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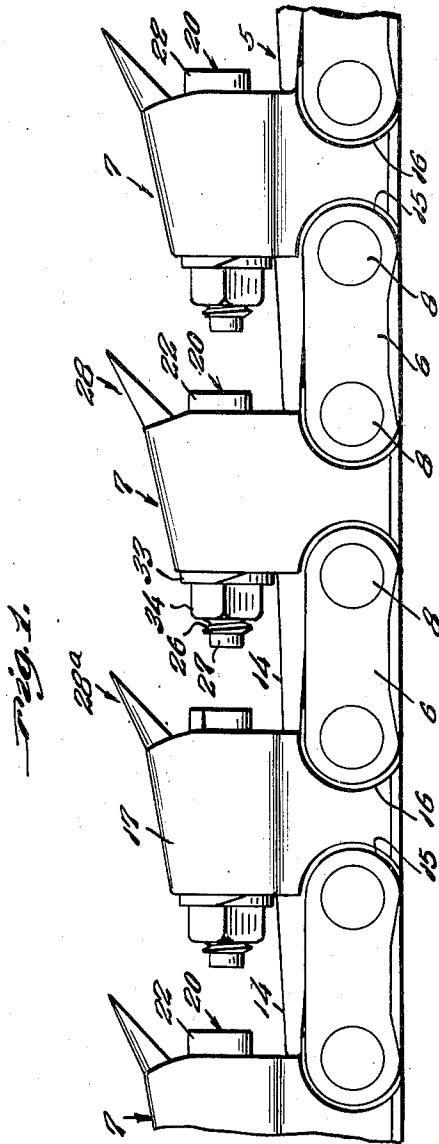
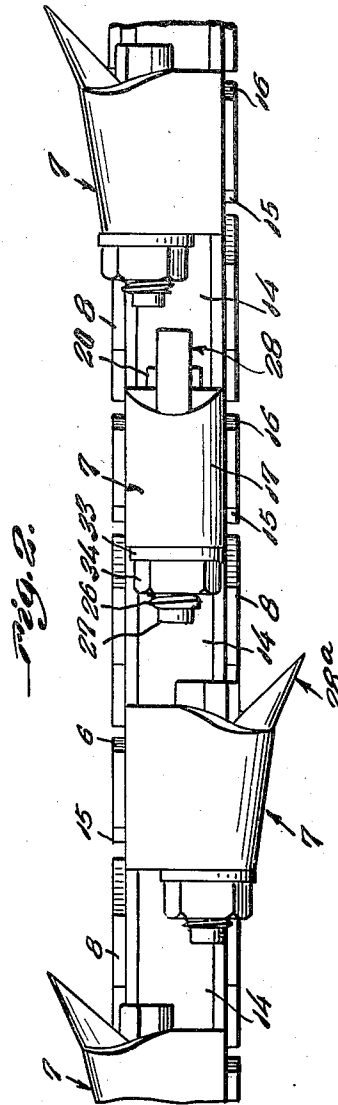
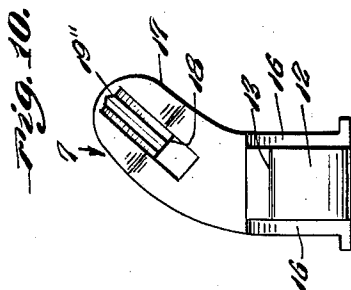
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2,389,936

CUTTER CHAIN

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2 Sheets-Sheet 1



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CUTTER CHAIN

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7 Claims. (Cl. 262—33)

This invention, as indicated, relates to improvements in cutter chains for mining machines. More particularly it comprises a chain structure of a character to provide a firm support for a selected cutter bit and means for firmly holding such bit on its base and in operative relation to companion cutter bits. The invention includes a single bit clamping means for receiving cutter bits of different types, such, for example, as pick, half-moon, or chisel type. It also includes a series of bit supporting units provided with a central, or right or left obliquely positioned cutter-bit-supporting lug, which units may be assembled in suitable succession in a cutter chain.

The principal object of the present invention is to provide an improved cutter chain for mining machines, including machines for mining coal.

Another object of the invention is to provide a bit supporting unit having a socket shaped to receive cutter bits of different types with a single universal clamping element.

Another object of the invention is to provide a bit supporting unit for a cutter chain wherein lugs of various inclinations may be provided to receive and support the cutter bits but wherein all units have identical base structures adapted for cooperative supporting action, and running engagement.

