

(No Model.)

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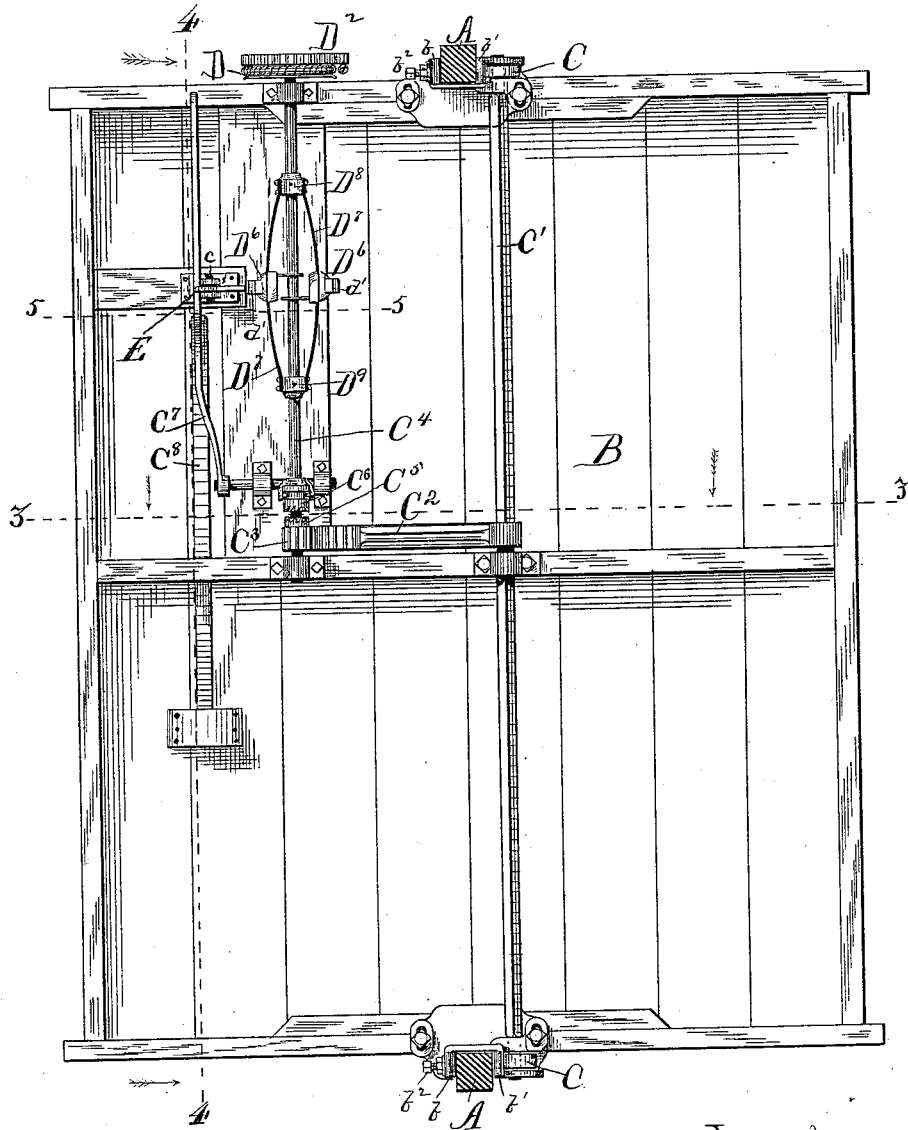
T. W. EATON, F. H. PRINCE & J. H. LIVESEY.

SAFETY BRAKE FOR ELEVATORS.

No. 347,778.

Patented Aug. 24, 1886.

Fig. A.



Witnesses:

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Inventors:

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Frederick H. Prince,

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Their Attorneys.

(No Model.)

