Jan. 6, 1953 E. G. BROWN ET AL 2,624,515

GARBAGE DISPOSAL DEVICE

Filed April 30, 1949 3 Sheets-Sheet 1

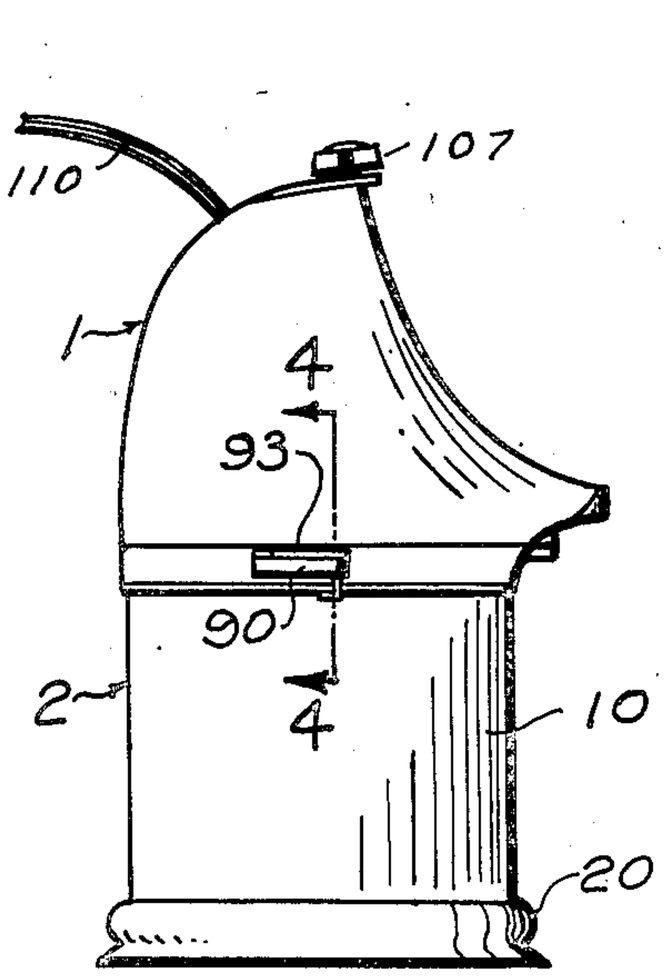

Fig. 1

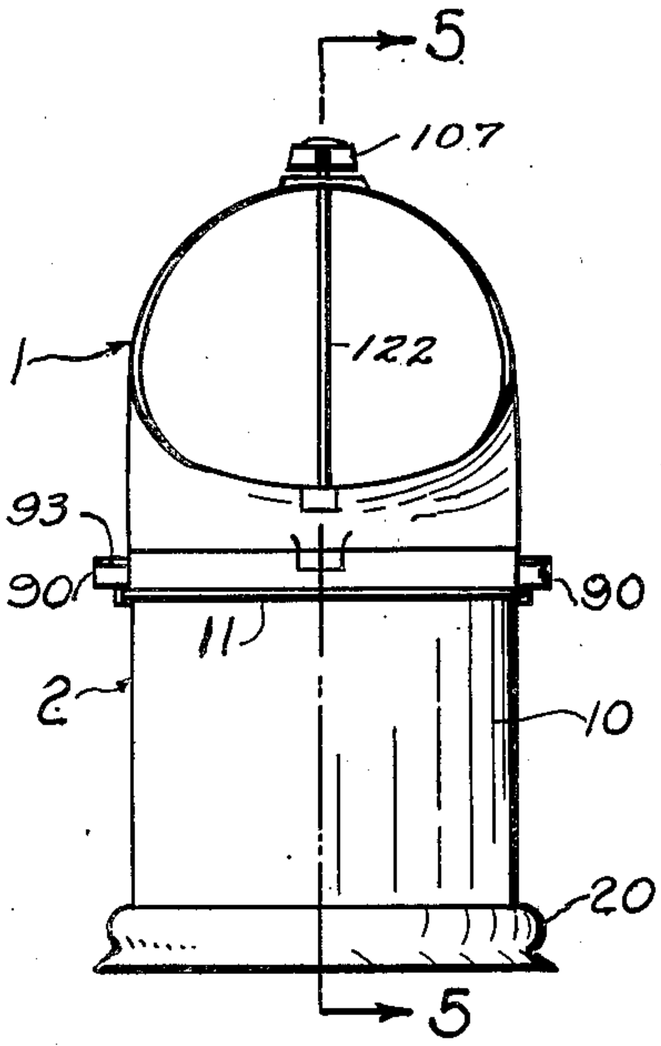

