July 8, 1969 C. W. BURKLAND 3,454,240

WASTE DISPOSER WITH CENTRIFUGALLY URGED IMPELLER

Filed June 27, 1966

Fig. 1

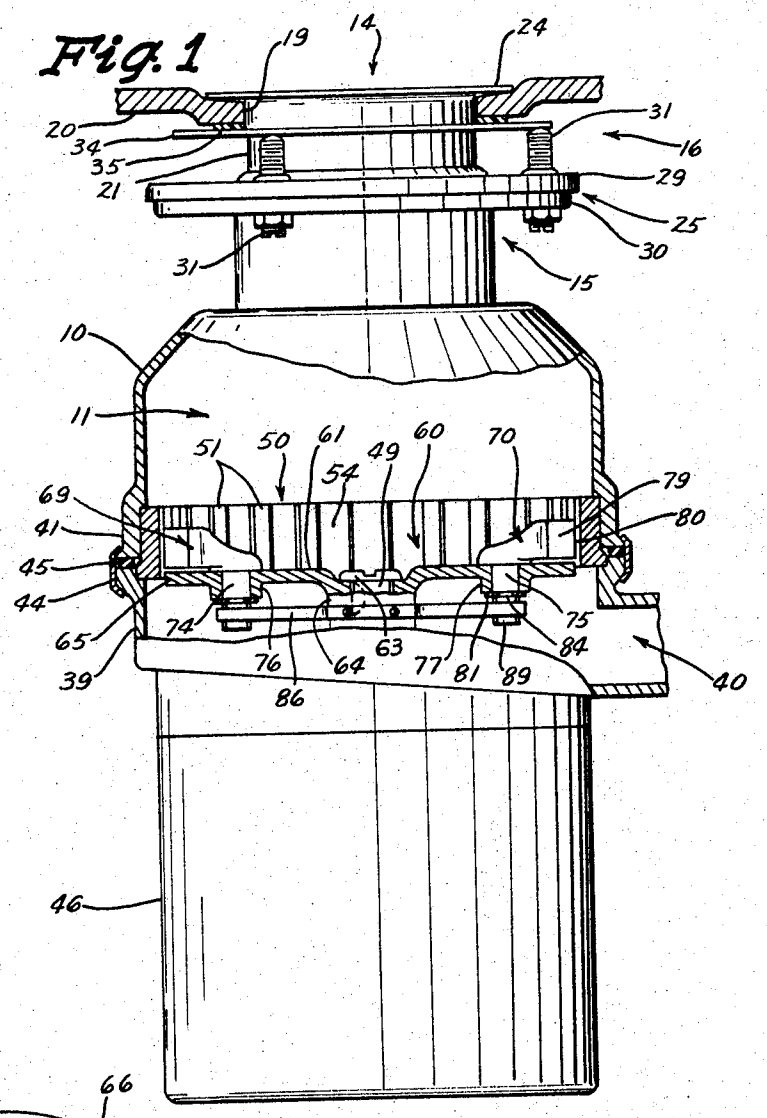


Fig. 2

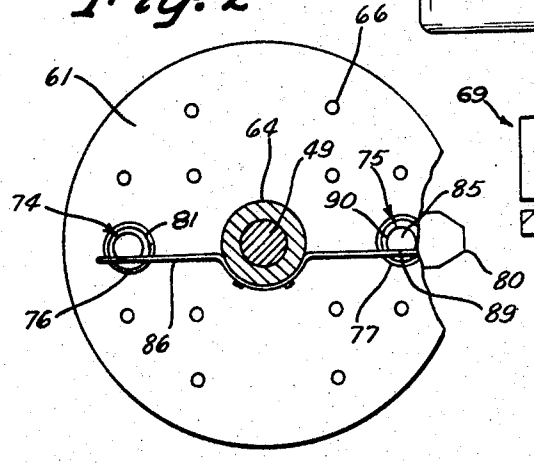
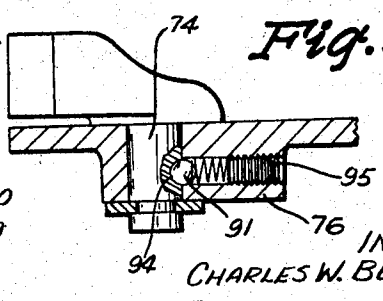


