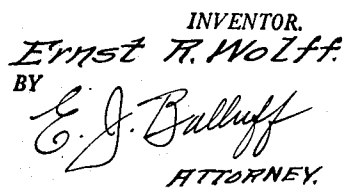


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GARBAGE DISPOSAL APPARATUS

Filed March 18, 1953

3 Sheets-Sheet 1



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GARBAGE DISPOSAL APPARATUS

Filed March 18, 1953

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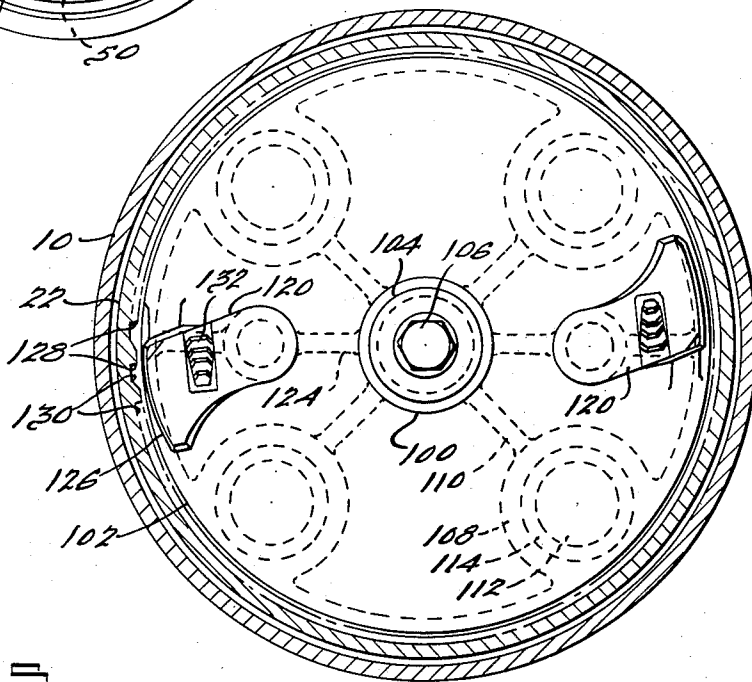
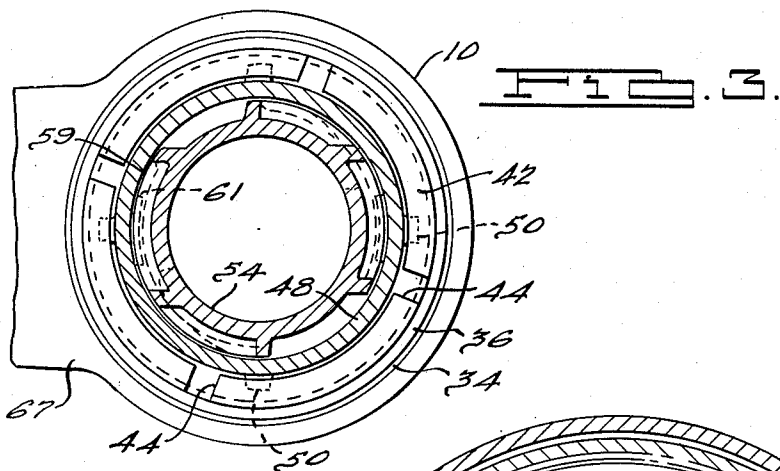


FIG. 5.

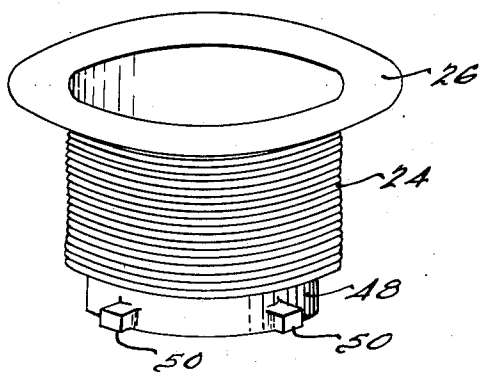


FIG. 4.

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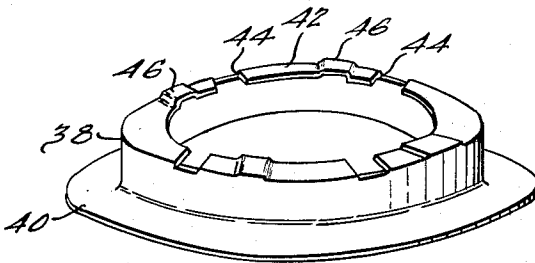


FIG. 6.