Fig. 2

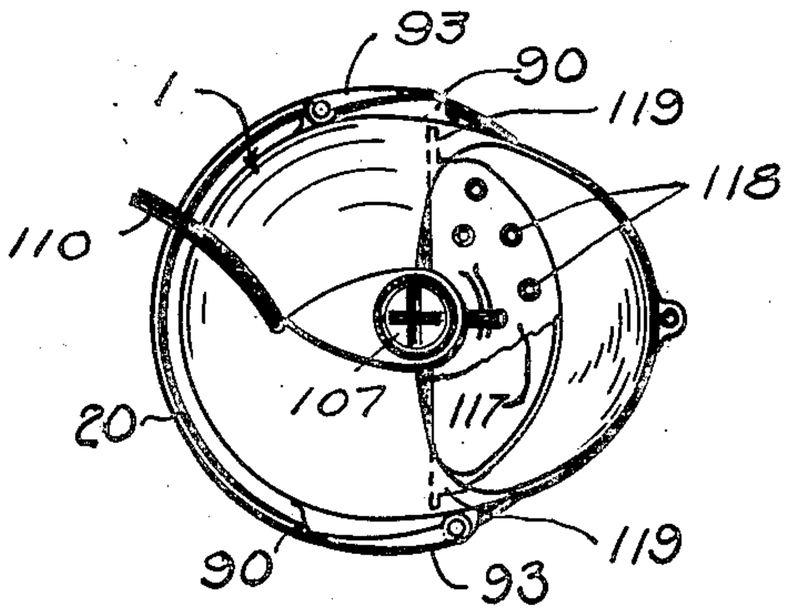

Fig. 3

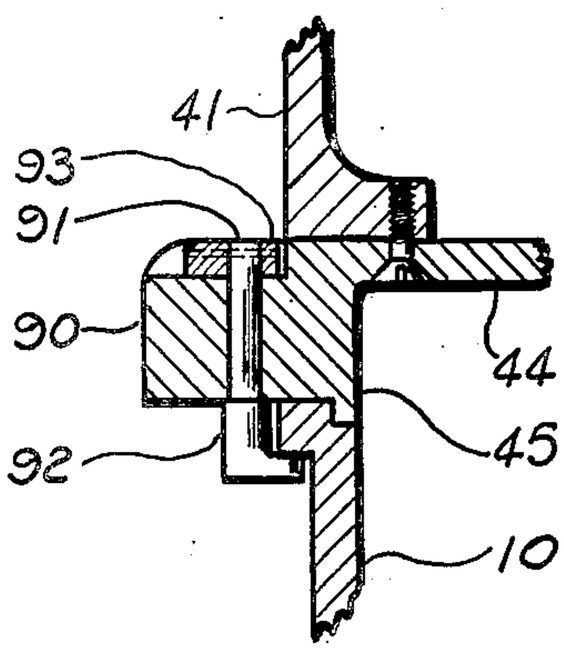

Fig. 4

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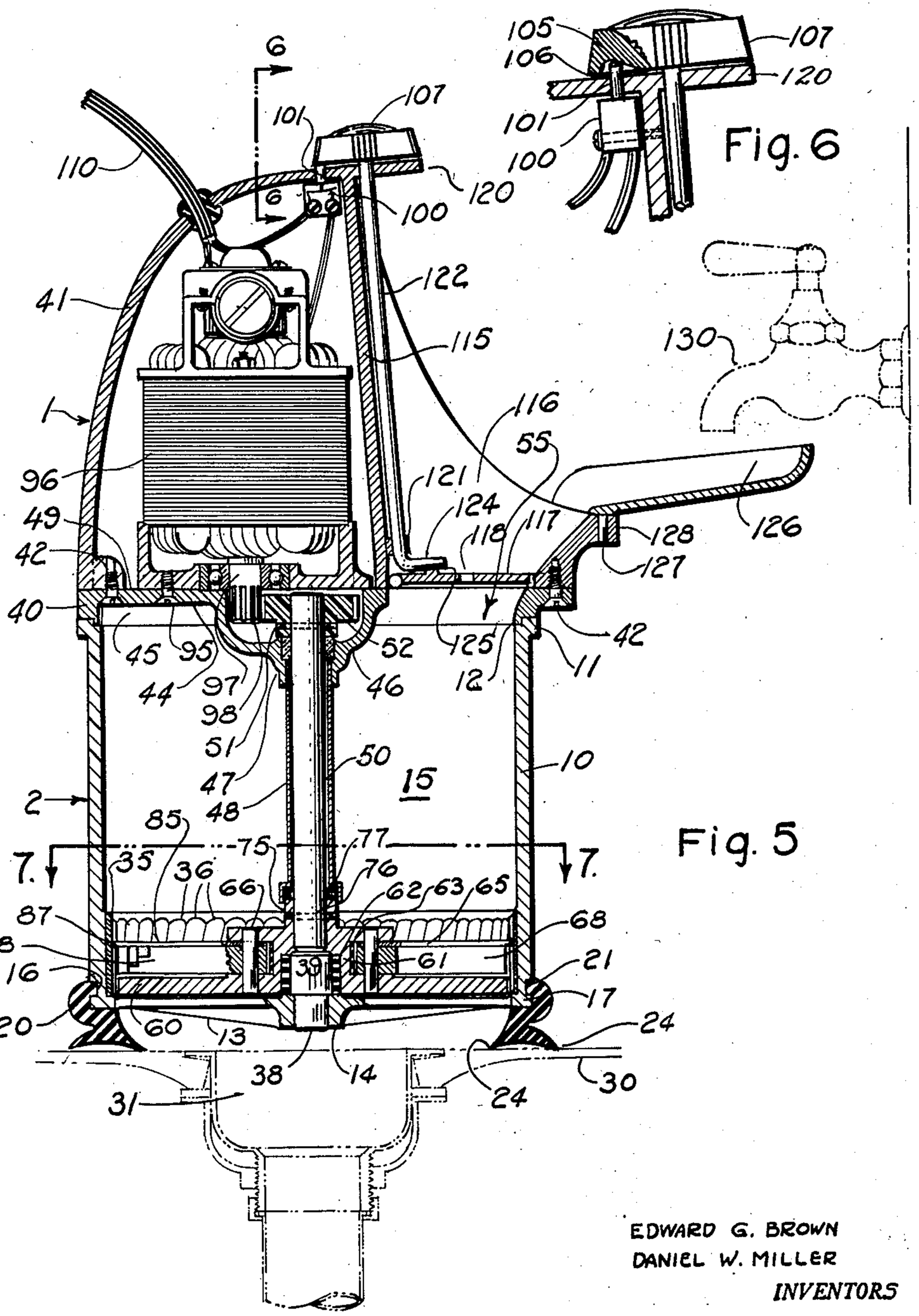

