

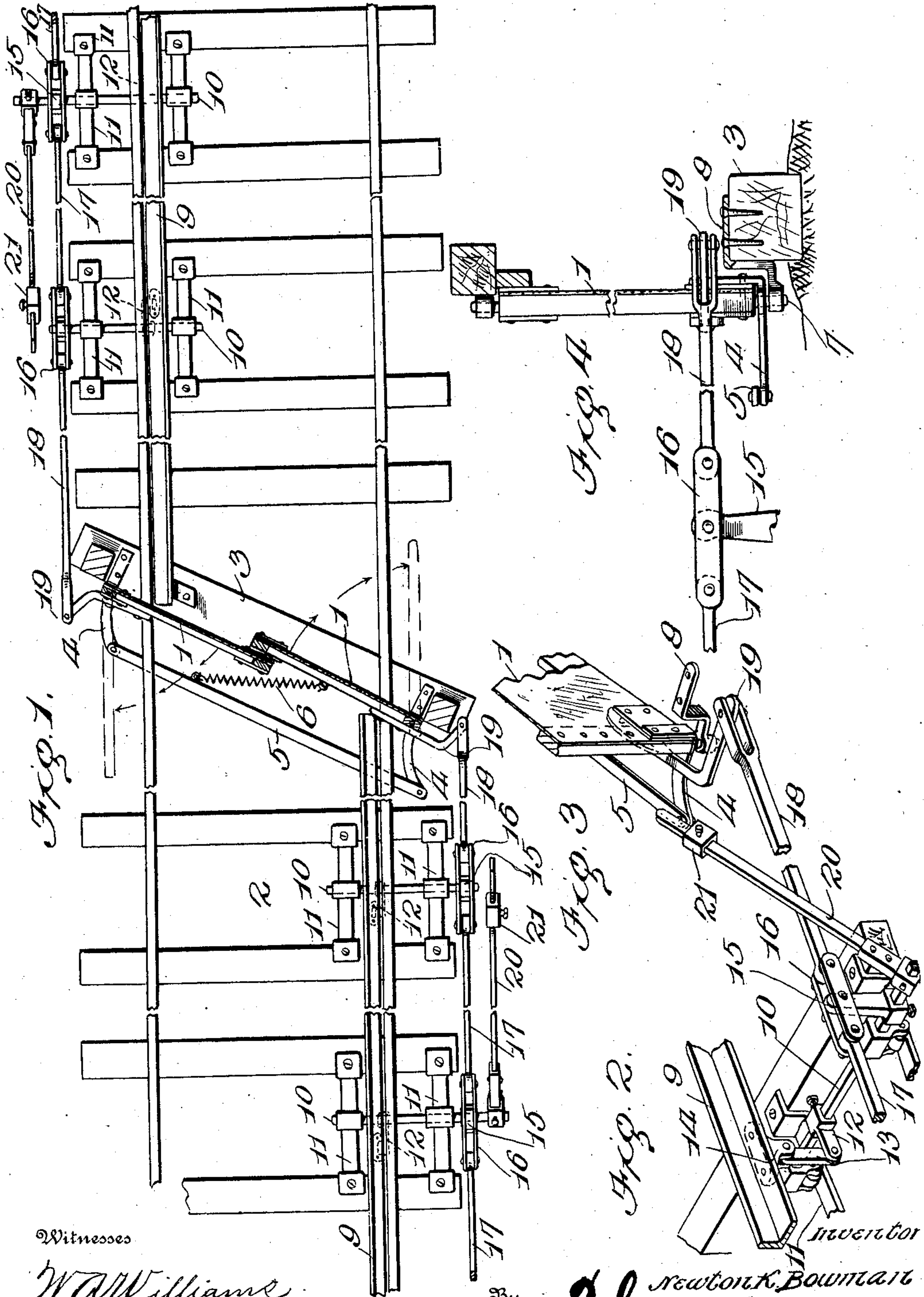
N. K. BOWMAN.

MINE GATE.

APPLICATION FILED MAY 23, 1908. RENEWED OCT. 12, 1910.

992,752.

Patented May 23, 1911.



Witnesses

W. A. Williams

W. J. Woodson

Newton K. Bowman  
Charles H. Kacy, Attorneys



# UNITED STATES PATENT OFFICE.

NEWTON K. BOWMAN, OF NORTH LAWRENCE, OHIO.

## MINE-GATE.

992,752.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed May 23, 1908, Serial No. 434,574. Renewed October 12, 1910. Serial No. 586,792.

*To all whom it may concern:*

Be it known that I, NEWTON K. BOWMAN, citizen of the United States, residing at North Lawrence, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Mine-Gates, of which the following is a specification.

It is the purpose of this invention to provide a mine door involving an exceedingly simple and compact construction, easy, positive and certain in operation, effective and durable in service and readily accessible in all parts to admit of necessary repairs being quickly effected.

