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SWING HAMMER ASSEMBLY
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Fig. 1

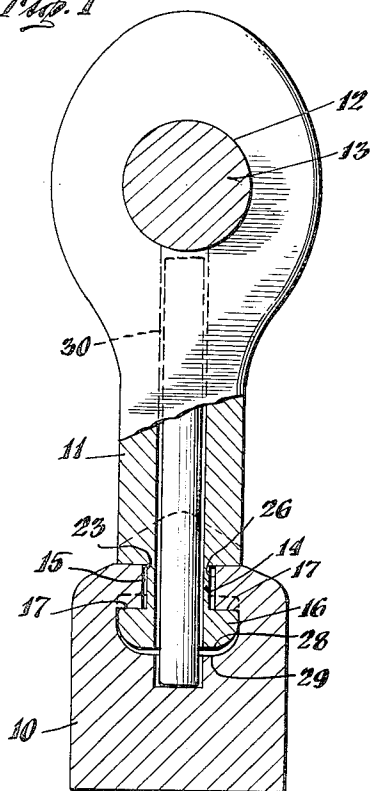


Fig. 2

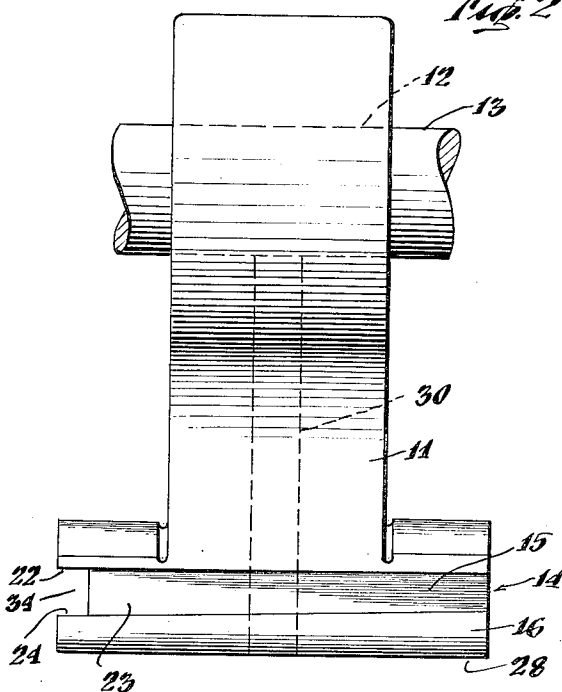


Fig. 3

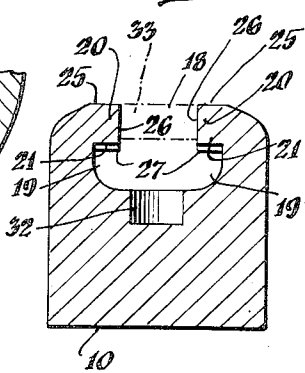


Fig. 4

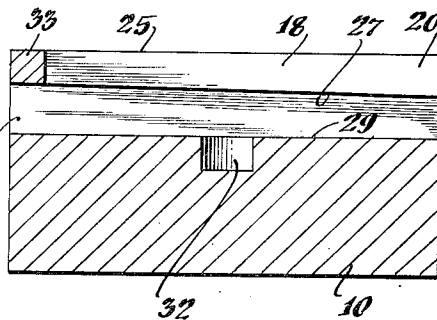
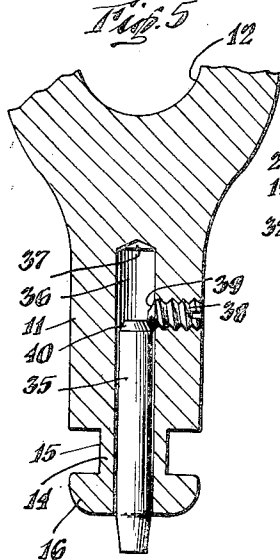


Fig. 5



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SWING HAMMER ASSEMBLY

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2 Claims. (Cl. 241-197)

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This invention relates to a renewable tip type hammer for an impact type crusher and more particularly to a mechanism for locking the hammer tip to the shank.

The object of this invention is to provide an impact type hammer with a renewable hammer tip that is easily attached to and removed from the hammer shank and locked in place.

Another object of the invention is to provide a renewable tip that will remain securely in place and may be easily removed when the hammer is worn out.

