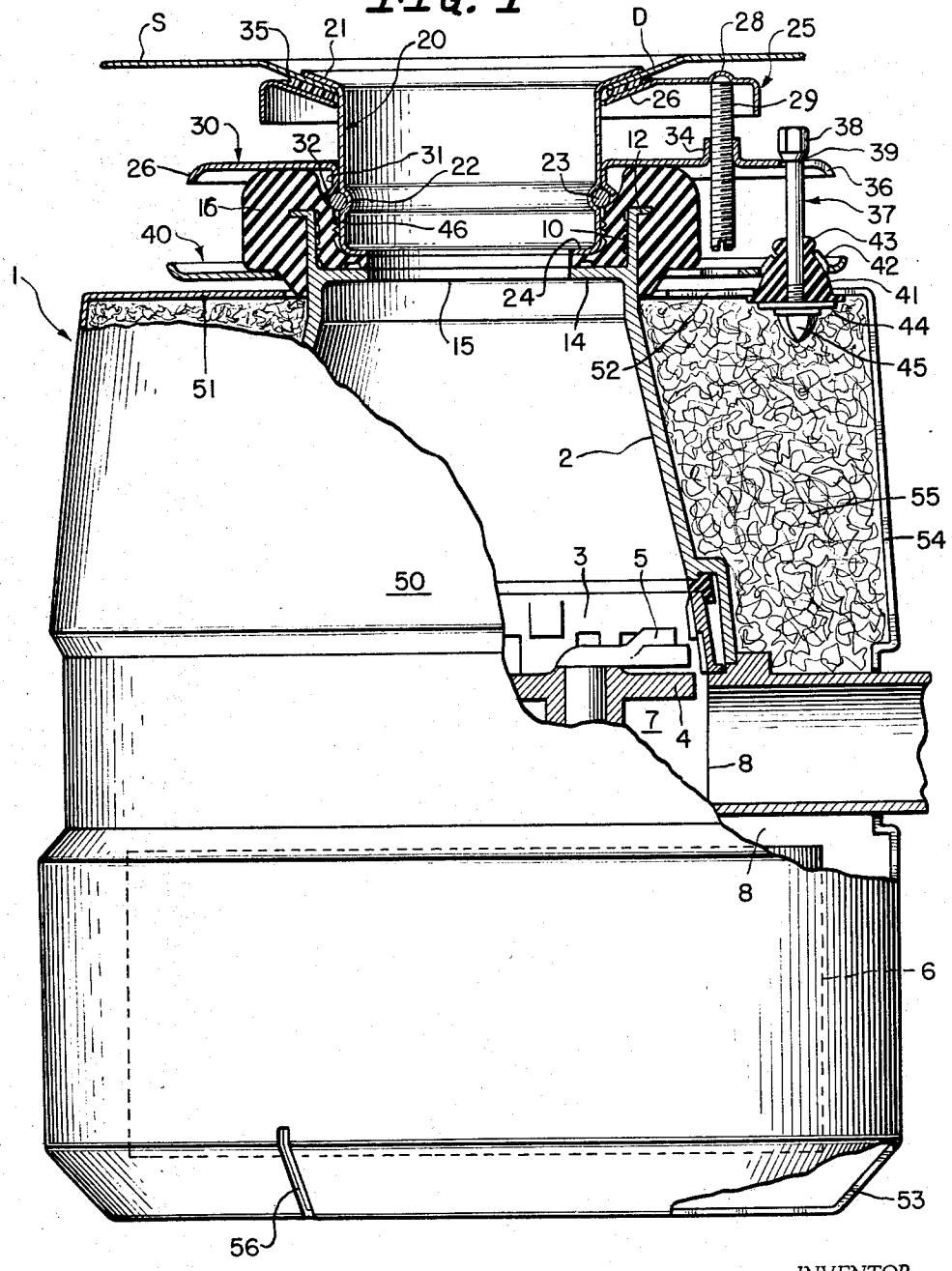
Nov. 22, 1966 T. S. McMAHON 3,286,936

SUPPORTING STRUCTURE FOR WASTE DISPOSAL APPARATUS

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FIG. 1



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FIG. 2

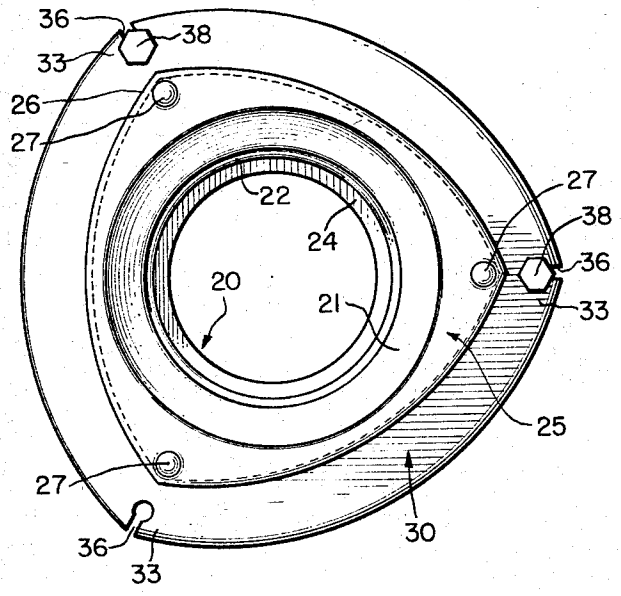


FIG. 3

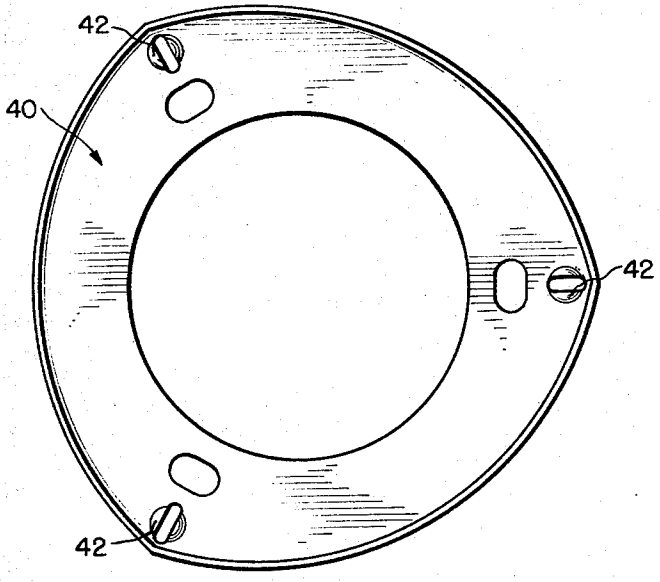
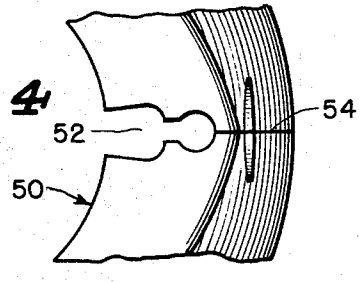


FIG. 4



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SUPPORTING STRUCTURE FOR WASTE DISPOSAL APPARATUS

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10 Claims. (Cl. 241—100.5)

This invention relates to food waste disposers and in particular to means for simplifying the attachment of the disposer to the bowl of a kitchen sink or the like and minimizing the transmission of sound-producing vibrations thereto.

Domestic food waste disposers are now provided with an inlet fitting which occupies the drainage opening in a sink bowl. By well-known clamping and securement devices which the present invention utilizes in an improved manner, the disposer mechanism is in a sense suspended from the outlet fitting, with the mouth of the disposer comminution chamber in registry with the fitting so as to receive food waste therethrough. Cold water is allowed to flow into the chamber, and the disposer motor is energized to cause the comminution mechanism to reduce the food waste to such small particle size that it will mix with the cold water and be carried thereby to the plumbing waste line ordinarily serving the sink. Because of the present very widespread use of pressed metal kitchen sinks rather than the earlier cast iron type, the operational vibrations of the disposer as its comminuting mechanism attacks hard waste such as bones, fruit pits and the like cause the metal of the sink bowl to vibrate, with the result that the relatively large area bowl amplifies the vibrations and thereby generates a very undesirable level of operational noise. Sound-deadening structure such as resilient collars and similar devices intermediate the sink bowl and disposer have been employed with varying degrees of effectiveness to reduce the transmission of vibrations to the sink bowl.

