

V. A. & H. JOHNSON.
TRAP DOOR FOR MINES.
APPLICATION FILED MAY 21, 1908.

925,915.

Patented June 22, 1909.

4 SHEETS—SHEET 1.

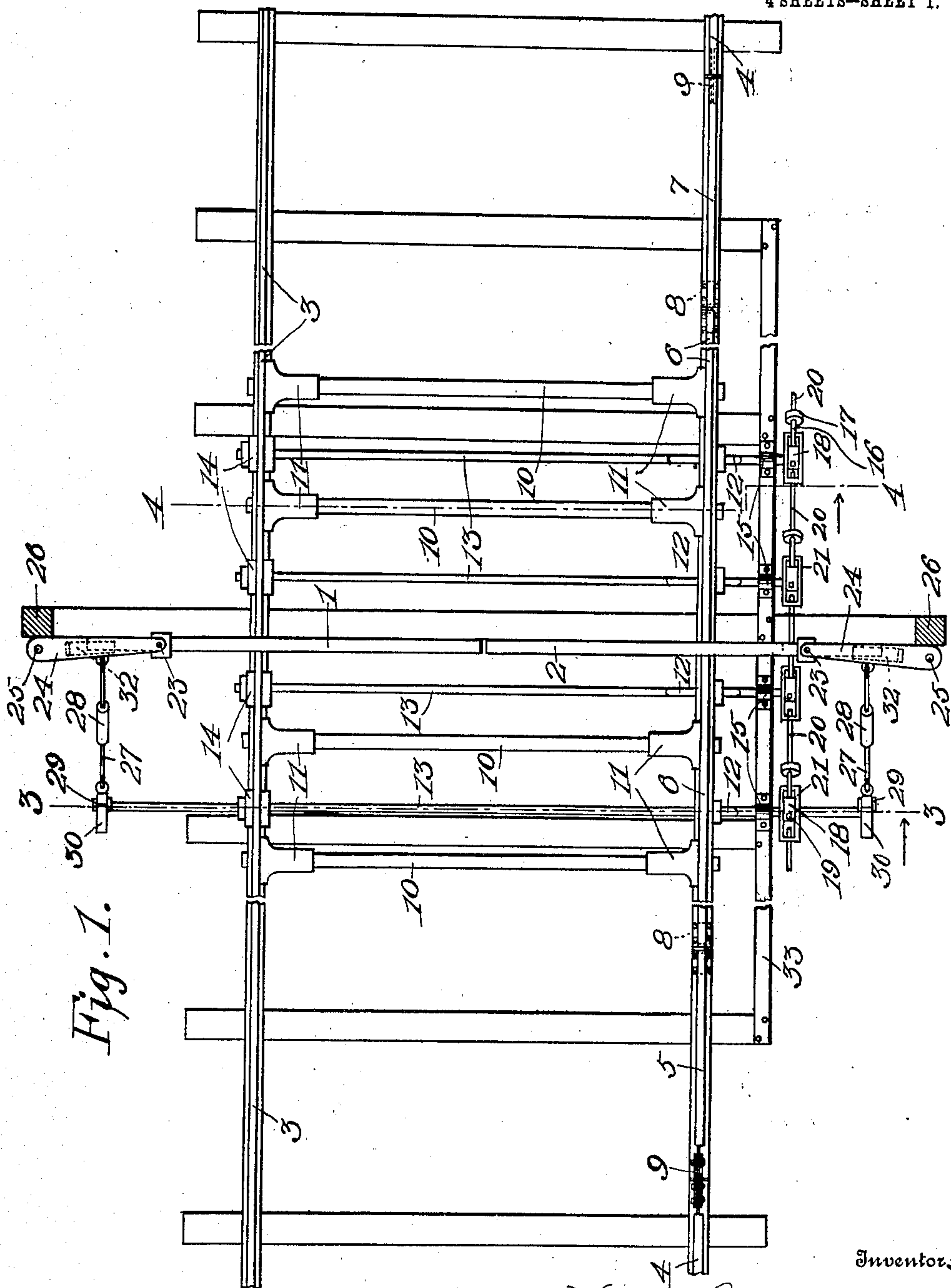


Fig. 1.

