April 4, 1961 B. L. BRUCKEN ET AL 2,978,190

GARBAGE GRINDER

Filed Aug. 30, 1956 3 Sheets-Sheet 1

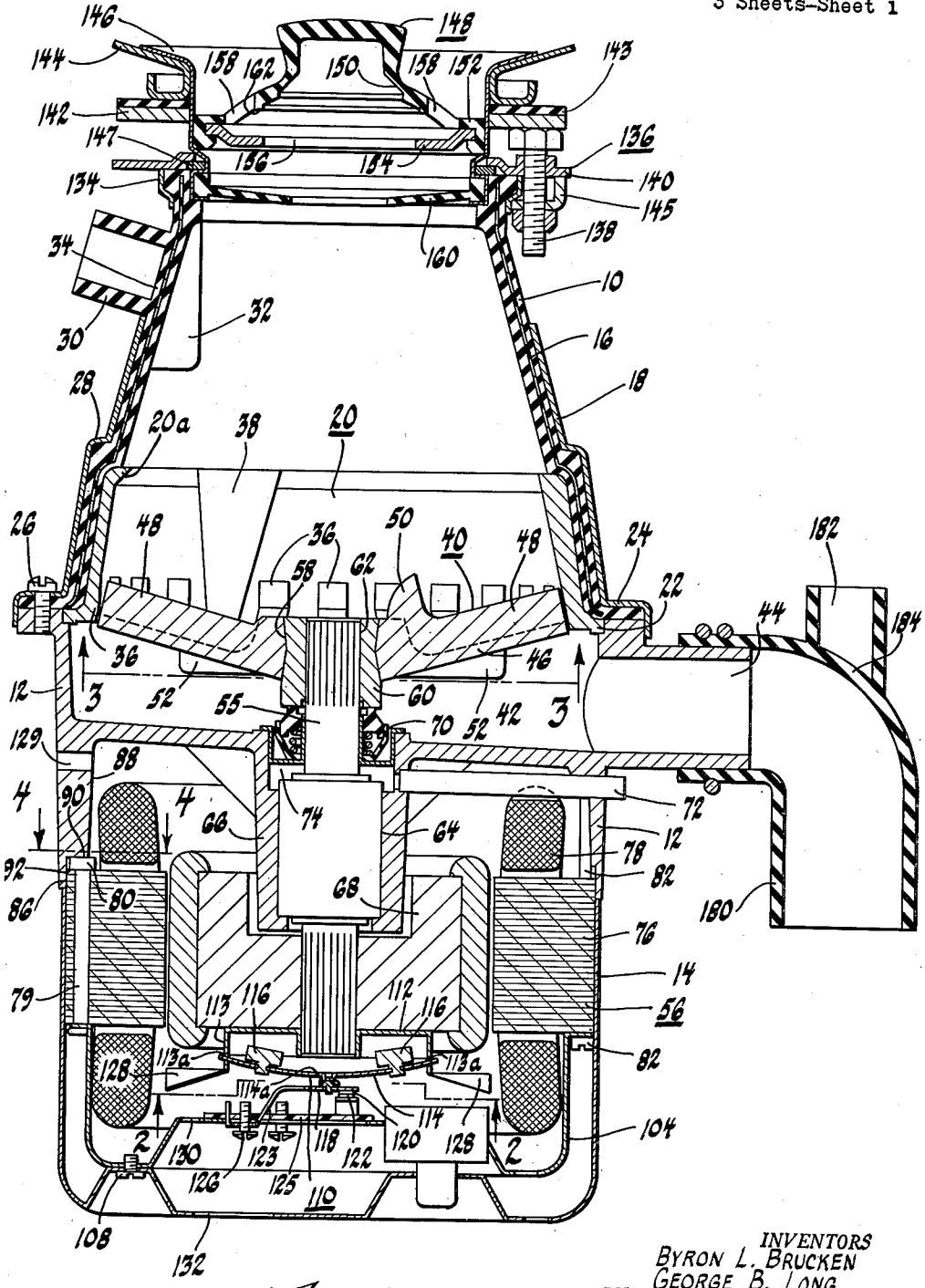


Fig. 1

INVENTORS
BYRON L. BRUCKEN
GEORGE B. LONG
BY Edwin S. Lybrand.
THEIR ATTORNEY

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Filed Aug. 30, 1956 3 Sheets-Sheet 2

