June 22, 1937. H. A. GERKEN 2,084,677

DOOR SAFETY DEVICE

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Fig. 1.

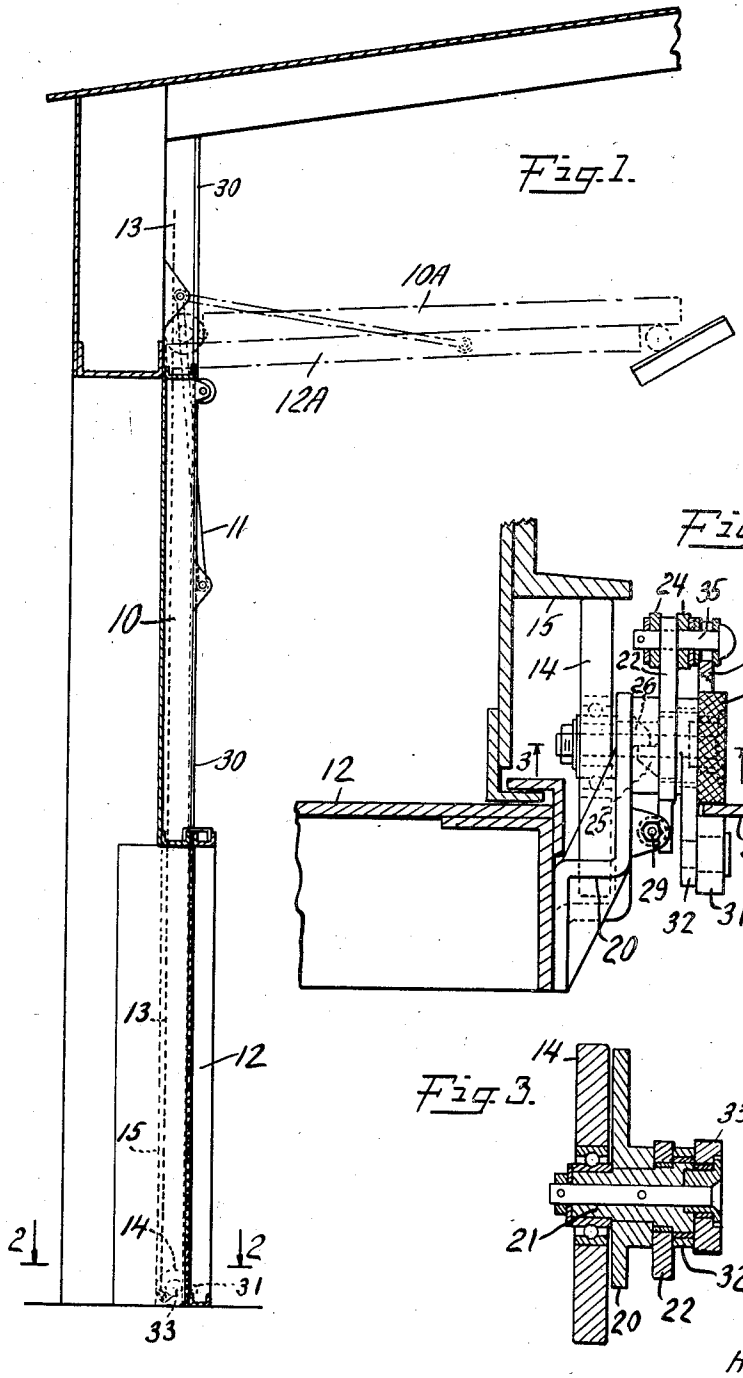


Fig. 2.

Fig. 3.

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Fig. 5.

