Nov. 28, 1950 E. C. ANDERSON 2,531,597

HAMMER AND RENEWABLE TIP FOR HAMMER MILLS

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Fig. 1.

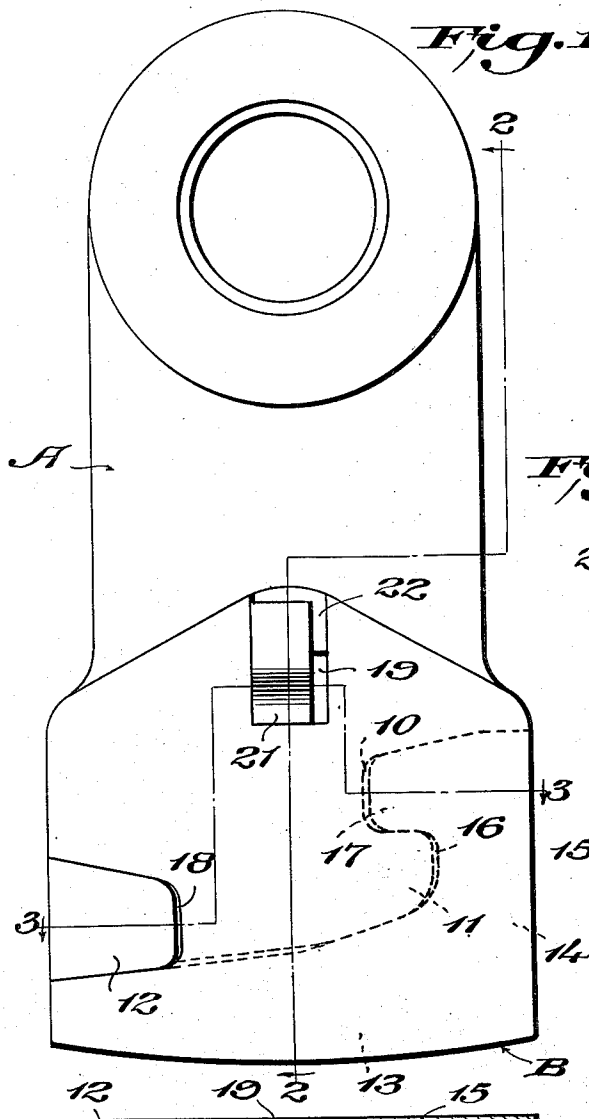
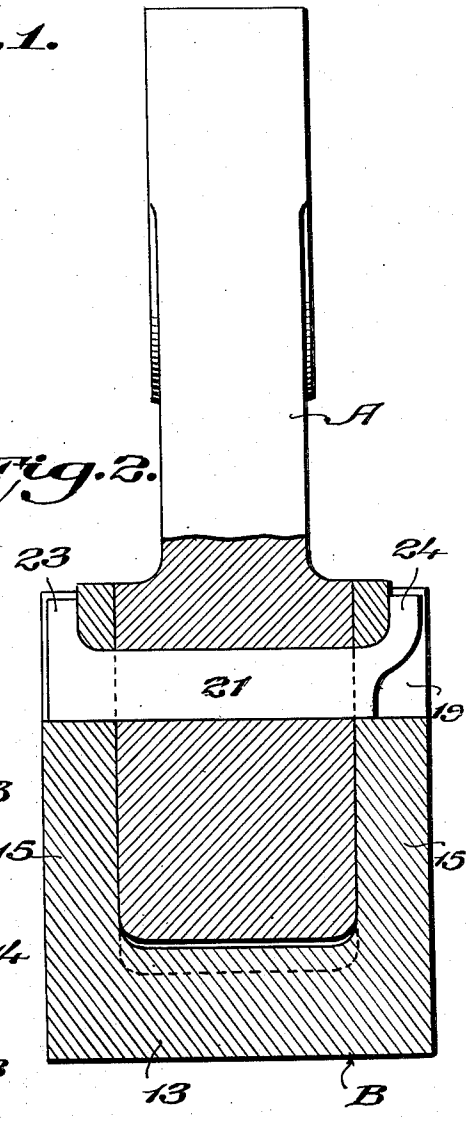


Fig. 2.



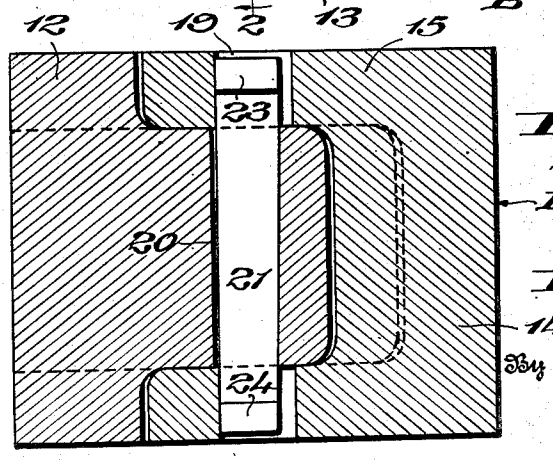


Fig. 3.

