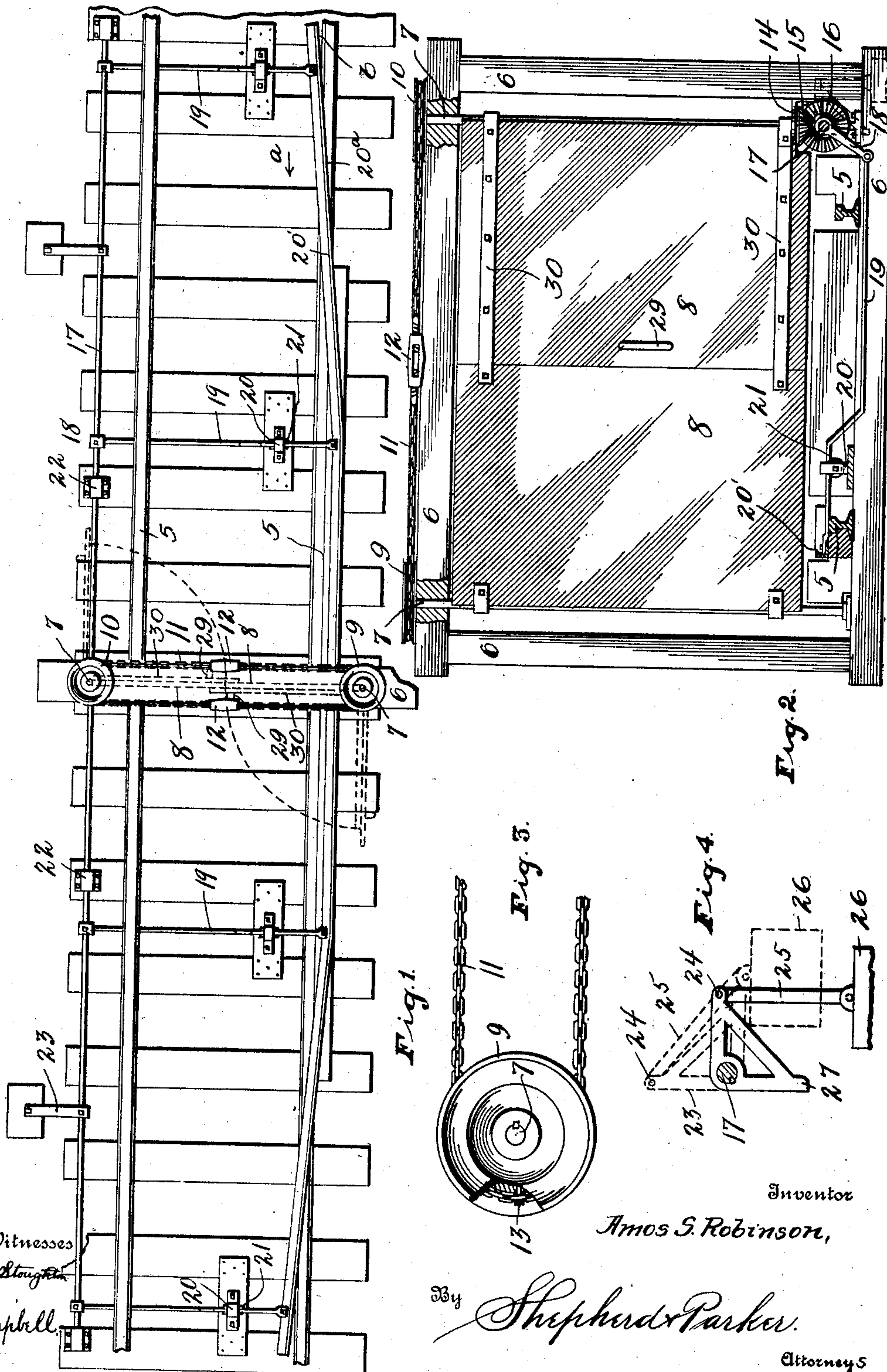


No. 859,522.

PATENTED JULY 9, 1907.

A. S. ROBINSON.  
MINE DOOR CONTROLLING APPARATUS.

APPLICATION FILED NOV. 14, 1906.



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# UNITED STATES PATENT OFFICE.

AMOS S. ROBINSON, OF NELSONVILLE, OHIO.

## MINE-DOOR-CONTROLLING APPARATUS.

No. 859,522.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed November 14, 1906. Serial No. 343,339.

*To all whom it may concern:*

Be it known that I, AMOS S. ROBINSON, a citizen of the United States, residing at Nelsonville, in the county of Athens and State of Ohio, have invented certain new and useful Improvements in Mine-Door-Controlling Apparatus, of which the following is a specification.

My invention relates to mine door controlling apparatus and has for its object the provision of a device of this character adapted to open and close mine doors with a minimum of power and with a minimum of strain upon said doors.

Further objects and advantages of the invention will be set forth in the detailed description which now follows:

In the accompanying drawing: Figure 1 is a plan view of a device constructed in accordance with the invention, Fig. 2 is a view in elevation illustrating a pair of mine doors and illustrating the rails forming the track in section, Fig. 3 is a detail view of one of the grooved pulleys hereinafter described, and, Fig. 4 is a detail view of the weighted members for closing the doors.

Like numerals designate corresponding parts in all of the figures of the drawing.

Referring to the drawing, the numerals 5 designate the two rails which form a mine railway.

