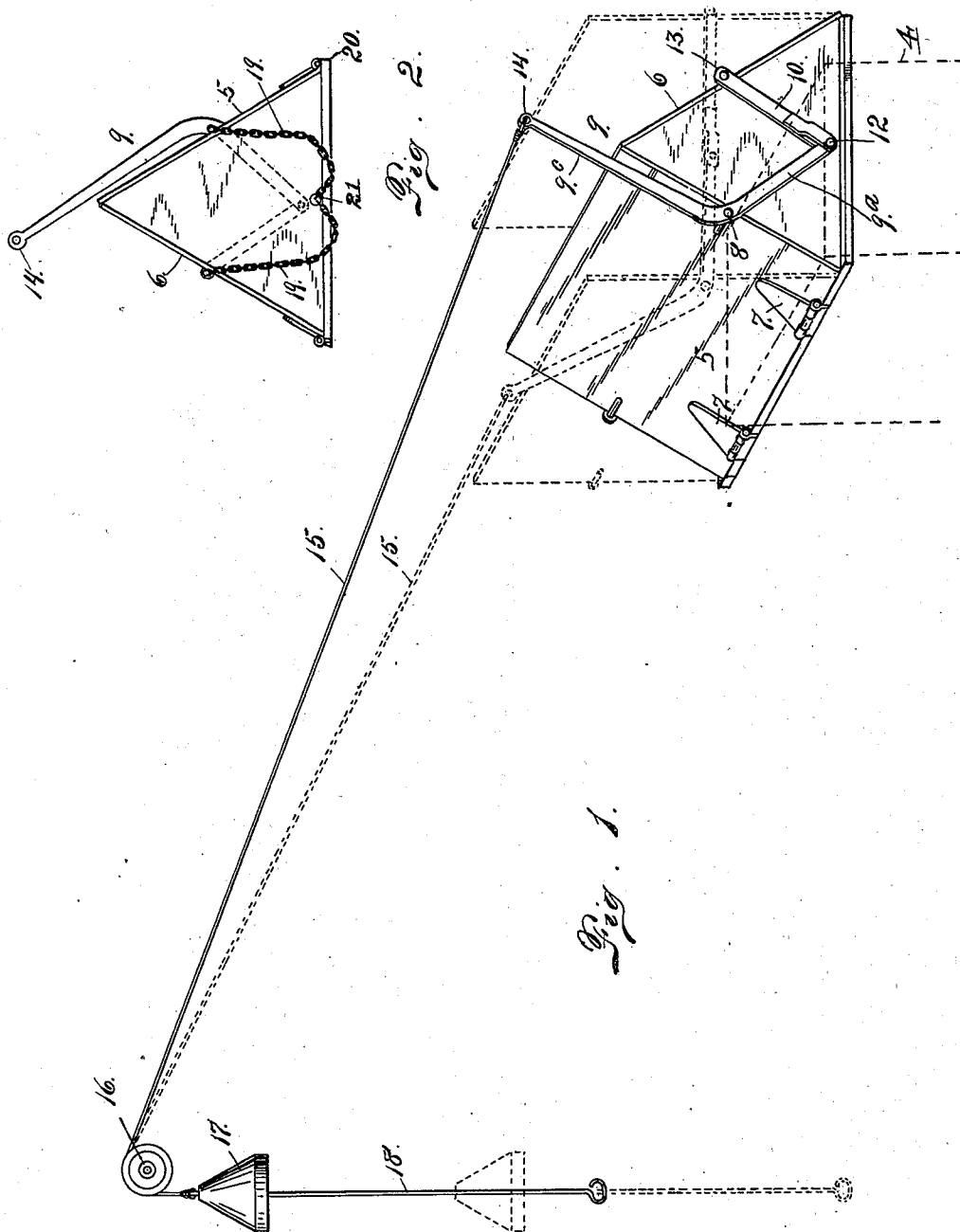


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W. R. WILCOX.
MEANS FOR OPERATING HATCHWAY DOORS.
APPLICATION FILED APR. 28, 1902.

NO MODEL.



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WILLIAM R. WILCOX, OF SARATOGA, WYOMING.

MEANS FOR OPERATING HATCHWAY-DOORS.

SPECIFICATION forming part of Letters Patent No. 723,793, dated March 24, 1903.

