

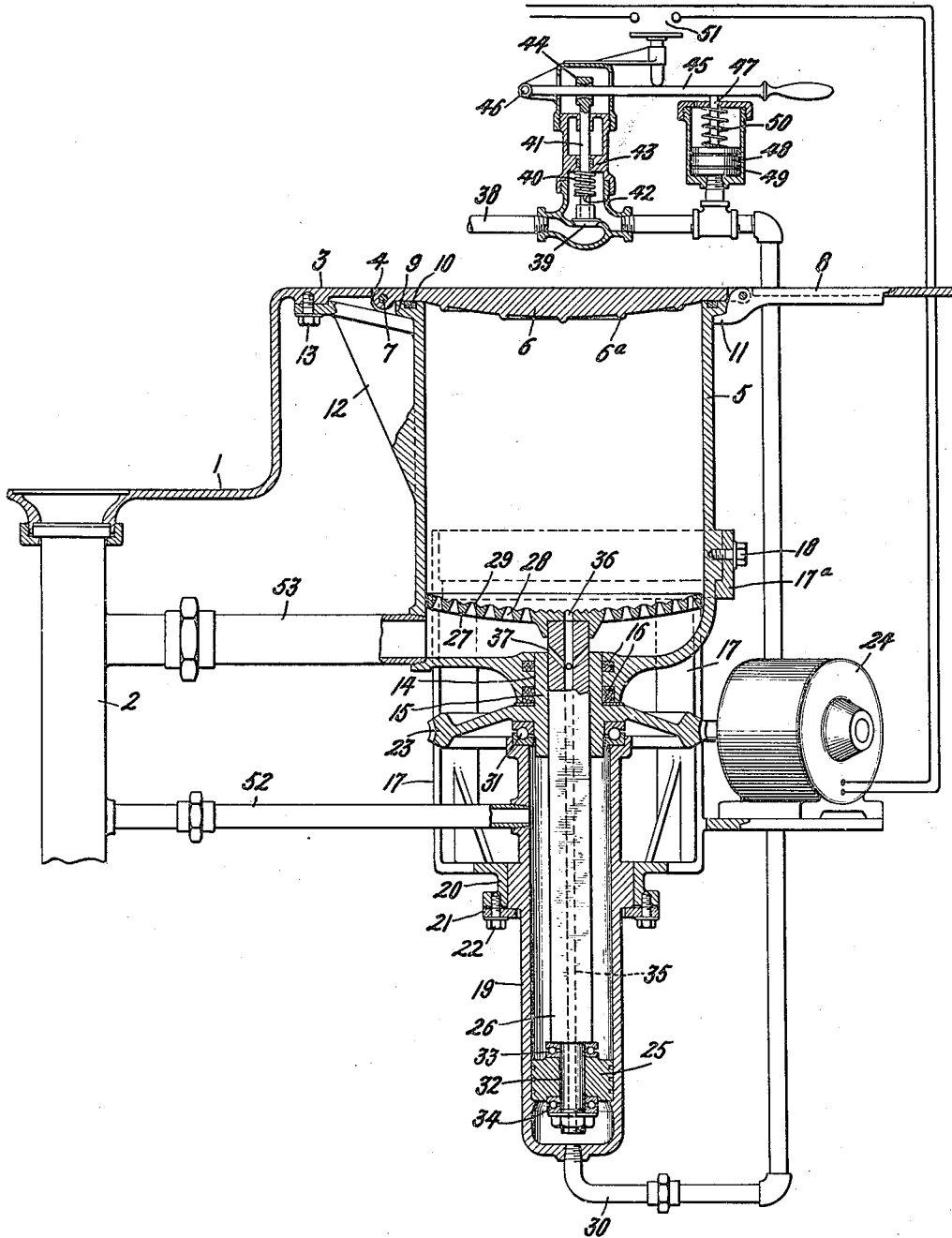
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GRINDING MACHINE

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# UNITED STATES PATENT OFFICE

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## GRINDING MACHINE

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10 Claims. (Cl. 83-7)

The present invention relates to grinding machines, and especially to grinding machines for grinding and disposing of refuse material such as garbage, for example.

5 The object of the invention is to provide an improved construction and arrangement in a grinding machine of this type, and for a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and the claims appended thereto.

10 In the drawing, the figure is a sectional view of a grinding machine embodying the invention.

The invention is especially adapted for grinding machines for domestic household use and accordingly, the invention is illustrated in connection with this application. It is to be understood, however, that this is only by way of example.