Witnesses

James F. Brown
W. L. Skinner

By

V. A. Johnson
Hezekiah Johnson
Clifton C. Coleman

Attorney

Inventors

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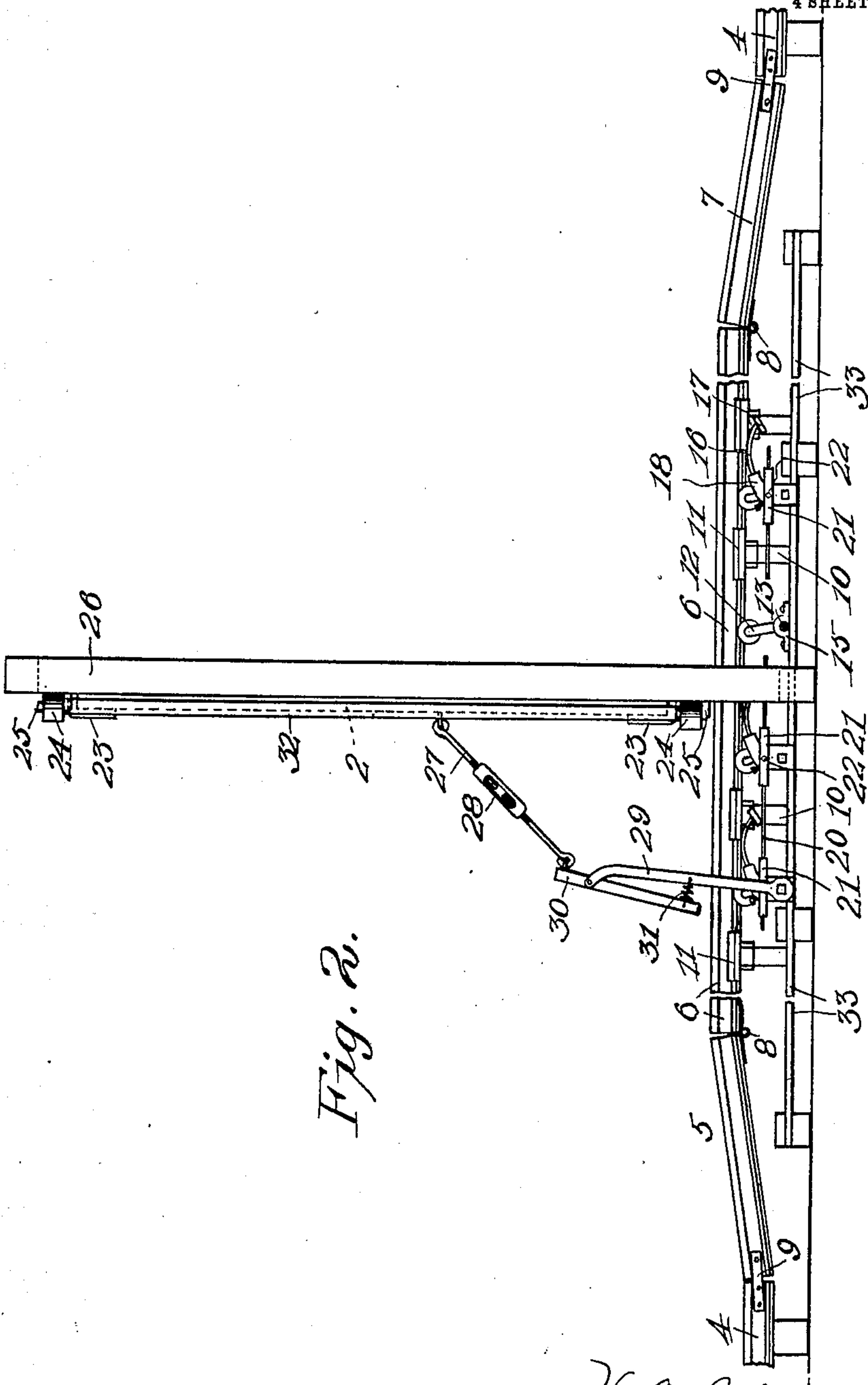


Fig. 2.

