

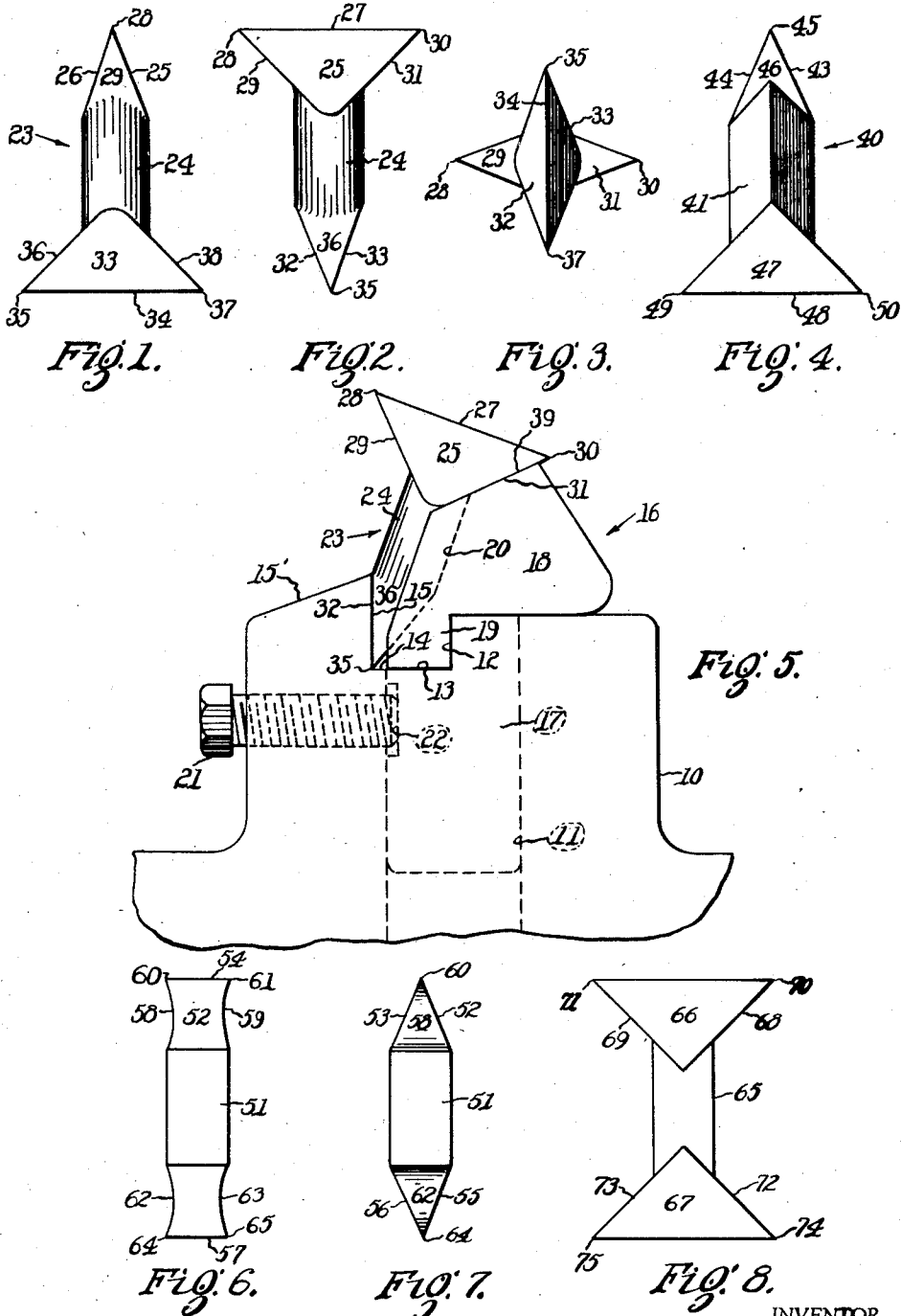
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MINING MACHINE CHAIN BIT AND HOLDER THEREFOR

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MINING MACHINE CHAIN BIT AND HOLDER THEREFOR

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The present invention relates to mining machine chain bits and holders therefor; and the primary object of the invention is to provide an economical bit, capable of four successive wearing uses, while an ancillary object of the invention is to provide improved means to hold the new bit in place on a mining machine chain link. More particularly, it is an object of the invention to provide a novel bit and means, cooperable with a mining machine chain link originally constructed for holding a conventional, single-use mine bit, to secure my new bit in place on such link, selectively in any one of four operating positions. Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the forms illustrated in the accompanying drawing, attention being called to the fact, however, that the drawing is illustrative only, and that change may be made in the specific constructions illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a front elevation of one form of bit embodying my invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is an end elevation thereof;

Fig. 4 is a view similar to Fig. 1, but showing a somewhat different form of bit;

Fig. 5 is a fragmentary side elevation of a mining machine chain link block, showing my improved holder for a bit of the type illustrated in Figs. 1 to 3;

Fig. 6 is a side elevation of a further form of bit embodying my invention;

Fig. 7 is a front elevation of the bit of Fig. 6; and

Fig. 8 is a side elevation of a still further form of bit embodying my invention.

