No. 796,666. PATENTED AUG. 8, 1905.

F. LUNDSTEN.

SPEED LIMIT CONTROLLER.

APPLICATION FILED JAN. 10, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

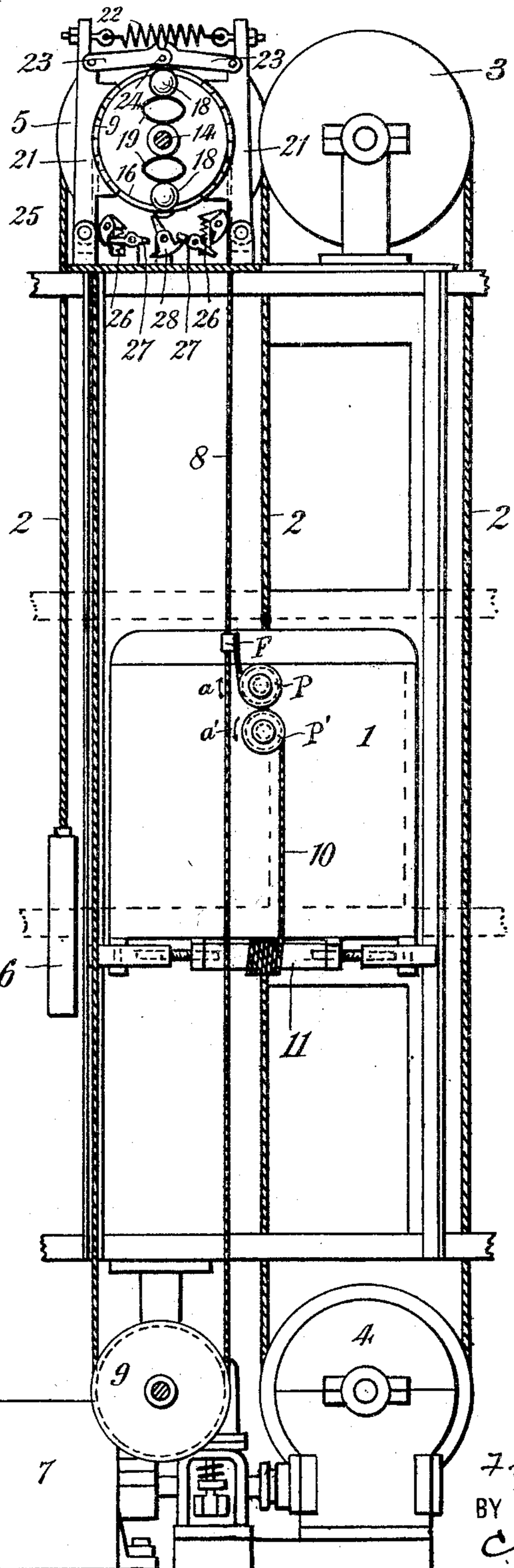
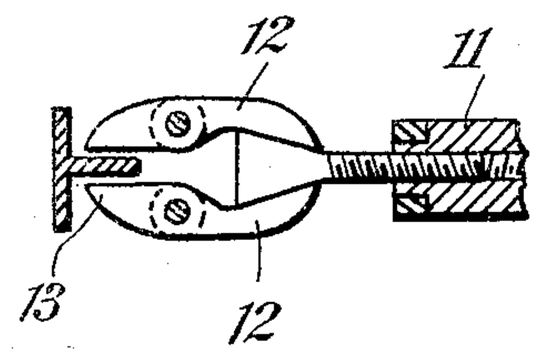


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 3.

