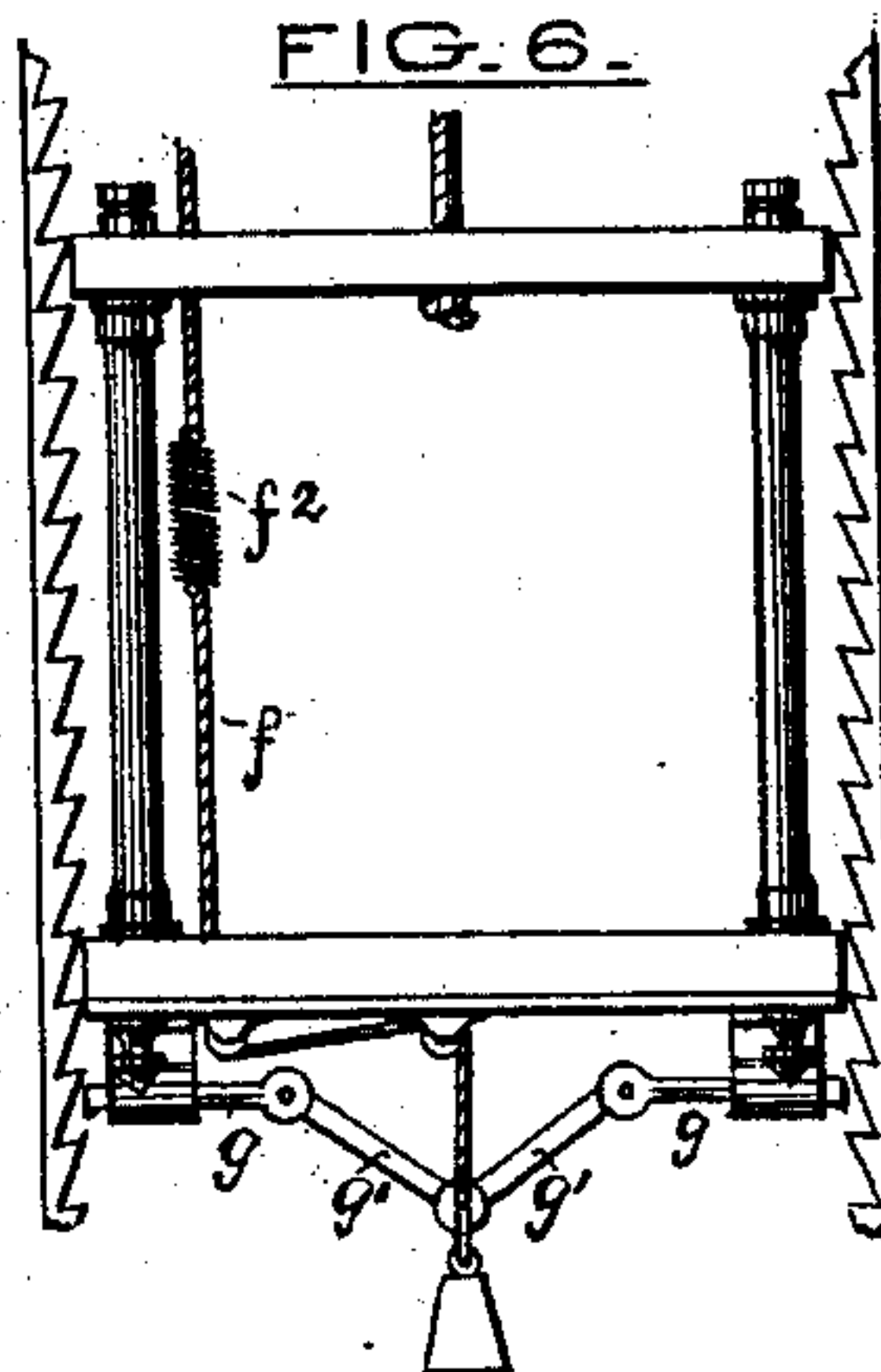