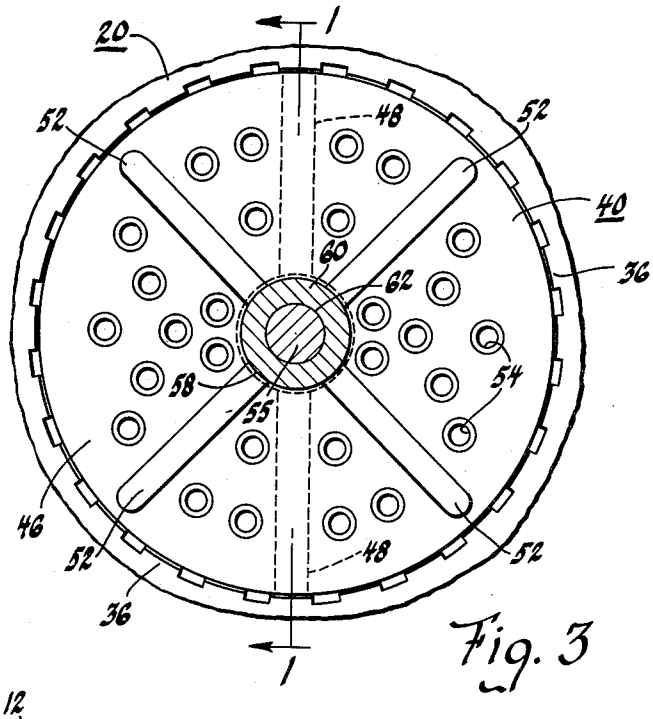


Fig. 3

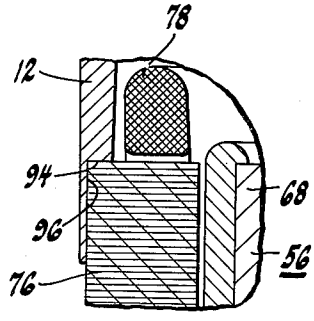


Fig. 7

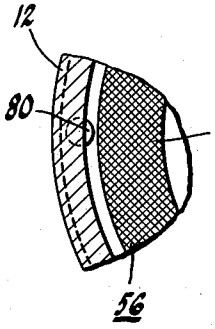


Fig. 4

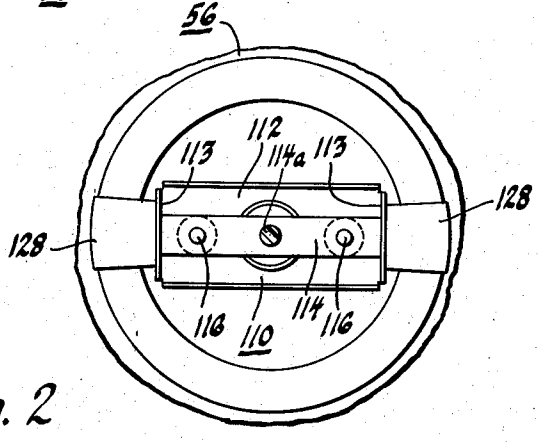


Fig. 2

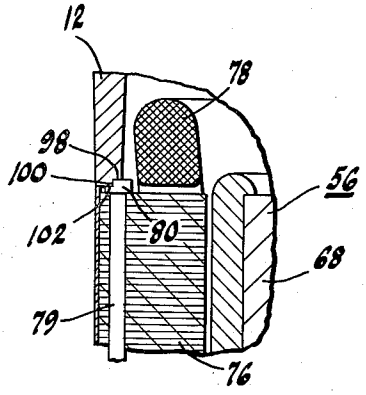


Fig. 8

INVENTORS
BYRON L. BRUCKEN
GEORGE B. LONG
BY Edwin S. Dybvig.
THEIR ATTORNEY

April 4, 1961 B. L. BRUCKEN ET AL 2,978,190

GARBAGE GRINDER

Filed Aug. 30, 1956 3 Sheets-Sheet 3

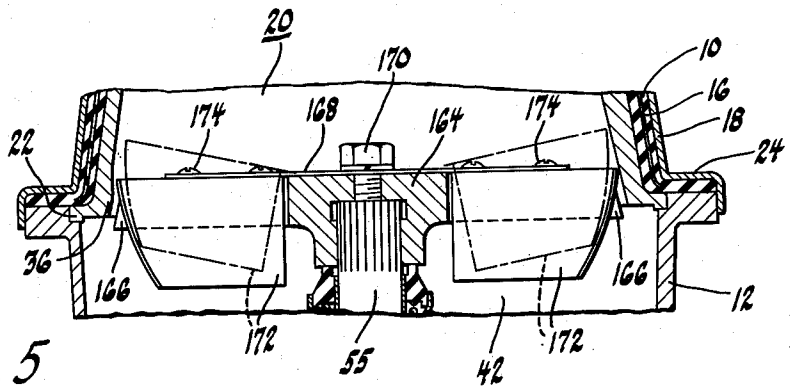


Fig. 5

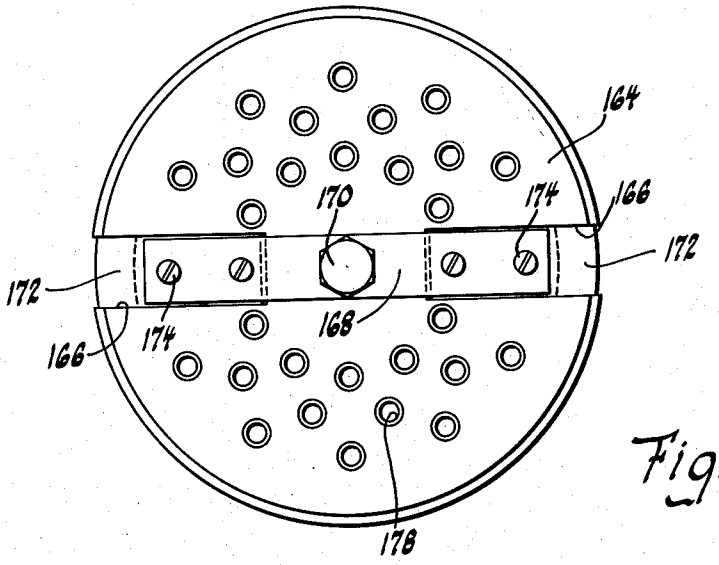


Fig. 6

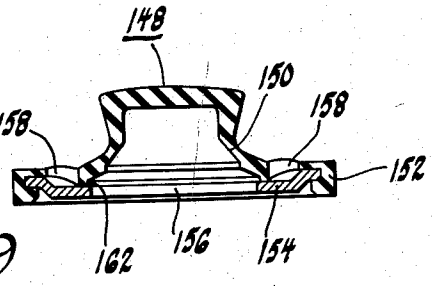


Fig. 9

INVENTORS
BYRON L. BRUCKEN
GEORGE B. LONG
BY Edwin S. Dybwig.
THEIR ATTORNEY

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2,978,190

GARBAGE GRINDER

Byron L. Brucken and George B. Long, Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Aug. 30, 1956, Ser. No. 607,118

4 Claims. (Cl. 241—46)

This invention relates to a domestic appliance and more particularly to a waste disposal unit for grinding waste material.

An object of the invention is to provide a waste disposal unit with an impeller having vane members pivoted to the impeller, the vane members moving away from the impeller under the action of centrifugal force when the impeller is rotated.

Another object of the invention is to provide a garbage disposal unit with a reinforced rubber throat section, the throat section being supported by a metal clamping member that holds the throat section in tight engagement with the disposal shredder ring and with the lower housing of the disposal.

Still another object is to provide a closure cap that is adapted to be mounted within a sink drain member, the closure cap comprising a dome-shaped resilient portion and a rigid insert located within the dome-shaped portion, the insert cooperating with the dome-shaped portion to permit or cut off the passage of fluid through the closure cap.

