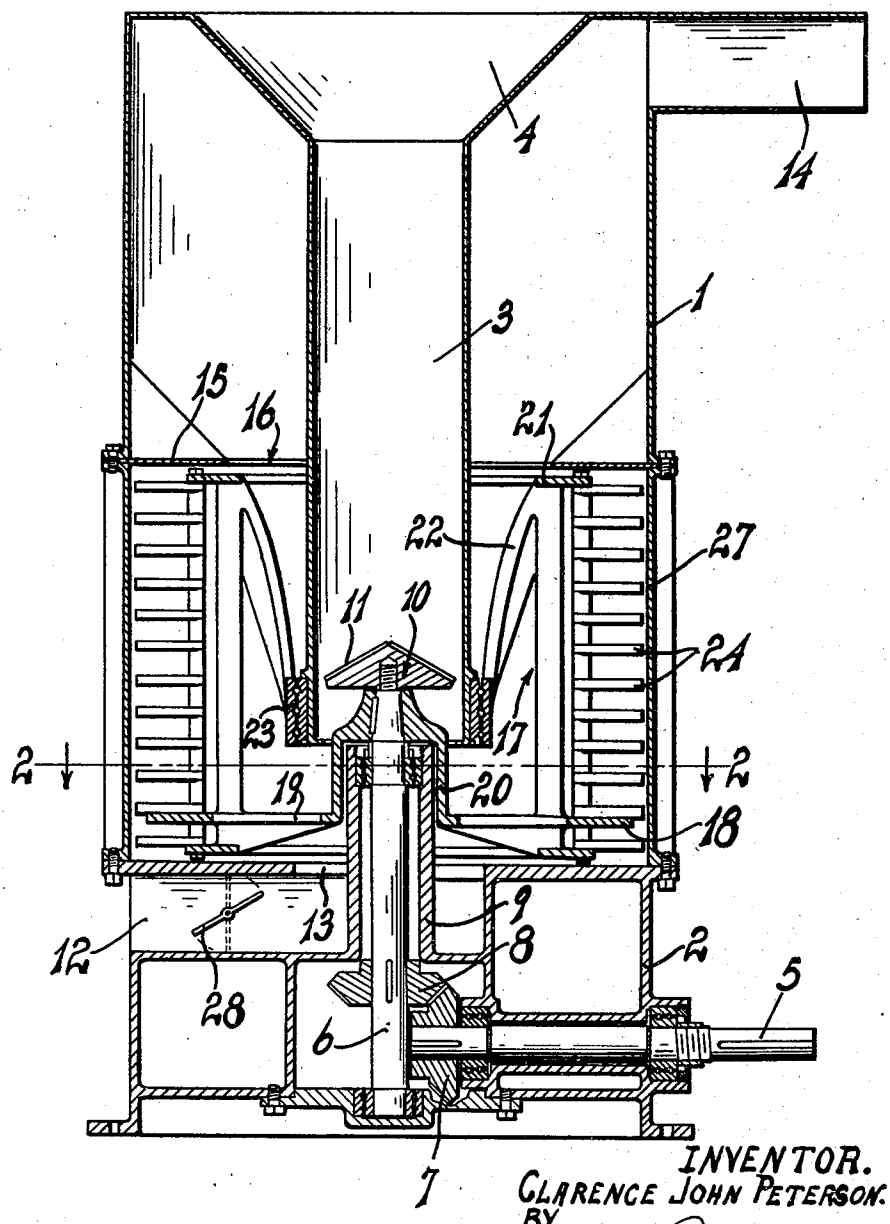
July 21, 1942. C. J. PETERSON 2,290,379

PULVERIZING MILL

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Fig. 1.



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Fig. 2.

