

No. 652,540.

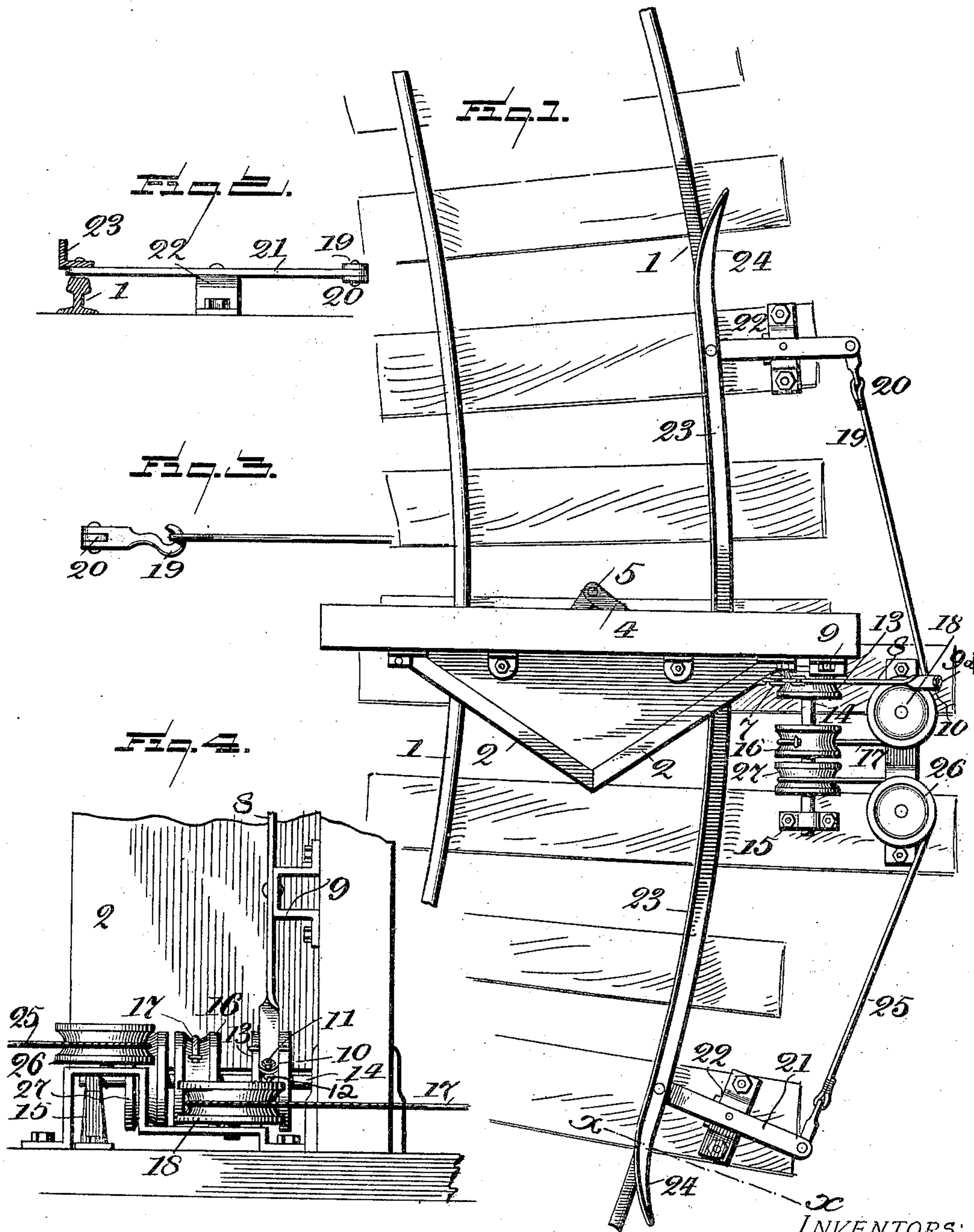
Patented June 26, 1900.

W. A. GOLD, F. P. ECKERT, A. PFEIFFER & A. H. LEWIS.
MINE DOOR OPENER.

(No Model.)

(Application filed Jan. 28, 1899.)

2 Sheets—Sheet 1.



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FIG. 5.

