O. KUTSCHE.

COMMINUTING MACHINE.

APPLICATION FILED SEPT. 12, 1918. RENEWED JULY 7, 1919.

1,332,220. Patented Mar. 2, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

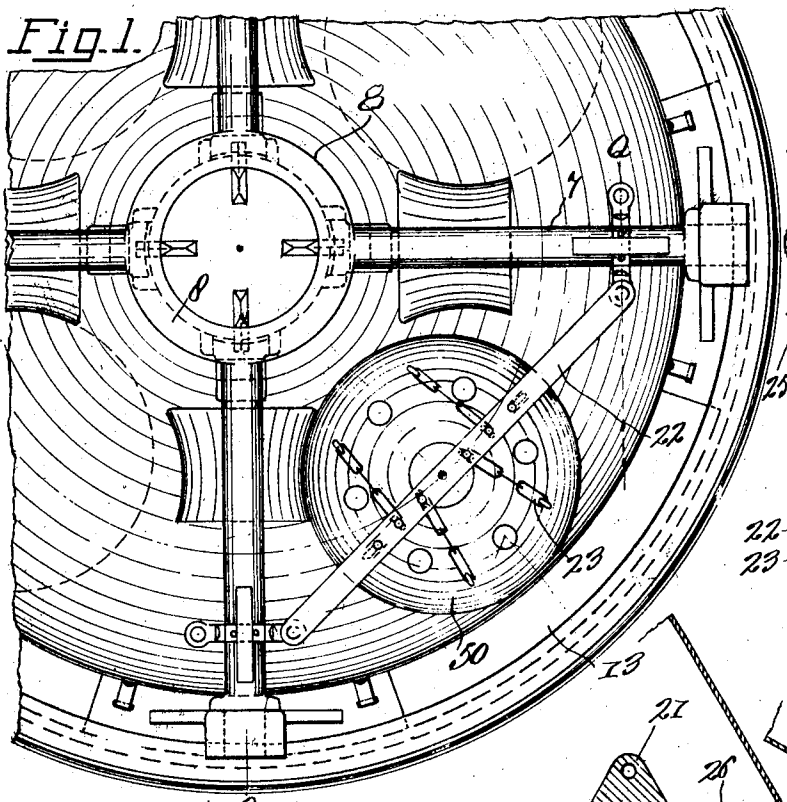
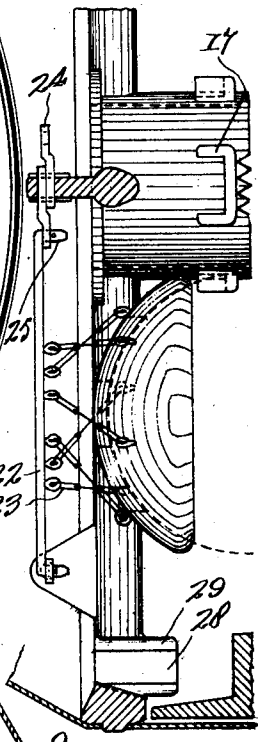


Fig. 3.



