A. GILLESPIE.

CRUSHER AND PULVERIZER.

APPLICATION FILED OCT. 28, 1921.

1,420,031. Patented June 20, 1922.

Fig. 2.

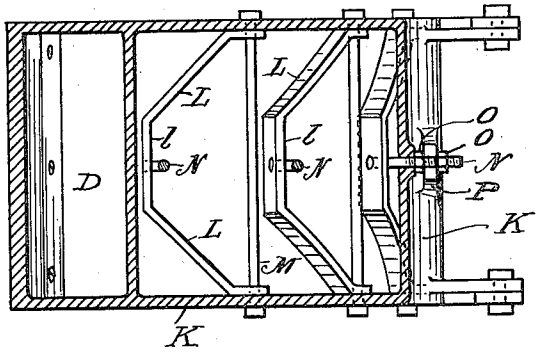
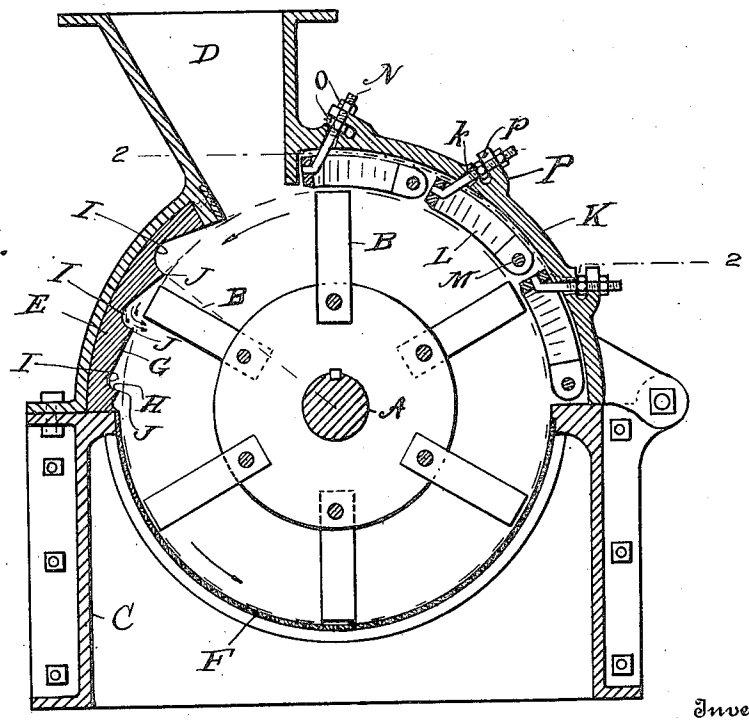


Fig. 1.



Inventor

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UNITED STATES PATENT OFFICE.

ALEXANDER GILLESPIE, OF PITTSFIELD, ILLINOIS, ASSIGNOR TO WILLIAMS PATENT CRUSHER & PULVERIZER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

CRUSHER AND PULVERIZER.

1,420,031. Specification of Letters Patent. Patented June 20, 1922.

Application filed October 28, 1921. Serial No. 511,183.

To all whom it may concern:

Be it known that I, ALEXANDER GILLESPIE, a subject of Great Britain, residing at Pittsfield, in the county of Pike and State of Illinois, have invented certain new and useful Improvements in Crushers and Pulverizers, of which the following is a specification.

This invention relates to certain new and useful improvements in crushes and pulverizers, the peculiarities of which will be hereinafter fully described and claimed.

The main object of my invention is to provide a preliminary grinding plate or breaker plate with a series of cove serrations of such form that the material passing from the hopper into the grinding chamber and meeting the hammers of the rotor mounted in said chamber, will be guided successively from a path tangential to the hammer circle into a path radial to the rotor, and thus transverse to the hammer circle or path of the hammers, so that the material thus diverted successively across the path of the hammers, will be effectively reduced on the inner edges of the coves as the hammers operate past said edges; secondly, to make the cove serrations of such shape that the material will tend to clear itself from the coves and pass into and out of the serrations; thirdly, to deflect the material from the sides of the rotor chamber toward the center; and fourthly, to effect a shear cutting action on the material while being thus deflected away from the sides of the rotor chamber.