Application filed April 28, 1902. Serial No. 105,115. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. WILCOX, a citizen of the United States of America, residing at Saratoga, in the county of Carbon and State of Wyoming, have invented certain new and useful Improvements in Means for Operating Hatchway-Doors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in means for operating the doors of hatchways, being more especially intended for opening and closing the doors located at the mouth of mining-shafts. These doors are normally closed to prevent articles from falling into the shaft, but must be opened to enable the ore-buckets to pass therethrough in ascending and descending the shaft.

My object is to provide an apparatus of this class which shall be comparatively simple in construction, economical in cost, reliable, durable, and efficient in use; and to these ends the invention consists of the features, arrangements, and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a perspective view of my improved operating devices applied to the doors of a shaft or hatchway. Fig. 2 is an elevation of the hatchway-doors and their connections viewed from the end opposite that shown in Fig. 1.

The same reference characters indicate the same parts in both views.

Let the numerals 5 and 6 designate the doors, which are hinged to a suitable frame 20, as shown at 7, and when closed are inclined toward each other, being shaped in end view like the letter A. These doors close the mouth of a shaft, which is indicated by dotted lines in Fig. 1 and designated by the numeral 4. Fulcrumed at 8 on the door 5 is a lever 9, having its lower arm 9^a pivotally connected, as shown at 12, with one extremity of a link 10, forming a toggle-joint. The opposite ex-

tr extremity of the link is pivotally connected, as shown at 13, to the door 6. The link 10 and the lever-arm 9^a form a V-shaped figure when the doors are closed, as shown by full lines in Fig. 1. The upwardly-extending arm 9^c of the lever 9 has at one end a flexible device 15, as a chain, cord, or cable, attached to its upper extremity, as shown at 14. This device 15 extends over a pulley 16, its opposite extremity being connected with a weight 17, forming a counterbalance to hold the doors 5 and 6 open when the weight is adjusted, as indicated by the dotted-line position in Fig. 1. Connected with the weight and extending below the same is a rod or other rigid depending device 18, whose lower extremity is within easy reach of the person in charge of the mine or whose business it is to open and close the doors 5 and 6. Respectively connected with the doors 5 and 6 opposite the link 10 and the lever-arm 9^a are two chains 19, whose extremities opposite their connection with the doors are attached at a point 21 to the stationary frame 20, surrounding the mouth of the shaft or hatchway. (See Fig. 2.)

Assuming that the doors 5 and 6 are closed, in order to open them it is only necessary to pull downwardly on the rod 18, when all the parts will assume the dotted-line position in Fig. 1. The chains 19 limit the opening movement of the doors and prevent the toggle-joint from moving upwardly sufficiently far to prevent the doors from closing automatically when released from the influence of the counterbalance, as hereinafter explained. After the doors are opened the weight 17 overcomes the gravity of the link 10 and the lever-arm 9^a, whose tendency is to close the doors, and they are made sufficiently heavy, when unresisted, for the purpose. When, however, it is desired to release the doors or return them to the closed position, the operator shoves upwardly on the rod, turning the weight 17 to its normal position or that shown by full lines in Fig. 1. The gravity of the link 10 and the lever-arm 9^a will then cause the doors to close, as will be readily understood.

Having thus described my invention, what I claim is—

1. In means for operating hatchway-doors, the combination of a lever fulcrumed on one

of the doors and having a downwardly-extending arm forming a toggle member, a link pivoted at one extremity to the opposite door, the opposite extremity of the link being pivoted to the downwardly-extending lever-arm forming a toggle-joint, and means connected with the free arm of the lever for manipulating the devices to open and close the doors.

2. In means for operating doors of the class described, the combination of a lever fulcrumed on one door, a link connected with the other door at one extremity and with one arm of the lever at the opposite extremity, and means connected with the other arm of the lever for opening the doors, said means comprising a flexible device, a guide over which said device passes, a counterweight connected with the opposite extremity of the flexible device, and a depending rigid device connected with the counterweight, substantially as described.

3. In means for operating doors of the class described, the combination of a lever fulcrumed on one door, a link pivotally connect-

ed at one extremity with the other door and at the opposite extremity with one arm of the lever, means connected with the other arm of the lever for opening and closing the doors, and flexible devices respectively connecting the doors with a stationary part for limiting the opening movement of the doors, substantially as described.

4. In a hatchway-door-operating means, the combination of a lever fulcrumed on one door, a link connected at one extremity with the other door, and at the opposite extremity with one arm of the lever, means connected with the other arm of the lever for opening the doors, and means respectively connected with the doors for limiting their opening movement, substantially as described.

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

WILLIAM R. WILCOX.

Witnesses:

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