(No Model.)

P. F. SNYDER.

OPERATING MINE DOORS.

No. 347,135. Patented Aug. 10, 1886.

Fig. 1.

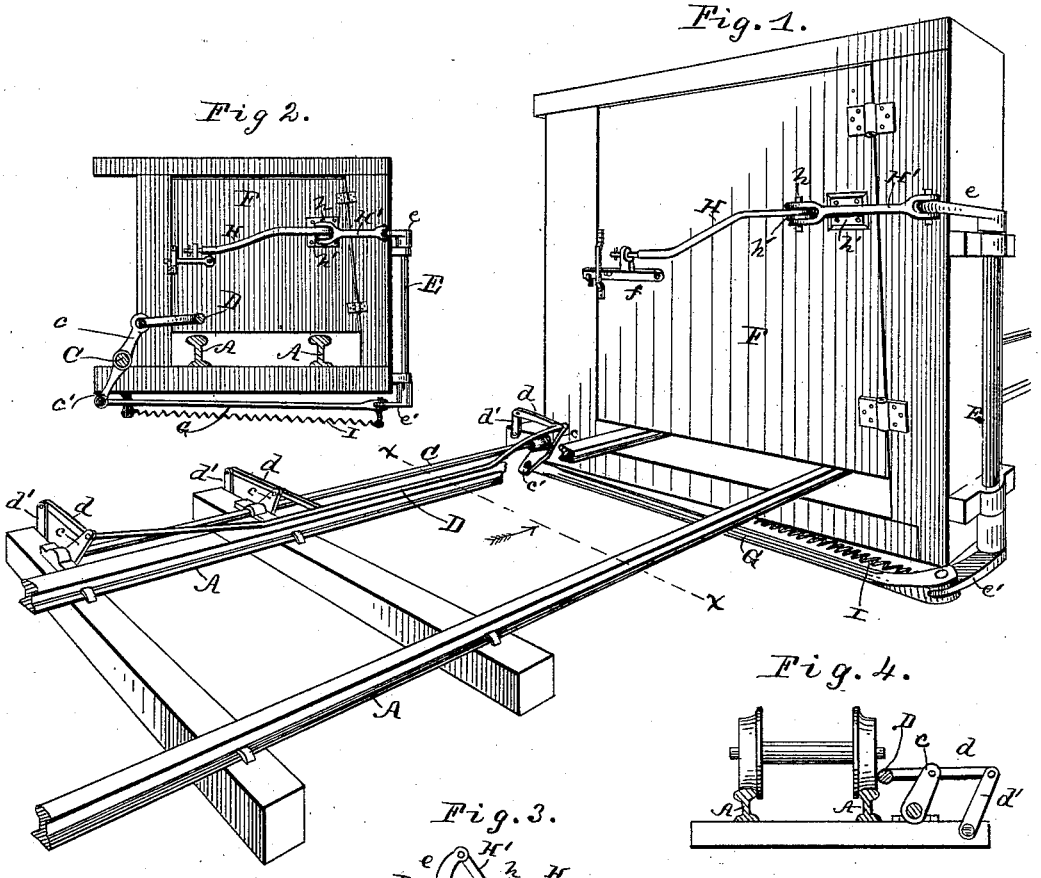

Fig 2.

Fig. 4.

Fig. 3.

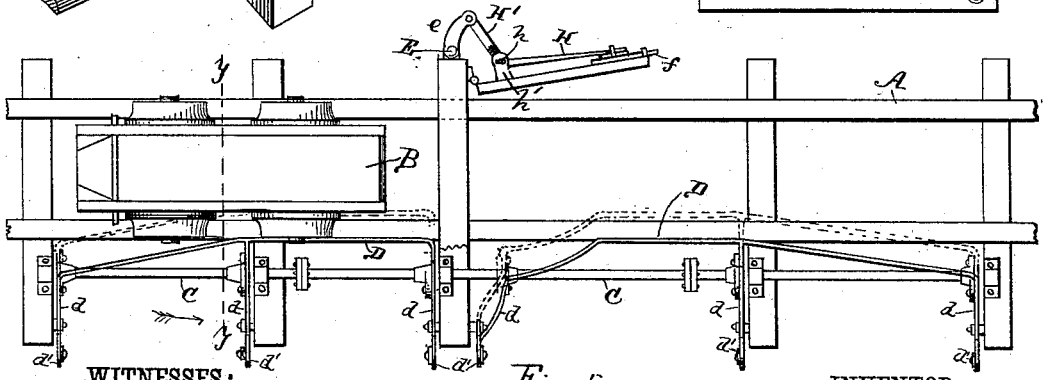

Fig. 5.

WITNESSES:

Thos. Houghton.

Anis W Hart

INVENTOR:

Peter F. Snyder

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

PETER F. SNYDER, OF McKEESPORT, PENNSYLVANIA.

OPERATING MINE-DOORS.

SPECIFICATION forming part of Letters Patent No. 347,135, dated August 10, 1886.

Application filed December 17, 1885. Serial No. 185,984. (No model.)

To all whom it may concern:

Be it known that I, PETER F. SNYDER, a citizen of the United States, residing at McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Operating Mine-Doors, of which the following is a full, clear, and exact description.

