Jan. 2, 1940. H. C. BLODGETT 2,185,828

SAFETY CATCH FOR VERTICALLY SLIDING DOORS

Filed Jan. 23, 1939 2 Sheets-Sheet 1

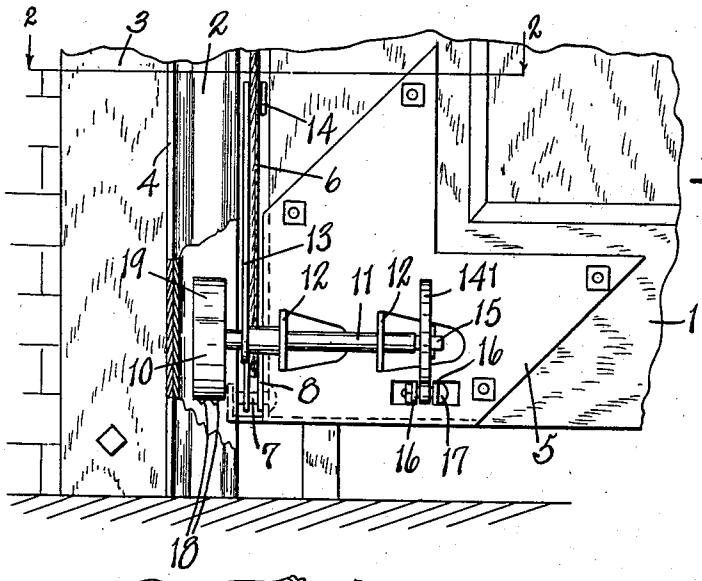


Fig. 1.

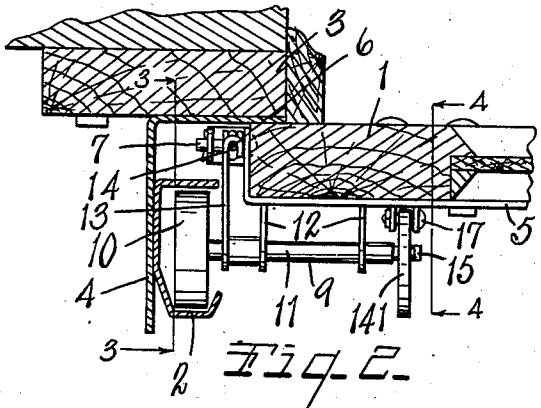


Fig. 2.

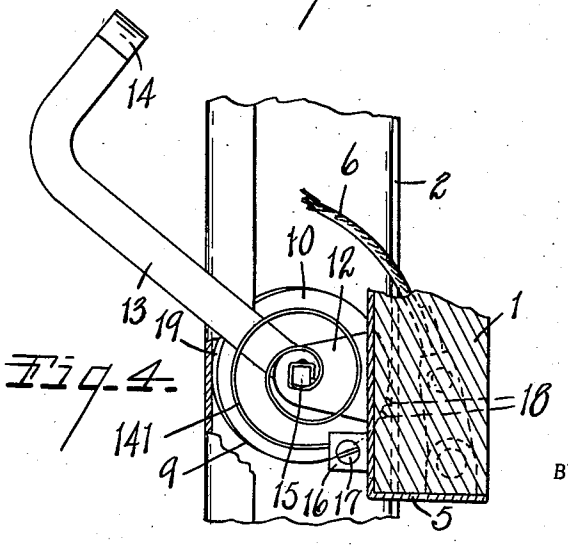
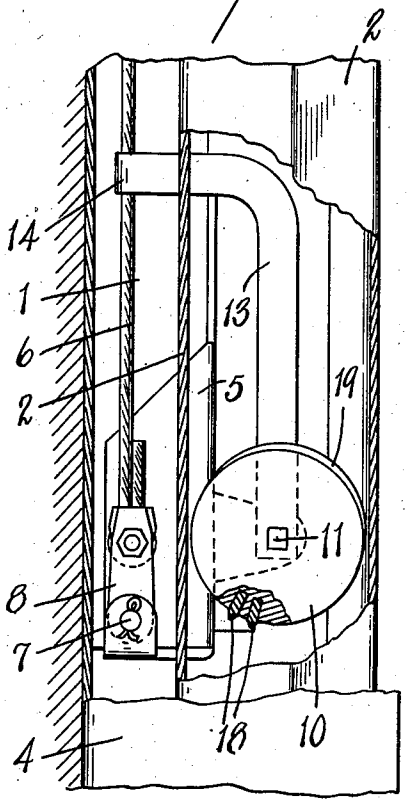


Fig. 4.

