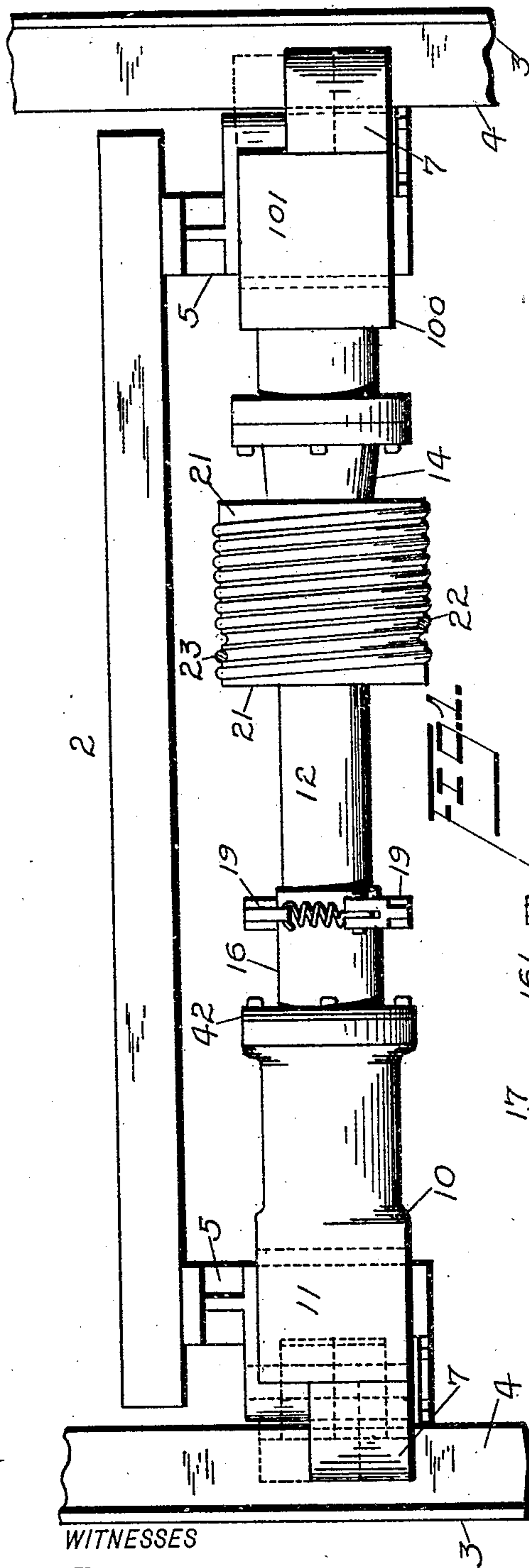


C. R. PRATT.  
ELEVATOR SAFETY DEVICE.  
APPLICATION FILED JUNE 15, 1907.

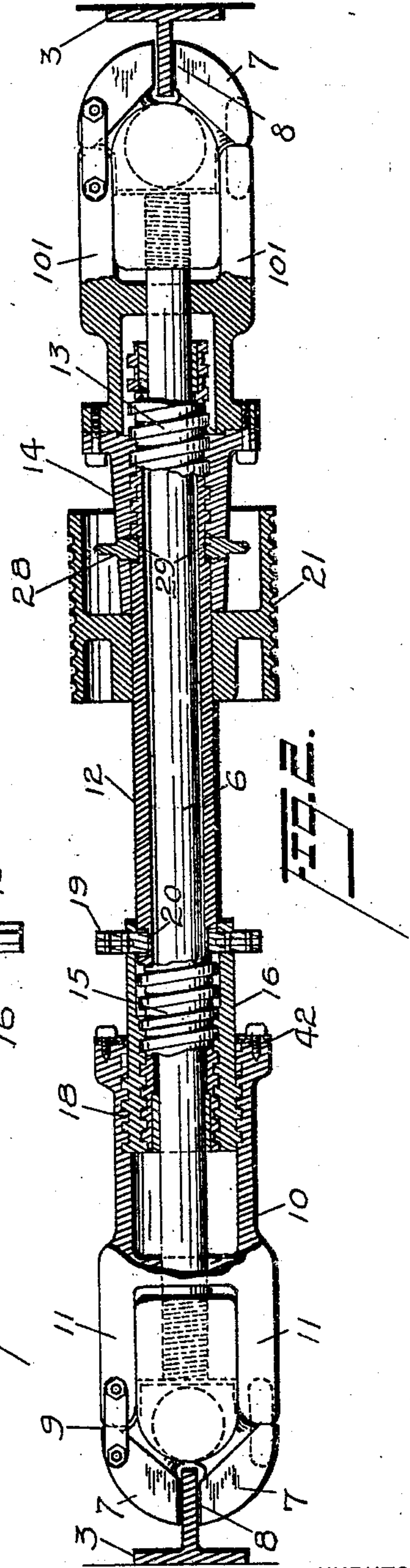
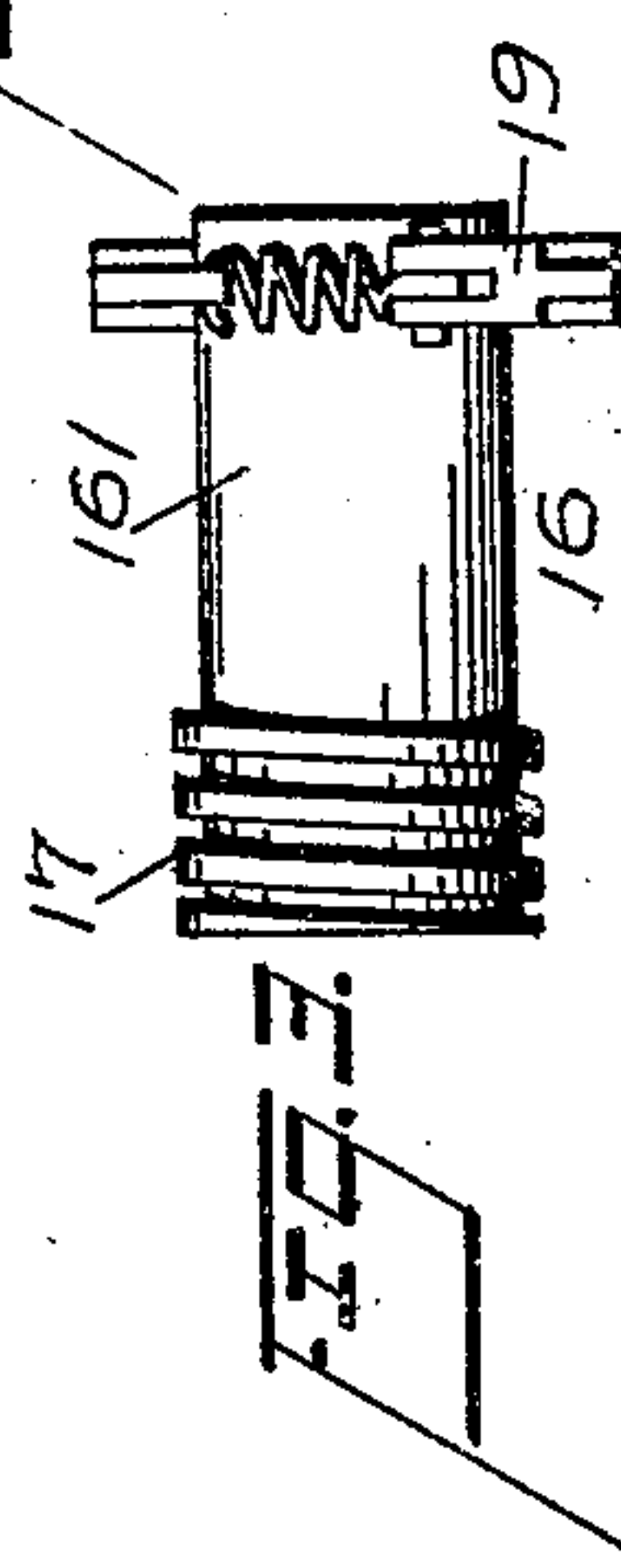
958,679.

Patented May 17, 1910.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES R. PRATT, OF MONTCLAIR, NEW JERSEY.

## ELEVATOR SAFETY DEVICE.

958,679.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed June 15, 1907. Serial No. 379,113.

*To all whom it may concern:*

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

This invention relates to that class of elevator safety devices represented by the one shown in my prior Patent No. 853,733, granted May 14, 1907, and the objects of the present improvements are to secure a more rapid initial movement of the gripping members into contact with the rails, while not interfering with the subsequent differential screw pressure of said members into engagement with the rails to hold the car; to positively insure the return of all parts to their initial position upon reverse motion of the shaft, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, Figure 1 is a rear elevation of my improved safety device arranged on the bottom of an elevator car; Fig. 2 is a view looking upward from beneath the car, the safety device mechanism being shown partly in section, and Fig. 3 is a side view of a certain threaded sleeve detached.

