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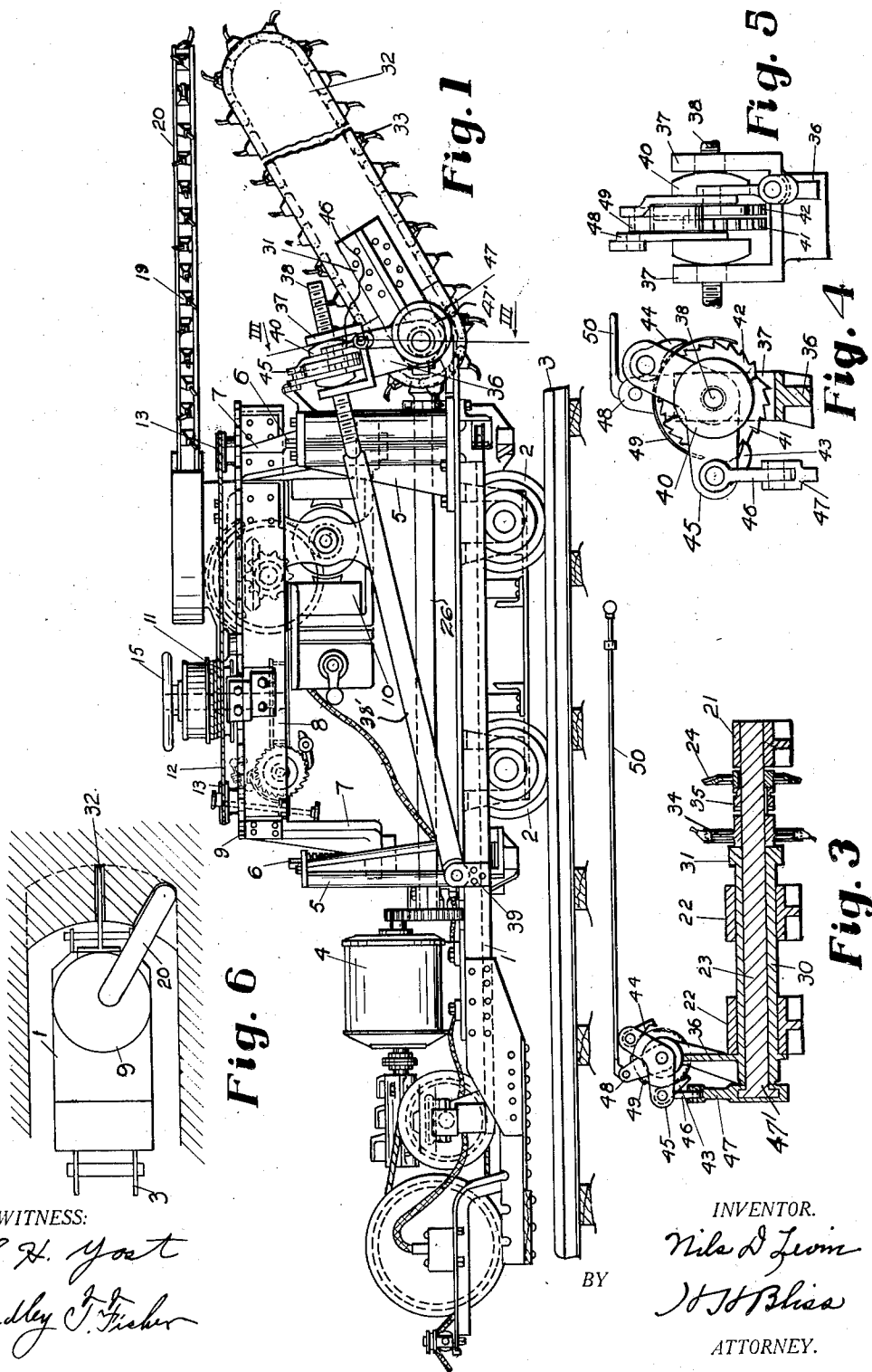
N. D. LEVIN

1,978,366

COAL MINING MACHINE

Original Filed Nov. 4, 1922

2 Sheets-Sheet 1



WITNESS:

S. H. Yost
Dudley J. Fisher

INVENTOR.

Nile D. Levin
W. H. Bliss

ATTORNEY.

