

April 8, 1930.

J. P. POLSTER  
ROTARY PIVOTED HAMMER  
Filed March 14, 1928

1,753,473

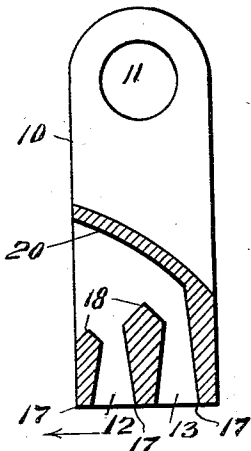


Fig. 6.

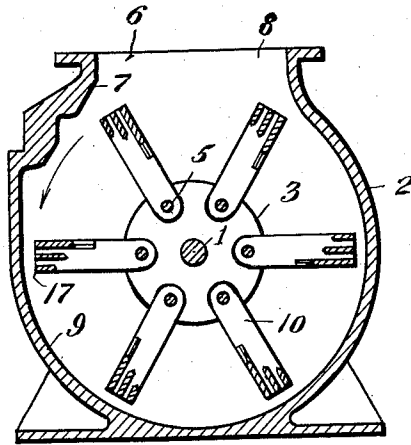


Fig. 1.

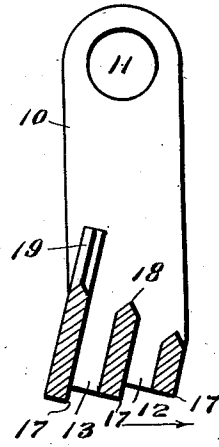


Fig. 5.

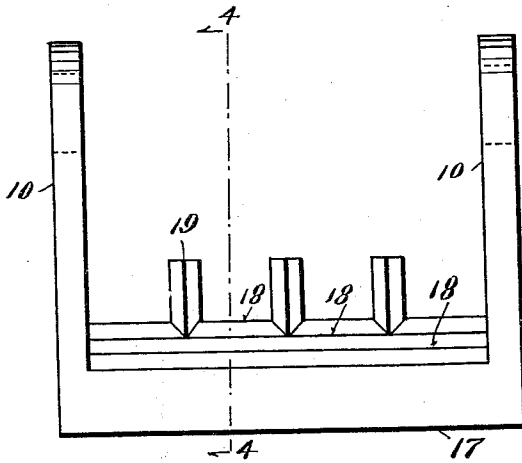


Fig. 2.

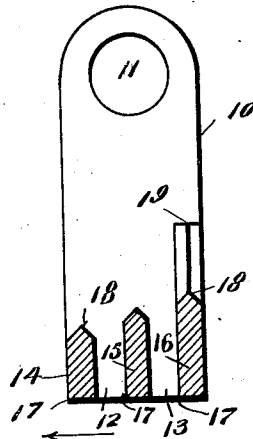


Fig. 4.

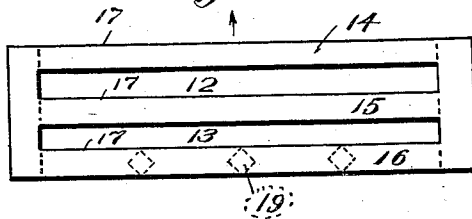


Fig. 3.

INVENTOR  
*John P. Polster,*  
BY *A. M. Plisted,*  
ATTORNEY.

# UNITED STATES PATENT OFFICE

JOHN P. POLSTER, OF ALTON, ILLINOIS, ASSIGNOR TO ILLINOIS STOKER COMPANY, OF ALTON, ILLINOIS, A CORPORATION OF ILLINOIS

## ROTARY PIVOTED HAMMER

Application filed March 14, 1928. Serial No. 261,471.

This invention relates to certain new and useful improvements in rotary pivoted hammers for crushing pulverizers for coal and other suitable material, the peculiarities of which will be hereinafter fully described and claimed.

The main objects of my invention are: first, to provide a rotary pivoted hammer with openings through the bar head of such shape as to allow the material being pulverized to pass outwardly from the central space near the rotor shaft to the annular clearance space between the hammer circle and the arcuate grinding surface where the pulverization is effected; secondly, to assist this outward movement by guiding the material into said openings; thirdly, to macerate or pulverize the material as it seeks said openings under centrifugal force; and fourthly, to further pulverize the material as it flows outward in streams from said openings.

In the usual form of solid cross bar head, the material being ground finds lodgment on the inner face of the head, and centrifugal force tends to cause it to maintain such position analogous to a bucket of water being swung in a circular path,—the water remains in the bucket due to centrifugal force. Should a hole be provided in the bottom of the bucket, the water will pass outward through it with velocity corresponding to the degree of said force due to rotative speed. In the same manner, and for the same purpose, I provide suitable openings in said cross bar head to permit the flow of the rotating material through the head from the inner to the outer face for further pulverizing action. Actual use of this hammer on coal has demonstrated that it affords largely increased capacity over the usual form of solid bar head.

In the accompanying drawing on which like reference numerals indicate corresponding parts,

Fig. 1 represents a crushing pulverizer

with one form of my improved hammer mounted therein;

Fig. 2, a detail front view of such a hammer;

Fig. 3, a similar view of the outer face of the same;

Fig. 4, a cross section on the line 4—4 of Fig. 2;

Fig. 5, a similar view showing openings inclined to the radial position; and

Fig. 6, a similar view showing outwardly diverging openings.

