United States Patent [19]

Guth

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[45] **Apr. 16, 1974**

[54] **WASTE FOOD DISPOSER**

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[73] Assignee: **General Electric Company,** Louisville, Ky.

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[52] **U.S. Cl.**..... **241/32.5,** 241/46 A, 241/100.5, 241/257 G

[51] **Int. Cl.**..... **B02c 23/04**

[58] **Field of Search**..... 241/32.5, 46 A, 100.5, 241/257 G

[56] **References Cited**

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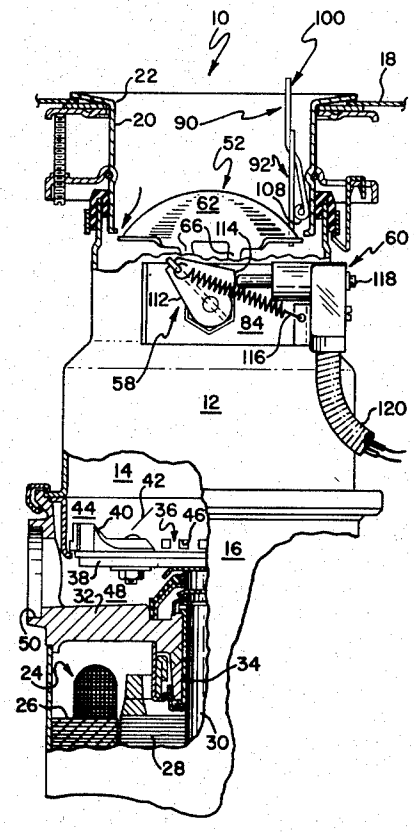
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Assistant Examiner—E. F. Desmond
Attorney, Agent, or Firm—Francis H. Boos, Jr.

