

C. MATTHEWS.

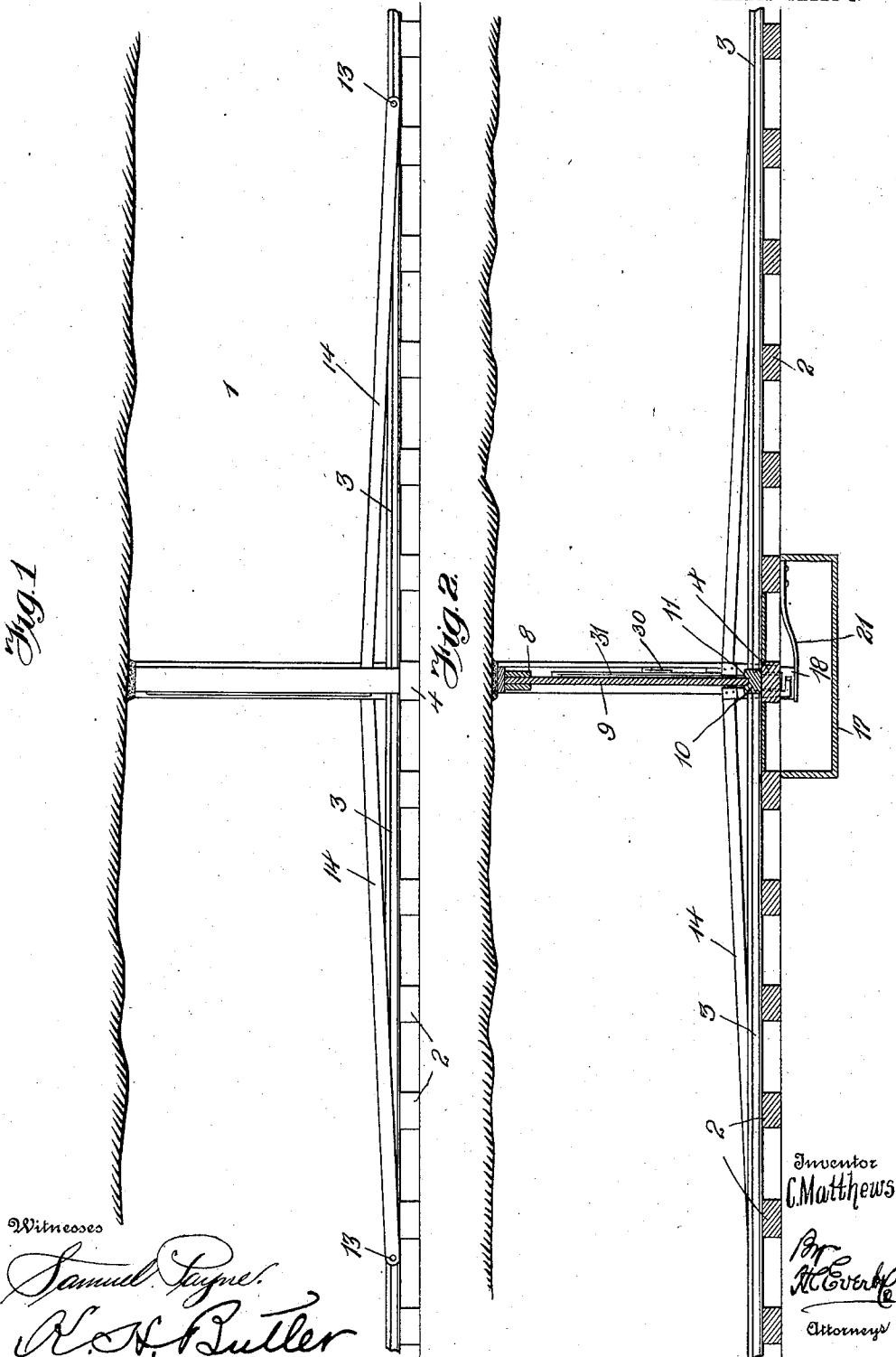
DOOR FOR MINES, QUARRIES, ELEVATOR SHAFTS, &c.

APPLICATION FILED OCT. 24, 1908. RENEWED NOV. 27, 1909.

963,611.

Patented July 5, 1910.

