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W. FARNSWORTH, M. ROGERS & R. DUKE.

SAFETY BRAKE FOR ELEVATOR CAGES.

APPLICATION FILED OCT. 6, 1904.

Fig. 1.

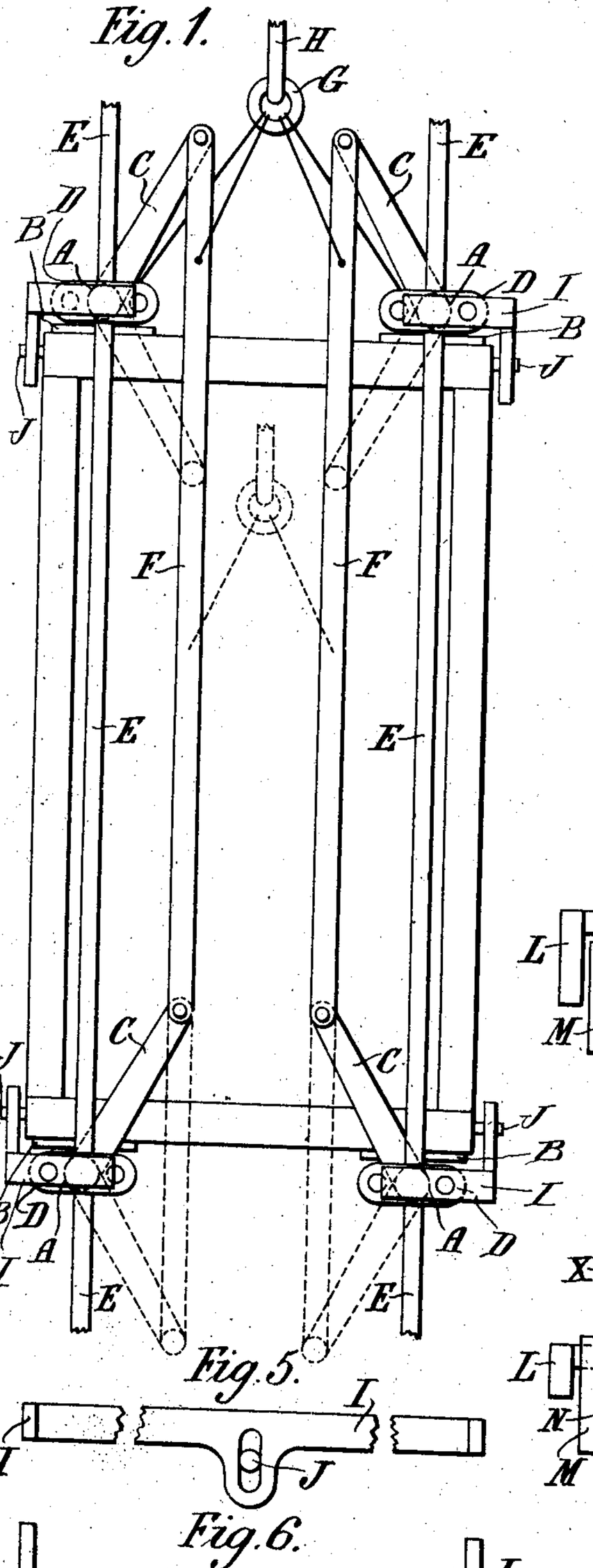



Fig. 2.

