

Dec. 20, 1927.

1,653,111

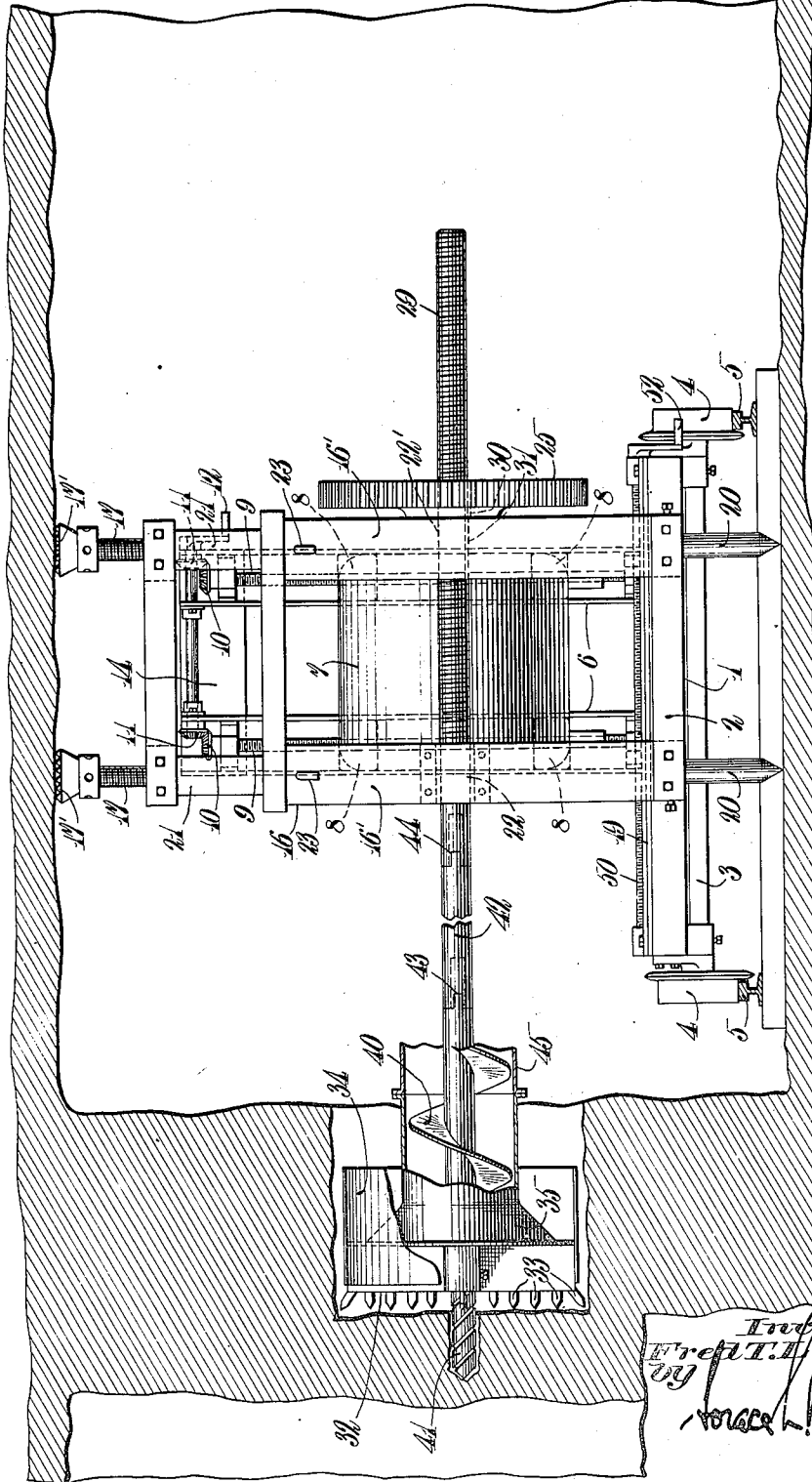
F. T. LOBBEY

MINING MECHANISM

Filed Aug. 3, 1921

2 Sheets-Sheet 1

Fig. 1.



Inventor:
Frederic T. Lobby.
by
[Signature]
Att'y.

