

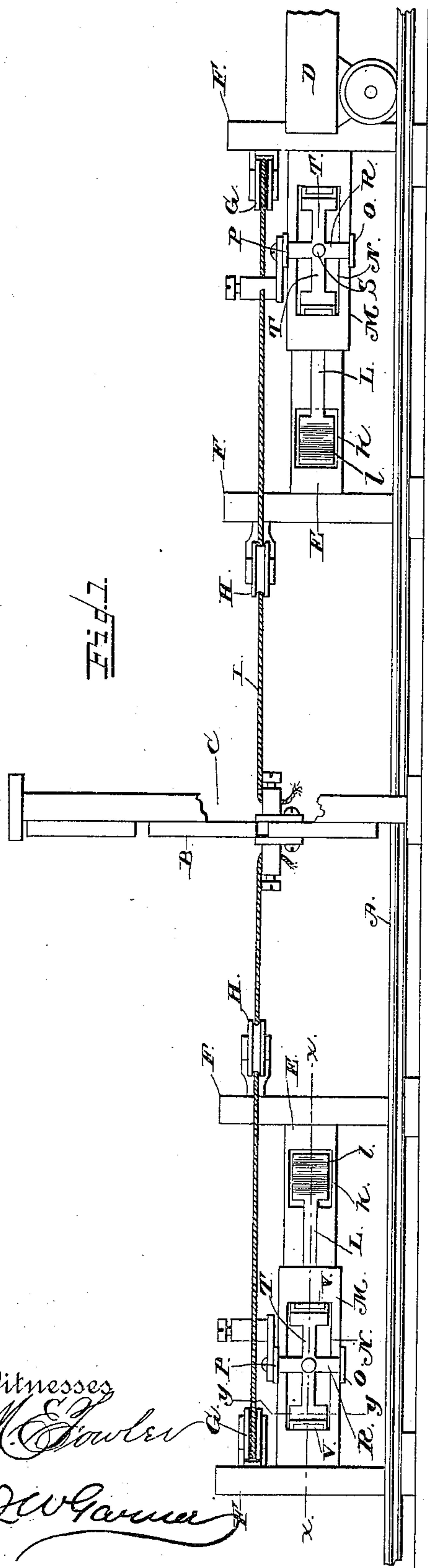
(No Model.)

2 Sheets—Sheet 1.

G. W. NATION.  
SHUTTER OR DOOR FOR MINES.

No. 350,599.

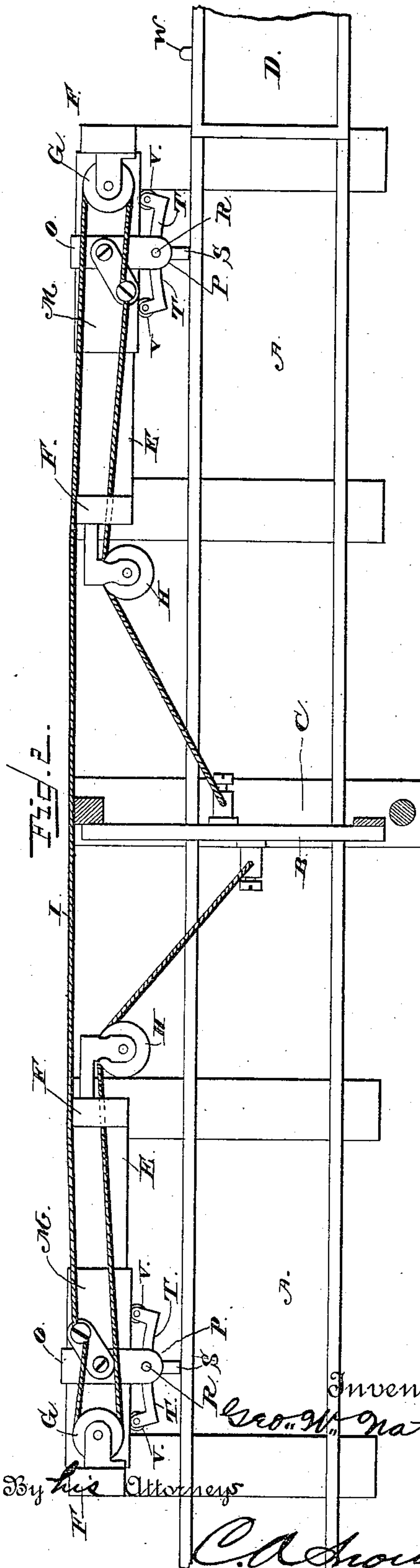
Patented Oct. 12, 1886.



