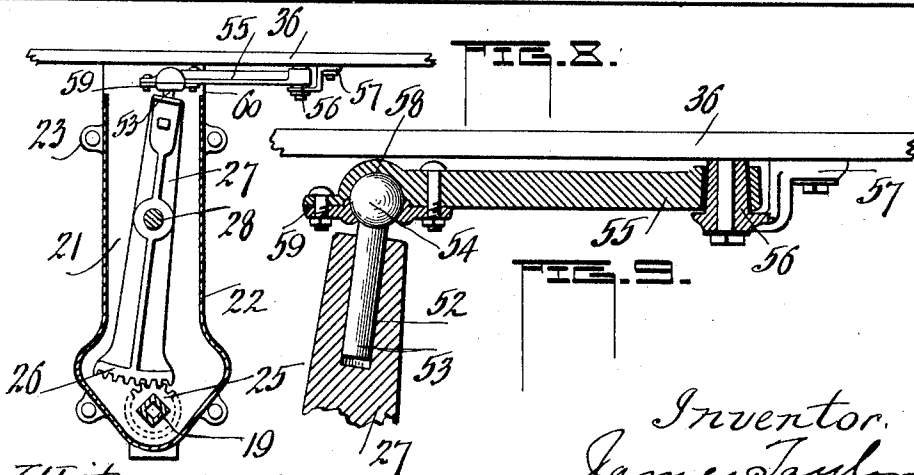
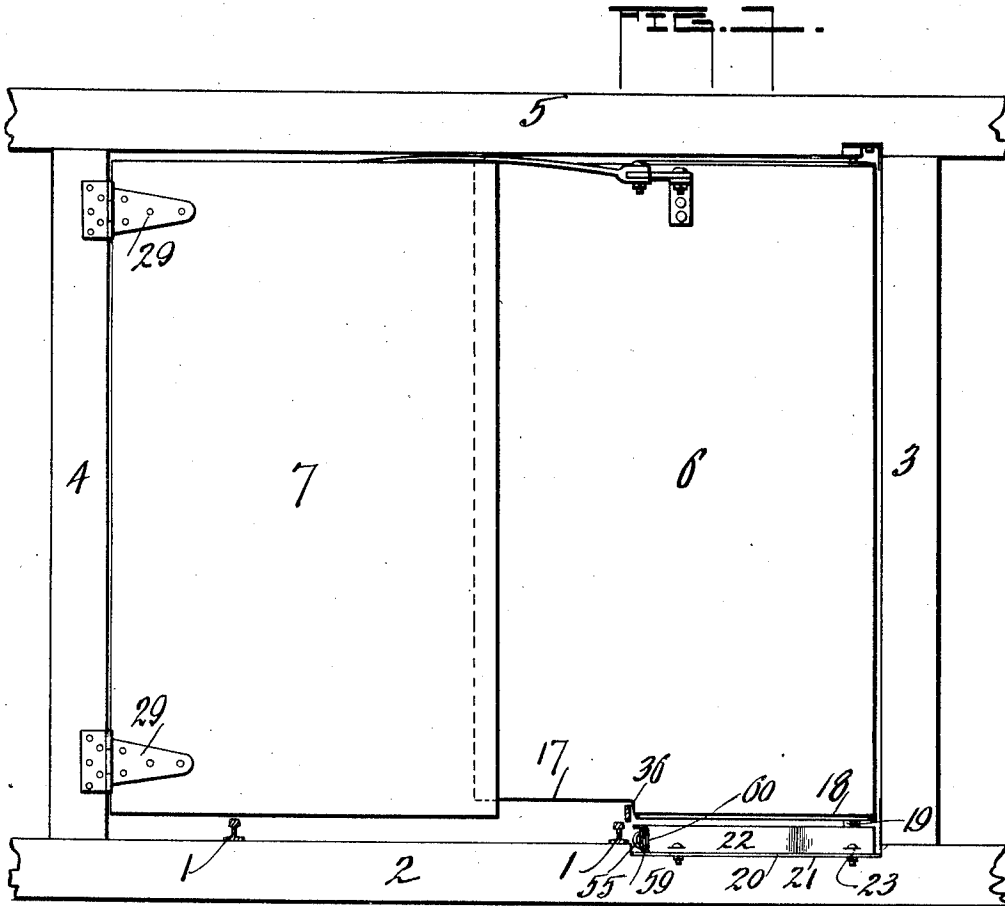


J. TAYLOR.
AUTOMATIC MINE DOOR.
APPLICATION FILED MAY 12, 1906.

996,949.

