No Model.)

C. SWAN & G. M. WHAITE.

MINE DOOR.

No. 456,446. Patented July 21, 1891.

Fig. 1

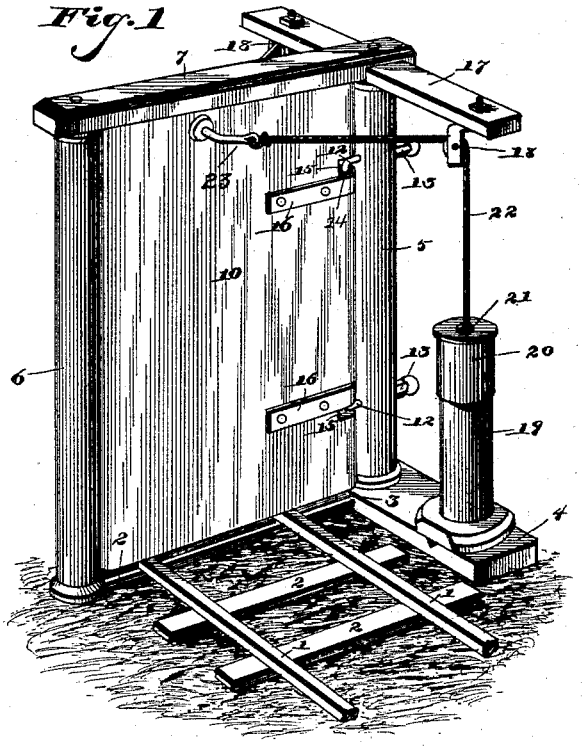


Fig. 4.

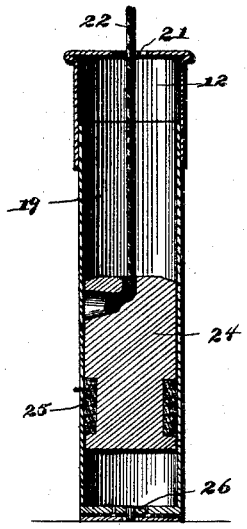


Fig. 2.

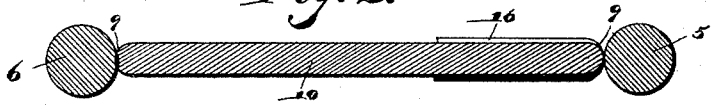
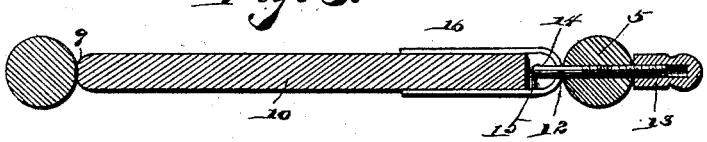


Fig. 3.



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By their Attorneys,

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UNITED STATES PATENT OFFICE.

CHARLES SWAN AND GEORGE M. WHAITE, OF GLENBURN, ILLINOIS.

MINE-DOOR.

SPECIFICATION forming part of Letters Patent No. 456,446, dated July 21, 1891.

Application filed April 24, 1890. Serial No. 349,314. (No model.)

To all whom it may concern:

Be it known that we, CHARLES SWAN and GEORGE M. WHAITE, citizens of the United States, residing at Glenburn, in the county of Vermilion and State of Illinois, have invented a new and useful Mine-Door, of which the following is a specification.

This invention relates to improvements in mine-doors.

The objects and advantages of the invention, together with the novel features thereof, will appear in the following description, and be particularly pointed out in the claim.

Referring to the drawings, Figure 1 is a perspective of a mine-door constructed in accordance with our invention. Fig. 2 is a transverse view through the door; Fig. 3, a transverse section through the hinge. Fig. 4 is a vertical longitudinal section of one of the cylinders.

Like numerals indicate like parts in all the figures of the drawings.

1 represents the usual rails forming the track, which rails are mounted upon a series of cross-ties 2, one of which is provided with a strip 3, combining therewith to form a sill.

At one side of the track and running parallel thereto is a side sill 4, from the center of which, opposite the end of the sill 3, rises the hinge-post 5, and at the opposite side of the track and end of the door-sill 3 is located a second vertical post 6, the two posts being connected at their upper ends by a transverse narrow strip 7. The posts 5 and 6 are cylindrical, as shown, and the opposite edges of the door 10 are rounded, as at 9, which door is designed to exactly fit between the strips 7 and door-sill and the posts 5 and 6, and by reason of the post being cylindrical and the edges of the door being curved a substantially air-tight joint or connection is effected between the door and frame. The hinge-post 5 is transversely perforated near its upper and lower ends, and through the same are passed L-shaped bolts 12, the rear threaded ends of which are provided with nuts 13 and the inner L-shaped ends of which are turned inwardly toward each other and take into and bear in openings 14, formed in the adjacent ends or bottom and top, respectively, of an upper and lower recess 15, formed in the hinge-edge of the door, the bearing ends of said recesses being surrounded by metallic straps 16, bolted to the opposite faces of the door.

Mounted upon the hinge-post 5 is a cross-arm 17, which extends parallel with the track and sill 4, and in the ends of the posts there is swiveled a sheaf and pulley 18, below which and mounted upon the sill 4 is a pair of vertical cylinders 19, one of which is hid by the door, provided at their upper ends with removable caps 20, centrally perforated, as at 21, and into said cylinders extend the terminals of door-operating ropes 22, the inner ends of which are, after having been passed over pulleys, connected to perforated studs 23, secured to the opposite sides of the door. The opposite ends of the ropes are connected to weighted pistons 24, having air-tight connections with the walls of the cylinders by means of a suitable packing 25, surrounding the pistons, which packing is preferably formed by a series of rubber rings located in an annular recess formed upon the piston. At or near the lower end of each of the cylinders there is located a valve 26, perforated and adapted to open upwardly, through which air is drawn when the door is opened in either direction by reason of the piston-head acting to form a vacuum, which air is compressed by the returning piston when the door is closed by the latter and forms a cushion for the piston, so that the door moving in either direction does so comparatively slowly. By regulating the movement of the valve 26 in a suitable way the escape and admission of air may be regulated, and in this way the ease with which the door may be operated is acquired. A door thus constructed requires no attention, and may be readily operated by a mule's head coming in contact with the same in either direction. In case of accident in the mine the door will not in any way interfere with the ready escape of the miners, as it will open as well from either direction and to its entire capacity. The simplicity of the construction warrants its durability and cheapness of construction.

Having described our invention, what we claim is—

In a mine-door, the combination, with the door-frame comprising opposite posts, of a door having opposite rounded edges and fit-

ting the frame, one edge of the door being provided with a pair of recesses, the top of one recess and bottom of the other recess being provided with bearing-openings, metallic straps embracing the parts of the door in which said openings are formed and secured to the opposite faces of the door, opposite inwardly-disposed L-shaped bolts passed through the adjacent cylindrical post and having their inner ends terminating in the bearing-openings of the recesses, and nuts on the outer ends of the bolts for securing them adjustably and removably in place, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

CHARLES SWAN.
GEORGE M. WHAITE.

Witnesses:
CHARLES A. ROGERS,
JAMES A. ROGERS.