E. G. WALL.

ELEVATOR SAFETY DEVICE.

APPLICATION FILED JULY 16, 1910.

980,460.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

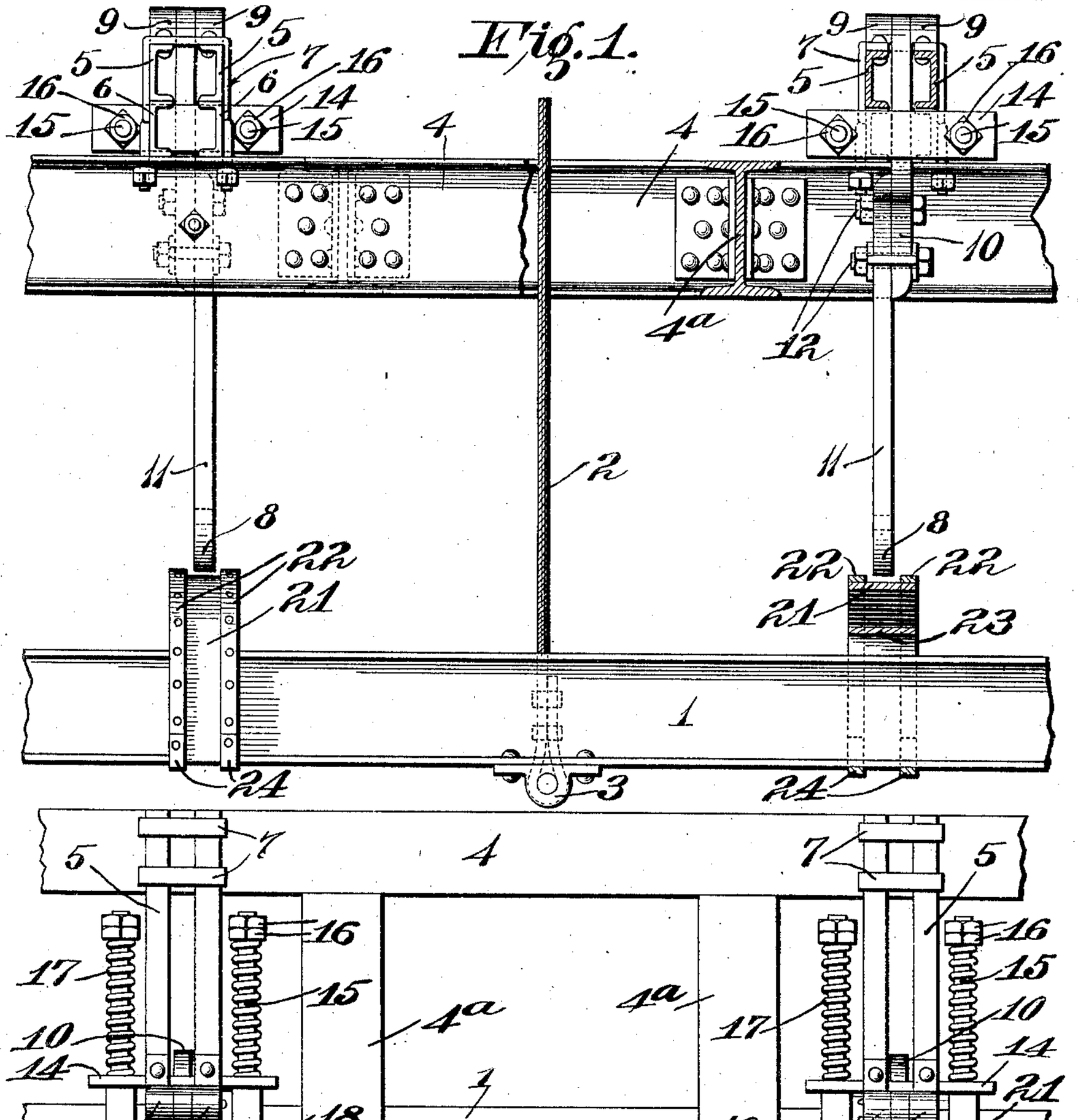

Fig. 2.

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Fig. 3.

