Sept. 21, 1937. E. H. McFARLAND 2,093,568

METHOD OF AND APPARATUS FOR MINING AND RECOVERING MINERALS

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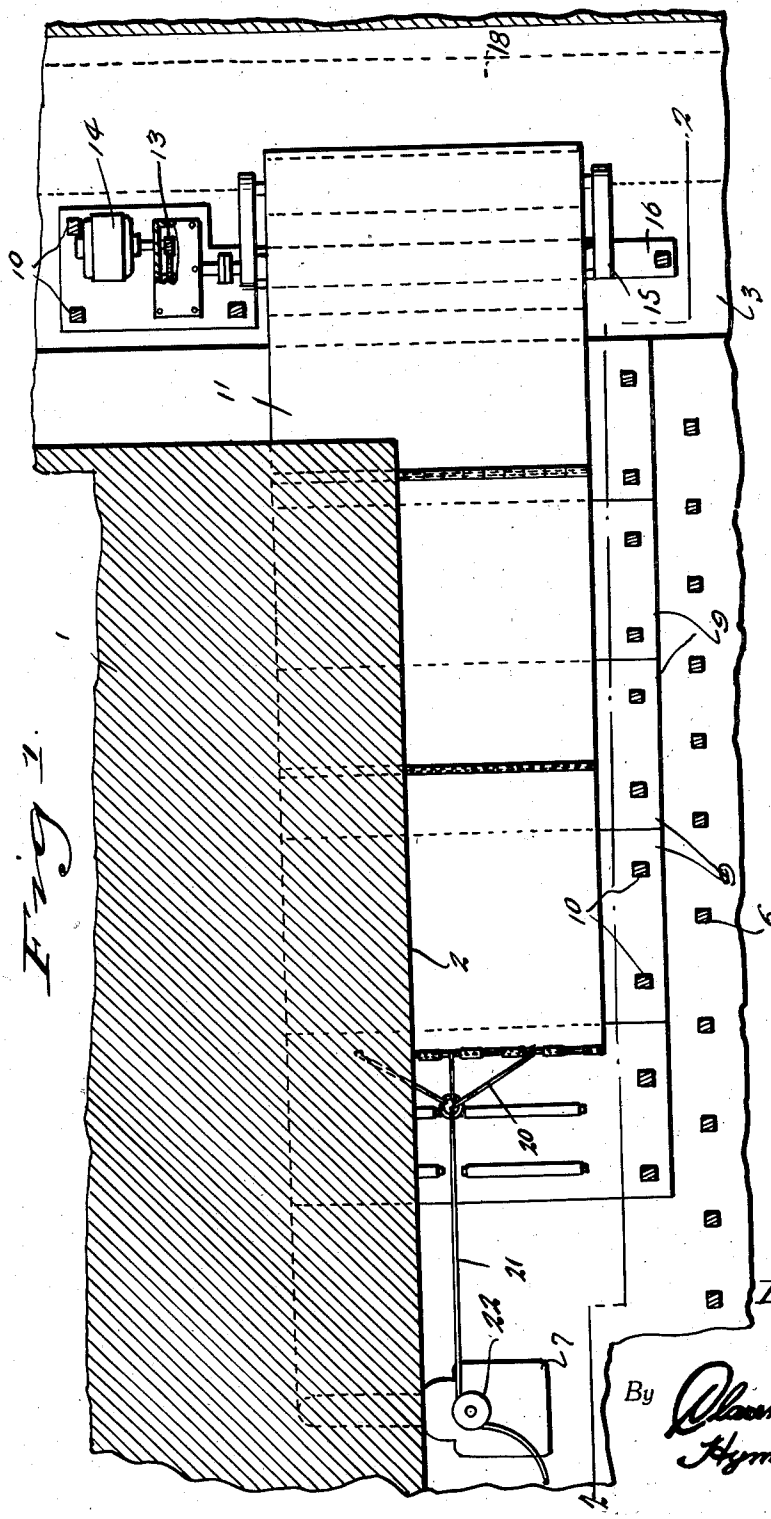


Fig. 1.

