

March 17, 1942.

O. F. LEWIS

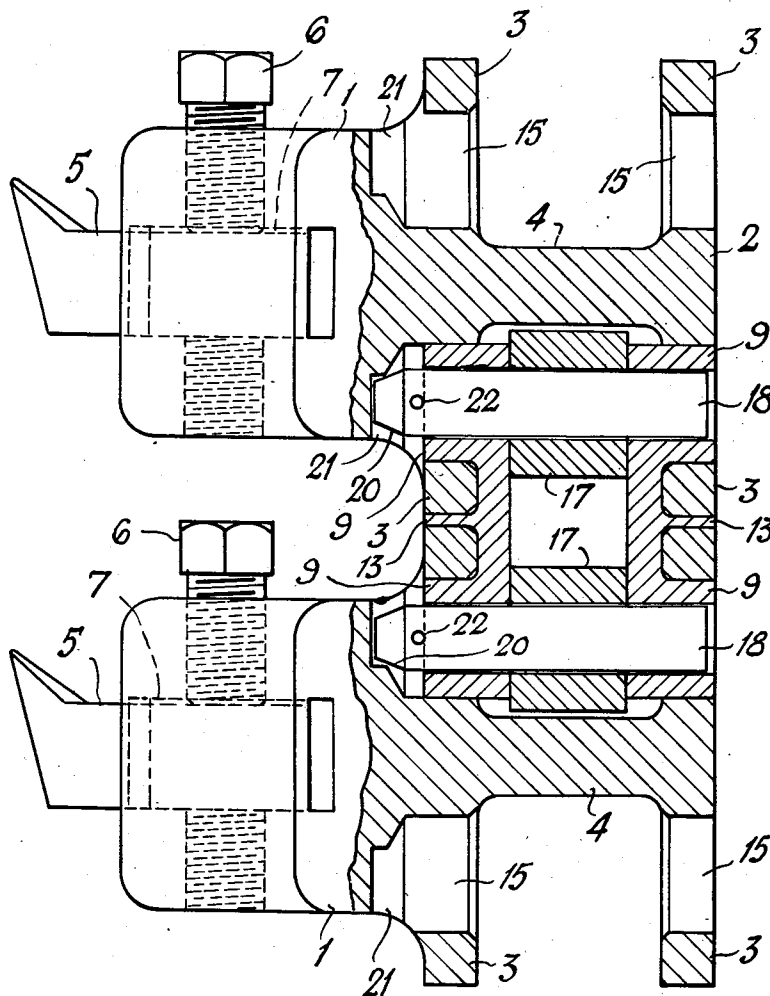
2,276,731

MINING MACHINERY

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2 Sheets-Sheet 1

Fig. 1.



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FIG. 4.

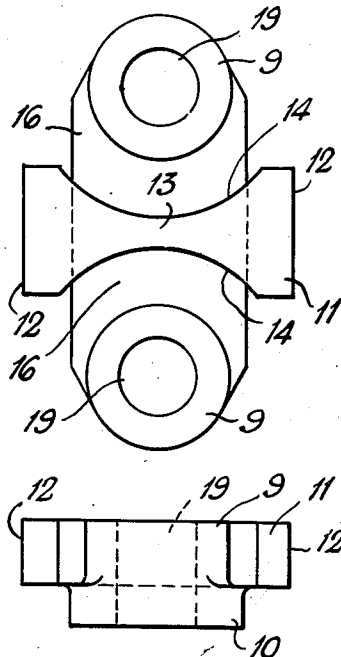


FIG. 2.

