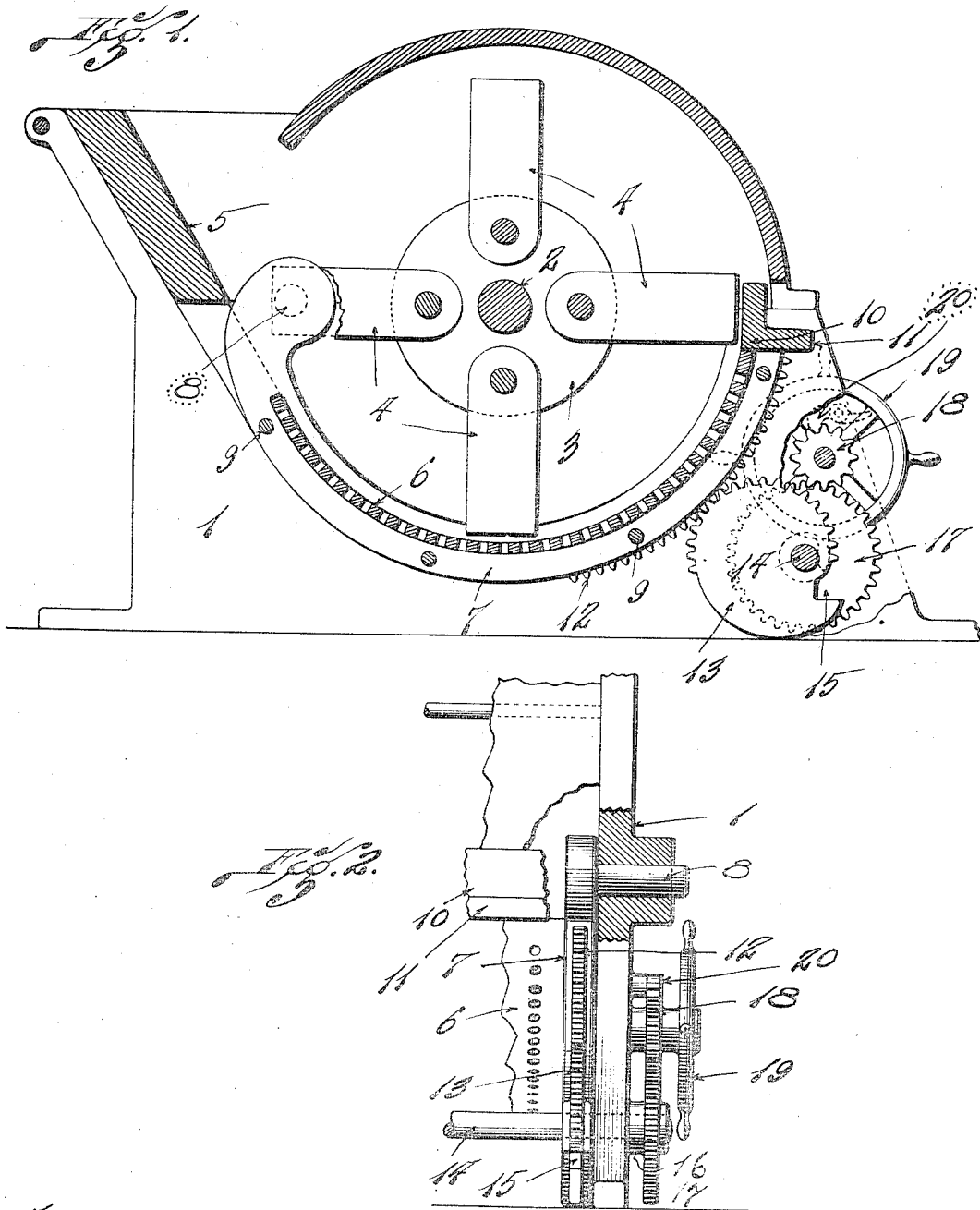


M. J. WILLIAMS.
CRUSHER OR PULVERIZER.
APPLICATION FILED MAY 20, 1911.

1,030,956.

Patented July 2, 1912.



WITNESSES.
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CRUSHER OR PULVERIZER.

1,030,956.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MILTON J. WILLIAMS, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Crushers or Pulverizers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section through my improved crusher and pulverizer. Fig. 2 is a transverse sectional view through one of the trunnions of the pivoted cage.

This invention relates to a new and useful improvement in crushers and pulverizers the object being to provide the same with a pivot cage which may be adjusted for the purpose of taking up wear on the ends of the hammers or beaters, and which cage may also be lowered in the event of a choke in the machine to relieve the machine of such choke. In grinding wet coal, it is found that the coal sometimes lodges in the feed chute which leads to the machine and is suddenly precipitated into the grinding chamber so as to overload the same and cause the machine to stop. In the event of stoppage if the machine is motor-driven, the fuse is likely to be blown out, or if belt-driven, the belt is liable to be broken, or the teeth of the gears stripped, if the machine is gear-driven. Also upon the introduction of foreign uncrushable materials in the machine, it is desirable to lower the cage so as to permit the discharge of such uncrushable particles. These conditions are usually determined by the ear of the operator, who may, upon the happening of any one of these conditions or in anticipation of their occurrence, drop the cage to relieve the machine and thus prevent damage to the machinery and possible injury to the operator.

