Nov. 21, 1961 T. E. JENKINS 3,009,657

SINK CONNECTION SUPPORT FOR WASTE DISPOSAL APPARATUS

Filed June 10, 1960 2 Sheets-Sheet 1

FIG. 1

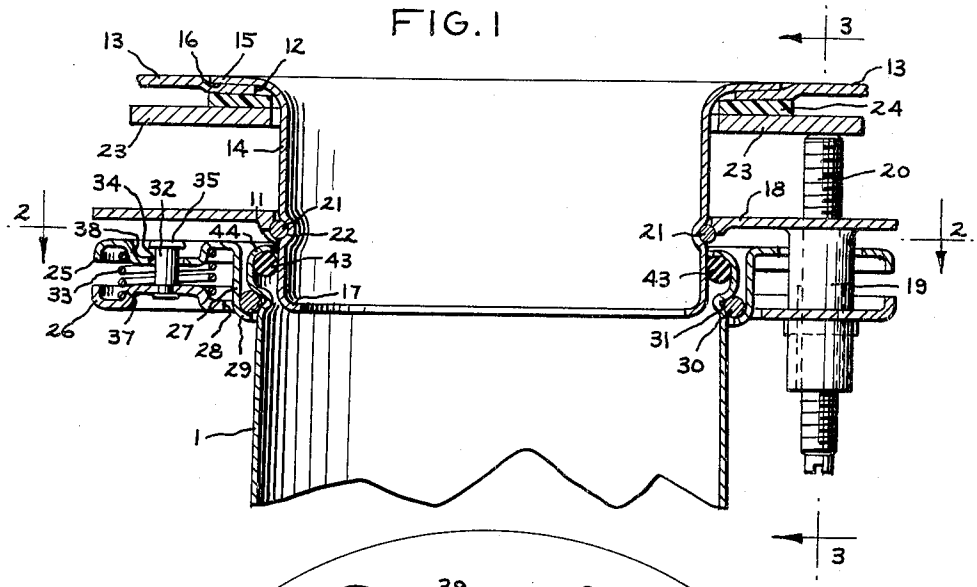


FIG. 2

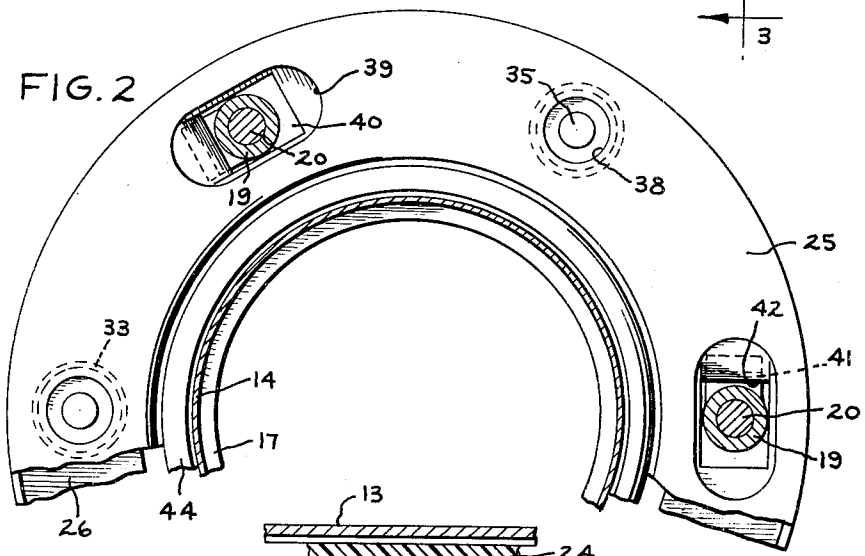
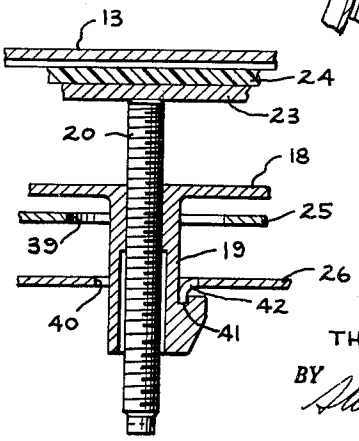