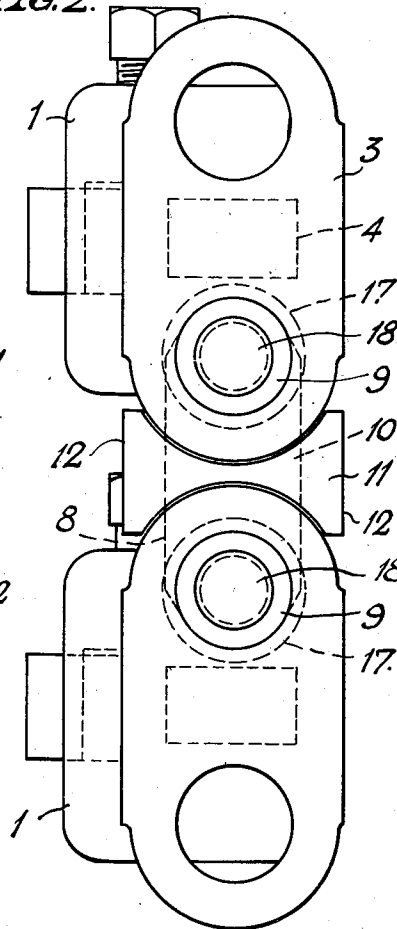
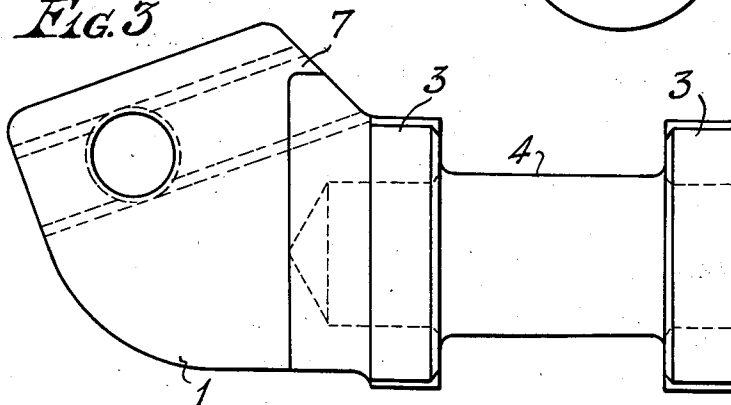


FIG. 5.

FIG. 3.



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MINING MACHINERY

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8 Claims. (Cl. 262—33)

This invention relates to mining machinery and more particularly to constructional details of a side-cutting chain as used on endless-chain machines for mining coal or other mineral by cutting around a core or block of coal.

One object of the invention is to enable the cutter chain to be constructed from parts which are easily made and assembled, thus greatly reducing the cost of manufacture and a further object is to provide an arrangement which will be compact and more flexible than the usual arrangement of cutter chain.

In order to make the chain as flexible as possible and enable it to run round comparatively sharp curves on the supporting jib it is necessary to reduce to a minimum the distance separating adjacent pivot pins by which the pick boxes and links of the cutter chain are connected together, but it has been difficult to reduce the distance between adjacent pins without reducing the rigidity of the pick boxes and their strength to withstand the stress involved in cutting. In some cases, also, it is necessary to allow for the ends of the picks to project into the interior of each pick box between the pivot pins.

In the arrangement later described in detail the side-cutting chain has each pick box, including the pick block and the saddle portion which rides in the jib guide, constructed from a single piece of metal, either by drop forging or by flame cutting from a suitable shaped block, followed by machining of the bearing surfaces, so that the pick box is constructed with a pick block on one side merging into one of the side wings of the saddle and this side wing is joined by a relatively narrow flat piece to the other side wing which is thereby spaced from the other parts but rigidly connected thereto. Thus the distance separating the pivot pins, which pass transversely through the spaced side wings towards the pick block, can be reduced to a minimum since the only part which has to be located between them is the rectangular sectional connecting piece joining the side wings of the saddle. The ends of the pivot pins adjacent the pick block project into recesses therein so that the distance apart of the pivot pins is not determined by the size of the pick block.

Each pick block has an inclined socket for the insertion of a cutting pick which is secured by a clamping screw and the socket is inclined in such a direction that the blunt end of the pick does not project into the body of the pick box.

A feature of the invention is that the connecting links are formed by pairs of parallel flat

strips having circular bosses at their ends which fit into circular bearing holes in the side wings of the saddles, the flat strips which form the connecting links being inserted into place from between the side wings with their bosses projecting outwardly into the bearing holes in the wings of the saddle and each pair of strips are separated and kept in a position by a hardened steel distance piece or roller which fits between the adjacent ends of the pairs of strips and is kept in place by a pivot pin which passes centrally through the bosses on the ends of the strips and through the spacing roller.

