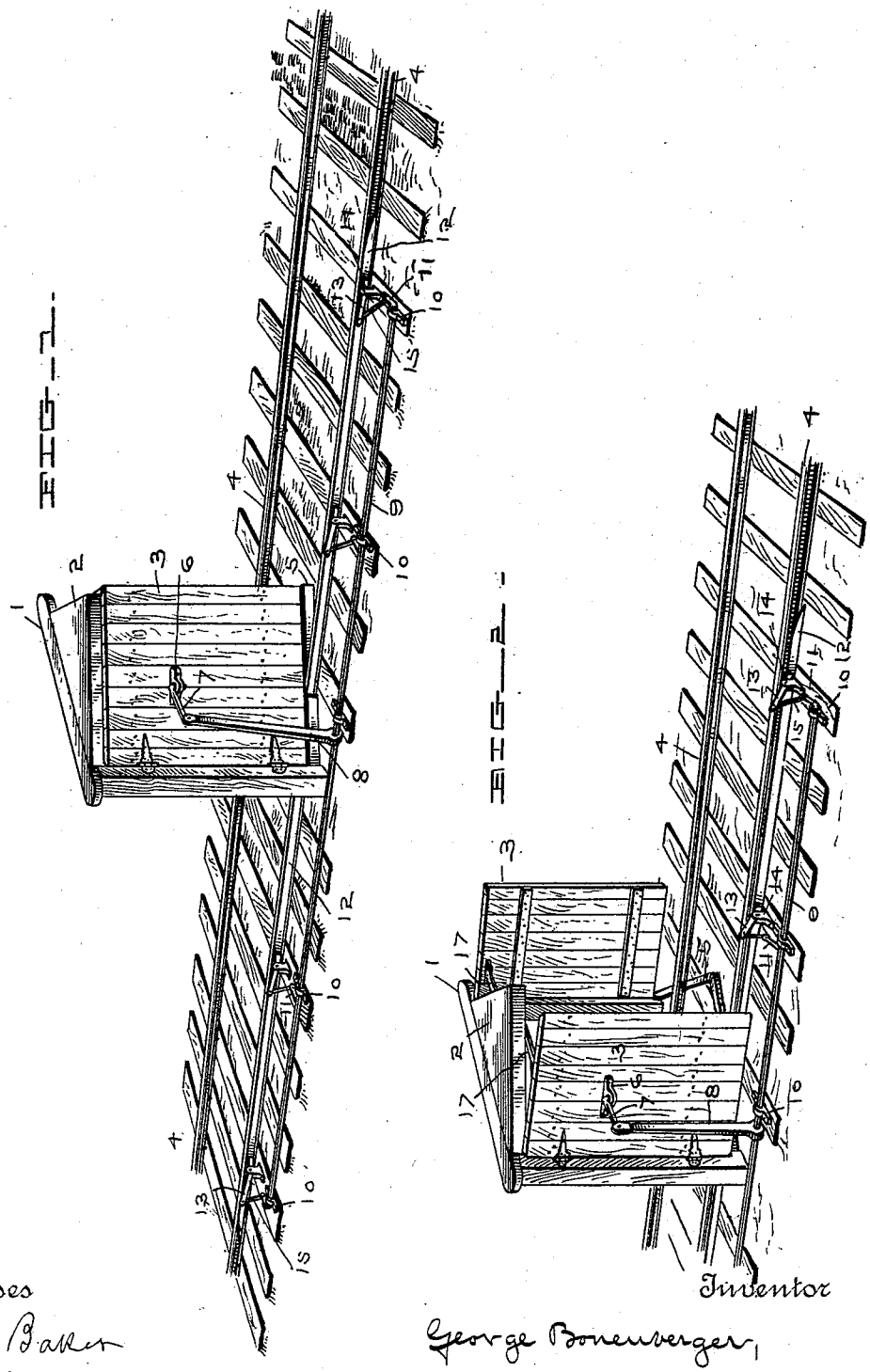
(No Model.) 2 Sheets—Sheet 1.

G. BONENBERGER.

MINE TRAP DOOR.

No. 536,561. Patented Mar. 26, 1895.



