May 27, 1947. F. T. HILLIKER 2,421,064

GARBAGE DISPOSAL DEVICE

Filed Oct. 9, 1944 2 Sheets-Sheet 1

FIG. 1.

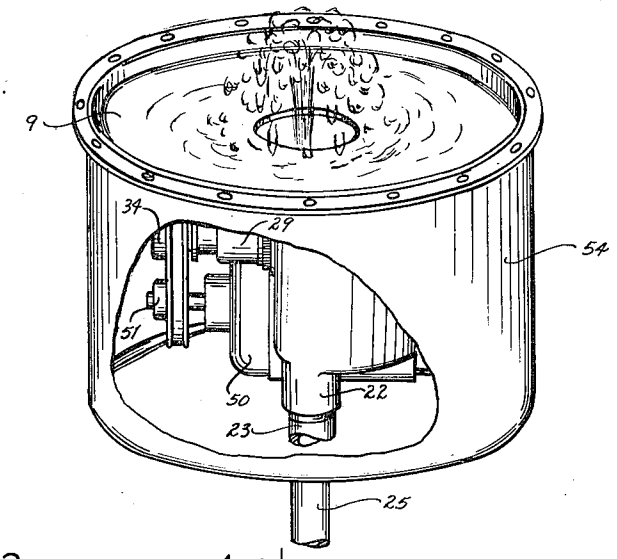

FIG. 2.

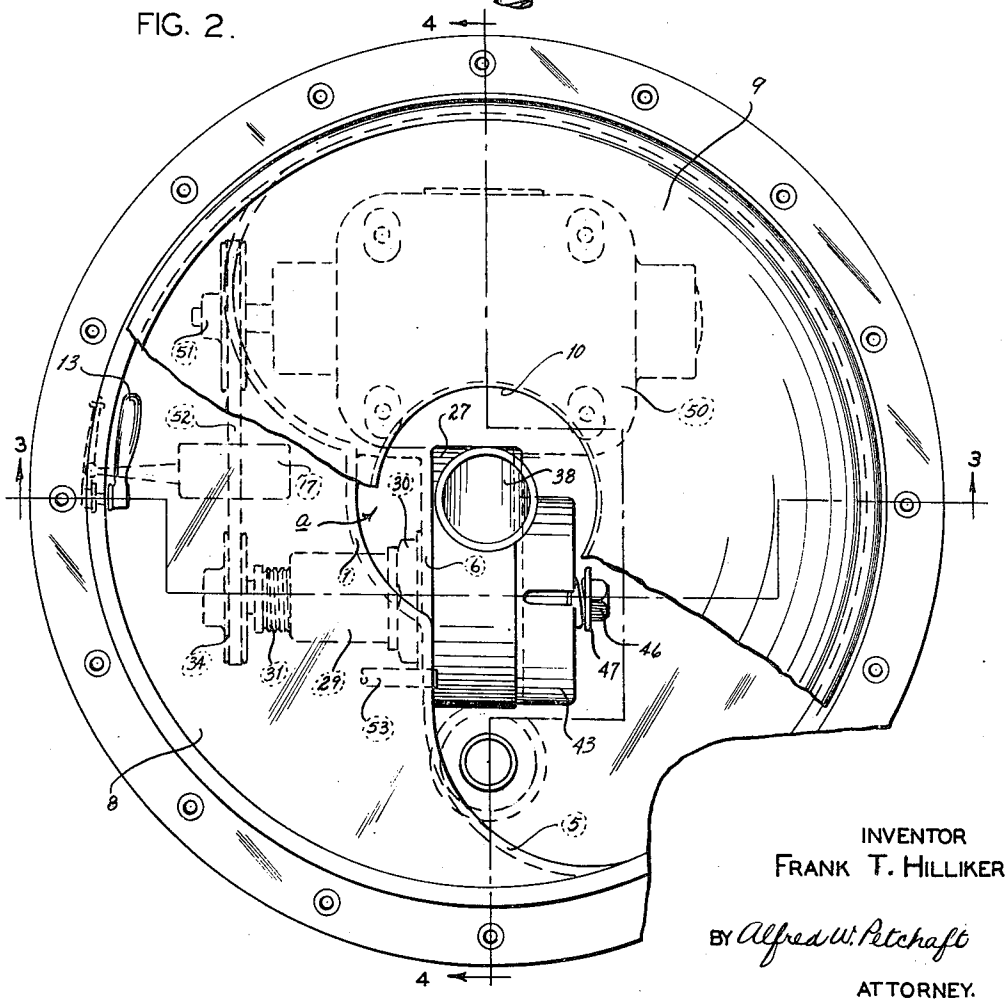

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FIG. 3.

