H. A. KUHN.

APPARATUS FOR MINING COAL.

APPLICATION FILED MAY 18, 1914.

1,273,504.

Patented July 23, 1918

2 SHEETS—SHEET 1.

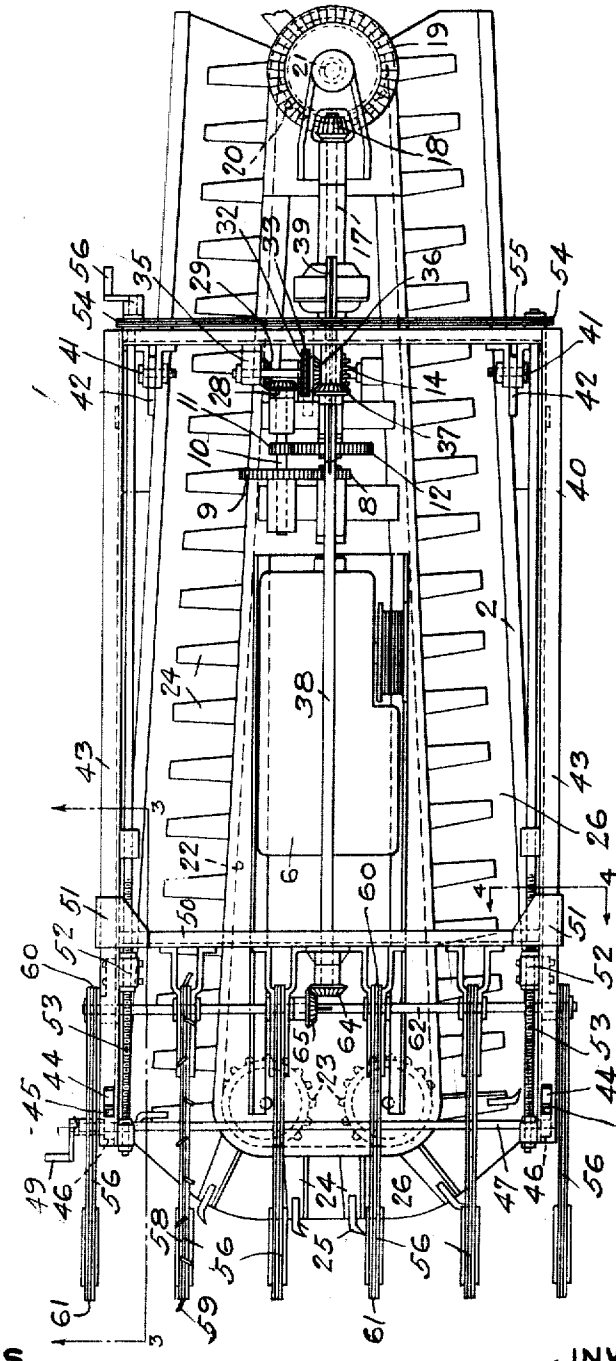


FIG. 1

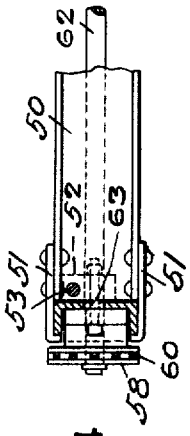


FIG. 4

WITNESSES.

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John F. Hill

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2 SHEETS—SHEET 2.

