

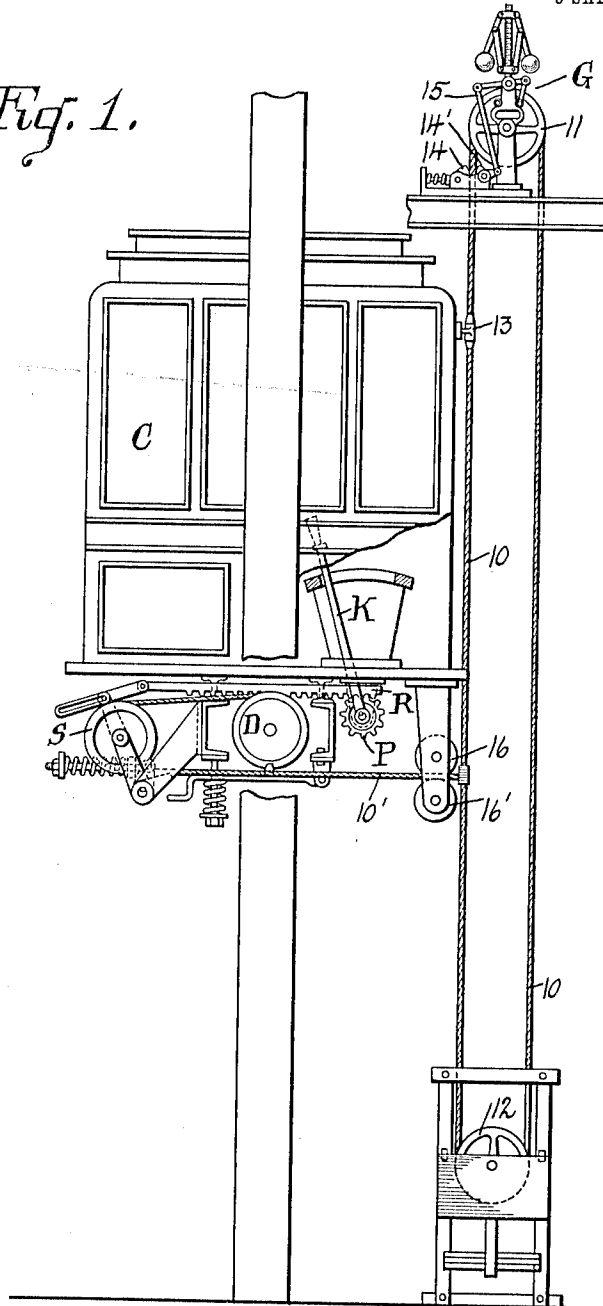
C. R. PRATT.
 QUICK ACTING SAFETY DEVICE.
 APPLICATION FILED APR. 23, 1910.

1,040,578.

Patented Oct. 8, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
James B. Bethell
J. F. Rule.

