Jan. 26, 1954 J. W. HAMMES 2,667,308

AUTOMATIC CONTROL FOR GARBAGE GRINDERS

Filed Jan. 15, 1947 3 Sheets-Sheet 1

Fig. 1.

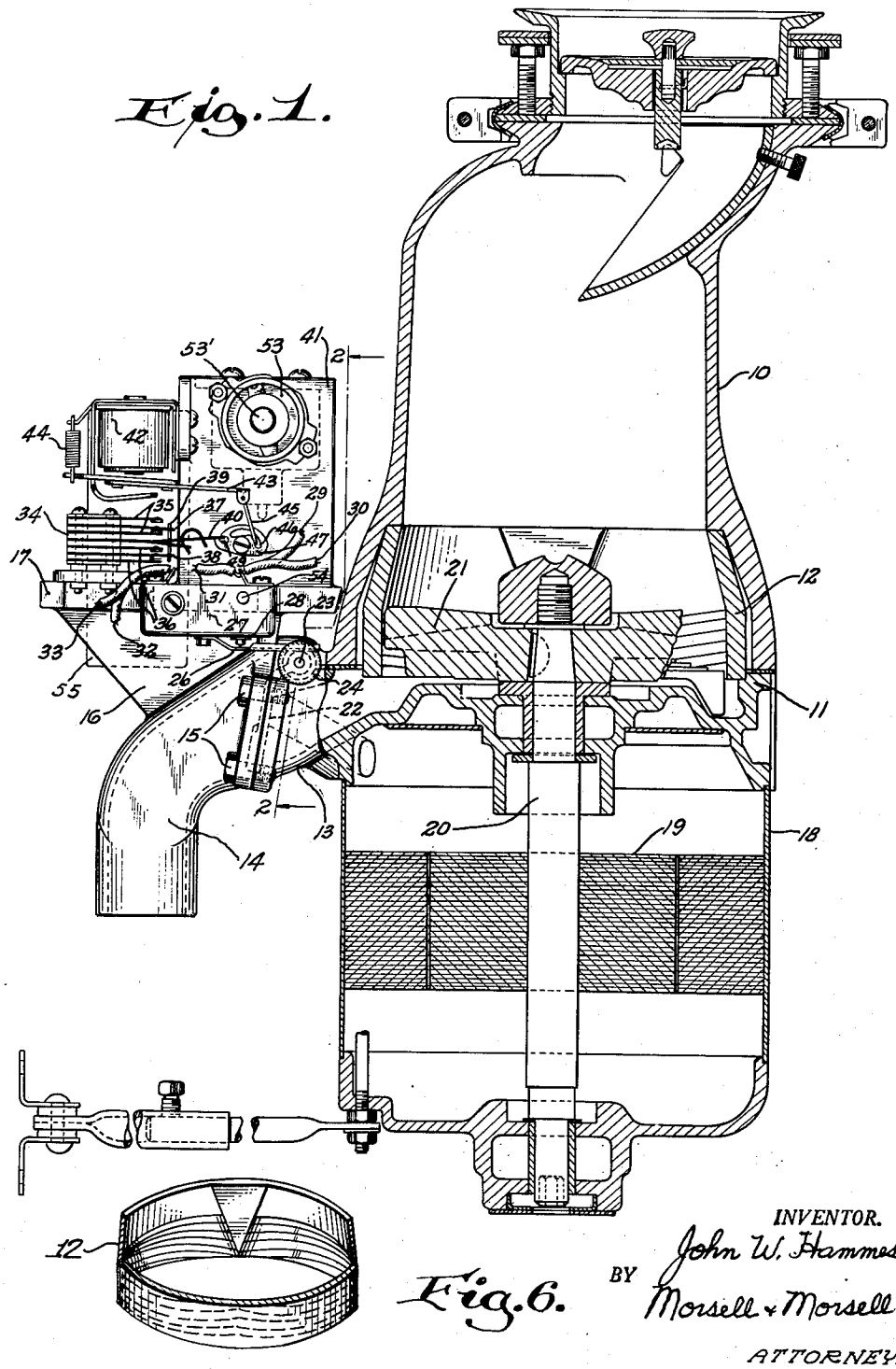


Fig. 6.

