ABSTRACT

There is disclosed a waste food disposer having a closure for substantially blocking the throat leading from a sink to a comminutor to prevent ejection of waste food particles. In the open position, the closure does not substantially obstruct the throat of the disposer. A handle is provided for moving the closure between the open and closed positions. The handle is arranged to move the closure from the fully closed position to an intermediate position partially blocking the throat and, after a delay, then moving the closure to the fully open position.

15 Claims, 7 Drawing Figures
WASTE FOOD DISPOSER

BACKGROUND OF THE INVENTION

Most commonly available food waste disposers, intended primarily for use in the home, are adapted for use beneath the kitchen sink. Disposers of this type are provided with an open-top housing defining a comminuting chamber. Means are provided to support the housing beneath the sink with the open top thereof aligned with the sink drain opening. In this arrangement, food waste may be placed in the sink and gradually fed into the disposer along with water.

Waste food disposers are of two basic types: continuous feed and batch operated. Disposers of the continuous feed type are normally installed in new homes or apartments and are typically integrated with the kitchen electric and water distribution systems. Conventional continuous feed disposers comprise a throat having a slotted flexible rubber member therein for passing material readily into the disposer and which substantially prevents the comminutor from throwing material out of the disposer.

Batch type disposers are normally installed during remodeling of a kitchen or as an addition to a finished kitchen not previously so equipped. When a batch type disposer is added to the kitchen of a home or apartment it is highly advantageous to utilize such a disposer having means for preventing forcible ejection of food particles from the disposer by the comminutor.

The batch feed type disposer has met with success since it usually provides an inherent safety feature which prevents the housewife from accidentally inserting her hand into the disposer during operation thereof.

Ideally, closures for batch-type disposers should have the following operating principles: in the open position, the closure should not substantially restrict the opening into the comminuting chamber; in the closed position the closure should not seal the throat but should allow passage of water into the comminuting chamber while preventing forcible ejection of food particles from the chamber; and the closure should be integrated with the comminutor motor to de-energize the motor when the throat is open.

As will be more fully apparent hereinafter, the device of this invention meets these criteria as well as provides additional operating advantages.

Disclosures of interest are found in U.S. Pat. Nos. 2,679,359; 2,753,121; 2,771,526 and 2,794,602.

It is accordingly an object of this invention to provide a food waste disposer having an improved closure therefor.

SUMMARY OF THE INVENTION

In summary, one aspect of this invention comprises a waste food disposer having a comminutor and a conduit providing an inlet for opening into a sink and defining a path of waste food movement from the sink toward the comminutor; and a closure and means mounting the closure for movement between positions within the conduit in and substantially out of the path of movement.

Another aspect of this invention comprises a waste food disposer comprising a comminutor and a conduit for providing access between a sink and the comminutor; a closure and means mounting the closure for movement between a first position substantially spanning the conduit, a partially open second position and a substantially fully open third position; control means responsive to movement of the closure away from the first position for stopping the comminutor; means for moving the closure between the positions thereof that preferably functions to delay the closure at the second position during travel away from the first position to allow the comminutor to at least slow substantially before the closure moves away from the second position toward the third position.

Still another aspect of this invention comprises a waste food disposer comprising a comminutor and a conduit having an inlet for opening into a sink and for providing access to the comminutor; a closure and means mounting the closure for movement within the conduit between a first position substantially spanning the conduit, a partially open second position and a substantially fully open third position; and means for moving the closure between the positions thereof including handle means extending through the conduit past the inlet thereof in the first and third closure positions for providing a graspable element and extending to a location between the closure and the conduit inlet in the second closure position for allowing a stopper to be received in the conduit inlet.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view, certain parts being broken away for clarity of illustration, illustrating the closure of this invention in the closed position in a food waste disposer;

FIG. 2 is a view similar to FIG. 1 illustrating the closure of this invention in an intermediate position illustrating the de-energization of a switch controlling the comminutor motor;

FIG. 3 is a view similar to FIGS. 1 and 2 illustrating the closure in its fully open position;

