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2,850,244

GARBAGE DISPOSER

Filed Feb. 1, 1956

3 Sheets-Sheet 1

Fig. 1.

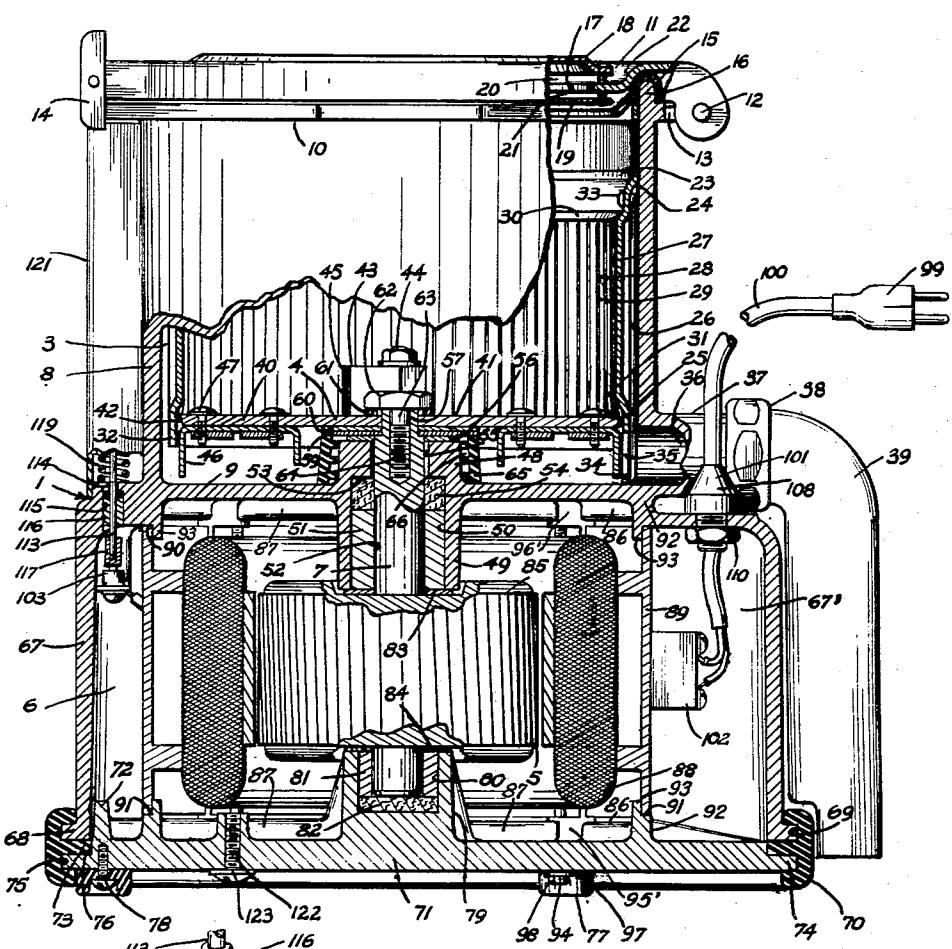
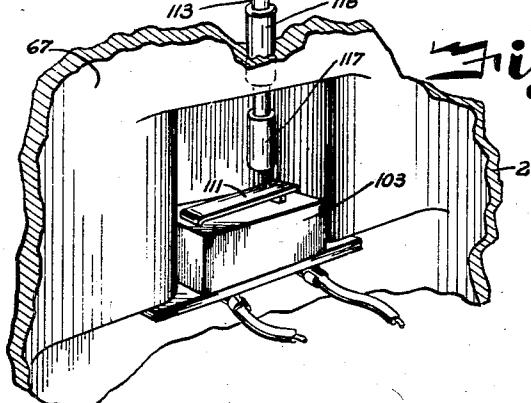


Fig. 2.



