Aug. 3, 1943. H. V. McCORMICK 2,326,046

ELEVATOR SAFETY APPARATUS

Filed May 2, 1942 2 Sheets-Sheet 1

Fig. 1.

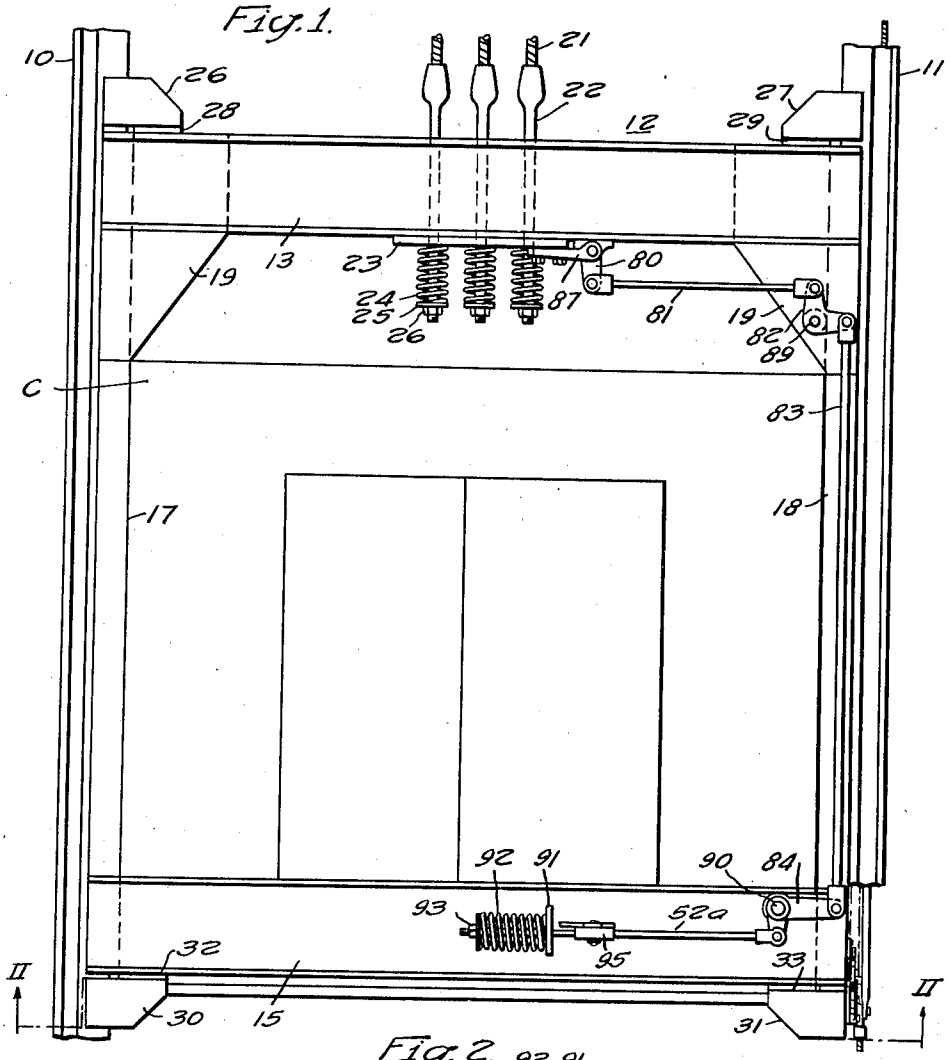
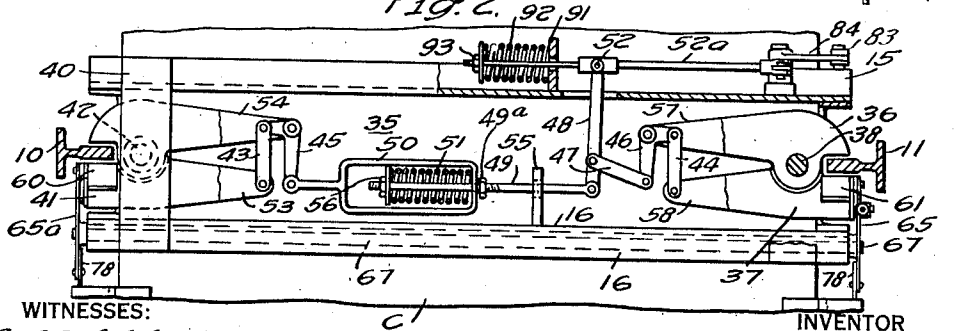


Fig. 2.



