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CUTTING CHAIN

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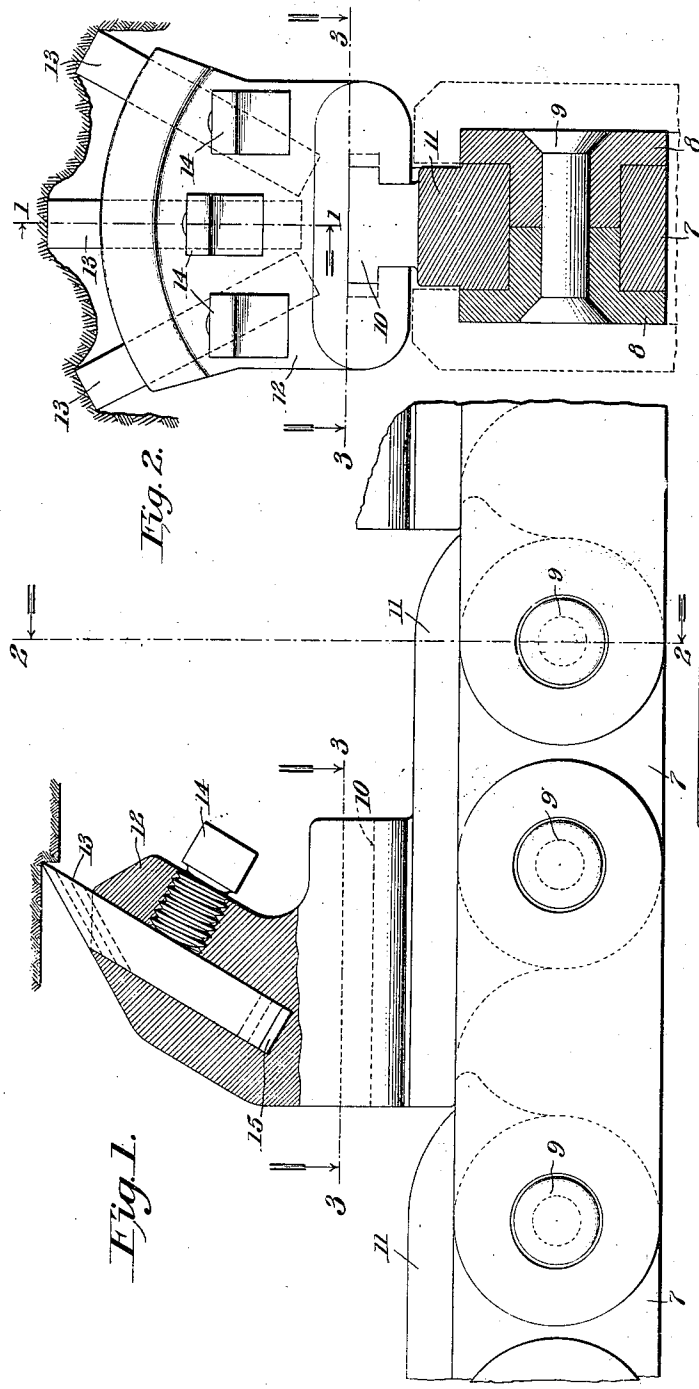


Fig. 1.

Fig. 2.

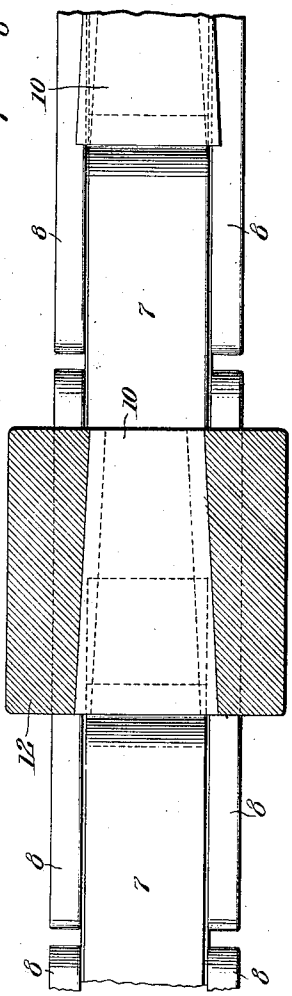


Fig. 3.