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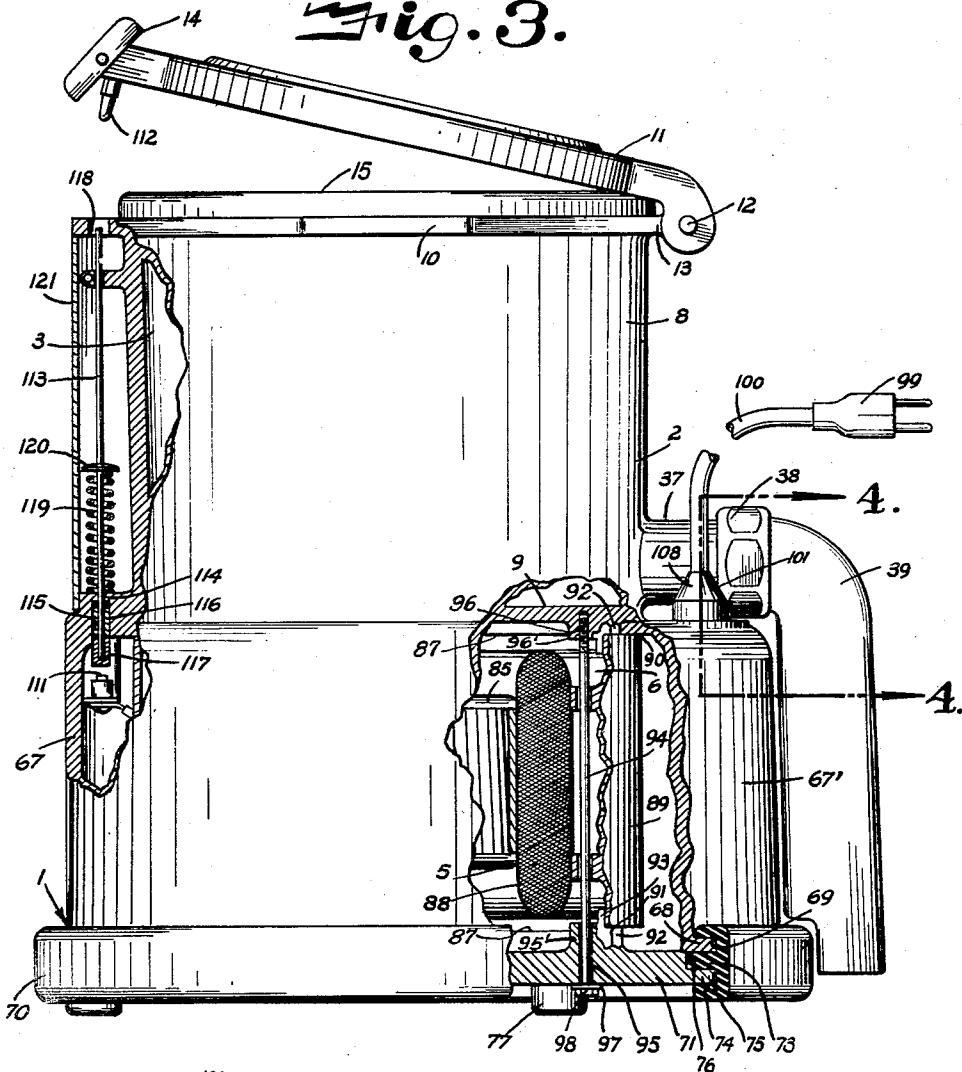
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Fig. 3.