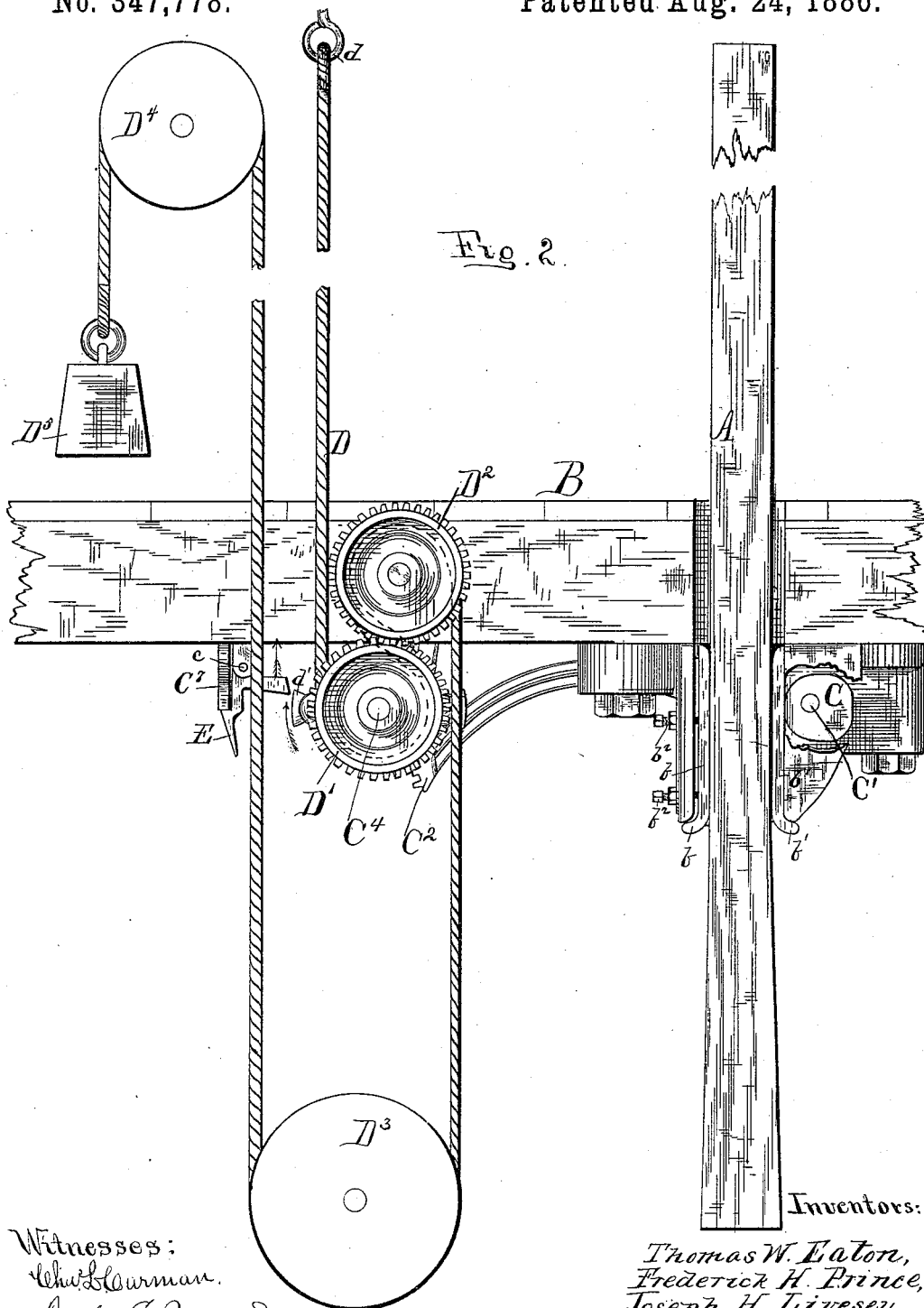
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T. W. EATON, F. H. PRINCE & J. H. LIVESEY.

SAFETY BRAKE FOR ELEVATORS.

No. 347,778.

Patented Aug. 24, 1886.



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(No Model.)

3 Sheets—Sheet 3.

T. W. EATON, F. H. PRINCE & J. H. LIVESEY.

SAFETY BRAKE FOR ELEVATORS.