Fig. 6

Fig. 5

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GARBAGE DISPOSAL DEVICE

Filed April 30, 1949 3 Sheets-Sheet 3

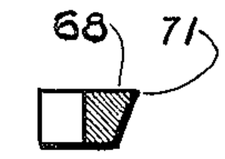

Fig.8

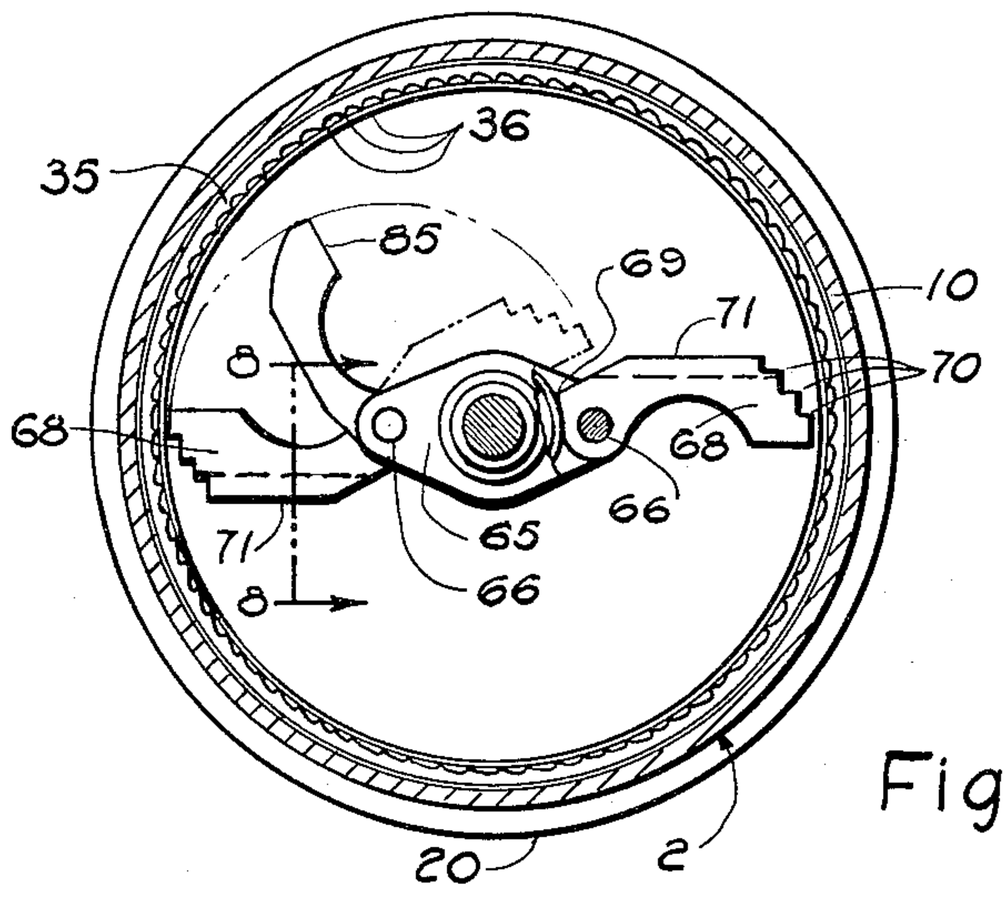

Fig.7

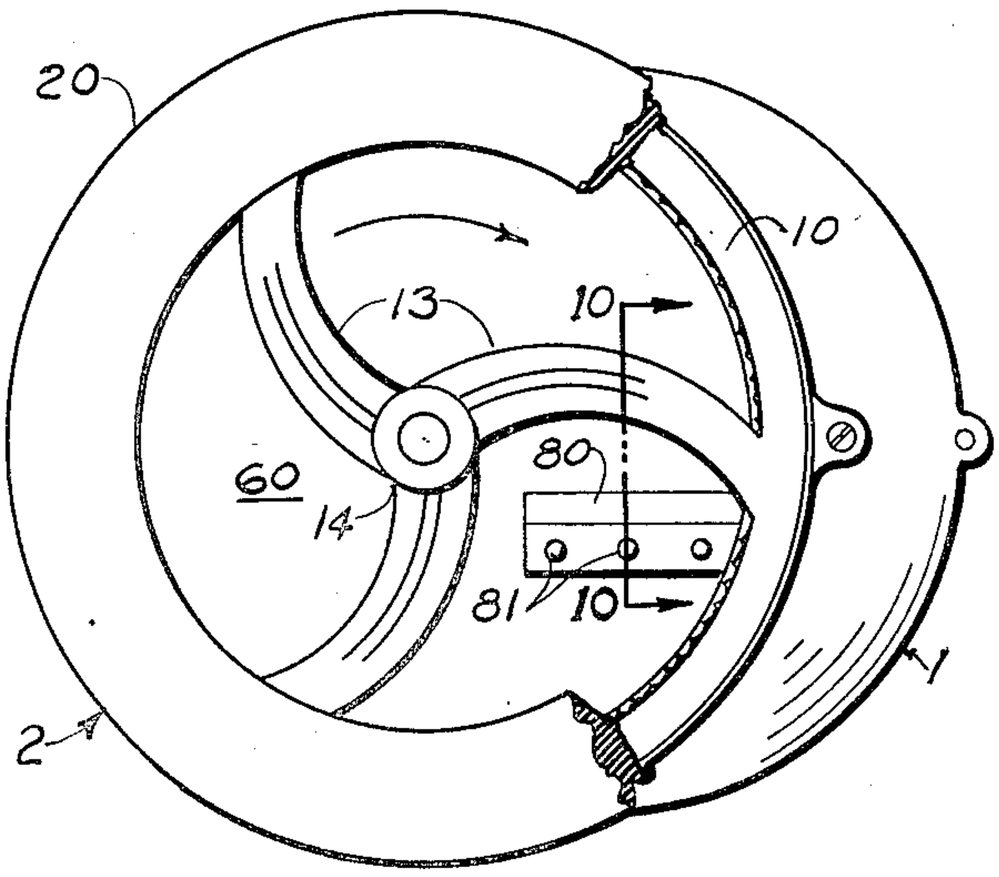

Fig.9

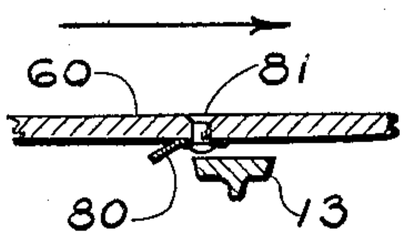

Fig.10

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UNITED STATES PATENT OFFICE

2,624,515

GARBAGE DISPOSAL DEVICE

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Application April 30, 1949, Serial No. 90,746

9 Claims. (Cl. 241—38)

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This invention relates, generally, to the class of garbage disposal devices or machines; and more particularly to a device or machine of this class that is of the portable type, as distinguished from the stationary type designed for installation in the drain connections beneath a kitchen sink, or similar places where water supply and drainage are available. The first portable garbage disposal device of which we have knowledge constitutes the subject matter of application Serial No. 27,881, filed May 19, 1948, by Daniel W. Miller, one of the applicants herein.

An object of the present invention is to provide a simple and relatively inexpensive portable garbage disposal device that is light of weight, and therefore easy of handling; that is compact, and of relatively small compass, and that is so shaped as to permit of its being placed within a sink and faced in any direction to best locate it in water receiving relation to the sink faucet.

Another object of the invention is to provide a portable garbage disposal device that has an especially large storage capacity relative to its over-all size so that the device may be used to advantage as a depository for food waste during the preparation of a meal or between meals and until such time as it is convenient to place the device over the sink drain and operate it to dispose of its contents.

Another object of our invention is to provide an electrically operated portable garbage disposal device wherein the electrical parts occupy an elevated position in the structure so as to clear the sink and be kept dry.

Another object is to provide a portable garbage disposal device wherein the grinding means is located at the lowest possible position in the structure so as to reduce vibration to the minimum.

