(No Model.) 3 Sheets—Sheet 1.

T. H. MELROSE.

SPEED CONTROLLING DEVICE FOR ELEVATORS.

No. 409,995. Patented Aug. 27, 1889.

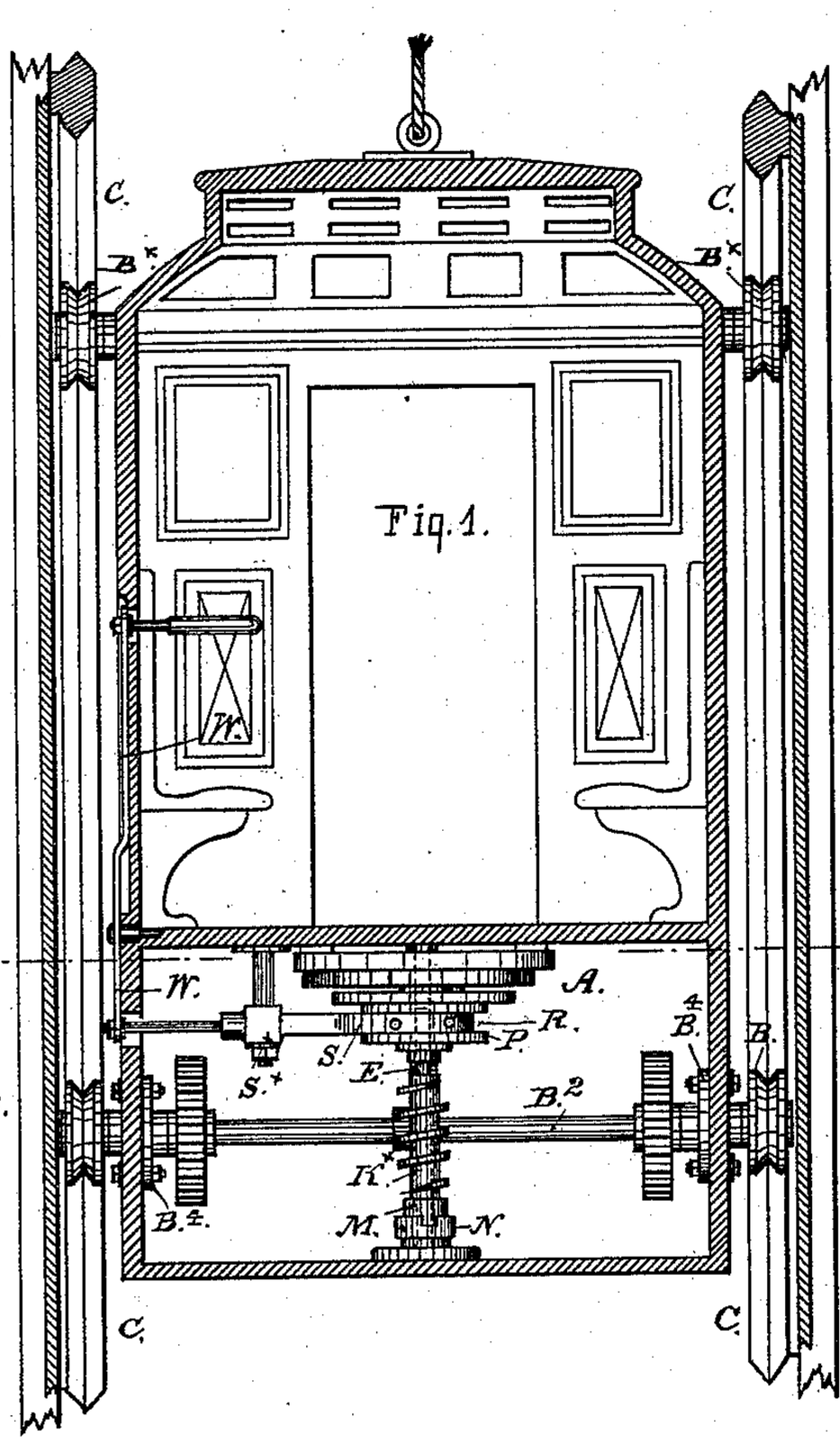


Fig. 1.

