

C. W. CARMAN.  
MINE DOOR.

APPLICATION FILED JAN. 26, 1909.

931,035.

Patented Aug. 17, 1909.

3 SHEETS—SHEET 1.

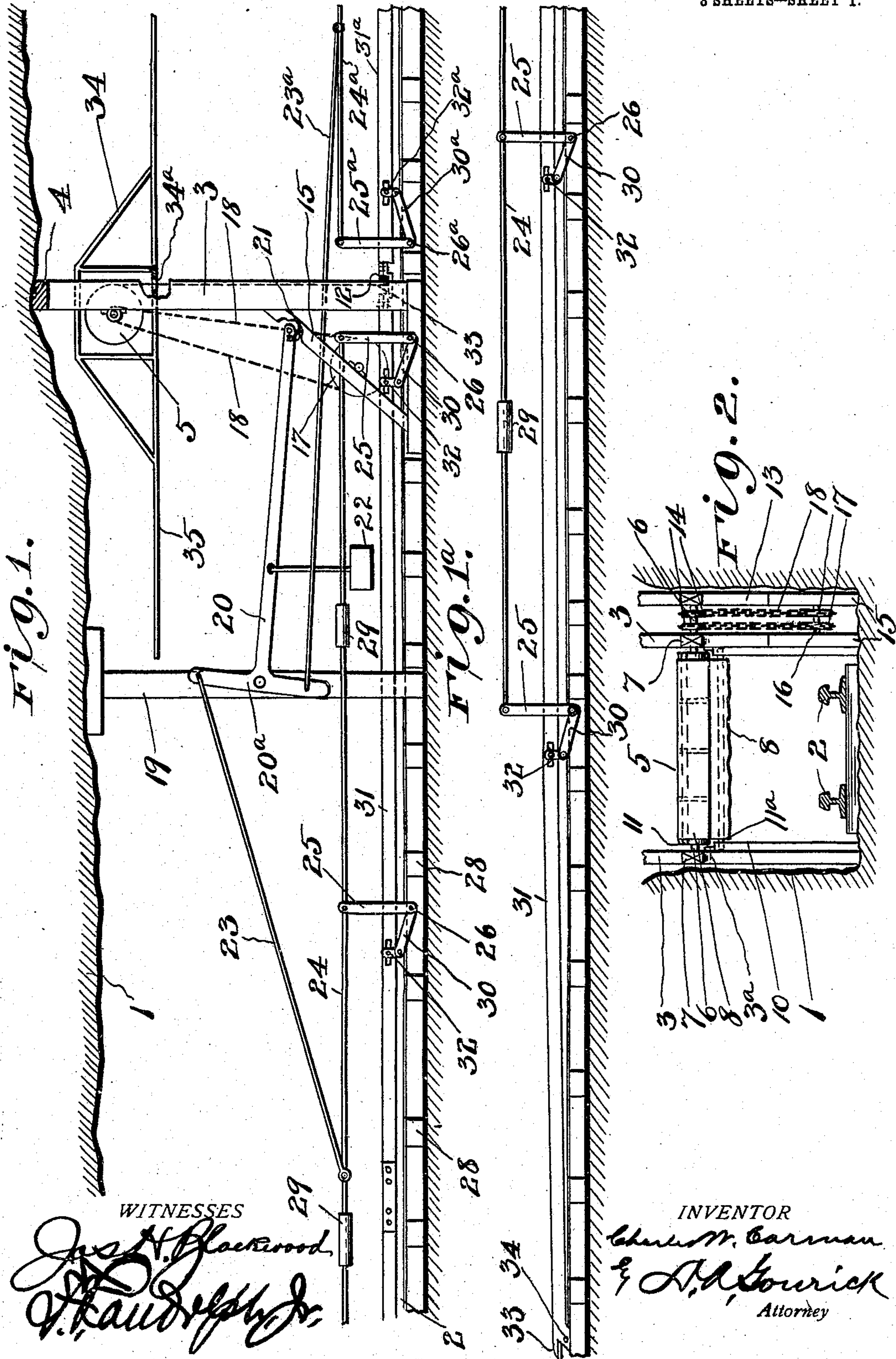


Fig. 1.

Fig. 1a.

Fig. 2.

WITNESSES

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3 SHEETS—SHEET 2.

Fig. 3.

