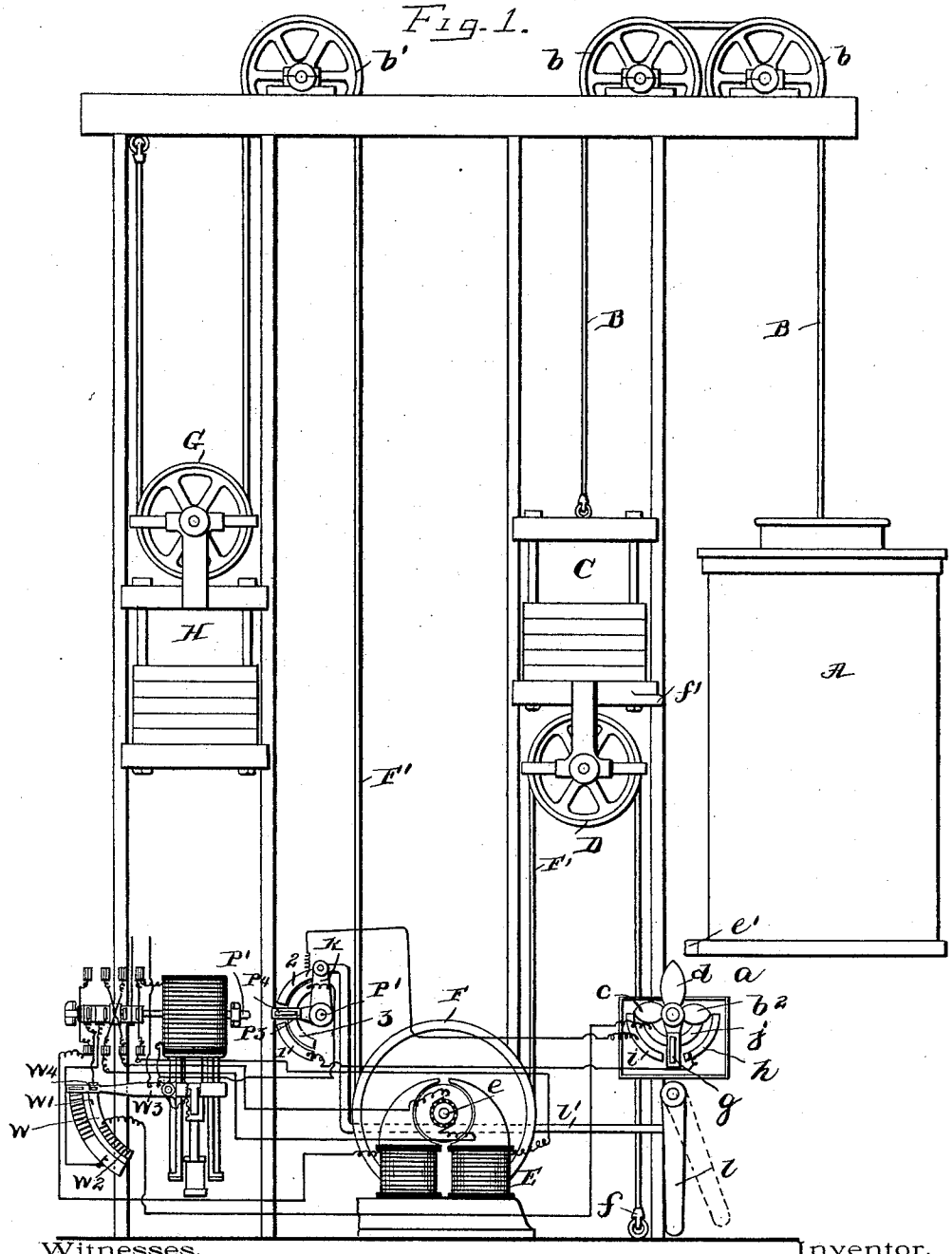
(No Model.) 2 Sheets—Sheet 1.

F. E. HERDMAN.

ELEVATOR MOTOR CONTROLLING DEVICE.

No. 568,568. Patented Sept. 29, 1896.

Fig. 1.



Witnesses.

Jesse B. Hellel.

Wm. W. Mitchell

Inventor.

Frank E. Herdman

by J. J. Hawley

Attorney.

(No Model.) 2 Sheets—Sheet 2.

