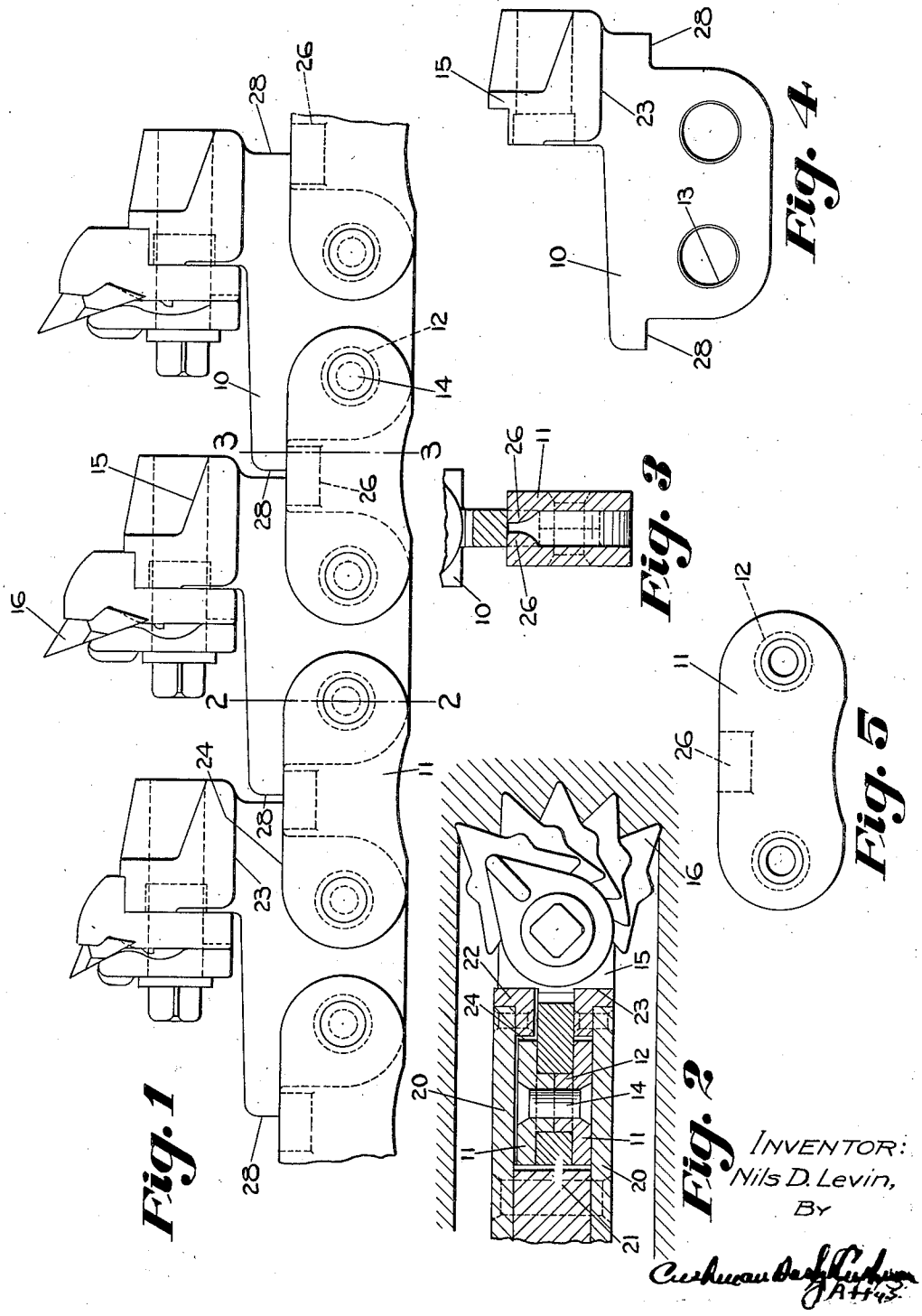
Jan. 26, 1937. N. D. LEVIN 2,068,807

CUTTER CHAIN AND CUTTER BAR

Original Filed June 7, 1934



Patented Jan. 26, 1937 2,068,807

UNITED STATES PATENT OFFICE

2,068,807

CUTTER CHAIN AND CUTTER BAR

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Application June 7, 1934, Serial No. 729,522
Renewed September 25, 1936

7 Claims. (Cl. 262—33)

The present invention relates to a cutter chain and cutter bar particularly adapted for use in a mining machine.