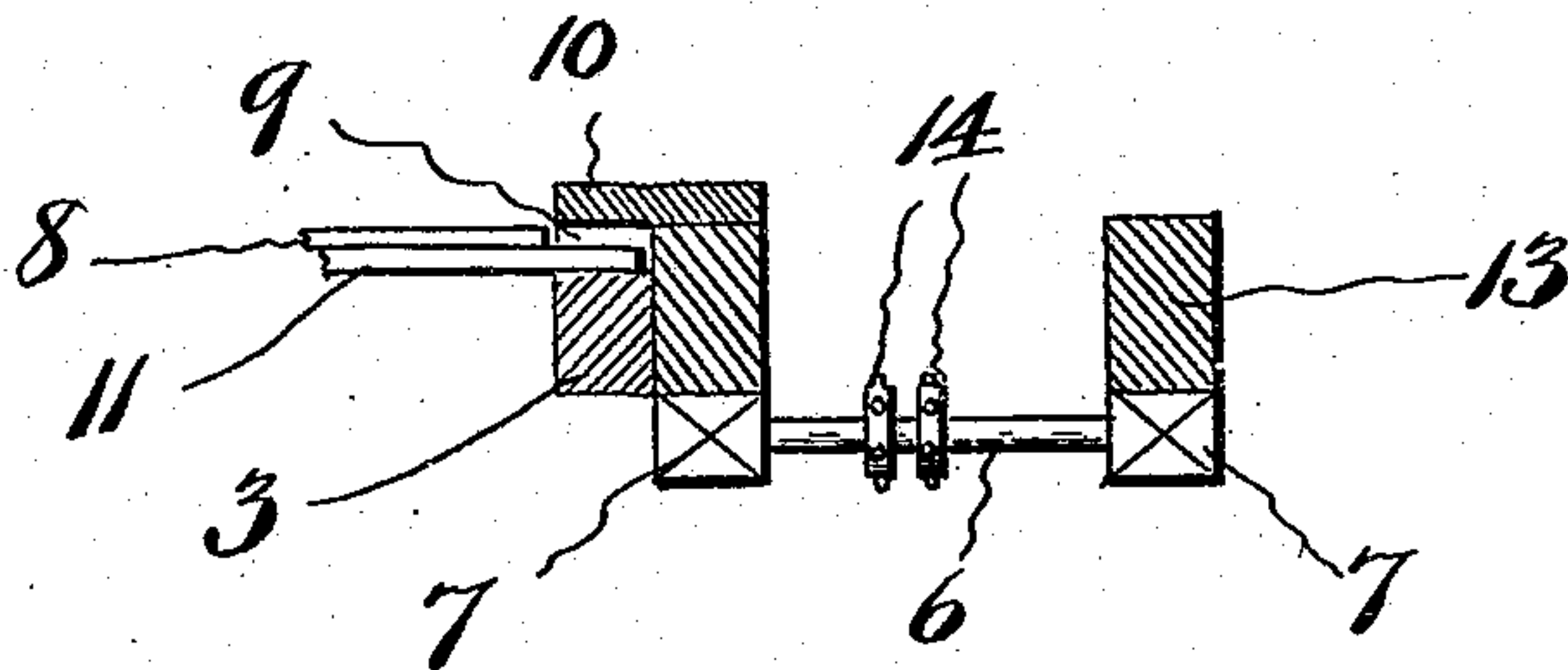


Fig. 4.

