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WASTE DISPOSAL APPARATUS

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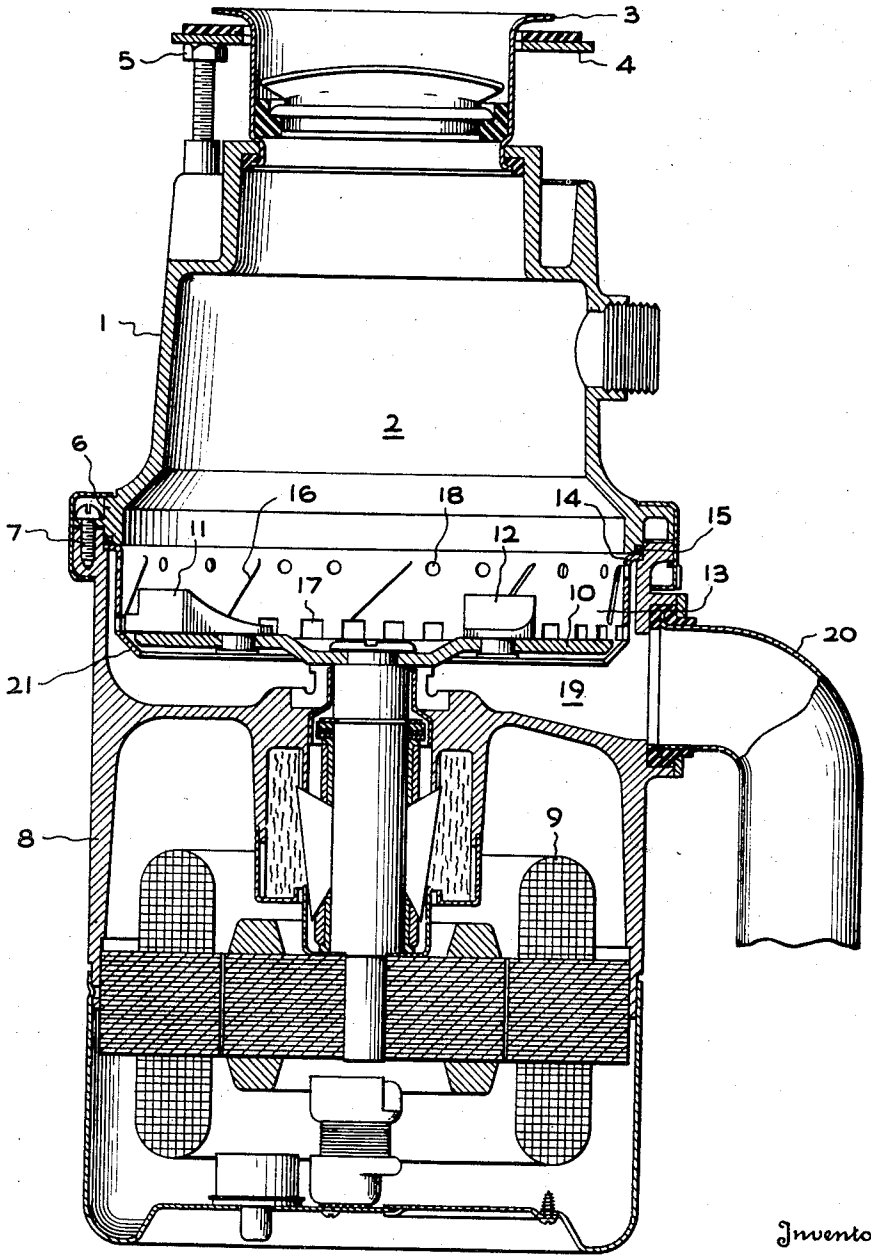

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WASTE DISPOSAL APPARATUS

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5 Claims. (Cl. 241—46)

This invention relates to waste disposal apparatus and has as its principal object the provision of comminuting or grinding mechanism for apparatus of this type which is particularly effective in comminuting fibers and other long stringy material.

Another object of this invention is to provide waste disposal apparatus of the type having a rotary grinding member and a stationary grinding member in which the annular clearance between these two members is sealed so as to prevent the passage of fibers and similar material.

Further objects and advantages of our invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Briefly stated in accordance with one aspect of our invention, we provide a generally cylindrical stationary shredding member having apertures therein through which comminuted material is expelled, a rotary comminuting member having a cylindrical peripheral surface in close proximity to the inner surface of the shredding member, and an inwardly inclined peripheral shelf so arranged that it cooperates with the rotary member in creating an upwardly directed fluid flow pattern in the clearance between the two members.