Witnesses

M. Fowler

*J. W. Garner*



Inventor

Geo. W. Nation

By his Attorneys

C. A. Howells

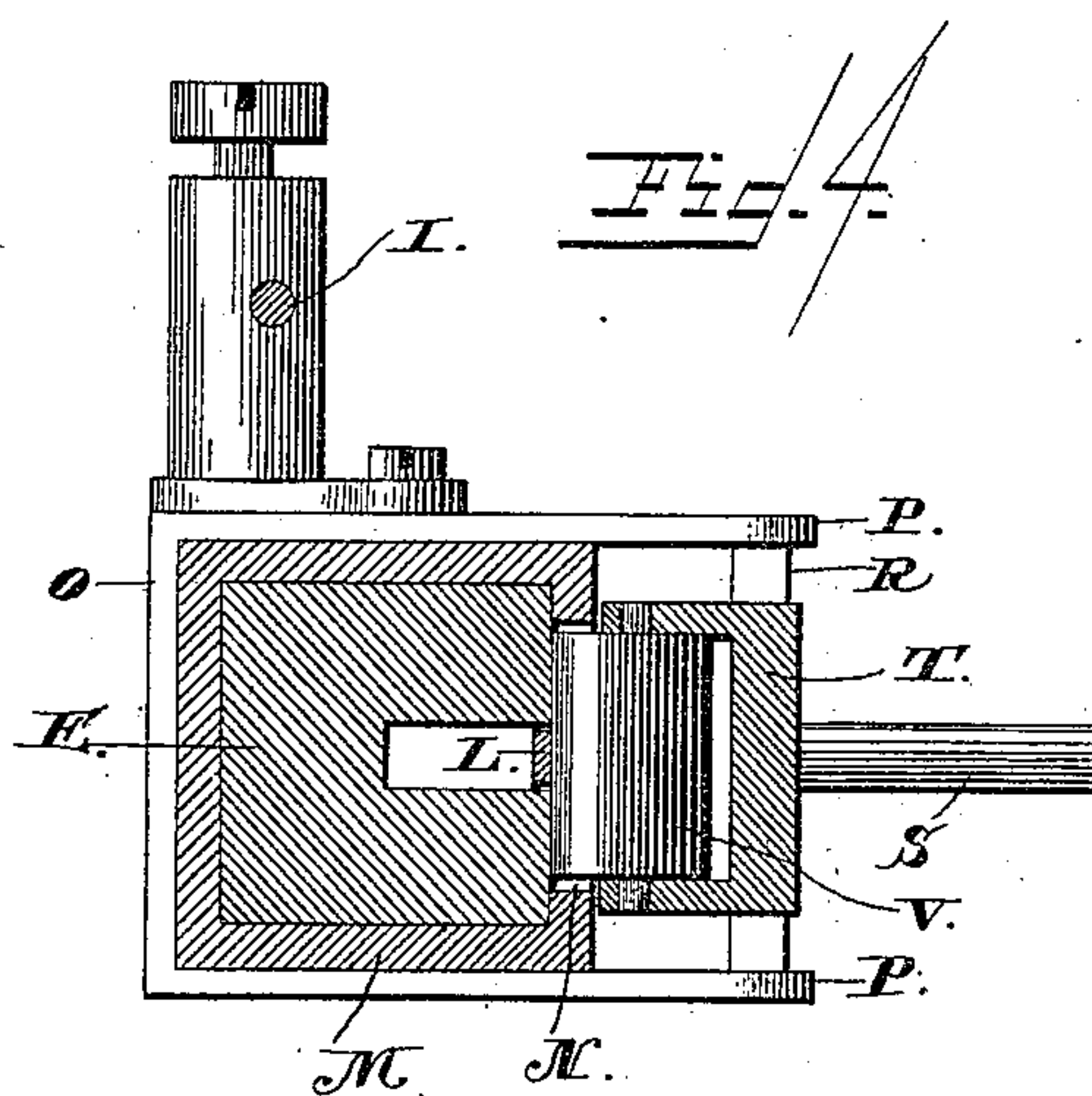
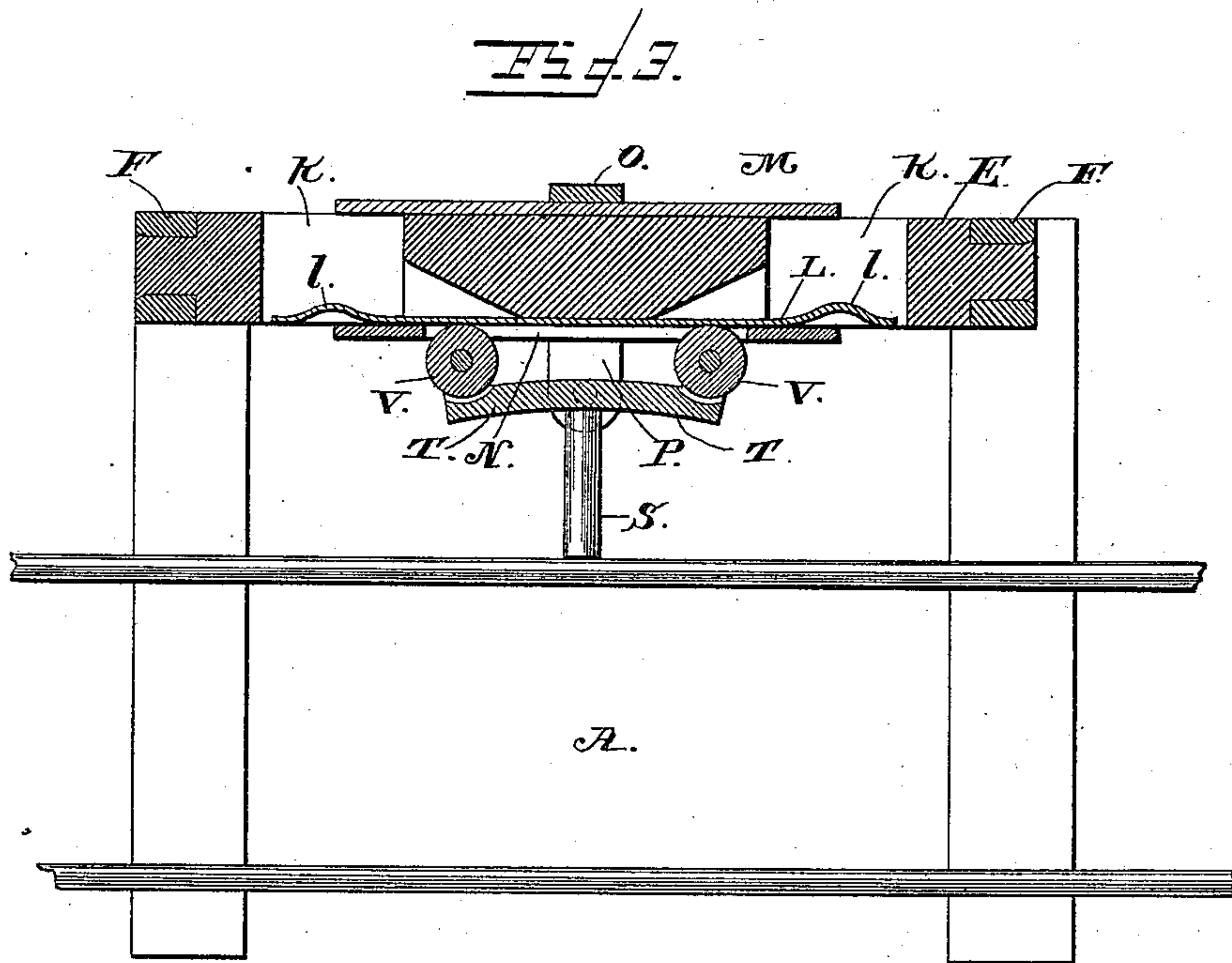
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# UNITED STATES PATENT OFFICE.

