Jan. 31, 1939. H. J. MANKOFF 2,145,728

GRINDING MACHINE

Filed Dec. 29, 1937 3 Sheets-Sheet 1

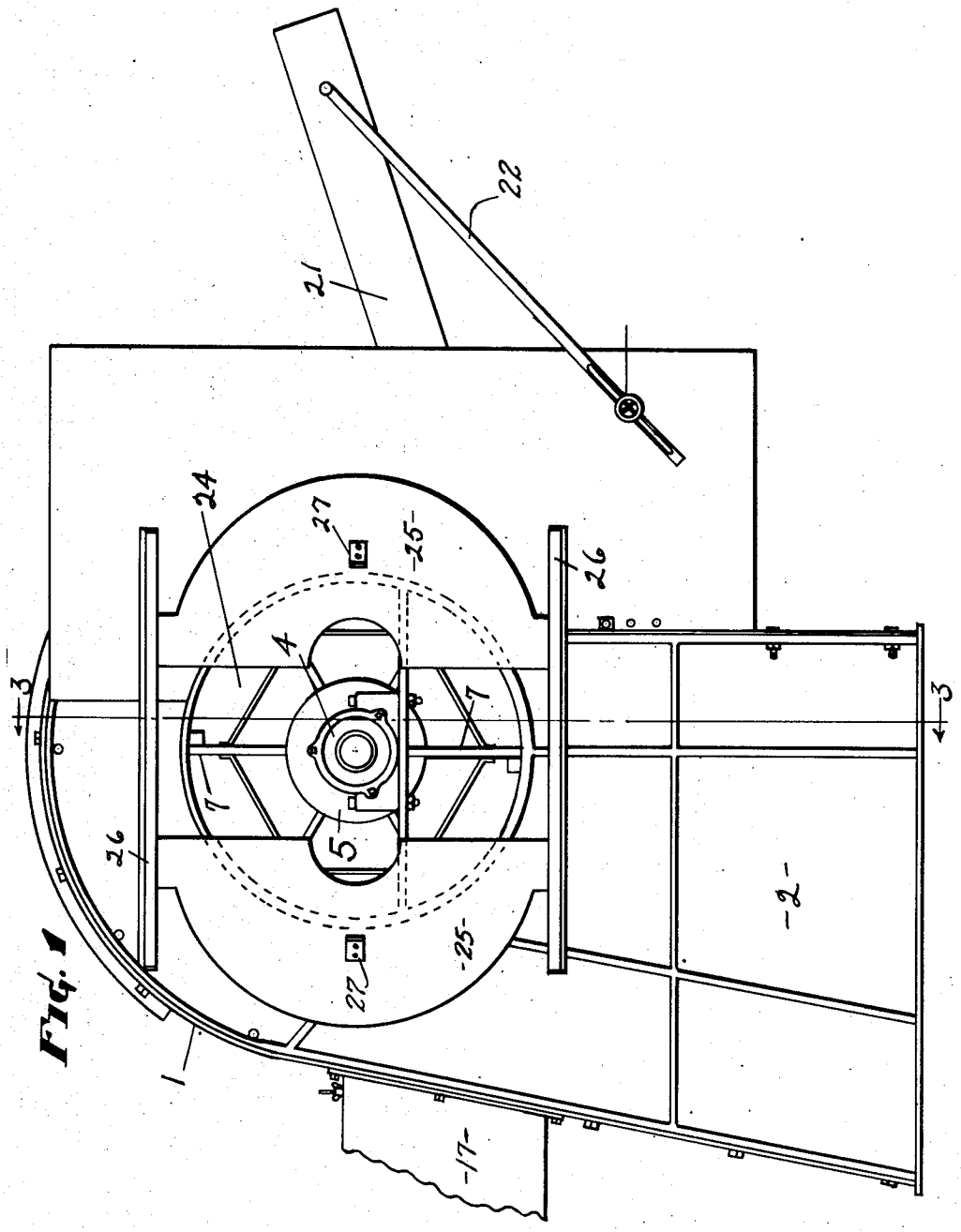


Fig. 1