Patented July 4, 1911.

3 SHEETS—SHEET 1.



Witnesses:
Gordon Anderson
Geo. J. Doehner

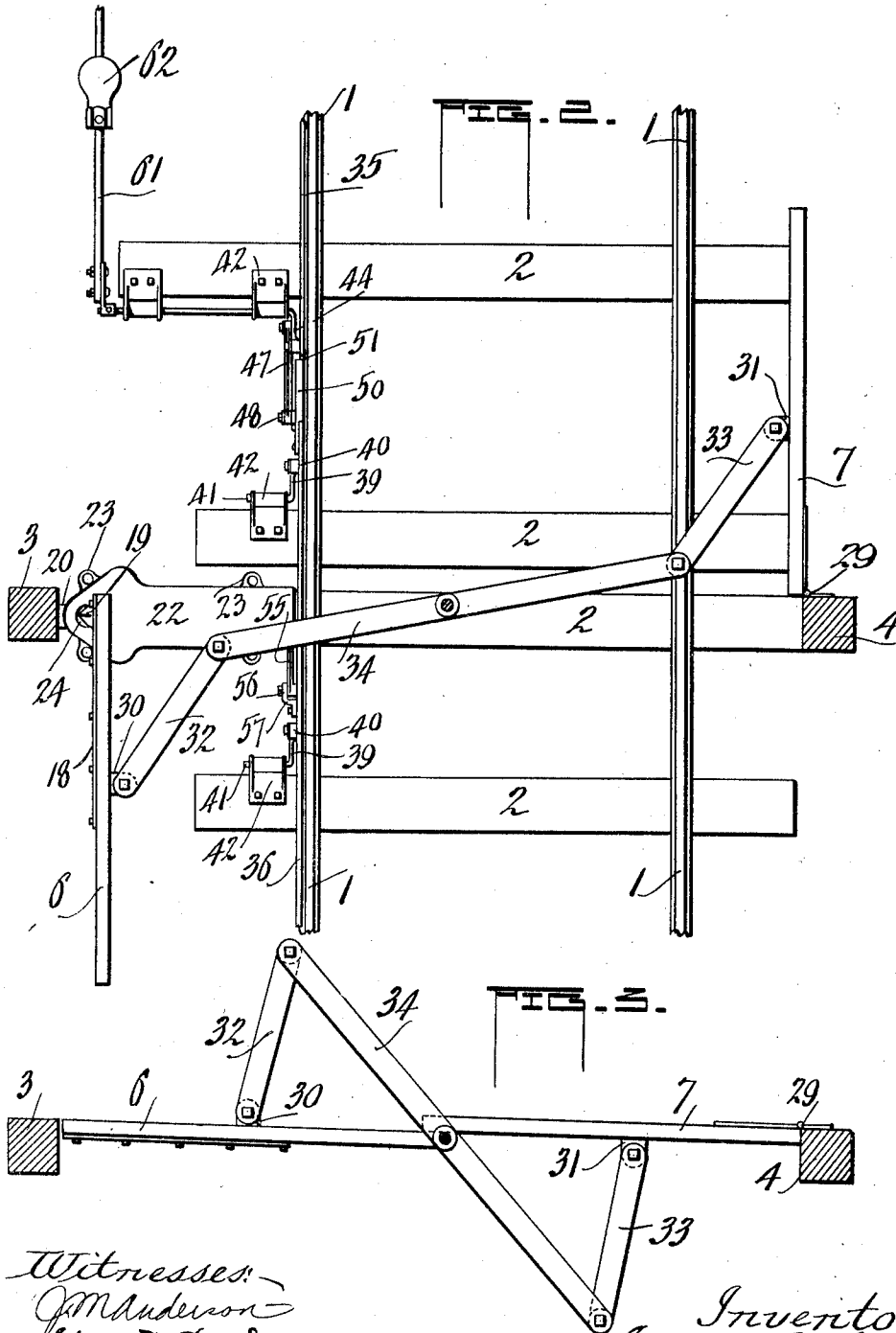
Inventor:
James Taylor
Chas. H. Porter
By _____, Atty.