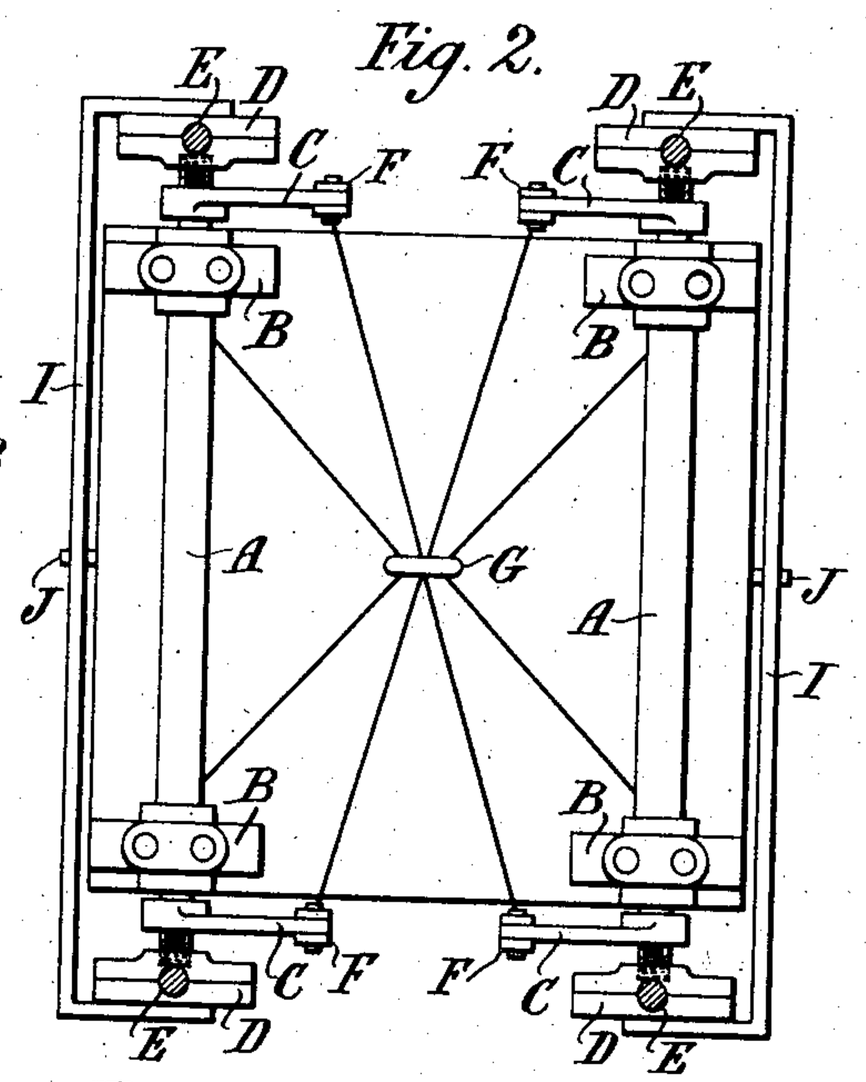



Fig. 7.

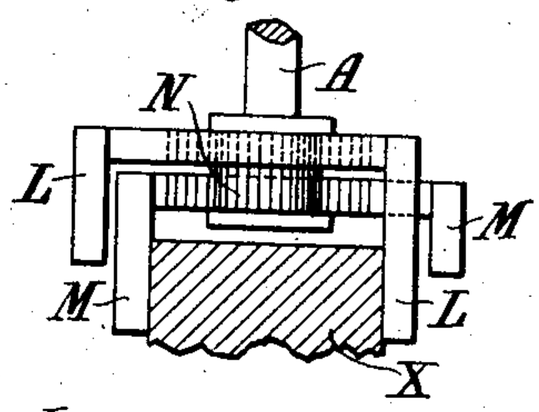
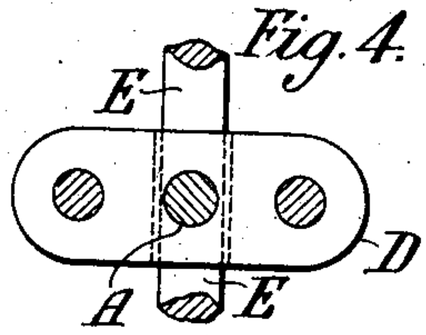



Fig. 8.

Fig. 4.



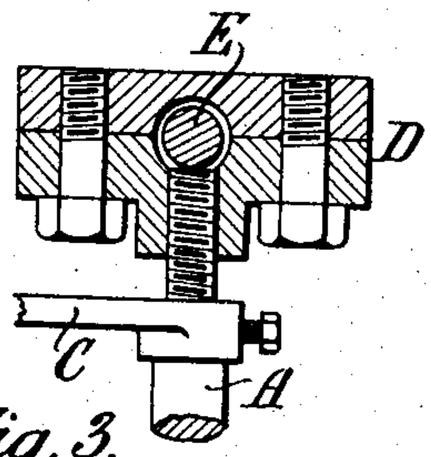




Fig. 3.

