

No. 632,414.

Patented Sept. 5, 1899.

J. H. JOHNSON.

ELEVATOR CAR ARRESTER WITH MOVABLE GUIDE STRIPS.

(Application filed Apr. 27, 1899.)

(No Model.)

3 Sheets—Sheet 1.

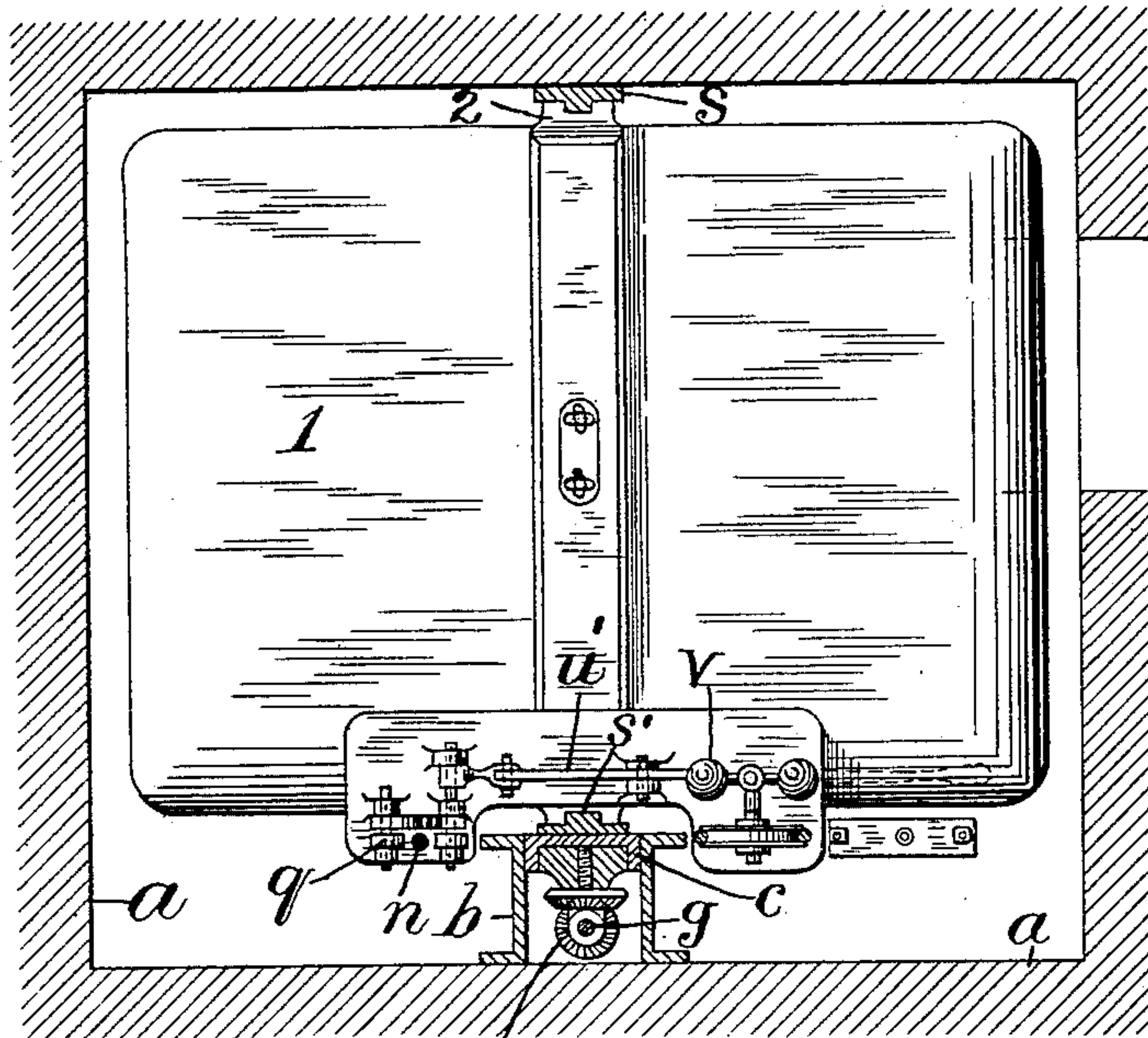


Fig. 1.