In said drawings, 2 indicates an elevator car of any well known construction adapted to move between rails arranged longitudinally of the hoistway at opposite sides thereof, the rails 3, 3, shown in the drawings being rigid T-rails each having its rib or stem portion 4, next to the car. Upon the car, preferably at its bottom, are arranged means for automatically gripping the said ribs 4, of the rails 3, in case of accident, so as to bring the car to a gradual stop. These gripping means are supported upon the bottom of the car by depending brackets 5, 5, having their lower ends braced by a cross rod 6, extending therebetween. Upon the said ends of the brackets 5, are pivoted opposing quadrangular or bell-crank levers 7, 7, adapted at their jaws 8, to bite against the opposite sides of the rib 4 of the T-rail, and having their other faces 9, projecting substantially at right angles on opposite sides of the brackets and their connecting rod 6. Furthermore, upon each end of the said rod 6, is mounted a sliding end-piece 10, or 100, adapted to slide on the rod and having at its outer end side-

extensions 11, 11, (or 101, 101) adapted to engage the said levers 7, 7, and force them against the rail 3.

The rod 6, carries upon itself intermediate of its ends and of the end pieces 10, 100, just described, a hollow shaft 12, which has at its opposite ends threads of the same kind or direction but differing in pitch, so that a differential screw is provided. One end of this hollow shaft, as 13, receives a correspondingly threaded nut 14, which is bolted to the end piece 100. The other end 15, of the said shaft 12 enters a sleeve 16 having interior threads corresponding to and engaging with those of the shaft. The end of this sleeve 16 lies within the inner end portion of the end piece 10, and on its outer surface has a screw thread 17 of the opposite kind or direction from the one on its interior surface, said threads 17 engaging corresponding female threads 18 upon the inside of the end piece 10.

The said exteriorly threaded end portion of the sleeve 16 is shorter in length than the threaded part of the end piece 10, and normally lies in idle position at the inner end thereof, the difference in length of the two parts being greater than the relative movement of them which is ever required. I have shown that portion of the said sleeve 16 which is devoid of exterior threads, as extending considerably beyond the inner extremity of the end piece 10 and provided with radially acting spring controlled pawls 19 adapted to normally lie in pockets or recesses 20 of the hollow shaft 12. An annular dust guard 42 of felt or any other suitable material is secured to the inner extremity of the end piece 10 to prevent dust and dirt from getting in between said end piece and the sleeve 16.

A rope drum 21 is fixed upon the hollow shaft 12 and said drum has oppositely wound upon itself and anchored thereto the ends 22, 23 of a governor rope which extends over a governor sheave which is not shown here but is well known in the art and can be seen upon reference to my prior patent above referred to. Under normal conditions, the drum 21 is held from turning by means of spring pawls 28 upon the nut 14 and which engage pockets 29 in the outer surface of the hollow shaft. In this relation of parts the governor rope idly rotates the governor sheave, but if an accident occurs so that the elevator car starts to move



with unwonted rapidity, such movement of the rope is stopped by the governor and the drum 21 begins to turn, one end of the rope unwinding therefrom and the other end winding upon the drum. When the drum thus begins to turn, the pawls 28 are forced out of their seats and ride upon the outside of the hollow shaft. When the hollow shaft 12 is thus turned, obviously the threaded sleeve 16 will be held to the shaft by means of its pawls 19 and will rotate with said shaft, turning in the end piece 10. This brings into action the screw threads 13 and 17 at the opposite ends of the shaft which are opposite in kind or direction, so that the end portions 10 and 101 are very quickly and rapidly forced apart to throw the gripping jaws against the rails. When such contact is effected, however, the pressure of the jaws creates a thrust of the end piece 10 against the exterior threads 17 of the sleeve 16 and which threads are preferably much steeper or of higher pitch than the interior threads. The pawls 19 are therefore forced out of their seats and the hollow shaft threads 15 begin to turn in the sleeve 16, so that the differential screw feature is now brought into play and the jaws at the opposite sides of the elevator car are forced into intimate relation to the rails gradually and with such pressure as may be desired. It should be noted that the motion resulting from the action of the screw threads 13 and 17 is the sum of the pitches of said threads, while the later movement from the action of the threads 13 and 15 is the difference of their pitches. Upon reversing the hollow shaft 12, it is immaterial whether turning of the shaft threads 15 in the sleeve 16, or turning of the sleeve threads 17 in the end piece 10, takes place first, because each of said movements has a fixed limit,—viz, the pawls 19 for the first and the end of the threads for the second, which insures that when one is completed the other shall take place. There is thus no uncertainty as to the parts being brought back to their initial position. As a matter of practice, however, the steep pitch threads 17 turn first in releasing the gripping members, and because of their angle reduce the frictional resistance to reversing the hollow shaft 12, thus facilitating this part of the operation of the device.