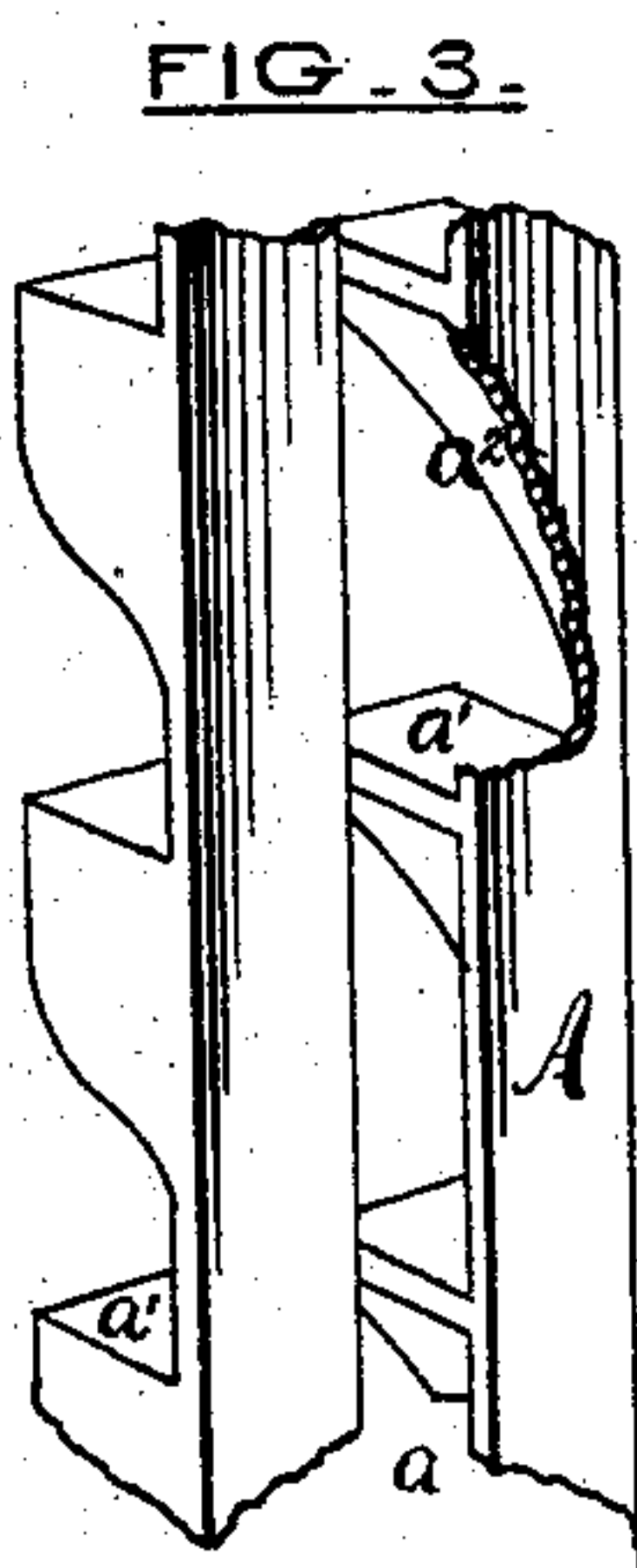