FIG. 4 is a top view, certain parts being broken away for clarity of illustration, illustrating the operating handle in the closed position of the closure and also illustrating the mounting mechanism for the closure;

FIG. 5 is a top view illustrating the closure handle in the intermediate closure position;

FIG. 6 is a view similar to FIG. 5 illustrating the closure handle in the fully opened position; and

FIG. 7 is an elevational view of the closure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, there is illustrated a food waste disposer 10 comprising a generally cylindrical upper housing 12 defining therein a comminuting chamber 14 and secured at the lower end thereof to a lower housing 16. The upper end of the housing 12 is designed to be suspended from the drain opening or outlet of a typical kitchen sink 18. Although any suitable suspension means may be employed for this purpose, FIG. 1 illustrates the mechanism disclosed in U.S. Pat. No. 3,180,755 which is assigned to the assignee of this in-
vention. The attachment mechanism comprises a sleeve or throat 20 having an inlet 22. The throat 22 provides access between the sink 18 and the comminuting chamber 14 and, as will be more fully apparent hereinafter, cooperates with the closure of this invention. It will be seen that the throat 20 and chamber 14 comprise a conduit leading from the sink 18 to the comminutor.

An electric motor 24 is supported within the housing 16 and comprises a stator 26 and a rotor 28. Affixed to the rotor 28 is an upwardly extending shaft 30 supported by a structural member 32 and a bearing 34. The upper end of the shaft 30 is connected to a comminuting assembly 36 comprising a flywheel 38 carrying one or more pivotal impellers or comminuting members 40. Cooperating with the member 40 to effect a comminuting action is at least one cutting surface 42 which projects inwardly from a stationary shredding ring 44. A plurality of openings 46 are provided in the shredding ring 44 for the passage of comminuted food waste into a sump 48 which is connected to the household sewer system through an outlet 50. Those skilled in the art will recognize that the disposed 10, as heretofore described, is typical of the disposers made by the assignee of this invention.

A closure 52 is pivotally mounted in the upper housing 12 to substantially close the throat 20 and thereby prevent forcible ejection of waste food particles from the disposer 10. The closure 52 is mounted by pivotal connections 54, 56 (FIG. 4) for movement within the housing 12 between a closed position (FIG. 1), an intermediate position (FIG. 2) and an open position (FIG. 3). The closure 52 operates through a camming mechanism 58 to control a switch 60 in the power circuit to the electric motor 24. The switch 60 is conveniently of the normally open type which is closed only when the closure 52 is in the closed position of FIG. 1. As the closure 52 moves away from the closed position of the camming mechanism 58 retreats from engagement with the switch 60 as illustrated in FIG. 2 to sever the power circuit leading to the electric motor 24.

The general operation of the disposer 10 should now be apparent. In the closure position illustrated in FIG. 1, the power circuit to the comminutor motor 24 is completed thereby driving the comminuting assembly 36 and pulverizing waste food particles in a conventional manner. When the closure 52 is moved away from the position of FIG. 1, the switch 60 is opened thereby de-energizing the motor 24 and providing an inherent safety feature.

The closure 52 desirably does not substantially obstruct the passage of waste food particles into the comminuting chamber 14 nor substantially reduce the volume of the comminuting chamber 14. It is also advantageous if the closure 52 presents a relatively smooth configuration in order to minimize collection sites for waste food particles.

To these ends, the closure 52 comprises a shell or closure member 62 made of sheet material or the like which preferably defines a section of a sphere. The shell 62 is spaced from its axis of rotation 64, defined by the pivotal connections 54, 56, by a set of arms 66 on each side of the shell 62. Each set of arms 66 merge into a yoke 68 which is constrained by the pivotal connections 54, 56.

In the closed position of FIG. 1, the closure 52 spans the throat 20 leading to the sink 18 thereby preventing ejection of waste particles from the comminuting chamber 14. It will be noted, however, that the shell 62 is spaced from the bottom edge of the throat 20 thereby allowing water passage from the sink 18 into the comminuting chamber 14 during operation. It is, of course, desirable to allow cold water to run into the comminuting chamber during operation in order to gel grease and the like and to form a liquid slurry for disposal through the outlet 50.

