(No Model.) 3 Sheets—Sheet 1.

W. P. GIBSON.

SPEED GOVERNOR MECHANISM FOR ELEVATORS.

No. 418,406. Patented Dec. 31, 1889.

Fig. 1.

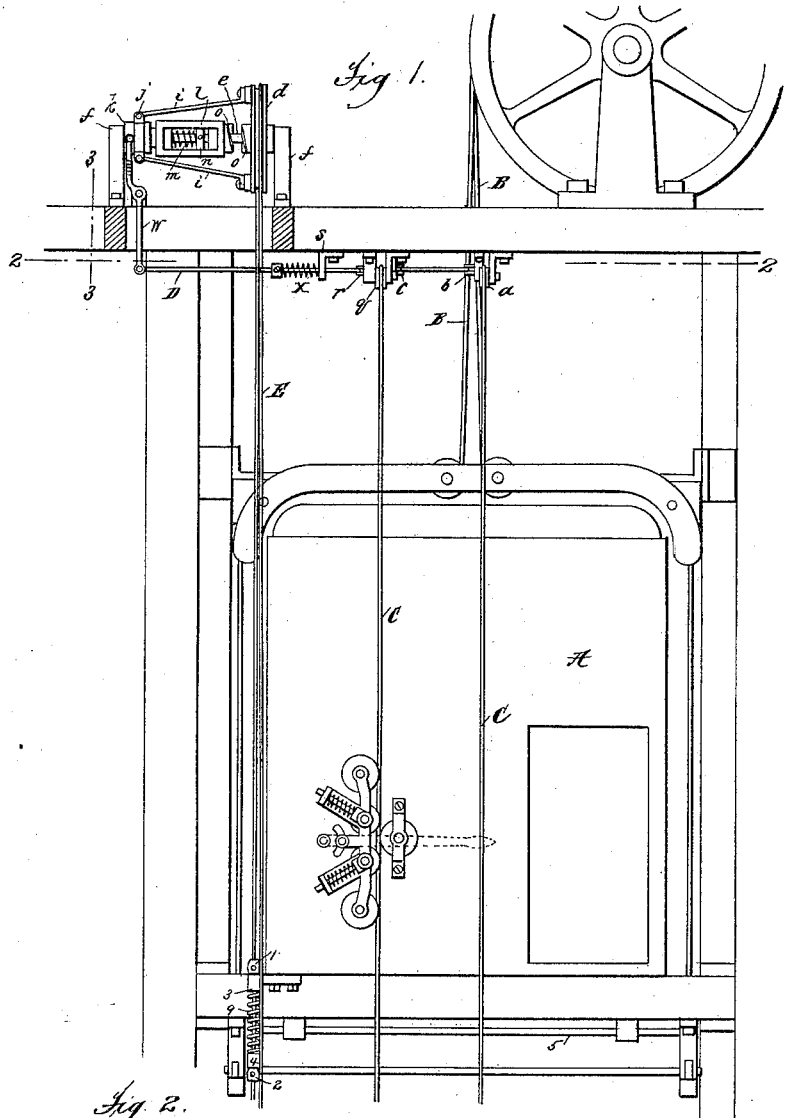
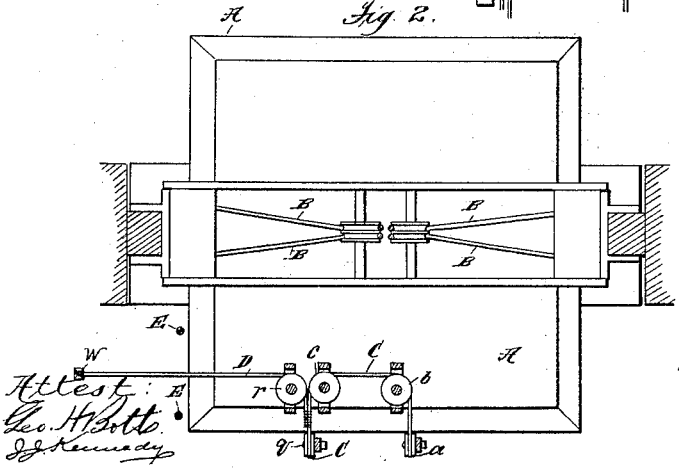