For a better understanding of our invention, reference may be made to the accompanying drawing in which the single figure is an elevation view partly in section, of a waste disposal device incorporating our invention.

Referring to the drawing, we have shown a waste disposal device having a generally cylindrical tubular casing or hopper 1 enclosing a grinding or shredding chamber 2 at the bottom of which the comminuting or shredding of waste material takes place as will be described below. The upper end of hopper 1 is provided with means suitable for supporting the device in the drain opening of a sink or the like, the supporting means including a supporting flange 3, a clamping flange 4 and clamping bolts 5, all arranged so that the open top of hopper 1 may be supported in alignment with a sink drain opening. Preferably, the drain opening is equipped with a suitable drain stopper, such as that disclosed in application Serial No. 549,744, filed by Fred W. Moore, November 29, 1955. This is now Patent No. 2,787,423, April 2, 1957, assigned to the assignee of the present application.

The lower end of hopper 1 is provided with a flange 6 which carries mounting screws 7 for securing a motor housing 8 to the hopper so as to form an integral structure. Mounted within motor housing 8 is an electric motor 9 provided with a vertically extending shaft to which is fixedly secured suitable rotary comminuting means located at the bottom of chamber 2. In the illustrated embodiment of our invention the rotary comminuting means comprises a flat generally circular flywheel 10 which carries a pair of movable impellers 11 and 12.

Secured to the bottom of tubular hopper 1 so as to cooperate with flywheel 10 and its impellers 11 and 12 is a generally cylindrical shredding ring 13. A flange 14 at

the top of shredding ring 13 is secured between flange 6 of the hopper and the upper end of motor housing 8 so that the shredding ring is stationary with respect to the hopper although it is preferably resiliently mounted to reduce noise and vibration, as by providing a resilient gasket 15 between flange 14 and the hopper structure. Shredding ring 13 is provided with a plurality of shredding projections 16 on its inner surface, a plurality of apertures 17 through which comminuted material is expelled during grinding operations, and a row of apertures 18 arranged to drain excess water from the comminuting zone. Projections 16, apertures 17 and apertures 18 may be conveniently formed by lancing and stamping operations, or by any other suitable means. The arrangement and functions of shredding ring 13 are more fully described and claimed in application Serial No. 553,119, filed by Herbert J. Macemon, December 14, 1955, and assigned to the assignee of the present application. From the foregoing it will be evident that during operation of the device shown in the drawing, waste material deposited in comminuting chamber 2 will be rotated by flywheel 10 and impelled against shredding projections 16 by impellers 11 and 12, and that the particles of comminuted material will be expelled through apertures 17 into drainage chamber 19 below flywheel 10 and will finally be carried by the flow of water through the device out through drain outlet 20.

One of the problems which has been encountered in the design and operation of waste disposal apparatus of the foregoing type is that fibrous material such as celery, bean pods and carrot stalks pass from the comminuting chamber into the drainage chamber practically intact and may later mat together to obstruct the drain line with which the device is connected. We have found that such material generally passes through the clearance between the flywheel 10 and the shredding ring 13, and furthermore that the fibers are in a generally horizontal extended position when they escape from the comminuting chamber. To overcome this difficulty, we provide an annular inwardly inclined shelf or ledge 21 around the lower edge of shredding ring 13, whereby a hydrodynamic seal is formed within the annular space between shelf 21 and flywheel 10 during rotation of the flywheel in the presence of water. By this means passage of waste material between the flywheel and the shredding ring is prevented. Preferably the periphery of flywheel 10 is slightly beveled at an angle equal to the angle at which shelf 21 is inclined so that a narrow annular clearance space defined by inclined concentric surfaces separates shredding ring 13 and flywheel 10. During rotation of flywheel 10 in the presence of water, any water which starts to flow through this clearance space is thrown outwardly by centrifugal force against inclined shelf 21 and is forced upwardly back into the comminuting chamber. Hence it will be seen that the water movement pattern upwardly along shelf 21 in the annular space between the flywheel and the shredding ring effectively prevents passage of waste material therethrough, and in particular the passage of fibrous materials which are generally thrown by centrifugal force into an arcuate position lying along the inner wall of the shredding ring. Hence fibrous materials are retained in the comminuting chamber until they are chopped into relatively short lengths either before or during their passage through apertures 17.

While we have shown and described a specific embodiment of our invention, we do not desire our invention to be limited to the particular construction shown and described, and we intend by the appended claims to cover all modifications within the true spirit and scope of the invention.

