No. 685,937. Patented Nov. 5, 1901.

J. T. O'NEILL & J. A. CURRIE.

SAFETY BRAKE MECHANISM FOR ELEVATORS.

(Application filed July 15, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

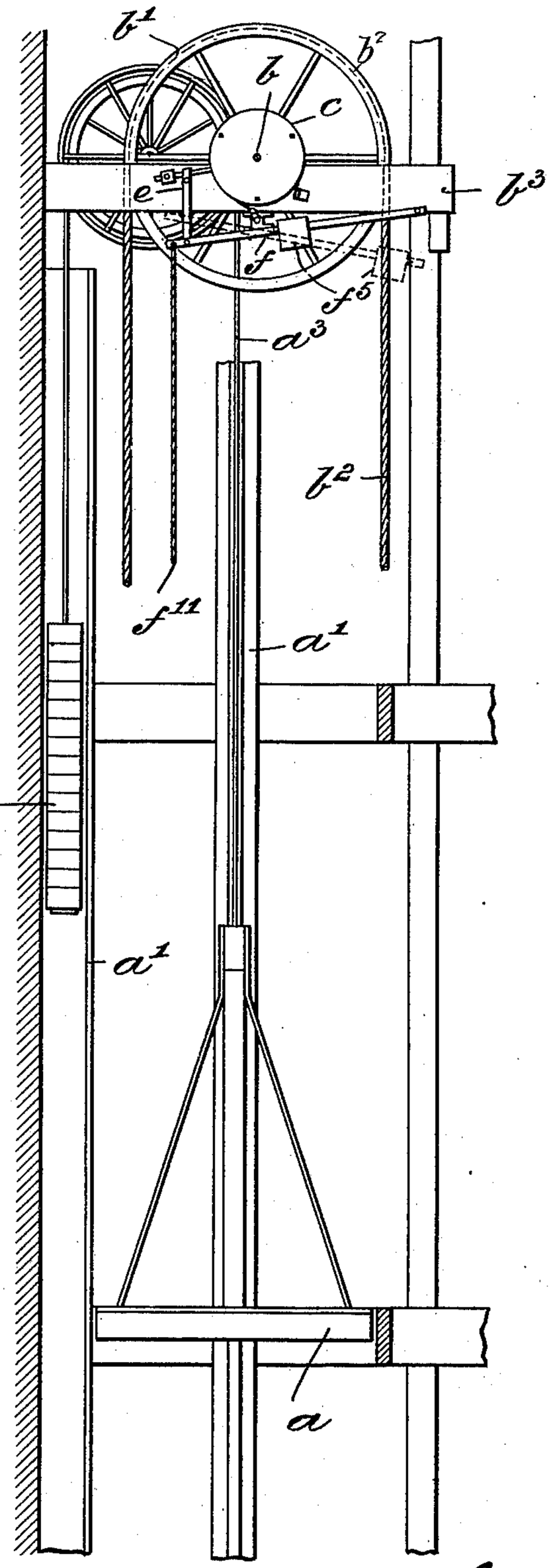

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Fig. 2.