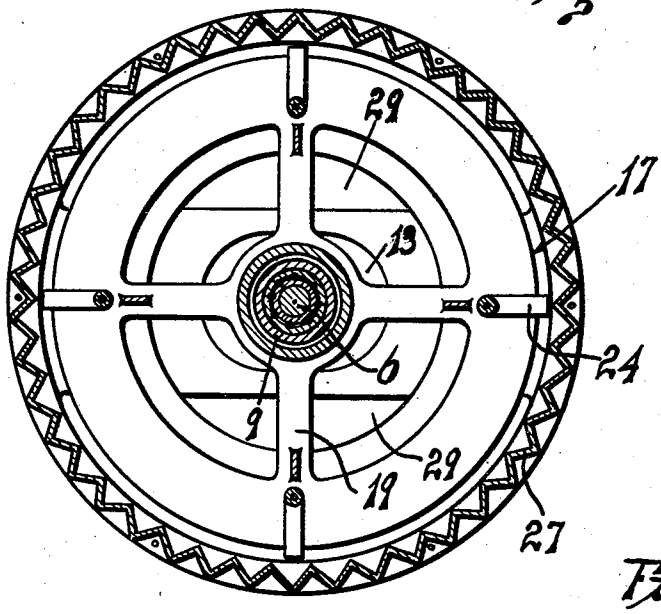


Fig. 3.

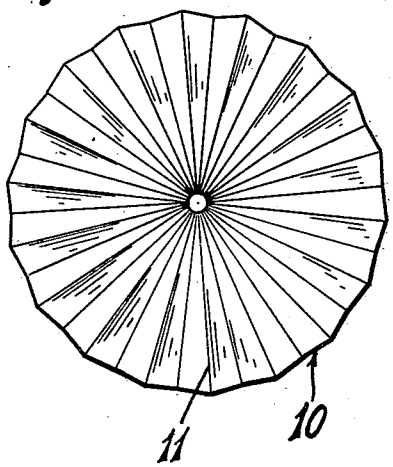
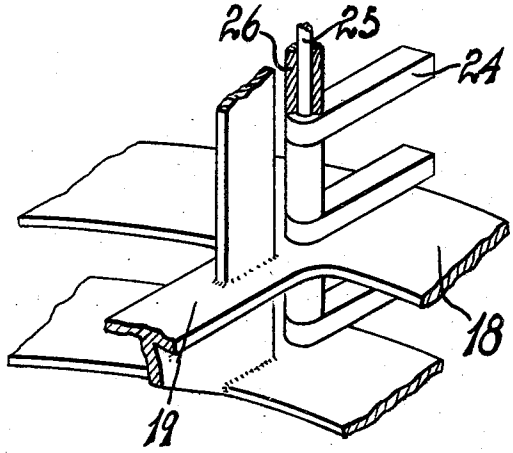


Fig. 4.



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UNITED STATES PATENT OFFICE

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PULVERIZING MILL

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Application October 24, 1939, Serial No. 300,954

3 Claims. (Cl. 83—11)

This invention relates to a pulverizing mill of the vertical type, and the prime object of my invention is to provide a novel means of circulating air vertically through the mill, and particularly over the rotor.

Another object is to provide a novel pulverizing mill of the character stated, which will effectively cut and break products, such as alfalfa hay, dried fruits, as well as other products such as gypsum, talc, asbestos, and the like.

A feature of my invention resides in the novel primary cutter over which the product worked upon must pass prior to engaging the secondary rotor or beater.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description, and the appended claims.

In the drawings:

Figure 1 is a longitudinal, sectional view of my pulverizing mill.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a plan view of the primary cutter.

Figure 4 is a fragmentary, perspective view of the beater or rotor.

Referring more particularly to the drawings, the numeral 1 indicates an outer housing, which is preferably cylindrical, and is positioned vertically, as shown. The housing 1 rests on a base 2, and this base may be separately cast or may be integrally formed with the housing, but, as here shown, the housing is bolted to the base. An intake tube 3 is arranged within the housing 1, and is substantially central within the housing. The tube 3 extends substantially the full length of the housing 1, the purpose of which will be further described.

A hopper extends into the upper end of the tube 3, and this hopper may include the bell portion 4 of the tube. A drive shaft 5 is journaled in the base 2 and is driven from a suitable source of power, not shown. A driven shaft 6 is journaled in the base 2 and is positioned vertically as shown. A gear 7 on the shaft 5 meshes with the gear 8 secured to the shaft 6, whereby the shaft 6 is continuously rotated. A sleeve 9, which is a part of the base 2, encloses the upper portion of the shaft 6, and this sleeve, as well as the shaft, extend into the lower part of the housing 1. A primary cutter 10 is fixedly secured to the upper end of the shaft 6, and this cutter is positioned within the tube 3, and preferably in the lower part of this tube. The cutter 10 is circular, as shown in Figure 3, and is provided with radial teeth 11. The periphery of the cutter 10 is spaced from the inner wall of the tube 3 so that material can pass downwardly between the cutter and the tube.