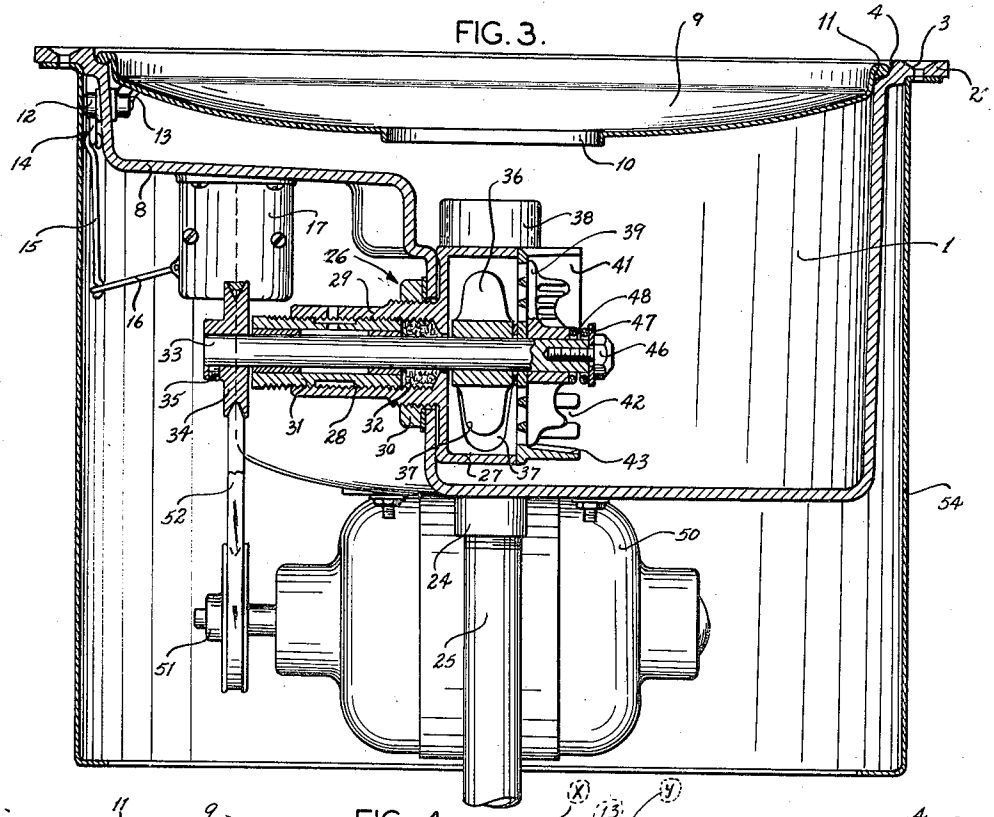
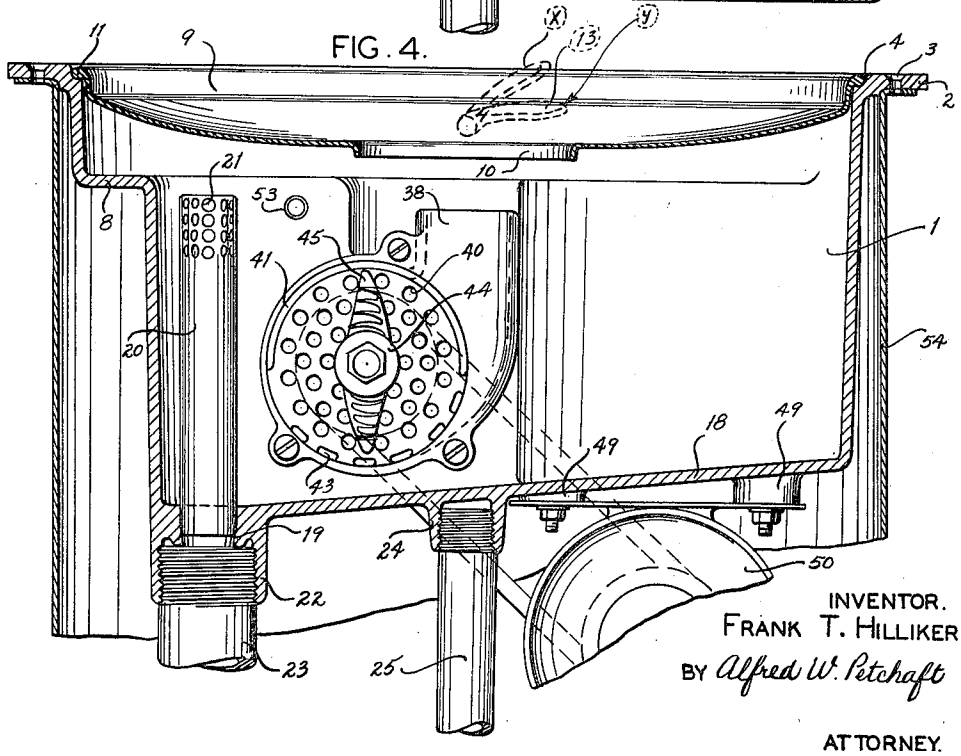