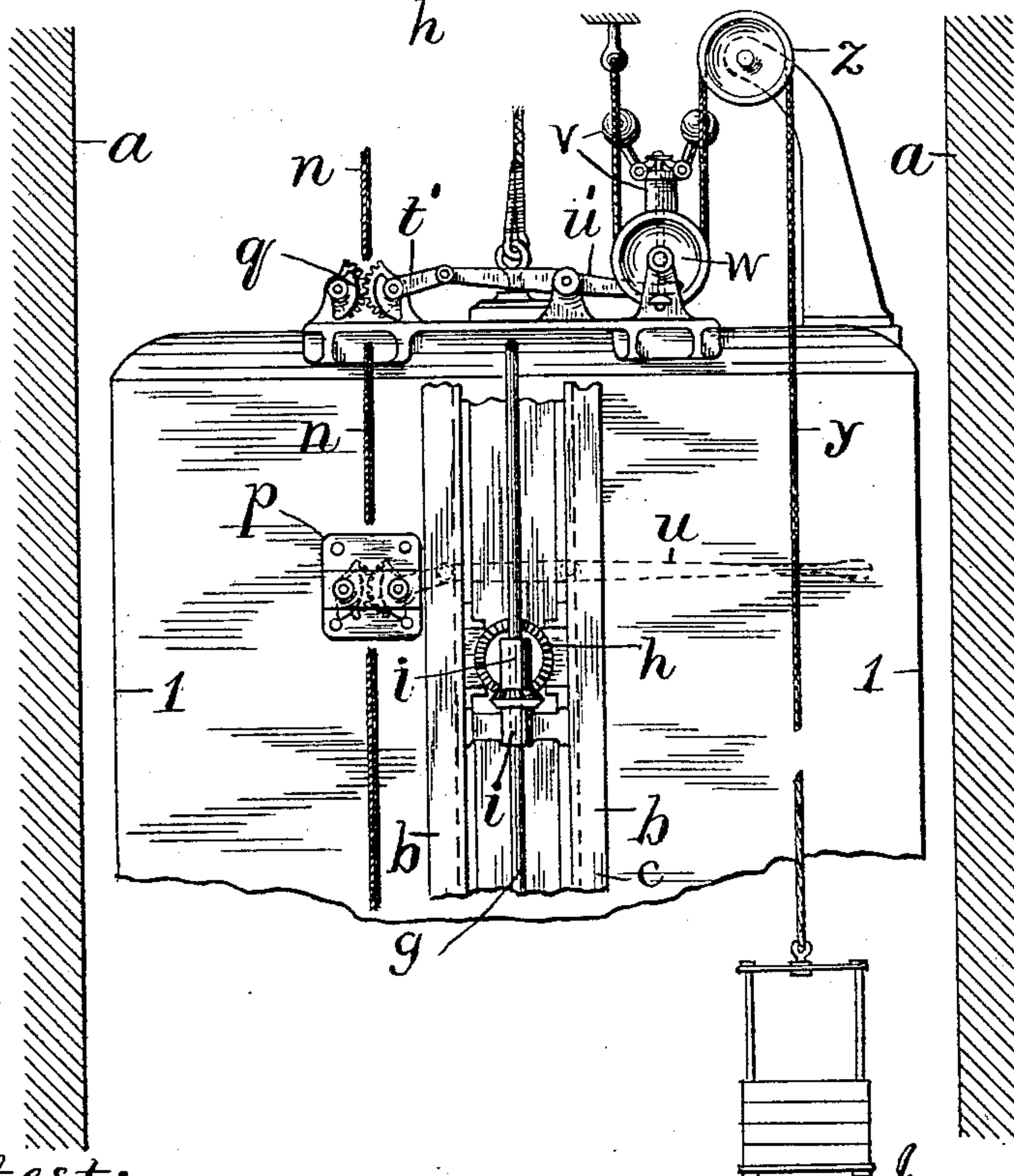


Fig. 2.

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3 Sheets—Sheet 2.