Referring to FIG. 3, it will be apparent that the throat 20 defines a path of waste food movement 70 into the comminuting chamber 14. It is also evident that the upper end of the housing 12 is of greater cross sectional area than the throat 20 thereby providing a closure receiving area 72 radially displaced from the path of movement 70. In the open position, the closure member 62 is disposed substantially within the closure receiving area 72 thereby minimally obstructing the path of movement 70. It will accordingly be seen that the closure member 62 is bodily moved in and out of the path of waste food movement 70 during movement between the closed and open positions.

As previously mentioned, the pivotal connections 54, 56 define the axis of rotation 64 of the closure member 62 and are best illustrated in FIG. 4. The pivotal connection 54 comprises a shoulder bolt 74 extending through the yoke 68 with a nut 76 binding the shoulder of the bolt 74 against the wall of the housing 12.

The pivotal connection 56 is somewhat more complicated since it also constitutes a drive connection between the closure member 62 and the camming mechanism 58. The pivotal connection 56 comprises an externally threaded tube 78 and a pair of nuts 80, 82 captivating a switch plate 84 against the upper housing 12.

The camming mechanism 58 includes a sleeve extending through the tube 80 and, in turn, receives a pin or shaft 86 having a head 88 thereon captivating the yoke 68. The shaft head 88 may be permanently affixed to the yoke 68 as suggested in FIG. 7 or may comprise splines received in corresponding grooves from the inside of the yoke 68. In any event, rotation of the closure member 62 effects rotation of the shaft 86.

The closure 52 also comprises means 90 for moving the closure member 62 between the various positions thereof. The moving means 90 provides advantages important to the operation of the disposer 10. It is highly desirable for the closure 52 to pause intermediate its travel between the fully closed position of FIG. 1 and the fully open position of FIG. 3 in order to allow the electric motor 24 to at least slow substantially in response to severing of the power circuit by the switch 60. It is also desirable that the moving means 90 regulate the insertion of a stopper into the throat 20.

To these ends, the moving means 90 comprises a first handle segment 92 movably mounted on the closure member 62 adjacent the leading edge thereof. The first segment 92 desirably provides a driving connection to the closure member 62 in both directions of movement thereof as well as provides an arc of non-driving movement. The first handle segment 92 comprises a bifurcated lower end projecting through a slot 94 in the closure member 62. A pair of tabs 96, 98 captivate the handle segment 92 to the closure member 62. It will be apparent that this arrangement provides a non-driving connection between the segment 92 and the closure member 62 until the tabs 96, 98 engage the closure member 62. When the segment 92 has been moved suf-
The camming mechanism 58 may be of any desirable type to transmit rotation of the shaft 86 into operation of the switch 60. The camming mechanism 58 conveniently includes a molded plastic camming element 112 having a spring retainer 113 inserted therethrough and through an opening in the shaft 86. The camming element 112 is accordingly rigid with the shaft 86 for rotation therewith. The camming element 112 includes a switch contacting face 114 actuating the switch 60 in the closed position of FIG. 1 and retracting out of engagement therewith in the partially open and fully open positions of FIGS. 2 and 3 respectively. A spring 116 is connected to the spring retainer 113 in a toggle arrangement to hold the camming mechanism 58 in either the fully open position of FIG. 3 or the fully closed position of FIG. 1. Since the camming mechanism 58 is rigid with the closure member 62, it will be apparent that the toggle spring 116 also retains the member 62 in either the fully open or fully closed position.

The switch 60 is conveniently attached to the switch plate 84 and includes a switch actuator 118 positioned in the path of movement of the camming face 114. The switch 60 is conveniently of the normally open type and the actuator 118 is depressed to close the switch 60 and thereby close the power circuit comprising the electrical connection 120 to the electric motor 24.

