Dec. 19, 1933. H. F. CAMPBELL 1,939,660

REPLACEABLE TOOTH FOR CRUSHER ROLLS AND OTHER CRUSHING ELEMENTS

Filed Sept. 26, 1930

Fig. 2.

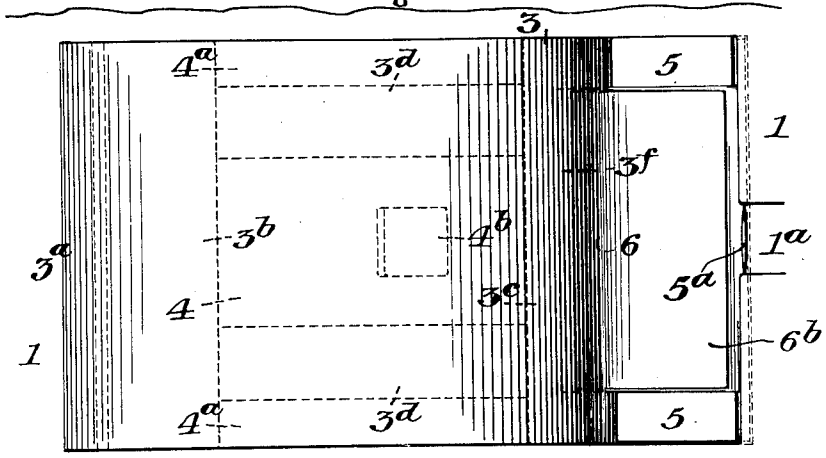


Fig. 1.

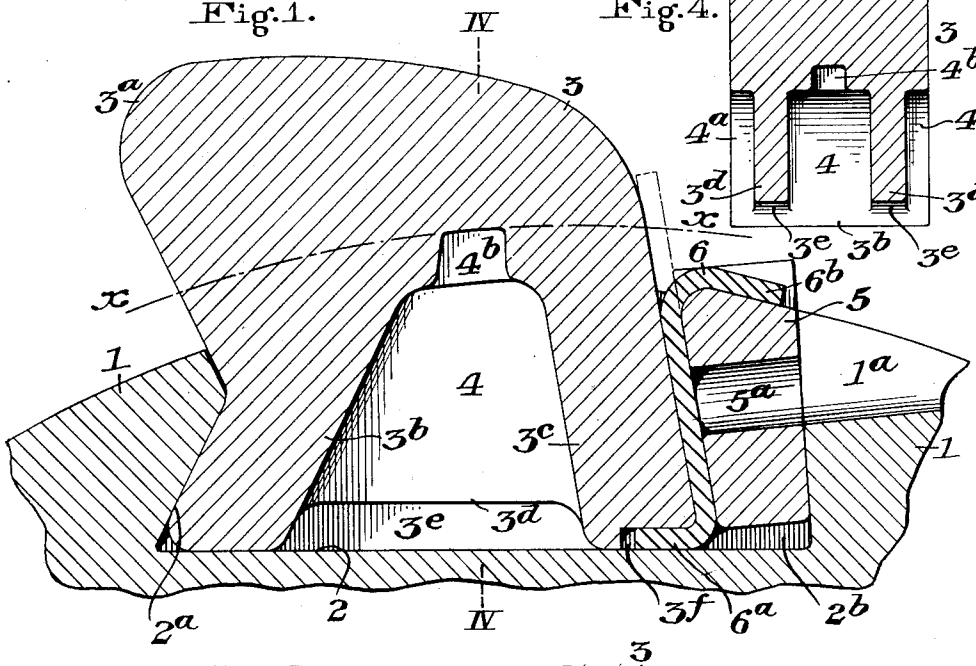
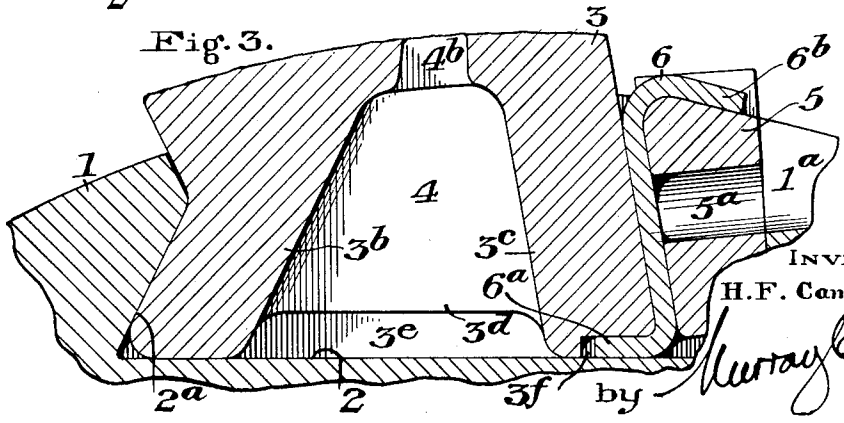


Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE

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REPLACEABLE TOOTH FOR CRUSHER ROLLS AND OTHER CRUSHING ELEMENTS

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Serial No. 484,628

4 Claims. (Cl. 83—53)

My invention relates to the art of crushing and more particularly to crusher rolls and other crushing elements employed in the reduction of large rock masses, coal and the like.

One object of my invention is to provide an improved form of replaceable tooth or impact member for such crushing elements, crusher rolls, and the like, such tooth occupying a preformed recess in the wall or body of the crusher roll or a suitable seat in other forms of crushing elements. It will be understood that a plurality of these teeth will be employed with a crusher roll and that they will be placed in preformed recesses disposed in the body of such roll.

A further object of my invention is to provide a form of hollow tooth adapted to recesses in a crusher roll, with means for securing such tooth in place.

And a still further object of my invention is to provide such hollow tooth so employed with a crusher roll with a special form of recess which will serve as a tell-tale to indicate when the tooth is worn to its limit of usefulness and will serve the further function of permitting or greatly facilitating access by suitable burning means, an acetylene torch or the like, for the purpose of removing such worn tooth from its seat in order that a new tooth can be applied in place of the worn one and held in place in the same manner.

These and other features of my invention are more fully described hereinafter; reference being had to the accompanying drawing, in which:

Figure 1 is a fragmentary sectional view illustrating one form of a hollow replaceable tooth and holding means therefor within the scope of my invention; such tooth being shown in position in its support, a crushing roll in the present instance.

Fig. 2 is a plan view of the form of tooth shown in Fig. 1.

Fig. 3 is a sectional view similar to Fig. 1 illustrating a tooth in worn condition, and

Fig. 4 is a sectional view of the tooth shown in Fig. 1, taken on the line IV—IV.

The general shape of the tooth, the form of recess in the support receiving the same and the locking means therefor, is substantially like that illustrated in the patent of E. H. Keiper, No. 1,865,860, July 5, 1932; a portion of the roll or supporting element being indicated at 1, and having a recess 2, with an undercut wall 2^a, for the reception of the tooth. The tooth, indicated at 3, disposed within such recess, comprises an impact portion 3^a, and front and rear walls 3^b and 3^c; the front wall providing a toe portion which substantially fits the undercut wall 2^a of the recess 2.

Inserted impact members, such as the teeth of crusher rolls, are subjected to enormous stress and wear, and replacement becomes necessary after they have been worn to such a point as to be non-effective in a crushing operation. In the present instance I have provided a hollow tooth with recessed sides, such tooth having an internal space or recess 4 which serves to lighten that portion of the tooth disposed within the recess of its support, the crusher roll for instance, without affecting the strength of the impact portion thereof. Additionally, the side recesses 4^a serve to further lighten the tooth without impairing its strength or effectiveness. The recessing of the tooth in the manner indicated provides a pair of connecting walls which may be in the form of ribs 3^d, between the front and rear walls 3^b and 3^c, shown more particularly in Fig. 4. These ribs may be recessed longitudinally of the tooth, as indicated at 3^e, so as to clear the bottom or floor of the recess 2; the walls 3^b and 3^c only contacting therewith.