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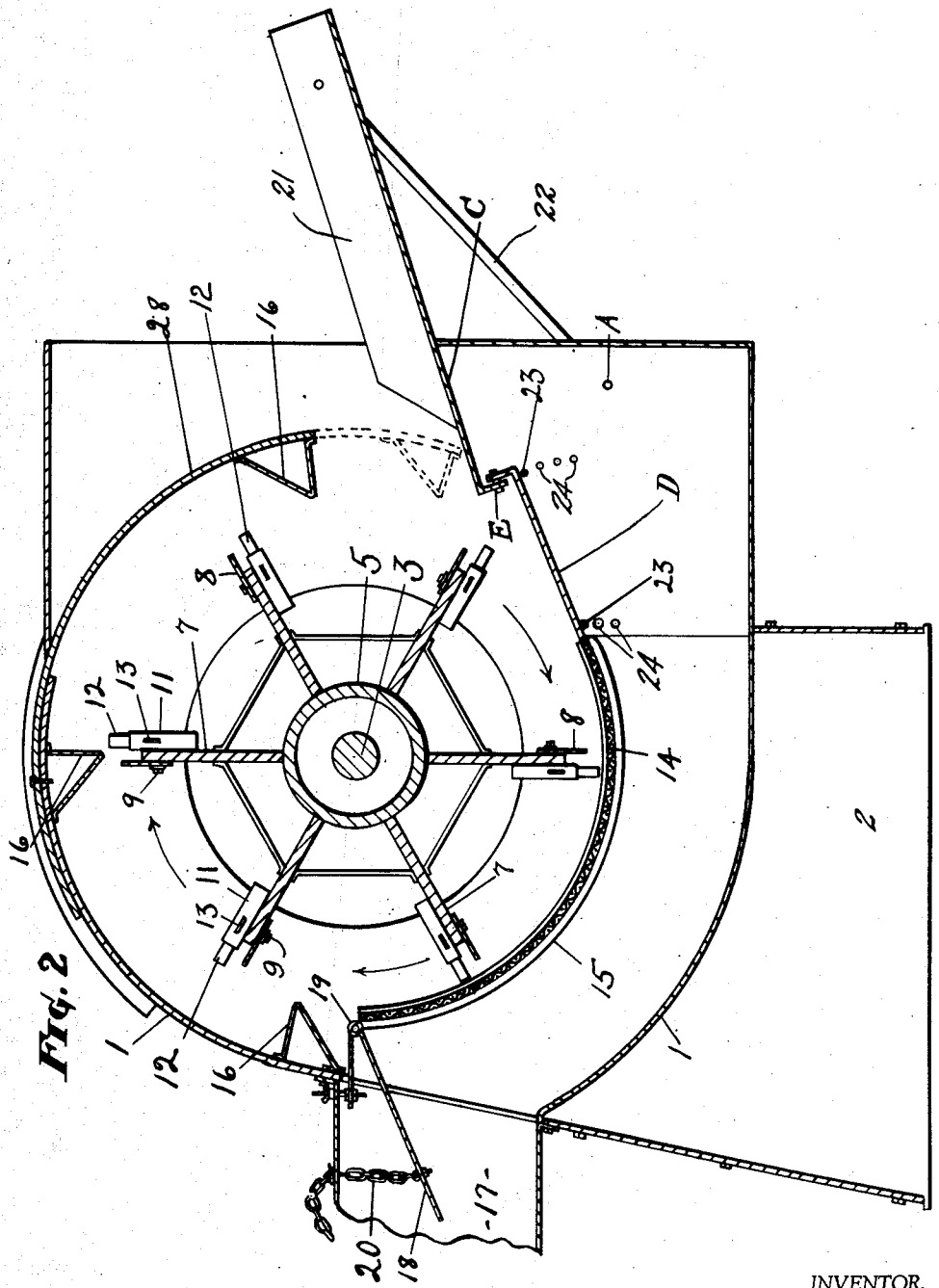


FIG. 2

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Fig. 7.