INVENTOR.
John W. Hammes,
BY Morsell & Morsell
ATTORNEYS.

Jan. 26, 1954 J. W. HAMMES 2,667,308

AUTOMATIC CONTROL FOR GARBAGE GRINDERS

Filed Jan. 15, 1947 3 Sheets-Sheet 2

Fig. 2.

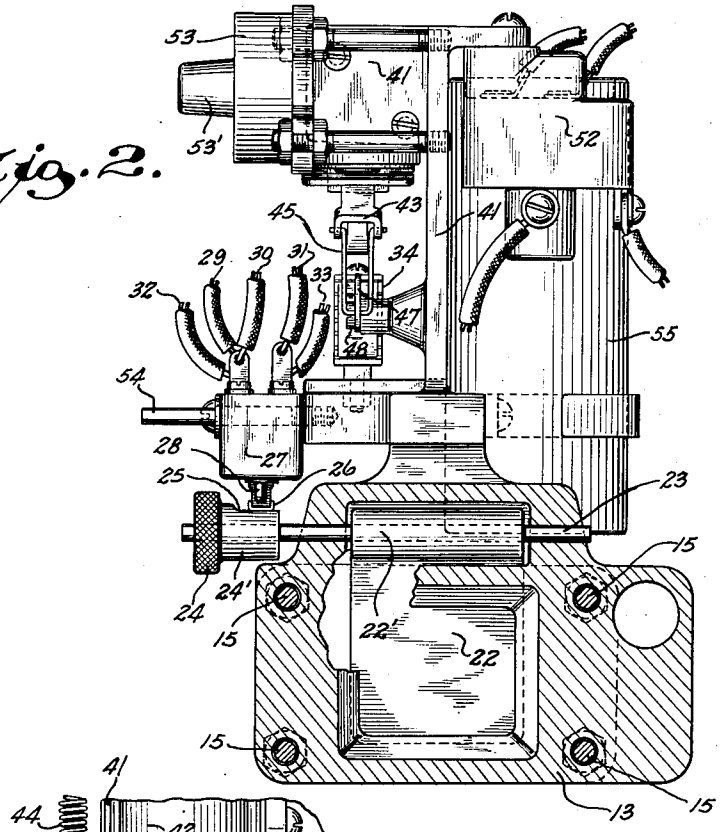
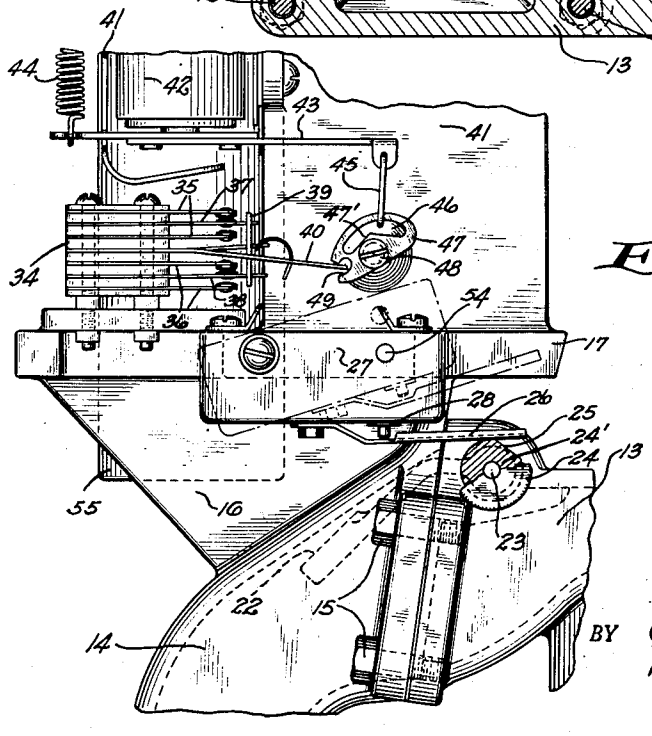


Fig. 3.



