J. CUNNINGHAM.

GRAVITY SPEED GOVERNOR FOR ELEVATOR SAFETY MECHANISMS.

APPLICATION FILED SEPT. 11, 1909.

943,523. **Patented Dec. 14, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.

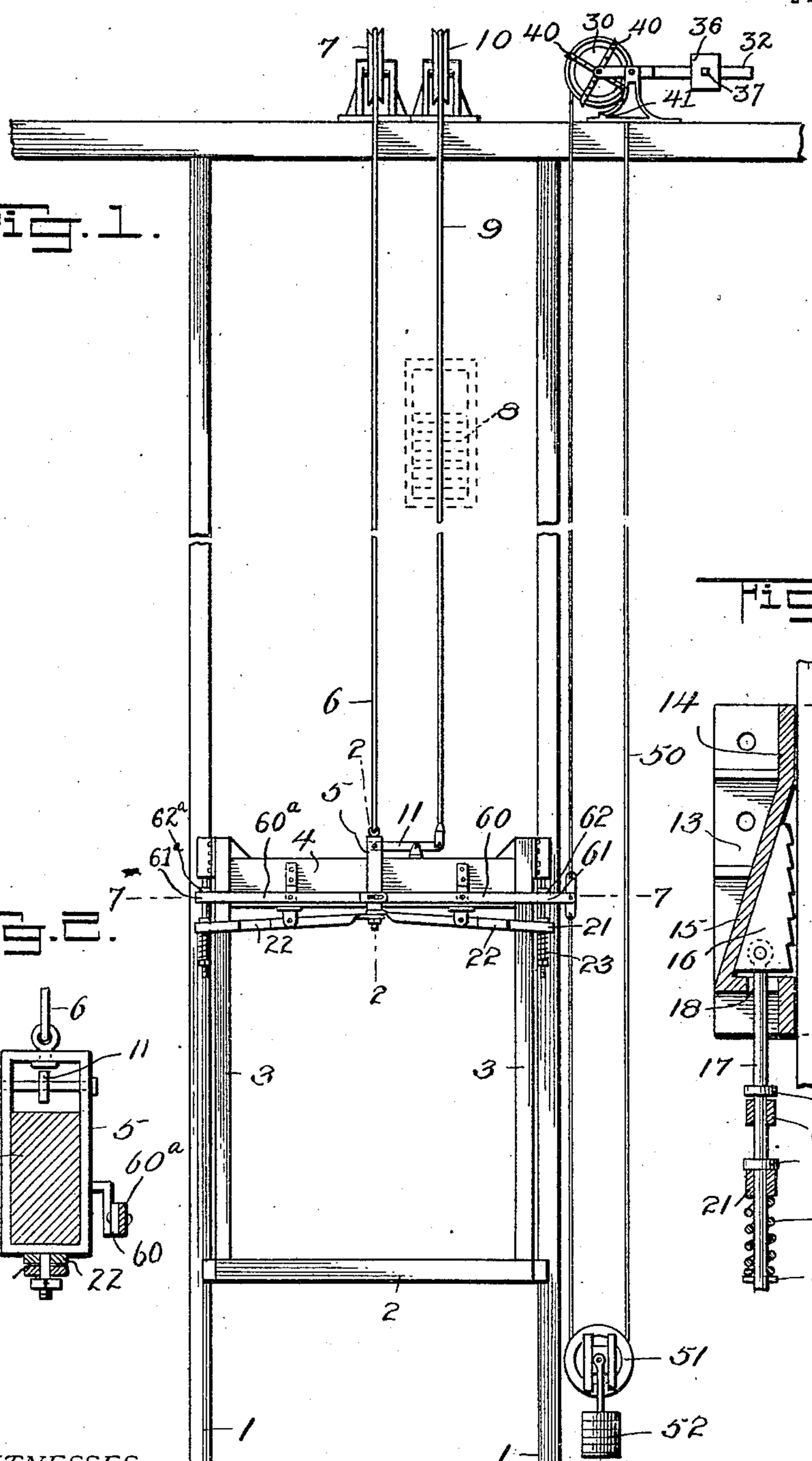


Fig. 3.