An intake duct 12 is provided in the base 2, and the opening 13 in the upper wall of the duct 12 permits air to pass into the lower part of the housing 1. The opening 13 surrounds the sleeve 9, and consequently air is admitted to the housing at the center and then passes outwardly towards the wall of the housing due to the action of the rotor, as will be further described. An outlet pipe 14 extends from the upper part of the housing 1. A diaphragm plate 15 extends inwardly from the wall of the housing 1, and an annular opening 16 is left around the tube 3. The diaphragm 15 acts as a baffle to direct the air inwardly through the opening 16, and thence upwardly to the outlet 14.

A rotor or beater 17 is arranged vertically within the lower portion of the housing 1, and consists of a lower ring 18, which is connected by arms 19 to a central cup support 20. This central cup support is fixedly attached to the upper end of the shaft 6, and immediately below the cutter 10, thus providing a drive for the rotor from the driven shaft 6. The upper ring 21 of the rotor is supported through arms 22 to an annular bearing 23 on the tube 3. A plurality of beater fingers 24 are arranged in vertical sets on posts 25, which posts are mounted in the rings 18 and 21. Spacing washers 26 hold the fingers 24 in proper spaced vertical position. When the rotor is rotating, centrifugal force will hold the fingers 24 outwardly, substantially as shown in the drawings. The housing 1 within the area enclosing the rotor 17 is preferably corrugated, as shown at 27, thus providing inclined surfaces against which the material is thrown, and effectively broken. A damper 28 in the intake duct 12 controls the amount of air which passes into the mill.

Due to the construction of the rotor 17, it will act as a vertical fan, drawing air through the duct 12 and the opening 13, thence upwardly past the diaphragm 15, and finally passing out through the outlet pipe 14. It will be noted that the lower end of the tube 3 is relatively close to the intake opening 13, and consequently the incoming material, which has been partially broken by the cutter 10, will then be picked up by the incoming stream and carried outwardly by the action of the rotor 17, and will be constantly agitated within the area covered by the rotor, and when finally broken up, the material will

drop downwardly through the spaces 29, 29 in the base 2, these outlet spaces being arranged on each side of the enclosed area, shown in Figure 1, which includes the shafts and the intake duct. The material being conveyed into the rotor adjacent the lower portion thereof, and then swept upwardly by the current of air passing through the mill, will more effectively distribute the material throughout the rotor area, and will more effectively pulverize the material passing through the mill.

The diaphragm 15 covers the periphery of the rotor 17, and thus the material being acted upon cannot be blown upwardly along the periphery of the rotor, and thence out of the mill. This diaphragm holds the material down and only very light dust-like particles can pass around this diaphragm.

Having described my invention, I claim:

1. A pulverizing mill comprising a housing, a central material intake tube positioned within the housing, a material outlet at the bottom of the housing, a vertical shaft journaled in the housing, drive means extending to said shaft, a rotor mounted on the shaft, said rotor surrounding the lower part of the material intake tube, an air intake duct in the housing below the rotor, and an outlet pipe extending from said housing adjacent the upper end thereof, a primary cutter mounted on said shaft, said primary cutter being positioned within the material intake tube.

2. A pulverizing mill comprising a cylindrical housing, a central material intake tube extending substantially the length of said housing and centrally arranged therein, a material outlet at the bottom of the housing, a vertical shaft journaled in the housing, drive means extending to said shaft, a rotor mounted on said shaft and arranged within the housing, said rotor partially surrounding the material intake tube, an air intake duct extending into the housing below said rotor, said air intake duct opening into the housing in substantially the center thereof, an air outlet pipe extending from said housing above the rotor, and a primary cutter mounted on said shaft, said primary cutter being positioned within the material intake tube.

3. A pulverizing mill comprising a cylindrical housing, a central material intake tube extending substantially the length of said housing and centrally arranged therein, a material outlet at the bottom of the housing, a vertical shaft journaled in the housing, drive means extending to said shaft, a rotor mounted on said shaft and arranged within the housing, said rotor partially surrounding the material intake tube, an air intake duct extending into the housing below said rotor, said air intake duct opening into the housing in substantially the center thereof, an air outlet pipe extending from said housing above the rotor, and a primary cutter mounted on said shaft, said primary cutter being positioned within the material intake tube, a stationary annular diaphragm within the housing, said diaphragm projecting inwardly from said housing and being positioned above the rotor.

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