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

1. Waste disposal apparatus comprising a generally cylindrical wall member located at the bottom of a vertically extending comminuting chamber having a top access opening for receiving waste material and water, said wall member having a plurality of apertures therein through which comminuted waste material is expelled from the lower portion of said chamber, stationary shredding means within the lower portion of said chamber, rotary means within the lower portion of said chamber for impelling waste material against said shredding means and for expelling comminuted material through said apertures, said rotary means including a circular flywheel having a peripheral surface concentric with the inner surface of said cylindrical member and in close proximity thereto, an inwardly inclined peripheral shelf depending from said cylindrical member and underlying the peripheral surface of said flywheel, and wall means below said shelf defining a drainage chamber communicating with said comminuting chamber through said apertures.

2. Waste disposal apparatus comprising a generally cylindrical shredding ring fixedly mounted at the bottom of a vertically extending tubular hopper having a top access opening for receiving waste material and water, said shredding ring having a plurality of apertures therein through which comminuted waste material is expelled, a plurality of shredding projections formed on the inner surface of said shredding ring, a circular flywheel mounted for rotation at the bottom of said shredding ring below said apertures and said shredding projections about an axis concentric with said shredding ring, means carried by said flywheel for impelling waste material against said shredding projections during rotation of said flywheel, said flywheel having a peripheral surface in close proximity to the inner cylindrical surface of said shredding ring, an inwardly inclined peripheral shelf depending from said shredding ring and surrounding said peripheral surface, whereby a hydrodynamic seal preventing downward passage of waste material and water between said shelf and said flywheel is formed during rotation of said flywheel in the presence of water, and wall means below said shelf defining a drainage chamber communicating with said comminuting chamber through said apertures.

3. Waste disposal apparatus comprising a generally cylindrical wall member located at the bottom of a vertically extending comminuting chamber having a top access opening for receiving waste material and water, said wall member having a plurality of apertures therein through which comminuted waste material is expelled from the lower portion of said chamber, stationary shredding means within the lower portion of said chamber, rotary means within the lower portion of said chamber for impelling waste material against said shredding means and for expelling comminuted material through said apertures, said rotary means including a circular flywheel having a peripheral surface including a cylindrical portion concentric with the inner surface of said cylindrical member and in close proximity thereto and an inwardly downwardly inclined portion, an inwardly inclined peripheral shelf depending from said cylindrical member and underlying said inclined peripheral portion of said rotary means, and wall means below said shelf defining a drainage chamber communicating with said comminuting chamber through said apertures.

4. Waste disposal apparatus comprising a generally cylindrical shredding ring fixedly mounted at the bottom of a vertically extending tubular hopper having a top access opening for receiving waste material and water, said shredding ring having a plurality of apertures therein through which comminuted waste material is expelled, a plurality of shredding projections formed on the inner surface of said shredding ring, a circular flywheel mounted for rotation at the bottom of said shredding ring below said apertures and said shredding projections about an axis concentric with said shredding ring, means carried by said flywheel for impelling waste material against said shredding projections during rotation of said flywheel, said flywheel having a peripheral surface including a cylindrical portion in close proximity to an annular portion of an inner cylindrical surface of said shredding ring and an inwardly downwardly inclined portion, an inwardly inclined peripheral shelf depending from said shredding ring and closely underlying said inclined peripheral portion of said flywheel, and wall means below said shelf defining an annular drainage chamber communicating with said comminuting chamber through said apertures.

5. Waste disposal apparatus comprising a generally cylindrical shredding ring fixedly mounted at the bottom of a vertically extending tubular hopper having a top access opening for receiving waste material and water, said shredding ring having a plurality of apertures therein through which comminuted waste material is expelled, a plurality of shredding projections formed on the inner surface of said shredding ring, an inwardly inclined peripheral shelf located at the bottom of said shredding ring, a circular flywheel mounted for rotation at the bottom of said shredding ring below said apertures and said shredding projections but above said shelf about an axis concentric with said shredding ring, means carried by said flywheel for impelling waste material against said shredding projections during rotation of said flywheel, said flywheel having a peripheral surface including a cylindrical portion and a beveled portion in close proximity to an annular portion of the inner cylindrical surface of said shredding ring and to said inclined shelf respectively, whereby a hydrodynamic seal is formed between said shredding ring and said flywheel during rotation of said flywheel in the presence of water, and wall means below said shelf defining an annular drainage chamber communicating with said comminuting chamber through said apertures.

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