Oct. 1, 1929. M. P. HOLMES 1,729,781

MINING APPARATUS

Original Filed April 12, 1926 2 Sheets-Sheet 1

Fig. 1.

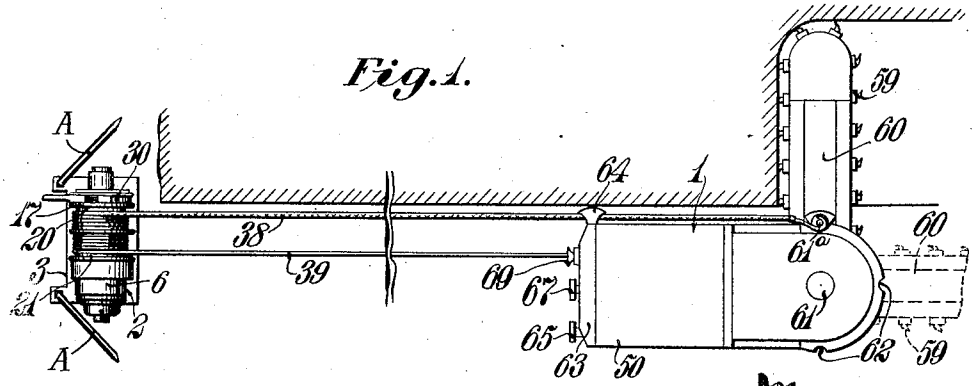


Fig. 6.

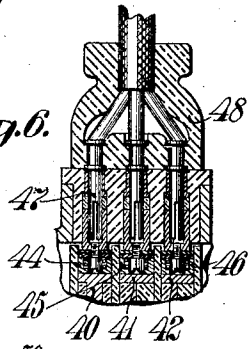


Fig. 2.

Fig. 3.

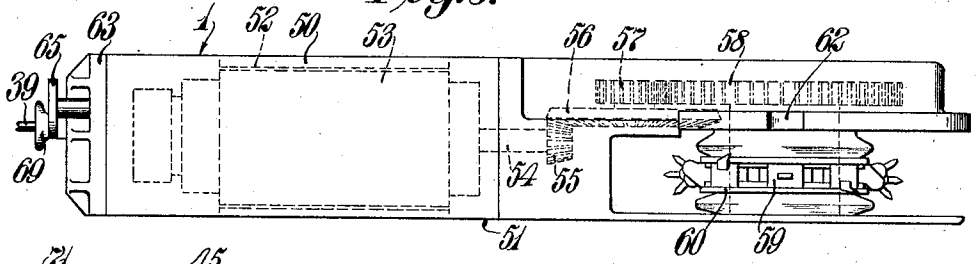
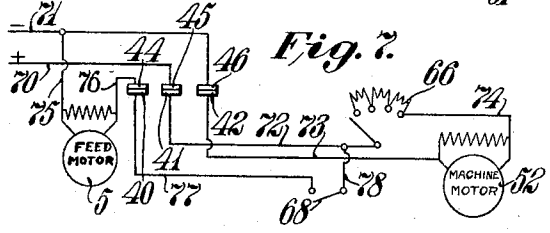


Fig. 7.



