Jan. 2, 1951 K. M. HAMMELL 2,536,928

GARBAGE DISPOSAL APPARATUS

Filed March 1, 1944 3 Sheets-Sheet 1

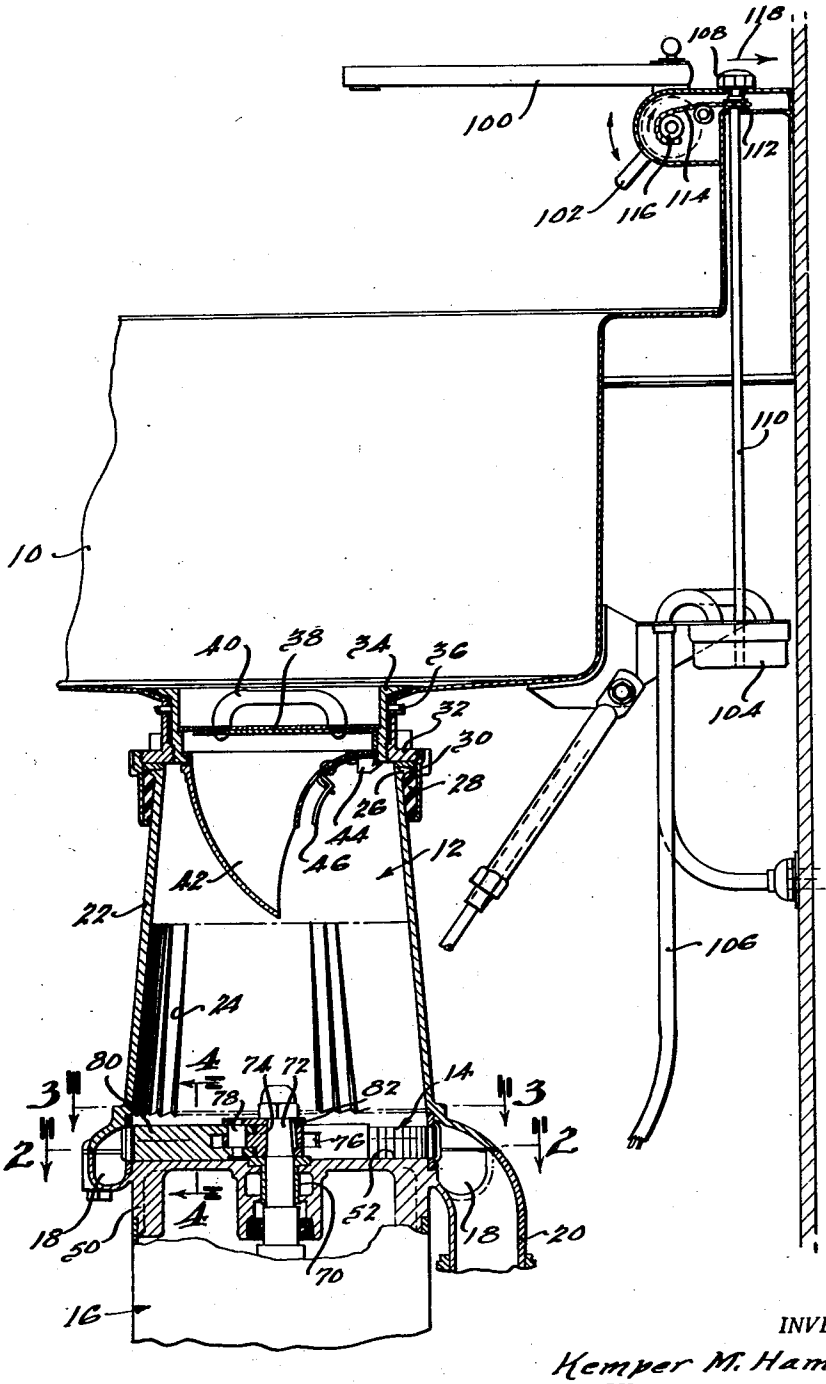


FIG. 1.