Another object of the invention is to provide a cutter bit of reversible type and selective cutting edge structure which is clamped by a single wedge-shaped locking bolt in a clamping socket which may be replaced or taken up for wear with a minimum of effort.

Another object of the invention is to provide a cutter chain structure having cutter bit units joined to each other by strap links, but wherein the cutter bit units also are directly in contact with each other and provide a type of cantilever action to provide a firm substantially non-vibrating articulated base for an extended series of actively engaged cutter bits.

Other and further objects of the invention will appear in the course of the following description.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but several of various forms in which the principle of the invention may be used.

In said annexed drawings:

Figure 1 is a view in side elevation of a portion of a cutter chain embodying the principles of the invention;

Figure 2 is a top plan view of the structure shown in Figure 1;

Figure 3 is a central vertical longitudinal view partly in section showing a cutter bit and its supporting unit in relation to immediately adjacent units;

Figure 4 is a view in end elevation of a cutter chain embodying the principle of the invention provided with a central chisel cutter unit intermediate right and left obliquely positioned pick cutter units in conventional manner;

Figure 5 is a central vertical longitudinal sectional view of one of the cutter bit supporting units;

Figure 6 is a view in side elevation of a wedge-shaped locking bolt for supporting a cutter bit;

Figures 7, 8 and 9 are each perspective views showing reversible cutter bits of the half-moon, chisel and pick types, respectively, each embodying the principles of the invention;

Figure 10 is a view in end elevation of a cutter bit supporting unit with the lug inclined obliquely to the right; and

Figure 11 is a fragmentary end elevation of the socket portion of a cutter bit supporting lug recessed and grooved to receive either half-moon, chisel, pick, or similar types of bits, of the general character shown in Figures 7, 8 and 9.

As is clearly shown in Figures 1 and 2, the cutter chain 5, has pairs of strap links 6 connecting cutter bit supporting units 7, in longitudinal alinement by means of pivot pins 8 firmly secured in opposite ends of said strap links. The units 7 are provided with bushings 9 in which the pivot pins are rotatably engaged.

The cutter bit supporting units 7 are preferably of solid metal structure with flat bottom areas 10, rounded at the ends, one end 11 merging in a top rearward extension 14 and the other end terminating in an extension receiving shoulder or seat 13. The seat 13 is formed as a recess of a depth corresponding to the thickness of the integral extension 14 so that the top surface of the chain apart from the upstanding lugs thereon is substantially a continuous flat surface on a straight section of chain, which prevents the entrance of foreign matter between the units 7. Such straight chain section by reason of the extensions 14 resting firmly on the seats 13 provides an interlinked structure which will resist rearward movement or gouging action of any unit 7 when a cutter bit is actively engaged, the series

of links becoming substantially a single basic support for such cutting action, which is carried out smoothly as though the chain with its cutter bits was a single integral structure.

The end portions 11, 12, of the units 7 are formed with recesses 15, 16, to accommodate the ends of the strap links 6 which are thus in smooth alinement with the sides of the units 7, which serves to prevent foreign matter obstructing the operation of the cutter chain.

As is shown more particularly in Figure 4 of the drawings, the units 7 are provided centrally of their upper portions with upstanding lugs 17 preferably having rounded upper surfaces which are inclined slightly upwardly and forwardly. The lugs may be inclined, preferably on a radius, to the right, as shown in the first unit in Figure 4, or may be perpendicular as shown in the second unit, or inclined, preferably on a radius, to the left, as shown in the rearward unit. Each lug 17 is provided with a longitudinal opening 18 with an upwardly and forwardly tapered enlargement 19 to provide a socket to receive the cutter bit interengaged by the wedge-shaped locking bolt 20, the cylindrical rearward end of which is slidably engaged in the cylindrical rearward portion of the opening 18.

The bottom portion 21 of the bolt 20 is substantially of smooth cylindrical shape but the upper surface 22 is flat and upwardly and outwardly inclined to provide a wedge structure. At a point spaced from the free end of the wedge bolt 20 a transverse cutter bit engaging recess 23 is provided, said recess having an inclined inner surface 25 and an abrupt end face or wall 24. The wedge is provided at its cylindrical end portion with a reduced terminal portion 27 having screw threads 26.