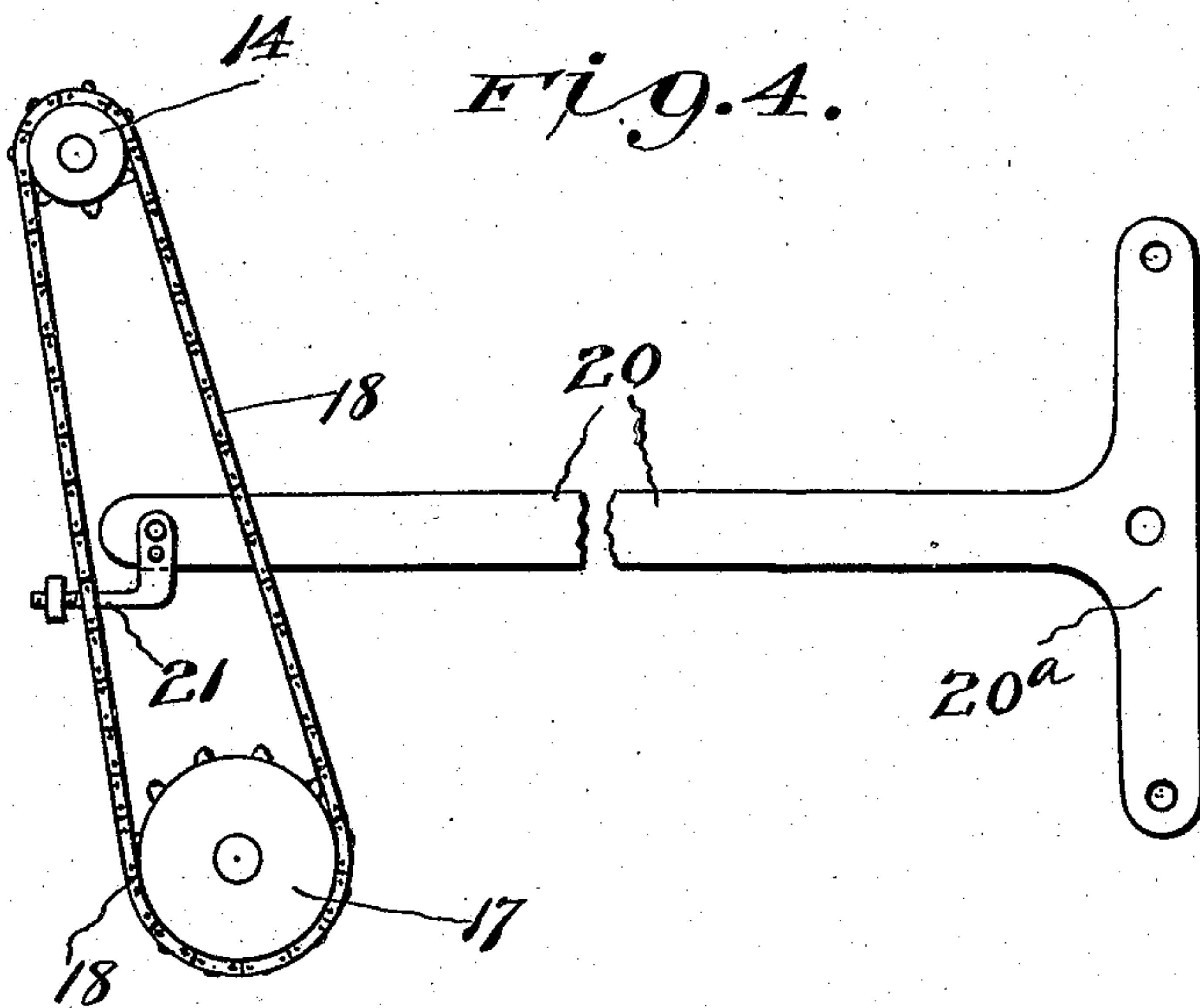
