May 3, 1949. J. H. POWERS 2,469,205

WASTE DISPOSAL APPARATUS

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Fig. 1.

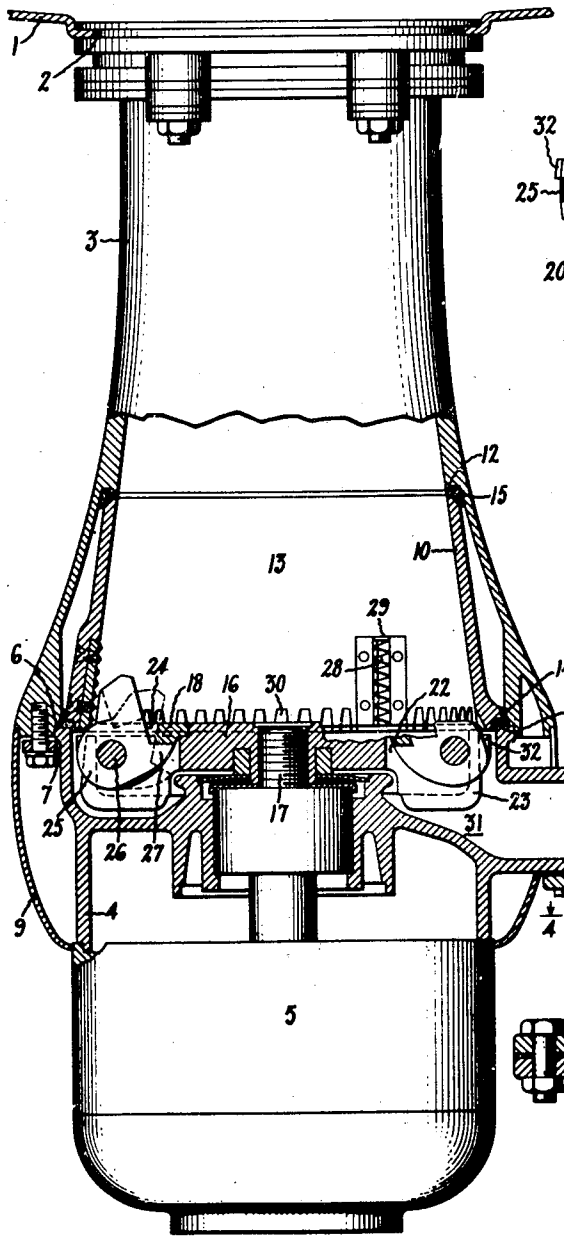


Fig. 2.

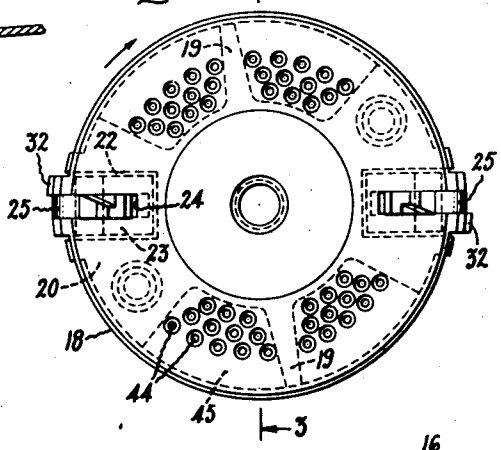
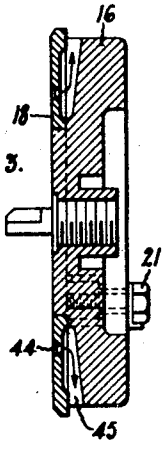


Fig. 3.



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Fig. 4.

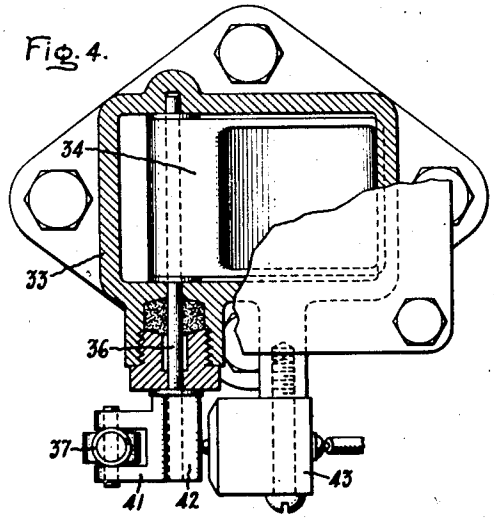


Fig. 5.