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3 SHEETS—SHEET 2.



Witnesses:
J. M. Anderson
Geo. J. Gochen

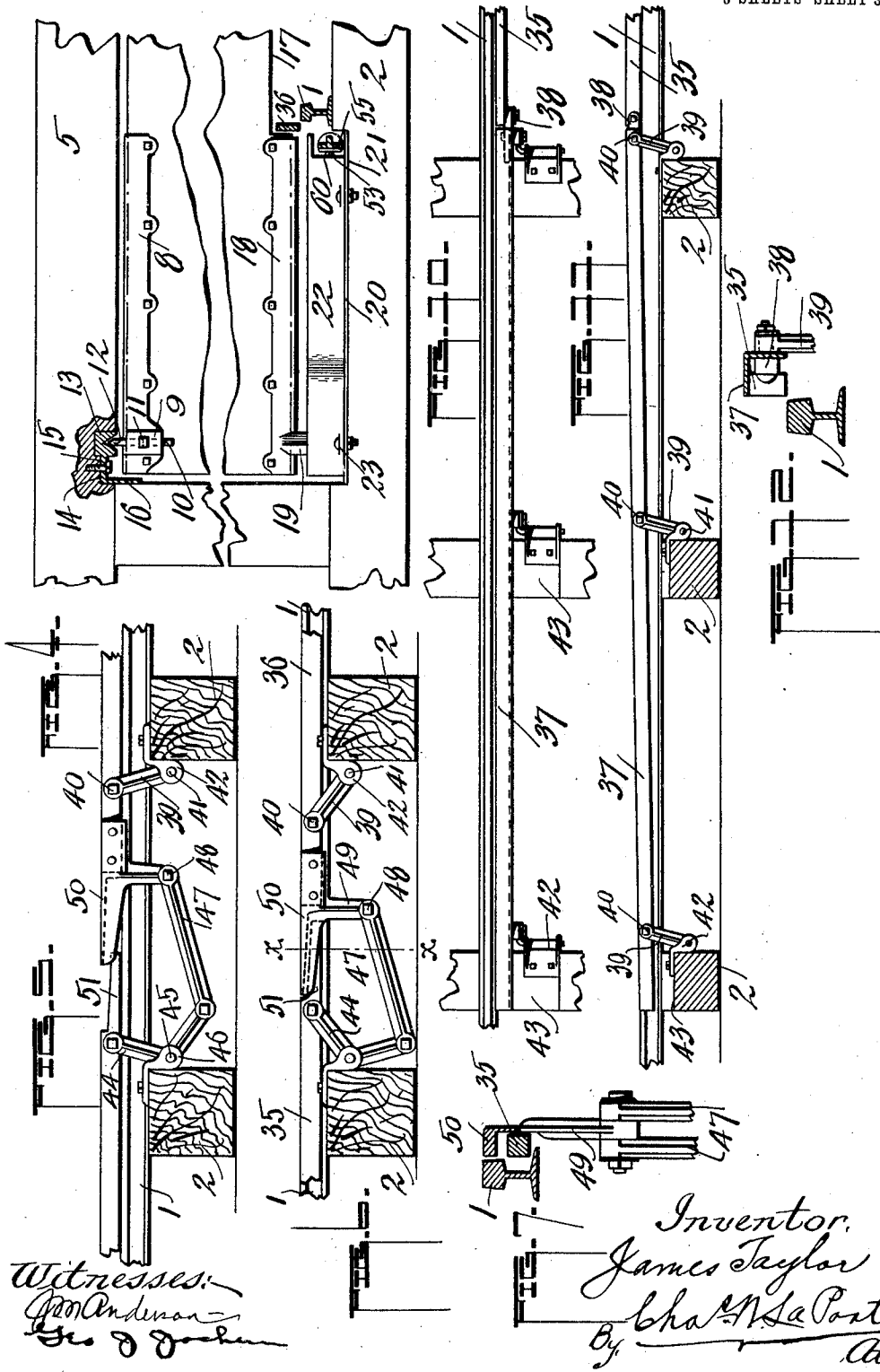
Inventor:
James Taylor
By: Chas. M. LaPorte Att'y.