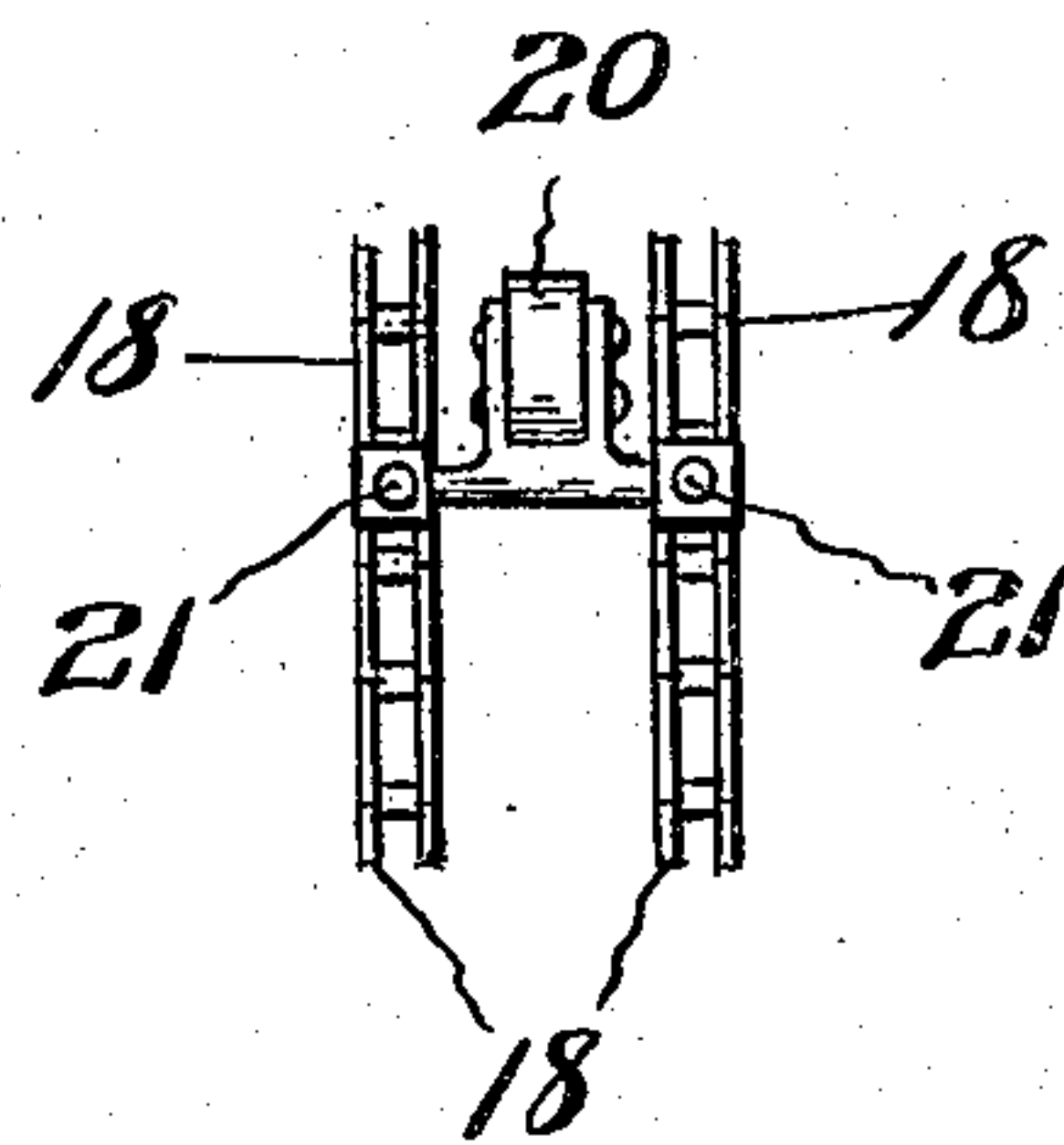