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2

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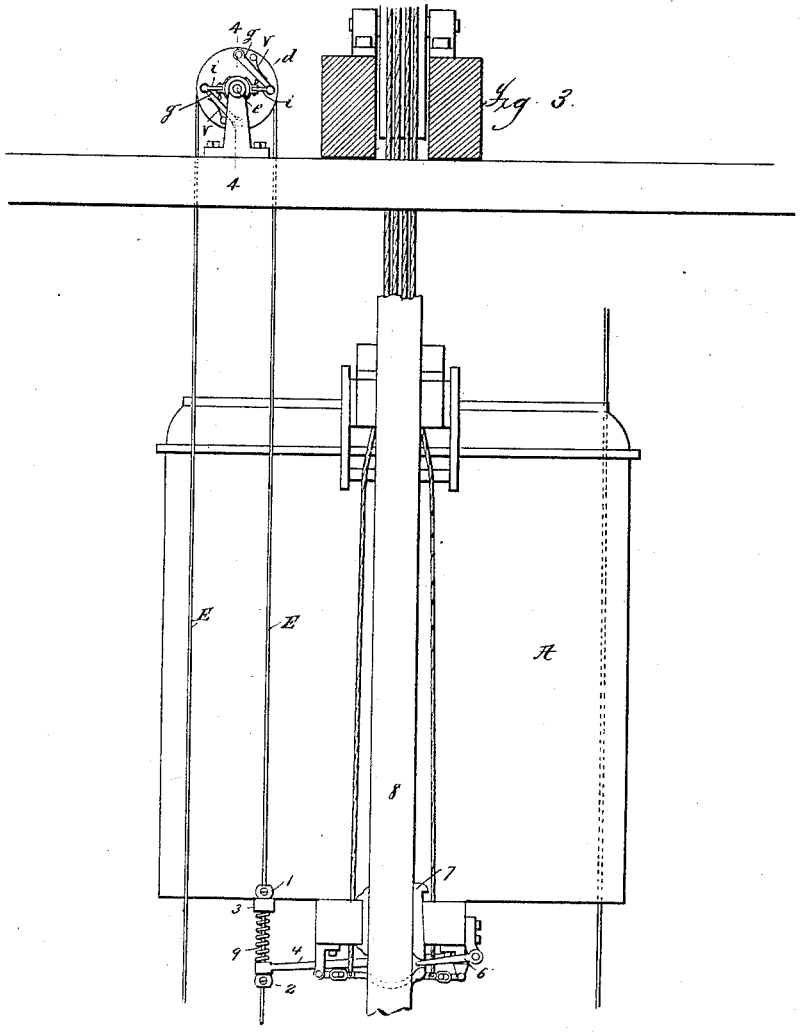

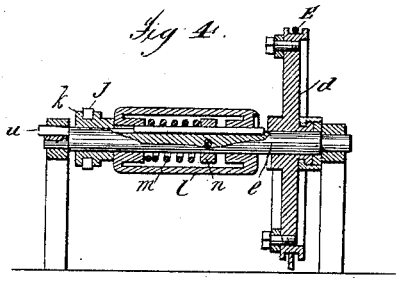

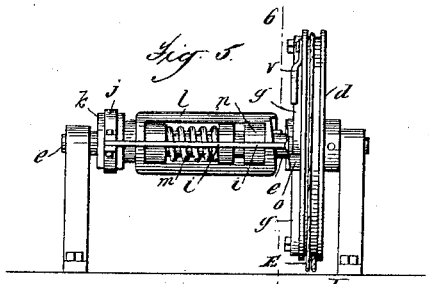

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SPEED GOVERNOR MECHANISM FOR ELEVATORS.

No. 418,406. Patented Dec. 31, 1889.