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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

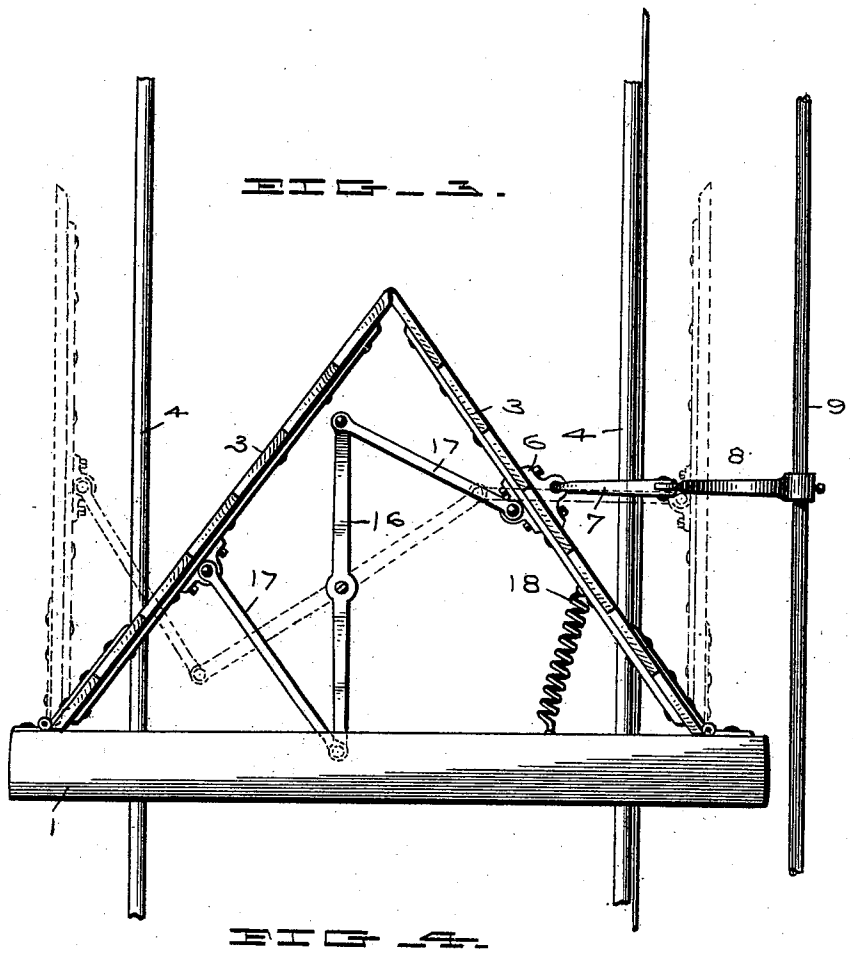
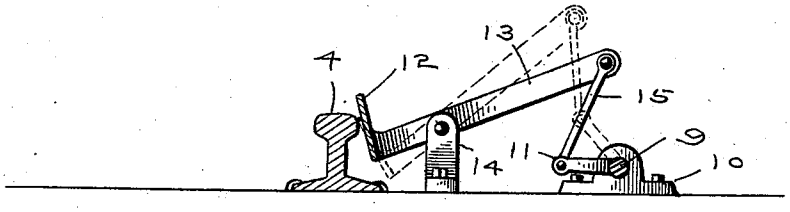


FIG. 4.



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UNITED STATES PATENT OFFICE.

GEORGE BONENBERGER, OF EVANSVILLE, ASSIGNOR TO JAY H. KEYES, OF TERRE HAUTE, INDIANA.

MINE TRAP-DOOR.

SPECIFICATION forming part of Letters Patent No. 536,561, dated March 26, 1895.

Application filed October 15, 1894. Serial No. 525,881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE BONENBERGER, a citizen of the United States, residing at Evansville, in the county of Vanderburg and State of Indiana, have invented certain new and useful Improvements in Mine Trap-Doors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to new and useful improvements in mine trap doors and to one of that class which is adapted to cut off or control air-currents in the different entries or rooms of a mine and the object is to provide such a door that is automatically opened or closed by a car passing through the entry on a track in either direction, the car causing the door to open just before it reaches such door, and causing it to close immediately after it has passed through the same.

A further object is to provide a door of the kind mentioned whose operating mechanism is entirely above ground, one whose operating mechanism does not require to be set at a great distance from the door, and one which does not require that the walls of the mine be cut out for any part of the operating mechanism or the door to work in.