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MINING APPARATUS

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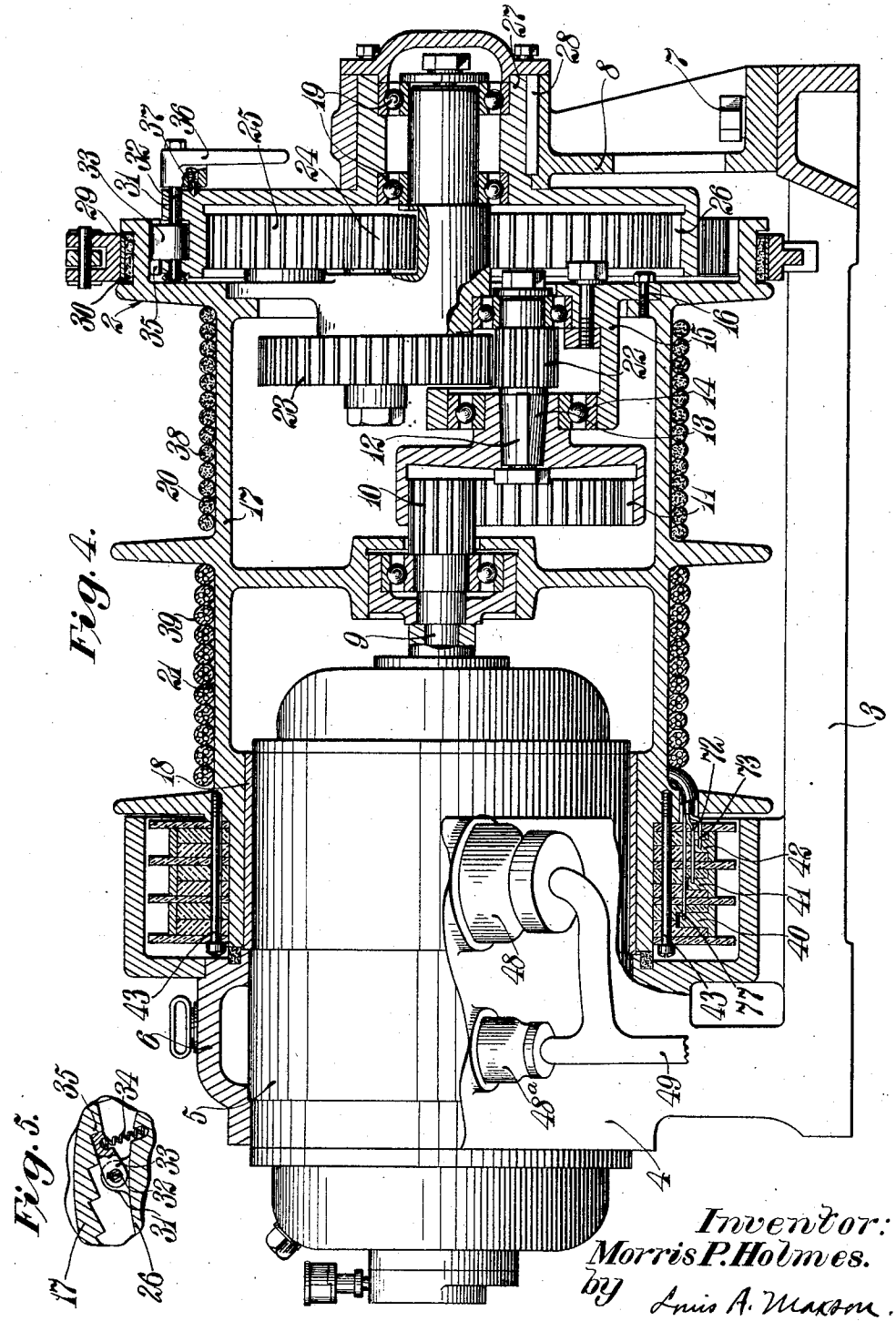


Fig. 4.

Fig. 5.

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1,729,781

UNITED STATES PATENT OFFICE

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MINING APPARATUS

Application filed April 12, 1926, Serial No. 101,482. Renewed September 10, 1928.

This invention relates to mining apparatus and more particularly to mining machines of the flexibly fed, continuous cutter, longwall type wherein the cutting mechanism is slidable over the mine bottom during cutting to cut a substantially horizontal kerf in the coal face.

Mining machines, especially those of the continuous cutter longwall type, are frequently utilized in cutting on steep pitches. The machines are usually fed by means of a flexible feeding element, the free end of which is usually secured as by a roof jack or other suitable device at a point in advance of the machine and the machine is fed along this element during the cutting operation. In the event of failure of the roof jack or other device it is highly desirable to make some provision for the safety of the operator and the machine, which results in considerable complication.