FIG. 4.



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UNITED STATES PATENT OFFICE

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GARBAGE DISPOSAL DEVICE

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4 Claims. (Cl. 146—182)

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This invention relates in general to certain new and useful improvements in garbage disposal devices and more particularly to a continuously operating garbage disposal device adapted for use in restaurants, clubs and other commercial eating places having a substantially large and continuous volume of garbage which is returned to the kitchen on and with the tableware of the diners and must be scraped and separated from such tableware prior to washing.

The primary object of the present invention is to provide a garbage disposal device which is extremely rugged and durable and is capable of continuous operation over relatively long periods of time without danger of mechanical failure or breakdown.

It is another object of the present invention to provide a garbage disposal device which is capable of grinding garbage in a continuously recirculated current of water to reduce the garbage to a finely divided state in which it is suspended in the water in the form of a highly fluid sludge.

It is another object of the present invention to provide a garbage disposal device which can be conveniently installed in a dish-washing table of the type commonly employed in restaurants so that the garbage and refuse brought back to the kitchen on the tableware of the diners may be readily and efficiently scraped into the garbage disposal device and be gradually carried away to the sewer without odor, or the creation of unsightly and unsanitary conditions.

It is an additional object of the present invention to provide a device of the type stated in which provision is made for preventing solid objects, such as pieces of crockery, silverware and the like, from accidentally getting into the cutting knives of the grinding mechanism.

Numerous other objects, advantages and inherent functions of the present invention will become apparent as the same is more fully understood from the following description which, taken with the accompanying drawings, discloses a preferred form of the present invention.

In the drawings (two sheets)—

Fig. 1 is a perspective view, partly broken away, of a preferred form of garbage disposal device constructed in accordance with and embodying my present invention;

Fig. 2 is a fragmentary top plan view of the garbage disposal device; and

Figs. 3 and 4 are vertical sectional views taken respectively along lines 3—3 and 4—4 of Fig. 2.