It is also an object of our invention to provide a portable garbage disposal device that is rendered thoroughly sanitary by the omission of ducts, pockets, transverse or horizontal surfaces whereupon, or in which, waste material may lodge or accumulate; by reducing to a minimum the number of structural parts below the grinding means; by providing mechanical means for clearing such structural parts as are below said means of any waste material that may lodge thereon, and by so shaping the grinding chamber that the flowing water, which is always present during the grinding operation, is caused to swirl or "rotate" against and throughout the area of the peripheral wall of the chamber from bottom to top thereof so as to keep said wall clean.

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A further object of our invention is to provide a garbage disposal device so constructed as to facilitate servicing and cleaning. To this end the machine is composed of two major assemblies which may be designated the top assemply and the bottom assembly. The assemblies are readily separable, and the top one includes the prime mover and driving mechanism, together with all moving parts including those of the grinding means; while the lower one comprises the casing that encloses the grinding chamber and incorporates the stationary parts of the grinding means.

A still further object of the present invention is to provide a seal and support ring of resilient material which, in the present case (as distinguished from the corresponding feature of the machine disclosed in the aforesaid application), constitutes the sole support for the device. By reason of this, the full weight of the device is imposed upon the ring, thereby to insure a more effective sealing of the device to the sink, about the discharge opening of the former and the drain opening of the latter. Another object is to incorporate in the seal and support ring a bumper that extends circumferentially of the device adjacent the bottom thereof and prevents damage to either the device or the usual vitreous enamel coating of the sink walls should the device be struck thereagainst while being lifted into and out of the sink.

With the above and other objects in veiw, our invention may be said to reside in the novel features of form, construction, arrangement and combination of parts illustrated in the accompanying drawings and presently described, and finally pointed out in the claims appended hereto; and while we shall proceed to describe the illustrated embodiment in detail, we wish it to be understood that the invention is not limited to the details of construction shown in the drawings further than is required by the terms of said claims.