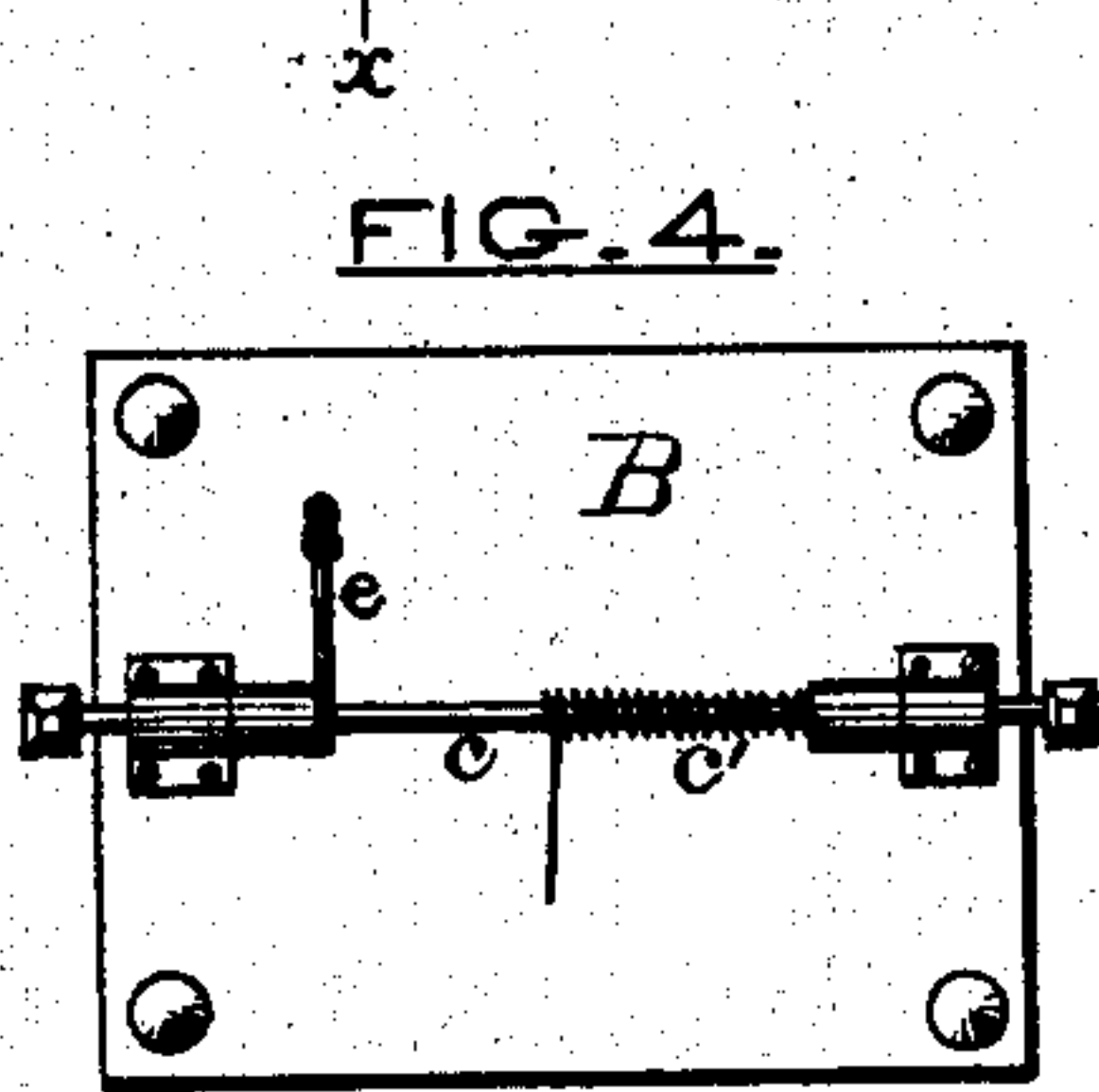
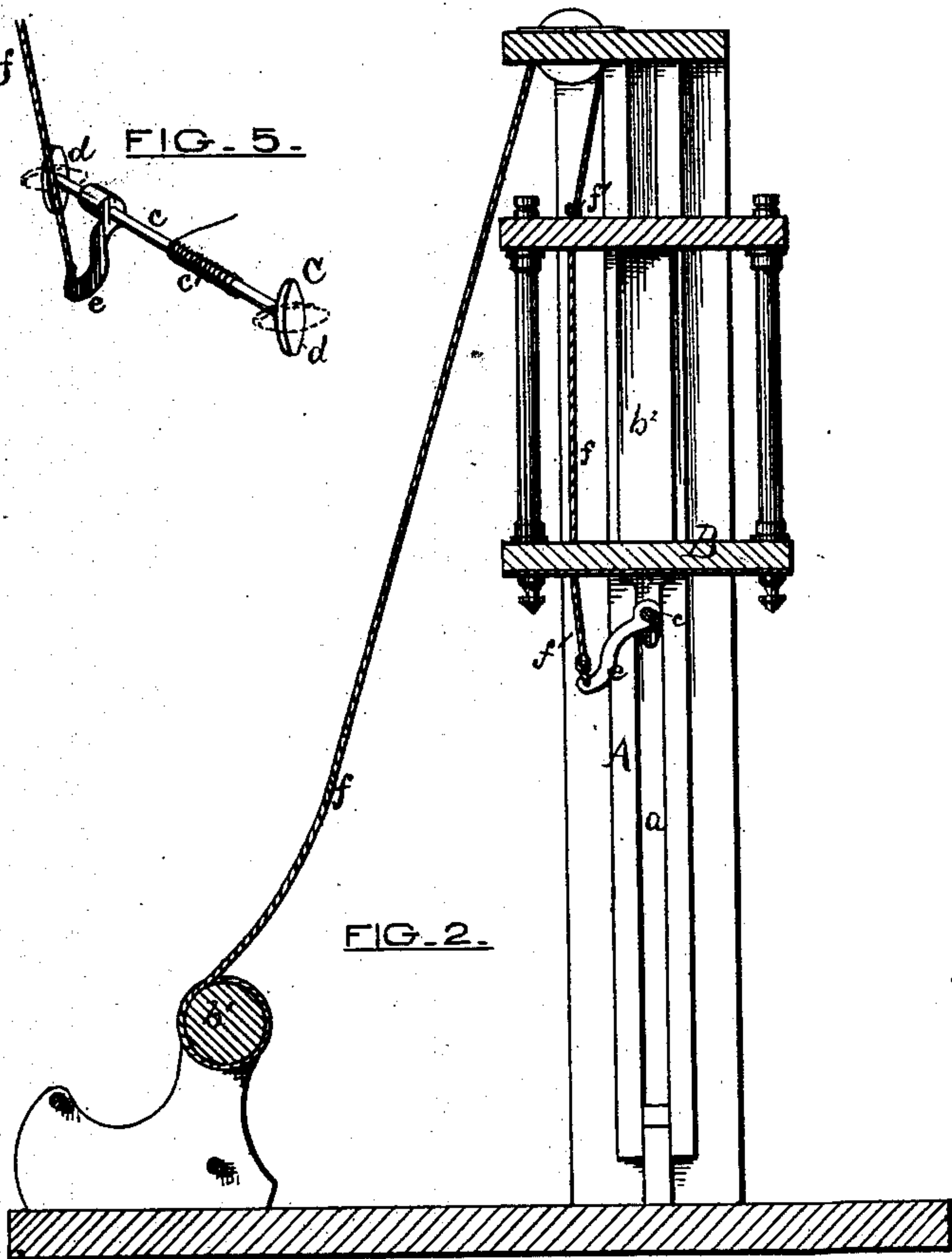
