

Feb. 23, 1954

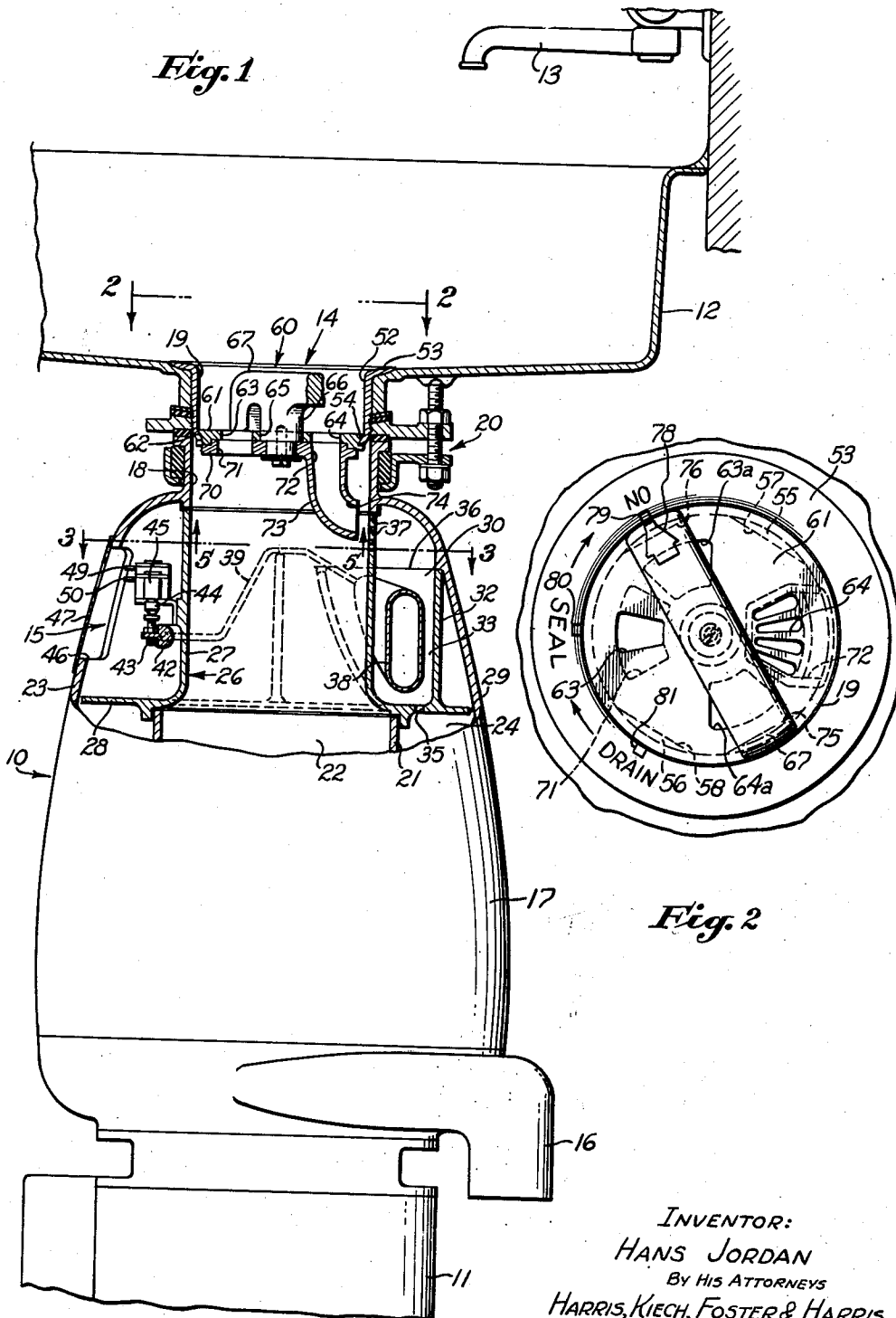
H. JORDAN

2,670,137

FLOAT CONTROLLED GARBAGE DISPOSER

Filed Feb. 24, 1947

3 Sheets-Sheet 1



INVENTOR:  
HANS JORDAN  
By HIS ATTORNEYS  
HARRIS, KIECH, FOSTER & HARRIS  
By *Lawrence H. Harris*

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H. JORDAN

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FLOAT CONTROLLED GARBAGE DISPOSER

