

No. 607,827.

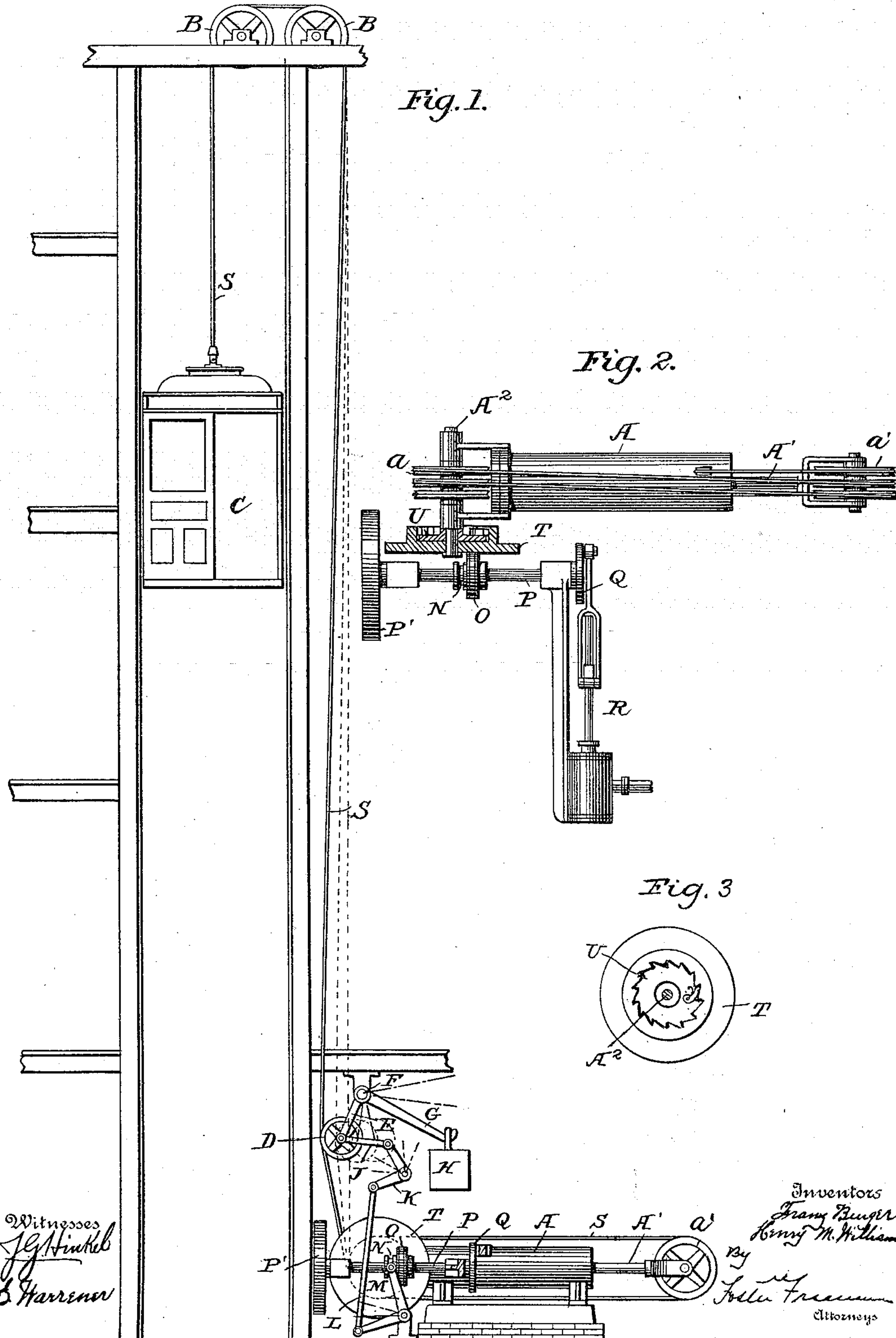
Patented July 26, 1898.

F. BURGER & H. M. WILLIAMS.

REGULATOR OR POWER GENERATING ATTACHMENT FOR ELEVATORS.

(Application filed Aug. 18, 1897.)

(No Model.)





# UNITED STATES PATENT OFFICE.

FRANZ BURGER AND HENRY M. WILLIAMS, OF FORT WAYNE, INDIANA;  
SAID BURGER ASSIGNOR OF ONE-HALF TO SAID WILLIAMS.

REGULATOR OR POWER-GENERATING ATTACHMENT FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 607,827, dated July 26, 1898.

