April 12, 1960 J. R. ROE 2,932,459

HEAVY DUTY WASTE DISPOSER

Filed Oct. 11, 1957 2 Sheets-Sheet 1

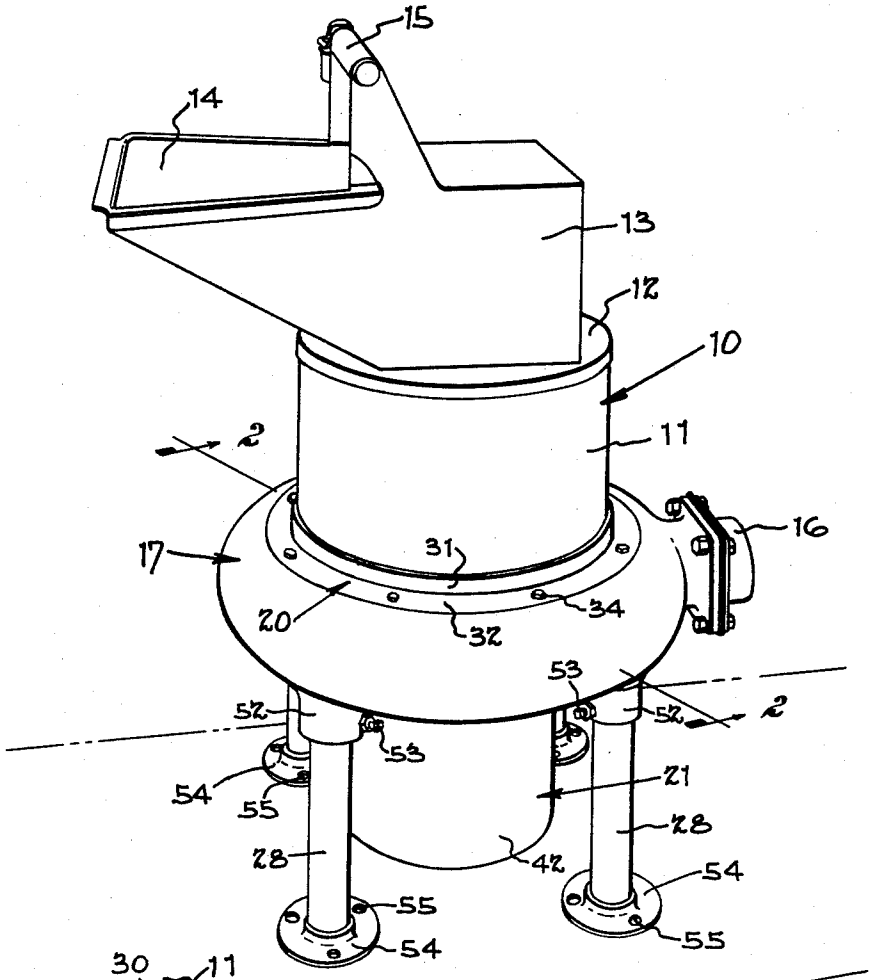


Fig. 1

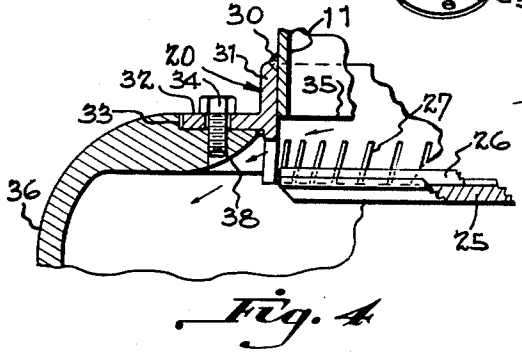


Fig. 4

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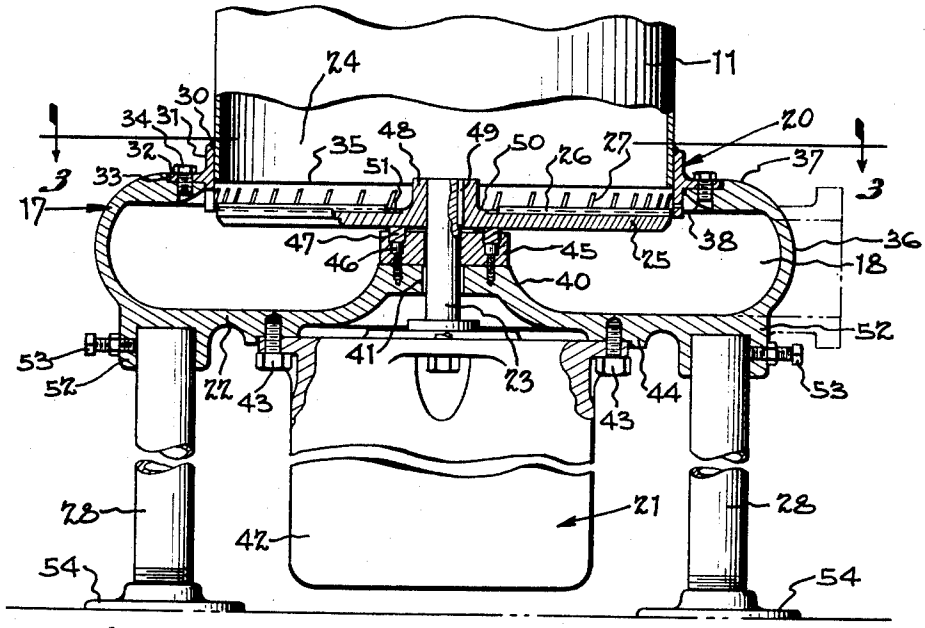


Fig. 2

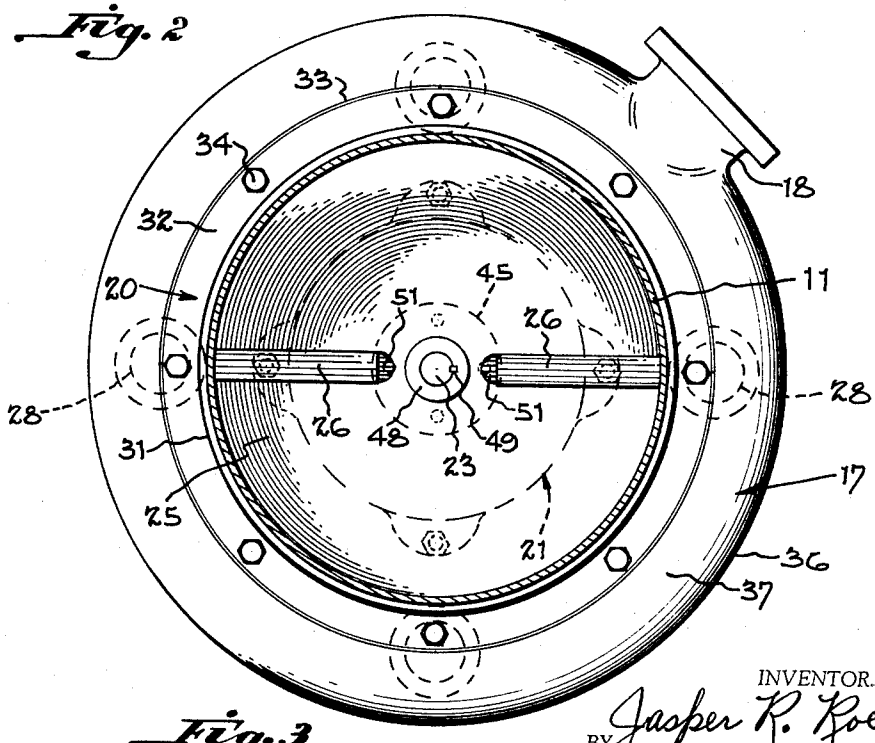


Fig. 3

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United States Patent Office 2,932,459
Patented Apr. 12, 1960

2,932,459

HEAVY DUTY WASTE DISPOSER

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Application October 11, 1957, Serial No. 689,638

2 Claims. (Cl. 241—46)

This invention relates to waste disposers and is particularly related to a waste disposer effective to comminute large volumes of waste material.

The principal object of this invention is to provide a waste disposer particularly adapted for use in super markets and other food processing establishments wherein large volumes of waste must be disposed of. The present disposer is adapted to rapidly handle all types of refuse such as produce trimmings and the like which accumulate during the processing of vegetables and fruits for distribution in a super market. This refuse is shoveled or otherwise dumped into the disposer where it is ground or pulverized and then flushed through a discharge line into a sewer.