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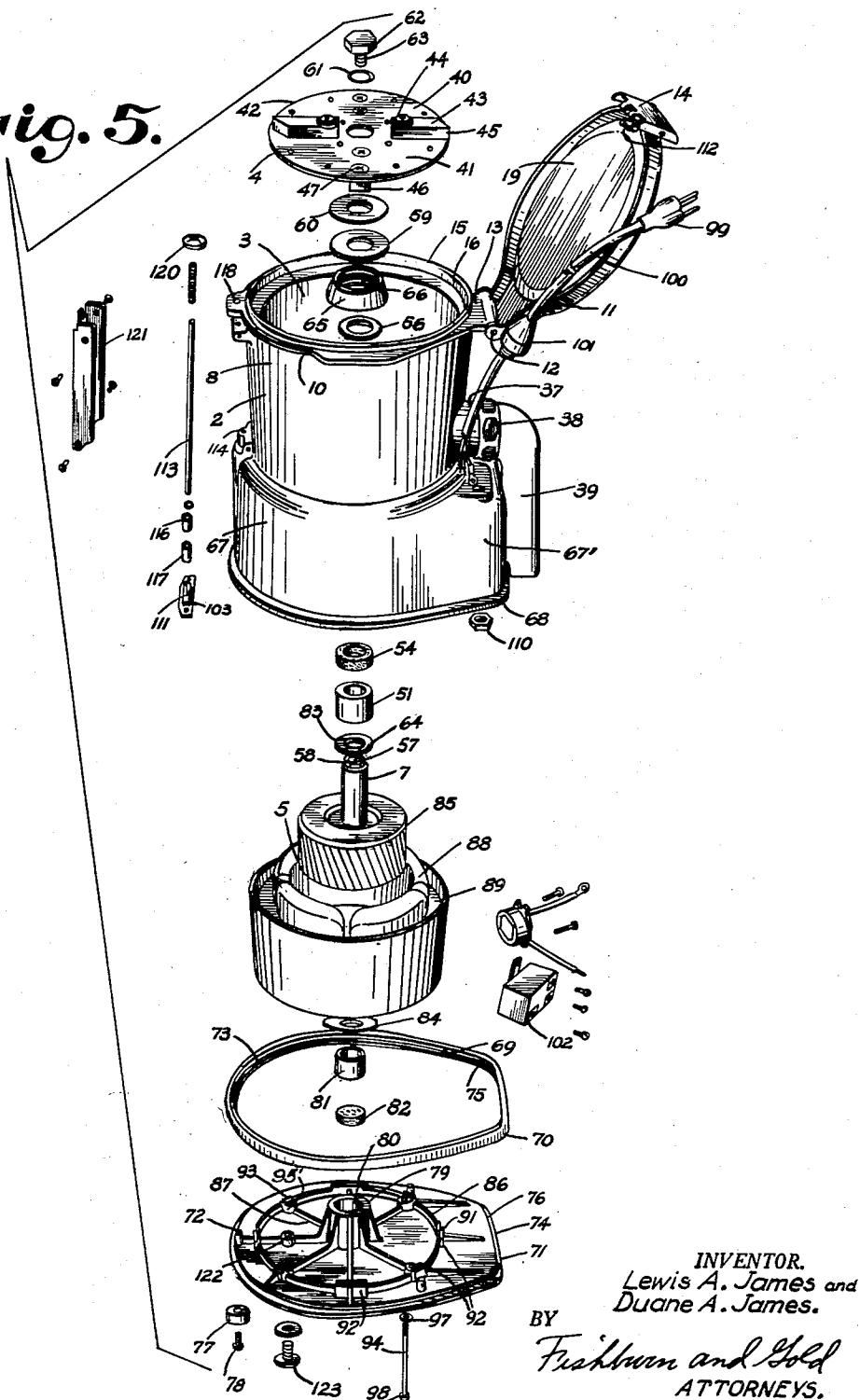
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Fig. 5.



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This invention relates to waste disposal apparatus, and more particularly to apparatus for use in homes and the like for comminution and disposal of relatively small volumes of garbage and other waste materials with a flow of water through a discharge to a sewer or other waste connection.

It is usual practice in the art to provide a garbage disposer unit under a conventional household sink with the disposer inlet directly open to the sink through the drain opening thereof. Such installations require expensive plumbing and electrical work. Also such disposers usually require heat insulation between the comminuting chamber and motor and circulation of cooling medium through the motor chamber to cool the motor during operation. Care must be exercised to prevent condensation or moisture collecting in the motor chamber and interfering with the operation of said motor. When the disposer is attached to the sink, it is considered a permanent mounting; therefore usually renters of houses will not undertake to have a disposer installed therein because it would involve difficulties to move the disposer unit to a new location.