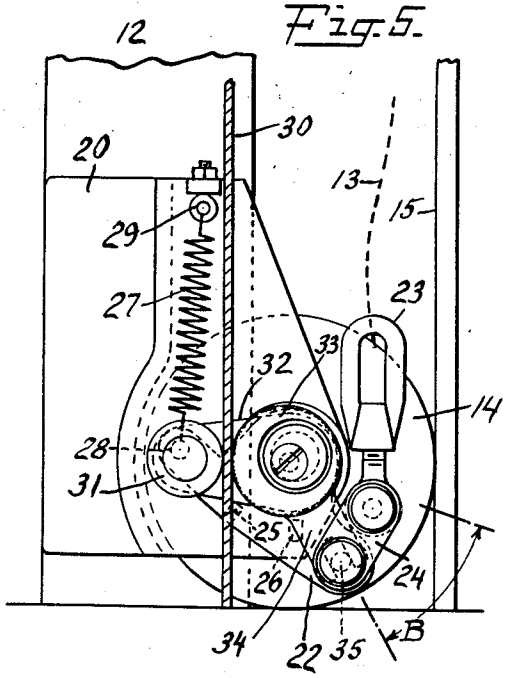


Fig. 4.

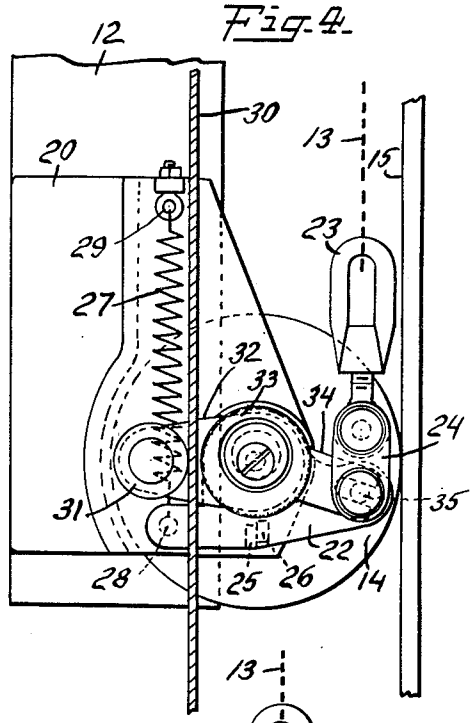
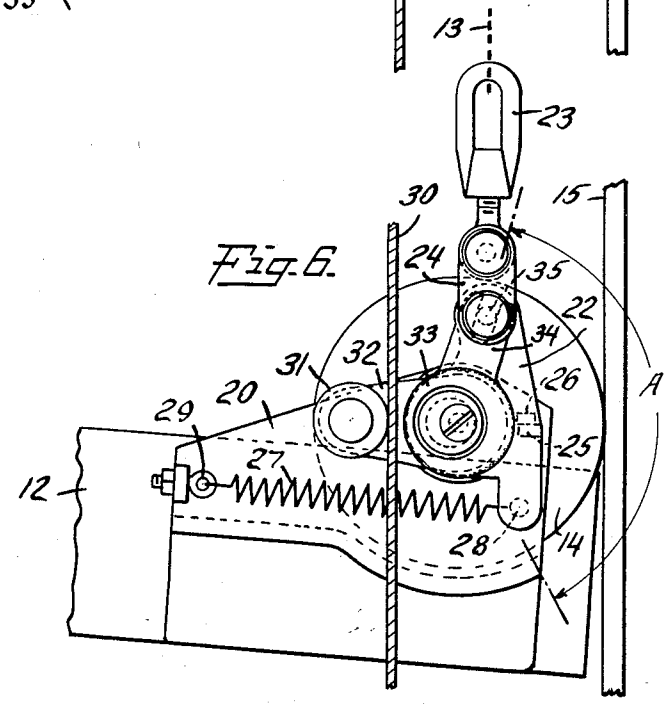


Fig. 6.



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UNITED STATES PATENT OFFICE

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DOOR SAFETY DEVICE

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Application March 23, 1936, Serial No. 70,239

9 Claims. (Cl. 20—20)

My invention relates to improvements in door safety devices and its object is to provide a simple and effective device for sectional doors which in their operation tilt out of vertical positions, which will hold the door sections from running down accidentally in case of the failure of their hoisting mechanism. Another object is to provide a braking device which will act quickly and effectively and which has a minimum number of parts compactly arranged.

