

N. O. LINDSTROM.  
SAFETY STOP FOR ELEVATORS.

APPLICATION FILED DEC. 15, 1902.

2 SHEETS—SHEET 1.

NO MODEL.

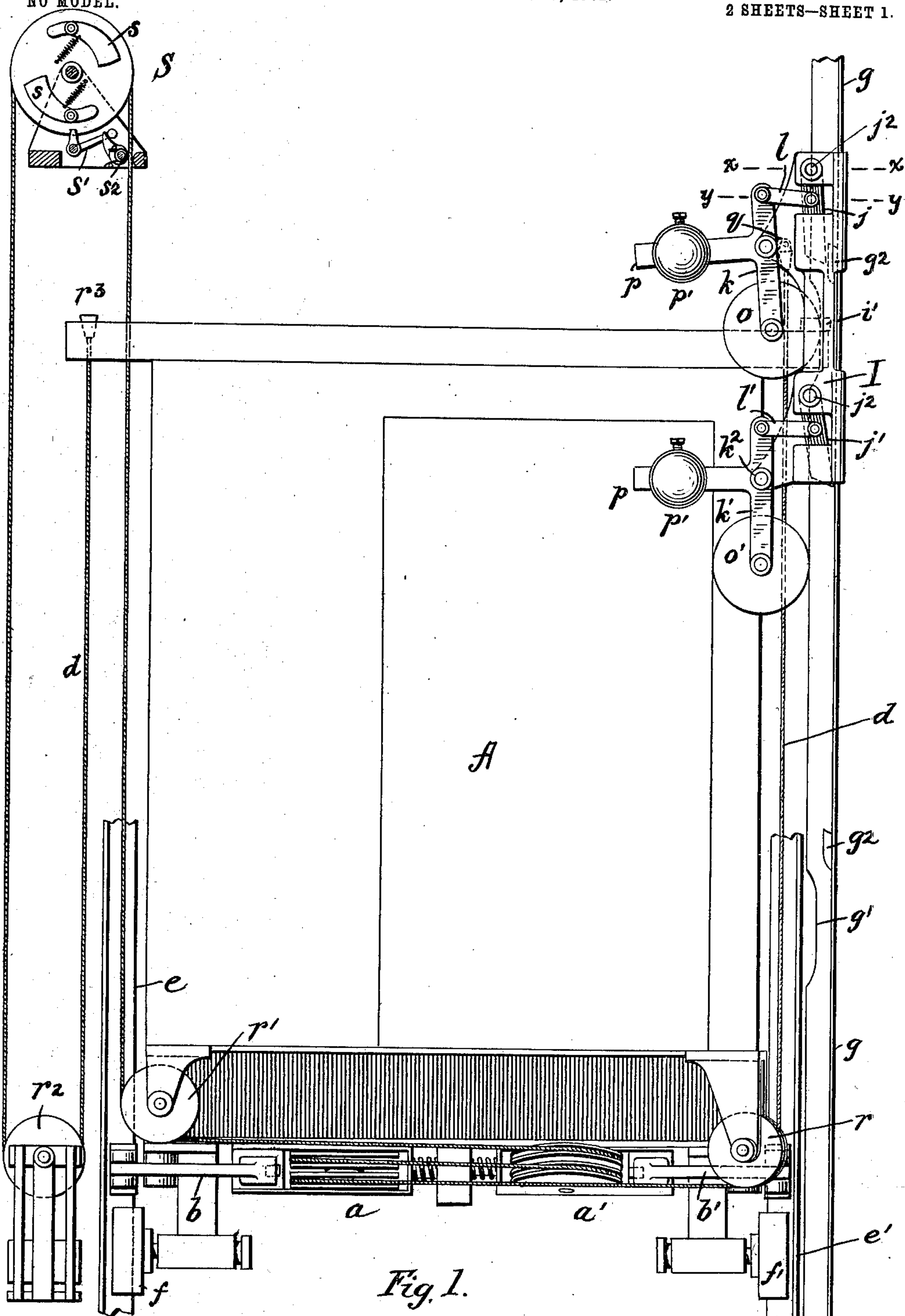


Fig. 1.

