FLUSHING SYSTEM FOR FOOD WASTE DISPOSERS

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4 Claims. (Cl. 241-101)

This invention relates to flushing systems for food waste disposers, particularly those types of food waste disposer-units which are used by commercial establishments, such as restaurants, food markets, etc., to dispose of relatively large quantities of food waste.

In such units, the quantity of material handled by the disposer is rather substantial, and the unit is expected to operate efficiently with a minimum of attention by the operator, or maintenance personnel. It is well known, as a matter of course, that a flushing system is required in order to maintain efficiency of the disposer by flushing liquid or liquid and food waste particles away from the unit, to avoid plugging the system and to minimize odor build-up in the disposer and adjacent areas.

The present invention relates to a novel flushing system, particularly for large commercial type food waste disposers, wherein the disposer is energized in response to the flow of liquid introduced into the disposer system, and wherein flow of liquid is controlled by a manually operated valve. The flow of liquid is controlled by a time delay valve and a pressure responsive switch which operate in conjunction with an electrical system to automatically control the operation of the disposer system in accordance with the present invention.

FIG. 3 is a plan view of the components of the system, showing particularly the relative position of the manually controlled valve, the time delay valve and the operating mechanism therefor;

FIG. 4 is another view of the components of the system, as seen from the right of FIG. 3;

FIG. 5 is a plan view of the actuator cam used to initiate opening of the time delay valve; and

FIG. 6 is a view of a modified form of the invention, showing a different operating arm and actuator cam connection.

Referring to the drawing, which illustrates a preferred embodiment of the invention, FIG. 1 shows a food waste disposer, preferably of the larger type used in commercial establishments, and having a drive motor 10 which may range in size, for example, from one to five horsepower. The motor 10 is supported by the housing 12 which in turn rests upon a plurality of adjustable legs 13. Within the housing is a rotatable bowl 14 which cooperates with a stationary cutter ring 15 to form a comminuting device operating to reduce food wastes into relatively small particles. A typical unit of this type is disclosed in U.S. Patent No. 2,836,369. Above the bowl 14 is a hopper 18, which preferably is formed integrally with the housing 12. On top of this hopper there is usually mounted a feed cone 19 into which chunks of food waste and similar refuse are dumped for disposal.

The chunks of food waste drop through the hopper 18 into the comminuting apparatus, where they are reduced into small particles that pass into the lower portion or chamber 20 of the housing 12, and are subsequently flushed into the sewer line 22. Flushing water supplied through a first branch line 25 is directed downwardly through a T-shaped discharge tube 26 into the cone adapter 19, and flows through the unit to flush the parts thereof and particularly to flush the particles through the sewer line. The air space between the tube 26 and the cone adapter 19 provides a siphon-breaker arrangement which prevents back flow of contaminated water from the unit into the line 22, as is required by many sanitation codes. A second or bypass branch line 30 is also arranged to receive flushing water, as will be described, during portions of the operation of the unit. This line terminates in a curved tube 31 which discharges across an air gap into pipe 33, and this pipe extends downwardly to open into the lower portion 28 of the housing. Thus, the anti-siphon air gap is provided between tube 31 and pipe 33, and flushing water supplied therethrough flows into housing 29 of the disposer unit, and flushes any particles collected therein, below the bowl 14, into the sewer pipe 22.

