March 26, 1968 W. M. SHIVE 3,374,958

FOOD WASTE DISPOSER

Filed June 11, 1965

FIG. 1

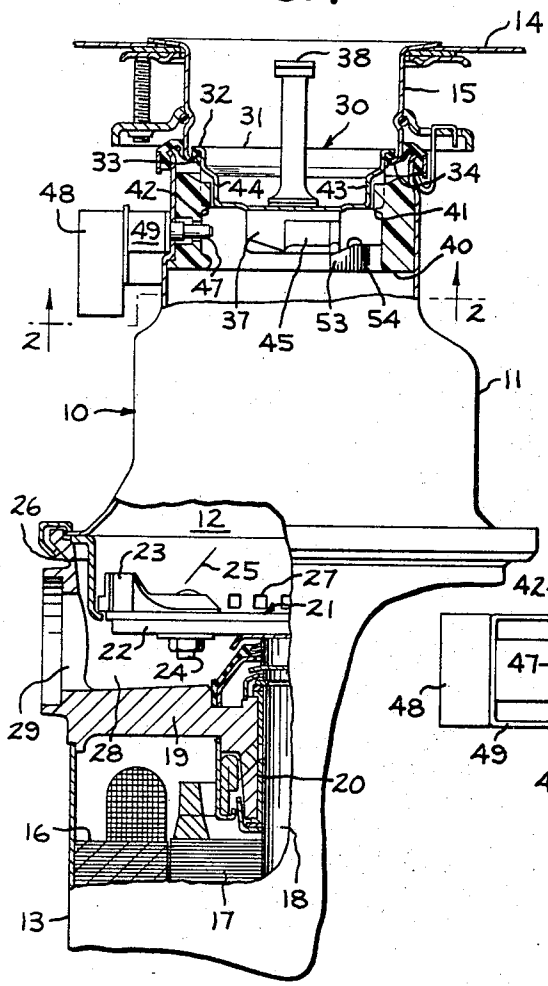


FIG. 2

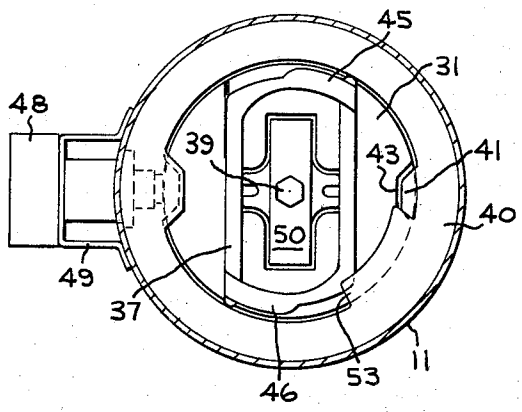


FIG. 3

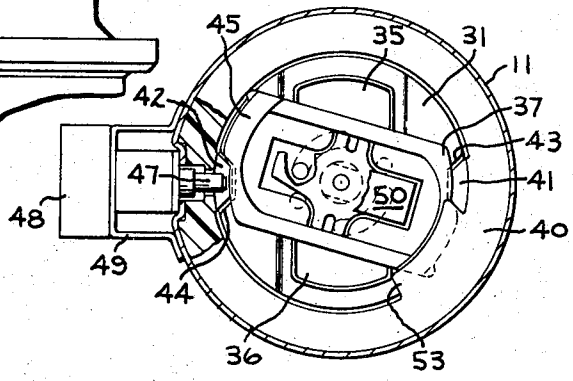


FIG. 4

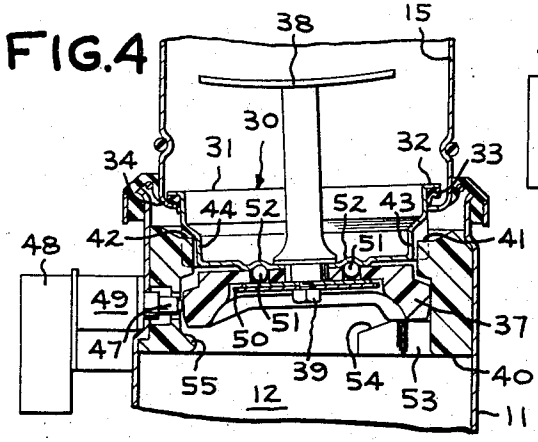
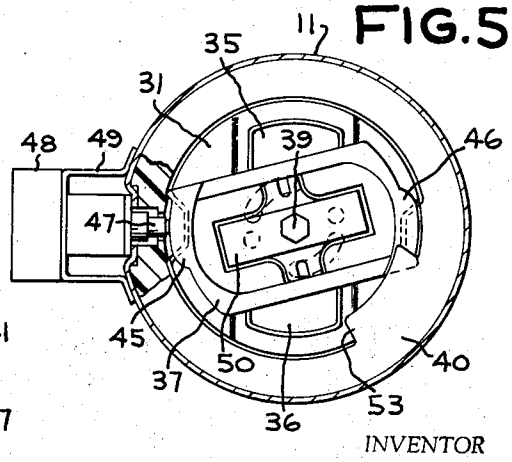


