June 24, 1941. J. HOLLAND-LETZ 2,246,799

CUTTING TIP FOR HAMMER MILLS

Filed June 23, 1938

Fig. 1.

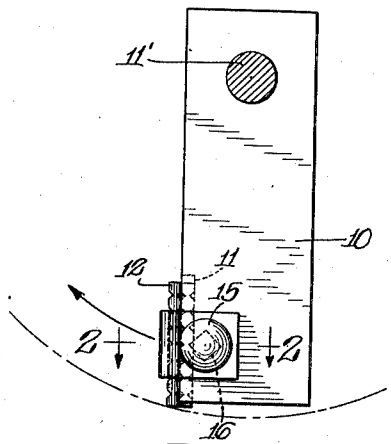


Fig. 2.

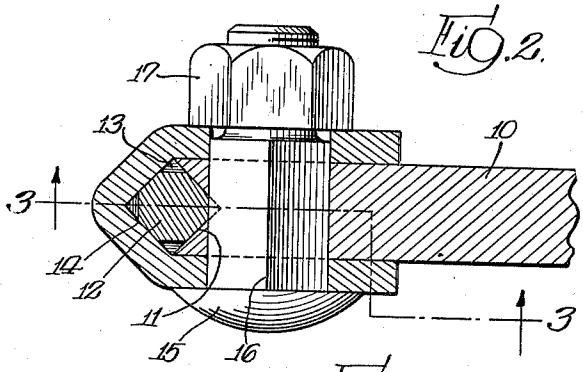


Fig. 3.

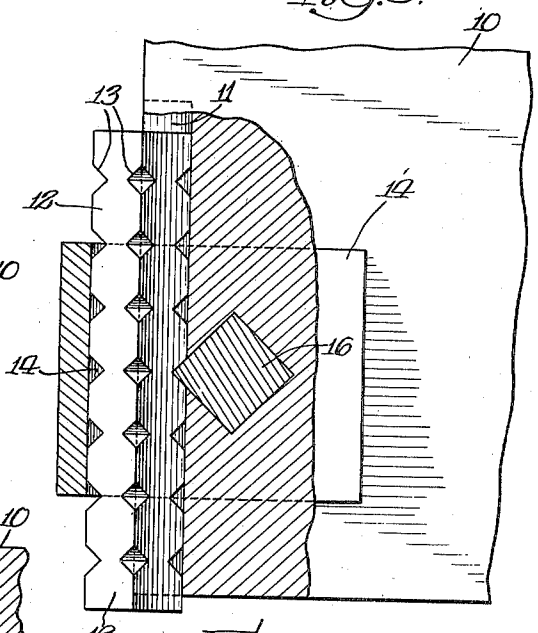


Fig. 4.

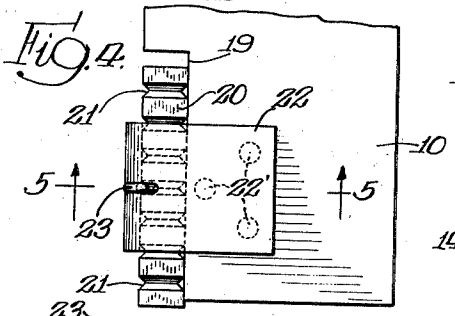


Fig. 5.

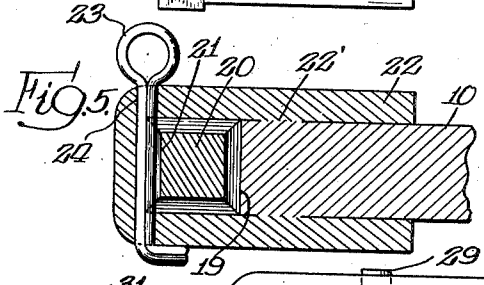


Fig. 6.

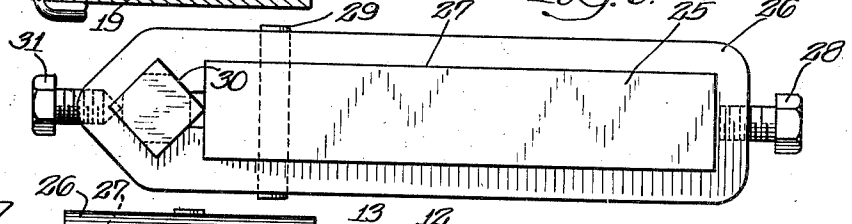
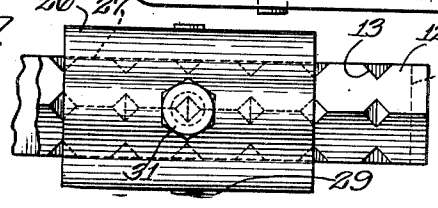


Fig. 7.



INVENTOR.
John Holland-Letz,
BY John P. Smith
ATTORNEY.

