Jan. 25, 1927. 1,615,738

N. K. BOWMAN

MINING MACHINE CHAIN LINK AND BIT

Filed Feb. 2, 1925

Fig. 1.

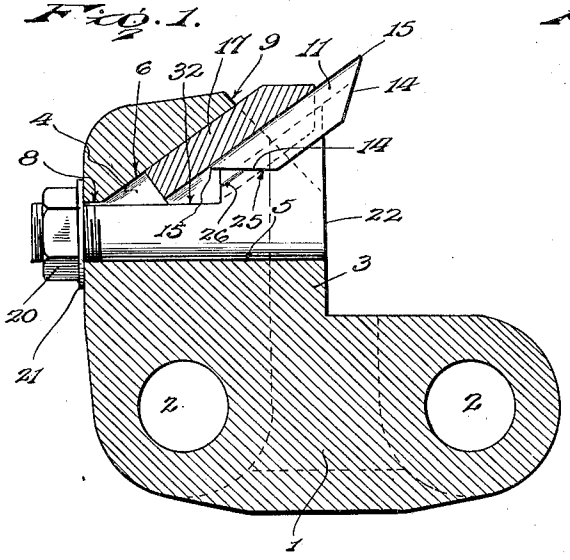


Fig. 2.

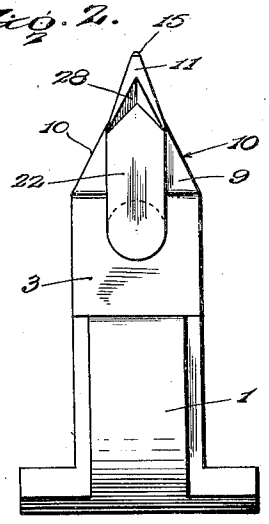


Fig. 4.

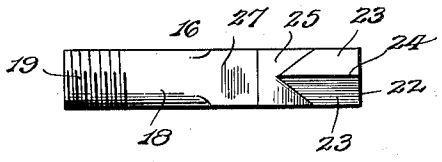


Fig. 3.

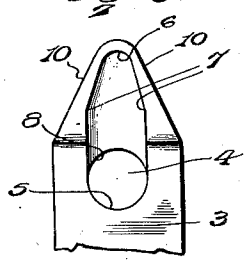
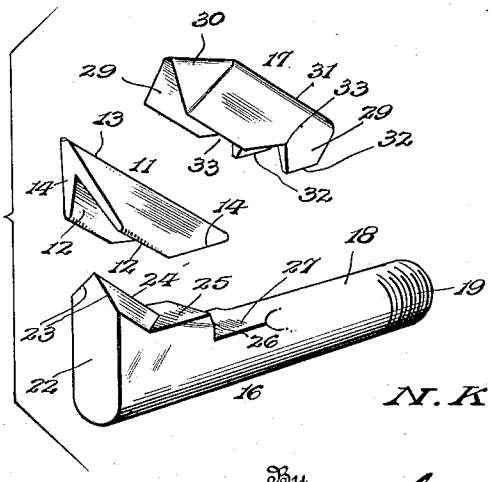


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MINING-MACHINE CHAIN LINK AND BIT.

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This invention relates to the chains of mining machines and has special reference to the chain link or lug and the means for securing the cutter or bit therein. The invention seeks to provide a novel construction of link or lug whereby the link or lug may be produced by drop-forging, and to provide novel means for clamping the bit or cutter in operative position in which the bit-clamping force will exert a compressing action upon the link or lug and will so support the bit or cutter that under the stress applied thereto in operation it will be more firmly clamped or secured in place. The invention also seeks to provide a structure in which maximum clearance for the bit will be attained, and while the bit will be very firmly secured in place it may be easily removed when renewal is necessary. These several objects, and other objects which will incidentally hereinafter appear, are attained in such a device as is illustrated in the accompanying drawing, and the invention resides in certain novel features which will be particularly pointed out in the appended claims.

In the accompanying drawing:

Figure 1 is a view, partly in longitudinal section and partly in elevation, of an embodiment of my present invention;

Fig. 2 is an end elevation of the same;

Fig. 3 is a detail end elevation of the upper portion of the chain lug, the bit and the bit-clamping devices being removed;

Fig. 4 is a plan view of the lower bit-clamping member or anvil, and

Fig. 5 is a view showing the bit and the bit-clamping members in perspective.