15 Referring to the drawing, 1 indicates a kitchen sink provided with the usual drain pipe 2, which connects through a suitable trap (not shown) with the sewer. Formed integral with the sink 1 is a table or drainboard 3 of suitable construction and rigidly supported in any suitable manner. In drain board 3 is an opening 4 beneath 25 which is supported a receptacle 5 for receiving the material to be ground. Receptacle 5 is provided with a cover 6 which is hinged along one edge to drainboard 3 as is indicated at 7. On the underside of cover 6 are projecting ribs 6a. 30 At the side opposite the hinge, the cover is provided with lugs to which is pivoted a locking arm or lever 8 for fastening the cover in closed position. The upper edge of receptacle 5 is provided with a flange 9 in the upper face of which 35 is a suitable packing 10 against which cover 6 rests when closed so that it is tight. Locking arm 8 is provided with a tongue 11 which clamps under flange 9 to lock the cover in closed position. Receptacle 5 is supported by a suitable 40 number of brackets 12 attached to the underside of drainboard 3 by studs 13.

45 In the lower end of receptacle 5 is an opening 14 in which is mounted a sleeve 15. Sleeve 15 is adapted to turn in opening 14 and to prevent leakage suitable packing means 16 is provided. Supported beneath receptacle 5 is a framework 17, the upper portion of which comprises a part of a ring 17a fastened in place by studs 18. Carried by framework 17 is a cylinder 19 which is 50 in line with opening 14 in the bottom wall of receptacle 5. Cylinder 19 may be supported by the framework in any suitable manner. In the present instance, it is shown as being held in a collar 20 which forms a part of the framework

by means of a ring 21 fastened to a flange on the collar by means of studs 22. Carried by sleeve 15 is a worm wheel 23 with which meshes a worm on the shaft of a motor 24. Motor 24 thus serves to turn sleeve 15.

5 In cylinder 19 is a piston 25 which is connected by a piston rod 26 to a cutting or grinding means 27 located in receptacle 5. The cutting or grinding means 27 may be of any suitable type. In the present instance, it is shown as being 10 the form of a disc having openings 28 through it and provided on its upper surface with grinding or cutting teeth or edges 29. The cutting or grinding member 27 is rigidly fastened to piston rod 26 so as to move and turn therewith. As al- 15 ready stated, piston rod 26 is turned by motor 24 through the worm wheel 23. It is adapted to be moved longitudinally by fluid pressure applied to the underside of piston 25 through a pipe 30. Piston rod 26 is suitably keyed to worm wheel 23 20 so that while it must turn with the worm wheel, it can move longitudinally through it. In the present instance, piston rod 26 is shown as being rectangular, sleeve 15 being provided with a rec- 25 tangular opening through which the piston rod may move axially. Worm wheel 23 is supported on a suitable ball thrust bearing 31 carried on the upper end of cylinder 19. Piston rod 26 is connected to piston 25 in a manner such that it may turn in the piston. To this end, the piston 30 rod is provided with a circular lower end 32 which passes through a round hole in piston 25 and is supported in connection with the piston by upper and lower ball thrust bearings 33 and 34. This arrangement permits the piston rod 35 26 to turn relatively to piston 25 with but small amount of friction.

In the operation of a grinding machine of this type, it is important that liquid be supplied to the cutting or grinding members in order to keep 40 them lubricated and to flush away the material as it is ground. An important feature of the present invention is the arrangement for accomplishing this result. According to this feature of my invention, I provide the piston rod 26 with a 45 longitudinally extending opening 35 which at its lower end communicates with the space beneath piston 25. At its upper end, opening 35 extends through the cutting or grinding member 27 as indicated at 36 so as to supply fluid to the active 50 face of the cutting or grinding means. Communicating with the opening 35 are a plurality of branch openings 37 located just beneath the cutting or grinding means 27 and arranged to dis- 55

charge liquid tangentially against the bottom or under face of the grinding or cutting means. With this arrangement, when the device is being used liquid is supplied to both sides of the cutting or grinding means for lubricating the cutting or grinding means and flushing away the material as it is ground.

Ordinarily, water is used as the fluid pressure means for actuating piston 25 and to this end, pipe 30 may be connected to a suitable supply of water pressure as indicated at 38. Preferably, I provide automatic means for controlling the supply of water to cylinder 19, the arrangement being such that when the grinding operation is completed, the supply of water is cut off automatically. To this end, there is provided in pipe 30 a valve 39 normally held against its seat by a spring 40 which surrounds valve stem 41 and is located between a pin 42 extending through the valve stem and housing wall 43. The upper end of stem 41 is provided with an eye 44 through which projects an actuating lever 45 pivoted at its one end on the valve casing as indicated at 46. The other end of operating lever 45 rests on the upper end of a pin 47 connected to piston 48 located in a cylinder 49. Between the top of piston 48 and the upper wall of cylinder 49 is a spring 50 which tends to bias piston 48 to the lower end of cylinder 49.