Witnesses

James F. Brown
M. L. Skinner

Inventor

V. A. Johnson
Hezekiah Johnson
By Watson E. Coleman
Attorney

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Fig. 3.

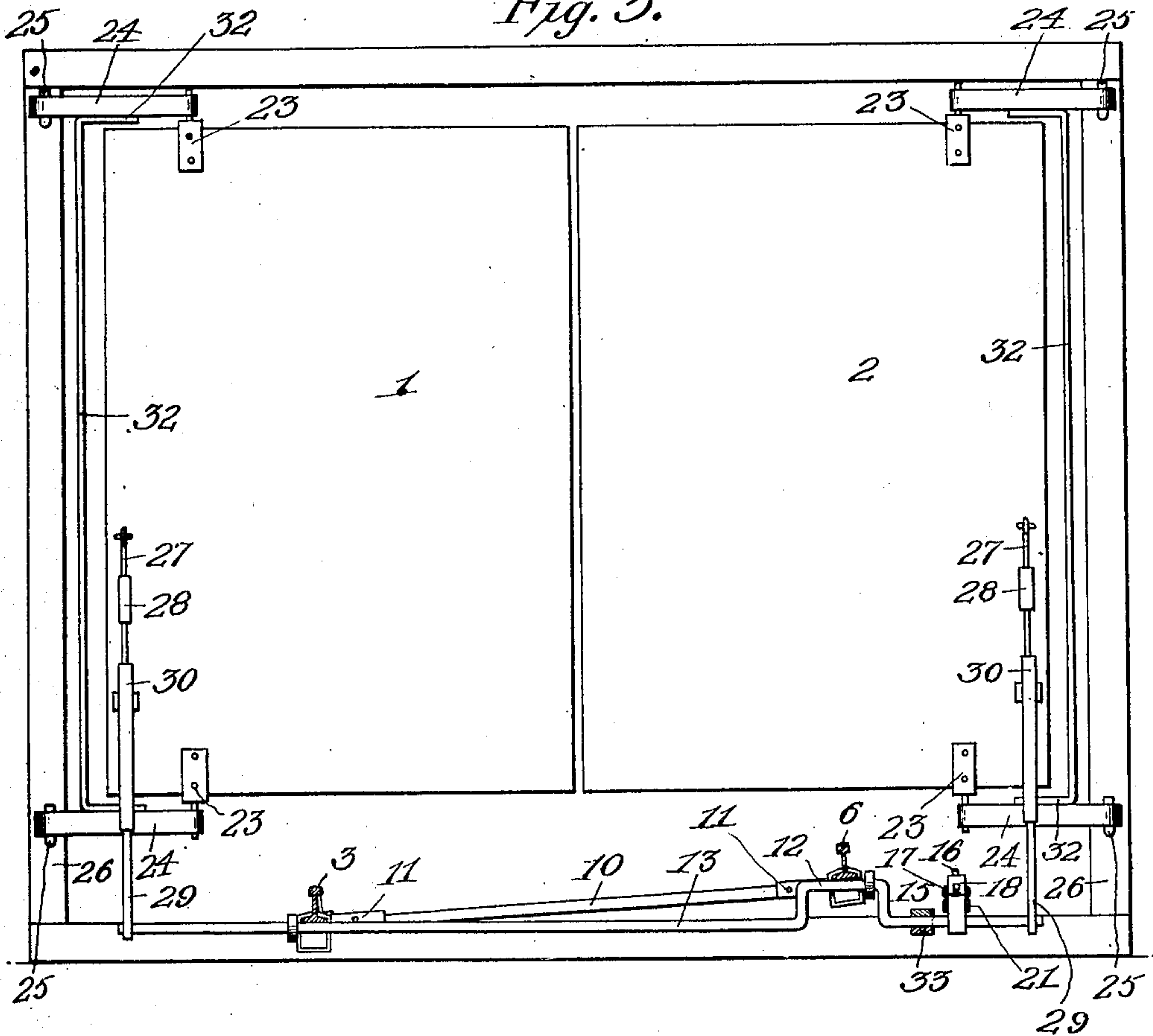
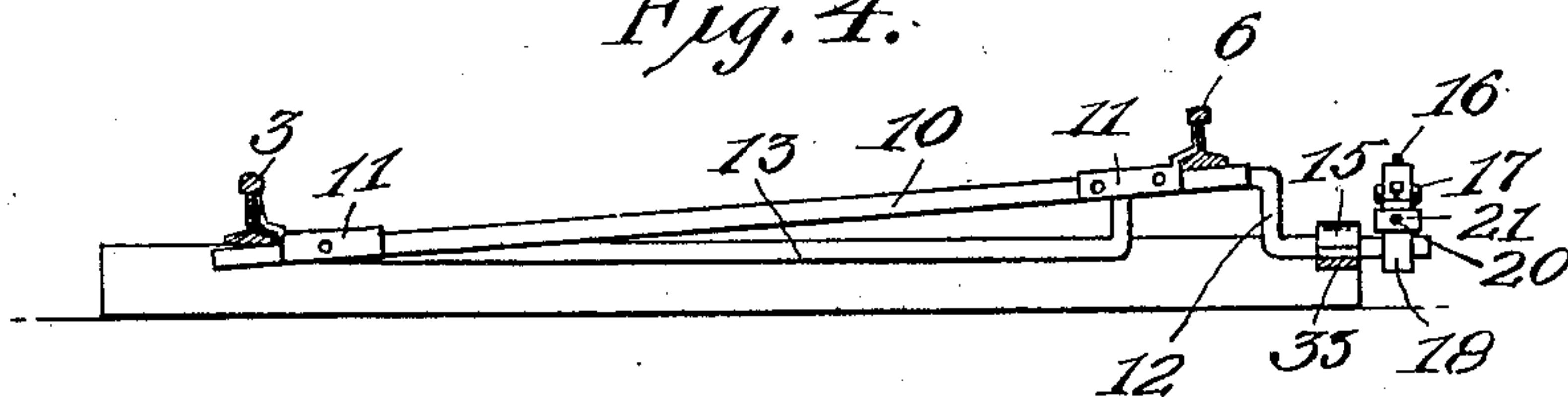