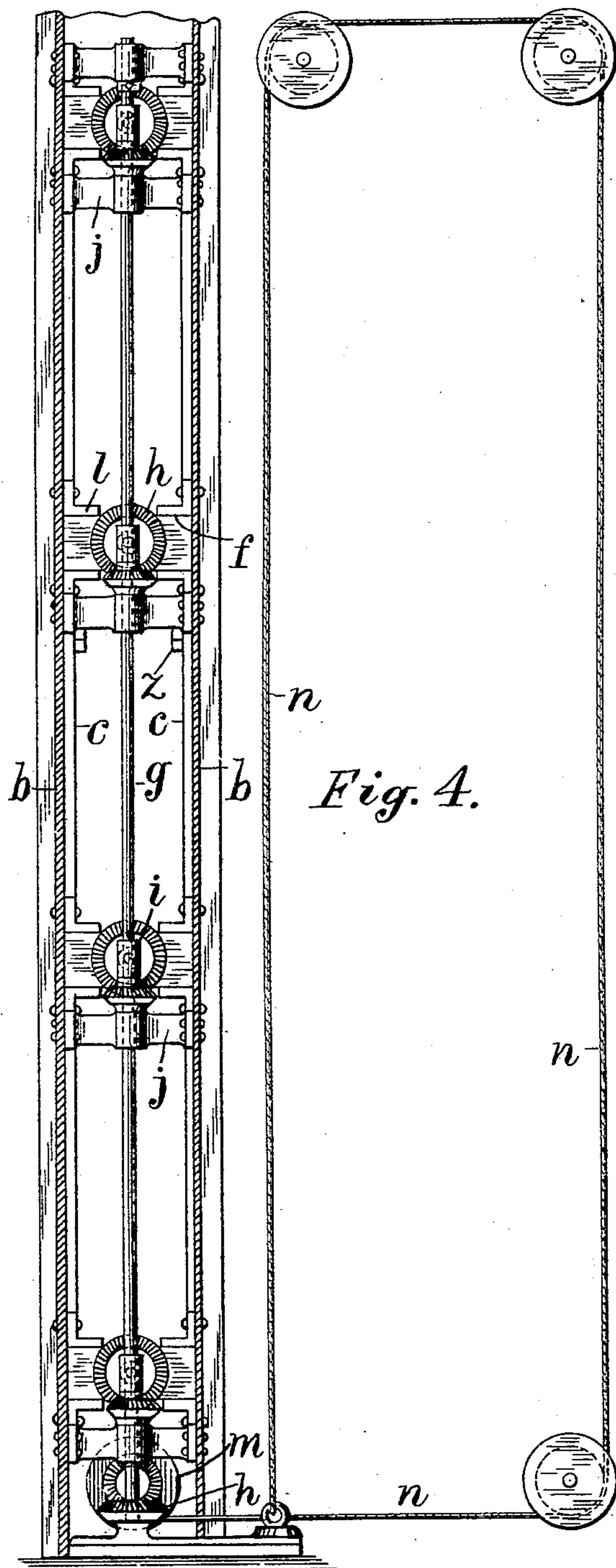


Fig. 4.

