M. F. WILLIAMS.

HAMMER ATTACHMENT FOR ROTARY MILLS.

APPLICATION FILED JAN. 27, 1915.

1,147,351. Patented July 20, 1915.

Fig. 1

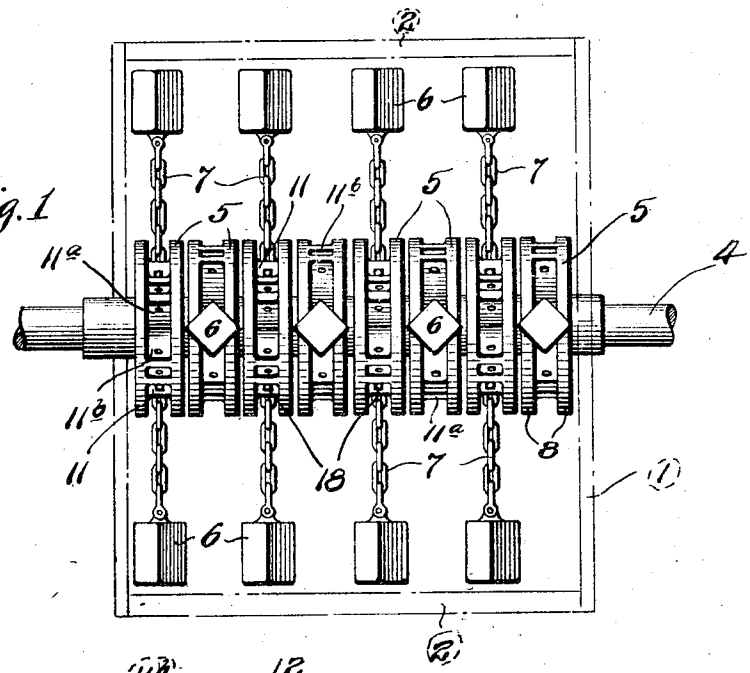


Fig. 2

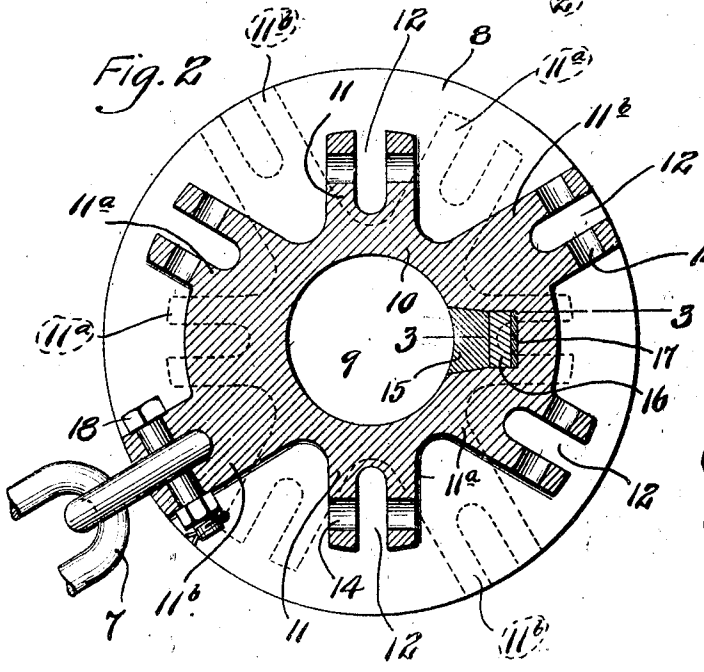
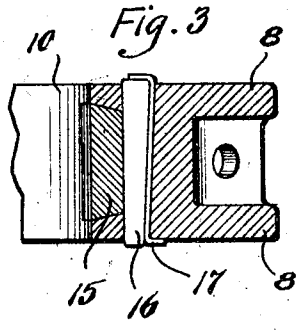


Fig. 3



Witnesses
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UNITED STATES PATENT OFFICE.

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HAMMER ATTACHMENT FOR ROTARY MILLS.

1,147,351. Specification of Letters Patent. Patented July 20, 1915.

Application filed January 27, 1915. Serial No. 4,692.

To all whom it may concern:

Be it known that I, MILTON F. WILLIAMS, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Hammer Attachments for Rotary Mills, 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.

My invention relates to rotary hammer mills of a type commonly employed in crushing the various rocks and ores, and characterized by the employment of beaters which are flexibly mounted by means of chains or similar flexible suspension means.

More specifically my invention relates to a form of collar or disk which provides a means of attachment whereby the suspension means of the hammers are operably connected to the driving shaft.

The broad object of my invention is to provide a form of mounting which is designed for the purpose of permitting adjustment or resetting of the flexibly mounted hammers so as to compensate for wear at their outer ends.

A further object is to provide such a form of mounting wherein the unslinging and reslinging of the hammers may be accomplished with a minimum amount of labor and without necessitating dismantling of the machine.

A further object of my invention is to provide such a form of mounting which is susceptible of arrangement to balance the shaft.

A further object of my invention is to provide such a form of mounting which will permit any desired arrangement or alinement of the hammers.

A further object of my invention contemplates the provision of a mounting, which may be manufactured cheaply, which is durable under the hard usage to which such a part is subjected, which is capable of being easily assembled in a machine, and which will give to the rotating or driving element such inertia as will permit a fly wheel being dispensed with.

Other and further objects of my invention will be obvious or hereinafter pointed out.