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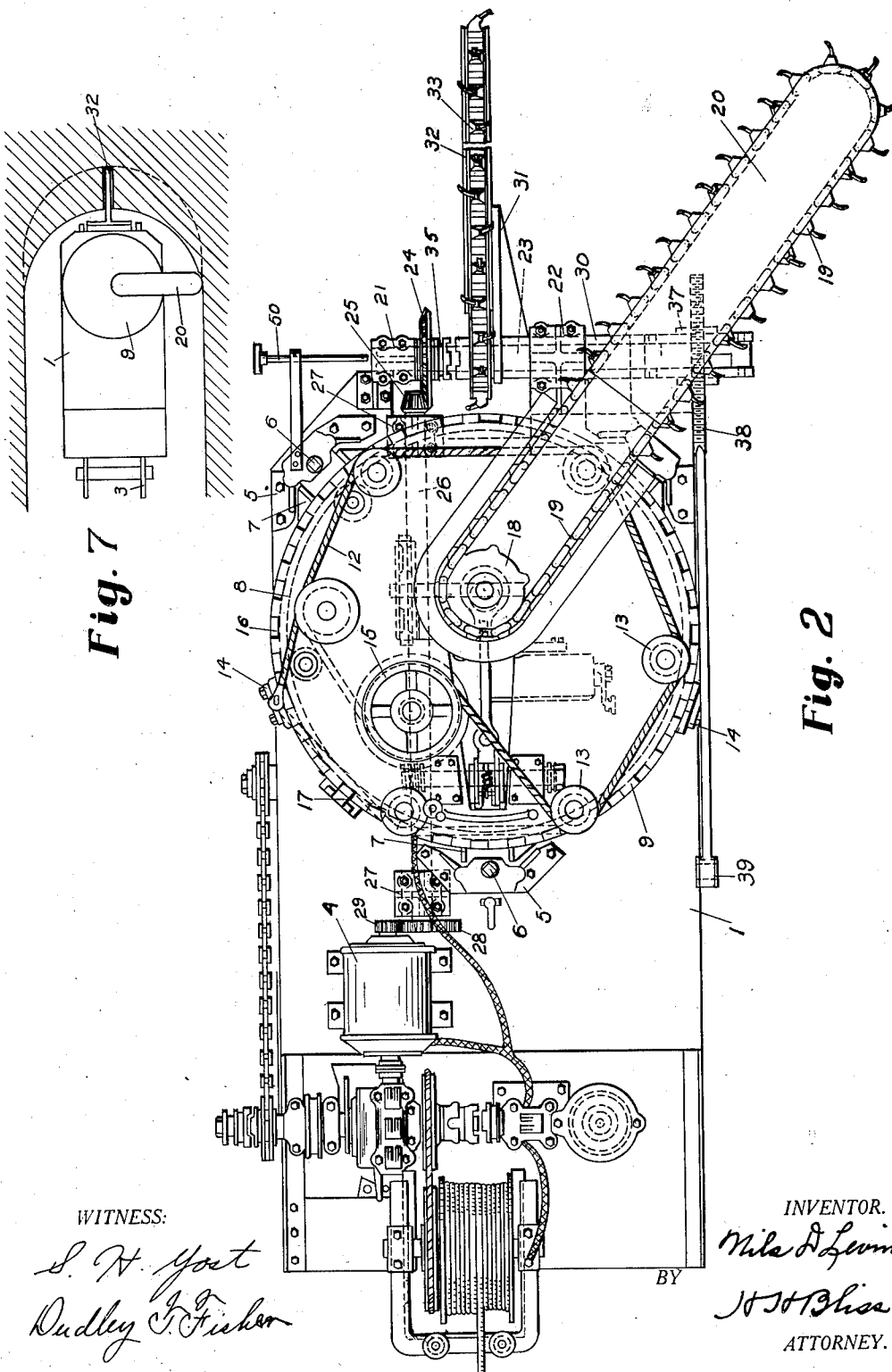


Fig. 7

Fig. 2

WITNESS:

S. H. Yost
Rudley J. Fisher

INVENTOR.

N. D. Levin

H. J. Blase

ATTORNEY.

BY

UNITED STATES PATENT OFFICE

1,978,366

COAL MINING MACHINE

Nils D. Levin, Columbus, Ohio, assignor to The
Jeffrey Manufacturing Company, Columbus,
Ohio, a corporation of Ohio

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43 Claims. (Cl. 262—28)

The present invention relates to certain new and useful improvements in a coal mining machine of the class in which each machine is provided with track wheels and is adapted to perform its cutting operation while supported upon said wheels.

It is the especial object of this invention to provide a machine of the class described adapted to simultaneously form horizontal and vertical kerfs in the coal face to facilitate breaking the coal from its native bed.

The means 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 side elevation of the preferred embodiment of my invention.

Fig. 2 is a plan view of the devices illustrated in Fig. 1.

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

Figs. 4 and 5 are details upon an enlarged scale, of certain parts illustrated in Fig. 3.