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3 Sheets-Sheet 2

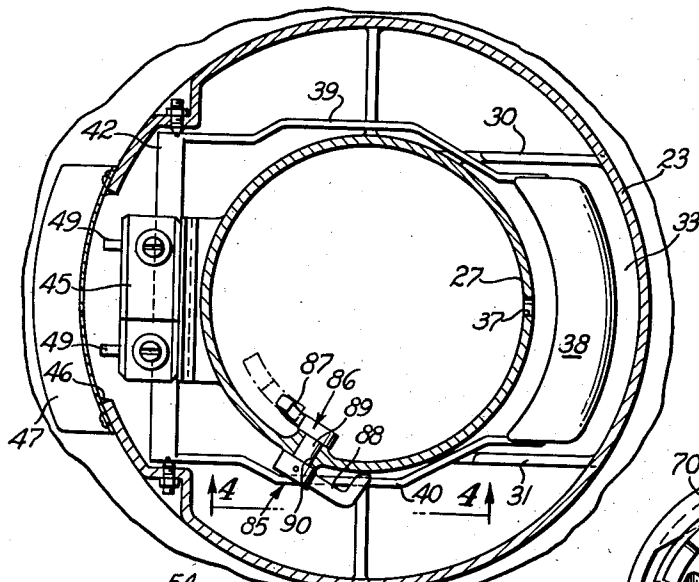


Fig. 3

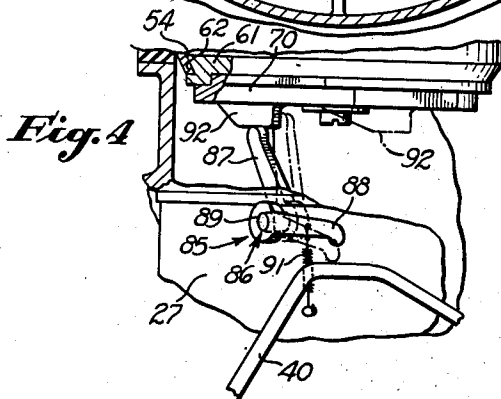


Fig. 4

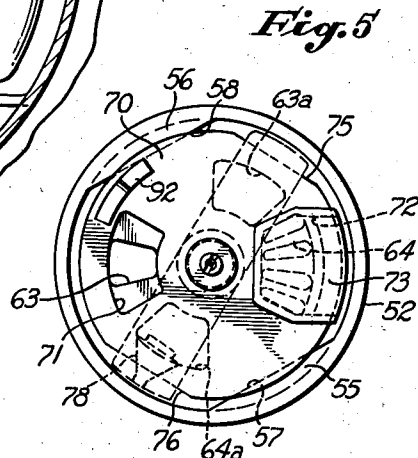


Fig. 5

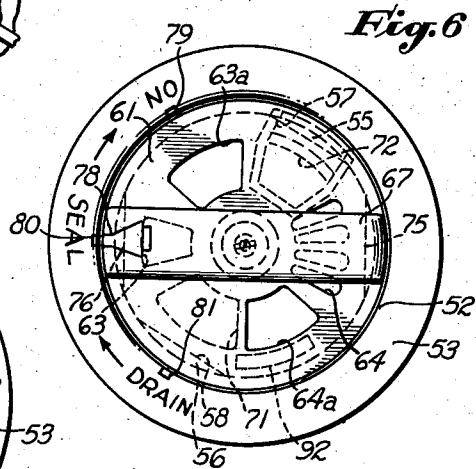


Fig. 6

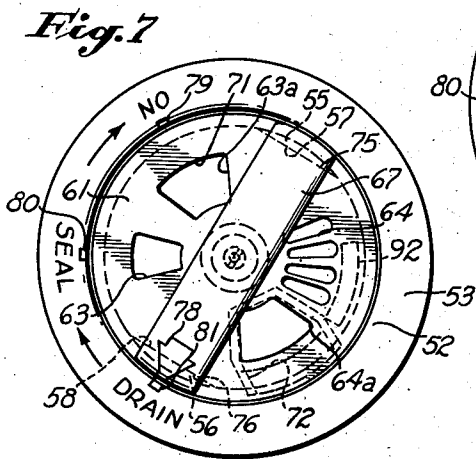


Fig. 7

INVENTOR:  
HANS JORDAN  
By His Attorneys  
HARRIS, KIECH, FOSTER & HARRIS  
By *[Signature]*

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H. JORDAN

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3 Sheets-Sheet 3

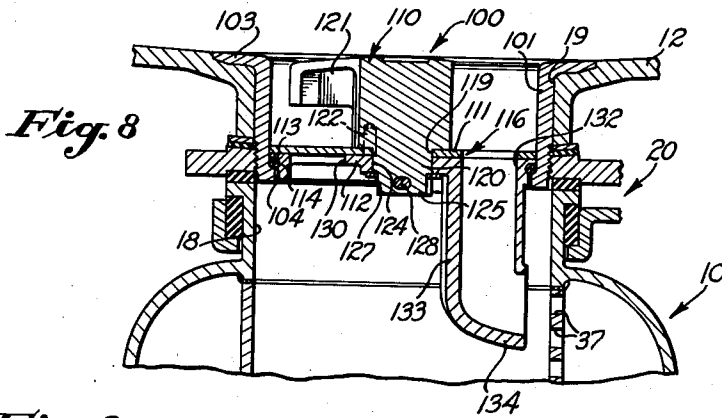


Fig. 8

Fig. 9

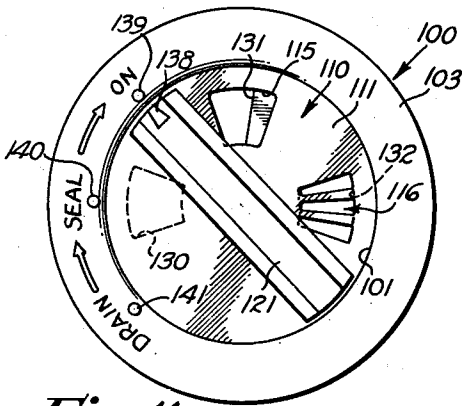


Fig. 11

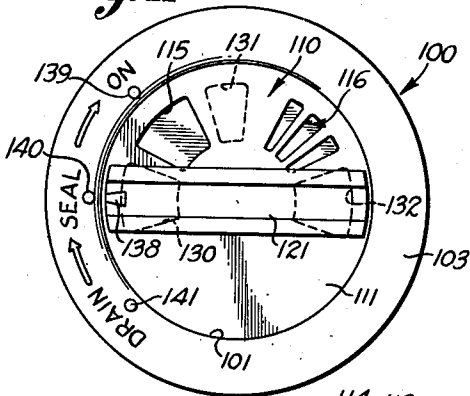


Fig. 13

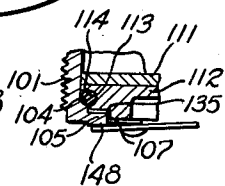


Fig. 10

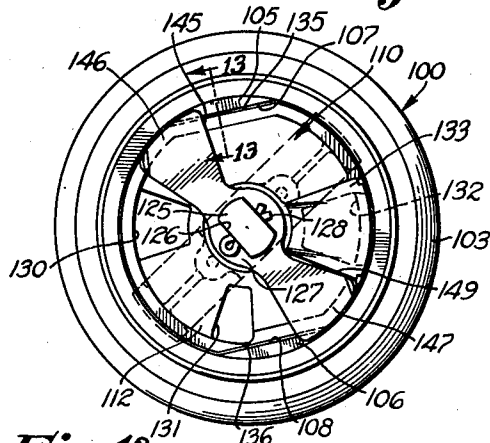
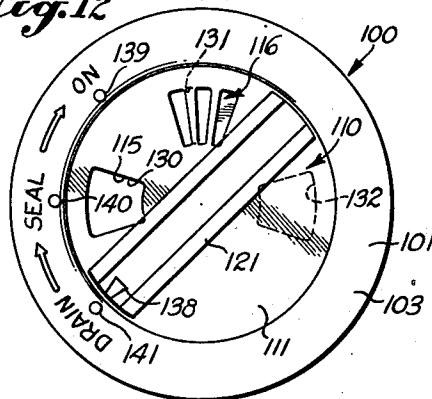


Fig. 12



INVENTOR:

HANS JORDAN

By HIS ATTORNEYS

HARRIS, KIECH, FOSTER & HARRIS

By *[Signature]*

# UNITED STATES PATENT OFFICE

2,670,137

## FLOAT CONTROLLED GARBAGE DISPOSER

Hans Jordan, Los Angeles, Calif., assignor, by mesne assignments, to Given Machinery Company, Los Angeles, Calif., a copartnership

Application February 24, 1947, Serial No. 730,482

25 Claims. (Cl. 241-36)

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My invention relates to the waste disposal art and, more particularly, to a device adapted for the comminution and disposal of garbage and other waste materials.

Such devices are generally well known in the art, one form thereof being illustrated and described in detail in my Patent No. 2,442,812, for Garbage Disposal Device, issued June 8, 1948, to which reference is hereby made for the purpose of a general understanding of such devices.

It is conventional practice in the art to supply a waste disposal device with water during operation of the device, so as to assist in the comminution of waste material by the device and the flushing of comminuted material therefrom. A common expedient in the household use of such disposal devices is to place the device beneath the drain opening of a conventional household sink, and to provide the drain opening with a stopper adapted to permit a flow of water from the sink faucet through the sink and through the drain opening and into the disposer to assist in the waste material comminution therein. Such disposal devices are normally provided with an electric motor for operating the comminuting means thereof, and usually include electrical switch mechanism adapted to be actuated by a flow of water through the line leading to the cold water faucet, to energize the motor and thus operate the comminuting means of the device. Thus, when the faucet is opened by the housewife the flow of water therefrom passes to the disposal device and, simultaneously, the comminuting means is energized by the electric motor.

It is highly desirable, if not essential, in most of such disposal units that a flow of water or other flushing liquid be supplied to the comminuting means during the operation thereof. If such flow of water is stopped during operation of the comminuting means, waste material, such as garbage, may pack in the disposal device to prevent operation of the comminuting means, thereby tending to jam the unit, with attendant damage thereto. In the use of such prior art disposal devices, if a conventional double sink is employed, and if during operation of the comminuting means of the disposal device the discharge nozzle of the faucet is turned so as to direct the water into the sink with which the disposal device is not connected, obviously, no water can then flow to the disposal device, and such jamming of the unit, and damage thereto, may be occasioned. This has been a serious difficulty with conventional types of garbage disposal devices now on the market.