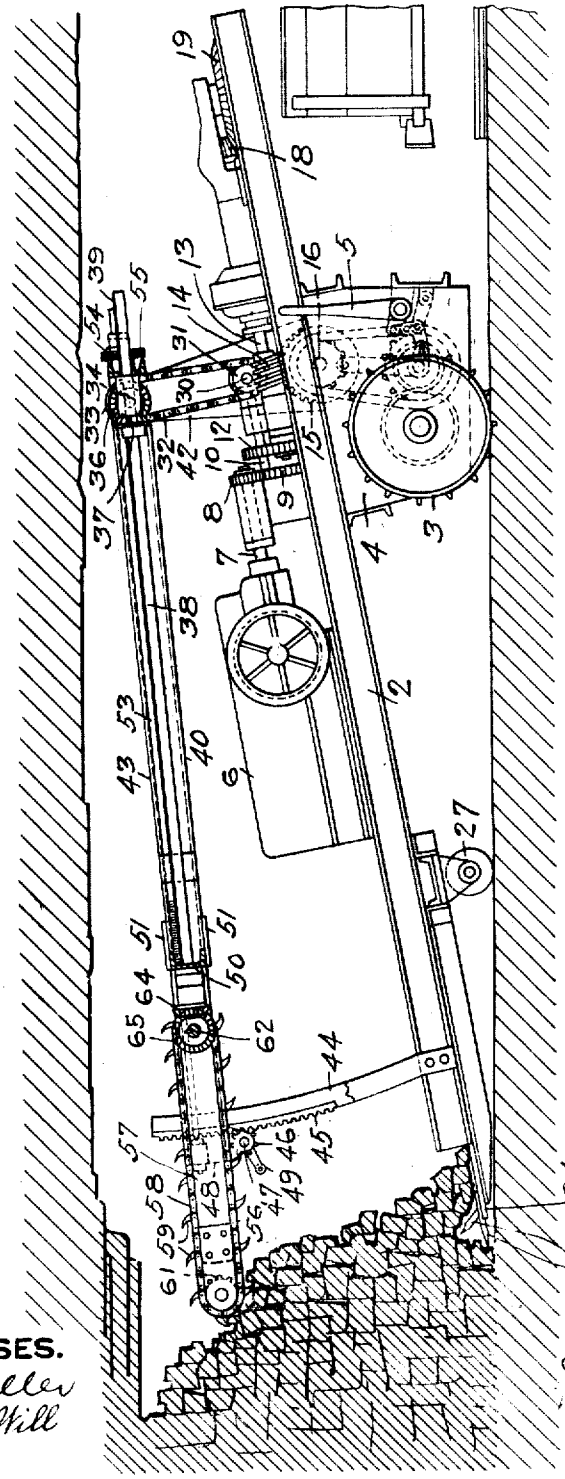


FIG. 2

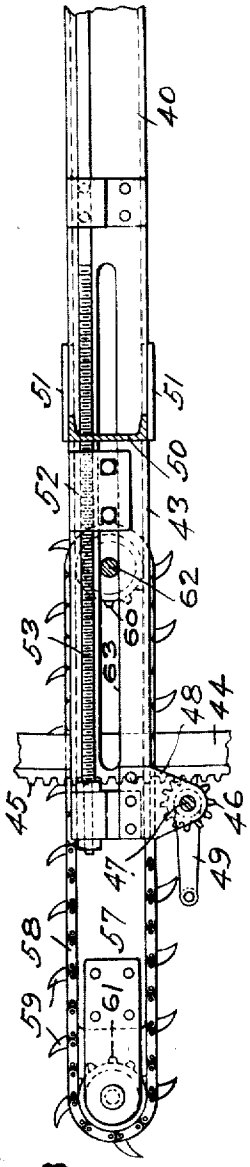


FIG. 3

WITNESSES.

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UNITED STATES PATENT OFFICE.

HARRY A. KUHN, OF PITTSBURGH, PENNSYLVANIA.

APPARATUS FOR MINING COAL.

1,273,504. Specification of Letters Patent. Patented July 23, 1918.

Application filed May 18, 1914. Serial No. 839,331.

To all whom it may concern:

Be it known that I, HARRY A. KUHN, a citizen of the United States, and resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Mining Coal; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to mining machines.

In an application for Letters Patent of the United States, Serial No. 796,497, I have set forth and described the method of mining coal in which an undercut is first made in the wall of coal and the coal is then separated along its lines of cleavage by shooting in the ordinary manner, and thereupon the coal is undermined and conveyed away. The present invention has reference to a machine in the operation of which the above method may be employed, and in addition, I provide means for advancing raking or disrupting devices at different heights working from the top to the bottom, and at the same time the coal is being undermined and carried away, these raking devices acting to move in a vertical plane at different levels and working in such way as to dislodge the coal and drop it onto the conveyer below.

In the accompanying drawings, Figure 1 is a plan view of my improved machine; Fig. 2 is a side elevation partly in section; Fig. 3 is an enlarged section on the line 3—3, Fig. 1, and Fig. 4 is a section on the line 4—4, Fig. 1.

In the drawings the machine for undermining the coal and conveying it away, is the same form of machine which is illustrated and described in an application of even date herewith, Serial No. 839,325, and is illustrated more or less diagrammatically. The frame 2 is carried by the traction wheels 3 and inclosed within the box or housing 4, are the gear connections which drive the traction wheels 3, and the lever 5 is employed for giving the forward or backward movement to the traction wheels 3, in advancing and withdrawing the frame 2. On the frame 2 is the motor 6 whose shaft 7 is provided with the pinion 8 meshing with the gear wheel 9 on the countershaft 10. The pinion 11 on the countershaft 10 engages the gear wheel 12 on the worm shaft 13. The worm 14 engages the worm wheel 15 on the shaft 16 and from this worm wheel power is transmitted to the gear in the housing 4 which drives the traction wheels 3.

The shaft 13 is connected up by suitable clutch mechanism with the shaft 17 and said shaft 17 as the beveled pinion 18 which meshes with the beveled teeth 19 on the large sprocket wheel 20 mounted on the shaft 21. A chain 22 engages the sprocket wheel 20 and said chain passes around the sprocket wheels 23 at the forward end of the frame 2. The chain 22 has the flights 24 and the cutters 25 said flights moving along the pan 26, all as illustrated and described in the aforesaid application. The frame 2 inclines downwardly and is supported near its front end by the rollers 27.

