Jan. 23, 1923.

1,442,946

J. L. HILLER.
HAMMER FOR PULVERIZERS.
FILED AUG. 4, 1919.

2 SHEETS-SHEET 1

FIG. 1

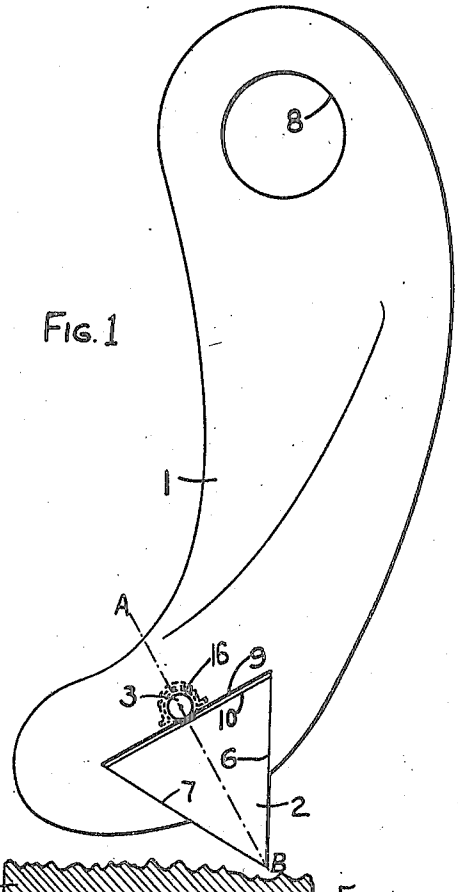


FIG. 2

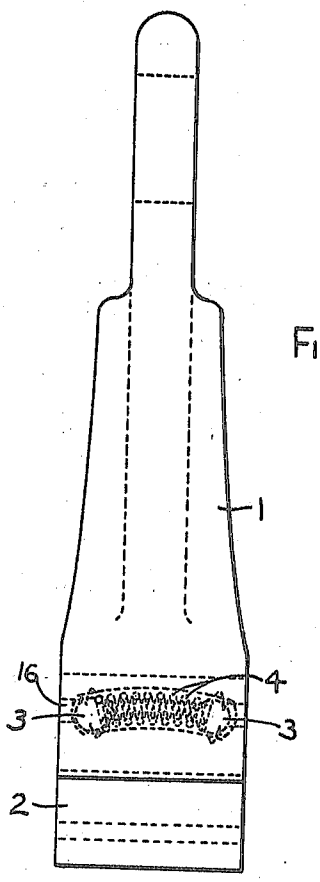


FIG. 3

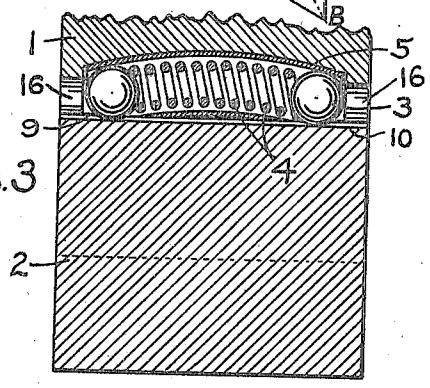
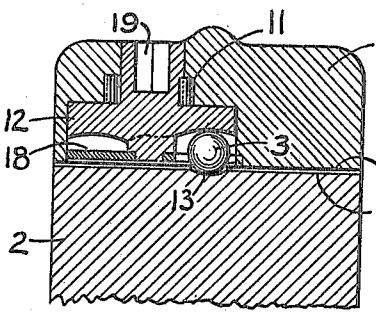


FIG. 4



WITNESS:
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Florence L. Hiller

INVENTOR.
JOSEPH L. HILLER
BY J. L. Hiller
ATTORNEY.

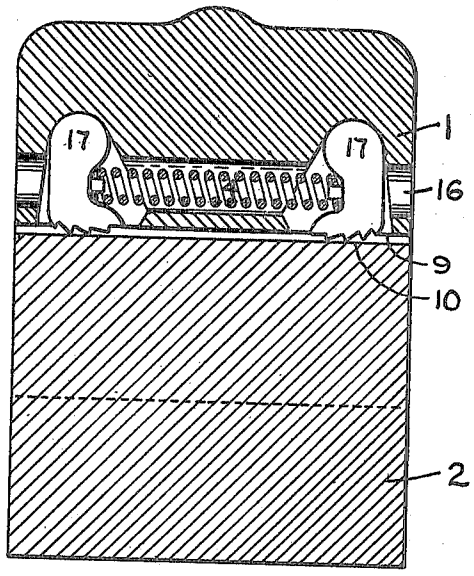
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2 SHEETS-SHEET 2