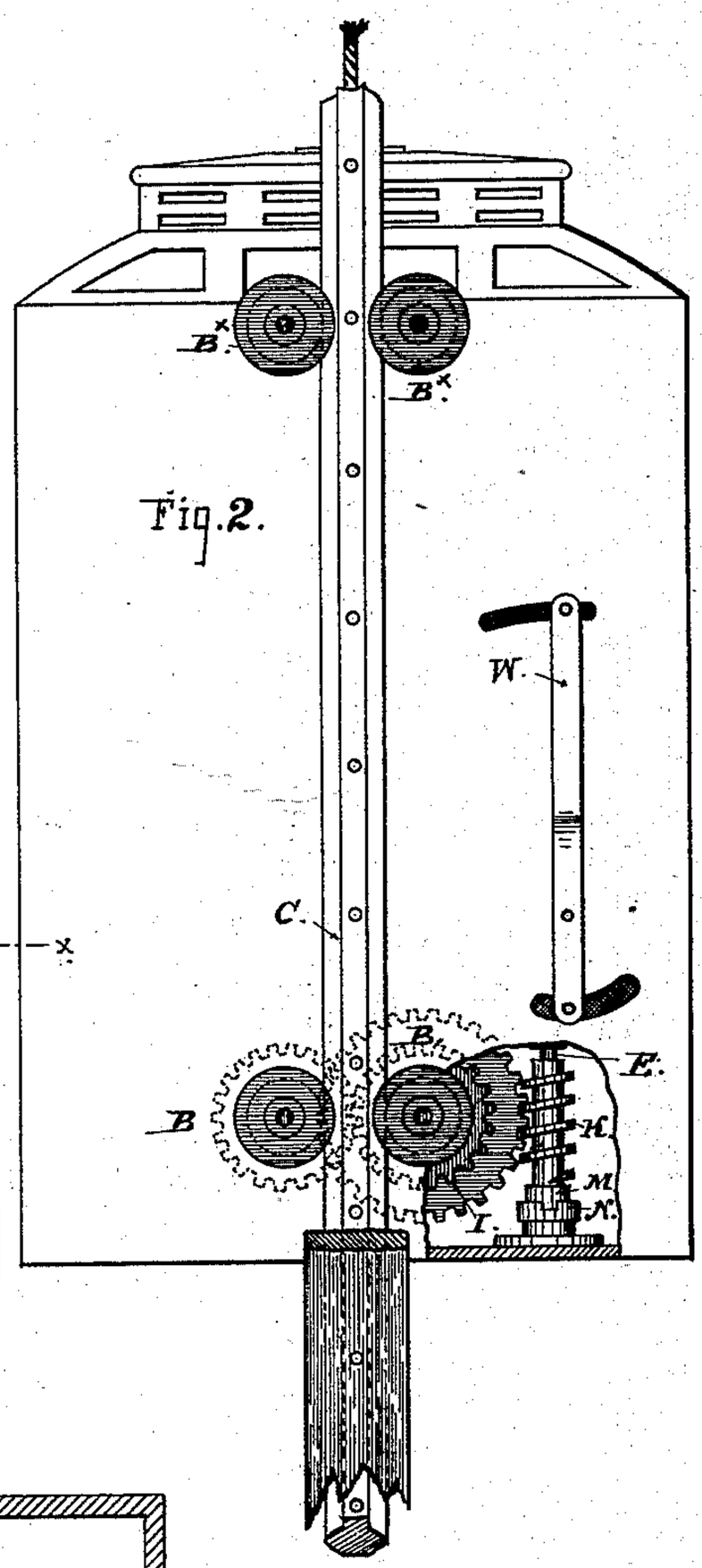


Fig. 2.