It is well known that domestic food waste disposers, particularly in the "de luxe" types which are provided with external sound-deadening casings, are becoming larger and more cumbersome. Accordingly, it is becoming more difficult for the plumber to install these disposers in the cabinet below the kitchen sink, because of the lack of working space. Usually, during at least some part of the installation procedure, the plumber is working "blind."

In recognition of the practical problems attending the installation of food waste disposers under adverse conditions, the present invention provides mounting means whereby the securement of the disposer is substantially simplified. The mounting structure also efficiently dampens and limits the transmission of vibrations from the disposer to the sink bowl.

In a presently preferred embodiment of the invention I employ a conventional cylindrical sheet metal inlet fitting which has an outwardly flaring flange at its upper end. The fitting is supported by the bottom of the sink bowl by reason of the overlapping flange and sink bowl. I also use a conventional annular clamping ring which extends about the inlet fitting and is arranged to cooperate with the inlet fitting flange to clamp the sink bowl therebetween. Also as is usual, the inlet fitting intermediate its ends is formed with an arcuate groove which receives a split ring. An annular support ring of substantial radial width is carried by said split ring, and again pursuant to conventional practice, is threaded at preferably three angularly separated locations to receive clamping screws which extend upwardly into engagement with the underside of the clamp ring. When these screws are made secure the clamping ring is brought tightly against the bottom of the sink, for it is obvious that the split ring on which the supporting

ring rests holds the supporting ring against axial movement along the tubular inlet fitting. The supporting ring is provided with a plurality of keyhole slots opening to the periphery of the ring; said slots removably accommodate hanger bolts which in turn carry a lower support ring through which the screws freely pass.

As a first cushioning means, rubber, sound-absorption devices are interposed, between each hanger bolt and the lower support ring. A second cushioning means, and the means by which the food waste disposer is actually related to the supporting structure above described, comprises a rubber collar into which fits an upwardly flanged upper portion of the disposer comminution chamber. This rubber collar rests upon the lower support ring and receives the lower portion of the inlet fitting in a manner preventing any leakage of water during the operation of the disposer or during the normal sink drainage function.

It is therefore an object of the invention to provide structure for suspending a food waste disposer from a kitchen sink or the like, such structure having means for minimizing transmission of vibrations to the sink bowl.

It is another object of the invention to provide a disposer supporting structure which simplifies installation procedures.

Other features and advantages of the invention will best be understood by reference to the following detailed description of a presently preferred embodiment thereof, read in connection with the accompanying drawings in which:

FIG. 1 is a side sectional elevation, partly in section, of a food waste disposer embodying the present invention;

FIG. 2 is a top plan view of the mounting means, it being understood that this view does not include any portion of the sink bowl;

FIG. 3 is a top plan view of the lower support means; and

FIG. 4 is a fragmentary top plan view of the disposer casing.

Referring now to FIG. 1, a food waste disposer **1** is shown in its normal operating relationship to the bowl of a kitchen sink S. That is to say, the disposer is suspended from the beveled portion of the sink bottom defining the drainage opening D of the bowl. The food waste disposer itself comprises an open-topped comminution chamber **2**, in the lower portion of which is a circumferentially extending shredding ring **3**. The bottom of the chamber **2** is actually provided by the flywheel **4** which is equipped with a pair of impellers or mauls **5**. The flywheel is rotated at motor speed by a suitable motor **6** located below a discharge chamber **7**, from which extends a drainage fitting **8** for connection to a trap (not shown) of a plumbing waste line (not shown). Because the type of shredding ring, flywheel and other comminution elements are not important to the present invention, they have not been described in detail; reference is hereby made to Stoynich, U.S. Patent 2,843,328, granted July 15, 1958, for "Food Waste Disposer," for a detailed description of these components.

Looking now to the several mounting elements which relate to the present invention, it is noted that the comminution chamber **2** has an upper structure including an upstanding cylindrical neck **10** having a short outwardly extending flange **12** at the top and a relatively longer inwardly extending flange **14** at the bottom, said latter flange defining the inlet opening **15** of the comminution chamber. The neck **10** and its respective flanges **12** and **14** provide for the securement of an annular collar **16** of a synthetic rubber-like material by means of which the disposer structure is carried by the sink mounting means now to be described.