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3 SHEETS—SHEET 3.



Witnesses:
Geo. Anderson
Geo. D. Johnson

Inventor,
James Taylor
By Chauncey La Porte
Att'y.

UNITED STATES PATENT OFFICE.

JAMES TAYLOR, OF PEORIA, ILLINOIS.

AUTOMATIC MINE-DOOR.

996,949.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed May 12, 1906. Serial No. 316,474.

To all whom it may concern:

Be it known that I, JAMES TAYLOR, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Automatic Mine-Doors; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to certain new and useful improvements in mine doors which are adapted to cut off or control air currents in the entries of mines, and has particular reference to the manner of hanging the doors and to the devices for opening and closing same.

One of the objects of the present invention is to provide a mine-door composed of two oppositely moving sections having overlapping portions when the sections are in a normally closed relation; connections between the sections to adapt them to be simultaneously opened and closed; the operating devices consisting of a pair of secondary rails adapted to be simultaneously depressed and moved longitudinally toward each other and connections between said rails and one of said doors, whereby as the said rails are depressed the doors are opened, and as they are raised the doors are correspondingly closed.

While the essential and characteristic features of the invention are necessarily susceptible to various changes in the form, proportions, and minor details of construction, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevation of my improved mine-door, and the means for supporting the same together with certain of the parts for operating same; Fig. 2 is a plan view of a portion of a mine-track, showing the opposite sections of the door in open position and the mechanism for operating the said door; Fig. 3 is a plan view of the two sections composing the door as closed and shows the position of the connecting parts between the door sections; Fig. 4 is an enlarged elevation of the upper and lower portions of the door sections connected with the mechanism adapted to be

actuated by depressing the rails, to illustrate the hinging of the door section; Fig. 5 is an enlarged detail elevation of the matching ends of secondary rails, showing the operative connections between the same whereby when one of said rails is operated motion will be transmitted to the other; the view illustrates the rails in elevation; Fig. 6 is a detail view, enlarged, of the parts which are shown in Fig. 5, but illustrating the secondary rails depressed and in a closed position; Fig. 7 is a cross section as the same would appear on the line X—X of Fig. 6; Fig. 8 is a sectional plan view of parts of the mechanism, particularly those parts connected with one of the door sections, and shows the mode of connecting such parts with one of the secondary rails; Fig. 9 is an enlarged sectional detail of parts seen in Fig. 8; Fig. 10 is an plan view of the forward end of one of the secondary rails, the same being in an elevated position; Fig. 11 is a side elevation of the parts seen in Fig. 10, and Fig. 12 is a detail in cross section of parts of one of the secondary rails.

Like numerals of reference indicate corresponding parts throughout the figures.

The rails 1 are attached or connected to the ordinary ties 2. At a suitable point on the track and at the side of the rails 1 is erected a frame work consisting of the uprights or supports 3 and 4 connected at their upper ends by a cross piece 5. This arrangement provides a substantial support or frame work for the mine door. The door in this instance comprises the two sections 6 and 7 which are so hung that they are adapted to swing in opposite directions when opening and closing. When closed the doors overlap each other, as will be seen in Figs. 1 and 3, providing a central closure, where otherwise there might be a gap, and such construction will insure the sections of door from passing their normal closed position and straining the operative parts connected therewith. By overlapping the doors one acts against the other and the same has an advantage over a single door in that the pressure of the air acts oppositely upon the two sections of the door and there is no possibility of the doors being forced open by the action of the air thereon.