The chain lug comprises a body 1 which is provided at its ends with the usual eyes 2 to be pivotally connected with the straps now commonly employed to join the successive lugs or links of the mining machine chain. According to the present invention, the lug is constructed with a lateral extension 3 at one end which has an opening 4 extending longitudinally therethrough. This opening has an inner wall 5 which is parallel with a plane common to the centers of the two eyes 2 and which is transversely curved, as shown in Fig. 3. The outer wall 6 of this passage or opening 4 is disposed obliquely with respect to the wall 5, as shown most clearly in Fig. 1, and the top and bottom walls 7 are parallel in their inner portions but in their outer portions converge outwardly toward the outer wall 6 which is appreciably narrower than the inner wall 5, this structure being clearly shown in Fig. 3. Upon referring to Figs. 1 and 3, it will also be noted that the wall 6 extends nearly to the rear side of the extension 3 of the link and a circular terminal 8 for the passage 4 is provided immediately adjacent the rear side of the link and extends through said rear side. The forward corners of the extension 3 are cut away or beveled, as shown at 9, and the outer sides of the said extension converge outwardly, as shown at 10 in Fig. 2, this construction being advantageous inasmuch as it provides clearance behind the cutting bit or point.

The bit or cutter 11 is shown as a straight bar of metal V-shape in cross section so as to present diverging wings 12 which form an edge 13 at the back of the bit, and the ends of the bit are tapered, as indicated at 14, whereby the extremities of the bits define cutting points 15. In assembling the parts, the bit rests against a clamping or anvil member 16 and is held to the same by a clamping jaw 17, the said anvil and clamping jaw being fitted in the opening 4 through the lug and firmly secured therein. The anvil member is so constructed as to present a shank 18 at its rear end of circular cross section whereby it is adapted to extend through the opening 8 in the rear side of the chain lug and the extremity of the shank is threaded, as shown at 19, whereby it may receive a nut 20 and a washer 21 adapted to bear against the rear side of the chain lug and secure the parts in position. At its forward end, the anvil is provided with a flat face 22 disposed at a right angle to its longitudinal axis and adapted to extend flush or substantially flush with the front face of the extension 3 when the parts are assembled, as shown in Fig. 1. The front face or extremity of the anvil projects outwardly beyond the main body of the anvil and has its outer surface beveled toward its sides, as shown at 23, whereby it defines a ridge or edge 24 adapted to fit closely between the diverging wings 12 of the bit. At the base of the longitudinally rearwardly inclined edge 24 and the diverging faces 23, the anvil is constructed with a shoulder or table 25 which extends longitudinally or parallel with the axis of the anvil and the inner rear end of the bit rests upon this shoulder or table 25, as shown clearly in Fig. 1. Immediately at

the rear of the said shoulder or table 25 is a transverse shoulder 26, and between the said transverse shoulder and the shank 18 is a flat surface 27. Upon referring to Figs. 1 and 2, it will be noted that the bit rests upon and is supported by the table 25 and the outwardly projecting inclined portion or horn of the anvil defined by the edge 24 and the surfaces 23, and the said horn projects beyond the beveled surface 9 of the chain link or lug so that the assembled structure will present minimum resistance to the passage of the chain through the coal. It will also be noted that the bit defines a forwardly projecting cutting point and also presents a recess, indicated at 28 in Fig. 2, whereby maximum clearance for the bit is attained. Cooperating with the bit and the anvil to secure the bit in place is the clamping jaw 17. This jaw 17 is a short metal body substantially V-shaped in cross section whereby it presents diverging sides or wings 29 adapted to rest upon and span the bit, and of such extent that its outer end will be disposed between the outer extremity of the chain link or lug and the outer end of the bit while extending nearly to the extremity of the bit, thereby reinforcing the same and acting to resist any tendency of the bit to bend under working stress. The outer extremity of the jaw 17 is tapered, as shown at 30, to provide clearance in rear of the bit point, and it is transversely convex along its longitudinally extending ridge 31 whereby it conforms to and fits closely against the outer wall 6 of the longitudinal opening through the chain lug. The lower corners of the wings 29 are cut away, as indicated at 32, whereby they may rest squarely upon the flat surface 27 of the anvil member, and, adjacent the said cut-away portions 32, notches 33 are formed in the wings of the jaw adapted to abut the shoulder or table 25 in juxtaposition to the inner end of the bit and at the sides thereof and also abut the transverse shoulder 26 of the anvil. The clamping jaw is set in the lug obliquely or inclined to the anvil member and the longitudinal dimensions of the clamping jaw 17 and the bit extend parallel with the wall 6 of the opening through the lug, as will be understood upon reference to Fig. 1.