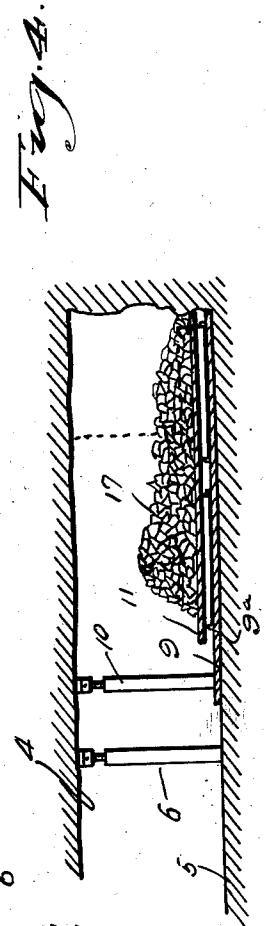


Fig. 4.

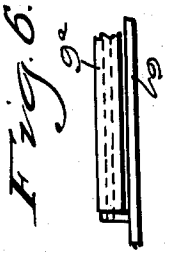


Fig. 6.

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Fig. 2.

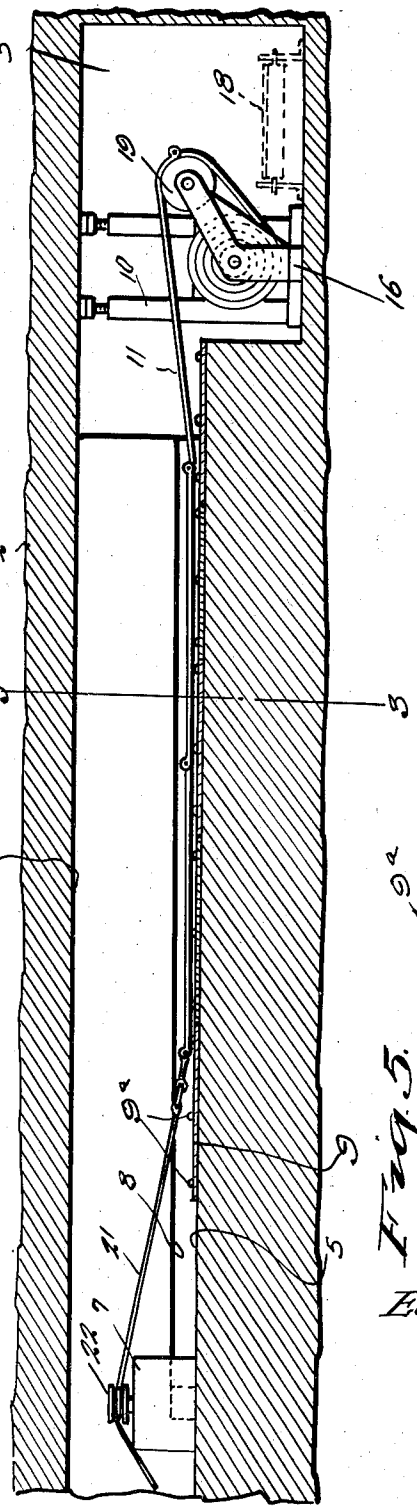


Fig. 3.

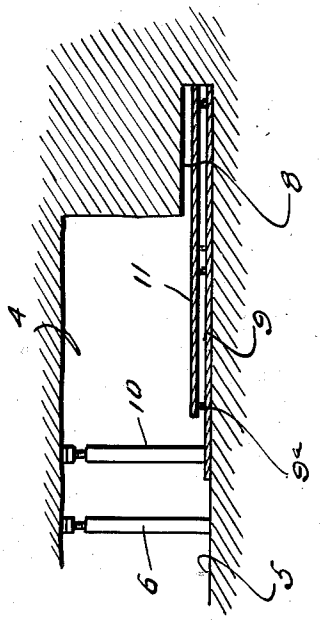
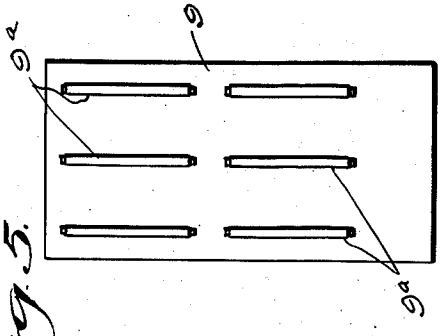


Fig. 5.