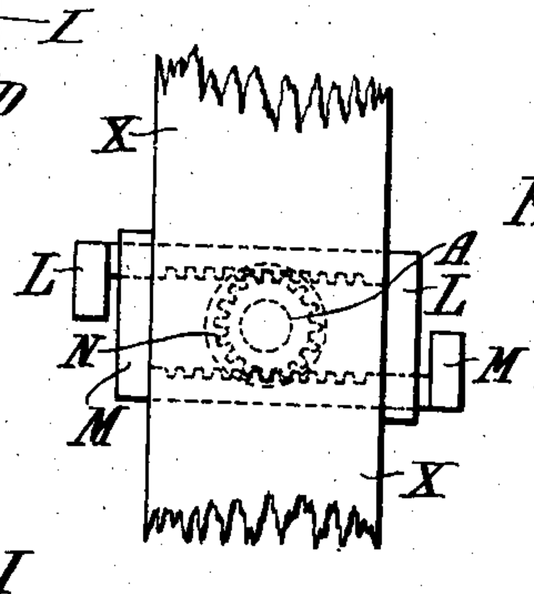


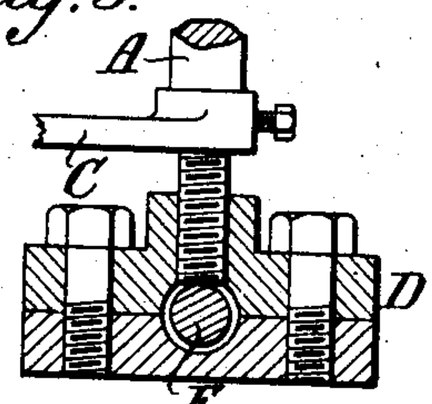

Fig. 5.




Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## SAFETY-BRAKE FOR ELEVATOR-CAGES.

No. 835,018. Specification of Letters Patent. Patented Nov. 6, 1906.

Application filed October 6, 1904. Serial No. 227,449.

*To all whom it may concern:*

Be it known that we, WILLIAM FARNSWORTH, residing in Nottingham, MORRIS ROGERS, residing in London, and ROBERT DUKE, residing in Nottingham, England, have invented certain new and useful Improvements in Safety-Brakes for Elevator-Cages, of which the following is a specification.

The object of our invention is to provide improved means for automatically arresting the descent of an elevator cage or car should the hauling-rope break.

According to our invention we provide the cage or car at top and bottom with horizontally-arranged shafts having levers projecting from them which are connected together by vertically-arranged links. The frame of the cage and the links are connected with the hauling-rope, and the shafts coöperate with plates or gripping devices acting upon vertical guides, the arrangement being such that should the hauling-rope break the levers and their connecting-links will descend, thus giving a rotary movement to the horizontal shafts which will cause the vertical guides to be gripped, and thus prevent the further descent of the cage.

In the accompanying drawings, Figure 1 shows an elevation of a cage with our improvements applied. Fig. 2 is a plan view showing also means for preventing the gripping-plates from improperly moving. Fig. 3 is an enlarged sectional view of one of the shaft ends and connections. Fig. 4 shows an elevation of a part of one of the guide-ropes and one of the gripping-plates. Figs. 5 and 6 show the locking-clips employed for preventing the gripping-plates from improperly moving. Fig. 7 is a plan view of a timber-clip which may be employed. Fig. 8 shows an elevation of the same.

Referring first to Figs. 1 to 6, inclusive, the cage illustrated may be of usual construction.

Horizontally-arranged shafts A are mounted in bearings B at the top and bottom of the cage, there being two shafts at the top and two at the bottom, as illustrated. Levers C are secured to each shaft A, the levers at the top on one side of the cage being connected with the levers at the bottom on the same side of the cage by connecting-links F. The cage and the levers F are connected by chains with a ring G on the lower end of the hauling-rope H. One end of each shaft A is formed with a right-hand screw-thread and the opposite end of each shaft A is formed with a left-hand thread. Each threaded end of each shaft screws into one of a pair of plates D, which are preferably constructed in the manner clearly indicated in Fig. 3. Passing vertically between the two plates of each pair are guide-ropes E, which at the proper time are gripped in the manner presently described.