WITNESSES:

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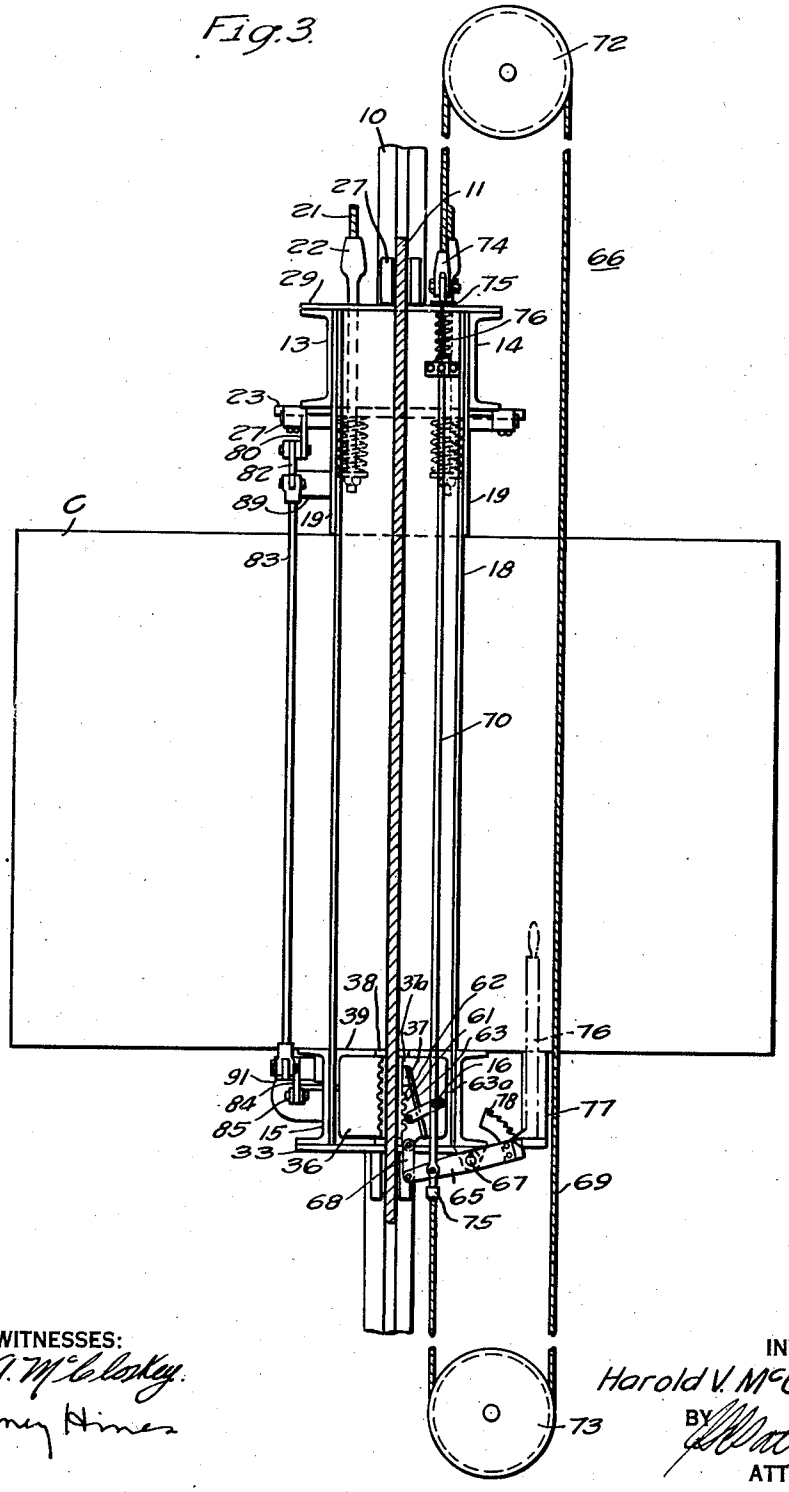
Fig. 3.



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Patented Aug. 3, 1943 2,326,046

UNITED STATES PATENT OFFICE

2,326,046

ELEVATOR SAFETY APPARATUS

Harold V. McCormick, Westfield, N. J., assignor to Westinghouse Electric Elevator Company, Jersey City, N. J., a corporation of Illinois

Application May 2, 1942, Serial No. 441,505

12 Claims. (Cl. 187—88)

My invention relates to elevator safety apparatus, and more particularly to such safety apparatus as includes gripping jaws mounted on the bottom of the car in position to engage the elevator guide rails and stop the car when its hoisting cables break or it exceeds a predetermined down speed.