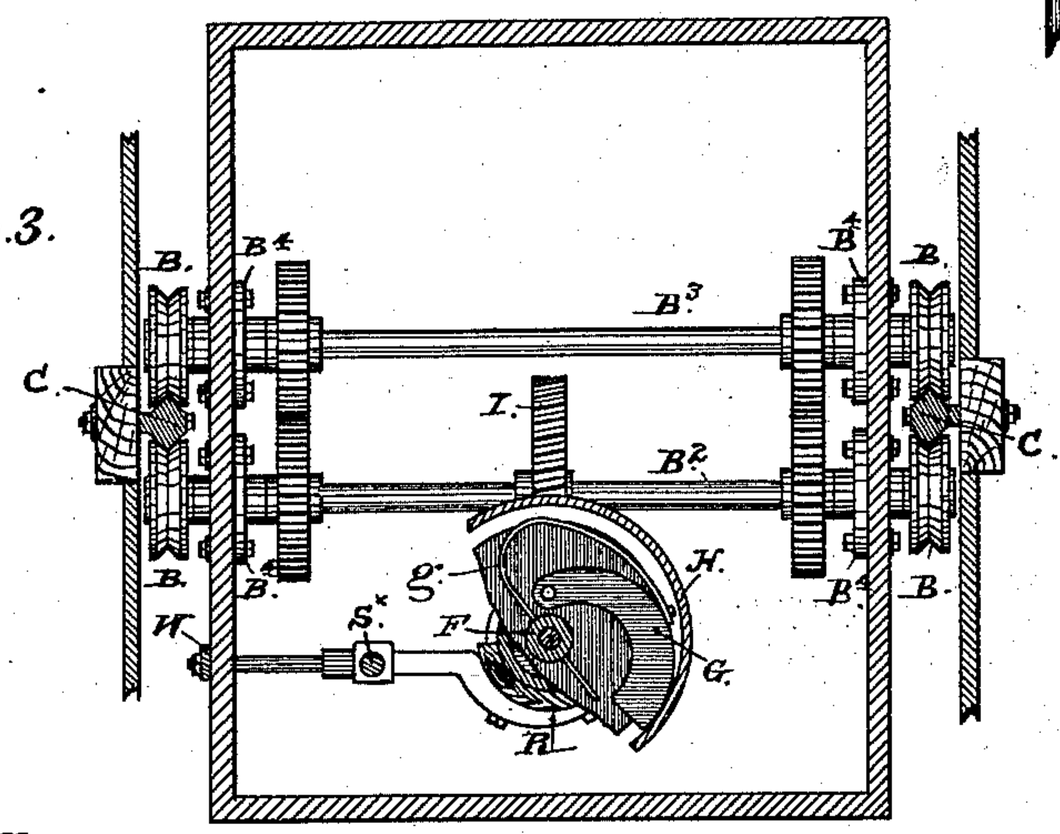


Fig. 3.

Witnesses:

Wm. Mayer.

J. E. Jacobus.

Inventor:

Thomas H. Melrose.

By E. C. Osborn.

Atty.

(No Model.) 3 Sheets—Sheet 2.

T. H. MELROSE.

SPEED CONTROLLING DEVICE FOR ELEVATORS.

No. 409,995. Patented Aug. 27, 1889.