In order to prevent any possibility of the plates D screwing or unscrewing when the cage is in motion, we may employ clips I. (Shown in Figs. 2, 5, and 6.) Each of these clips is shown as consisting of a plate bent at right angles at its ends to rest against the plates D. Midway between its ends it is slotted to receive a pin J, projecting from the frame of the cage. When the levers C are turned into the position shown in full lines in Fig. 1, the plates D are thrust outward by the action of the screws on the shafts A, and the plates are thereby thrust against the bent ends of the plates or clips I. When the plates D are thus thrust against the bent ends of the clips, the friction between them holds the plates fast, and the plates when adjusted can be thereby held in a position for the hole, which extends downward through them, to be in line with the rope which passes down through the hole, so that the rope may not be chafed as the cage is raised and lowered. If the shaft A is turned in such a direction that it screws itself into the plates D on its two ends, then it draws these plates away from the bent ends of the clip I, and the clip will no longer be held up by them, but it will be liberated and can then drop. If the hauling-rope breaks, the levers C and their connecting-links F will drop, thus turning the screw-shafts and causing them and the plates D to grip the guide-ropes E, and at the same time the clips I are released and may drop. The cage may drop to some extent before the levers C have fallen sufficiently to apply the screw-clamps; but ultimately or in a short time the clamp will be applied to arrest the descent of the cage.

It will be understood that the clips I are normally upheld by the nuts D being thrust against their bent ends, as shown in Fig. 2, by the action of the screw-threads on the shafts A when the rods F are held up in the position shown in Fig. 1 and that when the rods drop (when the supporting-rope breaks) the nuts

D are, by the action of the screw-threads on the shafts A, drawn away from the bent ends of the clips and leave these bent ends unsupported, and sooner or later they must drop by reason of their own weight. The pins J are shown in Fig. 1 as being applied to the frame of the cage. They serve to prevent the clips from becoming entirely detached from the cage. It is not essential that the clips should drop, as they would perform the same function without dropping.

When timber-guides are used instead of guide-ropes, we may employ the devices illustrated in Figs. 7 and 8. In this case each shaft carries on each end a pinion N, which gears with teeth or rack-bars on two clamping devices L M. The timber-guide is illustrated at X, and it will be observed that it is arranged between the opposite longer arms of the clamping devices. When the shafts A are turned in the proper direction, the timber-guides are clamped, thus a braking action is produced which will arrest the descent of the cage. The shafts A may be operated in the same manner and by the same devices as those shown in Fig. 1 and hereinbefore described.

We claim as our invention—

1. The combination of a cage, fixed vertical steadying-guides, a lifting-rope coupled to the cage, parallel shafts on opposite sides of the cage, two at the top and two at the bottom thereof, levers on the shafts normally coupled to the lifting-rope and so restrained from being turned, and clamping mechanism above and below the cage operated by the shafts when turning after a breakage has occurred in the hauling-rope.

2. The combination of a cage, a lifting-rope coupled to the cage and normally held taut, parallel shafts on opposite sides of the cage, two at the top and two at the bottom, levers projecting from the shafts, links coupling the levers on the lower shafts with the levers on the upper shafts, connections from the links to the lifting-rope to restrain the shafts from being turned, right and left hand threads on the ends of the shafts, plates into which the screw ends extend and fixed vertical guides passing down through the plates in proximity to the ends of the shafts so that when the shafts are turned and the plates at the ends of the shafts are drawn toward one another the guides are forced against the ends of the shafts and thereby nipped.

In testimony whereof we have signed our names to this specification in the presence of two witnesses subscribing their names.

WILLIAM FARNSWORTH.
MORRIS ROGERS.
ROBERT DUKE.

Witnesses:
THOS. H. COOK,
ERNEST MORAN.