Fig. 4.



Witnesses

James F. Brown
M. L. Skinner

V. A. Johnson
Hezekiah Johnson
By Watson & Coleman
Attorney

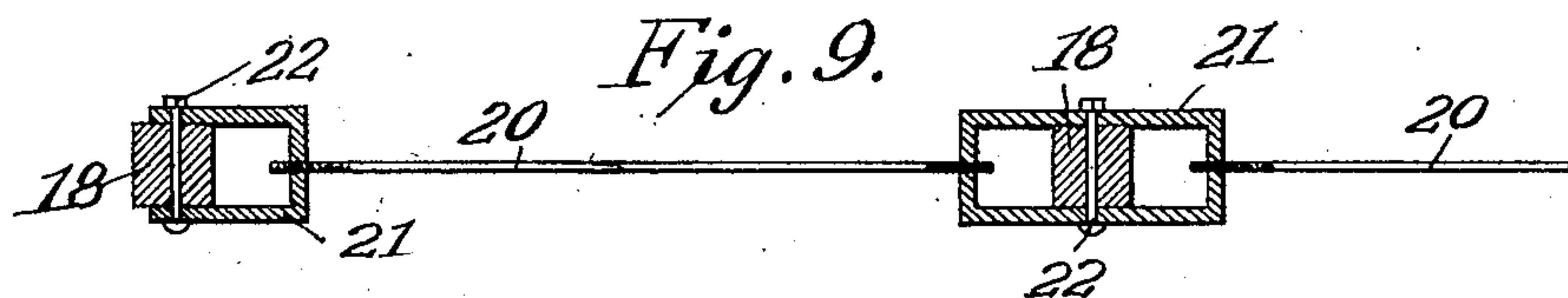
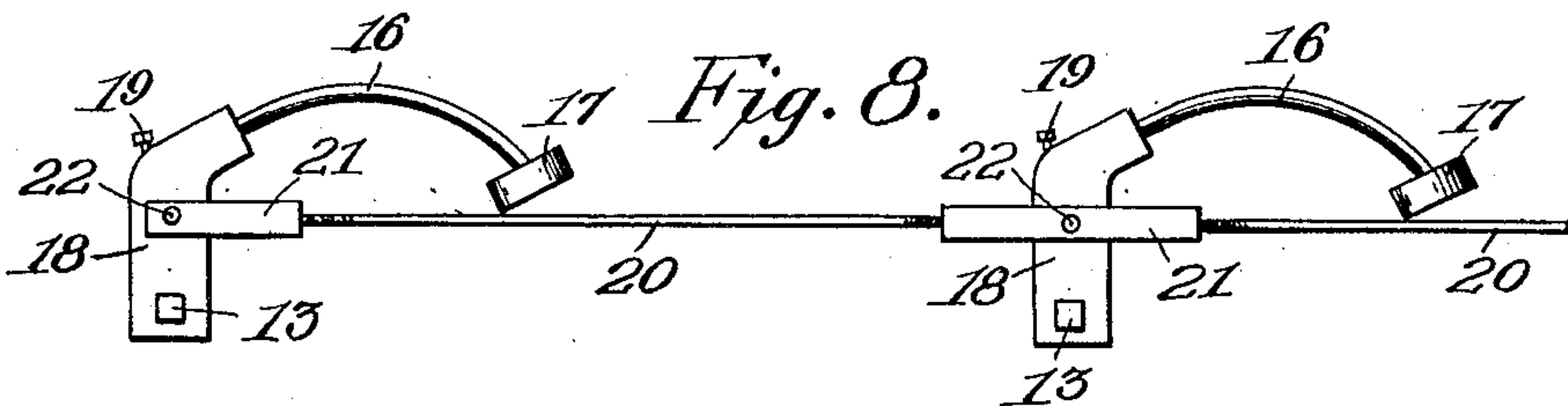
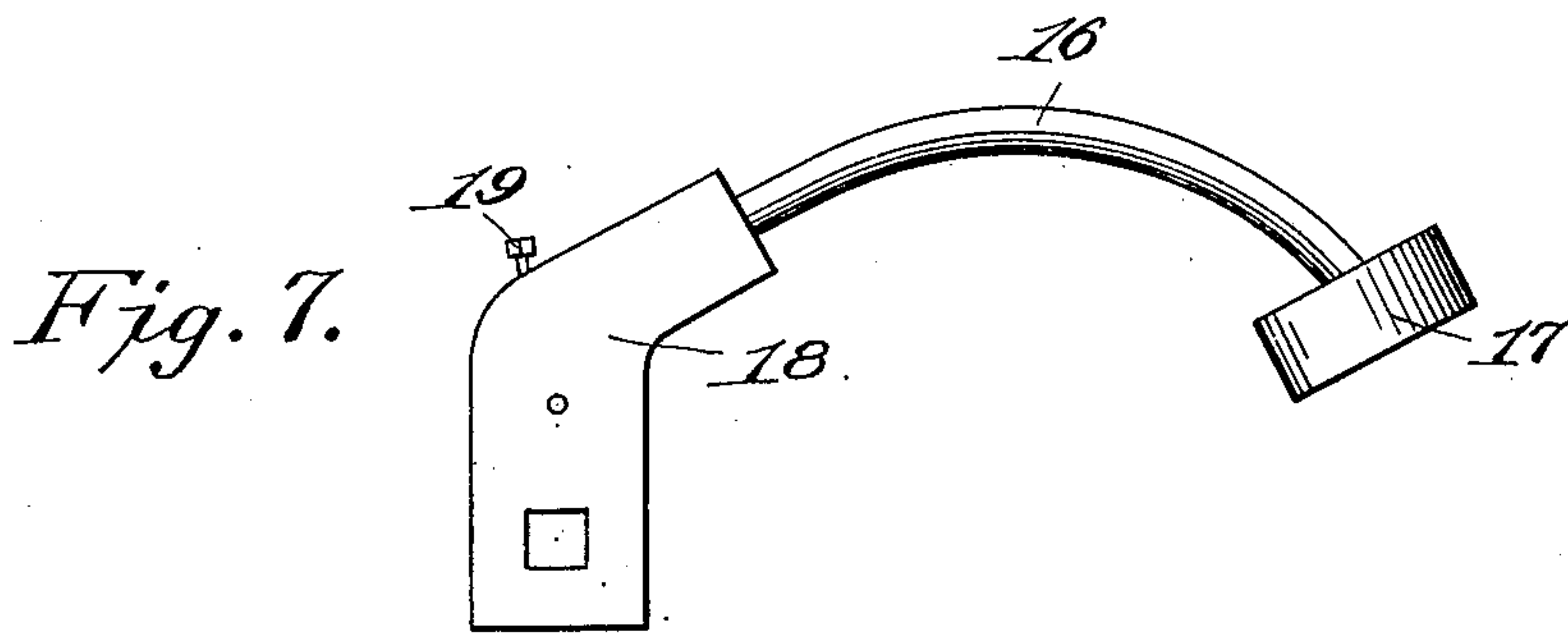
