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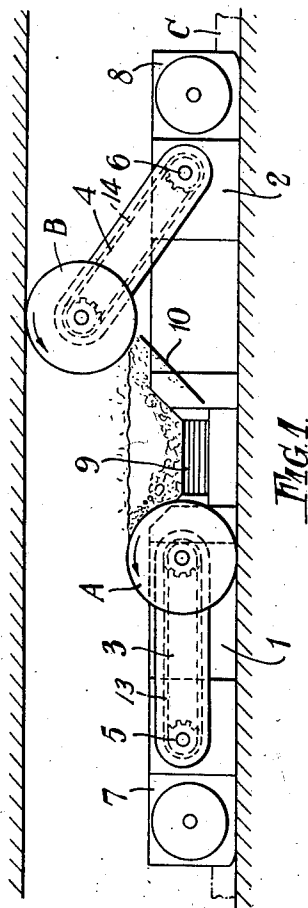
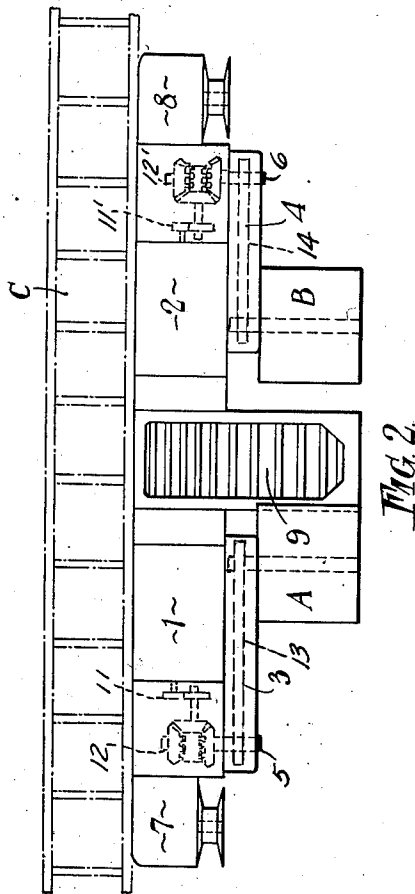
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2,767,970

REVERSIBLE LONGWALL MINING MACHINES

Filed Sept. 27, 1954

2 Sheets-Sheet 1



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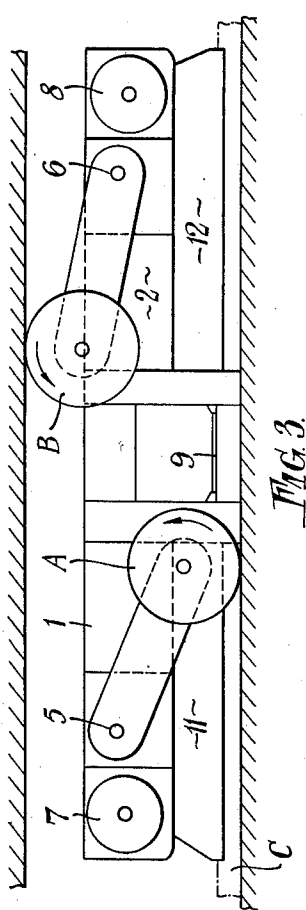
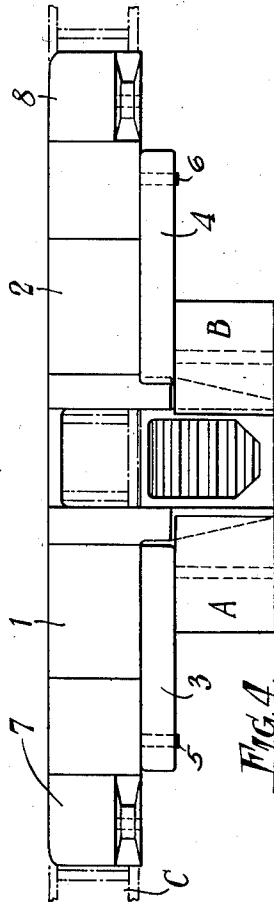
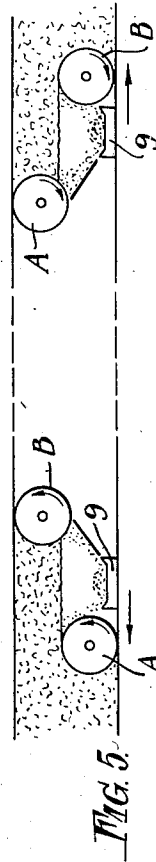
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REVERSIBLE LONGWALL MINING MACHINES

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Claims priority, application Great Britain October 1, 1953

8 Claims. (Cl. 262—27)

This invention relates to mining machines of the kind used for the longwall mining of coal and other minerals.

Mining machines are known which are provided with a transverse extension carrying cutter picks in closely set vertical planes which are driven in curved paths over the height of material to be recovered and which deliver comminuted material onto a transverse conveyor which delivers it to a face conveyor or the like running parallel to the longwall. Such a machine is described and claimed in British Patent No. 601,406.

Machines employing a pair of picked drums extending transversely from a loader portion to comminute the material are also known.

Known machines are either adapted for operation in one direction only along the longwall, in which case they are flitted back to a starting position, or they require at least partial dismantling and re-erection before they can operate in an opposite direction on a given face.

It is an object of the present invention to provide a longwall mining machine which can operate in either direction along a face without dismantling.

It is a further object of the invention to make provision in such a machine for adjusting the floor horizon being cut.