Fig. 3



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United States Patent Office 3,454,240 Patented July 8, 1969

3,454,240

WASTE DISPOSER WITH CENTRIFUGALLY URGED IMPELLER

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Filed June 27, 1966, Ser. No. 560,515
Int. Cl. B02c 13/16, 13/28, 18/42
U.S. Cl. 241—46.08 6 Claims

ABSTRACT OF THE DISCLOSURE

A waste disposer apparatus including a rotary assembly having pivotally operable impellers is disclosed. The pivotally operable impellers are centrifugally movable to an operative position at which detent means yieldingly locates and maintains the impellers for cooperation with a grinding ring to effect comminution of waste materials.

This invention relates to waste disposer apparatus and more particularly to an improved rotary impeller assembly for achieving optimum effectiveness while preventing jamming of the waste disposer apparatus.

Prior art has shown rotary impeller assemblies having movable impellers that are maintained in an outwardly pivoted position by centrifugal force and cooperable with a stationary shredder ring for comminuting waste material. To prevent jamming of the rotary impeller assembly by bones, for example, the impellers have been made freely pivotable out of the operative position. The impellers are retained in the operative position by forces related to rotation of the impeller assembly and are easily movable out of the operative position.

It is an object of the present invention to provide an improved impeller assembly for a waste disposer operable for preventing jamming by bones or other objects while insuring optimum operation of the impeller assembly.

It is a further object of this invention to provide an improved impeller assembly having a freely pivotable impeller and further having detent means for yieldingly maintaining the pivoted impeller in the outwardly pivoted position for effecting comminution of waste material.

It is a further object of the present invention to provide an improved impeller assembly for a waste disposer having a freely pivotable impeller mounted on a rotary member and operable to an outwardly pivoted position responsive to centrifugal force and further including means detentingly engageable with the impeller at the outward position for yieldingly maintaining it in the operative position.

It is a further object of the present invention to provide an improved impeller assembly for a waste disposer that includes symmetrically constructed and disposed pivotal impellers and that further includes means for yieldingly maintaining the impellers in a detented comminuting position to effect an optimum operation in either direction of rotation.

The present invention achieves the above objectives in a waste disposer apparatus having a rotary impeller assembly pivotally mounting at least one cutter or impeller that is cooperable with a stationary grinding or shredding ring for comminuting material therebetween. The impeller assembly further includes detent means mounted on the rotor and operable into detent engagement with the impeller for yieldingly maintaining the impeller in the operative position. This detent arrangement is operable for effecting optimum comminution of the waste material by maintaining the impellers in the operative position while permitting movement of the impellers from the operative position responsive to a predetermined force from bones or other waste material that might cause jamming of the rotary impeller assembly.

Operation of the device and further objects and advantages thereof will become evident as the description proceeds and from an examination of the accompanying page of drawings which illustrates a preferred embodiment of the invention and in which similar numerals refer to similar parts throughout the several views, wherein:

FIGURE 1 is an over-all vertical view of a waste disposer apparatus shown partially in section to illustrate the instant invention;

FIGURE 2 is a bottom view of the rotary impeller assembly showing the detent means of the instant invention and further having a fragmentary portion removed to illustrate the positioning of pivotal impellers upon engagement of the detent means; and

FIGURE 3 is a fragmentary view of the impeller assembly showing an alternate embodiment of the detent means.