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GARBAGE DISPOSAL APPARATUS

Filed March 1, 1944 3 Sheets-Sheet 2

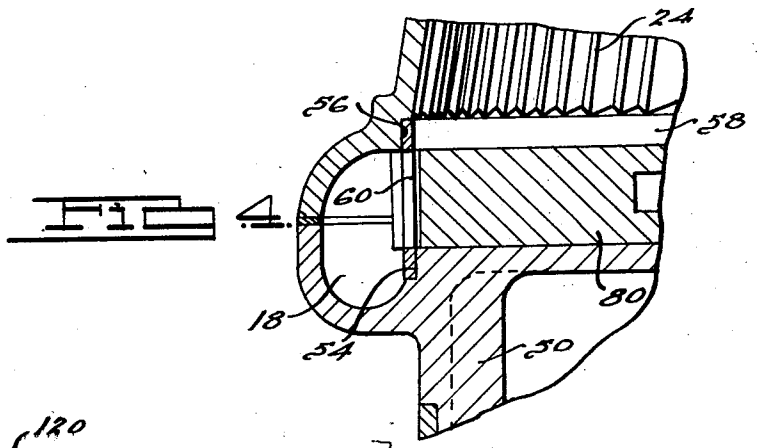


FIG. 4.

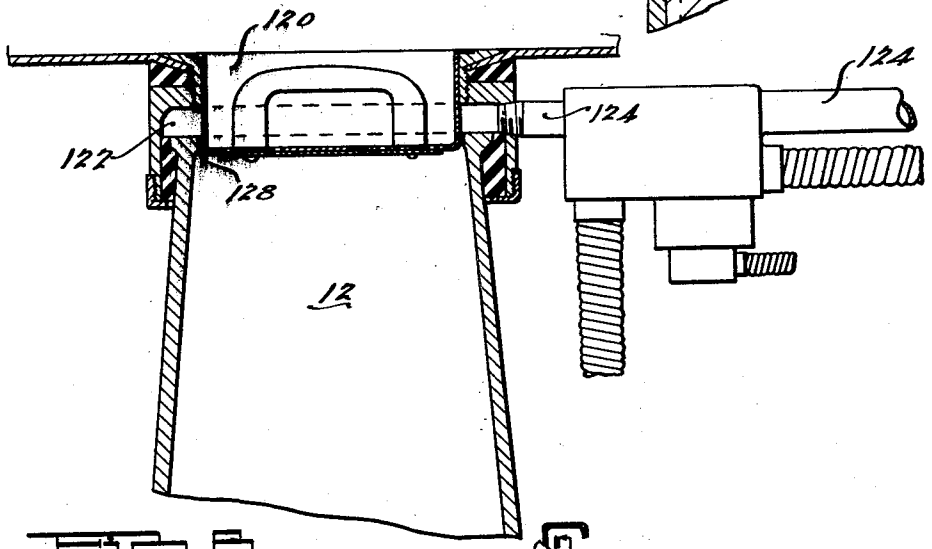
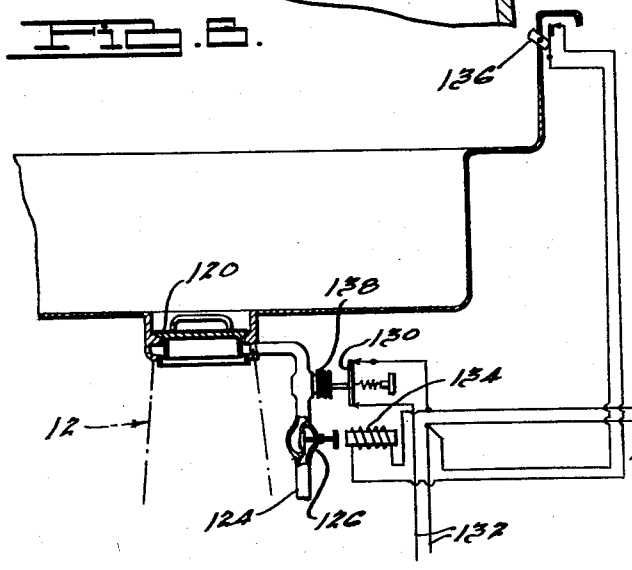


FIG. 5.