GEORGE WILLIAM NATION, OF WHAT CHEER, IOWA.

## SHUTTER OR DOOR FOR MINES.

SPECIFICATION forming part of Letters Patent No. 350,599, dated October 12, 1886.

Application filed June 10, 1886. Serial No. 204,767. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE WILLIAM NATION, a citizen of the United States, residing at What Cheer, in the county of Keokuk and State of Iowa, have invented a new and useful Improvement in Shutters or Doors for Mines, of which the following is a specification.

My invention relates to an improvement in apparatus for opening and closing mine-doors; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

The object of my invention is to provide an apparatus for automatically opening and closing the door as the car passes along the track, and thus saving the time of opening and closing the door, and also dispensing with the services of a person to do the same.

In the drawings, Figure 1 is a side elevation of an apparatus embodying my improvements. Fig. 2 is a top plan view of the same. Fig. 3 is a longitudinal section taken on the line *x x* of Fig. 1. Fig. 4 is a transverse section taken on the line *y y* of Fig. 1.

A represents the usual railroad-track with which the mine is provided, and B represents the hinged door which is located in the doorway C.

D represents one of the cars on the track. Along one side of the track and on each side of the door is a longitudinal beam, E, said beams being supported horizontally by vertical posts F, which are located at each end of the said beams. The post F at the end of each beam E farthest from the door is provided on its inner side with a pulley, G, and the post at the opposite end of each beam E is provided on its side nearest the track with a pulley, H.