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2 Sheets-Sheet 2

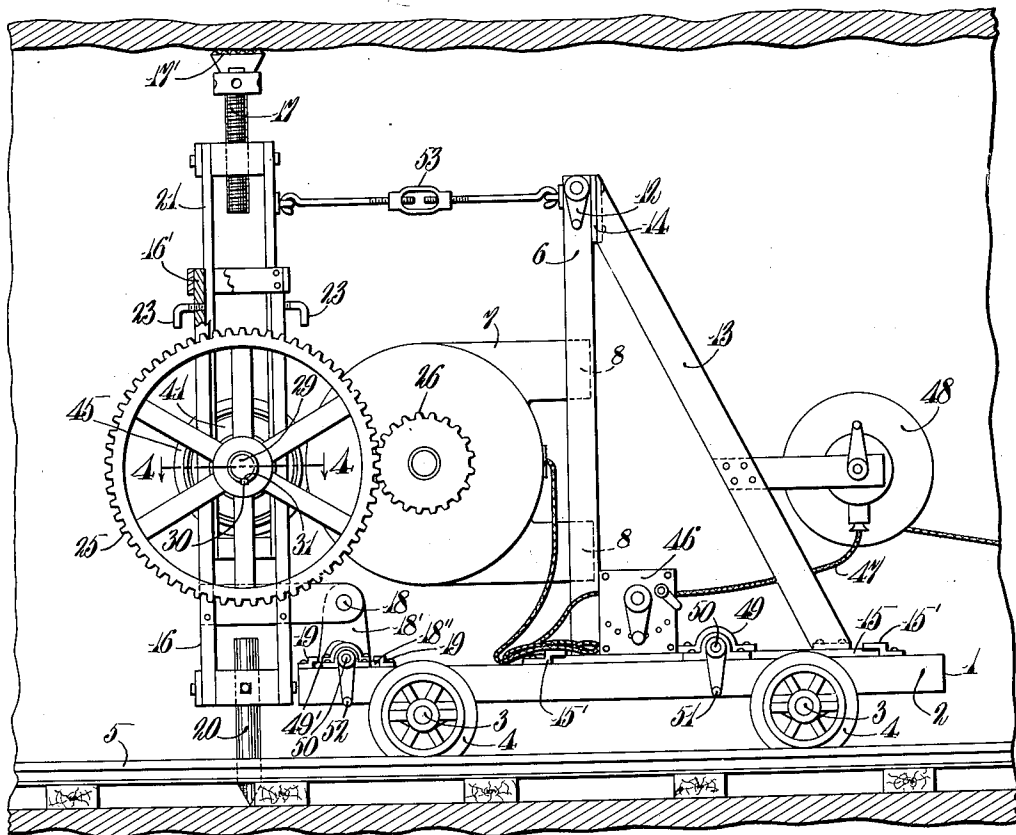


Fig. 2.

Fig. 3.

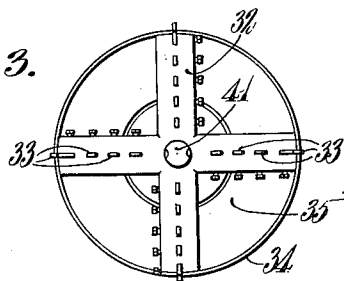
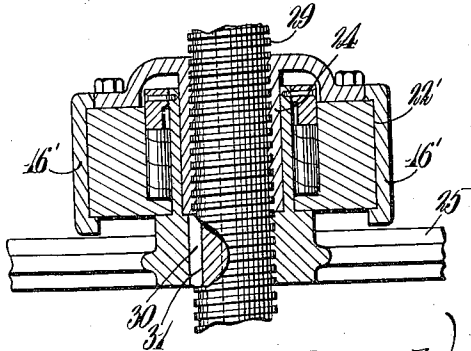


Fig. 4.



Inventor:
Fred T. Lobby.
by *[Signature]*
att'y.

UNITED STATES PATENT OFFICE.

FRED T. LOBBEY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

MINING MECHANISM.

Application filed August 3, 1921. Serial No. 489,594.

My invention relates to machines for making break-throughs in mines between entries or rooms and for making holes of similar nature in any other desired place.

5 An object of my invention is to provide a machine for making break-throughs in mines. A further object of my invention is to provide an improved mechanism for making openings in walls of coal or other
10 minerals. Further objects of my invention will appear in the course of the following specification and appended claims.

In the accompanying drawings I have shown one form which my invention may
15 assume in practice.

In these drawings,—

Fig. 1 is a front elevation of my improved apparatus in the operation of making a break-through between two rooms or entries
20 in a mine.

Fig. 2 is a side elevation thereof with parts broken away.

Fig. 3 is a front elevation of a cutting tool employed therewith.