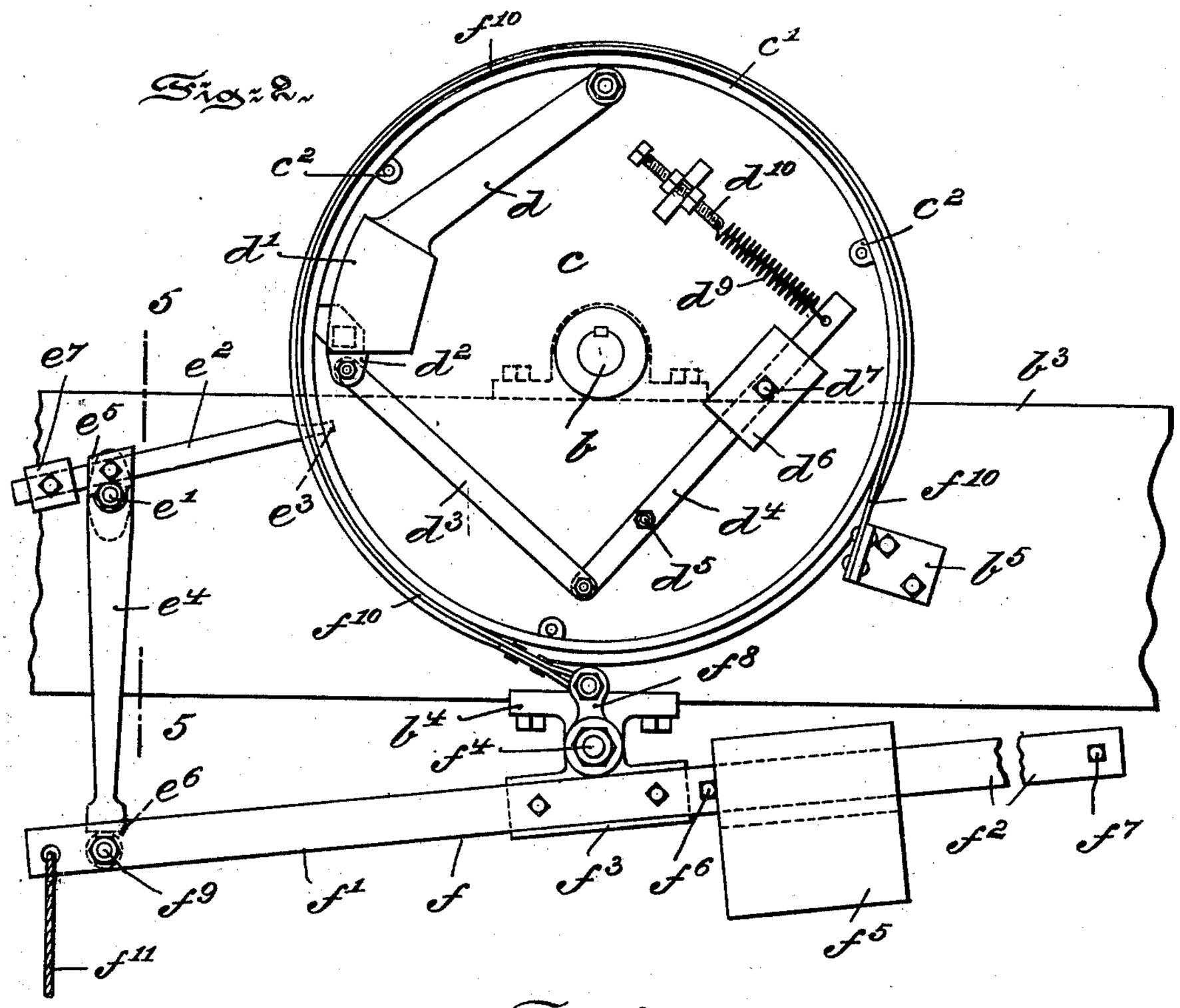


Fig. 3.