INVENTOR.
John W. Hammes,
BY Morsell & Morsell
ATTORNEYS.

Jan. 26, 1954 J. W. HAMMES 2,667,308

AUTOMATIC CONTROL FOR GARBAGE GRINDERS

Filed Jan. 15, 1947 3 Sheets-Sheet 3

Fig. 3.

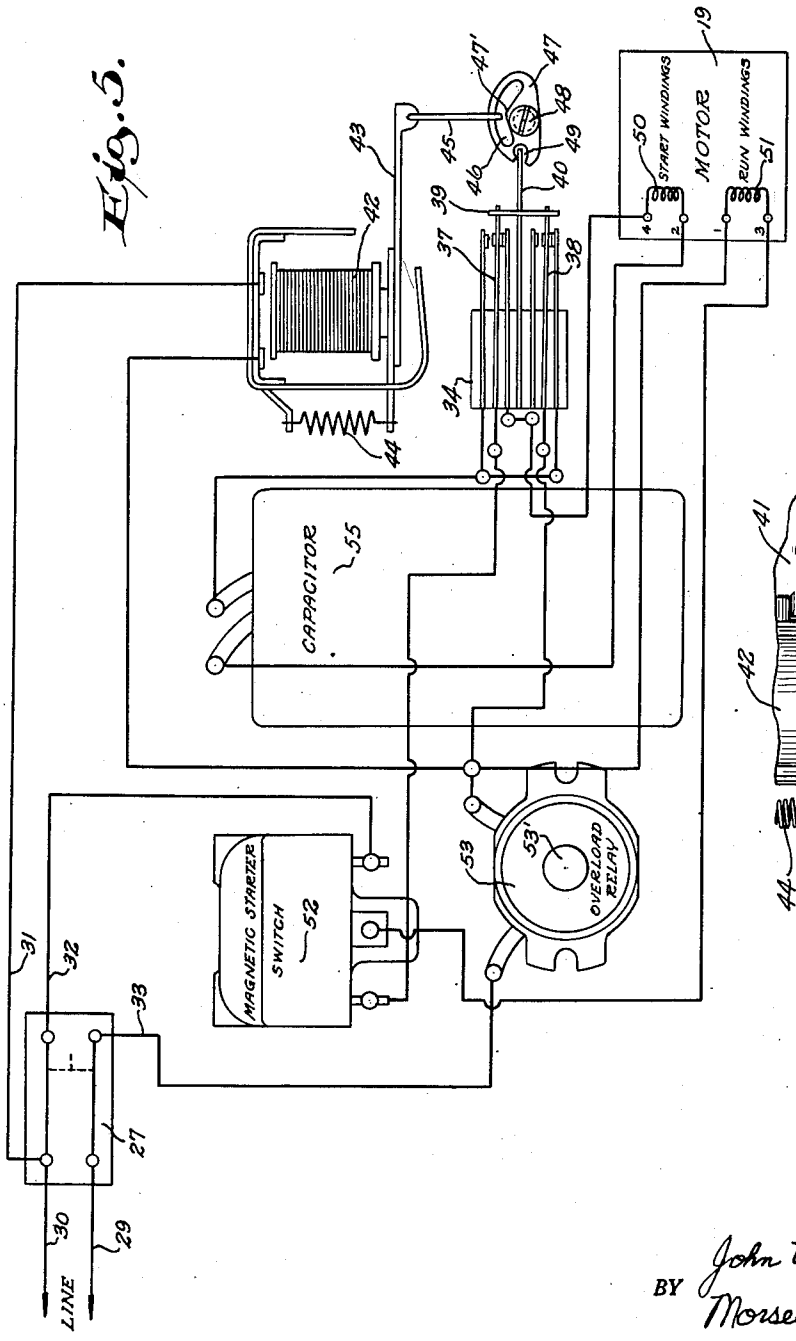
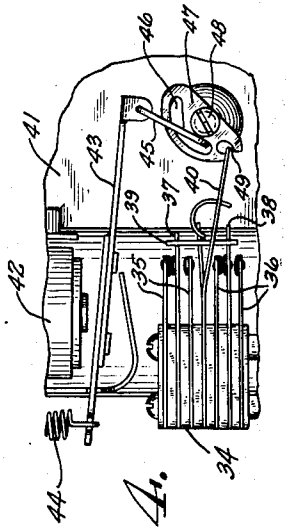


Fig. 4.