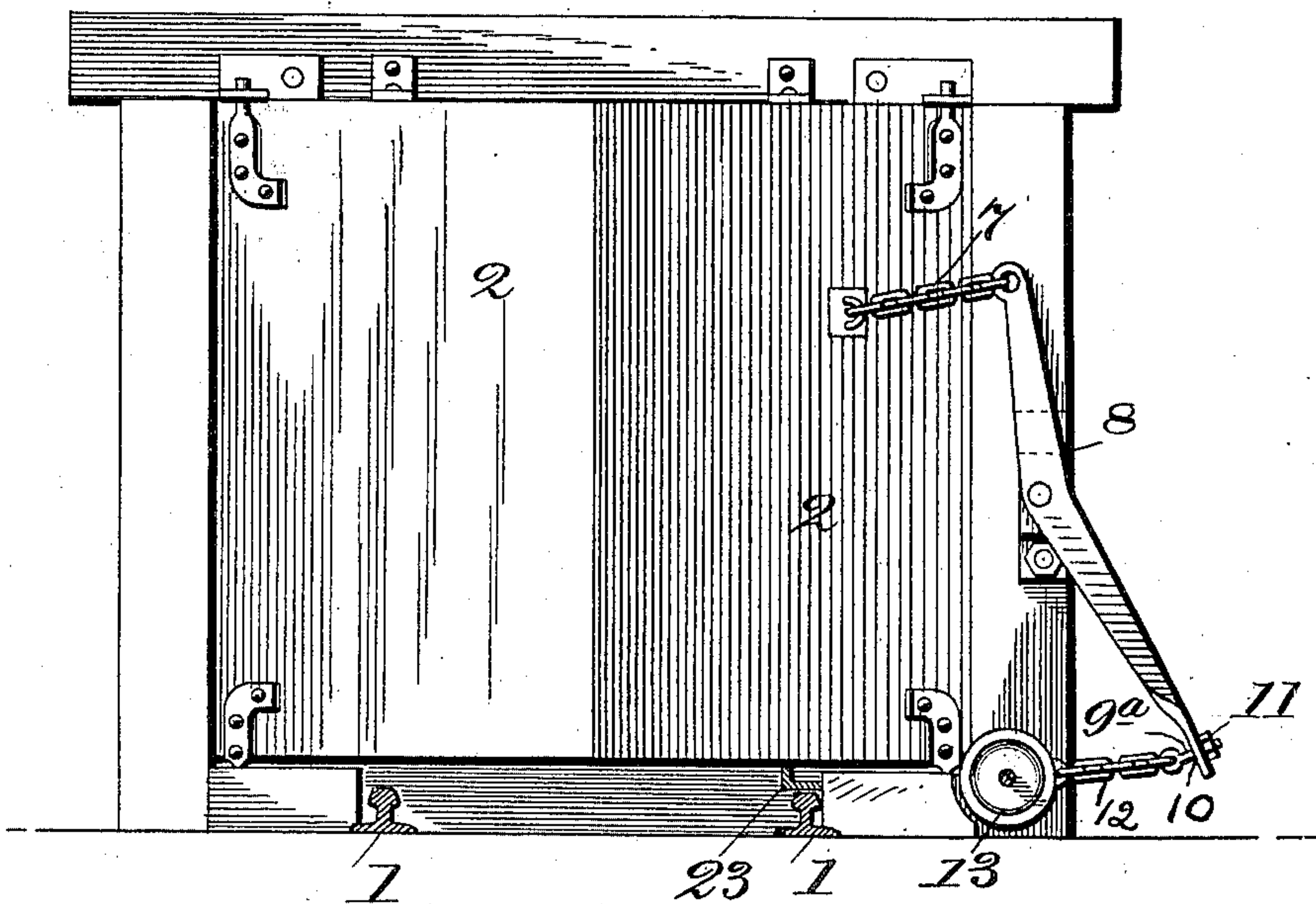


FIG. 6.