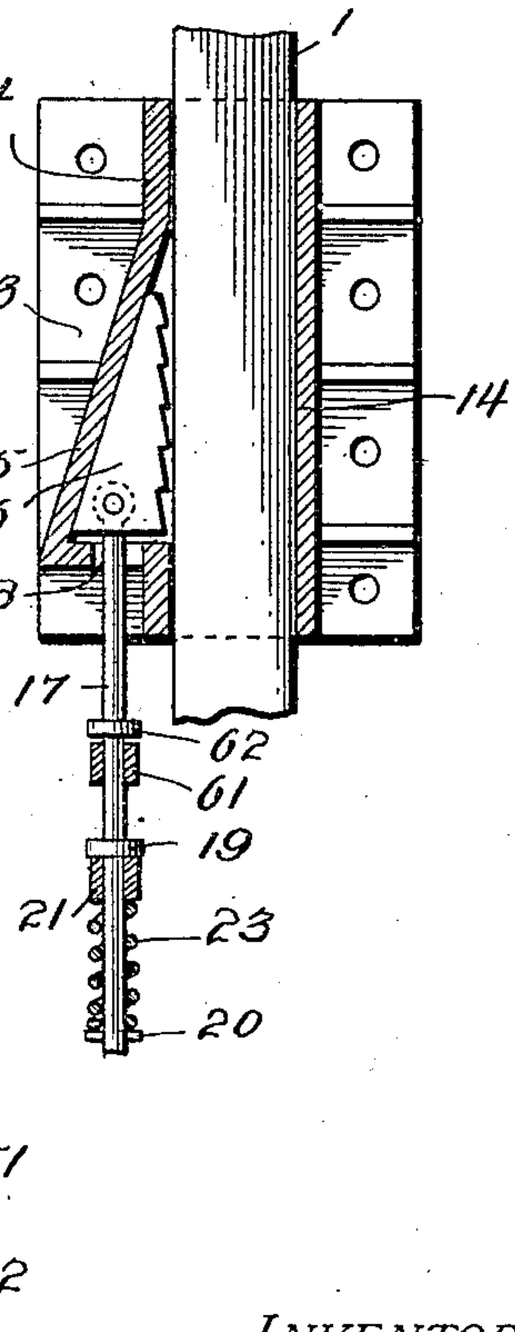


Fig. 2.

WITNESSES:

Wm. F. Hoyle.

J. K. Moore

INVENTOR

John Cunningham

BY

Whittaker & Prosser

Attorneys

J. CUNNINGHAM.

GRAVITY SPEED GOVERNOR FOR ELEVATOR SAFETY MECHANISMS.

APPLICATION FILED SEPT. 11, 1909.

943,523.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 2.

Fig. 4.