Fig. 3.



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Filed Jan. 23, 1939 2 Sheets-Sheet 2

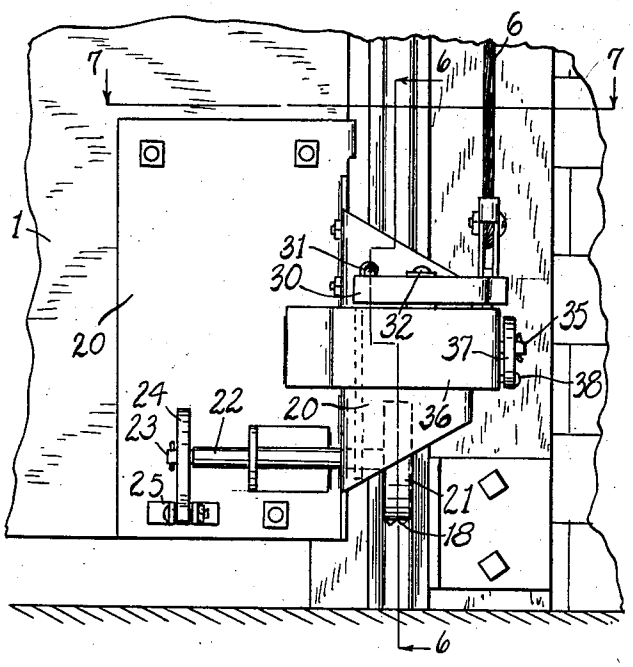


Fig. 5.

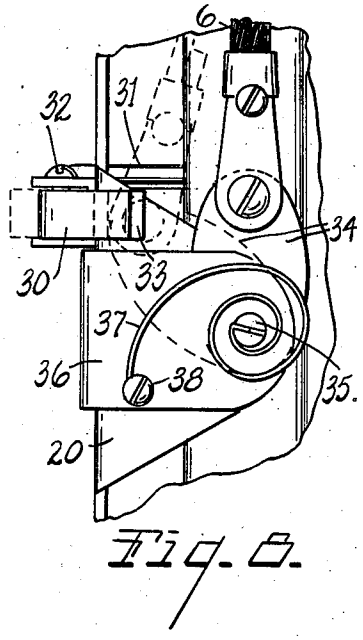


Fig. 8.

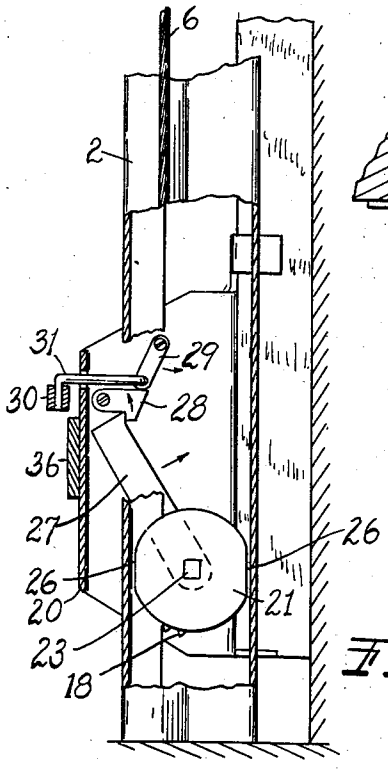


Fig. 6.