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Fig. 3

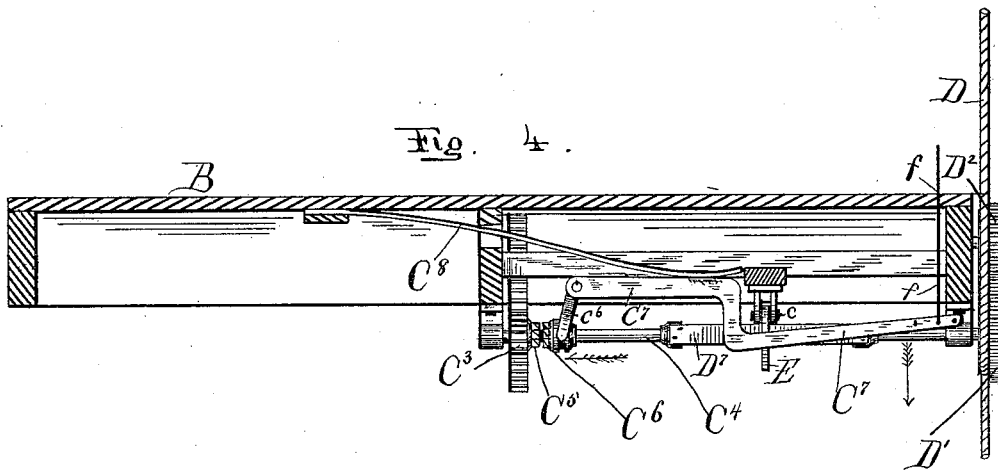
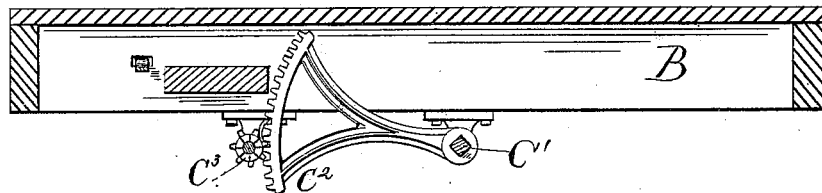
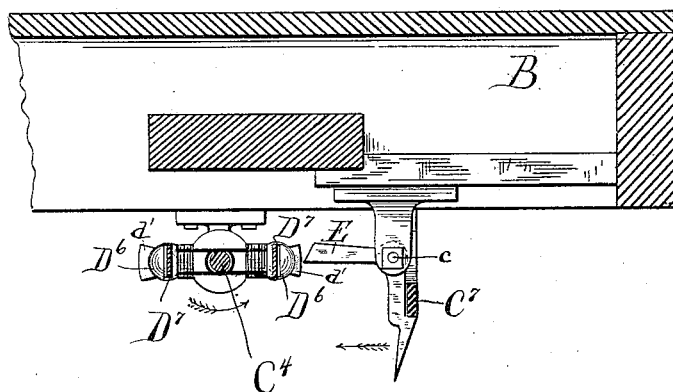


Fig. 5.



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per

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UNITED STATES PATENT OFFICE.

THOMAS W. EATON, FREDERICK H. PRINCE, AND JOSEPH H. LIVESEY, OF CHICAGO, ILLINOIS, ASSIGNORS TO SAID EATON AND PRINCE.

SAFETY-BRAKE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 347,778, dated August 24, 1886.

Application filed December 10, 1883. Serial No. 114,013. (No model.)

To all whom it may concern:

Be it known that we, THOMAS W. EATON, FREDERICK H. PRINCE, and JOSEPH H. LIVESEY, citizens of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Safety-Brakes for Elevators, of which the following is a specification.

This invention relates to safety-brakes for elevators; and it consists in the novel features hereinafter set forth and claimed.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a bottom view of an elevator-car having our improved brake applied thereto. Fig. 2 is an enlarged side elevation of the car and ways, showing also the cable for operating the wheels by which the brake is operated. Figs. 3, 4, and 5 are sections upon the lines 3 3, 4 4, and 5 5 of Fig. 1, respectively.

In the drawings, A represents the guide-ways or track up and down which the elevator travels. These ways are of uniform dimensions, except toward the bottom, where they increase in width, as illustrated in Fig. 2, sufficiently to take up any looseness or leeway with which the ordinary guides borne upon the car B fit upon the side of said ways. The guides are provided with gibs *b b'*. One may be adjustable by set-screws *b''*, while the other is free to be forced suddenly against the guide-way by the cams and their actuating mechanism, now to be described.

C C are cams upon the ends of a shaft, C', preferably square in cross-section, and each of said cams bears against one of the movable or free gibs *b b'*. Said shaft is held in bearings attached to the under side of the car, and at C'' is a toothed segment secured upon it. Meshing with said segment is a pinion, C'', loose upon a shaft, C'. This latter shaft carries also a clutch, the non-sliding half C'' whereof is fast to said pinion C'', and the sliding half C'' is moved into engagement with the non-sliding part, when occasion requires, by the lever C', connected to it by the fork *c'*.

