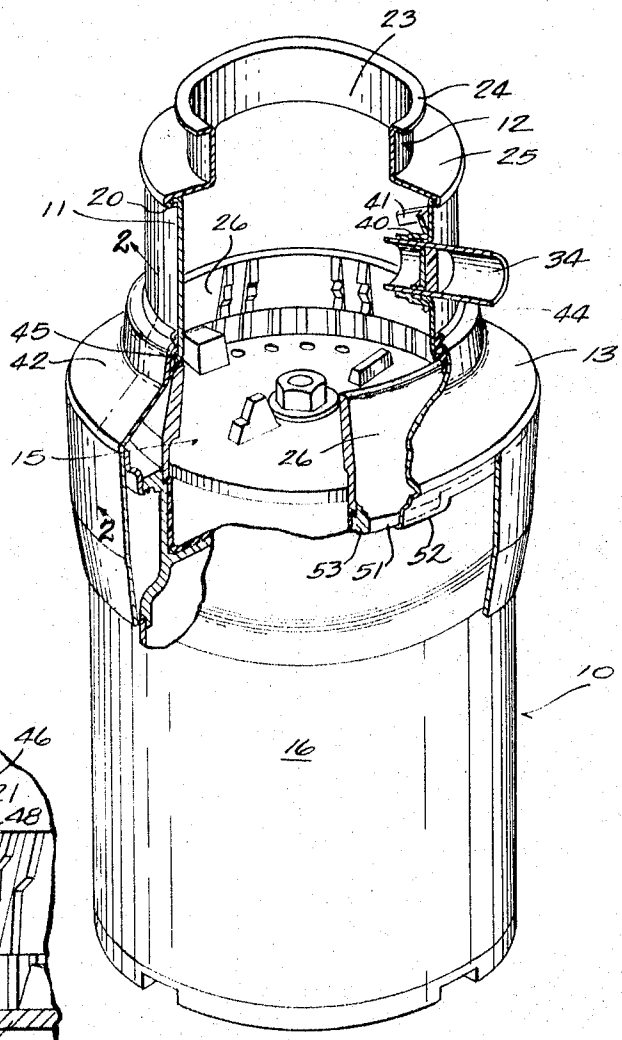
Sept. 2, 1969 J. H. ENRIGHT ETAL 3,464,638

COMMINUTING CHAMBER FOR A WASTE DISPOSAL

Filed Dec. 19, 1966 2 Sheets-Sheet 1

Fig. 1



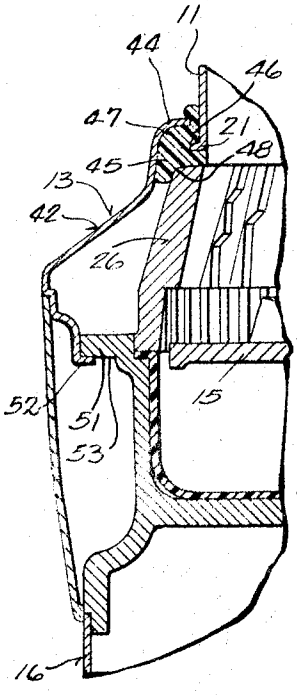


Fig. 2

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COMMINUTING CHAMBER FOR A WASTE DISPOSAL