The main object of this invention is to provide mechanism for substantially eliminating the possibility of injury of the operator and the machine due to the failure of the device to which the flexible feeding element for the machine is connected. Another object of this invention is to provide an improved mining machine wherein the cutting unit is entirely separate from the feeding unit, the feeding unit being located during operation of the cutting unit at a point remote therefrom. Still another object of this invention is to provide improved means for controlling the feeding unit, this means including mechanism carried by the cutting unit. Yet another object of this invention is to provide improved controlling mechanism, which is wholly under manual control, for the machine while the latter is moving down a steep incline. These and other objects of my invention will, however, hereinafter more fully appear.

This invention in one of its preferred embodiments may comprise a self-contained cutting unit adapted to be fed over the mine bottom and having improved feeding and controlling mechanism, the feeding mechanism being located at a point remote from the cutting unit during the cutting operation. More specifically, this embodiment may comprise a self-contained cutting unit having a machine frame slidable on its bottom on a mine bottom and this frame carries a driving motor which preferably is operatively connected through suitable transmission gearing to a cutter bit carrying cutter chain, the latter being adapted to be circulated about a projecting cutter bar. The cutting unit may be fed over the mine bottom by means of a separate feeding mechanism. This feeding mechanism preferably comprises a winding drum with which a flexible feeding element cooperates, the free end of this feeding element being connectible to the cutting unit. Another winding drum is provided for reeling in or paying out the electrical conductor cable for the motor of the cutting unit. The feed drum and cable reeling drum are preferably driven by a separate motor which is entirely independent of the driving motor of the cutting unit.

In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume in practice.

In these drawings,—

Fig. 1 is a plan view of the improved mining apparatus, the feeding mechanism and the cutting unit being shown disposed in operative position while effecting a cutting operation.

Fig. 2 is a side elevation of the mining apparatus shown in Fig. 1.

Fig. 3 is a side elevational view of the cutting unit.

Fig. 4 is a central longitudinal vertical sectional view through the improved feeding mechanism.

Fig. 5 is a detail sectional view of the controlling ratchet for the feed drum.

Fig. 6 is a detail sectional view through one of the electrical plug connections.

Fig. 7 is a wiring diagram of the electrical connections for the feeding mechanism and cutting unit.

In this illustrative embodiment of my invention I have shown a cutting unit generally designated 1 and an improved feeding mechanism generally designated 2 by means of which the cutting unit may be fed over the mine bottom, this feeding mechanism also including

means for winding in or paying out the electrical conductor cable for the cutting unit motor during machine movement.

