June 12, 1923. 1,458,486

C. A. KLOMAN

PULVERIZER

Original Filed June 25, 1919

FIG. 1

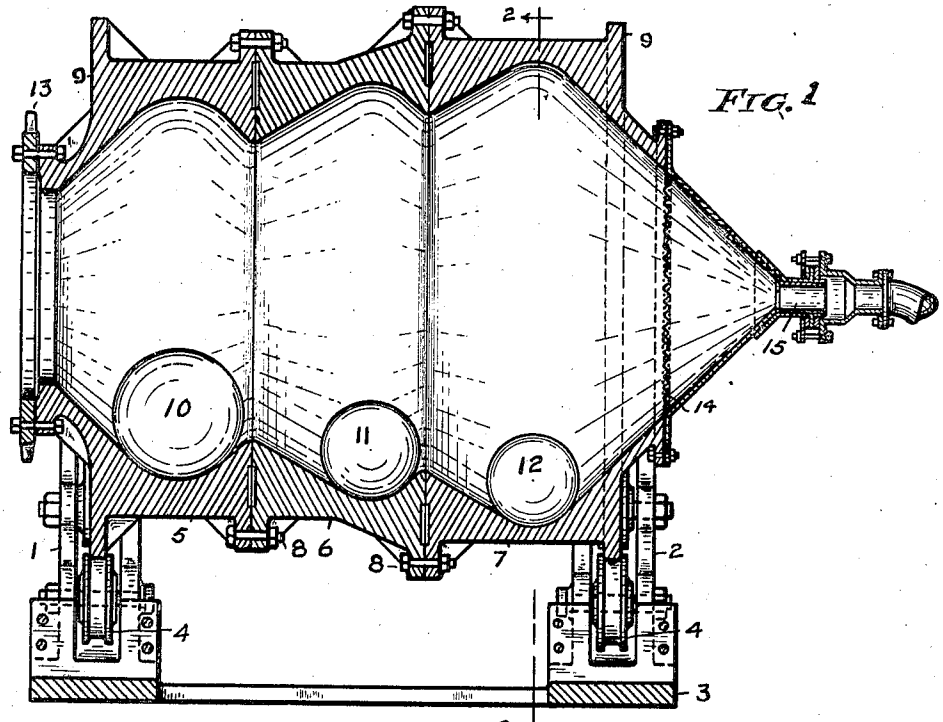
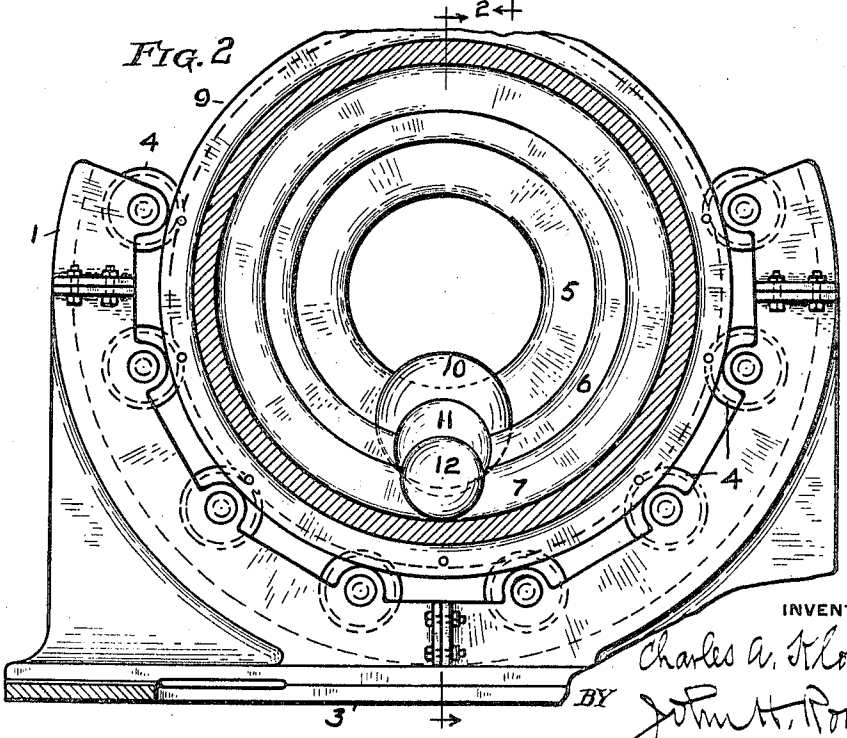


FIG. 2



INVENTOR.

Charles A. Kloman

BY John H. Poney

ATTORNEY

Patented June 12, 1923. 1,458,486

UNITED STATES PATENT OFFICE.

CHARLES A. KLOMAN, OF BELLEVUE, PENNSYLVANIA.

PULVERIZER.

Original application filed June 25, 1919, Serial No. 306,612. Divided and this application filed March 1, 1922. Serial No. 540,151.

To all whom it may concern:

Be it known that I, CHARLES A. KLOMAN, a citizen of the United States, residing at Bellevue, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pulverizers, of which improvement the following is a specification.