A further object is to provide a stator mounting arrangement for a dynamoelectric machine, wherein certain surfaces on the stator are machined flat and cooperate with flat surfaces on the stator housing in order to accurately position the stator within the housing.

Another object is to provide a method of attaching a relatively hard garbage disposal impeller to an electric motor drive shaft, the method including swaging soft metal into a central aperture of the impeller, machining out the soft metal to form a shaft engaging aperture, and press-fitting the shaft within the shaft engaging aperture.

Still another object is to provide a centrifugal switch for an electric motor, the switch having a housing attachable to the motor drive shaft, the housing being formed with fan blades for pulling air over the rotor and the stator of the motor when the electric motor is in operation.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a sectional view of a garbage disposal arrangement made in accordance with this invention, the impeller being shown in a section taken along line 1—1 of Figure 3;

Figure 2 is a view partly in section taken along line 2—2 of Figure 1;

Figure 3 is a sectional view taken along line 3—3 of Figure 1;

Figure 4 is a sectional view taken along line 4—4 of Figure 1;

Figure 5 is a view, partly in section, of a modified impeller for a garbage disposal unit made in accordance with this invention;

Figure 6 is a top view of the impeller shown in Figure 5;

Figure 7 is a sectional view of a modified arrangement for positioning a stator within the housing of an electric motor;

Figure 8 is a sectional view of still another modified arrangement for positioning a stator within the housing of an electric motor; and

Figure 9 is a sectional view of the closure cap of this invention showing the closure cap in a closed position.

The garbage or waste disposer of this invention as shown in Figure 1 comprises an upper housing 10, and a lower impeller housing 12 to which is attached an electric motor housing 14. The upper housing 10 is preferably made of a reinforced elastomeric material. The material may be of rubber reinforced with cord 16 that may be of nylon or any other suitable reinforcing material. The upper rubber housing 10 is fixed to the impeller housing 12 by means of a stainless steel clamping ring 18 that conforms to the outer contour of the rubber housing. A shredder ring generally denoted by reference numeral 20 is held in place between the impeller housing 12 and the clamping ring 18. The shredder ring has a lower flanged portion 22 that rests on and fits within a groove formed in the impeller housing as shown. The clamping ring as shown in Figure 1 has an outwardly directed flanged portion 24 that overlies a portion of the rubber housing 10 and also overlies an upper portion of impeller housing 12. A plurality of bolts 26 engage tapped openings in the impeller housing to hold the clamping ring 18, the rubber housing 10 and the shredder ring 20 in fixed relationship with impeller housing 12. It should be noted that the clamping ring 18 is provided with a second flanged portion 28 that overlies a part of the rubber housing 10, and which holds the rubber housing in tight engagement with the top portion of the shredder ring 20. The clamping ring 18 extends somewhat above the top edge of the shredder ring and operates together with the reinforced rubber throat section to prevent the puncturing of the side walls of the upper housing by bones or the like that may be deposited within the garbage disposer.

The rubber housing 10 is provided with an integral conduit portion 30 that may be connected with the drain conduit of a dishwasher or the like. A pair of rubber flaps 32 one of which is shown are formed integrally with the housing 10 and are disposed at opposite sides of the intersection of conduit 30 and the housing 10. When it is desired to use the drain connection 30, the portion 34 of the rubber housing is punctured out in order to connect the conduit 30 with the interior of rubber housing 10. When the portion 34 is punched out, the rubber flaps 32 operate to prevent the passage of waste material and water from being thrown into conduit 30 as the waste material and water is thrown along the inner periphery of housing 10.