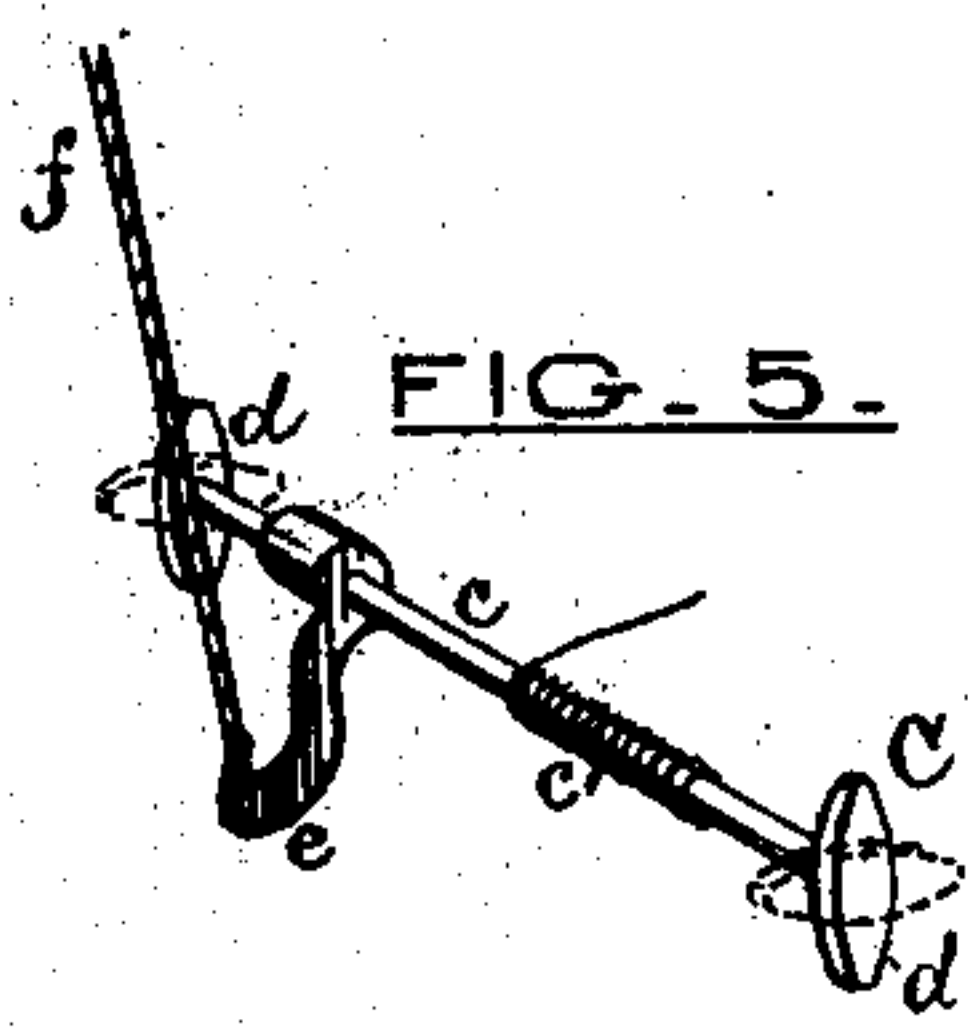