Figs. 6 and 7 are diagrammatic figures illustrating some of the methods of using the apparatus.

Like numerals refer to similar parts in the several figures.

In the drawings the numeral 1 indicates a main frame which is supported upon the track wheels 2 adapted to rest upon and travel along the rails 3 of the mine track. Mounted upon the main frame 1 is an electric motor 4 which is connected through trains of suitable gearing and driving chain with the wheels 2 whereby said wheels may be actuated to propel the machine along the track at a relatively high speed suitable to move the machine from one working place to another, or at a relatively low speed suitable to feed the cutting mechanism into the coal. Projecting upwardly from the main frame 1 are pedestals 5 containing vertically extending screw shafts 6 arranged to engage the brackets 7 attached to the supporting ring 8. The screw shafts 6 are connected by suitable gearing with the electric motor 4, and by the manipulation of suitable controlling devices may be caused to revolve in one direction to elevate the supporting ring 8, and in the other direction to move said supporting ring downwardly. As the transmission and controlling devices whereby the motor 4 is connected with the track wheels 2 and with the screw shaft 6 form no part in the present invention, and as they are well understood in

the art, further description and illustration at this time is not thought to be required.

Mounted upon the supporting ring 8 is a turn table 9 adapted to rotate about a vertical axis concentric with said supporting ring. Beneath the turn table 9 is mounted an electric motor 10 for the actuation of the feeding mechanism. The motor 10 is connected through suitable gearing to actuate the winding drum 11 upon which is windable the feed rope 12. The feed rope 12 is adapted to be carried around suitable guide sheaves 13 mounted upon the turn table, and to be attached to suitable abutments 14 attached to the supporting ring, in such manner that when said rope 12 is wound upon the drum 11 the turn table 9 will be caused to be rotated about its axis. Friction clutch mechanism mounted within the drum 11 and controlled by the hand wheel 15 affords means to control the winding of the drum 12. Formed on the edge of the turn table 9 are a plurality of notches 16 adapted to be engaged by a bolt 17 to lock the turn table in any preferred position of angular adjustment.

The motor 10 is also connected by suitable gearing to actuate the sprocket wheel 18 which engages the cutter chain 19 to drive it. The cutter chain 19 travels in guideways of the cutter arm 20 which is attached to the turn table 9 and projects horizontally therefrom in such manner that rotation of the turn table about its axis will cause the cutter chain 19 to engage the coal to form a kerf therein.

Mounted in suitable bearings 21 and 22, attached to the forward end of the main frame 1, is a shaft 23 to which is fixed the bevel gear 24. The gear 24 is engaged by a bevel pinion 25 attached to the longitudinally extending shaft 26. The shaft 26 is supported in suitable bearings 27 mounted upon the main frame 1, and is connected by a pair of spur gears 28 and 29 with the armature shaft of the motor 4 by which the shaft 26 is driven. Rotatably mounted within the bearings 22 is a quill 30 concentric with the shaft 23, and upon this quill is formed a bracket 31 to which is secured the cutter arm 32. The cutter arm 32 is provided with a cutter chain 33 engaged by the sprocket wheel 34 which is freely mounted upon the shaft 23. A clutch 35 is arranged to connect the sprocket wheel 34 with the shaft 23 to drive it, and this clutch may be arranged to be controlled by any mechanism suitable to the purpose. Upon the quill 30 is formed an upwardly projecting rocker arm 36 terminating in a U-shaped extension the arms 37 of which are provided with apertures through

