No. 637,396. Patented Nov. 21, 1899.

N. O. LINDSTROM.

SAFETY STOP FOR ELEVATORS.

(Application filed Sept. 14, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

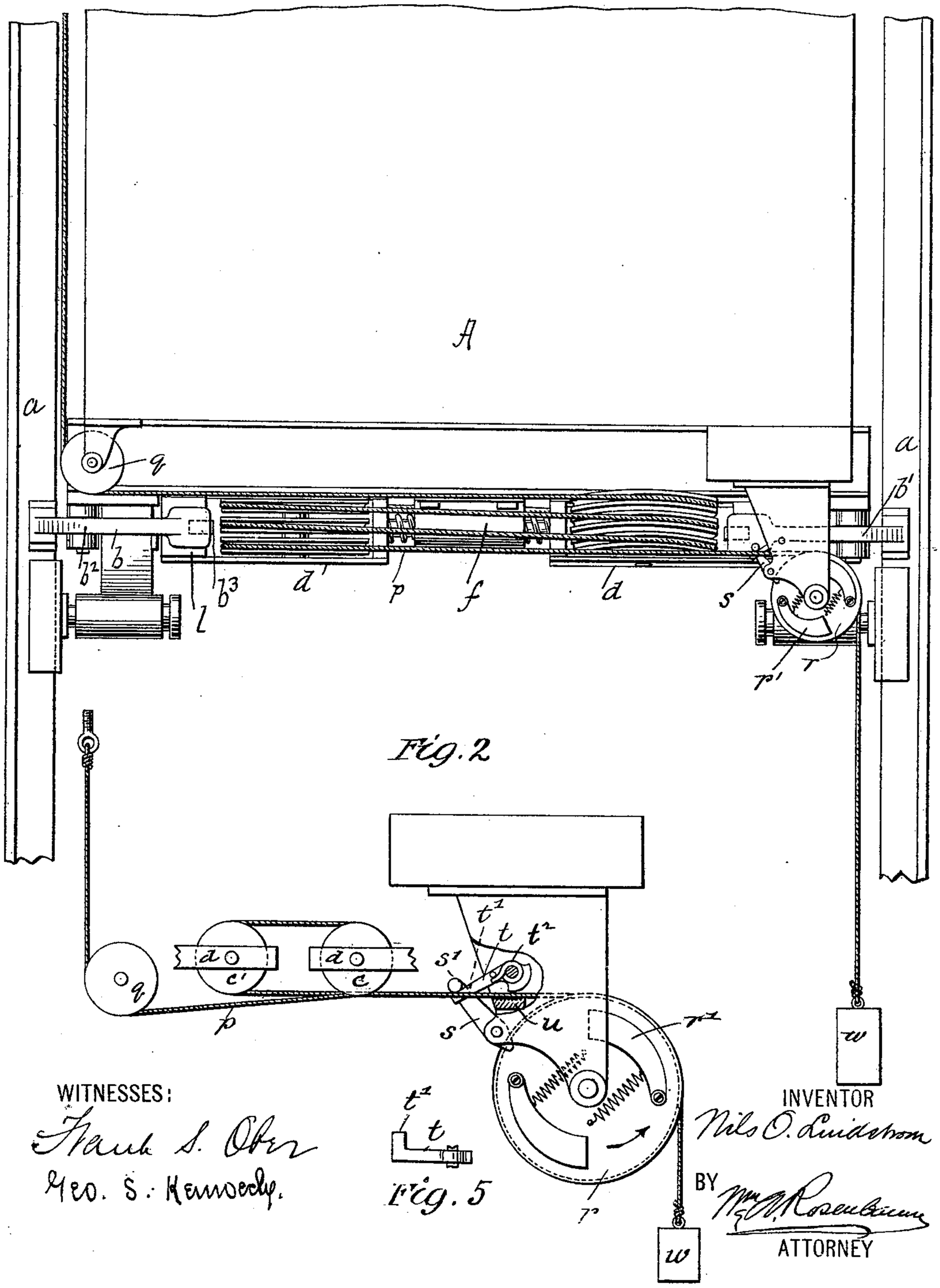

Fig. 5

WITNESSES:

Frank S. Otey

Geo. S. Kennedy.

INVENTOR

Nils O. Lindstrom

BY Munn & Co.