The objects of the present invention are to provide a novel garbage disposer with a sealed pressurized motor chamber; to provide such a disposer with a comminuting chamber and motor chamber defining structure so connected that the water passing through the comminuting chamber cools the motor during operation; to provide such a disposer structure that is portable in that it may be stored as desired and moved to a sink or the like whereby water may enter the upper end and be discharged therefrom with comminuted material for flow into the sink drain; to provide such a garbage disposer that may be set in a sink and operated with water around the exterior housing of the disposer; to provide such a disposer with an inlet cover or lid which cooperates with the electrical circuit to permit operation of the comminuting apparatus only when the cover is closed to prevent entry of a person's hand during operation; to provide such a disposer with an inlet cover which permits entry of water into the comminuting chamber, prevents entry of a person's hand and retains the waste material against discharge through the inlet during operation; and to provide a garbage disposer that is economical to manufacture, light in weight to be easily movable, that requires a minimum of installation expense and that is efficient and positive in operation.

In accomplishing these and other objects of the present invention, we have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevation of the garbage disposer unit with portions broken away to show the motor and its drive connection with the comminuting structure.

Fig. 2 is an enlarged perspective view of the arrangement in the housing of the control switch and the operator therefor.

Fig. 3 is a side elevation with portions broken away

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to show the fastening for the motor chamber closure and the arrangement of the switch control.

Fig. 4 is an enlarged sectional view through the electrical connection entering the motor chamber.

Fig. 5 is a disassembled perspective view of the garbage disposer.

Referring more in detail to the drawings:

1 designates a waste disposer unit which includes a housing 2 having a comminuting chamber or hopper 3 in which operates rotary comminuting means 4 which is operated by an electric motor 5 located in a motor chamber 6 in the lower part of the housing 2 with the motor shaft 7 arranged axially of the comminuting chamber 3.

The housing 2 preferably is of cast metal and has a substantially cylindrical wall 8 extending upwardly from a horizontal partition 9 that forms the bottom wall of the comminuting chamber 3. The upper end of the wall 8 terminates in a lateral peripheral flange 10 which may be secured by suitable mounting means and gaskets against the lower end of a conventional flange defining the discharge opening or drain in the bottom of a conventional kitchen sink; however, in the structure illustrated, a cover or lid 11 is hingedly mounted as by a pin 12 on a flange extension 13 whereby the cover may be hinged to expose the open upper end of the comminuting chamber 3 for insertion of waste material therein and the cover may be closed and held in closing position by a latch means 14 wherein said cover sealingly engages a gasket 15 on an upstanding flange 16. The cover or lid 11 has a central opening 17 and plates 18 and 19 are secured to the cover whereby the margins of the plate 18 extend over and are spaced as at 20 from the portion of the cover defining the opening 17 and the margins of the plate 19 extend under in spaced relation as at 21 from the margins of the portion defining the opening 17. The portions of the cover adjacent the edges of the plates 18 and 19 slope downwardly and inwardly whereby water discharged on the upper surface of the plate 18 tends to run laterally and then the sloping portion 22 causes said water to run inwardly through the spacing 20 and out through the spacing 21 into the comminuting chamber 3.

A stationary cutter element 23 is fixed in the comminuting chamber 3 and preferably is in the form of a shredder ring having an upper portion 24 engaging the inner surface of the wall 8. The shredder ring slopes inwardly and downwardly from the upper portion 24 and terminates in a cylindrical portion 25 extending downwardly therefrom and spaced from the wall 8 as at 26. The shredder ring is provided with a plurality of vertically arranged elongated indentations or serrations 27 to form a series of ridges 28 and valleys 29 with the upper ends 30 of the indentations spaced from the upper portion 24 of the shredder ring and the lower ends 31 of the indentations spaced from the lower edge 32 of the ring. The ring is held in the comminuting chamber by suitable fastening devices such as screws 33 arranged in the portion between the ends 30 of the indentations and the upper edge of the ring whereby the bottom edge 32 is spaced from the partition or bottom wall 9 of the comminuting chamber. The ring 23 has a downwardly extending leg 34 which preferably engages the bottom 9, said leg having a plurality of elongated apertures or slots 35 extending vertically therein in front of a discharge bore 36 which extends through a laterally extending boss 37 that is suitably connected by a union nut 38 to a discharge fitting 39.