which projects the longitudinally extending screw rod 38. The screw rod 38 constitutes a direct continuation or end portion of a bar 38' which is pivotally attached to the main frame 1 by a suitable attachment bracket 39, and is fitted with a screw nut 40 positioned between the arms 37 of the U-shaped extension in such manner that the rotation of the nut 40 relative to the rod 38 will rock the arm 36 about the shaft 23. On the periphery of the nut 40 are formed two oppositely disposed ratchet wheels 41 and 42 which are adapted to engagement with the pawls 43 and 44 respectively—which pawls may be of any known or suitable type of spring or gravity pawl which will normally engage their ratchet wheels. The pawls 43 and 44 are carried by the yoke 45 which is pivotally mounted upon the screw shaft 38, and is connected by the link 46 with the arm of an eccentric strap 47 mounted on an eccentric 47' at the end of the shaft 23. The arrangement is such that when the shaft 23 revolves the yoke 45 will be oscillated about its pivotal support to cause the pawls 43 and 44 to engage their respective ratchet wheels to rotate the nut 40 about the screw rod 38. Pivotally mounted upon the screw shaft 38 is a rocker arm 48 to which is attached a curved shield plate 49 arranged to lie closely adjacent to the ratchet wheels 41 and 42. The length of the shield plate 49 is such that when the rocker arm 48 is in its central position the shield plate 49 will engage both of the pawls 43 and 44 to hold them out of engagement with their respective ratchet wheels. A rod 50, convenient to the hand of the operator, is provided for the manipulation of the rocker arm 48 and the control of the vertical movement of the cutter arm 32. When the rocker arm 48 is moved to its right hand position the pawl 43 will be disengaged by the plate 49 and will engage the ratchet wheel 41 to cause rotation of the nut 40 about the screw shaft 38 in a direction to move the rocker arm 36 rearwardly of the carriage, thereby rotating the quill 30 about the shaft 23 to swing the cutter arm 32 upwardly. When the rocker arm 48 is moved to its left hand position the shield plate 49 engages the pawl 43 and disengages the pawl 44 allowing it to engage the ratchet wheel 42 to rotate the nut 40 in the opposite direction thereby causing the cutter arm 32 to swing downwardly about the shaft 23 as its pivot. When the rocker arm 48 is in its central position both of the pawls are held out of engagement with their respective ratchet wheels and the cutter arm 32 is held against movement either upwardly or downwardly.

In operation the machine is moved along the track from one working place to another by the tractive effort of the wheels 2 actuated by the motor 4. In Fig. 6 I have illustrated a method of operation in entries or similar narrow working places. When the machine has been brought to the desired working place the cutter arm 20 is moved to the right until its inner end reaches the line of the right hand rib. The cutter arm 32 is swung upwardly until its inner end reaches the line of the roof. The cutter chains are then actuated and the machine moved forwardly, by the tractive effort of the wheels 2, until the cutter arms 20 and 32 have been thrust longitudinally into the coal to the full depth of the cut. The ratchet mechanism is then manipulated to cause the cutter arm 32 to move downwardly to cut a vertical shearing kerf in the coal face, and at the same time the winding drum 11 and rope

12 are manipulated to swing the cutter arm 20 horizontally from right to left to cut a horizontal kerf across the end of the entry. When the cutter arm 32 has reached the line of the floor the ratchet mechanism will be manipulated to discontinue further downward movement of the cutter arm. And when the cutter arm 20 has reached the line of the left hand rib the hand wheel 15 will be manipulated to discontinue further winding of the rope and the consequent swinging of the cutter arm. The machine may then be backed away from the coal face, by the tractive effort of the wheels 2, to finish the cut. It is apparent that the reaction of the cutter bar 20 upon the coal face tending to force the machine frame to the right will be resisted by the cutter arm 32 thereby avoiding the necessity of the use of external jacks such as are commonly resorted to with machines of this class.

In Fig. 7 I have shown the method of operating in a mine room having a width equal to twice the radial length of the cutter arm 20. In such a case the operation is precisely the same as that above described, with the exception that the cutter arm 20 is primarily rotated to a position extending at right angles to the longitudinal lines of the mine track. After the machine has been so placed the cutter arm 32 will be forced longitudinally into the coal by the tractive effort of the wheels 2, and then fed downwardly from the roof to the floor to make the shearing cut. At the same time the cutter arm 20 will be swung horizontally in a complete semicircle to make a horizontal cut extending across the end of the mine room.

What I claim is:—

1. In a mining machine, the combination of a support, a kerf cutter mounted on said support and having a transverse cutting movement in a substantially horizontal plane, a second kerf cutter mounted on said support and having a transverse cutting movement in a substantially vertical plane intersecting the plane of movement of said first named kerf cutter, motor driven means for actuating said cutters, means for vertically adjusting the first kerf cutter relative to the second and means to control the direction of movement and to arrest said second kerf cutter.

2. In a mining machine, the combination of a support, a kerf cutter mounted on said support and having a transverse cutting movement in a substantially horizontal plane, a second kerf cutter mounted on said support and having a swinging transverse cutting movement in a substantially vertical plane intersecting the plane of movement of said first named kerf cutter, motor driven means for actuating said cutters, means for vertically adjusting the first kerf cutter relative to the second and manually operable means to control the direction of movement and to arrest said second kerf cutter.

3. In a mining machine, the combination of a movable support, a kerf cutter mounted on said support and having a transverse cutting action in a substantially horizontal plane, a second kerf cutter mounted on said support below said first named cutter and having a transverse cutting action in a substantially vertical plane, motor actuated means to move said second cutter with a step by step movement vertically and relative to the first kerf cutter through its plane of movement, and manually operable means to control said motor actuated means.

