June 27, 1933. G. H. DORMER 1,915,411

MINING METHOD

Filed April 8, 1932

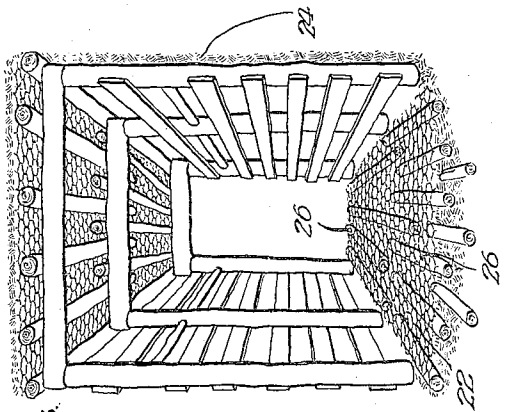


Fig. 3.

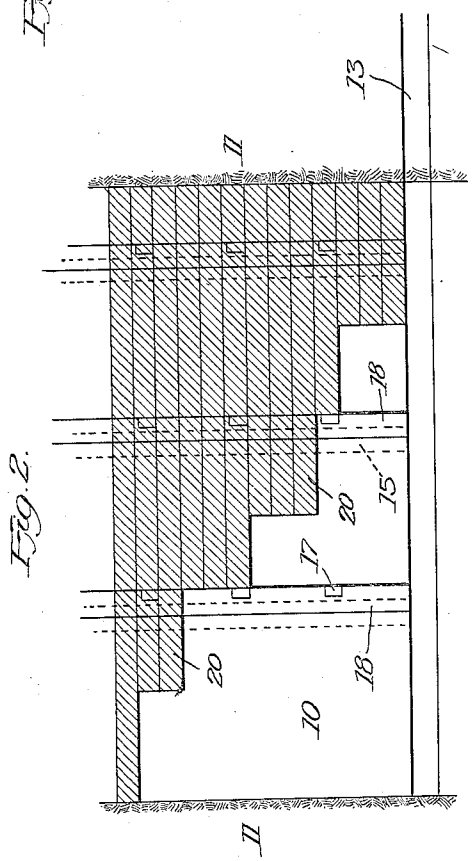


Fig. 2.

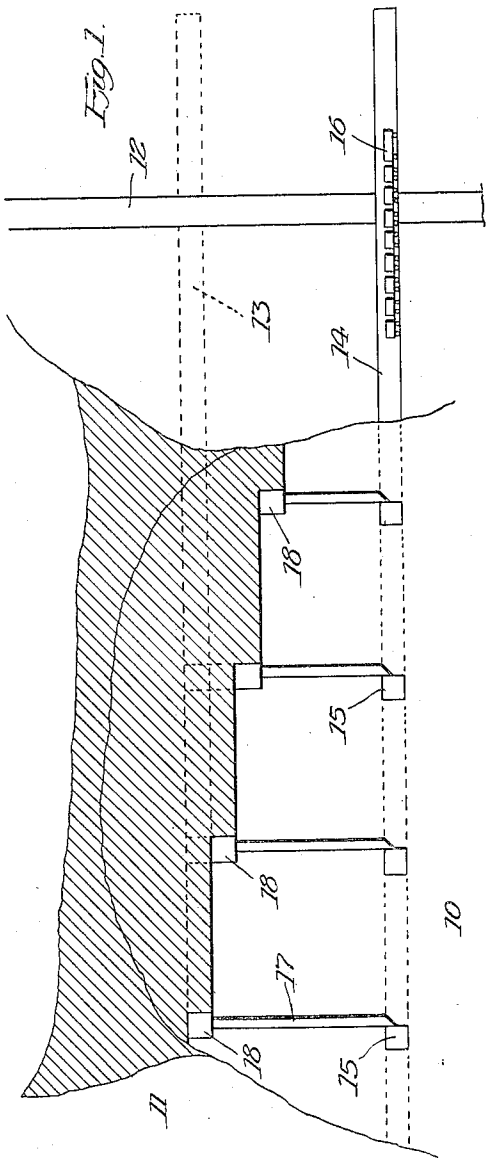


Fig. 1.

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UNITED STATES PATENT OFFICE

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MINING METHOD

Application filed April 8, 1932. Serial No. 604,078.

The invention relates to an improved method of mining ores but particularly to means for providing protection for the underground miner against the sudden and unexpected caving of the overburden, or of large bunches of rocks unmined in the operations above, or the falling of chunks of rock or ore from the sub-level above, in what are generally termed top slicing operations, or any similar operation.

Prior to the development of the present method nothing was used primarily for the protection of the miner against cavcins while extracting the ore by slicing operations, or against the falling of chunks of rock or ore from the sub-level above, particularly when the slice had not properly filled when blasted down. Boards have been employed to prevent cave material from coming in contact with the ore after a slice was blasted down and to some extent mixing therewith and contaminating same. The boarding, however, did not afford any real protection to the miner, as it was not of sufficient strength, and as a consequence the back of the slice had always to be poled and blocked up to make it reasonably secure to work under, which required considerable labor and was a hazardous operation.

The present invention contemplates the use of poles, usually four to six inches in diameter and ten to twelve feet in length, more or less, covered with wire fencing, as a covering for the bottom of slices before blasting down, resulting in a safe and secure covering for the miner to work under when slicing operations are being conducted on the sub-level beneath.