The invention contemplates a door having a diagonal arrangement across the track and composed of oppositely opening leaves, connecting means between the leaves to insure synchronous movement, depressible rails along the track to be operated by the car, and direct connecting means between the leaves of the door and the parts actuated by the movements of the said depressible rails.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment is shown in the accompanying drawings, in which:

Figure 1 is a top plan view of a mine door embodying the invention, the frame and leaves being in horizontal section. Fig. 2 is a detail perspective view of one of the rock shafts, showing the supports therefor and the connections between the rail and the rod leading to the leaf of the door. Fig. 3 is a detail perspective view of a lower corner portion of a leaf of the door, showing the mountings and connections. Fig. 4 is a vertical section of a leaf, showing the mountings and coöperating connections.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The door comprises like leaves 1 which are mounted to swing horizontally in opposite directions, said door having a diagonal arrangement with reference to the track 2 and

mounted in a frame 3 which may be of usual construction, comprising uprights at the sides of the track and upper and lower connecting pieces. The leaves 1 may be of any light, durable and substantial construction and their inner ends overlap. An arm 4 projects from each leaf upon the same side of the door, and a rod 5 connects said arms to cause both leaves to swing simultaneously in opposite directions. A spring 6 is connected at one end to the rod 5 and at its opposite end to the door frame or other fixed part and normally exerts a pressure to hold the leaves closed. The leaves may be hinged or pivoted in any manner so as to swing horizontally. As indicated, journals project from opposite ends of the hinge post of each leaf and are mounted in bearings or hinge members attached to the upper and lower horizontal connecting member of the door frame. The lower journal 7 is stepped in an extension of a bracket 8 secured to the lower horizontal member of the door frame. The arm 4 has one end bent and securely fastened to a side of a leaf and is apertured to receive the journal 7.

A depressible rail 9 is located at each side of the door and each is mounted and connected with a leaf of the door in a like manner, hence a detail description of one set of mountings and connections will suffice for a clear understanding of both. Each depressible rail and adjunctive parts are located upon the same side of the track with the leaf of the door for which provided and with which they coöperate. The depressible rail 9 is located adjacent a rail of the track and preferably upon the inner side thereof. A series of rock shafts 10 are mounted in bearings of irons 11 attached to adjacent ties. An arm 12 is secured to the inner end portion of each rock shaft and a link 13 connects said arm with a clip 14 secured to the depressible rail. The arm 12 normally occupies an approximately horizontal position, hence pressure upon the rail 9 depresses the same and turns the rock shaft and this movement is utilized to open the door. An arm 15 is secured to the outer end of each rock shaft and projects upwardly therefrom. A link 16 is pivotally connected between its ends to the upper end of each of the arms 15. A rod 17 connects the several links to cause the series of rock shafts to move in unison. A rod 18 connects the link 16 nearest the door with an arm 19 extended from



the leaf of the door. A weighted arm 20 is connected to the outer end of one of the rock shafts and the weight 21 thereon is adjustable. The arm 20 normally inclines 5 to the vertical. The weighted arm 20 supplements the action of the spring 6 in closing the leaves of the door and holding the same shut. The arm 19 is of elbow form and one member is firmly connected to the 10 leaf, whereas the other member projects from the leaf in such a direction as to admit of the leaf being swung open when the arm is pulled upon.

As the leaves of the door are swung open, 15 the tension of the spring 6 is increased and at the same time the weighted arms 20 are swung toward the perpendicular, hence as the tension of the spring 6 increases, the effective force of the weighted arms 20 proportionately decreases, hence the force pro- 20 vided for closing the door remains about uniform at all stages of movement of the leaves, thus the advantage of providing the spring 6 and weighted arms 20 and arranging them in the manner set forth, is appar- 25 ent. As a car approaches the door from either direction and when the rail 9 upon the side of the door corresponding with the position of the car is depressed, the series 30 of rock shafts connected to said depressible rail and to one another, move in such a manner as to pull upon the rod 18 and effect an opening of the leaf connected therewith. This movement is transmitted to the oppo- 35 site leaf by means of the rod 5 and the arms 4 and to the depressible rail and rock shafts upon the opposite side of the door. As the car passes through the door, it serves to hold the rail 9 upon the departing side de- 40 pressed, the door remaining open until the car has completely cleared the depressible rail upon the departing side, after which the combined action of the spring 6 and weighted arms 20 serves to close the door.

45 It will be understood that the parts have a simple and compact arrangement and are positive and certain in action, thereby resulting in the provision of a door which is reliable and effective for the purpose de- 50 signed, the construction being such that the

working parts are at all times under observation and may be quickly reached for repairs or any desired purpose.

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

1. In combination, a mine door, actuating means for opening said door, a spring for closing the door, and a weighted arm exerting a continuous force upon said door and normally inclined to the perpendicular and 60 adapted to be swung to the vertical as the door is opened, the combined action of the weighted arm and spring serving to close the door and the force of one proportionately decreasing as the other increases and 65 vice versa.

2. In a mine door comprising oppositely swinging leaves, a rod connecting said leaves to cause them to move in unison, a spring normally exerting a force upon said rod to 70 hold the door closed, actuating means upon opposite sides of the door, each having connection with a leaf thereof, and a weighted arm forming a part of each actuating means and exerting a continuous force upon said 75 door and normally inclined to the perpendicular and adapted to supplement the action of the aforesaid spring in holding the door closed, the effective force of the weighted arms proportionately increasing or de- 80 creasing as the tension of said spring decreases or increases with the result of maintaining a practically uniform door closing pressure.

3. In combination, a mine door, an arm 85 projected therefrom, a depressible rail, a series of rock shafts whose axes are arranged about at a right angle to the length of the track and provided with arms, link connections between a set of arms and the 90 depressible rail, links mounted upon the other set of arms, and rods connecting the links to one another and to the arm of the door.

In testimony whereof I affix my signature 95 in presence of two witnesses.

NEWTON K. BOWMAN. [L. S.]

Witnesses:

V. B. HILLYARD,  
W. N. WOODSON.