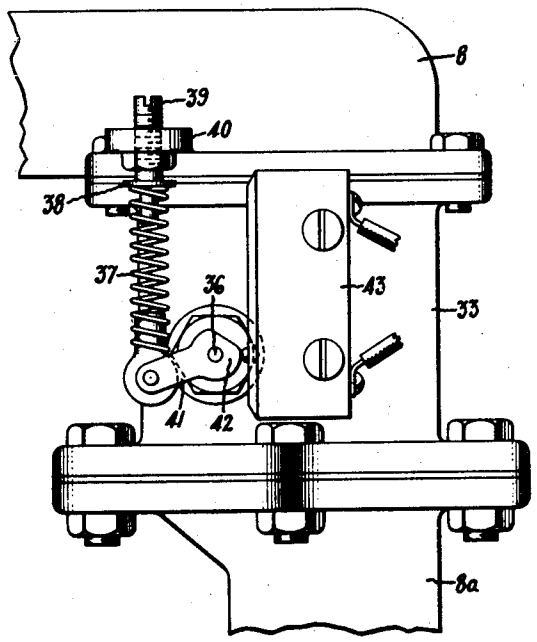
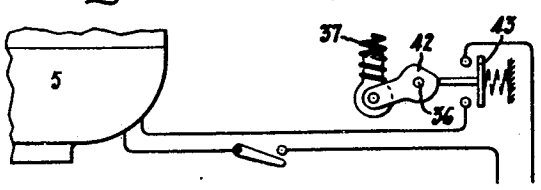


Fig. 6.



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WASTE DISPOSAL APPARATUS

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5 Claims. (Cl. 146—192)

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The present invention relates to waste disposal apparatus of the type for connection to a kitchen sink for example, comprising a chamber in which waste material is placed and means associated with the chamber for comminuting the waste material and supplying water for flushing it down a drain pipe to a sewerage system. In the operation of such apparatus, it is important that the machine be operated only when water is being supplied to it and in my Patent 2,244,402, June 3, 1941, I have disclosed mechanisms for accomplishing the result wherein the motor for operating the apparatus is controlled by flow of water to the apparatus. This arrangement is entirely satisfactory from an operating standpoint but is open to the objection that it is relatively expensive.

The object of my present invention is to provide an improved construction and arrangement which insures that the machine operates only when water is being supplied to it which is of lower cost than arrangements heretofore used and which has the further advantage that it may form an integral part of the machine proper.

According to my invention, I place the motor of the machine under control of water or comminuted waste material and water flowing from the machine and provided in the machine a construction which insures always that flow of water through the machine can take place whenever it is to be placed into operation or is operating.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and to the claims appended thereto.

In the drawing, Fig. 1 is a sectional elevation of a waste disposal device emodying my invention; Fig. 2 is a top plan view of a flywheel; Fig. 3 is a sectional view taken on line 3—3, Fig. 2; Fig. 4 is a sectional view taken on line 4—4, Fig. 1; Fig. 5 is a side view of the drain conduit, and Fig. 6 is a wiring diagram.

Referring to the drawing, 1 indicates a sink having a drain opening 2 to which is clamped the upper end of the frusto-conical casing or chamber 3 of a waste disposal apparatus. At the lower end of the casing is a bottom flange 4 carrying an electric motor 5 clamped against a shoulder 6 in the casing by a clamping ring 7. The bottom flange is provided with a flanged outlet 8 for connection with the sink drain line 8a. The bottom flange is enclosed by a removable shield 9 depending from the casing and blending into the motor.