Referring now in more detail and by reference characters to the drawings, the preferred embodiment of the present invention comprises an open-topped tank 1 formed preferably of cast-iron, sheet metal, stainless steel, or other suitable material. Preferably, though not necessarily, the tank 1 may be provided upon its exposed face

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with any conventional protective coating, as circumstances may warrant or permit. At its upper or open end the tank 1 is provided with an external angular flange 2 having a plurality of circumferentially spaced counter-sunk apertures 3 for receiving screws or other suitable fastening elements by which the entire structure may be secured in a dish scraping table. Around the inner peripheral margin of its flange 2, the tank 1 is provided with an open-faced channel 4 and, for a short distance downwardly therefrom, the tank 1 is of substantially true circular cross-section. For the rest of its depth, the tank 1 is restricted to the somewhat segmental cross-sectional shape shown in Fig. 2 and is provided with a transverse, vertical wall 5, which is curved arcuately inwardly and is provided with a straight section 6, the upper portion of which is relieved as at *a* in the provision of a short vertical wall section 7 of circular conformation concentric with the upper circular portion of the tank 1 and having its upper margin in the same plane, more or less, as the upper margin of the main portions of the tank wall 5. At such upper margin the tank wall 5 and the arcuate portion 7 thereof merge integrally into a substantially horizontal flat shelf portion 8, all as best seen in Figs. 2 and 3.

Removably fitted within, and extending horizontally across, the top of the tank 1 is a shallow slightly dished sheet metal tray 9 having a central aperture 10 and an outer peripheral bead 11 which is seated in the channel 4. Rotatably mounted in the side wall of the tank 1, just beneath the tray 9, is a switch control lever 12 provided at its inwardly projecting end with a radially extending arm 13 adapted for abutting engagement upon its upper face with its under side of the tray 9 so that when the latter is in place across the top of the tank 1 the arm will be swung downwardly to the lowermost position *y* shown in dotted lines in Fig. 4. On its outwardly projecting end, the control lever is provided with a short radial arm 14 apertured for receiving the upper hooked end of a depending link 15 which is, in turn, at its lower end, operably engaged with the outer end of a switch actuating arm 16 of a conventional spring-pressed switch 17, the latter being suitably bolted upon the under face of the tank shelf 8. When the tray 9 is in place, as above described, the arm 13 and the associated link 15 will be held in downward position so that the switch arm 16 will likewise be held in downward position and the switch will be "on," but when the tray 9 is removed, the switch will spring back to "off" position shifting the arm 16 upwardly and urging the link 15 also upwardly so that the arm 13 will assume the uppermost position *x* as shown in dotted lines in Fig. 4.

The bottom wall 18 of the tank 1 is inclined downwardly at a slight angle and at its lowest

point provided with a tapered drain aperture 19 for snugly receiving the lower tapered end of a stand-pipe 20, which extends upwardly almost to the level of the shelf 8 and at its upper end is provided with a plurality of small drain holes 21. On its under face the tank bottom 18 is provided with a depending internally threaded collar 22 concentric with, and substantially larger in diametral size than, the aperture 19 for receiving a drain pipe 23 which is connected in any conventional manner to the sewer. The tank bottom 18 is also integrally provided on its underface with a centrally disposed internally threaded socket 24 for receiving the upper end of a pipe-like supporting leg or stand 25, by which the entire device may be supported from the floor.

Mounted tightly against the inner vertical face of the straight section 6 of the tank wall 5 is a centrifugal grinder 26 comprising a cylindrical casing or shell 27 integrally provided with a concentric horizontal sleeve 28 projecting through the wall section 6 and being externally threaded as at 29 for receiving a collar nut 30, which is threaded up against the outer face of the wall section 6 thereby holding the entire grinder structure firmly in place. The sleeve 28 is internally threaded for receiving a tubular shaft bearing 31 which may be run up against a packing ring 32 in the manner of a stuffing box or gland, and rotatably mounted therein is a shaft 33 which extends at one end outwardly from the bearing 31 for receiving a pulley wall 34, which is held rigidly thereon by means of a set screw 35. At the other end the shaft 33 extends through the casing 27 and keyed thereon is a rotary impeller 36 arranged for sucking water into the casing 27 along lines co-axial with the shaft 33 and expelling the water through a circumferential discharge port 37 opening into a tangential vertical upwardly projecting discharge spout 38 which is concentric with and terminates below the opening 10 of the tray 9, as best seen in Fig. 3 and for purposes more fully appearing.