One object of my invention is to provide a safety apparatus in which the gripping jaws will be self-energizing and self-equalizing when they operate to retard the car to rest.

Another object is to provide a self-energizing safety apparatus in which a relatively light force on the governor cable will start the car retarding action and the safety apparatus will then complete the action.

Another object is to provide a self-energizing safety apparatus in which the forces applied by the gripping jaws on the guide rails will be equalized automatically during their operation in stopping the car.

Another object is to provide a self-energizing safety apparatus which may be adjusted to cause the gripping jaws to grip the guide rails with a predetermined gripping force when they operate to stop the car.

A further object is to provide an elevator safety apparatus for retarding the car to rest in case the hoisting cables break or when the car exceeds a predetermined down speed with its hoisting cables intact.

A still further object is to provide a safety apparatus which will operate to retard the car to rest at one rate of deceleration when its hoisting cables break and at a different rate of deceleration when the car overspeeds in its down direction with its hoisting cables intact.

A still further object to is provide a self-energizing safety apparatus which may be adjusted to retard the car at different desired predetermined rates when its hoisting cables break, or when it overspeeds in its down direction with its hoisting cables intact.

It is also an object of my invention to provide a self-energizing safety apparatus which will retard the car to rest in response to one means actuated by the breaking of the hoisting cables and in response to another means actuated by overspeeding of the car, and means for varying the retarding forces in accordance with whether the car responds to the breaking of the cables or to overspeeding.

For a better understanding of the invention, reference may be had to the accompanying drawings, in which:

Figure 1 is a view in front elevation of an elevator car equipped with my improved safety apparatus,

Fig. 2 is a view taken on line II—II of Fig. 1, illustrating the gripping jaws and their operating apparatus as viewed looking upward to the bottom of the car,

Fig. 3 is a view in side elevation of the car and my improved safety apparatus.

Referring more particularly to my invention, I have illustrated an elevator car C as disposed for operation between a pair of vertical guide rails 10 and 11. The car is mounted in a sling 12 comprising a pair of cross channel irons 13 and 14 at the top, a pair of cross channel irons 15 and 16 at the bottom, and a pair of vertically disposed side channel irons 17 and 18 which connect the top cross channel irons and the bottom cross channel irons at their outer ends. A plurality of metal plates 19 is attached to the top cross channel irons and the side channel irons to brace the frame and make it rigid. The channel irons also serve as a frame for the safety apparatus.

The car is suspended between the guide rails by a plurality of hoisting cables 21 connected to a plurality of cable rods 22 which pass through a plate 23 on the underside of the top channel irons 13 and 14. A cushion spring 24 is disposed on the lower end of each cable rod between the plate 23 and end washers 25 held in place by nuts 26 on the lower ends of the cable rods. The springs 24 are compressed between the plate 23 and the washers 25 by the weight of the car on the cables and serve to cushion the car as it is suspended by the cables.

A pair of guide shoes 26 and 27 is mounted on cross bars 28 and 29 disposed on top of the top channel irons 13 and 14 near their outer ends and a pair of guide shoes 30 and 31 is mounted on cross plates 32 and 33 on the undersurface of the bottom channel irons 15 and 16 near their outer ends in position to engage the guide rails 10 and 11 for guiding the car in its up and down movements.

In accordance with my invention, I have provided a safety device 35 mounted on the car for stopping it if its hoisting cables should break or it should exceed a predetermined speed in the down direction. The safety device includes a pair of braking devices or gripping jaws 36 and 37 pivotally mounted on a pin 38 having its upper end supported in an upper plate 39 and the lower plate 33 at one end of the channel irons 15 and 16 underneath the car in position

to engage the guide rail 11 when the car is to be retarded to a stop. A similar pair of gripping jaws 40 and 41 is mounted in a similar manner on the other end of the same channel irons by a pin 42 in position to engage the guide rail 10 when the car is to be stopped by the safety device.

In order that the gripping jaws may be caused to exert equal gripping pressure on the guide rails when they are placed in operation, I have connected them with an equalizing mechanism comprising a pair of links 43 and 44, a pair of bell crank levers 45 and 46, a link 47, a fulcrum lever 48, a connecting rod 49, a stirrup 50 and a resilient member such as a compression spring 51. The one end of the link 43 is pivotally mounted on the rear arm 53 of the jaw 41 and its other end is pivotally attached to the short arm of the bell crank lever 45 which is pivotally mounted on the rear arm 54 of the gripping jaw 40. The long arm of the bell crank lever 45 is pivotally attached to the left-hand end of the stirrup 50.