FIG. 5



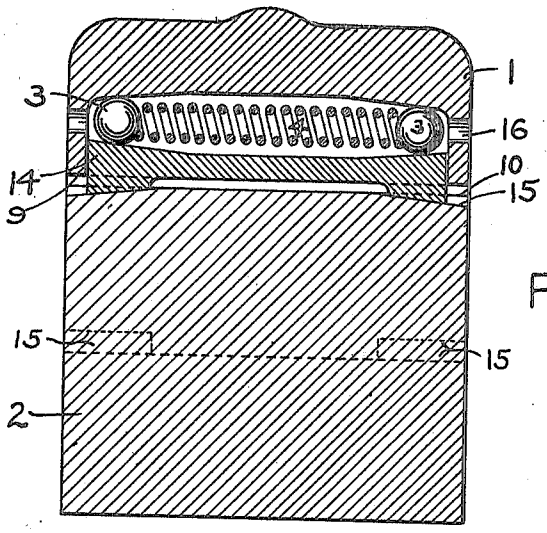


FIG. 6

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Patented Jan. 23, 1923. 1,442,946

UNITED STATES PATENT OFFICE.

JOSEPH L. HILLER, OF MATTAPOISETT, MASSACHUSETTS.

HAMMER FOR PULVERIZERS.

Application filed August 4, 1919. Serial No. 315,115.

To all whom it may concern:

Be it known that I, JOSEPH L. HILLER, a citizen of the United States, residing at Mattapoisett, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Hammers for Pulverizers, of which the following is a specification.

This invention relates to hammers for pulverizers and to that branch of the art in which Patent No. 1,197,026 was granted on September 5, 1916 to me. Hammers made in accordance with this invention are adapted for use in my pending applications, Serial No. 277702 of February 18, 1919 and Serial No. 279144 filed February 25, 1919 and generally in crushers and pulverizers of the swing hammer type. Such hammers are specially adapted for use in balanced rotors.

The object of the invention is to provide renewable cutting edges at a moderate cost, both for the material required for the renewable members and in the time for making the changes and to provide an efficient type of renewable cutting edge which is securely held in position in a simple manner.

I attain the objects sought by utilizing my discovery in the triangular prismatic form for the renewable member of a shape which is easy to manufacture, requires no surface finishing or other machining, possesses an admirable cutting edge and presents, when new, a choice of six edge faces each equally good for service. Although this is not a standard rolled section, it is adapted for production at a low cost when manufactured solely for the use herein disclosed.

Fig. 1 illustrates a side view of the device showing both the hammer holder and the renewable cutting member together with means for securing cutting member within the holder. This view shows the completed hammer in a plane parallel with its plane of rotation.

Fig. 2 shows an elevation of the hammer as it presents itself to the work of cutting and crushing.

Fig. 3 illustrates a simple clutch type of holding mechanism for securing the cutting member within the holder as a section in a plane along line A, B, Fig. 1.

Fig. 4 shows a circular wedge for supporting the clutch ball against the cutting member.

Fig. 5 illustrates another type of clutch mechanism which is positive in its action, in securely holding the cutting member.

Fig. 6 illustrates a form of keying and clamping mechanism which is also positive in its action and of low production cost.

In the several views the holding portion of the hammer is marked 1, and is provided with a recess with sides 6, 7 and 9 for the reception of the major portion of the renewable cutter marked 2, which may be inserted from one or both ends of the recess, depending on whether a strengthening wall is employed across one end or left open, as shown in drawing. The cutter has one acute angled corner projecting outwardly from the holding portion and exposed for cutting and crushing service. In Fig. 3 the clutch balls are marked 3, the compressed spring which forces the clutch balls apart is marked 4, and the curved tube provided for the purpose of making the mechanism self contained and attaching it to the holder 1, in a pocket, opening from the cutter recess, and for providing a surface which can be readily hardened and against which the balls 3 press in supporting the cutting member 2 in engagement with the jaws 6 and 7, is marked 5. The curved tube 5 of Figs. 1, 2 and 3 which is seated in the holding member 1, affords inclined surfaces for supporting each of the clutch balls in their various positions along the tube, which positions are in turn dependent upon the relative positions of the surface 10 of the renewable cutter, against which the clutch balls rest and the inside wall of the tube, and it allows the position of the clutch balls to compensate for various sizes of cutters as well as allowing the clamping and releasing of cutters. Thus when clamping a small cutter, the clutch balls will be farther apart than when clamping a large cutter.