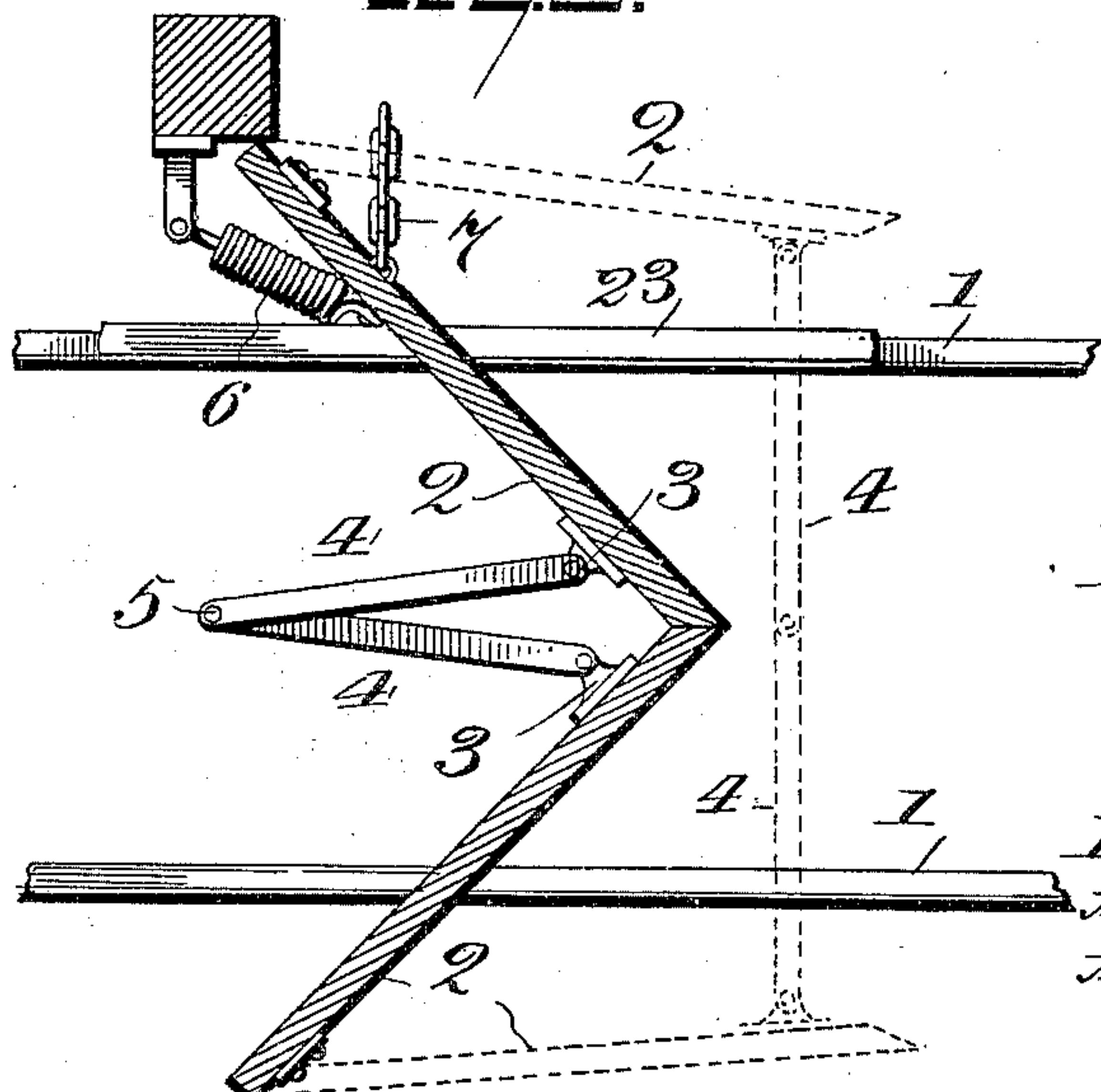


FIG. 7.