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In the lower end of the casing is a frusto-conical wall 10 clamped between a shoulder 11 on the bottom flange and a shoulder 12 on the casing which defines a shredding chamber 13. Rubber rings 14 and 15 arranged between the shredding chamber wall and the shoulders prevent the transmission of vibrations. At the lower end of the shredding chamber is a flywheel 16 threaded on the motor shaft 17 on the upper side of which is a replaceable disk 18 of wear-resisting material clamped against circumferentially spaced ribs 19 and 20 on the upper surface of the flywheel by bolts 21. The ribs 20, which are much wider than the ribs 19, are provided with radial recesses 22 for receiving pairs of spaced apart ears 23 depending from the lower side of the disk 18. The space between the ears of each pair of ears defines a slot 24 for receiving an impeller blade 25 pivoted on a pin 26 extending between the ears 23. The impeller blades are biased by gravity toward the dotted line position in Fig. 1 and are moved outward by centrifugal force to the full-line position when the flywheel is rotated. The outward movement of the impeller blades is limited by lugs 27 on the blades 25 which engage the under side of the disk as shown in Fig. 1. In the outer position the impeller blades are in shearing cooperation with toothed shredding members 28 fastened in recesses 29 in the lower end of the shredding chamber wall 10. Three shredding members are provided uniformly spaced around the shredding chamber which otherwise has a smooth inner surface. In operation the impeller blades cause a mixture of water and garbage to be whirled around the shredding chamber at a speed such that the solid particles are moved outward by centrifugal force and reduced or comminuted by being tumbled against the teeth of the shredding members. There is also a further comminuting action resulting from the shearing action between the impeller blades and the shredding members. Due to centrifugal action the whirling mixture of garbage and water is in the form of an annulus adjacent the side walls of the shredding chamber and having its upper end extending into the upper part of the casing. Water and garbage falling on the center of the flywheel are quickly moved outward by centrifugal force.

In the side wall 10 of the shredding chamber at its lower end are a series of straining grooves 30 the upper ends of which communicate with the shredding chamber and the lower ends of which discharge into an annular receiving cham-

ber 31 connected to the outlet 8. The grooves 30 limit the cross section of the particles discharged from the shredding chamber into the receiving chamber. To prevent the discharge of long stringy material to the drain line which might pass lengthwise through the straining grooves, the ears 23 are provided with shearing surfaces 32 which are in shearing cooperation with the lower ends of the straining grooves 30. These shearing surfaces clip the long stringy material, reducing it to lengths suitable for discharge to the drain line.

The construction so far described is a known one and is to be taken as typical of any suitable waste disposal apparatus. In use, the waste material to be comminuted is placed in chamber 13, the water is turned on in the sink to produce a suitable flow to the chamber 13 and the motor is operated to rotate the flywheel at high speed. The waste material in the chamber is comminuted and flushed down through grooves 30 and the outlet 8 to the drain line.

According to my invention, I provide in the drain line 8a a casing 33 in which is pivotally mounted a flow responsive member. Outlet 8, casing 33, and drain line 8a comprise the discharge conduit from the unit for suitable connection to the sewer system. In the present instance, the flow responsive member is in the form of a dished rectangular plate or gate 34 carried on a shaft 36 pivoted in the wall of casing 33 and adapted to extend across casing 33 as shown in full lines in Fig. 1 so as to be in the path of flow of material through the drain. Plate 34 is biased to the full line position by a spring 37 positioned between an abutment 38 carried by a screw 39 adjustably mounted in a lug 40 on the flange of outlet 8 and the free end of an arm 41 fixed on an end of shaft 36 outside casing 33. When in said position, the plate almost completely closes the casing 33, as shown in Fig. 4, and any fluid flow above a mere trickle will impinge upon the plate. The hub of arm 41 is in the form of a cam 42 adapted to open and close an electric switch 43 arranged in the motor circuit as shown in Fig. 6. Switch 43 is suitably attached directly to casing 33. Switch 43 is of a type normally biased to closed position. Cam 42 is so shaped as shown in Figs. 5 and 6 that when plate 34 stands in the full line position shown in Fig. 1, the switch is held open by the cam as shown in Figs. 5 and 6. When flow takes place through drain line 8a, it impinges on plate 34 to move it from the full line position shown in Fig. 1, the movement taking place against the action of spring 37. This moves cam 42 so its flat side comes in line with the switch button, permitting the switch to close and start motor 5. The rate of flow needed to operate the flow responsive means can be changed by adjusting spring 37.