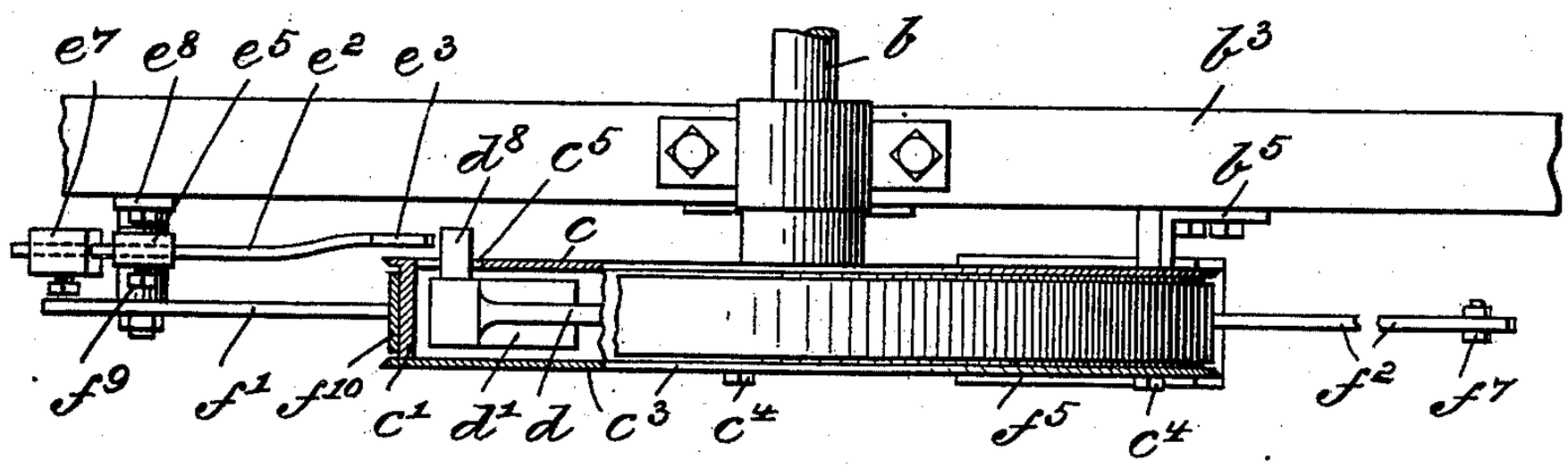
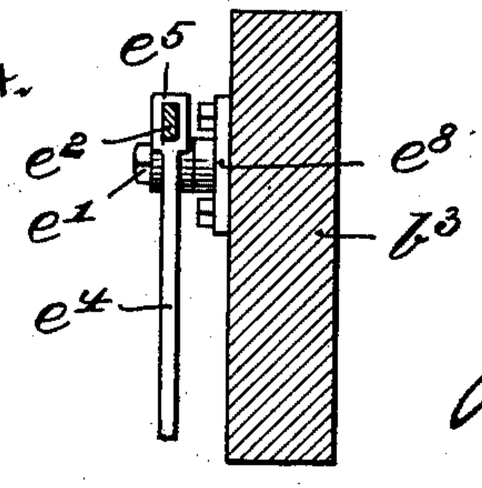


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN T. O'NEILL AND JOHN A. CURRIE, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY-BRAKE MECHANISM FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 685,937, dated November 5, 1901.

Application filed July 15, 1901. Serial No. 68,335. (No model.)

To all whom it may concern:

Be it known that we, JOHN T. O'NEILL and JOHN A. CURRIE, citizens of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have jointly invented certain new and useful Improvements in Safety-Brake Mechanism for Elevators, of which the following is a specification.

The principal objects of our invention are, first, to bring the car of an elevator automatically to a standstill when the speed thereof through any cause whatsoever becomes excessive; second, to provide a safety-brake mechanism whereby a too-rapid rotation of the operating-shaft in either direction caused by accelerated speed upward or downward of the elevator is obviated to check rotation of the operating-shaft, and consequently prevent further movement of the elevator; third, to provide the operating-shaft of an elevator with a disk or drum carrying a device which during a certain speed of rotation of the shaft is held out of the path of a bell-crank tripping-lever, but is moved into the path thereof by centrifugal force as soon as the speed is accelerated to release a counterweighted rock-shaft lever which applies and tightens a brake-band to said disk or drum to first check and then stop the rotation of said shaft, and thereby upward or downward movement of the car lifted or lowered by said shaft; fourth, to provide a counterweighted rock-shaft with a projection or bolt adapted to engage a bell-crank tripping-lever, so as to be held by the same in an inoperative position, and to loosen a brake-band surrounding the drum or disk of the operating-shaft, and, fifth, to provide said counterweighted rock-shaft with a hand-rope by means of which the same can be manually brought back into an inoperative position and into engagement with the bell-crank tripping-lever when automatically released therefrom.