Having thus described the invention, what I claim as new is:—

1. In an elevator safety device, the combination with gripping means, of two pairs of members each having male and female screw threads of opposite kind or direction from the other adapted to coact in moving the gripping means into contact with the hoistway rails, one member of each pair of said members forming together a third pair having male and female screw threads of the

same kind or direction as one of said first-mentioned pairs but of different pitch and adapted to constitute therewith a differential screw for forcing the gripping means into engagement with the rails, and means for connecting the other members of said first-mentioned pairs with the gripping means.

2. In an elevator safety device, the combination of opposite sets of gripping jaws adapted to engage hoistway rails, a shaft having upon different longitudinal portions of itself threads of the same kind or direction but of different pitch, means engaging one of said threaded portions and being non-rotatably connected to the adjacent set of gripping jaws, a member having one set of threads engaging the other threaded portion of the shaft and a second set of threads of the opposite kind or direction, and means engaging said second set of threads of said member and adapted to transmit motion to the adjacent set of gripping jaws.

3. In an elevator safety device, the combination of gripping jaws, a shaft having upon different longitudinal portions of itself threads of the same kind or direction but of different pitch, a member threaded to engage one of said threaded shaft portions and having other threads of the opposite kind or direction, means for turning said shaft, and means for transmitting motion from said last mentioned threads of said member and from the other threaded portion of the shaft to the gripping jaws.

4. In an elevator safety device, the combination of supporting means, sets of gripping jaws fulcrumed on said supporting means, end-pieces slidably arranged on said supporting means and connected to said gripping jaws to operate the same and having at their inner ends interior screw threads of opposite kind or direction, a shaft having its ends lying in said inner ends of the end-pieces and provided with threads of the same kind or direction, one end of said shaft engaging the end-piece which has threads of the same kind as itself, and a sleeve between the other shaft end and end-piece having interior and exterior threads engaging the said parts respectively.

5. In an elevator safety device, the combination of gripping jaws adapted to engage a hoistway rail, a shaft having upon different longitudinal portions of itself threads of the same kind or direction but of different pitch, a non-rotary nut engaging one of said threaded portions, a member having one set of threads engaging the other threaded portion of the shaft and a second set of threads of the opposite kind or direction, and means adapted to transmit motion from the said second set of threads of said member to the gripping jaws.

6. In an elevator safety device, the combination of supporting means, jaws fulcrumed



on said supporting means, an end-piece slidably arranged on said supporting means and connected to said jaws to operate the same and having at its inner end screw threads, a shaft having at its opposite ends threads of the same kind or direction but of different pitch, a nut engaging one of said threaded shaft ends, and a member having one threaded portion to engage the other threaded shaft end and another threaded portion to engage the end-piece, the threads of said two portions of said member being of opposite kind or direction.

7. In an elevator safety device, the combination of supporting means, gripping jaws fulcrumed on said supporting means, an end-piece slidably arranged on said supporting means and connected to said jaws to operate the same and having at its inner end screw threads, a shaft having at opposite end portions threads differing from each other, a nut engaging one of said threaded shaft ends, and a sleeve having one threaded portion adapted to engage the other threaded shaft end and another threaded portion differing from the first and engaging the said threads of the end-piece.

8. In an elevator safety device, the combination of gripping jaws, an end-piece connected to said jaw to operate the same and being threaded, a shaft having at opposite end portions threads differing from each other, a non-rotary nut engaging one of said threaded shaft ends, a sleeve having interior and exterior threads differing from each other and engaging with the other shaft end and said end-piece respectively, and means for limiting the movement of said sleeve with relation to one of the parts which it engages.

9. In an elevator safety device, the combination of gripping jaws, an end-piece connected to said jaw to operate the same and being threaded, a shaft having at its opposite end portions threads differing from each other, a non-rotary nut engaging one of said threaded shaft ends, a sleeve having at different portions of itself threads different from each other and engaging one with the other shaft end from said nut and the other with said end-piece, and stops upon said end-piece and shaft for the opposite ends of said sleeve.