The shredder ring 20 is provided with a plurality of lower teeth 36, as shown in Figures 1 and 3, the spaces between the teeth providing drain apertures for ground waste material and water. The shredder ring also is provided with one or more cutting teeth 38 that extend the entire length of the shredder ring. The cutting teeth 38 cooperate with an impeller generally denoted by reference numeral 40 and located partially within a chamber 42 formed in impeller housing 12. The chamber 42 communicates with a conduit portion 44 that is used as the drain connection for the garbage disposal unit. The impeller 40 comprises an intermediate portion 46 that is provided with a pair of upstanding ribs 48. One of the ribs is integrally formed with an upstanding tang 50 while the lower portion of the impeller is provided with

ribs 52. The intermediate portion 46 of the impeller is provided with a plurality of apertures 54 that are of a larger diameter at the bottom portion of the impeller and which taper to a smaller diameter at the top portion of the impeller. Preferably, the impeller is cast into the shape shown in Figures 1 and 3 and the apertures 54 are formed during the casting operation.

The impeller 40 is connected with a drive shaft 55 of an induction motor generally designated by reference numeral 56. This connection is made by swaging a quantity of soft metal material such as aluminum into the central aperture 58 of the impeller to form a soft metal insert 60 therein. The central aperture 58 of the impeller is preferably cast to a diameter greater than that of shaft 55 and may be roughened or made irregular to insure a good gripping action between the impeller 40 and insert 60. The soft metal insert 60 after being swaged into the impeller 40 is machined out to form a central aperture 62 that is of a diameter slightly less than the outside diameter of shaft 55. The shaft 55 may be knurled or splined and the metal insert is then press-fitted on the shaft 55 with the shaft engaging aperture 62 tightly engaging the knurled or splined portion of the shaft.

The shaft 55 of electric motor 56 is supported within a conventional bearing 64 located in a downward extension 66 of impeller housing 12. The lower end of shaft 55 is splined to a rotor 68 of the induction motor 56. A conventional sealing bearing 70 seals the chamber 42 from the bearing 64 and a pipe or conduit 72 is connected between a chamber 74 and the outside of the garbage disposer in order to provide a drain connection for fluid that might leak past bearing seal 70 into chamber 74.

The induction motor 56 is provided with a stator that includes a laminated core 76 and a stator winding 78. The laminated core 76 is held together by rivets 79 located circumferentially of the stator and having rivet heads 80. The stator is preferably held in fixed relationship with the impeller housing 12 by a plurality of bolts 82 that pass through the stator core 76 and which are threaded into impeller housing 12. The stator core is accurately positioned with respect to the longitudinal axis of the impeller housing 12 by machining flat the top surface of rivet heads 80 and by machining smooth the cylindrical surface 86 on stator core 76. The impeller housing 12 has boss portions 88 located at circumferentially spaced points around the housing. The boss portions 88 are machined flat along lower surfaces 90 and perpendicular to the longitudinal axis of impeller housing 12. A surface 92 formed in lower housing 12 is machined to form a cylindrical smooth surface located parallel to the longitudinal axis of the impeller housing 12. The circumferentially extending smooth surface 92 and the surface 86 when in engagement cooperate to position the stator with its longitudinal axis coinciding with the longitudinal axis of the impeller housing 12.

The flat surface at the top of each rivet head 80 also cooperate to accurately position the stator core 76 when the flat surface is in engagement with the flat surface 90 on the bosses 88 of impeller housing 12. These flat surfaces are held in tight engagement with one another by the bolts 82 which, when tightened, force the stator core 76 into tight engagement with impeller housing 12 along the above-mentioned flat surfaces.

A modified arrangement for positioning the stator core of a dynamoelectric machine in relation to a housing is shown in Figures 7 and 8, wherein the same reference numerals as used in Figure 1 denote the same or similar parts. In Figure 7 the stator core 76 is machined flat along surface 94 and smooth along surface 96, the surfaces cooperating with complementary flat and smooth surfaces formed on impeller housing 12. This type of stator mount may be used with a type of stator having a solid core or with a type having a laminated core wherein the rivets are disposed inwardly from the machined edge 94. In Figure 7 the smooth surface 96 is machined circumferentially of core 76 and is cylindrically shaped. The cooperating surface on impeller housing 12 is likewise smooth but cylindrically shaped.

