

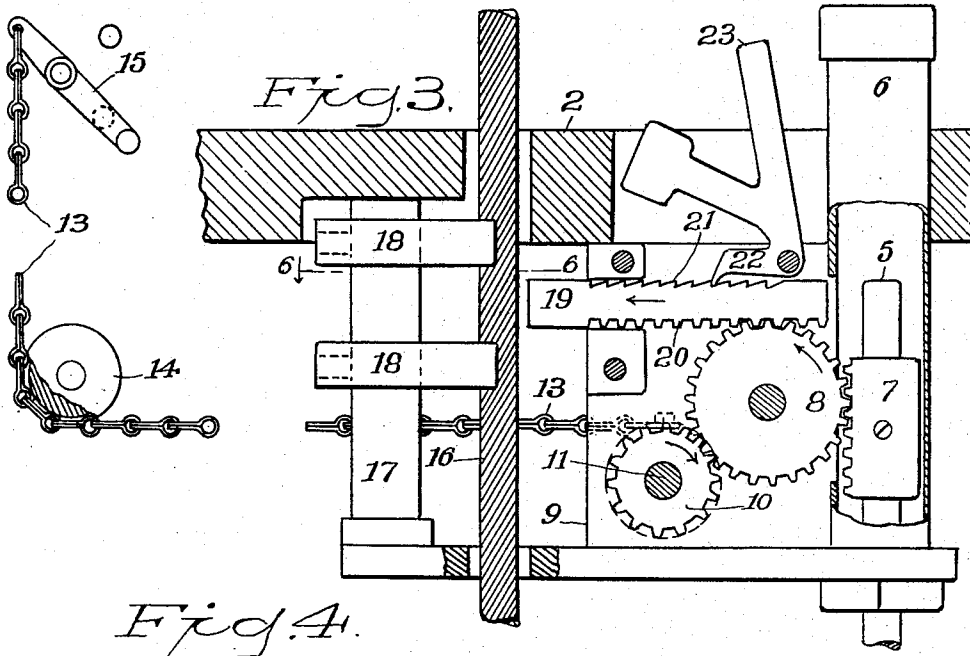
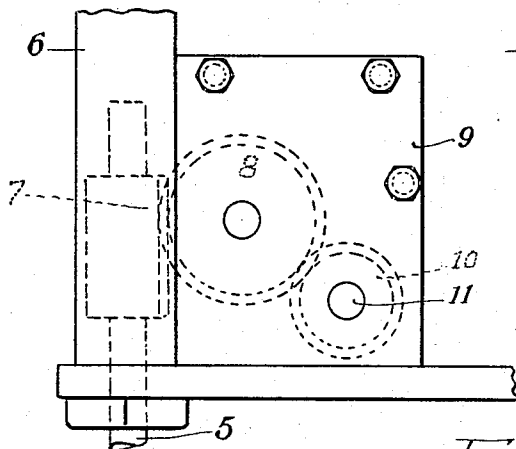
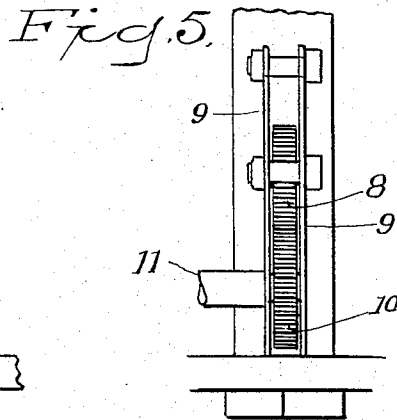
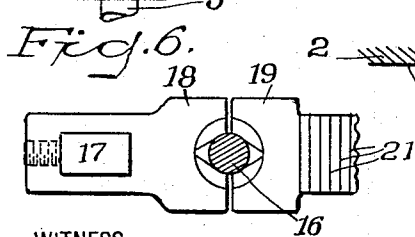
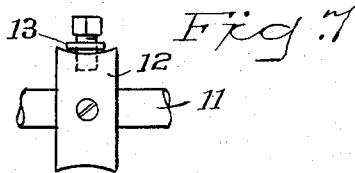
J. D. COUTURE.
SAFETY APPLIANCE FOR ELEVATORS.

APPLICATION FILED APR. 21, 1915.

Patented Feb. 22, 1916.