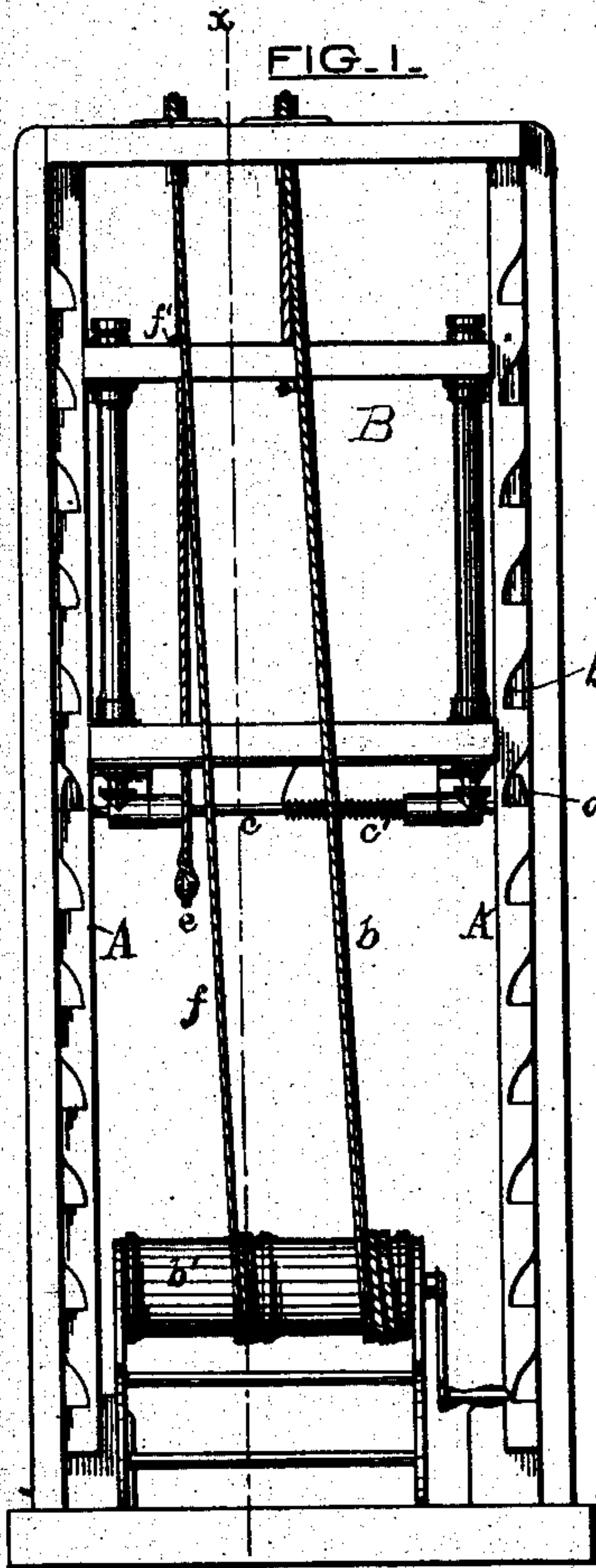