2 SHEETS—SHEET 1.



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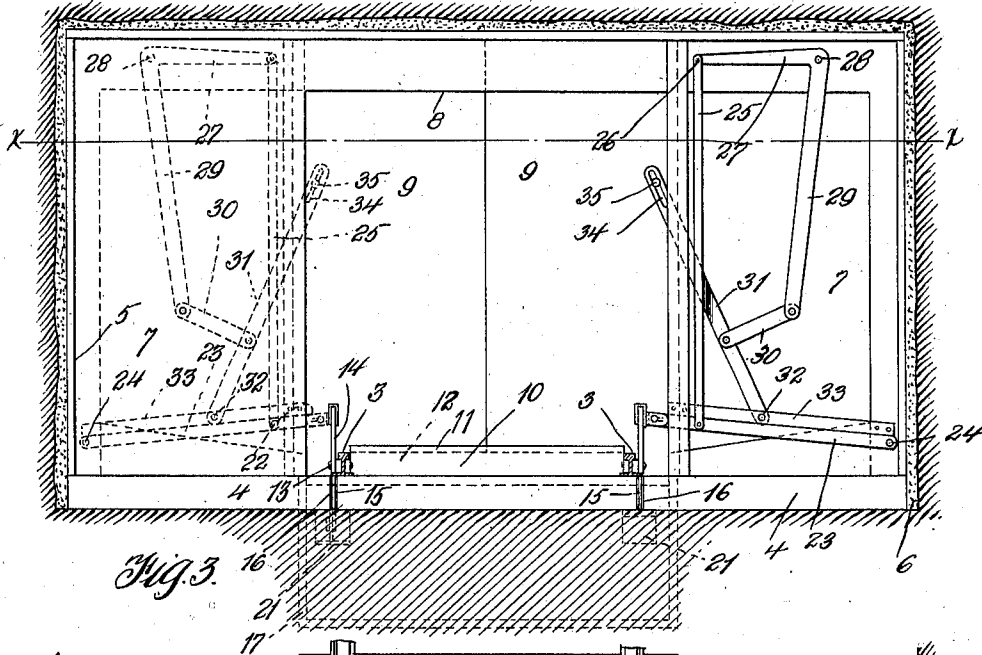


Fig. 3.

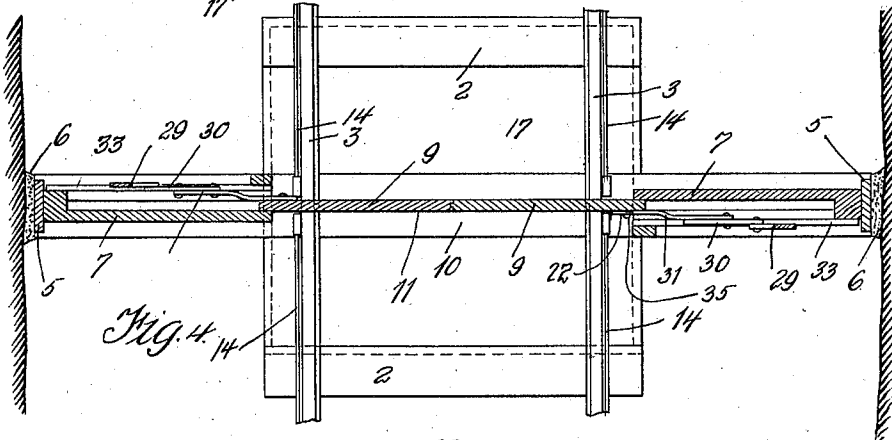


Fig. 4.

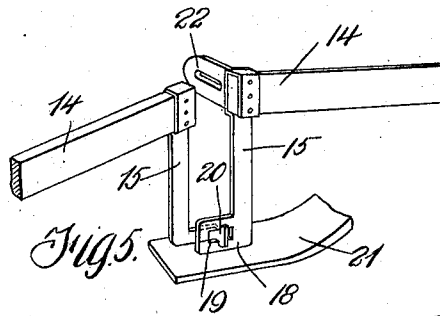


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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DOOR FOR MINES, QUARRIES, ELEVATOR-SHAFTS, &c.

963,611.

Specification of Letters Patent.

Patented July 5, 1910.

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To all whom it may concern:

Be it known that I, CHARLES MATTHEWS, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Doors for Mines, Quarries, Elevator-Shafts, &c., of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to doors for mines, quarries, elevator shafts, and places where it is desirable to use automatically closing doors.

The primary object of my invention is to provide automatic doors wherein positive and reliable means are employed for opening the doors upon the approach of a car and closing the same after the car has passed between the doors.

Another object of my invention is to provide a door closing and opening mechanism that can be easily operated without the attention on the part of an operator, the mechanism being simple, durable and highly efficient in connection with mine doors for maintaining the entrance to a mine closed or for partitioning one part of a mine from another.

A still further object of my invention is to provide automatic doors that can be used as fire doors in elevator shafts, closures for the upper ends of blast furnaces, or in connection with various kinds of tunnel or subway work.

With the above and other objects in view which will more readily appear as the invention is better understood, the same consists in the novel construction, combination and arrangement of parts to be hereinafter described and then specifically claimed.

In the drawings:—Figure 1 is an elevation of the automatic doors as located in a mine, Fig. 2 is a cross sectional view of the same, Fig. 3 is a front elevation of the automatic doors, Fig. 4 is a horizontal sectional view of the same, and Fig. 5 is a perspective view of a portion of the mechanism.

In the accompanying drawings, 1 designates a mine or subway in which are laid ties 2 for a track, comprising rails 3. One of the ties 2, which I have designated 4, forms

a sill for a rectangular door-frame 5, this door-frame being secured within the mine or subway 1 by concrete 6 or similar material. The door-frame 5 supports a casing 7 having a door-way 8 formed therein, said casing supporting movable doors 9 adapted to close the door-way 8.