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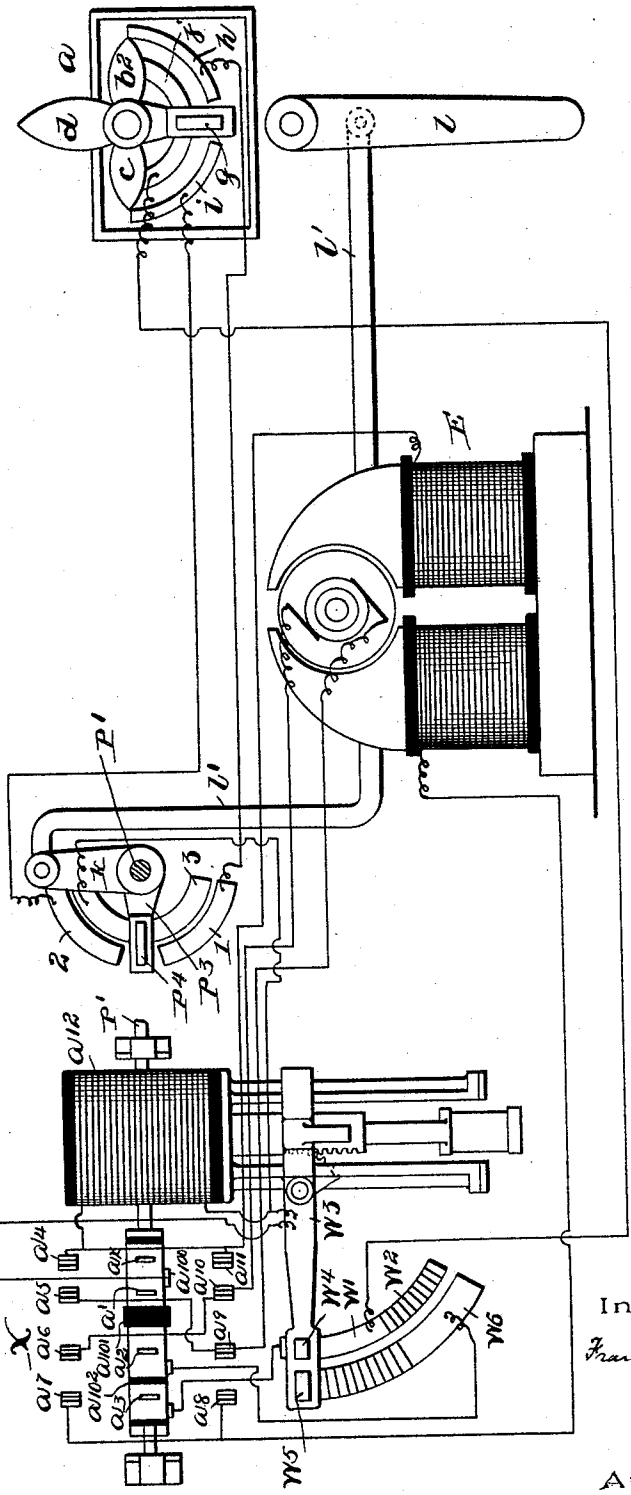

Fig. 2.

Witnesses.
Jesse B. Keller.
Munroe H. Ellis.

Inventor.
Frank E. Herdman
by G. H. Harding
Attorney.

UNITED STATES PATENT OFFICE.

FRANK E. HERDMAN, OF WINNETKA, ILLINOIS.

ELEVATOR-MOTOR-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 568,568, dated September 29, 1896.

Application filed October 5, 1895. Serial No. 564,733. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. HERDMAN, a citizen of the United States, residing at Winnetka, county of Cook, and State of Illinois, have invented a new and useful Improvement in Elevator-Motor-Controlling Devices, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

Speaking generally, this invention has for its object means and mechanism whereby the strength of the field in the motor at predetermined points in the travel of the elevator is automatically increased, so that thereby the speed of the motor and car would be decreased, and this independent of the motor-operating mechanism. This is intended to be used shortly before the end of the travel of the car in either direction and so as to bring the car to a slow speed before being brought to a full stop either by automatic devices or by moving the motor-operating mechanism by hand.

The generic invention, of which the subject-matter of this application forms a specific embodiment, forms the subject-matter of certain patent issued to me October 29, 1895, No. 548,830, and the invention therein described is generically claimed, and I intend in this application to describe and claim a specific embodiment of the generic invention described and claimed in the before-mentioned application.

I will first describe this invention as illustrated in the drawings and then specifically point out the same in the claims.

In the drawings, Figure 1 is a side elevation of elevator mechanism, and Fig. 2 is an electrical diagram.

A is the elevator-car; B, the lifting-cable, which passes up over the sheaves *b b* and down, and is connected to the frame C, carrying the sheave D.

F′ is a cable, one end secured at *f* to the bottom of the shaft, and passing around the sheave D around a sheave F upon the shaft *e* of electric motor E. The cable then passes up over the sheave *b′* on the top of the shaft down around the sheave G upon the top of frame H. Frictional contact between the cable F′ and sheave F is maintained by the frames C and H, and the sheaves F and D are so adjusted as to reduce the speed transmitted by the motor to the car. This arrangement of driving the car from the shaft of motor E without the use of worm and gear forms the subject-matter of another application filed by me October 5, 1895, Serial No. 564,732.