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

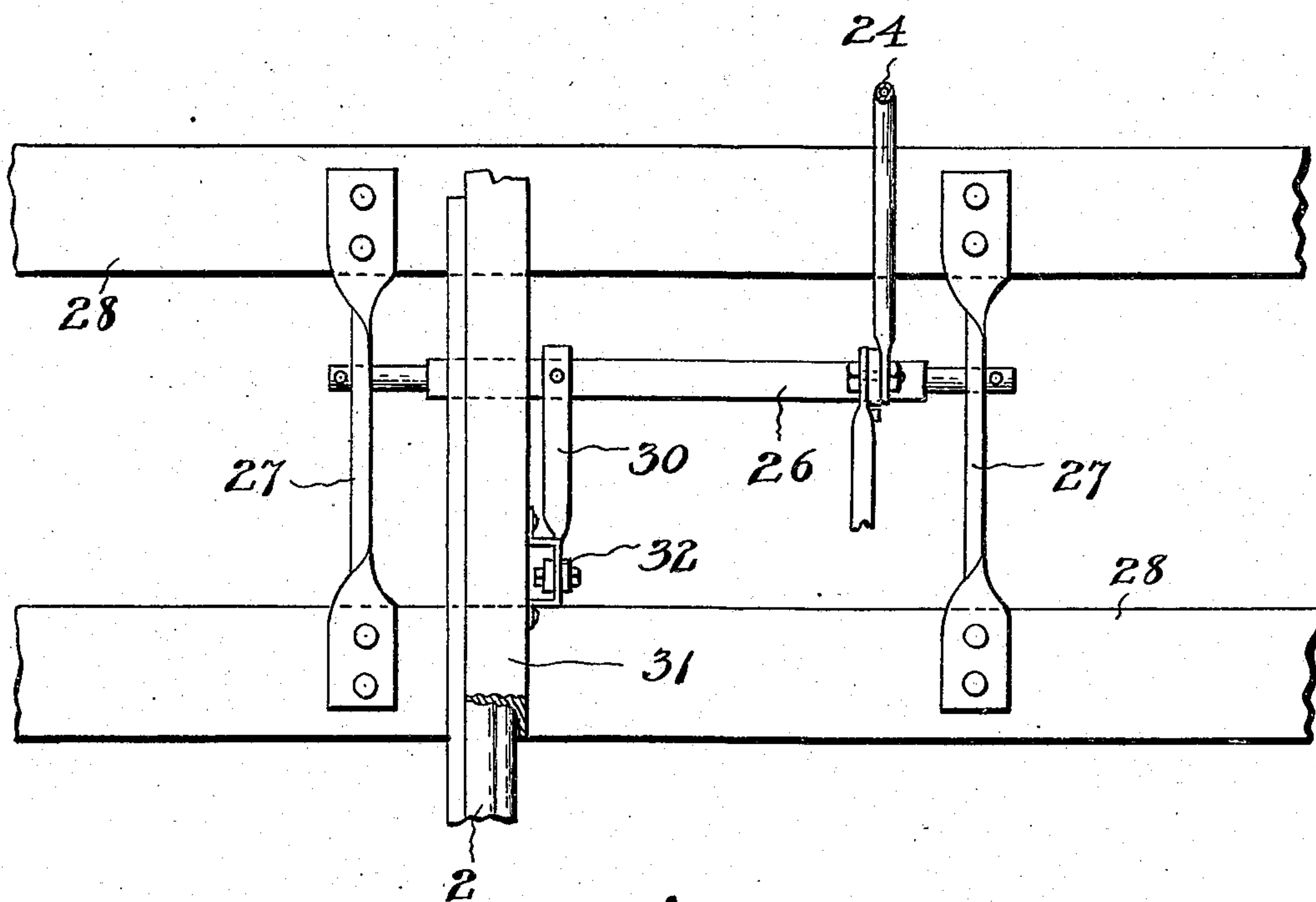
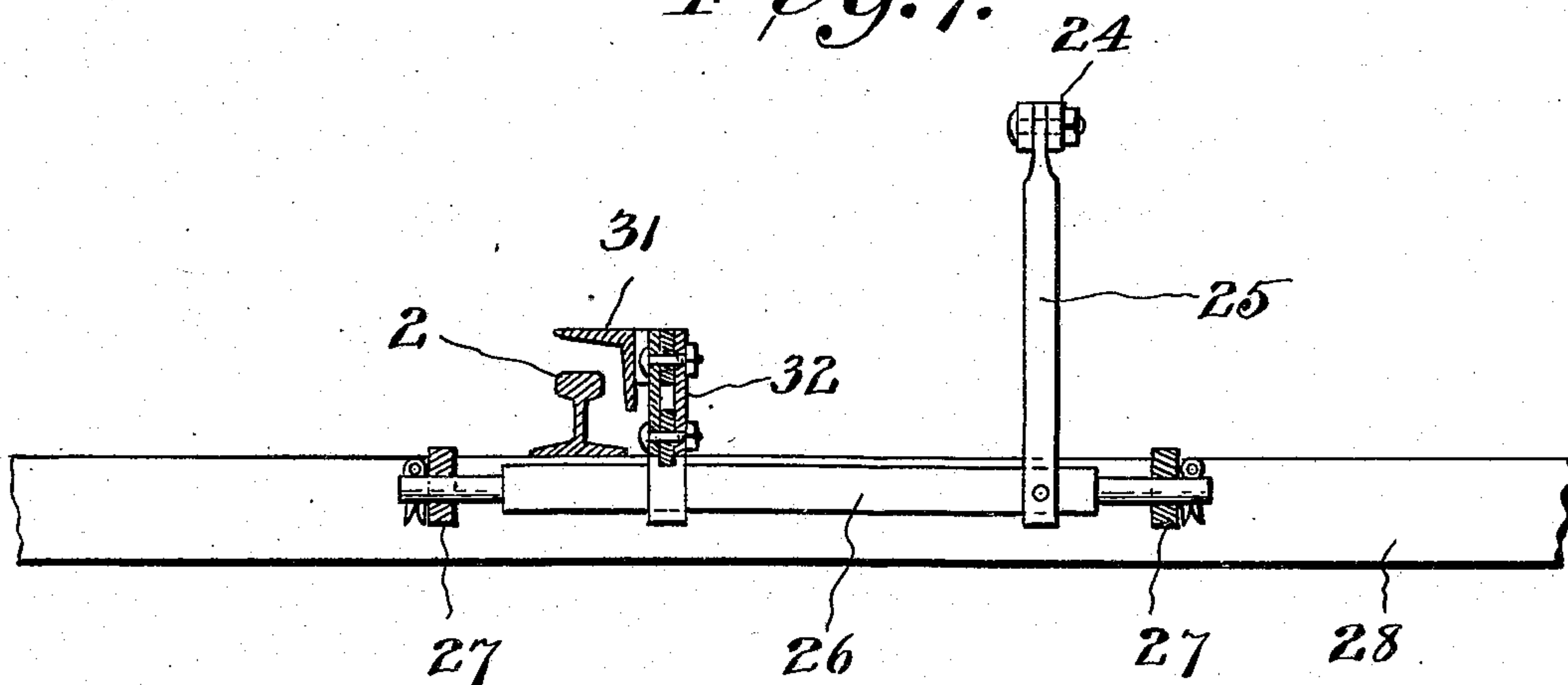