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Fig. 4.

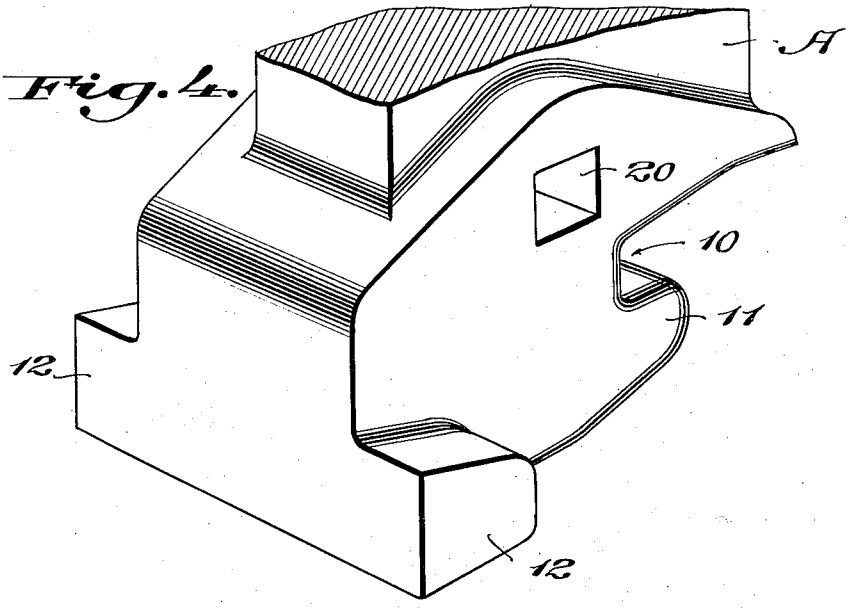
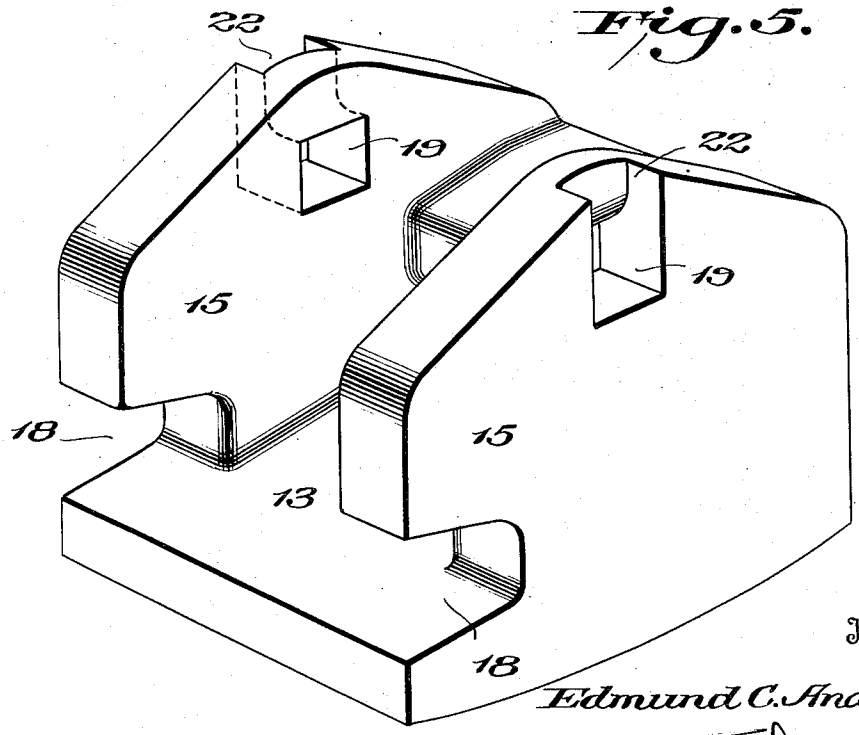


Fig. 5.



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HAMMER AND RENEWABLE TIP FOR HAMMER MILLS

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5 Claims. (Cl. 241—197)

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This invention relates to hammer mill hammers of the two-part type, comprising a shank and a separate tip which is designed to be removed when worn and to be replaced by a new or unworn tip, and has generally in view to provide a hammer mill hammer of this type embodying an improved interlocking connection between the tip and the shank, whereby the tip normally is retained firmly, positively and securely upon the shank and yet is readily removable and replaceable whenever desired while the shank remains operatively mounted in the mill.