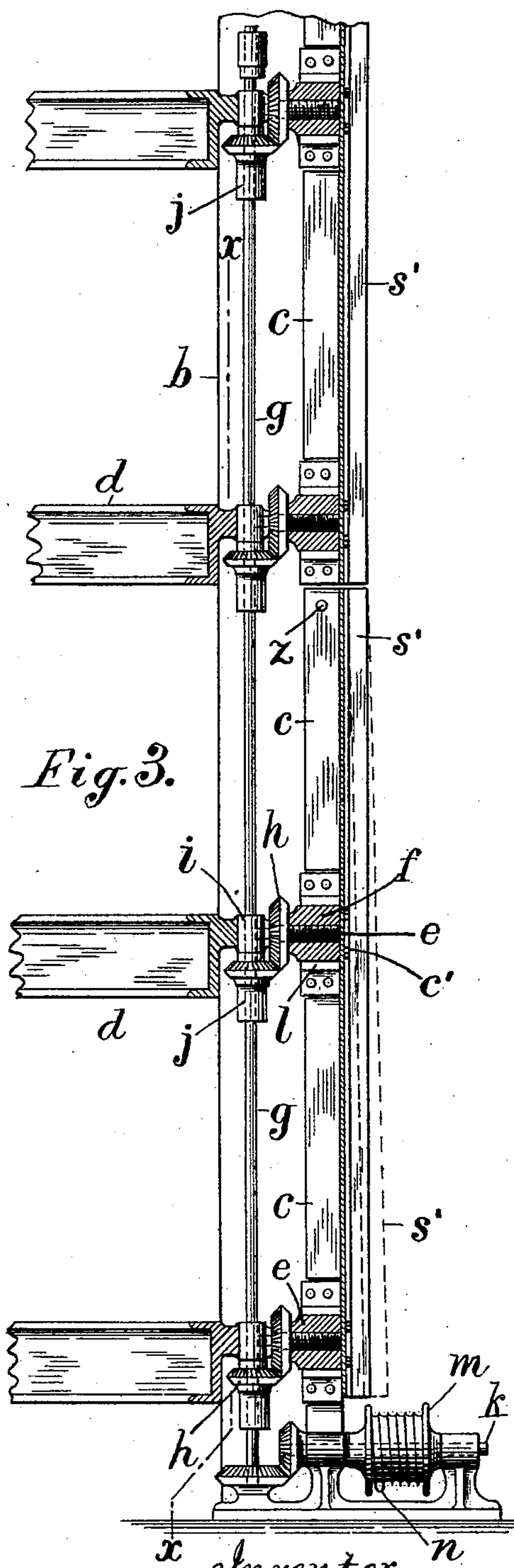


Fig. 3.

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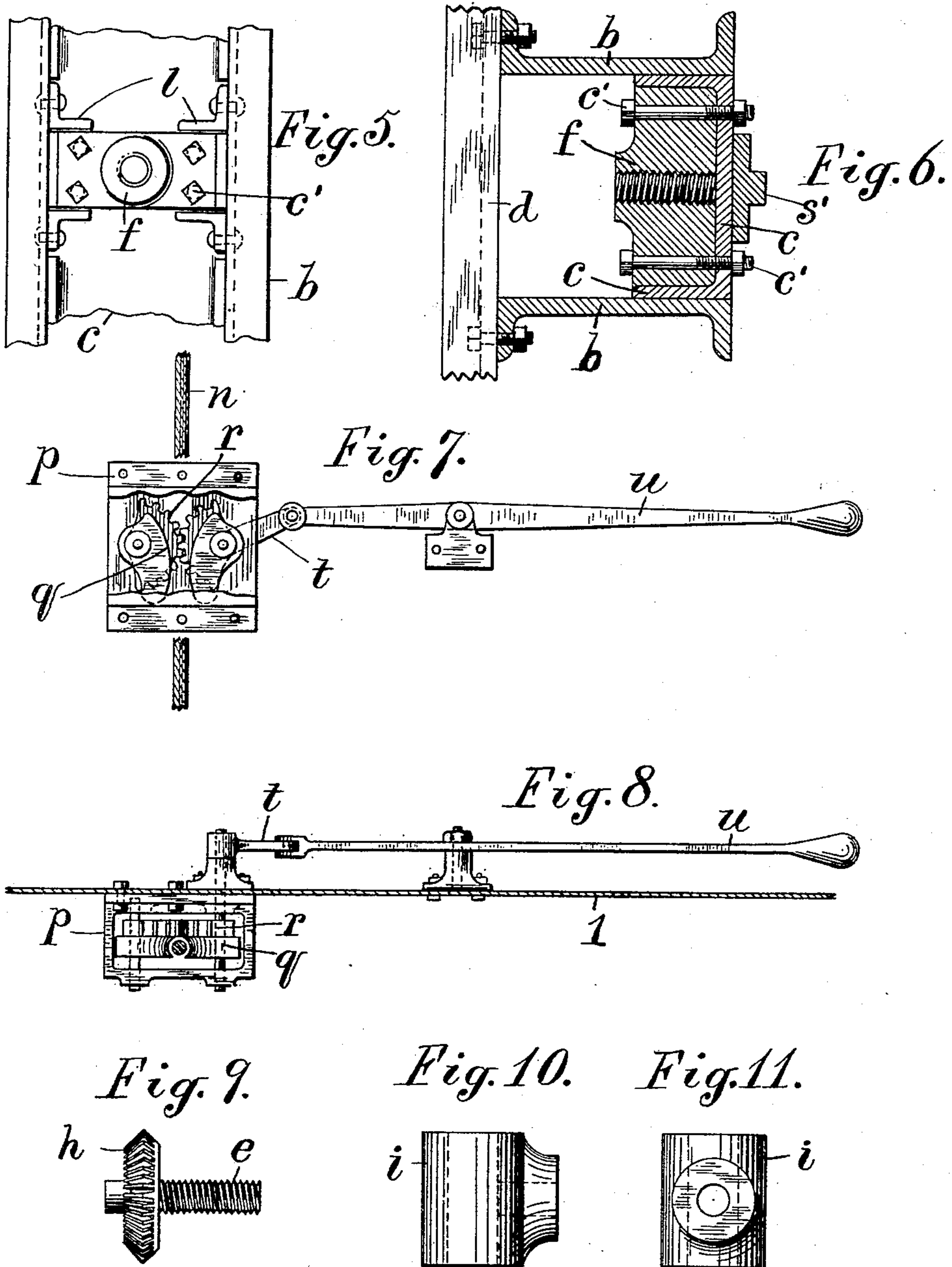
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JAMES H. JOHNSON, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-HALF
TO WILLIAM R. WEEKS, OF SAME PLACE.