In Figure 8 the rivet head 80 is provided with a top flat machined surface 98 and with a second smooth machined surface 100. The machined surfaces 98 and 100 cooperate with flat and smooth machined surfaces formed on impeller housing 12. In this arrangement the surface 100 is smooth but forms an arc of a circle and the surface 100 may be machined smooth by turning the surface on a lathe or the like. A third flat surface 102 may also be machined on rivet head 80 to cooperate with a flat surface on impeller housing 12. With this arrangement the stator core 76 is accurately positioned with respect to impeller housing 12 in a fashion similar to the positioning of stator 76 in Figure 1.

The electric motor 56 as shown in Figure 1 is provided with an inner housing 104 and an outer housing 14. The inner housing may be fixed to the stator core 76 by means of bolts 82 and rivets 79. The outer housing 14 is fixed to the inner housing 104 by means of one or more screws 108. A centrifugal switch generally denoted by reference numeral 110 has a part secured to the drive shaft 55 of the electric motor. The centrifugal switch 110 comprises a housing 112 that is press-fitted or otherwise secured to shaft 55 for rotation therewith. A transverse member 114 extends across the housing 112 and fits within slots 113*a* formed in the legs 113 of the housing, as shown in Fig. 1. The transverse member 114 is preferably made of spring steel and is bowed downwardly, as shown. A pair of centrifugal weights 116 are suitably secured to spring metal member 114 as shown and tend to move the spring metal member upwardly against its inherent resiliency and out of its bowed condition to a substantially flat condition when the shaft 55 is rotated at some predetermined speed. The ends of member 114 move outwardly through slots 113*a* to some extent when the weights 116 move upwardly. A button or bearing 114*a* made of nylon or other suitable material is secured to a contact arm 123 and has a top portion engaging a central protuberance formed on transverse member 114, as shown. It will be apparent that the central protuberance on member 114 rotates on the top surface of button 114*a* when shaft 55 is rotated.

The contact arm 123 carries an electrical contact 120 and is secured to a sheet of insulating material 125 that is in turn suitably secured to housing 104. A second contact 122 is suitably supported above insulator 125 and cooperates with contact 120. The contact arm 123 is made of a spring metal such as spring steel and, due to its own resiliency, normally holds contact 120 away from relatively fixed contact 122. The spring bias of member 114, however, is sufficient to hold contact arm 123 downwardly to a position wherein contacts 120 and 122 are in engagement. The contact arm 123 and contact 122 are electrically connected with post 126.

When shaft 55 is rotated at some predetermined speed the weights 116 operate to elevate the central protuberance of member 114, thus moving the protuberance away from the button 114*a*. In this position the member 114 is substantially flat and the ends of member 114 move outwardly through slots 113*a* to some extent. With the central protuberance out of engagement with button 114*a* the contact arm 123 moves upwardly under its own resilience, thereby moving contact 120 away from contact 122. It should be noted that the inherent resiliency of the member 114 in its bowed natural condition of Fig. 1 is sufficient to hold contact arm 123 down when the shaft 55 is not rotating. The housing 112 of the centrifugal switch is provided with integral fan blades 128 that operate to circulate cooling air over the rotor and stator of the induction motor when the motor is in operation. In order to provide a flow path for air being drawn through the housing of the electric motor by fan blades

128, the impeller housing 12 is formed with one or more air passages 129, while the housings 104 and 106 are, respectively, provided with air passages 130 and 132. The contacts 120 and 122 of centrifugal switch 110 are used to cut out the starter or phase winding of the induction motor 56 when the rotor shaft 55 reaches some predetermined rotational speed. The circuit connections between the centrifugal switch 110 and the induction motor 56 are not shown as they are well known to those skilled in the art.

The upper portion of rubber housing 10 is provided with a metal ring 134 bonded or otherwise secured to a flanged portion of the rubber housing. The metal ring 134 and the disposal are supported by clamping means generally denoted by reference numeral 136.