25 Fig. 4 is a detail section on the line 4—4 of Fig. 2.

It is a well-known fact that the operation of driving cross cuts through the ribs in a mine is an expensive proposition. It is also
30 well-known that the driving of these cross-cuts usually results in the removal of a much larger amount of coal than would be requisite to supply the desired ventilation. Furthermore in the event that it is desired
35 at any time to close these cross cuts, it is an expensive proposition to properly seal them in order to avoid difficulty with the ventilation of the mine. I have accordingly devised the machine whose illustrative em-
40 bodiment is disclosed in this application and whose function is the making of a break-through of sufficient size to permit proper ventilation without removing a surplus quantity of unnecessary material.

45 In the illustrative form of this machine I have shown it mounted upon a truck generally indicated by 1 and which has a frame 2 mounted on axles 3, the latter being provided with wheels 4 running on rails 5.
50 Mounted upon the frame 2 is a pair of standards 6 forming guides for the feet of a motor frame 7, which feet are each provided with nuts 8 which are threaded upon shafts 9 extending longitudinally of the guides 6

and adapted by rotation to cause the raising
and lowering of the motor frame 7. The threaded shafts 9 are connected by means of a cross shaft and pairs of beveled gears 10 and 11 so as to cause the motor frame to feed up uniformly, and a hand crank 12
60 is provided for turning the cross shaft to cause raising and lowering of the motor. One or more brace bars 13 extends between the top of the guides 6, where they are secured to a cross bar 14, and the plate 15
65 which also carries the guide members 6. This plate is in sliding engagement with guide members 15' whereby the entire mechanism may be moved laterally on the truck. Pivotally (and also slidably, as later de-
70 scribed) secured to the truck is a frame member generally indicated by 16 which is mounted upon pivots 18 arranged upon standards or hangers 18' in such manner that the frame 16 may be tilted relative to the truck frame. At its upper portion, the frame 16 is provided with threaded members 17 which, at their upper ends, have series of teeth 17' adapted to engage the top of the room and with the aid of adjustable
75 pin members 20 mounted in the lower end of the frame 16 to brace the frame 16 rigidly at any desired position. The frame 16 comprises a pair of parallel rigidly connected side members 16', and in the guides formed
80 by these members, is slidable a bearing support member or frame 21 provided with spaced bearings 22 and 22'. The hangers 18' on which the pivots 18 are carried are in turn mounted on a transversely extending plate 18'', which is slidably adjustable in guides 19 in a manner hereafter described. The position of the member 21 is adjustable in the guides and it may be secured in various fixed positions by threaded clamping
85 members 23. The bearing 22 may be of any ordinary type and permits sliding and rotation of a bar 29, hereafter described, relative thereto. The bearing 22' comprises a threaded nut 24, and this threaded nut is provided
90 at a point exterior to the bearing 22' with a large driving gear 25 which is adapted to mesh with a gear 26 on the shaft of a motor whose frame is designated 7. A threaded driving shaft or bar 29 is mounted in the
95 threaded nut 24 and in the bearing 22 and is adapted to be fed therethrough upon rotation. The gear 25 is splined to the shaft by

means of a key 30 engaging a longitudinal slot 31 formed in the shaft but is slidable relative thereto. The nut 24 is secured in stationary relation to the frame 21. As a result of this construction rotation of the gear 25 causes rotation of the shaft 29 and, by reason of the latter's co-action with the nut 24, its forward feed at the same time. Mounted on the shaft 29 at its forward extremity is a cross-shaped drill head 32 which is provided with a series of mountings for cutter bits or points 33, these mountings being arranged in a spiral having a distance between the convolutions thereof equal to the distance between adjacent bits on each arm of the head. This cross-shape head likewise carries a shield member or conveyor 34 which terminates at its rear in the conical discharge passage 35 and which is arranged coaxially with the shaft 29. Within the shield member is a spiral conveyor vane 40 so formed as to collect the cuttings from the bits and convey them back to the mouth of the hole being drilled. The forward end of the cutter head is provided with an auger point 41 which centers the same and guides it during its feeding movement. It will be understood that the head 32 is detachable from the shaft 29 and that its relative position with respect thereto may be varied by the insertion of one or more connector members 42, these being each provided with a socket at one end and a plug at the other and having interengaging projections and sockets respectively designated 43 and 44. It will be understood that after the cutter head is advanced a sufficient distance, additional conveyor sections 45 may be connected to the shield member 35 and so result in the dumping of the cuttings outside the mouth of the hole. The motor 7 is controlled by a suitable reversing and controller box 46 to which current is supplied through a cable 47 wound upon the reel 48. It will also be noted that between the main frame 2 and the supplemental frames 15 and 18'' are arranged means for moving the latter transversely of the frame 2, this transverse movement being accomplished by travelling nuts 49, 49' mounted on the plates 15 and 18'' respectively and cooperating with transversely extending longitudinally immovable threaded feed screws 50. Handles 51 and 52 are provided for turning the feed screws to accomplish lateral feed of the drilling mechanism. In order to maintain the frame 16 in proper relation to the standards 6 and with the gears 25 and 26 in mesh, a pair of short links connected by a turn buckle, the whole being designated as 53, are arranged between the upper ends of the parts.