One of the principal difficulties encountered with small domestic grinders has been the excessive vibration produced during grinding. It will readily be appreciated that this difficulty is greatly magnified in the operation of a large disposer which has a capacity many times that of a domestic unit. The present invention is predicated in part upon the concept of minimizing the effects of vibration by providing a high inertia member which surrounds the grinding zone and supports a large motor which is suspended beneath the grinding members. This high inertia member is in turn supported by legs joined to the member at points adjacent to its periphery and spaced radially outwardly from the grinding zone. Thus, the disposer itself absorbs most of the shocks and vibration produced during its operation; and the peripheral support provides a very stable mounting which readily absorbs any remaining vibration.

One preferred embodiment of waste disposer constructed in accordance with the present invention comprises a cylindrical metal housing communicating with a hopper adapted to receive refuse material. The lower edge of the housing is secured to a high inertia member, or bustle, the bustle in turn supporting a large motor which is suspended from the bottom wall of the bustle and includes a vertical shaft extending upwardly into the grinding chamber.

The inner wall of the housing is perfectly smooth and its lower edge is disposed adjacent to a sizing ring which also has a smooth inner face. This ring is further provided with a plurality of radial slots angulated slightly from the vertical. The sizing ring closely surrounds a heavy rotor, or disc, which is mounted upon the motor shaft and carries a plurality of radially extending cutting bars. These cutting bars are adapted to disintegrate the waste by impact and to impel it outwardly through the slots in the sizing ring. Waste which is discharged through these slots drops into an annular discharge passageway formed in the bustle and is flushed from there into a suitable sewer line by a stream of water which is introduced through the hopper.

The bustle is a relatively heavy cast member and extends outwardly beyond the walls of the grinding chamber for an appreciable distance. A plurality of legs are secured to the periphery of the bustle at points spaced

outwardly from the periphery of the rotating disc and sizing ring. In many installations these legs may merely be rested upon the floor or other supporting surface and the inertia of the bustle and motor will absorb substantially all of the vibrations so that the grinding apparatus will remain in position. However, if the floor slopes an appreciable amount, or if the floor is wet, it is advisable to bolt or otherwise secure the legs to the floor.

One of the principal advantages of the present grinding apparatus is that it is extremely economical to produce. The housing has a plain inner wall and can readily be fabricated from rolled sheet steel or the like. As explained above, the bustle is a simple casting; while the disc can be formed from rolled plate. The present disposer does not require any pivoted hammers or the like which must be accurately machined and fitted. Rather, the grinding action is produced by two or more replaceable steel bars mounted in radial slots formed on the upper surface of the disc. The only other major component of the grinder is the sizing ring which is readily fabricated from a hot rolled steel T strip which is machined to form the series of slots mentioned above.

A further advantage of the present device is that it is extremely rugged. It will readily be appreciated that waste which is shoveled from the floor of a super market frequently contains hard foreign objects such as staples, pieces of wire, tools and the like. Any such foreign objects will merely be repeatedly propelled against the wall of the grinding chamber and spin harmlessly around until the noise alerts an attendant who stops the machine and removes the object.

These and other objects and advantages of the present invention will be more readily apparent from a further consideration of the following detailed description of the drawings in which:

Figure 1 is a perspective view of a preferred embodiment of the present waste disposer.

Figure 2 is a cross sectional view taken along line 2—2 of Figure 1.

Figure 3 is a cross sectional view taken along line 3—3 of Figure 2.

Figure 4 is an enlarged cross sectional view of the sizing ring and exhaust chamber taken along line 4—4 of Figure 1.

As best shown in Figures 1 and 2, a waste disposer **10** constructed in accordance with the principles of the present invention comprises a cylindrical casing **11** provided with a cover **12** which supports a hopper **13** having an open mouth **14** adapted to receive refuse. A suitable water spray tube **15** is mounted on top of the hopper for projecting a curtain of water downwardly into housing **11** to provide a stream for discharging comminuted waste through a line **16** which is connected to a sewer or the like.