The door section 6 is hung in the following manner: To the upper end thereof and

to one side is secured a plate or casting 8 which overlaps the upper edge of the door as seen in Fig. 4, and such plate is provided with a bearing 9, in which is inserted a spindle 10 and suitably secured in proper position by means of the bolt 11. The upper end of the spindle 10 is preferably tapered as at 12 which corresponds to a tapered seat or depression in a bearing 13 forming a part of a plate 14 seated and secured in a recess 15 in the cross piece 5, and having a depending plate 16 secured to the inner face of upright 3, as shown.

The lower inner edge of the section 6 of the door is cut away as at 17 to adapt the same to swing across and above one of the rails 1 and a secondary depressible rail to be described. To the lower end of the door section 6 and to the same side to which plate 8 is secured, is secured a plate 18 which overlaps the lower edge for a portion of its length as seen in Fig. 4, and depending from the plate 18 at a point near the outer edge of the section 6 and in a vertical line directly beneath the spindle 10 at the upper end of the door, is a squared shank 19, the lower end of which, although not shown, is rounded to provide for a bearing in a plate 20 secured in a recess 21 provided in the tie 2 to which is secured the lower ends of uprights 3 and 4. It is preferable to taper the lower rounded end of the shank 19, in a manner similar to the spindle 10 and seat the same in a corresponding bearing.

The construction just referred to has not been shown in detail, owing to the fact that it would be in all respects similar to that shown at the top of the door section. It is however, understood that such construction may be modified to suit existing conditions, so it is not thought necessary to place any limitation on the exact construction.

The plate 20 forms the base plate of a housing consisting of the casing 22, shaped somewhat as seen in Figs. 2 and 8 and having the top and sides as shown. This casing is bolted to the base 21 through corresponding ears 23 on the base and casing, and said casing is provided with an opening 24 to permit the shank 19 to be passed there-through and on the lower end of the shank is secured a small spur-pinion 25 which is in mesh with a sector-gear 26 forming a part of or attached to a horizontally arranged lever 27 fulcrumed at 28 to the base plate 21. The lever 27 and pinion are inclosed in the casing 22 when the parts are all assembled and in working position.

The door 7 while it may be hung on hinges similar to that provided at the upper end of the door 6, has been shown hung on T hinges indicated as 29. When the pinion 25 is actuated through the lever 27, to open the door section 6, the door section 7 is si-

multaneously swung open, but in an opposite direction through means which will now be described.

To the upper outside face of the door section 6 and to the upper inside face of the door section 7 are secured brackets 30 and 31. Pivottally connected with the bracket 30 is a link 32 and pivottally connected with bracket 31 is a link 33 similar to lever 32.

34 is a reach bar or lever fulcrumed to the lower face of the cross-brace or beam 5 and has its opposite ends pivottally connected to the outer ends of the links 32 and 33. There is a small space over the upper ends of the door sections 6 and 7 to permit the carrying of the reach bar or lever 34 as seen in Fig. 1, which, when the doors are closed appears as seen in Fig. 3 and when the doors are opened appears as in Fig. 2.

Extending longitudinally alongside of one of the mine-track rails 1 and adjacent to the same, preferably that rail which passes beneath the door section 6, is shown a pair of secondary rails 35 and 36, which approach each other at a point on the track somewhat in advance of the doors 6 and 7, as shown in Fig. 2, and have their inner ends spaced a short distance apart. The sections of the secondary rails are of considerable length, but may be of any length desirable for the purpose intended. The extreme outer ends are not shown in Fig. 2, but in Figs. 10 and 11, the construction thereof may be plainly seen. The main body of said rails is preferably a rectangular bar while the outer ends are preferably made of angle-iron and indicated as 37. In their normal position the main bodies of the secondary rails 35 and 36 are elevated or raised so that their lower edges are approximately on a line with the upper face of the rails 1, while the angle-iron sections 37 are inclined from a point where they connect with the rail portions 35 and 36, to a point where their upper outer ends are approximately flush with the upper face of the rails 1, see Fig. 11. To unite the meeting ends of the rectangular and angle-iron portions of the secondary rails, I provide arms 38 pivottally connected to the outer ends of the rail portions 35 and 36 and which extend a short distance into the angle-iron portions 37 and are suitably secured thereto. The secondary rails are preferably supported through the connection therewith of the links or crank-arms 39 which are pivottally attached to the same at 40. The lower ends of the links or crank-arms 39 have laterally projecting studs 41 which have bearing or are journaled in the boxings 42 supported in any suitable manner, but preferably by the ties 2. Where the links or crank-arms 39 are attached to the inner ends of the angle-iron sections 37, it is best to connect the same with the arms 38 which extend into the