The electrical power supplied to the motor 10 is indicated schematically in FIG. 2 by the terminal wires 35 which extend to a suitable source of electrical power. These wires extend to a normally open double-pole pressure responsive switch 37 which in turn is wired in circuit with the motor 10. The switch 37 is of a conventional and well known type, including a pressure responsive device indicated generally at 38 (FIG. 4) which is subjected to the pressure of liquid in line 25. Thus, whenever there is sufficient pressure in this line, switch 37 will close to energize the motor 10. Upstream of the pressure responsive switch there is a manually controlled valve 40. This valve may be of any suitable type, such as a conventional ball valve, and may be directly controlled by the operator through a lever 42, as shown, or the valve may be manually operable through any suitable remote control. In most installations it has been found convenient to use the lever operated valve as shown, with the lever positioned so that the operator can easily reach the lever, and by turning the valve on or off, accordingly control operation of the switch 37 and therefore control the power supply to the disposer unit.
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3. The branch line 25, upstream of valve 40, is connected to a T fitting 44 which in turn is connected to the supply pipe 45. This pipe is adapted to be connected to any suitable source of flushing liquid, such as the normal water supply, and this supply is indicated in FIG. 2 by the arrow 46. The other outlet from the T fitting 44 is connected to the second or bypass branch line 50. Controlling the flow through this line is a normally closed time delay valve 50.

This valve is of conventional construction, and is known and used particularly in various types of flushing systems. The valve is normally closed, and when opened, as by pressing on an operating button, it will permit the flow of liquid through the valve, and when released, the valve will be closed. The operation of this valve is normally rapid, and then will return to its normally closed position. There are many types of such valves, and the usual arrangement of such valves includes a main valve member controlling the flow through the valve, a diaphragm or the like connected to control movement of the main valve member, and a pilot valve which controls the supply of liquid under pressure to the diaphragm and thus the position of the main valve member.

In the present arrangement, the operating button 52 of valve 50 is situated adjacent to the main manually controlled valve 40. The lever 42 includes an arm 43 on which there is mounted an operating cam 56. The arrangement is such that when the lever is moved between the open and closed positions of valve 40, the cam 56 engages the button 52 and moves or depresses that button to initiate opening of the time delay valve 50. The contour of the cam block 56 is designed to assure that the button 52 is depressed for a time sufficient to cause normal actuation of the time delay valve 50, even though the lever 42 may be shifted rapidly from one position to another.

The flushing system thus functions as follows. With the unit shut off, when the operator moves lever 42 to open valve 40, this initiates the supply of flushing liquid through the main branch line 25. At the same time, as valve 40 is opening this action has caused the time delay valve 50 to be opened and flushing liquid immediately flows through the second branch line 30 into the lower chamber of the disposer unit, and act to flush any collected particles therein into the sewer line, and acts also to flush out the sewer line including the usual trap therein. In the meantime, as valve 40 is fully opened, the pressure in line 25 will rise sufficiently to cause switch 57 to close, and this will close the power supply circuit to the motor 10. The disposer unit thus begins to operate, and the non-stop flushing liquid supply begins through line 25. After a time which is determined by the setting of the valve 50, this valve will close and flow through the bypass line 30 will cease. Generally, it is desirable to maintain flow into this bypass line until the unit has been operating for several seconds, since this assures that the main flow of flushing liquid has progressed through the hopper and through the comminuting apparatus and is supplemented by the flow through the bypass line to carry the initial flow of food waste particles into the sewer line.

During normal operation of the unit, valve 50 is closed and the bypass line is shut off. When the operator again moves the lever 42 to close valve 40 and thus shuts down the unit, this will again operate the time delay valve 50, and it again will open for an predetermined period to provide a supplementary flow of liquid through the bypass line 30 as the unit shuts down, and preferably for a few seconds after the comminuting device has ceased to operate, thereby tending to wash particles out of the lower chamber of the housing even after the unit has completely stopped.

The supply of flushing liquid to the food waste disposer unit before it actually begins operation, and during the period that it comes up to speed, is particularly beneficial in that if the hopper 18 contains a substantial amount of food wastes, it is possible that the flow through the normal flushing line 25 will not build up to the proper volume, particularly in the vicinity of the comminuting apparatus and beneath it lower, so that the rate of waste particles are produced by the comminuting apparatus. Thus, there may be a tendency in such instances to create an initial plug of material in the sewer line when the flow of flushing liquid has not yet reached the normal volume. The present invention overcomes any such possibility by initiating the supplementary flow of flushing liquid at this time. In this connection, it is, of course, possible to have the bypass line 30 discharge into the hopper 18, or directly into the sewer line 22, but the preferred arrangement is the one illustrated, where the bypass flow is directed to the lower chamber and thence directly into the line which connects to the diaphragm.