In the drawings, Figure 1 represents an illustrative side view of a portion of a crusher showing the use of my invention. Fig. 2 is a vertical section of one of the disks or mounts, the same being taken transversely on line 2—2 of Fig. 1. Fig. 3 is a sectional detail taken on line 3—3 of Fig. 2 illustrating one form of securing means.

Referring more specifically to the drawings, it will be understood that dotted lines 1 represent generally a portion of the casing of a crusher of the class described, and the dotted lines 2 represent generally the location of the cage or grizzly upon which material is supported during the crushing operation.

4 represents the driving shaft which is operable by any suitable driving means and upon which are mounted the hammer supports or disks 5. Hammers 6 having the suspension means 7, here shown as chains, are mounted on the supports 5 as will be hereinafter pointed out.

As is well known in the art, the material to be crushed is introduced through a suitable feed aperture in the casing of a machine, and the shaft rapidly rotated to whirl the hammers about, in which operation they function to beat and crush the material, the grizzly or cage 2 coöperating with them in this action. In this usage the hammers 6 necessarily become worn down at their outer ends so that they do not operate sufficiently close to the grizzly to have the maximum efficiency.

The disks or supports 5 are designed to permit the hammers being adjusted to compensate for this wear. As will be understood from Figs. 1 and 2, these disks comprise the side plates 8 which are provided with the central aperture 9 for the passage of the shaft, and formed with the integral connecting hub portion 10.

Radiating from the hub portion 10, and formed integrally therewith and with the side plates 8, are the mountings 11, 11^a and 11^b. In each of these mountings is provided a pocket or seat 12 extending radially of the shaft and adapted for the reception of the link or loop at the inner end of the suspension means 7. The length of the mountings 11, 11^a and 11^b, and the disposal of the seats 12 therein is such that the seats 12 in mountings 11 are radially nearer the shaft 4 than

are the seats in mountings 11^a, and the seats in mountings 11^b are radially farther from the shaft than the seats in mountings 11^a. The maximum width of the seats 12 extends longitudinally of the shaft, or transversely of the disk, and the mountings are provided with the seats 14 for attaching means, which seats are directed transversely of the seats 12, and consequently, transversely of the shaft 4. The seats 14 are adapted for the reception of any suitable securing means, such as rivets, bolts, or keys, which will afford means of attachment whereby the loops inserted in the seats 12 may be secured and retained in place.

It will be seen that mountings of equal length are disposed diametrically opposite each other so that they will operate to balance. A plurality of the disks or supports are mounted on the shaft 4 side by side, either with the side plates 8 of adjacent disks spaced apart or abutting. The disks may be positioned on the shaft so as to give the mountings any desired relative arrangement or alinement. As illustrated, the arrangement is such that the adjacent disks are placed with their corresponding mountings at right angles, as will be seen in Fig. 2, in which the dotted lines represent the position of the mountings on the juxtaposed disks, it being noted that the longest mounts 11^b on the adjacent disks are disposed at right angles to the longest mounts 11^b on the full-line disk, with the other mountings 11^a and 11 on the adjacent disks bearing similar relationship to their corresponding mountings 11^a and 11 on the full-line disk. With this arrangement the disks will balance each other and the shaft. Any other selected balancing arrangement may be employed, such as a disposal of the disks in such relationship that mountings of corresponding length are disposed spirally about the shaft.

Each of the individual disks may be secured to the shaft by some suitable locking arrangement as that illustrated in Fig. 3, or the end disks may be secured to the shaft and the intermediate disks interlocked therewith and with one another by any suitable interlocking arrangement, whereby to hold all the disks rigidly on the shaft. The locking arrangement illustrated in Fig. 3 comprises a gib 15 of mild steel which may be concaved to fit the shaft and operates in a suitable keyway in the disk. With this cooperates a key 16 which, when driven in place, operates to force the gib 15 into locking engagement with the shaft. A suitable lock 17 coöperates with the key 16 to hold it against displacement.

In use, when the hammers are new and have their maximum length, they are mounted in the mountings 11, which are nearest the shaft. Upon becoming worn, they may be adjusted by removing the securing means comprising the bolts or rivets 18, and remounted in the next longer mountings 11^a. When still further worn, the hammers may be dismounted from the mountings 11^a and remounted in the mountings 11^b. This form of hammer mounting facilitates the remounting of the hammers as the attaching means 18 are easily accessible. Furthermore, it is not necessary to remove the disks from the shaft when the hammers are remounted.

In operation the disks 5 give the shaft an added inertia, and when properly balanced, as they readily may be, render it unnecessary to employ a fly wheel on the shaft.

I am aware that the device is susceptible of changes and modifications not herein illustrated without departing from the spirit and scope of my invention, and hence it is not my intention that my invention be construed as limited to the specific form shown.

What I claim is:

1. A hammer mounting for rotary mills comprising a plurality of mounts disposed on an operating shaft, said mounts being provided with a plurality of radially directed seats disposed at different distances from the shaft, and means for securing a hammer suspension means in said seats.

2. In a rotary mill, a shaft, a hammer support mounted thereon, said hammer support having a plurality of hammer mountings projecting radially from said shaft, said mountings being provided with seats disposed at different radial distances from said shaft, and securing means disposed transversely of the shaft and adapted to cooperate with said seats to secure hammer suspension means therein.

3. A hammer mounting for a rotary mill comprising a shaft, and a disk member thereon and provided with radially directed seats for hammer suspension means disposed at different distances from the shaft.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 23rd day of January, 1915.

MILTON F. WILLIAMS.

Witnesses:
WM. G. WEBER,
NORMAN F. SHEPPARD.