FIG. 3



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SINK CONNECTION SUPPORT FOR WASTE DISPOSAL APPARATUS

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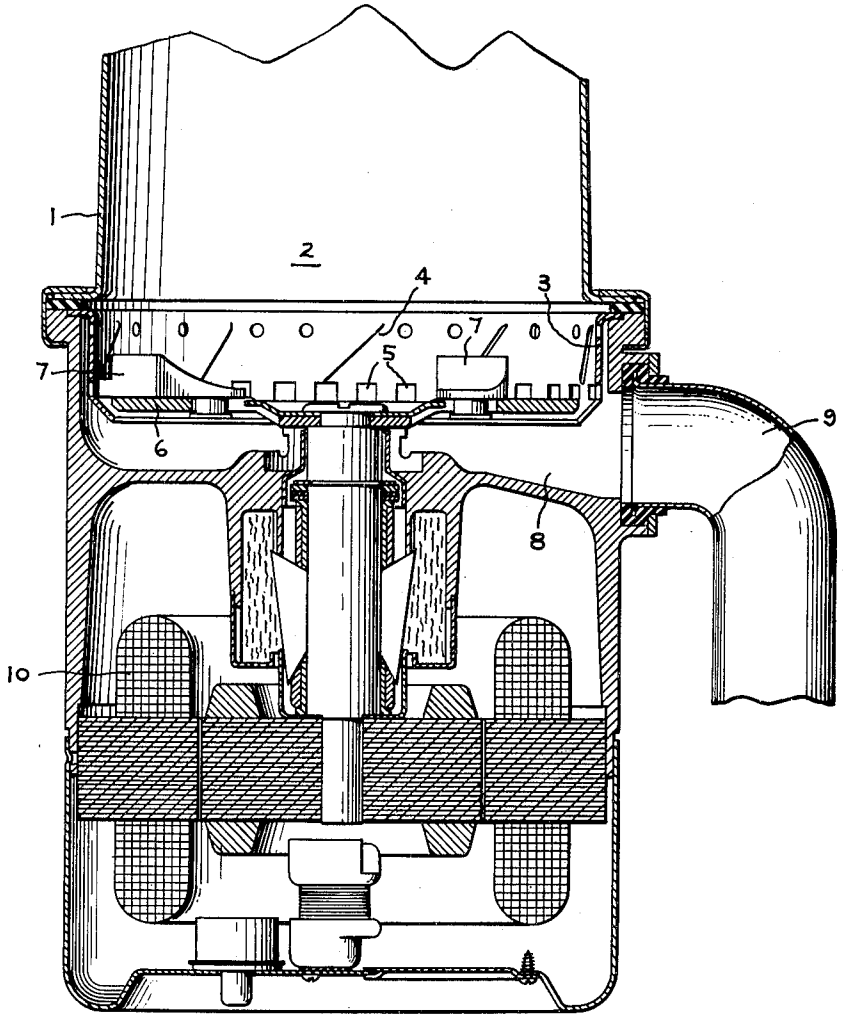


FIG. 4

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SINK CONNECTION SUPPORT FOR WASTE DISPOSAL APPARATUS

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6 Claims. (Cl. 241—100.5)

This invention relates to apparatus for the disposal of waste material wherein garbage and other kitchen wastes are comminuted in the presence of water by power driven comminuting means to a flowable mixture and the resultant mixture flushed to the waste disposal system of the house; and is especially applicable to such disposal apparatus which is connected with the drain opening of a kitchen sink which opening serves as an ingress opening for the admission of the waste material and water to the grinding apparatus.

This invention contemplates the provision in apparatus of this kind of improved means for attaching the apparatus to and supporting it from the sink in proper relation with the sink drain opening and incorporating means for isolating from the sink and hence from the kitchen the vibration incident to the operation of the apparatus and thereby reduce materially the noise usually associated with waste disposal apparatus.