4. In a mining machine, the combination of a

movable support, a kerf cutter mounted on said support and having a transverse cutting action in a substantially horizontal plane, a second kerf cutter mounted on said support below said first-named cutter and having a transverse cutting action in a substantially vertical plane, means to hold said second cutter in elevated positions, motor actuated means cooperating with said supporting means to raise or lower said second cutter relative to the first, and manually operable means to control the action of said motor actuated means.

5. In a mining machine, the combination of a wheel supported carriage adapted to rest upon and be braced by the rails of a mine track during the cutting operation, an elongated kerf cutter projecting from said carriage adapted to swing about a horizontal axis, a second elongated kerf cutter projecting from said carriage adapted to swing about a vertical axis, said kerf cutters having cutting teeth traveling throughout their peripheries and being adapted to be thrust longitudinally into the coal body by movement of the carriage along the track rails to cut a kerf across the coal face when moved about their respective axes, means to lock said kerf cutters against movement about their respective axes and motor actuated means to simultaneously swing said kerf cutters about their respective axes as and for the purpose set forth.

6. In a mining machine, the combination of a wheel supported carriage adapted to rest upon and be braced by the rails of a mine track during the cutting operation, an elongated kerf cutter projecting from said carriage adapted to swing about a horizontal axis, a second elongated kerf cutter projecting from said carriage adapted to swing about a vertical axis, said kerf cutters having cutting teeth traveling throughout their peripheries and being adapted to be thrust longitudinally into the coal body by movement of the carriage along the track rails or to cut a kerf across the face of the vein when moved about said respective axes, means to lock either or both of said kerf cutters against movement about their respective axes, and motor actuated means to either simultaneously or separately swing said kerf cutters about their respective axes as and for the purpose set forth.

7. In a mining machine, a support, a cutter arm pivotally mounted on said support, lateral cutting elements operating along the length of said cutter arm, a second similar cutter arm pivotally mounted on said support, means for locking said arms relative to said support, motor actuated means for advancing said support to engage said arms in a coal face, and motor actuated means for separately or simultaneously traversing said arms laterally in intersecting planes in the coal face.

8. In a mining machine, a support, a cutter arm pivotally mounted on said support, lateral cutting elements operating along the length of said cutter arm, a second similar cutter arm pivotally mounted on said support, means for locking said arms in desired angular relations to said support, motor actuated means for advancing said support to engage said arms with a coal face, and motor actuated means for separately or simultaneously traversing said arms laterally in substantially rectangularly disposed planes in the coal face.

9. In a mining machine, the combination of a support, a cutter bar pivotally mounted on said support, means to lock the cutter bar to the support in sumping position, means to bodily advance

the support to sump the cutter bar into a working face, the pivot point of said bar travelling in a substantially straight line during such advance, motor driven means to swing the bar to a position at an angle to said line of advance to form a kerf, means to withdraw the bar along said line of advance while in such angular position to complete the kerf, and an elongated cutting element mounted on said support and adapted to be advanced longitudinally into the mine face upon advance of the support on lines substantially parallel to the said line of advance of the bar and simultaneously with the sumping of the latter, said elongated element serving during the operation of the bar to brace the support against distortive effects exerted thereon by the bar.

10. In a mining machine, the combination of a support, a pair of cutter bars pivoted to said support for swinging movement in intersecting planes, means to secure the bars in desired angular relation to the support, means to bodily advance the bars to sump them into a working face when they are so secured, the pivot points of said bars moving along substantially straight parallel lines during such advance, motor driven means to swing the bars about their pivot points to positions at angles to said lines of advance to form kerfs in the working face, and means to withdraw said bars from the working face while in such angular positions to complete the kerfs, each bar serving during the described operations to counteract distortive effects exerted by the other on the support.

11. A mining machine according to claim 10 wherein the support is bodily movable and the cutter bars are mounted thereon for simultaneous advance or withdrawal relative to the mine face upon the advance or retraction of the support.

12. A machine according to claim 9 wherein the support is mounted on wheels adapted to cooperate with a track to determine the line of advance of the cutter bar, and the cutter bar and elongated cutting element are mounted on the support to be simultaneously advanced into and withdrawn from the working face upon the advance and retraction of the support.

13. A mining machine according to claim 10 wherein the support is bodily movable on wheels adapted to cooperate with a track to determine the lines of advance of the cutter bars, and the cutter bars are mounted on the support for simultaneous advance or withdrawal relative to the mine face upon the advance or retraction of the support.