INVENTOR.
John W. Hammes,
BY Morsell & Morsell
ATTORNEYS.

Patented Jan. 26, 1954

2,667,308

UNITED STATES PATENT OFFICE

2,667,308

AUTOMATIC CONTROL FOR GARBAGE GRINDERS

John W. Hammes, Racine, Wis.

Application January 15, 1947, Serial No. 722,201

11 Claims. (Cl. 241—36)

1

This invention relates to improvements in garbage disposal apparatuses, of the type wherein the garbage disposal apparatus is associated with a kitchen sink and in registration with the drain thereof, and is particularly concerned with a fluid pressure actuated mechanism for controlling the operation of the comminutor motor.

In the operation of a garbage disposal apparatus of the type under consideration, refuse is deposited into the sink outlet and enters a casing wherein it is subjected to the comminuting action of a motor operated shredder. The refuse, after being ground and reduced, is flushed into the drain pipe and ultimately reaches the sewer through the flow of tap water. In an installation of the type under consideration, it is usual to employ the sink water faucet for the purpose of supplying the necessary water to the apparatus. To guard against an inadequate supply of water to aid the comminuting and flushing functions, the present invention has as its general object the provision of a mechanism responsive to an adequate fluid pressure thereagainst for closing the circuit to the comminutor motor. In other words, until and unless there is an adequate head of water reacting against the mechanism, the comminuting motor will remain inoperative and in this manner, damage to the shredding members will be prevented and the arrangement insures an adequate head of water in the system for the purpose of flushing the reduced garbage through the drain connections so as to prevent clogging, sticking and other difficulties.

A further object of the invention is to provide, in a garbage disposal apparatus a comminutor motor control mechanism which will automatically cause operation of the comminutor motor when there is a sufficient head of water in the shredder or comminutor container, but when the head of water within the chamber diminishes beyond a predetermined extent, the comminutor motor will automatically be shut off.

A further object of the invention is to provide, in a garbage disposal apparatus of the class described, manually operated means for throwing the automatic electric system out of operation so that water may be drawn from the sink tap, when desired, without operating the garbage disposal apparatus.

A further object of the invention is to provide, in a garbage disposal apparatus of the character described, a reversing switch for the comminutor motor, which reversing switch will automatically cause the motor to alternately run in reverse

2

directions, thereby prolonging the life of the shredder or comminutor and facilitating self-cleaning and sharpening thereof.

A further object of the invention is to provide, in a garbage disposal apparatus of the character described, an automatic reversing switch for controlling operation of the comminutor motor, which reversing switch is operated by an on-and-off switch.

A further object of the invention is to provide, in a garbage disposal apparatus of the character described, a fluid pressure actuated switch for controlling the operation of the comminutor motor, which fluid pressure switch includes a backwater valve which will automatically close and prevent operation of the comminutor motor should there be any stoppage in the drain connections beyond the apparatus which might cause the water in such connections to back up into the apparatus and sink.

A further object of the invention is to provide a garbage disposal apparatus for association with kitchen sinks which is automatic in its operation, which is clean, sanitary and efficient, which is strong and durable, which is compact and unitary, and which is well adapted for the purposes set forth.

With the above and other objects in view, the invention consists of the improved garbage disposal apparatus and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a side view of the improved garbage disposal apparatus with the main unit thereof being shown in vertical section, said view also showing the "on" and "off" switch in its "off" position with the reversing switch solenoid de-energized and the reversing switch actuator cocked in one position.

