May 7, 1940. C. J. PETERSON 2,199,729

PULVERIZER

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Fig. 1.

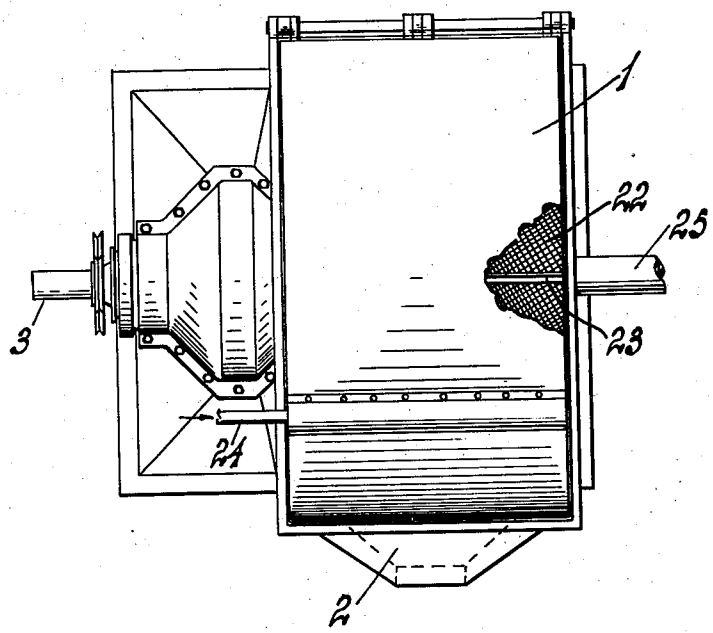
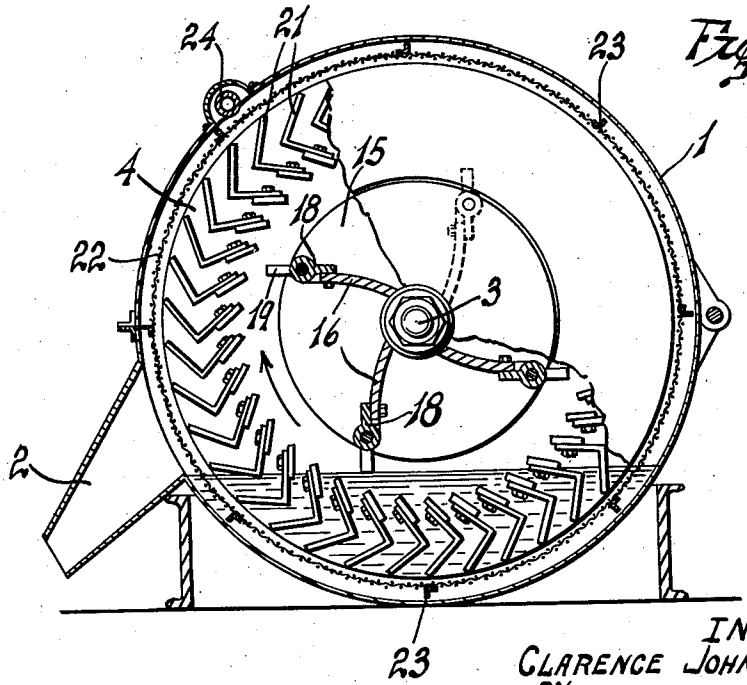


Fig. 2.



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Fig. 3.