14. In a mining machine the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, motor actuated means for driving the cutter chain and for swinging the cutter bar relative to said support, a second chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially horizontal axis, means operable to lock said second cutter bar in fixed angular relation to said support, and motor actuated means for driving the chain of said second cutter bar and for swinging said second cutter bar relative to said support, said cutter bars being swingable simultaneously or separately to form horizontal and vertical kerfs respectively.

15. In a mining machine the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement

- about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, a motor for driving the cutter chain and for swinging said cutter bar relative to said support, a second chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially horizontal axis, means operable to lock said second cutter bar in fixed angular relation to said support, and a second motor adapted to drive the chain of said second cutter bar and to swing said second cutter bar relative to said support, said cutter bars being swingable simultaneously or separately to form horizontal and vertical kerfs respectively.
16. In a mining machine the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, a motor for driving the cutter chain and for swinging said cutter bar relative to said support, a second chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially horizontal axis, means operable to lock said second cutter bar in fixed angular relation to said support, and control means for said motor actuated means to effect the drive of the cutter chains simultaneously or separately and to effect simultaneous or separate swinging movement of said cutter bars to form horizontal and vertical kerfs.
17. In a mining machine the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, a motor for driving the cutter chain and for swinging said cutter bar relative to said support, a second chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially horizontal axis, means operable to lock said second cutter bar in fixed angular relation to said support, and control means for said motor actuated means to effect the drive of the cutter chains simultaneously or separately and to effect simultaneous or separate swinging movement of said cutter bars to form horizontal and vertical intersecting kerfs.
18. In a mining machine the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, a motor for driving the cutter chain and for swinging said cutter bar relative to said support, a second chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially horizontal axis, means operable to lock said second cutter bar in fixed angular relation to said support, and a second motor adapted to drive the chain of said second cutter bar and to swing said second cutter bar relative to said support, said cutter bars being swingable simultaneously or separately to form horizontal and vertical intersecting kerfs.
19. In a mining machine the combination with a support, a turntable mounted on said support for oscillation relative thereto on a vertical axis, a chain carrying cutter bar projecting horizontally from said turntable and oscillable therewith, a motor on said turntable adapted to drive the cutter chain and to oscillate the turntable, means operable to lock the turntable in fixed relation to the support, a second chain carrying cutter bar pivotally mounted on the support for swinging movement about a horizontal axis, means operable to lock said second cutter bar in fixed angular relation to the support, and a second motor mounted on the support exterior of the turntable and adapted to drive the chain of the second cutter bar and to swing the second cutter bar relative to the support, said cutter bars being operable singly or simultaneously to form intersecting kerfs in a mine face.
20. In a mining machine the combination with a wheeled support, a turntable mounted on said support for oscillation relative thereto on a vertical axis, a chain carrying cutter bar projecting horizontally from said turntable and oscillable therewith, a motor on said turntable adapted to drive the cutter chain and to oscillate the turntable, means operable to lock the turntable in fixed relation to the support, a second chain carrying cutter bar pivotally mounted on the support for swinging movement about a horizontal axis, means operable to lock said second cutter bar in fixed angular relation to the support, and a second motor mounted on the support exterior of the turntable and adapted to drive the chain of the second cutter bar and to swing the second cutter bar relative to the support, said cutter bars being operable singly or simultaneously to form intersecting kerfs in a mine face, and controllable transmission means between the second motor and the wheels of said wheeled support to propel the latter from place to place in a mine or to sump the cutter bars in a mine face.
21. In a mining machine the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, motor actuated means for driving the cutter chain and for swinging said cutter bar relative to said support, a rotatable horizontal shaft extending transversely of the support and horizontally spaced from said vertical axis, motor driven means for rotating said shaft, a second chain carrying cutter bar mounted on said shaft for oscillation about the axis of the latter, means operable to lock said second cutter bar in desired radial position relative to the shaft, means to drive the chain of the second cutter bar from said shaft and means driven from said shaft for swinging said second cutter bar, the two cutter bars being operable singly or simultaneously to form intersecting kerfs in a mine face.
22. In a mining machine, the combination of a support, a chain carrying cutter bar pivotally mounted on said support for swinging movement about a substantially vertical axis, means operable to lock said cutter bar in fixed angular relation to said support, motor actuated means for driving the cutter chain and for swinging said cutter bar relative to said support, a horizontal shaft extending transversely of the support and horizontally spaced from said vertical axis, a second chain carrying cutter bar mounted on said shaft for oscillation about the axis of the latter, means operable to lock said second cutter bar in desired radial position relative to the shaft, and motor actuated means including a rotary member concentric with said shaft for driving the chain of said second cutter bar, said motor actuated means also including a second rotary member concentric with said shaft for swinging said second cutter bar, the two bars being operable singly or

simultaneously to form intersecting kerfs in a mine face.