ATTORNEY

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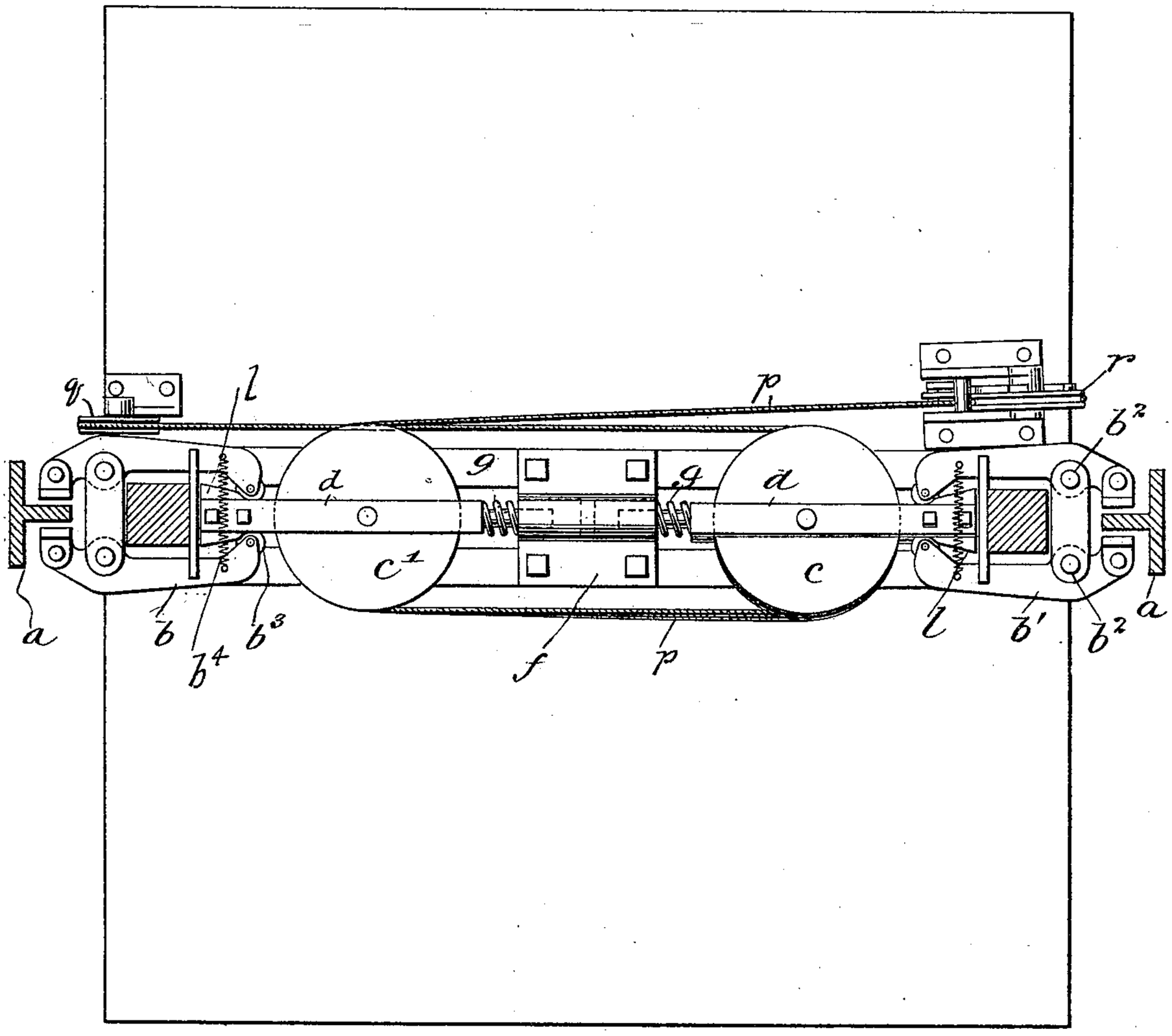
Fig. 3



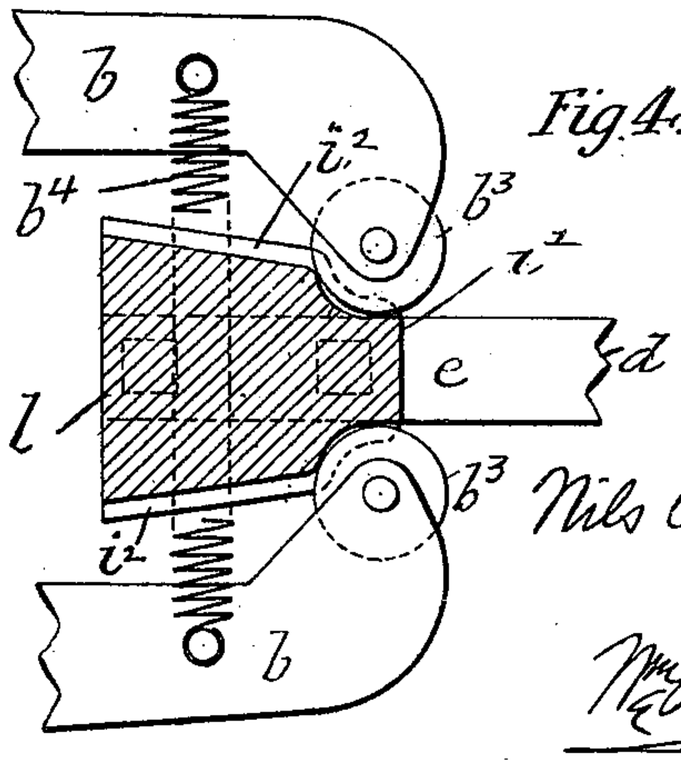


Fig. 4.

