
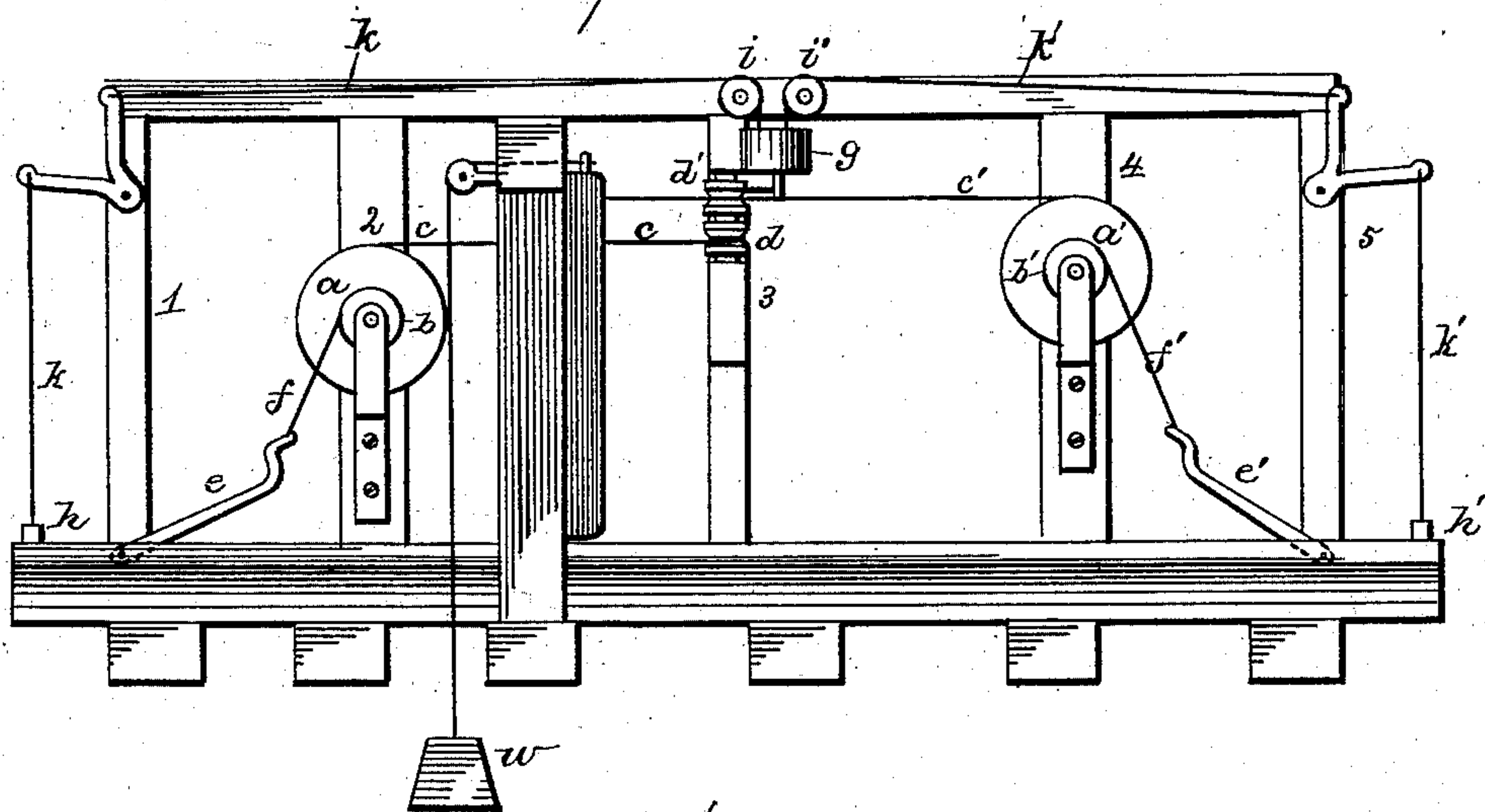


(No Model.)