From the foregoing description the mode of operation of this mechanism will be readily apparent. The device will be transported to such a point as it may be desired to cut

an opening through the rib. The members 6 and 16 will be adjusted transversely of the truck to a desired position. The connections 53 will be adjusted in such manner as to bring the gears 25 and 26 into mesh. The pins 20 and screws 17 will be adjusted to rigidly brace the frame 16 relative to the floor and ceiling of the room. The motor will then be started and the cutter fed into the rib and the spiral conveyor 40 will deposit the cuttings outside of the holes so cut. If the rib is of greater thickness than may be pierced by the possible feed of the threaded shaft 29 after a certain depth of hole has been obtained, the shaft may be run back by reversing the motor by means of the reversing mechanism associated with the controller box and a new section of shaft 42 inserted between the cutter head and the threaded shaft 29. The drilling can then be continued, if necessary, it being understood that additional sections 45 of the conveyor for cuttings are likewise added. It will be understood that the cutter head and conveyor will be removed while the machine is being moved about the mine and that the parts of the machine will be moved relatively to each other so as to permit the same to occupy minimum head room and the frame 16 may be moving about the pivots 18, when the motor frame is in bottom position and the parts are laterally displaced to disengage the gears 25 and 26 to bring its top down below the top of the standards 6. The adjustability of the parts to cut at various heights will also be noted.

While I have in this specification 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 same 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 drilling mechanism, a support, a rotary cutter head, a conveyor coaxial with said rotary cutter head, a mounting for said cutter head comprising a shaft to which said head is secured, a frame in which said shaft is journaled, means whereby said frame may be adjusted relative to said support by rectilinear movement in a direction perpendicular to the line of said shaft, and means including a common element coaxial with said shaft and cooperating therewith for rotating and feeding said cutter head.

2. In a drilling mechanism, a rotary cutter head, a tubular conveyor coaxial therewith, a shaft on which said cutter head is mounted, a frame in which said shaft is journaled, a guide frame in which said frame is mounted, means to enable adjusting of said frame in said guide frame, and means including

stationary and rotatable elements cooperating with said shaft for rotating and feeding said cutter head.

3. In a drilling mechanism, a rotary cutter head, a tubular conveyor coaxial therewith, a shaft on which said cutter head is mounted, a mounting for said shaft, means permitting adjustment of said mounting in a direction perpendicular to the axis of said shaft including a guide frame for said mounting, means for adjusting said mounting in a direction parallel to said shaft, and means for rotating and feeding said cutter head.

4. In a drilling mechanism, a portable base, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft on which said cutter head is mounted, a mounting for said shaft, a guide frame carried on said base and in which said mounting is adjustable, driving means for said shaft comprising a prime mover, and a mounting on said base for said prime mover in which the latter is adjustable relative to said shaft mounting in a direction substantially parallel to the direction of adjustment of said shaft mounting.

5. In a drilling mechanism, a portable base, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft on which said cutter head is mounted, a mounting for said shaft, a guide frame carried on said base and in which said mounting is adjustable, driving means for said shaft comprising a prime mover, a mounting on said base for said prime mover in which the latter is adjustable in a direction substantially parallel to the direction of said shaft mounting, and means for independently adjusting said frame and said prime mover mounting in directions parallel to the axis of said shaft.

6. In a drilling mechanism, a portable base, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft on which said cutter head is mounted, a mounting for said shaft, a guide frame carried on said base and in which said mounting is adjustable, driving means for said shaft comprising a prime mover, a mounting on said base for said prime mover in which the latter is adjustable in a direction substantially parallel to the direction of said shaft mounting, said shaft mounting and said prime mover mounting being adjustable as aforesaid independently of each other, and means for connecting said guide frame and prime mover mounting in rigid relation.