As in the form of tooth shown in the Keiper application, securing means are provided which are preferably associated with the heel or rear wall 3^c of the tooth; the rear surface of which may be substantially radially disposed with respect to the axis of the roll 1. At this point I provide a wedge 5 and key 6 between the wall 2^b of the recess and the wall 3^c of the tooth; the key 6 lying between the wedge and the tooth and having a portion 6^a underlying the heel of the tooth, which may be recessed at 3^f for the purpose of receiving the same. After the tooth has been inserted in the recess 2, together with the key and wedge, and the toe portion of the front wall 3^b has been jammed against the undercut wall 2^a of the recess 2, the wedge 5 may be driven home between said key and the wall 2^b of said recess 2 and then the upper portion 6^b of the key is bent over on top of the wedge. The key is of such metal and construction as to retain the bent over condition during use. In the present instance the key is provided with an aperture 5^a for the insertion of a removing tool and the roll may be recessed in line with said aperture, as at 1^a, for the ready application of such tool.

The improved teeth forming the subject of my invention are of such size that they may be considerably worn and still perform substantially the desired function. At the same time there is a limit to their usefulness and in order that such limit may readily be determined visually, I pro-

vide the internal hollow portion of the tooth with a supplemental recess 4^b, as clearly indicated in Figs. 1 and 3, which supplemental recess will be exposed when the tooth is worn to an extent as to be substantially useless; such extent being approximately indicated by the broken line *x*, in Fig. 1. When the wear has continued to this point, the supplemental recess 4^b is exposed and is a visual signal that the tooth is worn out and should be replaced.

Such tell-tale hole serves the further function of providing ready access for a burning device, an acetylene torch for instance, the flame of which may be introduced through such opening and effect the complete burning out of the tooth and permit removal of the securing means; thereby clearing the recess 2 and making it ready for the reception of a new tooth. This arrangement is highly desirable because in practice the keying or securing means are liable to be completely hidden by the finer particles of the material being crushed which collect in the recesses and interstices between the same and the tooth combined with the natural rusting; thereby rendering the securing means difficult if not impossible of removal until the tooth has been removed. The tell-tale, permitting access of the flame to burn the tooth, avoids the necessity of attempting to remove the wedge and/or key when they have rusted fast.

While I have illustrated a single tooth set in recesses formed in the wall of a crusher roll or similar body, these teeth may be of any width (or length) desired and I may employ segments or blades extending the full length of a roll internally recessed in the same manner as the single tooth and provided with supplemental recesses which serve as tell-tale indicia when such segments, blades or other members have been worn to such an extent as to require renewal. In like manner such segments or blades may be held in place by means similar to that disclosed with reference to the securing means for a single tooth.

I claim:

1. A crushing element having a recess, an inserted tooth fitting said recess and having an internal space or recess with a portion extending to a point beyond the surface of the recessed element receiving said tooth and adapted to be exposed when said tooth is worn, and means for securing said tooth within the recess of said crushing element.

2. A crusher roll having a recess, an inserted tooth fitting said recess and having an internal space or recess with a portion extending to a point above the periphery of said roll and adapted to be exposed when said tooth is worn, and means for securing said tooth within the recess of said crusher roll.

3. A crusher roll having a recess, a hollow tooth having front and back walls and connecting walls between the same defining an internal space fitting within said recess; said tooth having a supplemental recess extending from the space between its ribs to a point above the periphery of said roll adapted to be exposed when said tooth is worn, and means for securing said tooth within the recess of said crusher roll.

4. A crusher roll having a recess, a hollow tooth fitting within said recess; said tooth having front and back walls and connecting ribs defining an internal space and a supplemental recess extending from the space between its ribs to a point above the periphery of said roll adapted to be exposed when said tooth is worn, and means for securing said tooth within the recess of said crusher roll.

HERBERT F. CAMPBELL.