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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TO WILLIAM E. DEEGANS, OF GLEN JEAN, WEST VIRGINIA.

## MINE-DOOR.

No. 931,035.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed January 26, 1909. Serial No. 474,341.

*To all whom it may concern:*

Be it known that I, CHARLES W. CARMAN, a citizen of the United States, residing at Mount Hope, in the county of Fayette and State of West Virginia, have invented certain new and useful Improvements in Mine-Doors, of which the following is a specification.

My invention relates to doors used in mines to insure a circulation of pure air throughout the mine, said doors being placed in headings that would short circuit the draft and prevent the air from reaching all parts of the mines. Heretofore the doors used for this purpose have either been operated by hand, which proved expensive, or when operated automatically possessed faults that prevented satisfactory working.

The object of my invention is the provision of an automatic door opened by the weight of the car when approaching it from either side and closed by a counter-weight when the car has passed the door, and consists specifically of details of construction that will be described at length hereinafter.

In the drawings: Figures 1 and 1<sup>a</sup> are views of the interior of a mine tunnel showing the car track over which cars are transported, carrying the products of the mine, and with the mine door in position, Fig. 2, a cross-section of the tunnel showing the door curtain in elevation, Fig. 3, a cross-sectional view of one of the side posts of the door frame showing a fragment of the curtain in position, Figs. 4 and 5, detail views of the lever for operating the curtain and its connections, and Figs. 6 and 7, detail views of the track levers.

In the drawings similar reference characters indicate corresponding parts in all of the views.

The mine tunnel indicated at 1 has the railroad track 2 therein over which the products of the mine are transported and the automatically operated door to be hereinafter described installed therein.

The door frame consists of the side posts 3 and head piece 4 connecting the side posts.

5 indicates a roller secured to shaft 6 journaled in boxes 7, secured to side-posts 3, and has a curtain 8 made of canvas or other flexible material secured thereto and slidably mounted in channels 9 formed by strips 10 secured to the posts, said curtain being strengthened and stiffened by transverse

slats or bars 11 of rigid material secured thereto and also riding in channels 9, the lowermost slot 11<sup>a</sup> being slightly longer than the width of the curtain so as to positively limit the upward movement of the curtain. 60

12 indicates a cross-bar at the bottom of the curtain. 13 indicates another upright post secured adjacent to one of the posts 3, the shaft 6 being extended so that it is journaled on post 13 as well as the adjacent post 3, said extended end of the shaft having sprocket wheels 14 secured thereto. 65

15 indicates braces secured to posts 3 and 13, and 16 a shaft journaled on said braces and having sprocket wheels 17 secured thereto and geared to sprocket wheels 14 by means of chains 18. 19 indicates another post secured to tunnel 1 at a short distance from the door frame and 20 a T-shaped lever fulcrumed on said post and having its end provided with two pins 21, each of which is secured to one of the links of each of the chains 18. 70

It will be understood that when the lever is swung upwardly the roller 5 is rotated so that the curtain 8 is lifted and when it is lowered the roller is rotated in an opposite direction so that the curtain is lowered, the two chains working independently but both secured to lever 20 insures continuous working of the device as should one chain be broken the other one will carry the burden until the broken chain can be repaired or replaced. 80

