(No Model.)

G. W. MacKENZIE.

SAFETY LOCK FOR ELEVATORS.

No. 588,588. Patented Aug. 24, 1897.

Fig. 1.

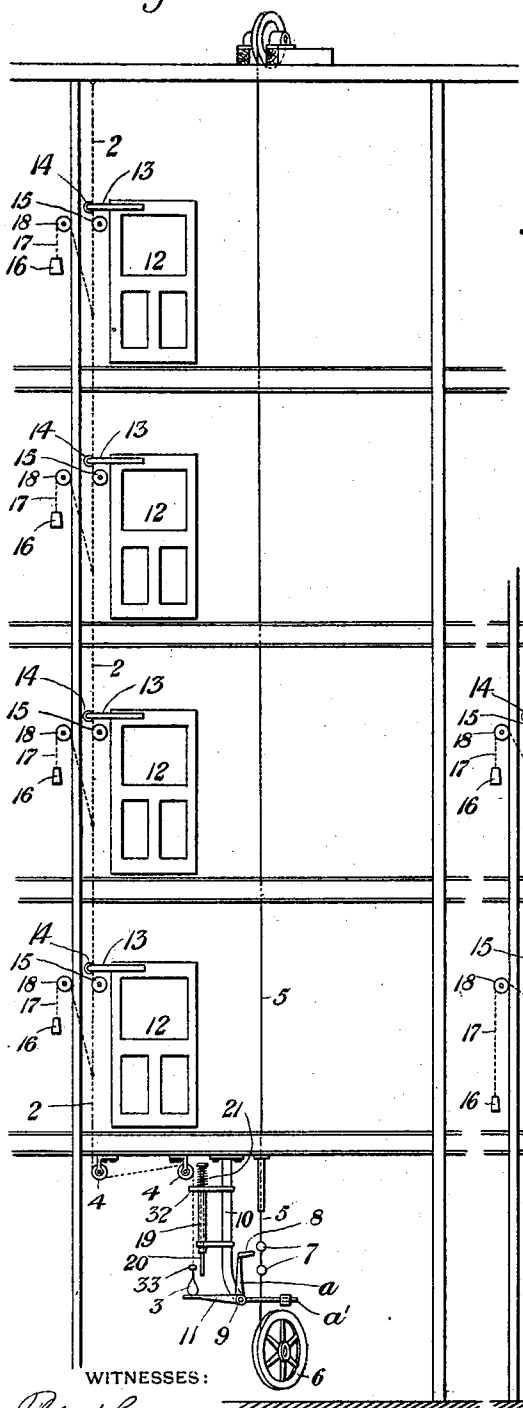


Fig. 4.

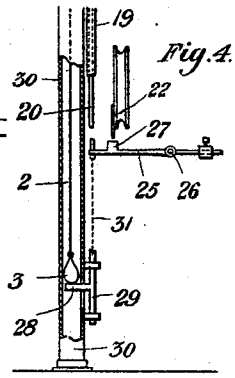


Fig. 5.

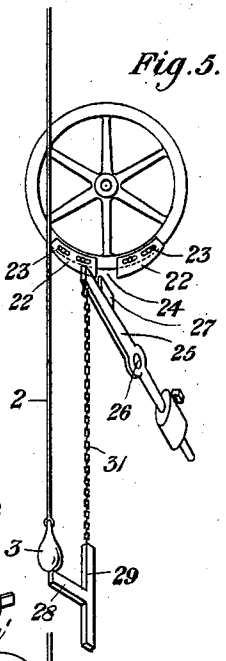


Fig. 3.