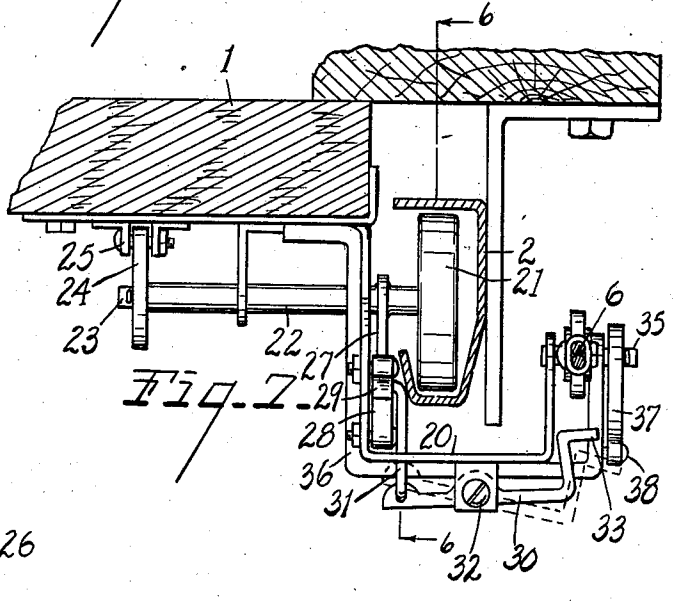


Fig. 7.

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UNITED STATES PATENT OFFICE

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SAFETY CATCH FOR VERTICALLY SLIDING DOORS

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Application January 23, 1939, Serial No. 252,333

15 Claims. (Cl. 20—19)

The main objects of my invention are:

First, to provide a safety catch for a vertically acting door to prevent the latter from falling in the event of failure of the counterbalancing mechanism therefor.

Second, to provide a device of the type described which is simple, reliable, and positive in action.

Third, to provide a device of the type described which may be applied to doors already installed, by the addition, or alternately, the substitution of easily assembled parts.

Further objects relating to details and economies of my invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of my invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary view in side elevation, partially broken away and in vertical section, illustrating parts of a vertically acting door installation with the safety catch device of my invention assembled thereon.

Fig. 2 is a fragmentary view in section on line 2—2 of Fig. 1.

Figs. 3 and 4 are fragmentary views in section, respectively, on lines 3—3 and 4—4 of Fig. 2.

Fig. 5 is a fragmentary inside elevation of a vertically acting door installation showing a modified form or embodiment of my invention.

Fig. 6 is a fragmentary view partially in vertical section on line 6—6 of Figs. 5 and 7.

Fig. 7 is an enlarged fragmentary view in section on line 7—7 of Fig. 5.

Fig. 8 is an enlarged fragmentary view looking from the left of Fig. 7.

The present invention relates to a safety catch for a vertically acting counterbalanced door which functions automatically to lock the latter in the event any part of the counterbalance mechanism therefor, such as the lifting and sustaining cable or the spring counterbalance, fails or breaks. It operates positively and unfailingly upon cessation of the tension in the suspending cable for any reason, being controlled by the latter, and immediately effects a braking engagement with reference to the door guide track and door to thereby prevent downward movement of the door. The operation is exceedingly rapid and the braking effect, although amply sufficient to prevent vertical movement of the door, is readily releasable by a simple manipulation.

Referring to the drawings, the reference numeral 1 indicates a vertically acting door which is provided with the usual rollers (not shown) operating in vertical ways or tracks 2 positioned on the door jamb 3 by means of an angle iron 4.

The door has a bottom fixture 5 bolted thereto, this fixture having the lifting and suspending cables 6 attached thereto. The single cable illustrated is attached adjacent the lower left hand corner of the door by means of a laterally extending bolt 7 carried by the fixture and a connector or apertured cable clamp 8 receiving the bolt. Fixture 5 normally serves to support a bottom track roller carried by the door and coacting with track 2, but in this case the roller is omitted and the safety catch or clutch, designated generally by the numeral 9, is supported by the usual roller support on the fixture.

This safety device consists of a roller-like catch member 10 secured to a spindle 11 which is rotatably carried by a pair of ears or brackets 12 integral with and struck out from fixture 5. The spindle has likewise fixedly secured thereto an arm 13 terminating in an offset hook 14 adapted to engage the cable 6. The arm is urged forwardly relative to the cable by means of a flat spiral spring 14' secured at its inner end to a squared end 15 of the spindle and at its other or outer end to the fixture 5 by means of a pair of ears 6 struck out from the latter and a suitable bolt and nut or other pin type securing element 17 coacting with the said ears and engaging the outer end of the spring.

Referring to Fig. 3, the rotatable safety catch member 10 has projecting radially therefrom pairs of hardened points 18 which are in the preferred embodiment formed of three-sixteenths inch drill rod suitably hardened. The diametrically opposite side of catch member 10 is provided with a raised eccentric wedging portion 19.

