

W. CLIFFORD.
MINE VENTILATION SYSTEM AND APPARATUS.

APPLICATION FILED JUNE 8, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

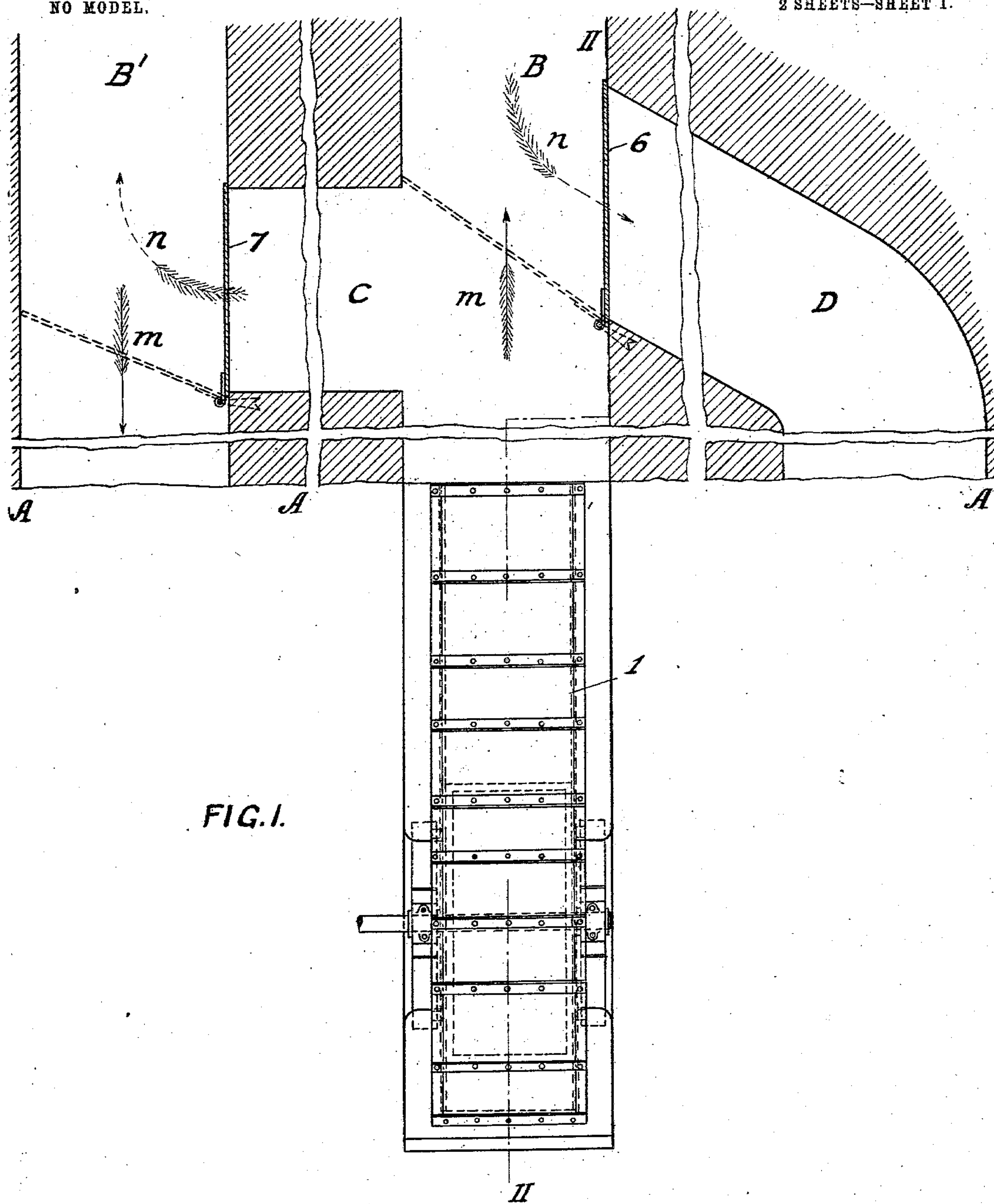


FIG. 1.

WITNESSES:
R. C. Gaidue
Jas. S. Mahony.

INVENTOR
William Clifford
by Christy and Christy
Att'ys

No. 752,955.