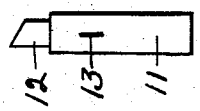


Fig. 6.

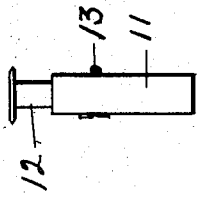


Fig. 5.

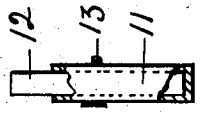


Fig. 4.

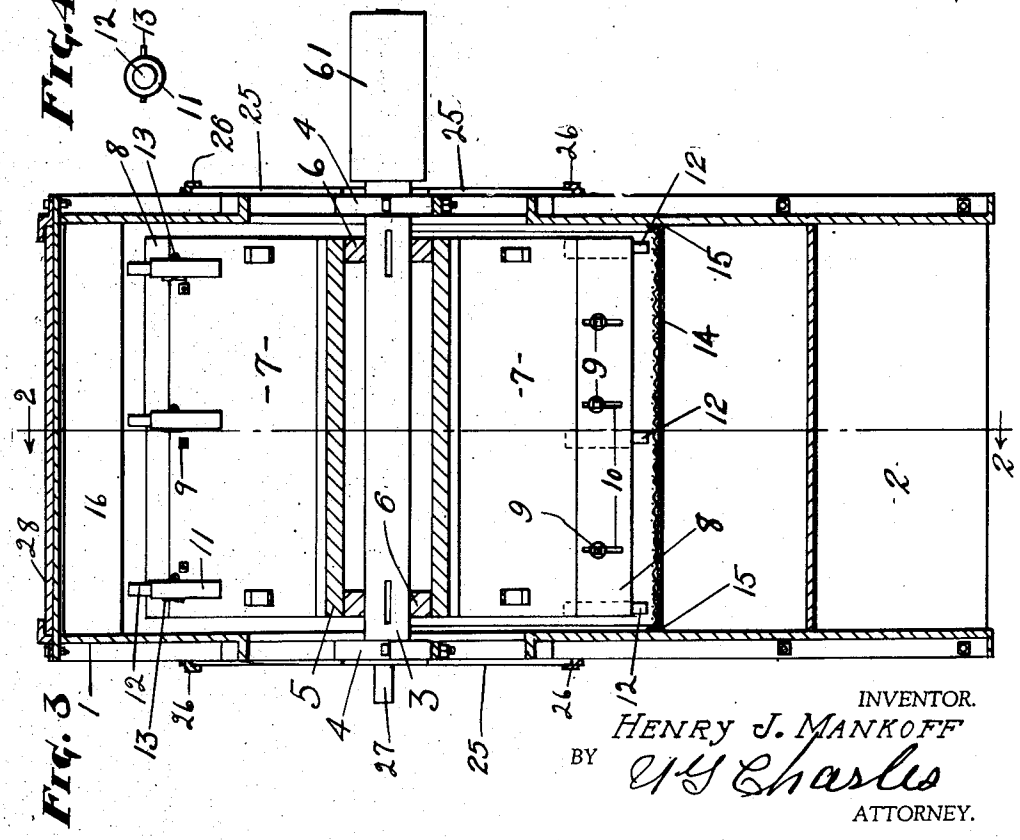


Fig. 3

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UNITED STATES PATENT OFFICE

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GRINDING MACHINE

Henry J. Mankoff, Wichita, Kans.

Application December 29, 1937, Serial No. 182,296

3 Claims. (Cl. 83—11)

My invention relates to a grinding machine and has for its principal object a rotor grinder of a hammer mill type, having fan blade elements associated with the grinding mechanism, the said rotor grinder hereinafter referred to as rotor.

A further object of my invention is to provide a grinding machine that is convertible into a blower to discharge the ground substance into a place of storage.