These and other objects of the invention will appear in the following specification in which I will describe the invention, the novel features of which will be pointed out in appended claims.

Referring to the drawings, Fig. 1 is a sectional elevation of a link-supported, sectional door, an example of the type of door to which this invention is applicable.

Fig. 2 is a sectional plan view of the lower part of Fig. 1, showing a safety device which embodies my invention. The section in this figure is taken on the line 2—2 of Fig. 1.

Fig. 3 is a sectional elevation of some of the parts shown in Fig. 2, the section being taken on the line 3—3 of Fig. 2.

Figs. 4, 5, and 6 are sectional elevations of the safety device shown in Fig. 2, with its parts shown in different relative positions in the different figures.

Referring first to Fig. 1, I will describe briefly the door structure shown therein. It comprises an upper section 10, pivotally supported by links 11, so that it may swing from the vertical closed position in which it is shown in full lines to a full open position indicated by dotted lines at 10A. In opening the door, the lower section 12, first rises vertically from the position in which it is shown in full lines in Fig. 1 until it overlies the upper section, and then the two sections swing together, supported by the links 11, until they are in a full open position when the lower section will be in that indicated by the dotted lines at 12A. This movement is effected by hoisting chains 13, which are connected with the lower corner of the lower door section.

During all of the movements of the door sections, the lower edge of the lower section is guided to move vertically by rollers 14, which run on tracks 15.

20 is a bracket shown in the other figures, rigidly affixed to the lower corner of the lower door section. This supports one of the rollers 14, and the parts of the safety device which will now be described. It is to be understood that these parts are duplicated at the other lower corner of the lower door section. 21 is a bushing supported in the bracket. The roller 14 is freely rotatable on this bushing. 22 is a chain arm pivoted on the bushing 21. The hoisting chain 13 is connected to it by a shackle 23 and links 24. The movement of the chain arm relative to the bracket is limited in one direction by a stop lug 25 on the chain arm and a stop lug 26 on the bracket 20. A spring 27 connected to the chain arm at 28 and to the bracket at 29, tends to move these stop lugs apart.

30 is a vertical safety rail permanently affixed to the building structure which supports the door. Inside of this rail is a floating member, in the particular case shown, a roller 31, on an arm 32, pivotally supported on the bushing 21. On the other side of the rail 30 is a locking cam 33. This is eccentrically mounted on the bushing 21. Its surface adjacent to the rail is roughened and it is preferably hardened. 34 is an arm which extends outwardly from the cam member. Its end is bifurcated and embraces a pin 35 which connects links 24 with the chain arm 22.

It may be seen from Figs. 4 and 1 that the chain arm extends toward guide rail 15, to bring the hoisting chain as close to this rail as possible and well outside the center of gravity of the door sections in their vertical positions. As this spaces the chain from the lower pivoted end of link 11, it helps to break in the door sections, that is, initiate their inward swing in opening.

In Fig. 4, the tension on the hoisting chain 13 is holding the stop lug 25 against lug 26, thereby supporting the weight of the door, and through arm 34, is holding the locking cam 33 out of contact with the safety rail 30. These are the positions of the parts during the usual operation of the door.

If the hoisting chain breaks, or if for any other reason its tension is lost, the spring 27 will rotate the chain arm in a clockwise direction to bring the locking cam 33 into engagement with the safety rail 30. Further downward movement of the door will tighten this engagement of the cam 33 and the rail will be gripped between it and the floating member 31.

When the lower door section tilts over toward a horizontal position in opening, the chain arm 22 and the locking cam arm 34 will move in a counterclockwise direction toward the positions shown in Fig. 6. During this tilting movement the roller 31 is guided by the safety rail 30 so that it is always in effective operative position. When in an emergency the lifting chain is slackened, the spring 27 will propel the cam through the angle A, Fig. 6, if the door is in wide open position or through a lesser angle in other tilted positions and the safety rail will be gripped between the cam and the roller. In the vertical position of the door the cam will move through the angle B shown in Fig. 5 when the device is in emergency operation.