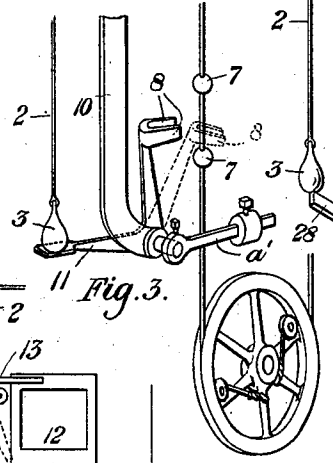
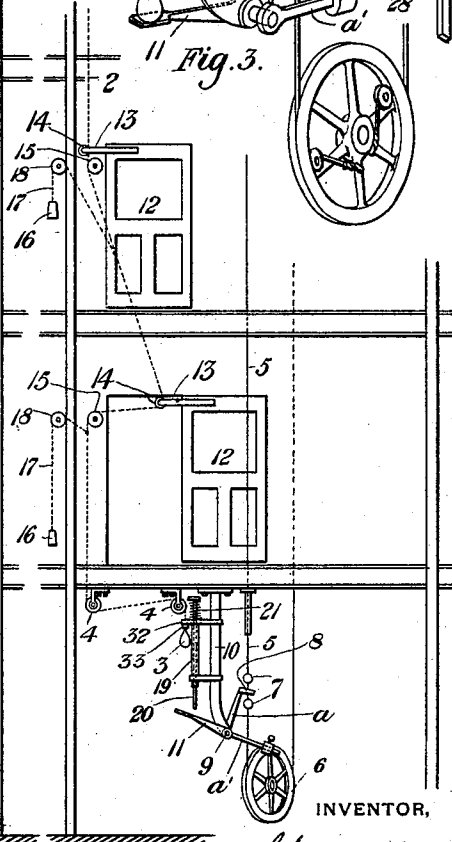


Fig. 2.



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GEORGE W. MACKENZIE, OF BEAVER, PENNSYLVANIA.

SAFETY-LOCK FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 588,588, dated August 24, 1897.

Application filed October 21, 1896. Serial No. 609,629. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. MACKENZIE, a citizen of the United States, residing at Beaver, in the county of Beaver and State of Pennsylvania, have invented or discovered a new and useful Improvement in Safety-Locks for Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 is a vertical sectional view of an elevator-shaft equipped with my improved apparatus. Fig. 2 is a partial similar view showing one of the doors open and the motor-locking device in engagement. Fig. 3 is a detail perspective view, on an enlarged scale, of the locking device. Fig. 4 is a detail view illustrating a modified construction. Fig. 5 illustrates in perspective the arrangement shown in Fig. 4.

Similar letters and numerals of reference refer to like parts wherever used throughout this specification.

The object of my invention is to provide means whereby the opening of any of the doors leading into an elevator-shaft will be prevented while the elevator-car is in motion, and also to render it impossible to start the elevator-car until all the doors are closed, the operation of any and all of the doors being dependent on the elevator-car, and vice versa.

It also consists of means for unlocking the device in case the elevator-car, by reason of any leakage in the motor, should fall below a certain desired level, and, further, in certain balancing devices for the valve-operating chain.

Referring to the drawings, 2 is a continuous flexible chain or cable permanently secured at the top and extending downwardly to the cellar or basement, and sustaining at its bottom a weight 3, suitable sheave-wheels 4 being located so as to permit the chain 2 and its suspended weight to be arranged in proximity to the operative mechanism.

The usual valve-actuating cable 5, secured to the valve-wheel 6, is provided with two buttons or stops 7, adjustably secured thereto, so that they may be set in proper position to be engaged by the forked end 8 of a bell-crank lever pivoted at 9 to the lower end of a depending bracket 10, the bell-crank lever *a* having an outwardly-extending arm 11 projecting into the path of the weight 3, which weight is sufficiently heavy, when thus resting on the arm 11, to hold the forked end 8 away from the cable 5 and from contact with the buttons 7.

A counterweighted arm *a'* is secured to the shaft of the lever *a*, and by setting the counterweight in or out the leverage on the arm *a* may be graduated, so as to throw the fork 8 into engagement with the buttons 7 when the weight 3 is drawn up.

At each floor is located the usual door 12, which may be sliding, as shown, or otherwise suitably mounted, and at the top of the door, mounted in an outwardly-extending carrier 13, is a sheave-wheel 14, engaging the chain 2, so that when the door is opened, as shown in Fig. 2, the chain will be drawn out, following the sheave 14 and riding over and under sheave 15, secured to the framework immediately below such point.

Inasmuch as the chain is permanently secured at the top it will be seen that the feed of the chain to follow the door must be from below, the chain swinging out above to follow the sheave 14. Counterweights 16, of proportionately-diminishing weight from the top downwardly, are secured to the ends of short chains 17, passing over sheaves 16 and secured to the main chain 2 a distance below the sheave somewhat greater than the throw of the door, thereby assisting in raising the chain when the door is opened. A sufficient excess of weight, however, is preferably left in the chain, so as to assist in closing the door.