Another object is to provide a self-locking mechanism for locking a renewable hammer tip on a hammer shank.

Other and further objects and advantages will be understood from the following description taken in connection with the accompanying drawings in which

Fig. 1 is a sectional view of an assembled hammer;

Fig. 2 is a side elevational view of the shank of the hammer;

Fig. 3 is a transverse sectional view of the hammer tip of this invention;

Fig. 4 is a side sectional view of the tip of the hammer; and

Fig. 5 is a sectional view partially in elevation of an assembled hammer illustrating another embodiment of the invention.

The hammer of this invention as shown in Fig. 1 is comprised of a massive hammer tip 10 carried on one end of a hammer shank 11. The other end of the shank 11 is formed as an eye 12. As shown in Fig. 2, a shaft 13 passes through the eye 12 to support the hammer assembly on a rotor not shown. The hammer assembly swings on the shaft 13 upon rotation of the rotor. As shown in Fig. 3, the tip 10 is separable from the shank 11 and slidably mounted thereon by an interengaging fit between the tip 10 and the shank 11, as shown in Fig. 1. An elongated pediment 14 is formed on the end of the shank 11 which engages the tip 10. As shown in Fig. 2, the pediment 14 extends parallel to the axis of the shaft 13 with extended portions to lengthen the engaging surfaces and provide a securer investment. The pediment 14 is provided at each side with a groove 15, which indented into the longitudinal sides of the pediment 14 form a broad rail-like head 16 on the bottom of the pediment 14 at the extreme end of the shank 11. The head 16 together with the adjacent grooves 15 form angular shoulders 17. As shown in Fig. 3, the hammer tip 10 has a central

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slot 18 extending inward from its upper side and from one end to the other, as indicated by the unhatched portion of Fig. 4. Referring again to Fig. 3, a pair of lateral grooves 19 are undercut in the walls of the slot 18 to provide overhanging edges 20 diametrically positioned along each side of the central slot 18. Each overhanging edge 20 and its adjacent groove 19 form a shoulder 21. The edges 20 form tongues.

When the hammer tip 10 is slid onto the shank 11 the pediment 14 fits into the open end of the slot 18 with the overhanging edges 20 fitting into the grooves 15 and the sides of the head 16 fitting into the grooves 19. The shoulders 17 engage the tip 10 while the shoulders 21 engage the shank 11. Thus interfitted and interengaged, the tip 10 is held on the shank 11. Each groove 15 is formed of an upper surface 22, a medial vertical surface 23 and a lower surface 24. Similarly, each tongue 20 is formed of an upper surface 25, a vertical medial surface 26, and a lower surface 27. The upper surface 22 and lower surface 24 of each groove 15 are inclined with relation to each other, as shown in Fig. 2, to provide the groove 15 with a taper. The upper surface 25 and lower surface 27 of each tongue 20 are similarly inclined with relation to each other, as shown in Fig. 4, to provide the tongue with a taper. The taper of the grooves 15 matches the taper of the tongues 20. The tapers run from left to right as seen in Figs. 2 and 4 with the left ends of the tongues 20 and grooves 15 greater than their respective right ends. The right end of each tongue 20 fits into the left end of its respective groove 15 and the tip 10 thus slid on the pediment 14.

When the tip 10 is placed on the pediment 14 and the tongues 20 slid into their respective surfaces are brought into congruence by the taper. The tongues 20 are forced into the grooves 15 so that they are in tight engagement with the respective upper surfaces 22 and 25, and lower surfaces 24 and 27 in a binding abutment. The medial vertical surfaces 23 and 26 are not in gripping engagement as neither are the nether surfaces of the head 16 or the curved surfaces of the grooves 19. The head 16 terminates in an end surface 28 and the slot 18 has a bottom surface 29 which also are not in engagement.

The shank 11 has a central, axial passage 30 running from the surface 28 to the eye 12. A lock pin 31 is loosely fitted into this passage 30. The bottom 29 has a recess 32 centrally formed to be aligned with the passage 30 when the tip 10 is in position on the shank 11. The lock pin

31 fits into this recess 32 thus locking the tip 10 from disengagement from the shank 11.