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Filed March 1, 1944 3 Sheets-Sheet 3

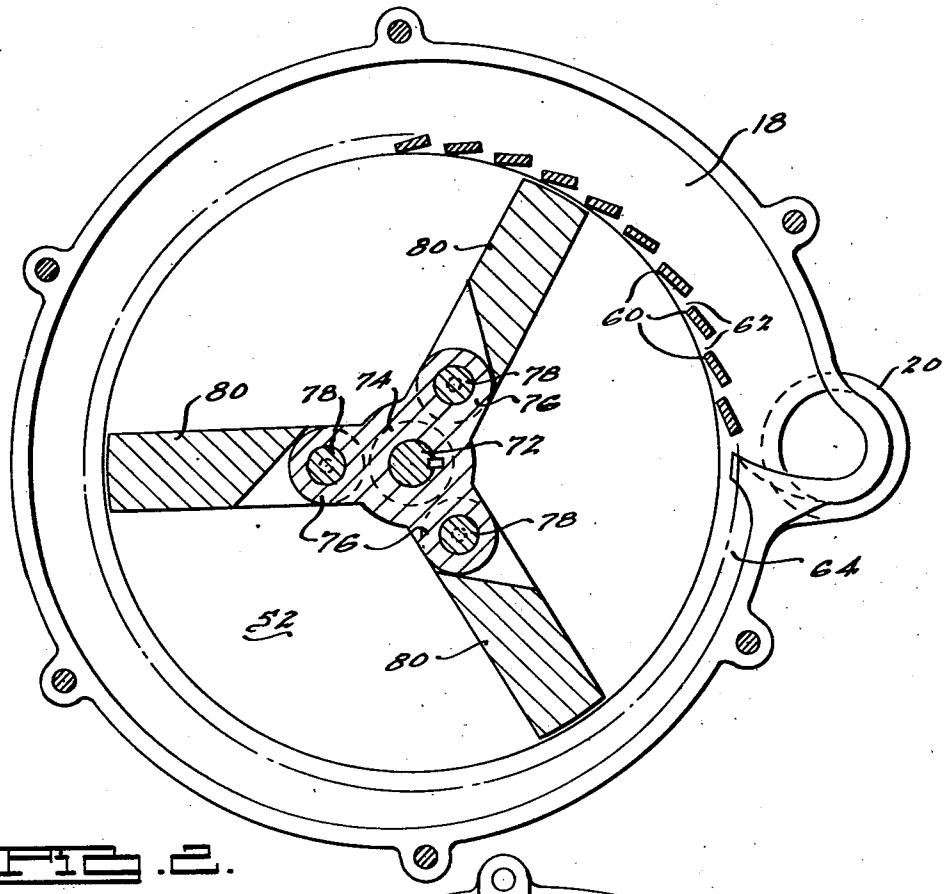


FIG. 2.

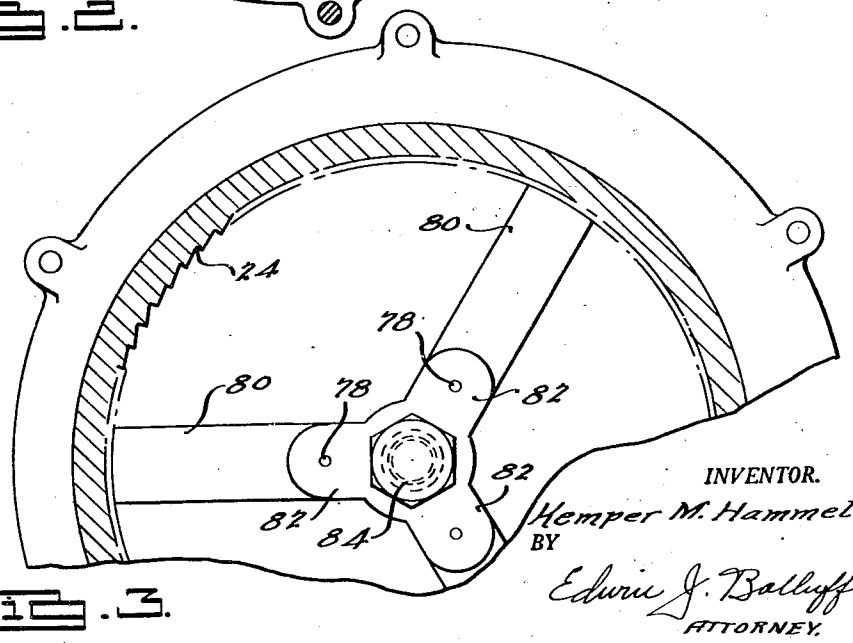


FIG. 3.

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UNITED STATES PATENT OFFICE

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GARBAGE DISPOSAL APPARATUS

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Application March 1, 1944, Serial No. 524,836

8 Claims. (Cl. 241—46)

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This invention relates to garbage disposal apparatus and has particular reference to a means adapted to be associated with a sink for reducing garbage and the like in order that the same may be disposed of down a conventional drain.