Objects of the invention are, to provide a cutter chain and a cutter bar for guiding the chain, both the cutter bar and the chain being designed for use in the cutting of a relatively narrow kerf; and to provide a cutter chain having the links so designed that they will be prevented from tilting or turning upon a transverse axis.

Other objects and advantages of the invention will be apparent from the following drawing, wherein:

Figure 1 is an elevation of a portion of the cutter chain;

Figure 2 is a transverse sectional view showing the cutter chain and the cutter bar for supporting the same, the view being taken on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a side view of one of the bit carrying links of the cutter chain; and

Figure 5 is a side view of one of the connecting links.

The cutter chain of the present invention comprises bit carrying links 10 and connecting links 11, adjacent bit carrying links being coupled by a pair of the connecting links. Each connecting link is provided with an apertured boss 12 adjacent each end thereof and the bosses of a pair of connecting links are arranged face to face within a socket 13 at the end of a bit carrying link as best shown in Figure 2 so that one of the connecting links of each pair is arranged on each side of the bit carrying links which the pair connects. A rivet or suitable pin 14 extends through the apertures in the connecting links to pivotally connect the links of the chain.

The bit carrying links are provided with bit holding lugs 15 in which bits 16 may be secured in any suitable manner. The lug 15 is preferably offset from the transverse center of the link so that the bit will project substantially from the transverse center of the link as shown in Figure 1.

As shown in Figure 2, the chain moves between slide plates 20 of the cutter bar, these plates being secured together by rivets or the like extending through a center bar 21, the center bar serving to space the slide plates and thus provide a track in which the chain may move. Angled wearing strips 22 are riveted to the outer ends of the slide plates, one flange of the strips extending along the inner side of the slide plates. The wear strips are preferably of hardened alloy steel.

It will be observed that the lugs 15 of the bit carrying links are of greater width than the body of these links with the result that overhanging shoulders 23 are provided on each side of the body of a bit carrying link, which shoulders bear upon the outer flanges of the wearing strips 22 covering the outer ends of the slide plates. The outer edges 24 of the connecting links 11 are opposite the inner edges of the wearing strips 22 and thereby serve to hold the chain between the slide plates. It will be noted that when the shoulders 23 of the bit carrying links are in contact with the wearing strips 22, the inner surfaces of the links will be out of contact with the center bar 21, thus preventing the center bar from being exposed to any wear by reason of the movement of the chain.

The connecting links 11 of each bar are provided on their inner and opposed surfaces, and substantially midway of their length, with lugs or shoulders 26. In order to prevent coal dust or slack from accumulating in the chain, the shoulders 26 are of insufficient thickness to contact with each other and their inner surfaces are rounded.

The bit carrying links have overhanging shoulders 28 at each end thereof, which shoulders are of sufficient thickness to engage the inwardly projecting shoulders 26 on the connecting links. By the opposed shoulder construction thus provided, the tilting of one bit carrying link at a sharp angle with respect to the remainder of the chain will be prevented. That is to say, if one bit carrying link 10 is caused to tilt or turn upon a transverse axis by reason of contact with a hard body of coal in the seam, causing an end 28 of the link to swing inwardly with respect to the cutter bar, this latter inward movement will be prevented by the lugs 26 on the connecting links beneath that end of the bit carrying link so that the two links will be maintained rigid with respect to each other. Should the tendency of a bit carrying link toward tilting movement be very sharp, the next adjacent bit carrying links will also tend to counteract the tilting, with the result that successive links of the chain will be held rigidly with respect to each other, but no one link may tilt at a sharp angle. The fact that the bits 16 are positioned substantially midway of the links 15 will, to a great extent, obviate tilting because of the fact that this arrangement will cause the forces resulting from contact of the bit with the coal to be substantially balanced.

In mining coal, it is particularly desirable that

the kerfs cut in the seam be of as small width as possible, since the coal cut out of a kerf becomes slack or dust and is therefore of little value.