(No Model.)

R. L. CARR.
Elevator.

No. 237,091.

Patented Feb. 1, 1881.



WITNESSES.

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UNITED STATES PATENT OFFICE.

ROBERT L. CARR, OF FALL RIVER, MASSACHUSETTS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 237,091, dated February 1, 1881.

Application filed November 5, 1880. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. CARR, of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Elevators; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My said improvements relate to means for obviating the fall of the elevator car or platform in the event of the breakage of the hoisting-cable.

Various safety attachments for elevators have heretofore been devised, involving the use of catches controlled by springs which force the catches into engagement with notches in the guideways of the elevator-car whenever the hoisting-cable breaks and the elevator car or platform ceases to be thereby suspended. So far as my knowledge extends said spring-catches, as heretofore organized, are maintained in their normal unlocking position by a tensile strain either upon the hoisting-cable, or upon a supplemental or auxiliary line or cord, so that when either said cable or said auxiliary line should be parted the springs will be permitted to operate the catches. With this class of safety attachments it is obvious that the springs are almost continuously under tension, and that therefore they are liable to become so far set as to lose their capacity to promptly and effectually cause the catches to operate when the exigency for their action occurs.

A certain class of elevators have heretofore been provided with catches on the ends of levers directly connected with the hoisting-cable, and maintained in an unlocked condition solely by the tension of said cable, and a safety or auxiliary line passing over a pulley and provided with a weight attached to its opposite end is relied upon to operate the catches.

The prime object of my invention is to render the operation of a safety-catch more positive than by means of springs or their equivalents. To that end I employ a catch which is maintained in its normal or unlocked position by a spring or its equivalent, (a weight,) and a safety-line, which controls the catch for locking it, should the hoisting-cable be parted.

In developing my invention I have devised certain novel features in the construction of the catch.

Although I use springs or their equivalents, weights, it is to be understood that they are only employed for maintaining the catches in an unlocked position, and are in no manner depended upon for causing them to assume the locking position in operating to prevent the disastrous fall of the car.

After fully describing an elevator embodying the several features of my invention, the devices and combinations of devices believed to be novel will be specifically designated in the claims hereunto annexed; and while I prefer to employ all of said parts and combinations as now organized by me, I am aware that certain portions thereof may be separately employed in connection with devices and combinations other than those preferably employed by me.

