July 31, 1928. 1,678,723

W. J. CLEMENT

ROTARY HAMMER GRINDING MILL

Filed Oct. 20, 1925

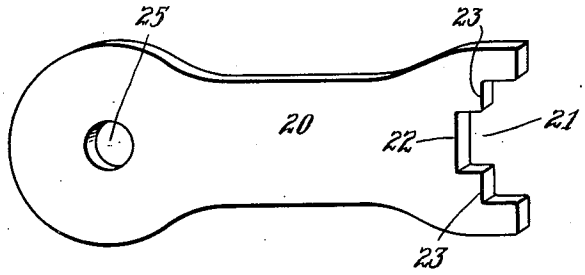

Fig. 1

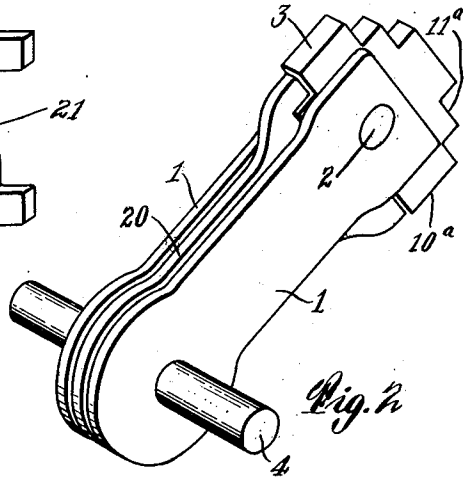

Fig. 2

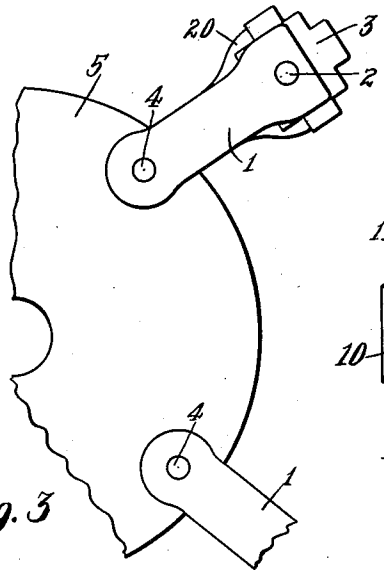

Fig. 3

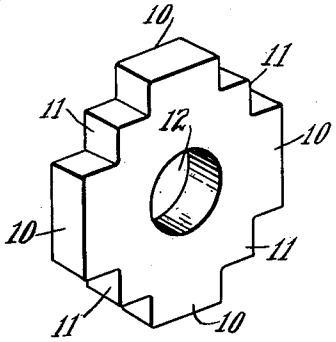

Fig. 4

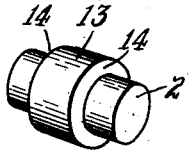

Fig. 5

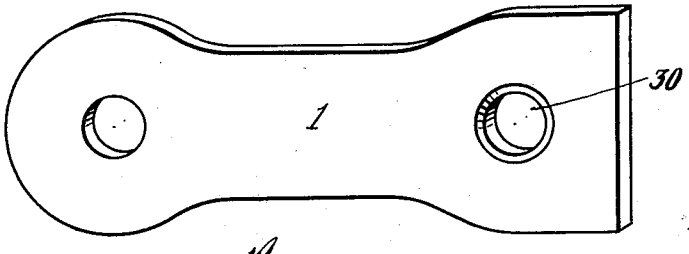

Fig. 6

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Att'ys.

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UNITED STATES PATENT OFFICE.

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ROTARY-HAMMER GRINDING MILL.

Application filed October 20, 1925. Serial No. 63,608.

This invention relates to hammers for grinding, crushing and pulverizing mills and provides a construction whereby the hammer head of each hammer is provided with a plurality of striking faces which may be selectively brought into operative position and so held during the operation of the mill. By so forming the heads they may be adjusted as the striking faces wear so as to prolong the effectiveness of the hammer heads and reduce replacements.

Provision is made also for retaining the hammer heads in the desired positions of adjustment, the retaining means being of such a character that the heads are held in their most efficient positions and in substantially rotative balance with each other.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figure 1 indicates in perspective a locking member for holding the head stationary.

Figure 2 is a perspective of the hammer assembled.

Figure 3 is a fragmentary side elevation showing the manner in which the hammers are mounted.

Figure 4 is a perspective of a hammer head.

Figure 5 is a perspective of a pivot for this head.

Figure 6 shows in perspective a shank member for the hammer.