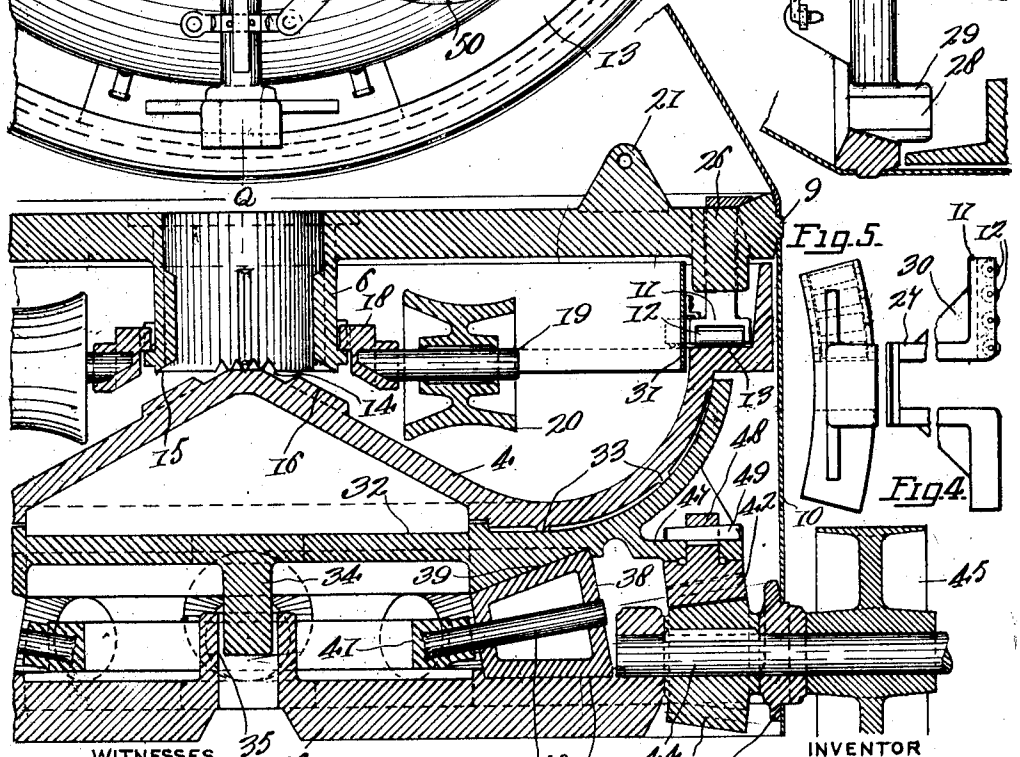


Fig. 5.

Fig. 4.

Fig. 2.

WITNESSES

Chas. C. Tetley.

Edwin J. Beller.

INVENTOR

OSWALD KUTSCHE.

by Edwin C. Stauffer

Attorney.

O. KUTSCHE.

COMMINUTING MACHINE.

APPLICATION FILED SEPT. 12, 1918. RENEWED JULY 7, 1919.

1,332,220.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 2.