FIG. 7.

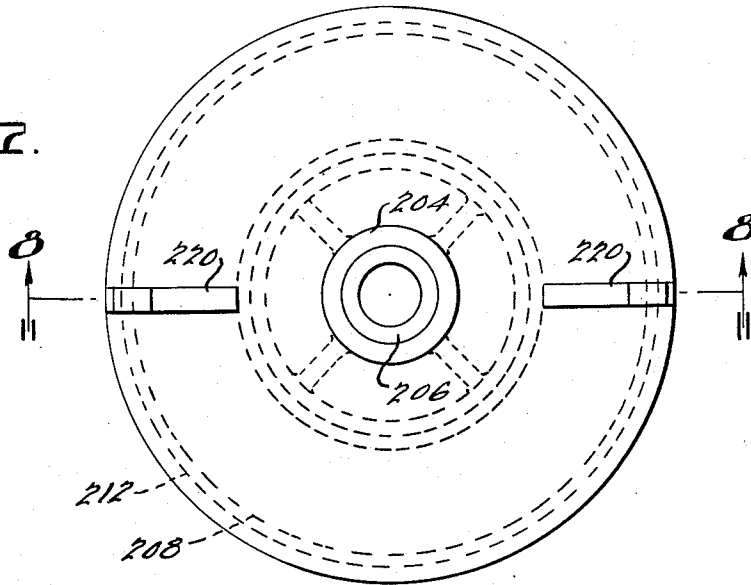
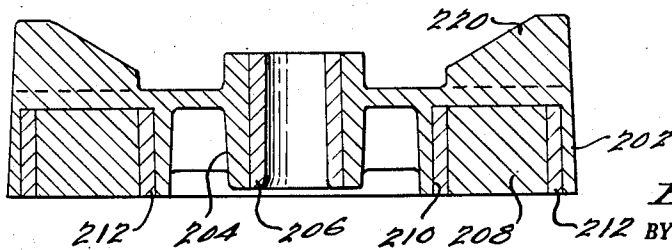


FIG. 8.



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GARBAGE DISPOSAL APPARATUS

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Application March 18, 1953, Serial No. 343,044

1 Claim. (Cl. 241—46)

This invention relates to garbage disposal apparatus in general and has particular reference to a novel construction of such a device to reduce the over-all height thereof and to simplify the construction thereof.

According to this invention there are provided a novel grinding mechanism and driving means therefor, comprising essentially a rotary grinding device arranged in the bottom of a material reducing chamber, a rotor of an electric motor carried by the rotary grinding device, the stator of the electric motor arranged in operative relation to the rotor, and a non-magnetic diaphragm forming the bottom wall of the chamber arranged between the rotor and stator and separating the stator from the grinding chamber.

Heretofore garbage disposal units have been provided with a conventional type of motor suspended beneath the housing containing the grinding mechanism and including a driven shaft projecting upwardly into the grinding chamber and having the grinding mechanism secured thereto for rotation within the chamber. With the arrangement contemplated by this invention it is possible to reduce the over-all height of the unit to a considerable extent, and at the same time the construction and assembly thereof are greatly simplified. The present invention also eliminates the need for the usual rotary seal provided in conventional units between the driven shaft and the bottom wall of the grinding chamber. The invention also contemplates a new and improved mounting arrangement for suspending the unit from the bottom wall of a sink or the like.

A principal object of the invention, therefore, is to provide a new and improved garbage disposal apparatus.

Another object of the invention is to provide a new and improved driving means for the grinding mechanism of a garbage disposal unit.

Another object of the invention is to provide a garbage disposal apparatus of substantially reduced height as compared with similar devices now in use.

A further object of the invention is to provide a new and improved mounting arrangement for securing an apparatus of the type described with its upper end in communication with the drain outlet of a sink or the like.

Other and further objects of the invention will be apparent from the following description and claims and may be understood by reference to the accompanying drawings, of which there are three sheets, which by way of illustration show preferred embodiments of the invention and what I now consider to be the best mode in which I have contemplated applying the principles of my invention. Other embodiments of the invention may be used without departing from the scope of the present invention as set forth in the appended claim.

In the drawings:

Fig. 1 is a vertical sectional view of a garbage disposal apparatus taken substantially along line 1—1 of Fig. 2;

Fig. 2 is a top plan view of the apparatus disclosed in Fig. 1;

Fig. 3 is a horizontal sectional view taken substantially along line 3—3 of Fig. 1;

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

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Fig. 5 is a perspective view of a cylindrical collar forming a part of the mounting arrangement of the apparatus;

Fig. 6 is a perspective view of a mounting ring also forming a part of the mounting structure;

Fig. 7 is a plan view of a modified form of rotary grinding device and rotor; and

Fig. 8 is a sectional view taken along line 8—8 of Fig. 7.

