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SAFETY GATE MECHANISM FOR ELEVATORS.

APPLICATION FILED SEPT. 13, 1909.

943,524.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

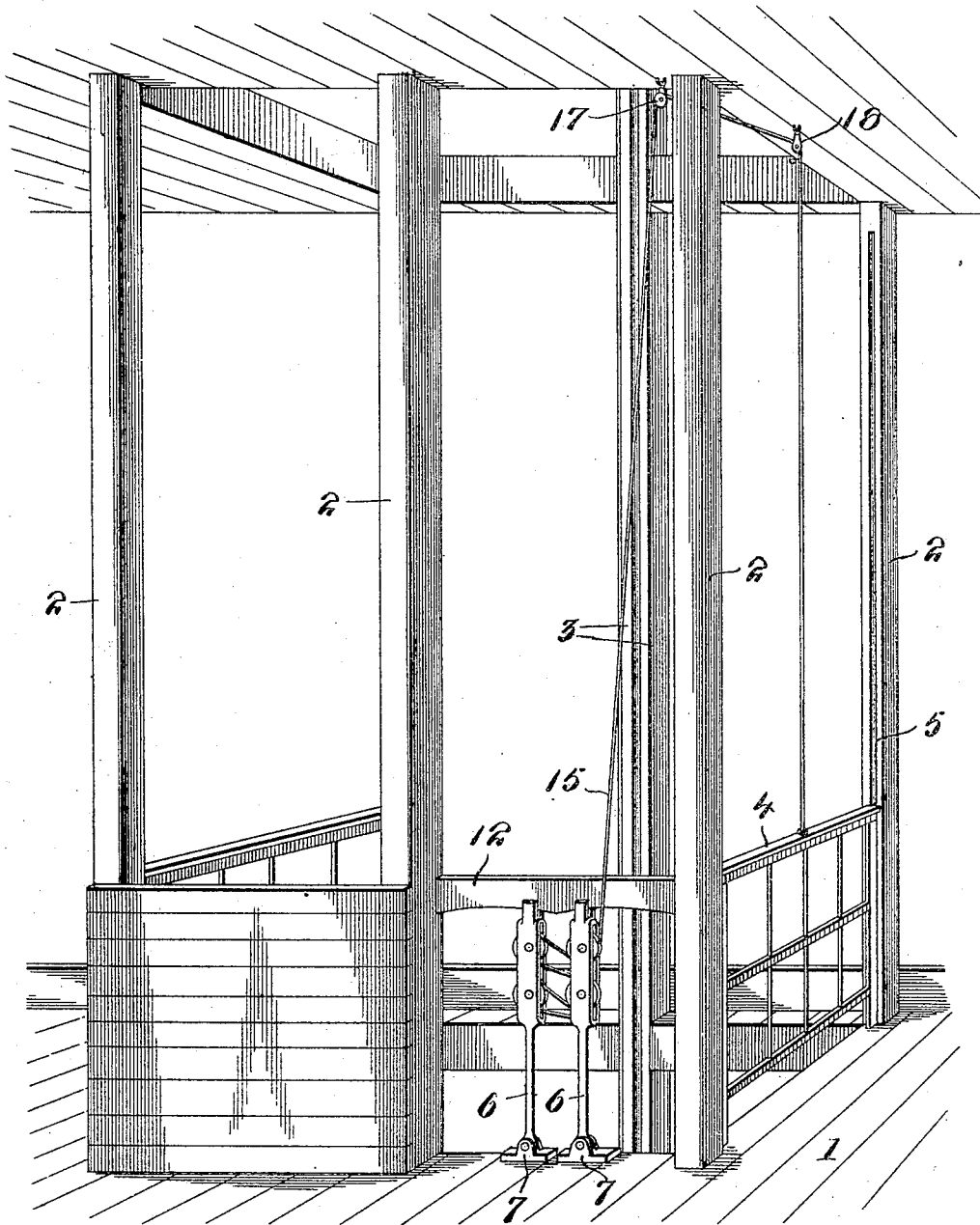


Fig. 1.

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SAFETY-GATE MECHANISM FOR ELEVATORS.

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Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed September 13, 1909. Serial No. 517,392.

To all whom it may concern:

Be it known that I, JOHN CUNNINGHAM, citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Safety-Gate Mechanism for Elevators; and I do hereby 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.