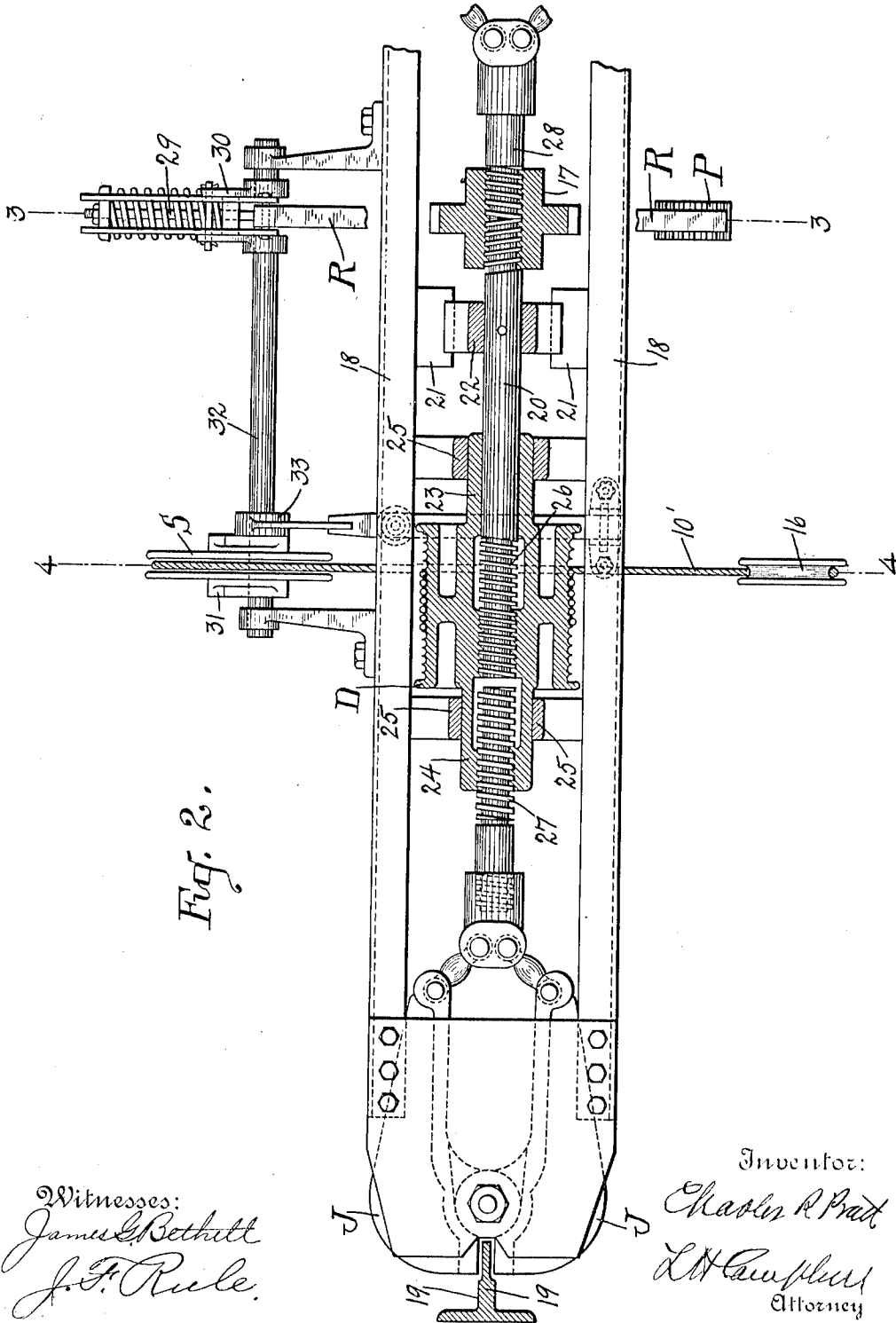
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 Attorney

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3 SHEETS—SHEET 3.

Fig. 3.

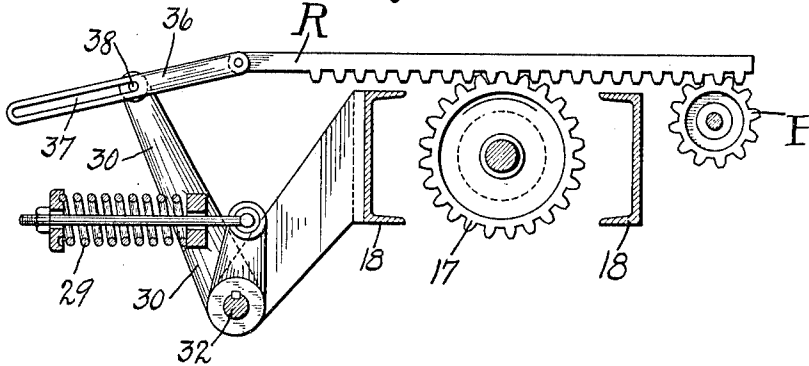
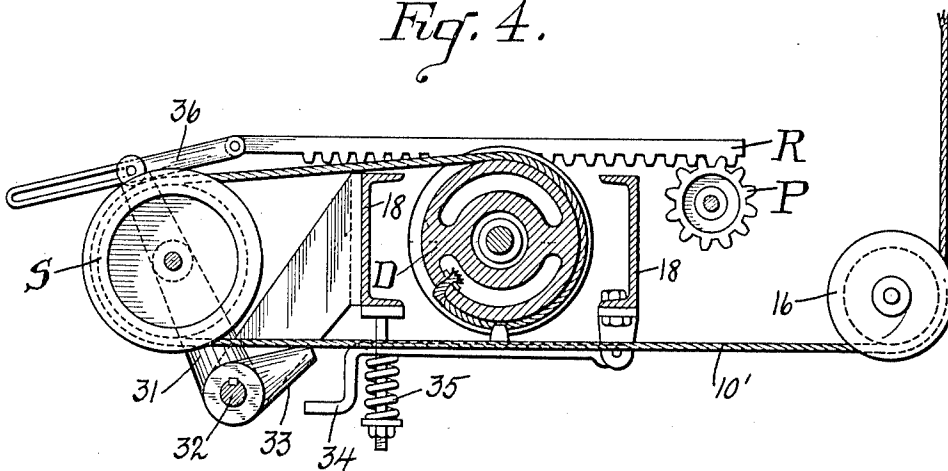