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It is therefore a primary object of the present invention to obviate the difficulties mentioned above in connection with conventional garbage disposal devices, providing a device of this general character in which the comminuting means of the disposal device is deenergized and stopped at any time that water or other flushing fluid ceases to enter the disposal device, or at any time that water or other flushing fluid is not passing through the disposal device. The invention has the primary advantage that it may be used with any type of sink indiscriminately, and no care need be taken by the housewife, or other operator, to maintain a flow of water from the faucet or other source directly into the sink to which the disposal device is connected. I prefer to accomplish this by utilizing a float mechanism, actuated by a supply of water, to close a switch adapted to energize the electric motor provided for actuating the comminuting means. While a preferred, specific embodiment of the invention has been disclosed, it will be apparent to those skilled in the art that the basic principle involved may be utilized in other embodiments without departing from the spirit of my invention.

A further object of the invention is to provide a garbage disposal device as described above, including a float mechanism provided in a float reservoir, in which means are provided to limit the maximum level of water that can accumulate in the reservoir, and to convey any surplus to the discharge side of the disposal device. Yet another object of the invention is to provide such a device in which locking means are provided to render the float mechanism inoperative when the drain stopper is removed from the units, so as to insure that the disposal device cannot be energized when the stopper is removed.

A further object of my invention is to provide a float actuated switch mechanism for a garbage disposal device, which mechanism is actuated by water flowing through the disposal device. Although I prefer to utilize such a switching mechanism in combination with the inlet of water into the disposal device, it will be apparent to those skilled in the art that such a switching mechanism may likewise be associated with discharge water flowing from the disposal device.

Another object of the invention is to provide in combination with a garbage disposal device a novel type of drain opening stopper adapted to direct water flowing into the device selectively so as to operate a suitable electrical switching mechanism.

Still another object of the invention is to pro-

vide a stopper device for a household sink, adapted to be selectively adjusted to any one of three alternative positions, in which an open passage is provided through the stopper, or in which a passage is provided that is partially restricted by a straining means, or to a third position in which no water can flow through the stopper. This type of stopper is of particular utility when used in combination with a garbage disposer device, as it can be employed in its freely open position to provide a clear passageway from a sink into the disposer, through which waste can pass through the sink into the disposer, or can be employed when the straining means partially closes such an opening through the stopper as a means for supplying water to the interior of the disposal unit without permitting any garbage to pass into the unit, or can be employed in its closed position to merely act as a stopper closing the drain opening of the sink.

Other objects and advantages of the invention reside in the particular construction disclosed and will appear from the following specification, and the drawings, which are for the purpose of illustration only, and in which:

Fig. 1 is a utility view partially in vertical section, showing the invention installed;

Fig. 2 is an enlarged plan view of one embodiment of the stopper device of the invention, in its "on" position, taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged cross-sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary elevational view, illustrating the locking means of the invention;

Fig. 5 is an enlarged bottom plan view of the embodiment of the stopper device of Fig. 2;

Fig. 6 is a view similar to Fig. 2, but showing this embodiment of the stopper device in its "seal" position;

Fig. 7 is an other view similar to Fig. 2, but showing this embodiment in its "drain" position;

Fig. 8 is an enlarged, fragmentary sectional view similar to the upper portion of Fig. 1, but showing another embodiment of the stopper device of the invention;

Fig. 9 is an enlarged plan view of the embodiment of the stopper device which is shown in Fig. 8, the device being in its "on" position;

Fig. 10 is an enlarged bottom plan view of the stopper device of Fig. 9;

Fig. 11 is a view similar to Fig. 9, but showing this embodiment of the stopper device in its "seal" position;

Fig. 12 is another view similar to Fig. 9, but showing this embodiment in its "drain" position; and

Fig. 13 is an enlarged, fragmentary sectional view taken along the broken line 13—13 of Fig. 10 in the direction of the arrows thereadjacent.

Referring to Fig. 1 of the drawings, I show a waste material disposal unit 10 having an electric motor 11, and supported by a conventional household sink 12. A conventional faucet 13 is provided so as to supply water to the sink 12 in the usual manner and is connected to a suitable source thereof, such as a water main (not shown). Provided between the disposal unit 10 and the sink 12 is a stopper device 14 and carried by the disposal unit is a main switch device 15.

The disposal unit 10 may be of any suitable type, such as that shown in my copending application Serial No. 639,753, now Patent No. 2,442,812, previously mentioned, which contains comminuting means (not shown) actuated by the

electric motor 11 to comminute garbage or other waste material introduced into this disposal unit. As will be noted, the disposal unit 10 includes a vertically disposed hopper 17 having an opening 18 in the upper end thereof which is axially aligned with an opening 19 in the sink 12, through which openings garbage or other waste materials may be introduced into the disposal unit. The upper end of the hopper 17 is resiliently secured to the bottom of the sink 12 by a flange assembly 20. Associated with the lower portion of the hopper 17 is a discharge pipe 16 adapted to convey fluid and comminuted material from the interior of the hopper to a point of disposal, such as, for example, a sewer main (not shown).

As best shown in Fig. 1, the hopper 17 includes an inner wall 21, of generally cylindrical cross section and defining an inner comminuting chamber 22, and an outer wall 23 surrounding the inner wall and defining an annular space 24 therebetween. Seated on the upper end of the inner wall 21, and enclosed by the outer wall 23, is an insert assembly 26 which includes a cylindrical inner wall 27 forming a downward continuation of the opening 18, and having an outwardly extending annular horizontal flange 28, the outer rim of which is spaced slightly from the outer wall 23 to form an annular space 29 therebetween. As best shown in Figs. 1 and 3, the insert assembly 26 also includes vertical side walls 30 and 31 connected by a semi-circular end wall 32 and forming a float chamber 33. As best shown in Fig. 1, the float chamber communicates directly with the annular space 24 through a restricted capacity bleed port 35 and, as will be noted, the side walls 30 and 31 have relatively low tops 36. The cylindrical inner wall 27 of the insert assembly 26 is provided with perforations 37 communicating between the interior of the cylindrical inner wall and the float chamber 33.

Disposed in the float chamber 33 is a hollow float member 38 which is provided with arms 39 and 40 which extend somewhat upwardly from the float member so as to pass over the tops 36 of the side walls 30 and 31 and then downwardly, the other ends of the arms being pivotally mounted on a pivot pin 42 carried by suitable bearings provided in the outer wall 23, as best shown in Fig. 3. Carried by the pivot pin 42 is an adjustable screw member 43 which extends upwardly and is adapted to engage a contact button 44 of a conventional microswitch 45 forming part of the main switch device 15. The micro-switch 45 is suitably carried by the insert assembly 26, and access is had thereto through an opening 46 provided in the outer wall 23, the opening normally being closed by a cover plate 47 which is suitably secured to the outer face of the outer wall 23, by screws or otherwise.