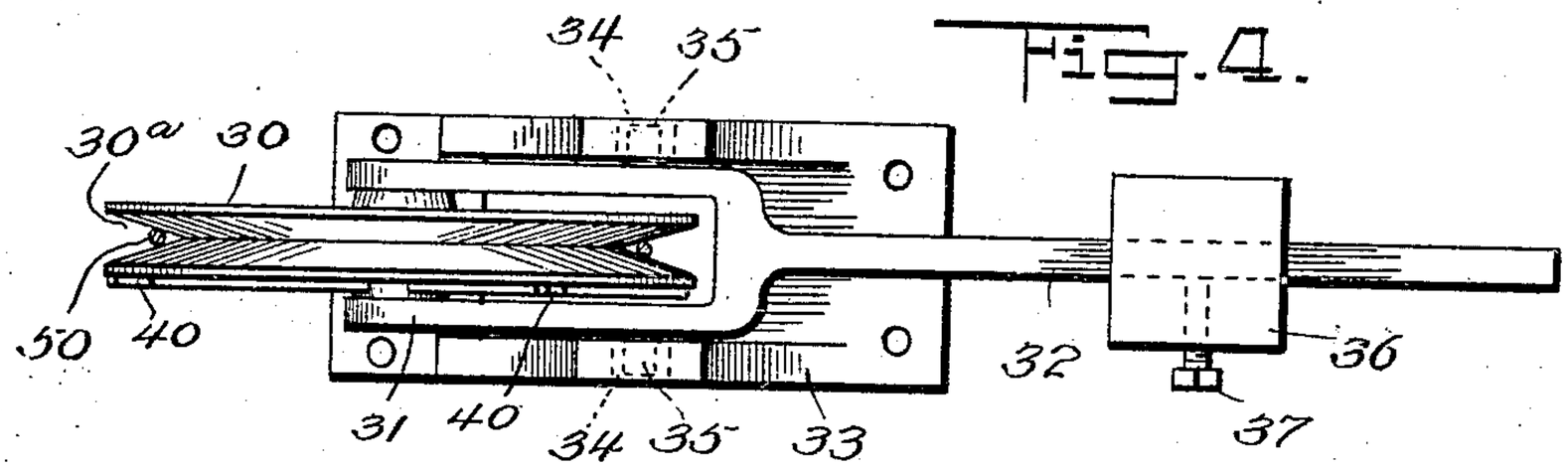


Fig. 5.