The improved feeding mechanism 2 specifically comprises a supporting frame 3 having a supporting standard 4 within which a driving motor 5, which herein may be of the uni-directional electric type, is supported, the motor 5 being held in rigid relation with respect to the standard 4 by means of a suitable split clamp 6. Secured as by bolts 7 to the opposite end of the frame 3 from the standard 4 is a supporting bracket 8. As shown, the armature shaft 9 of the motor 5 has suitably secured thereto a motor pinion 10 which meshes with an internal gear 11, keyed as at 12 to a shaft 13, the latter being journaled in ball bearings 14 suitably carried by a transverse head member 15. The head member 15 is secured as by screws 16 to a rotatable winding drum 17, the latter being journaled at one end on a bearing sleeve 18 supported by the stationary casing of the motor 5 and the opposite end of this drum is journaled in spaced alined ball bearings 19 disposed within the end bracket 8. The drum 17 has spaced peripheral winding surfaces 20 and 21 for purposes to be hereinafter described. Suitably secured to the shaft 13 is a spur pinion 22 which meshes with a spur gear 23 suitably secured to a shaft journaled within the head member 15 and this shaft also carries a spur pinion 24 which meshes with a spur gear 25 suitably journaled on a stub shaft, not shown, secured to the head member 15. The spur gear 25 meshes with an internal reaction gear 26 having a hub portion 27 splined, as at 28, in stationary relation with respect to the bracket 8, the hub portion 27 forming a support for the ball bearings 19. The drum 17 is externally grooved as at 29 and a brake band 30 cooperates with the bottom surface of this groove and is operable at will through suitable mechanism, not shown, for braking the rotation of the drum or to permit rotation thereof. In accordance with this form of the invention, rotatably mounted in bearings 31 formed integral with the internal gear 26 is a shaft 32 having suitably secured thereto a pawl 33 (see Fig. 5) which is normally yieldably held by means of a spring 34 in engagement with ratchet teeth 35 formed on the drum 17. As shown, secured to the outer end of the shaft 32 is an operating lever 36 which is adapted to be held in its different adjusted positions by means of a spring pressed plunger or locking pin 37. In this instance, cooperating with the winding surface 20 is a flexible feeding element 38 for the cutting unit 1 and this flexible feeding element is herein preferably in the form of a wire rope or cable suitably secured to the drum 17 and connectible in a manner to be hereinafter described to the cutting unit 1. Moreover, cooperating with the winding surface 21 of the drum 17 is an electrical conductor cable 39 which is adapted to supply current to the motors of the cutting unit and the feeding mechanism and this conductor cable houses the wires of the motor circuits. These wires are suitably connected to slip rings 40, 41, and 42 secured as by bolts 43 to and rotatable with the winding drum 17. Slidably engaging the slip rings 40, 41, and 42, as clearly shown in Fig. 6, are spring pressed contacts 44, 45, and 46 each having a plug connection 47 with a suitable detachable connector plug 48 carried by the support 4, the latter providing a connection for the wires of the main line conductor cable 49. The wires for the feed motor circuit are connectible to contacts carried by the support 4 by means of a usual connector plug 48^a as shown in Fig. 4. As this connector plug structure does not specifically enter into my invention, further detailed description and illustration of the same is deemed unnecessary. From the foregoing description it will be evident that when the plugs 48 and 48^a are suitably positioned, current is adapted to flow from the main line cable 49 through the resilient contacts and the slip rings to the conductor cable 39 carried by the rotatable winding drum 17 and hence to the feed motor and the motor of the cutting unit.

The improved cutting unit 1 specifically comprises a machine frame 50 slidable on its bottom 51 on a mine bottom and this frame carries at its forward end a motor 52, herein preferably of the reversible electric type, having an armature 53 (see Fig. 3) rotatable on a horizontal axis extending longitudinally of the machine frame. Secured to the rear end of the armature shaft 54 is a bevel pinion 55 which is meshed with a larger bevel gear 56 rotatable on a vertical axis. Rotatable with the gear 56 is a spur pinion 57 which is meshed with a larger spur gear 58 suitably secured to the drive sprocket, not shown, for the cutter bit carrying cutter chain 59, the latter being adapted to be circulated about the outer edges of a plane horizontal cutter bar 60. The cutter bar 60 is pivoted on a vertical axis 61 at the rear end of the machine frame and projects therefrom. The cutter bar is adapted to be locked in its different operative positions by means of a usual locking pin 61^a carried by and movable with the cutter bar 60, and this locking pin is adapted to cooperate with notches 62 formed in the machine frame in a usual manner. The locking pin 61^a has suitable means permitting the connection of the feeding cable 38 thereto. The motor 52 is provided with a front head member 63 having formed thereon a laterally projecting arcuate abutting or guiding surface 64 which is adapted to ride against the face of the coal during the cutting operation and this guiding member has a suitable opening therethrough through which the feed

cable is adapted to be extended and guided thereby. The frame portion 63 also carries a controlling member 65 for actuating the usual controller 66 for the motor of the cutting unit (see Fig. 7). This head member 63 also carries a controlling member 67 by which a suitable switch 68 is adapted to be actuated for purposes to be hereinafter described. As clearly shown in Fig. 1, the conductor cable 39 may extend from the winding surface 21 of the drum 17 to a suitable connector plug 69 also carried by the head member 63 and this connector plug is suitably connected to the circuits of the motor 52.