Hinged between the rails 3 and alining longitudinally with the casing 7 is a block 10 having longitudinal grooves 11 formed therein. The doors 9 are cut away, as at 12, to clear the rails 3 and slide in the grooves 11 of the block 10, whereby when the doors are closed, the mine or subway 1 will be completely partitioned.

Pivotally connected to the rails 3, as at 13, are actuating bars 14, the inner ends of said bars terminating above the block 10 where they are connected to a yoke-shape member formed of a pair of L-shaped straps 15. Straps 15 extend downwardly through slots 16 formed in the side edges of the tie 4 into a box-like structure 17 located in the road bed of the track. The lower ends of the straps 15 are connected together by providing one of the straps with an enlarged end 18 having an opening 19 formed therein through which extends the end 20 of the associate strap, this connection causing the straps to move in unison where one of the bars 14 is actuated.

Within the box-like structure 17 is arranged two flat springs 21, said springs being secured to one of the ties 2 and supporting the lower ends of the straps 15. The springs 21 normally support the bars 14 at an inclination, as shown in Figs. 1 and 2, and allow said bars to recede as a car passes over the rails 3.

The upper ends of the straps 15 are provided with slotted lugs 22 and loosely connected to said lugs are bars 23, which are pivotally connected to the casing 7, as at 24. Pivotally connected to the forward ends of the bars 23 are connecting rods 25, said rods being pivotally connected, as at 26, to the short arms 27 of bell crank levers, said bell crank levers being pivotally connected, as at 28, to the casing 7. The longer arms 29 of said bell crank levers are pivotally connected by links 30 to arms 31, said arms being pivotally connected, as at 32,

to braces 33 carried by the casing 7. The upper ends of the arms 31 are slotted, as at 34, to receive pins 35 carried by the doors 9. The arms 31 are slightly bent, whereby said arms, links 30 and the bell crank levers can be compactly arranged within the casing 7.

Operation: With a car moving upon the rails 3, the tread of the car wheel is adapted to engage the inclined actuating bars 14, pressing down upon said bars until the bars lie in a horizontal plane with the rails 3. Upon the car wheel striking the bars 14, the doors 9 commence to open, this being accomplished by the forward ends of the bars 23 being lowered, which through the medium of the bell crank levers, links 30 and arms 31 gradually swing the doors 9 to an open position. By connecting the straps 15 together, the actuating bars 14 upon one side of the door-way will be lowered simultaneously with the bars upon the opposite side of the door-way, whereby the doors will be maintained open, while the car passes through the door-way 8. As heretofore stated, the springs 21 are adapted to elevate the actuating bars 14 immediately upon a car passing off the same, and close the doors 9.

I would have it understood that coil springs can be used in lieu of the flat springs 21 and that the entire structure can be constructed of light and durable metal or similar non-fusible material.

By referring to Fig. 4 of the drawings, it will be observed that the casing 7 is closed upon opposite sides and that the arms 31, bell crank levers 29 and links 30 are exposed upon opposite sides of the casing 7, this arrangement being essential to maintain a closing and opening movement of the doors 9 when the bars 14 are depressed. I reserve the right, however, to incase the arms, bell crank levers and links, whereby coal dust or similar material can not interfere with the operation of the automatic doors.

While in the drawings forming a part of this application there is illustrated the preferred embodiments of my invention, it is obvious that the same can be varied or changed as to shape, proportion and manner of assemblage without departing from the spirit of the invention.

Having now described my invention what I claim as new, is:—

1. The combination of a frame, a casing supported thereby and provided with a door-way, doors slidably mounted in said casing and adapted to close said door-way, a track extending through the door-way, longitudinally extending inclined actuating bars arranged in pairs, said bars pivotally connected at one end with said track, depending yoke-shaped members pivotally connected to the confronting ends of each pair of bars, springs located below and bearing against said members for normally supporting the confronting ends of each pair of bars above the plane of the track, transversely extending bars pivotally connected to said casing and projecting in said door-way, means for attaching said transversely extending bars to one of the actuating bars of each pair, bell crank levers pivotally mounted in said casing, rods connecting one of the arms of the bell crank levers with said transversely extending bars, pivoted arms supported by said casing and loosely connected with said doors, and links connecting said pivoted arms with the other arms of said bell crank levers.

2. The combination of a frame, a casing carried thereby and formed with a door-way, doors arranged within said casing for closing said door-way, a track extending through said door-way, two pairs of inclined actuating bars connected with said track, depending yoke shape members connected to the confronting ends of said actuating bars, springs engaging said members for normally maintaining the confronting ends of said actuating bars in an elevated position, bars pivotally connected to said casing and to one of the actuating bars of each pair, arms pivotally supported by said casing and loosely connected with said doors, and means carried by said casing and actuated by a downward movement of said bars for moving the doors.

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

CHARLES MATTHEWS.

Witnesses:

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A. J. TRIGG.