A still further object of my invention is to provide a grinding machine having a series of deflectors carried by the housing adjacent the periphery of the rotor as a grinding element, and the said deflectors to function plurally with respect to grinding and control of the air blast.

A still further object of my invention is to provide an air intake at the axis of the rotor, the said intake to be on one or both sides of the housing, and means to control the volume of air passing therethrough.

A still further object of my invention is to provide a grinding machine adaptable to grinding fodder, straw, or the like as a feed substance, and also to grind grain or other substance of a mineral or like character.

A still further object of my invention is to provide an adjustable means for the feed chute so that chopped ensilage may be fed through the machine in such a way as to avoid contact with the grinding elements of the rotor, in which case the fan feature is the means to conduct such material through a duct to place of storage.

These and other objects will hereinafter be more fully explained, reference being had to the accompanying drawings forming a part of this specification, and in which like characters will apply to like parts in the different views of the structure.

Referring to the drawings:

Fig. 1 is a side view of the grinding machine illustrating the control means for air inlet, and adjustable support for the feed chute.

Fig. 2 is a sectional view of the grinding machine taken on line 2—2 in Fig. 3.

Fig. 3 is a sectional view taken on line 3—3 in Fig. 1.

Fig. 4 is an enlarged end view of one of the hammer grinding elements.

Fig. 5 is a side view of the element, parts removed for convenience of illustration.

Fig. 6 is a side view of the hammer grinding element, modified with respect to its grinding tip.

Fig. 7 illustrates another modified form of the hammer tip.

The following description of my invention is partially restricted to Figs. 1 and 2, consisting of a housing 1, substantially arcuate in form, supported by a base 2, the housing having a grinding rotor concentrically trunnioned therein, said rotor carried by a shaft 3, that is trunnioned in suitable bearings on each side of said housing, as shown at 4.

Positioned on said shaft is a tubular element 5, through which said shaft extends, and being centrally supported therein by heads 6, the purpose of which is to avoid the flexing of the shaft when a plurality of fan blades 7, are welded to the said tubular element, and the said blades radially extend from the said tube, and equally spaced therearound, as shown in Figs. 1 and 2. Positioned on the outer edge of each blade is an adjustable portion 8, as an extension outward for each blade, said portion being secured by bolts 9, engaging through elongated slots 10, respectively, said slots transversely positioned in the said extensions; being so arranged is means to increase or decrease the velocity of the blast as the rotor turns, and on each blade opposite the said extension is secured a plurality of hammer grinding elements spaced therealong and welded thereto, said elements consisting of a sleeve 11, in which is removably positioned a grinding element 12. Said elements are reversibly arranged to prolong the cutting capacity of the outer tip, as each end thereof is similar in form except the tip shown in Fig. 6, and the said grinding elements 12, and secured by the equivalent of a cotter pin 13, said pin engaging through an aperture in the sleeve and an aperture positioned in the grinding element with respect to the same longitudinally. By this arrangement, when the grinding elements become worn or otherwise deteriorated, they are easily withdrawn and reversed, and when both ends become so disabled, it is possible to sharpen each end alike for further engagement.

Positioned in the annular housing is an arcuate screen 14, that is secured in position by engaging in a channel formed by cleats 15, secured to the housing and coinciding with the arc of the screen. The screen, being thus secure, is removable, and may be replaced by a solid sheet of metal, or sheets perforated, varying in size with respect to the apertures positioned therein.