The discharge bore 36 preferably has a bottom substantially in line with the upper surface of the bottom wall 9 for unobstructed flow of water and comminuted material for discharge through the fitting 39, then through a sink

adjacent the bottom of the housing or to a conduit leading to a sewer or the like.

The comminuting apparatus 4 includes a rotatable table element 40 fixed to the motor shaft 7, said table preferably having a flat upper surface 41 and a diameter slightly smaller than the inside diameter of the shredder ring portion between the lower ends of the indentations 27 to provide operating clearance which is maintained sufficiently small to prevent the passage of any material therebetween that has not been properly comminuted. The table 40 has its peripheral edge 42 tapered inwardly and downwardly so that any material of small enough size that will pass between the table and shredder ring will readily escape downwardly towards the bottom 9 for flow through the discharge. The upper surface 41 of the table member 40 is preferably immediately below and close to the lower ends 31 of the indentations 27.

A pair of movable cutters 43 are rotatably mounted on the table element 40 by means of bearing pins 44 adjacent one end of the cutters whereby the center of gravity of the cutters are at one side of the axis of the pins. When the table element is rotated by the motor shaft 7 the centrifugal force will move the movable cutter elements 43 into cutting positions which are substantially radially on the table 40 at which positions the outer ends 45 of the movable cutters 43 moves adjacent to the indentations 27 with small operating clearance therebetween whereby said cutters 43 cooperate with the indentations 27 to shred and comminute waste material. The movable cutters 43 being rotatable on the pins 44 may rotate back to a retracted position to prevent damage to the outer ends 45 or cutting faces in the event hard material such as glass and the like is engaged thereby. The shredder ring 23 and table 40 preferably are heat treated metal to provide hard cutting edges on the ridges 28 and at the upper edge of the periphery 42 of the table for cooperation in comminuting waste material. The table 42 preferably has vertically depending knives 46 mounted thereon substantially in alignment with the periphery 42 to cooperate with the slots 35 in the leg 34 in cutting stringy material that may be of sufficient smallness in cross section to pass between the periphery 42 of the table 40 and the ring 23. The knives 46 are preferably adjustably mounted on the bottom of the table 40 by means of suitable fastening devices such as screws 47 whereby the knives may be moved inwardly or outwardly to provide suitable clearance between said knives and the leg 34 for proper cutting action.

The partition 9 has an upstanding boss 48 and a depending boss 49 arranged in alignment and axially of the comminuting chamber wall 8. The depending portion 49 of the boss has a bore 50 in which is secured a bearing 51 having a bore 52 therethrough for rotatably mounting the shaft 7. The bore 50 terminates as at 53 in spaced relation to the upper end of the bearing 51 and suitable packing such as a felt washer 54 is arranged between the bearing and end of the bore as at 53 and engages the shaft 7 and inside of the bore to form a seal therein between.

The upstanding boss 48 has a bore 55 coaxial with the bore 50 and is of suitable size to provide small operating clearance between the inside of the bore and the periphery of the shaft 7 which extends therethrough. A metal washer 56 is sleeved on the shaft 7 and engages the upper face of the boss 48. The upper end 57 of the shaft 7 which extends beyond the washer 56 is of reduced size and is provided with a flat side 58 to key same to a rubber washer 59 sleeved thereon and resting on the upper face of the metal washer 56 and a metal washer 60 sleeved thereon and resting on the upper face of the rubber washer 59.