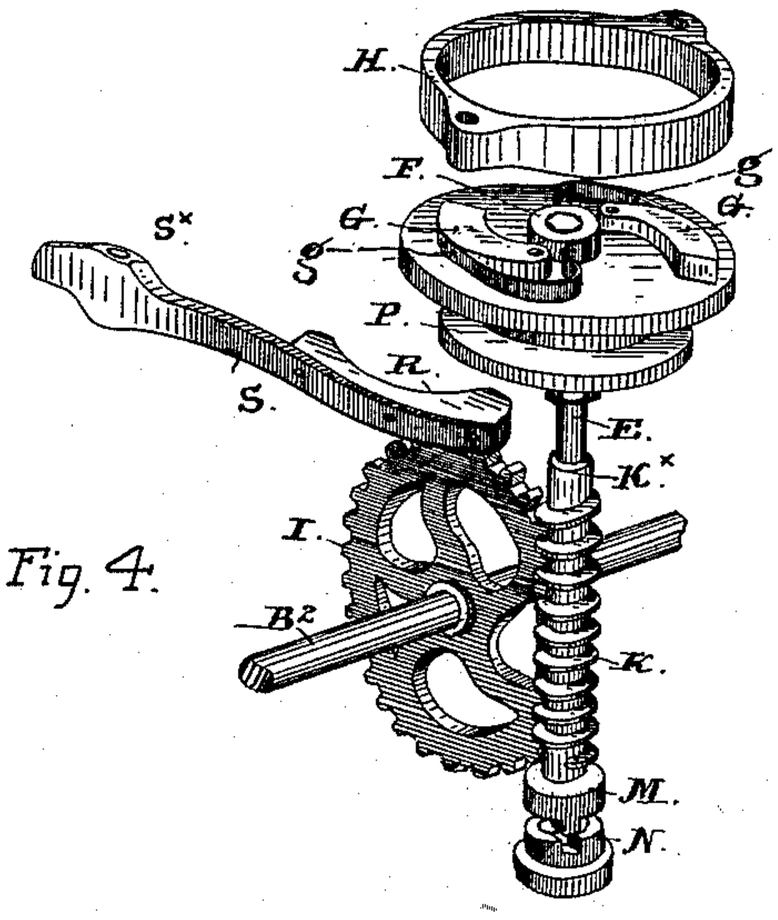


Fig. 4.

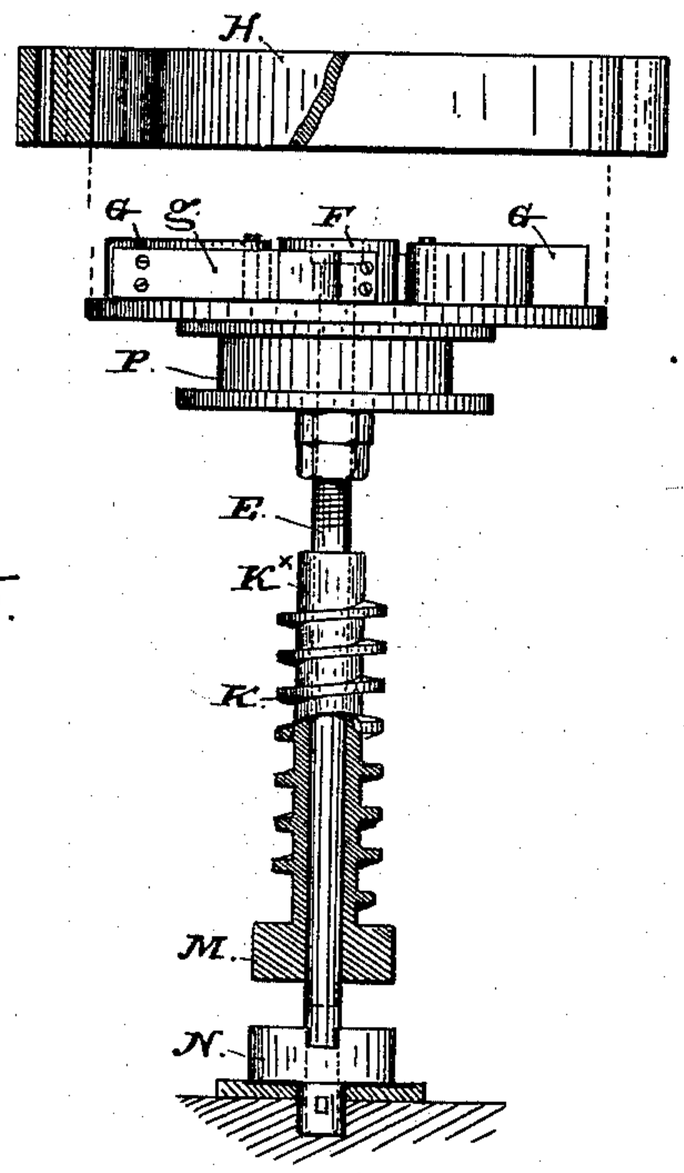


Fig. 5.

Witnesses:

J. E. Jacobus

E. E. Osborn

Inventor:

Thomas H. Melrose

By E. E. Osborn Atty

(No Model.) 3 Sheets—Sheet 3.

T. H. MELROSE.

SPEED CONTROLLING DEVICE FOR ELEVATORS.

No. 409,995. Patented Aug. 27, 1889.

Fig. 6.