[57] **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



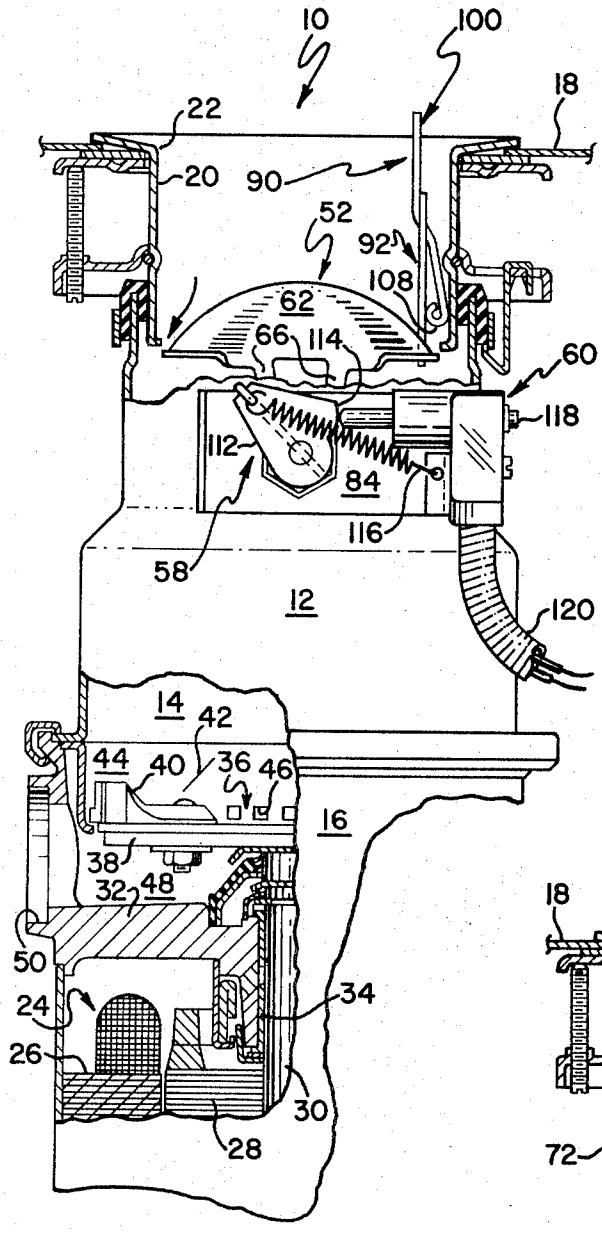


FIG. 1

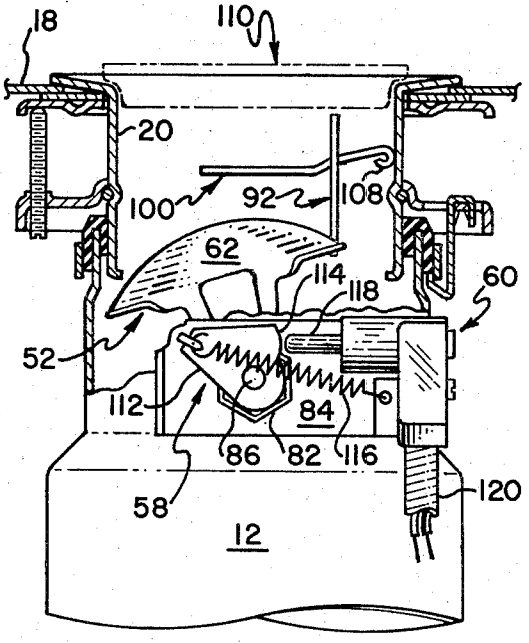


FIG. 2

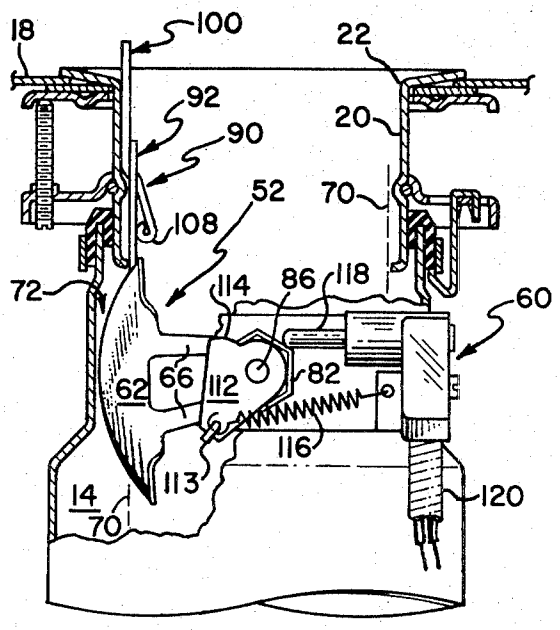


FIG. 3

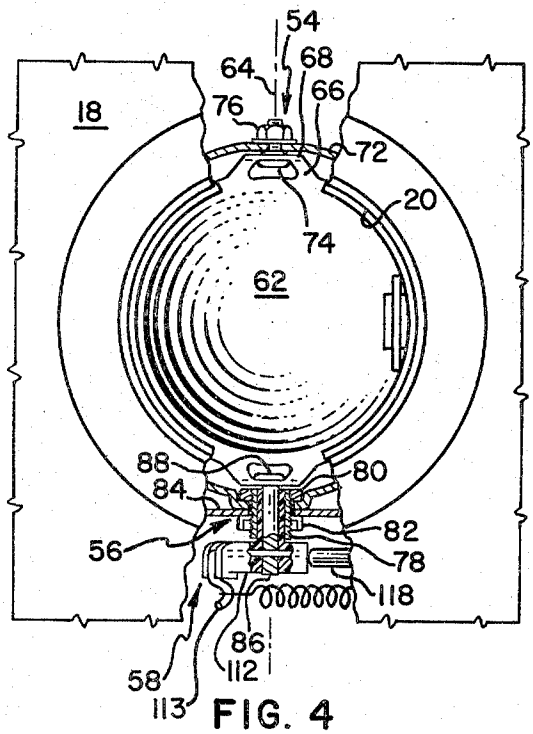


FIG. 4

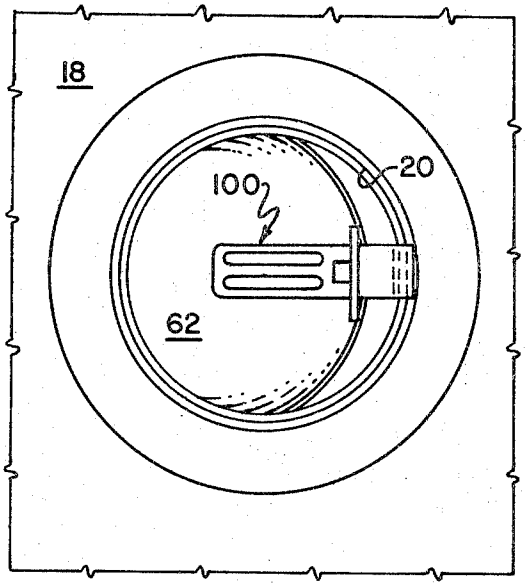


FIG. 5

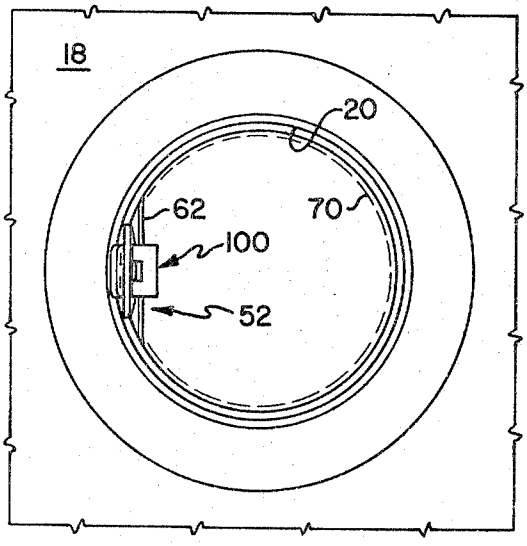


FIG. 6

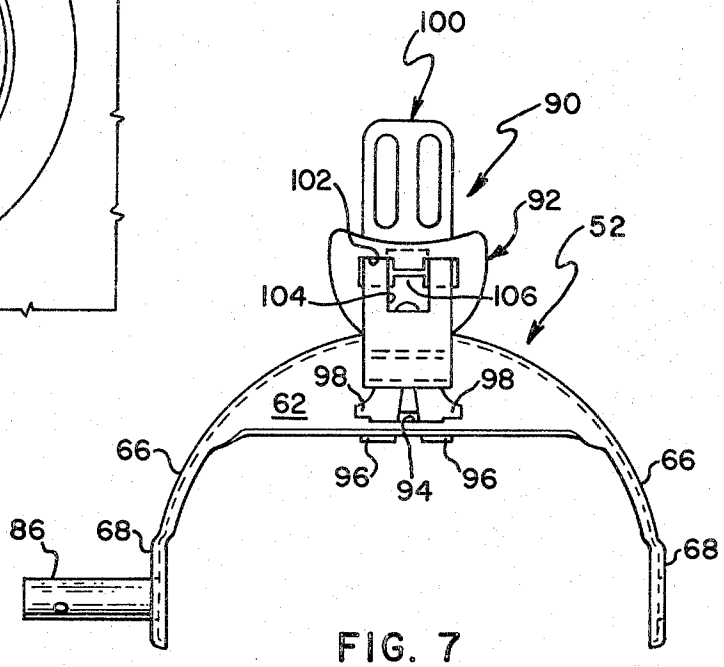


FIG. 7

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. This safety feature usually takes the form of a combined stopper and control means which fits into the sink drain outlet and serves the plural functions of a conventional sink stopper, control means to energize and de-energize the disposer, and is a guard to prevent the ejection of particles through the sink drain as well as the insertion of a 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 disposer **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, 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, desirably 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 exteriorally 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 on 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 desirably 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-

ficiently relative to the closure member **62** to bind the tabs **96, 98** against the closure member **62,** there is provided a driving connection between the segment **92** and the closure member **62** in both directions of movement thereof.

The moving means **90** also comprises a second handle segment **100** which is movably mounted on the first segment **92.** The segment **92** provides a slot **102** adjacent the upper end thereof receiving a central portion of the handle segment **100.** The segment **100** comprises a central slot **104** receiving a centering tab **106** on the segment **92** thereby captivating the segments **92, 100** yet allowing relative movement therebetween. As shown best in FIGS. **1** and **3,** the segment **100** extends diagonally through the segment **92** and includes, at the lower end thereof, a rolled edge **108.**

In the closed position of FIG. **1,** the closure member **62** is biased in the closed direction by a toggle spring discussed hereinafter such that the rolled edge **108** engages the throat **20** to maintain the segment **92** generally upright and to bias the segment **92** such that the tabs **96, 98** are in engagement with the closure member **62** in preparation for moving the same toward the open position. To commence opening of the closure member **62,** the second handle segment **100** is rotated or moved in a generally counter clockwise direction as shown in FIGS. **1–3.** The rolled edge **108** remains in engagement with the throat **20.** Coaction between the centering tab **106** and the base of the slot **104** causes the segment **92** to move in a generally counter clockwise direction. Since the tabs **96, 98** are in driving engagement with the closure member **62,** the closure member **62** is rotated about its axis of rotation **64** into the position shown in FIG. **2.** Relative rotation between the segments **92, 100** ceases at about the position of FIG. **2** because of interference between the segment **100** and the slot **102.**