Referring to FIGURE 1, there is shown a generally cylindrical waste disposer having an upper housing **10** defining a comminuting chamber **11** for accommodating waste material to be comminuted and including an inlet **14** at its upper end for receiving the waste material. The upper end **15** of the upper housing **10** is provided with means, indicated generally by arrow **16**, for mounting or supporting the disposer apparatus in a drain opening **19** of a sink **20** or the like. The mounting means **16** includes a flanged drain sleeve **21** supported at the sink opening **19** by an upper flange **24**. The mounting means **16** further includes a clamping assembly **25** supported on a lower portion of the drain sleeve **21** and including first and second ring members **29** and **30**. A plurality of clamping bolts **31** are threadingly engageable with the clamping assembly **25** and extend upwardly to bear against a clamping ring **34** spaced from the sink **20** by a resilient ring **35**. Tightening of the clamping blots **31** tends to clamp the upper end **15** of the upper housing **10** between the first and second ring members **29, 30** and to separate the clamping ring **34** from the upper ring **29** of the clamping assembly **25** to effect a connection of the disposer to the sink **20** through the drain sleeve **21**.

A lower housing **39** having a fluid outlet **40** is attached to the lower end **41** of the upper housing **10** by means of an encompassing clamp **44**. The junction of the upper and lower housings **10, 39** includes means for sealing against leakage of fluids from the comminuting chamber **11** such as shown diagrammatically by the seal means **45** in FIGURE 1. Attached to the lower portion of the lower housing **39** is a motor **46** having a motor shaft **49** extending upwardly toward the comminuting chamber **11**. The motor may be reversible for operating the disposer in either direction.

A substantially cylindrical shredder ring **50** is disposed within the comminuting chamber **11** and maintained in a relatively stationary position through the clamping action between said upper and lower housings **10, 39**. The shredder ring **50** includes a plurality of inwardly extending shredding elements **51** disposed around the inner periphery of the shredder ring **50**. Between each of the inwardly extending elements **51** is a longitudinally extending channel **54** for accommodating flow of fluid and comminuted waste material from the comminuting chamber **11** toward the outlet **40**.

A rotary impeller assembly **60** is disposed within the comminuting chamber **11** and includes a rotor **61** attached to the motor shaft **49** for rotation therewith. The rotor **61** includes a central hub portion **64** keyed to the motor shaft **49** and retained thereon by a screw **63** recessed in the upper surface of the rotor. The diameter of the rotor **61** is established so that the outer periphery **65** is closely spaced from the inner peripheral surface of the inwardly extending elements **51**. The rotor **61** also includes a plurality of holes **66** for accommodating flow of fluid from the comminuting chamber **11** toward the outlet **40**.

The rotor **61** pivotally supports a pair of impellers **69, 70** at diametrically opposed positions. The rotor **61** is free of stops or shoulders and thus the impellers **69, 70** are freely pivotable on pivot shafts **74, 75** extending through the rotor at mounting bosses **76, 77**. The impellers **69, 70** shown in FIGURE 1 are substantially identical and therefore description of one of the impellers is sufficient to cover constructional details and operation of each of the pair. The impeller **70** includes an upper portion having a mass portion **79** and also includes an outer portion **80** that is cooperable with the inwardly extending elements **51** of shredding ring **50** for effecting a comminution of waste material therebetween. The impeller **70** is constructed symmetrically with respect to a radially extending vertical plane so that the outer portion **80** is cooperable with the inwardly extending elements **51** to effect the comminution upon operation of the motor **46** in either of its two directions of rotation.

The impeller further includes a pivot shaft **75** extending through the rotor boss **77** and retained therein by a retaining ring **81** engageable with an undercut portion **84** of the impeller pivot shaft **75**.

As previously indicated, the upper surface of rotor **61** is free of stops or shoulder members engageable by the impellers **69, 70** and thus the disposer is free of the noise and banging due to movement of the impellers **69, 70** against such stops. The impellers **69, 70** are moved to the operative position under centrifugal force and are yieldingly maintained in this position by novel detent means as will be described hereinafter.