ELEVATOR-CAR ARRESTER WITH MOVABLE GUIDE-STRIPS.

SPECIFICATION forming part of Letters Patent No. 632,414, dated September 5, 1899.

Application filed April 27, 1899. Serial No. 714,668. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. JOHNSON, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Elevator-Car Arresters with Movable Guide-Strips, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of the present invention is to furnish an effective means for arresting the movement of an elevator-car in case the supporting-rope should break or the car should from any other cause be lowered at a dangerous rate of speed.

The car is always guided by vertical strips upon the sides of the hoistway, fitted to notched shoes upon the body of the car, and such strips are generally fastened to guide-posts at opposite sides of the hoistway. In the present invention I make the guide-strip upon one side of the hoistway movable and provide means for pressing the strip or its lower end outwardly into the hoistway, so as to contract the space in which the shoes move and form an efficient brake to retard or arrest the movement of the car. The shoes upon the car are made of suitable strength to resist the pressure, and the guide-strips are made in sections of suitable length and strength to operate as desired, and the guide-strip may be pressed outwardly and supported at different points by screws, wedges, or cams, and such agencies are connected by suitable gearing, so as to be actuated simultaneously or successively, as desired. The gearing for actuating such agencies is moved by a drum, around which a rope is wound and extended to the top of the hoistway and then over a pulley downward in the hoistway, so that as it is clamped by the car in its descent it may turn the drum and force the guide-strip outwardly. Such rope is for convenience termed a "safety-rope" herein. A clamp to grip such rope may be actuated by a governor upon the car when the normal speed of the car is exceeded, or a clamp may be actuated by a hand-lever within the car, or both may be provided to afford additional security. In a very tall

hoistway the guide-strip is preferably divided into sections and all the sections moved outwardly at the bottom simultaneously when the gearing is actuated.

The annexed drawings show diagrams of a construction in which the guide-strips are forced outwardly by screws and the gearing consists of a shaft with bevel-wheels for actuating such screws simultaneously and a rope-drum connected to turn such shaft when the safety-rope is pulled.

Figure 1 is a plan of the hoistway and car. Fig. 2 is a section of the hoistway with the upper end of the car therein. Fig. 3 is a vertical elevation through the center of the guide-post and the adjacent floor-beams, with the parts in section at the center line where hatched. Fig. 4 is a vertical section on line *xx* in Fig. 3. Fig. 5 is an outside view of part of the post and movable guide-strip at one of the actuating-nuts. Fig. 6 is a plan in section through the center of the nut *f* in Fig. 5, with the parts in section only where hatched. Fig. 7 is an elevation of the hand-clamp and its actuating-lever viewed from the outer side of the car, the car-body being omitted and the rope and a part of the clamp-casing being broken away to show the construction. Fig. 8 is a plan of the same parts with the car-body in section. Fig. 9 is an elevation of one of the screws and its attached bevel-wheel. Fig. 10 is a side elevation, and Fig. 11 a front elevation, of one of the thrust-bearings.