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CUTTING TIP FOR HAMMER MILLS

John Holland-Letz, Crown Point, Ind., assignor to The Letz Manufacturing Company, a corporation of Indiana

Application June 23, 1938, Serial No. 215,381

2 Claims. (Cl. 83—11)

The present invention relates generally to hammer mills, but more particularly to a novel and improved attachment for the hammer of hammer mills which eliminates the replacement of hammers when they have become dull and at the same time permits the attachment to be easily maintained in a sharpened condition so that the mill is always at its greatest efficiency. This efficiency is secured at a minimum cost by eliminating or reducing to a minimum replacement of parts.

One of the primary objects of the present invention is to provide a novel and improved attachment for hammers of hammer mills of the swinging or non-swinging type in the form of an adjustable, removable, as well as resharpenable high speed steel cutting tip for the individual hammers of the mill.

A further object of the invention is to provide a novel and improved attachment for the hammers of a hammer mill in the form of a non-circular cutting tip which, when required to be resharpened, may have the dulled portion broken off in a vice or reground, after which it may be replaced and adjusted with respect to the hammer in proper cutting position with respect to the screen of the mill.

A still further object of the invention is to provide a novel and improved attachment for the conventional form of hammers with which the present type of hammer mills are now equipped so that the same may be merely slipped over and attached to the conventional hammer.

These and other objects are accomplished by providing a construction and an arrangement of the various parts in the manner hereinafter described and particularly pointed out in the appended claims.

Referring to the drawing:

Fig. 1 is a side elevational view of a more or less conventional type of swinging hammer illustrating the manner in which my improved cutting tip is attached thereto;

Fig. 2 is an enlarged cross sectional view taken on the line 2—2 in Fig. 1;

Fig. 3 is an enlarged cross sectional view taken on the line 3—3 in Fig. 2;

Fig. 4 is an enlarged fragmentary side elevational view of a slightly modified form of my improved cutting tip;

Fig. 5 is a cross sectional view taken on the line 5—5 in Fig. 4;

Fig. 6 is an end elevational view of another modified form of the construction showing a quick detachable securing means by which my attachment is adapted to be mounted on the hammer of the hammer mill without modifying or changing the construction of the conventional hammer; and

Fig. 7 is an end elevational view of the construction shown in Fig. 6.

The invention in the present instance is adapted to be employed in connection with hammer mills which make use of the swinging type or non-swinging type of hammers. These hammers are mounted on a revolving head and rotated at relatively high speed in cooperation with a cylindrical screen located concentrically with the head and in close proximity to the outer free ends of the hammers. These revolving hammers when new have sharp cutting edges and very efficiently cut the grain and pass it through the screen, but after short use, these edges rapidly wear away until they become rounded and when this condition is reached, it has been the practice heretofore to turn the hammers end for end in the swinging type or reverse the hammers in the stationary type so as to present new cutting edges. As soon as these particular types of hammers have been dulled again by use, new hammers are required entailing a considerable expense and delay. With the present invention a relatively small tip in the form of an attachment to the hammer is readily removed, sharpened and replaced for presenting a new cutting edge. These tips are made of high speed tool steel and are of sufficient length so that a large number of successive sharpenings may be had therefrom before requiring new ones. The invention in the present instance also contemplates the form of an attachment which may be readily clamped on the conventional type of hammer without changing its form or construction.

In illustrating one form of my invention I have shown the same in connection with a swinging type of hammer blade generally indicated by the reference character 10 but it will, of course, be understood that the invention is applicable to the non-swinging hammer which is rigidly attached to and revolves with the rotary head. The swinging hammer or blade 10 is pivotally attached by means of a pin or shaft 11' to the rotary head (not shown). The lower forward edge or the normal cutting edge of the hammer or plate 10 is provided with a V-shaped recess 11 in which is adapted to be seated my improved non-circular cutting tip 12. This cutting tip 12 may be round or non-circular in cross section, but I preferably employ a tip of non-circular or square cross section which is made of high speed steel so as to resist wear and retain its sharpness as long as possible. The tip 12 is relatively short in length and is provided with transverse V-shaped cut out or recessed portions 13 which are in alignment in each of the four corners of the tip. These V-shaped recesses appear in a series of four in alignment in spaced apart relation on the corners throughout the length of the cutting tip. The tip proper is secured in the V-shaped