Doors are placed in the main "entries" or galleries of coal and other mines for the purpose of diverting the air-blast by which the mines are ventilated, into butt entries or side galleries. It is the common practice in most mining districts to employ boys to open such doors to permit the passage of cars along the track laid in the main entry or gallery. In some cases, however, mechanical means have been utilized for the purpose; but so far as I am aware none have proved satisfactory.

It is the object of my invention to provide an automatic but simple apparatus for operating mine-doors, the same being put in action by the cars and closing of themselves immediately after the cars have passed through the doorway.

In carrying out my invention I arrange a rock-shaft alongside the track and pivot it to a guard or push-bar, with which the cars come in contact as they pass along, and thus rotate the said shaft. The mine-door is connected with the shaft by a peculiar mechanism, which raises the latch and swings the door open when the shaft turns in consequence of the lateral pressure of the cars against the aforesaid guard-bar. The door is closed by gravity or by a spring, as may be preferred.

In the accompanying drawings, Figure 1 is a perspective view of a mine-door and track with my invention applied thereto. Fig. 2 is a cross-section on *x x*, Fig. 1. Fig. 3 is a plan view illustrating the operation of the apparatus. Fig. 4 is a cross-section on *y y*, Fig. 3. Fig. 5 is a detail perspective view of the bracket attached to the mine-door.

The letter A indicates the rails of the track that is supposed to extend into and along the main entry or gallery of a mine, and B a mine-car of the usual construction. Alongside one of the rails A A is arranged a line-shaft, C, which is adapted to rotate in bearings affixed to the ties or other suitable fixed supports. This shaft is made in sections, connected by suitable couplings. It has several radial arms, *c*, that project upward, and another, *c'*, that projects downward. To the former, *c*, is jointed or pivoted the guard or push-bar D, that projects horizontally over the adjacent rail, A, so that the lower portions of the car-wheels come in contact with it in passing along the track. The portions of the bar D that are farthest from the door are inclined backward, Figs. 1 and 3, so that the friction and pressure of the car-wheels on the same will be graduated both when the cars approach and recede from the door. The bar D has arms *d*, that project backward from the pivotal connections and are jointed to vertical rods *d'*, that are pivoted to the ties or sleepers and serve to maintain it (D) as nearly as practicable in the same horizontal plane when moving back and forth as cars pass and repass. In other words, the rods *d'* prevent the guard-bar D from rising far enough to strike the axles of the cars, when it is forced back by contact with the wheels of the latter, as shown in Figs. 3 and 4.

A vertical rock-shaft, E, is arranged in bearings attached to the post or jamb of the door-frame, to which the door F is also hinged. This shaft has two horizontal arms, *e e'*, and the lower one, *e'*, is connected with the aforementioned pendent arm *c* of the main rock-shaft C by means of a rod, G, that extends beneath the track A, so that both shafts C and E rotate together.

The latch *f* of the door F is shown hinged; but it may be arranged to slide. It is connected by rods H H' with the upper arm, *e*, of shaft E. These rods are jointed together by a pin, *h*, that works in the slot of a bracket or fixed horizontal arm, *h'*, attached to the side of the door. The function of the bracket is to support the rods and furnish a point of firm attachment of the shorter rod, H', which is chiefly instrumental in pulling the door open.

It is apparent that when a car or cars pass along the track A the guard-bar D will be pushed back and the shafts C and E thereby rotated a part of a revolution on their axes, which operation will cause the rods H H' to pull and raise the latch *f* and swing the door F wide open, Fig. 3. The latter will obviously remain in that position while a car or cars are passing. It will then close by its own gravity, since its lower hinge is set back of the upper

one for that purpose, as shown in Figs. 1 and 2; but as an aid I employ a spring, I, attached to the lower arm, e', of rock-shaft E, or I may hinge the door in the usual way and depend on the spring alone. It is obvious that a weight, cord, and pulley may be substituted for the spring.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the track and a door, of the rock-shaft C, a guard-bar connected therewith and arranged for contact with cars passing along said track, and mechanism for connecting said shaft with the door, substantially as shown and described.

2. The combination of the main rock-shaft and a guard and push-bar attached thereto, with the track and door, a secondary rock-shaft, and rods connecting it with said main shaft and door, substantially as shown and described, to operate as specified.

3. The combination, with the track and door, of the main rock-shaft, a guard-bar attached thereto, the vertical rock-shaft, connecting-rod G, the rods H H′, the slotted bracket, and the latch, all arranged as shown and described.

4. The combination, with the vertical rock-shaft and a swinging door operatively connected thereto, of the guard-bar D, having horizontal arms d, the horizontal shaft C, arranged beside the rail and having arms c, that are pivoted to said arms d, and the bar d', also pivoted to the latter and to the sleepers, as shown and described.

5. The combination, with the hinged door and the latch, of the pull-rods H H′, connected by a joint-pin, and the bracket attached to the door and provided with a slot to receive said pin and permit its due movement, as shown and described.

6. The combination of the spring with the vertical rock-shaft, the jointed rods H H′, the latch, the bracket, and the door, all as shown and described, for the purpose of closing the door automatically.

PETER F. SNYDER.

Witnesses:
AMOS W. HART,
SOLON C. KEMON.