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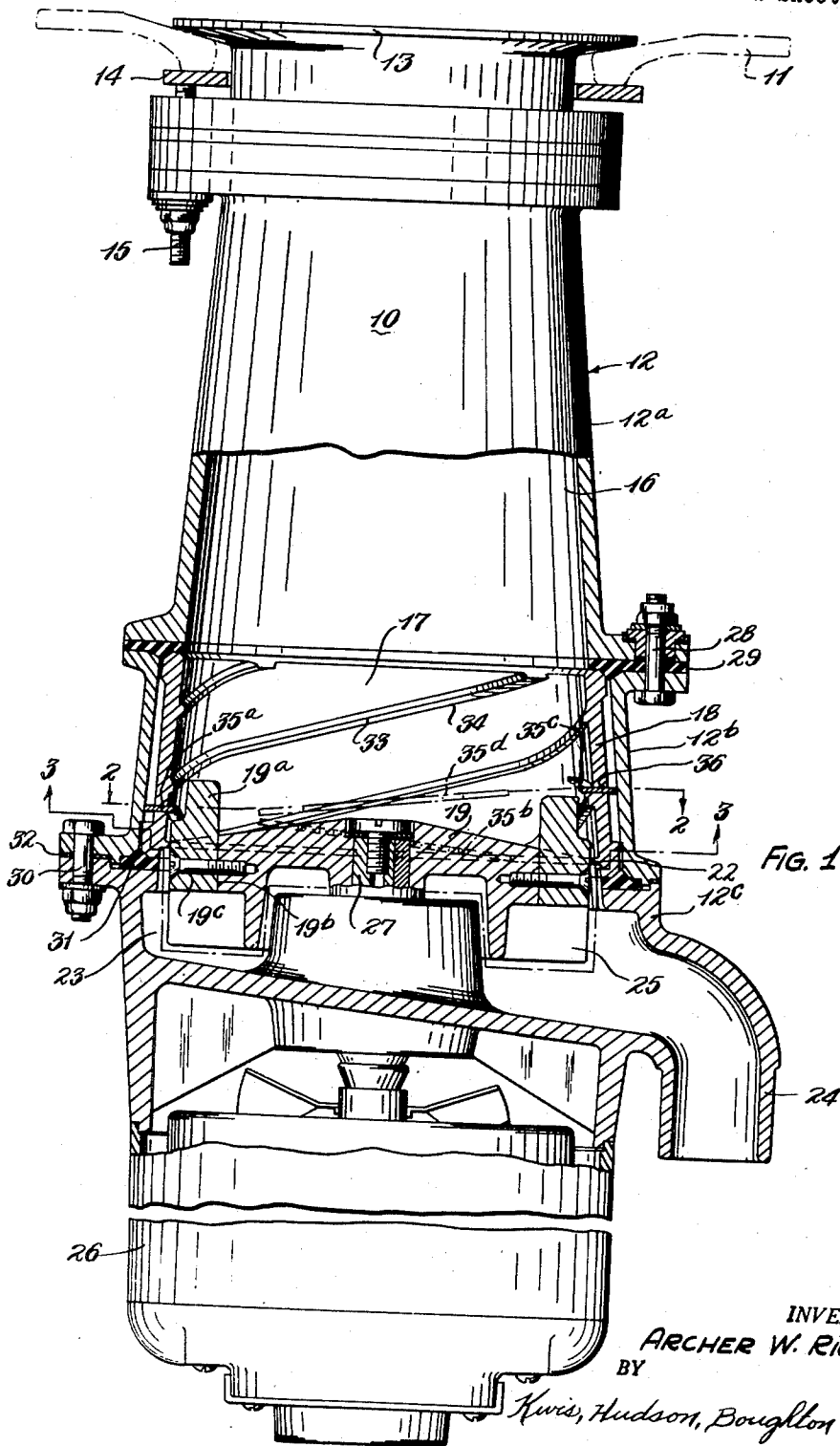
A. W. RICHARDS

2,495,983

GARBAGE COMMINUTING APPARATUS

Filed May 7, 1946

2 Sheets-Sheet 1



INVENTOR.
ARCHER W. RICHARDS
BY
Kuris, Hudson, Boughton & Williams
ATTORNEYS

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A. W. RICHARDS
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2 Sheets-Sheet 2