More particularly, a special and important object of the invention is to provide a hammer mill hammer of the type mentioned in which the interlocking connection between the tip and the shank of the hammer is so designed that blows struck by the hammer tend to maintain and to intensify a firm, rigid assembly of the tip with the shank.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in a hammer mill hammer of the type mentioned embodying the novel features of construction, combination and arrangement of parts as are illustrated by way of example in the accompanying drawings and as will be hereinafter more fully described and claimed.

In the accompanying drawings, wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a side elevation of a hammer mill hammer constructed in accordance with the invention.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a perspective view of the outer end portion of the shank of the hammer; and

Figure 5 is a perspective view of the hammer tip.

Referring to the drawings in detail, A designates, generally, the shank of the present hammer and B designates, generally, the hammer tip which is separate from said shank and removably, replaceably mounted thereon for the reasons aforementioned.

In accordance with the invention, the outer end portion of the shank A has formed therein and extending preferably entirely thereacross and opening through the front thereof a recess 10. Also, in accordance with the invention, the outer end portion of the shank A is provided, outwardly of the recess 10, with a forwardly projecting tongue 11 which likewise extends preferably en-

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tirely across said shank. Further, in accordance with the invention, the recess 10 is of rearwardly tapering form and the tongue 11 is of rearwardly flaring form. In addition, the outer end face of the shank A preferably is inclined rearwardly and outwardly, and the outer end portion of said shank has projecting laterally from each side thereof, adjacent to its rear edge, a lug 12 which preferably is of rearwardly flaring form.

The tip B is composed of a bottom or outer end wall 13, a front wall 14 and side walls 15, 15 which are spaced apart to accommodate between them the outer end portion of the shank A. As best shown in Figure 5 of the drawings, the tip B is open at its inner end and at its rear so that it is engageable with the outer end portion of the shank A by rearward movement relative to the latter.

The inner face of the bottom or outer end wall 13 of the tip B is rearwardly and outwardly inclined corresponding substantially to the rearward and outward inclination of the outer end of the shank A so as to engage the latter more or less throughout its length. On the other hand, the outer face of said bottom wall 13 is arcuately curved from front to rear about an axis located in, or in a continuation of, the transverse, central plane of the shank A, with the result that said bottom wall is of rearwardly tapering form and is composed of a greater amount of metal at its front end, where maximum wear of the tip occurs, than at its rear end where a lesser amount of wear occurs.

The front wall 14 of the tip B has formed therein and opening through the rear thereof a rearwardly flaring recess 16. In addition, said front wall is provided, inwardly of said recess 16, with a rearwardly projecting, rearwardly tapered lug 17.

The recess 16 is designed to accommodate the tongue 11 of the shank A and the recess 10 of said shank is designed to accommodate the tongue 17 of the tip B, and said tongues and recesses are of sizes and shapes so that said tongues have wedging engagement in said recesses as a result of rearward movement of the tip B to its operative or applied position relative to the shank A.

Formed in the side walls 15, 15 of the tip B are recesses 18, 18 which open through the rear edges of said side walls and which are located and are of sizes and shapes to receive the lugs 12 when the tip B is operatively applied to the shank A. Thus, when said tip B is operatively applied to the shank A, the wedging engagement of the

tongues 11 and 17 in the recesses 10 and 16, respectively, and the wedging engagement of the lugs 12 in the recesses 18, results in firm engagement of the tip B with the outer end portion of said shank and in positive holding of said tip against either inward, outward or rearward movement relative to said shank.

Near their inner ends the tip side walls 15, 15 have openings 19, 19 extending therethrough, while extending transversely through the shank A, for alinement with the holes 19, 19 when the tip B is operatively applied to said shank, is an opening 20.

A tapered pin 21 is insertable through the openings 19 and 20 when the tip B is operatively applied to the shank A and is operable, upon being driven through said openings, to urge said tip rearwardly relative to said shank to cause the tongue and recess formations 17—19 and 11—16 and the lug and recess formations 12—18 to wedgingly cooperate to fasten said tip tightly upon said shank. Moreover, said pin 21 obviously is effective to prevent forward movement of the tip B relative to the shank A and hence is operable to retain said tip securely upon said shank.

Formed in the outer faces of the tip side walls 15, 15 adjacent to the openings 19, 19 are recesses 22, one of which is adapted to accommodate a head 23 at one end of the pin 21 and the other of which is adapted to have a portion 24 of reduced thickness at the other end of said pin bent into the same, whereby accidental removal of said pin is prevented and whereby the ends of said pin do not project beyond the outer faces of the side walls 15, 15.