FIG. 5



INVENTOR

BY WILLIAM M. SHIVE

James E Espe

HIS ATTORNEY

United States Patent Office 3,374,958 Patented Mar. 26, 1968

3,374,958

FOOD WASTE DISPOSER

William M. Shive, Louisville, Ky., assignor to General Electric Company, a corporation of New York

Filed June 11, 1965, Ser. No. 463,153
6 Claims. (Cl. 241—46)

ABSTRACT OF THE DISCLOSURE

A stopper having passageways therethrough to allow water to drain from a sink or enter disposer for comminuting operation. A member is provided to selectively open and close the passageways. Means are also provided to separate at least a portion of the stopper periphery from its sealing surface to vent the comminuting chamber of the disposer as the passageways are opened.

This invention relates generally to food waste disposers for use with a kitchen sink or similar structure and, more particularly, to an improved stopper means to selectively retain water in the sink or allow it to enter the disposer.

Most commonly available food waste disposers, intended primarily for use in the home, are adapted for use beneath the kitchen sink. Such a food waste disposer is provided with an open-top housing defining a comminuting chamber. Means are provided to support the housing beneath the sink with its open top aligned with the sink drain opening. With this arrangement, food waste may be placed in the sink and then gradually fed into the disposer along with water. Food waste disposers for use in the home generally fall into one of two categories; the first is the continuous feed type wherein food waste may be continuously fed into the disposer during operation and the second is the batch feed type wherein the disposer is filled with food waste and then operated until the food waste is comminuted whereupon the unit is de-energized and refilled. The batch feed type has met with success since it usually provides an inherent safety feature which prevents the housewife from accidently inserting her hand into the disposer during its operation. 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 as a guard to prevent the ejection of particles through the sink drain as well as the insertion of a hand into the disposer during its operation.

Combined stopper and control means heretofore available allowed water to enter the disposer during its operation, the presence of water being necessary so that the comminuted food waste will form a liquid solution and be flushed through the sewer system, either through selectively closable passageways in the stopper or by raising the stopper axially a short distance to allow water to pass between the periphery of the stopper and the surface upon which it normally seats.

The present invention is primarily concerned with that type of stopper having passageways therein to allow water to enter the disposer during operation or to allow draining of the sink. I have discovered that under certain circumstances air may be entrapped within the comminuting chamber of the disposer and this air will impede the flow of water into the disposer through the passageways provided in the stopper. This impedance may occur during operation of the disposer and also during normal draining of the sink. I further have discovered that by venting the comminuting chamber of the disposer at the time the

passageways are opened, the entrapped air can escape thereby removing the impedance to flow of water.

Accordingly, it is an object of this invention to provide an improved stopper for a food waste disposer.

It is another object of this invention to provide a stopper for a food waste disposer wherein the stopper releases air entrapped within the comminuting chamber of the disposer.

Briefly stated, in accordance with one aspect of this invention, there is provided an improved stopper for a food waste disposer primarily adapted for use beneath the sink or similar structure. The stopper is adapted to rest within the drain outlet of the sink and has at least one passageway therethrough to allow water to pass from the sink into the disposer. A movable member is manually operable to selectively open and close the passageway. Further means are provided to separate at least a portion of the periphery of the stopper from the surface upon which it normally seats as the movable member opens the passageway. The separation of the periphery of the stopper from its seat provides suitable venting for the escape of any air entrapped within the comminuting chamber of the disposer.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed the invention will be better understood from the following description taken in connection with the accompanying drawing, in which:

FIGURE 1 is an elevational view, partially cut away to show details, of a food waste disposer employing the present invention;

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a view similar to FIGURE 2 but showing the stopper of the present invention in a condition to allow draining of the sink without operation of the disposer;

FIGURE 4 is a fragmentary view similar to FIGURE 1 but showing the stopper in the condition wherein water is allowed to pass into the disposer and the disposer is energized; and

FIGURE 5 is a view similar to FIGURE 3 but showing the stopper in the condition of FIGURE 4.