The connecting rod 49 is slidably supported in a projecting member 55 mounted on the channel iron 16, with its one end pivotally connected to one end of the lever 48 and its other end extending through the right-hand end of the stirrup 50. The other end of the lever 48 is fulcrumed on a pin 52 attached to a slidable bar 52a. The compression spring 51 is disposed on the rod 49 between the right-hand end of the stirrup and an adjusting nut 56 on the outer end of the rod.

A nut 49a is threaded on the screw-threaded portion of the rod 49 adjacent to the right-hand end of the stirrup 50. This nut provides a shoulder to engage the stirrup so that the spring 50 may be given an initial compression between the foot of the stirrup and the nut 56. The shoulder nut 49a or the nut 56 may be rotated on the screw-threaded portion of the rod 49 to adjust the initial compression of the spring and also to adjust the amount of clearance between the jaws and the rails when they are in their normal unapplied condition. The link 47 has its one end pivotally attached to the lever 48 at a point intermediate the pin 52 and the rod 49 and its other end pivotally attached to the long arm of the bell crank lever 46. The lever 46 is pivotally mounted on the rear arm 57 of the gripping jaw 36 with its short arm pivotally connected to the link 44, the other end of which is pivotally connected to the rear arm 58 of the gripping jaw 37.

The nut 56 may be rotated on the outer side of the connecting rod 49 to adjust the normal compression of the spring 51 to control in a predetermined manner the stopping force exerted by the gripping jaws of the guide rails.

In order that the gripping jaws may be self-energizing the jaw 41 is provided with a wedge member 60 and the jaw 37 with a wedge member 61. The wedge member 61 is slidably disposed in a recess or depression 62 in the jaw 37.

The upper end of the recess 62 is inclined toward the guide rail in such manner that if the wedge member 61 is lifted until it is forced into contact with the guide rail while the car is moving downwardly, a further down movement of the car will wedge the gripping jaws against the guide rail to retard the car in its down movement. A liner 63 of a low friction material is interposed between the jaw 37 and the wedge 61 to provide a lower degree of friction between the jaw and the wedge than will exist between the wedge and the guide rail when the jaw is operated, for the purpose of insuring that the wedge will adhere to the guide rail while the jaw structure is being expanded. A shoulder 37a at the top of the recess 62 limits the upward movement of the wedge in the jaw. A link 63a pivotally attached to the jaw 37 and the wedge 61 is provided for supporting and guiding the wedge 63 in the recess 62. The wedge 60 is mounted in the gripping jaw 41 in the same manner. When both wedges engage their stop shoulders 37a, the jaws are expanded the maximum possible and the spring 51 is compressed a predetermined amount providing an upper limit to braking force under normal emergency stopping conditions.

The means for operating the wedge 61 upwardly in its slot to effect the stopping of the car when it exceeds a predetermined down speed comprises a lever 65 and a governor rope 66. The lever 65 is fixed on the outer end of a shaft 67 and its inner end is connected by a link 68 to the lower end of the wedge 61. The governor rope comprises a cable portion 69 and a lift rod portion 70. The cable portion passes over a governor sheave 72 at the upper end of the hatchway (not shown) and around a tension sheave 73 at the lower end of the hatchway and is connected by a shackle 74 to the upper end of the rod 70 and by a shackle 75 to the lower end of the rod. The lift rod is pivotally connected near its lower end to the lever 65, so that an upward movement of the rod relative to the car will raise the inner end of the lever 65, thus pushing the wedge 61 upwardly to cause it to engage the guide rail 11.

The lift rod is slidably connected to the car by a bracket 75, one end of which is secured to the bar 29 on top of the car and the other end of which embraces the rod 70 just below the upper shackle 74 and above a tension spring 76. When the car moves in normal operation, the bracket 75 carries the governor rope along with the car, thereby rotating the governor sheave 72.

The rotation of the governor sheave 72 serves to operate a suitable governor (not shown) which will stop the rope against further movement when the car exceeds a predetermined down speed. Inasmuch as governors of this character are old and well-known, no further description thereof will be given. If desired, further details may be secured from Patent No. 1,957,311, issued May 1, 1934, on Inertia type governor and assigned to the Westinghouse Electric Elevator Company.