These rollers project beyond the links and help to reduce friction around curves as there is then only rolling friction. Also they are very easily and quickly replaced when worn.

The accompanying drawings illustrate the constructional details of the cutter chain just described and in the drawings—

Fig. 1 is a part sectional elevation of a portion of the chain

Fig. 2 is a side view of Fig. 1

Fig. 3 is an end view of a pick box; and

Figs. 4 and 5 are a side elevation and end view, respectively, of a connecting link.

Each pick box consists of a pick block 1 integral with a saddle portion 2 which consists of two spaced side wings 3 joined by a narrow bridge or web 4. The pick block 1 extends nearly the whole length of the complete box and can have any conventional or desired shape such as that illustrated in Fig. 3 according to the angle at which the cutter pick is to be located. The pick such as illustrated at 5 in Fig. 1 is held by a set screw 6 in a socket 7 extending through the block 1 at a suitable angle to the transverse centre line of the saddle as shown in Fig. 3. By building up the cutter chain from pick boxes having the picks at different angles, the width of the cut made by the complete chain can be adjusted. The saddle 2 is substantially rectangular with rounded ends as illustrated in Fig. 2 and the bridge 4 connecting the side wings 3 of the saddle is of rectangular cross-section as indicated in dotted lines in Fig. 2. The pick block 1 and saddle 2 are made from a single piece of metal, preferably by drop forging or by flame cutting from a suitable block.

The pick boxes are joined to form an endless chain by means of pairs of connecting links 8, one of which is shown in Figs. 4 and 5. Each link is made in one piece by drop stamping and is machined all over and in its finished form shown consists of two circular bosses 9 project-

ing laterally from a common web 10 with a projection 11 integral with the web 10 between the two bosses 9. The projection 11 has flat parallel ends 12 but its centre portion is cut away as shown in Fig. 4 to form a waist 13, the shape of this waist being defined by curved faces 14 practically concentric with the bosses 9. The outside diameters of the bosses 9 correspond with the diameters of circular holes 15 in the side wings 3 of the pick box. Said holes 15 are concentric with the rounded ends of wings 3, and the thickness of metal left between the holes 15 and the rounded ends of the wings 3 is the same size as the width of the curved gaps 16 in the links between the bosses 9 and the centre projection 11. Thus the pick boxes can be linked together by fitting the bosses 9 into the holes 15 so that the webs 10 are facing one another, that is, between the side wings 3 of the saddle, and the centre projections 11 then fit between the rounded ends of adjacent saddles as illustrated in Fig. 2. The pairs of links are held in proper spaced relation by the insertion between them of a hardened steel cylindrical distance piece or roller 17 at each end, the rollers being held in place by the insertion of axis pins 18 on which the rollers 17 can rotate. The pins 18 are headless and fit into the holes 19 in the bosses 9 of the links. One end of each pin is tapered as at 20 and projects into a recess 21 in the pick block 1 until it abuts against the bottom of the recess and a split pin 22 or other securing means is inserted transversely through the projecting end of the pin 18 to prevent it from slipping out in the opposite direction. The pins 18 are of such length that when their projecting ends 20 are against the ends of the recesses 21 and the split pins 22 are in position, then the opposite ends of the pins 18 are just below the side faces of the saddles and bosses 9 at those ends.

Since the pick block and saddle are made of a one-piece forging and the other parts are few and of very simple construction, the cost of manufacture and maintenance of the cutter chain is very low, while the assembly of the chain and any adjustment or repair can be very quickly dealt with since there are no complicated parts to fit together. The construction above described also has the advantage that the pivots of the chain are as close together as possible with the result that the chain is extremely flexible and can be taken round a very small radius during its travel on the jib, thus facilitating operation and design of the mining machine. Other advantages result from the construction of the connecting links with rollers between them which are of great assistance when going around curves on the jib guide, while the ends 12 of the projections 11 on the links ride on the jib guide, both around curves and on straight runs of the chain and distribute the load more evenly thus materially reducing wear, particularly around curves.

It will be noted that the rollers 17 are of such diameter as to project beyond the parallel edges and rounded ends of the links and thus reduce the friction on curves.