Referring now to the drawings and particularly to FIGURE 1, there is shown a food waste disposer **10** with which the present invention may be used. The disposer **10** includes a generally cylindrical upper housing **11** having a comminuting chamber **12** therein and being secured at its lower end to a lower housing **13**. The upper end of housing **11** is designed to be suspended from the drain opening or outlet of a typical kitchen sink **14**. Any suitable suspension means may be employed for this purpose and such means is disclosed and claimed by Johnny W. Yartz and Francis J. Clements in U.S. Patent 3,180,755, which issued on Oct. 29, 1963, and is assigned to the General Electric Company, assignee of the present invention. Since this particular suspension means does not form a material part of the present invention it is not discussed in detail herein; however, it should be pointed out that the lower end of a sink flange or depending sleeve **15** cooperates with elements of the present invention as more fully discussed hereinafter.

An electric motor, including a stator **16** and a rotor **17**, is supported within housing **13** and is provided with an upwardly extending shaft **18**. Shaft **18** is supported by member **19** and bearing **20**. The upper end of shaft **18** is connected to a comminuating assembly shown generally at **21**. Comminuting assembly **21** includes a flywheel **22** having at least one pivotal impeller **23** secured thereto by a bolt **24**. Cooperating with impeller **23** to effectuate a comminuting action is at least one cutting surface **25**

which projects inwardly from a stationary shredding ring **26**. Openings **27** are provided in shredding ring **26** for the passage of comminuted food waste into a sump **28**, from which the comminuted food waste passes into the normal household sewer system (not shown) through an outlet **29**.

Generally, the construction thus far described does not form a material part of the present invention and, as will become more evident as the description proceeds, many of the aforementioned elements may be materially modified from the specific illustration shown in the drawing.

The operation of the device as thus far described, is as follows. Food waste is inserted into housing **11** by the operator. As is customary in a food waste disposer of the type shown in FIGURE 1, it is desirable to have the kitchen faucet running to provide a constant supply of water into the comminuting chamber **12** during operation of the disposer. The electric motor is energized whereupon shaft **18** rotates, and with it, the comminuting assembly **21**. The food waste in chamber **12** is comminuted by the interaction between impeller **23** and cutting surface **25**. As the food waste is comminuted, the water entering the chamber **12** carries the ground-up food waste through openings **27** into sump **28** below the comminuting assembly **21**. The food waste is carried from sump **28** to the normal household sewer system through outlet **29**.

In order to allow the housewife to utilize sink **14** in the conventional manner for dishwashing or other purposes, it is necessary to provide means in the open top of housing **11** to prevent the flow of water through sleeve **15** during those times when it is desired to retain water in sink **14**. Moreover, in order to gain the benefits of the batch feed type disposer wherein the possibility of a hand being inserted into the comminuting chamber or the possibility of particles being ejected from the chamber during operation of the disposer are minimized, the means provided to retain water in sink **14** must be provided with passageways therein. Finally, to gain yet another benefit of the batch feed type disposer, the means should have associated therewith a switch operator so that the disposer can be energized at the same time that the passageways are opened to allow water to enter the disposer during its operation.

There is provided a stopper **30** having a generally circular cup-shaped element **31**. Element **31** has a peripheral portion **32** which is provided with a gasket or seal **33** suitably bonded thereto. Seal **33**, and in turn element **31**, rests upon an inturned flange **34** at the lower extremity of sleeve **15**. Element **31** and seal **33** normally provide a substantially liquid-tight seal with flange **34** when stopper **30** is positioned as illustrated in FIGURE 1. It is to be understood that flange **34** need not be an integral part of sleeve **15** in order to comply with the present invention. For example, flange **34** could project inwardly, with some modification, from the upper extremity of housing **11**.

In the central depressed portion of element **31** there is provided two openings or passageways **35** and **36**. Rotatably carried by element **31** is a movable member **37** of sufficient size so that when it is disposed in the position illustrated in FIGURES 1 and 2, it will completely cover passageways **35** and **36** to prevent the flow of water therethrough. A T-shaped handle **38** is also rotatably carried by element **31** and passes through the central portion of element **31**. A bolt **39**, or other suitable means, provides a connection between handle **38** and member **37** so that when handle **38** is rotated, member **37** will rotate therewith. Member **37** is of sufficient size and is in sufficiently close relationship with the central portion of element **31**, to completely close off passageways **35** and **36** to prevent the passage of water therethrough when it is in the position illustrated in FIGURES 1 and 2.

