

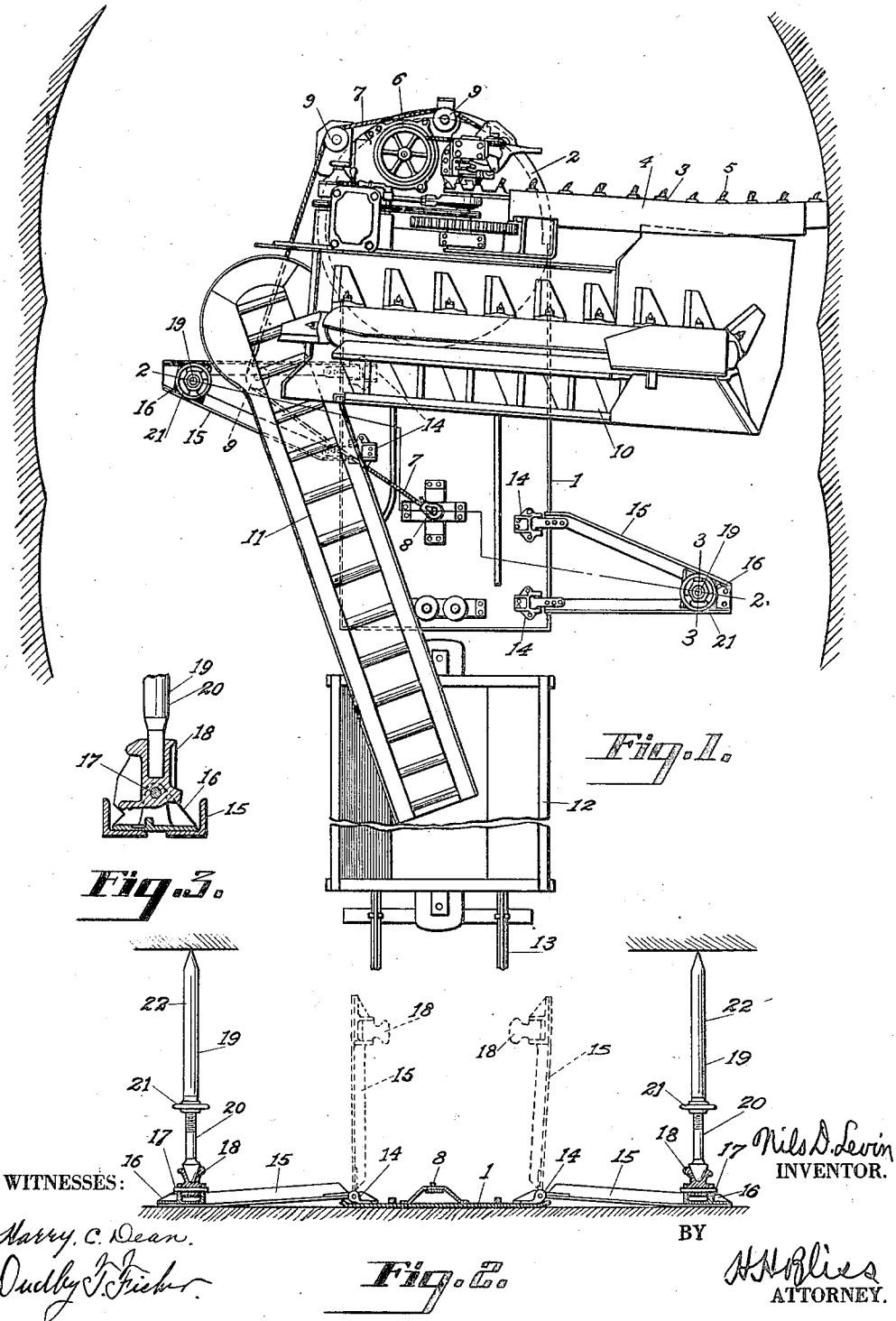
Nov. 13, 1923.

N. D. LEVIN

1,473,729

MINING MACHINE ANCHORING DEVICE

Original Filed Sept. 11, 1918



UNITED STATES PATENT OFFICE.

NILS D. LEVIN, OF COLUMBUS, OHIO, ASSIGNOR TO THE JEFFREY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

MINING-MACHINE-ANCHORING DEVICE.

Application filed September 11, 1918, Serial No. 253,633. Renewed April 11, 1923.

To all whom it may concern:

Be it known that I, NILS D. LEVIN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Mining-Machine-Anchoring Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to certain new and useful improvements in anchoring devices of the class adapted to securely hold a mining machine in working relation with the coal body during the mining operations.