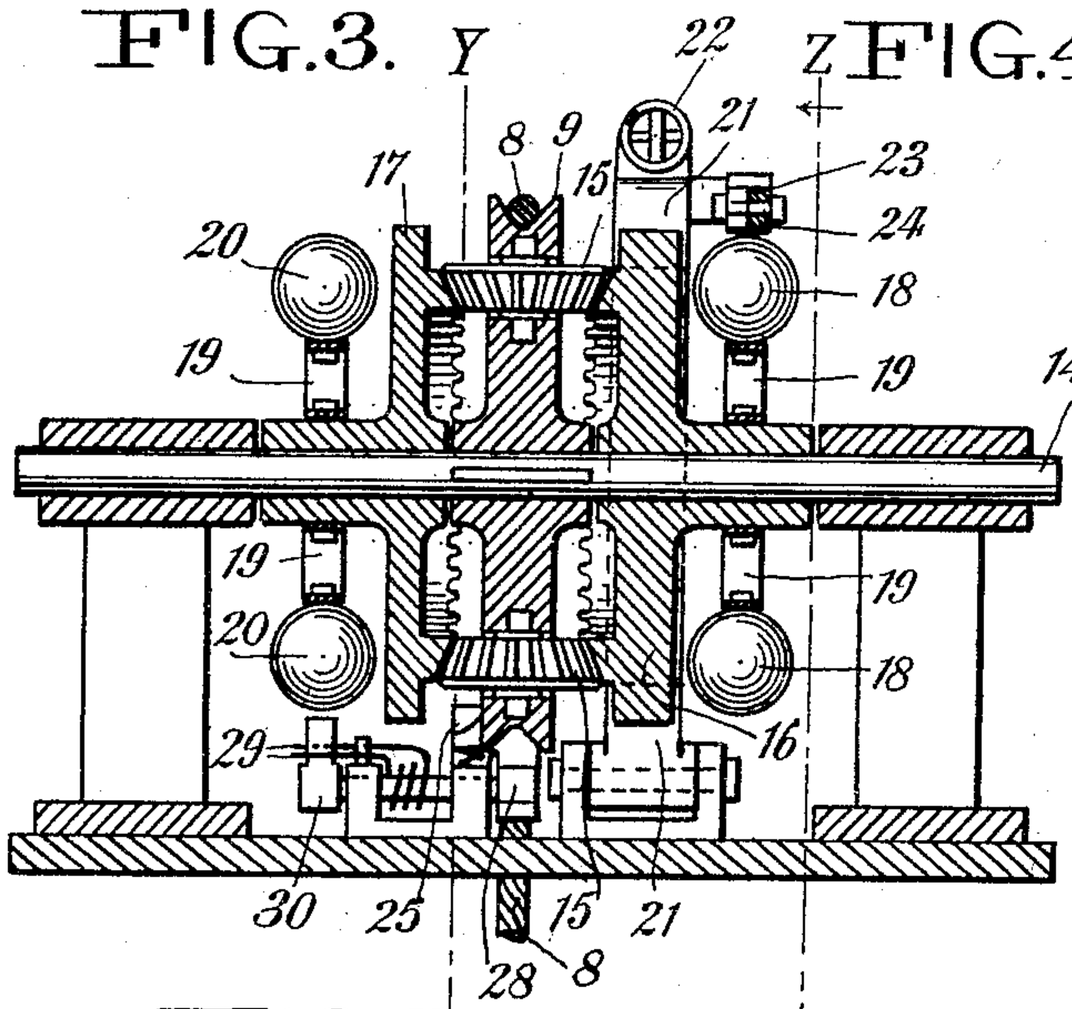


FIG. 4.