In the drawings, wherein like parts are designated by like reference characters throughout the several views, Fig. 1 is a side elevational view, Fig. 2 is a front elevational view, and Fig. 3 a plan view of a portable garbage disposal device or machine constructed in accordance with our invention; Fig. 4 is a sectional detail, on the line 4—4 of Fig. 1, of the latch means by which the top and bottom assemblies of the machine structure are detachably connected together; Fig. 5 is a central vertical section through the device, on the line 5—5 of Fig. 2, and on a scale consid-

erably enlarged over that of the preceding views, the device being shown as having attached to it an extension spout for directing water from the sink faucet into the trough that communicates with the grinding chamber; Fig. 6 is a sectional detail on the line 6—6 of Fig. 5; Fig. 7 is a horizontal section through the bottom assembly of the machine, substantially on the line 7—7 of Fig. 5; Fig. 8 is a sectional detail of one of the hammers of the grinding means, the plane of section being indicated by the line 8—8 of Fig. 7; Fig. 9 is a bottom plan view of the machine, with the seal and support ring partly broken away; and Fig. 10 is a sectional detail substantially on the line 10—10 of Fig. 9, but with the parts in a somewhat different relation, showing the wiper by which waste material is removed from the spokes of the spider below the flywheel of the grinding means.

In accordance with the present preferred embodiment of the invention, as hereinbefore pointed out, the device includes a top assembly and a bottom assembly, the respective assemblies being designated, generally, by the reference numerals 1 and 2. The bottom assembly comprises a casing 10 that is cylindrical and is open at top and bottom. An external flange 11 surrounds the upper end of the casing, and, adjacent its inner edge, said end is rabbeted to provide a shoulder 12. Supported centrally of the bottom of the casing, by curved spokes 13, is a hollow boss 14, the axis of the bore of which is coincident with the axis of the casing or, in other words, with the axis of the grinding chamber 15 that is enclosed by the casing 10. An external groove 16 extends about the casing 10 in suitably spaced relation to the lower end thereof to provide a rib 17. Embracing the rib 17 is the upper portion of a seal and support ring 20 of resilient material, such as natural or synthetic rubber, said ring terminating at its upper end in a lip 21 that is contracted within the groove 16. The ring 20 extends radially inwardly beneath the peripheral wall of the casing 10, and its inner surface inclines or curves downwardly and inwardly from the adjacent inner edge of said wall, in much the same manner as the corresponding feature of the machine that constitutes the subject matter of the beforementioned application. The ring 20 is of substantial thickness in the plane of the rib 17 and is suitably shaped to provide a bumper that desirably projects radially beyond the vertical plane of any part of the casing 10 so as to receive and absorb the shock of any blow, in case the lower end of the structure is struck against the side walls of a sink or other objects. Below the portion that constitutes the bumper, the ring is undercut to a considerable degree and therebelow flares outwardly. The broad under surface of the ring is concaved between its inner and outer edges, and in the region of said edges the ring tapers to thin lips 24 for sealing contact with the bottom of the sink. Under the weight of the device, the bottom of the ring will flatten to a certain extent and act in the manner of a vacuum cup and tend to hold the device in position. In Fig. 5, the bottom wall 30 of a sink is indicated in broken lines, with the drain opening 31 thereof surrounded by the seal and support ring 20.

The wall of the casing 10 is shown as somewhat thicker adjacent its lower end than elsewhere, the extra material being on the inner side of the wall, and throughout the region

thereof the wall is shaped to provide a true cylindrical portion within which a ring 35 is tightly seated. This ring, which is of steel or other suitable material, is provided on its inner face with relatively sharp teeth or ridges 36, and it constitutes the stationary part of the grinding means. The casing 10 may be cast of metal, such as an aluminum alloy, or similarly produced of a quality of plastic appropriate to the purpose; and while the ring 35 is adapted to be pressed to its seat, it may on the other hand be incorporated in the wall of the casing 10 during the casting or molding of the latter. The reduced lower end 38 of a journal 39 is fitted into the previously mentioned hollow boss 14, thereby to dispose the journal in concentric relation to the ring 35. This completes the bottom assembly 2.

The top assembly 1 includes a base 40, and a shroud or housing 41 that is connected to the base by a suitable number of screws 42. The base 40 comprises a flat wall 44, and a peripheral flange 45 that depends a distance below said wall and the lower edge of which mates with the top of the wall 10 of the bottom assembly, having a part that nests within the rabbeted groove of said wall and engages the shoulder 12. Shown as formed integral with and depending from the wall 44 is a housing 46 provided on its lower side with a hollow boss 47 that is concentric with the cylindrical wall of the casing 10. A sleeve 48 has its upper end fixed within the boss 47 and serves as a stationary sheath for a shaft 50 that is suitably journaled adjacent the top of the sleeve and thereabove has secured to it, as by a pin 51, a spur gear 52, preferably of a suitable plastic, such as a nylon composition, for the sake of quietness of operation. The wall 44 extends forwardly from the rear of the base only slightly beyond the housing 46, leaving in the front of the base an opening that constitutes the mouth 55 of the grinding chamber.