In Figs. 2 and 3 is shown a plurality of baffles 16, triangular in form with respect to cross section, the inward extending points of which are in close proximity to the outer extending points of the grinding elements, by which means a

pocket is formed between the triangular elements, and in which substance being ground is thrown to avoid its equal rotation with the rotor, and furthermore, to direct the material toward the center of the rotor, where it contacts the said grinding points, and each baffle that is adjacent the said inlet functions as means to retard or restrict the fan blast against outward flow through the feed inlet until each succeeding blade has well passed the feeding point, directing the pressure that will exhaust through the screen and outward through a conductor 17, forcing the ground substance to place of storage, and the said conductor has a cut-off plate 18, pivotally connected at its upper edge as at 19, and the said plate in its open position is access means for ground substance passing through screen 14 outward through said conductor 17. The free end of said plate is supported by a rod or chain 20, to an open position, as desired. The feed opening above referred to is equipped with a channeled chute 21, the outer end of which is supported by brace members 22, connected to the chute and to the housing as at A, at which point the said brace is adjustable to vary the slant of the chute and inward position. The inner end of said chute terminates in close proximity to where it enters the housing, while the bottom continues as at C and D, last said portions having an offset E, and means to connect the same, the offset functioning as a pocket in which substance being ground will recede from the grinder a short distance and, as moved onward, will be in contact with the grinding elements of the rotor.

When said chute is moved inward and downward, the same is supported by rods 23, engaging in apertures 24, selectively, a plurality of which are spaced downward and through each side of the housing.

When said chute is so positioned and the screen removed, ground substance may be fed in the housing and forced onward through the conductor by the fan faculty of the rotor without contact therewith. In this capacity, the grinding rotor will function as a blast fan, and the substance being conveyed may be similar to that of ensilage or other comminuted material. It will be understood that the air supply for the fan feature is at the ends of the rotor, through the medium of an opening 24, concentric to the rotor shaft, said opening being on each side of the housing and each thereof has a slidingly arranged member 25, that is diametrically divided so that each half will slide to and from the shaft, and fit closely therearound. The said members slidably engage in tracks 26, at the upper and lower extremity of said sliding members, the said members removable by a lip 27, secured to each, as moving means therefor to a desired position as a control for air inlet to the rotor.

In Fig. 2 is shown a segmental portion 28, of the arcuate housing wall, said portion adapted to rock to and from the feeding chute to govern the vertical width of the opening for the substance entering and moving in contact with the rotor.

It will be understood that shaft 3 has a pulley 61, secured on the outer end thereof to be engaged by a belt transmitting torque from a motor as turning means for the rotor and belt not shown in the drawings. It will also be understood that the hammer grinding elements are spaced along the edge of each fan blade and being staggered with respect to the blades in their consecutive order.

While I have shown and described certain modifications concerning the structure of the hammer grinding elements, I do not wish to be restricted to such alone, as other modifications may be employed as lie within the scope of the appended claims.

Having fully described my invention what I claim as new, and desire to secure by Letters Patent is:

1. In a rotor for grinding machines, a shaft, a plurality of fan blades spaced around the shaft, radially extending and secured thereto, and an extension for each blade and means to adjustably carry the extension at the outer edge of its respective blade, a plurality of sleeves secured to each of said blades and being spaced therealong, a cylindrical grinding element positioned in each sleeve so that one end thereof will extend outward and the said grinding elements being reversible, and means to secure the same in their respective sleeve when selectively reversed.

2. In a rotor for grinding machines, a shaft, a tubular element through which the shaft extends axially and secured together in such a way as to space the wall of the tubular element from the shaft, a plurality of fan blades spaced around the shaft, radially extending and secured to the tubular element, and an extension for each blade and means to adjustably carry the extension at the outer edge of its respective blade, a plurality of sleeves secured to each of said blades and being spaced therealong, a cylindrical grinding element positioned in each sleeve so that one end thereof will extend outward and the said grinding elements being reversible, and means to secure the same in their respective sleeve when selectively reversed.

3. In a rotor for grinding machines, a shaft, a tubular element through which the shaft extends axially and secured together in such a way as to space the wall of the tubular element from the shaft, a plurality of fan blades spaced around the shaft, radially extending and secured thereto, an extension for each blade, the extension adjustably secured to corresponding sides of the blades and a plurality of sleeves spaced along each blade and being secured to the other sides of the blades, a grinding element insertible in each sleeve, said grinding elements secured in their respective sleeves and being reversible with respect to their end engagement, and means to secure said grinding elements when selectively reversed.

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