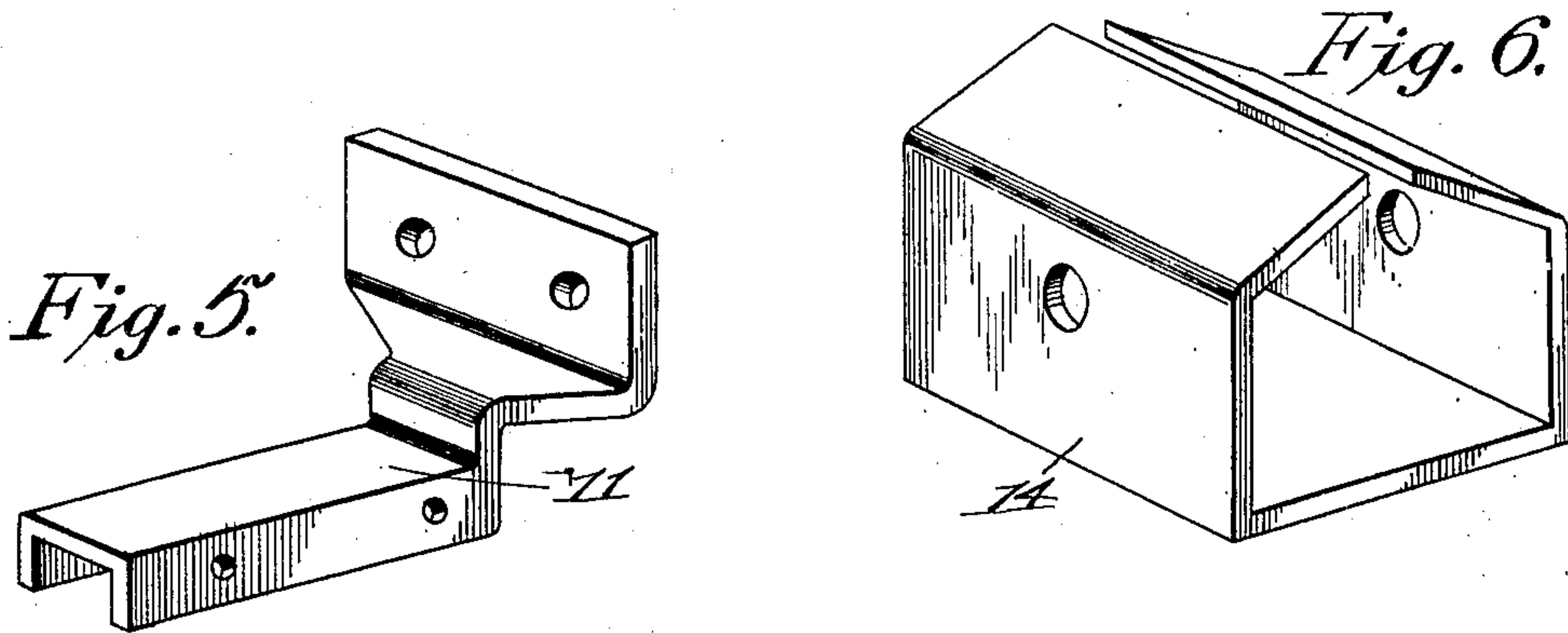
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4 SHEETS—SHEET 4.