In addition to the advantage resulting by reason of the greater safety provided, there is a considerable saving in the time of the contract miner through not having to pole and block the back after a cut has been blasted, which means more time for the other operations in connection with the work, and consequently, greater production.

Also a considerable saving in labor and material is secured by the use of poles and fencing as contemplated by the present invention over the covering formerly used.

Still another advantage is that the greater strength of the poles and fencing when used as a covering for the bottom of slices prevents the filling of working places by cave material, while blasting operations with covering formerly used would frequently cause the cave material to run, covering and contaminating the broken ore, and necessitating considerable expense and delay in removing same and making the working place safe to work in.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawing and claims appended hereto.

In the drawing which illustrates an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a vertical cross-section through the ore body of a mine showing the association and arrangement of the various drifts with the vertical mining shaft;

Figure 2 is a horizontal cross section taken through the ore body of the mine shown in Figure 1 and illustrating the manner of conducting the slicing operations, and

Figure 3 is a view looking into a slice and showing the manner of covering the bottom according to the present invention.

As shown in Figure 1 the ore body 10 is surrounded by the usual rock and earth 11 and a shaft 12 in proximity to the ore body provides access thereto through communicating horizontal drifts, designated 13 and 14, respectively. The horizontal drift 14 represents the main haulage drift and extends from the shaft 12 through the ore body, being intersected at intervals by other horizontal drifts 15, generally termed cross-cuts. Suitable tracks are located in the drifts described on which the ore cars 16 travel in hauling the ore from different sections of the ore body to the shaft 12 where the same is hoisted to the surface in skips.

Extending from the drifts 15 at uniform intervals, are vertical passages 17 termed "raises", terminating at their upper end in sub-level cross-cuts or drifts 18, located near

the top of the ore body. As will be seen from Figure 2, these sub-level drifts are directly above the main level drifts 15 but are somewhat slightly offset so as to bring the raises to the side of the drifts 15. The horizontal drift 13 provides a passage from the sub-level drifts 18 to the main shaft 12, and is used for transporting timber and other material to the sub-level workings.

In mining the ore short drifts, or slices, 20 are driven into the ore body from both sides of the sub-level cross cut, each drift or slice, as they are known, extending approximately half the distance between the passages 18. In driving these slices holes are drilled in the ore, charged with an explosive and blasted, the resultant broken ore being subsequently transported to the nearest raise 17 through which it is discharged to the tramming level drift or cross-cut 15 and removed from the mine in the manner described.

After the ore has been completely extracted from a slice it becomes necessary to blast down the supporting timbers that were put in to sustain the overburden as the ore was being removed before a new slice can safely be driven adjacent to the completed one. Upon completion of mining operations on one level they are resumed on the next sub-level below, and so on until the mine becomes exhausted. Before blasting down a slice, however, it is the practice, in accordance with the invention, to provide a covering of poles and wire fencing, Figure 3, the poles 26 being either laid in overlapping position or with broken joints through the use of short and long poles at the beginning of the covering, and covered with wire fencing. The fencing is usually attached to the poles by means of staples.

Particularly important is this bottom covering which becomes the top of the slice when operations are being conducted on the sub-level beneath. The poles and fencing being placed in position before the slice is blasted down results in a supported roof or back, when the sub-level beneath is being opened up and mined, and accordingly, it is not necessary for the miner to risk the danger involved in placing back-poles and blocking which would otherwise be necessary.

Experience has shown that although various kinds of wire fencing may be used for the purpose, the preferred is galvanized wire, of diamond shape, having extreme openings of four inches, although other similar covering may be used. This design of fencing has shown considerable strength and has proven practical.

It will be seen from the above that the method of the present invention has reduced considerably the expense of making secure the back or roof, after a set of ground has been blasted, by the placing of poles and fencing as a covering for the bottom of the slice on the sub-level above before blasting down, thus making a roof, or back, that is safe and secure for the miners to work under when the ground on the sub-level beneath is being opened up and mined, eliminating the hazards involved in the placing of back-poles and blocking as would otherwise be necessary.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown, which is merely by way of illustration and not limitation, as various and other forms of the device will be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A mining method comprising the driving of a suitable drift or slice in an ore body, removing the ore therefrom, covering the bottom of the excavated drift or slice with poles and wire fencing, whereby the drift or slice on the sub-level beneath will have a supported roof or back.

2. A mining method comprising the driving of a suitable drift or slice in an ore body, removing the ore therefrom, covering the bottom of the excavated drift or slice with poles and wire fencing and then blasting out the supporting timbers, whereby the overburden from the operations above is retained on the covering, facilitating operations on the sub-level beneath, and affording a safe and secure covering for the miners to work under.

3. A mining method comprising the driving of a suitable drift or slice, in an ore body, removing the ore therefrom, covering the bottom of the excavated drift or slice with poles and wire fencing, blasting out the supporting timbers, causing the overburden to fall upon the covering, and continuing the operation throughout the same level and then the adjacent sub-level.

4. A mining method comprising the driving of a suitable drift or slice in an ore body, removing the ore therefrom, covering the bottom of the excavated drift or slice with poles and wire fencing, blasting out the supporting timbers causing the overburden to fall upon the covering and thus preventing it from covering and contaminating the broken ore.

Signed at Eveleth, Minnesota, this 31st day of March, 1932.

GEORGE H. DORMER.