7. In a drilling mechanism, a portable base, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft on which said cutter head is mounted, a mounting for said shaft, a guide frame carried on said base and in which said mounting is adjustable, driving means for said shaft comprising a prime mover, a mounting on said base for said prime mover in which the latter is adjustable in a direction substantially parallel to the direction of said shaft mounting, said shaft mounting and said prime mover mounting being adjustable as aforesaid independently of each other, a gear on said shaft, and a gear on said prime mover, and means for maintaining the gears in mesh.

8. In a drilling mechanism, a portable base, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft to which said head is secured, a mounting for said shaft, a supporting frame on said base for said mounting, a pivot for said frame relative to which the latter is movable to cause the axis of said shaft to trace a portion of a right cylindrical surface, means for bracing said frame after such movement, means for moving said frame and pivot relative to said base and in a direction parallel to the axis of the shaft, and means for moving the mounting in a direction perpendicular to the shaft.

9. In a drilling mechanism, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft on which said cutter head is mounted, supporting means for said shaft in which the latter is adjustably mounted, driving means for said shaft comprising a prime mover, a mounting for said prime mover in which the latter is adjustable while said shaft remains stationary, and means for adjusting said shaft supporting means and said prime mover in a direction substantially parallel to the direction of said shaft.

10. In a drilling mechanism, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a shaft in which said cutter head is mounted, driving means for said shaft comprising a prime mover, and means for adjustably supporting said prime mover for adjustment in a direction substantially parallel to the direction of said shaft or in a direction perpendicular to a line parallel to said shaft both while said shaft remains stationary to permit movement of the axis of said cutter head

toward the axis of said prime mover for reducing the height of the mechanism during transport.

11. In a drilling mechanism, a portable
5 base, a vertically adjustable driving motor, an independently vertically adjustable rotary cutter head driven thereby, said head having cutting elements operative on rotation of the cutter head to form a bore circular
10 in cross section into which the head advances as cutting proceeds, separate relatively adjustable supporting frames for said motor and cutter head mounted on said base, a threaded element on which said cutter
15 head is disposed, and means including a common element for feeding and rotating said cutter head.

12. In a drilling mechanism, a rotatable
20 cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a guiding frame therefor providing for bodily rectilinear movement thereof, a driving motor
25 for said cutter head, a guiding frame for said motor, and means to feed said motor and said cutter head relative to said frames permitting independent feeds thereof, to permit movement of the axis of said cutter head
30 toward the axis of said prime mover for reducing the height of the mechanism during transport.

13. In a drilling mechanism, a wheeled
35 truck frame, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, means including a motor on said truck frame to feed and rotate said
40 cutter head relative to said frame, and means for adjusting said cutter head vertically, rectilinearly, laterally and arcuately in a vertical plane relative to said truck frame including means rotatable to effect each of
45 said adjustments.

14. In a drilling mechanism, a wheeled
50 truck frame, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a guiding frame for said
55 cutter head, a driving motor for rotating said cutter head, and means to tilt said guiding frame into different angular positions relative to said truck frame and said driving motor.

15. In a drilling mechanism, a wheeled
60 truck frame, a rotary cutter head, a conveyor coaxial therewith, a threaded feed shaft for feeding and rotating said cutter head, a motor on said truck frame for rotating said feed shaft, and means to adjust said cutter head rectilinearly in vertical and horizontal
65 planes and also bodily arcuately, relative to said truck frame.

16. In a drilling mechanism, a wheeled
truck, a rotary cutter head having cutting
elements operative on rotation of the cutter
head to form a bore circular in cross section
into which the head advances as cutting pro- 70
ceeds, a supporting frame on said truck for said cutter head adjustable about a transverse pivot at its lower end, means to adjust said frame radially relative to said
75 pivot, and a motor on said truck for driving said cutter head in any of its adjusted positions radially relative to said pivot.

17. In a drilling mechanism, a rotary
cutter head having cutting elements opera- 80
tive on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a supporting frame therefor disposed on a transverse pivot, means to adjust said frame laterally, means to adjust said cutter head
85 relative to said pivot, and means to simultaneously feed and rotate said cutter head.

18. In a drilling mechanism, a portable
base, a rotary cutter head having cutting
elements operative on rotation of the cutter
head to form a bore circular in cross section
into which the head advances as cutting
proceeds, a driving motor therefor, relatively
movable supporting frames respectively
95 for said cutter head and motor, said frames both being mounted on said base, and adjustable means for connecting said frames.

19. In a drilling mechanism, a portable
supporting frame, a rotary cutter head, a
driving element, a conveyor arranged co-
axial therewith, means to adjust said cutter
head relative to said supporting frame
bodily in vertical and horizontal planes and
also bodily arcuately, and means including
105 a common gear element for feeding and rotating said cutter head.