The spring 40 is sufficiently strong to normally hold valve 39 closed against the action of the water pressure. When the device is to be used, lever 45 is raised to open valve 39 against the action of spring 40. It is held in this position for a short time until the pressure in pipe 30 beyond valve 39 builds up sufficiently to raise piston 48 in cylinder 49 and hold lever 45 in the position to which it has been raised manually. Piston 48 will then hold valve 39 open. This condition will obtain until the pressure beneath piston 48 is relieved, when spring 50 will move piston 48 down in cylinder 49 and spring 40 will automatically close valve 39. In connection with the operation of lever 45, I may provide also a suitable switch 51 which when lever 45 is lifted upwardly to open valve 39 also actuates the switch to close the circuit of motor 24. This circuit closing arrangement is shown only diagrammatically in the drawing. Any suitable type of switch may be used.

For relieving the pressure beneath piston 48, I provide a by-pass pipe 52 which connects cylinder 19 to drain pipe 2. The connection of pipe 52 to cylinder 19 is so located with respect to piston 25 that piston 25 moves beyond it when the grinding operation is completed. As a result, when the grinding operation is completed, pipe 30 is connected to by-pass pipe 52, thus relieving the pressure under piston 48, and permitting valve 39 to close. Connecting the lower end of receptacle 5 to drain pipe 2 is a waste pipe 53 through which ground material is flushed away to the drain pipe.

The operation is as follows. Assuming the parts to be in the positions shown in the drawing, cover lock 8 is turned on its hinge to unlock cover 6, the cover is raised and the material to be ground is placed in receptacle 5. After the material has been placed in the receptacle, cover 6 is closed and locked in the closed position. The operator now lifts lever 45 by means of the handle at its end, thus simultaneously opening valve 39 to admit fluid pressure (water) to cylinder 19 beneath piston 25 and also to close switch 51 to start the motor. The operation of the motor turns the cutting or grinding means 27 at a suitable speed.

The fluid pressure admitted beneath piston 25 puts a certain pressure on the piston to feed the cutting or grinding means against the material to be ground, the material being held by the cover 6. In this connection, the ribs 6<sup>a</sup> on the cover serve to keep the material from rotating with the cutting means. As explained above, after lever 45 has been held up a short time, piston 48 will serve to maintain it in its upper position holding valve 39 open. As the grinding operation proceeds, water flows upward through opening 35 and out through openings 36 and 37, lubricating the cutting or grinding face of the grinding means and at the same time flushing the underside of the cutting or grinding means. The material as it is ground passes through openings 28 in the cutting or grinding means and is washed away by the water discharged against the under surface of the grinding or cutting means through pipe 53 to drain pipe 2. The cutting or grinding operation continues until piston 25 has moved the cutting or grinding means to the upper end of cylinder 5 whereupon piston 25 passes beyond by-pass pipe 52, thereby relieving the pressure in pipe 30 to permit valve 49 to close and switch member 51 to open the motor circuit. The water supply is thus automatically cut off and the motor is stopped. At this time, the grinding or cutting means has approached close to the underside of cover 6, thus effecting a complete grinding up of the material. The cutting or grinding member 27 together with connecting rod 26 and piston 25 move downward by gravity to their initial positions. During this movement, water is forced upward through passage 35 and out through openings 36 and 37, thus completing the flushing of the grinding or cutting means.

By the above described arrangement, I provide a grinding or cutting means which is simple in construction and operation and wherein water or other fluid for flushing the grinding or cutting means is provided in a simple and efficient manner.

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

1. In a grinding machine, the combination of a receptacle for receiving garbage or like material to be ground, grinding means comprising a perforated disk member adapted to move in the receptacle, a cylinder, a piston in the cylinder, a rod connecting the piston to the grinding means, means for supplying fluid pressure to the piston for moving it longitudinally in the cylinder, and means for turning the grinding means, said rod being provided with an axially extending passage through which fluid is supplied to the grinding means for flushing it.