The table 40 is sleeve on the upper end 57 of the shaft and rests on the upper surface of the washer 60. A seal ring 61 is sleeved on the upper end of the shaft 57 and is engaged by the lower face of a head 62 of a screw 63,

the shank of which is screwed into a threaded bore 64 extending into the shaft 7 to hold the ring 61, table 40, washers 60 and 59 in assembled relation and compress seal ring 61 and washer 59 to form a seal to prevent passage of gas or liquid through the bore 55. A resilient collar 65 is sleeved on the exterior of the upstanding boss 48 and has a plurality of spaced grooves 66 in the portion engaging the periphery of the boss. The collar is compressed between the washer 59 and the upper surface of the partition 9 to make a liquid and gas seal to prevent entry thereof into the bore 55.

The walls of the housing 2 extend outwardly from adjacent the partition 9 and then downwardly to provide a wall 67 which cooperates with the partition 9 in defining the motor chamber 6 of larger diameter than the comminuting chamber 3 and with an extension portion 67' for housing electrical equipment as later described. The depending wall 67 terminates in a laterally extending flange 68 which extends into a groove 69 of a flexible seal member 70. A bottom closure or plate 71 has upstanding centering lugs 72 adapted to engage the interior surface of the wall 67 to center the bottom closure 71 relative thereto. The flexible seal member 70 has an inwardly extending flange 73 arranged between the flange 68 and a peripheral flange 74 on the closure 71, said peripheral flange 74 extending into a groove 75 in said flexible seal member whereby the flange 73 when compressed between the flanges 68 and 74 forms a gas tight fit between the closure 71 and bottom portion of the housing. It is preferable that the flange 73 engage a shoulder 76 on the bottom closure 71. It is also preferable that flexible feet 77 be secured to the bottom closure 71 by fastening devices 78 whereby said feet extend below the seal member 70 to support the disposer unit and bottom portion of the flexible member 70 in spaced relation to a surface on which the unit is resting. The bottom closure plate 71 has an upstanding boss 79 in axial alignment with the boss 49 and has a bore 80 opening from the upper end thereof for receiving a bearing member 81 which rotatably mounts the lower end of the shaft 7. A disc of felt or like material 82 is arranged between the lower end of the bearing 81 and the bottom of the bore 80 as illustrated in Fig. 1. Flat bearing washers 83 and 84 are sleeved on the upper and lower portions respectively of the shaft 7 in operating engagement with the lower end of the boss 49 and upper end of the boss 79 whereby an armature 85 fixed on the shaft 7 will rotate with a minimum of end play.

The bottom surface of the partition 9 and central portion of the upper surface of the closure plate 71 are provided with substantially identical ribs and projections. Each has a circular rib 86 extending therefrom and radial ribs 87 extending from the bosses 49 and 79, said ribs serving to reinforce the structural characteristics of the housing and also to dissipate heat.

The driving motor 5 of the comminuting apparatus includes the armature 85 and field coils 88, said field coils being fixed inside of a circular ring 89 of suitable size whereby the upper and lower edges engage shoulders 90 and 91 of lugs 92 arranged adjacent the ribs 86. The lugs 92 have upstanding projections 93 which engage the inner surface of the circular ring 89 to center same whereby the field coils are concentric with the armature 85. The height of the circular ring 89 and the spacing of the shoulders on the lugs 92 is such that when the closure plate member 71 is drawn towards the partition 9 the ring member 89 is clamped between the shoulders and the flange 73 of the flexible member 70 is compressed to form a seal around the closure and the flange 68 on the wall 67 to make a gas tight seal. The closure plate 71 is drawn into ring clamping position by suitable bolts 94, the shanks of which extend through apertures 95 in bosses 95' on the plate 71 with ends screwed into threaded bores 96 in bosses 96' on the partition 9. Flexible seal rings 97 are arranged between the heads 98 of the bolts 94 and

the bottom surface of the plate 71 to prevent leakage of gas through the apertures 95.