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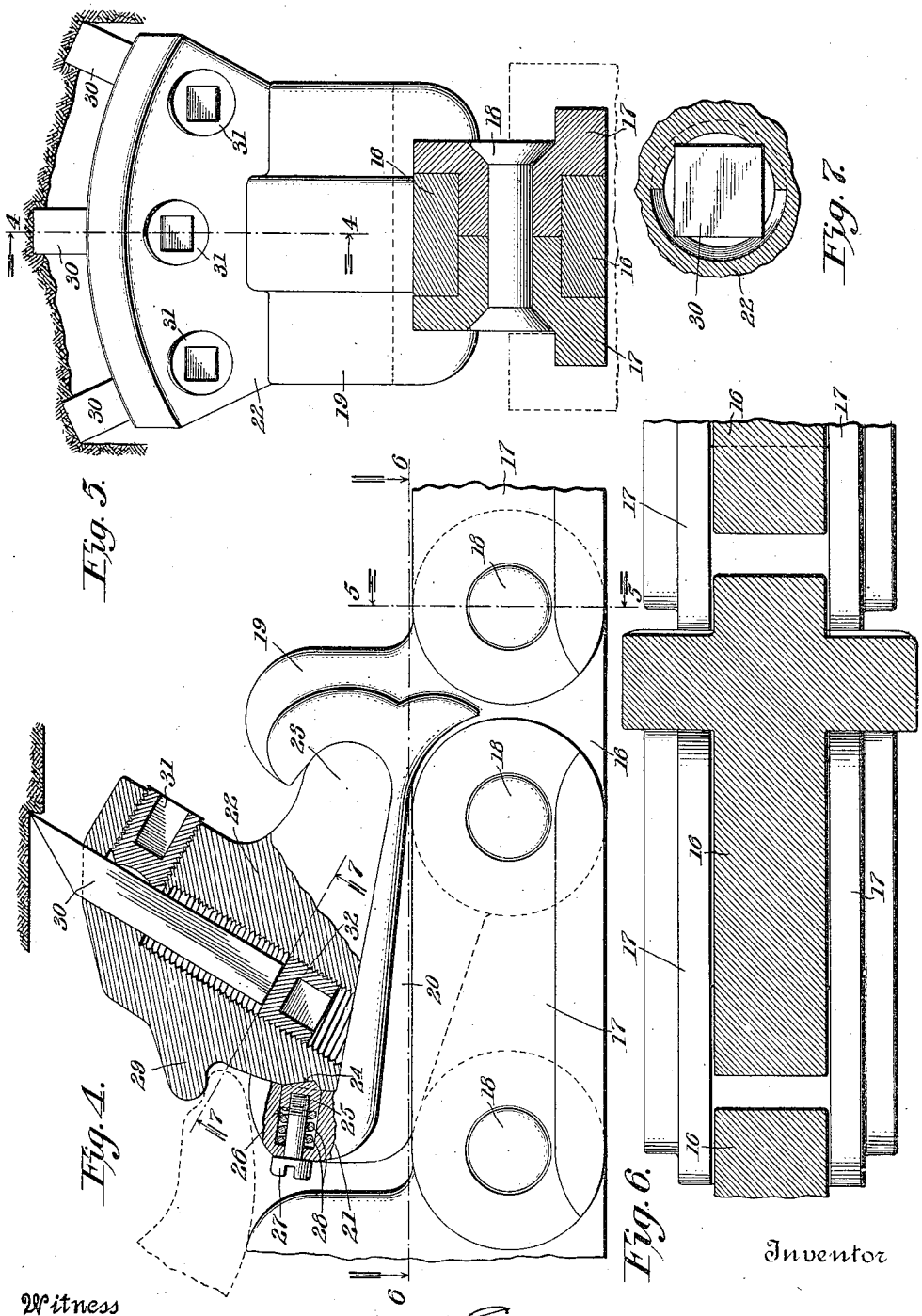
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UNITED STATES PATENT OFFICE.

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CUTTING CHAIN.

Application filed December 12, 1918. Serial No. 266,427.

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented a new and useful Improvement in Cutting Chains, of which the following is a specification.

My invention relates to the improvement in cutting chains intended for use in machines for cutting coal and other materials; and the objects of the improvement are, first, to provide a cutting chain in which the cutting elements can be quickly removed when they have become dulled and sharpened ones quickly inserted in their places; second, to provide cutting bits which can be formed from a straight bar of steel, sharpened and re-sharpened without heating and forging; third, to provide means whereby the bits can be sharpened several times without removal from the sockets; fourth, to provide means for adjusting the bits at each sharpening so as to maintain their cutting edges in a predetermined position with respect to the chain, and to securely fasten them in each of said adjusted positions; fifth, to provide a cutting chain in which the cutter-supporting links form supports for one another while cutting; and sixth, to provide a cutting chain in which the tendency of the cutters to gouge into the coal, is reduced.