Many changes and structural modifications may be made within the spirit and scope of this

invention and I intend no limitations other than those imposed by the appended claims.

What I claim is:

1. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot, a hoisting chain connected with said arm at a point spaced from said pivot toward the guide rail, cooperating stop lugs on the chain arm and on the door section, a locking cam held in inoperative position by the chain arm, and means acting against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and actuate the locking cam.

2. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot and extending toward the guide, a hoisting chain connected with said arm at a point spaced from said pivot toward the guide rail, cooperating stop lugs on the chain arm and on the door section, a locking cam held in inoperative position by the chain arm, and means acting against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and actuate the locking cam.

3. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot and extending toward the guide, a hoisting chain connected with said arm at a point spaced from said pivot toward the guide rail, cooperating stop lugs on the chain arm and on the door section, a safety rail, a locking cam arranged to engage the safety rail, held in inoperative position by the chain arm, and means acting against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and move the locking cam into engagement with the safety rail.

4. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot and extending toward the guide, a hoisting chain connected with said arm at a point spaced from said pivot toward the guide rail, cooperating stop lugs on the chain arm and on the door section, a safety rail, a locking cam on one side of the safety rail arranged to engage said rail, held in inoperative position by the chain arm, a floating member on the other side of the safety rail, an arm pivoted to the guide roller pivot and connected to said member, and means acting against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and move the locking cam into engagement with the safety rail.

5. A door section, a pivot on the lower edge thereof, a roller supported on said pivot, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot and extending toward the guide, a hoisting chain connected with said arm at a point spaced from said pivot toward the guide rail, cooperating stop lugs on the chain arm and on the door section, a safety rail, a locking cam eccentrically mounted on the guide roller pivot on one side of the safety rail, a floating member on the other side of the safety rail adjacent the locking cam, an arm pivoted to the guide roller pivot and connected to said member, and means acting against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and move the locking cam into engagement with the safety rail.

6. A door section, a pivot on the lower edge thereof, a roller supported on said pivot, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot and extending toward the guide, a hoisting chain connected with said arm at a point spaced from said pivot toward the guide rail, cooperating stop lugs on the chain arm and on the door section, a safety rail, a locking cam eccentrically mounted on the guide roller pivot on one side of the safety rail, a floating member on the other side of the safety rail adjacent the locking cam, an arm pivoted to the guide roller pivot and connected to said member, and a spring acting between the chain arm and the door section against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and move the locking cam into engagement with the safety rail.

7. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm pivotally supported on the guide roller pivot and extending transversely therefrom, a pin near one end of said chain arm at a point spaced from said guide roller pivot near the guide rail, a spring connected with the chain arm near its other end and with the door section, a locking cam eccentrically mounted on the guide roller pivot, and an arm extending from said cam into operative engagement with the pin on the chain arm.

8. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm pivotally supported on the guide roller pivot and extending transversely therefrom, a locking cam eccentrically mounted on the guide roller pivot, an arm extending from said cam into operative engagement with the chain arm, a floating member opposite the locking cam, and an arm pivotally supported on the guide roller pivot between the chain arm and the locking cam and connected with said floating member.

9. A door section, a guide roller pivoted to the lower edge thereof, a vertical guide for the roller, means for swinging the door section away from and toward said guide, a chain arm movably supported on the guide roller pivot, a hoisting chain connected with said arm, cooperating stop lugs on the chain arm and on the door section, a locking cam held in inoperative position by the chain arm, means acting against the tension on the chain tending to move the chain arm relative to the door section to separate the stop lugs and actuate the locking cam, and means coacting with the cam to lock the door when tension on the chain is removed.

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