recess 11 of the hammer or plate 10 by a bracket 14 which has its outer ends bent so as to form a V-shaped recess as shown at 14 and embraces an intermediate portion of the tip 12 as clearly shown in Figs. 1 to 3 inclusive of the drawing. This bracket 14 is secured in position by a special form of carriage bolt 15 which has a relatively long square shank 16 adjacent the head and is adapted to be seated in a square aperture 17 extending through aligned apertures in the hammer 10 and the bracket 14. One corner of the shank 16 of the bolt 15 engages one of the notches 13 of the tip 12 and retains it against displacement with respect to the same. The bolt, of course, is provided with a conventional nut 17 mounted in threaded engagement with the bolt for securing the parts in position. The cutting tip in this instance is arranged to project a slight distance beyond the free end of the hammer 10 as shown at 18 so as to present a cutting edge which in cooperation with the circular screen grinds or reduces the material in the operation of preparing the forage or ground feed. With this arrangement it will be obvious that the tip may be removed and revolved about its own axis to present a new cutting edge or may be ground on a grinding wheel or broken off and readjusted with respect to the hammer 10. Obviously each time the tip has become worn it may be removed and revolved or resharpened and replaced and adjusted so as to present a new cutting edge and the number of times this operation may be repeated depends upon the length of the cutting tip.

In Figs. 4 and 5 I have shown a slightly modified form of my improved cutting tip in which the hammer 10 is provided with a rectangular recess on its forward lower edge in which is seated a non-circular tip 20 having a plurality of spaced apart peripheral V-shaped recesses 21. A bracket 22 is in the form of a U-shaped member and embraces the tip 20. The bracket 22 is spot welded as shown at 22 to the opposite sides of the hammer 10. The tip 20 is retained in position by a cotter pin 23 which extends through aligned apertures in the opposite sides of the U-shaped member 22. This cotter pin is adapted to engage one of the V-shaped recesses 21 and the tip 20 for securing the tip in adjusted position with respect to the hammer.

In the second modified form shown in Figs. 6 and 7 of the drawing, I have illustrated an attachment or securing means which permits the adaptation of my cutting tip to the conventional form of hammers now employed in hammer mill constructions. This arrangement permits the securing of the cutting tip without changing the form or construction of the hammer proper so that the same may be sold as an attachment for all types of hammer mills heretofore manufactured. In Fig. 6 I have illustrated one end of a conventional hammer 25 in which a bracket 26 is provided with a rectangular opening of substantially the same size as the cross section of the hammer for receiving the hammer therein. The bracket proper is rigidly clamped to the hammer by a set screw 28. The bracket 26 embraces the hammer and under ordinary circumstances a set screw 28 is sufficient to retain the adjustable cutting tip in cutting position thereon, but for additional security, a pin 29 may be inserted and secured in aligned apertures in the bracket and hammer 25 in the manner indicated in Fig. 6 of the drawing. On one side of the bracket adjacent one edge of the hammer 25 is a square recess 30 in which is adapted to be adjustably mounted a cutting tip 20. The tip 20 is adjustably secured in position by a set screw 31 which is mounted in threaded engagement with a threaded bore in the bracket and has its inwardly pointed end adapted to engage one of the beveled recesses 21 of the cutting tip 20. The cutting tip in this modified form is positioned so that the corners extend forwardly, but it will, of course, be understood that the form of cutting tip as shown in Figs. 4 and 5 may be employed so that one flat side of the cutting tip rests against the edge of the hammer 25.

Summarizing the advantages and function of operation of my improved cutting tip for hammer mills, it will be obvious that by making these tips relatively small and of special high speed steel, they will be economical to manufacture and to replace as well as simple to remove and easy to grind for resharpening. This arrangement also permits the tips to be adjusted with respect to the hammers, thereby insuring an efficient hammer mill at a minimum cost. As the lower portions become worn they may be removed by removing the bolt 15 in the form shown in Fig. 2 or by removing the cotter pin 23 in the form shown in Fig. 4. When these tips are removed they may be revolved through an annular magnitude of 180° and secured in position so that a new cutting edge is presented. When the second edge is worn down, the worn portion may be either broken or ground off to present a new cutting edge. Through the medium of the transverse recesses the tips may be adjusted with respect to the hammer 10 for securing proper cooperation with the screen of the hammer mill. This simple attachment permits the use of old hammer blades which have been worn down by use and eliminates the cost incident to their replacement. Obviously the cost of replacing the tips which are relatively small reduces to a minimum the cost of maintaining the hammer mill at its maximum efficiency.

While in the above specification I have described one embodiment of my invention and two modifications thereof, it will, of course, be understood that the same is capable of other modifications within contemplation of my invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination with a hammer for a rotary hammer mill, a bracket secured to said hammer, a cutting member mounted in said bracket, said cutting member having a plurality of spaced apart recesses, and means carried by said bracket and engageable with said recesses for longitudinally adjusting said member in said bracket and for securing said bracket to said hammer.

2. The combination with a hammer for a rotary hammer mill, a bracket secured to said hammer, a cutting member mounted in said bracket, and single means for securing said bracket and said member to said hammer, said means adapted to permit said member to be rotated about its longitudinal axis and adjusted longitudinally with respect to said hammer.

JOHN HOLLAND-LETZ.