I attain these objects by the improvements illustrated in the accompanying drawing, in which—

Figure 1 is a side elevation of a portion of the cutting chain including one of the bit sockets shown partly broken away and in cross section taken on line 1—1 of Fig. 2; Fig. 2 is a front end view of Fig. 1 partly in cross section taken on line 2—2 of Fig. 1, looking in the direction indicated by the arrows; Fig. 3 is a top plan view of the portion of the chain shown in Fig. 1 partly in cross section taken on the line 3—3, Figs. 1 and 2, looking in the direction indicated by the arrows; Figs. 4, 5, 6, and 7 show a modified form of construction containing my invention in which Fig. 4 is a side elevation of a portion of the cutting chain partly broken away on the line 4, 4 Fig. 5. Fig. 5 is an end elevation of Fig. 4 taken on line 5, 5, Fig. 4. Fig. 6 is a top plan view of Fig. 4 in section taken on line 6, 6, Fig. 4. Fig. 7 is an end view of one of the bits including a portion of the bit socket in section taken on line 7, 7, Fig. 4.

Similar numerals refer to similar parts throughout the several views.

Referring to Figs. 1, 2 and 3, 7 indicates the central links of the chain, which are also the cutter-supporting links. A number of these links are connected together to form a complete chain by means of the side links 8—8, which have meeting bosses formed on them to fit into holes made in the cutting link 7. These side links are secured together by means of suitable rivets 9. These side links are also adapted to fit into guides of well-known construction, they being indicated by the dotted lines shown in Fig. 2 inclosing the side links. The particular side links shown are not essential for the operation of my invention as other well-known forms of side links may be used with equally as good results. Projecting upwardly from the link 7, and preferably rearwardly thereof, is the T head projection 10. This T head is made tapering, as shown, in the direction in which the chain travels when cutting. The T head 10 is preferably made integral with the links 7. The upper part of each link 7, as shown, is made in the form of a rib 11 extending forwardly and rearwardly of the main body of the link. The forwardly projecting portion is so made as to form a shelf at the outer end, and the rearwardly projecting portion of the rib is made so as to rest on the shelf of a similar link. Each link 7 of the chain is adapted to carry a bit socket such as 12. This bit socket 12 has a dovetailed opening formed in the lower portion of each to fit the T head 10 projection of the link 7 and is tapered to correspond with the taper of the T head. By means of this taper connection the sockets can be quickly inserted in the chain by hand and the pressure caused by the cutting action will keep them tight. At the same time they can quickly be detached by striking them sharp blows with a hammer on the back so as to loosen them from their taper seats. Each of the bit sockets 12 is arranged to carry one or more bits 13. As shown, three bits are carried. These bits are preferably made of steel, square in cross section and the cutting edge formed by grinding on the upper surface. The proper amount of draw for cutting is obtained by

forming the socket so as to incline the bits forwardly. The bits are secured in the sockets by means of the set screws 14. When the bits are sharpened a certain portion will be ground away, as indicated by the dotted lines running toward the point of the bit. In order to keep the edge of the bit in a predetermined relation with the chain, pieces of metal such as 15 of a thickness corresponding to an amount ground off at the point, may be inserted at the bottom of the socket so as to form a solid backing to receive the thrust of the bit when cutting.

I prefer to secure the socket 12 on the link 7 so that the point of the bit 13 will be on a line running at right angles with the length of the chain from the centre of the joint at the rear of the link 7. By this means, if the pressure of the cutting, forces the point of the bit back, it will recede from the coal instead of gouging into it, as it would if the point were further forward of the link 7.