In the accompanying drawing on which like reference letters indicate corresponding parts, Fig. 1 represents a vertical sectional elevation across the shaft in a machine exemplifying my invention; and Fig. 2, a plan view on a sectional plane 2—2 of Fig. 1.

The letter A designates a rotor shaft and B hammers, preferably pivoted and carried by said shaft on discs or other suitable hammer mounts. A suitable casing C, has a hopper D for delivery of material into the rotor chamber for reduction on a breaker plate E and a suitable cage F mounted in said casing. The breaker plate is provided on its inner face with a series of substantially horizontal serrations or coves, each of which has a plane surface G, substantially at a tangent to the circle of the outer ends of the hammers B, as indicated in Fig. 1 by a broken line, and a plane surface H that is substantially radial to the rotor shaft at the end nearest to the hammer circle. These surfaces G and H are connected by a curved plane surface I intermediately located and forming a deflecting surface to guide the material from a tangential path as driven by the hammers, into a radial path as it leaves each cove. The material thus crosses the hammer circle and path of the hammers as indicated in Fig. 1, and is reduced by a shearing action between the hammers and the sharp edge of each cove formed by the intersection J of the inner end of radial surface H with the inner end of the next adjacent tangent surface G.

It is preferred to make the depth of these coves gradually less in the direction of rotation of the rotor indicated by arrows, so that the upper cove is deeper than the next lower cove and so on successively. The material is thus driven off at a tangent by the hammers into the coves where it is deflected by the blended surfaces G I and H before mentioned, and guided into a radial direction and so delivered to the operating hammers and successively reduced on the cutting edges J of the intersecting surfaces above described.

This method of reduction takes the comparatively coarse particles of material received from the hopper and the hammers drive them off in a tangent to the rotary movement of the hammers, so that they glide over the substantially parallel tangent surface G of the first cove and are then guided by the curved surface I that deflects them inward upon the substantially radial surface H. As said particles pass inward and leave the cutting edge J they are traveling with practically the same initial velocity with which they left the hammers in their tangential flight, and they are met by the rapidly rotating pivoted hammers, and are subject to the resultant of the forces due to their speed and the speed of the hammers. Some of the particles are hit by the hammers just after leaving the cutting edges J of the coves and thus in the air, but other particles are caught and reduced between the cutting edges of the coves and the hammers passing said cutting edges as above described.

It has been found by actual operation that such a cove breaker plate allows the operation of the rotor with less power and with greater grinding effect, than other forms of serrations; and that the capacity is likewise greatly increased,—in fact substantially doubled over that previously obtained. It is believed that this is due to the cover serrations above described which allows of the material clearing itself from the coves and being repeatedly diverted radially into the path of the hammers as above described. The material more or less reduced, passes the breaker plate and is further reduced upon the cage F, and the particles not fine enough to pass through the openings in the cage, are carried around by the hammers. The material has a tendency to collect at the sides of the casing and I therefore provide baffles in the cover K that is formed on a larger radius so as to provide a recess as shown in Fig. 1, for said baffles. These baffles each consists preferably of a rectangular bar, the ends of which are inclined rearward in the direction of rotation and inward towards the middle portion, *l* connecting the ends forming a U-shape as shown in Fig. 2. The inclined ends L are likewise curved concentric to the shaft A so that the bottom edges lie closely adjacent to the hammer circle as shown in Fig 1. This lower edge is also preferably beveled outward to form a cutting edge in connection with the hammers operating close thereto, and thus a shear cut is given to the material while it is deflected from the sides of the casing. It is preferred to make these baffles adjustable, preferably by pivoting the ends on a pivot rod M, or otherwise, and adjusting the opposite end or middle portion *l* toward or away from the hammer circle by suitable adjusting means. This adjustment of the pivoted baffles is preferably by means of a threaded bolt N engaged at one end to the baffle at the center, and passing out through holes *k* in the cover as shown in Fig. 1. Nuts O are carried by the threaded bolts and adapted to engage on opposite faces of the cover K,—such as those provided by inclined lugs P, adjacent to the holes *k* having slots *p* in which the bolts are inserted. These lugs are inclined as shown so as to be nearly radial with the pivot bolt M and therefore nearly at right angles to the adjusting bolt N in each case, and the hole *k* is large enough to allow of the inward adjustment of the baffle to vary the distance of the cutting edge from the hammer circle as above described.