It will be apparent from an inspection of the drawings that the hammer, when attached to a rotor by means of a carrying member passing through opening 8 in one end thereof and rotated, as in practice, at high velocity, will develop, through the action of centrifugal force, a strong tendency for the cutting member, 2, to forcibly wedge itself between the jaw members 6 and 7

which will support said cutting member in service. It will also be seen that the clutch mechanisms are adapted to hold the cutting member, 2, securely in contact with the holder jaws and provide for taking up any varying clearance between the surface 9 of the holder and 10 of the cutting member which may be occasioned by slightly varying sizes in the cutting members or because of the cutting member adjusting itself more securely between the holding jaws 6 and 7.

Referring to Figs. 1 and 2, the operation of renewing a cutting edge will be seen to consist of the compression of spring 4 by means of either one or both of balls 3 being pressed inwardly against the spring, and in any convenient manner, as by the jaws of tongs inserted through the holes marked 16, which act releases the cutting member 2 so that it may be slid out endwise and again inserted after being rotated to present a new cutting edge, or another cutting member may be substituted therefore. When inserting a cutting member in the holder, it is necessary to restrain the clutch until the cutting member is properly positioned, at which time the release of the clutch will securely hold the cutting member within the holder jaws.

In the operation of the clutch shown in Fig. 4 the spring 11 tends to rotate the circular cam 12 which is made in the form of an annular wedge so as to force the ball 3 outward against surface 13 of the cutting member 2. The cam 12 being in the form of a circular wedge which is grooved on the side against which the ball presses will cause the ball to wedge between it and the cutting member 2 in case the cutting member should move in either direction.

It is obvious that other forms of clamping members may be utilized for holding the renewable cutting member 2 within the holder 1. I do not, therefore, limit my invention to the particular clamping devices shown, in view of other forms of wedges, toggles and other grips all of which are available. A fairly good and practical clutching arrangement consists of a rocking or inclined key in the cutting member engaging an inclined key-way in the holder to positively prevent movement in one direction and with a spring and ball clutch to prevent movement in the opposite direction. This latter arrangement may be especially useful in such a machine as is shown in my patent application No. 279144, filed February 25, 1919 and in which machine the rod for holding the hammer is arranged vertically and the rotation of the drum is in a horizontal plane in which case there would be a tendency for the renewable cutter 2 to drop, by the force of gravity, from the holder which the wedging key would positively prevent and in which type of machine such a wedging key located approximately central with the length of the renewable cutter might prove entirely satisfactory without any additional clutch.

It will be understood by those versed in the art that the cost of renewing hammers in crushing and pulverizing machines is a very substantial part of the cost of operation and any improvement which reduces the cost of renewals or lessens the cost of installing renewals is of importance.

What I claim is:

1. The combination of a holder, suitable for mounting in a crusher or a pulverizer, a triangular prism, and means for locking said triangular prism within a recess in said holder.

2. A crushing or pulverizing hammer comprising a holder having a recess in one end, a prismatic shaped tool fitting in said holder and clamping means in said recess for holding said tool in place; a portion of said tool fitting in said recess and having a projecting working edge outside of said holder.

3. A combination in a hammer, for crushers and pulverizers, of a regular triangular prism, a holder, having two jaws adapted to engage two sides of said prism and a clutch mechanism adapted to act between said holder and said prism, to retain said prism within said holder.

4. In a hammer, adapted for use in crushers or pulverizers, the combination of a member adapted for crushing or cutting, a holder for said member said holder having an eye at one end and a clutch mechanism adapted to prevent by wedging, the dislodgment of said member except when said clutch is intentionally released.

5. The combination, in a pulverizer hammer, of a triangular prism and a holder having at one end thereof a recess of incomplete triangular section adapted to hold two acute angled edges of said triangular prism, and adapted to permit the third acute angled edge of said triangular prism to project outside said holder.

6. A beater, adapted for use within a crusher or pulverizer, consisting of the combination of a holder with an incomplete triangular recess, adapted to engage portions of the three similar sides of a triangular prism, and a triangular prism in engagement therewith and having an edge adjacent to two of said sides thereof projecting from said holder.

7. The combination of a holder, adapted, by an eye in one end thereof, for mounting in a crusher or pulverizer and having a recess in the other end thereof, and a regular triangular prism and means for rigidly locking said triangular prism in said holder.

8. A pulverizing hammer consisting of a holder having a recess in one end; said

recess having two of its opposite walls inclined and its ends open; a prismatic-shaped tool seated in said recess and clamping means for holding said tool in place; said tool having a projecting edge outside of said holder and in line with the width of said recess.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH L. HILLER.

Witnesses:
EDWARD B. HILLER,
FLORENCE L. HILLER.