In the drawings: 1 indicates a side frame which is divided substantially in the horizontal plane of the hammer shaft 2 which shaft carries beater supports 3 upon which are mounted pivoted revoluble beaters 4.

5 is the breaker plate and 6 the grinding surface which may be in the form of cage bars or a perforated metal sheet extending from the lower end of the breaker plate under the beaters or hammers. This grinding cage or surface is mounted between side

frames 7 which are pivotally mounted upon the trunnions 8. These trunnions 8 are preferably journaled in the side frames at the parting line in the horizontal plane of the shaft 2 although the exact location of these trunnions is not important, the location shown in the drawing being desirable as it enables the grinding surface to be readily removed for purposes of repair, by taking off the top portion of the framing or housing. The points at which the side frame 7 are pivoted to the frame 1 are radially nearer the shaft 2 than is the grinding surface 6. This is to permit the portion of the grinding surface adjacent the pivoted end of the frames 7 being moved nearer the hammers 4 when the free ends of the side frames are raised. The pivotal points 8 are also above the lower edge of the breaker plate 5 and the breaker plate is recessed to accommodate the side frames 7 to permit the grinding surface 6 being juxtaposed to the breaker plate. The side frames 7 are connected at suitable points by tie-bolts 9, and the rear end of the cage is preferably braced by a connecting bar 10 having a tooth or projection 11. On the underside of the rear portion of these side frames are gear teeth 12 which mesh with teeth upon an eccentrically mounted gear wheel 13 arranged on a shaft 14. This eccentric wheel 13 is provided with a recess 15 adjacent to a shoulder whereby when the eccentric is released, the cage will drop on its pivot until the tooth 11 enters the recess and prevents further downward movement of the cage. When in this lowered position, the operation of the hammers will cause any overload or uncrushable material in the grinding chamber to be swept over the rear edge of the cage and in this manner relieve the machine. There are two eccentric gear wheels 13, one being on each side of the machine and on the shaft 14 is a pinion 16, conjoined to a gear 17 which latter in turn meshes with a pinion 18 conjoined to a hand wheel 19. A pawl 20 prevents retrograde movement of the pinion 18. When, however, it is desired to lower the cage to relieve the machine, this pawl may be operated to release the pinion when the cage will be permitted to drop. In the event that it is desired to adjust the cage, the hand wheel may be rotated.

It will be observed that the eccentrics 13 are so positioned relative to the shaft 14

that they are not at their point of greatest throw, and in being moved toward such point of greatest throw, the adjustment referred to is attained, such adjustment resulting in moving the cage inwardly toward the striking points of the hammers. Upon reaching the point of greatest throw, the eccentrics will, of course, support the cage as rigid bodies and relieve the pawls 20 of all strain. However, the slight displacement of the eccentrics at the beginning of operations in order to accomplish the adjustment referred to while subjecting the pawls 20 to some strain, is not sufficient to be of any considerable consequence and is usually taken care of by the pawls.

What I claim is:

1. In a machine of the character described, the combination of a grinding cage pivoted at one end and having its pivotal point located radially nearer the axis of rotation of the hammers than the grinding surface of said cage, revolving beaters or hammers cooperating with said grinding cage and means for raising and lowering the free end of said cage, substantially as described.

2. In a machine of the character described, the combination of side frames divided substantially horizontally, a beater shaft journaled in said side frames at the line of parting and a grinding cage having trunnions also journaled in said side frames at said line of parting; said trunnions being located radially nearer the beater shaft than said grinding shaft.

3. In a machine of the character described, the combination of a breaker plate recessed

at its side edges and a grinding cage comprising side frames extending up into said recess and having trunnions journaled in the side frames of the machine above the lower edge of the breaker plate and means for adjusting the free end of said cage, substantially as described.

4. In a machine of the character described, the combination of a pivoted grinding cage, a gear for moving the same into and out of operative position, and means on said gear cooperating with the free edge of said cage for arresting the opening movement of the cage, substantially as described.

5. In a machine of the character described, the combination of a pivoted grinding cage provided with gear teeth, an eccentrically mounted gear wheel meshing with said teeth, and means on said eccentrically mounted gear wheel for cooperating with the free end of the cage to arrest the same in its opening movement, substantially as described.

6. In a device of the class described, a combination of a pivoted grinding cage, a gear mounted upon said cage, a gear wheel meshing with said gear, a projection on said cage, and means on said gear wheel to engage said projection to arrest the pivotal movement of said cage.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this sixteenth day of May, 1911.

MILTON J. WILLIAMS.

Witnesses:

G. L. TOALE,
L. E. WINTER.