We have referred to the ring 35 as constituting the stationary part of the grinding means. The movable part of said means includes a disc or flywheel 60, provided with a central sleeve-like bearing 61 that is fitted with a bushing 62 that operates on the journal 39. Surrounding the exterior of the bearing 61 is a sleeve 63 of suitable cushioning material, such as natural or synthetic rubber. The bearing 61 is somewhat enlarged above the sleeve 63, and extending in opposite directions from the enlarged portion of the bearing are ears 65 (Figs. 5 and 7), there being elevated portions on the flywheel 60 directly below said ears. The upper and lower ends of pivot pins 66 are fixed within aligned apertures of the flywheel and the ears 65, and these pins support, for oscillation in a horizontal plane, hammers 68. Each hammer is capable of swinging through an arc of nearly 180° between a retracted position (indicated in broken lines in Fig. 7), wherein its rear curved side lies against the sleeve 63, to an extended position (as shown in full lines) in which the hammer is stopped by the engagement of a nose portion 69 thereof with said sleeve 63. Adjacent their free ends, the hammers are provided on their front sides with vertical teeth 70, and in this and other respects they are like the hammers incorporated in the grinding means of the machine disclosed in the application hereinbefore referred to. However, we have further improved the hammers by forming their front faces at an acute angle to their top surfaces, thereby

to provide along the top front corner of each hammer a cutting edge designated 71.

A hollow boss 75 rises from the top of the bearing 61 and has a bore that opens into and is in axial alignment with the bore of said bearing; and into the boss 75 is fitted the lower end of the shaft 50. The shaft is fastened to said boss, as by a pin 76, and a sealing ring 77 surrounds the shaft immediately above the boss 75. The lower end of the shaft 50 has bearing upon the crowned upper end of the journal 39 and by this means the flywheel 60 is supported a slight distance above the top surfaces of the spokes 13.

It follows from the foregoing description that the discharge opening of the grinding chamber 15 consists of the narrow annular slot between the edge of the flywheel 60 and the lower end of the ring 35. Consequently, any waste material discharged from the grinding chamber must be fine enough to pass through said opening. In order to avoid accumulation of waste material on the top surfaces of the spokes 13, a wiper 80 is fastened, as by rivets 81, to the underside of the flywheel 60, as best shown in Figs. 9 and 10, the parts in the latter view, which is described as a section on the line 10—10 of Fig. 9, being somewhat differently related from what they are in Fig. 9. As the flywheel 60 rotates in the direction indicated by the arrows in Figs. 9 and 10, the wiper 80 drags across the top surfaces of the spokes 13 to clear them of any deposits, and any waste material adhering to the wiper is removed by centrifugal force and by the shearing action between the wiper and the convexed sides of the curved spokes 13.

In the handling of waste materials including fibers or the like, such, for example, as garbage containing corn silk, or the fibrous stocky parts of certain plants or vegetables, difficulty may occasionally arise from the fibers becoming twisted or "roped" within the narrow discharge opening of the grinding chamber, or between the teeth of the ring 35 so as to impair the effectiveness thereof, and to avoid this difficulty we may incorporate in our grinding means a shearing contrivance, somewhat on the order of that disclosed in the aforesaid Miller application.

In our case, we pivot a flat plate or blade 85 on each of the pins 66 above the corresponding hammer 68, each blade being long enough, when extended as by centrifugal action, to cause its outer end to enter a groove 87 that extends circumferentially about the inner side of the ring 35 and of a depth equal to or slightly greater than the depth of the teeth 36.

Extending from opposite sides of the base 40, and desirably formed integral therewith, are handles 90 by which the device or machine may be lifted; and shown as associated with each of these handles is latch means for detachably connecting the top assembly 1 to the bottom assembly 2. Each latch means consists of a short shaft 91 that is journaled in a vertical bore in one end of the corresponding handle 90 and, at its lower end, the shaft has formed integrally with it, or rigidly secured to it, a finger 92 that is adapted to be swung beneath the flange 11 when a lever 93 that is pinned or otherwise fastened to the top of said shaft, is swung into a recess provided for its reception in the top of the handle 90.

Fastened to the wall 49 of the base 40, as by a suitable number of screws, one of which is designated 95 in Fig. 5, is an electric motor 96. The shaft 97 of the motor extends downwardly into the housing 46 and is provided with a pinion 98

that meshes with the previously mentioned gear 52, the pinion, in the present instance, being constituted of a toothed portion of said shaft. A conventional electric switch 100 is suitably supported within the top of the shroud or housing 41 and has an operating part or button 101 that projects through an aperture in the wall of said shroud or housing. The switch is of that type wherein a spring tends to hold the button outward, in which position of the button the switch is "open," and the button is adapted to be depressed to close the switch by a cam-like wall 105 of a recess 106 in a knob 107 when the knob is turned in an appropriate direction. The switch and motor are adapted to be placed in circuit with a suitable source of electric energy, as the house circuit, through conductors encased within a cable 110 that is led into the shroud or housing through an opening in the wall thereof above the motor. It may be mentioned, in this connection, that the only openings in said wall are adjacent the top of the structure where they are least likely to admit moisture to the electrical equipment.

The motor compartment is enclosed by the previously mentioned wall 44, the upwardly and forwardly curved rear wall of the shroud or housing 41, and by an upright wall 115 that rises from the front edge of the wall 44 and joins the top and sides of the shroud or housing. Said sides extend forwardly of the wall 115 and merge into a spout-like trough 116 that skirts the mouth 55 of the grinding chamber. A door 117, provided with a number of openings 118, is hingedly connected to the structure so as to swing between open and closed positions with respect to the mouth 55. This door may consist of a thin casting, or it may be stamped from sheet metal, and in either event it is hinged to the structure, desirably by means of trunnions 119 that extend laterally from its rear corners and have bearing within recesses that open through the lower, inner edge portions of the sides of the shroud or housing 41. Therefore, by engaging said trunnion in the recesses and then applying the shroud or housing to the base, the door is hingedly connected to the structure.