I represents an operating-cord, which extends alongside the track and is passed over the pulleys G, from whence the ends of the said cord pass on the inner side of the pulleys H, and are attached to opposite sides of the door, as shown in Fig. 2. In each of the beams E, and near the ends thereof, are made rectangular recesses K, which are of considerable depth.

L represents springs, which are secured in longitudinal grooves made in the beams E,

and are provided with enlarged extremities *l*, which are concave in a vertical direction and bear in the openings K.

On each of the beams E is placed a sliding block, M, the said blocks having rectangular longitudinal central openings, through which the beams E pass, whereby the said blocks are free to slide longitudinally on the said beams. In the face of each block nearest the railway-track, at the ends thereof, are made openings N. Stirrups or straps O are bent around the center of each of the blocks M, and the outer ends, P, of the said stirrups project horizontally from the inner faces of the blocks M at the upper and lower sides thereof. In said projecting ends of the stirrups or straps are journaled vertical rock-shafts R, which are provided with outwardly-extending horizontal tappet-arms S and with curved longitudinally-extending arms T, which extend in opposite directions from the shafts R, and in the outer ends of the said arms are journaled rollers V. These rollers enter the openings N in the blocks M and bear against the inner faces of the beams E, thereby keeping the tappet-arms S normally extending outwardly from the said beams and exactly at right angles thereto. One of the blocks M is attached to the inner side of the operating-cord I and the other block is attached to the outer side thereof, or the side of the cord I farthest from the railway-track. By this construction it will be readily understood that when the door is opened in either direction the blocks M will be moved simultaneously in opposite directions.

Each car D is provided on the side adjacent to the beams E with a projecting bracket or catch, W.

The operation of my invention is as follows: The door B is normally closed. When the car approaches the said door from either side, the catch or bracket W strikes against the projecting tappet-arm S of one of the blocks M, and thereby moves the said block longitudinally on its beam E. This movement is communicated to the block on the opposite beam, and also to the door, causing the latter to open in the direction from the car, as will be very readily understood. The blocks M move with the car until one of the rollers V of each block registers with one of the openings K at



the ends of the beams E, and bear upon the concaved ends of the springs L. The pressure of the car against the tappet-arms causes the shaft R to partly rotate, when the blocks reach either limit of their movement, thus forcing the roller in upon and against the resistance of the spring L and inclining the tappet-arm so as to cause the latter to disengage the catch or bracket of the car. By this time the door has swung sufficiently far to permit the car to pass readily through the doorway. When the car reaches the block M on the opposite side of the door, its catch W comes in contact with the tappet-arm S thereof and slides the said block in the contrary direction, thus causing the door to be swung to.

The function of the springs L is to keep the tappet-arm S projected normally at right angles from the blocks M, so as to cause the said arms to be engaged by the car when going in either direction.

I reserve the right to employ this apparatus for other purposes than opening mine-doors. For instance, the invention can be used to advantage for opening and closing farm-gates, railroad-gates, and turning switch-lights.

I do not wish to be limited to the precise construction and arrangement of the parts. For instance, the number and arrangement of the pulleys may be changed to suit the circumstances of the case.

Having thus described my invention, I claim—

1. The combination, with the door, of the operating-cord I, attached to opposite sides thereof and guided upon suitable pulleys or sheaves, and the sliding blocks M on opposite sides of the doorway, attached to the operating-cord and having the tappet-arms projecting from the said blocks in the path of the cars, whereby the latter strike the said tap-

pet-arms and move the blocks when approaching the door from either direction, for the purpose set forth, substantially as described.

2. The combination of the door, the operating-cord I, attached to opposite sides thereof and guided upon suitable pulleys, with the beams or guides E, the sliding blocks M thereon and attached to the cord, the rock-shafts attached to the said sliding blocks and having the tappet-arms S, and means to incline the said tappet-arms to disengage the car when the block reaches either end of its path, substantially as described.

3. The combination, with the door, of the sliding blocks M, connected thereto, the guides E for the sliding blocks, having the recesses K at each end of the path of the blocks, and the rock-shafts R, journaled to the sliding blocks and having the tappet-arms S, and the bearing-arms T, to engage the faces of the guides or beams E and enter the openings K at each end thereof, for the purpose set forth, substantially as described.

4. The combination, with the door, of the sliding block M, connected thereto, the guides E, for the sliding blocks, having the recesses K at each end of the path of the blocks, and the rock-shafts R, journaled to the sliding blocks and having the tappet-arms S, and the bearing arms T, to engage the faces of the guides or beams E and enter the openings K at each end thereof, and the springs L, bearing in the recesses K, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GEORGE WILLIAM NATION.

Witnesses:

B. S. BRAINARD,

C. E. BRAINARD.