Witnesses

James F. Brown
M. E. Skinner

Inventors

V. A. Johnson
Hezekiah Johnson
By Watson Coleman
Attorney

UNITED STATES PATENT OFFICE.

VOLEY A. JOHNSON AND HEZEKIAH JOHNSON, OF HOLDEN, WEST VIRGINIA.

TRAP-DOOR FOR MINES.

No. 925,915.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed May 21, 1908. Serial No. 434,193.

To all whom it may concern:

Be it known that we, VOLEY A. JOHNSON and HEZEKIAH JOHNSON, citizens of the United States, residing at Holden, in the county of Logan and State of West Virginia, have invented certain new and useful Improvements in Trap-Doors for Mines, of which the following is a specification, reference being had to the accompanying drawings.

Our invention relates to improvements in doors and operating devices therefor and more particularly to trap doors used in mines and adapted to be automatically opened and closed by track devices operated by passing cars.

The principal object of the invention is to provide a door of this character with an operating device which employs one of the track rails as the trip rail.

Another object of the invention is to provide an improved means for hanging the door and improved means for connecting the same to the trip or operating device.

A further object of the invention is to improve and simplify the construction and operation of door operating devices of this character and thereby render the same more reliable and efficient.

With the above and other objects in view, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a track, showing our improved mine trap door applied thereto; Fig. 2 is a side elevation; Figs. 3 and 4 are vertical transverse sections taken, respectively, on the planes indicated by the lines 3—3 and 4—4 in Fig. 1; and Figs. 5, 6, 7, 8 and 9 are detail views.

In the drawings 1 and 2 denote opposing vertically disposed doors arranged for horizontal movement above a track having rails 3, 4 preferably of the usual T-form and suitably secured upon cross ties. In the rail 4 are arranged three vertically movable trip rail sections 5, 6, 7 which are adapted to be depressed by the weight of a car passing over the same and which are connected to mechanism presently described for swinging the doors 1, 2. The central rail section 6 is long and extends under the door 1 and a suitable distance upon each side of the same, and to its ends are hinged, as shown at 8, the inner ends of the two end rail sections 5, 7,

which latter have their opposite ends hinged, as at 9, to rigid sections of the rail 4. In order to keep the trip rail sections 5, 6, 7 in proper alinement and prevent them from spreading they are connected to the rail 3 by metallic tie bars 10 the ends of which project under the track rails and are suitably secured thereto by brackets or connecting members 11.

The raised or movable rail sections 5, 6, 7, when depressed by the weight of a passing car, are adapted to actuate cranks 12 formed in transverse rock shafts 13 and disposed immediately beneath said rail sections. The shafts 13 are arranged at suitable intervals between the ends of the central rail section 6 and each has one of its ends journaled in a bearing 14 in the form of a clamp engaged with and bolted to the base flanges of the rail 3, as illustrated. The other end of each of the shafts 13 is journaled in suitable bearings 15 arranged on a supporting bar 33; and upon said end of the shaft is secured an arm 16 having at its free end a weight 17. Said arm 16 is secured in a casting 18 having a socket to receive the squared end of the shaft 13 and adapted to be retained on said end by a set screw 19. The weighted arms 16 serve to elevate the cranks 12 and thereby raise the movable rail sections 5, 6, 7 and support the same elevated. The shafts 13 are connected together for simultaneous operation preferably by connecting rods 20 each of which has threaded ends screwed into yokes 21, pivoted to the socket castings 18 of the arms 16, as shown at 22.