The hoistway *a* is shown in Fig. 1 provided upon one side with a fixed guide-strip *s* and upon the opposite side with a movable guide-strip *s'*, which is combined with a strengthening-bar *c*. The illustration shows a construction of metallic beams, the post being formed of two beams *b*, secured to the floor-beams *d* with an interspace or channel-way sufficient to receive the bar *c*. The beams *b* and bar *c* are flanged, as usual, and nuts *f* are shown attached to the bar *c* at intervals to receive screws *e*. A gear-shaft *g* is mounted in the rear of the nuts and connected with the screws by bevel-wheels *h* and is supported by bearings *i* and *j*. The bearings *i* of the vertical shaft furnish also bearings for the

outer ends of the screws and are sustained against the thrust of the screws by projections from the floor-beams *d*. A shaft *k* is also connected by bevel-wheels *h* with the vertical shaft and provided with drum *m*, from which the safety-rope *n* is led over pulleys *o* to and across the hoistway, so as to descend by the side of the car.

A car 1 is shown provided with shoes 2 to fit the guide-strips *s s'*, and clamps for the safety-rope are provided upon the top of the car and upon one side of the same to be actuated automatically or by hand. A clamp-casing *p* is shown secured upon the side of the car-body 1 with cams *q* pivoted therein and connected by segments *r* and arranged to clamp the safety-rope *n*. One of the segments is provided with an operating-crank *t* and with a hand-lever *u* within the car-body, so that the movement of the cam-lever may press the cams upon the safety-rope, and thus actuate the gearing to throw out the guide-strip. A similar clamp, with crank *t'* and lever *u'*, is shown upon the top of the car and so connected with a governor *v* that an excessive speed of the governor will move the lever and cause the cams to grip the safety-rope. The governor-pulley *w* is shown actuated by a rope *y*, fixed at the top of the hoistway and carried over the governor-pulley and over an idle pulley *z'* upon the car and provided at its lower end with a weight to produce a constant tension. The rope *y* is shown broken in Fig. 2, as the weight would in practice hang constantly at the bottom of the hoistway, because it does not rise and fall with the movement of the car; but the pulleys *w* and *z'* (which are both supported upon the car) simply roll over the rope as the car moves up or down. The weight is shown in the drawings adjacent to the side of the car, but in practice is designed to hang below the point which the car would reach in its movement. With this construction an excessive speed of the car induces an excessive speed of the governor and causes the clamp to grip the safety-rope *n* and throw the movable guide-strip out into the hoistway, where it crowds the car forcibly against the stationary guide-strip *s* and produces sufficient friction to retard or arrest the car.

In order to preserve the strength of the movable guide-strip in tall hoistways and to make it operative upon the car at various points in the hoistway, the guide-strip is preferably divided into sections, Fig. 3 showing the bottom section of the guide-strip and a part of the section next above. The lower guide-strip has the upper end of its strengthening-bar *c* fixed at the top by the insertion of bolts *z* through the flanges of the bar *c* into the post-beams *b*, which pivots the guide-strip, so that it may be pressed outwardly at the bottom without protruding into the hoistway at the top. Two nuts are shown at the lower end and at the middle, respectively, of the bar *c*

and secured thereto by bolts *c'*, and braces or guards *l* are shown attached to the post-beams *b* at the upper and lower side of the nuts *f* to support the nuts when a downward pressure is brought upon the guide-strips by their frictional contact with the car-shoes. The guide-strip, by its attachment to the nuts *f*, through the medium of the bar *c* and their support by the guards *l*, is firmly sustained against the vertical movement independently of the bolts *z*. The dotted lines *s'* in Fig. 3 show in an exaggerated degree the outward movement of the guide-strip when the safety-rope is pulled and the gearing of the screws is actuated, and as the middle of such strip does not require to move out as far as the lower end the screw and nut at the middle of the strip would be formed of less pitch, so that the movements produced by the two screws would be proportionate to their respective distances from the bolt *z*, upon which the guide-strip hinges. Instead of making the screws with different pitch in such an arrangement of the guide-strip the cog-wheels connected with the screws may be made of different diameters, so as to rotate them in the desired proportion. By moving all the sections of the guide-strip simultaneously the car would be retarded or arrested wherever it may be in the hoistway.

Any suitable means may be used to force the guide-strip outwardly, as the essential feature of the invention consists of the guide-strip movable toward the car and means actuated by the car for moving the guide-strip outward into the hoistway to press upon the car-shoes, and thus retard or arrest the car.

The car may be provided alone with the hand-clamp or with the automatic governor-clamp; but the combination of both, as shown in the drawings, furnishes the highest degree of security, and thus secures, especially in passenger-elevators, a degree of safety, which is more important than any other consideration. It will be observed that the provision of the hand-clamp with actuating-lever inside of the car enables any passenger, as well as the conductor, to control its descent in case of accident.