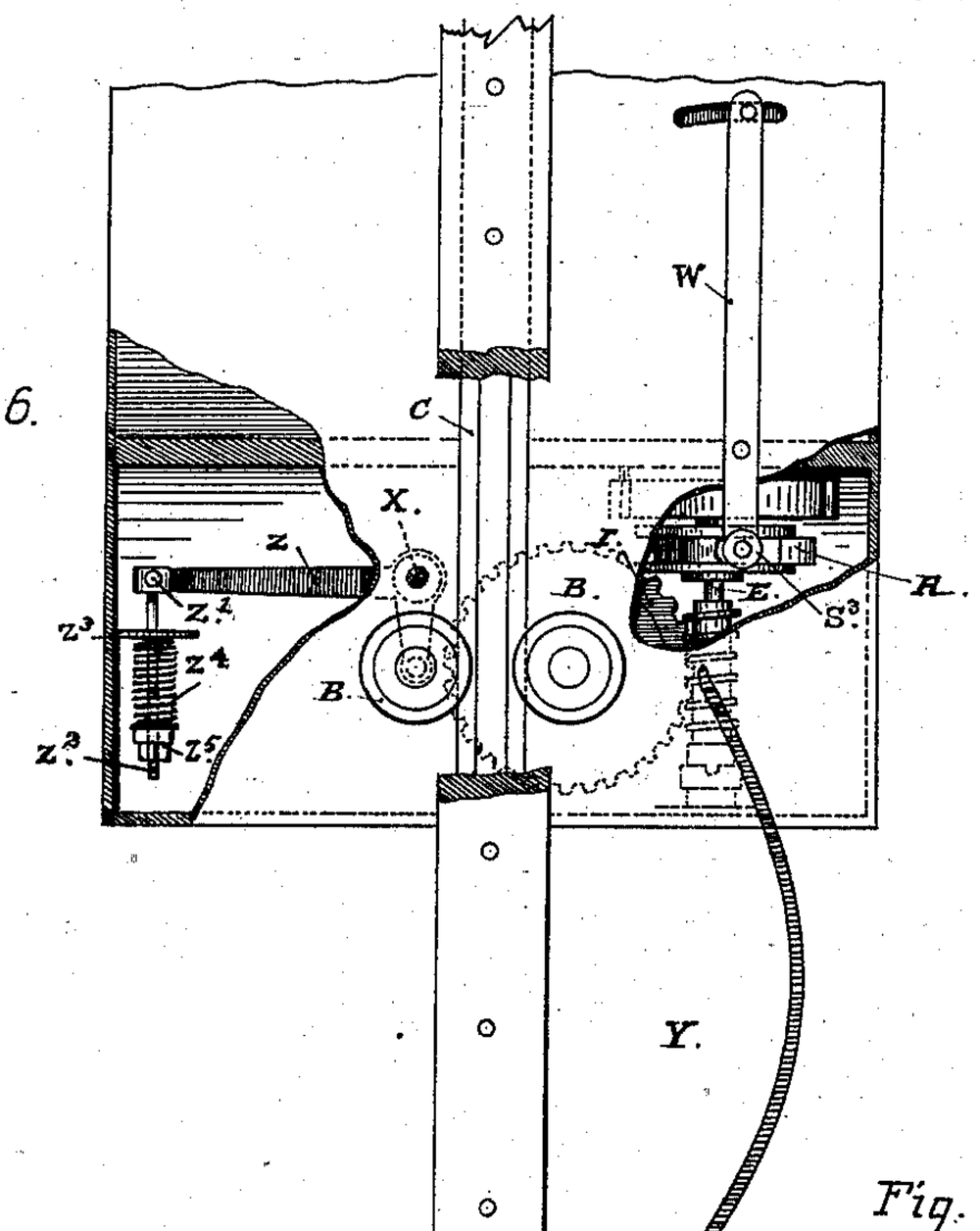


Fig. 7.

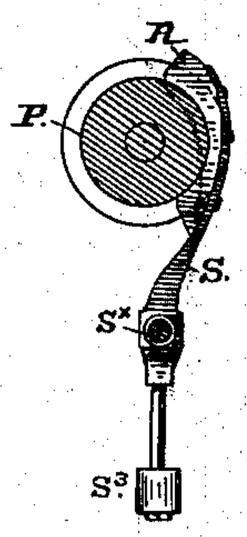


Fig. 8.