In my co-pending application, Serial No. 235,632 of even date herewith, I have disclosed a coal mining machine comprising a subbase adapted to rest upon and slide in any direction over the floor of a mine, a main frame mounted upon said subbase and adapted to rotation about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage the mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis. As the cutting mechanism engages the mine wall at a considerable distance from the axis of its rotation it acts with great leverage to resist movement of the main frame and thereby produces a strong reaction tending to move the subbase upon the mine floor, and powerful anchoring devices are required to counteract this tendency. In the room and pillar system of mining, as commonly practiced in the United States, when a room has been fully worked out the mining machine must be transferred to a new working place. This necessity for moving the mining machine along the narrow and tortuous passages of the mine and among the roof supporting timbers in the room, places narrow limits upon its allowable lateral dimensions and, when reliance is placed upon anchoring devices such as have been heretofore known, great difficulty has been experienced in holding the cutting mechanism to its work.

It is the especial object of this invention to provide an anchoring device connected

with the subbase of a mining machine such as is above contemplated, which will completely counteract its tendency to movement relative to the coal body during the cutting operation, and which may be conveniently disposed to permit freedom of movement of the mining machine along the narrow entries and intricate passages of the mine.

The devices by which I attain this object are fully set forth in the following specification reference being had to the accompanying drawings of which—

Fig. 1 is a general plan view of a coal mining machine of the type above referred to, equipped with the devices of my present invention.

Fig. 2 is a section along the line 2—2 of Fig. 1.

Fig. 3 is a section along the line 3—3 of Fig. 1.

Like numerals refer to similar parts in the several figures.

In the drawings I have illustrated a coal mining machine having a subbase 1 formed of a steel plate adapted to rest upon and slide in any direction over the floor of the mine. Upon the plate 1 is pivotally mounted a turn table 2 which constitutes the main frame upon which the operative parts of the machine are mounted. Extending outwardly from the turn table 2 is a cutting mechanism of the well known type consisting of an endless chain 3 adapted to travel in guide ways formed upon the forward edge of a vertically disposed loop shaped cutter frame 4. To the chain 3 are attached renewable cutter bits 5 adapted to engage the coal to cut it. Upon the turn table 2 is also mounted a winding mechanism 6 adapted to wind a feed rope 7 which is arranged to be attached to a suitable abutment 8 upon the subbase 1. By the winding of the rope 7 the turn table may be rotated relative to the subbase to cause the cutting mechanism to engage the material of the mine wall to sever sections therefrom. Suitable guide sheaves 9 are provided upon the turn table to guide the rope 7 in any desired direction. Mounted upon the turn table 2 is a conveyer 10 of well known construction which is arranged to receive the material dislodged by the cutting mechanism

and to convey it rearwardly of the machine. A second conveyer 11 is arranged to receive the material from the conveyer 10 and deposit it in a car 12 suitably positioned upon the mine tracks 13 in the rear of the machine. Actuating motors, transmission gearing, and like devices necessary to the formation of a completely operable machine are also provided but as these details form no part of the present invention further description at this time is not thought to be required. In the room and pillar system of mining such a machine advances step by step until the room has been completely worked out, after which it must be removed to a new working place. In order that it may be withdrawn from the worked out room, passing easily between the roof supporting timbers and through the restricted passages of the mine, it is imperative that its lateral dimensions shall be narrowly limited. When the cutting mechanism of such a mining machine engages the mine wall further rotation of the turn table will be resisted, and the strain of the feeding mechanism will produce a reaction tending to rotate the subbase about the pivot of the turn table. It has been the practice heretofore to set jack screws against the subbase and, by pressing their upper ends against the roof of the mine, force the subbase against the mine floor to prevent its movement relative to the mine walls. Owing to its narrowness difficulty has been experienced in holding the subbase against the leverage of the cutting mechanism without recourse to jack screws of prohibitive size and weight, and to avoid this difficulty I have provided the devices hereinafter set forth. Attached to the subbase 1 near either of its lateral edges are hinges 14 to which are connected the arms 15 adapted to extend laterally at either side of the machine, or to be turned upward upon their respective hinges to positions lying wholly within the vertical bounding planes of the subbase. Each of the arms 15 is composed of suitable angle bars joined together at their outboard ends by a hinge casting 16. Connected to the hinge casting 16 by a suitable hinge pin 17 is an upwardly extending socket 18 adapted to receive the foot of the jack post 19. The jack post 19 may be of any preferred construction. In the drawings I have shown, for the purpose of illustration, a jack of the type well known in the mining machine art comprising a cylindrical post 20 to which is screw threaded the hand wheel nut 21 adapted to engage the lower end of the tubular extension 22. When the jack post 19 is in position in the socket 18 the hand wheel nut 21 may be screwed upwardly upon the post 20 to thrust the tubular extension 22 against the roof of the mine, thereby pressing the arm 15 downwardly in contact with the floor of the mine