Referring to the drawings, Figure 1 represents, in rear elevation, an elevator embodying my invention. Fig. 2 represents the same in vertical section on line $x x$, Fig. 1. Fig. 3 is an enlarged view of a portion of the guideway. Fig. 4 is a bottom view of the elevator-car and its safety-catch detached from the guideways. Fig. 5 is a perspective view of the safety-catch detached from the elevator-car. Fig. 6 illustrates a modification of the main feature of my invention as applied to ordinary guideways.

The guideways A are, as usual, secured vertically to opposite walls or sides of the elevator-well. They are novel in their construction in that they afford a recess, a , which receives a spline on the elevator-car, instead of being in themselves in the nature of a spline for occupying a recess in the elevator-car. This construction is essential for co-operating with the particular catch devised by me, because the arm of said catch, when in a locked position, lies crosswise of the guideway-recess, and has bearings on each side of said recess for supporting the car or elevator-platform. Each guideway has at frequent and regular intervals horizontal bearing-surfaces a' , above each of which the guideway is chambered, as at a^2 ,

to admit of a swinging movement of the catch-arm, as will hereinafter be fully described. Elevator-guideways with serrated faces, as heretofore constructed, may be employed in connection with the main features of my invention, as hereinafter more fully set forth.

The elevator-car B is of a common type, having the usual cable *b*, (or more than one,) and drum *b'* for hoisting the same. For heavy work, as in factories, &c., an ordinary elevator-platform of a simpler construction is usually employed. The vertical recess in the guideways is occupied by guiding-splines *b*².

The safety-catch C differs from all others of its general class of which I have cognizance in that it is normally maintained in an unlocking position by a spring or its equivalent, instead of being normally held by a spring under tension, or by tension of the hoisting-cable, in a position ready to operate whenever the spring, or, in some instances, a weight, on the safety-line, is permitted to act upon the catch. In my case the spring is not under tension for operating the catch in locking it, but merely under a light tension, which is only increased whenever the catch is in its locked position, and said spring is relied upon only for throwing the catch from a locked to an unlocked position, when permitted so to do, instead of throwing the catch from an unlocked to a locked position, as heretofore. In other words, I do not rely upon a spring or a weight for locking the catch to prevent the destructive fall of the elevator, but do rely upon means which are positive and not liable to the derangement incident to the setting or weakening of a spring which is normally maintained under a heavy tension. I also obviate the use of the safety-line weights heretofore used in connection with catches which are maintained in their unlocked condition by the tension of the hoisting-cable.

The safety-catch C is composed of several parts, as follows: Beneath the platform of the elevator-car is a rock-shaft, *c*, extending from side to side into the recesses *a* of each guideway A. On each end of said rock-shaft is a catch-arm, *d*, extending in two directions from said shaft, and a spring, *c'*, is so spiraled and arranged on said arm as to normally maintain the catch-arms in an unlocking position—i. e., they normally stand vertically in the recesses *a* of the guideways. The rock-shaft *c* has also a lever-arm, *e*, to the outer end of which is attached a safety-line, *f*, which slackly extends upward through the car, and to the top of the well, over a sheave or pulley, and thence to a winding-drum, which may be an extension of the usual drum, *b'*, or it may be a separate drum, geared to the main drum so as to secure uniformity in coiling and uncoiling the safety-line and the hoisting-cable. The safety-line is provided with a check-knot, *f'*, or a washer attached to the line, which has a bearing on the upper surface of the car, which enables said line to resist the slight tension of the

spring *c'*, and to maintain the catch-arms *d* in a truly vertical or unlocking position. The check-knot *f'* may as well be located so as to take bearing upon the floor of the car as on the roof, its sole purpose being to offset the very slight tension of the spring, which might possibly otherwise throw the catch-arms slightly out of their truly vertical normal position.