In the drawings Figure 1 is a perspective view of my improved trap door and its operating mechanism, the door being closed. Fig. 2 is a similar view of the door and its operating mechanism on one side, the door being opened. Fig. 3 is a plan view of the door showing it closed in full lines and opened in dotted lines, the position of the link connection between the two doors also being shown and the top of the door frame being removed. Fig. 4 is a cross-sectional view through one of the rails, the operating bar and shaft, the connections between such bar and shaft being shown in elevation.

In detail 1 represents a frame work supported across a track in the entry of a mine, 2 being an angular extension on the top cross bar of such frame work, and 3 the double doors which are hinged to the uprights of the frame 1, the tops of the doors being adapted when closed to bear against the angular extension of the frame 1. The doors close above the tracks 4, and 5 are suitable pieces which fill the space between the bottom of the doors and the ground, between and outside of the tracks 4.

6 is a bracket secured to one of the doors and 7 is a link which is pivotally connected to such bracket, the outer end of the link being in turn pivoted to an operating lever 8. This operating lever is formed integral with or rigidly connected to a shaft 9 which lies alongside of and parallel with the rails 4, the shaft having bearings in suitable brackets set at any desired distance apart and preferably secured to the cross ties of the track. On the shaft 9 at any desired distance apart but preferably about five or seven feet are formed or secured cranks 11. The shaft 9 extends on each side of the door from fifteen to twenty feet, and 12 is an operating bar which lies alongside of and outside of one of the rails 4, this bar being a little longer than the shaft 9, and having its upper edge at each end tapered or inclined. The bar 12 has connected to it at suitable points arms 13 which are pivoted at one side of their center in brackets 14, these brackets being secured to the cross ties in any desired manner.

15 are links which are pivoted to the outer ends of the arms 13 and also to the cranks 11 on the shaft 9 so that through the movement of the operating bar 12 the shaft 9 will be turned.

To the under side of the angular top 2 of the door frame is centrally pivoted a lever 16 to each of whose ends is pivoted a link 17, these links being in turn pivoted to brackets secured to the inside of the doors, so that on the opening or the closing of the door to which the operating mechanism is connected, the other door will be simultaneously operated.

18 is a coil spring which is connected to one of the doors and to the door frames 1, this spring serving to give the door its initial movement in closing.

In practice the mine trap door described is set in the entry so that the doors will open and close on the side of the door frame from which

the air current comes, that is, so that the air current will always close the doors the spring 18 only serving to start them.

In operation the door being closed and the several parts of the operating mechanism being in the position shown in Fig. 1, upon a car approaching the door from either side the wheels on one side of the car will move onto and depress the operating bar 12 as shown in dotted lines in Fig. 4. The depression of the bar 12 will cause the outer ends of its arms 13 to be lifted up, and through the link and crank connection of the arms 13 with the shaft 9 such shaft will be turned, moving with it the operating lever 8 whose upper end is connected to the door 3 by the link 7, thus opening that door, and through the lever and links 16 and 17 connecting the two doors together, both are opened at the same time. The doors remain open as long as the car or the train of cars bear on the operating bar 12, and as soon as they have passed through the door and off of such bar, the coil spring 18 will start the doors to close, a complete closing being effected by the air-current, or if desired, the spring 18 may be made strong enough to do this but this is not preferable.

It will be apparent from the foregoing that the door herein described is very simple in construction and operation. The operating mechanism takes up but little room on each side of the door as the outer ends of the operating bar 12 only require to be at a distance of from ten to twenty feet from the door on each side, and it can therefore be placed in very short entries. Another great advantage of the door is that it not closing directly across the track, but each half on an angle the movement required of the operating lever 8 is very little, and therefore no recess or anything of the kind is necessary in the side wall of the entry. All the parts of the operating mechanism being above ground, they are not affected by any water which may be in the mine, and being entirely outside of the rails are not likely to be broken. The door can be readily opened by hand from either side and will always close afterward just the same as if a car had passed through.

I have described and shown in the drawings the preferred form and construction of my mine trap door, but it is obvious that many changes and modifications may be made therein without departing from the spirit of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

In a mine trap-door, double doors closing across a track at an angle to each other, such doors suitably connected together so as to operate simultaneously, a lever connected with one of such doors and carried on a shaft lying parallel with and outside of the rails, a moving bar lying parallel with and normally above one of the rails and in line with passing car wheels, arms formed on such bar and pivoted in suitable brackets, links connecting such arms with cranks formed on the operating shaft whereby such doors will be opened on the depression of the bar, and a means of closing such doors after they are opened.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE BONENBERGER.

Witnesses:
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