlet thereof, said body having a plurality of circumferentially spaced radially projecting lugs about the periphery thereof and a central outlet opening in its bottom end, said housing having an annular seat encircling a central inlet opening and a collar at its upper end, the bottom end of said body recessed within said seat, an O-ring interposed between the bottom end of said body and the base of said seat, an upper ring having an inner radius greater than the outer radius of said lugs and disposed concentrically about said body, said ring having a downwardly projecting rim with a continuous succession of serrations therein defining a plurality of like circumferentially adjacent inclined camming surfaces, said ring having an outwardly flared annular flange at its upper end with a plurality of radial grooves in the undersurface thereof, washers disposed concentrically about said body and interposed between the upper surface of the flange of said upper ring and the undersurface of said sink bottom, a lower ring having a diameter substantially equal that of said body and formed with a plurality of longitudinal grooves in the inner periphery thereof for passage of the ring over the lugs, said lower ring having a plurality of equally circumferentially spaced notches of graded depth in the underside thereof with one set engaged by said lugs, said lower ring having an upwardly projecting rim at the upper side thereof with a continuous succession of serrations therein defining a plurality of like circumferentially adjacent camming surfaces complementary to the camming surfaces of said upper ring and in end abutment therewith, said lower ring having a radially projecting flange with a plurality of radial notches therein, said upper ring being rotated relative to said lower ring into tight clamping engagement with said washers and the underside of said sink bottom, a split ring clamped about said housing in end abutment with the collar thereof, said split ring having a plurality of radially projecting lugs with bolt holes therethrough, a plurality of bolts engaging the notches of the flange of said lower ring with the bolt heads

abutting the upper surface of the flange, said bolts extending longitudinally downward through the holes in the split ring lugs and threadably engaging nuts tightened thereagainst.

5. In a clamping arrangement for securing a fixture to the outlet of a sink, said fixture having a flanged end for engagement with the upper surface of a sink bottom and a body extending downwardly through the outlet, the combination comprising a plurality of circumferentially spaced lugs peripherally substantially integrally secured to the body of said fixture, an upper ring disposed concentrically about said body above said lugs and rotatable about said body, said upper ring being mounted on said body for operatively positioning adjacent and clamping the sink bottom between the ring and flanged end, said ring having a downwardly projecting rim with a continuous succession of serrations therein defining a plurality of like circumferentially adjacent inclined camming surfaces, a lower ring disposed concentrically about said body below said upper ring and having a plurality of longitudinal grooves in the inner periphery thereof for passage of said lower ring over said lugs, said lower ring having a plurality of notches in the underside thereof for restrictive engagement with said lugs to hold the ring

against rotational displacement on said body, said lower ring having an upwardly projecting rim at the upper side thereof confronting said downwardly projecting rim and having a continuous succession of serrations defining a plurality of like circumferentially adjacent camming surfaces complementary to said camming surfaces of the upper ring and in end abutment therewith, and means provided on said rings for engagement by a tool for effecting rotation of said upper ring relative to said body.

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