Witnesses  
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Halse M. Chapin

Inventor  
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By his Attorney *W. H. Prentiss*

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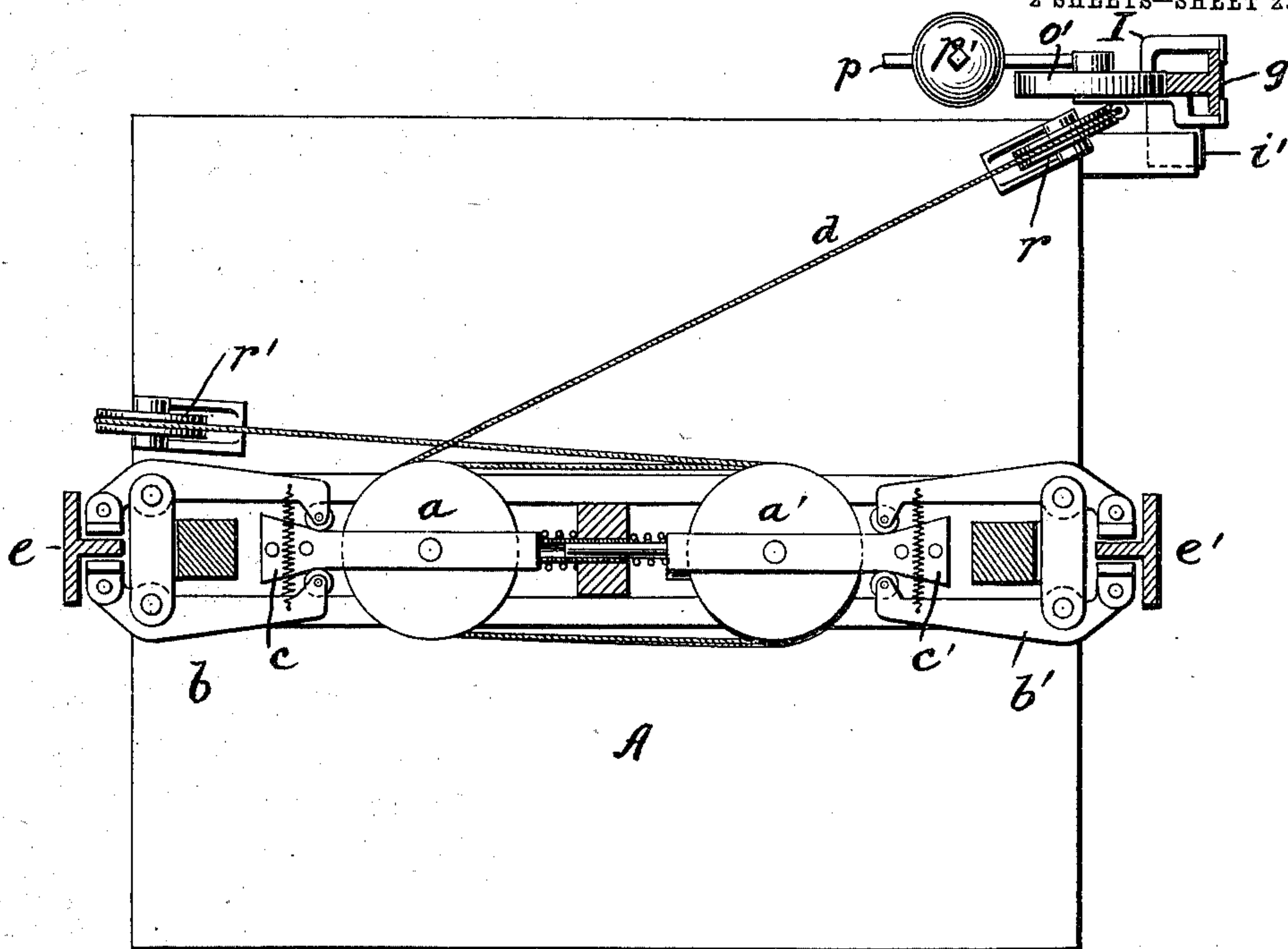


Fig. 2.