Fig. 4.



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By *Edw Campbell*
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UNITED STATES PATENT OFFICE

CHARLES R. PRATT, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

QUICK-ACTING SAFETY DEVICE.

1,040,578.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed April 23, 1910. Serial No. 557,285.

To all whom it may concern:

Be it known that I, CHARLES R. PRATT, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Quick-Acting Safety Devices, of which the following is a specification.

My invention relates to an elevator safety device, more particularly described as a safety device having jaws for gripping rails in the elevator hoistway to stop the elevator car.

One of the objects of my invention is to provide means for quickly moving the jaws into gripping position and then positively and powerfully to apply them to the rails.

A further object is to provide a safety device manually actuated from within the car, and automatically actuated from without the car.

A further object is to combine the action of a right and left screw device and a differential screw device in the initial and complete application of an elevator safety.

A still further object is to avoid angular deflection of the governor rope as it unwinds from the drum upon a sheave placed close to the drum.

Other objects of my invention will appear hereinafter, the novel combinations of elements being pointed out in the appended claims.

In an elevator car safety apparatus it is not desirable to have the gripping jaws too close to the rails for the reason that they may interfere unnecessarily with the movement of the car by striking or binding, or may become worn by reason of contact with the rails. But in the event of their use it is highly desirable that they be brought into gripping position as quickly as possible. To supplement the quick acting means there must be means powerfully to apply the jaws to the rails after they are in the gripping position.

Referring to the accompanying drawings, Figure 1 shows my invention as applied to an elevator car: Fig. 2 is a plan view partly in section of certain parts of the apparatus of Fig. 1. Fig. 3 is a sectional view on the line 3—3 of Fig. 2. Fig. 4 is a part sectional view on the line 4—4 of Fig. 2.

In Fig. 1 I have shown my invention applied to an elevator car C and its connection

with the automatic governor G. This governor comprises an endless rope 10 which passes over the governor sheave 11 and the weighted sheave 12. The governor rope 10 is secured to the elevator car by the flexible connection 13 and normally moves with the car. When, however, the speed of the car reaches a certain prescribed limit, the governor operates automatically to lift the arm 15 and operate the clamping devices 14, 14' to clamp the rope in a stationary position. The rope 10, fastened to the governor rope 10, passes between the idler sheaves 16, 16', over the sheave S and about the drum D, constituting a means for automatically applying the safety device when the governor operates. In the car is located a lever K which is connected to the pinion P beneath the car. This pinion meshes with the movable rack R and is operative lightly to apply the safety device.

Since my invention is more clearly shown by the remaining figures, I will refer now more specifically to them in describing the location and operation of the several parts.

Referring now more particularly to Fig. 2, the drum D and the right and left screw device 17 are shown in their respective positions mounted upon the rails 18. Gripping jaws J are provided at each side of the elevator car C and are adapted to grip the rails 19, only one of which, however, is shown in this figure. The shaft 20 is slidably mounted upon the rails 18 by means of the block 22 secured to the shaft, and the slide rails 21. When the pinion P is rotated from the car, it operatively moves the rack R which meshes with the gear teeth of the right and left screw device 17 and causes the device to rotate in a direction to separate the shafts 20 and 28. Opposing the motion of the rack R is the spring 29 which is also operative to return the rack and its lever 30 to its normal position after it has been operated. The drum D is formed with extending portions 23 and 24 which are rotatably and longitudinally movable in the bearings 25. The drum also rotates about the shaft 20 upon its threaded portion 26 and the shaft 27 is thrust outwardly by the rotation of the extending portion 24 of the drum. The pitch of the screw on the shaft 27 is greater than that of the screw 26 so that, when the drum is rotated about the screw 26, the shaft 27 is moved

outwardly, the differences in pitch being such that for a complete rotation of the drum D a very small longitudinal movement of the screw 27 is obtained. The sheave S is mounted upon the lever arm 31 which in turn is mounted upon the shaft 32 and upon this same shaft 32 are mounted the levers 30 and 33.