A strap 33 is positioned at the left end of the T-shaped slot 18 where the tongues 20 are thickest. The strap 33 fits into a corresponding notch 34 at the left end of the grooves 15. The strap 33 and notch 34 position the tip 10 on the shank 11 and position the recess 32 in line with the lockpin 31 so that the lockpin 31 falls into the recess 32. The hammer shank 11 is then mounted on the shaft 13 holding the lockpin 31 in the recess 32.

There is a large tolerance between the diameter of the lockpin 31 and the passage 30 so that the lockpin 31 will readily drop out of the recess when the tip is renewed. The sides of the recess may be slightly tapered as indicated and the end of the lockpin is tapered to facilitate the dropping of the pins into the recess and thus avoid the necessity of a precise positioning of the tip 10 on the shank 11.

In Fig. 5 a modified lockpin 35 is not held by the shaft 12 in the shank 11. The lockpin 35 fits into a passage 36 with a bottom 37. The pin fits in the passage and falls out when the tip is in place. The lockpin is held in the recess 32 of the tip 10 by a set screw 38 with a beveled edge 39 of the set screw engaging the beveled edge 40 of the lockpin 35. The set screw 38 is recessed below the outer surface of the shank 11 to protect it from damage. The lockpin 35 has a tapered lower end 41 seating in the recess 32 which may be correspondingly tapered.

Swing hammers of the type of this invention are subjected to extreme abrasion of the impact and crushing surfaces. They are also put under high tensile stress in the parts of the hammer attached to the rotor. The hammer is made of parts each adapted to serve its function best. It is a feature of this invention that the means for securing together these separate parts are protected from damage or destruction by the abuse in the crushing operation, and to best employ properties of each part in attaining a secure and permanent attachment. The hammer tip may be cast or even made of a drop forging and the material used will preferably be of manganese, steel or high carbon alloys or an abrasion-resistant, high carbon, steel. Various materials may be used in the shank portion, for instance, a high tensile strength, low carbon, steel. The structure, of various metals, combined in accordance with this invention involves a minimum of parts and simplicity in their assembly. The locking parts are protected from impact and abrasion while both side faces of the hammer tips may be employed for crushing by reversal of the hammer or the direction of rotation.

The above embodiment of this invention is for the purpose of description and is not intended to limit the scope. Various modifications are readily apparent without departure from the spirit of the invention. For example, the locking pin may pass through the pediment portion and lock into the hammer tip at some other point and at the same time be protected and removable. It is, therefore, intended to limit this invention solely by the scope of the appended claims.

I claim:

1. A hammer for a hammermill type crusher comprising a shank adapted at one end to be mounted on a rotor of a crusher and having at the other end a mounting tip disposed on each side of the longitudinal axis, mounting grooves on each side of the shank adjacent the tip and adapted to receive tapered tongue pieces, a locking pin, a bore within the shank for movably retaining the pin and extending through the tip between the mounting grooves to permit the pin to extend beyond the end of the tip in a locking position, a hammer head having spaced sides fitting around the sides of said tip and shank and overlapping with the extreme end of said bore and locking pin, strips on said sides projecting inwardly into the space between said sides and to form tongues adapted to be tightly gripped in said grooves, a recess in the hammer head between said sides and aligned with the bore to receive the end of said projecting locking pin, said movable locking pin being in a locking relationship when positioned between said grooves in overlapping relation with said sides and having an end portion protruding out of the end of said tip and fitting into said recess in said hammer for holding said head from sliding out of said grooves and off said shank.

2. A hammer for a hammermill type crusher comprising a shank adapted at one end to be mounted on a rotor of a crusher and having at the other end a mounting tip disposed on each side of the longitudinal axis, mounting grooves on each side of the shank adjacent the tip and adapted to receive tapered tongue pieces, a locking pin, a central concealed bore within the shank for removably retaining the pin and extending axially through the tip between the mounting grooves to permit the pin to extend beyond the end of the tip in a locking position, a hammer head having longitudinally extending spaced sides fitting around the sides of said tip and shank and overlapping with the extreme end of said bore and locking pin, strips on said sides projecting inwardly into the space between said sides and to form tongues adapted to be tightly gripped in said grooves, a recess in the hammer head between said sides and aligned with the bore to receive the end of said projecting locking pin, said movable locking pin being in a locking relationship when positioned between said grooves in overlapping relation with said sides and having an end portion protruding out of the end of said tip and fitting into said recess in said hammer for preventing the removal of said head from said shank.

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