April 5, 1938. H. D. ANDERSON 2,113,040

PULVERIZER

Filed July 12, 1935 2 Sheets-Sheet 1

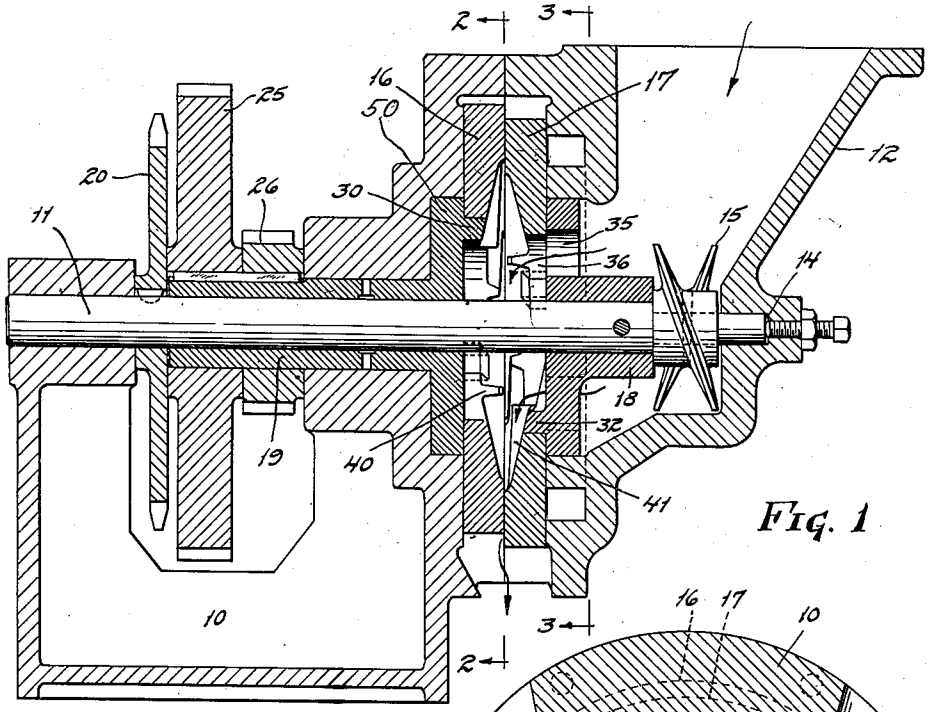


FIG. 1

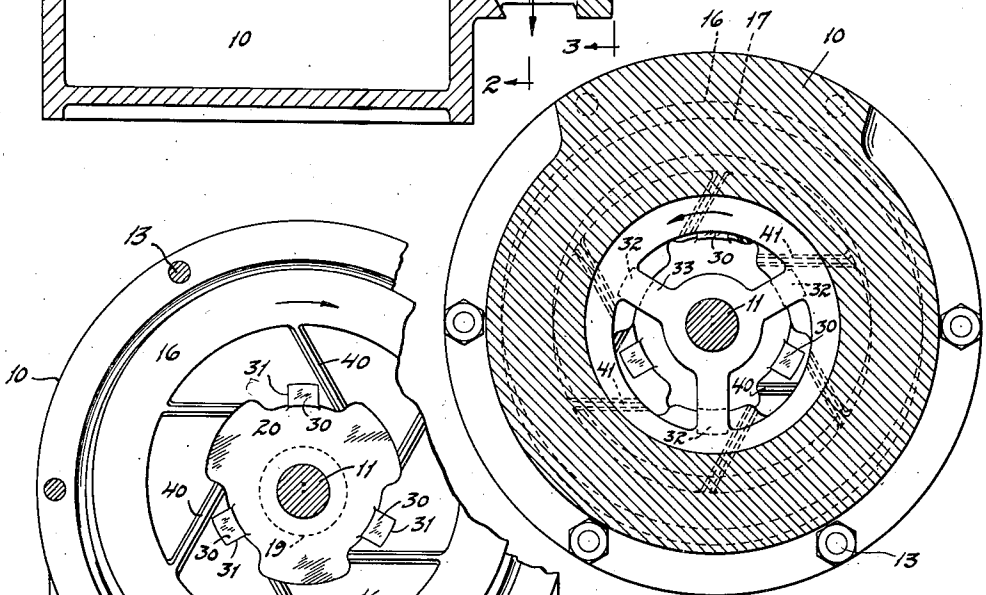


FIG. 3

FIG. 2

INVENTOR.
HENRY D. ANDERSON
BY
Bates, Golwick, & Teare
ATTORNEYS

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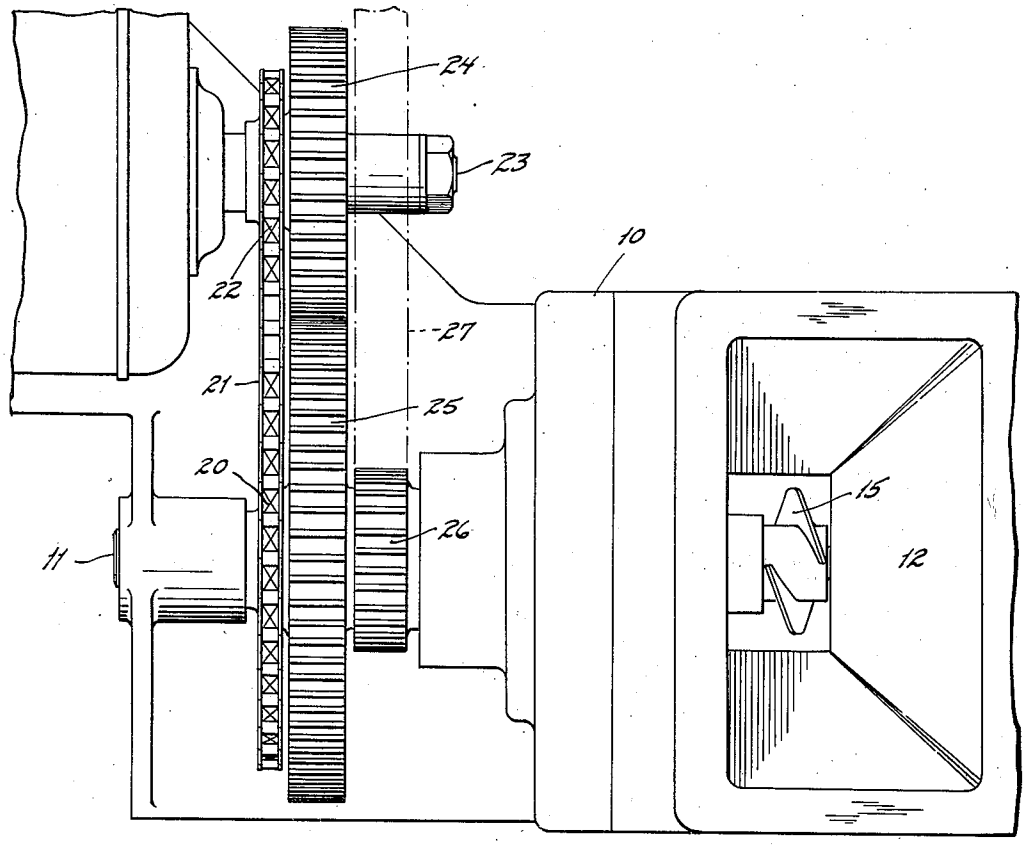


FIG. 4

INVENTOR.

HENRY D. ANDERSON

BY

Bates, Golrick & Teare

ATTORNEYS

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PULVERIZER

Henry D. Anderson, Cleveland, Ohio

Application July 12, 1935, Serial No. 31,007

2 Claims. (Cl. 83—8)

This invention relates to pulverizers and particularly to those which are adapted for use in pulverizing coal, at the place of use. The invention has for one of its objects, the construction of a pulverizer which will be sufficiently effective to pulverize coal to such an extent that it will pass through a 200 mesh sieve, if desired, and yet will be sufficiently simple in construction so as to have few operating parts that do not require frequent adjustment and that enable the entire device to be housed in a small compact structure.

Referring now to the drawings, Fig. 1 is a longitudinal section through a pulverizer made in accordance with my invention; Figs. 2 and 3 are sections taken on the correspondingly numbered lines in Fig. 1, and Fig. 4 is a top plan view of the pulverizer.

The pulverizer, which I have illustrated has a standard 10, in which a shaft 11 is journalled. A hopper 12 is attached to the standard by securing members 13, and has a recess 14 for receiving one end of the shaft 11. The material to be pulverized is fed into the hopper and is caused to flow in the direction indicated by the arrows by a worm 15 that is rigidly connected to the shaft 11. The material is pulverized by being forced to flow between two grinding members, such as discs 16 and 17, which are preferably rotated in opposite directions; one of the discs 17 being directly connected to the shaft through a collar 18 and the other being rigidly connected to a sleeve 19 which is freely movable on the shaft 11.