The member 10 is of such dimensions that it normally does not engage the track 2, as illustrated in Figs. 2 and 3, the arm 13 maintaining this spaced relation of the clutch member 10 and the track by its engagement with the lifting and suspending cable 6. Thus, the member 10 does not rotate as the door is raised and lowered in normal operation. Even should there be a slight engagement of the member 10 with the track, it will be a sliding engagement with very slight friction by reason of the aforesaid restraining engagement of the hooked arm 13 and cable and the fact that whatever relative movement occurs is in a vertical plane and hence free from substantial friction pressure.

Bearing in mind that the spindle 11 is under rotating stress through the spring 14, it will be

apparent that should cable 6 break the spring will immediately rotate the spindle 11, as illustrated in Fig. 4, in clockwise direction, thereby engaging the hardened points 18 with one wall of track 2 and the wedging portion 19 with the opposite wall of the track. The force exerted by spring 14 and the wedging action is sufficient to force the points 18 into the metal track to a slight extent and thereafter the weight of the released door causes the clutch or clutch member to effectively grip the track and hold the door from downward movement. The wedging portion 19 limits the rotation of clutch member 10 and thereby prevents excessive and objectionable imbedding of the points. Rotation of the arm to its original operative position again frees the door for the adjustment of the cable or counterbalancing spring.

The above described device is very rapid in its operation of catching a door, having been found to catch a descending door in about five-eighths inch travel of the latter. It functions as described, whether the cable 6 breaks or whether other failure of the counterbalancing mechanism results in loss of tension of the normally considerably tensioned cable. It is exceedingly economical and simple in its parts and may be installed without great modification of existing door structures.

In the embodiment of my invention shown in Figs. 5–8, inclusive, I illustrate my improvements embodied in a structure in which the door supporting cable 6 is arranged at the outer side of the track instead of being at the rear thereof, and at the edge of the door as shown in the embodiment of Figs. 1–4. In this construction the bracket 20 mounted on the door has an arm portion which overhangs the track 2. This bracket carries a clutch member 21, the spindle 22 of which is journaled on the bracket and provided with a squared end portion 23 to which one end of the spring 24 is secured, the other end being secured to the door at 25. This spring acts to rotate the clutch member 21 to clutching position, it being provided with flattened sides 26 allowing it to travel within the track without rotation as has been described for the clutch member 10. Track engaging teeth 18 are preferably provided in the structure described.

The spindle 22 is provided with an arm 27 engaged by the dog or detent 28 when the clutch member is in its disengaged position, see Fig. 6. A pivoted catch or holder 29 is provided for holding this dog or detent in its engaged position. This locking member is connected to the lever 30 by means of the link 31, the lever being pivoted at 32 and provided with a tail portion 33 which lies in the path of the tappet 34. This tappet 34 constitutes a coupling for the cable 6 to the door, the tappet being mounted on a pivot 35 carried by the bracket 20 and its reinforcing member 36.

One end of the spring 37 is connected to the bracket at 38 and its other end is connected to the pivot 35 so that the spring tends to rock or turn the pivot counterclockwise in reference to Fig. 8, thereby acting to swing the tappet 34 against the lever which in turn releases the locking member 29, allowing the detent 28 to disengage and permitting the clutch member to be actuated by its actuating spring. The operation in general is the same as that of the structure shown in Figs. 1–4, that is, the clutch is permitted to act when the tension or door supporting stress on the cable is released.

In the embodiment shown in Figs. 1–4 a direct connection from the spindle to the cable is possible owing to the relation of the cable to the track and door, but in the embodiment shown in Figs. 5–8 the position of the parts is such that additional means must be provided for controlling the clutch member from the cable.

I have illustrated two practical embodiments of my invention and it is believed that this disclosure will enable those skilled in the art to adapt my improvements to different arrangements of door and track and cable as may be desired for particular structures and installations. In the embodiments illustrated the clutch member is substituted for the lower track engaging roller of certain types of installations quite widely used. I believe it will be clear that it may be applied as an addition without disturbing or removing any parts of a vertically acting door installation of this character in which tracks are provided and a lifting and sustaining cable is used as a door actuating means and quite commonly as a part of an unbalancing means.

