

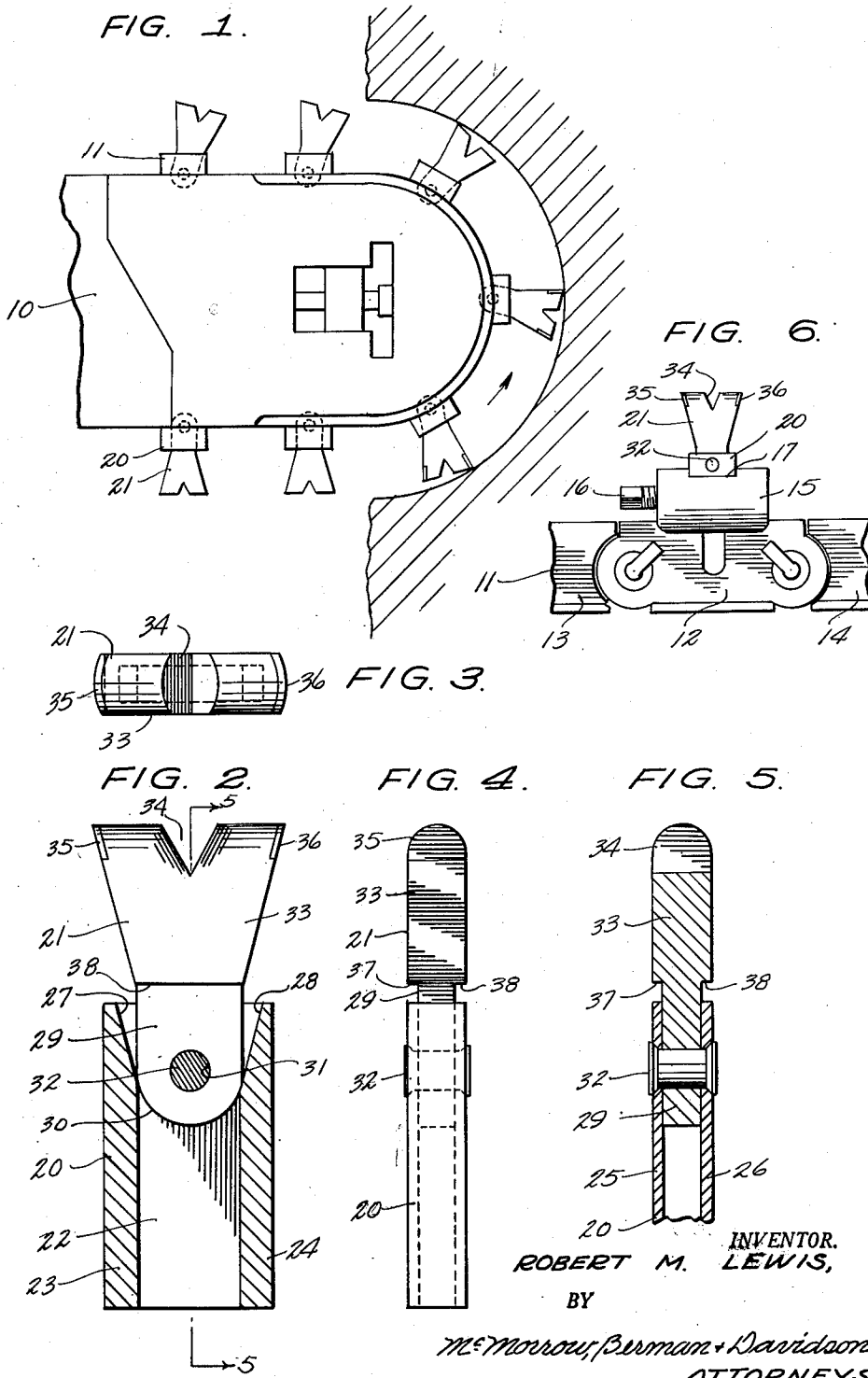
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CUTTER BIT FOR MINING MACHINES

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CUTTER BIT FOR MINING MACHINES

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4 Claims. (Cl. 262—33)

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This invention relates to cutter bits for cutting chains and more particularly to cutter bits for the chains of mining machines equipped with cutting chains.