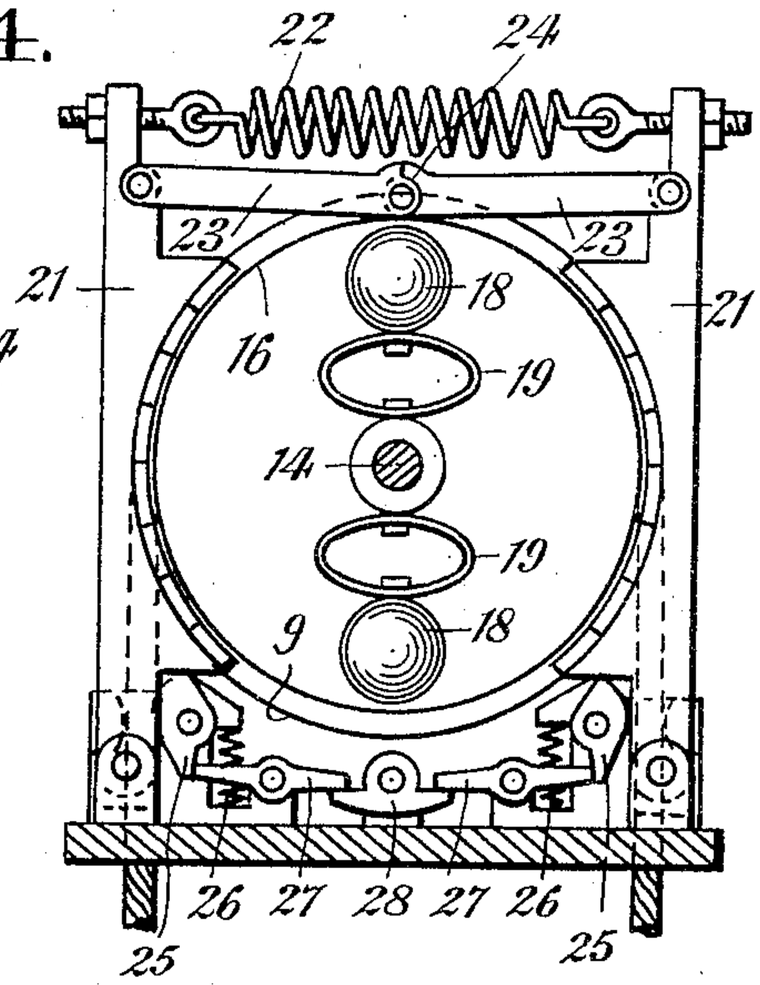
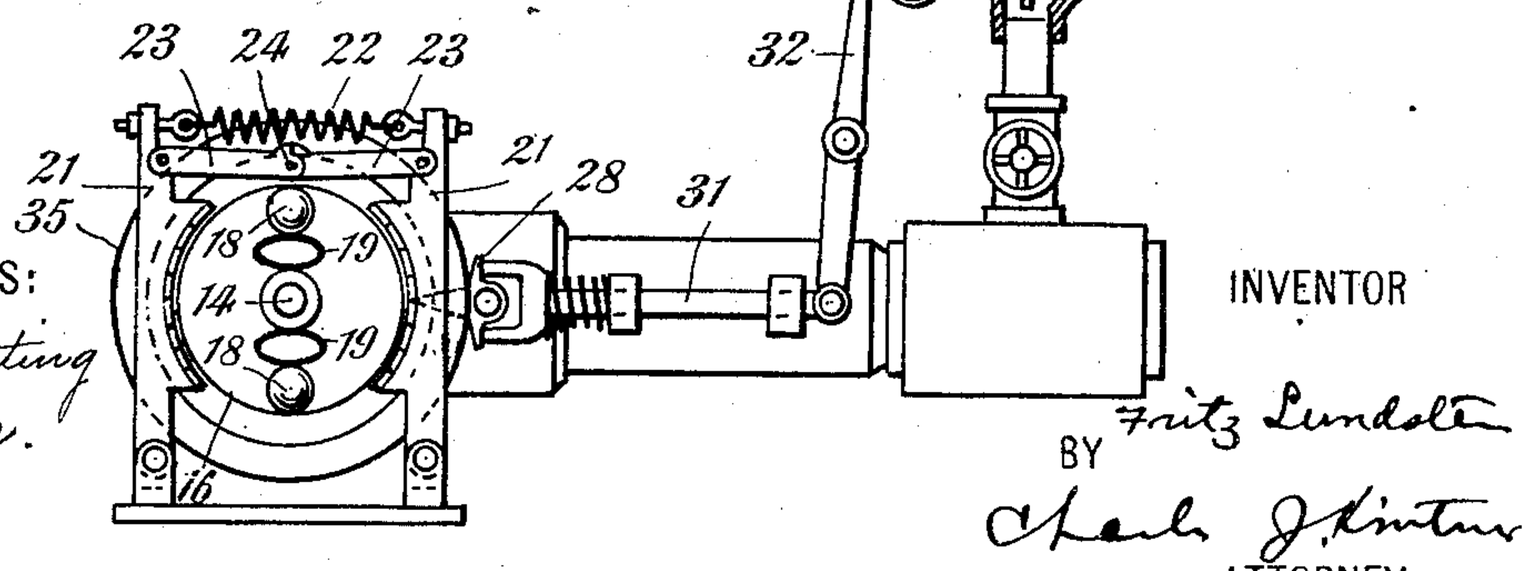