A beveled pinion 28 on the countershaft 10 meshes with the beveled pinion 29 on the shaft 30. A sprocket wheel 31 on the shaft 30 is engaged by the chain 32 which extends up and around the sprocket wheel 33 on the shaft 34 journaled in suitable bearings in the uprights 35. The shaft 34 has the beveled pinion 36 which meshes with the beveled pinion 37 on the shaft 38. The shaft 38 is provided with the key 39 which engages the key-way in the beveled gear 37, so as to provide for the longitudinal movement of said shaft 38 for the reasons hereinafter set forth.

The swinging frame 40 has a pivotal connection 41 with the uprights 42 on the frame 2 and said swinging frame 40 is composed of the side channel members 43. To support the forward end of the swinging frame 40, I provide the upright bars 44 which extend up through the flanges of the channel members 43.

These bars 44 are provided with the rack faces 45 with which the pinions 46 engage, said pinions being mounted on the shaft 47 journaled in the brackets 48 on the channel members 43 of the swinging frame 40. A crank 49 is secured to the shaft 47 and by turning said crank, the swinging frame 40 is raised and lowered at its forward end swinging on an arc described by the rack face 45.

A sliding frame 50 is mounted on the swinging frame 40 at the forward end thereof, said frame having the plates 51 which engage the upper and lower flanges of the channel members 43 of said swinging frame as clearly indicated in Fig. 4. This sliding frame 50 has the threaded blocks 52 with which the threaded feed bars 53

engage, said threaded feed bars being journaled in bearings in the swinging frame 40. The inner ends of said feed bars are provided with the sprocket wheels 54 connected up by a chain 55, one of said feed bars being provided with the crank 56, so that by turning said crank a simultaneous rotary movement is imparted to both feed bars and the sliding frame 50 is fed forward or backward on the swinging frame 40 according to the direction of rotation given to said feed bars.

The sliding frame 50 carries the raking or disrupting devices, and said devices comprise the guide frame 57 for the chain 58 which carries suitable raking or disrupting members 59. The chain 58 passes around the sprocket wheels 60 and 61 at the inner and outer ends of the guide frame 57, respectively. The sprocket wheels 60 are mounted on the shaft 62 which is mounted in bearings on the sliding frame 50, said shaft extending through slots 63 in the channel members 43 of the swinging frame 40, as clearly indicated in Fig. 3. Power to drive the shaft 62 is obtained from the shaft 38, said shaft having the beveled pinion 64 which meshes with the beveled pinion 65 on the shaft 62.

As above stated, my improved machine is applicable for use in connection with a method of mining coal set forth in the above mentioned application, and the coal having been undercut and separated along its lines of cleavage by shooting, so as to lower the coal into the undercut, as indicated in Fig. 2, my improved machine is then brought into play, and as indicated in Fig. 2 the machine is being advanced with its lower disrupting and conveying mechanism traveling along the floor of the mine in the line of the original undercut and the sliding frame 50 having been advanced by turning the crank 56 the said disrupting devices are then moved downwardly. This is accomplished by turning the crank 49 which lowers the front end of the swinging frame 40 and said swinging frame moving in the arc of a circle described by the rack faces 45 and frame 57 also move in a like arc and in their downward movement the disrupting members act to tear or disrupt the coal so as to coöperate with the conveyer below in such a way that the coal disrupted by the said devices is dropped onto the conveyer and carried away. The swinging frame moving in the arc of a circle, as above described is gradually lowered and with it the disrupting devices, so that the entire mass of coal is acted on by the sweep of the swinging frame. When the swinging frame has been lowered to its lowest position, it is again raised by turning the crank 56, and the machine is again advanced into the coal which has been loosened along its lines of cleavage and another downward movement of the swinging frame and its disrupting devices is made which results in a further removal of the mass of coal until all the coal which has been separated on its lines of cleavage is removed and another undercutting and shooting of the coal is required for the further operation of the machine. It is apparant that the disrupting members 59 might be turned in the opposite direction and by reversing the motor the disrupting devices could be moved upwardly to disrupt the coal.

What I claim is:

1. In a mining-machine, the combination with a suitable frame, dislodging and conveying means carried thereby, operating along a horizontal plane, a vertically swinging frame, means for raising and lowering the said swinging frame, a sliding frame on said swinging frame, means for advancing and withdrawing said sliding frame, and disrupting devices carried by said sliding frame.

2. In a mining-machine, the combination with a suitable frame, dislodging and conveying means carried by said frame, operating along a horizontal plane, a vertically swinging frame on said first frame, means for raising and lowering said swinging frame, a sliding frame on said swinging frame, a threaded feed-bar on said swinging frame engaging said sliding frame, and disrupting devices carried by said sliding frame.

In testimony whereof, I the said HARRY A. KUHN have hereunto set my hand.

HARRY A. KUHN.

Witnesses:
JOHN F. WILL,
ROBT. D. TOTTEN.