H. M. PLAISTED.

ROTARY PIVOTED HAMMER.

APPLICATION FILED AUG. 9, 1920.

1,413,611. **Patented Apr. 25, 1922.**

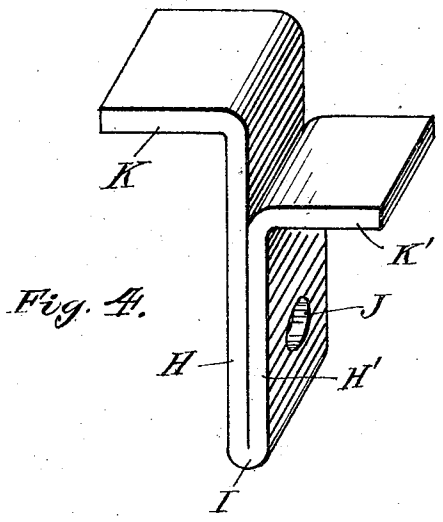
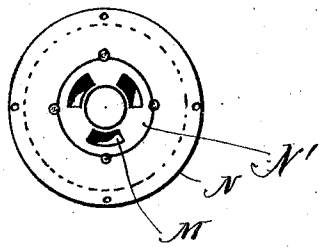


Fig. 4.

Fig. 3.



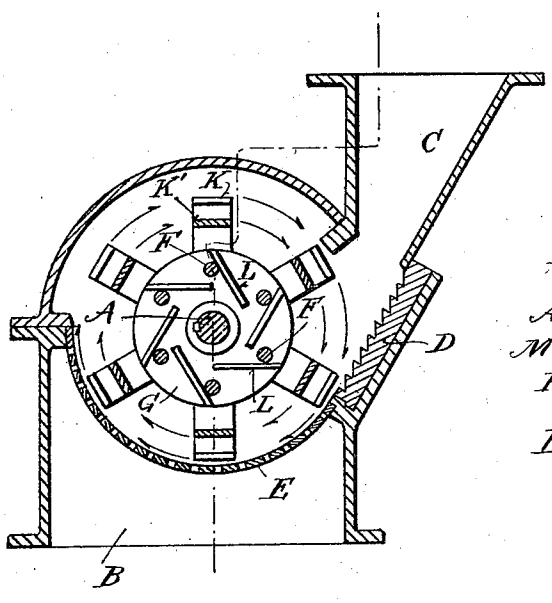


Fig. 2.

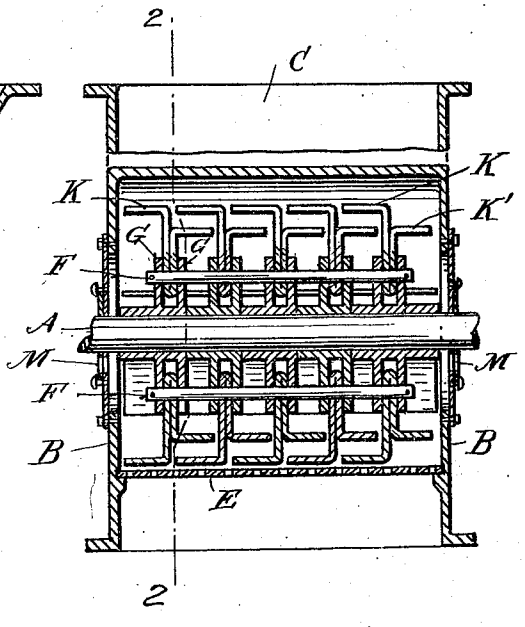


Fig. 1.

Inventor

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UNITED STATES PATENT OFFICE.

HAROLD M. PLAISTED, OF ST. LOUIS, MISSOURI, ASSIGNOR OF FORTY-NINE ONE-HUNDREDTHS TO WILLIAMS PATENT CRUSHER & PULVERIZER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

ROTARY PIVOTED HAMMER.

1,413,611. Specification of Letters Patent. Patented Apr. 25, 1922.

Application filed August 9, 1920. Serial No. 402,202.

To all whom it may concern:

Be it known that I, HAROLD M. PLAISTED, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Rotary Pivoted Hammers, of which the following is a specification.

This invention relates to certain new and useful improvements in rotary hammers for feed grinders or like machines, the peculiarities of which will be hereinafter fully described and claimed.