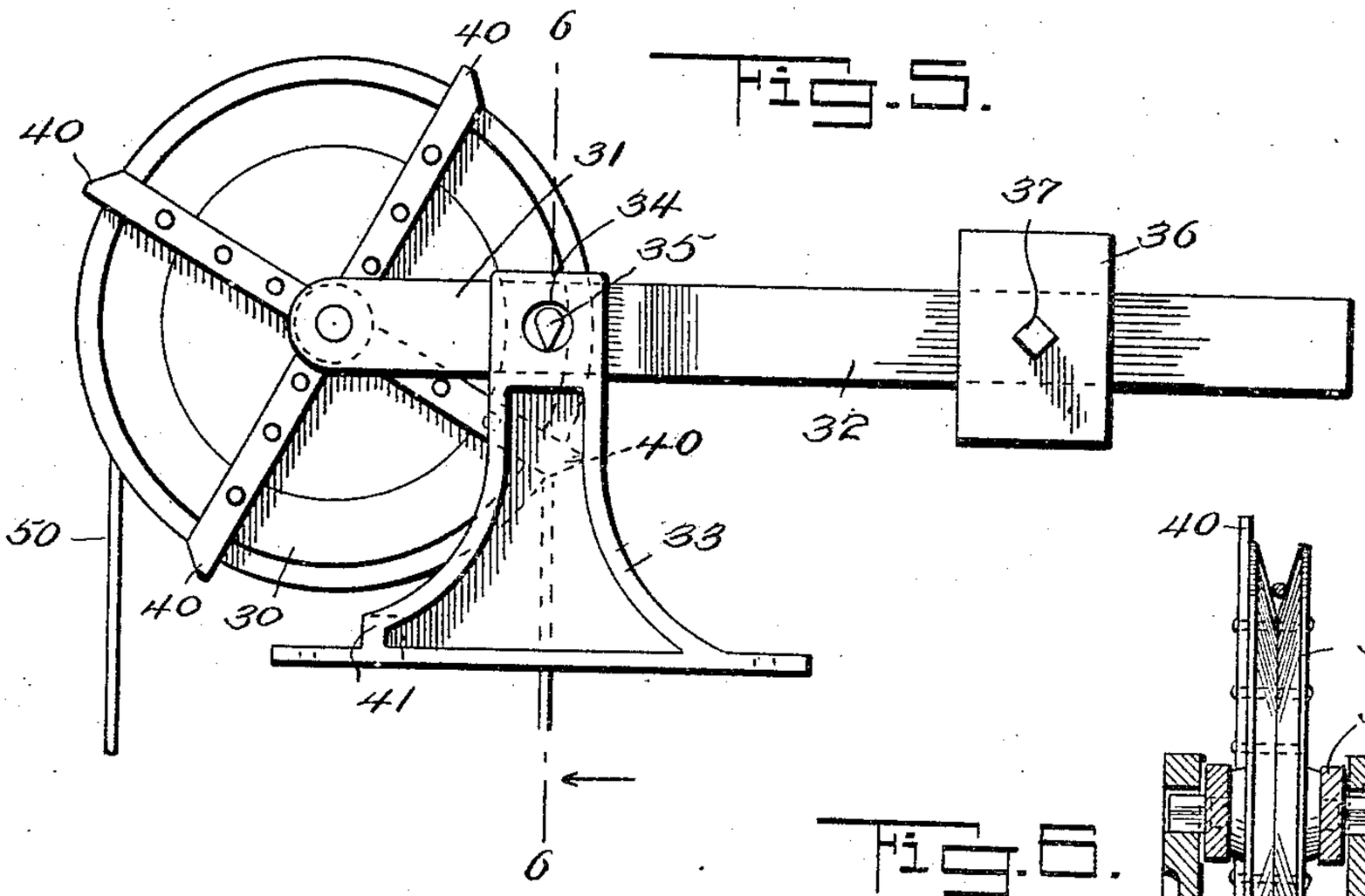


Fig. 6.

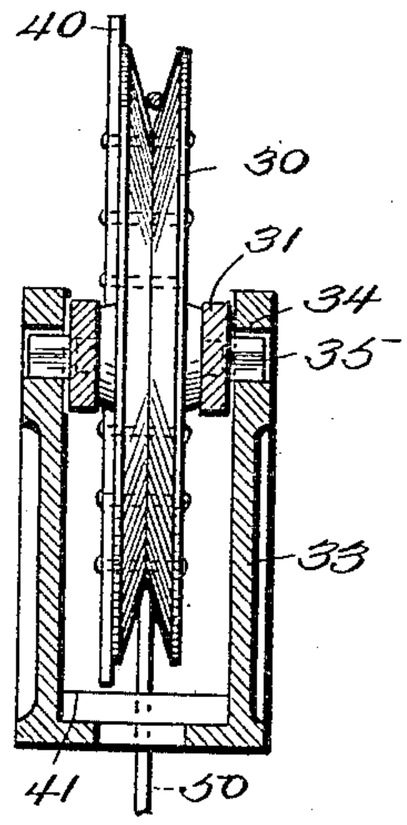
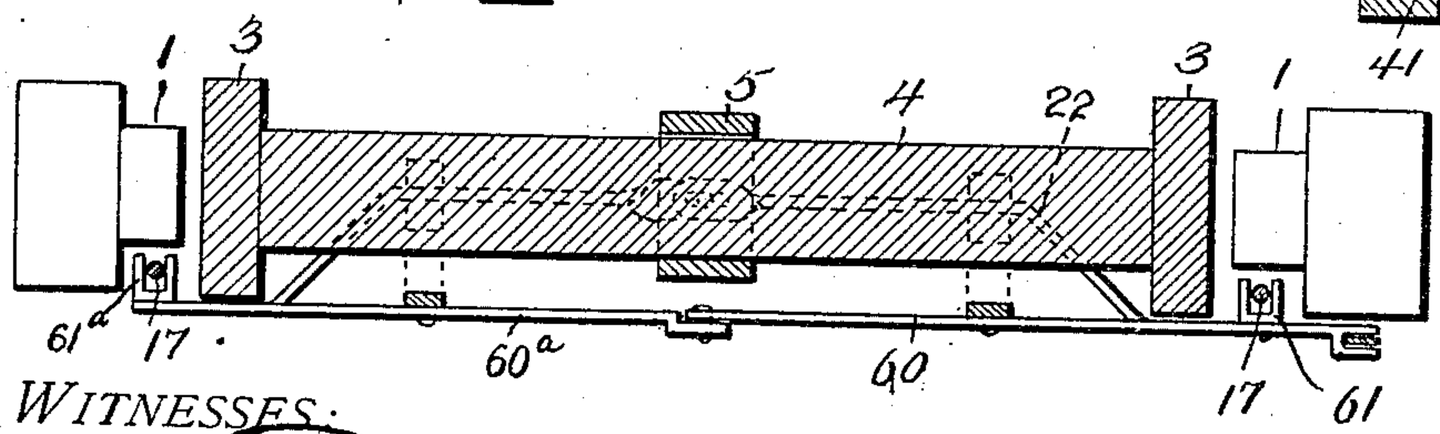