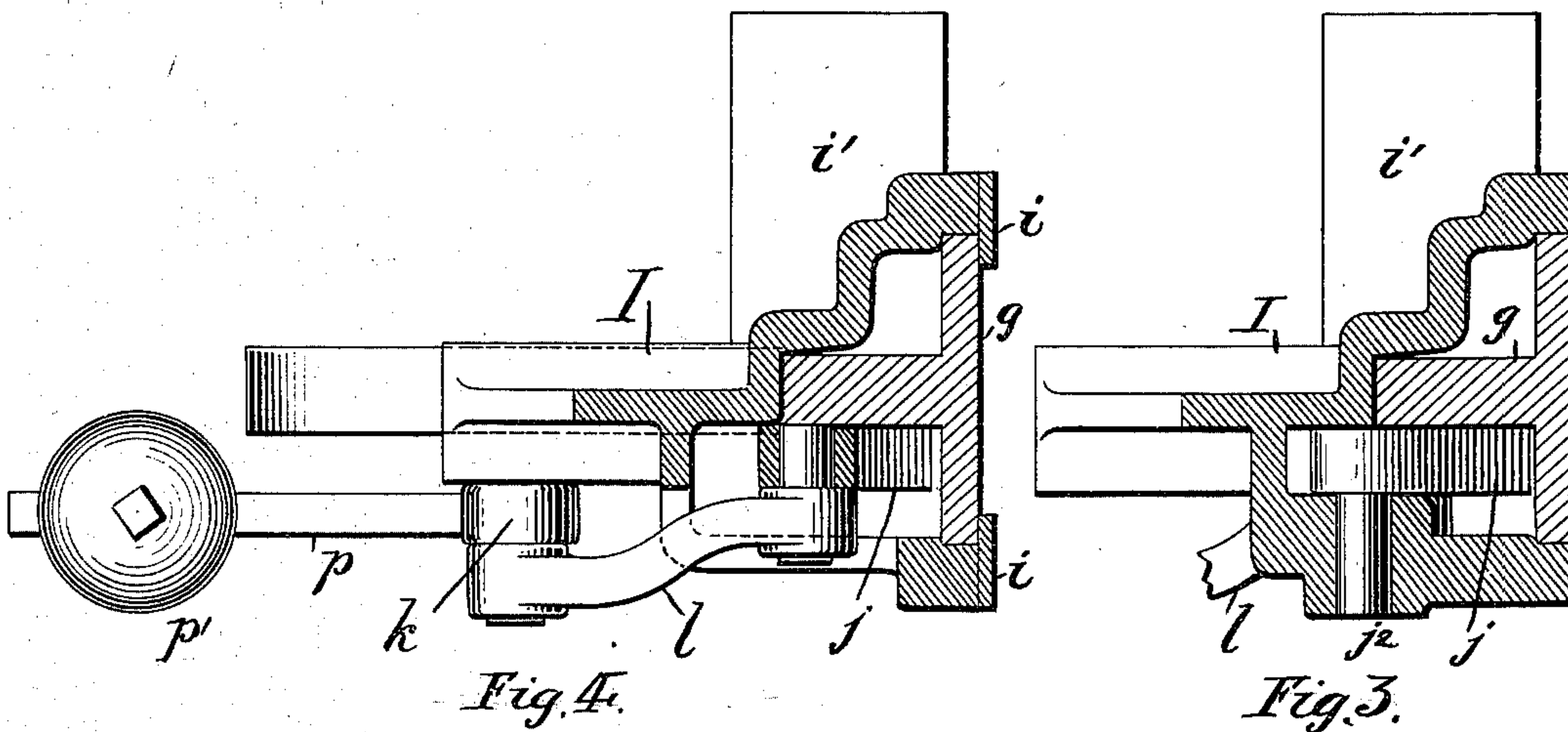


Fig. 4.

Fig. 3.

Witnesses  
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# UNITED STATES PATENT OFFICE.

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

## SAFETY-STOP FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 735,395, dated August 4, 1903.

Application filed December 15, 1902. Serial No. 135,206. (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 Queens 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 appliances for elevators, the object being to provide a simple and effective apparatus which will automatically stop the car without serious shock when the descending speed exceeds a certain predetermined maximum.

The invention is an improvement upon the safety device shown in the United States Patent of Allan Cowperthwait, No. 703,548, dated July 1, 1902, and, like the said Cowperthwait invention, is preferably applied in connection with a portion of the safety device described in Patent No. 637,396, issued to me November 21, 1899.