According to the invention a longwall mining machine comprises a loading section having conveying means extending transversely from the body of the machine and a pair of units mounted one at each side of the loading section, each unit incorporating a coal cutting element extending transversely from the same side as the conveyor means and being mounted on a pivoted arm capable of adjustment to shift the cutting element mounted thereon from floor level to ceiling level whereby, on reversal of the direction of working, the cutting element formerly at floor level and leading the cutting operation can be shifted to ceiling level while the cutting element formerly at ceiling level and trailing can be shifted to floor level to become the leading element.

The cutting elements may be in the form of picked drums or a series of picked discs. The cutting circles of the two elements normally overlap and they may be of equal or unequal diameters.

The above and other parts of the invention are incorporated in forms of mining machine which will now be described with reference to the accompanying drawings in which like reference numbers are used for like parts.

Fig. 1 is a diagrammatic side elevation from the face side of the machine when riding directly on the mine floor;

Fig. 2 is a plan view of the machine of Fig. 1;

Fig. 3 is a diagrammatic side elevation from the face side of a similar machine to that of Figs. 1 and 2, but adapted for mounting on a face conveyor;

Fig. 4 is a plan view of the machine of Fig. 3;

Fig. 5 is a diagram illustrating the positions adopted by cutting drums of the machines in alternative directions of face working.

Referring first to Figs. 1 and 2, the machine incor-

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porates two driving units 1 and 2, both of which are complete with a motor, conventional switch gear, reduction gearing 11, 11' and reverse gearing 12, 12' respectively driving shafts 5 and 6.

A pair of rotary drums, A and B, provided with series of cutter picks, is mounted on arms 3 and 4 pivoted about the shafts 5 and 6 respectively.

Haulage winches 7 and 8 are provided at the ends of both units 1 and 2, though one winch may be omitted for certain applications.

The pivoted arms 3 and 4 may incorporate the driving gearing 13, 14 between the shafts 5 and 6 and the drums A and B and these arms may be adjusted about their pivots, for example by one or more hydraulic rams (not shown).

The range of movement of the arms in the downward direction can be such as to bring the cutting picks below the level of the floor on which the body of the machine is sitting, or below the floor on which a face conveyor C is sitting, if the units are mounted on the face conveyor as in Figs. 3 and 4, so as to adjust the floor horizon.

A transverse conveyor 9 is provided low down on the machine between the units 1 and 2 to transfer comminuted material cut by the drums A and B onto the face conveyor C.

Guards and chutes, of which one example 10 is shown in Fig. 1, are fitted as necessary and convenient in conventional manner to guide the comminuted material onto the transverse conveyor or loader 9.

Referring now specifically to Figs. 3 and 4, it will be seen that the whole machine is carried upon the face conveyor C. In order to give sufficient clearance for the transverse conveyor 9 to deliver comminuted material onto the face conveyor C, the whole machine frame is raised upon bearers 11 and 12 which ride upon the side frames of the conveyor C.

The direction of rotation of the cutting drums can be altered to suit particular mine conditions and the guards and chutes necessary to lead cut material to the loading section are altered accordingly.

It is envisaged that satisfactory operation will be achieved with the lower drum always rotating in that sense which corresponds to a rolling motion by that drum over the floor while the upper drum rotates in the opposite sense to that corresponding to a rolling motion by that drum over the roof, as indicated by the arrows in Figs. 1, 3 and 5.

Put in other words, both the lower and upper drums may rotate anti-clockwise when viewed from the longwall on a right to left movement thereover, and both drums may rotate clockwise when viewed from the longwall on a left to right movement thereover. This is clearly shown in the diagram of Fig. 5.

In operation the machine is hauled along a face in a seam of coal or other mineral with the leading drum (or discs) at floor level and the trailing drum at roof level, the position of the drums being adjusted as conditions demand.

At the end of the face the machine is pulled forward into a "stable hole" (a previously excavated heading in advance of the face of mineral) and the return cut is commenced: this time the positions of the drums are reversed, i. e., what was the trailing drum cutting at roof level becomes the leading drum cutting at floor level, and vice versa.

I claim:

1. A longwall mining machine comprising a body, a loading section on one side of said body and including conveying means extending transversely from the body, a pair of cutting units mounted on the same side of the body with one at each side of said loading section, each of said units including a rotatable cutting element extend-

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ing transversely from said body and on opposite sides of said conveying means, an arm carrying said cutting element and pivoted on said body for adjustment to shift the cutting element from floor level to ceiling level, and means reversibly driving said cutting element whereby, on reversal of the direction of working, the cutting element formerly at floor level and leading the cutting operation can be shifted to ceiling level while the cutting element formerly at ceiling level and trailing can be shifted to floor level to become the leading element upon reverse movement of the machine.

2. A longwall mining machine according to claim 1 wherein the cutting circles of the cutting elements overlap.

3. A longwall mining machine according to claim 1 wherein the cutting elements comprise picked drums.

4. A longwall mining machine according to claim 1 wherein the cutting elements comprise a series of picked discs.

5. A longwall mining machine according to claim 1

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wherein the arms are adjustable in the downward direction to position the cutting elements below floor level.

6. A longwall mining machine according to claim 1 wherein each unit comprises a motor and the switch gear therefor.

7. A longwall mining machine according to claim 1 wherein each unit comprises winch means for hauling the machine along the longwall.

8. A longwall mining machine according to claim 1 comprising bearers for supporting the machine on a face conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

2,592,996	Anderson	Apr. 15, 1952
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FOREIGN PATENTS

1,065,513	France	Jan. 13, 1954
601,416	Great Britain	May 5, 1948
620,255	Great Britain	Mar. 22, 1949