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

1. A safety catch device for a vertically acting door having a vertical guide track and a lifting and sustaining cable, said device being governed by tension in the counterbalancing cable and coacting with the guide track thereof and comprising a roller-like catch located in said guide track, said catch having hardened track engaging points and an oppositely arranged eccentric portion adapted to coact with said track, a spindle secured to said catch and rotatably mounted on said door adjacent the bottom thereof, a coil spring secured at its inner end to said spindle and at its outer end to said door, said spring normally urging said catch in a direction to engage said points and said portion with said track, and an arm secured to said spindle having a hook thereon engageable with said cable to normally maintain the points and enlarged portion of said catch out of engagement with said track, said arm and spindle rotating under the influence of said spring upon release of the tension of said cable to engage said points and enlarged portion with said track and thereby prevent movement of the door.

2. A safety catch device for a vertically acting door having a vertical guide track and a lifting and sustaining cable, said device being governed by tension in the counterbalancing cable and coacting with the guide track thereof and comprising a catch member located in said guide track, said member having hardened track engaging points, a spindle secured to said member and rotatably mounted on said door adjacent the bottom thereof, a spring normally urging said member in a direction to engage said points with said track, and an arm secured to said spindle and engageable with said cable intermediate its ends to normally maintain the points out of engagement with said track, said arm and spindle rotating under the influence of said spring upon release of the tension of said cable to engage said points with said track and thereby prevent movement of the door.

3. A safety catch device for a vertically acting door having a guide track and a lifting and sustaining cable, said device being governed by tension in the lifting cable and coacting with said guide track and comprising a catch member disposed in said track and rotatably mounted on

said door adjacent the bottom thereof, said member having a track engaging portion, a spring normally urging said member rotatively in a direction to engage said portion with said track, and an arm fixedly connected to said member and engageable with said cable intermediate its ends to normally maintain said portion out of engagement with said track, release of the tension of said cable permitting angular movement of said arm and rotation of said member under the influence of said spring to engage said portion with said track and thereby prevent movement of the door.

4. A safety catch device for a vertically acting door having a guide track and a lifting and sustaining cable, said device being governed by tension in the lifting cable and coacting with said guide track and comprising a catch member rotatably mounted on said door adjacent the track, said member having a track engaging portion, means normally urging said member rotatively in a direction to engage said portion with said track, and an arm fixedly connected to said member and engageable with said cable intermediate its ends to normally maintain said portion out of engagement with said track, release of the tension of said cable permitting angular movement of said arm and rotation of said member under the influence of said means to engage said portion with said track and thereby prevent movement of the door.

5. A safety catch device for a vertically acting cable-actuated door, said device being engageable with a fixed guide track during vertical movement thereof and comprising a rotatable clutch member having projections thereon and a wedging portion diametrically opposite said projections, said projections and wedging portion being adapted to engage opposite sides of said track to prevent movement of the door, means for rotatably mounting said clutch member on said door with the clutch member normally out of clutching engagement with the track, spring means for normally urging the clutch member in a direction to engage said projections and wedging portion with the track, and means coacting with said cable to prevent said engagement comprising an arm rotatable with the clutch member and provided with a hook portion engageable with said cable to normally prevent engagement of the clutch member and track, cessation of tension in the cable releasing said arm and permitting rotation of the clutch member under the influence of said spring means.

6. A safety catch device for a vertically acting cable-actuated door, said device being engageable with a fixed guide track during vertical movement thereof and comprising a rotatable clutch member having a projection thereon adapted to engage said track to prevent movement of the door, means for rotatably mounting said clutch member on said door with the clutch member normally out of clutching engagement with the track, spring means for normally urging the clutch member in a direction to engage said projection with the track, and means coacting with said cable to prevent said engagement comprising means rotatable with the clutch member and engageable with said cable intermediate its ends to normally prevent engagement of the clutch member and track, cessation of tension in the cable releasing said last named means and permitting rotation of the clutch member under the influence of said spring means.