Operation of the disposer 10 should now be apparent. In the fully open positions of the closure 52, as in FIGS. 3 and 6, waste food disposed into the throat 20 follows the path of movement 70 into the comminuting chamber 14. The power circuit to the electric motor 24 is severed by the switch 60 thereby providing an inherent safety feature. As is most apparent from FIG. 6, the closure 52 is substantially out of the path of movement 70 and substantially wholly in the closure receiving area 72 thereby minimally restricting access to the comminuting chamber 14. When a desired amount of waste food has been placed in the comminuting chamber 14, the housewife grasps the upper end of the handle segment 100 and moves it in a generally clockwise direction. The driving connection between the moving means 90 and the closure member 62 causes the member 62 to rotate about the axis 64 toward the position of FIG. 1. As the toggle spring 116 passes above the shaft 86, the closure member 62 is biased into the closed position of FIG. 1. It will be noted that the driving connection between the handle segment 92 and the closure member 62 provides an arc of non-driving movement at least as great as the arc of rotation of the closure member 62 allowing the segment 92 to project along the throat 20 in all positions of the closure 52.

It will be apparent that the closure member 62 substantially spans the path of waste food movement 70 and thereby prevents forcible ejection of waste food particles from the comminuting chamber 14. Since the closure member 62 does not seal against the throat 20, cold water may advantageously be passed from the sink 18 into the comminuting chamber 14. It will be apparent that the camming face 114 engages the actuator 118 to close the switch 60 and thereby energize the electric motor 24.

When the comminuting operation is completed, the housewife moves the upper end of the handle segment 100 in a generally counter clockwise direction relative to the handle segment 92. Since the tabs 96, 98 are in driving engagement with the closure member 62, the
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rolled edge 108 engages the throat 20 and moves the closure member 62 to the position of Fig. 2. During movement to the intermediate position of Fig. 2, the camming face 114 retreats from the actuator 118 thereby allowing the switch 60 to assume its normally open position and de-energize the motor 24. Fig. 2 constitutes the normal position for the closure 50. The sink stopper 110 may be placed in the inlet 22 to use the sink 18 in a conventional manner. The switch 60 assures that the comminuting motor 24 is de-energized.

Since the closure member 62 partially obstructs the conduit leading from the sink 18 to the comminuting chamber 14, the inadvertent dropping of silverware or the like through the throat 20 into the comminuting chamber 14 is substantially prevented.

The intermediate position of Fig. 2 also provides another important feature. It will be apparent that the moving means 90 cannot readily be manipulated to move the closure member 62, without delay, from the fully closed position of Fig. 1 to the fully open position of Fig. 3. Unless the housewife makes a deliberate attempt to the contrary, the handle segment 90 moves to the position of Fig. 2 and the housewife must turn loose thereof and grasp the handle segment 92 to continue movement of the closure member toward the fully open position of Fig. 3. It will accordingly be seen that the closure member 62 passes at the intermediate position of Fig. 2. Since the switch 60 is moved to the open position during travel from the position of Fig. 1 to the position of Fig. 2, the electric motor 24 is de-energized and the delay afforded by the moving means 90 allows the motor 24 to slow at least substantially thereby obviating forcible ejection of waste food particles while the closure 52 moves from the intermediate position of Fig. 2 toward the fully open position of Fig. 3.

I claim:

1. A waste food disposer comprising a comminutor and a conduit for providing access between a sink and the comminutor; a closure and means mounting the closure for movement in a path including sequentially a first position substantially spanning the conduit, a partially open second position and a substantially fully open third position, the path including a segment beginning at a location intermediate the first and second positions and ending at the second position; means responsive to movement of the closure away from the first position in the path segment for stopping the comminutor; means for moving the closure between the positions thereof; and means for delaying the closure at the second position during travel away from the first position to allow the comminutor to at least slow substantially before the closure moves away from the second position toward the third position.