20. In a mining apparatus, a portable supporting frame, a driving motor, rotatable
cutting mechanism driven thereby including
a drive shaft, said rotatable cutting mechanism having cutting elements operative on
110 rotation of the cutting mechanism to clear a bore circular in cross section into which the cutting mechanism may bodily advance as cutting proceeds, means for adjusting said
115 cutting mechanism relative to said supporting frame bodily in vertical and horizontal planes and also bodily arcuately, and means including a common element coaxial with said drive shaft for simultaneously rotating
120 and feeding said cutting mechanism.

21. In a mining apparatus, a driving
motor, rotatable cutting mechanism driven
thereby, said rotatable cutting mechanism
having cutting elements operative on rota-
125 tion of the cutting mechanism to clear a bore circular in cross section into which the cutting mechanism may bodily advance as cutting proceeds, a tiltable guiding frame therefor, means to adjust said frame laterally and
130

vertically, and means including a common element for simultaneously feeding and rotating said cutting mechanism.

22. In a drilling mechanism, a wheeled truck, a circular rotary cutter head of a size adequate to form a break-through in a single cut, a supporting frame for said cutter head adjustable about a transverse pivot into an inclined transport position and a substantially vertical working position, said frame having means operative in the latter position to cooperate with the mine bottom to hold it in rigid position, means for adjusting said cutter head vertically relative to said frame, and a motor on said truck for driving said cutter head in any of its vertically adjusted positions.

23. In a drilling mechanism, a wheeled truck, a circular rotary cutter head of a size adequate to form a break-through in a single cut, a supporting frame for said cutter head adjustable about a transverse pivot into an inclined transport position and a substantially vertical working position, said frame having means operative in the latter position to cooperate with the mine bottom and roof to hold it in rigid position, means for adjusting said cutter head vertically relative to said frame, and a motor on said truck for driving said cutter head in any of its vertically adjusted positions.

24. In a drilling mechanism, a wheeled truck, a circular rotary cutter head of a size adequate to form a break-through in a single cut, a supporting frame for said cutter head adjustable about a transverse pivot into an inclined transport position and a substantially vertical working position, said frame having means operative in the latter position to cooperate with the mine bottom to hold it in rigid position, and means to adjust said head parallel to a line perpendicular to said pivot, and a motor on said truck for driving said cutter head in any of its last mentioned adjusted positions.

25. In a drilling mechanism, a wheeled truck, a circular rotary cutter head of a size adequate to form a break-through in a single cut, a supporting frame for said cutter head adjustable about a transverse pivot into an inclined transport position and a substantially vertical working position, said frame having means operative in the latter position to cooperate with the mine bottom and roof to hold it in rigid position, and means to adjust said head parallel to a line perpendicular to said pivot, and a motor on said truck for driving said cutter head in any of its last mentioned adjusted positions.

26. In a drilling mechanism, a portable base

a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a supporting frame therefor mounted on said base, a driving motor for said cutter head, and a supporting frame for said driving motor mounted on said base, one of said supporting frames being adjustable relative to said base in a direction parallel to the axis of rotation of said cutter head relative to the other.

27. In a drilling mechanism, a portable base a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a supporting frame therefor mounted on said base, a driving motor for said cutter head, a supporting frame for said driving motor mounted on said base, each of said supporting frames being adjustable relative to said base in a direction parallel to the axis of rotation of said cutter head relative to the other.

28. In a drilling mechanism, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a supporting frame therefor, a driving motor for said cutter head, a supporting frame for said driving motor, one of said supporting frames being adjustable in a direction parallel to the axis of rotation of said cutter head relative to the other, and the other frame pivotally adjustable upon an axis parallel to said axis relative to said first mentioned frame, said frames being adjustable to permit movement of said cutter head toward said driving motor to reduce the height of the mechanism during transport.

29. In a drilling mechanism, a rotary cutter head having cutting elements operative on rotation of the cutter head to form a bore circular in cross section into which the head advances as cutting proceeds, a supporting frame therefor, a driving motor for said cutter head, a supporting frame for said driving motor, each of said supporting frames being adjustable in a direction parallel to the axis of rotation of said cutter head relative to the other, and one frame pivotally adjustable upon an axis parallel to said axis relative to the other to permit movement of said cutter head toward said driving motor to reduce the height of the mechanism during transport.

In testimony whereof I affix my signature.

FRED T. LOBBEY.