same, see Figs. 10 and 11. The ties 2, to which the first two boxings 42 are attached, being those boxings which support the crank-arms 39 of the outer ends of the angle-iron sections 37 of the secondary rails, are provided with cut-out portions or recesses 43 in which the said boxings are seated, to allow the said angle-iron sections of the secondary rails when engaged by car wheels to be depressed sufficiently to bring the upper faces of the outer and inner sections of the secondary rails down even with the upper faces of the rails 1. It is to be noted that the manner of supporting the secondary rails is such that when the sections 35 and 36 are depressed they also move longitudinally and toward, each other; their inner matching ends, when in a raised or normal position being separated, and when depressed have their inner ends brought adjacent to each other, see Figs. 5 and 6.

Pivotally connected with the rail section 35 at or near its inner end is a crank-arm or lever 44 which is fulcrumed at 45 to a boxing or support 46 similar to the boxings 42 and the same is attached to one of the cross-ties 2. To the lower end of said crank-arm 44 are pivotally connected the lower ends of a pair of reach-bars 47 which have their opposite ends pivotally connected at 48 to the lower end of a bracket 49. This bracket is T shaped, and has one portion securely fastened to the inner end of the secondary rail sections 36, while the opposite and forward portion of the said bracket is in the form of an angle-iron which, for convenience, I have here indicated as 50, the lower inner face of the upper portion of which is beveled as shown by the dotted lines in Figs. 5 and 6. The inner end of the rail section 35 is formed with an off-set and tapered extension indicated as 51, the extreme inner end of which, when the rail sections 35 and 36 are separated as shown in Fig. 5, projects slightly beneath the portion 50 of the bracket 49, and when the rail sections 35 and 36 are depressed and brought together, the movement is such as to cause the extension 51 of the section 35 to ride beneath the portion 50 of the bracket aforesaid. The portion 50 of the bracket 49 affords a protection, and covering for the inner ends of the rail sections 35 and 36 when the same are separated, or brought together, so that there is little or no chance for anything to fall between the same which would prevent their being brought together in the operation of depressing and projecting the same and thereby prevent the opening of the mine-door.

Referring again to the lever 27, which is contained in the casing 22 and adapted to actuate the pinion 25 for opening the door sections 6, and 7 through the connections described, I have provided a ball and socket

connection between the lever and an arm or lever pivotally attached to the rail section 36. The inner end of the lever 27 is provided with a short longitudinal socket 52 in which is loosely seated a rod 53 on the outer end of which is arranged a ball 54.

55 denotes an arm or lever of suitable length carried alongside of the rail section 36, see Figs. 2, 8 and 9, and its outer end is pivotally connected to a boss 56 of a bracket 57 secured to rail section 36 as shown, and the opposite end of the said arm or lever is provided with a socket 58 adapted to receive the ball 54 of the rod 53, and the same is preferably so retained by means of a cap 59 suitably secured to the arm or lever 55 as seen particularly in Fig. 9 which also serves as a ball-race for the said ball. The ball and socket connection between the lever 55 and the lever 27 permits an easy operation of the said last mentioned lever when the rail section 36 is depressed and projected longitudinally in the manner specified. The inner opposite sides of the casing 22 are cut away as at 60 to allow the arm or lever 55 to have connection with the ball 54.