Referring in detail to the drawings, the numeral 10 indicates a casing substantially cylindrical in horizontal cross section and defining a reducing chamber 12 open at its upper end and formed to provide a discharge outlet 14 at its lower end and adapted to be connected by a conduit 16 to a conventional drainage system. The casing 10 is adapted to be suspended from the bottom wall 18 of a sink or the like with its open upper end in communication with the drain outlet from the sink so as to receive material to be reduced into the grinding chamber 12 where such material is acted upon by a rotary grinding device indicated generally at 20 which cooperates with a shredder ring 22 arranged adjacent the bottom of and forming part of the interior of the chamber 12 to reduce material fed into the chamber and to discharge the same through an annular passage between the grinding device 20 and shredder ring 22 into discharge outlet 14.

A cylindrical collar 24 having a flange 26 is secured to the bottom wall 18 of the sink by means of a nut 28 threaded on to the exteriorly threaded neck portion of collar 24. Gasket material 30 may be arranged between the bottom wall of the sink and the nut 28 so as to provide a seal therebetween. The upper end of the casing 10 has an inwardly directed lip 32 against which is seated a rim 34. A ring 36 of gasket material is arranged inwardly of rim 34 and surrounds a mounting ring 38 having a lower lateral flange 40 disposed below the lip 32 and an upper flange 42.

As will be seen more clearly in Fig. 6, the mounting ring 38 is provided with a plurality of slots 44 in the flange 42 thereof and a plurality of raised seats 46 adjacent the slots 44. The lower end 48 of the collar 24 is cylindrical and provided with a plurality of lateral projections 50 which are adapted to be aligned with slots 44 during assembly of the unit. A clamping ring 52 is threaded on to the collar 24 and during assembly of the unit may be threaded upwardly on to the collar 24 toward nut 28 to permit casing 10 and mounting ring 38, with gasket 36 and rim 34 therebetween, to be lifted upwardly with the slots 44 aligned with projections 50 until the flange 42 of mounting ring 38 is above projections 50, and the mounting ring may then be rotated until seats 46 seat against projections 50 on collar 24, the foregoing construction consisting of a bayonet connection between the mounting ring 38 and collar 24. The clamping ring 52 is then tightened against gasket 36 to provide a seal between the clamping ring and the casing, and such ring also clamps the mounting ring 38 to collar 24 to complete the assembly. The gasket 36 also provides a resilient connection between the casing 10 and the mounting ring so as to absorb vibrations and provide more silent operation of the unit.

A closure 54 having an imperforate top wall 56 and a handle 58 may be arranged within the collar 24 in such manner as to seal the drain outlet of the sink from the interior of the casing 10, or the closure may be manipulated so as to provide a communication between the drain outlet and the interior of the casing for the passage of water into the grinding chamber 12 during operation of the grinding mechanism, the closure being rotatable when in the last-named position into an angular position wherein one of the cam portions 60 at the lower

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end thereof will engage the end of a switch actuating plunger 62 which is slidably disposed in a vertical wall of the casing 10 and biased toward its innermost position relative to the casing by a spring 64. A switch 66 of the normally open type is adapted to be closed by movement of plunger 62 against the force of spring 64 whenever the cover 54 is manipulated so that one of the cam portions 60 thereof engages the plunger as previously described.

The switch 66 is located within a switch housing 67 and is arranged in the circuit of an electric motor indicated generally at 70 adapted to drive the rotary grinding mechanism 20 and to be more particularly described hereinafter.

The closure 54 is provided with a beveled edge 55 adapted to seat against a beveled seat 57 formed on the interior of collar 24 for sealing the outlet from the sink in certain angular positions of the closure 54. The closure is provided with arcuate projections 59 adapted to seat on arcuate seats 61 formed at the lower end of collar 24 whenever the closure is rotated into other angular positions thereof. The closure is raised into the elevated position shown in Fig. 1 whenever it is desired to provide for the flow of water from the sink into the reducing chamber to aid in the grinding operation, and whenever it is desired to provide for such flow of water without the grinding mechanism being operated. The arrangement of the cam portions 60 and plunger 62 is such that the cams cannot engage the plunger to close switch 66 except when the closure is maintained in its elevated position shown by means of projections 59 and seats 61, thus insuring that water can be supplied to the chamber 12 whenever the grinder is operated.