7. A safety catch for a vertically acting door assembly, comprising a channeled track and a cable normally under tension operatively associated with the door, a clutch member rotatably mounted on the door to move within the track with the movement of the door and provided with track engaging teeth and with a wedging member opposite the teeth whereby when the clutch member is in one position it is free to travel within the track and when in another position it clutchingly engages the opposite walls of the track, spring means acting to urge said clutch member to engaging position, and means including the tension cable for holding the clutch member in disengaged position permitting engagement thereof by said spring means when the cable breaks or tension on the cable is released.

8. A safety catch for a vertically acting door assembly, comprising a channeled track and a cable normally tensioned in supporting relation with the door, a clutch member rotatably mounted on the door to normally travel within the track without rotation on the opening and closing movements of the door and provided with track engaging teeth and with a wedging member opposite the teeth whereby when the clutch member is in normal position it is free to travel within the track and when rotated to another position it clutchingly engages the opposite walls of the track, means acting to urge said clutch member to clutching position, and means including the tensioned cable for holding the clutch member in disengaged position permitting engagement thereof by said clutch actuating means when the cable breaks or tension on the cable is released.

9. A safety catch for a vertically acting door assembly, comprising a channeled track and a cable normally tensioned in supporting relation with the door, a clutch member rotatably mounted on the door to normally travel within the track without rotation on the opening and closing movements of the door and provided with opposed track engaging portions whereby when the clutch member is in normal position it is free to travel within the track and when rotated to another position it clutchingly engages the opposite walls of the track, means acting to urge said clutch member to clutching position, and means including the tensioned cable for holding the clutch member in disengaged position permitting engagement thereof by said clutch actuating means when the cable breaks or tension on the cable is released.

10. A safety clutch for a vertically sliding door assembly comprising a channeled track and a cable normally tensioned in supporting relation with the door, of a clutch member rotatably mounted on the door to normally travel within the track without rotation on the opening and closing movements of the door and provided with opposed track engaging portions whereby the clutch member in normally position is free to travel within the track and when rotated to another position clutchingly engages the opposite walls of the track, means acting to urge said clutch member to clutching position, a detent for holding said clutch member in disengaged position, and a spring actuated tappet for releasing said detent to which said cable is connected and acting to disengage the detent when the cable breaks or the door supporting tension thereon is released.

11. A safety clutch for a vertically acting door assembly comprising a track and a cable normally under tension in supporting relation with

the door, a clutch member carried by the door and normally traveling with the door relative to the track and without clutching engagement therewith, means acting to actuate said clutch member to clutching engagement with the track, a detent for holding said clutch member in its disengaged position, a detent releasing member constituting a coupling element through which the cable is connected to the door, and a spring for actuating said detent releasing member when the cable breaks or the door supporting tension on the cable is released.

12. A safety clutch device for a vertically acting cable-actuated door slidable relative to a door frame during the vertical movement of the door, said clutch device comprising a clutch element adapted to clutchingly engage a fixed member on the frame to prevent closing movement of the door, means for normally urging said clutch element to clutching position relative to said fixed member, a detent for holding said clutch member in its disengaged position, and tripping means for said detent constituting a coupling for the cable and door, said last named means being subject to the door supporting tension of said cable and acting when such tension is released to release said detent.

13. A safety clutch for a vertically acting door assembly comprising a track and a cable normally tensioned in supporting relation with the door, a clutch member mounted on said door in coacting relation to said track, means acting to urge said clutch member to clutching position, a detent for holding said clutch member in disengaged position, and a spring actuated means constituting a coupling through which the cable is connected to the door, said last named means releasing said detent when the door supporting tension on the cable is removed.

14. A safety catch for a vertically acting door assembly comprising a track and a cable normally under tension in supporting relation with the door, a clutch member carried by the door and normally traveling with the door relative to the track and without clutching engagement therewith, means acting to actuate said clutch member to clutching engagement with the track, means for holding said clutch member in its disengaged position, and releasing means therefor including a coupling element through which the cable is connected to the door.

15. A safety clutch device for a vertically acting cable-actuated door slidable relative to a door frame during the vertical movement of the door, said clutch device comprising a clutch element adapted to clutchingly engage a fixed member on the frame to prevent closing movement of the door, means for normally urging said clutch element to clutching position relative to said fixed member, means for holding said clutch member in its disengaged position, and releasing means for said holding means connecting said cable to the door and subject to the door supporting tension of said cable, said releasing means acting when such tension is released to release said holding means.

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