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METHOD OF AND APPARATUS FOR MINING AND RECOVERING MINERALS

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Application February 18, 1937, Serial No. 126,507

5 Claims. (Cl. 262—1)

This invention relates to the mining and recovering of minerals, and particularly to the mining and recovering of minerals where the vein being mined is undercut.

At the present time in the mining of minerals after the vein of mineral is undercut and shot or snubbed down, the mined material is conveyed by hand labor to a conveyor generally by shoveling the mined material and during the shoveling of the material bands of impurities are picked out of the mineral as it is being shoveled by progressive stages towards the conveyor.

As an alternate mechanical loading or transferring of the mined material to the conveyor is resorted to, and where mechanical loading or transferring is resorted to, all the material shot or snubbed down from the face of the mineral vein is transferred to the conveyor, resulting in a product contaminated with impurities requiring supplemental cleaning operations outside of the working place.

An object of the invention is therefore to improve the art of mining and mechanical loading to the end that a cleaner mineral product is produced at materially reduced expense or cost.

The invention, together with its objects and advantages will be best understood from a study of the following description taken in connection with the accompanying drawings, wherein:—

Figure 1 is an enlarged fragmentary detail view taken through a mine working place and showing the apparatus used in accordance with the present invention in top plan.

Figure 2 is a longitudinal sectional view through the material being mined.

Figure 3 is a transverse sectional view taken substantially on the line 3—3 of Figure 2.

Figure 4 is a view somewhat similar to Figure 3, but showing the shot or snubbed down material on a conveyor belt in accordance with the present invention.

Figure 5 is a plan view of a friction plate; and Figure 6 is an end view of a friction plate.

Referring to the drawings by reference numerals, it will be seen that 1 indicates the block of mineral being mined, 2 the face of the mineral vein, 3 the entry to the place being worked, 4 the roof, and 5 the bottom strata, respectively, above and below the mineral vein.

Supports for the roof in the mined out area are indicated by the reference numeral 6.

The undercut in the face of the mineral vein is indicated by the reference numeral 8, and this undercut, slot or kerf, is formed through the medium of the usual undercutting machine indicated generally by the reference numeral 7.

In accordance with the present invention, as the undercutting machine progresses in the cutting of the kerf or slot 8, there are placed on the bottom strata 5 in edge-to-edge relation successively positioned friction plates 9 which at one end extend into the kerf 8 as clearly shown in Figures 1 and 3.

The plates 9 may be made of metal or other suitable material and are provided on their upper faces with finely divided coal, soapstone, graphite or other material spread over the surfaces thereof to reduce friction, or for the same purpose, and as illustrated, said plates may be provided on the top sides thereof with suitably spaced and positioned anti-friction rollers 9a.

Whether or not the plates 9 will be used will depend upon the friction coefficient of the bottom 5, and when used the plates 9 are secured in position through the medium of posts or jacks 10 which rest at their bases on the plates 9 and at their upper ends bear against the roof 4 as shown for example in Figures 3 and 4.

Further in accordance with the present invention there is provided a conveyor belt 11.

Belt 11 may consist of a single length of reinforced fabric, wooden or metal slats chained or linked together, and in the present instance is shown as consisting of a plurality of sections suitably connected together as to permit of their ready separation to facilitate transporting of the conveyor.

The conveyor belt 11 is wound on a roller 15 suitably journaled in a bracket structure 16 provided therefor in the entrance 3 to the area being mined.