In my previously-patented invention clamping-jaws are forced into frictional engagement with the guides in the shaft by putting tension upon a cord which passes around movable sheaves, such tension causing the sheaves to move and operate the clamps, and the tension of the cord is obtained automatically by the action of a speed-governor. In the Cowperthwait invention the improvement consisted, essentially, in supporting the ends of the cord in swinging seats carried by the car, the movement of the seats being controlled by offset portions on a track, against which the seat-carrier traveled. When the speed became excessive, the seat-carrier did not enter the offset in the track, and consequently the end of the cord resting in the seat was allowed to become connected with a fixed hook or projection in the shaft, thus holding the end of the cord while the car passed on and created the necessary tension to operate the clamping-jaws. It has been found in practice that owing to the wear of the guide-shoes of the car or to any poor fit thereof the swaying of the car from side to side which is thereby permitted is liable to alter the relation between the seat for the end of the cord on the car and the fixed hook in the shaft, so that notwithstanding the fact

that the offset guide performs its function properly the seat in which the end of the cord is carried is not thrown into a position where the end of the cord will be caught by the hook, and the apparatus fails. The present invention is intended to provide a construction wherein failure from this cause cannot take place; and it consists, in general, in securing the end of the cord to a carriage which slides freely upon a guide in the shaft and which merely rests by gravity upon the car, being otherwise entirely independent thereof. The carriage itself also supports the engaging devices, which are actuated by the offset portions of the guide, so that when the speed of the carriage (which is also that of the car) becomes excessive in descending the engaging devices will be sure of automatic operation regardless of any lateral motion of the elevator-car.

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

Figure 1 represents a side elevation of an elevator-car and the shaft-guides equipped with my improved safety appliances. Fig. 2 is a plan of the bottom of the car. Fig. 3 is a section of the carriage, taken on line  $x x$  of Fig. 1; and Fig. 4 is a section of the carriage, taken on line  $y y$  of Fig. 1.

A indicates the elevator-car, under the floor of which are supported the movable sheaves  $a$  and  $a'$ , adapted to actuate the clamping-jaws  $b$  and  $b'$  by means of the wedges  $c$  and  $c'$  in accordance with the disclosure in my previous patent above referred to. The cord for actuating these devices is indicated by  $d$ . The usual guides for the car are indicated by  $e$  and  $e'$ , and they are engaged by the guide-shoes  $f$  and  $f'$  and also by the clamps  $b$  and  $b'$ . The guide-shoes are subjected to considerable wear and after a time will allow the car to sway somewhat laterally as it traverses the shaft.

$g$  is a special guide arranged vertically in the shaft, and, as shown, in one corner thereof. It consists of an ordinary T-rail having its web projecting outward and its outer edge provided with offset portions or notches  $g'$  at regular intervals of a few feet. On the base of this rail and immediately above each offset  $g'$  is



fixed a lug  $g^2$ . Upon the rail  $g$  is placed a carriage I, consisting of an irregularly-shaped casting which is held in place upon the rail in such a manner as to allow it to slide freely thereon by lips  $i$ , the carriage in effect embracing the rail. A lug  $i'$  on the carriage projects in such a way as to be engaged by the roof of the car or a projection therefrom or from any other part of the car, so that as the car rises the carriage will be pushed upward, while as the car lowers it will be free to follow it, the lug being always in contact with the car, except under abnormal conditions. In the carriage are arranged two pawls  $j$  and  $j'$ , pointed downward and placed one above the other. They are pivoted at the points  $j^2$ .  $k$  and  $k'$  are two levers pivoted at points  $k^2$  between their extremities to offset portions of the carriage. One end of lever  $k$  is connected by a link  $l$  with the pawl  $j$ , while its other end carries a roller  $o$ , which rides upon the outer edge of the rail. Lever  $k'$  is likewise connected with pawl  $j'$  by a link  $l'$  and also carries a roller  $o'$ , which rides upon the edge of the rail. Both levers  $k$  and  $k'$  have arms  $p$ , upon which are adjustable weights  $p'$ , tending to keep the rollers against the edge of the rail. So long as the rollers are riding on the straight portion of the rail the pawls which they control are held in their innermost position, where they will engage with the lugs  $g^2$ ; but just before such engagement takes place the rollers normally pass into the offset portions  $g'$ , and thus swing the ends of the pawls out of the path of the lugs and prevent engagement therewith. One end of the cord  $d$  is permanently fixed at the point  $q$  to the carriage. It leads thence downward and around the guide-sheave  $r$ , thence around the sheaves  $a$  and  $a'$ , thence upward to the top of the shaft, where it passes over a centrifugal governor  $S$ , thence to the bottom of the shaft and around another guide-sheave  $r^2$ , and finally to the car, where its end is permanently fixed at  $r^3$ . The governor  $S$  is merely an extra safety appliance of well-known construction, in which the excessive speed of the pulley is supposed to throw out the weights  $s$  to strike the latch  $s'$  and release a cam  $s^2$ , which grips the cord and puts a tension thereon for operating the clamping-jaws. This, however, forms no part of the present invention, it being included herein merely to show that an ordinary governor can be operated by the same cord and will act through the same cord as is used in connection with the carriage which forms the subject of this invention.