Application filed August 18, 1897. Serial No. 648,704. (No model.)

*To all whom it may concern:*

Be it known that we, FRANZ BURGER and HENRY M. WILLIAMS, citizens of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Regulators and Power-Generating Attachments for Elevators, of which the following is a specification.

10 This invention relates to a governor and power-generating attachment for elevators; and it has for its object to improve the construction, arrangement, and economical operation of elevators; and to these ends it consists in the various features of invention substantially as hereinafter more fully pointed out.

20 In the accompanying drawings there is illustrated sufficient of an apparatus to enable the invention to be understood by those skilled in the art, in which—

Figure 1 is a side view of an elevator and attachments necessary to carry out the objects of the invention. Fig. 2 is a plan view, 25 partly in section, of some of the details; and Fig. 3 is a detail view of a form of clutch which may be used.

30 In the ordinary operation of elevators and the like it is necessary to exert power to raise the elevator-car, and as a general thing the elevator-car is lowered by its own weight in addition to the load. In lowering the elevator-car its rate of speed should be controlled by some sort of mechanism, so that it will run 35 at a substantially uniform rate of speed regardless of the load carried thereby, and it is manifest that in order to regulate the speed considerable power or energy is exerted, depending upon the load.

40 The object of the invention is to provide improved means whereby the energy exerted by the descending elevator-car can be converted into power or energy, which may be employed for useful purposes, and the apparatus illustrated in the drawings represents an embodiment of the invention.

50 It is evident that the invention may be employed in connection with other devices than elevators and with any class of elevators, either electric, hydraulic, or pneumatic, and the details of construction and arrangement

of parts will of course be varied to suit the requirements of any particular case.

Referring to the drawings, A represents a cylinder such as is used in hydraulic or pneumatic elevators and in which move a piston 55 and piston-rod A' under pressure of the motor fluid in the usual way. Connected to the cylinder are the sheaves  $\alpha$ , and connected to the piston and piston-rod are the sheaves  $\alpha'$ , and 60 the suspensory rope S is arranged to pass over and around these sheaves in any of the usual ways, so that as the piston and piston-rod move in and out of the cylinder the suspensory rope will be moved accordingly, and the car 65 C, attached to the rope, will move up and down in the well of the elevator, the rope being shown in the present instance as passing over the fixed sheaves B B to the engine or motor-cylinder A, located in this instance 70 near the bottom of the well.

Arranged somewhere in connection with the suspensory rope or ropes between the engine and car, and as shown in the present instance adjacent to the engine or motor 75 cylinder, is an idler sheave or sheaves D, which normally bears upon the suspensory rope and in the present instance is mounted in an arm E, pivoted at F and connected to an arm G, carrying a counterweight H, so that 80 the tendency of the idler-sheave D is to deflect the suspensory rope from its normal position, the amount of deflection depending upon the weight of the car and its load and the power necessary to raise or lower the same. 85 While the idler-pulley is shown as mounted on a weighted lever or arm, any other equivalent construction may be used, the object being to cause the idler to be operated by the suspensory rope and moved in accordance 90 with the weight of the car and its load, and it is evident that these devices may be arranged in different relations to the rope, whereby they will accomplish the same purpose. It is manifest that the position of the 95 idler will depend upon the relations between the counterweight H and the load on the car, and advantage is taken of this fact to operate the mechanism for utilizing the waste energy as well as for regulating the speed or 100 motions of the elevator. This counterbalanced idler is connected by some sort of



means with some sort of devices for producing power, and while these means and devices may vary largely there is shown in the drawings one simple and effective arrangement of parts whereby the objects of the invention may be accomplished.

The counterweighted idler or some part connected thereto in this instance is connected to a bell-crank lever K, as by a link J, and a connecting-rod L extends from the bell-crank lever K to a similar bell-crank lever M. This latter bell-crank lever is forked to engage a groove N in a friction-wheel O, sliding upon a shaft P and revolving the shaft by means of a feather or other equivalent structure on the shaft, and it is evident that the position of this friction-wheel O on its shaft will be varied in accordance with the movements of the weighted idler, which in turn are varied and controlled by the load on the car.

The shaft P is provided with some sort of means for producing useful power or energy, and it is shown as having a fly-wheel P' and a crank-wheel Q, connected to operate an air or water pump R, although, of course, any other equivalent mechanical means may be operated by the shaft.