It is apparent that when a car approaches the mine-door and rides on to the secondary rails the movement of the same will operate the mechanism for actuating the doors to cause them to swing open in opposite directions. It is needful to automatically return the working parts of the device including the secondary rails and doors to their normal positions after a car has passed off of said secondary rails, and this is accomplished by means of a weighted lever indicated as 61 which is suitably attached at one end to the outer end of one of the studs 41, of a crank-arm 39, and carries on the opposite end thereof, the adjustable weight 62. In the movement of the secondary rails, as the same are depressed, the weighted lever is caused to be elevated and when said secondary rails are released it will be seen that the weight 62 will drop and in so doing will rotate or rock the stud 41 with which it is connected, in an opposite direction, and in so doing, will cause the rail sections 35 and 36 through their connections to be raised and thereby operate the connections between the rail section 36 and the door 6 to cause the said door sections 6 and 7 to close.

While I have shown that the weighted lever is attached to the rail section 35, it is understood that the same may be applied equally as well, if it is desired, to the rail section 36.

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

1. In combination, a mine-door comprising two oppositely movable sections, connect-

tions between the said sections, a gear directly connected with one of said sections, a lever fulcrumed midway of its length and having one end in operative connection with
5 said gear, a pair of depressible and longitudinally movable members, connections between said members, and connections between one of said members and the opposite end of said lever.

10 2. In combination, a mine-door comprising two oppositely movable sections, a lever having connection with opposite faces of the said sections, a pair of depressible and longitudinally movable members, link connections
15 between said members, a gear directly connected with one of said sections, a lever fulcrumed midway of its length and having one end in operative connection with said gear, and connections between one of said
20 members and the opposite end of said lever.

3. In combination, a mine-door comprising two hinged sections adapted to be swung open in opposite directions, a lever having a connection with opposite faces of the said
25 sections, a pair of depressible and longitudinally movable members, link connections between said members, a gear connected with the lower hinge of one of said sections, and a lever fulcrumed midway of its
30 length, one end in mesh with said gear and its opposite end in operative connection with one of said members.

4. In combination, a mine-door comprising two oppositely movable sections, links
35 pivotally connected with opposite faces of said sections, a lever normally disposed diagonally above said sections, and having its opposite ends pivotally connected with the links aforesaid, a pair of depressible and
40 longitudinally movable members, link connections between said members, a gear connected with the lower hinge of one of said sections, and a lever fulcrumed midway of its length, one end in mesh with said
45 and its opposite end in operative connection with one of said members.

5. In combination, a mine-door comprising two hinged sections adapted to be swung open in opposite directions, links pivotally
50 connected with opposite faces of said sections, a lever normally disposed diagonally above said sections and having its opposite ends pivotally connected with the link aforesaid, a pair of depressible and longitudinally
55 movable members, a gear in connection with the lower hinge of one of said sections, a lever fulcrumed midway of its length, disposed between the gear aforesaid and said movable members and having a sector gear in mesh with said gear, and connections
60 between one of said members and said sector lever.

6. In combination, a mine-door comprising two hinged sections adapted to be swung
65 open in opposite directions and when closed

having overlapping portions, links pivotally connected with opposite faces of said sections, a lever fulcrumed above the meeting ends of said sections, and having its opposite ends pivotally connected with said links,
70 a pair of depressible and longitudinally movable members, a horizontally swingable lever located beneath one of said sections, and connected therewith, and connections between said last mentioned lever and said depressible members.

7. In combination, a pair of mine track rails, a pair of depressible and longitudinally movable members associated with said
80 rails, link connections between the matching ends of said members, a mine door, a lever, gearing connection between said door and said lever, and a ball and socket connection between said lever and one of said members.

8. In combination, a pair of mine track
85 rails, a pair of depressible and longitudinally movable members associated with said rails, a mine door comprising two hinged sections adapted to be swung open in opposite directions, link connections between the
90 inner ends of said members, a lever, a gear connected with the lower hinge of one of said sections and in mesh with said lever, and a ball and socket connection between said lever and one of said members.

9. In combination, a mine-door, a lever in operative connection with said door and provided with a ball at its opposite end, a depressible and longitudinally movable
100 member, and an arm pivotally connected with said member and also connected with the ball of said lever.