23. In a mining machine the combination of a support, a turntable mounted on said support for oscillation relative thereto on a vertical axis, a chain carrying cutter bar projecting horizontally from said turntable and oscillable therewith, means operable to lock the turntable in fixed relation to the support, motor driven means adapted to drive the cutter chain and to oscillate the turntable, a rotatable horizontal shaft extending across the support in advance of said turntable, motor driven means for rotating said shaft, a second chain carrying cutter bar mounted on said shaft for oscillation about the axis of the latter, means to drive the chain of the second cutter bar from said shaft, means operable to lock said second cutter bar in desired radial position relative to the shaft, and motor driven means for swinging said second cutter bar, the two cutter bars being operable separately or simultaneously to form horizontal and vertical kerfs respectively.

24. In a mining machine the combination of a support, a turntable mounted on said support for oscillation relative thereto on a vertical axis, a chain carrying cutter bar projecting horizontally from said turntable and oscillable therewith, means operable to lock the turntable in fixed relation to the support, motor driven means adapted to drive the cutter chain and to oscillate the turntable, a rotatable horizontal shaft extending across the support in advance of said turntable, motor driven means for rotating said shaft, a second chain carrying cutter bar mounted on said shaft for oscillation about the axis of the latter, means to drive the chain of the second cutter bar from said shaft, means operable to lock said second cutter bar in desired radial position relative to the shaft, and means driven from said shaft for swinging said second cutter bar, the two cutter bars being operable separately or simultaneously to form horizontal and vertical kerfs respectively.

25. In mining apparatus, a wheeled truck, a cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw and nut elements of which one has a connection with said truck whereby it is held against axial displacement and the other has a connection with the outer end of said arm, one of said elements being rotatable relative to the other, and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction.

26. In mining apparatus, a wheeled truck, a chain carrying cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, means driven by said motor for driving said chain, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw

and nut elements of which one has a connection with said truck whereby it is held against axial displacement and the other has a connection with the outer end of said arm, one of said elements being rotatable relative to the other and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction.

27. In mining apparatus, a wheeled truck, a cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw and nut elements of which one has a connection with said truck whereby it is held against axial displacement and the other has a connection with the outer end of said arm, one of said elements being rotatable relative to the other and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction, said last named means comprising a rotary shaft disposed on the pivoting axis of the cutter bar.

28. In mining apparatus, a wheeled truck, a chain carrying cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, means driven by said motor for driving said chain, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw and nut elements of which one has a connection with said truck whereby it is held against axial displacement and the other has a connection with the outer end of said arm, one of said elements being rotatable relative to the other and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction, said last named means comprising a rotary shaft disposed on the pivoting axis of the cutter bar, the driving means for the cutter chain including a sprocket on said shaft.

29. In mining apparatus, a wheeled truck, a chain carrying cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, means driven by said motor for driving said chain, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw and nut elements of which one has a connection with said truck whereby it is held against axial displacement and the other has a connection with the outer end of said arm, one of said elements being rotatable relative to the other

and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction, said last named means comprising a rotary shaft disposed on the pivoting axis of the cutter bar, the driving means for the cutter chain including a sprocket free on said shaft, and clutch means movable on the axis of said shaft for engaging said shaft and sprocket.

30. In mining apparatus, a wheeled truck, a cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in the desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw and nut elements of which one has a connection with said truck whereby it is held against longitudinal displacement and the other has a connection with the outer end of said arm, one of said connections including a pivoted bar extending rearwardly of said arm and in an axial plane of said elements, one of said elements being rotatable relative to the other, and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction.

31. In mining apparatus, a wheeled truck, a cutter bar pivotally supported by said truck and swingable relative to the truck in a vertical plane, a motor carried by said truck, and means for swinging the cutter bar about its pivoting axis or for maintaining the cutter bar in the desired angular relation, said means comprising an arm pivotal on the pivoting axis of the cutter bar and fixedly connected to the latter in upwardly extending relation in a plane of the pivoting axis of the cutter bar which is substantially at right angles to the longitudinal axis of the cutter bar, cooperating self-locking screw and nut elements of which one has a connection with said truck whereby it is held against longitudinal displacement and the other has a connection with the outer end of said arm, one of said connections including a pivoted bar extending rearwardly of said arm and in an axial plane of said elements, one of said elements being rotatable relative to the other, and means driven by said motor controllable to drive the rotatable one of said elements in either direction whereby the cutter bar may be swung in either direction.

32. Structure according to claim 30 wherein said pivoted bar is in direct continuation of the screw element and connects the screw element to the truck through a pivotal connection with the latter.