What I claim as my invention and desire to secure by Letters Patent is:

1. A mining machine cutter chain comprising pick boxes consisting of pick blocks integral with saddle portions having a pair of spaced parallel side wings provided with pairs of opposing circular holes for the reception of the ends of connecting links by which said pick boxes are joined to form an endless cutter chain, said links having

circular end bosses projecting laterally from flat webs and fitted into said holes from between the side wings and separated by spacers held in position by pivot pins passing centrally through said end bosses and through the spacers.

2. A mining machine cutter chain according to claim 1 wherein the pivot pins abut into recesses in the pick blocks so that their other ends are sunk in the side wings, the pivot pins being restrained from endwise movement by the bottoms of the recesses and by transverse securing means through the abutting ends of the pivot pins.

3. A mining machine cutter chain comprising pick boxes consisting of pick blocks integral with saddles having pairs of spaced parallel side wings with parallel bearing faces and semi-circular ends and provided with pairs of opposing circular holes, concentric with said semicircular ends, for the reception of the ends of connecting links by which said pick boxes are joined to form a cutter chain, said links having circular end bosses projecting laterally from flat webs and fitted into said holes from between the side wings and also having projections midway between said end bosses with concave circular faces concentric with and fitting between the semicircular ends of adjacent pick boxes; spacers holding said links with their bosses in said holes, and pivot pins passing centrally through said bosses and the spacers.

4. The structure of claim 3 with the projection on the links extending beyond the webs to form bearing faces in alignment with the bearing faces of said side wings.

5. A mining machine cutter chain comprising pick boxes consisting of pick blocks integral with saddles having pairs of spaced parallel side wings with parallel bearing faces and semicircular ends and provided with pairs of opposing circular holes, concentric with said semicircular ends, for the reception of the ends of connecting links by which said pick boxes are joined to form a cutter chain, said links having circular end bosses projecting laterally from flat webs and fitted into said holes from between the side wings and also having projections midway between said end bosses with concave circular faces concentric with and fitting between the semicircular ends of adjacent pick boxes, cylindrical rollers separating pairs of said links in spaced relation with their bosses in said holes, said rollers having their cylindrical faces projecting beyond the links to act as bearing faces, and pivot pins passing centrally through said bosses and the rollers.

6. A mining machine cutter chain comprising pick boxes consisting of pick blocks integral with saddles having pairs of spaced parallel side wings with parallel bearing faces and semicircular ends and provided with pairs of opposing circular holes, concentric with said semi-circular ends, for the reception of the ends of connecting links by which said pick boxes are joined to form a cutter chain, said links having circular end bosses projecting laterally from flat webs and fitted into said holes from between the side wings and also having projections midway between said end bosses with concave circular faces concentric with and fitting between the semicircular ends of adjacent pick boxes; cylindrical rollers separating pairs of said links in spaced relation with their bosses in said holes, said rollers having their cylindrical faces projecting beyond the links to act as bearing faces, and pivot pins passing centrally through said bosses and the rollers and

abutting at one end into recesses in the pick blocks so that their opposite ends are sunk in the side wings and restrained from endwise movement by their abutting ends and by transverse securing means through said abutting ends.

7. A mining machine cutter chain comprising pick boxes each having a saddle portion including a pair of spaced and parallel side wings having parallel bearing faces, links including means pivotally connecting said boxes together to form an endless chain, said links being substantially narrower than said side wings, projections on said links extending outwardly thereof to provide bearing faces in alignment with said bearing faces of said side wings, there being a link pivotally connected to each end of each side wing from be-

tween said side wings, a spacer separating each pair of opposed links, and a pivot pin extending through each pair of opposed links and their spacer to hold said spacer in position.

8. A mining machine cutter chain, comprising pick boxes each having a saddle portion including a pair of spaced and parallel side wings having parallel bearing faces, links including means pivotally connecting said boxes together to form an endless chain, there being a link pivotally connected to each end of each side wing from between said side wings, a spacer separating each pair of opposed links, and a pivot pin extending through each pair of opposed links and their spacer to hold said spacer in position.

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