Filed Dec. 19, 1966 2 Sheets-Sheet 2

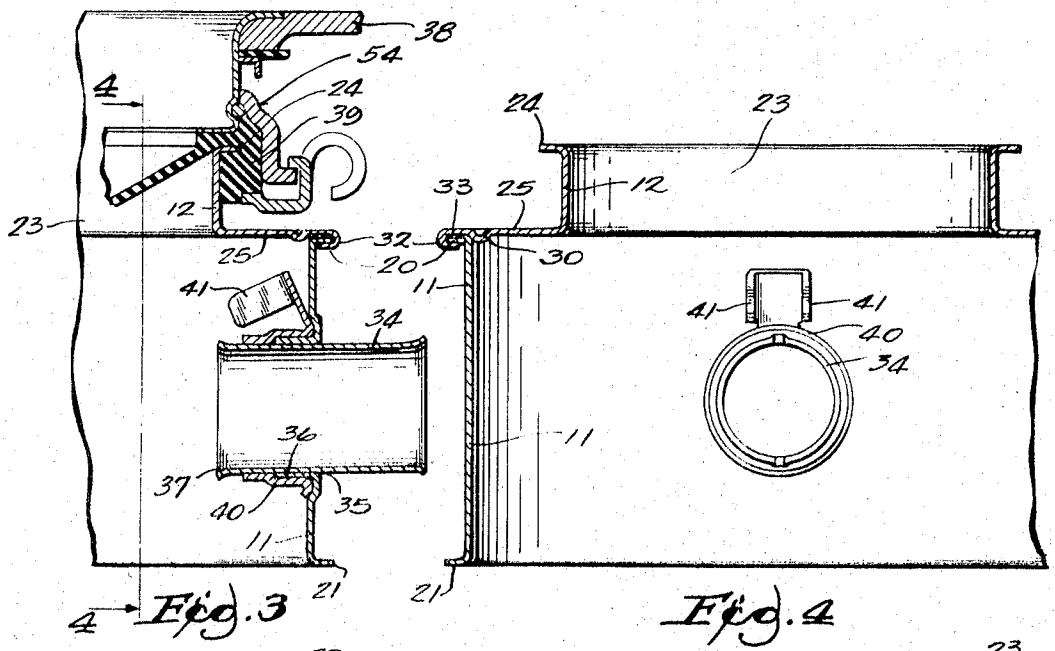


Fig. 3

Fig. 4

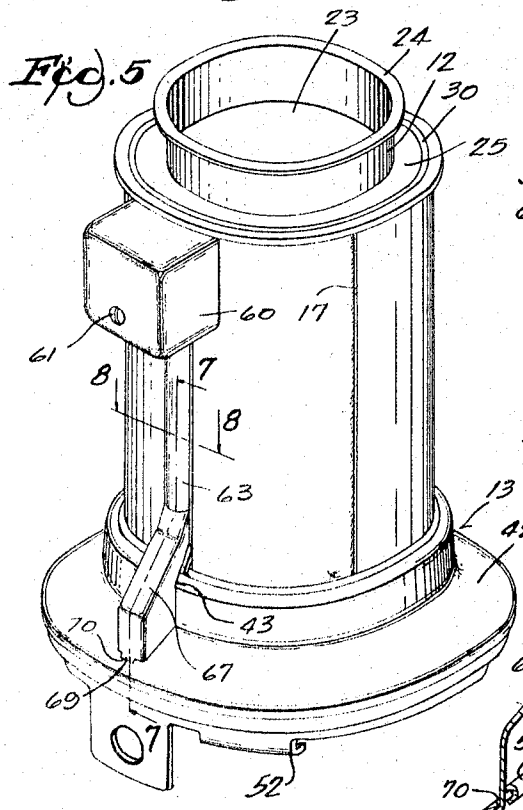


Fig. 5

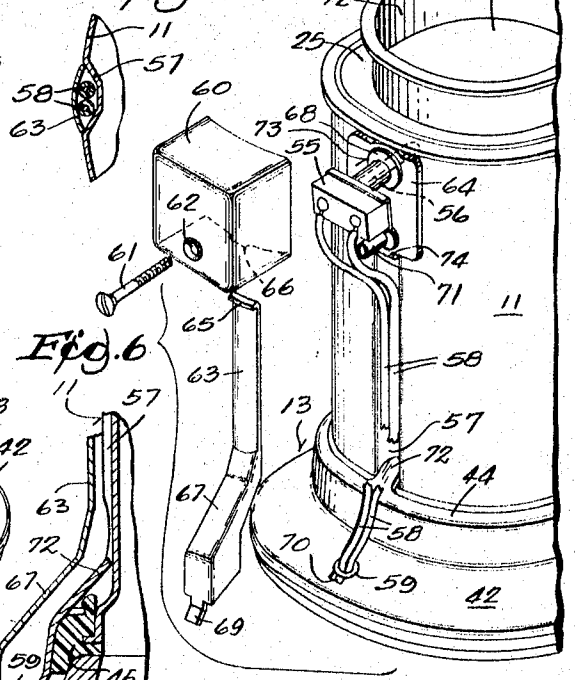


Fig. 6

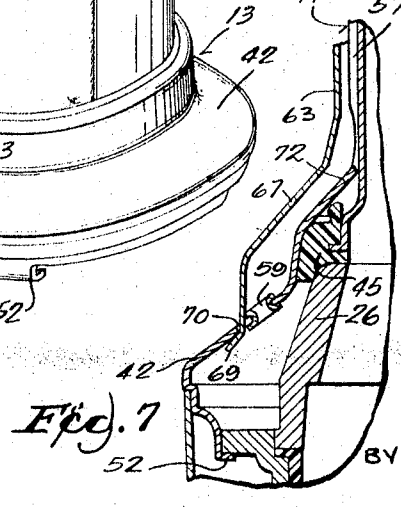


Fig. 7

Fig. 8

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United States Patent Office

3,464,638

Patented Sept. 2, 1969

3,464,638

COMMINUTING CHAMBER FOR A WASTE DISPOSAL

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Filed Dec. 19, 1966, Ser. No. 602,727
Int. Cl. B02b 7/02; B02c 19/00, 23/00
U.S. Cl. 241—100.5 17 Claims

ABSTRACT OF THE DISCLOSURE

A comminuting chamber for a waste disposer consisting of a container body and a cap formed from corrosion resistant strip material such as stainless steel. Flat strip for the container body is desirably formed into a cylinder around a mandrel and the mating edges welded to form a seam. The cylinder wall is expanded and flanged at both ends to increase wall strength. The cap is made from a flat strip, drawn, and formed in a conventional manner and is crimped over the flange at one end of the cylinder and provides an inlet throat and a perpendicular shoulder to form a stepped cylinder which is inherently strong. In some embodiments the chamber has a dishwasher inlet tube with anti-swirl vanes that projects into the chamber to minimize swirl. In some embodiments the comminuting chamber is resiliently mounted at both ends to damp noise level. In some embodiments there is an enclosure for electrical wires running to a stopper actuated switch.

Background of the invention

Various attempts have been made in the art of waste disposers to provide a comminuting chamber for the disposer constructed of a material of sufficient corrosion and erosion resistance to equal or exceed the life of the complete product under normal operating conditions. A common practice in the industry is to cast this chamber of aluminum or