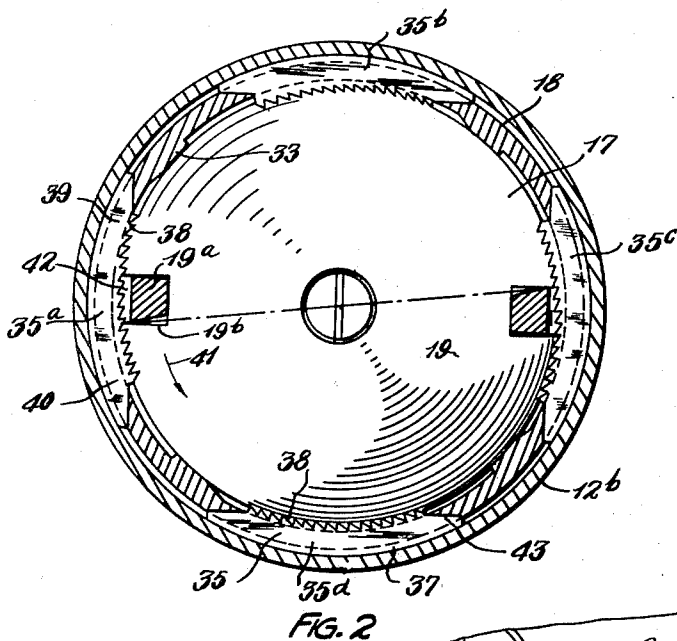


FIG. 2

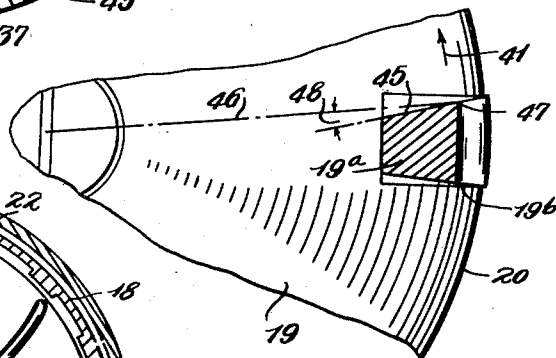


FIG. 4

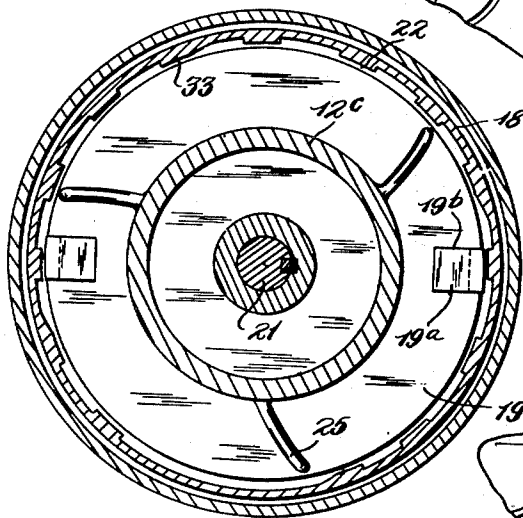


FIG. 3

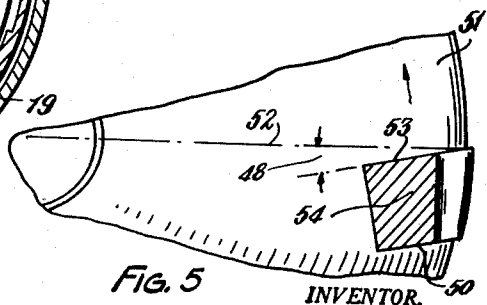


FIG. 5

INVENTOR.

ARCHER W. RICHARDS

BY

Kris, Hudson, Boughton & Williams
ATTORNEYS

UNITED STATES PATENT OFFICE

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GARBAGE COMMINUING APPARATUS

Archer W. Richards, Chagrin Falls, Ohio, assignor
to Lockley Machine Company, New Castle, Pa.,
a corporation of Pennsylvania

Application May 7, 1946, Serial No. 667,812

1 Claim. (Cl. 241—257)

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This invention relates to waste disposal devices of the kind used in disposing of kitchen waste or garbage and aims to provide an improved device of this character in which jamming is substantially eliminated.