The micro-switch 45 is provided with electrical contacts 49 and 50 which are adapted to be electrically connected in series with the electric motor 11 and an electric power source, in conventional fashion. The micro-switch 45 is of the type such that when the contact button 44 thereof is depressed relative to the body of the switch, i. e., when the contact button is in its uppermost position as viewed in Fig. 1, the electrical circuit between the contacts 49 and 50 is broken so as to de-energize the electric motor 11, the electrical circuit therethrough being established only when the contact button is extended automatically, i. e., when the contact button is in its lowermost position as viewed in Fig.

1, such extension being permitted only when the adjustable screw member 43 is moved downwardly relative to the micro-switch as will be described hereinafter.

The stopper device 14 includes a collar 52 which extends through the opening 19 and which is threaded into the flange assembly 20, and which is provided with an annular top flange 53 which seats in a suitable annular recess formed in the sink 12. The collar 52 is so formed at its lower end as to provide a conical seat 54 and, as shown in Fig. 5, is provided with inwardly extending, diametrically opposed, horizontal lips 55 and 56 providing flat inner faces 57 and 58, respectively. Adapted to fit into the collar 52 is a stopper assembly 60, which includes a circular top plate 61 provided with a beveled edge 62 adapted to seat in fluid tight relation on the conical seat 54 of the collar 52. As best shown in Figs. 1 and 2, formed in the top plate 61 are drain openings 63, 63a, 64 and 64a, the openings 63 and 64 being disposed diametrically opposite each other and the openings 63a and 64a also being diametrically opposite. The drain opening 64 is comprised of a plurality of closely spaced slots formed in the top plate 61 so that this opening is, in effect, a strainer device for fluid and solid materials tending to pass there-through. The top plate 61 is also provided with a central aperture 65 through which extends a hub 66 of a handle member 67. The lower end of the hub 66 is of reduced diameter so as to receive a lower plate 70, the lower plate being retained on the hub by a suitable screw, and being retained against rotation relative to the hub. The lower plate 70 is provided with drain apertures 71 and 72, the drain aperture 72 communicating with a depending spout 73 which is provided with a horizontally directed discharge orifice 74. As best shown in Fig. 5, the lower plate 70 is provided with a pair of diametrically opposite flats 75 and 76 corresponding to the flat faces 57 and 58, respectively, on the collar 52.

The three operational positions of the stopper assembly 60 are shown in Figs. 2, 6 and 7, Fig. 5 showing a bottom view of the stopper assembly when it is in the position equivalent to that shown in Fig. 2, and Fig. 1 also showing the stopper assembly when it is in the position equivalent to that shown in Fig. 2. As will be apparent, rotation of the handle member 67 rotates the lower plate 70 and the drain spout 73 depending therefrom. As shown in Figs. 2, 6 and 7, the top of the handle member 67 is provided with an arrow 78, or other indicium, adapted to register with indicia 79, 80 or 81 formed on the top flange 53 of the collar 52, and indicating the various operational positions of the stopper assembly, such operational positions being further indicated by the words "on," "seal" and "drain" opposite the indicia 79, 80 and 81, respectively.

Considering first the "on" position of the stopper assembly 60 with reference to Figs. 1 and 2, the positions of the handle member 67 and the lower plate 70 are such that the arrow 78 is opposite the indicium 79 and the drain apertures 71 and 72 in the lower plate are in registry with the drain openings 63 and 64, respectively, in the top plate 61 so that if water is discharged into the sink 12 from the faucet 13 it passes downwardly through the opening 63 and aperture 71 into the comminuting chamber 22 and also passes downwardly through the opening 64 and aperture 72 into the depending spout 73. As best shown in Fig. 1, when the stopper assembly 60 is

in its "on" position the discharge orifice 74 of the depending spout 73 is directed toward the perforations 37 leading into the float chamber 33 so that the water flowing downwardly through the depending spout passes through the perforations and into the float chamber. It will be noted that when the stopper assembly 60 is in its "on" position, the slotted drain opening 64 in the top plate 61 serves as a strainer which prevents the passage of large pieces of waste material into the depending drain spout 73 so that such waste material will not clog the perforations 37 leading to the float chamber 33. The slotted drain opening 64 strains large pieces of waste material from the water flowing into the drain spout 73 only when the stopper assembly 60 is in its "on" position, the passage of all waste material through the drain spout being permissible when the stopper assembly is in its "drain" position since, as will be pointed out in more detail hereinafter, the drain spout is not directed toward the perforations 37 leading to the float chamber 33 when the stopper assembly is in the "drain" position.

If the volume of water passing into the float chamber 33 through the perforations 37 is less than the capacity of the bleed port 35, such water will be drained from the float chamber through the bleed port into the annular space 24 in the hopper 17 and thence into the discharge pipe 16 so that the float member 33 will not move. If, however, the volume of water entering the float chamber 33 is substantially greater than the capacity of the bleed port 35, the float chamber obviously will tend to fill with water so that the water level therein will rise until it passes the center of buoyancy of the float member 33, following which the float member will move upwardly in the float chamber and will rotate about the pivot pin 42. Such movement of the float member 33 is communicated through the arms 39 and 40 to the screw member 43, causing it to move downwardly as viewed in Fig. 1. Such downward movement of the screw member 43 permits the micro-switch 45 to move downwardly, as viewed in Fig. 1, so that the contacts 49 and 50 engage each other to complete the electrical circuit to the electric motor 11. As will be understood, energization of the motor 11 in this manner causes the comminuting means (not shown) of the disposal unit 10 to operate therein.

In the event that water flowing into the float chamber 33 through the depending spout 73 and perforations 37 causes the float chamber to overflow, because of a difference between the rate of flow into the float chamber and the rate of flow of water therefrom through the bleed port 35, such overflow will pass over the tops 36 of the relatively low side walls 30 and 31 of the float chamber and will pass into the annular space 24 in the float chamber through the annular space 29 between the horizontal flange 23 and the outer wall 23 of the hopper, such overflow draining from the annular space 24 into the discharge pipe 16. The passage thus provided by the perforations 37, the annular space 24, the annular space 29, and the connecting discharge pipe 16 provides a self-venting passage for back flow in the event that the waste line beyond the discharge pipe 16 becomes clogged as sometimes happens. Thus, the inherent pressure of the comminuting mechanism in the comminuting chamber 22, instead of working continuously against the plug in the waste line caused by the clogging, is conveniently vented upward through

the lower portion of the annular space 24 via the annular space 29 and back through the perforations 37 until backing up of the water in the sink 12 gives warning of the clogging of the sewer line.

It will be apparent that the electric motor 11 will continue to operate so long as the level of water in the float chamber 33 maintains the float member 38 in its upper position. If at any time the flow of water through the drain spout 73 stops, due to closure of the faucet 13, or due to the faucet 13 being directed into another compartment of the sink 12 (as commonly occurs in double compartment household sinks), water will immediately bleed from the float chamber 33 through the bleed port 35, thus permitting the float member 38 to drop which, in turn, results in opening of the circuit to the motor 11 through the mechanism previously described. This construction provides a safety feature of the invention which prevents the operation of the electric motor 11 when no water, or when an insufficient volume of water is being discharged into the float chamber 33 through the drain spout 73.