The lever is actuated so as to raise the curtain by the instrumentalities hereinafter described and is returned in its lowermost position by means of weights 22 secured thereto. The mechanism for raising the curtain consists of rods 23 and 23<sup>a</sup> secured to the two ends of the cross-bar 20<sup>a</sup> of T-shaped lever 20, the rod 23 secured to the upper end of the cross bar 20<sup>a</sup> being secured to a bar 24 supported by arms 25 secured to rock shafts 26, journaled at one side of track 2, in plates 27 secured to two adjacent cross-ties 28. The bar 24 is made up of a number of sections secured to arms 25 and secured together between each pair of arms by means of turn buckles 29 so that the length of bar between each pair of arms may be adjusted for the most effectual operation of the door. 90 95 100 105

30 indicates an arm secured to each shaft 26 and 31 a supplemental rail supported 110



by means of links 32 secured to the free ends of arms 30, said supplemental rail extending above the rail of track 2 and having its free end extended at a distance as shown at 33 and loosely secured to the track rail as shown at 34 so that a car approaching the door will run onto the rail 31 and by its weight depress the extended ends of arms 30, thus rocking shafts 26 and with them swinging arms 25. This will draw the bar 24 back from the door frame so as to swing the long arm of the lever 20 upwardly and through the instrumentality of chains 18 and the sprocket wheels 14, secured to shaft 6, rotate the roller 5 so as to roll up the curtain 8. The rod 23<sup>a</sup> secured to the lower end of cross-bar 20<sup>a</sup> of lever 20 is secured to a bar 24<sup>a</sup> on the other side of the door frame from the bar 24 and is supported by arms 25<sup>a</sup> secured to rock shafts 26<sup>a</sup> journaled on cross ties 28, said bar being also divided in sections secured together by turnbuckles not shown similar to the construction of bar 24. Shafts 26<sup>a</sup> are rocked by means of arms 30<sup>a</sup> secured thereto and connected to supplemental rail 31<sup>a</sup> by means of links 32<sup>a</sup>. The adjacent ends of supplemental rails 31 and 31<sup>a</sup> are secured together by means of U-shaped strap 33.

It will be understood from the above description and an inspection of the drawings that a car approaching the door from either direction will depress the supplemental rail 31 or 31<sup>a</sup> and through the instrumentality of rock shafts 26 or 26<sup>a</sup> move the bar 24 or 24<sup>a</sup> away from the door so that the rod 23 or 23<sup>a</sup> swings the long arm of the lever 20 upwardly, rotating the roller 5 and lifting the curtain 8 so that the car can pass through the door. After the car has left the supplemental rail at the other side of the door the weight 22 pulls the long arm of the lever downwardly closing the door and returning the other operating parts to their former position.

As the operating mechanism for the curtain is outside of the track rails the danger

of injuring the animals, used in hauling cars, by the mechanism is substantially eliminated. If, however, the cars are operated by trolley as is the case in the large percentage of modern mines I provide a bridge 34 for carrying the current over the break 34<sup>a</sup> in the line wire 35 provided for the curtain 8.

Having thus described my invention what I claim is—

1. In an automatic door for mines, in combination with a tunnel, a track in the tunnel, a door frame secured in the tunnel, a roller journaled on said frame, a curtain secured to the roller, chain and sprocket gearing secured to the roller, a lever suitably fulcrumed and secured to said chain gearing, rock shafts journaled adjacent to the track, arms secured to said shafts, a bar secured to said arm, a rod connecting the bar and lever, other arms secured to the rock shafts, and a supplemental rail secured to the last mentioned arms and positioned over one of the track rails.

2. In an automatic door for mines, in combination with a tunnel, a track in the tunnel, a door frame secured in the tunnel, a roller journaled on said frame, a curtain secured to the roller, chain and sprocket gearing secured to the roller, a T-shaped lever suitably fulcrumed and secured to the chain gearing, the cross-bar of the lever having rods secured to its ends, rock shafts journaled at one side of the track, arms secured to said rock shafts, bars secured to said arms, the rods secured to the lever cross-bar secured to the bars, one on one side of the door frame, the other on the other, other arms secured to said rock shafts, a supplemental rail positioned above one of the track rails, and links connecting said supplemental rail and the last mentioned arms.

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

CHARLES W. CARMAN.

Witnesses:

D. B. HUNTER,  
G. H. NUGEN.