If the wedge 61 becomes firmly wedged against the guide rail 11 in a car-stopping operation, it may be forced out of its wedged position after the car is ready to resume operation by the use of an inching bar 76 placed against the stirrup or fulcrum 77 in position to engage a notched bar 78 riveted to the right-hand end of the lever 65. The inching bar 76 may be carried on the car and used, as shown in its dotted position, when necessary.

In this installation, the rod or bar 67 is illustrated as extending horizontally from the lever 65 to the lever 65a disposed adjacent to the wedge 60 for operating it to retard the car if the car exceeds a predetermined speed. The lever 65a is fixed on the outer end of the shaft 67, so that operation of the lever 65 by the safety rope will cause a similar action of both wedges 60 and 61. However, if desired, the safety apparatus may be

installed without the bar 67 or the lever 65a. Under such conditions, the operation of the gripping jaws 36 and 37 when the car is making a safety stop will, by reason of the equalizing levers, operate the gripping jaws 40 and 41 to clamp the guide rail 10, thereby bringing the wedge 69 into operation and causing the gripping jaws at each end of the safety device to operate effectively on the guide rails 10 and 11 to stop the car. In such a case, the spring 51 will cause the forces exerted by the two pairs of gripping jaws to be equalized. It may be noted that the link 44 is made shorter than the link 43 in the equalizing apparatus to compensate for the different positions at which the rod 49 and the link 47 are attached to the lever 48, since the lever 48 rotates about a fixed fulcrum. That is, the links of the levers 43 and 44 are made such that the forces at the inner ends of the gripping jaws 37 and 41 are identical when the apparatus is operated.

The foregoing description relates to the means for operating the safety apparatus to retard the car to a stop when it exceeds a predetermined speed in the down direction. My improvement also includes an additional means for causing the safety apparatus to be applied immediately to retard the car when the hoisting cables break. This improvement comprises the plate 23, a lever 80, a horizontal connecting rod 81, a vertical connecting rod 83, a bell crank lever 84, the driving rod 52a and a resilient member such as a compression spring 92.

The plate 23 is mounted on the underside of the top channel irons 13 and 14 by a pair of hinges 87, so that, if the hoisting cables 21 break, the upward force they exert will cease and the plate 23 may drop downwardly from the channel irons 13 and 14. The lever 80 is mounted on the hinged portion of the plate 23 so that its lower end will be moved to the right when the plate 23 is pulled down by the expansion of a spring 92. The connecting rod 81 connects the lower end of the lever 80 to the upper end of the bell crank lever 82 which is rotatably mounted by a pin 89 on the frame plate 19 of the car. The right-hand end of the lever 82 is connected by the rod 83 to the right-hand end of the bell crank lever 84 which is pivotally mounted by a pin 90 on the bottom channel iron 15. The lower end of the downwardly extending arm of the lever 83 is pivotally connected to the right-hand end of the rod 85. The left-hand end of the rod 85 is slidably supported by a projecting member 91 mounted on the side of the channel iron 15.

The compression spring 92 is mounted on the rod 52a between the projecting member 91 and the outer left-hand end of the rod and is maintained in position by a nut 93, so that movement of the rod 52a to the left under the action of the spring 92 will tighten the equalizing jaws to cause them to grip the guide rails for the purpose of stopping the car. The nut 93 may be rotated to adjust the compression of the spring 92 to the point to secure any desired predetermined pressure.

It should be observed that the fulcrum 52 of the lever 48 is located at one point when the safety jaws are set by the operation of the governor rope when the car exceeds a predetermined down speed and that it is moved to the left to another point additionally compressing spring 51, when the hoist ropes break and cause the safety jaws to be placed in operation. This shifting of the fulcrum point of the lever 48 provides a means for securing a retarding force suitable for stopping the car when the hoisting cables break and another retarding force suitable for stopping the car when it exceeds a predetermined down speed with its hoisting cables intact.

Operation of the system

It will be assumed now that the car is moving down the shaftway and starts to fall or run away with its hoisting cables intact. When it exceeds its predetermined down speed it operates the governor (not shown) thereby stopping the governor rope 66. As the governor rope stops, the further down movement of the car along the governor rod 70 raises the inner end of the lever 65 relative to its pivotal point 67. This movement of the lever 65 operates the link 68 to move the wedge member 61 upwardly in its recess 62. The rotation of the lever 65 also rotates the rod 67 to cause the lever 65a to raise the wedge member 69 at the other end of the safety device. When the wedge members 69 and 61 move upwardly a sufficient distance in their gripping jaws to contact the guide rails 10 and 11, they are wedged tightly against the guide rails by the further down movement of the car and thereby cause the gripping jaws to so grip the guide rails as to retard the car to rest.