In Fig. 5 I have shown the outermost portion of a mining machine bit block, indicated by the reference numeral 10, and provided with a socket 11 of rectangular cross section constructed and designed to receive the shank of a conventional, single-use mining machine bit. A transverse groove 12 extends from side to side of the outermost portion of the block 10, communicating with the socket 11, but extending forwardly beyond the front wall of said socket to define a table 14 parallel with the outermost end of the bit block, said table being bounded, at its forward edge, by an upstanding plane wall 15. This transverse groove is provided in order to increase the lateral strength of the holder, indicated generally by the reference numeral 16, at this other-

wise dangerous breaking point, as is described in my co-pending application, Serial No. 213,423, filed June 13, 1938. By extending the groove forwardly and providing the wall 15 at a point substantially in advance of the front wall of the socket 11, I avoid weakening the holder in a direction in line with the travel of the chain, through displacement of mass by the bit body at this vital point. The transverse groove will not be detrimental in any way if ordinary mine bits are used with my chain, and the upstanding wall 15 and the abutment block 15', which are preferably hard surfaced, will tend to resist coring.

The integral holder unit 16 is formed to provide a shank 17 receivable in the socket 11, and a head 18 projecting outwardly from the block 10, but resting on the outermost surface of said block. Lateral arms 19 fit into the groove 12, and bottom upon the surfaces 13 at opposite sides of the socket 11. The forward face of the head 18 is recessed, as at 20, to embrace the bit 23 in such a manner as to hold the bit against the wall 15 and retain the same against removal from the block 10. The shank 17 of the holder 16 is retained in position in the socket 11 by means of a set screw 21, which preferably takes into a notch 22 formed in the forward face of the shank 17.

Referring more particularly to Figs. 1 to 3, it will be seen that my bit, indicated generally by the reference numeral 23, comprises a rod or stem 24 of uniform cross section and of substantial length, terminating at its opposite ends in cutter heads. The word "rod" as used in the present specification and in the claims appended hereto, is intended to imply a longitudinal structure having its mass symmetrically distributed about its axis in all directions. The upper end of the bit 23 is angularly flattened to form surfaces 25 and 26 which are allochirally related to the axis of the rod 24, and meet in a thin edge 27 perpendicular to the axis of the rod 24. As is clearly illustrated in Fig. 2, the surfaces 25 and 26 flare symmetrically from the axis of the rod to form substantially triangular end cutting faces 29 and 31 which meet the edge 27, respectively, in cutting points 28 and 30.

At its lower end, the rod is similarly formed with a cutting head. The flattened faces 32 and 33 are allochirally angularly related to the axis of the rod 24 and merge in a thin edge 34. Said surfaces 32 and 33 flare, as is shown in Fig. 1, symmetrically from the axis of the rod 24 to form substantially triangular cutting surfaces 36 and

36 merging with the line 34, respectively, in cutting points 35 and 37.

The edges 27 and 34 are of equal length, and the length of each of those edges is at least twice the dimension of the rod 24 on a line parallel with such edge. Each of such edges 27 and 34 lies in a plane including the axis of the rod 24 and perpendicular to the plane including the other edge and the axis of the rod 24.

In the form of Figs. 1, 2, and 3, the rod 24 is cylindrical; and that particular form of bit is shown, in Fig. 5, held in place on the block 10 by the holder 16.

It will be seen that the front face of the holder 16, in this particular form of my invention, is socketed to conform to the surface 31 of the bit, to embrace the rod 24 throughout its length and throughout substantially one-half its periphery, and to overlie substantially one-half of each of the surfaces 36 and 38, positioning the bit with its surface 32 flat against the wall 15 and with its edge 34 cornered between the table 14 and the wall 15. Thus, each half of each of the surfaces 29, 31, 36, and 38 may be considered as a shoulder, engageable, at times, by a portion of the socket in the holder to hold the bit in place; so that the bit may be construed as formed to provide eight such shoulders.