A cylindrical inlet fitting **20** has an outwardly flaring

flange 21 which rests within the bowl drainage opening D. Near its lower end the fitting 20 is formed with an inwardly rolled groove 22 of somewhat less than semi-circular contour to receive a wire split ring 23. As is known in the art, the split ring 23 has a normal or relaxed diameter which will cause it to fit snugly within the groove 22, but the ring can be expanded to be slid over the bottom portion of the inlet fitting. At its base the inlet fitting has a short inwardly extending flange 24 providing an opening commensurate with the opening 15.

The supporting structure further includes the clamping device 25 known in the art as a "clamping ring." This structure is an annulus of relatively heavy sheet metal. A portion 26 sloped to conform to the slope of the sink drainage opening D accommodates the passage of the body portion of the inlet fitting 20. As best shown in FIG. 2, the outer margin of the clamping ring is not circular, but at 120° intervals has three lobes 27 which are upwardly dimpled (see 28, FIG. 1), each dimple serving to receive the end of a clamping screw 29, as later described.

For cooperation with clamping ring 25 and the rigid securement of the inlet fitting, an upper support ring 30 is arranged to fit snugly about the inlet fitting 20 and to rest upon the split ring 23. Accordingly, the central opening in the support ring 30 is defined by the downwardly extending cylindrical portion 31 which terminates in an outwardly flaring portion 32 which rests upon the split ring 23. The support ring 30 has a non-circular shape similar to that of the clamping ring 25, and at each of the respective lobes 33 has a threaded neck 34 registering with the respective dimples 28 when the clamping ring and supporting ring are brought into operative relationship. Screws 29 are received into the necks 34. As the screws are made up, it will be obvious that the clamping ring 25 must be moved upwardly because the split ring 23 provides an immovable base for the support ring 30. A suitable resilient gasket 35 is ordinarily interposed between the clamping ring and the sink bowl.

An important departure from prior art clamping and supporting devices of generally similar functional relationship resides in forming the outer peripheral portion of the support ring 30 in an outwardly and downwardly extending curve, and at each of the respective lobes 33 providing a keyhole slot 36, the entrance passage of which is only slightly wider than the shank diameter of the hanger bolts 37, and the circular end of which is sufficiently smaller than the diameter of the bolt heads 38 to cause said heads to seat therein. Preferably, the bolt heads have a tapering bottom edge shown at 39, FIG. 1, and the edge of the keyhole slot end opening is beveled so as to insure the centering of the bolt head therein.

The weight of the disposer is actually carried by the support ring 30 by way of a lower support plate 40 and the substantially hemispherical grommets 41 through which the hanger bolts 37 pass. The lower support plate 40 is an annular sheet metal structure, the central opening of which is substantially larger than the outside diameter of the cylindrical neck 10, but sufficient to provide an adequate supporting base for the annular collar 16, as shown in FIG. 1. The lower support plate 40 has spherical embosses 42 having apertures through which pass the neck portions of the grommets 41, said grommets terminating in slightly larger diameter heads 43. It will be understood that these head portions 43 can be compressed so that they may be forced through the openings in said bosses. The hemispherical body portion of the grommet 41 seats within the concavity provided by the spherical embosses. A washer 44 provides the support of the base of each grommet 41; washer 44 need not necessarily be of larger diameter than the grommet. Means such as a lock-tight acorn nut 45 secures the grommets 41 in place and completes the suspension assembly. Preferably, the length of the hanger bolts 37 is such that when the respective acorn nuts 45 are made up to the full extent, the collar 16 is not under compression between the respective support plates 30 and 40. The collar 16 fits very snugly about the cylindrical inlet fitting 20 and may extend below the flange 24 of said fitting. To perfect a water seal between the collar and the inlet fitting, the collar may be formed with a plurality of grooves 46 to provide therebetween small radially compressible ridges which tightly engage the wall of the fitting 20.

In FIG. 1, I have chosen to illustrate the invention as applied to a disposer having an external casing accommodating a layer of sound insulation material about the comminution chamber. It is obvious that the present invention is not restricted to this type of disposer. However, the structure comprising the present invention provides an advantageous means for supporting the casing for the grommets 41 about the respective hanger bolts provide convenient platforms on which the casing may be mounted.

The casing 50 comprises a unitary structure of thin wall section, molded of a plastic material. The casing has a top wall 51 which has a rather large central opening to accommodate the upper portion of the comminution chamber 2; said top wall also has enlarged slot-like openings 52, FIG. 4, to fit about the respective hanger bolt grommets 41. Each of the three openings 52 extends substantially to the side wall of the casing. At the bottom, the casing wall slopes inwardly, as shown at 53, and terminates in a rather large bottom opening, as shown. This opening insures the free admission of cooling air to the motor.