The gripping action of the two pairs of jaws is equalized because the wedging action of the wedge members 61, in spreading the jaws 36 and 37, causes their inner ends 57 and 58 to move toward each other, thereby rotating the bell crank lever 46 by means of the link 44 to exert a pull on the link 47 which moves the lever 48 to the right around its fulcrum point 52. This movement of the lever 48 pulls the connecting rod 49 toward the right against the compression spring 51 and thus applies a predetermined amount of force to the stirrup 50 which pulls upon the bell crank lever 45, thereby operating the link 43 to spread the arms 53 and 54 to increase the gripping action of the jaws 40 and 41 against the guide rail 10.

Inasmuch as the gripping force applied to either pair of jaws will be immediately transmitted to the other pair of jaws by means of the equalizing levers and the compression spring 51, it is evident that the retarding effect of the gripping jaws will be equalized at all times to the predetermined point determined by the spring 51. It will also be evident that this predetermined point may be changed or adjusted by rotating the cap nut 56 to set the gripping pressure at the predetermined degree desired.

It will be assumed now that the car has been returned to service and that its hoisting cables break. The breaking of the hoisting cable releases the operating rod 52a because the upward force of the cables against the plate 23 caused by the weight of the car ceases and permits the plate to be pulled downwardly under the force exerted by the spring 92, it being evident that the downward movement of the plate 23 will permit the lever 80 and the connecting rod 81 to move to the right, thus permitting the bell crank lever 82 to rotate around its pivot 89 to permit the vertical rod 83 to move downwardly which, in turn, permits the bell crank lever 84 to rotate around its pivot 90, and thereby permit the rod 52a to move to the left under the force of the compression spring 92.

The leftward movement of the rod 52a carries with it the connector 52 and the outer end of the lever 48. This movement pulls the connecting rod 49 and the link 47 closer to each other. The left movement of the link 47 operates the

bell crank lever 46 and the link 44 to spread the arms 57 and 58 and thereby move the jaws 36 and 37 into gripping position against the guide rail 11. The movement of the connecting rod 49 to the right pulls on the stirrup 50 through the compression spring 51, and thereby operates the bell crank lever 45 and the link 43 to spread the rear arms 53 and 54, thus moving the jaws 40 and 41 into position to grip the guide rail 10.

As the jaws 36 and 37 move into gripping position, they carry their wedge member 61 against the guide rail 11 and a further down movement of the car wedges the wedge member 61 and the jaws 36 and 37 more tightly on the guide rail.

At the same time the downward movement of the car causes the wedge 60 mounted on the jaw 41 to be brought against the guide rail 10, so that further down movement of the car wedges that wedge member more tightly between the jaws 40 and 41 to grip the guide rail 10 for the purpose of retarding the car against further down movement. If the jaws grip the guide rails with unequal forces, the equalizing mechanism will cause the gripping effect to be equalized so that the retarding effects on both sides of the car will be of equal value.

It will be obvious that plate 23 may be held in place by only one cable which, if broken, would apply the heavier retarding force, or by suitable cable equalizing devices the breaking of any cable could be used to apply the increased braking force.

In the apparatus illustrated, the operating rod 67 on which the levers 65 and 65a are mounted will cause the wedging members 60 and 61 to be moved upwardly approximately in unison and they will be placed in operation at approximately the same time. However, in installations where the connecting rod 67 is not used, the movement of the lever 48 by the compression spring 92 when the plate 23 is released will cause the gripping jaws to move toward the guide rails, and the first wedge member to be moved into engagement with its guide rail will cause the jaws with which it is associated to grip their guide rail, and further down movement of the car will so increase the gripping action that the equalizing levers will transmit the effect to the other pair of gripping jaws, thus closing them to the point where their wedge will be brought against its guide rail so that further down movement of the car will cause them to grip the guide rail with the desired retarding effect. If the jaws grip the guide rails unequally at the start of the operation, the equalizing levers will equalize the gripping action until the retarding effect of the two pairs of jaws is equalized and the value at that point will correspond to the degree of retardation for which the compression spring 51 is adjusted.