WITNESSES:
Frank S. Ober
Geo. S. Kennedy.

INVENTOR
Nils O. Lindstrom
BY
Wm. A. Rosenbaum
ATTORNEY

UNITED STATES PATENT OFFICE.

NILS O. LINDSTROM, OF NEW YORK, N. Y., ASSIGNOR TO ALONZO B. SEE AND WALTER L. TYLER, OF SAME PLACE.

SAFETY-STOP FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 637,396, dated November 21, 1899.

Application filed September 14, 1899. Serial No. 730,397. (No model.)

To all whom it may concern:

Be it known that I, NILS O. LINDSTROM, a citizen of the United States, residing at the city of New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Safety-Stops for Elevators, of which the following is a full, clear, and exact description.

This invention relates to safety-stops for elevators of that class in which an abnormal increase of speed of the car will automatically throw the stop into action.

The object of my invention is to provide a device of this character which can be relied upon for the greatest degree of safety and will be simple in construction and gentle in operation.

The invention comprehends two pairs of clamping-jaws adapted to act frictionally upon the vertical guide-rails in the shaft, said jaws being moved by wedges working between them, which are moved by the drawing together of a pair of compound sheaves around which a cord passes. The cord is ordinarily stationary and threaded through or past the car. The sheaves run in a loop formed in the cord, and when a suitable gripping device clutches the cord and puts a tension on it under the movement of the car such tension causes the loop in the cord to close up and so draw the sheaves together and operate the wedges.

The invention will be described more in detail with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the lower portion of an elevator-car equipped with my invention. Fig. 2 is a conventional view of the apparatus, showing the action of the grip, the sheaves for clearness being turned into a plane parallel with the governor-pulley. Fig. 3 is a plan of the bottom of the elevator-car. Fig. 4 is an enlarged detail of the rear end of a pair of jaws and the wedge which operates them, and Fig. 5 is a detail of the eccentric dog.

The car is indicated by A. It is supposed to travel in a shaft, of which the two T-rails *a a* are the usual guides for the car or special guides furnished for the purpose of this invention. At each side of the bottom of the car and in line with the rails *a a* is a pair of jaws *b b'*, pivoted at b^2 to a suitable framework and arranged with their working faces on opposite sides of the rail *a*. The inner ends of these jaws are provided with rollers b^3, which are pressed toward each other by a spring b^4, normally holding the jaws out of contact with the rails *a*. For the purpose of stopping the car in case of accident these jaws are caused to grip the rail *a* with a pressure depending upon the speed and weight of the car and its load. For this purpose I arrange on the bottom of the car two compound sheaves *c c'*, each made up of a number of sheaves or pulleys and each mounted in an independent frame *d*, in which the pulleys are free to turn. The frames *d* are provided with tailpieces *e*, extending inward to the center of the car-floor, where they enter a tubular casting *f*, forming a bearing. Between each frame *d* and the bearing-casting a spring *g* is interposed, which tends to force the frames outward in opposite directions toward the rails *a*, and the frames normally occupy this extreme outer position. The outer end of each frame *d* carries a wedge-shaped block *l*, which stands between the rollers b^3 on the inner ends of the jaws *b*, the narrow portion of the wedge being normally in contact with the rollers and permitting the jaws to open wide enough to be free of the rails. At this narrow portion of the wedge seats *i'* are provided for the rollers, said seats being continued along the face of the wedge in the form of grooves or tracks i^2 for the rollers when the wedge moves. It will be seen that a movement of the compound sheaves and their frames toward each other will draw the wedges through the space between the rollers, spreading them apart and causing the jaws to grip the rails. To accomplish this movement of the sheaves, I arrange in the elevator-shaft a cord *p*, one end of which is permanently fastened to the upper end of the shaft, and thence leads downward over a guide-sheave *q* on the car, thence around one of the pulleys of the compound sheave *c*, then around one of the pulleys in the sheave *c'*, and so on successively around all of the pulleys of the compound sheaves,

forming a loop in the cord, whence it leads over a pulley r and terminates near the lower end of the shaft, with a weight w upon it to take up its slack and maintain it in working position. The pulley r is mounted on the car and carries a pair of pivoted weights r', normally restrained by springs, but adapted to be thrown outward by centrifugal force. Adjacent to the periphery of this pulley a latch-lever s is pivoted and provided with a pin s', which normally stands upon a lug t', formed upon an eccentric dog t. The cord p passes between the face of this eccentric dog and a plate u, and when the dog is released by the latch s a spring t^2 turns the dog on its pivot, so that the rope will be gripped between the plate and the dog.