The shaft 11 may be rotated by means of a sprocket wheel 20 which is keyed to the shaft and which is connected by a chain 21 to a sprocket pinion 22 on a motor shaft 23. The motor shaft has also rigidly fixed to it a pinion 24 which meshes with a gear 25 that is fixed to the sleeve 19. Thus, the motor by rotating in one direction causes rotation of the sprocket wheel 20 in the same direction, and causes rotation of the sleeve in the opposite direction. As the wheel 20 drives the disc 17, and the gear 25 drives the disc 16, it is apparent that the two discs are caused to be rotated in opposite directions. The relation between the speed of the discs may be varied by varying the relationship between the gears on the motor shaft and sleeve 19 respectively. For example, I have shown a two step gearing which comprises the gear 25 and a pinion 26 which may be driven by a pinion 24 and a gear 27 respectively, on the motor shaft. It is to be understood that when the pinion 24 is used, the gear 27 is removed from the motor shaft. On the other hand when the gear 27 is used, then the pinion 24 is removed from the motor shaft.

To connect the disc 16 to the sleeve 19, I have shown the sleeve, as having lugs 30 which project laterally toward the hopper from a flange 50 that extends radially from the sleeve adjacent the hopper end thereof. These lugs fit into correspondingly shaped openings 31 in the disc 16, as is shown in Fig. 2, and thus provide a driving connection between the sleeve and disc. Similarly the collar 18 has lugs 32 which fit into correspondingly shaped recesses in the disc 17 and which operate to provide a connection between the disc and collar. The collar has radially extending arms 33 between which are passageways 35 through which the material may flow from the hopper; similarly, the disc 17 has a hollow central portion which provides a passage 36 for conducting material from the passageway 35 into the space between the discs.

The pulverizing action is accomplished partly by means of ribs that are positioned on the contiguous faces of the discs, and partly by the radial surfaces adjacent the periphery. To this end, the disc 16 is illustrated as having ribs 40 and the disc 17 is shown as having ribs 41. Preferably the ribs extend obliquely on the face of the disc with leading edges insofar as the direction of rotation is concerned on the ends adjacent the axis of the shaft. The spaces between the ribs provide pockets into which the material is collected so as to facilitate utilization of the entire edges of the ribs for grinding purposes.

The ribs serve to break up the large particles of material before it is fed between the flat grinding surfaces which are disposed adjacent the periphery of each disc. The latter grinding surfaces are shown, as comprising flat smooth surfaces that are annular in shape and that extend inwardly a considerable distance from the marginal edges; in fact, they extend inwardly substantially one-half of the distance between the inner and outer diameters of the disc. In this way, I obtain a grinding action, when applied to coal, that will grind it so fine it will pass through a 200 mesh sieve. For purposes of economy in manufacture, the discs are interchangeable.

For this purpose the faces of the disc on which the ribs are located are frustro-conical in shape with the faces adjacent each other hollowed out so that the two faces cooperate to provide passageways along which the material is fed, as it passes outwardly and radially between the discs.

To avoid the formation of grooves in the discs by the moving material, I mount each disc eccentrically upon the supporting lugs. The slight degree of eccentricity also aids in obtaining a more finely ground product.

From the foregoing description, it will be apparent that my invention has resulted in a more compact machine that may be economically operated and that will pulverize coal to an extremely fine degree.

I claim:

1. In a pulverizing machine, a housing made in two parts detachably secured together and having oppositely facing recesses respectively containing relatively eccentric grinding elements having annular face surfaces which are held in operative contact by the end wall surfaces of the recesses, separate driving means for said elements extending from one housing part and connected with respective elements, the other housing part having a hopper formed therein with a circular opening which forms an effective support for one of the grinding elements, the latter element having a through passage which admits material from the hopper, through said circular opening, to a position enabling the material to be ground by said annular face surfaces of the said elements.

2. A pulverizer, comprising in combination a frame having spaced, upright members thereon, one member being relatively enlarged and circularly recessed to form part of a housing for a grinding disc, a hollow body having a hopper chamber formed therein, said body having a circular recess facing the circular recess of said enlarged portion of the frame in a manner to complete said housing, means to secure said body to the frame, a shaft journalled in one of said upright members and extending into the housing, a sleeve journalled in the other upright member, surrounding the shaft and partially supporting it, separate driving members attached to the shaft and sleeve respectively, and located in the space between said upright members, a pair of driving discs on said sleeve and shaft respectively, said discs being radially supported by the members which form the housing, one driving disc being apertured to afford communication between the hopper chamber and said grinding disc housing, and a pair of grinding members drivingly coupled with respective discs, one of the grinding members having a central opening in operative alignment with the opening in said driving disc.

HENRY D. ANDERSON.