Within an apertured lug 120 that projects forwardly from the top of the shroud or housing, and in a bearing 121 that is fastened to the wall 115 adjacent the bottom thereof, is journaled a shaft 122 to the upper end of which the previously mentioned knob 107 is secured. The lower end of said shaft is turned laterally to provide an arm 124, arranged to override a cam ridge 125 of the door.

126 is a trough extension or spout that is used under conditions later to be described, and it is removably attached to the structure by the engagement of a pin 127, that depends from the spout near the inner end thereof, in an eye 128 on the front of the trough 116. The spout is shown in a position to receive water from a faucet 130, illustrated in broken lines in Fig. 5.

When the device is not in use, the knob 107 is turned to a position to dispose the arm 124 alongside the wall 115 and out of the way of the door 117, and to locate the recess 106 of the knob 107 above the button 101 of the electric switch 100 so that the switch may assume "open" position. At any time, as during the preparation of a meal, or after the meal, with the door 117 lifted, garbage may be introduced into the grinding chamber 15 through the spout 116 and mouth 55. Unless the device is already in such position, it is lifted by the handles 90 into the sink where it

is placed with the seal and support ring 20 surrounding the drain opening 31, and so as to receive water from the sink faucet. Under the weight of the device or machine, the inner and outer flexible lip portions of said ring 20 make tight contact with the bottom of the sink and seal the passage between the discharge opening of the device and the sink drain, which passage is defined by the downwardly convergent inner surface of the ring 20. With the door 117 closed, the knob 107 is turned in a direction to swing the arm 124 over the ridge 125 and thus lock the door in closed position. At the same time, the turning of the knob will cause the cam surface 105 to depress the button 101 of the switch 100 and close the circuit to the motor 96, thus starting the motor. As above mentioned, when placing the machine in the sink, the trough 116 is arranged in a position to receive water from the sink faucet, and with the swinging type of faucet, the discharge end of the latter may invariably be adjusted to a position above the spout when the machine is over the drain opening of the sink. However, in the case of sinks equipped with faucets like that indicated by broken lines in Fig. 5, it may be necessary to attach the spout 126 in order to direct the water from the faucet into the grinding chamber. When the machine is in position, and before, or substantially simultaneously with the turning of the knob 107 to start the motor, the water is turned on so as to provide a continuous flow through the grinding chamber while the grinding means is in operation. As the flywheel 60 rotates at a relatively high speed, the hammers 68 will tend, through centrifugal force, to swing outward and, as will be readily understood, they will be forcibly thrown against the waste material that is in proximity to the flywheel, and such material as orange peel or the like will be chopped by the relatively sharp edges 71 of the hammers 68, while all material within their reach will be pounded by the hammers and thrown forcibly against the teeth 36 of the ring 35. Under the violent pounding of the hammers and the agitation of the mass of material by the moving parts of the grinding means in the presence of the stream of water which is caused to swirl about the chamber and up the walls thereof by the action of said parts, the material will be thoroughly comminuted and reduced to particles of such size as will readily flush down through the discharge opening of the chamber between the periphery of the flywheel and the lower portion of the ring 35. During the grinding operation, the blades 85 will function in the manner previously described to cut any fibers into small pieces, and these will readily flush out with the fine granular material. As the material is discharged through said opening it will be diverted inwardly toward the drain opening 31 by the downwardly and inwardly inclined inner surface of the ring 29. Any material lodging upon the tops of the ribs 13 will be removed by the wiper 80, in the manner already described.

While the device is self-cleansing to a very large degree and is designed with the object in view of promoting sanitation in machines of this class, it is highly desirable that the top assembly be readily removable from the bottom assembly so that all parts of the grinding means and the interior surfaces of the grinding chamber may be made accessible for thorough cleaning, inspection and servicing. To this end we have provided the latch means previously described for detachably connecting the top and bottom assemblies together.

When it is desired to gain access to the parts enclosed within the grinding chamber, it is only necessary to swing the levers 93 from the recesses of the handles 90 far enough to remove the fingers 92 from beneath the flange 11 of the casing 10 and, by means of the handles 90, the top assembly may be lifted clear of the bottom assembly. Inasmuch as the flywheel 60 and all other movable parts of the grinding means are connected to the top assembly, the grinding chamber 15 will be left in such condition that access may be had to all parts of its interior, including the stationary part of the grinding means consisting of the ring 35.

We have already explained how each hammer 68 is capable of swinging on its pivotal axis in a rearward direction (with reference to its direction of orbital travel) until its curved rear side contacts the sleeve 63 of cushioning material, and how the hammer is prevented from swinging in the opposite direction little if any beyond a radial position with respect to the rotating axis of the flywheel, where it is stopped by the engagement of the nose 69 with said sleeve. This restriction of movement of the hammers is quite important in that it precludes interference between the hammers which would result in loud clatter and noise, and avoids the hammers assuming a position substantially tangent to the orbital path of their pivotal axes and which would be likely to result in a terrific end thrust being imposed upon the hammers as they would dig into the mass of garbage.