In addition to these members, waste grinder **10** includes a high inertia member or bustle **17**. This member is in the form of a relatively heavy casting and provides an annular discharge chamber **18** for receiving the comminuted waste and channeling it to sewer line **16**. Bustle member **17** carries a sizing ring **20** which in turn supports the lower end of cylindrical housing **11**. Bustle member **17** further supports a large motor **21** which is suspended from the bottom wall **22** of the bustle and includes a vertical shaft **23** extending upwardly through the bustle into grinding chamber **24**. The motor shaft carries a flat, circular rotor, or disc **25** which revolves within and closely adjacent to the inner walls of the sizing ring. The disc carries two radially extending, replaceable cutting bars **26** which are adapted to disintegrate waste by impact and to impel it outwardly through suitable slots **27** formed in the sizing ring. The entire grinding apparatus is supported by means of a plurality of

tubular legs 28 which are joined to the periphery of the bustle at points disposed outwardly beyond the periphery of rotor 25 and sizing ring 20.

More particularly, cylindrical housing 11 is formed of heavy gage sheet metal, the lower edge of this housing being welded as at 30 to the upstanding ring wall 31 of sizing ring member 20. Sizing ring member 20 is generally T shaped in cross section and includes an upstanding wall 31 and a horizontal mounting flange 32 extending radially outwardly from the upstanding wall. This mounting flange resides in an annular groove 33 machined in the upper face of bustle member 17. The sizing ring is joined to the bustle member as by means of bolts 34.

As best shown in Figures 2 and 4, the inner wall of housing 11 is perfectly smooth and the lower edge 35 of this housing is disposed at substantially the mid point of upstanding wall 31 which also presents a smooth inner face. The lower portion of wall 31 is provided with a series of slots 27. These slots extend radially through the wall and are preferably angulated from the vertical. By way of example, in one preferred embodiment of sizing ring, the diameter of the ring is approximately 15 inches and the ring is provided with 40 slots $\frac{3}{32}$ of an inch wide and approximately $\frac{11}{16}$ of an inch deep.

Bustle member 17 is a relatively heavy casting of generally circular outline. This member includes a bottom wall 22, an upwardly curved peripheral wall 36 and a top wall 37. Upwardly curved peripheral wall 36 is disposed a substantial distance outwardly from cylindrical housing 11, sizing ring 20, and rotor 25. The upper wall 37 of the bustle is bevelled as at 38 adjacent to the juncture of this wall and vertical wall 31 of the sizing ring to provide a clearance space for comminuted material discharged through slots 27. Bottom wall 22 of the bustle includes an upwardly extending central shoulder 40 having a central bore 41 for receiving motor shaft 23.

Motor 21 is a large relatively heavy motor, for example, a five horse power motor, and includes a housing 42 which is secured as by means of bolts 43 to a mounting flange 44 formed on bottom wall 22 of the bustle. The motor is thus suspended from the bustle and is free from any other support. Shoulder 40 of the bustle carries an annular seal supporting member 45 which is bolted to the shoulder as by means of bolts 46 and carries a bronze sealing ring 47.

Bronze sealing ring 47 engages the undersurface of rotor 25 and functions to seal the motor from discharge passageway 18. Rotor 25 is a flat heavy plate, for example, a ½ inch thick and 15 inches in diameter which is provided with a central hub 48 mounted upon motor shaft 23 as by means of a suitable key 49. The upper face 50 of this disc is generally planar and is provided with two radial slots 51 extending outwardly to the periphery of the disc. These slots receive replaceable cutter bars 26, the cutter bars being hardened steel members of rectangular cross section which are press fitted or otherwise secured within the slots. As best shown in Figure 3, the upper surface of disc 25 rotates in a plane spaced upwardly a small amount from the lower ends of slits 27 while cutter bars 26 extend upwardly above the surface of the disc to substantially the mid points of the slits.

Bustle member 17 is provided with a plurality of depending bosses 52 projecting downwardly from the bottom wall 22 of the bustle adjacent to the juncture of that wall and curved peripheral wall 36. These bosses receive the upper ends of tubular legs 28, the legs being held within the bosses by means of suitable set screws 53. The lower end of each of the legs is preferably provided with a flanged foot member 54 which is threaded over the lower end of the leg and contains a suitable opening 55 adapted to receive bolts for securing the feet to the floor.