The actuator arm and cam mounting shown in FIG. 6 is a modified arrangement which can be employed, as desired, to cause the time delay valve 50 to be actuated only when the manually operated valve 40 is being opened, or conversely only when valve 40 is being closed. Thus, the arm 55 shown in FIG. 3 is replaced by an arm 65 which is divided into two sections 65a and 65b pivotally connected by a pin 66. One of these sections, shown as the section 65a, is provided with an abutment or stop piece 68 such that the sections of the arm present a rigid connection and the arm is swung in one direction, namely the direction indicated by the arrow 69. The section 65a carries an actuator cam block 70 for engaging the button 52 (the same time delay valve is used) and the section 65b is a rigid, preferably integral, part of the valve lever 42. The sections are also biased into the position shown in FIG. 6 by a conventional spring 72.

Thus, assuming that it is desired to actuate the time delay valve only when the manually controlled valve 40 is being opened, the arrangement will be such that rotation of the arm structure 65 during opening of valve 40 is in the direction indicated by arrow 69. As a result the arm structure 65 will be effectively rigid and the cam block 68 will engage the button 52 and cause the time delay valve to operate. Then, when the lever is moved in the opposite direction to close valve 40, the arm structure 65 will break around the pin 66, and against the force of the spring 72, and the time delay valve 50 will not operate.

Conversely, if it is desired to have a flow through the bypass line only when the manually controlled valve is being closed, the arm structure 65 will be arranged such that closing movement of valve 40 will be in the direction of arrow 69, and the time delay valve will be actuated only during closing movement thereof, with the arm structure 65 being ineffective during opening movement of the manually controlled valve 40.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the spirit of the invention which is defined in the appended claims.

What is claimed is:

1. In combination with a food waste disposer including a housing with a hopper to accept food waste and a motor driving a comminuting device beneath said hopper acting to reduce the food waste into small particles for flushing into a sewer line, a flushing system comprising a supply pipe adapted to be connected to a supply of flushing water, a first branch line receiving water from said supply pipe and discharging into said hopper, a manually operable valve in said first branch line arranged for opening and closing by an operator, a normally closed time delay valve in said second branch line extending from said supply pipe and connected to discharge into the housing of said disposer, a normally closed time delay valve in said sec-
2. A flushing system for a food waste disposer including a housing with a hopper to accept food waste and a motor driving a comminuting device receiving waste from said hopper and acting to reduce the food waste into small particles for flushing into a sewer line, said flushing system comprising a supply pipe adapted to be connected to a supply of flushing water, a first branch line from said pipe discharging into said hopper, a manually operable valve in said first branch line having a control lever for opening and closing of said valve by an operator, circuit means including a pressure responsive switch controlling the supply of power to said motor and arranged to energize said motor only in response to pressure in said first branch line from opening of said manually operable valve, a second branch line extending from said supply line and connected to discharge into said disposer, a normally closed manually operable time delay valve in said second branch line, and means responsive to actuation of said control lever to initiate opening of said time delay valve.

3. A flushing system for a food waste disposer as defined in claim 2, including a device incorporated in said means to initiate opening of said time delay valve constructed and arranged to cause actuation of said time delay valve in response to movement of said control lever in one direction only.

4. A flushing system for a food waste disposer as defined in claim 2, wherein said manually operable valve and said time delay valve are mounted adjacent to each other, and wherein the means to initiate opening of said time delay valve includes an extension from said control lever mounted to move past said time delay valve during movement of said lever to open and close said manually operable valve, and a button on said time delay valve positioned to be contacted by said extension on said control lever to actuate said button and initiate timed opening of said time delay valve in response to movement of said lever between positions opening and closing said manually operable valve.

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