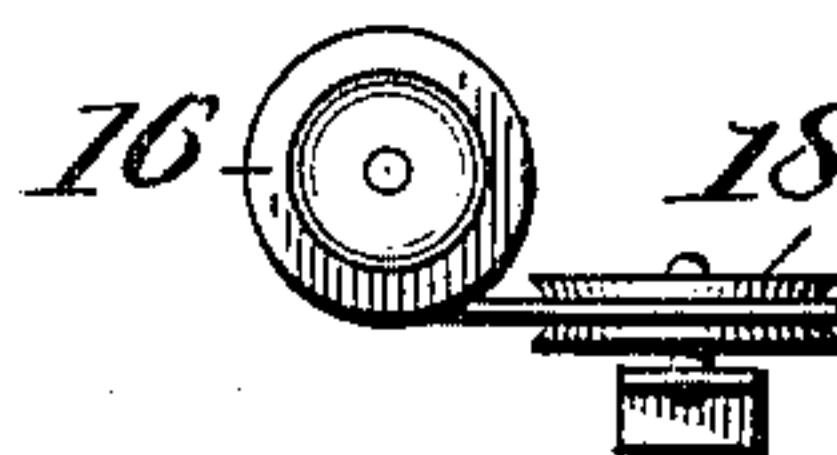
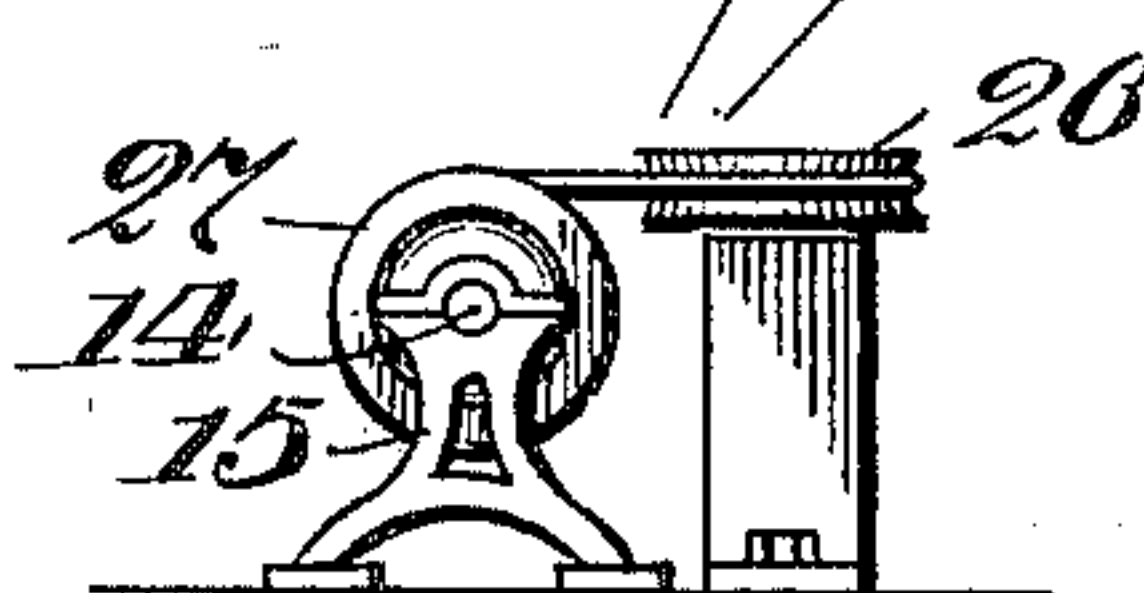


FIG. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM A. GOLD, FREDERICK P. ECKERT, ADAM PFEIFFER, AND ALBERT H. LEWIS, OF PORT WASHINGTON, OHIO.

MINE-DOOR OPENER.

SPECIFICATION forming part of Letters Patent No. 652,540, dated June 26, 1900.

Application filed January 28, 1899. Serial No. 703,760. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM A. GOLD, FREDERICK P. ECKERT, ADAM PFEIFFER, and ALBERT H. LEWIS, citizens of the United States, residing at Port Washington, in the county of Tuscarawas and State of Ohio, have invented certain new and useful Improvements in Automatic Mine-Door Openers, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to doors for mines, and is substantially a device for automatically opening the said door upon the approach of the mine-car and closing the same after the said car has passed. Moreover, the apparatus is so designed as to operate for a car moving in either direction upon the mine-track in common use.

We will first describe our invention in detail with the aid of the accompanying drawings, in which—

Figure 1 is a plan view of a mine-door with our apparatus for opening and closing the same. Fig. 2 is a view as seen from the line *xx* of Fig. 1. Fig. 3 is a detail of the cable-hook. Fig. 4 is a view of a portion of the opening apparatus. Fig. 5 is a front view of the doors, with a portion of the opening apparatus. Figs. 6 and 7 are successive views of parts of the opening apparatus; and Fig. 8 is a plan view of the doors, showing the device for moving the doors in unison.