10. In a safety device for elevators, the combination of a shaft having upon different longitudinal portions of itself threads of the same kind or direction, a member having one set of threads adapted to engage one threaded portion of the shaft and another set of threads differing from the first mentioned set, gripping means adapted to receive motion from the last mentioned threads of said member and from the other threaded portion of the shaft, respectively, and means for turning said shaft.

11. In an elevator safety device, the combination of a shaft having upon different longitudinal portions of itself threads of the same kind or direction, a member engaging one of said threaded portions and having a second set of threads differing from the first, gripping means and a nut one connected to the last mentioned threads of the said member and the other to the other threaded shaft portion, and means for turning said shaft.

12. In a safety device for elevators, the combination of a shaft having upon different longitudinal portions of itself threads of the same kind or direction, a member having one set of threads adapted to engage one threaded portion of the shaft and another set of threads differing from the first mentioned set, gripping means adapted to receive motion from the last mentioned threads of said member and from the other threaded portion of the shaft, respectively, means for limiting the movement of said member with relation to one of the parts which it engages, and means for turning the said shaft.

13. In an elevator safety device, the combination of a shaft having upon different longitudinal portions of itself threads differing from one another, a member engaging one of said threaded portions and having a second set of threads differing from the first, gripping means and a nut one connected to the last mentioned threads of the said member and the other to the opposite threaded shaft portion, stops for the opposite ends of said member, and means for turning said shaft.

14. The combination of a shaft having at different points of its length threads of the same direction but of different pitch, a sleeve upon one of said threaded portions interiorly threaded to engage the same and having on its exterior threads of an opposite kind or direction, and means engaging the exterior threads of said sleeve and the other threaded portion of the shaft.

15. The combination of a shaft having at different points of its length threads of the same direction but of different pitch, a member having threads engaging one of said threaded portions of the shaft and having other threads differing from those first mentioned, and means engaging said last mentioned threads of said member and the other threaded portion of the shaft, and means for turning said shaft.

16. The combination of a shaft having differently threaded longitudinal portions, a member having one set of threads engaging one of said threaded shaft portions and another set of threads differing from the first mentioned set, and means engaging said last mentioned set of threads on said member and the other threaded portion of the



shaft from said member, respectively, and means for turning said shaft.

17. The combination of a shaft having at different points of its length threads of the same direction but of different pitch, a sleeve upon one of said threaded portions interiorly threaded to engage the same and having on its exterior threads of an opposite kind or direction and of higher pitch, dependent means upon said sleeve engaging the shaft, and means engaging the exterior threads of said sleeve and the other threaded portion of the shaft.

18. In a safety device for elevators, the combination of gripping jaws, screws having threads of opposite kind or direction adapted to initially apply said jaws, a screw co-acting with one of said screws and having threads of the same kind or direction but of different pitch adapted to finally apply said jaws, and governing means adapted to effect first the operation of the first-mentioned screws and subsequently the operation of the second-mentioned screws.

19. In a safety device for elevators, the combination of gripping jaws, screws having threads of opposite kind or direction adapted to initially apply said jaws, a screw co-acting with one of said screws and having threads of the same kind or direction but of different pitch adapted to finally apply said jaws, means for effecting the operation of said first-mentioned screws, and means normally holding said second-mentioned screw from operation actuated upon the completion of the operation of the first-men-

tioned screws to permit the operation of the screws of different pitch.

20. In a safety device for elevators, the combination of gripping jaws, screws adapted to co-act in pairs one having threads of opposite kind or direction and another having threads of the same kind or direction but of different pitch, and governing means adapted to effect first the operation of the pair of screws having threads of opposite kind or direction to initially apply the jaws and subsequently the operation of the pair of screws having threads of the same kind or direction but of different pitch to finally apply the jaws.

21. In a safety device for elevators, the combination of gripping jaws, screws adapted to co-act in pairs one having threads of opposite kind or direction and another having threads of the same kind or direction but of different pitch, means for effecting the operation of the pair of screws having threads of opposite kind or direction to initially apply the jaws, and means normally holding from operation the pair of screws having threads of the same kind or direction but of different pitch adapted to be actuated upon completion of operation of the pair of screws having threads of opposite kind or direction to permit operation of said pair having threads of the same kind or direction but of different pitch.

CHARLES R. PRATT.

In the presence of—

RUSSELL M. EVERETT,  
ETHEL B. REED.