The parts having been assembled as described and as shown in Fig. 1, the nut 20 is turned home against the washer 21 and the anvil member is thereby drawn through the opening 4 in the chain lug so that the horn of the anvil rides into snug engagement with the under or inner side of the bit and fits between the wings of the same and the bit is, in turn, carried into snug engagement with the inner side of the jaw 17 and fits between the side wings of the latter. The notches 33 in the jaw 17 are caused to abut squarely against the table 25 and the shoulder 26 of the anvil with the lower cut-away portions 32 of the jaw resting upon the flat surface 27 of the anvil, the jaw being carried against the inclined wall 6 of the opening through the lug so that the bit will be very securely clamped by and between the anvil and the jaw. It will be seen at once that the force exerted upon the lug through the nut 20 and the working end of the anvil is a binding or compressing force rather than an expanding force so that the tendency of the lug to crack or split under the strain is minimized, and this feature of the present construction is a decided advantage over arrangements heretofore employed. It will also be noted that the anvil presents a firm support for the bit while it is at work and the resistance of the coal to the passage of the bit causes the bit and the jaw to wedge or bind firmly within the opening through the chain link or lug. When the parts are fully assembled and secured, there is no play or lost motion between the bit and the jaw or the anvil, and the bit is held firmly to its work so that it operates with a very high degree of efficiency. It is also to be noted that the passage or opening through the extension of the chain lug or link is such that it cooperates in effecting a wedging or binding action of the clamping jaw upon the bit and also permits the lug to be formed by drop-forging. The structure constituting the present invention is very simple notwithstanding its high efficiency and enables the device to be manufactured and assembled at a very low cost.

Having thus described the invention, I claim:

1. A mining machine chain structure comprising a chain link or lug having a lateral extension provided with a longitudinal opening therethrough, the inner wall of said opening being paralled with the longitudinal axis of the lug and the outer wall extending obliquely rearwardly toward the inner wall, an anvil member seated in said opening and extending through the same and beyond the rear side of the lug with its shank in contact with the inner wall of the opening, a bit resting upon the anvil parallel with the outer wall of the opening through the lug, a clamping jaw fitting over the bit and against the outer wall of the opening through the lug and engaged with the anvil at the inner end of the bit, and means on the rear end of the anvil cooperating with the rear side of the lug to clamp the anvil, the bit and the jaw within the opening through the lug.

2. A mining machine chain lug having an opening extending longitudinally therethrough and provided with rearwardly converging walls, an anvil member seated in said opening and having a threaded stem

projecting through the rear side of the lug, a horn at the front end of the anvil, a bit spanning the horn and having its lower end resting upon the anvil at the base of the horn, a clamping jaw fitting over the bit and bearing against a wall of the opening through the lug, and a nut mounted on the threaded extremity of the anvil and bearing against the rear side of the lug to clamp the anvil, the bit and the jaw within the lug.

3. A mining machine chain lug having a longitudinal passage therethrough, said passage having converging walls and opening through the front and rear of the lug, an anvil seated in said passage and projecting through the rear side of the lug, the said anvil being provided at its front end with an outwardly projecting horn having diverging rearwardly inclined surfaces and a flat table at the base of the horn in rear of the same, a V-shaped bit resting over the horn and having its lower end resting on said table, and a V-shaped clamping jaw fitting over the bit and also resting on said table with its outer side bearing against the outer wall of the passage through the lug, and means cooperating with the rear end of the anvil and the rear end of the lug to secure the anvil, the bit and the jaw firmly in said passage.

4. A mining machine chain lug having a longitudinal passage therethrough, said passage having converging walls, an anvil member seated in said passage and extending through the rear end of the lug, the front end of the anvil being provided with an outwardly projecting rearwardly inclined horn, a flat table at the lower end of the horn and at the rear side of the same and an inwardly projecting shoulder at the rear end of the table, a V-shaped bit fitting over the horn and having its lower end resting upon said table, a V-shaped clamping jaw fitting over the bit and provided adjacent its lower end in its sides with notches having one wall resting upon the table and another wall abutting the shoulder at the end of the table, and means cooperating with the anvil and the rear end of the lug to clamp the anvil, the bit and the jaw within the passage through the lug.

5. A mining machine chain lug having a longitudinal passage therethrough, said pas sage having converging walls, an anvil member seated in said passage and extending through the rear end of the lug and provided at its front end with an outwardly projecting horn, a flat table at the lower rear side of the horn and having a flat surface in stepped relation inwardly to the said table, a bit fitting over the horn and having its lower end resting on said table, and a clamping jaw fitting over the bit and provided at its inner end with portions abutting the table and also abutting the flat portion of the anvil stepped inwardly from the table, and means cooperating with the anvil and the rear end of the lug to clamp the anvil, the bit and the jaw within the passage through the lug.

6. A mining machine chain lug having a longitudinal passage therethrough, an anvil member seated in and extending through said passage, a bit seated on the front end of said anvil member, a clamping jaw fitted in the lug over the bit and interengaging with the anvil member around the inner end of the bit, and means at the rear end of the anvil member whereby to draw said member rearwardly to clamp the bit in the lug.

In testimony whereof I affix my signature.

NEWTON K. BOWMAN. [L. S.]