The numeral 6 designates the framework which supports the doors that close the shaft. Mounted in this framework are shafts 7 to which the doors 8 are secured, said doors turning with the shafts. Mounted upon the upper ends of these shafts are grooved pulleys 9 and 10. These pulleys are connected by a chain 11, said chain having turn buckles 12 located therein for the purpose of tightening the same. A bolt 13 passes through the chain and into the grooved pulleys to prevent the chains from slipping from the pulleys. The chain 11 provides means for imparting movement to the left hand door in Fig. 2, from the shaft of the right hand door. Mounted upon the lower end of the shaft of this right hand door, the lower end of this shaft being mounted in a bracket 14, is a bevel pinion 15. This pinion meshes with a bevel gear wheel 16 which is fast upon a shaft 17. This gear wheel 16 is slightly larger than the pinion 15. It is to be understood, however, that I do not limit myself to any exact proportions between these gear wheels, as any desired ratio between said gear wheels may be used. A plurality of crank arms 18 are secured to the shaft 17. These crank arms are connected by transversely disposed rods 19 with a rail 20'. This rail is formed by a piece of angle iron, though it is to be understood that it may be of any desired form in cross section.

The transversely disposed rods 19 pass through bearings 20 and rest upon rollers 21 which are mounted in

said bearings. The shaft 17 lies parallel with one of the rails 5 and is mounted in bearings 22. Triangular brackets 23 are secured to this shaft 17 and pivoted to one end of these triangular brackets as at 24 are links 25. Weights 26 are pivoted to the lower ends of these links. The arms 27 of these triangular brackets serve a purpose which will be hereinafter described.

The operation of the device is as follows: Assuming that a car is moving in the direction of arrow *a* in Fig. 1, the flange of one of the front wheels of said car enters between the rails 5 and 20' at *b* and forces the rail 20 to the right. This entire rail moves bodily to the right as the car progresses toward the doors 8, said wheel riding along the inclined portion 20<sup>a</sup> of the rail 20'. When this rail is thus forced toward the right, the rods 19 through their connection with the cranks 18 rock the shaft 17. This in turn imparts a partial rotation to the gear wheel 16 and through the bevel pinion 14 imparts a partial rotation to the shaft 7. This swings the right hand door 8 open to the dotted line position illustrated in Fig. 1 and through the chain 11 imparts a like motion to the left hand door 8. Handles 29 are secured to these doors and provide means for permitting the miners to pass through when desired, since these doors may be pulled open by these handles. After a car passes, the weights 26 act to return the parts to the position shown in the drawing, the overlapping ends of the battens 30 stopping these doors at their central position.

By referring to Fig. 4, it will be seen that during the initial movement of the shaft 17, the fulcrum 24 moves over toward said shaft, rendering it easy to raise the weights. It is desirable, however, that the full force of these weights be available when they start to close the door. To this end the arm 27 is provided. After the weights have been partly raised, the lower ends of the arms 27 contact with the links 25 and force the weights out to the dotted line position shown in Fig. 4. The full force of these weights is therefore available.

From the foregoing description, it will be seen that simple and efficient means are herein provided for accomplishing the objects of the invention, but while the elements shown and described are well adapted to serve the purposes for which they are intended, it is to be understood that the invention is not limited to the precise construction set forth, for instance, if it be desired to have both of the doors open in the same direction instead of opening in opposite directions, this may be readily accomplished by merely crossing the chain 11 in the usual and well known manner. Opening these doors in the opposite direction as shown, is, however, desirable, for the reason that there is usually a strong air current in a mine and it would be difficult to open both of these doors against said air current. By opening them in opposite directions, it will be seen that the air current aids the operation as much as it retards it.



In other words, one of the doors will be opened in the direction of the air current, while the other door will be opened against said air current.

What I claim is:

- 5 1. The combination with a mine railway, of a bodily movable rail which moves over one of the rails of said railway, transversely disposed rods connected to said rail and passing beneath the other of said rails, a rock shaft, crank arms connected to said rock shaft and to said transversely disposed rods, a pair of mine doors, and connections between said rock shaft and one of said mine doors and means for simultaneously opening said doors in opposite directions.
- 10 2. The combination with a mine railway, of a bodily movable rail which moves over one of the rails of said railway, transversely disposed rods connected to said rail and passing beneath the other of said rails, a rock shaft, crank arms connected to said rock shaft, and to said transversely disposed rods, a pair of mine doors, connections between said rock shaft and one of said mine doors, means for simultaneously opening said doors, and weights for returning said doors to their closed position.
- 15 3. The combination with a mine railway, of a bodily movable rail which moves over one of the rails of said railway, transversely disposed rods connected to said rail
- 20
- 25

and passing beneath the other of said rails, a rock shaft, crank arms connected to said rock shaft, and to said transversely disposed rods, a pair of mine doors, connections between said rock shaft and one of said mine doors, means for simultaneously opening said doors, a bracket carried by said rock shaft, a link pivoted to one of the arms of said bracket, and a weight pivoted to the lower end of said link, the lower end of said bracket being adapted to contact with said link to throw the weight away from the rock shaft, substantially as described. 30 35

4. The combination with a mine railway, of a bodily movable rail which moves over one of the rails of said railway, a rock shaft, crank arms connected to said rock shaft, connecting rods between said crank arms and the bodily movable rail, a pair of upright shafts, a mine door connected to each of said upright shafts, connections between said mine doors for causing them to move simultaneously, a bevel gear wheel upon one of the upright shafts, and a bevel gear wheel upon the rock shaft with which said first named bevel gear wheel meshes. 40 45

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

AMOS S. ROBINSON.

Witnesses:

A. J. JUNIPER,  
JOHN HILL.