iron or some alloy of either material. These materials typically deteriorate or corrode by reason of their chemical reaction with water and/or other fluids, chemicals, and waste, placed into a disposer. Deterioration is further accelerated by the erosive action of swirling fluids and waste within the disposer. Some attempt was made to increase casting wall thickness beyond that required for strength of construction to overcome corrosion deterioration; however, to be effective, this added considerable cost. Another practice is to coat the surfaces of the comminuting chamber subject to corrosion deterioration with epoxy and the like. This technique, however, is usually rendered ineffective because impelled waste chips and scrapes the coating off the chamber wall and leaves a bare metal surface. This bare metal surface is then exposed to corrosion and erosion, as before.

Stainless steel has become popular in disposer construction because of its corrosion resistance. However, stainless steel is relatively expensive and the conventional methods of construction result in considerable scrap. A conventional method of constructing a comminuting chamber is to cold work sheet material by mechanical press, or the like, until the desired deep drawn shape is achieved. Inasmuch as the shape of a comminuting chamber is esentially round, the deep drawn method initiates from an essentially round blank punched, or otherwise removed from a sheet of material. This leaves approximately 20 percent of the available stock as scrap.

Summary of the invention

In accordance with the present inventon there is provided a comminuting chamber with a two-piece construction which is fabricated from relatively thin sheet materials such as stainless steel, brass, copper or reinforced plastics into a structure that affords maximum strength. The container body is the main part of the chamber and serves as an enclosure for the comminuting action.