In operation, a valve is opened to supply water to

spray head 15 and a switch is actuated to energize motor 21. Thereafter, refuse is dumped into the hopper 13 and enters cylindrical casing 11. As the wet refuse drops onto the rotor, the refuse is partially broken up by its impact with cutting bars 26 which are rotated at a high rate of speed along with disc 25. These cutter bars further cooperate with the rotating disc to impel the refuse outwardly against the sharp edges of the slots formed in wall 31 of the sizing ring. The continued rotation of the disc results in all of the refuse material being comminuted to a size such that it passes outwardly through slots 27, which form the only discharge openings from cylinder 11. The comminuted refuse drops from slots 27 into annular discharge passageway 18 formed in bustle 17. The refuse in the passageway has been reduced to a flowable mass which becomes entrained in the stream of water flowing downwardly from spray head 15, through housing 11 and slots 27 into the discharge passageway. From this passageway the water and ground refuse flow outwardly through line 16 to a sewer, septic tank, or the like.

During the grinding operation, rotor 25 functions not only to impel refuse against the slots in sizing ring 17 but in addition functions as a flywheel for maintaining the speed and torque required for effective comminuation when a heavy quantity of material is placed within housing 11. Any vibrations which are created due to the grinding action are largely absorbed by the inertia of the heavy bustle member and the motor which is suspended therefrom. Any remaining vibration is absorbed by legs 28 which provide an extremely stable support for the unit since the legs are mounted at the outer periphery of the bustle and are spaced outwardly from the periphery of the rotating disc and sizing ring.

In the event that a tool, piece of metal, or other hard foreign object should be inadvertently dropped in the hopper, such objects will not cause any damage to the machine but rather will merely be projected repeatedly against the smooth inner wall of the cylinder and sizing ring. Such a foreign object will cause a noise to warn the attendant of its presence so that he can stop the motor and withdraw the object from the grinding chamber.

Having described my invention, I claim:

1. A heavy duty refuse grinder comprising a cylindrical housing having a generally cylindrical interior wall, a sizing ring disposed adjacent to the lower edge of said cylindrical housing and fixedly attached thereto, said sizing ring having a smooth inner face of circular cross section and a plurality of spaced slots extending completely therethrough, said slots being offset from the vertical, an inertia rotor mounted for rotation within said sizing ring, said rotor comprising a single heavy flat imperforate circular plate of a diameter slightly less than the diameter of said sizing ring, said plate having a substantially planar upper face forming the bottom wall of said cylindrical housing, said face having two radial grooves formed therein, two radially extending cutter bars of generally rectangular cross section disposed in said grooves and extending above said plate, means fixedly mounting said cutter bars in said grooves, said cutter bars terminating radially outwardly closely adjacent said sizing ring, the grooves in said sizing ring extending upwardly above the face of said rotor and above the upper edges of said bars, an inertia base member comprising a heavy generally toroidal member projecting a substantial distance radially outwardly from said ring and having an annular opening in the upper surface thereof, said housing and sizing ring being mounted on said toroidal member adjacent the outer edge of said annular opening with said sizing ring projecting below said edge to permit comminuted material to discharge through said slots into said toroidal member, and a heavy motor suspended from said toroidal member and having a shaft projecting through a central opening of said toroidal member to drive said rotor.

2. A heavy duty refuse grinder comprising a cylindrical housing having a generally cylindrical interior wall, a circular sizing ring disposed adjacent to the lower edge of said cylindrical housing and fixedly attached thereto, said sizing ring presenting a smooth inner face comprising a plurality of arcuate segments disposed about the circumference of the circle, and a like plurality of discharge passageways disposed intermediate each of said segments for discharging refuse from the interior of said sizing ring, an inertia rotor mounted for rotation within said sizing ring, said rotor comprising a single heavy imperforate circular plate of a diameter slightly less than the internal diameter of said sizing ring, said rotor having a generally planar upper face forming the bottom wall of said housing, said face having two radial grooves formed therein, two radially extending cutter bars of generally rectangular cross section respectively disposed in said grooves and extending above the upper surface of said plate, means fixedly mounting said cutter bars in said grooves, said cutter bars terminating radially outwardly closely adjacent to said sizing ring, an inertia base member comprising a heavy generally toroidal member projecting a substantial distance radially outwardly from said ring and having an annular opening in the upper surface thereof, said housing and sizing ring being mounted on said toroidal member adjacent the outer edge of said annular opening with said sizing ring projecting below said edge to permit comminuted material to discharge through said passageways into said toroidal member, and a heavy motor suspended from said toroidal member and having a shaft projecting through the central opening of said toroidal member to drive said rotor.

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