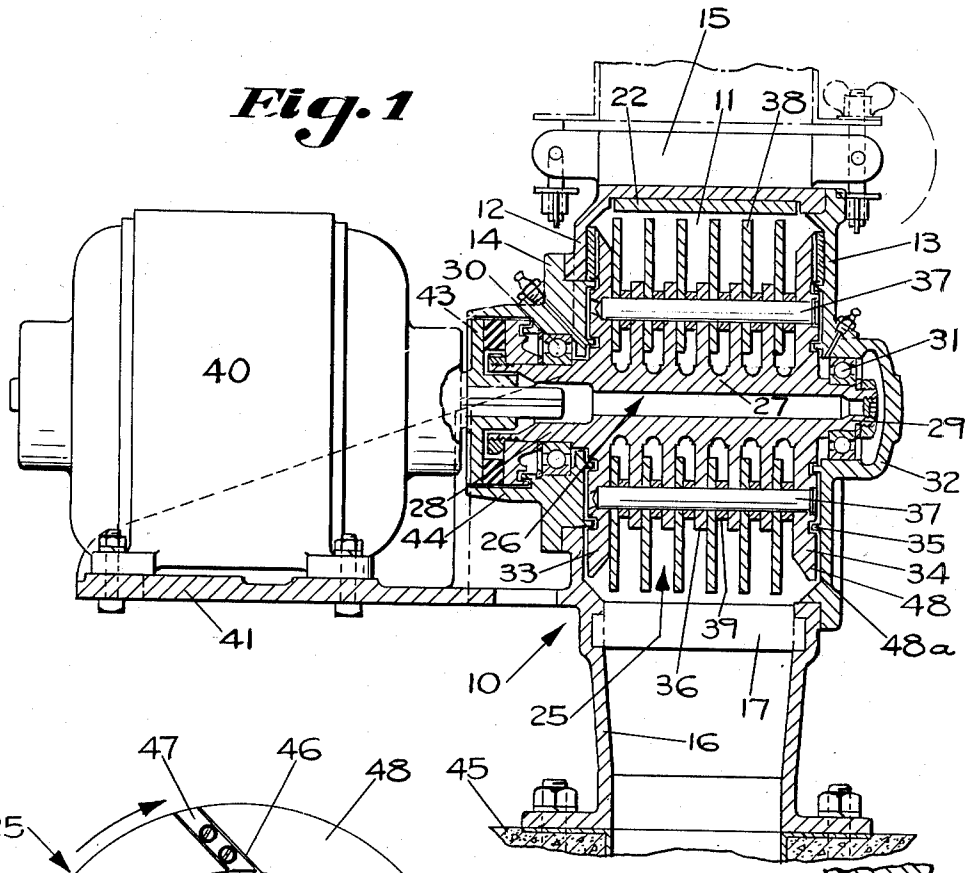
April 1, 1952 L. K. KNIGHT 2,591,076

GRINDER, INCLUDING MEANS PREVENTING THE ENTRANCE OF MATERIAL BETWEEN THE ROTOR AND HOUSING THEREOF

Filed Feb. 25, 1950

Fig. 1



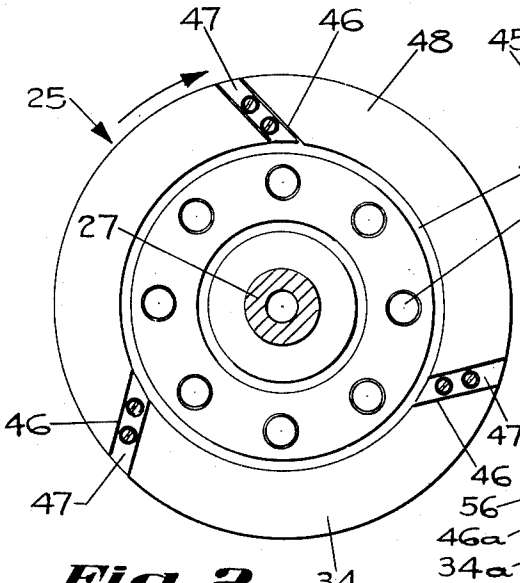


Fig. 2

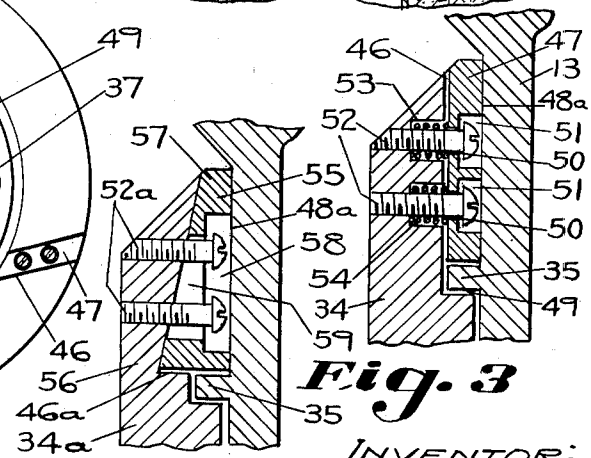


Fig. 3

Fig. 4

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GRINDER, INCLUDING MEANS PREVENTING THE ENTRANCE OF MATERIAL BETWEEN THE ROTOR AND HOUSING THEREOF