At its outer end casing is provided with a vertical closure wall 39 having a plurality of concentrically arranged small apertures 40 and being provided around its peripheral margin with an integral, outwardly extending annular collar 41, the upper half of which is solid and the lower half of which is provided with a plurality of axial slots 42 in the formation of circumferentially spaced tines or fingers 43. The shaft 33 extends rotatably through the wall 39 and is provided with a two-bladed cutter 44, having a plurality of upstanding fingers 45 which taper forwardly and downwardly from the trailing edge toward the leading or cutting edge and are somewhat concentric with the shaft 33 for deflecting outwardly any accumulated material so as to prevent clogging or binding of the apertures 40. The outer end of the shaft 33 is axially tapped and threaded to receive a locking screw 46 for holding in place a washer 47, which, in turn, retains a concentric spiral spring 48 for resiliently urging the cutter 44 inwardly into operative abutment against the outer face of the wall 39 so that upon rotation the cutter 44 will cooperate with the apertures 40 of the wall 39 to grind the solid material which is suspended in the stream of water drawn inwardly by the impeller 36.

Bolted, or otherwise suitably secured upon bosses 49 formed integrally upon the underside of the tank bottom 18, is a high-speed, heavy duty, electric motor 50 having a driving pulley 51 connected by means of a belt 52 to the pulley 34. It will, of course, be obvious in this connection that the motor is electrically connected by wires or electric conduit (not shown) to the switch 17. Finally, the tank 1 is provided with a small water inlet pipe 53 mounted in and extending through the tank wall 5 adjacent to, and upon a level with the upper end of, the stand pipe 20. The inlet pipe 53 is conventionally connected to a water supply line through a suitable hand valve (not shown) by which a relatively small stream of make-up water may be supplied to the tank 1.

For appearance, as well as protection of the moving parts, the tank 1 is preferably, though not necessarily, enclosed within an external skirt 54 which is flanged outwardly at its upper end and welded, riveted, or otherwise secured upon the underface of the tank flange 2. As has been above pointed out, the entire structure may be supported from the floor by means of the leg or stand 25, or if desired, the leg or stand 25 may be utilized merely as a reenforcing support and the entire structure mounted in dishwashers table, in which case the upper horizontal plane of the device would ordinarily be located approximately in the plane of the table top so that the tableware as they are brought in from the dining room by waiters and bus-boys can be quickly and conveniently scraped.

In operation, the tray 9 is fitted snugly within the channel 4 of the tank 1 so that the arm 13 will be suitably depressed and the switch 17 will be turned on. The motor 50 will thereupon rotatably drive the shaft 33 and its associated parts at relatively high speed. Meanwhile, the tank 1 has been filled up to the level permitted by the height of the stand-pipe 20. The water is drawn horizontally inwardly by the impeller 36 and discharged upwardly through the discharge spout 38 in a gushing fountain somewhat similar to that which issues from a fountain bubbler except that the volume is much greater. This gusher or fountain of water issues upwardly through the aperture 10 through the tray 9 and projects itself for a distance of several inches above the entire device and then falls back downwardly upon the upper face of the tray 9 in the area adjacent the opening 10 and flows thence by gravity into and through the opening 10 to return to tank 1.

When an item is scraped by the dishwasher or attendant, the refuse is directed in the more or less general direction of the fountain of water bubbling up through the opening 10 and is caught in the returning stream of water, being thereby carried through the opening 10 into the body of the tank 1. This refuse may consist of food peelings and various kinds of table scraps of any texture or consistency ranging from the solidity and fragmentary character of meat scraps, chicken bones, and the like, to the leafy readily destructible types of scrap, such as lettuce, tomatoes and other salad leavings, and semi-fluid refuse such as gravy and the like. Regardless of type, the table scrap is caught in the stream of water within the tank 1, is drawn inwardly by the impeller 36 through the cutting knives 44, and is comminuted by the action thereof while it is suspended in the flowing stream. The comminuted table scrap then passes upwardly and becomes a part of the bubbling fountain of water and again flows down into the tank 1, perhaps with additional table scrap and is recirculated and reground. This continues a number of times until the table scrap becomes suspended in the water in the form of a sludge. As table scrap is con-