It will be noted in FIGS. 1 and 4 that the casing is split along the line 54, and because of its thin wall section and other components presently described, the casing is sufficiently flexible to be "opened up" along the lines which extend vertically along the casing at the points where the remaining two slots 52 extend to the outer casing wall. This flexibility is made possible by the provision of slots 56 at the bottom of the casing where it slopes inwardly along the portions 53, FIG. 1. By these slots the otherwise stiffening effect of the bottom slope 53 is eliminated. Any suitable clamping devices or interfitting tongue and groove arrangements (not shown) may be employed to secure the casing along the line 54.

In the installation of a food waste disposer embodying the invention, the plumber insalls the inlet fitting 20 in the sink bowl, slides the clamping ring 25 and its thereon applied gasket 35 upwardly along the fitting 20, passes the upper support ring 30 along the fitting (it being understood that the screws 29 are in the respective threaded necks 34), and then positions the split ring 23. The plumber then makes a rotational adjustment of the clamping ring 25 and support ring 30 on the fitting 20 so that one of the keyhole slots 36 is facing the lateral opening (not shown) which will receive the plumbing waste line trap (not shown). The respective screws 29 are then made up tight to securely clamp the inlet fitting to the sink bowl.

In preparation for the securement of the actual disposer to the upper support ring 30, the lower support plate 40 has received the three hanger bolts 37 and the grommets 41, the plate 40 has been applied over the neck 10 of the comminution chamber and the rubber collar 16 applied. This may all have been done at the factory, or may be done by the plumber at the site of installation. The plumber then inserts the collar 16 over the end of the fitting 20 and swings the hanger bolts outwardly so that they bear against the outer edge of the support ring 30, whereupon the disposer may be rotated until the hanger bolts enter the respective keyhole slots. It will be understood, of course, that the hanger bolt which is in line with the disposer drainage fitting 8 will be in the keyhole slot which had earlier been aligned with the plumbing waste line. Then the disposer may be pushed upwardly until the bottom of the collar 16 seats against

the flange portion **24** of the inlet fitting and the hanger bolts individually moved into home position in the slots. The resilience of the collar **16** and the respective hanger bolt grommets **41** provide the necessary yieldability to permit this final placing of the hanger bolts even though the acorn nuts on said bolts were previously made up to their limit.

If as shown in FIG. 1 the disposer is of the type utilizing the outer casing **50** and the sound insulation **55**, these elements would have been applied prior to the positioning of the disposer as above described.

After the final manipulation of the hanger bolts, the installer completes his connections to the plumbing waste line and the connections to provide for the operation of the disposer motor. It will be understood, of course, that a combination stopper and sink drainage fitting is utilized with the inlet fitting **20** and that said stopper may have means cooperating with a disposer-mounted switch (not shown) for the energization of the motor. Reference is made to Bebinger, U.S. Patent 3,084,877, granted Apr. 9, 1963, for "Waste Disposer," for an illustration and description of a stopper and switch-operating device.

While there has been described what is at present thought to be a preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover the appended claims all such modifications which fall within the true spirit and scope of the invention.

I claim:

1. Means for suspending a food waste disposer from a kitchen sink or the like comprising, in combination:
- a cylindrical inlet structure having at one end an outwardly flaring flange adapted to overlie sink bowl structure surrounding a drainage opening therein;
- an annular clamping ring surrounding said inlet structure below the flange portion thereof;
- a first annular support ring surrounding said inlet structure;
- means for retaining said support ring on said inlet structure;
- screw means threadedly engaging said first support ring for engagement with said clamping ring to urge the latter toward said flange;
- a second annular support ring disposed about said inlet structure below said first support ring, and second ring having a plurality of angularly spaced apertures therein;
- means including hanger bolts carried by said first support ring and passing through the said apertures of said second ring;
- means interposed between said hanger bolts and said second support ring whereby said latter ring is resiliently suspended from said first support ring;
- and an annular resilient member interposed between said first and second support rings and engaging with the extenrnal wall of said inlet structure, said resilient member being adapted to receive said food waste disposer for the support thereof on said second support ring.