With the above described arrangement, it is necessary for flow to take place through the machine in volume sufficient to actuate plate 34 in order to close the motor circuit to start the motor. This means that initially, when the machine is to be started, there must be a sufficient flow of water alone through the machine for this purpose. To insure this, I provide means for flow of water which is in parallel to and independent of the grooves 30 through which during normal operation the comminuted material and water is discharged whereby even should the grooves 30 be clogged from a previous use of the machine, it is insured that when the water is turned on the switch will be closed and the motor started. To this end, there are provided strainer openings 44 in disk 18 which communicate with the radial passages 45 between parts 19 and 20 which passages extend to the periphery of the flywheel (see Fig. 3). By this arrangement, flow of water can take place through the machine sufficient to close the motor switch even though grooves 30 are partly or wholly clogged.

It will be seen that the flow responsive device including the switch 43 is a unitary structure which forms a part of the machine so that when the machine is installed, it is necessary merely to connect the drain line 8a to the flange at the outer end of casing 33 and connect the power line into the motor circuit. It is not required that any parts be installed in the water line to the sink. This results in a lower overall cost of the machine and a simpler, lower cost installation.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a waste disposal apparatus, a wall which defines a waste receiving chamber having shredding means on its inner surface, a flywheel in the chamber having at its periphery impeller blades which cooperate with the shredding means, walls defining passages in the chamber wall at the periphery of the flywheel for conveying comminuted material from above to below the flywheel, a discharge conduit, a motor for rotating the flywheel, a plate in the discharge conduit biased to a position where it stands in the path of flow through such conduit, switch means operated by movement of said plate away from such path of flow for controlling the motor, and walls which define passage means separate from said first named passages for conveying water from the chamber to said discharge conduit.

2. In a waste disposal apparatus, a wall which defines a waste receiving chamber having shredding means on its inner surface, a flywheel in the chamber having at its periphery impeller blades which cooperate with the shredding means, walls defining passages in the chamber wall at the periphery of the flywheel for conveying comminuted material from above to below the flywheel, a discharge conduit, a motor for rotating the flywheel, a control element for said motor for controlling its operation located in said conduit and movable to a position to effect the rotation of said motor by water and material in said conduit having a predetermined rate of flow therein, and walls which define passage means separate from and in parallel to said first named passages for conveying water from the chamber to said discharge conduit.

3. In a waste disposal apparatus, a wall which defines a waste receiving chamber having shredding means on its inner surface, a flywheel in the chamber having at its periphery impeller blades which cooperate with the shredding means, walls defining passages in the chamber wall at the periphery of the flywheel for conveying comminuted material from above to below the flywheel, a discharge conduit, a motor for rotating the flywheel, a control switch in said motor circuit, and means for closing said switch only in

the circumstance of substantial flow of liquid through said conduit, comprising a gate member pivotally mounted within said conduit, said gate member pivotally mounted within said conduit, said gate being normally biased to substantially close said conduit and retractable upon flow of fluid into said conduit in predetermined volume to permit flow therethrough, and a lever operated by retraction of said gate into open-conduit position for actuation of said control switch.

4. In a waste disposal apparatus, a wall which defines a waste receiving chamber having shredding means on its inner surface, a flywheel in the chamber having at its periphery impeller blades which cooperate with the shredding means, walls defining passages in the chamber wall at the periphery of the flywheel for conveying comminuted material from above to below the flywheel, a wear plate on the top surface of the flywheel, walls defining water flow passages between the flywheel and wear plate which extend from the peripheral edge of the flywheel to its central portion, said wear plate having openings at its radially inner portion in line with said water flow passages, a discharge conduit, a motor for rotating the flywheel, and a control element for said motor for controlling its operation located in said conduit and movable to a position to effect the operation of said motor to rotate said impeller by water and material in the conduit having a predetermined rate of flow.

5. In a waste disposal apparatus, a wall which defines a waste receiving chamber, means for

introducing water into said chamber, means in said chamber for comminuting material, a drain conduit connected with the chamber, a plurality of mutually independent means for directing water or a mixture of water and comminuted material from the sides and the central portion of the chamber to the drain conduit, a motor for operating said comminuting means and a control switch in the motor circuit, a pivotally mounted gate member disposed within said drain conduit in the path of fluid flow and rotatable to open said conduit upon fluid flow into said conduit in substantial volume, an actuator for said control switch, and means interposed between said gate member and said switch actuator to operate the switch to motor starting position upon movement of said gate under fluid flow conditions.

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