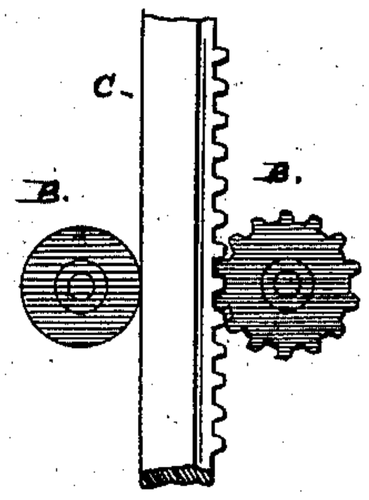
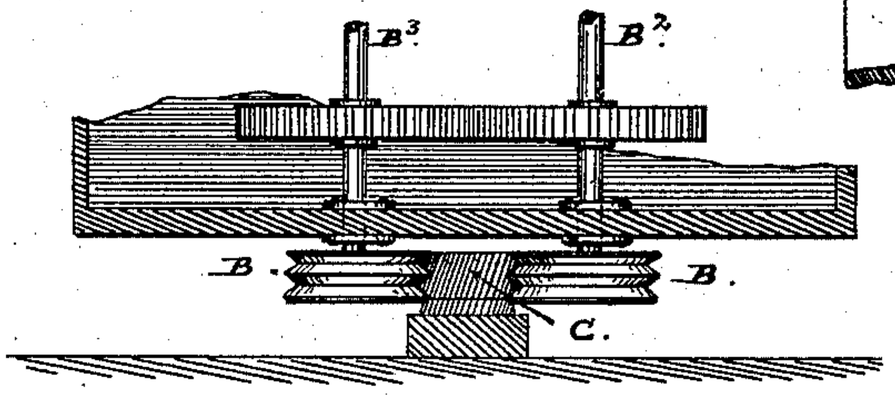


Fig. 9.



Witnesses:

J. E. Jacobus

L. C. Thorn

Inventor:

Thomas H. Melrose

By E. E. Osborn atty

UNITED STATES PATENT OFFICE.

THOMAS H. MELROSE, OF SAN FRANCISCO, CALIFORNIA.

SPEED-CONTROLLING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 409,995, dated August 27, 1889.

Application filed January 12, 1889. Serial No. 296,165. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. MELROSE, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented a certain new and useful Speed-Controller and Brake for Elevators, of which the following is a specification.

The object of my invention is to produce a device or mechanism for governing the movements of the car, cage, or platform of an elevator in its descent, whereby the rate of speed being automatically controlled by the device the car or vehicle is at all times kept within safe limits of speed during the descent, and is governed independently of the hoisting-rope and machinery; also, to provide means for stopping the car automatically at any station or point in the line of descent when running down without the rope; also, to furnish means for stopping and holding the car at any point in the descent at the will of the attendant in the car in case of accident. These objects I attain by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents the car of a passenger-elevator and portions of the vertical guides with my invention applied thereto, the car being represented in section. Fig. 2 is a side view taken from the left-hand side of Fig. 1. Fig. 3 is a horizontal section taken through the compartment beneath the car in which the mechanism is placed. This section is taken at the line X X, Fig. 1. Figs. 4 and 5 represent the parts in detail that compose the governor. Figs. 6 and 7 show in detail the friction-brake and automatic setting mechanism. Figs. 8 and 9 illustrate different styles of wheels and fixed rails adapted to secure various degrees of holding-power on the rails.

Similar letters of reference indicate corresponding parts in the several figures.

By the hereinafter-described construction and arrangement of parts and mechanism I am enabled to govern the speed of a car or traveling platform in an elevator and keep it within safe limits during its descent at all times, both independently of the hoisting apparatus and of the elevator boy or attendant, so that in case of accident, when the car is no longer under control of the hoisting-rope, the device will bring down the car at a safe rate of speed to the lower floor, or will arrest it at the next floor or landing, or at any given point where the passengers may get off. In connection with this automatic mechanism a hand-brake of novel construction is provided by which the car can be stopped at any point in its descent by the attendant or an occupant of the car.