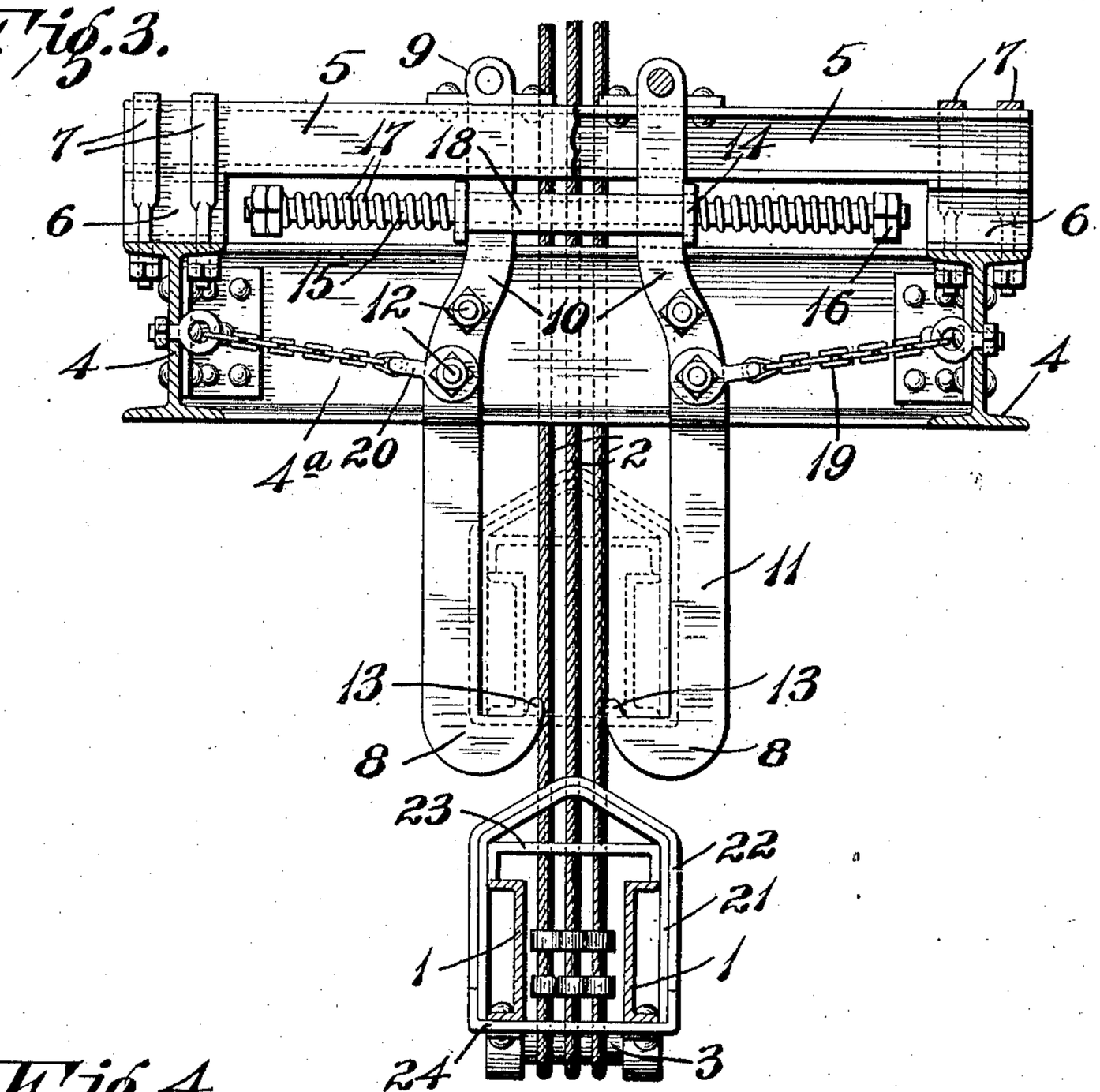