With the parts thus constructed and arranged, it is obvious that should the hoisting-cable break the downward movement of the car would develop a tension on the safety-line which would cause it to tilt the rock-shaft and throw the catch-arms crosswise of the recess *a*, and cause each of them to rest at each of their ends firmly upon the horizontal bearings *a'* in the guideways, the chambered portions *a*² of the guideways freely permitting the quarter-rotation of said arms requisite for them to make in occupying their bearings whereon to support the elevator-car and its contents.

It will be seen that the tension of the safety-line (which occurs only in the event of the parting of the hoisting-cable) positively locks the safety-catch, and that said line need only be strong enough to rock the shaft *c* against the slight tension of its spring, and thus set the catch-arms, as described. The safety-line will possess the requisite strength as long as it is strong enough to hold together, for the shock incident to its breakage by the rapid drop of the car would be sufficient to set the catch-arms, even should the safety-line part immediately after the drop following a break of the hoisting-cable. Said line is also always in full view for inspection, and can quickly and economically be renewed, if desired.

As before stated, I am aware that safety-lines have heretofore been employed; but, so far as I know, said lines have either been provided with heavy weights, which rise and fall according to the opposite movements of the car, or they were so organized that they must first be broken in order to permit the catch to be operated by its spring or springs; whereas my catch operates by undue tension upon the line itself, rendering it more secure and reliable for its operation at the critical moment than a spring which has been set under more or less constant heavy tension, and therefore liable to become set and powerless to properly operate the catches.

This principle of combining a safety-line with a catch is applicable to catches and guideways more closely resembling those of ordinary construction, as illustrated in Fig. 6. Therein is shown a pair of serrated guideways adapted to occupy recesses in the sides of the elevator-car, as usual. Two bolts, *g*, fitted to side bearings, are arranged to slide from each other toward the serrated guideways, and these are connected by coupled links *g'*, pivoted to the rear end of each bolt and to each other, and projecting downward at their connected ends, as shown, to operate after the manner of a knuckle-joint in forcing

the bolts outward to engage with the serrations on the guideway. To these links, at their junction, is attached the safety-line, whereby the bolts are both projected, should the hoisting cable be parted, in a manner similar to that already described in connection with my specially-devised catch and guideways. A light weight, as shown, may be relied upon for maintaining the bolts securely in their normal or unlocked position.

In order to provide for the contingency of the ends of the bolts striking against the outer ends of the teeth on the guideway, and so be prevented from entering the intervening recesses, one of the bolts may be so set as to occupy a higher plane than its fellow, so that one bolt, at least, would be sure to enter a recess and sustain the car. In lieu of this variation in the location of the bolts, they may be as shown, and the contingency referred to provided for by having at some point in the safety-line f a strong spiral spring, f^2 , constituting merely an elastic or extensible part of said line, which would admit of the descent of the elevator past one tooth, but insure the outward forcing of the bolts into a locking position within recesses immediately thereafter.

Should the hoisting-cable break and the car be arrested in its fall by the safety-catch, the latter is readily disengaged for permitting

the elevator-car to be again moved in either direction after the repair of the hoisting-cable and slightly lifting the car by slacking up on the safety-line, the spring on the rock-shaft then causing the catch-arms to promptly assume a vertical or unlocked position in the guideway-recesses.

Having thus described my invention, I claim—

1. The combination, substantially as hereinafore described, with an elevator car and its hoisting-cable, of a safety-line, a drum or drums to which said cable and line are attached, and a safety-catch which is positively operated by the undue tension of the safety-line on the parting of the hoisting-cable.

2. The guideways provided with the vertical recess a , the bearings a' , and chambered, to admit of the partial rotation of a catch-arm across the recess a , substantially as described.

3. The combination of the recessed and chambered guideways, the safety-line, and the safety-catch, embodying the catch-arms within the recesses of the guideways, and adapted to be rotated by undue tension of the safety-line, substantially as described.

ROBERT L. CARR.

Witnesses:

GEO. B. DURFEE,
MARCUS G. B. SWIFT.