The lower end of casing 10 is provided with a flange 72 adapted to be bolted against a flange 74 provided on a stator housing 76 by bolts 78. A thin, nonmagnetic diaphragm 80 is clamped between casing 10 and stator housing 76 and forms the bottom wall of the reducing chamber 12. A stationary shaft 82 is secured within a boss 88 on housing 76 by a nut 90. The shaft 82 projects upwardly through the diaphragm 80 which is clamped between a pair of washers 92 on opposite sides of the opening therein, which washers are in turn clamped against the upper end of the boss 88 and against a shoulder 94 provided on shaft 82.

The upper end 96 of the shaft 82 is surrounded by a suitable bearing 98 and the hub 100 of a rotary disk 102 is mounted on bearing 98 and seated against the shoulder 94 of shaft 82. A washer 104 seats against the upper ends of hub 100, bearing 98, and shaft 82 and is secured thereagainst by a bolt 106.

The bottom surface of the disk 102 is arranged immediately above the upper surface of diaphragm 80 and the disk is provided with a plurality of recesses or sockets 108 opening into the bottom surface of the disk. The walls of the disk defining sockets 108 are connected to the central hub 100 of the disk by webs 110. In the embodiment shown in Fig. 1 there are four of such sockets 108, and permanent magnetic members 112 are arranged within the sockets 108 with insulating material 114 surrounding the magnetic members 112. The magnetic members 112 form the rotor of the electric motor 70.

The stator of the motor 70 comprises a laminated core 116 provided with field windings 118 arranged immediately below the diaphragm 80 and opposite the magnetic members 112. Electric current is supplied to the stator by suitable power leads, not shown, and energization thereof creates magnetic lines of force which pass through the diaphragm 80 and induce a turning moment in the rotor.

The rotary disk 102 has a plurality of impellers 120 mounted thereon within bosses 122 depending from the upper surface of the disk and joined to the central hub 100 by webs 124. The impellers 120 are rotatable relative to the disk 102 about vertical axes and are provided

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with curved ends 126 which are adapted to cooperate with cutting teeth 128 formed by a plurality of vertically extending grooves 130 formed on the interior of shredder ring 22 at the lower end thereof. The periphery of disk 102 is also arranged in close proximity to the inner peripheral wall of shredder ring 22, and material acted upon by the grinding mechanism is discharged through grooves 130 into the discharge outlet 14. The impellers 120 are provided with upstanding agitators 132 which are arranged opposite inwardly projecting cutting teeth 134 also formed on the shredder ring 22. In operation of the unit, material fed into chamber 12 is impelled against cutting teeth 134 and teeth 128 by centrifugal force resulting from rotation of disk 102 and impellers 120, until the material is broken up into particles fine enough to pass through the grooves 130 into the discharge outlet 14.

In the embodiment of the invention disclosed in Figs. 7 and 8, the rotary disk 202 is provided with a central hub 204 having a bearing 206 secured therein and adapted to rotate with the disk 202 about the upper end 96 of shaft 82. In this modification the impellers 220 are formed integrally with the disk 202 and may comprise relatively narrow ribs projecting from the upper surface of the disk. The rotor employed in this modification may consist of a steel core 208 in the shape of a ring and arranged within an annular recess 210 formed on the under side of the disk 202. Copper winding 212 is employed in conjunction with the core 208, and this rotor comprises an induction type rotor in which a turning moment will be induced when the stator is energized. It is apparent that forms of rotors other than those disclosed herein could be devised without departing from the principles of the invention.

While I have illustrated and described preferred embodiments of my invention, it is understood that these are capable of modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claim.

I claim:

Garbage disposal apparatus comprising a casing defining a reducing chamber with a feed opening at the upper end thereof, a nonmagnetic diaphragm extending across and defining the bottom of said chamber, said chamber being provided with an outlet for reduced material at the bottom thereof, a shaft projecting upwardly from said diaphragm into said chamber, a circular disk journaled on said shaft for rotation in the bottom of said chamber immediately above said diaphragm and adapted to impel material to be reduced against the side wall of said chamber, a rotor of an electric motor housed within said disk and having one face disposed immediately above and exposed to said diaphragm, a stator of an electric motor disposed below and immediately adjacent said diaphragm and in operative relation with said rotor, said diaphragm separating said stator from said chamber, and cooperating elements on said disk and casing for reducing material in said chamber upon rotation of said disk, the periphery of said disk being arranged in closely spaced relation with the side wall of said chamber so as to define a narrow annular opening therebetween through which reduced material may pass downwardly for discharge through said outlet.

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