Briefly stated, in accordance with one aspect of this invention, I provide a food waste disposer having a comminuting housing which has an upper inlet opening which is intended to register with the sink drain opening and afford an ingress opening for the waste material and water introduced through the sink opening. I also provide a supporting sleeve for the housing and its associated comminuting apparatus arranged to be mounted in the drain opening in supporting relation with the sink. The comminuting housing with its associated power operated grinding means is supported from the sleeve so that the upper end of the housing is in spaced concentric relation outside of the sleeve by a pair of vertically spaced rings encircling the housing. The rings are attached to the housing and sleeve respectively and a part of the ring attached to the housing is positioned above a coating part on the other ring, and resilient supporting means is interposed between these parts so that the housing is supported from the sleeve through the resilient means; the resilient supporting means provides for movement of the ring parts relative to each other in any plane. A resilient seal ring, as for example a resilient O-ring, is interposed in the space between the housing and the sleeve to form a radial fluid and vibration isolating seal between these members. The resilient means and the O-ring each has a natural vibration frequency less than the natural vibration frequency of the comminuting apparatus as a whole attached to the sleeve.

I assemble the two spaced rings which support the resilient supporting means into a unit which as a whole is attachable to the disposal housing, and include in the supporting means a connection between parts which will permit quick assembly of the disposal housing with the sleeve merely by elevating the housing into telescopic relation with the lower end of the sleeve, turning the housing slightly and finally allowing it to fall into its operating position in which it is to be supported from the sleeve.

For a more complete understanding of this invention, reference should be had to the accompanying drawings in which:

FIGURE 1 is a fragmentary vertical sectional view of food waste disposal apparatus embodying this invention;

FIGURE 2 is a horizontal sectional view taken through the line 2—2 of FIGURE 1 and looking in the direction of the arrows;

FIGURE 3 is a vertical sectional view taken through the line 3—3 of FIGURE 1 and looking in the direction of the arrows; and

FIGURE 4 is a fragmentary vertical elevation of food waste disposer apparatus embodying this invention, parts being shown in section so as to illustrate certain details of construction.

Referring to the drawings this invention has been shown in one form as applied to food waste disposal apparatus having a generally cylindrical tubular casing or housing 1 enclosing a grinding or shredding chamber 2 at the bottom of which the comminuting or shredding of waste material takes place. Any suitable shredding means may be used at the bottom of the housing 1 to effect the comminuting operation, for example the shredding means may be used which is described and claimed in the United States patent to H. J. Macemon No. 2,828,083, dated March 25, 1958, and assigned to the General Electric Company the assignee of this application. Briefly, the grinding means comprises a stationary shredding ring 3 (FIG. 4) which is provided with cutting surfaces 4 and with a plurality of apertures 5. Coacting with the shredding ring 3 is a material impelling flywheel 6 which is provided with impellers 7 arranged when the flywheel is rotated to impel the waste material against the shredding ring 3 to comminute the material into a fine mass. It will be understood that during this operation water will be caused to flow down through the housing 1, and that eventually the water and the comminuted material constituting a flowable mass will be impelled outwardly through the apertures 5 into a drain chamber 8 which drains into a drain line 9 which in turn is connected with the sewer system of the house.

The impeller 6 is driven by a suitable electric motor 10.

The upper end 11 of the housing 1 constitutes an opening through which the waste material and the water is supplied to the housing 1 from the drain opening 12 provided in the household sink, the bottom wall of the basin of which is designated by the numeral 13.

The means arranged in accordance with this invention for supporting the disposal unit from the wall 13 to vibration insulate the unit from the sink and hence from the house in which the sink is installed, comprises a cylindrical tubular sleeve 14 which is arranged to be inserted down through the sink opening 12 and at its upper end is provided with an outwardly extending circular flange 15 adapted to overlie the marginal edge 16 of the drain opening 12, as shown in FIGURE 1. Preferably and as shown the marginal area 16 will be slightly depressed from the bottom wall 13. The lower end of the sleeve 14 is provided with an inturned flange 17 which will support a suitable sink stopper (not shown), for example as shown and described in the United States patent to F. W. Moore, No. 2,787,423, dated April 2, 1957, and assigned to the General Electric Company, the assignee of this application.