2. A grinding machine comprising a receptacle for material to be ground, grinding means adapted to move axially and to turn in the receptacle, a cylinder connected to the receptacle, a piston in the cylinder, a rod connecting the grinding means to the piston, said rod being provided with a longitudinally extending opening which communicates with the space at each side of the grinding means, means for supplying fluid pressure to the underside of the piston for effecting longitudinal movement of the piston in the cylinder, means for rotating the grinding means, and means for automatically cutting off the supply of fluid pressure to the cylinder and connecting the cylinder to drain when the piston reaches a predetermined point in its travel in the cylinder.

3. A grinding machine comprising a casing for

receiving garbage or like material, cutting means taking up the major portion of the cross-sectional area of the casing and being rotatable in and movable longitudinally of the casing, a cylinder, a piston in the cylinder, a rod connecting the piston to the cutting means and having an axially extending opening therein which at one end communicates with the space beneath the piston and at the other end with the spaces adjacent to the cutting means, means for turning the cutting means, and means for supplying fluid pressure to the cylinder beneath said piston and through said rod opening to effect longitudinal movement of the piston and continuous cleaning of the cutting means during operation.

4. A grinding machine comprising a casing, grinding means adapted to rotate in and move longitudinally of the casing, a cylinder, a piston in the cylinder, a rod connecting the piston to the grinding means, an axially extending opening in the rod which at one end communicates with the space beneath the piston and at the other end with the spaces adjacent to the cutting means, means for turning the grinding means, means for supplying fluid pressure to the cylinder beneath said piston, and means controlled by movement of the piston for effecting the stopping of the turning means and the cutting off of the fluid pressure supplying means.

5. A grinding machine comprising a casing for receiving garbage or like material, grinding means adapted to rotate in and move longitudinally of the casing, a cylinder, a piston in the cylinder, a rod connecting the piston to the grinding means, an axially extending opening in the rod which at one end communicates with the spaces adjacent to the grinding means, means for turning the grinding means, means for supplying fluid pressure to the cylinder beneath said piston, a drain conduit connected to the lower end of the casing, and means for forcing fluid through said rod opening to effect continuous cleaning of the grinding means during operation.

6. In a grinding machine, the combination of a cylindrical receptacle for garbage or like material to be ground, the receptacle having a cover with projections extending into the receptacle, a grinding disk having a surface with cutting teeth formed thereon and perforations adjacent the teeth, means including a motor for rotating the grinding disk, fluid pressure actuated means for axially moving the disk in the cylinder to compress the material to be ground, and means including said fluid pressure actuated means for effecting continuous flushing of said perforations during grinding operation.

7. A grinding machine including in combination, a receptacle for receiving garbage or like material to be ground, a grinding element mounted for rotation in said receptacle and hav-

ing a cross sectional area substantially equal to that of the receptacle, a cylinder, a piston in the cylinder, a rod connecting the piston to said element and having an axially extending passage therethrough, means for supplying fluid pressure to said cylinder for moving said piston longitudinally therein, means for rotating said element, and means including said passage for supplying fluid to both faces of said grinding element.

8. A grinding machine including in combination a receptacle for receiving garbage or like material to be ground, means for grinding the material including a rotatable grinding element extending over a major portion of the cross sectional area of said receptacle and mounted for axial movement in the receptacle, a cylinder connected to the receptacle, a piston in the cylinder, a rod connecting the piston to said grinding element, means for supplying fluid pressure to the cylinder for effecting longitudinal movement of the piston therein, means for rotating said grinding element, and means for supplying fluid through said rod to the space at each side of said grinding element to thereby effect cleaning of said grinding means during operation.

9. In a machine for grinding garbage or like material, the combination with a receptacle for the material to be ground, grinding mechanism including a rotatable perforated disk member mounted for axial movement in the receptacle and means for rotating said member, of fluid pressure means operable for effecting axial movement of said member in the receptacle including a cylinder, a piston movable therein, means for supplying fluid pressure to the cylinder for moving the piston therein, and means controlled by the piston for shutting off the fluid pressure supply to the cylinder when the piston reaches a predetermined position in the cylinder.

10. In a machine for grinding garbage or like material, the combination of a cylindrical receptacle having an opening in one end thereof for the deposit of material therein, a grinding disk disposed in the receptacle and having a surface with cutting teeth formed thereon and perforations adjacent the teeth, a drain conduit connected to a lower portion of the receptacle for conducting away ground garbage discharged through said perforations, a removable cover for closing said opening in the end of the receptacle during grinding operation and having projections on the inner face thereof arranged to extend into the receptacle, means for locking the cover in closing position, means for rotating the grinding disk and means for moving the grinding disk axially towards said cover to compress the material during grinding operation.

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