The manner of releasing the lever C' so it may close the clutch is as follows: A cable or chain, D, fast at *d*, passes first under and over a pulley attached to the gear D', thence over

another pulley attached to the gear D'', said gears being borne upon the car and intermeshing with each other, and from thence said cable passes down to and under a stationary pulley, D'', and over another stationary pulley, D', a weight, D'', being attached to its end to keep it taut, and insure the working of the gears D' and D''. Instead of keeping the rope taut by a weight, it may be secured fast at some point below the travel of the car, provided the stretch is taken up whenever requisite. The weight is to be preferred, however, as it is a constant quantity, and automatically performs this duty of keeping the rope sufficiently tight to rotate the gears. The purpose of passing the rope around two pulleys and gearing those pulleys together is to prevent slipping, and insure such power as will rotate the governor, soon to be described.

The gear D' actuates the shaft C', already mentioned, and with it the governor formed of the balls D' D'', secured upon springs D' D'', which are in turn secured to a fast collar, D'', at one end, and a loose or sliding collar, D'', at the other end. The balls carry small projections *d'*, adapted to strike the elbow-trigger E, by which said lever C' is held from actuating the clutch into engagement, and said projections are caused thus to strike said trigger whenever the motion of the shaft C' becomes so speedy as to cause the governor-springs to expand sufficiently to bring about contact between the balls and the trigger. The lever C' being pivoted at *c* and sustained at the other end by the trigger, it follows that when the trigger is withdrawn, as it is when struck by the governor-balls, the lever, under the pressure of the spring C'', swings on its pivot and forces the clutch together.

With the brake thus constructed the operation is very simple. As the car descends, the cable operates the pulleys upon the governor-shaft, and when the movement of the car is at the ordinary speed the governor does not expand under the centrifugal action sufficiently to cause contact with the trigger. If, however, the movement of the car becomes more rapid than safety warrants, the revolution of the governor is increased in speed accordingly, and with this faster revolution the governor expands until it strikes the trigger and compels

it to release the lever C'. This brings the parts of the clutch together and results in the actuating of the pinion C³, the segment, the square shaft, and the cams, and the gripping of the ways by the gibs under the pressure from the cams. If the car be near the bottom of the ways at this time, the widened ways will supplement the brake by increasing the friction between the gibs and the ways.

It is not necessary that the ways be thus widened; but we deem them a valuable auxiliary to the brake, and they may be employed with other brakes to advantage. By extending them below the ordinary path of the car to a suitable distance, and widening them gradually to an extent which will absolutely stop the car, the safety-brake may be altogether dispensed with. In Fig. 2 the ways are shown widened in this manner, and in such cases we recommend that they be constructed to take up the play of the guides at about the point where the car stops its descent in its regular trips, and from thence downward they should widen still further to insure the stoppage.

Both in this form of the invention and in the other where the less-widened ways are employed in connection with the safety-brake, a very gradual stoppage of the car in case of accident may be relied upon.

The governor in our improved brake is attached to the bottom of the car. This saves the train of mechanism for actuating the gripping parts of the brake necessary where it is located above the car, simplifies the brake as a whole, and avoids liability to get out of order.

The cord *f* may be employed to raise the lever C' to its normal position.

The governor may be operated otherwise than by the cable and pulley, if some other way is preferred. The weight may be attached to the cable at any point below the lowest point in the travel of the car, if room can be had to suspend it there, the only object obtained by carrying the cable around the stationary sheaves shown being to permit the

attachment of the weight at a point above, where such room is usually available.

We claim—

1. The combination, with an elevator-car, of an expansible governor operated by the descent of the car, mechanism for carrying motion from the governor to the gibs which grip the elevator-ways, a clutch for connecting the governor with said mechanism, and means set in motion by the expanded governor for closing the clutch, substantially as specified.

2. The combination, with the movable gib and its cam, of the cable D, the expanding governor operated by the cable, the trigger, the lever, the clutch, the pinion, the segment, and the shaft upon which the segment and cam are mounted, substantially as specified.

3. The combination, with a car having a safety-brake, of guideways slightly widened at the bottom, substantially as specified.

4. The guideways extended below the ordinary path of the car and gradually widened in such extended part to create the friction with the car necessary for its stoppage, in combination with the car, substantially as specified.

5. The combination, with the governor, of its actuating-cable, the two pulleys around which said cable passes, and the intermeshing gears attached to said pulleys, whereby the power imparted to both said pulleys by the cable is utilized in operating the governor, substantially as specified.

6. In an elevator safety-brake, the combination, with an expansible ball-governor, of a trigger located relative to the governor, substantially as shown, whereby said trigger is operated directly by contact therewith of the governor balls, essentially as specified.

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