The sleeve 14 not only functions to conduct the waste

material and water to the housing 1 but it also constitutes the sole supporting means for the housing. For the purpose of supporting the disposal unit the sleeve 14 itself is rigidly secured to the bottom wall 13 of the sink. This is accomplished by a support ring 18 which encircles the depending sleeve 14 and is provided with a series of integral bosses 19 depending from the ring 18 and bolts 20 threaded into the bosses; preferably the bosses 19 and associated bolts 20 will be spaced at uniform intervals around the circumference of the ring 18 (three being provided in the form of the invention illustrated spaced 120° apart). The ring 18 with the bolts 20 is supported from the sleeve 14 by means of a snap ring 21 which is received in an outwardly facing circular recess 22 formed in the sleeve. The bolts 20 function to clamp the flange 15 to the annular wall 16 of the sink by means of a clamping ring 23 encircling the sleeve, it being understood that when the bolts 20 are screwed upwardly they will sandwich the bottom wall of the sink between the flange 15 on the sleeve and the ring 23; preferably a ring gasket 24 encircling the sleeve will be inserted between the bottom of the sink and the clamping ring 23.

The support ring 18 not only functions to rigidly secure the sleeve 14 to the sink, but it also constitutes the means for attaching the disposal unit to the sleeve 14. For this purpose a pair of spring retaining rings 25 and 26 are positioned to encircle the upper end portion of the tubular housing 1, the central openings in these rings being spaced from the housing, as shown. The two rings are arranged in vertically spaced apart superimposed relation with respect to each other, as shown. The upper ring 25 is provided at its central opening with a depending cylindrical wall 27 which extends downwardly through the central opening 28 in the lower ring member 26, and the wall 27 has an inturned flange 29 at its lower end. This flange functions to connect the upper ring 25 with the tubular housing 1 by means of a snap ring 30 which seats in the flange 29 and is received in an outwardly facing circular groove 31 formed in the upper end of the housing 1 spaced somewhat from its top edge.

The lower ring 26 is connected with the upper ring 25 and hence with the housing 1 by means of a plurality of rivets 32 and coiled springs 33 encircling the rivets. In the specific embodiment of the invention illustrated three rivets 32 and associate springs 33 will be provided spaced substantially 120° apart. As shown, the lower end of each rivet is riveted to the lower ring 26 while the upper portion of each rivet passes freely through an enlarged opening 34 provided for it in the upper ring and this upper end of the rivet is provided with an enlarged head 35 which will prevent withdrawal of the ring from the rivet. Preferably, the rings will be provided with facing protuberances 37 and 38 to form spring retaining seats which enter into the opposite ends of the associated coiled springs 33. It will be observed in view of this construction that the two rings 25 and 26 are held in assembled relation and that this ring assembly as a unit is secured to the housing 1 by means of the snap ring 30. It will also be observed that the two rings 25 and 26 are biased away from each other by the springs 33 and that the movement of the springs apart is limited by the length of the rivets 32.

The assembly of rings 25 and 26 is arranged to be secured to the supporting ring 18, and for this purpose I use the bosses 19 provided for the screws 20. The bosses 19 extend downwardly through circumferentially elongated spaced openings 39 and 40 provided in the rings 25 and 26 (FIGURE 3). The lower end of each boss 19 is provided with a hooked shaped seat 41 which is adapted to receive an associated downturned tongue 42 provided in the lower ring 26 from the margin of the associated opening 40. The seats and tongues prevent relative rotary movement between the ring 26 and the ring 18.

I provide between the lower end of the sleeve 14 and the upper end of the housing 1 a radial fluid and vibration seal. For this purpose I provide a flexible O-ring 43 in the radial space between the sleeve and the housing as shown in FIGURE 1, and as shown in this figure the circular groove in the housing defining the recess 31, spaced somewhat below the upper end of the housing, defines a lower limiting stop for the O-ring, while the upper end of housing 1 will be provided with an inturned flange 44 to limit the upper movement of the O-ring.

In view of the foregoing construction, it will be understood that the spring 33 and the O-ring 43 arranged in parallel relation constitute vibration insulating means between the housing 1 and the sleeve and sink. The natural frequency of vibration of each of the spring means 33 and of the O-ring 43 should be less than the natural frequency of vibration of the housing 1 and its associated comminuting apparatus; preferably the natural frequency of vibration of each of the spring means and O-ring will only be from one-half to one-third as great as the natural frequency of vibration of the housing 1 and its associated operating apparatus; stating it differently the spring means and O-ring may for example each vibrate at nine to ten cycles per second, while the housing 1 and associated mechanisms may vibrate at twenty-five to thirty cycles per second. Therefore, the two resilient means 33 and 43 isolate the vibration of the housing 1 and associated mechanism from the sleeve 14 and the sink 13 and hence from the house in which the sink is installed. Since the vibration is isolated the noise incident to vibration effect is eliminated. It will be understood that when the machine operates the springs 33 permit limited movement of the housing 1 and associated parts with respect to the fixed sleeve 14 in any plane due to random vibration of the machine, and that this movement may take place without interference by the O-ring 43.