3 SHEETS—SHEET 2.

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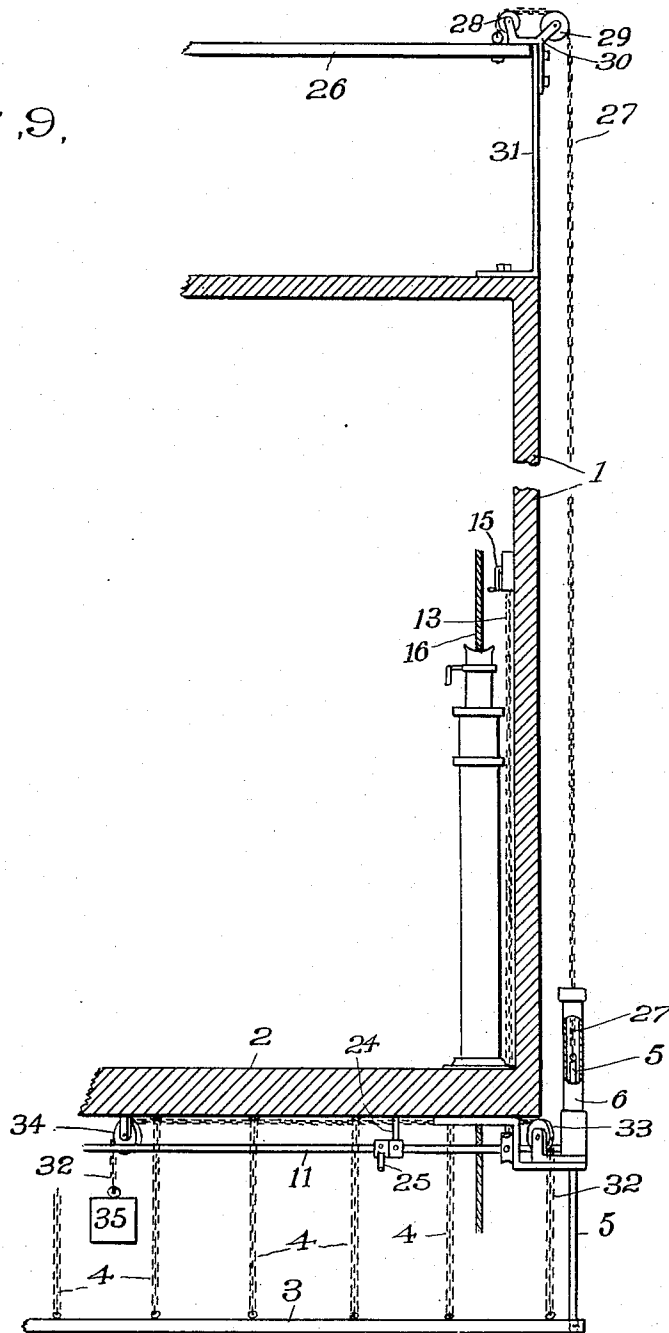
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SAFETY APPLIANCE FOR ELEVATORS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH D. COUTURE, a citizen of the United States, residing at the town of Stratford, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Safety Appliances for Elevators; and I do 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.

This invention relates to safety appliances for elevators, and has for its object to equip an elevator with automatically operating devices for stopping the movement of the elevator car should the latter strike an obstruction projecting either above or below the car into the elevator well or hoistway.

Primarily, the invention contemplates a collapsible bar that may extend either above or below the elevator, so that when this bar comes in contact with any obstruction, as when a person's head or other part of his body projects into the hoistway, the bar striking such obstruction will readily collapse and thereby bring into operation certain instrumentalities which will operate to instantly stop the elevator car.

This improvement is applicable, whether the elevator is run by electricity or by hydraulic power, since the devices brought into operation by the collapsing of the bar will instantly open a switch that is in the main circuit and will at the same time cause the check rope or cable to be firmly gripped, thus doubly insuring the stopping of the elevator car.

In the accompanying drawings which form a part of this application Figure 1 is a front elevation, partly broken and sectioned, of an elevator car equipped with my improvement—Fig. 2 a plan view broken away of the structure shown in Fig. 1—Fig. 3 is a detail broken sectional elevation of the operative parts carried by the elevator car, taken generally on the line 3—3 of Fig. 1—Fig. 4 is a detail broken view of one lower corner portion of the elevator car with the operative parts shown in dotted lines, this view showing particularly the manner in which the parts are housed—Fig. 5 is an edge elevation of the parts shown at Fig. 4—Fig. 6 is a section at the line 6—6 of Fig. 3, but showing the gripping elements embracing the check rope or cable—Fig. 7 is a detail elevation of the sheave pulley which

operates to wind the chain and open the switch—Fig. 8 is a section at the line 8—8 of Fig. 1, and Fig. 9 is a broken sectional front elevation showing the elevator car equipped with my improvement both at the top and bottom.

Similar numerals of reference denote like parts in the several figures of the drawing.

1 represents the side walls of an elevator car and 2 the floor thereof.

Referring to Figs. 1 and 2, the top of the elevator is omitted for sake of clearness in illustration.

3 is an elongated bar suspended below the floor of the elevator by means of chains 4, and rigidly secured to said bar near the ends thereof are vertical rods 5 which project upwardly within tubular guides 6 that are fixed to the elevator car in any suitable manner.