It is particularly to be noted that the cutting point 28 is positioned rearwardly of the cutting points 35 and 37, in the plane of travel of the bit; and that said cutting point 28, which is in active position in Fig. 5, lies ahead of and outwardly of the cutting point 30. It is also to be noted that substantially the whole operating end of the bit lies outwardly beyond the whole body of the holder 16, the surface 31 of the bit lying upon and completely protecting the outermost surface 39 of the holder 16. In fact, the temporarily inactive cutting point 30 lies rearwardly beyond the rearmost end of the surface 39. Thus, the bit 23 provides a uniquely complete protection for the holder 16 against abrasion.

It is to be noted that approximately two-thirds of the axial length of the bit projects, when held in the manner illustrated in Fig. 5, beyond the outermost portion of the expensive bit block, whereby the danger of abrasion upon the bit block is materially decreased. With a short bit, such as illustrated in full size in the original drawing forming a part of my present application for patent, I get a projection of the cutting point one and a half inches beyond the outermost portion of the bit block. It will also be noted that the peculiar construction of my bit and holding means results in the positioning of the bit with the lower end of its long axis in advance of the active working point 28, just as would a miner grip the handle of a pick to deliver a blow with the pick point rearward of his handle grip as the blow is delivered. Likewise, the laterally disposed lower chisel end of my bit lends itself admirably to the simple, positive, and rapidly operating gripping mechanism illustrated herein, and permits the use of a single-piece holder cooperable with a chain block originally adapted for use with ordinary, single-use mine bits.

In Fig. 4, I have illustrated a bit 40 which is, to all intents and purposes, identical with the bit 23, except for the fact that the rod portion 41 thereof is square in cross section. The flattened surfaces 43 and 44 root from opposite corners of the rectangular rod 41, and are allo-

chirally angularly related with the axis of the rod 41, merging in a thin edge. The end surfaces of the chisel edge so formed are substantially triangular in shape, the surface 46 being characteristic, and those end surfaces merge with the chisel edge in cutting points, such as 45. The opposite end of the rod 41 is provided with a similar head having allochirally related surfaces, such as 47, meeting in an edge 48 which terminates in cutting points 49 and 50.

A holder, closely similar to the holder 16, but modified merely to conform to the differences produced by the use of square stock in place of round stock, may be associated with the bit 40 to hold the same in place on the block 10.

In Figs. 6 and 7 I have illustrated a somewhat different form of bit, comprising a rod 51 of rectangular stock having its ends flattened to form, at one end, allochirally angularly related surfaces 52 and 53 meeting in a thin edge 54. At its other end, the rod is flattened to provide angularly related surfaces 55 and 56 which meet in a thin edge 57.

The end surfaces 58 and 59, defined by the surfaces 52 and 53, are substantially triangular in elevation, but are relieved, immediately adjacent the ends of the edge 54, to form oppositely facing cutting points 60 and 61. The surfaces 62 and 63 are similarly relieved to define oppositely facing cutting points 64 and 65 at the opposite end of the bit.

In Fig. 8 I have illustrated a still further form of bit, comprising a rod 65 of rectangular stock flattened at its opposite ends in a manner similar to that above described in connection with Fig. 4, except that the two thin chisel edges lie in a common plane including the axis of the rod 65. Thus, surfaces 66 and 67, oppositely angularly related to the axis of the rod, cooperate with allochiral surfaces (not shown) on the opposite side of the bit to form cutting faces, 68 and 69 terminating in cutting points 70 and 71, and cutting faces 72 and 73 terminating in cutting points 74 and 75.

In this construction I have provided in my bit, and in my holder, and in my chain block, the necessary strength of the members and the positive association required to grip the bit firmly during the cutting operation, but it will be noted that I have also contrived to keep my bit small and relatively short, notwithstanding that I cause its active point to project at least 1½ inches outward from the block, the necessity for which, to avoid coring, etc., is understood by all versed in the art. And my flared chisel ends, being at least twice the body dimension of my bit will permit severe abrasion at each cutting point without endangering the possibility of utilizing all four points successively, nor the accuracy and positiveness of engagement of its gripping surfaces during cutting. And in cooperation with this purpose, my holder surfaces engaging the bit are so formed that burrs on the bit arising from the cutting action will not interfere with setting my bit as would be the case if I employed a hole or socket in my holder instead of the simple open contours I employ. It will also be noted how the cutting point rearward of my active cutting point is protected by being not only rearward but lower than the active point.

I claim as my invention:

1. As an article of manufacture, a four-pointed cutter bit comprising a metal piece formed to

provide a central rod portion of uniform cross section flattened equally at its opposite ends, the flattened surfaces at each end converging from rod thickness at their roots at equal angles to the axis of the rod to form a thin straight edge perpendicular to said axis, said two straight edges lying in planes perpendicular to each other and including said rod axis, and each of said edges terminating in two oppositely facing cutting points.