In the several views the same numeral always indicates the same part.

1 represents the railroad of a mine, passing through the double doors 2 in a manner well known to miners, and we have shown the doors as placed upon a curve, although they would more often be upon straight road. The apparatus for opening and closing the doors will operate as well, however, when the doors are placed upon a curve as when upon a straight section.

Near the upper edge of the doors are secured brackets 3, to which are pivoted the ends of arms 4, extending rearward and pivoted to each other at 5. By this means the

doors are made to open and close together. To close the doors, a coil-spring 6 is provided, one end of which is secured to one of the doors and the other end to the framework.

The mechanism for opening the doors will now be described.

A short chain or flexible connection 7 is secured to the outer face of one of the doors a short distance away from the pivotal line of its hinging, the other end of said connection being secured to the extremity of a bell-crank 8, pivoted to the door-frame by means of a bracket 9. The other end of the bell-crank 8 is bent to a plane at right angles with the main portion thereof, and a hole 9^a is provided therein, in which is seated an eyebolt 10, secured in place by the nut 11, by means of which the eyebolt may be adjusted. Secured to the eye of the said eyebolt is a flexible connection 12, the other end of which is secured in the groove of a pulley 13 above its horizontal center, said pulley being mounted fast upon a rocking shaft 14, journaled in bearings 15. Adjacent to the pulley 13 and likewise fast-mounted upon the rocking shaft 14 is a second pulley 16, with a flexible connection 17 secured to the top thereof and passing under the said pulley to and around a horizontal pulley 18 and thence to the hook 19 of a coupling 20, pivoted to the end of the lever 21, pivoted at its mid-portion to a pedestal 22 and at its extremity to a flanged push-rail 23. This rail 23 is supported by levers 21 slightly over and parallel to the road-rail and extends some little distance in either direction from the doors. The ends of the push-rail are curved outwardly, as at 24, to receive the first impact of the car-wheels and cause them to push the said rail forward and outward without jar. At the other end of the push-rail 23 is a second lever 21, pivoted thereto and to a pedestal 22. At the end of the lever 21 is a second pivoted coupling and hook, from which last a flexible connection 25 passes about a pulley 26 and over a pulley 27, to the bottom of which it is secured. The pulley 27 is fast-mounted upon the rocking shaft 14, adjacent to the pulley 16.

Having now described the several mechanical elements of our invention, we will show its method of operation.

A car approaching either end of the push-rail 23 will press against its curved end, pushing the rail both forward and outward. The lever 21 is oscillated, pulling upon the nearest flexible connection, which will rotate the rocking-shaft pulley, to which it is attached. The rocking of the said shaft will partly rotate the pulley 13, oscillate the bell-crank 8, and open the doors. When the car passes the other end of the push-rail, it returns to its original position and the doors are closed by the spring 6.

Our invention being now fully described and its method of operation shown, what we wish to secure by Letters Patent and claim is—

1. In an automatic door-opener, the combination of the doors, means for closing them, a pivoted bell-crank, flexibly connected at one end to a door, a rock-shaft, a pulley fast-mounted upon said rock-shaft, to the groove of which the other end of the bell-crank is flexibly connected, two other pulleys fast upon said rock-shaft, flexible connections secured to said pulleys, and to mechanism for actuating said flexible connections, rotating

the pulleys and oscillating the bell-crank, substantially as and for the purpose described.

2. In an automatic door-opener, the combination of the doors, means for closing them, a pivoted bell-crank, flexibly connected at one end to a door, a rock-shaft, a pulley fast-mounted upon said rock-shaft, to the groove of which the other end of the bell-crank is flexibly connected, two other pulleys fast upon said rock-shaft, a push-rail, levers pivoted thereto and fulcrumed adjacent to said rail, hooks pivoted to the ends of said levers, horizontal pulleys, and flexible connections from the hooks, passing about the horizontal pulleys, and secured to the rock-shaft pulleys, one above and one below the same.

Signed by us at Port Washington, Ohio, this 16th day of April, 1898.

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