Figs. 4, 5, 6 and 7 show a modified form of construction of my invention including the preferred form of bit holding and adjusting means. Referring to these views 16 indicates the central links of the chain, which are also the cutter supporting links. A number of these links are connected together to form a complete chain by means of the side links 17, 17, which have meeting bosses formed on them to fit into holes made in the cutting links 16. These side links are secured together by means of rivets 18. These side links are of well known construction now most universally used in cutting chains. They have guiding lugs which fit in guides about as indicated by the dotted lines in Fig. 5. Cast integrally with the link 16 is a hook 19; also extending rearwardly a projection 20 having a hook shaped end 21. The two hook shaped projections 19 and 21 form a jaw into which the bit socket 22 is adapted to be inserted and firmly secured by means of the forwardly projecting portion 23 which engages with the hook 19 and the notch 24 at the rear of the socket which engages with the latch 25 secured in the hook shaped portion 21. This latch is made square to form a sliding fit in the square hole 26, and is provided with a screw 27 to limit its outward movement. A spring 28 is provided to press the latch to the furthest limit allowed by the screw with considerable pressure. As will be noted, the end of the latch is made with a slight taper in one direction, and a steep taper in the other direction. The object of this is to permit the socket 22 to be easily inserted in the link 16 but to require considerable force to remove it. I have provided a lug 29 on the socket 22 so that a lever as indicated by the dotted lines may be employed to effect the detachment.

The bits 30 are adjustably secured in the sockets and arranged to be firmly held in any of the several positions by clamping screws 31 and end supporting and adjusting screws 32. The bits 30 are made with square corners to fit into sockets having square corners so as to resist twisting strains. I carry the square corners down through the screw threads for the adjusting screw 32 as indicated clearly in Fig. 7. By this means a long shank bit can be used so as to provide for sharpening a number of times by grinding and the cutting edge always kept at a predetermined position with respect to the body of the cutting chain.

In Fig. 4 I have shown a bit socket a portion of which is screw threaded to receive the threaded nut 32 provided with a squared inner recess for receiving a turning tool to adjust the position of the bit 30 thereby forming an adjustable support for the bit lengthwise of the latter. It will thus be seen that the combination of the bit structure with the chain links includes two means of securing the bit in place; one of these means comprises the hollow set screw 31 for binding the bit on the side and the other comprises the hollow set screw 32 for backing up the bit at the end. This arrangement permits the use of a straight bit as shown in Fig. 4 which may be sharpened by grinding without removal from the bit socket and adjusted outwardly by loosening the nut 31 turning the nut 32 and again tightening the nut 31. Such adjustment is desirable to take up the part removed by wear and by sharpening and enables the point of the bit to be maintained at an originally predetermined distance from the center line of the path of travel of the cutter chain.

By my construction it will be seen that the bit sockets can be easily inserted in the chain and securely held and at the same time they can be quickly detached.

Having now described my invention, I claim:

1. In a chain cutter for mining machines, the combination with a cutter link, of a bit socket, a bit in said socket, means for adjustably holding said bit in said socket, and securing mechanism independent of the bit holding means between said cutter link and said bit socket to permit the latter to be attached to said chain or detached therefrom by a single sliding movement of said bit socket in a direction substantially parallel with the path of travel of the chain.

2. A cutter chain comprising a link, a bit holder having a bit socket therein, connections between said bit holder and said link to detachably hold said bit holder securely attached to said link by wedging action but permitting quick detachment of said bit holder from said link, and a bit independently and adjustably mounted in said

socket to have a cutting path of travel at a predetermined distance from the path of travel of said link.

3. In a chain cutter for mining machines, the combination with a series of central cutter supporting links each having a forwardly extending projection and a rearwardly extending projection, the latter being adapted to overlap the forwardly extending projection of the next adjacent cutter supporting link when the chain cutter is traveling rectilinearly, side links for connecting the cutter supporting links to form an endless cutting chain, said cutter supporting links being so spaced by said side links that the said overlapping will be secured, bit sockets, and means for supporting said bit sockets on said cutter links for a direction of cutting travel of the chain cutter whereby the tendency of the cutting action to tilt the cutter links will be resisted by the said overlapping of said projections.

4. A chain cutter comprising a cutter link having spaced-apart transverse pivotal axes for connection to adjacent connecting links, a rearward extension relative to the direction of cutting path of travel, a bit holder, means on said bit holder and said rearward extension of said cutter link for detachably holding said bit holder on said cutter link, and a forward extension in position to extend under and engage the rearward extension of the next adjacent forward cutter link.

5. A chain cutter comprising a series of central cutter supporting links, each having a forwardly extending projection engaging the under side of a rearwardly extending projection of the next adjacent forward cutter supporting link, additional links for connecting said cutter supporting links together to form a cutting chain, and bit holders carried by said rearwardly extending projection.