The main object of my invention is to provide a rotary hammer of such shape that when mounted in a row or rows a plurality of such hammers will form a double operative edge, or edges of different radii and flexibly disposed paralled to the rotor shaft; second, to provide a hammer that when mounted in rows will furnish more cutting edges near the center or midway of the sides of the casing where the entering feed is normally of greater quantity, than at the sides; third, a hammer that tends to dislodge material collected by an adjacent hammer; fourth, to provide a hammer that may be readily forged to the desired shape; fifth, to provide a hammer that will cooperate with deflecting means between the rotor shaft and the operative edges whereby the material will be deflected into the path of the hammer.

In the accompanying drawing in which like reference letters indicate corresponding parts, Fig. 1 represents a vertical sectional view through the axis of the rotor and portion of the hopper; Fig. 2 a vertical sectional elevation across the rotor on the plane 2—2 of Fig. 1; Fig. 3 a detached view of a cover plate having regulative openings for air inlet; and Fig. 4 a perspective view of my preferred form of rotary hammer.

In machines for grinding feed or other suitable material the tendency of the feed is to seek the middle of the hopper generally, and it is desirable to furnish more cutting edges or operative edges at the center than at the sides of the casing; also in hammers having projecting heads or portions the material is inclined to lodge on the underside of said heads, as has been demonstrated by experience. In my preferred form of hammer the heads are so arranged that they overlap the heads of adjacently located hammers independently mounted in rows and flexibly disposed, whereby the relative movement of adjacent hammers will dislodge such collected material. Likewise, I have provided means for throwing outward into the path of said overlapping heads, material that may crowd within the hammer circle of the operative edges.

Referring to the drawing, the letter A designates a rotor shaft mounted in suitable bearings between the sides B—B of a casing having a hopper C, a breaker plate D, and a grinding cage E adapted to cooperate with rotary pivoted hammers pivotally mounted on rods F or otherwise, carried by discs G or other rod supports mounted on the shaft A. These hammers in the preferred form comprise a shank having an opening or other means at one end for pivotal mounting, and heads at the opposite end of the shank of peculiar construction as illustrated. In the preferred form of my hammer, a flat relatively thin bar of rectangular cross section is folded upon itself to form a double shank portion H—H′ extending outward from the fold I. The line of fold lies in the plane of rotation. Near the fold is an opening J for the hammer rod F on which the hammer is pivoted. This opening is in the flat sides of the double shank and its axis is parallel to the rotor shaft. The free ends of the flat bar forming the hammer are bent outward laterally in opposite directions in the axial plane of the central line extending through the pivot opening and form heads K—K′ that are stepped or located at different distances from the pivot end of the hammer, and thus oscillate in circumferential planes of unequal radii from the hammer pivot, and travel in hammer circles of unequal radii from the center of the shaft. The lesser dimension of the bar in both shank and head is presented to the material operated on, to effect a cutting action. When a plurality of such hammers are mounted on a hammer rod as shown in Figure 1, the heads of the same radius are alined in each row and normally parallel to the shaft, and overlap each other and form a double operative edge in each row intermediate of the end hammers, where a single head is presented to the material being ground. It will be observed by reference to Fig. 1 and Fig. 4 that the head K is horizontally longer

than the head K′ preferably, as the head K with its longer radial distance extends horizontally towards the single thickness of the adjacent longer shank while the head K′ is shorter on account of being opposite the double thickness of the shank. In other words the projecting heads K—K′ extend unequal distances from the central plane of the shank through the meeting faces of the double portions H—H′, when the same clearance is allowed between the ends of the heads K and K′ respectively and the adjacent shanks.

The heads thus overlapping as shown in Fig. 1 and flexibly disposed on the hammer rods, will oscillate about their pivots when meeting unequal resistance from the feed material, and will tend to clear adjacent heads from collected material and will operate with especial efficiency on the feed material.

