

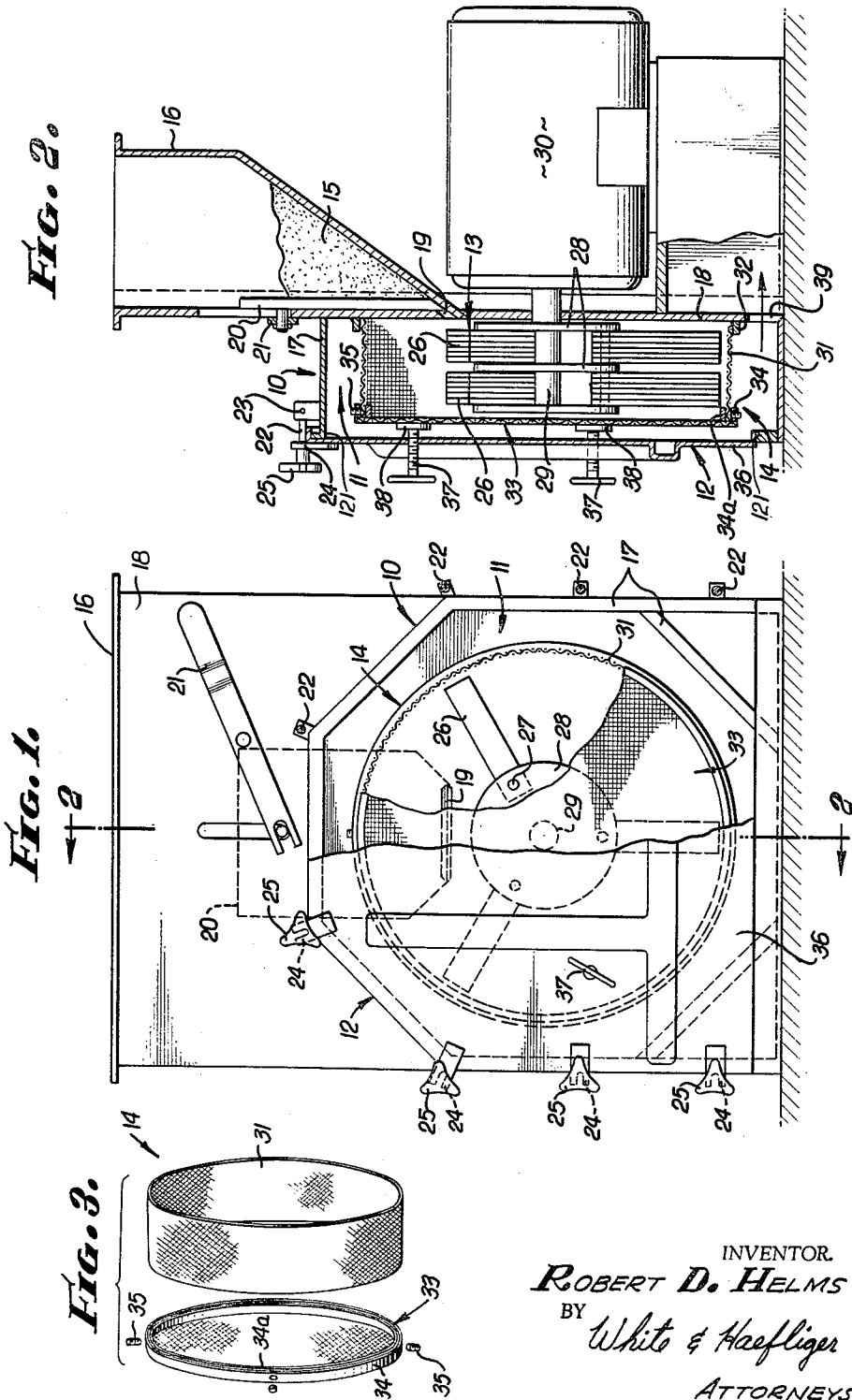
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ROTARY GRINDING MILL

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ROTARY GRINDING MILL

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6 Claims. (Cl. 241-74)

This invention has to do generally with improvements in rotary grinders of the hammer mill type, usable for comminuting any of various materials, typically of vegetable origin and in the category of feeds and the like. More specifically, the invention relates to grinders of this type comprising an impact element or hammer assembly rotatable at the inside of a screen against which the hammers impact to reduce the material for passage through the screen.

My general object is to provide improvements in such grinding equipment that permit greatly increased throughput in relation to power consumption, by comparison with conventional grinders, and which otherwise have advantages in permitting construction of the equipment economically and according to highly practicable designs.

Structurally considered, the invention achieves its important objectives by reason of a novel screen assembly which provides for full circular screen extent about the rotor assembly, with consequent increased capacity for continuous comminution of the feed material and passage of the fines through the screen, together with a separable end screen which, though not receiving the hammer impact, presents an added foraminous medium for the passage of fines displaced beyond the impact area of the hammers.

Accordingly, the invention contemplates accommodation of a ring screen about the hammer rotor and in communication at one end with a feed opening, and detachably secured at its opposite end to a disc screen, separability of the two screens being of advantage in permitting replacements only of the ring screen which is subject to most severe wear.