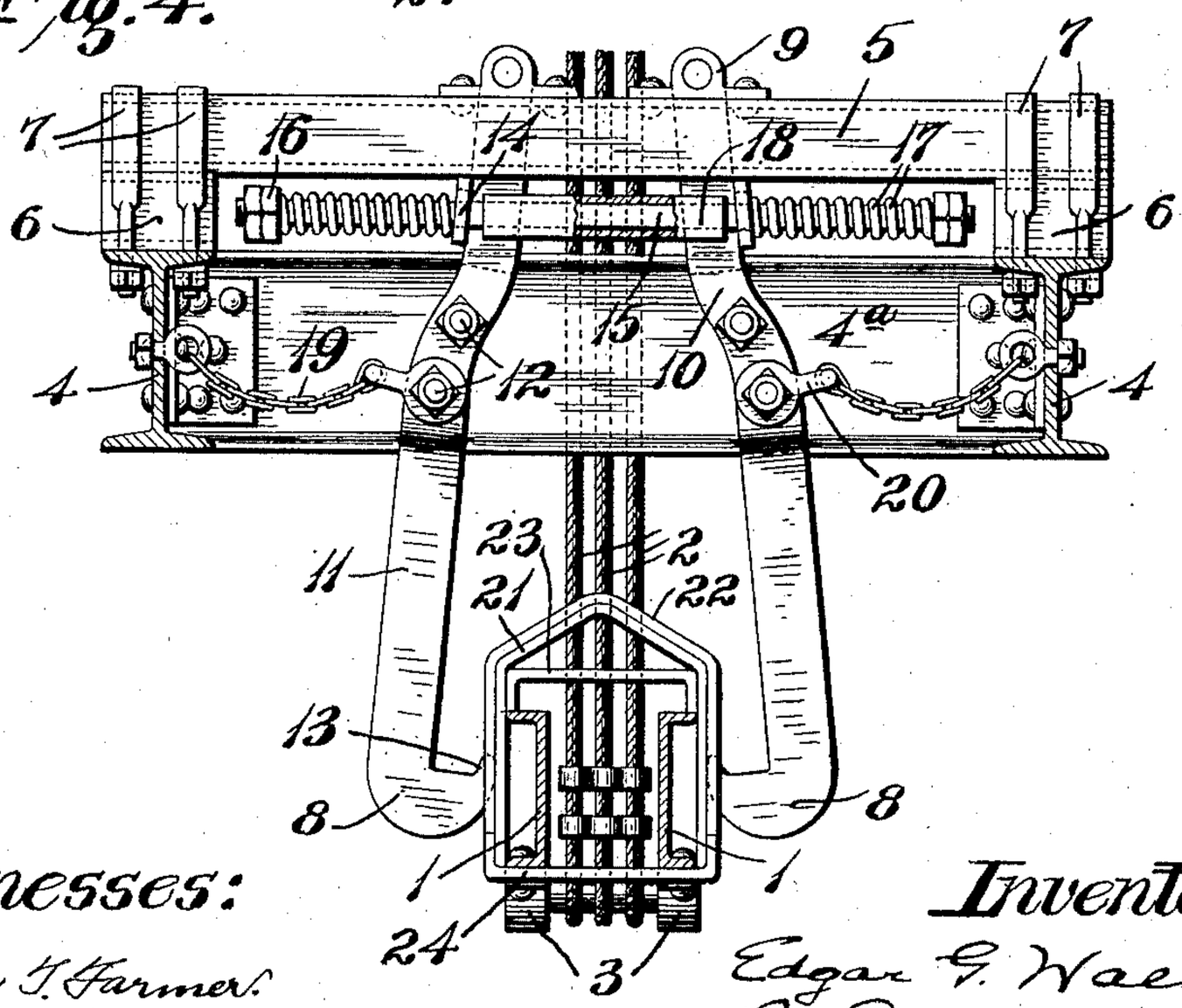