The conveyor belt 11 is trained over an idler roller 19 and at its free end has connected therewith as at 20 one end of a cable 21.

Under actual working conditions the cable 21 is given several turns about a winch or the like 22 carried by the undercutting machine 7 so that from time to time, as the undercutting machine 7 progresses the conveyor belt 11 is caused to unwind from the roll 15 to be extended over the plates 9 as the plates are being laid behind the traveling undercutting machine 7. In this connection it will be noted that an edge portion of the conveyor belt 11 extends into the kerf 8, as clearly shown in Figures 1, 3 and 4.

When the kerf cutting operation has been completed, the mineral vein is snubbed down or drilled and shot down with explosives, the loosened material 17 falling in a pile on the conveyor belt

or apron 11. This pile of material now on the belt contains of course partings or bands of foreign material in addition to the mineral. The loose mineral is raked or spread by a suitable tool uniformly on the belt and the foreign material picked free from the mineral and cast to the mined out area of the mine.

For winding the conveyor belt or apron 11 on the roller 15 with the material 17 thereon to the end that the material 17 will be conveyed to the entrance 3 to pass from the conveyor belt 11 on to a suitable belt conveyor 18 provided in the entrance space 3, as clearly shown in the drawings, there is provided a prime mover, the same in the present instance being an electric motor 14 that is in driving engagement with the roller 15 through the medium of suitable reduction gearing 13, as will be clear from a study of Figure 1.

The material received on the conveyor 18 is carried thereby to a point outside of the mine, or to another conveying medium thus completing the mining and recovering cycle of operation.

It is thought that a clear understanding of the utility and advantages of the invention will be had without a more detailed description.

Having thus described the invention, what is claimed as new is:—

1. A method of mining and recovering minerals which consists in cutting a horizontal kerf in the mineral vein, feeding a conveyor belt longitudinally into the kerf as the kerf is being cut, next, shooting or snubbing down the mineral on to the conveyor belt, and finally withdrawing the conveyor belt with the shot or snubbed down mineral thereon.

2. A method of mining and recovering minerals which consists in undercutting a kerf in the mineral vein, laying successive plates on the bottom strata below the mineral vein successively and in edge-to-edge relation with one end of the plates extending into the kerf, feeding a conveyor belt over the successively laid plates directly behind the undercutting machine, next, shooting or snubbing down the mineral on to the conveyor belt, and finally withdrawing the conveyor belt with the shot or snubbed down material thereon.

3. For use in mining and recovering minerals where the mineral vein is undercut, the combination of an undercutting machine, a roll of conveyor belting supported at a point approximating the starting point of the undercutting operation, and means connecting the free end of the conveyor belt with the undercutting machine for paying out the belt longitudinally into the kerf as the undercutting machine progresses, with a longitudinal portion of the conveyor belt extending into the kerf.

4. For use in mining and recovering minerals where the mineral vein is undercut, a combination of an undercutting machine, a roll of conveyor belting supported at a point approximating the starting point of the undercutting operation, means connecting the free end of the conveyor belt with the undercutting machine for paying out the belt longitudinally into the kerf as the undercutting machine progresses, with a longitudinal portion of the conveyor belt extending into the kerf, and mechanism connected with the conveyor belting roll for rewinding the latter for withdrawing the shot or snubbed down mineral piled thereon.

5. For use in mining and recovering minerals where the mineral vein is undercut, a combination of an undercutting machine, a roll of conveyor belting supported at a point approximating the starting point of the undercutting operation, means connecting the free end of the conveyor belt with the undercutting machine for paying out the belt longitudinally into the kerf as the undercutting machine progresses, with a longitudinal portion of the conveyor belt extending into the kerf, mechanism connected with the conveyor belting roll for rewinding the latter for withdrawing the shot or snubbed down mineral piled thereon, and a second conveyor extending at right angles to the conveyor belt roll for receiving the contents of the latter.

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