FIG. 5.

FIG. 6.

FIG. 7.



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UNITED STATES PATENT OFFICE.

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SPEED-LIMIT CONTROLLER.

No. 796,666. Specification of Letters Patent. Patented Aug. 8, 1905.

Application filed January 10, 1905. Serial No. 240,415.

To all whom it may concern:

Be it known that I, FRITZ LUNDSTEN, a citizen of the United States, residing at New York, borough of Brooklyn, county of Kings, and State of New York, have made a new and useful invention in Speed-Limit Controllers, of which the following is a specification.

My invention is directed particularly to speed-limit controllers adapted to be automatically actuated when the car of an elevator reaches an abnormal speed no matter in which direction it may be traveling; and it has for its objects, first, to devise a speed-limit controller which will operate instantaneously and with certainty the moment the car reaches abnormal speed and will automatically apply the brakes or actuate such other device or devices as will prevent dangerous accidents; second, to devise a speed-limit controller which shall be operatively connected with a safety-cable and in such manner that when the sheaves thereof attain abnormal speeds the car will be instantly automatically checked no matter in which direction it may be moving.

My invention will be fully understood by referring to the accompanying drawings, in which—

Figure 1 represents a longitudinal sectional view of an elevator-shaft with the car and attachments and the propelling-motor all shown in elevation, my improvements being operatively connected thereto at the top of the shaft. Fig. 2 is a detail view illustrating the application of a well-known form of safety appliance for an elevator-car as actuated by the controlling-cable. Fig. 3 is an enlarged longitudinal sectional view taken through my novel speed-limit controller. Fig. 4 is a transverse sectional view taken through Fig. 3 on the line Z Z and as seen looking thereat from right to left in the direction of the arrows. Fig. 5 is a second transverse sectional view of Fig. 3, taken on the line Y Y and as seen looking thereat from right to left; and Fig. 6 is a similar view as seen looking in the other direction. Fig. 7 is an elevational view illustrating the application of my novel speed-limit controller to the cut-off valve in the steam-pipe of a steam-engine.

Referring now to the drawings in detail, 1 represents an elevator-car, and 2 the supporting-cables therefor, the same passing over the usual drums or sheaves 3 4 5, 6 being the usual counterweight and 7 an electric motor geared in the usual way to the lower driving-sheave 4. The car, being propelled by the motor 7, is provided with any well-known form of controlling apparatus, the same not being illustrated in the drawings, so as to avoid unnecessary complication thereof.

8 represents a main safety-cable running over two sheaves 9 9, located the one at the top and the other at the bottom of the shaft and through a friction-clutch F, secured near the top of the car and on the outside thereof, said clutch having sufficient frictional bearing upon the cable normally to carry it, with the car, as it ascends and descends.

10 is a branch safety-cable secured to the main safety-cable at a point near the clutch F and running between two pulleys P P′ downward and around a drum 11 beneath the bottom of the car, which is provided with right and left screw-threaded safety appliances adapted to actuate by wedging action gripping devices or clutches 12 12, so as to grip the vertically-extending webs 13, which guide the car in its ascent and descent in a manner well understood by those skilled in the art.