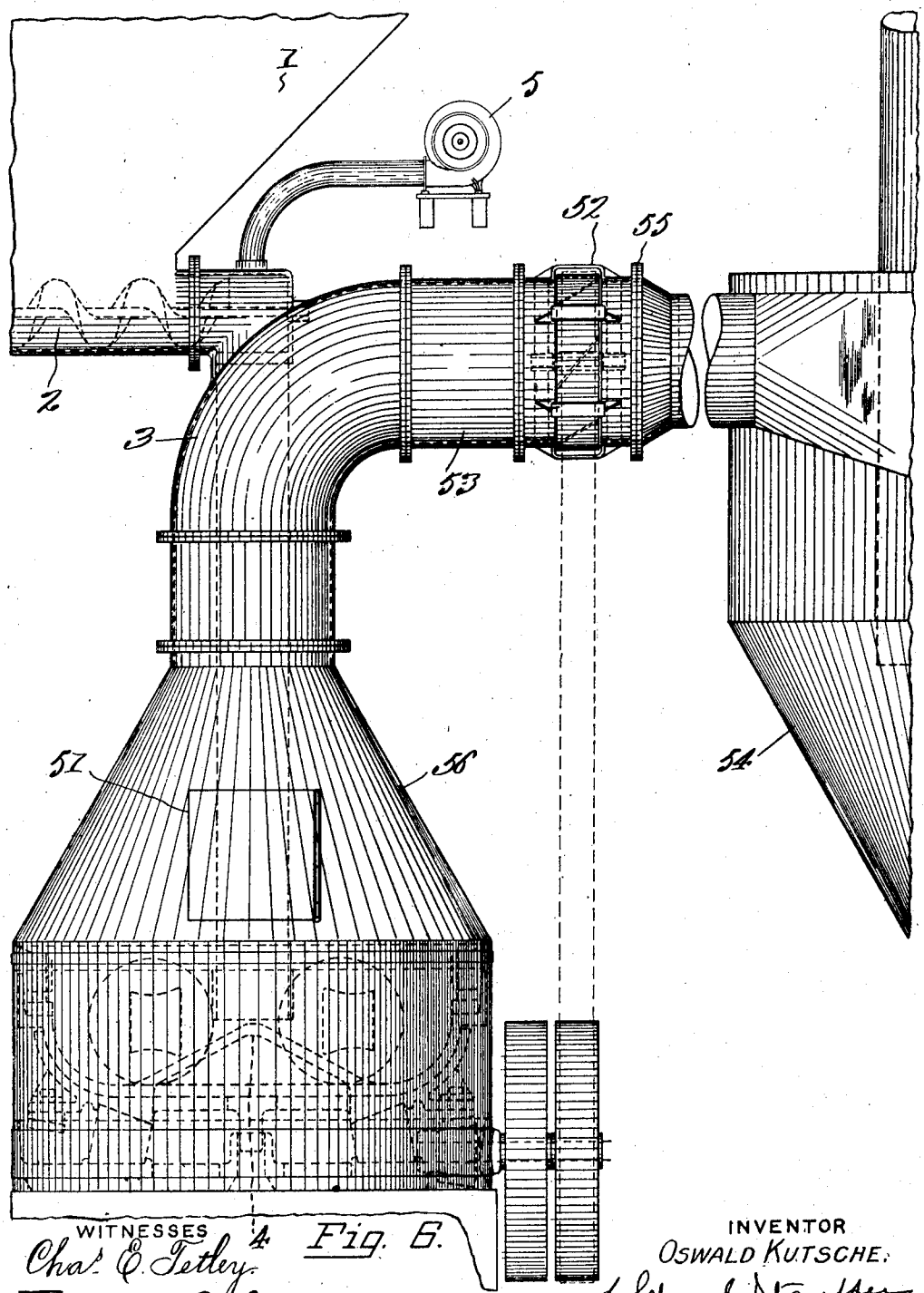


Fig. 6.

WITNESSES

Chas. E. Tetley.

Edwin J. Belker.

INVENTOR

OSWALD KUTSCHE.

by Chas. C. Stauffer

Attorney.

UNITED STATES PATENT OFFICE.

OSWALD KUTSCHE, OF PITTSBURGH, PENNSYLVANIA.

COMMINUTING-MACHINE.

1,332,220. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed September 12, 1918, Serial No. 253.721. Renewed July 7, 1919. Serial No. 309.180.

To all whom it may concern:

Be it known that I, OSWALD KUTSCHE, a citizen of the United States, residing at Pittsburgh, county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Comminuting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to apparatus for effecting the comminution of various substances to a uniform degree and to the fineness, if necessary, of an impalpable powder.

My present invention is an improvement upon that disclosed in my application Serial No. 245,587, filed July 18, 1918, and like the device in that application, is intended to effect, and does effect complete pulverization of all the particles to a uniform degree of fineness. This effect I produce by causing the separation or return of any not completely ground particles, automatically, to be reground or repulverized.

My machine is intended particularly for the comminution of coal, ores of all kinds and paint bases, cement, grits for abrasives, grains, bone, and in fact for general fine grinding purposes.

My apparatus is intended to obviate the necessity of employing screens, and to produce a product of a degree of fineness sufficient to meet industrial requirements in any art.

In the drawings:

Figure 1 is a plan view of my apparatus;

Fig. 2 is a vertical sectional view of a part thereof;

Fig. 3 is a sectional view on the line Q—Q of Fig. 1, looking toward the left;

Fig. 4 is a side view, and Fig. 5 a top view of one of the shoes used to support certain rollers; and

Fig. 6 is a general perspective showing my apparatus.