Fig. 7

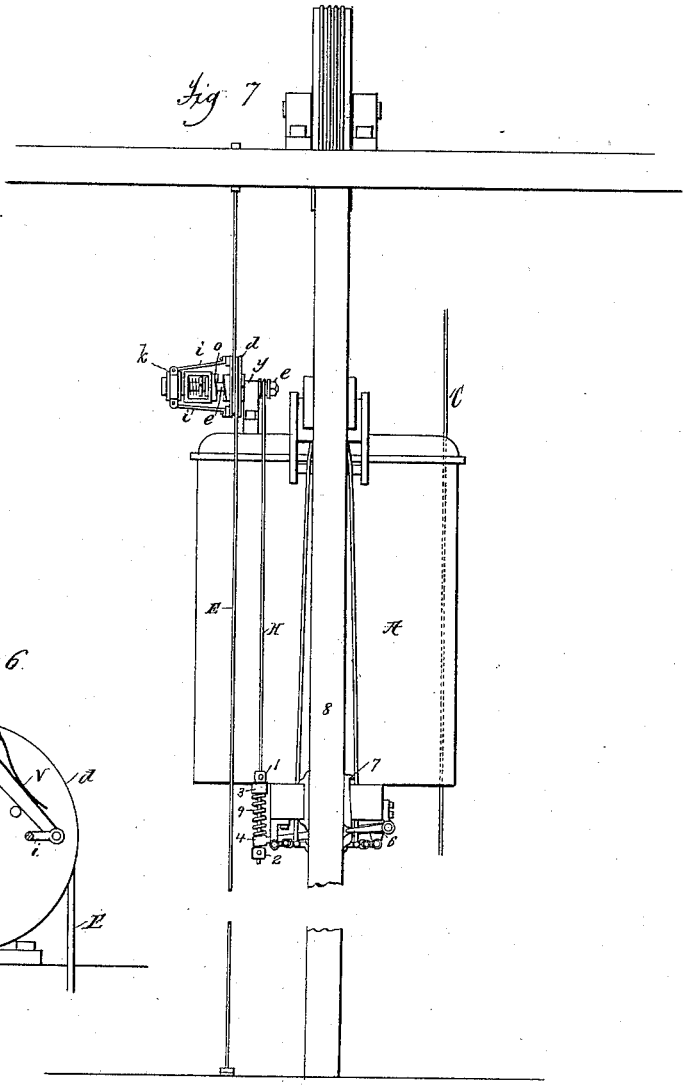


Fig. 6.

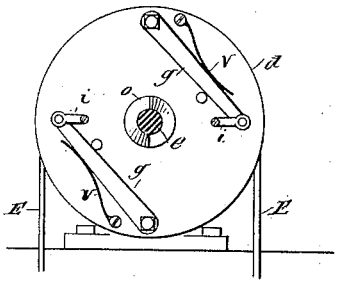
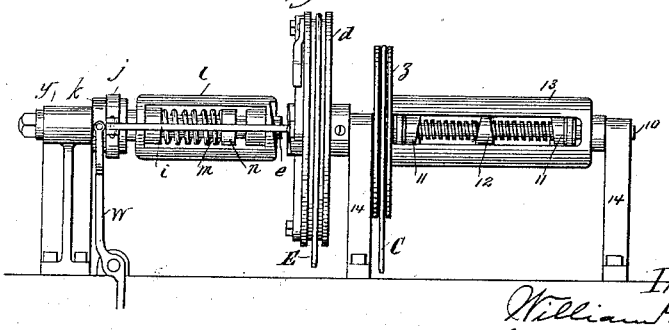


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM P. GIBSON, OF NEW YORK, N. Y.

SPEED-GOVERNOR MECHANISM FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 418,406, dated December 31, 1889.

Application filed December 31, 1888. Serial No. 295,000. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. GIBSON, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Speed-Governor Mechanism for Elevators, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates, generally, to improvements in elevators, and particularly to speed-governing automatic stop mechanism for the same.

The invention consists in a novel construction of speed-governing apparatus connected to the safety appliances of the elevator mechanism for arresting the descent of the elevator-car when it attains an undue speed and of connections between said speed-governing apparatus and the rope which operates the valve of the elevator, whereby the governing apparatus in its operation of the safety appliances of the elevator also acts through the rope to move the main valve of the elevator to arrest the descent of the car.