When it is desired to remove a worn tip B, the bent end portion 24 of the pin 21 is straightened and said pin is removed. The worn tip B then may readily be moved forwardly relative to the shank A to disengage it from said shank and a replacement tip may readily be applied by moving the same rearwardly relative to the shank and inserting the same or a new pin 21.

As will be apparent from the foregoing, the present tip B is readily removable and replaceable while the shank A remains operatively mounted in the mill; blows struck by said tip tend to wedge the same more firmly upon said shank; said tip is positively interlocked with said shank and includes a major amount of metal where greatest wear occurs, and the pin 21 is not required to assume any loads due to operation of the hammer so that there is little or no likelihood of loss of the tip from the shank due to fatigue of said pin.

From the foregoing description, considered in connection with the accompanying drawings, it is believed that the construction of the present hammer will be clearly understood and its advantages appreciated. It is desired to point out, however, that while only a single, specific structural embodiment of the invention has been illustrated and described, the same is readily capable of specifically different structural embodiments within its spirit and scope as defined in the appended claims.

I claim:

1. A hammer mill hammer comprising a shank, a tip separate from said shank mounted upon the outer end portion of the latter, said tip including a front wall overlying the front face of the outer end portion of said shank, a bottom wall overlying the outer end of said shank, and side walls overlying the side faces of the outer end portion of said shank, the front part of the outer end portion of said shank and the front wall of said tip having tongue and recess wedge formations tightly engageable with each other by rearward movement of the tip relative to the shank to secure the tip firmly upon the shank, the sides of said shank and the side walls of said tip having lug and recess wedge formations also tightly engageable with each other by rearward movement of the tip relative to the shank to assist in securing the tip firmly upon the shank, there being clearance spaces between adjacent ends of said wedge formations to permit said tip to move rearwardly relative to said shank to compensate for wear upon said wedge formations, and means for securing said tip against forward movement relative to said shank.

2. A hammer mill hammer as set forth in claim 1 wherein the shank and the side walls of the tip have alined transverse openings, and wherein the means for securing the tip against forward movement relative to the shank comprises a tapered pin extending through said openings and effective upon driving of the same to urge the tip rearwardly relative to the shank to tighten said tip relative to said shank.

3. A hammer mill hammer as set forth in claim 1 in which the lug and recess wedge formations comprise forwardly tapered lugs projecting from the sides of the shank and forwardly tapered recesses in the side walls of the tip opening through the rear edges of said side walls.

4. A hammer mill hammer comprising a shank, a tip separate from said shank mounted upon the outer end portion of the latter, said tip including a front wall overlying the front face of the outer end portion of said shank, a bottom wall overlying the outer end of said shank, and side walls overlying the side faces of the outer end portion of said shank, the front part of the outer end portion of said shank having a rearwardly tapered recess therein and a forwardly tapered tongue projecting forwardly therefrom, the front wall of said tip having a forwardly tapered recess therein and a rearwardly tapered tongue projecting rearwardly therefrom, said tongues being disposed in said recesses, respectively, and having wedging cooperation therewith responsive to rearward movement of said tip relative to said shank to secure said tip firmly upon said shank, there being clearance spaces between adjacent ends of said tongues and said recesses to permit said tip to move rearwardly relative to said shank to compensate for wear upon the coacting wedging surfaces of said tongues and said recesses, the side walls of said tip having therein and opening through their rear edges forwardly tapered recesses, forwardly tapered lugs projecting from the sides of the outer end portion of said shank and disposed in the recesses in said side walls and having wedging cooperation therewith responsive to rearward movement of said tip relative to said shank to assist in securing said tip firmly upon said shank, there being clearance spaces between the adjacent ends of said lugs and said side wall recesses to permit the tip to move rearwardly relative to the shank to compensate for wear upon the coacting wedging surfaces of said lugs and said side wall recesses, and means for securing said tip against forward movement relative to said shank.

5. A hammer mill hammer tip to be replaceably mounted on the outer end of a hammer mill hammer shank, said tip including a front wall to overlie the front face of the outer end portion of

the shank, and side walls to overlie the side faces of the shank, the front wall of said tip having at the rear thereof a wedge-shaped formation for wedging cooperation with a companion wedge-shaped formation of the shank to secure the tip firmly upon the shank responsive to rearward movement of the tip relative to the shank, the side walls of said tip having forwardly tapered recesses therein opening through the rear edges of said side walls and extending substantial distances into said side walls for wedging cooperation with lugs projecting from the sides of the shank to assist in securing the tip firmly upon the shank responsive to rearward movement of the tip relative to the shank.

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