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This invention relates to grinders and more particularly to mechanism in, or for use in, a grinder that prevents material being ground from entering and accumulating between parts of the grinder, one of which rotates with respect to the other, therefore the chief object of the invention is to provide an improved mechanism of the type set forth.

It is another object of the invention to provide an improved material reducing grinder that includes a reducing chamber and a rotor therein having end members adjacent opposite walls of the chamber that rotate with respect thereto and between which chamber walls and rotor end members there are wiper and/or impeller elements that prevent material from entering and accumulating between the chamber walls and the rotor end members.

In carrying out the foregoing object it is a more specific object of the invention to mount the wiper and/or impeller elements whereby they may be urged against either or both the rotor and members and the chamber walls.

In carrying out the foregoing objects it is yet another and more specific object of the invention to mount the wiper and/or impeller elements loosely upon the rotor end elements whereby they may be urged toward the chamber walls.

Other objects of the invention will appear hereinafter, the novel features and combinations being set forth in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevational and sectional view of a grinder incorporating the features of the invention;

Fig. 2 is an end view of the rotor of the grinder seen in Fig. 1, the central or shaft portion thereof being shown in section;

Fig. 3 is a view in section on a larger scale of a fragment of a rotor and element and a material reducing chamber wall of the grinder and including a preferred form of rotor and wiper and/or impeller construction; and

Fig. 4 is a view similar to Fig. 3, showing a modified form of rotor or wiper and/or impeller construction.

The grinder herein disclosed which incorporates the several features of my invention includes a unitary main frame 10 in the form of a casting. The main frame 10 includes a central generally cylindrical portion which forms a reducing chamber 11. Reducing chamber 11 includes a pair of spaced upright side walls including inner side wall 12 and outer side wall 13. Inner side wall 12 is formed in part as an integral portion of the

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main frame 10 and in part by a removable plate or cap 14 which closes a circular opening in the main frame 10 as well as performing additional functions hereinafter described more completely. The outer side wall 13 is formed entirely by a removable cap or plate which covers a large outer opening in the main frame 10 and performs other functions as hereinafter described more completely.

The main frame 10 has an integrally formed feed chute 15 and an integrally formed discharged chute 16 which is located below the reducing chamber 11 and below an arcuate sectional bar screen 17 adjacent the lower portion of the reducing chamber 11. The upper arcuate portion of the chamber 11 is provided with a reducing plate 22 which is bolted or otherwise attached to the adjacent portion of the main frame casting 10. It may be mentioned that the grinder includes water spraying pipes (not shown) which are provided adjacent the feed chute 15 and the discharge chute 16, respectively, so as to feed water into the reducing chamber 11 and to flush out the discharge chute 16.

Mounted for rotation within the reducing chamber 11 and on a horizontal axis that extends transversely therethrough is a material reducing or grinder rotor 25. Rotor 25 as shown in the drawings includes as its main body element a single casting designated as a whole by the reference 26. Casting 26 includes a shaft portion 27 which is preferably hollow and at its opposite ends is provided with bearing receiving portions 28 and 29 upon which are mounted ball bearings 30 and 31, respectively. Bearing 30 is carried in an appropriate cup in the previously mentioned plate or cap 14, the outer race being held therein by a snap ring or the like. Bearing 31 is received in and is carried by a cup 32 formed as an integral part of the previously described side wall 13 of the chamber 11. Side wall 13 when removed provides for ready removal of the entire rotor 25 by moving it axially out of the chamber 11.

Formed integral with the shaft portion 27 and thus as a portion of the rotor casting 26 is a pair of spaced rotor end portions, discs, or members 33 and 34, which are located and rotate adjacent the side walls 12 and 13, respectively, of the reducing chamber 11 and have diameters substantially equal to the diameter of the said reducing chamber. As a matter of fact the effective or working portion of the reducing chamber 11 is located between the inner and opposite faces of the end discs, plates or members 33 and 34. While the rotor is described herein as in-

cluding a one piece cast main body 26 it is to be distinctly understood that the rotor employed in carrying out this invention may be of any suitable construction and it may be provided with separate removable end portions or discs 33 and 34.

Peripheral tongues and grooves are provided between the end walls 12 and 13 and the outer surfaces of the end plates 33 and 34, those on side wall 13 and end plate 34 being seen at 35. The sealing means 35 assist in preventing grease delivered to the bearings 30 and 31 from being undesirably lost therefrom by working its way into the reducing chamber 11.