As the power to raise the car is exerted it is manifest that some sort of means should be arranged so that the shaft P shall not be operated when the car is being raised, and connections are provided between the engine or motor cylinder A and the shaft whereby this is accomplished, and in the present instance there is shown a driving-disk T, loosely mounted on the shaft A<sup>2</sup> of the motor-cylinder and bearing on the friction-wheel O. Also mounted on the shaft A<sup>2</sup> is a clutch device U of any well-known construction, but so arranged that when the shaft A<sup>2</sup> rotates in one direction the driving-disk T will be operated and when the shaft rotates in the opposite direction the clutch will not engage the disk to operate the same. In this connection it may be stated that the sheaves *a* are usually loose upon the shaft A<sup>2</sup>; but in order to carry out this invention one of the sheaves *a*, and preferably the one around which the suspensory rope S first passes as it extends from the car, is keyed to the shaft A<sup>2</sup>, so that it will be rotated in accordance with the movements of the suspensory rope.

With this general description the general mode of operation will be largely understood, and it may be said that the suspensory rope S will be moved in or out of its normal position more or less by the weighted idler-sheave, according to the weight of the car and its load, and when power is exerted to raise the car, while the weighted idler will be moved more or less, it will be seen that through the intervention of the friction-clutch in the present instance no power is exerted on the pump or other power-generating device, so that practically no increase of power is necessary for raising the load other than would be required

under ordinary circumstances. When, however, the car is going down with little or no load, it is manifest that the counterweighted idler will force the suspensory rope to the greatest extent out of its ordinary path, as indicated in full lines in the drawings, and consequently the friction-wheel O will be moved toward the center of the driving-disk T and the power generated in the pump or other device will be at a minimum. If, however, the load is increased as the car is coming down, the suspensory rope will approach more nearly to its normal position and by the mechanism shown the friction-wheel O will be forced nearer the periphery of the driving-disk T, where it will exert a greater generating power on the pump, and so on proportionately, and thus it will be seen that not only will the power generated at R be proportionate to the load of the car, but that this power generated will be automatically moved and adjusted with relation to the load, so that it will act as a regulator controlling the speed of the car, so that it will travel practically at the same speed regardless of the load thereon. The apparatus therefore accomplishes two useful purposes at the same time—that is, it acts as an automatic regulator for the speed of the descending car regardless of its load and at the same time it generates power for a useful purpose in accordance with the waste of energy due to the difference in the loads.

It is evident that the pump R may be used to pump water or compress air to be used in operating the elevator or for any other purpose, and it is not deemed necessary to show these connections. It is also evident, as above indicated, that other mechanical means may be applied in substantially the same manner to the suspensory rope to accomplish substantially the same end, and it is evident that when a suspensory rope is mentioned it includes a number of ropes, such as are commonly used, and there may be more than one counterweighted idler-sheave employed to compensate for the different degrees of speed of the rope, and many and various mechanical modifications of the apparatus for accomplishing the same end will readily suggest themselves to those skilled in the art, and the invention is therefore not limited to the precise mechanism and arrangement of parts shown in the drawings.

What is claimed is—

1. The combination with an elevator-car and suspensory rope therefor, of means for generating power, and connections between the rope and said means whereby the latter are operated by the descending car and in accordance with the load of the car, substantially as described.

2. The combination with an elevator-car and suspensory rope, of means for generating power, a counterweighted idler operating in connection with the rope, and connections between the idler and power-generating



means whereby the latter are operated when the car descends, substantially as described.

3. The combination with an elevator-car and suspensory rope, of power-generating means, a counterweighted idler operating in connection with the rope, and connections between the idler and power-generating means whereby said means are operated when the car descends and are at rest when the car is elevated, substantially as described.

4. The combination with an elevator-car, suspensory rope, and engine for operating the same, of power-generating means, connections between the engine and power-generating means for operating the latter, and means controlled by the load of the car for controlling the operation of the connections between the engine and power-generating means, substantially as described.

5. The combination with an elevator-car, suspensory rope, and engine for operating the same, of power-generating means, a driving-disk connected with the engine, a friction-wheel connected with the power-generating means, and means controlled by the load of the car for controlling the friction-wheel, substantially as described.

tion-wheel connected with the power-generating means, and means controlled by the load of the car for controlling the friction-wheel, substantially as described.

6. The combination with an elevator-car, suspensory rope, and engine therefor, of a driving-disk connected to be operated by the engine in one direction, power-generating means, a friction-wheel connected with said power-generating means and operating on the driving-disk, a counterweighted idler controlled by the suspensory rope and connected to control the friction-wheel, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANZ BURGER.

HENRY M. WILLIAMS.

Witnesses:

GEO. D. CRANE,  
J. BURGER.