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELEVATOR SAFETY DEVICE.

980,460. Specification of Letters Patent. **Patented Jan. 3, 1911.**

Application filed July 16, 1910. Serial No. 572,271.

To all whom it may concern:

Be it known that I, EDGAR G. WALL, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Elevator Safety Devices, of which the following is a specification.

This invention relates to elevator safety devices.

It sometimes happens that an elevator or lift becomes beyond the control of the operator or conductor, or the safety stop or reversing device usually provided at or near the top of the shaft fails to act, and the car continues its upward travel until it contacts forcibly with some of the supporting elements or frame work at the top of the shaft and the hoisting cable is cut or broken owing to the shock or impact, or the rebound, as the case may be, with the result that the car drops and often resulting in considerable damage to the car and serious injury to life and limb.

My invention, therefore, has for its principal object to provide for arresting and suspending the car should it pass upwardly beyond the safety stop or reversing device usually employed at the top of the shaft, or should the car pass beyond a predetermined height in case no such safety stops or reversing devices are provided, and thereby prevent the car from dropping whether the cable breaks or not.

It has for its further objects to attain certain advantages hereinafter more fully appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings which form part of my invention and wherein like symbols refer to like parts wherever they occur, Figure 1 is a fragmentary view, partly in front elevation and partly in vertical section, showing a safety device embodying my invention and the coöperating portion of an elevator car in a position in proximity thereto; Fig. 2 is a top plan view; Fig. 3 is a view, partly in end elevation and partly in vertical section, of the parts shown in Fig. 1, the hanger beam of the car being shown by dotted lines in engagement with the retaining hooks of the safety device; and Fig. 4 is a view similar to Fig. 3, showing the action of the parts as the hanger beam of the car moves into engagement with the retaining hooks of the safety device.

Obviously, the elevator shaft, car and hoisting mechanism may be of any suitable or desirable construction and arrangement. Therefore, the same are not illustrated in detail in the accompanying drawings, but only so much of the structure as enters into the invention is shown.

The elevator car as usually constructed, comprises a carrier or hanger beam which extends either transversely or diagonally across the top of the cage. As shown in the drawings, the hanger beam comprises two vertically disposed channels 1 whose flanges are disposed outwardly. In practice, these channels are spaced apart and suitably braced. At their end portions they are obviously connected to the cage or car frame (not shown). The hoisting cable or cables 2 are securely attached to the middle portions of these beams 1 through the medium of castings, forgings or suitable connecting members 3. These cables are passed over a suitable arrangement of sheaves (not shown) at the top of the shaft and to the hoisting mechanism in the usual manner.

At or near the top of the shaft are arranged supporting I-beams or other suitable members 4. These I-beams are spaced apart in parallel relation to each other; and spanning the space between said I-beams and located at opposite sides of the cables 2, are cross beams 5. These cross beams each comprise, preferably, two channels set edgewise and spaced apart. The opposite end portions of the cross beams 5 rest on short channel members or blocks 6 which are mounted on top of the respective I-beams 4. The cross beams 5 and supporting members 6 are preferably secured by straps or stirrups 7 to the top flanges of the I-beams.

Depending between the members of each of the double cross beams 5 is a pair of hooked members 8 which are pivotally mounted at their upper ends in suitable oppositely disposed bearings 9 on top of said cross beams. The hooks of each pair are oppositely disposed inwardly, and said members 8 are, preferably, each made in two sections 10, 11, respectively, whose meeting ends are overlapped and bolted together by removable bolts 12, so that the two sections can be readily detached.

The top edge portions of the hooked ends

of the lower members 11 are straight and, in the normal position of the parts, lie in a horizontal plane. These hooked portions are each of a length a little greater than the width of the flanges of the respective channels of the cross beams 1 whose lower flanges are engaged by said hooks in a manner hereinafter more fully appearing. On the ends of the hooks are upturned projections 13; and the bottom edge portions of the hooks are rounded or beveled, as shown.

Secured transversely across the upper hook members 10 are plates 14 whose opposite end portions project on opposite sides of the said hook members and are perforated for the reception of rods 15 whose opposite end portions are screw-threaded to receive locking nuts 16. Sleeved on said rods between the nuts 16 and outer faces of the plates 14 are coiled springs 17; and sleeved on each of the rods 15 between the plates 14 are tubes 18. The springs 17 resiliently hold the hooks in normal inward position and each tube 18 is made of the proper length to limit the normal distance between said hooks. Flexible cords or chains 19 are each connected at one end to an I-beam 4, and at its opposite end to a loop or clevis 20 which is preferably secured to its coöperating hook member by one of the bolts 12. These chains serve to locate the hooks in normal position.

Secured on the yoke or hanger beam 1 of the elevator car are guide-ways 21 having wedge shape top portions which coöperate with the hooks 8 to spread the same apart as they are brought into contact therewith. These guide-ways preferably comprise plates which are bent over and down the outside of the channel members comprising the yoke or hanger beam 1 and have strips 22 secured to their opposite marginal portions so as to form a channeled or grooved guideway for the hooks 8. Brace plates 23 are inserted beneath the rigid portion of the guideway on top of the hanger beam 1, and strips 24 are secured to the under side of the hanger beam and to the corner portions of the plates forming the guideways.