Rotor body casting 26 also includes a plurality of integral spaced apart discs 36 which are provided with aligned openings through which pins 37 extend. Pins 37 are removable and function as pivotal supporting means for a plurality of reversable swing hammers or cutters 38, and a spacer element 39 is provided adjacent each swing hammer or cutter 38. Pins 37 are preferably removably held in place in the end plate 34 by removable snap rings or the like.

An electric motor 40 for driving the rotor 25 is mounted on a platform 41 of the main frame 10. The shaft of motor 40 extends into a recess in the shaft portion 27 of rotor casting 26 and is connected thereto through a flexible coupling 43. The aforementioned removable cap 14 is preferably provided with a peripheral cup 44 which receives the flexible coupling 43 and provides a housing therefor.

The bottom portion of the main frame casting 10 not only provides the discharge chute 16 but it acts as a pedestal to support the complete grinder by virtue of the fact that it is removably bolted or otherwise attached to the floor or other building structure 45 which, for example, may be of poured concrete.

The described grinder is particularly adapted to grind garbage and the like and it has been found in connection with grinders of this general type that there is a tendency for the material being ground in the reducing chamber 11 to find its way between or to be worked into the space between the rotor end portions, discs, or members 33, 34 and the adjacent material reducing chamber walls 12, 13, respectively. If sufficient of the material being reduced does enter the spaces between said members then there is a tendency for the rotor to become jammed or to bind with the walls of the material reducing chamber.

This invention relates particularly to apparatus for preventing material in the material reducing chamber from entering and accumulating in the space between the rotor end members and the adjacent material reducing chamber walls.

Specific structures which provide these features are seen in Figs. 2 and 3 and 4 of the drawings, and they, either alone or in combination with the grinder, embody forms of the invention. Referring now to Figs. 2 and 3 of the drawings, Fig. 2 is an end view of the rotor 25 showing the end disc 34 thereof. Since the end discs 33 and 34 and the mechanisms associated therewith are substantially identical in construction, the end disc 34 and its associated mechanism only need be described.

The end disc 34 is provided with three slots 46 equally spaced circumferentially about its outer face. Each slot 46 receives and carries a wiper and/or impeller member or element 47. The slots 46 are formed in the outside of the rotor end disc 34 and in the face portion 48 thereof which lies radially outwardly of the sealing means 35 and faces the adjacent wall 13 of the material reducing chamber 11. Each slot 46 extends across the face portion 48 of disc 34 at such a trailing angle that it carries the wiper element 47 so that its radially innermost end will be rotated in advance of its radially outermost end, that is, so that the radially inner end will lead the radially outermost end when the rotor 25 is rotated in the direction of the arrow seen in Fig. 2. It will be seen that this placement or position of the slots 46 and wiper elements 47 will cause those portions of the wiper elements 47 which extend axially outwardly beyond the face 48 of the end disc 34 or toward the adjacent wall 13 to function as centrifugal impeller or slinger elements when the rotor is driven. Thus it may be said that elements 47 are impeller elements and that they alone or in combination with the end disc or member 34 will function as impeller, slinger or pump elements to throw, sling or pump outwardly and into the reducing chamber 11 any garbage or the like which tends to enter, or enters, into their path of rotation when the rotor is rotated in the direction of the arrow seen in Fig. 2.

In the embodiment shown in Fig. 3 of the drawings the slots 46 are of uniform depth measured axially of the rotor 25 and they extend radially inwardly to a circular groove 49 into which the tongue of the radially outermost seal 35 extends (see Fig. 1). The wiper and/or impeller member or element 47 is a rectangular strip or bar preferably, but not necessarily, of brass that is provided with two bolt receiving openings 50 which are countersunk or recessed at 51 to receive completely the heads of machine screws 52. Machine screws 52 each extend through a bore 53 in the rotor end disc 34 and their ends are threaded into and locked therein, for example, as by peening the exposed ends of the machine screws. Within each bore 53 there is a compression spring 54 that surrounds the machine screw 50 and urges the wiper and/or impeller element 47 axially outwardly, that is, toward the adjacent wall 13 of the material reducing chamber 11.

Thus, when the rotor 25 is driven by the motor 40 the wiper and/or impeller elements 47 rotate with the end discs of the rotor and they bear against the oppositely spaced walls 12, 13 of the material reducing chamber to wipe therefrom any material, water or the like which might be running down the sides of the reducing chamber walls which water would normally flow into the space between the end members of the rotor and the side walls of the reducing chamber.