It will be apparent that the effect of the spring 51 or the degree of force exerted by it when the hoisting cables break will be different from the force exerted by the safety apparatus when it is operated by the governor rope when the car exceeded its predetermined down speed with the hoisting cables intact. This difference is secured by the shifting of the fulcrum point 52. Hence it will be apparent that one predetermined degree of retarding force will be applied to the car when its safety device is operated by the breaking of the hoisting cables and that another predetermined degree of retarding force will be applied to the car when its safety apparatus is operated by the car exceeding a predetermined down speed with its hoisting cables intact.

It will be further apparent that these predetermined degrees of retardation may be easily adjusted by adjusting the compression of the spring 51 by rotating the cap nut 56. It will be further evident that adjustment of the compression spring 92 by rotation of the cap nut 93 will adjust the predetermined effect of the operating lever 48.

From the foregoing description it will be evident that I have provided a safety apparatus which will retard the car to rest with one degree of retardation when the hoisting cables break and with a different degree of retardation when the car exceeds a predetermined down speed with its hoisting cables intact, and that I thereby prevent disagreeable or unpleasant deceleration of the car during a safety stop from whatever cause.

Although the safety apparatus has been described in connection with an elevator car, it may be used for the counterweight or any other movable body in an elevator requiring safety apparatus to prevent its falling.

Although I have illustrated and described only one specific embodiment of my invention, it is to be understood that changes therein and modifications thereof may be made without departing from the spirit and scope of the invention.

I claim as my invention:

1. In a safety device for a body movable along a pair of guide rails by a hoisting device, a frame, two pairs of safety jaws, each jaw being provided with a rearwardly extending arm and one jaw of each pair being provided with a depression in its gripping face, means for pivotally mounting each pair of jaws on the frame in position to grip a guide rail, a wedge member disposed in each of said depressions whereby down movement of the body when the jaws are closed or the wedge members are moved upwardly wedges the jaws against the guide rails to retard the body, means responsive to a predetermined down speed of the body for operating the wedge members to cause the jaws to retard the down movement of the body, a plurality of equalizing members connected to the arms of the gripping jaws, a fulcrum lever and a resilient member for connecting the equalizing members attached to one pair of jaws to the equalizing members attached to the other pair of jaws whereby an opening movement of one pair of jaws will apply a predetermined force to close the other pair of jaws, a biasing device for biasing the fulcrum lever to operate the equalizing members to close the gripping jaws, and means responsive to the hoisting device remaining intact for preventing operation of the biasing device and responsive to the hoisting device breaking for releasing the biasing device to operate the fulcrum lever to close the jaws to retard the body.

2. In a safety device for a body movable along a pair of guide rails by a hoisting device, a frame, two pairs of safety jaws, each jaw being provided with a rearwardly extending arm and one jaw of each pair being provided with a depression in its gripping face, means for pivotally mounting each pair of jaws on the frame in position to grip a guide rail, a wedge member disposed in each of said depressions whereby down movement of the car when the jaws are operated to grip the guide rails will increase the retarding effect of the jaws, a plurality of equalizing members connected to the arms of the gripping jaws, a fulcrum lever

and a resilient member for connecting the equalizing members of one pair of jaws to the equalizing members of the other pair of jaws whereby an opening movement of one pair of jaws will apply a predetermined force to close the other pair of jaws, a biasing device for biasing the fulcrum lever to operate the equalizing members to close the gripping jaws, and means responsive to the hoisting device for preventing operation of the biasing device while the hoisting device remains intact and responsive to the hoisting device breaking for releasing the biasing means to operate the fulcrum lever to close the jaws to retard the body.

3. In a safety device for a body movable along a pair of guide rails by a hoisting device, a frame, two pairs of safety jaws, each jaw being provided with a rearwardly extending arm and one jaw of each pair being provided with a depression in its gripping face, means for pivotally mounting each pair of jaws on the frame in position to grip a guide rail, a wedge member disposed in each of said depressions whereby down movement of the car when the wedge members are operated wedges the jaws against the guide rails to retard the body, means responsive to a predetermined down speed of the body for operating the wedge members to cause the jaws to grip the guide rails to retard the down movement of the body, a plurality of equalizing members connected to the arms of the gripping jaws, and a fulcrum lever and a resilient member for connecting the equalizing members of one pair of jaws to the equalizing members of the other pair of jaws whereby an opening movement of either pair of jaws will apply a predetermined force to close the other pair of jaws to equalize the retarding force applied by them.