The nature and scope of our invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a side elevational view, partly in section, of a hand-operated elevator and the safety-brake mechanism of our invention applied thereto. Fig. 2 is an enlarged detail view, certain portions being removed to illustrate in side elevation the brake mechanism of our said invention. Fig. 3 is a top or plan view of Fig. 2, certain portions being broken away; and Fig. 4 is a sectional view on the line 5 5 of Fig. 2.

Referring to the drawings, a represents the car of an elevator, which is suitably guided by beams a' and has a range of upward-and-downward movement between said beams. The car a is counterbalanced by weights a^2 and is lifted and lowered by means of the rope or cable a^3 and the operating-shaft b, which is rotated in the usual and well-understood manner by a wheel b' and rope b^2. The operating-shaft b is carried at the upper end of the elevator structure by cross-beams b^3, as illustrated in Figs. 1, 2, and 3 of the drawings. At the front end of the operating-shaft b is secured a disk or drum c, having an annular projecting rim c', provided internally at certain distances apart with lugs c^2. The disk c and rim c' form a chamber for the reception of mechanism to be presently described. This chamber is preferably closed by a disk c^3, removably secured to the rim c' by bolts c^4 engaging the lugs c^2 thereof. Each of the disks c and c^3 projects beyond the rim c', forming flanges adapted to hold a metal band in position on the rim c', as will be hereinafter more fully explained. Pivotally secured to the disk c at one end is a lever d, provided at its free end and preferably integral therewith with a weight d' and a lug d^2. To this lug d^2 is pivotally secured a link d^3, pivotally engaging a lever d^4, which at the point d^5 is movably secured to the disk c and intermediate of its ends. One end of the lever d^4 is engaged by a spring d^9. This end is secured to a screw-bolt d^{10}, by means of which the tension thereof can be readily regulated. On the lever d^4 is arranged a weight d^6, secured thereto by a set-screw d^7, by means of which the weight d' of the lever d is counterbalanced and is held a certain distance away from the rim c' of the disk c in all positions of the disk c and during a certain speed of rotation thereof. The pivotal connections of the levers d and d^4 with the disk c further-

more allow the weight d' to move in a radial direction and toward or away from the rim c' of the disk c and operating the shaft b. The weight d' is also provided with a bolt or finger d^8, projecting through an opening c^5, arranged in the disk c, as illustrated in Fig. 3 of the drawings. Near this bolt or finger d^8 extends the end e^3 of an arm e^2 of a bell-crank tripping-lever e. This arm e^2 is adjustably held in the eye e^5 of a downwardly-projecting arm e^4 and is provided at its other end with a counterweight e^7, the purpose of which is to hold the arm e^4 in a substantially vertical position. The eye e^5 allows of the lateral adjustment of the arm e^2, so that the end e^3 may be brought nearer to or away from the finger or bolt d^8 of the weight d' of the lever d. By this lateral adjustment of the arm e^2 the speed of rotation of the operating-shaft b and disk c can be accurately determined before the bolt d^8 is brought into engagement with the end e^3 of the lever e^2 for a purpose to be presently more fully explained. The downwardly-projecting lever e^4 of the bell-crank tripping-lever e is pivotally secured by a bolt e' to a bracket e^8, carried by the cross-beam b^3 of the elevator, as fully illustrated in Figs. 2, 3, and 4 of the drawings. The end e^6 of the lever e^4 extends in the path of a bolt f^9, projecting from the end f' of a rock-shaft lever f. This lever f is carried by a bracket f^3, which is pivotally secured to the bracket b^4 of the cross-beam b^3 by means of a bolt f^4. The other end f^2 of the rocking lever f carries a weight f^5, having a range of lateral movement thereon, which movement is limited in its extent by means of bolts f^6 and f^7. The bracket f^3 is provided with an extension or lug f^8, to which is secured one end of a band f^{10}, the other end of which is fastened to a bracket b^5, secured to the cross-beam b^3. This band f^{10} engages, as described, the rim c' of the disk c, secured to the operating-shaft b, and in the position of the rock-shaft lever f as shown in Fig. 2 the same is loose thereon. During the upward or downward movement of the car a, and consequently during the rotation of the operating-shaft b and disk c at a certain predetermined speed, the weight d' of the lever d, secured to said disk c, is held out of the path of the end e^3 of the lever e^2 of the bell-crank tripping-lever e by means of the counterweight d^6 of the lever d^4, as hereinbefore fully described. If, however, the required speed is exceeded in either direction through any cause whatsoever, the weight d' is moved automatically by the centrifugal force toward the rim c' of the disk c and its projecting finger d^8 is now brought into engagement with the end e^3 of the lever e^2 of the bell-crank tripping-lever e. The bolt d^8 by striking the end e^3 will move the downwardly-projecting arm e^4 of the lever c sidewise and will bring the end e^6 out of engagement with the bolt f^9 of the lever f. The weight f^5 of the lever f will now instantly depress the end f^2, and by sliding downward on said end f^2 and out of engagement with the bolt f^6 until its movement is stopped by the bolt f^7 the band f^{10} will then be brought into engagement with the rim c' of the disk c to tighten the same on said rim. The speed of the operating-shaft b and disk c, as well as the speed of the car a either in its ascent or descent, will first be checked and then brought to a standstill.