Fig. 7.



WITNESSES:

Wm. F. Hoyle.

J. K. Moore

INVENTOR

John Cunningham

BY

Mitchell & Prescott

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN CUNNINGHAM, OF DAYTON, OHIO.

GRAVITY SPEED-GOVERNOR FOR ELEVATOR SAFETY MECHANISMS.

943,523. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed September 11, 1909. Serial No. 517,255.

To all whom it may concern:

Be it known that I, JOHN CUNNINGHAM, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Gravity Speed-Governors for Elevator Safety Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In connection with both freight and passenger elevators it is common to provide the car with a safety mechanism designed to be thrown into operation in case of the breaking of the hoisting cables or the sudden descent of the car from any cause, thereby causing devices on the car to engage the vertical guides for the car, and arrest its descent. In connection with such safety mechanism it is also customary to employ a governor, usually of the centrifugal type, operated by the movements of the car, and adjusted so that in case of over speeding of the car the safety mechanism is automatically thrown into operation. These centrifugal governors, and connected mechanism are expensive to install, and it sometimes happens that an ignorant operator or mechanic will change the adjustment of the governor, setting it to trip at a higher speed than the car would be likely to move it even in case of an accident, so that the governor is actually rendered inoperative, while to all appearance it is in proper and effective condition.

The object of my present invention is to provide a governing mechanism for throwing the safety mechanism into operation, which is less complicated and expensive than the centrifugal governor and less liable to get out of order, and in which the effective condition of the governor can be ascertained at a glance so that any tampering with the governor, as in making repairs to the elevator mechanism can be noted at once.

In the accompanying drawings I have illustrated the best form in which I have contemplated embodying my invention and my invention is fully disclosed in the following description and claims.

In the said drawings, Figure 1 represents an elevation of an elevator showing my improved apparatus connected therewith. Fig. 2 is a vertical section on line 2—2 of Fig. 1 drawn to an enlarged scale. Fig. 3 is an enlarged view of one of the locking wedges and its associated parts. Fig. 4 is a top plan view of my improved governor drawn to an enlarged scale. Fig. 5 is an elevation of the same. Fig. 6 is a transverse vertical sectional view of the governor on line 6—6 Fig. 5 looking in the direction of the arrow. Fig. 7 is a sectional view on line 7—7 of Fig. 1 drawn to an enlarged scale.

In Fig. 1 of the drawings I have illustrated an elevator well, provided with the vertical guides 1, for the car, which is shown provided with one form of safety mechanism. It is to be understood, however, that my governor can be employed in connection with any form of safety mechanism, and this particular form shown and described is selected merely for purposes of illustration and its specific construction forms no part of my invention. In order, however, that the construction and operation of my governor may be more clearly understood, I will first describe the safety mechanism with which it is here associated, and which is of known construction. The car in this instance comprises the platform 2, provided with the vertical stiles 3, 3 and cross beam 4, the stiles 3, 3 being provided with guides or brackets for engaging the vertical guides 1, 1 of the well. The cross beam is provided with a vertically movable yoke 5 to which is secured the lifting cable 6, which passes over a sheave 7 at the top of the well, and thence to the elevator winding mechanism which may be constructed and operated in any desired manner. In this instance the counterweight 8, indicated in dotted lines in Fig. 1 is connected to a cable 9, passing over a sheave 10, at the top of the well, and thence extending downward to one end of a lever 11, pivoted to the cross beam 4, the other end of the lever 11 being connected to the yoke 5. The construction is such that should the lifting cable 6 break, the upward strain of the counterweight cable would move the yoke 5 downwardly with respect to the cross beam 4, and throw into operation the safety mechanism, as hereinafter described. In this instance the safety mechanism consists of two (or more) wedges 16, 16, which are so arranged as to be forced between the vertical guides 1, and the guides on the car and lock the car to the guides in case of a too sudden descent of the car. The stiles 3, 3 of the car are shown provided near their upper ends with metal guide plates 13, 13, each of