The parts of the automatic speed-controller consist of a governor A of novel construction, mounted on the car or vehicle and geared into two pairs of wheels B B at the sides of the car, that are set on the outside in position to embrace and travel on fixed rails C C on the sides of the well or shaft within which the car travels. These rails are secured on opposite sides of the well parallel with each other, extending also the full length of the run, and the wheels on the car are arranged to run against opposite faces of the rails. The wheels of each pair are connected by spur-gears of equal size, and the two parallel shafts B^2 B^3, on which they are keyed, are furnished with bearings B^4 B^4 beneath the floor of the car. The faces of the wheels are grooved, and the faces of the rails are formed with grooves to correspond, as shown in Figs. 3 and 9, in order to increase the holding-power on the rails, so that when the wheels are locked or kept from turning the car will be held by the wheels alone under the heaviest load that the car is required to carry. The V-shaped grooves on the rims of the wheels and in the rails will furnish abundant friction to hold the car under all ordinary uses; but where a positive grip is desired or considered advisable, as in the case of a freight-elevator or in deep mines, the gear-wheels and fixed racks shown in Fig. 8 may be substituted for the friction-surfaces illustrated in the other figures.

The shaft B^2 of one pair of wheels is geared into an upright shaft E, set in bearings at top and bottom to turn freely, and it carries near its upper end a hub F, to which is fixed a number of friction dogs or blocks G G. The outer faces of these blocks set in close relation to the inner surface of a stationary ring H, that is fixed by bolts to the bottom of the car to form a circular track or surface for the blocks to act against. The blocks are mounted

on spring-arms *g g*, and are thrown outward by the centrifugal force produced in the rotation of the shaft E; but when the shaft is at rest they are held in light contact or just clear of the fixed ring, so that in consequence of such contact a suitable degree of friction or resistance is produced by centrifugal force as the shaft E turns and the speed of the shaft is controlled within safe limits. By means of the geared connections between the several shafts it will be seen that the resistance produced by the friction-dogs against the fixed ring is multiplied at the wheels, and so long as these are prevented from slipping on the vertical guides the governor-shaft E will hold the car at a given speed. Shaft E is connected with the wheel-shaft by a worm-wheel I and a worm K, the former being keyed on the wheel-shaft, but the worm being formed on a loose sleeve $K^{\times}$, that is free to slip on the shaft in a vertical direction while being in gear with the worm-wheel. A suitable clutch-section M on the lower end of the sleeve and corresponding with a similar clutch-section N, fast on the shaft E, constitutes the means by which the sleeve and shaft are locked together, and under the pressure exerted by the worm-wheel in one direction of its rotation upon the thread of the worm the two parts of the clutch are locked together and the shaft E is turned. In the reverse motion of the worm-wheel, however, and as soon as it begins, the sleeve is moved vertically on the shaft E and the clutch is parted. All the parts are so arranged that the sleeve is lifted by the worm-wheel and the clutch held off during the movement of the elevator-car in an upward direction when ascending, while in the descent or contrary direction the clutches are brought together and the shaft and sleeve are locked. The sleeve runs loosely on the shaft, therefore, during the ascent, so that no resistance beyond the weight of the load is brought on the hoisting machinery; but as soon as the descent begins the shaft is clutched into the sleeve and the governor is brought into action by the simple change in the movement of the car.

Beneath the friction-blocks and on the same shaft is secured a flanged disk or pulley P, against the face of which a friction-shoe R on the end of a lever S is set to bear, the fulcrum $S^{\times}$ of this lever being placed to one side of the governor, and the end beyond the fulcrum being carried through a slot to the outside, where connection can conveniently be made of a hand-lever W with the lever S. This hand-lever furnishes means for throwing the brake-shoe on and off, and its upper end is brought inside the car convenient to the hand of the elevator-boy. By increasing the diameter of the friction-pulley P it will be seen that the effective holding-power of the brake can be made great enough for any load, and sufficient friction can be applied by the brake-shoe to a pulley of large radius to hold a freight cage or platform of large dimensions with its load, or to let it down at a very slow rate of movement in the run. It will be noticed, also, that this brake can be kept on during the whole upward travel of the car, and consequently it is ready to act in an emergency—such as the parting of the hoisting-ropes or an accident to the hoisting-gear—when the car unless held at such time would descend of itself.

In connection with this brake I provide means for throwing it on or off automatically, by means of which additional device the brake can be set at the beginning of the upward run and taken off when the downward run begins. It should be mentioned, however, that the governor acting during the descent is sufficiently powerful to take the car down at safe rate of movement without the hoisting-gear, and consequently it will not be necessary to bring the brake into operation, except where it is desired to stop the car at a floor or landing. This can be done at any time in the downward movement by the attendant in the car through the medium of the hand-lever provided.