Principal objects of the invention are to provide:

A new and improved form of garbage disposal apparatus:

A new and improved arrangement of controls therefor;

A new and improved form of means for reducing the garbage to a size suitable for passing the same down the drain.

Other objects and advantages of the invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying drawings, of which there are three sheets and wherein:

Fig. 1 is a fragmentary vertical sectional view of a garbage disposal apparatus embodying the invention;

Figs. 2 and 3 are sectional views taken along the lines 2—2 and 3—3 respectively of Fig. 1;

Fig. 4 is an enlarged fragmentary sectional view taken along the line 4—4 of Fig. 1;

Fig. 5 is a schematic view illustrating a modified form of apparatus; and

Fig. 6 is an enlarged fragmentary diagrammatic view of part of the apparatus illustrated in Fig. 5.

The invention contemplates a disposal apparatus which is constructed and arranged for grinding or reducing garbage so that the same may be carried away by the conventional drain system of a sink. The apparatus as illustrated is associated with a sink 10 and includes a hopper or chamber 12 for collecting the refuse material and feeding it to a grinding or reducing means 14 which may be operated by an electric motor 16. A trough 18 is provided for collecting the reduced material, and this trough is adapted to be connected through a conduit 20 to the usual drainage ssytem for conducting away the reduced material.

The hopper or chamber 12 may be formed by a frusto-conical casting 22, the interior of which is formed to provide a series of vertically extending cutting teeth or edges 24. The teeth 24 extend axially of the chamber 12 a substantial distance and, due to the shape of the chamber 12, extend radially a short distance. They preferably also are arranged so that they are at an angle to any plane passing through the longitudinal axis of the chamber 12 so that the

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lower edge of the teeth are offset from the upper edge thereof in order to expedite the self-cleaning thereof by the action of the water which is continuously fed into the chamber 12 during the operation of the apparatus.

The upper end of the casting 22 is provided with a marginal flange 26 which seats upon an annular gasket 28 of resilient material, such gasket being held by a ring 30 which is threaded on a collar 32. The collar is threaded to a ring 34 which defines the throat of the sink drain, such ring 34 at its upper end having a flange which seats on the rim of the opening provided in the bottom wall of the sink. A gasket 36 is clamped between the edge of the opening in the bottom of the sink and the collar 32. The interior of the ring 34 is provided with a shoulder which forms a seat for a valve and closure 38 provided with a handle 40. The valve 38 is constructed and arranged so that one part thereof may be turned relative to another part thereof by means of a handle 40 in order to close the drain through the ring 34 or to permit water to flow through suitable perforations in the valve 38 into the chamber 12. The valve 38 is removable to permit garbage to be fed into the chamber 12.

A baffle 42 may be secured to the lower end of the ring 34 and be arranged so as to deflect material which is fed into the chamber 12 to one side thereof. The baffle 42 is removable and also will function as a means to prevent the entrance of a person's hand into the hopper 12. A latch 44 adapted to be released by a lever 46 may be provided on the under side of the baffle 42 for releasably securing the same in position.

The lower end of the casting 22 is formed to seat upon a casting 50 and cooperate therewith to define the trough 18. The lower end of the casting 22 and the upper end of the casting 50 have complementarily formed surfaces between which a gasket may be inserted, and a series of bolts and nuts extending through suitable openings in the castings may be provided for rigidly bolting the same together. The casting 50 in addition may form the upper closure of the motor 16 and have a substantially flat surface 52 which closes the bottom of the hopper 12.

The rim of the surface 52 may be formed to provide an annular seat 54 (Fig. 4) which cooperates with an oppositely arranged annular seat 56 formed on the casting 22 below the teeth 24 to support and locate a circular rack or ring of shredding or reducing teeth 58. The rack or ring 58 is formed to provide a series of teeth 60

which extend around the bottom of the hopper 12 below the teeth 24 thereof. The ring or rack 58 may be formed from a strip of suitable metal and is secured in position on the seats 54 and 56.

The slots 62 between the teeth 60 are of such length and width so that the garbage or other material is reduced to the proper size before passing from the chamber 12 into the trough 18. The trough 18 is arranged in the form of a spiral and tapers outwardly and slopes downwardly from its beginning end 64 to the outer end defined by the elbow 20.