Considering next the operation of the stopper assembly 60 when it is in its "drain" position and referring particularly to Fig. 7, it will be noted that the positions of the handle member 67 and the lower plate 70 are such that the arrow 78 registers with the indicium 81 and the drain apertures 71 and 72 in the lower plate register with the drain openings 63a and 64a, respectively, in the top plate 61. Thus, any water and waste material in the sink 12 may flow past the stopper assembly 60 into the interior of the hopper 17 through the registering opening 63a and aperture 71 and through the registering opening 64a and aperture 72. It is also to be noted that when the stopper assembly 60 is in its "drain" position as shown in Fig. 7, the depending drain spout 73 is directed away from the perforations 37 leading to the float chamber 33 so that no fluid or waste material passing through the drain spout when it is in this position can enter the float chamber through the perforations 37, this being an important feature of the invention since it prevents the perforations 37 from being clogged by waste material passing through the drain spout. It will, of course, be apparent that since the drain spout 73 is directed away from the perforations 37 leading to the float chamber 33 when the stopper assembly 60 is in its "drain" position, no water can enter the float chamber 33 so that the electric motor 11 cannot be energized when the stopper assembly is in its "drain" position.

In order to permit insertion of the stopper assembly 60 into the collar 52, or to permit removal of the stopper assembly therefrom, the lower plate 70 of the stopper assembly must be in such a position that the diametrically opposite flats 75 and 76 thereon register with the flat faces 57 and 58, respectively, on the collar 52. As shown in Fig. 7, the flats 75 and 76 are in registry with the flat faces 57 and 58 only when the stopper assembly 60 is in its "drain" position. Consequently, the handle member 67 must be rotated until the arrow 78 thereon registers with the indicium 81 before the stopper assembly 60 can be removed from or inserted in the collar 52.

Considering now the operation of the stopper assembly 60 when it is in its "seal" position and referring particularly to Fig. 6, as the handle member 67 is rotated into a position such that the arrow 78 thereon registers with the indicium

30, the lower plate 70 is rotated into a position such that the drain apertures 71 and 72 therein are out of registry with all of the drain openings 63, 63a, 64, 64a in the top plate 61; thus terminating all communication through the stopper assembly between the sink 12 and the hopper 17. In its "seal" position, the stopper assembly 60 merely acts as a drain stopper for the sink 12. It will also be noted that when the stopper assembly 60 is in its "seal" position, the depending drain spout 73 is directed away from the perforations 37 leading to the float chamber 33 so that there is no possible communication in this position between the drain spout and the interior of the float chamber.

Thus, the stopper assembly 60 performs three principal functions, viz., it serves to energize the electric motor 11 when it is in its "on" position so that the comminuting means (not shown) in the comminuting chamber 22 processes any waste material flowing into the comminuting chamber from the sink 12, it serves as a simple drain when it is in its "drain" position to permit unobstructed flow of water from the sink, and it also serves as a drain plug when it is in its "seal" position to prevent flow of water from the sink. It will be apparent that since the depending drain spout is directed toward the perforations 37 leading to the float chamber 33 only when the stopper assembly 60 is in its "on" position, the motor 11 can be energized to drive the comminuting means (not shown) only when the stopper assembly 60 also serves as a safety device which prevents operation of the electric motor whenever no water is flowing into the disposal device to prevent possible damage to the unit from jamming, in accordance with the previously discussed objects of my invention.

In order to prevent operation of the disposal unit 10 when the stopper assembly 60 is removed therefrom, the unit is provided with locking means 85 for preventing operation of the float member 38, which controls the energization of the electric motor 11, when the stopper assembly 60 is removed. Preferably the locking means 85 prevents operation of the float member 38 under all conditions except for that in which the stopper assembly 60 is inserted in the collar 52 and is in its "on" position as will be discussed in more detail in the following paragraph.

Referring to Figs. 3 and 4, the locking means 85 comprises a bell crank member 86 which includes rigidly interconnected arms 87 and 88, the arms of the bell crank member being interconnected by a pivot pin 89 which is journaled in a bearing 90 formed in the cylindrical inner wall 27. The bell crank member 86 is biased for rotation in the clockwise direction, as viewed in Fig. 4, by a spring 91 which is connected to the arm 88 and to the cylindrical inner wall 27, whereby the spring tends to retain the bell crank member in the position shown in phantom in Fig. 4 with the arm 88 thereof engaging the arm 40 to which the float member 38 is attached so as to prevent operation of the float member even though water may be present in sufficient volume in the float chamber 33 to lift the float member. In order to release the arm 40 connected to the float member 38 when the stopper assembly 60 is in its "on" position so that the float member 38 will be free to energize the electric motor 11 in the manner described as the float chamber 33 fills with water, the lower plate 70 of the stopper assembly is provided with a projection 92 there-



on which engages the arm 87 of the bell crank member to rotate this member into the position shown in full lines in Fig. 4 as the lower plate is rotated into its "on" position, thereby rotating the arm 88 of the bell crank member out of engagement with the arm 89 to which the float member 38 is connected so that the float member may operate to energize the electric motor 11. The position of the projection 32 on the lower plate 79 of the stopper assembly 60 is such that it rotates the bell crank member 86 into the position shown in full lines in Fig. 4 only when the stopper assembly is in its "on" position so that the electric motor 11 can be energized only when the stopper assembly is in this position, and can not be energized when the stopper assembly is in any other position or is removed from the collar 52. Thus, the locking means 85 serves as an additional safety device which permits the disposal unit 10 to be operated only under the proper operating conditions hereinbefore set forth.

Referring now to Figs. 8 to 13 of the drawings, and particularly to Fig. 8, I show a disposal unit which is similar to the one described previously except that the stopper device 14 is replaced by another stopper device 100. This stopper device includes a collar 101 which extends through the opening 19 in the sink 12 and which is threaded into the flange assembly 20, the collar being provided with an annular top flange 193 which seats in the annular recess formed in the sink 12 as in the case of the previously described collar 52. The collar 101 is so formed at its lower end as to provide a conical seat 104 and, as shown in Fig. 10, is provided with inwardly extending, diametrically opposed, horizontal lips 105 and 106 providing flat inner faces 107 and 108, respectively. Adapted to fit into the collar 101 is a stopper assembly 110 which is generally similar to the stopper assembly 60, the assembly 110 including a circular top plate 111 and a circular bottom plate 112. The latter is provided with an annular groove 113 therein for a sealing ring 114 which is adapted to seat on the conical seat 104 of the collar 101 in fluid-tight engagement therewith.

As best shown in Fig. 11, the top plate 111 is provided with drain apertures or openings 115 and 116 therein, the aperture 116 comprising a plurality of closely spaced slots formed in the top plate so that this aperture is, in effect, a strainer device for large pieces of solid material tending to pass therethrough. The top plate 111 is also provided with a central opening 119 through which extends a hub 120 of a handle member 121, the handle member being rigidly connected to the top plate by means of a pin 122. The hub 120 is journaled in an opening 124 in the bottom plate 112 so that the handle member 121 and the top plate 111 may be rotated relative to the bottom plate, which is stationary as will be discussed in more detail hereinafter. The hub 120 of the handle member terminates in a generally rectangular projection 125 which extends through a complementary opening 126 in a resilient member 127 which will be described hereinafter, this resilient member being retained on the hub 120 by a cotter key 128, or the like which extends through an opening in the hub.