10. In combination, a mine-door hinged to adapt it to be swung open and closed, a gear connected with the lower hinge of the
105 door, a lever having a sector gear in mesh with said gear, a depressible and longitudinally movable member, an arm pivotally connected to said member, and a ball and socket connection between said lever and
110 said arm.

11. In combination, a mine-door hinged to adapt it to be swung open and closed, a gear connected with the lower hinge of the
115 door, a lever having a sector gear in mesh with aforesaid gear, a housing for the sector lever and gear, a spindle detachably connected with the lever and provided with a ball on its outer end, a depressible and longitudinally movable member, an arm pivotally connected with said member, and means for connecting the opposite end of
120 said arm, to the ball carried by the lever.

12. In a device of the character described, the combination with a door, of a pair of
125 rails adapted to be moved toward and from each other, connections between one of said rails and said door, a bracket secured to the inner end of one rail, lever connections between the bracket and the inner end of the
130

opposite rail, the said bracket provided with an extension adapted to overlie the end of the opposite rail to form a covering therefor, and for the space between the rails when separated.

13. In a device of the character described, the combination with a door, of a pair of rails adapted to be moved toward and from each other, connections between one of said rails and said door, a bracket secured to the inner end of one of said rails, lever connections between said bracket and the inner end of the opposite rail, the said last mentioned rail provided with a tapered extension and the bracket provided with a portion adapted to overlie the tapered end of the rail aforesaid to form a covering for the space between the rails when the same are separated.

14. In a device of the character described, the combination with a door, of a pair of movable rails, connections between one of said rails and said door, their matching ends normally held spaced apart, a lever pivotally connected at one end with the inner end of one of said rails, a bracket secured to the inner end of the opposite rail and having a depending portion, and a pair of reach bars pivotally connected with the opposite end of aforesaid lever and the depending portion of said bracket, said bracket provided with an extension adapted to overlie the inner end of the opposite rail to form a covering for the space between the rails when they are separated.

15. In combination, a mine-door hinged at one side thereof, a gear-wheel connected with said door, a sector-lever in mesh with said gear, a pair of depressible and longitudinally movable members, a reach connected with one of said members and with said sector-lever, and lever connections between the inner ends of said members.

16. In combination, a mine-door, a pair of depressible and longitudinally movable members, a lever fulcrumed on a stationary part and pivotally connected at one end with one of said members, a reach pivotally connected with the opposite end of said lever and having its opposite end connected with the other member, and connections between one of said members and said door.

17. In combination, a mine-door, a pair of depressible and longitudinally movable members, a lever fulcrumed on a stationary part and pivotally connected at one end with one of said members, a reach pivotally connected with the opposite end of the lever and with the opposite member, a second

reach pivotally connected with one of said members, and oscillatory means in connection with the second reach and with the door.

18. In a device of the character described, a pair of rails adapted to be moved toward and from each other, one of said rails provided with an extension adapted to overlie the end of the opposite rail to form a covering for the space between the rails when the same are separated.

19. In a device of the character described, the combination with a mine-door, of a pair of rails adapted to be moved toward and from each other, one of said rails provided with an extension adapted to overlie the end of the opposite rail to form a covering for the space between the rails when the same are separated, and operable connections between the rails and said door.

20. In a device of the character described, a pair of movable rails their matching ends normally held spaced apart, and one of said rails provided with an extension overlying the end of the opposite rail to form a covering for the space between the rails when they are separated and movable with the said rail.

21. In combination, a mine-door, a pair of longitudinally movable rails having their matching inner ends normally spaced apart, one of said rails provided with an extension overlying and movable above the end of the opposite rail and forming a covering for the space between the rails when they are separated, connections between both of said rails, an oscillatory member, connections between the member and door, connections between the member and one of said rails, and a weighted lever for automatically closing the door.

22. In combination with a mine door, a pair of rails and connections between the same for opening and closing the door, said rails operated to open the door when engaged by the wheels of a car, means for automatically closing the door upon the car leaving the rails, and means extending between the matching ends of the rails to form a covering for the space made by the separation of the said rails.

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

JAMES TAYLOR.

Witnesses:

CHAS. W. LA PORTE,
ROBERT N. McCORMICK.