2. A waste food disposer comprising a comminutor and a conduit including an inlet for providing access between a sink and the comminutor; a closure and means mounting the closure for movement within the conduit between a first position substantially spanning the conduit, a partially open second position and a substantially fully open third position; and means for moving the closure between the positions thereof including handle means extending through the first position for stopping the comminutor; means for moving the closure between the positions thereof including a handle extending from the closure past the conduit inlet in the first and third closure positions providing a graspable element and extending to a location between the closure and the conduit inlet in the second closure positions enabling a stopper to be placed in the conduit inlet.

3. The waste food disposer of claim 1 wherein the moving means includes the delaying means.

4. A waste food disposer comprising a comminutor and a conduit including an inlet for providing access between a sink and the comminutor; a closure and means rotatably mounting the closure for movement within the conduit between a first position substantially spanning the conduit, a partially open second position and a substantially fully open third position; means responsive to movement of the closure away from the first position for stopping the comminutor; means for moving the closure between the positions thereof including a handle having a segment extending in the conduit toward the inlet, means connecting the segment and the closure in driving engagement and a lever movably mounted on the segment for engaging the conduit wall and forcing the closure toward the second position.

5. The waste food disposer of claim 4 wherein the connecting means provides for nonmoving movement between the segment and the closure through an arc of movement at least as great as the pivotal range of the closure.

6. A waste food disposer comprising a housing having an inlet for opening into a sink; means in the housing for comminuting material inserted through the inlet; a closure mounted for sequential movement between a position closing the housing and a multiplicity of increasingly open positions terminating in a substantially fully open position; means for moving the closure from the closed position to one of the increasingly open positions and, after a delay, then to the substantially fully open position; and means for halting operation of the comminuting means in response to movement of the closure toward said one increasingly open position.

7. The subject matter of claim 6 wherein the comminuting means includes a comminuting member and an electric motor for driving the comminuting member; and the halting means comprises a switch controlling a power circuit to the electric motor for deenergizing the motor upon movement of the closure away from the closed position.

8. A waste food disposer comprising a comminutor and a conduit having an inlet for opening into a sink and for providing access to the comminutor; a closure and means mounting the closure for movement within the conduit between a first position substantially spanning the conduit, a partially open second position and a substantially fully open third position; and means for moving the closure between the positions thereof including handle means extending through
9. The waste food disposer of claim 8 wherein the handle means comprises a first segment in driving connection with the closure and extending in the conduit to a location between the closure and the conduit inlet in all positions of the closure; a second segment movably mounted on the first segment; and means operative only in the first and third closure positions for extending the second segment in the same direction as the first segment.

10. The waste food disposer of claim 9 wherein the second handle segment comprises lever means for engaging the conduit wall in the first closure position for forcing the closure toward the second closure position.

11. The waste food disposer of claim 1 wherein the conduit defines a path of waste food movement from the sink toward the comminutor; and the mounting means includes means mounting the closure for movement between positions, within the conduit, in and substantially out of the path of movement.

12. The waste food disposer of claim 11 wherein the mounting means comprises pivotal connections on the conduit wall defining a pivot axis transverse to the conduit and extending through a central portion thereof; and the closure comprises a closure member extending, in the first position, across the conduit and arms interconnected and displacing the member from the pivotal connections.

13. The waste food disposer of claim 12 wherein the closure member is of arcuate shaped material and concave toward the comminutor in the first position.

14. The food waste disposer of claim 8 wherein the mounting means comprises pivotal connections on the conduit wall defining a pivot axis transverse to the conduit and extending through a central portion thereof; and the closure comprises a member extending, in the first position, across the conduit and arms interconnected and displacing the member from the pivotal connections.

15. The waste food disposer of claim 2 wherein the handle includes a segment extending in the conduit toward the inlet; means connecting the segment and closure in driving engagement during closure movement from the first position to the second position and connecting the segment and closure in non-driving engagement during closure movement from a toggle position, intermediate the second and third positions, and the third position; and means movably mounted on the segment for engaging the conduit wall and forcing the closure toward the second position; and wherein the moving means comprises a toggle spring operatively connected to the closure for biasing the closure from the toggle position to the third position.

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