It will be seen from Fig. 3 of the drawings that the heads of the machine screws 52 do not seat upon the wiper elements 47 but that there is sufficient space between the heads of these machine screws and the wiper elements 47 to permit considerable wear particularly of that face or surface of the wiper element 47 which rides upon the circular area or face 48*a* of the wall 12 or 13, as the case may be.

The garbage grinder illustrated in Fig. 1 of the drawings is driven only in one direction and therefore the wiper and/or impeller elements 47 are carried by the rotor end portions at the angle described, but it is to be understood that when the invention is to be employed in a grinder in which the rotor may be driven in reverse directions, the wiper and/or impeller elements 47 may be carried by its rotor end portions 33, 34 so that

their longitudinal axes lie substantially upon radial lines struck from the axis of rotation of the rotor **25**. While it is preferred that the elements **47** be both wiper and impeller elements, they may only be impeller elements, that is, they need not actually bear and ride upon the walls **12, 13**, but they should rotate in close proximity therewith.

The wiper and/or impeller element **55** seen in Fig. 4 of the drawings functions in the same general manner as does the wiper element **47** seen in Fig. 3. However, the wiper element **55** is urged outwardly or toward the wall of the reducing chamber wall **13** by a means different from that employed in connection with wiper element **47**. In this embodiment the slot **46***a* is sloped axially outwardly from its root or inner end **56** toward the wall **13** of the reducing chamber to its radially outer end **57** and the bottom of the wiper element **55** is sloped so as to cooperate with the bottom of the slot **46***a* so that these two surfaces cooperate to form a cam means which causes the wiper element **55** to be cammed outwardly resiliently or toward the material reducing wall **13** by centrifugal force when the motor is driven. Wiper element **55** is also carried by the end disc **34***a* of the rotor through a pair of machine screws **52***a* similar to the screws **52** and the heads of screws **52***a* are received within a shouldered slot **58** in the wiper element **55** while the bodies thereof extend through a narrow slot **59** and are threaded into the end disc **34***a* and locked therein, as described in connection with the machine screws **52**.

From the foregoing it will be seen that I have provided an improved material reducing apparatus and more particularly a grinder adapted to grind materials such as garbage in which there is provided a very efficient means for preventing the entrance of material being ground and water into the space between the ends of the rotor and the material reducing chamber walls.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended and applicant wishes therefore not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of the invention, what it is desired to secure by Letters Patent of the United States is:

1. A material reducing rotor adapted to rotate upon an axis in a material reducing chamber having a side wall, said rotor including an end portion adapted to rotate adjacent said side wall and carrying a separate wiper member, spring means urging said wiper member axially outwardly, the longitudinal axis of which wiper member extends generally radially with respect to the rotor end and with its radially innermost end positioned to lead its radially outermost end when said rotor is rotated in one direction.

2. A material reducing rotor adapted to rotate upon an axis in a material reducing chamber having a side wall, said rotor including an end portion adapted to rotate adjacent said side wall and carrying a separate impeller member movable outwardly by centrifugal force, the longitudinal axis of which impeller member extends

generally radially with respect to the rotor end and with its radially innermost end positioned to lead its radially outermost end when said rotor is rotated in one direction.

3. A grinder including a material reducing chamber having a side wall, a material reducing rotor in said chamber adapted to rotate on an axis and having an end wall adjacent said chamber side wall, a wiper mounted on said rotor end wall for movement toward and from said chamber side wall and having a wiping contact therewith, and spring means urging said wiper toward said chamber side wall, said wiper having a leading edge which extends generally radially with respect to the rotor and which has its radially innermost position leading its radially outermost position when said rotor is rotated in its normal direction of rotation.

4. A grinder including a material reducing chamber having a side wall, a material reducing rotor in said chamber adapted to rotate on an axis and having an end wall adjacent said chamber side wall, a wiper mounted on said rotor end wall for movement toward and from said chamber side wall, and spring means urging said wiper toward said chamber side wall, said wiper having a leading edge which extends generally radially with respect to the rotor and which has its radially innermost position leading its radially outermost position when said rotor is rotated in its normal direction of rotation.

5. A grinder including a material reducing chamber having a side wall, a material reducing rotor in said chamber adapted to rotate on an axis and having an end wall adjacent said chamber side wall, and a wiper mounted on said rotor end wall for movement toward and from said chamber side wall and having a wiping contact therewith, said wiper having a leading edge which extends generally radially with respect to the rotor and which has its radially innermost position leading its radially outermost position when said rotor is rotated in its normal direction of rotation.

6. A grinder including a material reducing chamber having a side wall, a material reducing rotor in said chamber adapted to rotate on an axis and having an end wall adjacent said chamber side wall, and a wiper mounted on said rotor end wall for movement toward and from said chamber side wall, said wiper having a leading edge which extends generally radially with respect to the rotor and which has its radially innermost position leading its radially outermost position when said rotor is rotated in its normal direction of rotation.

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