My invention relates to improvements in devices for pulverizing ore, coal and like material, which had preferably previously been reduced to a comparatively fine condition by the action of a crusher, being a division of application No. 306,612, filed June 25th, 1919.

One of the principal objects of the invention is to produce a device to pulverize coal, in the use of which the liability to ignite the fine dust by the friction of the pulverizing surfaces is avoided or reduced to a minimum. Another object is to produce a device adapted to pulverize the material in gradually increasing degrees of fineness. I accomplish this object by means of the device hereinafter described, reference being had to the accompanying drawings, forming part hereof, in which—

Fig. 1 is a central, longitudinal section of the pulverizer;

Fig. 2 is a transverse section on line 2—2 of Fig. 1.

Referring to said drawings, 1, 2, are housings mounted on the bed plate, 3, which may be secured to any suitable foundation, not shown, in any suitable manner. The said housings are arranged at each end of the pulverizer and consist of a number of segmental sections, bolted or otherwise suitably secured together, in which series of rollers, 4, are suitably journalled. The said segments, when assembled as shown in the drawings, conform to the configuration of the end sections of the pulverizer and support said end sections upon the rollers, so that the said pulverizer may, when driven by any suitable power, be rotated, as hereinafter set forth. The said pulverizer comprises a series of rings, 5, 6, 7, bolted together by means of bolts, 8, so as to form an integral tightly closed shell. The end sections or rings, 5 and 7, are provided with an annular flange, 9, which is seated upon the rollers, *a*, journalled in said housings. The said pulverizer, however, may be preferably formed of an integral casting instead of, as shown, in several parts. The interior of said pulverizer comprises several compartments of varying diameters, which constitute races in which heavy metal balls, 10, 11 and 12, of varying diameters and weighted are located and are adapted to revolve for the purpose of pulverizing the material fed into said pulverizer.

It will be noted that the entrance end of said pulverizer, *i. e.*, the end to the left of the sheet of drawings, is of much less diameter than the compartment immediately adjacent thereto and that the ball 10 seated therein is of much greater diameter and of greater weight than the balls seated in the remaining compartments, the variation in diameter of said compartments or sectors producing a variation in the speed at which said balls travel in said sectors. The last and smallest ball rotates at a greater speed than the intermediate ball, for the purpose of finally reducing the comminuted fuel to the greatest degree of fineness. The pulverizing process comprises the three steps or phases in which the reduction of the material from fine material to still finer material, and finally to the finest, is accomplished by the impact of the balls upon the material, and in such manner that little or no friction is created between the balls and the surfaces over which they rotate, thus avoiding the liability of igniting the fine dust by the friction of the pulverizing surfaces. These several steps or phases in the reduction of the material from coarse to the finest condition are greatly facilitated by the peculiar construction of the races or ways in which the various balls travel, for instance, the configuration of the race in which the largest or breaking ball 10 travels. It will be noted that both sides are symmetrically curved, compelling the said ball to travel in a direct orbit, whereas in the races or ways in which the smaller balls 11 and 12 travel, the outer sides are projected on a different curvature than the inner sides, causing the said balls 11 and 12 to travel farther up the outer sides than the inner sides and with a swirling movement, the effect of which being to more effectually reduce the material.

The said pulverizer is rotated by means of a chain or other suitably driven element, operated over the sprocket, 13, which is bolted to one end of said pulverizer, the said sprocket being driven from any power source

not shown. A screen, 14, is preferably secured at the discharge end of the pulverizer, for the purpose of preventing, by any possibility, the passing of anything but the finest material from said pulverizer to the discharge pipe, 15, which is connected to the discharge end of said pulverizer. The said screen may be of 200 mesh at least and the said conduit may be connected to said pulverizer in such manner that said pulverizer may be rotated thereabout without endangering the permanency of the connection. The said conduit may also be provided with a non-return check valve.

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

A pulverizer comprising a shell mounted for rotation about an axis, means for rotating the shell, the shell being open from end to end and completely closed circumferentially along its sides, the shell being provided at its interior with a series of annular raceways disposed transversely of the axis of the shell, the raceways increasing in diameter from the inlet end of the shell toward the exit thereof, each raceway having a transverse arcuate intermediate wall surface and synclined side wall surfaces, the said side wall surfaces which are disposed toward the inlet opening of the casing and of the initial and intermediate raceways being of greater area and greater transverse breadth than the said side wall surfaces which are disposed toward the exit end of the casing, the side wall surface of the final raceway which is disposed toward the exit opening of the casing being of greater area and transverse breadth than the side wall surface thereof which is disposed toward the inlet opening of the casing, the edges of the side wall surfaces of the adjacent raceways merging with each other at angles to each other, the radius lengths of the arcuate surfaces of the raceways increasing from the initial to the final raceway and a ball loosely resting in each raceway, the length of the radius of each ball corresponding with the length of the radius of the arcuate surface of its respective retaining raceway.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES A. KLOMAN.

In the presence of—

JOHN H. RONEY,

CLARENCE A. WILLIAMS.