The garbage grinding devices heretofore provided are subject to the disadvantage that jamming of the rotor frequently occurs during starting of the device and particularly if bones or other hard objects are contained in the waste material. The jamming may also occur at times other than during the starting of the device. When a comminuting device of this kind is being started up, the rotor will initially be driven at a slow speed and the rotor and driving motor will not then have the momentum that they do when the motor has acquired its full operating speed. If a bone or other hard object happens to come between the comminuting elements of the rotor and housing during this starting condition, it will be very likely to cause jamming of the rotor and the further operation of the device will be prevented until the jammed condition can be corrected.

The present invention provides simple and effective means by which such jamming of the rotor of a device of this kind will be minimized or eliminated.

Another object of this invention is to provide an improved comminuting device in which the projection or projections of the rotor which cooperate with the stationary comminuting element of the housing have an inclination on the leading side thereof which will cause the material to be pushed or deflected away from the stationary comminuting elements during slow speeds of rotation for the rotor, such that the objectionable jamming of the rotor heretofore encountered during starting of the device is substantially eliminated.

A further object of the invention is to provide an improved construction for a comminuting device in which the inclination of the rotor projections is such that it tends to relieve the load during starting by pushing the material away from the wall of the comminuting chamber during low rotor speeds, but during high rotor speeds will permit the material to be moved toward or held against the wall of the chamber by centrifugal force.

Still another object of the invention is to provide an improved comminuting device of the character mentioned in which the inclination of the leading or material engaging face of the rotor projection is on the order of ten degrees and in which the stationary shredding elements comprise spiral ridges and/or a series of substantially spirally disposed toothed shredding blades.

The invention can be further briefly summarized as consisting in certain novel combina-

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tions and arrangements of parts hereinafter described and particularly set out in the appended claim.

In the accompanying sheets of drawings

5 Fig. 1 is an elevational view of a comminuting device embodying the present invention, the device being shown with certain portions thereof in vertical section;

10 Fig. 2 is a transverse sectional view taken through the comminuting section of the device and looking downwardly toward the rotor as indicated by section line 2—2 of Fig. 1;

15 Fig. 3 is a transverse sectional view taken mainly through the discharge section of the device and looking upwardly toward the rotor substantially as indicated by section line 3—3 of Fig. 1,

20 Fig. 4 is a partial plan view of the rotor, the view being somewhat diagrammatic in form and further illustrating the inclination of the material engaging face of one of the rotor projections; and

25 Fig. 5 is a partial plan view of the rotor similar to Fig. 4 but showing a modified construction.

30 The drawings show the present invention applied to a comminuting device 10 which is of the type intended for use in disposing of kitchen waste material or garbage. The comminuting device 10 is here shown as being suspended from a kitchen sink or similar plumbing fixture 11. The device includes a housing 12 whose upper end is connected with the sink 11 as by means of a suitable mounting sleeve or fitting 13, a leveling ring 14 and clamping screws 15.

35 In the device here illustrated, the housing 12 comprises three main housing sections, these being an inlet section 12a, a comminuting section 12b and a discharge section 12c. The inlet section 12a has a downwardly enlarging feed passage 16 therein whose upper end communicates with the interior of the sink 11 through the passage of the mounting sleeve 13. The comminuting section 12b contains a comminuting chamber 17 40 of a tapered or downwardly enlarging shape and which forms a downward continuation of the feed passage 16. The comminuting chamber 17 can be defined directly by the annular wall of the housing section 12b, or preferably as here shown, is defined by a tapered sleeve insert 18 which is coaxially retained in the housing section 12b.

45 The comminuting chamber 17 is also defined in part by a cone-shaped disk rotor 19 which is located adjacent the lower end of the liner 18 and forms the bottom wall of the comminuting chamber. The rim or peripheral edge 20 of the rotor is spaced from the wall of the liner 18 and cooperates therewith in defining an annular discharge passage 22 through which the ground 50 material passes from the comminuting chamber

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into the discharge chamber 23 of the housing section 12c. The rotor carries one or more axial projections or lugs 19a which extend upwardly into the comminuting chamber and sweep around the wall thereof for a purpose which is explained more fully hereinafter. The projections are located in peripheral slots 19b of the rotor and are retained therein by the screws 19c.