Secured to the rods 5 within the guides 6 are rack bars 7, and meshing with these rack bars are rotary pinions 8 which are journaled between cheek plates 9 that are secured to the floor of the elevator car in any suitable manner. These pinions 8 in turn mesh with pinions 10 which latter are mounted on a shaft 11 that is supported from the bottom of the car, and likewise mounted on this shaft 11 at one end thereof is a sheave pulley 12.

The elevator car is equipped at each side with these rack bars and pinions, and at Fig. 3 I have illustrated in detail these parts as they appear at one side of the car while at Fig. 4 I have simply shown the parts at the other side of the car in dotted lines.

The object of having the rods 5, the rack bars, and the pinions above referred to at both sides of the elevator is in order to provide a better balanced construction whereby the shaft 11 can be revolved without any strain or binding.

Secured to the pulley 12 is a chain or equivalent 13 which leads around an idle pulley 14 carried by the elevator car and is connected to a switch lever 15, as shown at Fig. 3. This switch lever is placed within the car within convenient reach of the operator and is located in the main electrical circuit that would control the operation of the elevator in case the same was operated by electricity. From the foregoing it will be understood that the upward movement of the rack bars will effect the turning of the shaft 11 thereby causing the pulley 12 to operate to wind

the chain around the face of such pulley and this will, of course, cause the chain to exert a pull on the switch lever 15 thereby opening the circuit and causing the elevator to stop.

16 is the check rope or cable passing through the elevator car and by means of which the movements of the car are controlled.

Depending below the floor of the car is a rigid vertically disposed bar 17 to which are secured spaced grips 18 whose faces are in close proximity to the check rope 16.

Slidably arranged within the cheek plates 9 is a grip bar 19 whose gripping face is in close proximity to the check rope 16 and on the bottom of this bar is a rack 20 which is in mesh with the pinion 8 while the top of this bar has ratchet teeth 21 formed therein with which a weighted detent pawl 22 engages, this pawl having an upwardly extending arm 23 which projects through the floor of the elevator car. On the upward movement of the racks, as above set forth, not only will the electrical circuit be opened but the bar 19 will be driven, by the pinion 8, very firmly against the check rope 16 so that the latter will be firmly gripped between the grip bars 18, 19, thereby effecting the stopping of the elevator.

A detent 22 prevents the grip bar 19 from relaxing its grip against the check rope, and in order to release the bar 19 the operator merely thrusts his foot against the arm 23 thus raising the detent out of contact with the ratchet teeth 21.

Should any portion of a person's body be accidentally projected within the hoistway of the elevator car, the latter would be instantly arrested in its descent by the impact of the bar 3 against the obstruction, because just as soon as the bar hits the object projected into the hoistway it would collapse thereby throwing the rack bars 7 upwardly and effecting the operations hereinbefore described.

Secured to the shaft 11 are cranks 24, 25, and when the shaft has been turned in the manner above described by the operation of the racks and pinions the crank 24 will strike against the bottom of the elevator car, and it will be necessary, in order to start the car again, for the operator to grasp the other crank 25 and operate it to reverse the movement of the shaft 11 so as to restore all the parts to normal position.

This invention as heretofore described relates to the application of the safety bar beneath the elevator car, but, referring to Fig. 9, I have shown a bar 26 which is held spaced away from the top of the elevator by means of a chain 27 one end of which is secured to the bar and passed around suitable pulleys 28, 29, journaled within a bracket 30 that is secured to an upright arm 31

that is fixed to the top of the elevator, the other end of this chain depending and being connected to the rod 5. It will, of course, be understood that this construction is duplicated at the other side of the elevator in order that the bar may be well balanced and be capable of ready operation. If there is an obstruction projecting within the hoistway of the elevator during the ascent of the latter the bar 26 will strike this obstruction and will thereby pull the rack bars 7 upwardly and effect the stopping of the elevator in the manner hereinbefore described.

In order to make the bars very sensitive so that they will collapse readily I secure chains 32 to the ends of the bar 3 and pass these chains over idle pulleys 33 that are fixed to the bottom of the elevator car, and then carry the chains down over a pair of idle pulleys 34 that are fixed to the bottom of the car and suspend a counterpoise 35 from the ends of the chains. The use of this counterpoise facilitates the ready collapsing of the bars both above and below the elevator car.