Referring to the drawing, the numeral 1 designates a horizontal rotary shaft suitably mounted in a casing 2, and having discs 3 carrying the same distance from the shaft, hammer rods 5, on which are pivotally mounted stirrup hammers illustrating my invention. The said casing is preferably closed except for an opening at the top adapted for receiving the feed material at one side 6 adjacent to a preliminary breaker plate 7, and the discharge of the pulverized material at the other side 8 or elsewhere, after it has been pulverized between an arcuate grinding plate 9 (smooth or otherwise) and the outer face of said hammers as they rotate in the direction of the arrow.

These hammers have the usual end shanks 10, spaced apart and provided with holes 11 at their inner ends for said rods, and connected at their outer ends by a cross bar head provided with one or more longitudinal or other form of openings 12 and 13 for example, thus dividing the head into multiple bars 14, 15 and 16, that provide cutting edges 17 at their outer edges substantially in the outer circumferential cylindrical plane of the heads to cooperate with said grinding surface 9 and breaker plate 7. These bars are preferably of increasing radial width inward from the outer face—the shorter bar preferably in front as indicated by the arrow, but having its outer cutting edge in the same cylindrical plane and circumferentially in front of the adjacent

cutting edges, so as to facilitate the passage outward through said openings of the partly crushed material carried around by the rotating hammers, and thus subject to centrifugal force causing it to stream outward through said openings towards the arcuate grinding surface. These cutting edges 17 are positioned substantially equally distant from said grinding plate 9 when operating, and each being fed independently by material passing outward through the substantially radial passage in front of it, operates practically simultaneously on their respective streams of material. The inner edges 18 of said bars are preferably beveled sharply angular to form cutting edges, and a plurality of inwardly extending, spaced, tooth-like, angular projections 19 having sharp front and side edges and located on the widest bar, tend to break up further the material impinging thereon as it seeks the said openings.

These openings are substantially radial as shown in all the figures. They have sides parallel as shown in Figs. 4 and 5, and diverging outward in Fig. 6 to facilitate the passage of material therethrough. A longitudinal web 20 near the inner face of the head and inclined from its inner front edge outward rearwardly between the shanks forming a scoop, is located integral with the rear bar (Fig. 6) or otherwise and is thus adapted to deflect and guide the material to said openings as the hammers carry around rotatively the material seeking to leave the central space inside the hammers.

My form of bar head is preferably mounted on two shanks as shown, but may be otherwise supported without departing from the spirit of my invention.

I claim:

1. A stirrup hammer comprising a bar head provided with a longitudinal opening, substantially radial, forming multiple bars, and a longitudinal web inclined rearwardly outward and extending slantingly toward the front forming a scoop adapted to deflect material outward through said opening.

2. A stirrup hammer comprising a bar head provided with a longitudinal opening, substantially radial, forming bars, and a longitudinal web inclined from its inner front edge rearwardly outward and integral with the rear bar forming a scoop adapted to direct the material outwardly through said opening, substantially as and for the purpose described.

3. A stirrup hammer comprising end shanks spaced apart and adapted for pivotal mounting at their inner ends and connected at their outer ends by a bar head,—said head having multiple longitudinal openings, substantially radial and forming multiple bars of different radial width provided with cutting edges on their outer faces and angular sharply beveled cutting edges on their inner

faces,—said openings diverging outwardly to form larger spaces at said outer faces and adapted for passage of material outward under centrifugal force, substantially as described.

4. A stirrup hammer comprising end shanks spaced apart and adapted for pivotal mounting at their inner ends and connected at their outer ends by a bar head,—said head having multiple longitudinal openings substantially radial and forming multiple bars of different radial width having cutting edges on both their outer and inner faces,—said openings diverging outwardly from the inner face of said head,—and deflecting means carried by said hammer adapted to guide material from the front outwardly into said openings, substantially as described.

5. In combination with a rotary crushing pulverizer comprising an enclosed casing having an arcuate grinding surface and an opening for inlet of feed material and outlet of pulverized product, of a set of stirrup hammers each having multiple outer cutting edges all normally in the cylindrical plane of the hammer circle and all operative simultaneously,—said hammers being mounted in said casing and adapted to cooperate with said grinding surface and each comprising end shanks adapted for pivotal mounting, and a bar head connecting said shanks and having substantially radial outwardly diverging passages affording larger space in front of adjacent simultaneously operative outer edges and adapted to deliver streams of material to the grinding cage.

6. In combination with a crusher casing having an arcuate grinding surface, of rotary pivoted hammers, each having a bar head with substantially radial openings therethrough diverging outwardly, thereby facilitating outward flow of material and forming operative edges normally positioned substantially an uniform distance from said grinding surface when operating and in substantially simultaneous action on the respective streams of material flowing outwardly through such openings, substantially as described.

7. The combination with a cylindrical grinding surface and a rotary shaft, of multiple pivotal hammers eccentrically mounted on said shaft and having heads with openings diverging outwardly to the outer face and forming cutting edges in said outer face circumferentially positioned and operative substantially in the cylindrical plane of rotation about the axis of said shaft and adapted to be fed with material through said openings, substantially as described.

8. The combination with a casing having a cylindrical grinding surface, a rotary shaft mounted thereon, and rotary pivoted hammers operatively mounted eccentrically to said shaft with their heads in proximity to

5 said grinding surface,—said heads extending longitudinally and each composed of multiple cutting bars spaced apart and having outer cutting edges arranged parallel to each other and operative substantially in the circumferential cylindrical plane of rotation about the axis of said shaft while the spaces between said bars afford outward passage of material in parallel streams adapted to be simultaneously reduced between said outer cutting edges and said cylindrical grinding surface, substantially as described.

10 In testimony whereof I have affixed my signature.

15 JOHN P. POLSTER.

20

25

30

35

40

45

50

55

60

65