Fig. 2 is an enlarged detail sectional view taken on line 2—2 of Fig. 1 to show details of the fluid pressure actuated switch and associated mechanisms;

Fig. 3 is an enlarged fragmentary view of the mechanism shown in Fig. 2 with said view being taken at right angles to the showing in Fig. 2 only with the conduit valve open, the "on" and "off" switch in its "on" position, and the reversing switch solenoid energized;

Fig. 4 is an enlarged fragmentary detail view showing the reversing switch solenoid deenergized

and the reversing switch actuator cocked in a different position from that of Fig. 1;

Fig. 5 is a wiring diagram for the switches and electrical control devices included in the apparatus with the reversing switch solenoid energized; and

Fig. 6 is a perspective view of the cutting ring.

The garbage disposal apparatus illustrated in section in Fig. 1 of the drawings is generally of the type disclosed in my prior patent No. 2,225,171. As such, it includes an upper section 10 of a refuse container, said section being of substantially cylindrical form and having its upper end open and arranged for securement to the bottom portion of a kitchen sink in registration with the drain opening therein. The lower portion of the container section 10 is slightly outwardly flared and engages a lower casing section 11. Within the lower portion of the container section 10 there is secured a cutting or comminuting shell 12 and integral with the lower portion of the casing section 11, extending laterally of one side thereof, is a tubular drain extension 13 whose outer end is flanged to receive the mating flanged extremity of a drain elbow 14. Said complementary flanges on the members 13 and 14 are secured together by bolts 15 with an interposed gasket and extending upwardly from the elbow 14 is a web 16 carrying a horizontal shelf 17 on which are mounted supports for some of the mechanisms hereinafter to be described.

A motor casing 18 depends from the container section 11 and encloses an electric motor 19 which is of the reversible type. As is conventional with reversible electric motors of this type, the motor 19 has two sets of windings. One set of windings, the starting windings, as well as the running windings, initially carry the electrical current until the speed of rotation of the motor attains a predetermined value, whereupon the starting windings cease to function and all of the current thereafter flows through the second set of windings which are the running windings. The above explanation is given in view of the fact that hereafter we will refer to a magnetic switch which functions automatically to take the starting windings out of play at the proper time and to cause the motor to operate only on the running windings.

The motor 19 includes a motor shaft 20 which extends vertically upwardly and within the comminuting shell 12 the motor shaft 20 has fast thereon a shredder or comminutor 21.

The above general explanation is necessary in order that the present improvements may be appreciated in connection with their association with the elements of the apparatus described. Referring now particularly to Figs. 1, 2 and 3, it will be observed that the opening in the drain extension 13 is rectangular, and adapted to control said opening is a flapper valve 22. The upper end of this flapper valve is cylindrical, as at 22', and is mounted fast on a shaft 23 journalled through the upper wall of the extension 13. The outer end portion of the shaft 23 has fast thereon a knurled operating knob 24 having an integral, inwardly extending sleeve portion 24' which functions as a cam and has a flattened cam surface 25 thereon. Riding on the cam sleeve 24' is the free end portion of a metallic, yieldable switch contact arm 26. The inner end of the switch arm 26 is anchored to the bottom portion of a switch box 27. When the apparatus is inoperative, or when there is an insufficient head of water reacting against the flapper valve 22 to swing it toward its open position of Fig. 3, then the flapper valve 22 is in the position of Figs. 1 and 2, preventing material passage from the casing through the members 13 and 14. Under these conditions the switch arm 26 rests on the flattened cam surface 25 and is thus separated from the fixed contact element 28 depending from the switch box 27. However, when there is a sufficient head of fluid reacting against the face of the flapper valve 22, the pressure will cause said flapper valve to swing toward its open position shown in Fig. 3. The swinging movement of the flapper valve will turn the shaft 23 and the cam sleeve 24' to cause a raised portion of the cam sleeve to react against the contact arm 26 to flex it into engagement with the fixed contact element 28, thereby completing the circuit through the switch mechanism within the casing 27. The switch mechanism housed within the casing 27 is in fact an "on" and "off" switch and is in the electrical circuit to the electric motor 19, current being supplied thereto by means of circuit wires 29 and 30 from the source while wires 31, 32 and 33 connect with other electrical instrumentalities in the circuit.