The operation is as follows: The car in traversing the shaft at normal speed causes the cord p to be drawn through the sheaves c c', rotating them without moving their frames. If an accident occurs which causes the car to travel downward at an abnormally high speed, the pulley r will be rotated faster than usual and the weights r' thrown outward until one of them will strike the latch s and move it out of engagement with the lug t' on the dog t. This will allow the dog to rise and cause the cord p to be gripped. The further movement of the car will then put a tension on the cord between the gripping-point and the top of the shaft, where the cord is permanently secured. This tension will close up the loop in the cord, which includes the compound sheaves, and will draw said sheaves and their frames together, thus pulling the wedges through the space between the ends of the jaws. The first movement of the wedges will result in a quick movement of the jaws into contact with the rails, due to the forcing of the rollers b^3 out of their seats. The continued movement of the wedges will then gradually increase the grip of the jaws upon the rails and finally bring the car to a stop. It will be observed that the farther the car moves after the dog is put in action the tighter will be the grip of the jaws. Consequently the speed of the car or its load will automatically control the stopping.

The action of the safety-stop will be very gentle and smooth, owing to the fact that the cord passes around a number of pulleys in the loop, which increases the size of the loop and requires that the cord shall be drawn a comparatively long distance to effect the required movement of the compound sheaves. The same construction also affords great leverage for the action of the cord upon the sheaves. To release the grips, it is only necessary to reset the latch s, whereupon the release of the cord thus effected will allow the springs g to move the sheaves outward to carry the wedges to their normal positions with respect to rollers b^3. This allows the jaws to be opened by springs b^4.

Having described my invention, I claim—

1. In a safety-stop for elevators, the combination of the elevator-car, a pair of sheaves mounted thereon and arranged so that the space between them can be increased or diminished, a stationary cord extending through the shaft and forming a loop around the sheaves, an automatically-operating device carried by the car for putting a tension on the cord to reduce the loop and thereby move the sheaves, and means whereby such motion of the sheaves will act to stop the car.

2. In a safety-stop for elevators, the combination of the elevator-car, a pair of sheaves movably mounted thereon, a stationary cord extending through the shaft and forming a loop around the sheaves, and a device carried by the car for gripping the cord to reduce the loop and thereby move the sheaves and means whereby such motion of the sheaves will act to stop the car, substantially as described.

3. In a safety-stop for elevators, the combination of the elevator-car, a pair of compound sheaves movably mounted thereon, a stationary cord extending through the shaft and forming a compound loop around the sheaves, and a device carried by the car for gripping the cord to reduce the loop and thereby move the sheaves and means whereby such motion of the sheaves will act to stop the car, substantially as described.

4. In a safety-stop for elevators, a pair of gripping-jaws, a pair of movably-mounted sheaves, a cord forming a loop around said sheaves, means for putting a tension on said cord to draw the sheaves together and means whereby such motion of the sheaves will cause the gripping-jaws to act, substantially as described.

5. The combination with an elevator-car and side rails arranged along the shaft, of pairs of gripping-jaws adapted to engage the said side rails, and means for moving said jaws into contact with the rails, consisting of a pair of movably-mounted sheaves, a cord formed into a loop around said sheaves, means for putting a tension on the cord to close up the loop, and means whereby the motion thus imparted to the sheaves is used to force the jaws against the rails, substantially as described.

6. The combination of an elevator, a pair of guide-rails on opposite sides of the elevator, a pair of pivoted jaws on each side of the elevator adapted to respectively grip said guide-rails, a pair of wedges arranged to act upon said jaws, a pair of sheaves mounted in movable frames attached respectively to said wedges, a stationary cord looped around said sheaves and a device on the car for gripping the cord whereby the loop is reduced, the sheaves and wedges moved and the jaws caused to grip the rails, substantially as described.

7. The combination of the car, the movable

frames carrying the sheaves, the stationary cord forming a loop around the sheaves, the springs tending to hold the frames apart, wedges carried by the frames, gripping-jaws operated by said wedges, a gripping device carried by the car for action upon the cord and a centrifugal governor-wheel carried by the car, and over which the cord passes said wheel adapted to act upon the cord-gripping device, substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

NILS O. LINDSTROM.

Witnesses:
GEO. S. KENNEDY,
FRANK S. OBER.