Each of the doors 1, 2 has upon its top and bottom at a suitable distance from its inner edge vertically projecting pivots 23 arranged in bearing openings in the outer ends of upper and lower supporting arms or brackets 24 the opposite ends of which latter are hinged, as at 25, upon upright supports 26. The arms on each support 26 are connected by a bar 32 which causes them to swing in unison. The hinges 25 for the bracket arms 24 permit the arms to swing in one direction and the pivots or hinges 23 permit the inner edge of the door to swing in the same direction. Pivotaly connected to the doors, adjacent to the center of their inner edges, are operating rods or links 27 preferably made adjustable by means of turn buckles 28. The links 27 extend longitudinally and are connected to crank arms provided upon the ends of one of the shafts 13. Each of these crank arms has a rigid member or section 29 fixed to the

shaft 13 and having its outer end provided with a fork or loop to receive a movable member or section 30, the outer end of which is pivoted in the forked end of the link 27 and the inner end of which is connected by a stiff spring 31 to the rigid member 29 of the crank. It will be seen that by making the cranks in two members which are movably connected by the springs 31, they may yield slightly when the draft against the doors 1, 2 is very great, thereby preventing the device from becoming damaged, but at the same time the springs 31 are sufficiently strong to cause the crank arms to operate the links 27 and thereby actuate the doors when a car passes upon the raised track rail sections 5, 6, 7.

In operation, it will be seen that when the wheels of a car pass upon either of the inclined end rail sections 5, 7 it will be depressed and as it moves downwardly the other raised rail sections will be lowered, said rail sections thereby forming a trip rail which actuates the cranks 12 of the shafts 13. As the cranks 12 move downwardly the weighted arms 16 are raised and the crank arms 29 draw upon the links 27 to open the doors 1, 2. Owing to the double hinges for the latter it will be seen that said doors will swing first upon their pivots 23 and then upon the hinges 25. When the car passes off of the raised track or trip rails 5, 6, 7, the weighted arms 16 will lower and elevate the cranks 12 and consequently said rail sections 5, 6, 7.

While we have shown and described in detail the preferred embodiment of our invention it will be understood that we do not wish to be limited to the precise construction set forth and that various changes in the form, proportion, and minor details may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described our invention what we claim is:

1. The combination of a vertically movable rail, a swinging door, a shaft actuated by said rail, a crank arm having one section fixed to said shaft and another section pivoted intermediate its ends to the first mentioned section, a coil spring arranged be-

tween one end of the pivoted section and the first mentioned section and a link arranged between the other end of said pivoted section and said door.

2. The combination of a track having vertically movable track rail sections, a swinging door, a transverse shaft having a crank portion to be engaged and actuated by said movable rail sections, a weighted arm on said crank shaft for elevating said movable track rails, a crank arm having one section fixed to said shaft and another section pivoted intermediate its ends to said fixed section, a coil spring between the latter and one end of the pivoted section and a link connecting the other end of the pivoted section to said door.

3. The combination of a track having upon one side an elevated intermediate track rail section and inclined end track rail sections, said sections being hingedly connected to each other and to the stationary track rail sections on said side of the track, tie bars each having one end connected to the intermediate track rail section and to the opposing stationary track rails on the other side of the track, a plurality of transverse shafts each having a crank portion arranged to bear upon the base of the intermediate track rail section, weighted crank arms fixed to said crank shafts, connections uniting said weighted crank arms for simultaneous movement, a swinging door, a sectional crank arm having one section fixed to one of said crank shafts and another section pivoted intermediate its ends to the first mentioned section, a coil spring connecting one end of the pivoted section to the other section of said sectional crank arm, and a link connecting the other end of the pivoted crank arm section to said door.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

VOLEY A. JOHNSON.
HEZEKIAH JOHNSON.

Witnesses:

ROY MITCHELL,

his
CHARLEY X HOGE.
mark.