The operation is as follows: As the car moves up and down in the shaft the carriage I merely rests thereon and normally maintains a constant relation with the car. As the rollers  $o$  and  $o'$  pass into the offsets  $g'$  they shift the pawls, so that no engagement with the lugs  $g^2$  will take place. If, however, in descending the speed exceeds a certain predetermined maximum, the rollers in pass-

ing an offset  $g'$  will not have time to ride into it, the result of which is that the pawl corresponding to the roller is not swung clear of the corresponding lug  $g^2$  and engagement takes place therewith. This detains the carriage, allowing the car to pass onward. The end of the cord being thus held tension is put upon the cord, the sheaves  $a$  and  $a'$  are drawn together, so that the clamps  $b$  and  $b'$  are caused to grip the main guides  $e$  and  $e'$  and stop the car. The rapidity of the stop is of course regulated by the number of turns around the sheaves and the nature of the friction-surfaces.

This device can be adjusted to act at any desired speed by setting the weights  $p'$  at the proper points on their arms  $p$ . The weights of course can be replaced by springs, or springs and weights can be used in any relation together to accomplish the same result. One pawl and its accompanying controller would ordinarily serve the purpose; but two are used for extra precaution.

The operation of the centrifugal governor is already understood from the preceding description, it being only necessary to repeat that when it acts, and it may act either before or simultaneously with the carriage, tension is put upon the cord with the same desired result.

It will be seen that since the carriage to which the cord is secured is mounted to run with invariable relation to the guide  $g$  any lateral movements which the car may make due to wear of its guide-shoes will not in any way affect the certainty of the pawls engaging the lugs when the abnormal speed is acquired.

Having described my invention, I claim—

1. In a safety device for elevators, the combination of a car, stopping devices therefor, a cord carried by the car and adapted to actuate said stopping devices, devices fixed in the shaft for engaging with the cord and means whereby such engagement will take place regardless of lateral movements of the car.

2. In a safety device for elevators, the combination of a car, stopping devices therefor, a cord carried by the car and adapted to actuate said stopping devices, devices fixed in the shaft for engaging with the cord, automatic means for causing said engagement when the speed of the car becomes excessive and means whereby such engagement will take place regardless of lateral movements of the car.

3. In a safety device for elevators, the combination of a car, stopping devices carried thereby, a cord engaging with said stopping devices, a carriage adapted to traverse the elevator-shaft and guided independently of the car, the cord being secured to said carriage and means whereby excessive speeds of the car will cause the carriage to be detained, substantially as described.

4. In a safety device for elevators, the combination of a car, stopping devices carried



thereby, a cord engaging with said stopping devices, a carriage adapted to traverse the elevator-shaft and guided independently of the car, the cord being secured to said carriage, fixed stops in the shaft and means whereby excessive speeds of the car will cause the carriage to engage and be detained by said stops, substantially as described.

5 5. In a safety device for elevators, the combination of a car, stopping devices carried thereby, a cord engaging with said stopping devices, a carriage adapted to traverse the elevator-shaft and guided independently of the car, the cord being secured to said carriage, a pawl on said carriage and stops fixed  
15 in the elevator-shaft and means whereby ex-

cessive speeds of the car will cause said pawl to engage a stop, substantially as described.

6. In a safety device for elevators, the combination of a car, stopping devices carried  
20 thereby, a cord engaging with said stopping devices, a carriage resting by gravity upon the car and to which the cord is secured, and means whereby excessive speeds of the car will cause the carriage to be detained, sub-  
25 stantially as described.

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

NILS O. LINDSTROM.

Witnesses:

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WALDO M. CHAPIN.