The lower plate 112 is provided with drain ports 130, 131 and 132 therein with which the apertures 115 and 116 in the top plate 111 are adapted to register in various combinations as will be discussed in more detail hereinafter. Communicat-

ing with the port 132 in the stationary lower plate 112 and rigidly connected to the lower plate is a depending spout 133 which is provided with a horizontally directed discharge orifice 134 for directing water toward the perforations 37 leading to the float chamber 33, the spout 133 being generally similar to the spout 73 which was described previously, except that it is stationary and is always directed toward the perforations 37. As best shown in Fig. 10, the lower plate 112 is provided with a pair of diametrically opposed, inwardly extending, horizontal flat faces 135 and 136 corresponding to the flat faces 107 and 108, respectively, on the collar 101 and cooperating therewith to prevent rotation of the lower plate with respect to the collar.

The various operational positions of the stopper assembly 110 are shown in Figs. 9, 11 and 12, Fig. 10 being a bottom view of the stopper assembly when it is in the position equivalent to that shown in Fig. 9, and Fig. 8 also showing the stopper assembly when it is in the position equivalent to that shown in Fig. 9. As will readily be apparent, rotation of the handle member 121 rotates the upper plate 111 relative to the bottom plate 112 to bring the apertures 115 and 116 in the top plate into registry with the ports 130, 131 and 132 in the lower plate in various combinations which will be discussed hereinafter. As shown in Figs. 9, 11 and 12, the top of the handle member 121 is provided with a pointer 138, or other indicium, adapted to register with indicia 139, 140 or 141 formed on the top flange 103 of the collar 101, and indicating the various operational positions of the stopper assembly, such operational positions being further indicated by the words "on," "seal" and "drain" opposite the indicia 139, 140 and 141, respectively. It will be noted that when the stopper assembly 110 is in its "on" position, as shown in Fig. 9, the aperture 115 in the top plate 111 registers with the port 131 in the lower plate 112, and the aperture 116 in the top plate registers with the port 132 in the lower plate. Similarly, when the stopper assembly is in its "drain" position, as shown in Fig. 12, the apertures 115 and 116 in the top plate register with the ports 130 and 131, respectively, in the lower plate. However, when the stopper assembly is in its "seal" position, as shown in Fig. 11, the apertures in the top plate 111 do not register with any of the ports in the bottom plate 112.

As best shown in Fig. 10, when the stopper assembly is in its "on" position, the resilient member 127, which is preferably in the form of a spring strap, engages the inwardly extending lips 105 and 106 on the collar 101 to prevent removal of the stopper assembly from the collar for a reason which will be pointed out hereinafter. The resilient member 127 remains in engagement with the lips 105 and 106 when the stopper assembly 110 is moved to its "seal" position, but disengages these lips when the stopper assembly is in its "drain" position so that the stopper assembly may be removed from the collar 101. When the stopper assembly 110 is in its "drain" position, the resilient member 127, referring to Fig. 10, is rotated in the clockwise direction so that the edge 145 thereof is adjacent the depending spout 133, whereby the ends 146 and 147 of the resilient member no longer engage the lips 105 and 106 so that the stopper assembly 110 may be withdrawn from the collar 101.

As best shown in Fig. 13, the lips 105 and 106 on the collar 101 are provided with raised cam portions 148 which tend to deflect the ends 146



and 147 of the resilient member 127 downwardly so that the resilient member, acting through the hub 120 of the handle member 121, draws the top plate 111 downwardly into fluid-tight engagement with the bottom plate 112. The ends 146 and 147 of the resilient member 127 are bent downwardly at opposite corners of the resilient member, as best shown in Fig. 10, so that the ends of the resilient member will ride up onto the raised cam portions 148 readily in rotating the stopper assembly 110 from its "drain" position toward its "seal" position. The ends of the resilient member 127 engage the raised cam portions 148 of the lips 105 and 106 while the stopper assembly 110 is in its "seal" position so as to prevent leakage of fluid between the upper plate 111 and the lower plate 112 when the stopper assembly is in this position. It will be noted that the edge 149 of the resilient member 127 engages the spout 133 when the stopper assembly 110 is in its "on" position so that in setting the stopper assembly in this position, the operator need merely rotate the handle member 121 until the resilient member engages the spout. Similarly, the edge 145 of the resilient member 127 is adapted to engage the spout 133 when the stopper assembly 110 is in its "drain" position to provide a positive means for locating this position.

The operation of the stopper device 100 is generally similar to that of the stopper device 14 and need not be described in detail. In general, when the stopper assembly 110 is in its "on" position wherein the pointer 132 registers with the indicium 139, the apertures 115 and 116 in the upper plate 111 register with the drain ports 131 and 132, respectively, in the bottom plate 112 as shown in Figs. 9 and 10. Thus, any water in the sink 12 passes downwardly through the registering openings 115 and 131, and also passes downwardly through the registering openings 116 and 132 into the depending spout 133. The water flowing through the spout 133, which is stationary and is always directed toward the perforations 37 leading into the float chamber 33, enters the float chamber through these perforations to operate the main switch device 15 in the manner previously described. It will be noted that when the stopper assembly 110 is in its "on" position, the slotted drain aperture 116 in the upper plate 111 serves as a strainer which prevents the passage of large pieces of waste material into the drain spout 133 so that such pieces will not clog the perforations 37 leading to the float chamber 33. However, the waste material to be comminuted may be carried into the comminuting chamber 22 by water flowing downwardly through the registering opening 115 and 131. The remainder of the operation of the disposal unit 10 when the stopper device 100 is employed in connection therewith is similar to its operation when the stopper device 14 is used and will not be considered further herein.

Considering the operation of the stopper device 100 when the stopper assembly 110 is in its "drain" position, it will be noted that the positions of the handle 121 and the upper plate 111 are such that the pointer 138 registers with the indicium 141 and the drain apertures 115 and 116 in the top plate register with the ports 130 and 131, respectively, in the bottom plate 112, all as shown in Fig. 12. Thus, any water and waste material in the sink 12 may flow past the stopper assembly 110 into the interior of the hopper 17 through the registering aperture 115 and port 130 and through the registering aperture 116 and port 131. It is also to be noted that when

the stopper assembly 110 is in its "drain" position, as shown in Fig. 12, the port 132 in the bottom plate 112 which leads to the spout 133 is closed by the top plate 111 so that no fluid or waste material may enter the spout. Consequently, any possibility of clogging the perforations 37 leading to the float chamber 33 with waste material while the stopper assembly 110 is in its "drain" position is eliminated. It will, of course, be apparent that since the drain spout 133 is closed when the stopper assembly 110 is in its "drain" position, no water can enter the float chamber 33 so that the electric motor 11 cannot be energized.

In order to permit insertion of the stopper assembly 110 into the collar 101, or to permit removal of the stopper assembly therefrom, the stopper assembly must be in its "drain" position so that the ends 146 and 147 of the resilient member 127 clear the inwardly extending lips 105 and 106 on the collar as previously discussed. Consequently, the handle member 121 must be rotated until the pointer 138 therein registers with the indicium 141 before the stopper assembly 110 can be removed from or inserted in the collar 101.

When the handle member 121 of the stopper device 100 is rotated into a position such that the pointer 138 thereon is in registry with the indicium 140 as shown in Fig. 11, the stopper assembly 110 is in its "seal" position and, in this position, the apertures 115 and 116 in the top plate 111 do not register with any of the ports 130, 131, or 132 in the bottom plate 112. Also, when the stopper assembly is in its "seal" position, the ends 146 and 147 of the resilient member 127 are in engagement with the raised cam portions 148 on the lips 105 and 106 so that the resilient member 127 urges the top plate 111 downwardly into fluid-tight engagement with the bottom plate. Consequently, no fluid can flow past the stopper assembly 110 when it is in its "seal" position so that the stopper device 100 acts as a simple drain stopper for the sink 12.