The casting 50 at the center thereof is formed to provide a support for a bearing 70 through and above which extends a continuation 72 of the shaft of the motor 16. A hub 74 is fixed to that part of the shaft 72 which extends above the surface 52, and this hub is provided with a plurality of radially extending arms 76. Each arm 76 carries a pin 78 to which a swinging hammer or impeller 80 is connected, the pins 78 projecting from both sides of the arms 76 and extending into suitable openings formed in bifurcated portions of the impellers 80. The impellers 80 are thus free to swing about the pins 78 as a pivot. A plate 82 provided with holes for receiving reduced ends of the pins 78 overlies the hub 74 and its arms, and a nut 84 threaded on a threaded end of the shaft 72 retains the parts in their assembled relationship.

During operation of the motor, which may rotate at approximately 1600 R. P. M., the centrifugal force of the mass of the impellers 80 tends to hold the same in a radial position where they are operative to move the material in the bottom of the hopper 12 around the chamber. The material lying between the impellers 80 will be brought into contact with the teeth 60, while that thereabove will be brought into contact with the teeth 24. The teeth 60 and 24, due to the rotation of the mass of material, will produce a shredding or reducing action thereon. The impellers 80 are of such length that in their extended position they will clear the teeth 60 by a slight amount, say for example one-sixteenth of an inch.

The hub 74 and the impellers 80 and the driving means therefor form a means for rotating or turning the mass of material in the hopper in order that the teeth 24 and 60 may produce a reducing action thereon. Since the impellers 80 are free to pivot about the pin 78, they are free to swing back about the pivot 78, that is, in a counterclockwise direction about their pivots, if they should encounter an obstruction such as might be caused by a bone temporarily lodging against one of the teeth in the bottom of the hopper 12. When the material is reduced sufficiently to pass through the slots 62 between the teeth 60, such material will escape into the trough 18. Water should be continuously supplied to the garbage grinding apparatus during the operation thereof so as to aid in carrying the reduced material into the trough 18 and down the drain. The impellers 80 tend to act as a rotary impeller for projecting material through the slots 62.

The sink 10 is provided with the usual cold water supply including the faucet 100 and cold water valve control or handle 102. Means are provided to insure the supplying of cold water to the apparatus during the operation thereof and which comprise the following.

A conventional rotary electric switch 104 may be provided in the current line 106 to the motor 16 for controlling the supply of current thereto,

and an operating knob 108 connected by a shaft 110 to the mechanism of the switch 104 is provided for turning the switch 104 off and on. The switch 104 is of the type in which rotary movement in one direction turns the switch on and rotary movement in the opposite direction turns the switch off.

The rod 110 has a drum 112 connected thereto to rotate therewith. A chain 114 has one of its ends connected to the drum 112 and its other end connected to a drum 116 which is connected to the cold water control 102 so as to turn therewith. Assuming that the switch 104 is open, rotation of the knob 108 in the direction of the arrow 118 will turn the switch on. This rotation will also serve to wind the chain 114 on the drum 112. Since the other end of the chain is connected to the drum 116, such movement of the knob 108 will move the control 102 so as to open the cold water valve, thereby permitting the flow of water through the faucet 100 into the sink where it can drain into the hopper 12 if the valve 38 is open or removed. The chain 114 permits the control 102 for the cold water to be opened without turning on the switch 104. However, if the switch 104 is closed, the valve 102 will be open, and closing movement of such valve 102 will through the chain 114 serve to impart motion to the rod 110 for opening the switch 104.

In the embodiment illustrated in Figs. 5 and 6, a modified control arrangement is illustrated. In this modification the inlet to the hopper 12 is adapted to be closed by a removable cup-shaped stopper 120. When the stopper 120 is removed, water is free to flow into the hopper 12 from an annular passage 122, water being supplied thereto by a cold water line 124 under the control of a solenoid controlled water valve 126. When the stopper 120 is arranged in the position illustrated in Fig. 6, it will be observed that there is a slight clearance or passage 128 between the outside of the stopper 12 and the neck of the chamber 12. This passage 128 which is annular will permit water to flow from the passage 122 into the hopper 12, but is of such size so as to set up sufficient back pressure or resistance of the flow of the water so as to actuate a pressure-actuated double contact switch 130 (shown closed in Fig. 5) which controls the supply of current to the motor through the lines 132. The valve 126 is closed but is adapted to be open upon energization of the solenoid 134, the energization of which is controlled by a manually operated switch 136. Thus closing of the switch 136 will energize the solenoid 134 which will open the water valve 126, thereby permitting the flow of water to the hopper 12. When the stopper 120 is arranged in position, the back pressure in the water line will actuate the Sylphon 138 of the pressure-actuated switch 130 to close the same, thereby closing the circuit through the motor which is connected to the lines 132. With this arrangement, the disposal apparatus may be operated only when the stopper 120 is obstructing the inlet to the hopper 12. Removal of stopper 120 will eliminate the back pressure on the Sylphon 138 thereby permitting the switch 130 to open as a consequence of which the motor circuit will be deenergized.