As mentioned above, the housing section 12c is the discharge section and has a discharge nozzle or spout 24 through which the ground material is discharged from the chamber 23 into a drain connection of the plumbing system. The rotor 19 preferably has vanes or blades 25 on the underside thereof which act to pump or expel the ground material through the discharge nozzle 24. The housing section 12c may also form a portion of the housing of an electric motor 26 which drives the device. This motor is disposed with its shaft 27 extending upwardly into the comminuting chamber 17 and the rotor 19 is keyed, or otherwise connected, to the shaft to be driven thereby.

The housing sections 12a and 12b have their adjacent ends connected together by means of bolts 28 and with a yieldable packing ring or gasket 29 clamped therebetween. The adjacent ends of the housing sections 12b and 12c are connected together by means of the bolts 30 and with a yieldable packing ring or gasket 31 disposed therebetween. An additional gasket 32 may be used between the connected ends of the housing sections 12b and 12c. The packing rings 29 and 31 are engaged by opposite ends of the liner 18 and form a vibration absorbing means which retains the liner in the desired position in the housing section 12b.

The comminuting chamber 17 is provided with stationary comminuting or shredding elements and, in this instance, there are two sets of these shredding elements and both sets are carried by the liner 18. One set of the shredding elements comprises the axially spaced spirally extending shredding ridges 33 which have relatively sharp cutting edges 34 on one side thereof. The ridges 33 are disposed so that their cutting edges 34 are prevented toward the material which is being propelled or whirled in the comminuting chamber by the rotation of the rotor 19. The other set of shredding elements comprises a substantially spirally extending series of shredding blades 35 which are mounted in slots 36 of the liner 18 and have their outer edges 37 in seating engagement with the outer wall of the housing section 12b. The inner edges of these shredding blades can be straight, or may be arcuate as here shown, and carry teeth or serrations 38 and project into the comminuting chamber 17.

The slots 36 in which the blades are mounted are located between pairs of the shredding ridges 33 and are disposed substantially on a spiral line having a reverse slope with respect to the ridges. By locating the shredding blades between the ridges 33 on such a reverse spiral, they will be very effective in preventing waste material from following the ridges 33 without being subjected to a complete comminuting action. The blades 35 are here shown as being four in number, although any suitable number of these blades can be provided.

In the arrangement here shown, the blades 35a, 35b and 35c are of an identical construction and each of these blades has a narrow end 39 and a wide end 40 and is disposed so that the narrow end extends in a direction opposite to the direc-

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tion of rotation of the rotor 19. The teeth or serrations 38 on the narrow end of these three blades project into the comminuting chamber approximately the same distance as the shredding ridges 33 while the teeth at the wide end of these blades project into the comminuting chamber a distance somewhat greater than the shredding ridges. During the rotation of the rotor 19 in the direction indicated by the arrow 41 the rotor projections 19a sweep around the annular portion of the wall of the comminuting chamber on which the shredding blades 35 are located and the clearance space 42 between the blades and projections will decrease in width as the projections move along the blades toward their wide ends 40. This decreasing width for the clearance spaces 42 will produce a more effective comminuting action on the material.

It will also be observed that the teeth or serrations 38 of all of the shredding blades 35 are inclined with respect to a true radial line of the comminuting chamber so that they point substantially in a direction opposite to the direction of rotation of the rotor. The inclination of these teeth in this direction also results in a more effective comminuting action.

The shredding blade 35d can be of the same shape as the blades 35a, 35b and 35c, or as here shown, can be of uniform width throughout its length so that the teeth or serrations 38 all extend into the comminuting chamber for the same distance which in this case is substantially the same distance as the shredding ridges 33. All of the shredding blades 35 have tapered extensions 43 at their ends which cooperate with the ends of the slots 36 in a manner to prevent the blades from passing completely through the liner.

The invention herein disclosed contemplates that the shredding ridges 33 can be used alone, that is, without the shredding blades 35 and conversely the blades 35 could be used without the ridges 33 if desired and in the latter case the spiral line on which the blades are disposed would have substantially the same direction and slope, with respect to the direction of rotation of the rotor, as the ridges 33.