It is among the objects of the invention to provide an improved bit which will cut in both directions of movement of the chain on which it is mounted and is so constructed that reversal of its movement in the work material will not dislodge the hardened tips from the bit, which renders the mining machine capable of cutting in both directions so that it is not necessary to traverse the machine in idle condition across the work face each time a new cut is made, which can be easily mounted on an existing chain with no material modification of the chain construction and is reversible relative to the chain to prolong its periods of use between resharpening operations, and which is strong and durable in construction, economical to manufacture, and easy to install.

Other objects and advantages will become apparent from a consideration of the following description and the appended claims in conjunction with the accompanying drawing, wherein:

Figure 1 is a diagrammatic illustration showing the cutting element of a mining machine engaged in work material, such as unmined coal, with cutting bits illustrative of the invention mounted on the cutting chain of the machine;

Figure 2 is a longitudinal cross sectional view of a cutting bit assembly illustrative of the invention;

Figure 3 is a top plan view of the cutting bit assembly illustrated in Figure 2;

Figure 4 is a side elevational view of the cutting bit assembly;

Figure 5 is a longitudinal cross sectional view on the line 5—5 of Figure 2; and

Figure 6 is an elevational view of a fragmentary portion of a cutting chain illustrating the manner in which the cutting bit assembly is secured to the chain.

With continued reference to the drawing, the mining machine may be of any desired or well known construction and is provided with a flat cutting blade 10 projecting outwardly from the machine and providing a guide for a cutting chain 11 which moves around the blade or guide 10 and is guided in a groove extending around the edge of the blade.

The chain comprises pivotally interconnected links as indicated at 12, 13 and 14 in Figure 6 and some of the links, spaced apart at substantially equal intervals along the chain, are provided with bit receiving sockets, as indicated at 15.

The socket 15 illustrated comprises a cylindrical body secured at one side to the link 12 and projecting outwardly from the link. This

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body has a well or recess of rectangular shape extending transversely thereof substantially at its midlength location and opening to the side of the socket remote from the chain link to receive a cutting bit and has in one end a tapped hole which receives a set screw 16 which is threaded into the corresponding end of the socket to engage a bit received in the bit receiving well or recess 17 and clamp the bit firmly in the socket so that the bit extends outwardly of the socket in a direction away from the chain.

According to present practice each bit has a stem portion of generally rectangular cross sectional shape received in the socket recess and clamped in the socket by the set screw 16 and has a head portion extending outwardly of the socket and provided on one side with a tip of hard metal alloy material. Such a bit will cut in only one direction of movement of the associated chain and when the movement of the chain is reversed, as must frequently occur, to free the chain and bit, the incidental reverse movement of the bit tends to dislodge the cutting tip from the bit and render the bit useless for further cutting. The single tip bits currently in use also require that the machine always cut in one direction only so that, when a cut has been completed, it is necessary to traverse the machine in idle condition across the work face in order to begin a new cut. This is extremely wasteful of time and effort and decreases the productive capacity of the machine.

The present invention contemplates a two way cutting bit having two hardened tips disposed one at each opposite side of the head of the bit and comprises an assembly including a sleeve 20 and a bit 21 pivotally connected to the sleeve.

The sleeve 20 is an elongated metal body of generally rectangular cross sectional shape and of a size to fit in the bit receiving recess 17 in the chain socket 15. This sleeve has a bore 22 extending longitudinally therethrough which bore is also of rectangular cross sectional shape but somewhat different in shape from the cross section of the sleeve so that the edge walls 23 and 24 of the sleeve are much thicker than the sleeve side walls 25 and 26. At one end of the sleeve the side walls 23 and 24 are inclined or tapered outwardly on their inner surfaces, as indicated at 27 and 28 so that this one end of the sleeve bore is larger than the other end of the bore. The bit 21 has a stem portion 29 of rectangular cross sectional shape received in the bore of the sleeve at the enlarged end of the sleeve bore and this stem has an arcuately rounded end 30 and an aperture 31 extending transversely therethrough substantially coaxial with the curvature of the curved end 30. A pivot pin 32 extends through the aperture in the bit stem 29 and through aligned apertures in the

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side walls 25 and 26 of the sleeve to pivotally connect the bit to the sleeve. A limited freedom of rocking movement of the bit relative to the sleeve is provided by the outwardly inclined end wall surfaces 27 and 28.