Having thus described our invention, what we claim is:

1. A garbage disposal device comprising a casing enclosing a grinding chamber and having a discharge opening at the bottom thereof, the casing having an opening at the top adjacent one side thereof, a housing surmounting the casing at the other side thereof, an electric motor enclosed by said housing, an electric switch supported within the housing and including an operating part for opening and closing the switch, the housing including a wall provided with an aperture through which said operating part projects, a cover supported for movement between open and closed positions with respect to the top opening of the casing, an obstructing element, and an instrumentality movably supported adjacent the housing and including an actuator for the aforesaid operating part of the switch and an obstructing part for cooperation with the aforesaid closure and which is so related to the actuator that it prevents said closure from being moved to open position when the actuator is in a position to maintain the switch closed through intervention of the aforesaid operating part.

2. In a garbage disposal device, a casing including a peripheral wall enclosing a grinding chamber, bearing means situated centrally of the bottom of the casing, a skeletal structure supporting said bearing means from the lower end of said peripheral wall, the casing being otherwise open at its lower end, the casing having a circular cross section in substantially the horizontal plane of said bearing means and with respect to which said bearing means is centered, grinding means including a disc-like flywheel that is supported for rotation by said bearing means, the said flywheel constituting the bottom wall of the grinding chamber and having its periphery

slightly spaced from the surrounding portion of the casing so as to provide therebetween an annular slot that constitutes the discharge opening of the grinding chamber, wiping means beneath and carried by the flywheel for removing waste material from said skeletal structure, driving mechanism supported adjacent the casing, and operative connections between the driving mechanism and said flywheel.

3. A garbage disposal device according to claim 2, wherein said skeletal structure consists of spokes that extend from the bearing means to the peripheral wall of the casing, and said wiping means consists of an element that is secured to the underside of the flywheel and has a part that extends substantially radially of said flywheel and is shaped to wipe across the top surfaces of said spokes.

4. In a portable garbage disposal device, a casing enclosing a grinding chamber and having a discharge opening for said chamber adjacent its lower end, a resilient sealing and supporting member attached to the bottom of the casing about said discharge opening and solely through the medium of which the casing is adapted to be supported from and sealed to the bottom of a sink about the drain opening thereof grinding means situated within the casing adjacent the bottom of said chamber, a drive shaft connected to and rising from said grinding means centrally of the casing and terminating adjacent the upper end of the latter, a housing structure separable from and surmounting the casing adjacent one side thereof and formed adjacent the opposite side of the casing to provide a trough, an opening in said structure skirted by said trough through which garbage is adapted to be admitted to the grinding chamber, a lid for said opening provided with means to admit water to the grinding chamber when said lid is in closed position, an electric motor enclosed by said housing structure and arranged with its shaft in a substantially vertical position and offset with respect to the former shaft, and driving connections between the lower end of the motor shaft and the upper end of said former shaft.

5. In a garbage disposal device, a casing enclosing a grinding chamber and having a discharge opening for said chamber adjacent its lower end, grinding means situated within the casing adjacent the bottom of said chamber, a housing surmounting the casing and formed adjacent one side of the latter to provide an opening through which garbage is adapted to be admitted to the grinding chamber, a lid for said opening provided with means to admit water to the grinding chamber when said lid is in closed position, an electric motor enclosed by said housing, driving connections between the motor and the aforesaid grinding means, an electric switch enclosed by said housing, electrical conductors by which said switch and the motor are placed in circuit, said housing including a wall portion having an aperture and the switch incorporating an operating part accessible through said aperture, and movable means on the exterior of the housing cooperating with said operating part of the switch and with the aforesaid lid and shiftable between a position wherein said means closes the switch and simultaneously retains said lid

closed, and a second position wherein it opens said switch and releases said lid.

6. In a garbage disposal device, a casing enclosing a grinding chamber and having a discharge opening for said chamber adjacent its lower end, a ring fixed within the casing about the lower end of the grinding chamber and formed on its interior with abrading means, a disc-like flywheel supported for rotation within the aforesaid ring with its periphery in spaced relation thereto, relatively thin centrifugal shear blades mounted upon the flywheel and pivotally connected thereto on vertical axes adjacent their inner ends, the aforesaid ring having an internal circumferential groove for the reception of the outer ends of the shear blades, the portion of the ring defining one side of said groove being in a horizontal plane and in shearing relation to an edge portion of each blade, driving mechanisms supported adjacent the casing, and operative connections between said mechanism and the flywheel, the device having an opening through which garbage and flushing water are admitted to the top of the grinding chamber.

7. In a garbage disposal device according to claim 4, handles on opposite sides of said housing structure by which the device may be lifted when the housing structure and casing are connected together, and by which the housing structure may be removed from the casing when said structure and casing are disconnected, and readily releasable latch means adjacent each handle for connecting the housing structure to the casing.

8. A garbage disposal device comprising the combination and arrangement of elements defined by claim 4, plus: a stationary tube enclosing the shaft between the housing structure and the grinding means.

9. A portable garbage disposal device according to claim 4, wherein said sealing and supporting member has a relatively thick peripheral portion that encircles the bottom of the casing and extends radially outwardly beyond the bottom portion of the casing to serve as a shock absorbing bumper therefor.

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DANIEL W. MILLER.

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