Referring now to Fig. 4, the arrangement of the sheave S on the lever 31 is more plainly seen as well as the location of the arm 33 which is operative when the shaft 32 is rotated to engage the drum locking lever 34. This drum locking lever 34 is retained in its normal position by means of the spring 35 and is only disengaged when the lever 33 knocks the lever 34 out of engagement with the drum. Connection between the lever 30 and the rack R is effected by means of the slotted link 36, the length of the slot 37 therein being such that the rack rotates the screw device 17 a predetermined amount before the end of the slot 37 engages the pin 38 in the lever 30. The operation of this portion of the device is as follows: The pinion P is rotated from the car, thereby forcing the rack to the right and carrying with it the slotted link 36. When the end of the slot 37 engages the pin 38 in the lever 30, the lever is carried with the rack R, causing the rotation of the shaft 32. The pitch of the threads in the screw device 17 may be sufficient to normally bring the gripping jaws J into gripping position with the rails 19 when the device is rotated, or it may be sufficient lightly to apply the said jaws to the rails. This is to effect the initial application only of the jaws but it is evident that considerable pressure may be exerted by the jaws J upon the guide rails if the screw device 17 is rotated far enough. While the manual operation from the car is effective to rotate the shaft 32, it is evident that the manual operation alone does not effect the rotation of the drum D, even though the shaft 32 carries the lever 33 far enough to disengage the locking lever 34.

The automatic operation of my invention is effected by means of the governor rope 10' which passes over the sheave S and about the drum D. When the governor rope is held stationary by the action of the automatic governor device G, the sheave S is pulled to one side, thereby causing the shaft 32 to rotate and carry with it the levers 30 and 33. The lever 30 is operative to move the rack R and effect a rotation of the screw device 17 as previously explained, which brings the jaws J quickly into gripping position. The lever 33 thereafter disengages the locking lever 34, and since the car is moving relatively to the governor rope 10', the said rope will be wound off from the drum D, causing the drum to rotate. The rotation of the drum causes the relative

movement of the shafts 20 and 27 away from each other and effects the more powerful application of the gripping jaws J to the rails 19. As the governor rope 10' unwinds from the drum D, the drum is rotated, and by means of the pitch of the threads 26 and the width of the said rope, the latter is maintained in substantial alinement with the sheave S, thereby facilitating the unwinding and preventing wearing and binding of the said rope.

Thus it is evident that the safety device may be actuated manually from within the car by the operation of the lever, or automatically from without the car by the operation of the speed governor. It can be seen that each operation is separate and distinct, and the complete application of the safety device by means of the differential screw is not dependent for operation upon the said manual operation. It may happen that the car operator will attempt to apply the right and left screw when the speed of the car has not reached the prescribed limit for the automatic application. In such a case it would not be necessary completely to apply the safety device, for the car would not be traveling at an excessive rate. But if the car operator, fearing that the car is getting beyond his control, operates the manual device in the car, and subsequently the speed of the car does get beyond the limit prescribed by the governor device, the differential screw will be immediately applied thereby, for the initial application of the safety device has already been effected by means of the manual device.

Although I have thus specifically described the preferred embodiment of my invention, it is evident that various changes may be made by those skilled in the art to which this appertains, without departing from the spirit and scope of my invention. I wish, therefore, not to be limited to the exact construction, combination and arrangement as herein set forth.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In an elevator safety device, the combination of retarding means, right and left screws initially to apply the retarding means, and a differential screw in addition to said right and left screws and operable automatically completely to apply the said retarding means.

2. In an elevator safety device, the combination of retarding means, right and left screws operative initially and lightly to apply the retarding means, and differential means in addition to said screws, and operable automatically when said screws have operated more powerfully to apply the retarding means.