While the invention has been described with some detail, it is to be understood that the description is for the purpose of illustration only and is not definitive of the limits of the inventive idea. The right is reserved as make such changes in the details of construction and ar-

rangement of parts as will fall within the purview of the attached claims.

I claim:

1. Garbage disposal apparatus comprising a vertically disposed hopper having a circular cross sectional configuration, an inlet for garbage and water at the top of said hopper, an outlet for reduced material extending around the bottom periphery of said hopper, said hopper being adapted to convey said garbage and water within the inner wall thereof from said inlet to said outlet, cutting teeth arranged around said inner wall and extending from said outlet upwardly within said hopper toward said inlet, and rotary means disposed for rotation in the bottom of said hopper about the axis thereof, said rotary means comprising a hammer mounted on a secondary axis rotating about but disposed in parallel relation to said hopper axis, said hammer being effective to rotate said garbage and water around the interior of said hopper to impel said garbage against said teeth to reduce said garbage to a fluid pulpous material and to project said reduced material through said outlet, and said hammer being rotatable about said secondary axis, in a direction opposite the direction of rotation of said rotary means, by the force opposing the rotation of said garbage and water against said teeth and against the centrifugal force involved in the rotation of said hammer by said rotary means.

2. Garbage disposal apparatus comprising a vertically disposed hopper having a circular cross sectional configuration, an inlet for garbage and water at the top of said hopper, an outlet for reduced material extending around the bottom periphery of said hopper, said hopper being adapted to convey said garbage and water within the inner wall thereof from said inlet to said outlet, cutting teeth arranged around said inner wall adjacent said outlet, and rotary means disposed inwardly of said teeth for rotation in the bottom of said hopper about the axis thereof, said rotary means comprising a hammer mounted on a secondary axis rotating about but disposed in parallel relation to said hopper, said hammer being effective to rotate said garbage and water around the interior of said hopper to impel said garbage against said teeth to reduce said garbage to a fluid pulpous material and to project said reduced material through said outlet, and said hammer being rotatable about said secondary axis, in a direction opposite the direction of rotation of said rotary means, by the force opposing the rotation of said garbage and water against said teeth and against the centrifugal force involved in the rotation of said hammer by said rotary means.

3. Garbage disposal apparatus comprising a vertically disposed hopper having a circular cross sectional configuration, an inlet for garbage and water at the top of said hopper, an outlet for reduced material extending around the bottom periphery of said hopper, said hopper being adapted to convey said garbage and water within the inner wall thereof from said inlet to said outlet, cutting teeth arranged around said inner wall adjacent said outlet, and rotary means disposed for rotation in the bottom of said hopper about the axis thereof, said rotary means comprising a plurality of hammers mounted on secondary axes rotating about but disposed in parallel relation to said hopper axis, said hammers being effective to rotate said garbage and water around the interior of said hopper to impel said garbage against said teeth to reduce said garbage to a fluid pulpous material and to project said reduced material through said outlet, and said hammers being rotatable about said secondary axes, in a direction opposite the direction of rotation of said rotary means, by the force opposing the rotation of said garbage and water against said teeth and against the centrifugal force involved in the rotation of said hammers by said rotary means.

4. Garbage disposal apparatus comprising a vertically disposed hopper having a circular cross sectional configuration, an inlet for garbage and water at the top of said hopper, an outlet for reduced material extending around the bottom periphery of said hopper, said hopper being adapted to convey said garbage and water within the inner wall thereof from said inlet to said outlet, cutting teeth arranged around said inner wall adjacent said outlet and extending from said outlet upwardly within said hopper toward said inlet, and rotary means disposed for rotation in the bottom of said hopper about the axis thereof, said rotary means comprising a plurality of hammers mounted on secondary axes rotating about but disposed in parallel relation to said hopper axis, said hammers being effective to rotate said garbage and water around the interior of said hopper to impel said garbage against said teeth to reduce said garbage to a fluid pulpous material and to project said reduced material through said outlet, said hammers being rotatable about said secondary axes, in a direction opposite the direction of rotation of said rotary means, by the force opposing the rotation of said garbage and water against said teeth and against the centrifugal force involved in the rotation of said hammers by said rotary means and said hammers having upper limiting surfaces disposed adjacent said outlet and remote from said inlet, to provide between said upper limiting surfaces and said inlet a hopper supply chamber adapted to receive and to contain a substantial quantity of said garbage and water for rotation by and upon said hammers against the interior surface of said hopper and said teeth.