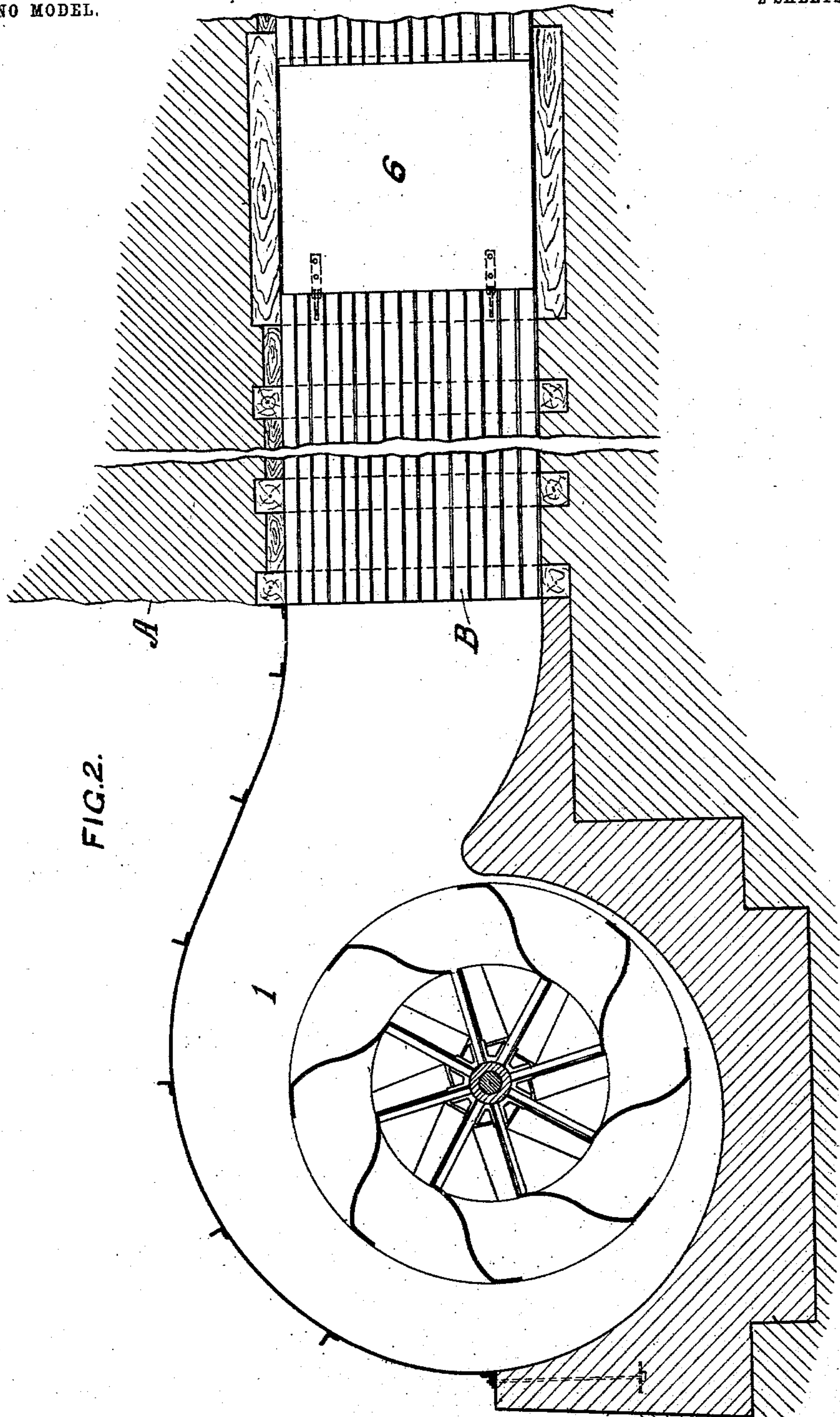
PATENTED FEB. 23, 1904.

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E. C. Gaither
Jas. J. Mahony.

INVENTOR
William Clifford
by Christy and Christy
Att'ys

UNITED STATES PATENT OFFICE.

WILLIAM CLIFFORD, OF JEANNETTE, PENNSYLVANIA.

MINE-VENTILATION SYSTEM AND APPARATUS.

SPECIFICATION forming part of Letters Patent No. 752,955, dated February 23, 1904.

Application filed June 8, 1903. Serial No. 160,597. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CLIFFORD, a citizen of the United States, residing at Jeannette, in the county of Westmoreland and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Mine-Ventilating Systems and Apparatus, of which the following is a specification.

My invention relates to the control of the supply of air commonly provided in mines of considerable extent; and its object is to accomplish speedily and easily a reversal in the direction of the current of air which is caused to pass through a mine.

In the accompanying drawings, which form a part of this specification, I have illustrated my invention applied to a coal mine of usual arrangement, and I shall describe my invention in connection therewith, pointing out its applicability to mines in general.

Figure 1 represents diagrammatically in horizontal section the entrance to a mine with my invention applied. Fig. 2 is a view in vertical section on the line II II of Fig. 1.

Parts represented in both figures bear the same reference characters in each.

In the drawings, A indicates an outcrop of coal in which the mine is cut.