For the purpose of throwing the brake-lever over to set the shoe against its pulley, I fix a spring-plate Y by one end at any given point in the elevator-shaft, as at a landing where the car is to be stopped in the downward run, and give the plate such curved form that it presents a cam-like surface projecting in the path of the end of the brake-lever. On the outer end of the lever I place a friction-roller S^{3}. The plate Y can be fixed against one side of the upright guides, or at any convenient part in the shaft against the wall, and sufficient lateral projection is given to produce the required length of movement in the brake-lever. In a similar manner a spring-plate or curved projection can be fixed at any point to throw the lever S over to the opposite side, by which means the brake can be taken off automatically. Such a throw-off can be placed for operation at the top of the shaft to remove the brake on the downward run; but for all ordinary purposes the brake need not be put on automatically in the descent of the car, excepting, perhaps, at the bottom landing.

The hand-lever in the car furnishes all necessary means for making a landing at any intermediate point in case of accident, when the car is no longer controlled by the hoisting-gear.

As thus constructed and applied, my improved governor, in connection with the brake, constitutes a certain and effective means of controlling a car, cage, or platform in an elevator.

When friction-wheels are used, as illustrated in Figs. 1 and 6, some means should be provided for regulating the strength of the grip or pressure of the wheels against the fixed rails, so that the same can be adjusted to hold the car without slipping, and yet without producing excessive friction on the rails. Pro-

vision is made for this adjustment by mounting the axle or shaft of one set of wheels in angle-levers Z Z in bearings on the ends of their upright members that extend above the fulcrum x and connecting the horizontal ends of the levers by a rod Z′. To this connection an upright draw-rod Z^2 is attached at the middle and carried up through guides Z^3, fixed against the side of the car or the compartment beneath in which the governor and connecting parts are contained. Below the fixed point Z^3 a stiff coil-spring Z^4 is placed around the rod, and the lower end of the rod, being carried through this piece Z^3, is screw-threaded and provided with a nut Z^5. By turning up this nut the strength of the spring will be increased and the wheels at the outer ends of the levers will be pressed against the fixed rails with an amount of pressure that depends on the adjustment. It will be obvious that where gears are substituted for the friction-wheels, as illustrated in Fig. 9, this means for regulating the degree of contact and pressure on the fixed rails will not be required.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a speed-controller for elevator-cars, the combination of wheels on the car adapted to embrace and run on rails in the well or shaft of the elevator, a controlling-shaft geared into one of the shafts or axles of said wheels by a worm-wheel on the axle, and a loosely-sliding sleeve on the controlling-shaft having a worm engaging with said worm-wheel, a clutch-section on said controlling-shaft and a fellow clutch-section on the end of said sleeve, and friction dogs or blocks fixed on the said controlling-shaft in position for operation by centrifugal force against a fixed friction-ring or circular track surrounding them, substantially as set forth.

2. In an elevator, the combination, with guide-rails fixed in the well or rim of the car, of wheels on the car having their axles geared together, a controlling-shaft, a friction-ring having centrifugal friction dogs or blocks, on which the controlling-shaft acts to cause them to operate in the direction of rotation of the shaft, a loosely-sliding sleeve on said controlling-shaft having a worm-gear, a clutch-section on the end of said sleeve, and a fellow clutch-section on the shaft, which are adapted to be locked by the movement of the sleeve longitudinally in one direction and to be released to run idly by a contrary movement, and a worm-wheel on one of the axles of said wheels adapted to engage said worm, substantially as set forth.

3. The combination of a controlling-shaft E, carrying a loose sleeve capable of longitudinal movement thereon, and having a worm-gear, a clutch-section on said sleeve, and a fellow clutch-section on the controlling-shaft adapted to be locked or unlocked by the longitudinal movements of said sleeve, and a governor connected with said controlling-shaft, consisting, essentially, of centrifugal dogs or blocks carried by the shaft, and a surrounding fixed ring presenting a friction-surface to engage said dogs, substantially as described, for operation as set forth.

4. The combination of the friction-pulley P, brake R, brake-lever S, and cam-plates Y, fixed in the run of the elevator at given point or points to engage with and throw the said brake-lever, substantially as set forth.

THOMAS H. MELROSE.

Witnesses:
EDWARD E. OSBORN,
CHAS. E. KELLY.