The invention consists, further, in the combination, with the speed-governing apparatus, of a device operated in connection therewith to automatically arrest the elevator-car at its lower limit of movement.

The invention also consists of certain modifications in the arrangement of the speed-governing apparatus hereinafter referred to.

In the accompanying drawings, Figure 1 is a front elevation of an elevator-car and its connections equipped with speed-governing apparatus embodying my invention. Fig. 2 is a horizontal section on the line 2 of Fig. 1. Fig. 3 is a vertical sectional elevation on the line 3 of Fig. 1. Fig. 4 is a vertical section on the line 4 of Fig. 3, illustrating the construction of the speed-governing apparatus proper. Fig. 5 is a side view of the same. Fig. 6 is a section on the line 6 of Fig. 5. Fig. 7 is a side elevation illustrating a modification in the arrangement of the speed-governing apparatus. Fig. 8 is a view similar to Fig. 5, illustrating the combination, with the same, of the automatic arresting apparatus.

Referring to said drawings, it will be understood that A represents the elevator-car, B its hoisting-cables, and C the rope connected in the usual manner with the operating-connections of the main valve of the elevator mechanism for controlling the movements of the power-piston. The safety appliances of the elevator may be of any common form; but as illustrated, they are the same as described in a companion application filed December 31, 1888, Serial No. 294,998, and need not, therefore, be particularly described herein, reference being made to said application for a more detailed description of the same. The hoisting-cables B are connected to the safety appliances in one of the well-known ways and as described in my said application. The mechanism for operating the rope C from the elevator-car also is described in still another companion application filed December 31, 1888, Serial No. 294,999, to which reference is made for a detailed description of the same; but it may be of any form.

Referring now particularly to Figs. 1, 4, 5, and 6, the speed-governing apparatus therein illustrated will be described. The speed-governor proper, which will preferably be located on the frame-work at the top of the elevator-shaft, consists of a sheave *d*, grooved circumferentially for receiving a cable E, passing around a pulley (not shown) at the bottom of the shaft and connected with the safety appliances of the elevator and traveling with the car. The sheave *d* is mounted loosely upon a shaft *e*, held stationary in vertical standards *f* by means of a key *u* (see Fig. 4) or otherwise. The outer face of the sheave *d* has pivotally secured to it, so as to be capable of a limited amount of outward swing, a pair of levers *g*, arranged parallel to each other upon opposite sides of the shaft *e*. The levers *g* are retained in their normal positions by means of springs *v*, secured to the sheave *d*. The levers *g* carry arms *i*, extending outwardly from the face of the sheave *d*, which arms converge slightly toward each other at their outer ends, which are loosely connected to a collar *j*, seated in a recess formed in a sleeve *k*, arranged to turn freely upon the shaft *e* at the end of the sleeve *l*. The sleeve *l* has connected to it upon its exterior one end of a spring *m*, the other end of which is secured to a head *n*, fixed to the shaft *e*. (See Fig.

4.) The sleeve *l* is splined to the shaft *e*, as shown in said figure, so as to be capable of movement along said shaft into engagement with the sheave *d*, the spring *n* holding said sleeve normally away from said sheave and in the position shown in the drawings. For the purpose of ready engagement between the sheave *d* and sleeve *l* their adjacent faces have formed upon them spiral projections *o*. The projections *o* form a clutch, one member of which is carried by the sleeve and the other by the sheave *d*.

The cable E is provided with stops 1 2, the former engaging with a projection 3 upon the car A and the latter with the end of an arm 4, connected to a rock-shaft 5, extending from side to side of the elevator-car and carrying fingers 6 for engagement with wedges 7, interposed between the guides 8 and the cross-beam of the car A. The arm 4 is held down in its normal position by means of a spring 9, located between the end thereof and the projection 3 upon the car A, the stops 1 2 upon the cable E causing said cable to travel with the car.