My invention relates to elevator safety gates, and particularly to that type of device in which a pair of pivoted arms are forced apart by a wedge like device carried by the car, said arms each carrying a pair of pulleys or sheaves arranged side by side, and engaged by a rope or cable, the separation of the said arms producing a draw upon the rope or cable, one end of which is operatively connected with a gate mounted to slide vertically in guides, and thereby raising the gate to its highest position as the elevator car platform comes into horizontal alignment with the floor on which the gate and operating mechanism is located.

In the operation of safety gate operating mechanism of this character it has been found in actual practice that when the mechanism is first installed it will operate with reasonable accuracy, if the rope is sufficiently short to hold the bottom of the gate slightly above the floor when in its lowest position, or in other words, if the weight of the gate is always upon the rope or cable. But even in this case it is found that the rope or cable will be worn and cut by the flanges of the sheaves or pulleys, owing to the fact that the rope must be carried laterally or diagonally from the pulleys of one pivoted arm to those of the other, thus preventing a direct pull on the cable between certain of the pulleys on the opposing arms, and drawing the rope diagonally across the flange or outer portions of certain pulleys, when the arms are in close proximity, thus causing the weakening or breaking of the rope. It is also found that in course of use the rope will stretch, so as to allow the gate to touch the floor when in its lowest position and this causes the rope to lie in a slackened condition upon the pulleys of the arms, and in consequence of the diagonal course of the rope between certain of the pulleys, the rope frequently jumps off of the pulleys while slack and wedges between the pulleys, or between a

pulley and the frame of the arm carrying it, resulting in the breaking of the rope. As this generally happens after the device has been in use some time, the rope is apt to have been previously weakened or cut as before stated by rubbing against the flanges of the pulleys and more readily wedges and breaks.

The object of my invention is to provide a simple device of this general character in which a number of pulleys are carried by each arm, but are so arranged that all portions of the rope carried thereby are in the same vertical plane, thus avoiding the disadvantages above referred to. It should also be stated that it is desirable in devices of this character to employ a number of pulleys on each arm, in order to obtain the necessary movement of the rope for raising the gate the required distance, with the least possible movement of the arms, so that the strain on the car in operating the device shall be reduced to a minimum to avoid the possibility of causing the car to bind in relation to its guides, and for the same reason it is preferred to employ two arms, and a cam or device on the car acting as a double wedge between them, as the use of a single acting cam or wedge is apt to throw the car to one side and cause it to bind on its guides.

In the accompanying drawings, I have shown one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

In these drawings, Figure 1 is a perspective view of a portion of an elevator well showing a vertically sliding gate and actuating mechanism therefor. Fig. 2 is an enlarged view of the gate actuating devices, the car being indicated in dotted lines, and the double wedge or cam carried thereby being indicated in full lines. Fig. 3 is a top plan view of the pivoted arms. Fig. 4 is an edge view of the same.

In the drawings 1 represents one of the floors of a building provided with an elevator well, 2, 2 the corner posts of the well, and 3, 3 the guides for the car.

4 represents a gate mounted in vertical guides 5, in opposite posts 2, 2.

6, 6 represents a pair of vertically disposed arms, the lower ends of which are pivotally connected to supporting brackets 7, 7 which are screwed or otherwise secured to the floor. Each of the arms 6, 6 is provided at its upper end with a frame or yoke

8 in which are mounted a plurality of grooved rollers or sheaves 9, 9 (two being shown) one above the other in the same vertical plane. Each arm 6 is also provided on one side, with a projecting stud, preferably carrying a friction roll 10, and the upper part of each arm 6 is preferably provided with one or more guiding projections or lugs 11, 11 (two being shown). In setting up the device the arms 6, 6 are arranged at the edge of the floor opening, with their rolls 10, 10 projecting inwardly beyond the edge of the opening and the guide lugs 11 in engagement with a horizontal guide bar 12, secured to the framing of the well.

13 represents the car (shown in Fig. 2 in dotted lines) which is provided with a double wedge cam 14, so located as to pass between the rolls 10, 10 and separate them, forcing the arms in opposite directions.

15 represents a rope which is secured to an eye 16, on one of the arms 6, 6 in line vertically with the pulleys thereof, and is carried around one of the pulleys on the opposite arm, thence around a pulley of the first mentioned arm, thence around another pulley of the opposing arm, thence around a pulley of the first mentioned arm (and in similar manner around other pulleys of said arms, if more than two are provided). The rope is then led over a pulley 17 attached adjacent to the ceiling, to a swivel connection permitting a slight lateral swing of the pulley to accommodate the movement of the arm, thence over a pulley 18 on a line horizontally with pulley 17, and above the center of the gate, and thence to the gate 4 to which it is preferably secured at its center, the gate being balanced so that it may be lifted and lowered by said rope without binding.