B and B' are entries of the mine. It will be understood that these entries are in communication at one or more points in the mine remote from the entry. Two entries, at least, are essential to the practice of my invention. As a mine is commonly arranged one entry, B, is under normal conditions used wholly or chiefly for supplying air to the mine and is termed the "air-road" or "air-entry," while another entry (indicated by B') is employed for the working of the mine and is termed the "hauling-road" or "hauling-entry."

To provide for the practice of my invention, a drift C is carried from entry B to entry B', the location of drift C being nearer the entrance of the mine than the point where these entries open into the mine proper or are otherwise connected and preferably near the mine-entrance. Another drift or by-pass D is carried from air-entry B to the atmosphere.

A fan 1 of any preferred construction im-

pels a current of air through the mine. If the fan be acting as a blowing-fan, the current of air under normal conditions passes down air-entry B through the mine and out through hauling-entry B'. If, on the other hand, the fan be acting as an exhaust-fan, the current of air under normal conditions will flow down hauling-entry B' through the mine and be drawn out through air-entry B. The invention in no way concerns the construction of this blower or fan. Blowers for the purpose indicated are in common use.

A swinging door 6 is placed in the air-entry B. This door 6 when in one position closes communication from air-entry B to by-pass D, leaving the entry unobstructed; but when in another position it obstructs the entry itself and at the same time opens the portion of the entry to the rearward from the obstruction to the open air through the drift or by-pass D. A swinging door 7 is placed in the hauling-entry B'. This door 7 when in one position leaves the entry unobstructed and closes drift C, which extends from the entry to the air-entry B; but when in another position it obstructs entry B' itself, at the same time leaving the portion of the hauling-entry rearward of the obstruction in free communication with the adjacent air-entry B through the drift C. The doors 6 and 7 may be operated in any desired manner or by any desired mechanism.

It will be understood from an inspection of the drawings that when doors 6 and 7 are in the positions indicated in full lines in Fig. 1 and when the fan is blowing the current of air will pass down air-entry B through the mine and out hauling-entry B', the course being indicated by the full-line arrows *m m*; but if the fan be exhausting the course of the current will be opposite to that indicated by arrows *m m*. When doors 6 and 7 are shifted and they stand as indicated in Fig. 1 in dotted lines, then if the fan be blowing the current of air entering air-entry B will be deflected through drift C, down hauling-entry B', through the mine and out by air-entry B and the drift or by-pass D, the course in this case being indicated by the dotted arrows *n n*, and

if the fan be exhausting the course of the current will be opposite to that indicated by the arrows *n n*.

The advantages to be derived from this system and apparatus are obvious. Notable among them is the advantage which may be obtained in the case of fire. Should fire occur in a mine provided with my invention and should the miners happen to be working at a point in the line of flow of air beyond the point at which the fire occurred, it would be necessary only to swing doors 6 and 7 to their alternate positions to produce a reversal of current of air, and thus afford relief for the miners. Again, in winter time when the air-entry is frozen a reversal of the current through the mine will bring the warm air from the mine through the air-entry B, causing the frozen ground to thaw. Such an equalizing of temperature is in many cases desirable. In many cases it will be found desirable to use one entry or another as an air-entry, changing from one to another, as may be desired. It is obvious that the same reversal of circulation may be had whether the mine has two entries or more than two. A duplication of hauling-entry B', drift C, and door 7 will not in any way change the application of the invention.

I have described the invention as applicable to a coal-mine in which entries are commonly sunk in a horizontal or an approximately horizontal direction through a seam of coal. It is apparent that my invention is equally applicable to a mine of any kind, cut in any formation and at any angle, to a mine having inclined or vertical shafts, as well as to a mine having horizontal entries.

In the following claims the word "entry" is used to designate the passage-way of a mine,

whether that passage-way be horizontal, vertical, or inclined.

I claim herein as my invention—

1. In a mine having a plurality of entries, a drift or drifts connecting the entries, and a drift connecting one of the entries with the open air, the combination of a fan adapted to impel a current of air through the mine, and movable doors placed at the points of communication between the entries and drifts, adapted when in one position to allow the current to circulate through the mine in one direction and when in another position to allow the current to circulate in another direction and out through the drift to the open air, substantially as described.

2. In a mine having two entries, a drift connecting the entries and a drift or by-pass from one entry to the open air, the combination of a fan adapted to impel a current of air through the mine, and two swinging doors, one of said doors within its range of movement obstructing one entry and one drift, and the other door within its range of movement obstructing the other entry and the other drift, substantially as described.

3. In a mine having a plurality of entries, a drift or by-pass connecting one of the said entries with the open air, in combination with a fan, means for connecting the fan to either of the said entries, and a door controlling the flow of air through the drift or by-pass, substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM CLIFFORD.

Witnesses:

F. E. GAITHER,
BAYARD H. CHRISTY.