When the material crowds upon the rotating hammers and passes within the hammer circles of the heads as above described, it is deflected outward again in my construction, by inclined blades L that are disposed, as shown in Fig. 2, between alternate pairs of discs G—G between which the shanks of the hammers are mounted. These blades L may be integrally formed with one of the adjacent discs G, or otherwise, and preferably extend with a tangential inclination close to the hammer rods F, and leave a space between the inner end of each blade and the adjacent blade, as shown in Fig. 2, and also the hammer rod, through which space any material forced to the center may be discharged, and the blades will deflect such material outward again into the path or hammer circles of the heads K—K′. At the end discs these blades will act as fans also for air that is taken in through openings M near the shaft A in a double closing plate N—N′ Fig. 3; by the rotation of N′ relative to N, the said openings are varied and the amount of air is regulated.

I claim:

1. A machine of the character described comprising a rotor having rows of rotary pivoted hammers having pivot openings by which they are flexibly mounted on pivot rods eccentric to the rotor axis,—the heads of said hammers in each row being alternately located at longer and shorter distances from the pivot openings and on shanks correspondingly longer and shorter from their pivot openings,—the shanks having their greater dimension disposed in parallel planes of rotation and the heads extending laterally from the shanks and having their greater dimension disposed in cylindrical planes of rotation of alternately longer and shorter radii,—the lesser dimension of both heads and shanks forming cutting edges being thus presented to the material being reduced and the cutting edges of the heads operating in cylindrical planes of alternately longer and shorter radii from the rotor axis.

2. A rotary pivoted hammer comprising a single piece of flat bar folded on itself forming a double shank integrally connected at its lower end by the fold and having an opening through the flat sides of each shank adapted for pivotal mounting near the fold,—the free ends of said bar being bent laterally in opposite directions in the axial plane of the central line extending through said opening.

3. A rotary pivoted hammer comprising a single piece of flat bar folded on itself intermediate of its ends forming a double shank integrally connected at the inner end by the fold and having an opening through the flat sides of the doubled shank adapted for pivotal mounting near the fold,—the outer free ends of said bar being bent laterally in opposite directions in the axial plane of the central line extending through said opening, at different radial distances from the pivot.

4. A rotary pivoted hammer comprising a single piece of flat bar folded on itself intermediate of its ends forming a double shank and having an opening near the fold for pivotal mounting,—one free end being bent out laterally at the outer end of the double shank and the other free end being formed on a single shank portion that is extended beyond the double shank and is bent laterally in the opposite direction at a longer radial distance from the pivot opening.

5. A rotary pivoted hammer comprising a double shank folded flat ways on itself through-out the length of the shank and having an opening for pivotal mounting near the inner end, and having two heads projecting laterally and horizontally parallel to the pivot axis an unequal distance in each head from the meeting plane of the shanks and each head respectively located at unequal radial distances from the central line through the pivotal axis at the folded end of the shank,—the line of said fold and the plane of the meeting faces lying in the plane of rotation and at right angles to the pivot axis.

6. A plurality of rotary pivoted hammers mounted in a row, and each comprising a flat bar shank having a pivot hole near one end and laterally projecting heads located at unequal distances from the pivot,— the heads of the several shanks having the same radial distances being in line with each other and presenting the lesser dimension of the bar to the material operated on,—a hammer rod passing through said holes, and supports for said rods.

7. A plurality of rotary pivoted hammers adjacently mounted in a row and each comprising a shank having a pivot hole near one end and heads projecting laterally at

different distances from the pivot, the heads having a longer radial distance overlapping the adjacent heads having a shorter radial distance,—a hammer rod passing through said holes, and a rod support.

8. A plurality of rotary pivoted hammers mounted in rows and laterally adjacent in each row,—each hammer comprising a shank adapted for pivotal mounting and heads projecting laterally in opposite directions at different distances from the pivot and overlapping adjacent heads and forming a flexible double operative edge intermediate of the ends of each row, substantially as described.

9. The combination with a plurality of rows of rotary pivoted hammers,—each row comprising overlapping laterally projecting heads and radial shanks having holes,—of discs in pairs and having holes, hammer rods passing through the holes in the shanks and discs, and a shaft for said discs,—the said pairs of discs alternating axially and with inclined webs forming deflecting blades located opposite said overlapping heads.

10. The combination with rotary pivoted hammers mounted in rows, and hammer rods for said hammers, of supports for said rods comprising alternately disposed discs in pairs and deflecting blades tangentially arranged, substantially as described.

In testimony whereof I have affixed my signature.

HAROLD M. PLAISTED.