The operation of the apparatus thus far described is as follows: When the car is traveling downward within its proper degree of speed, the levers *g* upon the governing apparatus will remain in their normal parallel positions, the sheave *d* being caused to revolve by the passage over it of the cable E, connected to the car. When, however, through any cause the speed of the elevator in its descent becomes unduly accelerated, its increase of speed will be communicated to the sheave *d*. As the sheave *d* increases thus in speed, the levers *g* will be thrown outward by centrifugal force from their parallel positions, thereby causing the arms *i* to spread outward, and as the arms *i* are thus spread apart they will draw the sleeve *l* inward against the tension of its spring *m* into engagement with the sheave *d*. When the sleeve *l* and sheave *d* have been thus brought into engagement, the former, being fast to the shaft *e*, will prevent the further rotation of the sheave. The sheave *d*, being thus held stationary, will act as a brake upon the cable E and retard its movement sufficiently to raise the arm 4, and thereby rock the shaft 5 and raise its fingers 6 upward to press the wedges 7 between the guides 8 and the cross-beam of the car. When the elevator has been arrested in its descent, the sleeve *l* will be returned to its normal position by its spring *m*, and the levers *g* and arms *i* by the springs *v*. The sleeve *k* of the speed-governing apparatus has connected to it the bifurcated end of lever *w*, to the lower end of which is connected a cord D, passing around a pulley *r*, the other end of which cord is joined to the rope C, which passes around a series of pulleys *a b c q* at the upper end of the elevator-shaft. The cord passes through a projection *s* upon the frame-work of the elevator-shaft, and is held in its normal position by means of a spring *x*, bearing against said projection. The operation of this mechanism is as follows: Whenever the speed of the car becomes so accelerated as to cause the levers *g* to be swung outward and thus move the sleeve *l* inward toward the sheave *d*, and before the sleeve has been brought into engagement with the sheave *d*, so as to operate the wedges in the manner described, the lower end of the fulcrumed lever *w* will be rocked outward, drawing with it the cord D. This movement of the cord D will draw the rope C upward and through said rope operate the main valve of the elevator mechanism in the usual manner to retard or arrest the movement of the car. If, however, the undue speed of the car should be due to such causes that it is not checked by the closing of the valve, the levers *g* will continue to spread and will move the sleeve *l* into engagement with the sheave *d*, with the result before stated. It will thus be seen that by means of the mechanism described provision is made for the arrest of the car in its descent by the successive operation of its valve mechanism and its safety appliances, and the mechanism provided for the purpose is of such construction that should there be any failure in the operation or effect of the valve mechanism the safety appliances will still be effective.

Many changes may be made in the arrangement of the apparatus described without departing from the spirit of my invention. Such a change is illustrated in Fig. 7. The speed-governing apparatus in this case is mounted upon the car A, with the cable E passing around its sheave *d*, the ends of said cable being secured at the top and bottom of the elevator-shaft. The shaft *e* in this case is journaled in a bearing formed in a standard *y* and is extended beyond said bearing to receive the end of a cord H, the other end of which cord is secured to the arm 4 of the safety mechanism, as in the previous construction. With this construction during the descent of the elevator-car the sheave *d*, moving therewith, will be rotated by its cable E, the sleeve *l* remaining out of engagement with said sheave, as in the previous construction, until the descent of the elevator-car becomes accelerated beyond its proper limit. When, however, the car begins to descend with undue speed, the arms *i* will draw said sleeve and sheave into engagement. In this instance, however, the shaft *e*, not being keyed in its bearing *y*, will at the moment of such engagement have the movement of the sheave *d* transmitted to it through its sleeve *l* and will revolve therewith. As the shaft *e* revolves, it will draw upward upon the cord H and raise the arm 4, and through it rock the shaft 5 and fingers 6 and cause the latter to press the wedges 7 upward, with the effect heretofore described.