With a construction of metallic beams, as illustrated in the drawings, the guide-post for the movable strip is readily formed with an open channel-way in the front in which the guide-strip can be fitted; but if a wooden construction is employed the same result may be secured by using two separate posts like the beams *b* or guiding the strip in its outward movement upon a single wooden post by any suitable means.

The strengthening-bar *c* is secured rigidly to the guide-strip, so that it forms practically a part of the same, and it is obvious that the guide-strip may be made integral with such strengthening-bar or may be of any suitable dimensions to give it the requisite strength, and where I have used the term "guide-strip" in the claims it is intended to include the

strengthening-bar or any other suitable means of giving it the necessary stiffness to perform its functions.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In an elevator, a guide-strip movable toward the car and means controlled by the movement of the car for moving such guide-strip to press upon the car-shoes.
2. In an elevator, a guide-strip fixed at the upper end and movable at the lower end toward the car, and means controlled by the movement of the car for pressing the lower end of the strip against the car-shoes.
3. In an elevator, the combination, with the guide-post, of a guide-strip divided into sections each fixed at the top and movable at the bottom toward the car, and means controlled by the movement of the car for pressing the bottoms of the strips upon the car-shoes, substantially as herein set forth.
4. In an elevator, the combination, with the elevator-post, of a guide-strip movable toward the car, a screw for pressing the bottom of the strip toward the car, and means controlled by the movement of the car for rotating the screw, as and for the purpose set forth.
5. In an elevator, the combination, with the elevator-post, of a guide-strip movable toward the car, a series of screws for pressing the strip toward the car, gearing controlled by the movement of the car for rotating the screws, and such gearing and the screw-threads proportioned to move the guide-strip obliquely with the bottom projected toward the car, substantially as herein set forth.
6. In an elevator, the combination, with the elevator-post, of a guide-strip movable toward the car, a screw for pressing the lower end of the guide-strip toward the car, gearing actuated by a rope-drum for rotating the screw, a rope extended in the hoistway, and a clamp upon the car adapted to grip the rope and rotate the drum and screw, substantially as herein set forth.
7. In an elevator, the combination, with the elevator-post, of a guide-strip movable toward the car, a screw for pressing the lower end of the guide-strip toward the car, a rope-drum and gearing actuated thereby for rotating the screw, a rope extended in the hoistway, a governor upon the car, and a clamp actuated by the governor to grip the said rope when rotated abnormally, and thus rotate the drum and screw to arrest the car, substantially as herein set forth.

8. In an elevator, the combination, with the elevator-post, of a guide-strip movable toward the car, a screw for pressing the lower end of the guide-strip toward the car, a rope-drum and gearing actuated thereby for rotating the screw, a rope extended in the hoistway, a governor upon the car, and a clamp having connections to be actuated by the governor to grip the said rope, and an additional clamp with hand-lever inside the car to be actuated directly by the operator, substantially as herein set forth.

9. In an elevator, a guide-post having open channel-way in the front, a guide-strip fitted movably in such channel-way, and provided with a series of threaded nuts, screws fitted to such nuts and provided with thrust-bearings, and gearing controlled by the movement of the car to rotate such screws to press the guide-strip upon the car-shoes, substantially as herein set forth.

10. In an elevator, a guide-post having open channel-way in the front, a guide-strip fitted movably in such channel-way, and provided with a series of threaded nuts, screws fitted to such nuts and provided with thrust-bearings and bevel-gears, a rotary shaft with cog-wheels to drive such gears, a rope-drum connected with such shaft with a rope extended through such hoistway, and a clamp upon the car to grip such rope and rotate the drum and screws, substantially as herein set forth.

11. In an elevator, a guide-post having open channel-way in the front, a guide-strip secured at its upper end in such channel-way, and movable outwardly at its lower end, and means controlled by the movement of the car for pressing the lower end of the strip outwardly into the hoistway.

12. In an elevator, a guide-post having open channel-way in the front, a guide-strip divided into sections with each section secured at its upper end in such channel-way, and movable outwardly at its lower end, gearing for moving the lower ends of the guide-strips outwardly into the hoistway simultaneously, and means upon the car for actuating such gearing, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES H. JOHNSON.

Witnesses:

L. LEE,

THOMAS S. CRANE.