The clamping means includes an annular metal ring 140 that encircles a downwardly cylindrically shaped portion of a tubular sink drain member 146. A second annular metal ring 142 encircles the lower portion of sink drain member 146 and is disposed above ring 140. A flexible sealing member 143 made of rubber or the like is interposed between the ring 142 and a flanged portion of drain member 146. A plurality of bolts 138, one of which is shown, are threaded into ring 140 with the heads of the bolts facing ring 142. Each bolt is provided with an L-shaped clamping member 145, the two legs of the member abutting clamp 134 and ring 142 respectively. The clamping member 145 is held in place by a nut threaded on the bolt 138 as shown. The above described connection is made by first assemblying the sink drain member 146 within a drain opening in a sink. The flexible member 143 and the metal ring 142 are then slipped onto the sink drain member. The metal ring 140 carrying the bolts 138 is then slipped over the lower end of sink drain member 146. A snap ring 147 is then slipped on the member 146. The snap ring fits within a circumferentially extending inwardly bent portion of member 146 and engages the underside of ring 140 as shown. With the parts in this assembled position the bolts 138 may be rotated and move upwardly due to the threaded connection with ring 140. In moving upwardly the bolt heads move rings 142 and 143 into tight engagement with the flanged portion of member 144 and member 144 is clamped between drain member 146 and flexible member 143. With this operation complete the open end of housing 10 is slipped over the lowermost portion of drain member 146. The clamps 145 are then slipped onto bolts 138 and are drawn up tight against ring 134 and ring 140 by the nuts as shown. With this arrangement the disposal unit is securely fixed to the bottom of the sink.

A stopper generally denoted by reference numeral 148 is located within sink drain member 146 and has an upper handle portion and a dome-shaped portion 150 that merges into a cylindrical portion 152 which tightly engages the walls of sink drain member 146. The sink drain member 146 is provided with a circumferentially extending ledge that supports the lowermost portion of stopper 146 as shown. The stopper 18 is preferably made of an elastomeric material such as rubber and carries a stainless steel plate 154. The stainless steel plate has a central aperture 156 while the dome-shaped portion of the stopper 148 is provided with a plurality of circumferentially spaced apertures 158. When the stopper is in the position shown in Figure 1, water draining down into sink drain portion 146 may pass through apertures 158, aperture 156 and through a central aperture formed in rubber guard 160 and thence into the interior of rubber housing 10.

The rubber guard 160 preferably has a plurality of radially extending slits (not shown) extending outwardly from the central aperture. The outer peripheral edge of guard 160 fits within a groove formed by bending the sink drain to the shape shown in Figure 1. The dome-shaped portion 150 of stopper 148 is adapted to be collapsed and remain in the position shown in Figure 9. In this position an annular rib 162 integral with the dome-shaped portion of the stopper engages the stainless steel plate and closes a drain path ordinarily provided by apertures 158 and aperture 156. The stopper 148 may be removed from within the sink drain portion 146 by grasping the top portion of the stopper and removing the stopper from within the sink drain. The stopper when in position in the sink drain 146 may be closed by simply pressing downwardly on the top portion of the stopper in order to collapse the dome-shaped portion and thus force the annular rib 162 against the stainless steel plate 154.

A modified impeller adapted to be used with the garbage disposal unit of Figure 1 is shown in Figures 5 and 6. In these figures the same reference numeral as those used in Figure 1 represent the same or similar parts. The impeller 164 as shown in Figures 5 and 6 is cylindrically shaped and is provided with a pair of diametrically opposed slots 166. A flat sheet of spring metal 168 is secured to the top portion of impeller 164 and has end portions that extend over the slots 166. The flat spring metal sheet is secured to impeller 164 by means of a bolt 170 that also serves to hold the impeller fixed to drive shaft 55. A pair of vane members 172 are secured to the underside of spring metal member 168 by means of screws 174. The vane members 172 as shown in Figures 5 and 6 lie within the diametrically opposed slots 166. When the impeller 164 is rotated at high speeds, the vanes 172 move upwardly to the dotted line positions of Figure 5 to provide an improved grinding action. The impeller 164 is provided with a plurality of apertures 178 that permit the drainage of fluid and waste material from upper housing 10 into the chamber 42.

It should be noted that the conduit 44 formed in housing 12 of the disposal as shown in Figure 1 may be provided with a rubber connector 180 that is formed with an integral conduit portion 182. The conduit portion 182 may be used as a drain connection for a dishwasher or the like when the material at 184 is punched out to connect the conduit 182 with the interior of the conduit 180.