Referring now to Figs. 3 to 7, inclusive, I will describe my novel improvement, which is preferably supported at the top of the elevator-shaft, as shown in Fig. 1, the same consisting of a rotary shaft 14, journaled upon standards and supporting at its center the upper safety-sheave 9, over which the controlling-cable 8 passes, said sheave being keyed to the shaft, as shown, and provided with diametrically-disposed bevel gear-pinions 15 15, journaled as shown and adapted to mesh on their opposite sides with two bevel gear-wheels 16 17, running loosely upon the shaft 14. 18 18 and 20 20 are governor-balls secured by springs 19 19 directly to the hubs of the gear-wheels 16 17 and adapted by reason of the supporting-springs to assume different radial positions when the car attains abnormal speeds, as will be more particularly described in connection with the description of the mode of operation. 21 21 are brake-levers pivotally supported at their ends upon the framework and provided with braking-surfaces to bear against the outer face of the gear-wheel 16. 22 is a strong spiral spring provided with adjustable means at its opposite ends for securing it directly to the free

ends of the brake-levers 21 21, said parts being adjusted so that the tendency of the spring is always to bring the faces of the brakes into strong frictional contact with the outer cylindrical surface of the gear-wheel 16. 23 23 are toggle-levers pivotally secured at their outer ends to the brake-levers 21 21 and provided at their united ends with a knuckle-joint 24, so arranged that when in the position shown in Fig. 4 they lock the brake-levers 21 21 with their frictional faces out of contact with the face of the gear-wheel 16. 25 25 are pivoted gripping devices provided with strong spiral springs 26 26, which normally tend to grip or clutch the cable 8. 27 27 are pivoted locking-levers adapted to lock said gripping devices out of operative relation with this cable. 28 is a pivoted releasing-lever having its opposite ends resting under the ends of the locking-levers 27 27 and adapted when rotated in reverse direction to release either one or the other of said levers. 29 is a spring wound around the shaft which supports the pivoted releasing-lever 28, having its free ends located on opposite sides of a tripping-tappet 30, located in the path of the governor-balls 20 when the latter are forced outward by centrifugal force.

The operation is as follows: When the car is running at normal speeds, the safety-cable 8 is moving therewith, and the sheave 9, carrying with it the two pinions 15 15, causes the two gear-wheels 16 17, meshing therewith, to rotate in the same direction and at the same speed as the sheave. Consequently the governor-balls 18 18 and 20 20, having been adjusted for a normal speed, produce no effect upon the operative devices they are adapted to control. When, however, the car speeds up, either on ascending or descending, as shown by the arrows *a a'*, the governor-balls 18 18 are caused to be thrown outward by reason of centrifugal force and ultimately act upon the toggle-levers 23 in such manner as to move the knuckle-joint 24 upward sufficiently to allow the strong spiral spring 22 to draw the brake-levers 21 toward each other, thus applying a braking force upon the outer face of the gear-wheel 16, thereby tending to check it. When this occurs, rotary motion is imparted to both of the pinions 15, so that the gear-wheel 17 is now driven at double speed, thereby imparting rapid rotation to the second set of governor-balls 20 20 and causing them to move outward sufficiently to strike the tappet-lever 30, which, acting through the supporting-shaft for the releasing-lever 28, releases the corresponding locking-lever 27, thereby allowing the spring 26 to operate the pivoted gripping device 25, thus tending to check or slow up the movement of the car. It will be apparent on examination of the drawings that no matter in which direction the car may be moving the corresponding locking-lever 27 will be released, and hence the corresponding gripping device 25 applied and the cable 8 checked or reversed in its motion by reason of the fact that as the safety-cable is gripped or clutched at the upper end of the shaft, as before described, and thus caused to slide through the frictional clutch F, the branch cable 10 will be moved if the car be ascending in the direction of the arrow *a* and if it be descending in the direction of the arrow *a'*, thus causing the drum 11 to always rotate in the same direction, and thereby impart motion to the clutches 12 12 and to the extending webs 13 13 in a manner which will be understood by those skilled in the art.