In practice, the hook members 8 are so positioned that their hooked lower end portions will engage the under flanges of the yoke or carrier beam 1 of the elevator car. In the operation of the device, if the car is moved upwardly to a height where the wedge portions at the top of the guideways 21 enter between the hooks 8, said hooks will be spread apart against the tension of the springs 17 and if the car continues upwardly until the bottom flange portions pass above the hooked end portions of the members 11, the springs 17 will move the hooked members inwardly into position to engage said lower flanges of the carrier beam 1 and prevent the car from moving downwardly until the hooks have been moved out of the way.

The safety device is primarily provided for the purpose of preventing the car from dropping should the cables become broken or cut by reason of the car becoming beyond the control of the operator in its upward travel and passing beyond the proper point at the top of the shaft at which the car should be stopped or reversed. By making the hooked members in two sections as above set forth, the bolts 12 may be readily moved when it is desired to release the hooks from the car to permit it to be lowered.

Obviously, the device admits of considerable modification without departing from my invention. Therefore, I do not wish to be limited to the specific construction and arrangement shown.

What I claim is:

1. A safety device for elevators comprising a pair of oppositely disposed catches which are supported at or near the top of the elevator shaft, means for resiliently holding the catches in normal position in coöperative relation to each other, a flexible device connected to each of said catches for limiting the normal position thereof, and means on the elevator car arranged and adapted to engage said catches at a predetermined height.

2. A safety device for elevators comprising a pair of oppositely disposed depending hook members which are pivotally mounted at or near the top of the shaft, with their hooked portions disposed inwardly toward each other, means for resiliently holding said hooked members in normal inward position, a flexible device arranged and adapted to limit the normal coöperative inward position of each of said hook members, and a device on the elevator car adapted to spread said hooked members apart and engage the same at a predetermined height.

3. The combination with a horizontal supporting beam which is located at or near the top of the elevator shaft, of a pair of oppositely disposed depending hooked members which are pivotally mounted on said supporting beam, the hooked portions of said hooked members being disposed inwardly toward each other, adjustable means for resiliently holding said members in normal inward position, a flexible device arranged and adapted to limit the normal inward position of each of said hooked members, and a guideway on the elevator car, said guideway having a wedge-shape top portion adapted to enter between said hooked members and spread the same apart at a predetermined height, so that said hooked members automatically engage said elevator car and prevent the same from dropping.

4. A safety device for elevators comprising a support which is located at or near

the top of the shaft, a pair of pivotally mounted hooked members depending from said support, the hooked lower end portions of said members being disposed inwardly in coöperative relation to each other, cross members secured to each of said hooked members and extending on opposite sides thereof, said cross members having perforations therein, rods loosely fitted through the perforations in said cross members, stops on the opposite end portions of said rods, springs sleeved on the opposite end portions of said rods and interposed between the respective stops and the respective cross members, stops on said rods between the cross members, and chains or cords secured at one end to the respective hooked members and at their opposite ends to a fixed support for positioning said hooked members in normal position, and a guideway on the top frame member of the elevator car, said guideway having a wedge shape upper portion adapted to enter between said hook members and spread the latter apart.

5. A safety device for elevators comprising a horizontal supporting beam which is located at or near the top of the elevator shaft, a pair of oppositely disposed depending hooked members which are pivotally mounted on said supporting beam, the hooked lower end portions of said hooked members being disposed inwardly in cooperative relation to each other, means for resiliently holding said members in normal inward position, and an elevator car frame comprising a supporting top beam, said top beam comprising two spaced beams which are secured in parallel relation to each other, and a guide device fitted over said beams, said guide device having a wedge shape top portion arranged and adapted to enter between said hooked member and spread the latter apart so that the same may catch under the respective members of the supporting beam of the elevator car frame.

6. A safety catch for elevators comprising a pair of depending hooked members pivotally supported at or near the top of the shaft, the hooked lower end portions of said members being disposed inwardly in cooperative relation to each other, a rod slidably mounted on said hooked members, means on said rod for limiting the normal distance between said hooked members, resilient means on said rod for holding said hooked members in normal coöperative relation to each other, and a flexible device arranged and adapted to locate each of said pair of hooked members in normal operative position.

Signed at St. Louis, Missouri, this 13th day of July, 1910.

EDGAR G. WALL.

Witnesses:

P. P. ANDERSON,

G. A. PENNINGTON.