2. A coal cutting bit formed to provide a pair of oppositely facing cutting points at each of its ends, the two cutting points at one end defining a line lying in a plane including the axis of said bit and perpendicular to the plane including the axis of said bit and the line defined by the two cutting points at the opposite end of said bit.

3. A coal cutting bit formed to provide a central rod and two flared end portions, each of said end portions terminating in two oppositely facing cutting points defining a line perpendicular to the axis of said rod, said two cutting points at each end of said bit defining the termini of a line at least twice as long as the dimension of said rod parallel with said line, and each of said lines lying in a plane including said rod axis and perpendicular to the plane including the other of said lines and said rod axis.

4. In a cutter chain a block having a socket, a bit holder having a head and having a shank received in said socket, said block being formed with a transverse groove communicating with said socket but extending forwardly beyond said socket to define a floor bounded by an upstanding, rearwardly facing wall, a bit having a portion engaged between said upstanding wall and said head, and means for retaining said holder in said socket.

5. In a cutter chain a block having a socket, a bit holder having a head and having a shank received in said socket, said block being formed with a transverse groove communicating with said socket but extending forwardly beyond said socket to define a floor bounded by an upstanding, rearwardly facing wall, a bit having portions disposed in said groove and extending laterally beyond said socket, certain parts of said bit, including said last-mentioned portions, being gripped between said wall and said holder head, and means for retaining said holder in said socket.

6. In a mining machine chain, a link block having a socket, a holder having a portion received in said socket, and a reversible bit, said bit being formed to provide a central stem portion and two opposite end portions, each of said end portions being shaped to provide two allochiral substantially triangular diverging surfaces, the bases of such triangular surfaces meeting in an edge terminating in oppositely-facing cutting points and the apices thereof lying substantially in a common axial plane of said stem and being separated by the thickness of said stem, and each of said end portions further defining a pair of oppositely-facing cutting faces, each of said cutting faces being bounded by a pair of such triangular diverging surfaces and therefore flaring from one of said cutting points to stem-thickness at its base, said oppositely-facing cutting faces converging toward each other from their cutting points to their bases, said holder being formed with a surface overlying a portion of one of said

cutting faces when another of said cutting faces is presented in active position, to hold said bit firmly in place on said block, and means holding said holder against movement relative to said block.

7. In a mining machine chain, a link block having a socket, a holder having a portion received in said socket, and a reversible bit, said bit being formed to provide a central stem portion and two opposite end portions, each of said end portions being shaped to provide two allochiral substantially triangular diverging surfaces, the bases of such triangular surfaces meeting in an edge terminating in oppositely-facing cutting points and the apices thereof lying substantially in a common axial plane of said stem and being separated by the thickness of said stem, and each of said end portions further defining a pair of oppositely-facing cutting faces, each of said cutting faces being bounded by a pair of such triangular diverging surfaces and therefore flaring from one of said cutting points to stem-thickness at its base, said oppositely-facing cutting faces converging toward each other from their cutting points to their bases, said holder being formed with a surface overlying a portion of one of said cutting faces and gripping the same between said holder and said block when another of said cutting faces is presented in active position, to hold said bit firmly in place on said block, and said holder further being formed with another surface forming a supporting abutment for the cutting face of said bit opposite such active cutting face, and means holding said holder against movement relative to said block.

8. In combination with a cutter chain, a link and a bit holder element and a four-pointed bit comprising a rod symmetrically formed at each opposite end with a pair of wide faces and a pair of narrow faces and two cutting points and four shoulders, said bit holder being surfaced to cooperatively engage at least one of said wide faces and at least two of said shoulders and the said rod, for securing said bit to said link.

9. In combination with a cutter chain, a link having a socket, a bit holder having a shank in said socket and a head extending outwardly therefrom, a four-pointed bit comprising a relatively small steel rod formed at each opposite end with at least two cutting points, two wide faces, two narrow faces, one edge in the plane of and at right angles to the rod axis, and four shoulders at an angle to said axis and to said edge, said holder being surfaced to cooperatively engage at least one of said wide faces, at least two of said shoulders, and the said rod itself for securing said bit to said link with one point in active cutting position, one point rearward of and below said active point, and one entire end together with a portion of said rod entirely outward of and clear of said cooperative holder surfaces.

10. In combination with a cutter chain, a link and a bit holder carried by said link, and a bit comprising a rod formed to define at each opposite end a pair of cutting points resting in a line at right angles to and in the plane of the rod axis, said bit holder being surfaced to cooperate with an end of said bit to secure it to said link with said rod axis inclined rearwardly and outwardly from said link.

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