2. Means for suspending a food waste disposer from a kitchen sink or the like comprising, in combination:
- a cylindrical inlet structure having at one end an outwardly flaring flange adapted to overlie sink bowl structure surrounding a drainage opening therein;
- an annular clamping ring surrounding said inlet structure below the flange portion thereof;
- a first annular support ring supported on said inlet structure;
- set screw means threadedly engaging said first support ring for engagement against the underside of said clamping ring to urge the latter toward said flange;
- a second annular support ring disposed about said inlet structure below said first support ring;
- means extending between said first and second support rings to resiliently suspend said second support ring from the said first support ring;
- and an annular resilient member interposed between said first and second support rings and engaging with the external wall of said cylindrical inlet structure, said resilient member being adapted to receive said food waste disposer for the support thereof on said second support ring.

3. Means for suspending a food waste disposer from a kitchen sink or the like comprising, in combination:
- a cylindrical inlet structure having at one end an outwardly flaring flange adapted to overlie sink bowl structure surrounding a drainage opening therein;
- an annular clamping ring surrounding said inlet structure below the flange portion thereof;
- a first annular support ring supported on said inlet structure, said support ring having a plurality of angularly spaced keyhole apertures opening at the periphery thereof;
- a second support ring disposed below said first support ring, said second support ring having a plurality of angularly spaced apertures registering with said keyhole apertures;
- means including hanger bolts passing through said second support ring apertures and through said keyhole apertures;
- and resilient means interposed between said hanger bolts and said second support ring whereby said latter ring is resiliently suspended from said first support ring.

4. Disposer suspending means according to claim **3**, in which said hanger bolts extend through said resilient means, and said resilient means are sufficiently compressible to permit said hanger bolts to be angularly displaced for entry into or removal from said keyhole apertures.

5. Disposer suspending means according to claim **4**, in which the portion of said first support ring comprehending the entrance portions of said keyhole apertures curves downwardly in a radius facilitating the entry of said hanger bolts thereinto.

6. Disposer suspending means according to claim **3**, in which the resilient means comprise substantially hemispherical bodies of elastomeric material surrounding said hanger bolts.

7. Disposer suspending means according to claim **3**, in which the apertures in said second support ring are in substantially spherical embosses thereof, the concave side of said embosses facing downwardly and the resilient means having substantially spherical portions fitting into said embosses.

8. Means for suspending a food waste disposer from a kitchen sink or the like comprising, in combination:
- a cylindrical inlet structure having at one end an outwardly flaring flange adapted to overlie sink bowl structure surrounding a drainage opening therein;
- an annular clamping ring surrounding said inlet structure below the flange portion thereof;
- a first annular support ring carried by said inlet structure;
- set screw means extending between said first support ring and said clamping ring to urge the latter toward said inlet structure flange;
- a second support ring disposed about said inlet structure below said first support ring;
- means including hanger bolts extending between said first and second support rings whereby said second ring is suspended from the first ring;
- and an annular resilent member interposed between said first and second support rings and engaging with the external wall of said cylindrical inlet structure, said resilient member being adapted to interfit with an upper portion of said food waste disposer for the support thereof on said lower support ring.

9. A food waste disposer comprising, in combination:

a structure providing an upwardly opening comminution chamber having a cylindrical upper portion surrounding the opening thereof;

a cylindrical inlet fitting adapted to occupy the drainage opening of a kitchen sink;

and means for resiliently mounting said comminution chamber in coaxial relation with said inlet fitting, comprising

a first annular support ring having an opening accommodating the passage therethrough of said inlet fitting;

means for supporting said ring on said inlet fitting;

a second annular support ring having an opening accommodating the passage therethrough of the cylindrical upper portion of said comminution chamber;

a resilient annular member having means accepting the said cylindrical upper portion in interfitting relation therewith, said resilient annular member snugly engaging the exterior of said inlet fitting below said first-named support ring, and said annular member, further, being carried by said second support ring;

means extending between said first and second support rings for resiliently suspending said second support ring;

and a casing structure enveloping said comminution chamber and supported thereon at least in part by said suspension means.

10. A food waste disposer as set forth in claim **9**, in which said suspension means include hanger bolts angularly disposed about said second support ring and said casing structure includes an inwardly extending flange having slotted openings accommodating the passage of the respective hanger bolts.

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