4. In a safety device for a body movable along a pair of guide rails by a hoisting device, a frame, two pairs of safety jaws, means for pivotally mounting each pair of the safety jaws on the frame in position to grip a guide rail, a wedge member for each pair of jaws disposed to cause the jaws to retard the down movement of the body when they are moved into gripping engagement with guide rails, an equalizing device attached to each pair of jaws, a fulcrum lever for connecting the equalizing devices to control the actions of the jaws to equalize the forces they apply in retarding the body, means responsive to a predetermined down speed of the body to operate the wedge members to effect retardation of the body, a biasing device for biasing the fulcrum end of the fulcrum lever to operate the jaws and wedge members to retard the downward movement of the car, and means responsive to the condition of the hoisting device for restraining the biasing device from moving the fulcrum lever while the hoisting device remains intact and for releasing the biasing means to move the fulcrum lever when the hoisting device breaks.

5. In a safety device for a body movable along a pair of guide rails by a hoisting device, a frame, a plurality of safety jaws, means for pivotally mounting the jaws on the frame in position to be moved into engagement with the guide rails, an equalizing means connecting the jaws for causing them to grip the guide rails with equal force when they are moved into engagement therewith, a resilient member mounted in the equalizing means for limiting the equalizing force to a predetermined value, means responsive to the hoisting device breaking for operating the equalizing means to effect operation of the jaws to retard the body, and means responsive to a predetermined down speed of the body for operating the jaws to retard the down movement of the body.

6. In a safety device for a body movable along a pair of guide rails by a hoisting device, a frame, two pairs of safety jaws, means for pivotally mounting each pair of jaws on the frame in position for gripping a guide rail, a wedge member for each pair of jaws disposed to cause the jaws to retard the down movement of the body when they are moved into gripping engagement with the guide rails, an equalizing means connecting one pair of jaws to the other for causing them to apply equal retarding forces when they are operated to retard the body, means responsive to a predetermined down speed of the body for operating the wedges to engage the rails to stop the car, and means responsive to breaking of the hoisting device for operating the equalizing means to move the jaws into engagement with the guide rails to retard the body.

7. In a safety device for a body movable along a guide rail by a hoisting device, a frame, a pair of rail gripping jaws pivotally mounted on the frame, one of said jaws being provided with an angular depression in its rail gripping face, a wedge member of angular shape disposed in said depression, means responsive to a predetermined down speed of the body for operating the wedge member to wedge the jaws on the guide rails to retard the down movement of the body, and a lining member disposed on the surface of the depression in the jaw, said lining member having a degree of friction sufficiently low to provide a less degree of friction between the jaw and the wedge member than the degree of friction between the wedge member and the rail.

8. In a safety device for an elevator body movable along a guide rail by a hoisting device, a frame, a pair of rail gripping jaws pivotally mounted on the frame in position to engage the guide rail, means responsive to a predetermined down speed of the car for operating the jaws to grip the guide rail with a predetermined force to retard the body with one rate of deceleration, and means responsive of the hoisting device breaking for operating the jaws to grip the guide rail with a force different from said predetermined force to retard the body at a different rate of deceleration.

9. In a safety device for a body movable along a pair of guide rails, a plurality of safety jaws, means responsive to the hoisting device breaking for applying the jaws to the guide rails to retard down movement of the body with a predetermined force and means responsive to a predetermined down speed of the body for applying the jaws to the guide rails to retard down movement of the body with a predetermined force different from the first-named predetermined force.

10. In a safety device for a body movable along a guide rail, a frame, a pair of rail gripping jaws pivotally mounted on the frame, a wedge member mounted in the jaws, a lever for moving the wedge member into wedging position in the jaws, a ratchet device mounted on the free end of the lever, whereby an inching bar may be used for engaging the frame and the ratchet device to force the wedge out of its wedging position.

11. In a safety device for an elevator body movable along a guide rail by a hoisting device, a braking device for retarding movement of the body along the rail, means responsive to a predetermined down speed of the body for operating the braking device to apply a predetermined brak-

ing effect on the rail to retard the body, and means responsive to the hoisting device breaking for operating said braking device to apply a different predetermined braking effect on the rail to retard the body.

12. In a safety device for an elevator body movable along a pair of guide rails by a hoisting device, a frame, two pairs of safety jaws pivotally mounted on the frame adjacent to the guide rails, a plurality of equalizing levers connected to the jaws, a fulcrum lever for connecting the equalizing levers, means responsive to a predetermined down speed of the body for operating the jaws with a predetermined force to grip the guide rails for retarding the body, and means responsive to the hoisting device breaking for moving the fulcrum lever to operate the jaws with a different predetermined force to grip the guide rails for retarding the body.

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