I claim:

1. In a machine of the character described, the combination of pivoted hammers with a breaker plate, said breaker plate being formed with a cove having a leading surface tangential the path of the hammers and a surface radial the path of the hammers, said surfaces being connected by a concave surface and said radial surface terminating in a cutting edge closely adjacent the path of the hammers to produce a shearing effect therewith.

2. In a machine of the character described, the combination of pivoted hammers with a breaker plate, said breaker plate comprising a plurality of coves, each cove having a leading surface tangential the path of the hammers and a surface radial the path of the breakers, said surfaces of each cove being connected by a concave surface and the radially disposed surface of each cove intersecting the tangentially disposed surface of the next adjacent cove to form a cutting edge closely adjacent the path of the hammers, to produce a shearing effect therewith.

3. In a machine of the character described, the combination of pivoted hammers with a breaker plate, said breaker plate comprising a plurality of coves of graduated size diminishing in the direction of rotation of the hammers, each cove having a leading surface tangential the path of the hammers and a surface radial the path of the breakers, said surfaces of each cove being connected by a concave surface and a radially disposed surface of each cove intersecting the tangentially disposed surface of the next adjacent cove to form a cutting edge closely adjacent the path of the hammers, to produce a shearing effect therewith.

4. A machine of the character described comprising a casing, a rotor shaft provided with hammers mounted in said casing, and baffle plates mounted in said casing adjacent to the hammer circle of said rotor and consisting of bars each having ends inclined circumferentially towards the middle in the direction of rotation for deflecting the material away from the sides of the casing.

5. A machine of the character described comprising a casing, a rotor having hammers mounted in said casing, a series of baffles mounted in the casing adjacent to the path of the hammers and each consisting of a bar the ends of which are inclined circumferentially towards the middle and curved radially according to the hammer circle,—the inner face of each bar being beveled outward forming a shearing cutting edge adjacent to the path of the hammers.

6. A machine of the character described comprising a casing having a recessed cover, a rotor having hammers mounted in the casing, a series of adjustable baffles each consisting of a bar pivoted by its ends in said recess and circumferentially inclined forward towards the middle, and having cutting edges adjacent to the path of the hammer, and threaded bolts engaging said bars and passing outward through said cover and provided with nuts adapted to bear on op-

posite faces of the cover for maintaining the adjustment of said baffles with regard to the hammers.

7. A machine of the character described comprising a casing cover, a series of adjustable U-shaped flat bar baffles pivoted in said cover and having holes in the flat sides between the pivots, hook bolts engaging said holes by the hook ends and passing outside said cover, and means for maintaining the adjustment of the baffles engaged by the hook end of the said bolts.

8. A machine of the character described comprising a casing having a recessed cover, a rotor having hammers operable past said cover recess, an adjustable bar bent to a U-shape and pivotally mounted in the cove recess by its front ends that are curved concentric with the rotor forming shearing deflecting surfaces, and means to adjust said bar on its pivots with regard to the hammers, substantially as described.

9. A machine of the character described comprising a casing, a rotor provided with hammers mounted in said casing, adjustable U-shaped baffle plates pivotally mounted in said casing adjacent to the hammer circle of said rotor,—and means to adjust said baffle plates.

In testimony whereof I have affixed my signature.

ALEXANDER GILLESPIE.