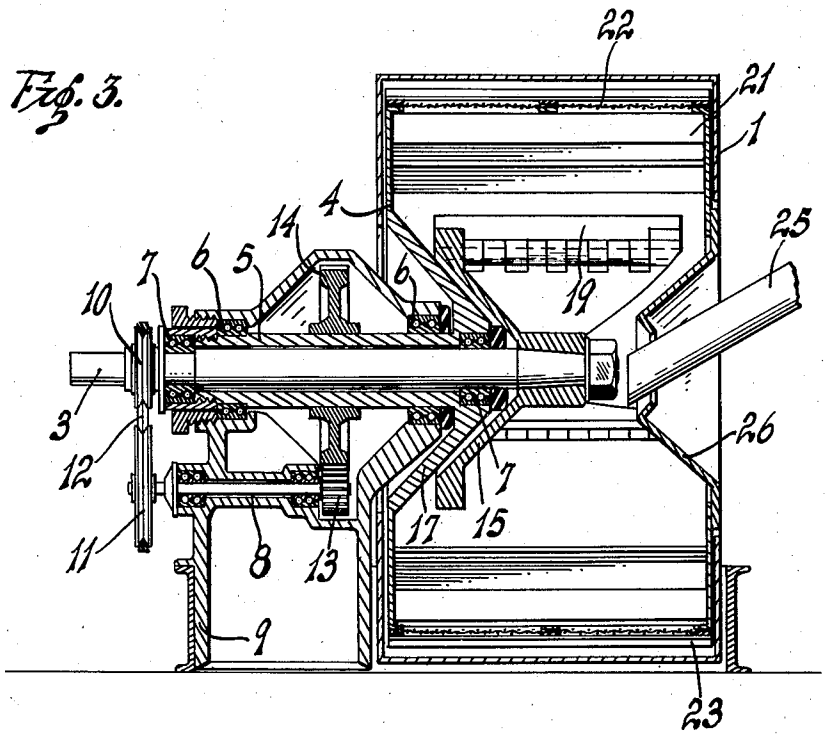


Fig. 4.

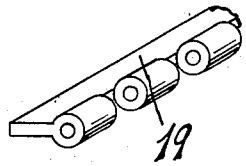
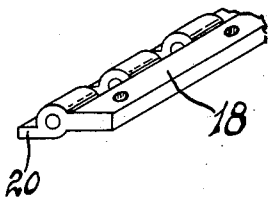


Fig. 5.



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PULVERIZER

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Application January 11, 1938, Serial No. 184,402

4 Claims. (Cl. 83—11)

This invention relates to a pulverizer wherein substances are finely divided, the pulverizing operation being accomplished in a wet state so that the material flowing from the pulverizer is in the form of a mulch or slime, particularly useful in the mining industry.

An object of my invention is to provide a pulverizer of the impact type which is effective in operation and certain parts thereof are constantly washed by an incoming stream of water.

Another object is to provide a pulverizer of the character stated, in which the breaker plates are of novel design and are constantly washed by the incoming water to prevent clogging.

Still another object is to provide a novel means in the pulverizer to move the outgoing material through a path of water and thence to the outlet spout.

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 top plan view of my pulverizer, with parts broken away to show interior construction.

Figure 2 is an end view of the pulverizer with parts broken away to show interior construction.

Figure 3 is a transverse sectional view of the pulverizer.

Figure 4 is a fragmentary perspective view of one of the beater plates.

Figure 5 is a fragmentary perspective view of one of the mounting plates for a beater.

Referring more particularly to the drawings, the numeral 1 indicates an outer stationary housing, substantially cylindrical in form, and this housing is provided with an outlet shoot 2, preferably positioned above the bottom of the housing, so that a sump is thus provided in the bottom, the purpose of which will be further described.

A horizontal shaft 3 extends into the housing 1, and is rapidly rotated from a suitable source of power, not shown. A drum 4 is positioned within the housing 1 and this drum is provided with a sleeve 5 which surrounds the shaft 3. Suitable bearings 6, 6 support the sleeve 5 adjacent each end thereof, and suitable bearings 7, 7 support the shaft 3. The sleeve 5 and drum 4 are rotated by the following arrangement: A horizontal shaft 8 is mounted below the shaft 3 in the supporting frame 9. A sheave 10 is secured to the shaft 3 and a sheave 11 is mounted on the shaft 8. A belt 12 encircles these sheaves, which causes the shaft 8 to be driven. A gear 13 on the shaft 8 meshes with the gear 14 attached to the sleeve 5. Thus the sleeve 5 and the drum 4 are rotated at a lesser speed than the shaft 3.

A conical hub 15 is mounted on the inner end of the shaft 3, and a plurality of radial arms 16 project from this hub. The purpose of the conical hub 15 and the conical wall 17 of the drum 4 is to protect the inner bearings 7 from the impact of the material within the pulverizer, and also to prevent accumulation of water and the like in this bearing. To the outer end of each of the arms 16, there is bolted a plate 18 and a beater plate 19 is hingedly attached to each of the plates 18. A rib 20 on the plate 18 supports the beater 19 in the direction of movement of the hub 15, so that these beaters are substantially rigid when contacting the material within the pulverizer.

A plurality of substantially V-shaped pulverizer plates 21 are mounted transversely of the drum 4, and adjacent the periphery of the drum. These breaker plates are so arranged as to provide bucket like receptacles, which tend to retain material until the drum has rotated each bucket to approximately the top of its travel. Starting at a point to the left of the center line as shown in Figure 2, the material will pour down upon the beaters 19 and during the upward movement of these beaters, thus a more effective pulverizing of the material is accomplished.

A screen 22 encircles the drum 4 on the outside of the pulverizing plates 21. A plurality of transverse and circumferentially spaced angles 23 are arranged outside of the screen 22, and these angles scrape the pulverized material upwardly into the outlet shoot 2.