It will be observed that the O-ring functions solely as a radial seal and vibration insulation member, and that it does not take any of the load of the machine supported from the sleeve 14.

It will be understood that in assembling the apparatus described above in the field the sleeve 14 will be inserted through the sink opening 12 into its operative position; then the gasket 24 and the clamping ring 23 will be elevated over the sleeve to their positions under the sink; and then the supporting ring 18 will be placed about the sleeve 14, and the snap ring 21 positioned in its recess 22 under the ring 18. After all of this the sleeve 14 will be clamped to the sink by threading the bolts 20 upwardly.

It will be understood that the assembly of spring retaining rings 25 and 26 together with their springs 33 will have been assembled with the housing at the factory; this is accomplished by inserting the spring ring assembly over the top of the cylindrical housing 1 to expose the upper end portion of the housing so that the snap ring 30 may be inserted in the groove 31, which will have been formed in the housing, and then the ring assembly will be elevated into position against the split ring. The O-ring 43 will be inserted in its position in the upper end of the housing.

In the field the housing 1 with the attached ring assembly and O-ring 43 placed in position in the upper end of the housing will then be assembled with the supporting ring 18 by placing the housing in a vertical position under the sleeve 14 and elevating it so that the bosses 19 are received in the elongated openings 39 and 40 provided in the rings. After the assembly has been moved upwardly to allow the tongues 42 to clear their associated hook spaced seats 41 the housing assembly is turned slightly to bring the tongues into registry with the seats and then allowed to fall so that these members are received in interlocking relationship.

While I have shown and described a specific embodiment of my invention, I do not desire my invention to be limited to this particular construction shown, and I in-

tend by the appended claims to cover all modifications within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Waste disposal apparatus for use in connection with a sink having a drain opening comprising a tubular housing enclosing a comminuting chamber having an inlet opening for water and waste material at the top thereof, a cylindrical sleeve adapted to be disposed in said drain opening including an outwardly projecting supporting flange on the upper end thereof adapted to overlie the marginal edge of said drain opening with the sleeve depending downwardly from the sink basin, the lower end of said sleeve being adapted to be received within the upper end of said housing in substantially concentric spaced relation with it, a pair of retainer rings encircling said housing in vertically spaced relation, each of said rings having an inner circular edge defining a central opening, the upper ring having a cylindrical wall depending from the central opening of said ring for movement into the central opening in the lower ring, means attaching said depending wall to said housing so that the housing is supported from said upper ring, attachment means supporting said lower ring from said sleeve, a plurality of circumferentially spaced springs interposed between said rings resiliently to support the upper one from the lower one, and a resilient O-ring in the space between said sleeve and housing to provide a radial fluid seal between them, said springs and O-ring vibration isolating said housing from said sleeve.

2. Waste disposal apparatus for use in connection with a sink having a drain opening comprising a tubular housing enclosing a comminuting chamber having an inlet opening for water and waste material at the top thereof, a cylindrical sleeve adapted to be disposed in said drain opening including an outwardly projecting supporting flange on the upper end thereof adapted to overlie the marginal edge of said drain opening with the sleeve depending downwardly from the sink basin, the lower end of said sleeve being adapted to be received within the upper end of said housing in substantially concentric spaced relation with it, a pair of retainer rings encircling said housing in vertically spaced relation, attaching means connecting said rings together in an assembly and providing for relative movement between them in any plane, said attaching means including spring means resisting movement of said rings towards each other with a yielding resilient force, means attaching the upper of said rings to the upper end of said housing thereby to attach said assembly of rings and their attaching means to said housing, and supporting means for supporting said ring assembly and thereby said housing from said sleeve including a ring-plate encircling and attached to said sleeve, a plurality of spaced rod-like supports depending from said ring-plate and extended through circumferentially elongated spaced openings provided for them in said rings, the lower end portions of said rod-like supports being provided with supporting retaining shoulders and said lower ring having a plurality of tongues adapted to rest upon said shoulders to support said housing from said shoulders, said housing being asembled with said ring-plate by elevating it so that said rods freely pass through said elongated apertures in said rings, by turning said housing to bring said tongues and shoulders into alignment and then allowing said housing to drop to engage said tongues with said shoulders, and a resilient O-ring in the space between said housing and sleeve forming a radial fluid sealing and vibration isolating connection between them.