In the drawings I provide a hopper 1, in which the material to be pulverized is supplied as needed; from this hopper, by means of the conveyer 2, the material is fed forward to the right, in Fig. 6, until it is over the chute 3 down which it drops to the distributing cone 4, it being aided in its dropping by the blast from the fan 5. When it strikes the cone 4 it has passed through the mouth-piece 6, Fig. 2, which forms the terminus of the chute 3, and which mouth-piece 6 is itself supported by the arms 7 united to the ring 8 upon which the mouth-piece 6 is supported or attached in any suitable way.

These arms 7 constitute a spider or support, the outer end of each of which at 9 is secured to the shell 10 of sheet iron or galvanized iron, which incloses the whole apparatus. At the outer end of each of said arms I provide a shoe 11 with which the said arm engages, and this shoe, which is provided with the rollers 12, is arranged in each case to rest upon a track 13.

The lower part of the mouth-piece 6 is provided with teeth 14 and 15 which coact with the other teeth 16 to crush or reduce any of the larger lumps. Supported in stirrups 17 upon the mouth-piece, are brackets 18 carrying shafts 19. The brackets are connected together as seen on Fig. 2 so as to form a ring or hub. Upon each of these shafts is arranged a roller 20.

On the upper side and toward the outer end of each arm 7, I arrange a bracket 21, and to connect these brackets I use the links 22, of which there would be four, and from each of these links I suspend the scraping chains 23 to be alluded to later. These links are removable with the chains thereon, as shown in Fig. 3, the link being secured to the arms by the intermediate eye links 24, said links being kept in place by the pins 25, as shown in Fig. 3.

It will be noted that the arms 7 are connected by a tire or rim 26 extending throughout the circumference of the mill. The projections 9 are as numerous as may be found necessary to give assured support. The shoe 11, it will be noted, is provided with the upwardly projecting arms 27 which engage in grooves 28 formed in the heads or projections 29 at the end of the said arm 7. There is thus permitted a sliding motion between these two parts.

The arms 27 are strengthened with reference to the main body of the shoe 11 by the brackets 30, and when the parts are assembled the shoe 11 travels upon the track 13 by means of the rollers. The main support of this part of the mill is obtained from the engagement of the projections 9, which in fact might be any suitable fastenings with the shell 10.

The parts thus far described constitute

the stationary members of my grinding device.

I provide a movable member for my mill, this movable member consisting of the cone part 4 provided with teeth 16, the track 13, and the dust guard 31 shown in Fig. 2. The movable member is made, as indeed are most of the parts of my mill, of cast iron, and the mill is easily assembled and the parts easily replaceable if any become worn by the action of the grit of the material being ground. This movable member or casting rests upon a corresponding shell 32 by means of certain bosses or projections 33 whereby an accurate fit may be obtained. The cone part of the mill serves to aid in the distribution of the material to be ground by spreading it downward under the crushing elements to be referred to later.

The part or shell 32 is provided with a separate projection or boss 34 which fits into a base socket 35 and keeps the mill centered. This base socket 35 is on the base 36 which is secured in fixed position in any desired manner, and is provided with a track 37, rollers 38 being provided between the fixed base 36 and the shell 32 previously referred to which has a corresponding inclined track 39 to engage the said rollers 38. These rollers are carried each upon a shaft 40, and these shafts are mounted in a ring 41 as shown, the ring being cast upon the shafts in a manner well known.

I provide the shell 32 with a driving gear track 42 which engages a beveled pinion 43, the track being also correspondingly beveled. The pinion 43 is keyed to the shaft 44, upon which shaft is the driving pulley 45 projecting outside the casing 10. I provide a dust guard 46 to prevent the escape of dust, the opening for the shaft 44 being practically the only opening in the shell. The track 42 is removable and replaceable. This track is made to engage a circular bracket or projection 47 which is provided with certain apertures through which projections from the gear track project, and to which such projections are keyed by cotter pins 49.

It will be obvious that as this element is rotated it will carry the material beneath the fixed upper part of the mill.

As crushing elements I provide a series of heavy balls 50, which balls are held in fixed angular position by means of the rollers 20 heretofore described. The contour of said rollers 20 is such as to adapt them to the exterior of the balls. The base or lower chamber of the mill, where the balls are held conforms substantially to the shape of the balls, though this need not be exact. The scraping chains 23 engage these balls.