Several types of cutter bits for use with the supporting units 7 are shown in Figures 7, 8 and 9, but still other types of cutter bits fitting sockets of complementary shape may be provided as circumstances may require. The cutter bits shown are reversible, the cutter bit 28^b in Figure 7 being of the half-moon type, and the cutter bit 28 shown in Figure 8 being of the chisel type having a flat plane top 29 having cutting edges 31 at each end, with inclined under surfaces 30 merging with a depending triangular enlargement of the central portion of the body providing a supporting and locking extension 32 of a shape to have its lower end engage the recess 23 on the wedge-shaped locking bolt 20 heretofore described, while one inclined surface 30 bears upon the wedge bolt surface 22, and a portion of the top surface 29 of the cutter bit is received within the socket bearing on the shoulders 19', shown in Figure 11. A washer 33 is engaged over the threaded end of the locking bolt 20 bearing against the rearward face of the upstanding lug 17 and a nut 34 serves to draw the assembled locking bolt 20 and cutter bit 28 firmly into the socket 19, locking the cutter bit securely on the supporting unit 7.

The half-moon type cutter bit 28^b and the pick type cutter 28^a, shown respectively in Figures 7 and 9 have narrowed upper surfaces. The cutter bit 28^a has the relatively sharp upper surface 29^a adapted to seat within a notch or recess 19'' of triangular cross-section formed in the upper surface of the socket 19. The ends 31^a of the picker type cutter bit 28^b are less sharp, and the back of the cutter bit 28^b is of a transversely more rounded surface.

The cutter bits 28^b and 28^a shown respectively in Figures 7 and 9 have similar depending substantially triangular supporting and locking extensions positioned centrally of the underside of the body.

As shown in Figures 3 and 9 the inclined under surfaces 30^a at the under sides of the bit 28^a merge with the sides of the abruptly tapered enlargement 32^a, the bearing of which engages within the recess 23 on the wedge bolt 20 in advance of the end wall 24.

The construction above set forth provides for simplicity of manufacture and maintenance and, as stated, the rigidity of the cutter chain in operation is substantially that of an integral structure. The angular cutters as shown in Figure 4 are preferably set to cut at substantially the same level of operation.

Other modes of applying the principle of my invention may be employed instead of those explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A cutter chain having in combination a series of chain blocks supporting cutter bits, a series of strap links connecting the blocks, extensions on each block adjacent one end and a seat on each block adjacent the other end, said extensions adapted to engage adjacent seats at points adjacent pivot connections of said strap links.

2. A cutter chain having in combination a series of chain blocks supporting cutter bits, a series of strap links connecting the blocks, extensions on each block extending rearwardly and seats on the forward end of each block, said extensions adapted to engage adjacent seats at points adjacent pivot connections of said strap links.

3. A cutter chain having in combination a series of chain blocks supporting cutter bits, a series of strap links connecting the blocks, extensions on each block having squared ends and a squared seat on each block adjacent the other end, each squared extension adapted to engage a squared seat on an adjacent block at a point adjacent a pivot connection of said strap link.

4. A cutter chain having in combination a series of chain blocks supporting cutter bits and having recessed areas adjacent its forward and rearward side portions, strap links connecting said blocks, said recessed areas being adapted to receive the ends of said connecting strap links to present substantially smooth lateral surfaces, extensions on each block adjacent one end and a seat on each block adjacent the other end, said extensions adapted to engage adjacent seats at points adjacent pivot connections of said strap links.

5. A cutter chain having in combination a series of chain blocks supporting cutter bits and having recessed areas adjacent its forward and rearward side portions, strap links connecting said blocks, said recessed areas being adapted to receive the ends of said connecting strap links to present substantially smooth lateral surfaces, extensions on each block adjacent one end and a seat on each block adjacent the other end, said extensions adapted to engage adjacent seats at points adjacent pivot connections of said strap links, said chain blocks and strap links presenting a structure with substantially continuous flat

sides and substantially continuous top plates throughout an active cutting area.

6. A cutter bit having an elongated body with a straight line top surface and a generally triangular side elevation, provided with cutting edges at its opposite ends, and having two converging cutter faces and a projection extending from said faces downwardly forming a bit retaining lug.

7. A cutter bit supporting unit having an up- 10 standing lug on its upper surface provided with

a socket to receive a cutter bit of an elongated body with a straight line top surface and a generally triangular side elevation, provided with cutting edges at its opposite ends, and having two converging cutter faces and a projection extending from said faces downwardly forming a bit retaining lug, and a single clamping bolt slidably engaged within said socket beneath said cutter bit firmly engaging said lug and body.

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