In the organization shown in Fig. 8 the sheave *d* is mounted, as in Figs. 1 to 6, upon the frame-work at the top of the elevator-shaft,

and has in this instance the cable E of the safety appliances of the elevator passing over it. The shaft *e* is keyed within a standard *y* and extends to within a short distance of the sheave *d*. The sheave *d*, instead of being mounted upon the shaft *e*, is in this instance secured to a shaft 10, journaled in bearings in standards 14 and threaded throughout a portion of its length and provided with stationary nuts or abutments 11—one at each end of its threaded portion—for engagement at the proper time with a traveling nut 12, mounted upon said shaft, and having a projecting lower end entering a longitudinal groove formed within a sleeve 13, inclosing said shaft, by which the nut 12 is guided in its movement along said shaft into engagement with the nuts 11 as the shaft is revolved in reverse directions. The sleeve 13 is loose upon the shaft 10, so as to be turned freely about the shaft, and carries a pulley *z*, around which the rope C, for operating the valve mechanism, passes. The rope C is or may be in this case connected to the cord D of the governor, the same as shown in Figs. 1 and 2, the only difference being that the rope C passes around the pulley *z* instead of around the pulleys *a b c q*. The operation of the speed-governing apparatus when thus organized is the same as that of the organization illustrated in Figs. 1 to 6. In this case, however, the revolution of the sheave *d*, which, as before remarked, is secured to the shaft 10, causes said shaft to revolve in the same direction. During this revolution of the shaft 10 the traveling nut 12, mounted thereon, will travel along said shaft into engagement with the nuts 11 and thereby lock the shaft 10 and its sheave *d* to the sleeve 13, and thus cause the sleeve 13 and pulley *z* to partake of the movement of the sheave *d*, which will operate the rope C to stop the car. The movement of the nut 12 along the shaft 10 will be so timed that its engagement with the respective nuts will not take place until the elevator-car has about reached its lower and upper limits of movement. When the descent of the car becomes unduly accelerated, the arrest of the rotation of the sheave *d* will be accomplished in the manner described in connection with the mechanism of Figs. 1 to 6, the sleeve *l* being advanced along the shaft *e* into engagement with the sheave *d*, as heretofore described.

It is to be understood that changes may be made in the construction and arrangement of the parts without departing from the invention. For example, the apparatus illustrated in Fig. 7 may by a slight change be used equally well for operating the rope C of the elevator to move the main valve to stop the movement of the power-piston instead of operating the safety appliances of the elevator; or the apparatus therein shown may be used for operating both the valve mechanism of the elevator and at the same time its safety appliances.

What I claim is—

1. The combination, with the elevator-car and its safety appliances, of a sheave having one member of a clutch, a cable passing around said sheave to drive it at a speed to conform to the movements of the car, a sleeve sliding upon a shaft, but fixed against revolving upon said shaft, and having the other member of the clutch, and levers *g*, pivoted upon said sheave to be swung outward by centrifugal force and connected to said sleeve to move the same and operate the clutch to clutch the sheave to the shaft when the movement of the car becomes excessive, substantially as described.

2. The combination, with the elevator-car and its safety appliances, of a sheave *d*, driven at a speed conforming to the speed of the car, a speed-governor driven by said sheave, a clutch operated by the speed-governor to clutch the sheave when the speed of the car becomes excessive and having one of its members connected to operate the safety appliances when said sheave is clutched, a rope C, connected to operate the valve of the elevator, and connections between said rope and the speed-governor, whereby the governor will operate the valve to check the car, substantially as described.

3. The combination, with the elevator-car and its safety appliances, of a cable E, connected to operate said safety appliances and passing over a sheave *d*, so as to drive said sheave at a speed conforming to the speed of the car, a speed-governor driven by said sheave, a clutch operated by the speed-governor to clutch and arrest said sheave when the speed of the car becomes excessive, a rope C, connected to operate the valve of the elevator, and a lever *w*, connected to said rope and operated by the governor, substantially as described.

4. The combination, with the elevator-car and its safety appliances, of a cable E, connected to operate said safety appliances and passing over a sheave *d*, so as to drive said sheave at a speed conforming to the speed of the car, a speed-governor driven by said sheave, a clutch operated by the speed-governor to clutch and arrest said sheave when the speed of the car becomes excessive, a threaded shaft 10, driven by said sheave *d*, a rope C, connected to operate the valve of the elevator and passing over a loose pulley upon said threaded shaft, and a nut 12, traveling upon said shaft between fixed stops and connected to lock the pulley to the shaft as the car approaches the limit of its movement in each direction, substantially as described.

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

WM. P. GIBSON.

Witnesses:
J. J. KENNEDY,
EDWARD WOOD.