Various strengthening features are provided for the container body including flanges at each end of the tubular body and a cap in engagement with the upper flange. The cap has a shoulder perpendicular to the wall of the container body which gives the container body the desired strength and rigidity to maintain its tubular shape and withstand large components of force commonly present during the comminuting action when hard, unyielding waste materials are wedged between the body and rotating shredder.

The two-piece cap and body construction of the present invention affords a structure which facilitates fabrication of comminuting chambers of different capacities to accommodate differing sales demands and capacity requirements. Increasing the width of the strip of the desired material for the container body will accordingly increase the length of the comminuting chamber and the capacity. Increasing the length of the strip will increase the diameter of the comminuting chamber.

The method of constructing the comminuting chamber in accordance with the invention comprises the forming of the container body into a tube or cylinder around a mandrel from sheet stainless steel or the like. The seam is welded and the container body expanded to raise the operating wall strength to the yield strength of the material employed, thus reducing the possibility of distortion due to high impact. The ends of the container body are then flanged. This method permits the use of thinner sheet material than the method of constructing the chamber for cold working sheet metal. This method also eliminates additional cost which may be incurred to anneal the semi-finished parts to allow finish forming to the desired shape by the conventional method. The use of sheet material to construct the comminuting chamber in uniform lengths results in minimizing the total scrap.

The cap may still be deep drawn. However, because it is relatively much smaller than the body, any scrap resultant from drawing this part is not substantial in the overall picture.

Further features of the comminuting chamber include a corrosion resistant dishwasher outlet or fresh water inlet tube extending into the chamber. The inwardly extending tube together with ani-swirl vanes mounted thereon diminish undesirable swirling caused by the comminuting action which increases the pumping head at the inlet and can result in backflow into the tube source.

An additional object of the present invention is to provide universal positioning of the inlet tube by a rotatable mounting of the body container to a lower body which supports the motor and grinding members.

The noise level during comminuting is reduced by isolating the comminuting chamber by resilient mounting at both ends.

A modified embodiment of the comminuting chamber of the present invention is provided which includes an on-off switch mounted in the side wall of the comminuting chamber. The present invention provides a cover or box for the switch which may be constructed of the same material as the comminuting chamber to give a uniform appearance. The electrical wires are contained in a conduit which is formed from a channel strip stamped from sheet material which encloses a longitudinal groove in the comminuting chamber providing an enclosure for the wires.

Other objects, features and advantages of the invention will become apparent from the following disclosure.

Drawings

FIGURE 1 is a perspective view of a waste disposer, partially broken away embodying various of the features of the present invention.

FIGURE 2 is an enlarged fragmentary sectional view along line 2—2 of FIGURE 1.

FIGURE 3 is a fragmentary sectional view showing the dish-washer inlet tube of the container body.

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 3.

FIGURE 5 is a perspective view of a modified embodiment of the present invention showing an elongated container body provided with a stopper actuated switch cover and wire enclosing channel strip.

FIGURE 6 is an exploded view of the embodiment illustrated in FIGURE 5.

FIGURE 7 is an enlarged sectional view along line 7—7 of FIGURE 5.

FIGURE 8 is an enlarged sectional view along line 8—8 of FIGURE 5.

Detailed description

Although the disclosure herein is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

Referring to FIGURE 1, a waste disposer generally designated **10** is shown having a comminuting chamber including a relatively deep container sleeve or body **11**, a relatively shallow cap **12**, and a lower body **13**. The comminuting action is provided by a comminuting ring or stationary shredder **26** and a rotor **15** driven by a motor enclosed in motor housing **16**. Inasmuch as the motor and elements that co-operate to provide comminuting action form no part of the present invention, they are not illustrated or described in detail.

The container body **11** is desirably fabricated from a strip of thin sheet material cut to the desired width and length. The strip is formed preferably about a mandrel, into a cylinder. The joint between mating edges of the strip is welded to form a seam **17**. The container body is then expanded to increase the wall strength to the yield strength of the material. This can be accomplished with an expandable mandrel or the like. This fabrication technique eliminates scrap which would otherwise develop if an attempt were made to deep draw this piece. In practice such scrap would be about 20 percent of the available stock.