It will be noted that, in the closure position of FIG. **1,** the handle segment **100** extends above the throat inlet **22.** It will accordingly be seen that a stopper cannot be inserted into the inlet **22** while the closure member **62** is closed. This is quite desirable since cold water should be allowed to flow through the throat **20** and past the closure **52** while the comminuting assembly **36** is operating. In the partially open position of FIG. **2,** neither handle segment **92, 100** projects above the throat inlet **22** thereby allowing a stopper **110** to be inserted in the inlet **22** to prevent liquids in the sink **18** from passing into the disposer **10.**

To continue opening movement of the closure member **62,** the housewife extends a finger into the throat **20** and grasps the handle segment **92** and pulls toward the left in FIG. **2.** Since the tabs **96, 98** remain in driving engagement with the closure member **62,** counter clockwise rotation of the closure member **62** is effected. As soon as the member **62** moves past the toggle position, the toggle spring snaps the same into the fully open position of FIG. **3.** The lower end of the segment **100** is preferably heavier than the upper end thereof to prevent the upper end of the segment **100** from engaging the throat **20** while downwardly inclined. When the upper end of the segment **100** engages the throat **20** while upwardly inclined, further rotation of the member **62** extends the segment **100** in a generally upwardly direction to again project through the throat inlet **22.**

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 retreating 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 inserted through 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

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 advertent 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** pauses 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;

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 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 nondriving 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

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.

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 interconnecting 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 interconnecting 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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