In order to loosen or disengage the brake-band f^{10} from the rim c' of the disk c and to operate the elevator, the end f' of the rock-shaft lever f is lowered by a hand-rope f^{11} until its bolt f^9 is brought below and into engagement with the end a^6 of the downwardly-projecting arm e^4 of the bell-crank tripping-lever e, as illustrated in Fig. 2 of the drawings.

Although a hand freight-elevator has been illustrated in the drawings, it is obvious that the safety-brake mechanism, as hereinbefore described, can be employed equally as well in connection with power-operated elevators without departing from the spirit and scope of our invention.

Having thus described the nature and objects of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a mechanism of the character described, an operating-shaft, a disk mounted thereon, a brake-band surrounding said disk, a lever adapted to operate said brake-band and carrying at one end a sliding weight adapted normally to depress said lever to tighten said band, means engaging the other end of said lever to elevate said sliding weight, and means controlled by the actuation of said disk for releasing said lever.

2. In a mechanism of the character described, an operating-shaft, a disk mounted thereon, a brake-band engaging said disk, a lever pivoted intermediate of its ends and secured to one end of the brake-band, said lever having at one end a counterweight adapted to slide on said lever to depress the same and to cause said band to tighten on said disk, a trip-lever normally engaging the other end of said lever to elevate the counterweight, a mechanism adapted to swing said trip-lever, and means controlled by the revolution of said disk for operating said releasing mechanism.

3. In a mechanism of the character described, an operating-shaft, a disk secured thereto and traveling therewith, a counterweighted lever pivoted at one end to said disk adjacent to the periphery of said disk, a pin projecting from the opposite end of said counterweighted lever, means for retracting said pin toward the center of said disk against the centrifugal action of said disk, a weighted lever, a trip-lever engaging said weighted lever, and a brake-band engaging said disk, and secured at one end to said weighted lever.

4. In a mechanism of the character described, an operating-shaft, a disk turning therewith, a counterweighted lever pivoted at one end to said disk at or near its periph-

ery, a pin projecting transversely beyond said disk and carried by the free and counterweighted end of said lever, a second lever pivoted intermediate of its ends to said disk, a link connecting one end of said second lever with the counterweighted end of the first lever, a counterweight secured to the other end of said lever, a spring normally attracting the counterweighted lever away from the periphery of said disk, a brake-band surrounding the periphery of said disk, means for contracting said brake-band, and mechanism controlling said means, said mechanism controlled by the centrifugal movement of the first counterweighted lever during the revolution of said disk.

In testimony whereof we have hereunto set our signatures in the presence of two subscribing witnesses.

JOHN T. O'NEILL.
JOHN A. CURRIE.

Witnesses:
J. WALTER DOUGLASS,
THOMAS M. SMITH.