It is evident from the foregoing description that this invention may be embodied in several forms, and it will be further evident that the chains 4 are not at all necessary, and it will be, of course, understood that certain changes and variations may be made in the structure without departing from the invention, the gist of which resides in the broad idea of the collapsible bar normally spaced from the elevator car and so connected with certain elements that control the movements of the car that the collapsing of the bar will bring about the results hereinbefore set forth.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A safety appliance for elevators, comprising a horizontal bar suspended from the car and spaced therefrom but capable of independent vertical movements, vertically disposed guided racks rigid with said bar, pinions carried by the car in meshing engagement with said racks, and connections geared to said pinions and interposed between the latter and the devices which control the movements of the car whereby the rotation of the pinions will effect the stoppage of the car.

2. A safety appliance for elevators, comprising a bar suspended beneath the elevator car and carried thereby and capable of vertical movements, guided vertical rack carrying rods rigid with said bar and projecting upwardly therefrom, rotary pinions carried by the car and in mesh with said racks, and means carried by the car and geared with said pinions and operated by the latter to stop the car.

3. A safety appliance for elevators, comprising an elevator car, a bar carried thereby, flexible means for normally securing the bar in spaced relation to the elevator car but permitting the bar to be capable of free independent vertical movements, guided rack carrying rods extending vertically from the ends of said bar and movable therewith, rotary pinions carried by said car and meshing with said racks, and means carried by the car and geared to said pinions for operation thereby for stopping the car.

4. A safety appliance for elevators, comprising a bar suspended beneath the elevator car and carried thereby and capable of vertical movements, guided vertical rack carrying rods rigid with said bar and projecting upwardly therefrom, rotary pinions carried by the car and in mesh with said racks, devices carried by the car and capable of operation to stop the movement of the car, and instrumentalities geared with said pinions and carried by the car intermediate said pinions and devices for causing the latter to operate and stop the car when the pinions are rotated by the racks.

5. In a safety appliance for elevators, the combination with a car carrying rack guides, a bar carried by the car and normally spaced from the latter but capable of independent vertical movements, racks within said guides, pinions carried by the car and engaged by said racks, rods rigid with said bar and adapted to operate said racks to revolve said pinions when said bar strikes an obstruction and is moved toward the car, and means carried by the car and geared with said pinions for operation thereby for stopping the car.

6. A safety appliance for electrically controlled elevators, comprising a bar suspended beneath the elevator car and capable of vertical movements, guided vertical rack carrying rods rigid with said bar and projecting upwardly therefrom, rotary pinions carried by the car and in mesh with said racks, a rotary shaft carried by the car below the bottom thereof, a sheave pulley and pinions carried by said shaft which pinions are in mesh with the aforesaid rotary pinions, a switch lever in the main electrical circuit that controls the movements of the elevator, said lever operable to open and close the circuit, and connections between said pulley and switch lever whereby the rotation of the pulley will throw said lever to open the circuit.

7. A safety appliance for elevators, comprising a bar suspended beneath the elevator car and capable of vertical movements, guided vertical rack carrying rods rigid with said bar and projecting upwardly therefrom, rotary pinions carried by the car and

in mesh with said racks, a check cable for controlling the movements of the elevator, grip bars fixed in proximity to said cable, a slidable grip bar carrying a rack in mesh with one of said pinions said bar also having ratchet teeth on its upper face, and a detent engaging said teeth and having an arm which projects through the floor of the car.

8. A safety appliance for elevators, comprising a bar suspended beneath the elevator car and capable of vertical movements, guided vertical rack carrying rods rigid with said bar and projecting upwardly therefrom, rotary pinions carried by the car and in mesh with said racks, a rotary shaft carried by the car below the bottom thereof, a sheave pulley and pinions carried by said shaft which pinions are in mesh with the aforesaid rotary pinions, an electric switch lever operable to open and close an electric circuit, connections between said pulley and switch lever whereby the rotation of the pulley will throw said lever to open the circuit, a check cable for controlling movements of the elevator, grip bars fixed in proximity to said cable, a slidable grip bar having a rack on its under surface and ratchet teeth on its top surface which rack is in mesh with one of the first mentioned pinions, and a pivoted detent engaging said teeth and having an arm projecting through the car floor accessible to the operator, whereby the upward movement of said vertical rods will effect the rotation of said pulley and will simultaneously cause the slidable grip bar to be impinged against the check cable.

9. A safety appliance for elevators comprising a bar carried by the elevator car for independent vertical movement, a pinion operable by the bar, and a car stopping mechanism including a rack element meshing with the pinion and provided with ratchet teeth, and a pawl engaging with the ratchet teeth of the rack element to retain the latter in a position to which it has been moved by the pinion.

10. A safety appliance for elevators comprising a bar suspended beneath the elevator car and capable of vertical movements, a shaft journaled on the car, pinions fixed on the shaft and operable by the bar, means operable by the shaft for stopping the car, and adjustable cranks on the shaft adapted to abut the car to limit the rotation of the shaft.

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

JOSEPH D. COUTURE.

Witnesses:

MALCOLM BAXTER,
P. A. COLLJUNG.