Electric current is supplied from a suitable source through a plug connection 99 and wires in a conduit 100 formed of material that is waterproof. The conduit has a connection 101 with the housing 2 whereby it extends through said housing into the motor chamber and prevents passage of air through the entry. The wires are connected through an automatic heat sensitive overload switch structure 102 in contact with the ring and a control switch 103 to the motor 5. The connector 101 includes a ferrule 104 having a threaded shank 105 screwed into a threaded bore 106 in the housing 2. The outer end of the ferrule has a flange 107 enclosed in an enlarged molded portion 108 of the conduit with a portion thereof adjacent the housing having a circular rib 109 adapted to be drawn into sealing engagement with the housing by means of a nut 110 threaded on the shank 105 on the interior of the housing as illustrated in Fig. 4.

The switch 103 preferably is a conventional switch structure having an operating arm 111 suitably mounted in the motor chamber 6 in alignment with a projection or lug 112 on the cover 11. A switch actuating rod 113 extends through a bore 114 in the housing 2 which has a counter bore 115 provided with packing 116 to form an air tight seal around the rod 113. An end 117 is secured to the lower end of the rod 113 and arranged whereby when the lid is closed and latched in closed position, the lug 112 extends through an aperture 118 in the flange 10 forcing the rod downwardly into activating engagement with the switch arm 111 to complete the circuit to the motor, and when the lid is opened, a spring 119 sleeved on the rod with one end engaged with the housing 2 and the other end engaged with the collar 120 fixed on the rod, retracts the rod from the switch until the end 117 engages the interior surface of the housing adjacent the counter bore 115. The portion of the rod 113 exteriorly of the wall 8 is enclosed by a channel shaped member 121.

The bottom plate 71 is provided with a suitable aperture 122 which is preferably threaded to receive a suitable fitting whereby the motor chamber may be evacuated during assembly and then non-combustible gases such as carbon dioxide are forced into the chamber and the aperture sealed with a suitable gas-tight closure 123 to hold the gas under pressure, as for example two pounds on the interior of the motor chamber. By making the motor chamber gas-tight and applying non-combustible gas under pressure thereto, vapors from oil and the like can never cause a combustible or explosive mixture.

In operating a garbage disposer constructed and assembled as described, the latch 14 is released and the cover 11 raised. Then garbage or other waste is placed in the comminuting chamber 3. Then the disposer unit 1 is moved into a conventional sink whereby water from the faucet will run onto the plate 18. The plug 99 is connected to a suitable outlet, water turned on and the cover 11 closed and secured in place by the latch 14. Closing of the cover operates a switch arm 111 to complete the circuit to the motor which rotates the table 40 and cutters 43 thereon causing the material to be moved around in contact with the cutting edges of the ridges 28 of the shredder ring 23, gradually grinding the material to a sufficient fineness whereby it will pass with the water between the periphery 42 of the plate 40 and the shredder ring flowing under the plate 40 through the openings 35 to the discharge bore 36 and connection 39, and since the feet 77 support the flexible seal member around the periphery at the base of the housing above the bottom of the sink, the water and waste material will flow under the housing to the sink drain, even though the drain is under the unit. If any stringy material is of small cross section and tends to pass between the periphery 42 of the plate 40 and the shredder ring 23, such stringy material will tend to be cut as it passes through the openings 35 by the knives 46. After the material in the comminuting

chamber 3 or hopper has been comminuted, the water supply may be turned off and the latch 14 released whereby the spring 119 tends to force the rod 113 upwardly and due to its bearing on the lug 112 forces the lid or cover 11 to hinge same upwardly whereby air can enter into the chamber 3 during periods of nonuse. The entire unit is then lifted from the sink and placed on a suitable support adjacent thereto or in other storage as is convenient.

Seals around the motor shaft 7 and the seals around 10 all connections and parts of the motor chamber 6 being gas tight prevents water or other material from entering the motor chamber even though water surrounds the lower part of the housing. Also, the presence of 15 non-combustible gas pressure in the motor chamber aids in preventing entry of water or the like and also prevents any accumulation of explosive gases from oil vapors or the like.