Forming a portion of the detent arrangement is a D-shaped extension **85** of the pivot shaft **75** extending downwardly from the pivotable impeller. The detent means further includes a leaf spring **86** attached to the rotor hub **64** and extending outwardly from the rotor hub **64** for engagement with the flat portion **89** of the D-shaft **85**. It may be noted that the leaf spring **86** is maintained in biased contact with the circular portion **90** of the D-shaft **85** but achieves a biased detent engagement with the flat portion **89** of the shaft **85** upon rotation of the impeller **70** to the outwardly extended operative position. The detent arrangement tends to hold the impeller **70** in the operative position during the comminuting operation. The detent also maintains the impeller **70** in the extended position at termination of rotation for preventing inertia-caused movement of the impeller to be a forward-pivoted position where jamming tends to occur upon the initiation of subsequent cycles.

The detenting force applied by the leaf spring **86** is established so that loading of the impeller **70** under normal grinding or comminuting circumstances does not move the impeller **70** out of the operative position. The detent, however, is overcome responsive to the presence of heavy overloading or dynamic overloading due to the presence of jamming material and the impeller is moved out of the operative position for effecting release of the jamming material. Upon freeing itself of the jamming material, the impeller **70** will again move to the operative position under centrifugal force and re-establish the yieldingly detented engagement.

An alternate embodiment of the detent means as shown in FIGURE 3 includes a biased ball and socket detent wherein the rotor boss **76**, for example, supports a movable detent ball **91** biased toward engagement with a recess **94** on the pivot shaft **74** when the impeller **69** is pivoted into the operative position. The amount of detent force could be varied to establish the level of jamming force necessary to pivot the impeller out of the operative position by means of an adjustable screw **95**, for example.

It is therefore seen that the instant invention provides an improved impeller assembly for a waste disposer that is operable for effecting optimum comminution of waste material while eliminating the jamming of bones or other waste materials. This novel arrangement is achieved by use of a freely pivotable impeller operable into a yieldingly detented position responsive to centrifugal force but operable from that position upon encountering a condition tending to cause jamming.

In the drawings and specification, there has been set forth a preferred embodiment of the invention and, although specific terms are employed, these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in form and the proportion of parts as well as the substitution of equivalents are contemplated, as circumstances may suggest or render expedient, without departing from the spirit or scope of this invention as further defined in the following claims.

I claim:

1. A waste disposer apparatus comprising: a housing providing a comminuting chamber and having an inlet for receiving waste materials; a shredding ring positioned within said chamber and including shredding elements; a rotary impeller assembly within said chamber and including a rotor and at least one impeller movably mounted on said rotor, said impeller being responsive to centrifugal force for movement into an operative position at which said impeller is cooperable with said shredding elements for effecting comminution of said waste materials; drive means for rotating said impeller assembly to effect movement of said impeller to said operative position; and detent means engageable at a predetermined detent position for yieldingly maintaining said impeller in said operative position.

2. A waste disposer as defined in claim **1** wherein said detent means includes biased engagement means for effecting a yieldable detented connection between said impeller and said rotor at said operative position and wherein said impeller is responsive to a predetermined resistance of said waste material at said operative position for moving out of said detented connection.

3. A waste disposer as defined in claim **1** wherein said detent means includes a first detent element connected to said impeller and a second detent element connected to said rotor and wherein said first and second detent elements are yieldingly engageable at said operative position.

4. A waste disposer as defined in claim **3** wherein said impeller is freely pivotable about its axis and is symmetrically constructed for bidirectional operation of said impeller assembly.

5. A waste disposer apparatus comprising: a housing providing a comminuting chamber and having an inlet for receiving waste materials; a shredding ring positioned within said chamber and including shredding elements; a rotary impeller assembly within said chamber and including a rotor and at least one impeller having a pivot pin movably mounted on said rotor, said impeller being responsive to centrifugal force for movement into an operative position at which said impeller is cooperable with said shredding elements for effecting comminution of said waste materials; drive means for rotating said impeller assembly to effect movement of said impeller to said operative position; and detent means including a first detent element formed in said pivot pin and a second detent element connected to said rotor and engageable with said first detent element in a yieldable detented engagement at said operative position.

6. A waste disposer as defined in claim **5** wherein said second detent element includes a biasing portion

for maintaining said second detent element in said yieldable detented engagement.

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U.S. Cl. X.R.

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