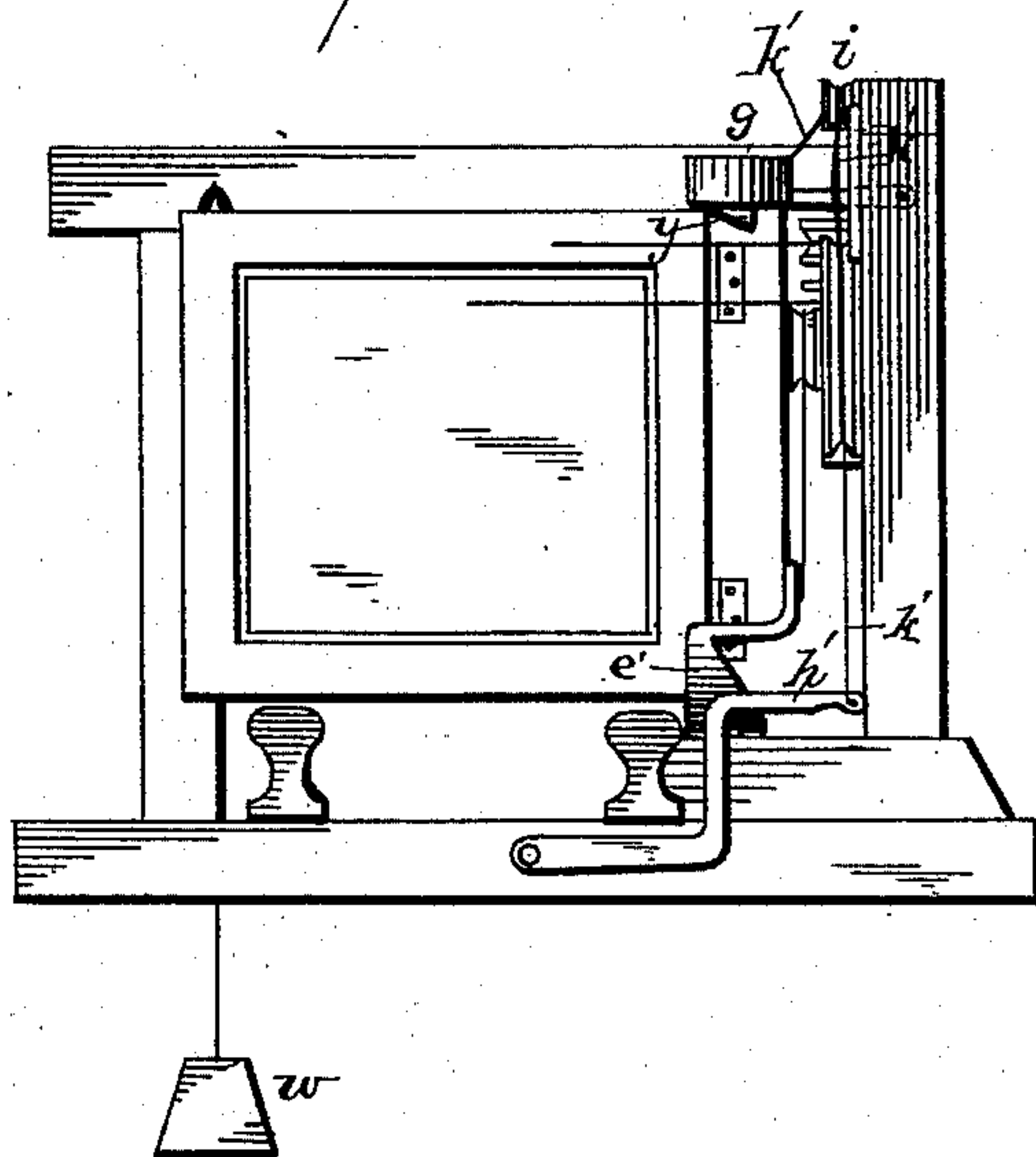
J. CASE & J. A. WHITAKER.

DEVICE FOR AUTOMATICALLY OPENING AND SHUTTING DOORS IN  
COAL MINES.

No. 282,269.


Patented July 31, 1883.

File 2.



— **Witnesses.** —

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# UNITED STATES PATENT OFFICE.

JOHN CASE AND JOHN A. WHITAKER, OF McDONALD, PENNSYLVANIA.

DEVICE FOR AUTOMATICALLY OPENING AND SHUTTING DOORS IN COAL-MINES.

SPECIFICATION forming part of Letters Patent No. 282,269, dated July 31, 1883.

Application filed January 11, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN CASE and JOHN A. WHITAKER, citizens of the United States, residing at McDonald, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Automatically Opening and Shutting Doors in Coal-Mines, of which the following is a specification, reference being had therein to the accompanying drawing.