Mounted in any suitable guideway 19 and in line with the arm 11 is a vertical rod 20, so arranged with a sustaining-spring 21 or suitable counterweight that it will be depressed by the elevator should it fall below the level of the first floor, as is sometimes the case, due to leakage of the valve of the engine. In its downward travel the rod 20 will strike the arm 11 and throw the forks 8 out of engagement, thereby unlocking the buttons 7, so that the stops mounted on the elevator-car usually employed to operate automatically to turn the valve-wheel through the rope may be free to operate.

In Figs. 4 and 5 I have illustrated a modified construction in which the valve-wheel of

the motor is furnished with two adjustably-secured plates 22, held upon the face of the rim of the wheel by set-screws passing through radial slots 23, the inner ends being wider and set adjacent to each other, leaving an intervening space 24.

In place of the bell-crank lever a straight counterweighted lever 25 is employed, pivoted at 26 and provided with an upwardly-extending blade 27, designed to enter the space 24 and lock the wheel against movement under action of the counterweight. When all the doors are closed and it is desired to leave the motor unlocked, the depending weight 3 of the chain 2 rests on an inwardly-projecting finger 28 of a bar 29, mounted on the housing 30 of the chain, the finger 28 passing inwardly through a slot.

The bar 29 is connected to the lever by a chain 31, so that downward movement will be transmitted thereby and the blade 27 withdrawn.

The rod 20 may be arranged above the end of the lever and will operate as already described.

It will easily be understood that the locking device may be arranged to operate on the upper side of the wheel as well by simply rearranging the lever.

It is obvious that upon opening any of the doors after having stopped the elevator the first movement of but a fraction of an inch will result in the raising of the weight 3, when by means of the mechanism described the motor will be locked.

By means of interfering stops 32 33 the chain is so stretched when any one of the doors is opened that all of the other doors are thereby locked against movement, inasmuch as all slack is thus taken up and the sheaves 14 can have no play.

Changes may be made in the construction and arrangement to suit varying conditions of application without departing from my invention, and I do not desire to be limited to the exact construction shown.

What I claim, and desire to secure by Letters Patent, is—

1. In combination with a pivoted lever designed to lock the valve-operating mechanism of an elevator-car; a chain suspended at the top of the elevator-shaft, doors opening into the shaft, connections between the doors and the chain whereby the chain is raised by motion of the doors, and a weight secured to the bottom of the chain and above one arm of the lever, substantially as set forth.

2. In combination with a chain suspended at the top of the elevator-shaft, doors opening into the shaft, connections between the doors and the chain whereby the chain is raised by motion of the doors, and a weight secured to the bottom of the chain; a lever pivoted in proximity to the valve-operating cable provided with an arm projecting into the path of the suspended weight and designed to engage buttons secured to the cable, substantially as set forth.

3. In combination with a suspended chain provided with a weight at its bottom and means attached to each door for raising the chain; a forked lever pivoted in proximity to the valve-operating cable provided with an arm projecting into the path of the suspended weight, and adjacent buttons secured to the cable, designed to be engaged by the forked lever, substantially as set forth.

4. In combination with a suspended chain provided with a weight at its bottom and means attached to each door for raising the chain; a forked lever pivoted in proximity to the valve-operating cable provided with an arm projecting into the path of the suspended weight, and adjacent buttons secured to the cable, designed to be engaged by the forked lever, with a counterweighted arm for throwing the forked lever into engagement with the buttons upon raising the suspended weight, substantially as set forth.

5. In combination with a pivoted lever designed to lock the valve-operating mechanism of an elevator; a rod adapted to be depressed by the elevator and to disengage the lever, substantially as set forth.

6. In combination with a suspended chain, and means secured to the doors for lifting the chain; auxiliary counterweights secured to the ends of secondary chains attached to the main chain, passing over sheaves, and designed to assist in raising the main chain, substantially as set forth.

In testimony whereof I have hereunto set my hand this 28th day of July, 1896.

GEORGE W. MACKENZIE.

Witnesses:
PETER J. EDWARDS,
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