As indicated above, an important feature of the present invention is the prevention of jamming of the rotor and this is effectively accomplished by providing the rotor projections 19a with an inclined material engaging face 45 on the leading side thereof. The inclined face 45 is the same on each of the projections 19a and the inclination should be such that during low speeds of operation of the rotor, such as during the starting of the device, this face will act to push or deflect material inwardly or away from the wall of the comminuting chamber. This action will tend to unload the rotor because the material will be shifted away from effective engagement with the shredding elements 33 and 35. Moreover, if bones or other hard particles are contained in the material, they will thus be prevented from becoming jammed between the rotor projections and the shredding elements during the starting operation when the momentum of the rotor is relatively low.

The inclination of the material engaging face 45 should also be such that during operation of the rotor at higher speeds, such as at the full or rated operating speed of the driving motor 26, the material will be shifted outwardly by centrifugal force and will be pressed or held against the wall of the comminuting chamber while the material is being whirled by the rotor. In other

words, the inclination of the face 45 should be such that during high speeds of operation the tendency to deflect the material inwardly will be overcome by centrifugal force with the result that the material will be held against the shredding elements and will be subjected to an effective comminuting action.

The inclination of the face 45 of the rotor projection 19a can be selected or varied to suit the requirements of different types of material to be treated in the device but for comminuting kitchen waste or ordinary garbage an inclination on the order of ten degrees has been found to produce a very satisfactory operation. As shown in the drawings, and particularly in Fig. 4, the inclination of the face 45 is such that it slopes inwardly and rearwardly with respect to the direction of rotation and the true radial line 46 of the comminuting chamber. When the radial line 46 is drawn so as to pass through the upright outer corner 47 of the rotor projection 19a, the material engaging face 45 will define therewith an angle 48, which is the angle of inclination mentioned above as being on the order of ten degrees. The inclined face 45 may be further defined as lying in an upright plane which is substantially normal to the general horizontal plane of rotation of the rotor 19 and which is inclined inwardly and rearwardly with respect to the radial line 46.

In the construction above described the recesses 19b of the rotor 19 are square or straight, that is to say, they extend radially of the rotor and the lower portions of the projections 19a engaging in these recesses are correspondingly shaped. When this construction is employed the working face 45 can be machined to the desired angle of inclination. A separate machining operation for this purpose can be eliminated, however, when the modified construction of Fig. 5 is used. In the modified construction the slots 50 of the rotor 51 are formed therein with the inclination, relative to a true radial line 52, which is desired for the working face 53 of the rotor projections 54. This inclination can be the same as provided by the angle 48 mentioned above. With the modified construction the working face 53 of the projection 54 is straight or flush with the base portion which engages in the slot 50 and can therefore be machined as a part of the same operation by which the base portion is machined.

As is understood by those skilled in this art, the comminuting action of the device above de-

scribed is best carried out with water flowing through the device while the comminution is taking place.

From the foregoing description and the accompanying drawings it will now be readily understood that the present invention provides an improved construction for comminuting devices and particularly for devices of this kind which are intended for disposing of kitchen waste material or garbage. It will be understood further that the inclination of the material engaging face of the rotor projection or projections, as explained above, will effectively prevent jamming of the rotor and will enable the device to handle all types of garbage regardless of whether it contains bones or other hard pieces.

Although the improved comminuting device of the present invention has been illustrated and described herein in considerable detail, the invention is not to be regarded as limited correspondingly in scope but includes all changes and modifications coming within the scope of the appended claim.

Having thus described my invention, I claim:

In a garbage grinding device of the type having an upright working chamber defined by an annular wall and a power driven disk rotor located adjacent the lower end of said annular wall, spiral shredding ridges on said wall and projecting into said chamber, a series of spaced shredding blades carried by said wall and having serrated edges projecting into said chamber, the blades of said series being located substantially on a line having a reverse slope with respect to said ridges, and a material impelling projection carried by said rotor and adapted to sweep around said chamber adjacent said wall, said projection having on the leading side thereof a material engaging face which is inclined rearwardly and inwardly with respect to a true radial line of said chamber.

ARCHER W. RICHARDS.

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