It is believed obvious that we have provided a garbage 20 disposer unit that is light in weight, easily portable, and capable of operating while resting in a sink having water therein and of comminuting waste material safely whereby it will flow through the sink drain to a sewer connection and the like.

It is to be understood that while we have illustrated 25 and described one form of our invention, it is not to be limited to the specific form or arrangement of parts herein described and shown except insofar as such limitations are included in the claims.

What we claim and desire to secure by Letters Patent is:

1. A waste disposer device comprising, a housing having a substantially circular wall on the upper portion and a partition cooperating to define a comminuting chamber having an opening therein through which waste material and fluid can be inserted into said chamber, said housing having walls depending from the partition, a bottom plate secured to the depending walls and cooperating with the depending walls and partition to define a motor chamber, resilient means engaged between the bottom plate and depending walls forming a seal therebetween, a motor including field coils and armature, a ring member supporting the field coils and clamped between the bottom plate and partition in heat conductive relation therewith, said motor having a shaft extending into the comminuting chamber, comminuting means in said comminuting chamber operatively connected with the motor shaft and adapted to comminute waste material in the comminuting chamber, an electrical circuit including connections extending into the motor chamber for supplying current to the motor, means sealing the motor chamber whereby said motor chamber is gas tight and adapted to operate with gas pressure therein, ribs on the partition and bottom plate in heat transfer engagement with the motor whereby heat of the motor is conducted therethrough to the partition and is dissipated by fluid flowing through the comminuting chamber, and depending projections on the bottom plate adapted to rest on a support whereby the bottom plate is in spaced relation thereto.

2. In a waste disposer device, a housing providing separate comminuting chamber and motor chamber with the comminuting chamber above the motor chamber and separated therefrom by a substantially horizontal wall, said wall having an axial opening, said housing having a bottom plate forming the bottom member of the motor chamber, a motor including field coils and armature, a ring member supporting the field coils between the bottom plate and wall, means on said bottom plate and wall engaging said ring member to support same in heat conductive relation to said bottom plate and wall, a resilient seal engaging the bottom plate and housing to form a gas tight seal therebetween, means connecting the bottom plate and wall to draw one toward the other and clamp the ring member therebetween, a motor shaft having the armature fixed thereto rotatably mounted in the motor

chamber with the shaft extending through the opening in the horizontal wall into the comminuting chamber, means sealing the opening around the shaft whereby gaseous medium cannot pass therethrough, an electrical conductor connected to a source of electric current and extending into the motor chamber for supplying current to the motor, means sealing the entry of the conductor into the motor chamber whereby said motor chamber will contain gas under pressure, and means in the comminuting chamber operatively connected with the motor shaft for comminuting material therein.

3. In a waste disposer device, a housing providing separate comminuting chamber and motor chamber with the comminuting chamber above the motor chamber and separated therefrom by a substantially horizontal wall, said wall having an axial opening, said housing having a bottom plate forming the bottom member of the motor chamber, a motor including field coils and armature, a ring member supporting the field coils between the bottom plate and wall, means on said bottom plate and wall engaging said ring member to support same in heat conductive relation to said bottom plate and wall, a resilient seal engaging the bottom plate and housing to form a gas tight seal therebetween, means connecting the bottom plate and wall to draw one toward the other and clamp the ring member therebetween, a motor shaft having the armature fixed thereto rotatably mounted in

the motor chamber with the shaft extending through the opening in the horizontal wall into the comminuting chamber, means sealing the opening around the shaft whereby gaseous medium cannot pass therethrough, an electrical conductor connected to a source of electric current and extending into the motor chamber for supplying current to the motor, means sealing the entry of the conductor into the motor chamber whereby said motor chamber will contain gas under pressure, means in the comminuting chamber operatively connected with the motor shaft for comminuting material therein, said housing having an opening in the upper end thereof communicating with the comminuting chamber for insertion of waste material and water thereto, and means for conducting heat of the motor to the horizontal wall whereby water flowing through the comminuting chamber will dissipate the heat from the motor.

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