In operation, waste material that is to be ground and disposed of is deposited within the upper housing 10 of the garbage disposal. The waste material together with water passing through closure cap 148 are thrown centrifugally against the shredder ring 20 and are ground, due to the cooperation of impeller 40 and the cutting teeth 38. It should be noted that the shredder ring 20 is formed with an annular bead 20*a*, as shown in Fig. 1, that extends around the shredder ring between cutting teeth 38. The bead 20*a* prevents the shearing off of the portion of the rubber housing 10 that abuts the top rim of the shredder ring by waste material moving up on the shredder ring during the grinding operation. The ground waste material passes downwardly through the apertures formed in the impeller 40 and flows downwardly through the spaces located between teeth 36 into chamber 42. This waste material mixed with the water then flows outwardly through conduit portion 44 that is connected with a drain conduit 180 that is in turn preferably connected with a sewer line.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. A waste disposer unit comprising, an upper housing and a lower housing, a chamber in said upper housing adapted to be connected with a sink drain or the like, an inlet for said chamber, a closure member located in said inlet, said closure member opening and closing a flow path to said chamber, a shredder ring located in said chamber, an impeller in said chamber, said impeller having a pair of diametrically opposed transverse slots, a

spring metal member connected to the top side of said impeller having portions extending over said slots, a pair of vanes connected to the underside of said spring portions, a shaft connected with said impeller and extending into said lower housing, a dynamoelectric machine in said lower housing including a rotor connected with said shaft, a stator having a laminated core surrounding said rotor, a plurality of rivets extending through said core and having rivet heads projecting from an end face of said core, said rivet heads each having a flat surface abutting flat surfaces on said lower housing, said flat surfaces being so oriented that said stator assumes a position wherein the longitudinal axis of said stator is parallel to the longitudinal axis of said lower housing when said flat surfaces are in engagement, and means for holding said first surfaces in tight engagement with one another.

2. A waste disposal unit comprising, an upper housing and a lower housing, shredder means located in said upper housing, an impeller in said upper housing having an outer wall located adjacent said shredder means, a shaft connected with said impeller and extending into said lower housing, a dynamoelectric machine in said lower housing including a rotor connected with said shaft, a stator having a laminated core surrounding said rotor, a plurality of rivets extending through said core having rivet heads projecting from an end face of said core, said rivet heads each having a flat surface abutting flat surfaces on said lower housing, said flat surfaces being so oriented that said stator assumes a position wherein the longitudinal axis of said stator is parallel to the longitudinal axis of said lower housing when said flat surfaces are in engagement, and means for holding said flat surfaces in tight engagement with one another.

3. A garbage disposal having an upper housing of elastomeric material and a lower housing, said upper housing defining a chamber for the reception of waste material and having a top opening adapted to be aligned with a sink drain or the like, a shredder ring located in said upper housing, said shredder ring having an outer wall engaging a portion of the inner wall of said upper housing and having a lower portion abutting said lower housing, the upper rim portion of said shredder ring engaging a flanged portion of said upper housing and being formed with an annular head that extends inwardly of the inner edge of said flanged portion, a supporting and clamping member engaging a portion of the outer wall of said upper housing and extending above said shredder ring, and means engaging said clamping member and said lower housing for holding said elastomeric upper housing in tight engagement with said shredder ring and lower housing, and for holding said shredder ring in tight engagement with said lower housing.

4. A waste disposer comprising, a lower housing enclosing an electric motor, an impeller connected with the rotor of said motor, a shredder ring resting on a portion of said lower housing and cooperating with said impeller in the grinding of waste material, an upper waste receiving housing formed of a reinforced elastomeric material, said upper housing having a lower edge resting on said lower housing, and having a portion engaging a top edge of said shredder ring, a metal clamp tightly fitting the outer wall of said upper housing and having a portion etxending above said shredder ring, and means fastening said clamp to said lower housing, said clamp holding said shredder ring and upper and lower housings in fixed relationship with one another, the portion of said clamp extending above said shredder ring and said reinforced elastomeric housing adjacent thereto preventing puncturing of said disposer upper housing above said shredder ring.

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