An insert **40** of suitably non-corrosive material is rigidly secured to the inner surface of the upper portion of housing **11**. One material which has been found suitable for use as the insert **40** is an asbestos-filled polypropylene

molding material which provides a rigid, non-corrosive insert which may be press fit into housing **11** so as to be rigidly secured thereto. Insert **40** has two generally diametrically opposed protrusions **41** and **42** which cooperate with indentations **43** and **44** in element **31** to prevent element **31** from rotating relative to insert **40** or housing **11**. By preventing the rotation of element **31**, it is possible to rotate member **37** relative to element **31** by a simple twist of handle **38**.

Handle **38** and member **37** have three stable functional positions. The first position is that illustrated in FIGURES 1 and 2 wherein element **37** blocks passageways **35** and **36** so that stopper **30** will retain water in sink **14**. The second position is that ilustrated in FIGURE 3 wherein element **37** has been rotated approximately 75° to at least partially open passageways **35** and **36** to allow water to drain from sink **14** down through chamber **12** into sump **28** and finally into the sewer system through outlet **29**. The third position is that illustrated in FIGURES 4 and 5 wherein member **37** has been rotated approximately 100° from the position in FIGURE 1. In the third position, passageways **35** and **36** are still free to pass liquid into chamber **12** but additionally one of a pair of extensions **45** and **46**, located at opposite ends of member **37**, engage and depresses a button **47** extending from a switch **48**. The depression of button **47**, to the extent illustrated in FIGURES 4 and 5, closes switch **48** which energizes the electric drive motor and causes disposer **10** to operate. Switch **48** is, of course, suitably secured to housing **11** by a bracket **49** which may be brazed or welded to the outer surface of housing **11**.

In order to stabilize member **37** in each of its three functional positions, a spring-biased ball and detent arrangement is provided between member **37** and element **31**. This arrangement includes a leaf spring **50**, secured to the bottom surface of member **37** by bolt **39**, a pair of balls **51** and appropriate detents **52** in element **31** which receive balls **51**.

Although certain aspects of the aforedescribed arrangement presently appear novel, the broad concept of a combined stopper and control means for a food waste disposer wherein the stopper has one or more movable elements to serve the three functions discussed above, is old. However, as mentioned above, it has been discovered that under certain circumstances air may be entrapped within the comminuting chamber of the disposer and the entrapped air will impede the flow of water into the disposer, both during operation of the disposer and when the housewife is attempting to simply drain water from the sink. In accordance with the present invention means are provided to vent the comminuting chamber of the disposer so that the entrapped air can escape thereby removing the impedance to flow of water. This means, in one embodiment, includes a cam **53** having an inclined surface **54**, on the insert **40**. Cam **53** extends inwardly from the inner surface of insert **40** such that, as member **37** is rotated, one end of member **37** will ride up surface **54**. As illustrated in FIGURE 4, when member **37** rides up surface **54**, seal **33** separates from flange **34**. The separation of gasket or seal **33** from flange **34** provides an effective vent for air entrapped within chamber **12** to escape therefrom.

To better understand the phenomenon which occurs, it should be understood that water very quickly and very easily covers passageways **35** and **36** and only a very small volume of water is required to substantially fill sleeve **15**. The user of a food waste disposer such as that illustrated in FIGURE 1, is instructed to open the faucet above sink **14** prior to turning handle **38** when it is desired to operate the disposer. This instruction is intended to assure that water will be present within chamber **12** prior to operation of the comminuting assembly since dry operation of the assembly might well result in clogging and jamming of both openings **27** and sump **28** as well as the sewer system downstream from sump

28. Accordingly, when the housewife turns on the faucet it is only a matter of moments before sleeve **15** becomes filled with water so that passageways **35** and **36** are completely immersed. When handle **38** is then rotated to energize the disposer, there is no way for the air entrapped within chamber **12** to escape except through passageways **35** and **36** which are, as indicated, covered with water. It is not unusual for a static condition to be so created that the air entrapped within the chamber **12** prevents water from passing through passageways **35** and **36**.

Of course, the identical static condition may be created simply by filling the sink **14** with water and then attempting to drain the sink by rotating handle **38** and member **37** to the position illustrated in FIGURE 3. The only way for the air to escape is to bubble up through passageways **35** and **36** as water is attempting to pass downwardly therethrough.

The separation of at least a portion of the periphery of element **31** from flange **34** provides a secondary means of communication between chamber **12** and sleeve **15** so that as water attempts to enter chamber **12** through passageways **35** and **36** a momentary break-down of the aforedescribed static condition is created which allows the water to begin passing through passageways **35** and **36** and, once it begins to pass through, the static condition is sufficiently overcome to that the air is no longer entrapped within chamber **12** and will no longer substantially impede the flow of water.