Each of the hammers comprises a shank formed of a pair of plate members 1 spaced apart to receive pivotally between their outer ends, as on the pivot 2, a hammer head 3. The opposite end of the shank of the hammer is hinged as by means of the pivot shaft 4 passing through the shank members 1 to a rotary drum 5, there being a plurality of hammers spaced about the circumference of the drum so that the drum may be in rotative balance when in operation. As shown best in Figure 4 each hammer head comprises a block of substantially uniform thickness having a plurality of flat faces 10 arranged substantially perpendicularly to radial lines from their centers to the pivotal center of the head and between these faces 10 are the stepped portions 11. Four such faces 10 are shown, but there might be more or less as desired. A central transverse opening 12 passing substantially through the center of gravity of the head is formed to receive the enlarged intermediate portion 13 of the pivot 2, this enlarged portion 13 being of somewhat greater length than the thickness of the hammer head so that the shoulders 14 at either end of the portion 13 form abutments against which the inner faces of the shank members 1 engage when the hammer is assembled. By this construction a single pivotal axis for the head is provided.

The hammer head is fixed in any angular adjustment desired in such a manner that one of the faces, as 10^a of Figure 2, is arranged parallel to the longitudinal axis of the hammer shank, this face and the adjacent stepped portion 11^a extending outwardly therefrom being the operative striking faces of the hammer, assuming that the direction of the drum is such as to swing the hammer in the direction shown by the arrow in Figure 2. By rotating the hammer head any one of the faces 10 with its adjacent step formation may be brought into operative position. Means is provided for holding the head in any of these angular positions, this means as shown comprising a plate 20 having a notched out end 21 complementally formed to mate the faces of the hammer head, there being an inner end face 22 and stepped faces 23 extending outwardly therefrom, the stepped faces engaging a pair of step faces of the head as shown in Figure 2, the flat face 10 therebetween extending toward the face 22 of the locking member. The opposite end of this member 20 is formed with a perforation 25 to receive the pivot shaft 4 by which the hammer is hinged to the drum 5. It is evident, therefore, that to change the angular relation of the hammer head, the shaft 4 must be removed so as to free the locking member from the hammer head which may then be turned to present the desired striking faces in operative position and the locking member may then be reassembled with the shank members and the shaft 4 replaced, passing through the shank members, the locking member and its proper portion of the drum 5. By forming the portion 13 of the pivot 2 slightly longer than the thickness of the head, the shank members are held spaced therefrom so that the hammer head is freely rotatable so long as the locking member is not brought into operative position. The engagement of the step faces between the locking member and the

hammer head permits the hammer head to be retained in its extreme outward position which it would take naturally when in operation due to centrifugal force should the hole 12 be somewhat larger or of different shape than the portion 13 of the pivot pin. It is evident also that because of the manner of mounting of the locking member, it is impossible for the hammer head to be moved out of its proper position when in use so that the parts are securely held in such position that the several hammers carried by the drum 5 will remain substantially in rotative balance and in their most efficient positions. In mills of this character where the hammers are heavy and swing with considerable velocity the matter of the balancing of the rotating parts is of great importance.

This construction also is found to prevent any tendency to "pack" the hammer head out of a proper opeative position by accumulations of the material being operated upon on or between the parts.

In some cases it may be found desirable to permit free rotation of the hammer heads when in operation and when this is desired the locking members may be omitted when the hammers are assembled on the drum.

Particularly when materials having an abrasive action are being ground, it is desirable to countersink the holes 30 in the shank members 1 through which the pivot pins 2 pass and rivet the ends of the pivot pins in the countersunk portions substantially flush with the outer faces of the shank members. Otherwise these pins are likely to be injured by the material being ground.

Having thus described an embodiment of this invention it should be evident to those skilled in the art that various changes and modifications may be made therein without departing from its spirit or scope as defined by the appended claims.

I claim:

1. A hammer of the class described, comprising a pair of spaced members, a hammer head having a plurality of striking faces pivoted between said members, and an element positioned between said members for holding said head against turning on its pivot with any selected face in operative position.

2. A hammer of the class described, comprising a shank, a hammer head having a plurality of stepped striking faces pivoted to said shank, and a member notched out to engage in said steps for holding said head against turning on its pivot with any selected face in operative position.

3. A hammer of the class described, comprising a pair of spaced shank members, a hammer head having a plurality of stepped striking faces pivoted between said shank members, and a member positioned between said shank members and notched to engage in said steps for holding said head against rotation with any selected face in operative position.

4. A hammer of the class described, comprising a pair of spaced shank members, having countersunk opposed holes at one end, a pivot pin extending through said holes and having its ends headed over into said countersunk portions substantially flush with the outer faces of said shank members, and a hammer head pivotally mounted on said pin between said shank members.

5. A hammer of the class described, comprising a pair of spaced shank members, having countersunk opposed holes at one end, a pivot pin extending through said holes and having its ends headed over into said countersunk portions substantially flush with the outer faces of said shank members, said pivot pin being of enlarged diameter between said shank members to form annular shoulders against which said members engage, and a hammer head pivotally mounted on said pin between said shank members.

In testimony whereof I have affixed my signature.

WALTER J. CLEMENT.