Thus, the stopper assembly 110 performs three principal functions, viz., it serves to energize the electric motor 11 when it is in its "on" position so that the comminuting means (not shown) in the chamber 22 processes any waste material flowing into this chamber from the sink 12; it serves as a simple drain when it is in its "drain" position to permit unobstructed flow of water from the sink, and it also serves as a drain plug when it is in its "seal" position to prevent flow of water from the sink. It will be apparent that since water may flow into the depending drain spout 133 only when the stopper assembly 110 is in its "on" position, water may enter the float chamber 33 through the perforations 37 to energize the motor 11 only when the stopper assembly is in this position. Thus, the stopper device 100, as in the case of the stopper device 14 which was described previously, serves as a safety device which prevents operation of the electric motor whenever no water is flowing into the disposal device to prevent possible damage to the unit from jamming as previously discussed.

Although I have shown and described only two embodiments of the invention, it will be apparent that modifications in the construction disclosed may be made without departing from the spirit of the invention. For example, although I have shown the float chamber 33 adjacent the upper inlet end of the hopper 17, it will be apparent that the float chamber may be disposed as desired so

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as to control the operation of the main switch device 15 by water passing through any desired portion of the disposal unit 10. Thus, the float chamber 33 may be disposed adjacent the discharge pipe 16, if desired, so that the main switch device 15 may be controlled by water being discharged from the disposal unit 10 through the discharge pipe. Other modifications of the embodiments of my invention disclosed herein will occur to those skilled in the art and, consequently, I do not intend to be limited to the specific constructions illustrated and described but desire to be afforded the full protection offered by the following claims.

I claim as my invention:

1. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material and a fluid can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber; float means in said float chamber; means for conveying fluid from said opening to said float chamber so as to move said float means therein; and means operatively connecting said float means and said switch means so that movement of said float means actuates said switch means.

2. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material and a fluid can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber, said walls having a bleed opening in the lower portion thereof adapted to permit fluid to drain from said chamber; float means in said float chamber; means for conveying fluid from said opening to said float chamber in such volume as to cause said float means to move in one direction therein, said float means being adapted to move in the other direction when the volume of such fluid supplied to said chamber drops below a predetermined value; and means operatively connecting said float means and said switch means so that movement of said float means in said one direction closes said switch means to energize said power means, and so that movement of said float means in said other direction opens said switch means to deenergize said power means.

3. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material and a fluid can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber adjacent said hopper means, said walls having a bleed opening communicating between said chamber and the interior of said hopper means; float means in said float chamber; means for conveying fluid from said opening to said float chamber so as to move said float means therein; and means operatively connecting said float means and said switch means so that movement of said float means actuates said switch means.

4. In a waste disposal device, the combination of: hopper means having an opening therein

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through which waste material and a fluid can be inserted into said hopper means and a discharge pipe through which fluid and comminuted material can be conveyed from said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber adjacent said hopper means, said walls having an inlet opening communicating between the interior of said hopper and said float chamber, said walls having an outlet opening communicating between said chamber and said discharge pipe; float means in said float chamber; means for directing a fluid to said float chamber through said inlet opening from said hopper so to move said float means therein; and means operatively connecting said float means and said switch means so that movement of said float means actuates said switch means.

5. In a waste disposal device, the combination of: hoppers means having an opening therein through which waste material can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; a stopper device for said opening, said stopper device having channel means for directing a flow of fluid therethrough and actuating means connected with said switch means and carried by said hopper means adjacent the path of flowing fluid and responsive to and energizable by a predetermined flow of fluid to actuate said switch means, said stopper means being selectively movable to a first position to direct fluid to said switch actuating means or to a second position to withhold fluid from said switch actuating means.

6. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; a stopper device for said opening, said stopper device having channel means for directing a flow of fluid therethrough and actuating means connected with said switch means and carried by said hopper means adjacent the path of flowing fluid and responsive to and energizable by a predetermined flow of fluid to actuate said switch means, said stopper device being selectively movable to a first position to direct fluid to said switch actuating means or to a second position to direct fluid away from said switch actuating means or to a third position to block fluid flow through said channel means, said stopper device having closure means turnable with respect to said channel means to said third position to close said channel means and thereby effect said blocking of said fluid flow through said channel means.

7. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber, there being an inlet opening communicating between said chamber and the

interior of said hopper means; float means in said float chamber; means operatively connecting said float means and said switch means so that movement of said float means actuates said switch means; and a stopper device for said opening, said stopper device having channel means for directing a flow of fluid therefrom through said inlet opening into said float chamber.

8. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber, there being an inlet opening communicating between said chamber and the interior of said hopper means; float means in said float chamber; means operatively connecting said float means and said switch means so that movement of said float means actuates said switch means; and a stopper device for said opening, said stopper device having channel means for directing a flow of fluid therefrom through said inlet opening into said float chamber, said stopper means being selectively movable to a first position in which fluid flowing through said channel means is directed through said inlet opening or to a second position in which fluid flowing through said channel means is directed away from said inlet opening.

9. In a waste disposal device, the combination of: hopper means having an opening therein through which waste material can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a float chamber, there being an inlet opening communicating between said chamber and the interior of said hopper means; float means in said float chamber; means operatively connecting said float means and said switch means so that movement of said float means actuates said switch means; and a stopper device for said opening, said stopper device having channel means for directing a flow of fluid therefrom through said inlet opening into said float chamber, said stopper means being selectively movable to a first position in which fluid flowing through said channel means is directed through said inlet opening or to a second position in which fluid flowing through said channel means is directed away from said inlet opening or to a third position in which fluid is prevented from flowing through said channel means.

10. In combination: a drain opening collar providing an annular, upwardly faced seat; and a drain stopper including a plate adapted to rest on said seat, said plate having a downwardly faced annular groove therein and an annular sealing ring disposed in said groove and engaging said upwardly faced seat, and a second plate rotatably disposed upon the first mentioned plate, said plates having ports adapted to register in one position, said ports being movable to positions of non-registration by relative rotation of said plates, said stopper including an angularly directed spout depending from the under side of the first mentioned plate at a port therein for receiving liquid therefrom and directing such liquid lateral-

ly away from the axis of said collar and said stopper.

11. In a stopper device, the combination of: a bottom plate adapted to seat in an opening and having a drain port therein; a top plate movable relative to said bottom plate and having an aperture therein which is adapted to register with said drain port; angularly directed depending spout means carried by said bottom plate and communicating with said drain port for receiving liquid from said drain port of said bottom plate and directing the liquid angularly away from the axis of said plates; and means for moving said top plate relative to said bottom plate so as to vary the position of said aperture with respect to said drain port.

12. In a drain stopper device, the combination of: a drain opening collar providing an annular seat; and a drain stopper adapted to seat on said annular seat, said stopper having a depending spout directed angularly from the axis of said drain stopper and adapted to convey a fluid through said stopper and laterally with respect to said collar, and having means for varying the position of said spout relative to said collar when said stopper is seated on said collar.