to securely hold it against lateral movement in any direction. The hinge connection between the sockets 18 and the arms 15 affords a flexibility of connection which materially contributes to the convenience of placing and adjusting the jack post, and permits the jack to be inclined in a plane tangential to the path of rotation of the end of the arm so as to more effectively resist its tendency to rotation. When the arms 15 are thus anchored to the floor of the mine the subbase 1 will be securely held in the desired position, and the distance of the jack post from the pivotal axis of the turn table affords a leverage sufficient to insure the stability of such anchorage while permitting the use of jack posts of convenient size and weight. If it becomes desirable to move the machine from one working place to another, because of the working out of the room, or for any other cause, these anchoring devices may be conveniently disposed to prevent their interference with the walls of the mine or the roof supporting timbers by removing the jack posts 19 from the sockets 18 and swinging the arms 15 upon their hinges 14 to the upright positions illustrated by the dotted lines in Fig. 2.

What I claim is—

1. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase and adapted to rotate about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage the mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis, of arms connected with said subbase, and adjustable from positions within the vertical bounding planes thereof to positions laterally remote therefrom, and means to hold said arms in forcible engagement with the mine floor to resist movement of said subbase relative to the mine walls.

2. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase and adapted to rotate about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage the mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis, of arms hinged to said subbase and adapted to be adjusted from positions within the vertical bounding planes thereof to positions laterally remote therefrom, and means to hold said arms in forced engagement with the mine floor to

resist movement of said subbase relative to the mine walls.

3. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase and adapted to rotate about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage the mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis, of arms hinged to said subbase and adapted to extend laterally at either side thereof or to be folded upwardly to positions within the vertical bounding planes of the subbase, and means to hold said arms in forced engagement with the floor of the mine to resist movement of said subbase relative to the mine walls.

4. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase and adapted to rotate about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage the mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis, of anchoring devices connected with said subbase adapted to engage the floor of the mine at points outside said subbase and widely separated from said vertical axis or to be disposed within the bounding planes of said subbase.

5. The combination with a mining machine comprising a subbase adapted to rest upon and slide in any direction over the floor of a mine, a main frame mounted upon said subbase and adapted to rotate about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage a mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis, of anchoring devices permanently connected with said subbase adapted to engage the floor of the mine at points outside said subbase and widely separated from said vertical axis or to be disposed within the bounding planes of said subbase.

6. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase, cutting mechanism carried by said main frame, and feeding devices arranged to produce movement of said main frame relative to said subbase to cause said cutting mechanism to engage the mine wall to form a kerf

therein, of arms hinged to and adapted to extend beyond said subbase, sockets hinged to said arms, and anchor jacks adapted to engage said sockets and the roof of the mine to resist movement of said subbase relative to the mine wall.

7. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase and adapted to rotate about a vertical axis, cutting mechanism extending laterally from said main frame for rotation therewith and adapted to engage the mine wall to form a kerf therein, and feeding devices connected with said main frame and said subbase to cause relative rotation thereof about said vertical axis, of anchoring devices flexibly connected with said subbase adapted to engage the mine floor at points remote from said subbase or to be disposed entirely within the vertical bounding planes of said subbase.

8. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase, cutting mechanism carried by said main frame, and feeding devices arranged to produce movement of said main frame relative to said subbase to cause said cutting mechanism to engage the mine wall to form a kerf therein, of arms hinged to and adapted to extend beyond said subbase, or to be disposed within the vertical bounding planes thereof, and means to engage said arms to resist movement of said subbase relative to the mine wall.

9. The combination with a mining machine comprising a subbase adapted to rest upon and slide over the floor of a mine, a main frame mounted upon said subbase, cutting mechanism carried by said main frame, and feeding devices arranged to produce movement of said main frame relative to said subbase to cause said cutting mechanism to engage the mine wall to form a kerf therein, of arms hinged to and adapted to extend beyond said subbase or to be folded up to positions within the vertical bounding planes of the subbase, and means to engage said arms to resist movement of said subbase relative to said mine wall.

10. In a mining machine of the class described the combination of the cutter, the horizontally rotating cutter carrier, the base which is stationary when the cutting apparatus is advancing, the jack engaging with the roof and bearing downward on the floor on a vertical line remote from the base, and a bracing holding arm movably connected to the base and detachably connected at its outer end to the jack.

11. In a machine of the class described the combination of the cutting device, the hori-

zontally rotatable cutter carrier, the base stationary while the cutter carrier is advancing, the bracing holder arm movably connected to the base and adapted to be positioned while the operation at either of several inclinations, vertically, to the base, and the vertically extensible jack adapted to bear downward on said arm and to be posi-

tioned at either of several inclinations relatively thereto. 10

In testimony whereof, I affix my signature, in presence of two witnesses.

NILS D. LEVIN.

Witnesses:

HARRY C. DEAN,
ANNA M. FENLON.