In the wiring diagram shown in Fig. 7, it will be observed that the main line wires 70 and 71 of the cable 49 are respectively connected through the connector plug 48 to the resilient contacts 45 and 46 which slidably engage the slip rings 41 and 42 respectively. The slip rings 41 and 42 have leading therefrom wires 72 and 73, the latter leading directly to the windings of the motor 52 while the wire 72 is connected to the motor controller 66, there being also a wire 74 leading from this controller to the motor 52. Leading from the motor 5 are wires 75 and 76, the former being connected to the main line wire 71 while the latter wire 76 is connected through the resilient contact 44 which slidably engages the slip ring 40, there being a wire 77 leading from the latter to the switch 68. The wires 75 and 76 are connectible to the windings of the motor 5 by means of the connector plug 48^a. Furthermore, the switch 68 is also connected by a wire 78 to the wire 72 of the circuit for the motor 52.

The operation of the improved mining apparatus is as follows. After the feeding mechanism 2 is secured in position at the top of the incline, as by the roof jacks A (see Figs. 1 and 2), the feed cable 38 is extended through the opening in the guide member 64 and the free end of this cable is attached in any suitable manner to the locking pin 61^a, it being understood that the cutter bar is in the dotted line position shown in Fig. 1 at that time. The cutting unit 1 is then lowered down the incline, the winding drum 17 paying out the feed cable 38 and the conductor cable 39 under the control of the brake band 30. After the cutting unit is suitably positioned the switch 68 is thrown in and the feeding cable 38 wound in by the drum 17 at a suitable speed and consequently the cutter bar 60 is swung or slued about its pivot beneath the coal. It will be understood that there is sufficient slack in the conductor cable 39 to prevent the latter from becoming taut during the bar swinging operation. After the bar is swung into the full line position shown in Fig. 1 it is rigidly locked to the machine frame by means of the locking pin 61^a and the cutting unit is then fed laterally of the coal face to cut a substantially horizontal kerf therein, the conductor cable 39 and the feed cable 38 simultaneously being wound in by the winding drum 17, and the pawl 33 slipping over the ratchet teeth 35 on the drum at this time. In the event of failure of the driving motor 5 or the transmission gearing between the motor and the drum 17, the spring pressed pawl 33 automatically locks the drum 17 against rotation, thereby preventing any substantial movement of the cutting unit 1 down the incline. However, if it is desired to lower the cutting unit 1 down the incline, the pawl 33 is released from the ratchet teeth by means of a lever 36 and the drum is then rotated to pay out the feeding cable under the control of the brake band 30. It will also be noted that the motor 5 is controllable at the will of the operator by means of the switch 68 carried by the cutting unit, it being possible for the operator to manipulate the controlling member 67 to start or stop the motor 5. It is therefore evident that an improved remote control for the feeding mechanism is provided which is controllable at will by the operator while the latter stands adjacent the cutting unit. These and other operations of the improved mining apparatus will be clearly apparent to those skilled in the art.

As a result of this invention, an improved mining apparatus is provided wherein the cutting unit is fed by means of an independent feeding mechanism located at a point remote therefrom for feeding the cutting unit bodily relative thereto during the cutting operation. Furthermore, it will be noted that improved safety means are provided for preventing inadvertent movement of the machine down the incline in the event of failure of the feeding mechanism, improved means also being provided for lowering the machine down the incline wholly under manual control. It will also be noted that an improved independent feeding mechanism for the cutting unit is provided which is operable at a point remote from the cutting unit during operation of the latter and improved means are provided for controlling the operation of the feeding mechanism and this controlling means is carried directly by the cutting unit. These and other advantages of this invention will be clearly apparent to those skilled in the art.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

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

1. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting

unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a driving motor, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

2. In a mining apparatus, a self-contained cutting unit, an independently powered feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a driving motor, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

3. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a feed operating member and a cooperating flexible feeding element, and a driving motor for said feed operating member, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

4. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a driving motor, and power supply and controlling means for said driving motor carried by said cutting unit.

5. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit including an independently powered feeding mechanism having a driving motor, said feeding means being normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto during the cutting operation, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

6. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit including a driving motor, and an independently powered winding drum driven thereby, said feeding means being normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

7. In a mining apparatus, a self-contained cutting unit, feeding mechanism for said cutting unit including a driving motor, and means driven by said motor for feeding the cutting unit bodily relative thereto during the cutting operation, said feeding means being normally located during feeding at a place spaced materially from said cutting unit, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

8. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit including an independently powered winding drum normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said winding drum having a driving motor, and power supply and controlling means for said driving motor carried by said cutting unit.

9. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a feeding mechanism having an independent driving motor and a feed operating member driven thereby, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

10. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a feeding mechanism having an independent driving motor and a frictionally controlled feed operating member driven thereby, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

11. An independently powered feeding mechanism for mining machines comprising a motor, a winding drum, operative driving connections between said motor and drum, a flexible feeding element engaging said drum and adapted for connection to a motor driven mining machine to effect feeding thereof, and an electric conductor cable for the motor of said mining machine also engaging said drum.

12. In combination, an independently powered feeding mechanism for mining machines

comprising a motor, a winding drum, operative driving connections between said motor and drum, means for preventing drum rotation in one direction, a flexible feeding element cooperating with said drum, a mining machine having a motor and connected with said flexible feeding element for bodily feeding movement thereby, an electric conductor cable for the motor of the mining machine also cooperating with said drum, and controlling switches for said motors carried by said mining machine.

13. In combination, an independently powered feeding mechanism for mining machines comprising a motor, a feeding member, operative driving connections between said motor and member, ratchet and brake mechanism for controlling said feeding member, a mining machine operatively connected with said feeding member whereby said feeding member may effect feed thereof, and power supply and controlling means for said motor carried by the mining machine.

14. In combination, an independently powered feeding mechanism for mining machines comprising a motor, a feeding member comprising a drum, a flexible element cooperating with said feed drum, operative driving connections between said motor and said drum, a mining machine operatively connected with said flexible element whereby said drum may effect feed thereof, means for controlling drum rotation to effect cutting feed of the machine, and power supply and controlling means for said motor carried by the mining machine.

15. In combination, an independently powered feeding mechanism for mining machines comprising a motor, a winding drum, a flexible haulage element cooperating therewith, a power conducting cable wound on said drum, operative driving connections between said motor and drum, means for preventing drum rotation in one direction, a braking mechanism for controlling drum rotation, a mining machine operatively connected with said haulage element whereby said winding drum may effect feed thereof, and a power transmitting and controlling device carried by the mining machine for controlling the flow of power through said conductor cable to said motor.

16. In a mining apparatus, a self-contained cutting unit having a pivoted cutter bar, an independently powered feeding mechanism normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding mechanism including means for effecting bar swing, and power supply and controlling connections for said feeding mechanism including power supply and controlling means carried by said cutting unit.

17. In a mining apparatus, a self-contained cutting unit having a pivoted cutter bar, an independently powered feeding mechanism for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding mechanism including a winding drum and a cooperating flexible element for effecting bar swing, and power supply and controlling connections for said feeding mechanism including power supply and controlling means carried by said cutting unit.

18. In a mining apparatus, a self-contained cutting unit having a driving motor, an independently powered feeding mechanism for said cutting unit normally located during feeding at a place spaced materially from said cutitng unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding mechanism including a winding device having a plurality of winding portions, a feed cable and an electric conductor cable cooperating respectively with said winding portions, and power transmitting and controlling devices carried by said cutting unit for supplying power through said conductor cable to said motor.

19. In a mining apparatus, a self-contained cutting unit of the type slidable on a mine bottom during cutting, an independently powered feeding mechanism for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding mechanism including a driving motor and flexible feeding connections between said cutting unit and said feeding mechanism, and power supply and controlling connections for said driving motor including power supply and controlling means carried by said cutting unit.

20. In a mining apparatus, a self-contained cutting unit, an independently powered feeding mechanism therefor normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding mechanism including a driving motor and flexible feeding connections between said cutting unit and said feeding mechanism for feeding said unit, and a power transmitting and controlling device for said motor carried by said cutting unit.

21. In a mining apparatus, a cutting unit, an independently powered feeding mechanism therefor normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding mechanism including a driving motor, flexible feeding connections extending between said cutting unit and feeding mechanism and operatively connected

thereto, and a power transmitting and controlling device for said motor carried by said cutting unit.