13. In a drain stopper device, the combination of: a drain opening collar providing an annular seat, said collar provided with first interlocking means in the form of an inwardly extending lip of limited circumferential extent; a drain stopper adapted to seat on said annular seat, said drain stopper having means for detachably inter-locking the same in fixed position under said lip relative to said seat and having a cut-away portion to disengage said lip upon rotation; drain spout means carried by said stopper and depending therefrom; and means for varying the position of said spout means relative to said stopper, said interlocking means holding said spout means in one position of adjustment.

14. In a drain stopper device, the combination of: a top plate adapted to seat in an opening, said top plate having an aperture therein; a bottom plate rotatably associated with said top plate, and having a drain port therein; spout mean carried by said bottom plate and depending therefrom, said spout means being offset from the axis of rotation of said bottom plate and communicating with said drain port and being angularly directed away from said axis to direct liquid outward toward the side of a vessel carrying said stopper device; and means for rotating said bottom plate relative to said top plate so as to vary the position of said spout means relative to said top plate.

15. In a waste disposal device, the combination of: a main chamber; comminuting means in said main chamber, adapted to comminute waste material therein; an electric motor adapted to energize said comminuting means; inlet means at the upper end of said main chamber; discharge means communicating with the lower end of said main chamber; float chamber means communicating with said inlet means and with said discharge means, said float chamber means being adapted to receive liquid introduced into said main chamber and being so disposed that any liquid overflow thereof passes into said discharge means; float means in said float chamber and adapted to be moved in response to a rise in liquid level therein; and switch means electrically connected to said electric motor and mechanically

connected to said float means, so that movement of said float means opens or closes said switch means.

16. In a waste-disposal device, the combination of: hopper means having an opening through which waste material can be inserted into said hopper means; comminuting means in said hopper means, adapted to comminute waste material therein; power means for operating said comminuting means; switch means for energizing said power means; walls defining a liquid chamber, there being an inlet opening communicating between said chamber and the interior of said hopper means; operating means connected to said switch means and operative in response to a predetermined change in the water level in one direction in said chamber to actuate said switch means to energize said motor and operative in response to a predetermined change in the water level in another direction to actuate said switch means to de-energize said motor; and a stopper device for said opening, said stopper device having channel means for directing a flow of fluid therefrom through said inlet opening into said chamber.

17. In a drain stopper device, the combination of: plate means adapted to be inserted into a sink opening so as to close the same, said plate means having port means therethrough adapted to permit liquid to pass through said plate means; and a depending spout movably mounted on the under side of said plate means and adapted to be moved to a first position in which it registers with said port means and to a second position in which it is out of register with said port means, said spout having a discharge orifice in the lower portion of said spout and in one side thereof adapted to direct liquid flowing through said spout radially outwardly relative to said sink opening.

18. In a household waste disposal apparatus having a stopper device adapted to seat in the drain opening of a sink, the combination of: a first substantially circular plate member having a first opening therethrough; a second substantially circular plate member having a second opening therethrough, one of said plate members being disposed above the other, one of said plate members being adapted to be seated in the drain opening of a sink; means rotatably connecting one of said plate members to the other; handle means connected to one of said plate means for rotating said last mentioned one of said plate means relative to the other, said last mentioned plate means being rotatable from a first position in which one of said openings communicates with the other to permit a flow of liquid therethrough to a second position in which liquid communication between said openings is closed; spout means connected to one of said plate members and depending therefrom and communicating with the opening in said last mentioned one of said plate member, said spout means being directed laterally away from the axis of said plate members; and a reservoir in said apparatus and disposed laterally from said axis in position to receive liquid from said spout means.

19. In a stopper device for a household waste disposal apparatus, the stopper device being adapted to seat in the drain opening of a sink, the combination of: a first substantially circular plate member having a first opening therethrough; a second substantially circular plate member having a second opening therethrough, one of said plate members being disposed above the other, one of said plate members being

adapted to be seated in the drain opening of a sink; means rotatably connecting one of said plate members to the other; handle means connected to one of said plate means for rotating said last mentioned one of said plate means relative to the other, said last mentioned plate means being rotatable from a first position in which one of said openings communicates with the other to permit a flow of liquid therethrough to a second position in which liquid communication between said openings is closed; and spout means connected to one of said plate members and depending therefrom and communicating with the opening in said last mentioned one of said plate members, said spout means having an orifice adjacent its lower end and being disposed so as to direct a flow of liquid passing through said spout means at an angle with respect to the axis of said stopper device.

20. In a waste grinding and disposal unit of the type which has a water supply thereto, said unit having a waste and water receiving casing, means for introducing water into the casing, a motor driven grinder in the casing and a discharge beyond the grinder, that improvement which includes a movable water directing member in the casing in the path of water flow thereto, a water confining passage carried by the casing with an inlet adjacent said member and an outlet adjacent the grinder, said member being movable between a plurality of positions, in at least one of which it directs water to the inlet of said passage, and a grinder drive controller connected with said passage operable to actuate the drive for the grinder upon a predetermined flow of water in said passage.

21. A garbage grinder unit of the type adapted to be connected to the drain of a sink comprising a fitting for connection to the sink drain, a waste and water chamber below the fitting, a grinder below the chamber, a motor for driving the grinder, a water confining passage alongside the chamber, said passage opening into said chamber immediately beneath said fitting and having an outlet adjacent said grinder, a motor control element in connection with said passage operable to start said motor to drive said grinder upon a predetermined flow of water in the passage, and a manually operable directional flow controller in said fitting, said flow controller having a water directing trough and being optionally movable to any of three positions.

22. In a waste grinding and disposal unit of the type which has a water supply thereto, said unit having a waste and water receiving casing, means for introducing water into the casing, a motor-driven grinder in the casing and a discharge beyond the grinder, that improvement which includes a movable water directing member in the casing in the path of water flow thereto, a water confining passage carried by the casing with an inlet adjacent said member and an outlet above the grinder, said member being movable between a plurality of positions, in at least one of which it directs water to the inlet of said passage, and a grinder drive controller in said passage operable to actuate the drive for the grinder upon a predetermined flow of water in said passage, whereby the grinder may operate only upon a proper amount of flow of water in a proper direction downstream of the water directing member.

23. In a waste disposal device, the combination of: housing means providing a comminuting chamber and having an opening adjacent the

top thereof for the introduction of waste material and a flushing liquid into said chamber; comminuting means within said housing means to disintegrate waste material therein; power means for operating said comminuting means; 5 discharge means leading from said housing means and comminuting chamber to discharge flushing liquid and disintegrated material from the device; reservoir means carried by said housing means apart from said chamber and said discharge means to accumulate in said reservoir means at least a predetermined body of said flushing liquid, said reservoir means having a discharge therefrom; means to by-pass a portion of said introduced flushing liquid into said 15 reservoir means, said by-pass means including stopper means for said opening and having means to direct liquid to said reservoir means and relatively movable closing means to move with respect to said liquid-directing means and cut off liquid flow to said liquid-directing means; and control means operatively connected with said power means to control the latter, said control means being carried by said device and connected with said reservoir means to be actuated by said 25 accumulated, predetermined body of liquid and thereby control said power means.

24. A combination as in claim 23 wherein said liquid-directing means and movable closing means have registrable ports to pass liquid to said chamber and being movable to positions of non-registration to cut off liquid flow from said chamber. 30

25. A combination as in claim 23 wherein said

control means includes switch means for said power means, and means connected with said switch means and controlled by said liquid body in said reservoir means.

HANS JORDAN.

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