As will appear, the invention further contemplates providing for one end of the grinder housing a removable closure provided with means capable of manipulation at the outside to bear against the end of the disc screen, and in so doing to retain the screen assembly in operating position by pressing the opposite end of the ring screen against the inlet end of the housing. Thus in addition to maximized screen area about and beyond the hammer assembly, the invention provides for easy assembly and dismantling of the grinder parts as required from time to time for replacement or screening purposes.

The invention has various additional features and objects, all of which will be most readily understood from the following detailed description of an illustrative embodiment shown by the accompanying drawing in which:

FIG. 1 is a view showing the grinder in front elevation, a portion of the chamber closure being broken away to expose the interior;

FIG. 2 is a vertical cross section taken on line 2-2 of FIG. 1; and

FIG. 3 is a perspective showing of the screen assembly.

The grinder structure is shown generally to comprise a housing 10 defining a grinding chamber 11 and having a removable front closure 12 for the chamber access opening 121, the chamber containing a grinder rotor 13 within a screen assembly 14 into which the material 15 to be ground is fed from chute 16.

Merely as exemplary, the housing 10 is shown to be peripherally defined by an imperforate octagonal wall 17 closed at its rear by plate 18 which mounts and may form the front wall of chute 16, plate 18 containing a feed opening 19 through which the material 15 feeds into the

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screen assembly 14, under control of a valve or gate 20 manually positionable by lever 21.

The chamber closure 12 is shown to be conformed in shape with the wall 17 and releasably held thereto by bolts 22 pivoted to the housing at 23 and extending through the bifurcations of projections 24 carried by the closure. The latter is releasably held to the housing by nuts 25 threaded to bear against the projections 24.

Rotor 13 may be of any appropriate type or construction capable of comminuting the feed material against the screen structure. Merely as illustrative, the rotor is shown to comprise circularly spaced assemblages of hammer pieces 26 pivoted at 27 to hub plates 28 on the rotor shaft 29 driven by motor 30.

The invention is primarily concerned with the screen assembly 14 which is shown to comprise a cylindrical or ring section 31 removably retained in concentric relation with the rotor, within ring flange 32 fixed to plate 18. The assembly 14 also includes a disc screen 33 to which is welded spaced bar stock rings 34-34a between which is received the outer end of the ring screen 31. Suitable fasteners, such as set screws 35, may be provided for releasably holding together the screens during their installation and independently of the chamber end closure.

Provision is made for releasably retaining the ring screen within flange 32 by threading through the closure plate 36 circularly arranged screws 37, the inner ends of which carry pads 38 which may be pressed against the screen disc 33 to retain the screen assembly in the condition illustrated by FIG. 2.

In the operation of the grinder, the rotor hammers 26 impact against and comminute the feed material against the ring screen, causing passage of the fines through the screen into chamber 11 for appropriate removal as through outlet 39. Rotation of the hammer assemblies tends to displace some of the material being ground, upwardly about the rotor and opposed surfaces of the ring screen, so that the latter remains effective for the full 360° grinding surface and for passage of fines throughout the full circular extent. By virtue of the removability and adjustability of the screen ring, the latter may be rotationally varied to expose different arcuate extents to the more severe grinding action at the bottom, and for such purposes the screen may be reversed to bring either end within the retaining flange 32.

The disc screen 33 presents an additional foraminous medium for the passage into chamber 11 of fines displaced outwardly beyond the rotor and opposite its full circular extent. Being subjected to greater wear than the disc screen, the ring screen 31 may be replaced a number of times during the useful life of a single disc screen. As will be apparent, by the simple procedure of removing the cover plate 36, access may be had to chamber 11 for cleaning, readjustment or replacement of the screen parts.

I claim:

1. A grinder comprising a housing having an imperforate wall peripherally defining a grinding chamber and having at the front end of the housing an access opening and at its rear end a feed opening, a movable closure for said access opening mounted to the front end of the housing, a rotatably driven shaft and radially movable hammer assembly within said chamber, a screen ring surrounding the said assembly and internally communicating at one end with said feed opening to receive material to be ground by said assembly against and passed through the screen, said screen being annularly spaced from said imperforate housing wall and the space communicating with an outlet passage at the base of the housing, a second screen removably engaged against the opposite end of the screen ring directly at the inside of

said closure, and means positioning the screen ring to the housing about the feed opening, said screen ring being releasable from said positioning means and the screens being removable through said access opening of the housing when said closure is opened.

2. A grinder according to claim 1, in which said second screen is in centrally continuous disc form fitted to the screen ring and is positioned beyond the end of the shaft and hammer assembly.

3. A grinder according to claim 2, including fasteners directly and releasably interconnecting said screens. 10

4. A grinder according to claim 1, including bearing means carried by said closure and bearing against said second screen and pressing the screen ring against said positioning means about said feed opening.

5. A grinder according to claim 4, in which said bearing means comprise retainers threaded through said closure and carrying terminal pads engageable against said second screen.

6. A grinder according to claim 1, in which said second screen comprises a screen disc fitted and detachably secured to said opposite end of the screen ring, and including also retainers threaded through said closure and carrying terminal pads bearing against the disc screen and pressing the screen ring against the housing about said feed opening. 5

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