Any sheet material may be used for this purpose if it has the required corrosion resistance and tensile strength. Stainless steel is desirable because of its strength and corrosion and erosion resistance. However, in certain applications brass or copper may be used.

As illustrated in FIGURE 4 the container body **11** is provided with an upper outturned peripheral flange **20** and lower outturned peripheral flange **21**. These flanges strengthen the thin wall container body and facilitate sealing and mounting the container body **11**.

The cylindrical cap **12** is relatively shallow and is of lesser diameter than the body **11** and provides an inlet throat **23** for the comminuting chamber. Cap **12** may be constructed of the same material as the container body. Because of its smaller size, it may be drawn in conventional manner without production of much scrap. The cap has an upper outturned peripheral mounting flange **24** adapted for use with a resilient sink mount such as that shown in U.S. Patent 3,025,007.

Cap **12** also has a radially extended outturned peripheral flange providing a broad annular shoulder **25**. Shoulder **25** has a downwardly formed circular bead **30** which facilitates alignment of the cap **12** on the container body **11** for a crimping operation. Cap **12** is desirably secured to the container body **11** by crimping or turning the peripheral edge **32** of shoulder flange **25** of the cap over the upper flange **20** of body **11**. Alternate or added fastening means may be employed such as welding, adhesives, or screws.

A fluid seal between the container body **11** and the cap **12** is afforded by an intermediate gasket **33** between shoulder **25** and flange **20**. Bead **30** serves to constrain the gasket against peripheral edge **20** and provide added rigidity to the engagement between cap **12** and the container body **11**. The shoulder **25** perpendicular to body **11** provides an angular structure which strengthens the body container and assists in maintaining the desired tubular shape of the container body **11**. The resultant structure comprises a stepped pair of cylinders with an annular shoulder therebetween.

The techniques aforestated facilitate the use of relatively thin sheet materials such as stainless steel ranging between .015 and .044 inch thick. Such material thicknesses are adequate for the requirements for home use. The use of heavier material may be required for larger commercial disposers with substantially greater horsepower.

The perpendicular shoulder **25** also provides a rebound baffle to return upwardly swirling water and escaping waste objects which occasionally are impelled outward into the sink during the comminuting operation.

The comminuting chamber is optionally provided with an inlet to receive discharge from a dishwasher or fresh water from the water main. The inlet comprises tube **34** which may be constructed of the same sheet material as the container body. It projects through an aperture **35** in wall **11**. Aperture **35** has an inwardly extending annular lip **36** for firm support of the tube **34**.

The inlet tube **34** is desirably secured to the container body by a collar **40** which is telescoped over the annular lip **36** and which compresses the lip **36** against the tube **34**. The tube **34** is then flared at **37** to frictionally bind the collar **40** and the inlet tube **34**.

The swirl of fluids in the comminuting chamber caused by rotation of the rotor **15** is broken up somewhat by the tube **34** which extends inwardly into the container body **11** (about ¾") and into the path of the swirling fluid. Additional antiswirl effect is achieved by vanes **41** on collar **40** which also interrupt such swirling. Thus the inlet structure lowers the pumping head at the inlet and retards backflow through tube **34**.

In most instances the container body **11** is rotatably mounted to the comminuting ring **26** and motor housing **16** by a lower body **13** which comprises a flare-shaped intermediate body section or bell **42** with an upper stepped shoulder **43** with an inwardly extending flange **44**.

Resilient mounting of the container body **11** to the lower body **13** and to ring **26** is afforded by a resilient mounting gasket or ring **45** (FIG. 2) having an annular groove **46** adapted to receive the lower outturned peripheral flange **21** of the container body **11**. Mounting ring **45** is made of any suitable elastomeric material and has a rounded shoulder **47** that provides a seat for the flange **44** of bell **42**. Gasket **45** also has a corner groove **48** which seats on the corner of ring **26**. The motor housing **16** is removably secured to the lower body **13** in accordance with the disclosure in U.S. Patent No. 2,868,465 and the copending application Ser. No. 567,246 of James H. Enright, by three spaced lugs **51** which engage three spaced flanges **52** on the bottom edge of the lower body **13**. Lugs **51** have a cam surface **53** which raises the upper corner of ring **26** in firm engagement with groove **48** of gasket **45** as the lugs **51** are rotated into engagement with flanges **52**, thus clamping the motor housing **16** to the comminuting chamber.