A quantity of water is always maintained in the bottom of the housing 1, through which the screen, the angles and the pulverization plates are constantly moved. The water over-flows into the outlet shoot 2 and thus forms a mulch with the pulverized material. Incoming water is supplied through a transverse spray or head 24, and the incoming water washes through the screen 22, thence over the breaker plates 21, and eventually finds its way to the sump in the bottom of the housing 1, and finally passes out through the shoot 2 as previously stated.

Material is fed into the pulverizer and adjacent the center thereof through the pipe 25, which pipe extends through the inwardly extending cone 26 of the drum 4. The purpose of the centrally arranged pipe 25, as well as the cones 17 and 26 is to urge the material towards the

center of the pulverizer, whereby the material is more effectively pulverized.

In actual operation, I have found that certain ores are very effectively pulverized in a wet condition and the wet mulch can be effectively used in a concentrator, or the like, to recover the material.

The incoming water effectively washes the screen and the breaker plates so that the machine does not clog up. The V- shape of the breaker plates tends to protect the screen 22 from the heavier particles of rock, or the like, and even though the peripheral speeds of the drum and the beaters is relatively high, the rock or the like is not thrown violently against the screen, nor is the screen damaged.

Having described my invention, I claim:

1. A pulverizing machine, comprising a housing, a drum mounted within the housing, means to rotate said drum, a peripheral row of breaker plates mounted on the drum, a hub positioned within the drum, means to rotate the hub, beater bars mounted on the hub, said beater bars extending transversely of the machine, and substantially parallel to the breaker plates, an outlet spout extending from the housing, and a water intake pipe extending into the housing adjacent and above the drum, said pipe being arranged outside of the drum periphery, a screen surrounding the drum, a plurality of angle bars arranged on the outside of the drum, said spout being arranged above the bottom of the housing, whereby a sump is provided in the bottom of said housing, the water from said water intake pipe pouring downwardly over the drum, the angle bars and the breaker plates, and collecting in the sump, and subsequently passing out through the spout, carrying the pulverized material, the angle bars scraping the pulverized material from the sump into the spout.

2. A pulverizing machine, comprising a housing, a drum mounted within the housing, means to rotate said drum, a peripheral row of breaker plates mounted on the drum, a hub positioned within the drum, means to rotate the hub, beater bars mounted on the hub, said beater bars extending transversely of the machine, and substantially parallel to the breaker plates, an outlet spout extending from the housing, and a water intake pipe extending into the housing adjacent and above the drum, said pipe being arranged outside of the drum periphery, a screen surrounding the drum, a plurality of angle bars arranged on the outside of the drum, said spout being arranged above the bottom of the housing, whereby a sump is provided in the bottom of said housing, said breaker plates being substantially V-shape in cross-section, the water from said water intake pipe pouring downwardly over the drum, the angle bars and the breaker plates, and collecting in the sump, and subsequently passing out through the spout, carrying the pulverized material, the angle bars scraping the pulverized material from the sump into the spout.

3. A pulverizing machine comprising a housing, a shaft extending into the housing, means to rotate the shaft, a drum mounted within the housing, a sleeve on the drum, said sleeve surrounding the shaft, drive means extending from the shaft to the sleeve, whereby the shaft and sleeve are driven at different speeds, a hub mounted on the shaft, a plurality of beaters mounted on the hub, said beaters extending transversely of the machine, a peripheral row of breaker plates mounted in the drum and extending transversely of the drum, said breaker plates being substantially V-shape in cross-section, a screen surrounding the drum and mounted thereon, a water intake pipe arranged adjacent the periphery and above the drum, and an outlet spout extending from the housing, the outlet spout being arranged above the bottom of the housing, whereby a sump is provided, and transverse angle bars on the drum, providing scrapers to eject material from the housing, the water from said water intake pipe pouring downwardly over the drum, the angle bars and the breaker plates, and collecting in the sump, and subsequently passing out through the spout, carrying the pulverized material, the angle bars scraping the pulverized material from the sump into the spout.

4. A pulverizing machine, comprising a housing, a drum mounted within the housing, means to rotate said drum, a peripheral row of breaker plates mounted on the drum, a hub positioned within the drum, means to rotate the hub, beater bars mounted on the hub, said beater bars extending transversely of the machine, and substantially parallel to the breaker plates, an outlet spout extending from the housing, and a water intake pipe extending into the housing adjacent and above the drum, said pipe being arranged outside of the drum periphery, opposite faces of the drum being substantially cone shaped and projecting inwardly, said hub being substantially cone shaped and arranged adjacent one conical face of the drum, and an intake pipe extending through the other conical face of the drum, the water from said water intake pipe pouring downwardly over the drum and the breaker plates and passing out through the outlet spout, carrying the pulverized material.

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