I prefer to provide stops 19, 19 to limit the inward movement of the arms 6, 6 and hold the rolls 10, 10 in position to be engaged by the point of the wedge 14, and in order to insure the rolls being in proper position, even in case the rope becomes slack, I prefer to provide the arms 6, 6 with a light spring 20, which in this instance connects said arms and will force them into engagement with said stops and insure their accurate alinement with the actuating wedge 14 at all times, as shown in Fig. 2.

The operation of the device will be readily understood from the accompanying drawings. Suppose the car to be moving downward, the wedge cam 14 will enter between the rolls 10, and separate the arms 6, 6 thus lifting the gate 4 which reaches its highest position as the floor of the car comes opposite the floor 1. The downward movement of the car below floor 1 will permit the arms 6, 6 to be drawn together by the weight of the gate, and lower the gate into its closed position. The operation will be the same whether the car is moving up or down.

It will be noted that all portions of the rope which engage the pulleys 9, 9 are in a single vertical plane so that there can be no undue wear of the ropes by engaging the flanges of the pulleys, and as the pulleys of each arm are above one another, the rope cannot get out of place or become jammed or wedged even if it should become slack. Moreover, the pulley 17 being swiveled, will accommodate itself to the lateral movement of the adjacent arm 6, and prevent wear on the rope, and a very direct connection with the center of the gate can thus be obtained without multiplicity of ropes and pulleys. It will also be noted that should the rope become slack owing to the stretching thereof permitting the gate 4 to touch the floor, or by the gate engaging a package or box in its descent, the arms 6, 6 will be moved inward against the stops 19, 19 by the spring (or springs) and the rolls 10, 10 will be held accurately in position with respect to the wedge cam 14, thus preventing an accident to the apparatus which might wreck it and perhaps cause injury to persons about the elevator.

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

1. The combination with an elevator car, of a double wedge gate actuating cam mounted thereon, a vertically movable gate for the elevator well, a pair of vertically disposed pivoted arms adjacent to said gate, a plurality of pulleys mounted on each arm and located one above another in the same vertical plane, a laterally projecting device secured to each arm in position to engage the said cam, a flexible connection passing around the pulleys on said pivoted arms and having one end connected to one of said arms and the other end connected to said gate, and means for limiting the movement of said arms toward each other, whereby said arms are held in position to cause the double wedge cam to enter between the cam engaging lateral projections thereof.

2. The combination with an elevator car of a gate actuating device, a vertically movable gate for the elevator well, a pair of vertically disposed pivoted arms adjacent to said gate, a pair of pulleys mounted on each arm, and located one above the other, in the same vertical plane, laterally projecting devices secured to said arms, in position to engage the gate actuating device on the car, a flexible connection passing around the pulleys on said pivoted arms, and having one end connected to one of said arms, in a line vertically with the pulleys thereof, and the other end secured to the gate, intermediate pulleys engaging said rope and located above the gate and said arms, stops for limiting the movement of said arms toward each other, and holding the laterally projecting devices thereof in line with the actuating

device on the car, and yielding means for normally holding said arms in engagement with said stops.

3. The combination with an elevator car
5 of a gate actuating device, a vertically movable gate for the elevator well, a pair of vertically disposed pivoted arms adjacent to said gate, a pair of pulleys mounted on each arm, and located one above the other, in the
10 same vertical plane, laterally projecting devices on each arm in position to engage the gate actuating device on the car, a flexible connection passing around the pulleys on said pivoted arms, and having one end connected to one of said arms, in a line vertically with the pulleys thereof, and the
15 other end secured to the gate, intermediate pulleys engaging said rope and located above

the gate and said arms, stops for limiting the inward movement of said arms, and holding
20 the laterally projecting devices thereof in operative relation with the actuating device on the car, a spring connecting said arms, and intermediate pulleys above the gate and arms engaging the said flexible connection,
25 the intermediate pulley adjacent to said arms being pivotally supported and receiving the flexible connection directly from one of the pulleys thereof.

In testimony whereof I affix my signature, 30
in the presence of two witnesses.

JOHN CUNNINGHAM.

Witnesses:

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CARRIE E. SCHMIDT.