Resilient mounting of the cap **12** to a sink **38** is accomplished by utilization of a swivel sink mounting **54** with an elastomeric ring **39** in accordance with the disclosure in U.S. Patent No. 3,025,007 which also permits universal rotation of the container body **11**.

Inasmuch as body **11** is rotatable as aforestated, its inlet tube **34** can be shifted circumferentially to facilitate connection to a dishwasher outlet or other liquid source.

By reason of its resilient mount **39** at the top and its resilient mount **45** at the bottom, the comminuting chamber floats in elastomeric isolation. Transmission of sound generated in the chamber to the sink and to the motor housing **16** is damped by the rubber mounts, thus reducing noise level in the kitchen.

Although this engagement firmly secures the comminuting chamber to the other components of the disposal, the comminuting chamber can be released and rotated with respect to the motor housing. During such rotation flange **21** rides in groove **46**.

FIGURES 5 through 8 illustrate a modified embodiment of the invention in which the comminuting chamber is adapted to mount a stopper actuated switch, and the wiring therefor. Switch **55** has a plunger **56** which is atcuated by a cam on a cover or a stopper (not illustrated) for the container body **11**. Details of such a stopper actuated switch are typically illustrated in U.S. Patents 2,917,246 and 2,961,172, for example.

In this embodiment of the present invention the container wall **11** has a longitudinal groove **57** which may be stamped into the container wall after the container body **11** is seamed. The insulated electrical wires **58** connected to the switch run along groove **57** through a grommet **59** in the lower body for connection between the line circuit and the motor. A cover or switch box **60** encloses the switch **55** and is secured to the container body wall **11** by a bolt **61** extending through aperture **62** in the cover and into a tapped embossment **71** integral with plate **64**. In addition to the bolt **61** the cover **60** is maintained in engagement against the container body **11** by the plate **64**. Plate **64** is secured to the container wall by a flange **68** on a switch mount **73**. Plate **64** has a tab **74** which extends into groove **57** thereby preventing angular displacement of plate **64**.

The electrical wires **58** are covered by a channel-shaped conduit **63** desirably constructed of thin sheet material of the same type as the container body **11**. Conduit **63** cooperates with the wall of groove **57** formed in chamber wall **11** to completely enclose the wiring. At its lower end conduit **63** has an offset or step **67** which conforms to the step shoulder **43** of the lower body **13**. The upper end of conduit **63** has a flange or lip **65** which hooks over the lower edge **66** of cover **60** which is shown in broken lines in FIGURE 6.

The lower end of the conduit **63** has a tab **69** which enters slot **70** adjacent grommet **59** in lower body **13** when the cover and channel member are installed.

FIGURE 8 illustrates the enclosure of the wires between the channel member **63** and the wall of groove **57**. Diametric keying and alignment of groove **57** and grommet **59** is facilitated by a finger **72** which extends inwardly anl upwardly from flange **44** of lower body **13** into groove **57**. In this embodiment finger **72** prevents rotation of container body **11**.

We claim:

1. A comminuting chamber for a sink mounted waste disposer said chamber comprising a relatively deep container body and a relatively shallow cap therefor, said body comprising a strip of thin wall corrosion resistant material formed into a cylinder and having upper and lower out-turned peripheral flanges, said cap comprising a cylindrical throat of smaller diameter than the cylinder of the body and having at one end a mounting flange and having at its other end a radially extending annular shoulder flange and securing means securing the periphery of said annular shoulder flange to the upper peripheral flange of the body cylinder to form said cap and body into a comminuting chamber having a large diameter relatively deep container body and a smaller diameter relatively shallow throat.

2. A comminuting chamber in accordance with claim **1** wherein said securing means comprises a crimp between said flanges.