which is provided with flanges 14, 14 embracing one of the vertical guides 1, 1. One of the guides 14 is provided with a wedge shaped recess 15 in which is located a vertically movable locking wedge 16, preferably provided on the face nearest the guide 1 with teeth or serrations as shown. From each wedge 16 a rod 17 extends downwardly through a slot 18 in the wall of the recess 15 and said rod is provided about midway of its length with a fixed shoulder 19, and at its lower end with a threaded portion having thereon a nut 20. The shoulder 19 of each rod 17 is engaged by a fork 21, on the outer end of an operating lever 22, pivoted to the cross beam 4, and having its inner end connected to the yoke 5. Each rod carries a spiral spring 23 between the fork 21 and the nut 20, the tension of which is regulated by the nut, so that the wedges are kept just out of contact with the guides 1, 1 of the elevator shaft or well. It will be observed that in case of the breakage of the hoisting cable, the yoke 5 will be depressed, moving downwardly the inner ends of the levers 22, 22 and raising their outer ends, thus forcing the wedges instantly into engagement with the vertical guides and locking the car thereto.

I will now describe my improved gravity governor and its application to an elevator provided with the safety mechanism above described. The governor proper is shown as located at the top of the well, and it comprises a sheave 30, mounted in a yoke 31, formed at one end of a counterbalanced lever 32, which is pivotally mounted in a suitable supporting stand or frame 33. In this instance the side portions of the stand 33, are provided with bearing apertures 34 to receive trunnions or studs 35 on opposite sides of the lever 32, and in this instance projecting laterally from the yoke 31, said trunnions or studs being preferably V-shaped in cross section to provide a very delicate fulcrum for the lever and to avoid friction. The outer end of the lever 32 is provided with a counterbalance weight 36 adjustable longitudinally on the lever and provided with a set screw 37 for securing it in its adjusted position. The sheave 30 is provided with one or more projections 40, extending preferably beyond its periphery (four of such projections being here shown) and the stand 31 is provided with a fixed stop, shoulder or projection 41, which is so located that the projections 40 on the sheave will pass the stop when the lever 32 is balanced, or tilted slightly in a direction to raise the sheave, but when the end of the lever 32 carrying the sheave is drawn downward below the balanced position, the projection 40 (or one of the projections if there are more than one) will engage the stop 41 and lock the sheave from movement.

The sheave 30, is provided with a groove 30^a having a frictional surface. As shown the groove is V-shaped, thus enabling it to frictionally engage a rope or cable 50, but any other form of groove may be employed which will produce this result, and the grooved portion may be roughened, or provided with a lining of leather or other frictional material if desired to increase its friction on the cable.

The cable 50 is passed around an idle sheave 51, located adjacent to the bottom of the well, mounted in guides permitting its vertical movement and preferably provided with a weight 52 sufficient to keep the cable taut, under variations of temperature. The ends of the cable 50 are connected to the outer end of a lever 60, pivoted to the cross beam 4 of the car, and provided with a yoke portion 61 embracing the adjacent rod 17 from one of the wedges 16, said rod being provided with a shoulder 62 above said yoke, adapted to be engaged by the same, when the outer end of the lever is raised. The lever 60 extends to the center of the beam 4 and its inner end is pivoted by a slotted connection to the inner end of a similar lever 60^a which extends to the other side of the car, is pivoted to the beam 4, and has its outer end provided with a yoke 61^a, embracing the rod 17 of the opposite wedge, the said rod being provided with a shoulder 62^a above said yoke. The construction is such that if the portion of the governor cable 50 connected to the lever 60 is given an upward jerk the levers 60 and 60^a will be simultaneously actuated to apply the wedges and stop the car.