6. A chain cutter for mining machines, comprising a cutter link, a seat thereon, a bit holder, means on said bit holder adapting the latter to be slipped on said seat for rigid connection to said link by back pressure due to the cutting operation, a bit, and means operating independently of the means for securing the bit holder to the link for adjustably holding said bit to occupy a predetermined cutting path of travel, whereby adjustment of said bit in said holder may be made after the holder has been released manually from said seat and after the bit has been resharpened.

7. A chain cutter for mining machines, a cutter link, a friction seat thereon, a detachable bit holder, means operating independently of the means for securing the bit holder to the link for adjustably securing said bit in said holder while the latter is detached, and means, on said holder adapting the latter and said bit to be slipped manually on said seat for rigid connection to said link.

8. A chain cutter for mining machines, a cutter link, a seat thereon, a bit holder, means on said bit holder for wedging the latter onto said seat and permitting manual release of said bit holder, a bit, and means operating independently of the means for securing the bit holder to the link for adjustably securing said bit to said holder when the latter is detached from said link.

9. A chain cutter comprising a cutter link having spaced-apart transverse pivotal axes for connection to adjacent connecting links, a projection extending rearwardly from said cutter link relative to the direction of cutting path of travel, a bit holder, means on said bit holder and said rearward projection for detachably holding said bit holder on said cutter link, a projection extending forwardly from said cutter link in position to extend under and engage the rearward extension of the next adjacent forward cutter link, and pairs of side links connecting the cutter links and mounted independently of said forward and rearward projections.

10. A chain cutter comprising a series of central cutter supporting links, additional links for connecting said cutter supporting links together to form a cutting chain, a projection extending forwardly from each of the cutter supporting links, a projection extending rearwardly from each of the cutter links to engage and overlap the forward end of the forward extending projection independently of said additional links, and bit holders carried by the rearwardly extending projections.

11. A chain cutter for coal mining machines comprising a cutter-carrying link having a T-shaped tapered head, a bit holder having jaws with a tapered socket adapted to fit on said tapered T-head, a bit adapted to be carried by said bit holder, and means for adjustably securing said bit in said bit holder.

12. A mining machine chain cutter comprising a cutter link, a bit holder, detachable connections between said bit holder and said link and comprising lateral spaced-apart interconnecting wedging surfaces for removably securing said bit holder to said link, and means on said bit holder for securing a bit thereon in adjusted position.

13. A mining machine chain cutter comprising a cutter link, a bit holder comprising a socket inclined forward in the direction of travel of the chain cutter, means on said bit holder for securing a bit thereto in adjusted position, and interlocking connections between said bit holder and said link for quick attachment and detachment of said bit holder to and from said chain

while said bit remains in adjusted position relative to said bit holder.

14. A chain cutter comprising a cutter link, a bit holder, an interlocking detachable connection between said link and said bit holder, and means independent of said interlocking connection for securing a bit in said bit holder separately from such connection to permit the bit holder to be removed from said link with the bit secured in place and to permit such bit holder to be replaced with a re-sharpened bit already in adjusted position relative to said bit holder.

15. In a chain cutter for mining machines, the combination with a cutter link, of a detachable bit holder, a bit, means for securing said bit in adjusted position in said holder whether connected or disconnected with said link, and interlocking mechanism between said bit holder and said cutter link for permitting the attaching or detaching of said bit holder to and from said cutter link by a single sliding movement along the chain while said bit remains secured in adjusted position independently of the interlocking connection.

16. In a chain cutter for mining machines, the combination with a bit holder, of a bit adapted to be carried thereby, means for securing said bit in adjusted position in said holder, and means on said holder adapting the latter to be placed manually on a cutter link while said bit remains secured in adjusted position in said bit holder.

17. A chain cutter for mining machines comprising a cutter link, a seat on said cutter link, a bit holder, means for adjustably holding a bit in said bit holder to occupy a predetermined cutting path of travel, and means on said bit holder adapting the latter to be slipped onto said seat for rigid connection to said link by back pressure due to the cutting operation whereby the bit holder may be manually released from said seat for resharpening of said bit and the readjustment thereof before being manually replaced on said seat after said bit has been secured to said bit holder in adjusted position.

18. A chain cutter for mining machines comprising a cutter link, a friction seat thereon, a detachable bit holder, means on said holder adapting the latter to be slipped manually on said seat for rigid connection to said link, and means for adjustably securing a bit in said holder independently of the detachable connections between said bit holder and said seat whereby said bit holder with the bit adjustably secured thereto may be bodily removed from the chain or connected thereto.

EDMUND C. MORGAN.