In the preferred form of the present invention, the vent created by the separation of element **31** from flange **34** is at a level above passageways **35** and **36**. This means that there is a pressure differential created between passageways **35** and **36**, and the vent by the difference in heads of water above each point. This difference in pressure facilitates the momentary disturbance of the static condition which impedes the flow of water in the chamber **12**.

It should be noted that member **37** is symmetrical about its axis of rotation so that when it is removed for the insertion of food waste into chamber **12**, no care need be taken when reinstalling it. The only requirement is that either of indentations **43** and **44** be aligned with either of protrusions **41** and **42**. It should also be noted that protrusion **42** is positioned immediately above button **47** and an additional protrusion **55** is provided below button **47** to minimize the possibility of depressing button **47** accidentally while food waste is being inserted into chamber **12**.

Thus, it can be seen that the present invention provides an improved stopper means to selectively retain water in the sink or allow it to enter a disposer supported below the sink. Moreover, the present invention provides a suitable means for overcoming the problem of air entrapped within the comminuting chamber of a disposer which may impede the flow of water into the disposer.

As will be evident from the foregoing description, certain aspects of the invention are not limited to the particular details of construction of the example illustrated, and it is contemplated that various other modifications or applications will occur to those skilled in the art. It is therefore intended that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A food waste disposer for use at the outlet drain of a sink or like structure comprising:
- (a) a housing having an open top,
- (b) means to support said housing below the sink with said open top in alignment with the outlet drain,
- (c) a stopper,
- (d) means to support said stopper about its periphery,
- (e) said last-mentioned means and said stopper normally providing a substantially liquid-tight seal therebetween to retain water within the sink,
- (f) said stopper having at least one passageway therethrough,
- (g) a movable member carried by said stopper to selectively open and close said passageway, and
- (h) means operable upon movement of said movable members to separate at least a portion of the periphery of said stopper from said means supporting said stopper as said movable member opens said passageway.

2. A food waste disposer for use at the outlet drain of a sink or like structure comprising:
- (a) a housing having an open top,
- (b) means to support said housing below the sink with said open top in alignment with the outlet drain,
- (c) a comminuting chamber within said housing,
- (d) comminuting means within said chamber,
- (e) an electric motor to drive said comminuting means,
- (f) a stopper,
- (g) means to support said stopper about its periphery,
- (h) said last-mentioned means and said stopper normally providing a substantially liquid-tight seal therebetween to retain water within the sink,
- (i) said stopper having at least one passageway therethrough,
- (j) a movable member carried by said stopper to selectively open and close said passageway,
- (k) a switch carried by said housing to control the energization of said electrical motor,
- (l) said movable member being adapted to close said switch and energize said motor when moved to open said passageway, and
- (m) means operable upon movement of said movable member to separate at least a portion of the periphery of said stopper from said means supporting said stopper as said movable member opens said passageway.

3. For use with a food waste disposer supported below the outlet drain of the sink, a combined stopper and control means comprising:
- (a) an element having a peripheral portion,
- (b) means to support said element by engagement with said peripheral portion,
- (c) said means and said peripheral portion normally forming a substantially liquid-tight seal,
- (d) at least one passageway through said element,
- (e) a movable member carried by said element to selectively open and close said passageway, and
- (f) means cooperating with said movable member to at least partially separate said peripheral portion from said means to support said element as said movable member moves to open said passageway.

4. The invention defined in claim **3** wherein said element has a central depressed portion and said passageway is located in said central depressed portion at a level below said peripheral portion.

5. A food waste disposer for use at the outlet drain of a sink or like structure comprising:
- (a) a housing having an open top,
- (b) means to support said housing below the sink with said open top in alignment with the outlet drain,
- (c) a comminuting chamber within said housing,
- (d) a stopper,
- (e) said stopper having at least one passageway therethrough,
- (f) a movable member carried by said stopper to selectively open and close said passageway, and
- (g) means separate from said passageway to vent said comminuting chamber upon movement of said movable member to open said passageway.

6. A food waste disposer for use at the outlet drain of a sink or like structure comprising:
- (a) a housing having an open top,

(b) means to support said housing below the sink with said open top in alignment with the outlet drain,

(c) a stopper,

(d) means to support said stopper about its periphery,

(e) said last-mentioned means and said stopper normally providing a substantially liquid-tight seal therebetween to retain water within the sink,

(f) said stopper having at least one passageway therethrough,

(g) a movable member carried by said stopper to selectively open and close said passageway, and

(h) cam means on said housing engageable by said movable member as said movable member is moved to open said passageway whereby said stopper is cammed upwardly to separate at least a portion of the periphery of said stopper from said means supporting said stopper.

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HARRY F. PEPPER, JR., *Examiner.*

HARRISON L. HINSON, *Primary Examiner.*