I provide a door 51 in the upper part of my cone-shaped hood or casing, as shown in Fig. 6. I also provide an exhaust fan 52, indicated in the same figure, for aiding in drawing off the ground material.

I aim in this case to have the air pressure induced or occasioned by the fan 5 in excess of the air pressure induced by the fan 52. It will be noted that the size of the conduits is arranged accordingly. The diminution of pressure has a tendency to permit the deposition of the ground particles and the carrying off by the gentle draft of the pipe 53 of only the most completely reduced material, and this is carried to the collector 54 where it is collected by means not forming a part of the present application.

It will be noted that I have made the parts in section, as indicated at 55. I have also simplified my construction, made the parts massive, all of cast material, the wearing surfaces being easily replaceable and renewable. For instance, the rotating base of the mill may be easily replaced as indicated, and so may the mouth-piece of the conduit; also the rollers and balls may be easily removed and replaced by simply removing the sloping hood 56, whereupon the whole machinery can be got at.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. In an apparatus of the character described, in combination, a rotating shell, a lower chamber carried by said shell, a gear track carried by said shell, a gear engaging said gear track to rotate said shell, grinding balls adapted to crush material in said lower chamber, means for keeping said balls in position, a fixed upper element upon which said ball position keeping means is mounted, and a dust proof shell inclosing the whole and forming a support for said fixed upper element.

2. In an apparatus of the character described, in combination, a rotating shell, a lower chamber carried by said shell, a track on the outer periphery of said shell, grinding balls, said chamber being contoured substantially to the grinding balls, restraining rollers for said balls, shafts for said rollers, shoes traveling upon said track, and supports for the roller shafts upon said shoes.

3. In a device of the character described, in combination, a rotating base, a fixed upper part, crushing balls, restraining rollers axially arranged, shafts for said rollers, brackets for said shafts, a stirrup upon a fixed part to support the inner end of each of said shafts, and a shoe for the support of the outer end of each of said shafts, said shoes being slidingly carried by the rotating member.

4. In a device of the character described, in combination, a rotating base, a fixed top, a track on the base, shoes carried by the

track, arms projecting from said shoes upwardly and engaging the fixed top, crushing elements between the rotating base and the fixed top, and means supported by said shoes for keeping the crushing elements with respect to the rotating base.

5. In a device of the character described, in combination, a rotating base, a fixed top part, a conduit fixed centerwise, means for introducing material to be ground through said conduit, a removable mouth-piece forming the end of said conduit, supported by said top part, stirrups on said mouth-piece, crushing balls between the movable and fixed parts, retaining rollers for said balls, and shafts for said rollers, and a bracket on each end of each of said shafts, the inner bracket in each instance resting within one of said stirrups.

6. In a device of the character described, in combination, a rotating base, a fixed upper part, a casing, means whereby said upper part is made to engage said casing and be supported thereby, a track on said lower part, a removable central supply mouth-piece on said upper part, crushing balls, restraining rollers for said balls, and shafts for said rollers, said shafts being supported at one end by said mouth-piece and at the other end by said track.

7. In an apparatus for comminuting material, in combination, a rotating shell, a lower chamber carried thereby, a track on said shell, grinding balls, restraining devices for said balls, and means partly supported on said track and moving in relation to said track for keeping the said balls stationary while the chamber rotates under said restraining balls.

8. In an apparatus of the character described, in combination, a rotating shell, a chamber carried by said shell, grinding balls in said chamber, a device for keeping said balls stationary, and means for supporting said device at the axis of rotation and upon the outer edge of the drum.

9. In a comminuting device, in combination, a rotating chamber, balls for said chamber, means to hold said balls in fixed angular position while the chamber rotates beneath the balls, and a device for supporting said restraining means at the center of rotation and at some other point.

In testimony whereof I affix my signature.

OSWALD KUTSCHE.