5. Garbage disposal apparatus comprising a vertically disposed hopper, an inlet for garbage and water at the top of said hopper, an outlet for reduced material at the bottom of said hopper, said hopper being adapted to convey said garbage and water within the inner wall thereof from said inlet to said outlet, cutting tooth means arranged on said inner wall and adjacent said outlet, and rotary means disposed for rotation in the bottom of said hopper, said rotary means comprising a plurality of hammers mounted on secondary axes rotating about but disposed in parallel relation to the axis of said rotary means, said hammers being adapted to rotate said garbage and water within said hopper to impel said garbage against said cutting tooth means to reduce said garbage to a fluid pulpous material and to project said reduced material through said outlet, and said hammers being rotatable about said secondary axes, in a direction opposite the direction of rotation of said rotary means, by the force opposing the rotation of said garbage and water against said cutting tooth means and against the centrifugal force involved in the rotation of said hammers by said rotary means, said hopper outlet being formed to exclude garbage material and to permit the continuous rotation thereof by said rotary means until said garbage material is reduced to a fluid, pulpous state.

6. Garbage disposal apparatus comprising a generally cylindrical vertically extending chamber provided with a stationary bottom wall and with vertically and inwardly extending teeth with vertically extending slots therebetween projecting upwardly from the periphery of said bottom wall, said slots being formed by radial openings extending through the chamber side wall and forming an outlet from said chamber for reduced material, said stationary bottom wall being upwardly exposed so as to support the material to be reduced in said chamber, and power driven rotary means in the bottom of said chamber operable for impelling material therein against said teeth and for expelling reduced material outwardly through said slots, and a trough externally of said teeth for collecting and conducting away material discharged through said slots, said rotary means comprising a hub rotatable about a vertical axis and of materially less size than said bottom wall and having a plurality of radially extending members pivoted to said hub and projecting therefrom towards and into contiguous working relation with said teeth, said members being positioned immediately above and contiguous to said bottom wall and movable relative to said bottom wall through the space immediately thereabove so as to impel material on said bottom wall of said chamber against said teeth and reduced material through said slots, said members being pivoted to said hub in such a manner as to yield transversely of the axis of rotation of said hub and swing away from said teeth in the event their path of movement is obstructed during rotation of said rotary means.

7. Garbage disposal apparatus according to claim 6, wherein a unitary annular ring having integral deflected portions thereof form said teeth with said slots therebetween, said ring forming an annular saw toothed cutting surface around the inside of said chamber at the bottom thereof.

8. Garbage disposal apparatus comprising a hopper having an annular trough disposed radially outwardly of and surrounding the outlet end thereof for conveying reduced material away from said hopper, a unitary shredder ring disposed between and separating said trough and said outlet end of said hopper and forming a dividing wall therebetween, said shredder ring being disposed outside the inner surface of said hopper to provide a continuing inner surface therein for said hopper, said shredder ring being provided with a plurality of circumferentially spaced and parallel cutting teeth, said cutting teeth being provided

with surfaces projecting outwardly toward said trough from said inner surface and with cutting edges facing inwardly, said shredder ring having portions between and leading said teeth projecting outwardly toward said trough to provide depressions in the inner surface of said ring leading said teeth, rotary garbage reducing means in the outlet end of said hopper for projecting material to be reduced against said teeth, said ring being provided with radial outlets for said reduced material between the bottom of said hopper and said trough, said reducing means comprising a rotor having a plurality of radially extending impellers pivoted thereto and projecting therefrom toward and into contiguous working relation with said teeth, said impellers being positioned immediately above and contiguous to the outlet end of said hopper and movable relative thereto through the space immediately thereabove so as to impel material at the outlet end of said hopper against said teeth and through said outlets, said impellers being pivoted to said rotor in such manner as to yield transversely of the axis of rotation of said rotor and swing away from said teeth in the event their path of movement is obstructed during rotation of said rotary reducing means.

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