3. A comminuting chamber in accordance with claim **1** wherein said securing means includes an annular bead on said annular shoulder flange adjacent said body wall, and a gasket surrounding said bead between the upper flange of said body and said annular shoulder flange.

4. A comminuting chamber in accordance with claim **1** wherein said container body has an aperture in the side wall, an inlet tube extending into said container body, and means to secure said inlet tube to said body.

5. A comminuting chamber in accordance with claim **4** wherein said means to secure said inlet tube to said body comprise an annular lip surrounding said body aperture and extending inwardly, and a collar telescoped over said annular lip compressing said lip against said tube.

6. A comminuting chamber in accordance with claim **5** in which said collar is provided with anti-swirl vanes.

7. A comminuting chamber in accordance with claim **1** in combination with a comminuting ring at the bottom end of the container body and means rotatably mounting said chamber to said comminuting ring.

8. A comminuting chamber in accordance with claim **1** in combination with a comminuting ring at the bottom end of the container body, a resilient mounting ring having an annular groove adapted to receive said lower peripheral flange of said body, said mounting ring having a circumferential shoulder providing a seat, a lower body having an upper, inwardly extending flange engageable with said seat, and means to detachably secure said lower body to said comminuting ring.

9. A comminuting chamber having a lower outturned peripheral flange in combination with a resilient mounting ring having an annular groove for receiving said lower peripheral flange and said ring having a circumferential shoulder providing a seat, a lower body having an upper inwardly extending flange engageable with said seat, a motor housing a comminuting ring, means to detachably secure said lower body to said motor housing and said comminuting ring.

10. A comminuting chamber in accordance with claim **9** wherein said means to secure said lower body to said motor housing and said comminuting ring comprises a plurality of spaced inturned flanges on said lower body and said motor housing is provided with a plurality of spaced lugs which engage said flanges.

11. A comminuting chamber in accordance with claim **10** wherein said lugs have a cam surface in engagement with said flanges and movement of said lugs in engagement with said flanges urges said motor housing and said comminuting ring against said resilient mounting ring thereby compressing said mounting ring.

12. A comminuting chamber comprising a container body having a wall with a longitudinal groove, an electrical switch mounted in said body wall, a cover for said switch, a lower body connected to said container body, a comminuter in said lower body and a motor therefor, a channel-shaped conduit along said groove to cooperate with said groove to provide a wire enclosure, wiring in said enclosure from the switch to the motor, and means to secure said conduit over said groove.

13. A comminuting chamber in accordance with claim **12** wherein said means to secure one end of said conduit to said container body comprises a lip engaging the lower edge of said cover and said means to secure the other end of said conduit to said lower body comprises a tab extending into a slot in said lower body.

14. A comminuting chamber in accordance with claim **1** including an electrical switch mounted in said body wall with plunger actuating means, said switch having wires to complete a circuit between the line current and a driving motor, said container body having a longitudinal groove in said body wall, and a conduit along said

groove to provide an enclosure for said wires in said groove, a lower body attached to said container body, said conduit having a tab extending into a slot in said lower body and said lower body having a finger extending into said groove in said container body.

15. A comminuting chamber having a sheet metal wall having an aperture therethrough, an inlet tube extending into said container body through said aperture, an annular lip surrounding said body aperture and extending inwardly, and a collar telescoped over said annular lip compressing said lip against said tube.

16. A comminuting chamber in accordance with claim **15** in which said collar is provided with anti-swirl vanes.

17. In a sink mounted waste disposer having waste comminuting parts, a comminuting chamber enclosing said parts and an enclosed motor to power said parts, the improvement for damping sound transmission from said chamber to the sink and to the motor enclosure in which said chamber has a resilient mounting at its top to the sink and a resilient mounting at its bottom to the motor enclosure, said chamber comprising a stepped cylinder having an enlarged body portion and a smaller throat portion and a radially extending annular shoulder between said portions, said chamber being formed of thin walled metal, said annular shoulder rigidifying the cylindrical shape of the chamber.

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U.S. Cl. X.R.

174—52; 241—286; 285—177, 382