The bit also includes a head portion 33 joined to the end of the stem portion 29 opposite the curved end 30 and extending longitudinally outward from the corresponding end of the stem portion. The opposite edges of the head portion 23 diverge symmetrically in a direction away from the stem portion and the other end of the head portion is disposed substantially perpendicular to the common longitudinal center line of the stem and head portions of the bit. The head portion is transversely rounded at its outer end on an arcuate curvature of approximately 180° and is provided with a V-shaped notch 34 the apex of which is on the common center line of the stem and head portions and the sides of which diverge symmetrically of this center line from the apex to the other end of the head portion. Recesses are provided in the head portion at respectively opposite sides and at the outer end of the head portion and cutting tips 35 and 36 of hard metal alloy are respectively mounted in these recesses. Each of the cutting tip has a curved surface substantially flush with the transversely curved surface of the outer end of the head portion of the bit so that the tips are provided with cutting edges around their curved ends or edges.

With a bit assembly as above described mounted on the cutting chain, the bit 21 will rock relative to the sleeve in accordance with the direction of movement of the cutting chain to bring the corresponding cutting tip into cutting position. For example, in considering the illustration in Figure 2, if the bit assembly is moved to the right by the cutting chain the bit 21 will be rocked to the left and the tip 36 will be further from the chain than the tip 35. The tip 36 will then be the cutting tip and the tip 35 will follow in the groove provided by the tip 36 and will not be dislodged from the bit. If the direction of the cutting chain is reversed the bit will be rocked to the right, as illustrated in Figure 2, and the tip 35 will then become the cutting tip and the tip 36 will follow in the groove provided by the tip 35. Thus with bit assemblies as provided by the present invention mounted on the cutting chain, the chain may be operated in either direction and will cut as efficiently in one direction as in the other.

It will be noted that the head portion 33 of the bit is thicker than the stem portion 29 so that the thickness of the head portion is substantially equal to the thickness of the sleeve 20, the bit having transversely extending shoulders 37 and 38 disposed at respectively opposite sides of the bit at the juncture between the head and stem portions of the bit and overlying the outer ends of the side walls 25 and 26 of the sleeve. With this arrangement, the bit cuts a groove of sufficient width for the sleeve and chain to pass through the groove.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the

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claims are, therefore, intended to be embraced therein.

What is claimed is:

1. A cutting bit assembly for a cutting chain comprising a sleeve attachable to a cutting chain link, a bit having a stem portion received in said sleeve and a head portion projecting from one end of the latter, means pivotally connecting said bit to said sleeve for rocking movement of the former relative to the latter, and tips of material harder than the material of said bit secured on said bit at respectively opposite sides of the outer end of said head portion and selectively brought to cutting position in accordance with the direction of movement of the bit carrying chain by the rocking movement of the bit relative to the associated sleeve.

2. A cutting bit assembly for a cutting chain comprising a sleeve receivable in a chain socket, a bit having a stem portion received in said sleeve and a head portion projecting from one end of the sleeve, said sleeve and stem portion having aligned apertures therein, and a pivot pin extending through said apertures pivotally connecting said bit to said sleeve, said sleeve having inclined internal walls at said one end providing a limited freedom of rocking movement of said bit relative to said sleeve.

3. A cutting bit assembly for a cutting chain comprising a sleeve receivable in a chain socket, a bit having a stem portion received in said sleeve and a head portion projecting from one end of the sleeve, said sleeve and stem portion having aligned apertures therein, and a pivot pin extending through said apertures pivotally connecting said bit to said sleeve, said sleeve having inclined internal walls at said one end providing a limited freedom of rocking movement of said bit relative to said sleeve, and tips of material harder than the material of said bit secured to said bit at respectively opposite edges of said head portion and at the outer end of the latter.

4. A cutting bit assembly for a cutting chain comprising a sleeve receivable in a chain socket, a bit having a stem portion received in said sleeve and a head portion projecting from one end of the sleeve, said sleeve and stem portion having aligned apertures therein, and a pivot pin extending through said apertures pivotally connecting said bit to said sleeve, said sleeve having inclined internal walls at said one end providing a limited freedom of rocking movement of said bit relative to said sleeve, and tips of material harder than the material of said bit secured to said bit at respectively opposite edges of said head portion and at the outer end of the latter, said head portion having a thickness as great as the thickness of said sleeve so that the sleeve may pass through a groove cut by a tip on said head portion.

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