33. In a mining machine, the combination with a supporting frame, of cutting mechanism mounted thereon, an actuating arm connected to said cutting mechanism, a rod pivoted to said frame at one end, and screw and nut means between the other end of said rod and said arm for adjusting the position of said cutting mechanism and holding the same locked in adjusted position, said screw and nut means being coaxial with said rod.

34. In a mining machine, the combination with cutting mechanism comprising a cutter bar, of a sleeve connected to said cutter bar, an actuating arm connected to said sleeve, a shaft journaled in said sleeve and connected to said cutting mechanism

to drive the same, and a mechanical train terminating in screw and nut means operated by the rotation of said shaft to swing said arm to effect corresponding swinging of said cutting mechanism.

35. In a mining machine, the combination with a supporting frame, of a kerf-cutter comprising a cutter bar, a sleeve journaled to said frame and rigidly connected to said cutter bar, an actuating arm extending radially from said sleeve, a shaft journaled in said sleeve and connected to said kerf-cutter to drive the same, and means for swinging said arm and therewith the cutter bar comprising a screw and nut connecting the frame and arm, and means comprising an eccentric cam for rotating the nut on the screw.

36. In a mining machine, the combination with a supporting frame, of kerf-cutting mechanism comprising a cutter bar pivotally mounted on said frame, an actuating arm connected to said cutter bar, a shaft for driving said kerf-cutting mechanism, and means for swinging said arm and therewith the cutter bar comprising a screw and nut connecting the frame and arm, an eccentric cam on said shaft, and means operated by said cam to rotate the nut on the screw.

37. In a mining machine, the combination with cutting mechanism comprising a cutter bar, of an actuating arm connected to said cutter bar, and means for swinging said arm and therewith the cutter bar comprising a screw and nut connecting the frame and arm, and ratchet mechanism for rotating the nut on the screw.

38. In a mining machine, the combination with a supporting frame, of cutting mechanism comprising a cutter bar pivoted to said frame, an actuating arm rigidly connected to said cutter bar, means comprising screw and nut means and pawl and ratchet actuating mechanism therefor between said cutter bar and said frame for adjusting the position of said cutter bar, an actuating shaft for the cutting mechanism disposed on the pivotal axis of said cutter bar, and an eccentric on said shaft for actuating said pawl and ratchet mechanism.

39. In a mining machine, the combination with a supporting frame, of an upright shearing kerf-cutter pivoted to said frame, a rod pivoted at its rear end to said frame and screw-threaded at its forward end, a nut on said screw-threaded end, an actuating arm connected between said nut and said kerf-cutter, and means for turning said nut on said screw-threaded end to effect adjustment of the position of said kerf-cutter.

40. In a mining machine, the combination with a supporting frame, of cutting mechanism pivotally mounted thereon, a screw-threaded supporting rod, a feed nut thereon, an actuating arm connected between said nut and said cutting mechanism, reversely arranged ratchets on said nut, two pawls one for one of said ratchets and the other for the other ratchet, means for moving said pawls into and out of engagement with said ratchets, and means for reciprocating the pawl in engagement with its corresponding ratchet to effect feeding movement of said cutting mechanism.

41. In a mining machine, the combination with a supporting frame, of an upright shearing kerf-cutter pivotally mounted thereon, an actuating arm projecting upwardly from the axis of pivotal movement of said kerf-cutter, a shaft coincident with said axis, and reversible feed mechanism including pawl and ratchet mechanism connected between the said supporting frame and said up-

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wardly projecting actuating arm and driven from said shaft.

42. In a mining machine, the combination with a supporting frame, of an upright shearing kerf-cutter, a drive shaft for said kerf-cutter, a supporting rod pivoted at its rear end to said frame and having a forward screw-threaded portion, a feed nut on said screw-threaded portion, an actuating arm associated with said feed nut and connected to said kerf-cutter, and pawl and ratchet mechanism reversible from one side of the machine for effecting feed of said kerf-cutter either upwardly or downwardly.

43. In mining apparatus, the combination with a wheeled truck, of a supporting frame mounted

thereon, kerf-cutting mechanism comprising a cutter bar pivoted to said frame to swing relatively thereto in a vertical plane, a driving motor carried by said frame, means driven by said motor for swinging said bar about its pivot in opposite directions comprising relatively rotatable nut and screw elements with pawl and ratchet mechanism associated therewith, an actuating shaft for the cutting mechanism disposed on the pivotal axis of said cutter bar, and an eccentric on said shaft for actuating said pawl and ratchet mechanism, and means for setting said pawl and ratchet mechanism to predetermine the direction of swing of said bar.

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