3. The waste disposal apparatus specified in claim 2 wherein said supporting shoulders and tongues have mutually interlocking parts to prevent relative circumferential movement between said lower ring and said ring-plate.

4. Waste disposal apparatus for use in connection with a sink having a drain opening comprising a housing enclosing a comminuting chamber having an inlet opening for water and waste material at the top thereof, a cylindrical sleeve adapted to be disposed in said drain opening, means on said sleeve adapted to support it from said sink so that it depends downwardly from said opening, support means for attaching said housing to said sleeve with its inlet opening end in telescopic substantially concentric spaced relation with said sleeve including a pair of vertically spaced rings encircling said housing, means attaching said rings respectively to said sleeve and to said housing and said rings constructed and arranged so that when they are so attached a part of said ring attached to said housing is superimposed above a coacting part of said ring attached to said sleeve, resilient means interposed between said ring parts so as to support said housing, a resilient seal member interposed in the space between the telescopically related parts of said housing and sleeve to form a radial fluid and vibration isolating seal therebetween, shredding means in said comminuting chamber, an electric motor carried by said housing to drive said shredding means, and said resilient means and seal member each having a natural vibration frequency less than the natural vibration frequency of said housing including said shredding means and motor.

5. Waste disposal apparatus for use in connection with a sink having a drain opening comprising a tubular housing enclosing a comminuting chamber having an inlet opening for water and waste material at the top thereof, a cylindrical sleeve adapted to be disposed in said drain opening, supporting means for supporting said sleeve in said opening so that the sleeve depends downwardly from the sink basin through said opening, the lower end of said sleeve being adapted to be received within the upper end of said housing in substantially concentric spaced relation with it, a pair of retainer rings encircling said housing in vertically spaced relation, attaching means connecting said rings together in an assembly and providing for relative movement between them in any plane, said attaching means including resilient means resisting movement of said rings towards each other with a yielding resilient force, means attaching the upper of said rings to the upper end of said housing thereby to attach said assembly of rings and their attaching means to said housing, support means attached to said sleeve including circumferentially spaced supporting shoulders, and said lower ring having a plurality of parts complementary to and adapted to rest upon said shoulders to support said housing from said shoulders, said housing being assembled with said sleeve by elevating said housing so that said parts are moved to a point above said supporting shoulders, by turning said housing to bring said parts and shoulders into alignment and then allowing said housing to drop to engage said parts with said shoulders, and a resilient fluid sealing ring member carried by said housing in fluid sealed relation with it and so as to be moved into sealing relation with said sleeve when said housing is elevated for assembly with said sleeve and is maintained in fluid sealed relation with said sleeve when said housing is supported from said sleeve thereby to fluid seal the radial space between said sleeve and housing.

6. Waste disposal apparatus for use in connection with a sink having a drain opening comprising a tubular housing enclosing a comminuting chamber having an inlet opening for water and waste material at the top thereof, a cylindrical sleeve adapted to be disposed in said drain opening, supporting means for supporting said sleeve in said opening so that the sleeve depends downwardly from the sink basin through said opening, the lower end of said sleeve being adapted to be received within the upper end of said housing in substantially concentric spaced relation with it, a pair of rings one encircling and connected to said sleeve and the other encircling and connected to said housing for supporting the weight of the housing, a plurality of circumferentially spaced hook-shaped seats on said one ring and a plurality of comple-

mentary spaced tongue members on said other ring for resting on said seats to support said housing from said sleeve, said housing being assembled with said sleeve by elevating said housing so that said tongue members are moved to a point above said seats, by turning said housing to bring said tongue members and seats into alignment and then allowing said housing to drop to engage said tongue members with said seats, and a resilient fluid sealing ring member carried by said housing in fluid sealed relation with it and so as to be moved into sealing relation with said sleeve when said housing is elevated for assembly with said sleeve and is maintained in fluid sealing relation with said sleeve when said housing is supported from said sleeve thereby to fluid seal the radial space between said sleeve and housing.

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