In installing the governor, the counterbalance weight is so adjusted, that the normal down pull of the car in its descent at normal speed, will not draw down the sheave 30, far enough to cause the locking projections 40 to engage the stop 41. But should the car start to descend too rapidly the extra down pull of the cable 50 on the sheave would instantly overcome the counterbalance and draw the sheave 30 downward, thereby locking it by the engagement of one of the locking projections 40 with the stop 41 and thus stopping the cable 50, which would instantly cause an upward pull on the levers 60 and 60^a and apply the safety locking wedges.

The governor mechanism will preferably be accurately adjusted so that it is nearly balanced, a slight preponderance of weight being on the end of the lever 32, carrying the counterbalance weight and during the normal operation of the car the state of substantial equilibrium of said lever can be noted by the eye. Any lack of sensitiveness of said lever would at once suggest that the adjustment of the counterbalance weight had been disturbed, in case a workman for any reason should move the weight too far

outwardly and neglect to return it. I also propose to first adjust the governor and then paint the lever 32 on each side of the weight, leaving the part beneath the weight unpainted, or painted in a contrasting color, so that any change in the position of the weight can be instantly noted by a glance at the apparatus.

As before stated I do not limit myself to the use of this governor with the particular style of safety mechanism herein shown and described, as it is perfectly obvious that it can be used to throw into operation any form of safety mechanism with which it may be desirable to employ it.

What I claim and desire to secure by Letters Patent is:—

1. A governor for elevator safety mechanism, comprising a movable sheave, a counterbalance therefor, a cable passing over said sheave and operatively connected with the safety mechanism on the car and means for arresting said sheave constructed to be thrown into operation by the movement of the sheave against its counterbalance.

2. A governor for elevator safety mechanism, comprising a vertically movable sheave, a counterbalance therefor, a cable passing over said sheave and operatively connected with the safety mechanism on the car, a stop for arresting said sheave and a part on the sheave normally out of operative relation with said stop but adapted to be brought into line therewith when the sheave is moved vertically against its counterbalance.

3. A governor for elevator safety mechanism, comprising among its members, a sheave, a pivoted lever supporting said sheave, a counterbalance for said sheave, connected with said lever, a cable passing over said sheave and connected with the safety mechanism on the elevator car, a stop for arresting the sheave, and a stop engaging projection on the sheave, normally out of operative relation with said stop.

4. A governor for elevator safety mechanism, comprising among its members, a supporting frame, a horizontal lever pivotally mounted in said frame between its ends, a sheave mounted in said lever adjacent to one end, a counterbalance connected to the other end of the lever, a fixed stop for arresting the sheave, a stop engaging projection on the sheave normally out of operative relation with the fixed stop but adapted to be brought into line therewith by the downward movement of the sheave, and a cable passing over said sheave, and connected with the safety mechanism on the car.

5. A governor for elevator safety mechanism, comprising among its members, a supporting frame, a horizontal lever provided with laterally extending pivot lugs V-shaped in cross section, engaging bearings in the frame, said lever having a forked portion at one end, a sheave mounted in said forked portion and provided with a V-shaped peripheral groove, a counterbalance weight movably connected to the other end of said lever, a fixed stop for said sheave, stop engaging projections on said sheave normally out of operative relation with said stop, and a cable engaging the groove in said sheave, and operatively connected with the safety mechanism.

In testimony whereof I affix my signature, in the presence of two witnesses.

JOHN CUNNINGHAM.

Witnesses:
EDWARD T. HALL,
GUSTAV BECKER, Jr.