The numeral 34 indicates a reversing switch mounted on the shelf 17. This reversing switch is also in the electrical circuit which is controlled by the "on" and "off" switch mechanism within the casing 27. As is best shown in Figs. 1 and 3, said reversing switch has two pairs of yielding contact elements 35 and 36, respectively, with a flexible contact arm 37 between the arms 35 and a flexible contact arm 38 between the arms 36. The outer ends of the interposed arms 37 and 38 are joined by a fiber connector 39 which is also engaged by a portion of a band spring 40 whereby, under the influence of the spring 40 the contact arms 37 and 38 will be operated jointly.

For the purpose of actuating the reversing switch 34 there is mounted on an upright bracket 41 on the shelf 17, a solenoid 42. The solenoid is in the same electrical circuit which includes the "on" and "off" switch 27 and the reversing switch 34 and energization and de-energization of the solenoid will cause upward and downward movement of the outer end of a solenoid arm 43 which is mounted for pivotal movement relative to the solenoid and is, when the solenoid is de-energized, normally maintained in the lowered position of Fig. 1 by a coiled spring 44. Swingably depended from the outer end of the solenoid arm 43 is a link 45 whose free end is movably engaged within the elongated curved eccentric slot 46 in an oscillatable ovate actuator 47. The latter is turnably mounted on a pin 48 projecting laterally of the bracket 41. A peripheral portion of the actuator 47 is provided with a notch 49 in which the free end of the band spring 40 is yieldingly engaged.

When the solenoid 42 is deenergized, which is the condition when the switch mechanism 27 is off and the electrical circuit is open, then the reversing switch actuator 47 will be in either the position shown in Fig. 1 or the position shown in Fig. 4, depending upon how it was previously cocked by the link 45. When it is in the position of Fig. 1, it will be observed that in the reversing switch the yielding contact elements 37 and 38 are making contact with the lowermost fixed contacts of the pairs of contact elements 35 and 36. This means that thereafter, when current is supplied to the motor 19, the motor shaft 20 will be turned in one direction. However, if the actuator

47 is in the position of Fig. 4, then the yielding contact elements 37 and 38 of the reversing switch are making contact with the uppermost fixed contacts of the pairs 35 and 36 with the result that thereafter, when current is supplied to the motor 19, the motor shaft 20 will be turned in a direction the reverse of that which results from the arrangement shown in Fig. 1. With the condition attaining depicted in Fig. 1, then let it be assumed that the switch mechanism 27 is moved to its "on" position and this will close the circuit and energize the solenoid 42, whereupon the solenoid arm 43 will be raised to the position of Fig. 5. This movement of the solenoid arm raises the link 45 relative to the actuator slot 48, but as long as the solenoid is energized, the lowermost fixed contacts in the reversing switch are still engaged by the yielding contact elements 37 and 38. Thereafter, if the switch mechanism 27 is moved to its "off" position, the circuit will be broken and the solenoid 42 will release the arm 43 and such movement will cause the link 45 to swing somewhat toward the left (relative to the drawings) in the slot 46, oscillating the actuator 47 to the position of Fig. 4. In this position of the actuator, through the band spring 40 and the connector 39 the pair of yielding contact elements 37 and 38 will be moved into contact with the uppermost fixed contacts of the pairs 35 and 36 so as to thereafter effect reversal of the electric motor 19. From the position of Fig. 4, upon closing of the switch 27 and energization of the solenoid 42, the upward movement of the arm 43 will result in the position shown in Fig. 3. Thereafter, upon deenergization of the solenoid 42, reverse cocking of the actuator 47 will take place, returning to the Fig. 1 position thereof, with the opposite contacts in the reversing switch being engaged.

In connection with the operation of the oscillatable actuator 47 attention is directed to the shoulder 47' projecting into the slot 48. In the up position of the solenoid arm 43 the link 45 may hang to one side or the other of the shoulder 47'. Upon release of the arm 45 by the solenoid the link will then move in the slot either toward one end thereof or toward the other, depending on its position relative to the shoulder 47', and this effects the successive reverse oscillations of the actuator 47 for reversing the contacts in the switch 34.