The cutter bar and cutter chain of the present invention are particularly adapted for forming a thin kerf in a seam of coal, this result being due to the fact that all of the elements of the structure are compactly arranged as regards width. For example, the fact that the connecting links 11 themselves serve as gibs within the cutter bar, without the use of any outstanding lugs, makes the structure quite narrow, since the gibs ordinarily provided usually project from either the connecting links or the bit carrying links and thus increase the width of the entire structure. As is shown in Figure 2, the elements of the cutter bar are of sufficiently small width with respect to the thickness of the kerf that there will be ample space on each side of the cutter bar to prevent it from being cramped in the kerf.

It will be observed that the provision of shoulders **26** and **28** at each end of the bit carrying link will cause thrust resulting from any tendency of the bit carrying link to tilt on an axis transversely of its line of movement to be distributed over the four pintles of the two connecting links joined to the bit carrying link. Also, because the connecting links are entirely embedded in the cutter bar, tilting of the chain on a line parallel to its path of movement will be resisted to the maximum degree.

It will be understood that the invention is not limited to the details of construction shown and described in the drawing and that the example of the use of the invention which has been given does not include all of the uses of which it is capable; also, that the phraseology employed in the specification is for the purpose of description and not of limitation.

I claim:

1. A cutter chain comprising bit carrying links and alternate connecting links, one of said connecting links being provided with an inwardly projecting shoulder, each of said bit carrying links being provided with a shoulder adapted to overlie and contact with said first named shoulder to prevent the links from being tilted with respect to the cutter bar.

2. A cutter chain comprising bit carrying links and alternate connecting links, said connecting links being arranged in pairs, one on each side of adjacent bit carrying links, said connecting links being provided with inwardly projecting shoulders and said bit carrying links being provided with shoulders adapted to overlie and contact with said first named shoulders to prevent tilting of the links of the chain.

3. A cutter chain comprising bit carrying links and alternate connecting links, each of said connecting links being provided with a laterally projecting centrally disposed shoulder, and each of said bit carrying links being provided with a shoulder adapted to overlie and contact with said first named shoulder to prevent the links from being tilted with respect to the cutter bar.

4. In combination, a cutter chain and a cutter bar for supporting the same, said cutter bar including spaced flanges having wear strips right-angled in cross-section extending longitudinally along their facing outer edges, one arm of each angled strip forming an outer edge of the cutter bar and the edge of the strip arm at right angles to said first arm being normal to the face of the cutter bar flange and forming and defining the outer edge of a groove on the inner face of each cutter bar flange, said cutter chain comprising bit carrying links and alternate connecting links, the bit carrying links being provided with shoulders adapted to contact with the first-named faces of said wear strips, and the connecting links having flat outer edges opposed to the inner edges of the last-named arms of said wear strips.

5. In combination, a cutter chain and a cutter bar for suporting the same, said cutter bar including spaced side plates, L-shaped wear plates adjacent the outer edges of said side plates and each having one leg positioned adjacent and riveted to one of said side plates, said cutter chain comprising alternate bit carrying links and connecting links, the connecting links being positioned entirely between said side plates with their outer edges adapted to make sliding contact with the inner edges of said L-shaped wear plates and the bit carrying links being provided with shoulders adapted to make sliding contact with the outer edges of said wear plate.

6. In combination, a cutter chain and a cutter bar for supporting the same, said cutter bar including spaced side plates, L-shaped wear plates adjacent the outer edges of said side plates and each having one leg positioned adjacent and riveted to one of said side plates, said cutter chain comprising alternate bit carrying links and connecting links, the connecting links being positioned entirely between said side plates with their outer edges adapted to make sliding contact with the inner edges of said L-shaped wear plates and the bit carrying links being provided with shoulders arranged directly opposite the outer edges of the connecting links and adapted to make sliding contact with the outer edges of said wear plate.

7. In combination, a cutter chain and a cutter bar including inwardly extending shoulders, said cutter chain including a bit carrying link and connecting links in advance of and following each bit carrying link and beneath the shoulders of the cutter bar, a cutting bit fixed to the bit carrying link at a point adjacent the transverse center line thereof, the advance connecting link being joined to the bit carrying link adjacent the transverse center line of the latter and extending forwardly from that point, the bit carrying link being provided with shoulders rearwardly of its transverse center line and overlying the cutter bar shoulders, the following connecting link being joined to the bit carrying link at a point beneath said shoulders on the latter, and opposed shoulders on the bit carrying links and connecting links, respectively, beneath the said bit carrying link shoulders.

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