tinuously dumped into the device, the thickness of the sludge will build up but at all times the table scrap will be recirculated continuously. Meanwhile, the volume of liquid within the tank 1 will be increased by reason of the additional volume resulting from the table scrap and refuse as well as by reason of the trickling in of makeup water through the inlet pipe 53. As a result, there is a more or less continuous overflow of sludge into the stand pipe 20 and thence to the sewer. Consequently, the sludge is being carried away to the sewer in a highly fluid form and the garbage or table refuse is being continuously ground and disposed of. By reason of its high speed and continuous operation, the garbage disposal device of the present invention is capable of handling a very large quantity of table scraps and refuse and can take care of a very large kitchen volume such as that encountered in large restaurants and hotels.

When it is desired to shut the machine down at the end of the day's operations, the tray 9 is lifted out of place and the switch 17, together with its associating actuating links and levers, returns to "off" position thereby shutting the motor down. The stand pipe 20 then is manually lifted out of the drainage aperture 19 and the entire tank 1 drained. In this connection it should be noted that the bottom wall 18 of the tank 1 is spaced downwardly from the lowermost point of the grinder 26 and acts as a catch basin for any articles, such as silverware or the like, which may accidentally be thrown into the device with the garbage. Such tableware will sink to the bottom and be thus prevented from entering and damaging the grinding apparatus, or be itself damaged thereby. It is, therefore, desirable to explore the bottom of the tank manually before removing the stand pipe 20 so as to recover any small silver articles that might otherwise get caught in or pass down through the drain aperture 19 to the sewer. As a practical matter, however, the drain aperture 19 is of such relatively small size that knives, forks, spoons, and similar tableware, would not pass through in any case.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the garbage disposal device may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A garbage disposal device comprising an open-topped tank, means for supplying water to the tank, an overflow pipe in the tank adapted to maintain a body of water within the tank up to a predetermined level, a tray removably mounted across the open top of the tank and having an opening through which garbage may be deposited into the body of water within the tank, a pump immersed within the body of water, and grinding means associated with the pump for reducing the water and suspended garbage to a relatively fluid sludge, said pump having a discharge opening disposed beneath the tray opening so as to cause a spout of fluid to bubble up through the tray-opening and over the face of the tray for sluicing garbage down through the tray-opening into the tank.

2. A garbage disposal device comprising an

open-topped tank having an upper shallow section of relatively large cross-sectional area and a lower portion of reduced cross-sectional area with respect to the upper section in the provision of a relatively deep sump, a tray disposed across the open top of the tank and having an unobstructed opening above the sump, and a comminuting pump in the sump having a discharge orifice aligned with said unobstructed opening and directed upwardly out of the sump so that when the tank is filled with liquid and the pump is operated a fountain of liquid will be projected upwardly out of the sump and through said unobstructed opening.

3. A garbage disposal device comprising a tank having an upper shallow section of relatively large cross-sectional area and a lower portion of reduced cross-sectional area with respect to the upper section in the provision of a relatively deep sump, and a comminuting pump in the sump having a discharge orifice directed upwardly out of the sump, said sump being unobstructed in the area over said discharge orifice so that when the tank is filled with liquid and the pump is operated a fountain of liquid will be projected upwardly out of the sump, said tank further having an inclined bottom wall spaced downwardly from the pump in the formation of a catch basin for receiving silverware and similar objects which may be accidentally thrown into the tank along with the garbage.

4. A garbage disposal device comprising an open-topped tank having a tray disposed across the open top thereof and being provided with an opening, said tank further having an upper shallow section of relatively large cross-sectional area and a lower portion of reduced cross-sectional area with respect to the upper section in the provision of a relatively deep sump having a side wall spaced inwardly from the periphery of the upper shallow section and extending transversely thereacross, and a comminuting pump mounted on said side wall in the sump, said pump having an intake orifice presented horizontally to the sump and having a discharge orifice directed upwardly out of the sump and aligned with the tray-opening, said sump being unobstructed in the area over said discharge orifice so that when the tank is filled with liquid and the pump is operated a fountain of liquid will be projected upwardly out of the sump.

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