3. In an elevator safety device comprising rail gripping jaws, the combination of a

right and left screw device to bring the jaws quickly to the rails, and in addition thereto a differential device operable automatically to effect the application of the jaws to the rails.

4. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device automatically to bring the jaws quickly to the rails, and in addition to said right and left screw device a differential device operable to effect the application of the jaws to the rails.

5. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device to bring the jaws quickly to the rails, and in addition thereto a differential device automatically to effect the application of the jaws to the rails.

6. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device automatically to bring the jaws quickly to the rails, and a separate differential device automatically to effect the application of the jaws to the rails.

7. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device to bring the jaws quickly to the rails, means for automatically operating the said screw device, and differential means operable independently of said screw device automatically to effect application of the jaws to the rails to stop the car.

8. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device to bring the jaws quickly to the rails, manual means operable from the car to effect the operation of the said screw device, and automatically operable differential means for effecting complete application of the jaws to the rails.

9. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device to bring the jaws quickly to the rails, a manual device operable from the car to effect the operation of the said screw device, differential means for automatically effecting a complete application of the jaws, and means actuated by the said manual device and operative to permit the operation of said differential means.

10. In an elevator safety device, the combination of retarding means, a right and left screw device lightly and initially to apply the retarding means, manual and automatic means for operating the screw device, and differential screw means for completely applying the retarding means.

11. In an elevator safety device, the combination of retarding means, a right and left screw device lightly and initially to apply the said retarding means, manual means in the car and automatic means for operat-

ing the screw device, and differential screw mechanism completely to apply the retarding means.

12. In an elevator safety device, the combination of retarding means, a right and left screw device lightly and initially to apply the retarding means, manual means in the car and automatic means without the car for operating the screw device, and differential screw mechanism completely to apply the retarding means.

13. In an elevator safety device, the combination of retarding means, a right and left screw device lightly and initially to apply the said retarding means, differential screw mechanism completely to apply the said retarding means, and manual means in the car for operating the right and left screw device and for effecting the release of the differential screw mechanism.

14. In an elevator safety device, the combination of gripping mechanism, a right and left screw device lightly and initially to apply the said mechanism, manual apparatus in the car to operate the said screw device, and means independent of said manual apparatus to effect the operation of the screw device and additional means to effect a more complete application of the gripping mechanism.

15. In an elevator safety device, the combination of retarding mechanism, a right and left screw device lightly and initially to apply the retarding mechanism, a differential screw in addition to the said right and left screw device completely to apply the retarding mechanism, and an automatic governor device operable first to effect the operation of the right and left screws and subsequently to effect the operation of the differential screw.

16. In an elevator safety device, the combination of retarding mechanism, a right and left screw device lightly and initially to apply the said mechanism, differential screw means completely to apply the said mechanism, a rotatable drum to operate the differential means, and means to effect first the operation of the right and left screw device and then the rotation of the said drum.

17. In an elevator safety device, the combination of retarding mechanism, a right and left screw device quickly and lightly to apply the said mechanism, differential screw means completely to apply the same, a rotatable drum to control the differential screw means, a device normally locking the drum during said quick application of the retarding mechanism, and automatic means to operate the right and left screw device to release the locking device, and to effect the rotation of the drum.

18. In an elevator safety device, the combination of a brake, a right and left screw device quickly and lightly to apply the

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brake, differential screw means separate from said screw device and operable completely to apply the brake, a rotatable drum to control the differential screw means, an automatic governor to effect the operation of both screw devices, and means to prevent the operation of the differential screw until the other screw device has operated.

19. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws quickly to place the jaws in gripping position, manual and automatic means for operating the said screws, differential screw means for applying the jaws to the rails, and means to delay the application of the jaws until the jaws are in gripping position.

20. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws quickly to place the jaws in gripping position, a rack and pinion device for operating the right and left screws, differential screw means for applying the jaws to the rails, and a slotted link attached to the rack, and means operated by said link to prevent the operation of the differential screw means until the right and left screws have operated.

21. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws quickly to place the jaws in gripping position, a device to operate the said screws, a pulley having connection with the said device, a rotatable drum, means associated with the said drum for operating the gripping jaws, an automatic governor, and a rope operated by said governor and which passes over the said pulley and around the drum and is effective first to operate the said screw-operating device and then to rotate the drum.

22. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws quickly to place the jaws in gripping position, a device to operate the said screws, a pulley having connection with the said device, a rotatable drum, a differential screw operated by the drum, an automatic governor, and a rope passing over the said pulley and around the drum and effective first to operate the screw operating device and then to operate the differential screw.

23. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws quickly to advance the jaws to gripping position, means operated from the car and automatically operated from without the car for operating the said screws, a differential screw for applying the jaws to the rails, a rotatable drum to operate the differential screw, a locking device for the drum, and means in connection with the right and left screw operative means for releasing the drum locking device.

24. In an elevator safety device, the combination of retarding means, rotatable members mounted in alinement, one member operative when rotated to effect an initial and light application of the retarding means, another member operative when oppositely rotated to effect the complete application of the retarding means, and means to automatically effect the successive operation of said rotatable members.

25. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws to advance the jaws, a differential screw to apply the same, rotatable members to operate the screws, automatic and manual means to operate one of said rotatable members, and automatic means to effect the operation of the other member.

26. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws to advance the jaws, a differential screw to apply the jaws, a rotatable sheave, a speed governor, a governor rope, a revoluble governor rope drum having a threaded portion of such a pitch that by reason of the differential screw the governor rope unwinds from the drum in substantial alinement with the rotatable sheave.

27. In an elevator safety device comprising rail gripping jaws, the combination of right and left screws to advance the jaws to gripping position, rack and pinion means operable from the elevator car to effect the said advancement, automatic means in connection with the rack to effect the same, a winding drum, a drum locking device, differential screw means operated by the drum to apply the jaws to the rails, and means to release the said locking device when the rack has been moved.

28. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device to advance the jaws to gripping position, rack and pinion means operable from the elevator car to effect the said advancement, a differential screw completely to apply the gripping jaws to the rails, a rotatable drum to effect the operation of the said screw, a drum locking device, a rotatable shaft carrying levers, a slotted link to connect one of said levers and the rack, a pulley sheave mounted upon one lever, another lever to engage the locking device and release the drum, an automatic governor, a governor rope passing over the pulley and about the drum, and operative to rotate the said shaft thereby effecting the rapid initial advancement of the jaws and the release of the drum, and the rotation of the drum completely to apply the gripping jaws.

29. In an elevator safety device comprising rail gripping jaws, the combination of a right and left screw device to advance the jaws to gripping position, rack and pinion

means operable from the elevator car to effect the said advancement, a differential screw completely to apply the gripping jaws to the rails, a rotatable drum to effect the operation of the said screw, a drum locking device, a rotatable shaft carrying levers, a slotted link to connect one of said levers and the rack, a pulley sheave mounted upon one lever, another lever to engage the locking device and release the drum, automatic governor means to effect the rotation of the said shaft, and resilient means to return the shaft to its un-operated position.

30. In an elevator, the combination of a governor, guide rails, rail gripping jaws, a right and left screw device to operate said jaws and bring them quickly to the rails, and a differential device automatically operable independently of the operation of said screw device to effect a gripping action of the jaws on the rails.

31. In an elevator, the combination of a car, guide rails, gripping mechanism carried by the car, a right and left screw device operable quickly to apply the gripping mechanism to the guide rails, means in addition to said screw device for powerfully applying said gripping mechanism to the guide rails and a speed governor controlling the opera-

tion of said last-named means and said screw device.

32. In an elevator the combination of a car, guide rails, gripping mechanism, a right and left screw device for initially operating the gripping mechanism, a safety drum, means operated thereby independently of said screw device to effect the final operation of the gripping mechanism, a safety governor, a governor rope, and a rope connecting the governor rope and safety drum.

33. In an elevator, the combination of a car, retarding mechanism carried by the car, a speed governor, a governor rope, a safety drum, a rope connecting said drum and the governor rope, a bodily movable sheave over which said connecting rope passes, means operated by the movement of said sheave for initially operating the retarding mechanism, and means operated by the rotation of the safety drum for effecting a final operation of the retarding mechanism.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES R. PRATT.

Witnesses:

JAMES HODGE,

RUSSELL M. EVERETT.