In Fig. 7 of the drawings I have illustrated the application of my improvement to the cut-off valve in the steam-pipe of an engine. In this case the pivoted releasing-lever 28 is controlled in the same way and adapted to actuate upon a spring-sustained push-rod 31, operatively connected through a lever 32 in such manner as to support a weight or ball 33, adapted to shut off the steam at the cut-off 34, 14 being the main driving-shaft and 35 the driving-pulley or fly-wheel of the engine.

I do not limit my invention to the especial details of construction shown in the accompanying drawings, as obviously a number of the features thereof might be materially departed from and still come within the scope of my claims hereinafter made.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A speed-limit controller for elevators embracing a safety-cable; a pair of sheaves supporting the same at the opposite ends of the shaft, and a clutch supported by the car and having frictional connection with the cable; in combination with a tripping device and a centrifugal governor operatively connected with the same shaft which supports one of the sheaves; together with a gripping device, a pivoted releasing-lever and a locking-lever between the gripping device and releasing-lever, substantially as described.

2. A speed-limit controller for elevators embracing a safety-cable; a sheave; a supporting-shaft therefor; a friction-clutch carried by the car and having frictional connection with the cable; a centrifugal governor carried by the same shaft which supports the sheave; in combination with a tripping device, gripping means and a locking-lever which locks the gripping means out of frictional relation with the cable; together with braking mechanism embracing a drum, a branch safety-cable connected to the main safety-cable and to the drum, with gripping devices or clutches supported also by the car and having mechanical connection with the drum, all of said parts acting substantially as and for the purpose set forth.

3. A speed-limit controller for elevators

embracing a safety-cable; a sheave; a supporting-shaft therefor; a centrifugal governor carried by the shaft which supports the sheave; a friction-clutch carried by the car and having frictional connection with the safety-cable; in combination with a pivoted tripping device located in the path of the governor and gripping means held out of contact with the cable by the tripping device; together with a branch safety-cable operatively connected with the main safety-cable and braking mechanism carried by the car and operatively connected to the branch safety-cable, substantially as described.

4. A speed-limit controller embracing the following elements—a sheave, a safety-cable, a friction-clutch carried by the car and having frictional connection with the cable; a pair of gear-wheels loosely journaled in the same shaft as the sheave; a pair of pinions carried by the shaft and meshing with both gear-wheels; a brake embracing a pair of brake-shoes and a braking-surface, the latter carried by one of the gear-wheels; pivoted toggle-levers for normally holding said braking-shoes out of action with said braking-surface; a ball-governor operatively connected to one of said gear-wheels and a spring for holding said toggle-levers in locked position, all of said parts acting substantially as and for the purpose set forth.

5. A speed-limit controller for elevators embracing a safety-cable, a clutch carried by a car and having frictional connection with said cable; two sheaves which support said cable; automatic releasing and governing means carried by and moving with the shaft which supports one of the sheaves; in combination with braking means and a cable-clutch; together with a tripping device and interlocking and releasing devices, said tripping devices being located in the path of the governing means as the latter is thrown outward by centrifugal force, substantially as and for the purpose set forth.

6. A speed-limit controller, embracing rotary means keyed to a shaft; one or more pinions carried by said rotary means; in combination with a pair of gear-wheels loosely journaled on said shaft and meshing with said pinion or pinions; together with braking means and a centrifugal governor for applying such braking means to the face of one of said gear-wheels; a second centrifugal governor operatively connected with the second gear-wheel, clamping and tripping devices adapted to be actuated by said second set of governors for abnormal speeds and clutching devices controlled thereby.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRITZ LUNDSTEN.

Witnesses:
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M. F. KEATING.