Our invention relates to a device for automatically opening the doors in the passages in coal-mines to let cars enter or pass out, and again closing them after a car has passed through.

In coal-mines the passages for cars to enter and pass out are generally guarded by doors to control or exclude the currents of air, and these doors have to be opened and shut every time a car passes in or out. To avoid the stopping of the cars for the driver to open and shut them, a boy is kept at each door, whose duty it is to open and again shut it after the passage of a car. This involves expense, which to avoid we have invented and constructed a device by which each car, on approaching a door, automatically opens and closes it after passing through. Posts placed on both sides of the railroad on which the cars run are braced by a cross-piece overhead to support the swinging door. The rails of the road are narrow; but the flanges on the car-wheels are wide enough to extend several inches beyond them.

The accompanying drawing represents our invention.

In the passage of a coal-mine, parallel with the railroad and at the rear of a door-post, we place a series of posts, 1 2 3 4 5, of which the top brace is higher than that of the door-posts. Three of these posts, 3, 4, and 5, are on the side where the door is hinged, and the door-posts stand in front of the space between the posts 2 and 3. On posts 2 and 4 are sheaves  $a a'$ , of a diameter that, if a rope be attached to their circumference, one half-revolution takes up a length of the rope equal to the distance between the door-post, against which the door leans when shut, and the door when fully opened for a car to pass. At the outside of the sheaves  $a a'$ , and of a piece with them or rigidly attached thereto, are smaller sheaves,

$b b'$ , of about one-fourth the diameter of the former. To the sheaves  $a a'$  ropes  $c c'$  are fastened at a point of their circumference beyond the center at the top, passing from there over pulleys  $d d'$  on post 3 to the door, to which their ends are attached, so that when pulled at by the rotating sheaves the door opens. At a suitable distance from both sides of the door, that, when opening, it does not interfere with the animal drawing the car, are treadles  $e e'$ , hinged to one of the sleepers, and which can be moved up or down close to the outside of the rails. These treadles, when the door is shut, are raised considerably higher than the top of the rails by ropes  $f f'$ , wound around the smaller sheaves,  $b b'$ , and hooked to the ends of the slightly-curved treadles, so that when the wide flanges of the car-wheels pass over them they are pressed down to a level with the rails. The ropes  $f f'$  on the smaller sheaves, being pulled at by the descending treadles, cause the sheaves to revolve and the ropes  $c c'$  on the sheaves  $a a'$  to draw the door open to its full extent, where it is held by the catch  $g$ . This catch  $g$  has a vertical play just sufficient to allow the door to pass under it, when its inclined part  $y$  catches over the edge of the door and holds it in position. When one of the bars  $h h'$  is operated, the cord, wire, or chain  $k$  or  $k'$  raises the latch upward, so as to release the door when the weight  $w$  swings the door back. The car, having passed through the opening of the door, passes over the second treadle, now on a level with the rails, without being obstructed thereby. Before arriving at one of the treadles on their approach to the door, the car-wheels encounter horizontal bars  $h h'$  at a right angle with the rails and above their level. The bars are pivoted and yield to the pressure of the wheels while passing over them. At the ends of the bars  $h h'$  are ropes  $k k'$ , that, when the bars are depressed, turn bell-cranks and extend along the upper brace of the row of posts over pulleys  $i i'$  to the catch  $g$  and lift it up, to allow the door, when opened, to pass under, or to set the door free to be shut by means of a weight attached to a cord that passes over a pulley on the door-post.

Having thus described our invention, we claim—

1. The hereinbefore-described device for au-



tomatically opening and shutting doors in passages in coal-mines, consisting in the combination of sheaves *a a'* and *b b'*, treadles *e e'*, bars *h h'*, ropes *c c'*, *f f'*, *k k'*, and catch *g* with  
5 the passage-door, all arranged substantially as shown and set forth.

2. The combination of the door, the treadles *e e'*, the ropes *f f'*, pulleys *a a' b b'*, cords *c c'*, pulleys *d d'*, and catch *g* with a mechanism  
10 for moving the catch, substantially as shown.

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

JOHN CASE.

JOHN A. WHITAKER.

Witnesses:

T. F. LEHMANN,

I. E. HIRSCH.