It was previously mentioned that the motor 19 is provided with a set of starting windings (50 in Fig. 5) and a set of running windings (51 in Fig. 5). After the motor reaches a predetermined running speed, a magnetic switch 52 functions automatically to take the starting windings in the motor out of play and to cause the motor to operate only on the running windings 51. It will be observed that this magnetic switch is located on the exterior frame portion of the unit on the bracket 41, and is, therefore, exteriorly of and remote from the container 10—11 and the conduits and cannot be affected by any fluid passing through the container and conduits.

Also in the main electrical circuit is an overload protection switch or relay 53 of conventional construction. This member 53 is normally in closed condition but should an overload in the electrical circuit result by virtue of unusual conditions such as clogging or jamming of the container and comminutor, the member 53 will automatically break the circuit. After the unusual condition which has created the overload is corrected, the member 53 can be reset to close the circuit by pushing inwardly on the button 53'.

The casing enclosing the "on" and "off" switch mechanism 27 is normally maintained in the position of Fig. 1 so that "on" and "off" operation of the switch mechanism is automatically accomplished by swinging movements of the back water valve plate 22. However, the casing 27 is arranged for pivotal movement and under unusual conditions, it is susceptible of being manually pivotally moved from the full line position of Fig. 3 to the broken line position of Fig. 3. This is accomplished by manually engaging a laterally projecting rod 54 on a side portion of the casing 27. When the casing 27 is manually moved to the broken line position of Fig. 3, it will be obvious that then the yielding contact arm 26 thereon will be unaffected by turning movement of the cam 24' associated with the valve plate 22 and hence the electrical circuit controlling the motor 19 will be open and the motor will not operate. This condition is desirable at such times as one might wish to draw water from the sink tap without regard to the operation of the garbage disposal apparatus. Any excess water flowing through the sink outlet and the container 10—11 will, when its weight builds up, merely open the valve plate 22 and flow to the sewer through the outlet connections 13 and 14 and the comminuting mechanism for the garbage disposal apparatus will not operate. Manual swivelling of the switch casing 27 to the broken line position of Fig. 3 might also be desirable if a condition attains wherein refuse either is jammed against the inner or outer faces of the valve plate 22 to prevent its proper functioning. The switch casing 27 can be manually turned down to its operative position, or it may be manipulated so as to close the yielding contact arm 26 to cause operation of the motor with the result that operation of the comminutor 21 and the force of water flowing through the outlet 13 will clear out the clogged refuse and thereafter permit the valve plate 22 to function in its normal manner.

As will be noted from the drawings, it is desirable to include a conventional capacitor 55 which is also mounted on the unitary shelf 17. This capacitor is in series with the starting windings of the motor 19.

From the foregoing description, it will be apparent that in the improved garbage disposal apparatus under normal operating conditions there will be no functioning of the comminuting mechanism without the flow through the system of an adequate body of fluent waste material. Hence improper operation of the mechanism is automatically prevented. The "on" and "off" switch is unique in that its operation is dependent upon a predetermined fluid pressure within the system of the apparatus. The mechanism also includes a novel and highly effective type of automatic reversing switch for the motor which drives the comminuting member. This reversing switch is automatically caused to function through operation of the main "on" and "off" switch. The improved garbage disposal apparatus is furthermore of simple and novel construction, is neat, compact and unitary, and is well adapted for the purposes described.

What is claimed as the invention is:

1. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, an electric motor for driv-

ing said comminutor, a waste material conduit extending from said casing, an electrical circuit including said motor, a switch to open and close said circuit, a back water valve movably mounted within said waste material conduit, and connections between said valve and said switch whereby movements of the valve operate the switch.

2. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, an electric motor for driving said comminutor, a waste material conduit extending from said casing, an electrical circuit including said motor, a switch to open and close said circuit, a back water valve movably mounted within said waste material conduit, and connections between said valve and said switch whereby opening movements of said valve close said switch and closing movements of said valve open said switch.

3. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, a reversible electric motor for driving said comminutor in reverse directions, a waste material conduit extending from said casing, an electrical circuit including said motor, a motor reversing switch in said circuit, a switch to open and close said circuit, and to operate said reversing switch, and fluid pressure means extending into the waste material conduit for operating said last-mentioned switch.

4. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, a reversible electric motor for driving said comminutor in reverse directions, a waste material conduit extending from said casing, an electrical circuit including said motor, a motor reversing switch in said circuit a solenoid also included in said circuit, mechanical connections between said solenoid and said reversing switch for operating the latter, a switch to open and close said circuit and to energize and deenergize said solenoid, and a fluid pressure actuated member influenced by fluid pressure in said casing and connected to said last mentioned switch to operate the same.

5. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, a reversible electric motor for driving said comminutor in reverse directions, a waste material conduit extending from said casing, an electrical circuit including said motor, a motor reversing switch in said circuit, said switch including pairs of fixed contacts with jointly movable contacts operating between the contacts of the respective pairs, an oscillatable actuator for successively shifting said movable contacts in reverse directions, mechanical means extending to said actuator for successively rocking it in reverse directions, a solenoid also included in said circuit adapted to actuate said mechanical means upon energization and deenergization of the solenoid, a switch to open and close said circuit, and fluid pressure actuated means extending adjacent the waste material conduit and connected with the last-mentioned switch for operating the same.

6. 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 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.

7. 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.

8. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, a reversible electric motor for driving said comminutor in reverse directions, means forming ingress and egress openings in said casing, an electrical power circuit for said motor, a motor reversing switch in said circuit, and means in one of said openings operable under conditions of flow through said opening to cause actuation of said reversing switch.

9. Waste disposal apparatus including a comminution chamber having an inlet opening and an outlet opening, comminution means including a movable element within said chamber, a reversible motor for driving said element in forward or reverse direction, an electrical circuit for said motor, a reversing switch in said circuit, said switch having an open-circuit position and two closed-circuit positions respectively establishing one or the other directions of motor operation, and switch actuator means in one of said openings operable under conditions of flow through said opening to cause actuation of said switch to one of its two closed positions.

10. In a garbage disposal apparatus having a garbage- and water-receiving casing with a comminutor therewithin, a reversible electric motor for driving said comminutor in reverse directions, means forming ingress and egress openings in said casing, an electric power circuit for said motor, a motor reversing switch in said circuit, and flow device means in one of said openings operable when said opening is open for the flow of water to cause actuation of said reversing switch.

11. In a garbage disposal apparatus having a garbage and water receiving casing with a comminutor therewithin, a reversible electric motor for driving said comminutor in reverse directions, a waste material conduit extending from said casing, an electrical circuit including said motor, a motor reversing switch in said circuit, a switch to open and close said circuit, a fluid pressure actuated member in said casing influenced by

fluid pressure in said casing and means operably connecting said member to said last-mentioned switch to operate the same in response to fluid pressure actuation of said members.

JOHN W. HAMMES.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
745,899	Patterson	Dec. 1, 1903
809,693	Johnston	Jan. 9, 1906
959,257	Proutt	May 24, 1910
990,512	Barnum	Apr. 25, 1911
1,114,225	Cahussac	Oct. 20, 1914
1,887,273	Lewis	Nov. 8, 1932
1,916,360	Crane	July 4, 1933
1,956,038	Little	Apr. 24, 1934
2,014,194	Johnson	Sept. 10, 1935
2,155,868	Pauly	Apr. 25, 1939
2,195,287	Schaefer	Mar. 26, 1940
2,196,319	McLoughlin	Apr. 9, 1940
2,225,171	Hames	Dec. 17, 1940
2,237,705	Kohl	Apr. 8, 1941
2,244,402	Powers	June 3, 1941
2,320,176	Dunham	May 25, 1943
2,364,540	Luhn	Dec. 5, 1944
2,404,644	Lowe	July 23, 1946
2,469,205	Powers	May 3, 1949

FOREIGN PATENTS

Number	Country	Date
541/26	Australia	Mar. 11, 1927