22. In a mining apparatus, a cutting unit, a stationary independently powered feeding unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding unit including a driving motor, connections between said units whereby said cutting unit may be fed, and a power transmitting and controlling device for said motor carried by said cutting unit.

23. In a mining apparatus, a cutting unit of the type slidable over a mine bottom during cutting, an independently powered feeding unit therefor normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding unit including a driving motor, flexible connections between said units whereby said cutting unit may be fed, and a power transmitting and controlling device for said motor carried by said cutting unit.

24. In a mining apparatus, a cutting unit, an independently powered feeding unit therefor normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding unit including a feeding member and a driving motor therefor, flexible feeding connections extending between said feeding member and said cutting unit whereby the latter may be fed, and a power transmitting and controlling device for said motor carried by said cutting unit.

25. In a feeding mechanism, a motor having a stationary casing, a rotatable winding drum, a conductor cable cooperating with said drum, operative driving connections between said motor and drum, and means for conducting electrical energy to said motor including electrical contacts carried by said stationary motor casing, and cooperating electrical contacts carried by said rotatable drum and connected to the conductor cable carried thereon.

26. In a feeding mechanism, a motor, a winding drum, a conductor cable cooperating with said drum, operative driving connections between said motor and drum, electrical connections between said cable and motor including contacts carried by the latter, means for positively preventing drum rotation in one direction, and means cooperating with said drum for positively controlling rotation thereof.

27. In a cable winding mechanism, a stationary frame, a motor having a casing, a winding drum driven by said motor, a conductor cable carried by said drum, and means for conducting electrical energy between said motor and cable comprising cooperating electrical contact elements carried by said stationary frame and said drum, said conducting means comprising slip rings rotatable with said drum, and cooperating electrical contacts carried by said motor casing.

28. In a cable winding mechanism, a motor having a stationary casing, a winding drum journaled on said casing and having spaced winding portions, cables cooperating with said portions respectively, one of said cables housing power conducting elements for said motor, and operative driving connections between said motor and drum.

29. In a cable winding mechanism, a motor having a stationary casing, a winding drum journaled on said casing and having spaced winding portions, cables cooperating with said portions respectively, one of said cables housing power conducting elements for said motor, operative driving connections between said motor and drum, and means for controlling drum rotation.

30. In a cable winding mechanism, a motor having a stationary casing, a winding drum journaled on said casing and having spaced winding portions, cables cooperating with said portions respectively, one of said cables housing power conducting elements for said motor, operative driving connections between said motor and drum, and means for positively preventing drum rotation in one direction.

31. In a mining apparatus, a self-contained cutting unit, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means including a driving motor, and power supply means for said motor including a power transmitting element carried by said cutting unit.

32. In a mining apparatus, a cutting unit having a driving motor, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means comprising a driving motor and a winding element driven thereby, a flexible feeding element extending between said cutting unit and said winding element and wound on the latter, and power supply connections for said cutting unit motor and said feed driving motor including a power transmitting element also wound on said winding element.

33. In a mining apparatus, a cutting unit having a driving motor, feeding means for said cutting unit normally located during feeding at a place spaced materially from said cutting unit and adapted to effect feeding movement of said cutting unit bod-

ily relative thereto, said feeding means comprising a driving motor and a winding element driven thereby, a flexible feeding element extending between said cutting unit and said winding element and wound on the latter, and power supply connections for said cutting unit and said driving motor including a power transmitting element also wound on said winding element and a control device for said supply means carried by said cutting unit.

34. In a mining apparatus, a cutting unit, feeding means therefor normally located during feeding at a place spaced materially from the cutting unit and adapted to effect feeding movement of said cutting unit bodily relative thereto, said feeding means comprising a driving motor and a winding element driven thereby, a flexible feeding element extending between said cutting unit and said winding element, power supply connections for said cutting unit motor and said feeding motor including a power transmitting element, and means for maintaining said power transmitting element taut as said cutting unit is fed by said feeding unit.

In testimony whereof I affix my signature.

MORRIS P. HOLMES.