At a point on the shaft near the lower end thereof, and when it is desired to slow down the speed of the car, is placed a switch *a*. This switch consists in the brush *g* and the arms or projections b^2, *c*, and *d*, the projection *c* being in line with the projection *f′*, carried by frame C, and the projection b^2 in line with projection *e′*, carried by car.

j is a long contact, and *h* and *i* two short contacts. When the switch is central, the brush *g* rests on contact *j*, but is free from contacts *i* and *h*. When moved in one direction, brush *g* makes contact with contacts *j* and *h* and in the other direction with contacts *j* and *i*.

Connected to the motor-operating shaft P′ is a crank or lever P^3, carrying a brush P^4, insulated therefrom.

3 is a long contact, and 1 and 2 short contacts. When the shaft P′ is central, the brush P^4 is in contact with contact 3, but free from contacts 1 and 2. When the shaft is moved in one direction, the brush makes contact with contacts 1 and 3, and when moved in the other direction with contacts 2 and 3.

Contact 1 and contact *h* are in electrical connection, and contact 2 and contact *i* are also in electrical connection.

The circuit to the armature and field of the motor is admitted through resistance devices controlled by a resistance-arm in the following manner: X is a snap-switch having the blades $a^\times$ a' a^2 a^3, the blades $a^\times$ and a' being in electrical connection with each other through the conductive portion a^{100} of the hub of the snap-switch X, but insulated from the brushes a^2 and a^3 by the insulation a^{101}, the brushes a^2 and a^3 being insulated from each other by insulation a^{102}. The brush $a^\times$ in the movement of the switch in one direction makes contact with contact a^4 and in the other direction with contact a^{11}. So brush a' makes contact with a^5 and a^{10}, brush a^2 with contacts a^6 and a^9, brush a^3 with contacts a^7 and a^8. The contacts a^5 and a^9 are electrically connected, and so are a^6 and a^{10}. The current from one pole of cur-

rent supply passes to the conductive portion a^{100} of the hub of the snap-switch X, making therefore direct electrical connection from one pole of the current supply to both the brushes $a^{\times}$ and a'. Contacts a^4 and a^{11} are in electrical connection, and so are contacts a^7 and a^8. From contact a^4 a wire leads to the resistance-arm solenoid a^{12}, and from said solenoid a wire leads to the resistance-arm W^3, and from said arm a wire leads to the other pole of the source of current supply. From the contact a^{11} a wire leads to one side of the field, and from the other side of the field a wire leads to the contact a^8. From the brush a^3 a wire leads to the field-resistance W', in electrical connection with the brush W^4, in electrical connection with the arm W^3. From the contact a^{10} a wire leads to one side of the armature, and from the other side of the armature a wire leads to the contact a^9, and from the brush a^2 a wire leads to the armature-resistance W^6, in electrical connection with the brush W^5, by resistance-arm W^3. From the arm W^3 a wire runs to contact 3, and from non-resistance portion W' of field-resistance W a wire runs to contact *j*. Now where it is desired that the car shall ascend, the operating-shaft is moved in the proper direction to cause the current to be admitted to the motor to cause it to revolve in the proper direction. This causes the brush P^4 to be moved so as to be in contact with contacts 1 and 3. The car now ascends, the motor operating in the ordinary manner, the arm W^3 being moved by solenoid a^{12} until it is upon the portion W^3 of the resistance-plate W, and current passing to the field through resistances. This continues until the frame C has moved a distance, (its travel being equal to the travel of the car,) so that the projection *f'* strikes the arm C, which swings or revolves the switch, so that the brush *g* makes contact with contacts *h* and *j*, and at once a circuit independent of the resistances is completed to the field, and the strength of the field is increased and the speed of the motor and car decreased. The movement of the projection *f* is such that it passes beyond the projection or arm C, and in the return movement (when the movement of the car and frame C are reversed) the projection *f'* strikes the projection or arm *d*, returning the switch to its normal condition and cutting out this circuit to the field. When the operating-shaft P' moves so as to cause the car to descend, the brush P^4 is brought in contact with contacts 2 and 3, and when the car has descended to its proper point of travel the projection *e* in the car strikes the arm or projection b^2, making connection between the brush *g* and contacts *i* and *j*, and again the circuit to the field is made independent of the resistances. The switch is turned by the projection *e* in the reversed movement of the car striking the projection *d* and cutting out this circuit to the field.

I can, if desired, instead of having a double switch *a* at the bottom of the shaft, have two switches, one at the top and the other at the bottom of the shaft, and control and operate both switches by means of a projection either upon the car or carried by the frame C.

Beneath the switch *a* is a pivoted lever *l*, connected by a link *l'* with a crank or lever *k*, upon the operating-shaft P'. When the shaft P' is central, the lever is in the position shown in full lines. When it is moved so as to cause the car to ascend, the lever is in the left-hand dotted-line position, and when it is moved to cause the car to descend the lever is in the right-hand dotted-line position, taking the position for the car to descend. When the car has descended so that the projection *e* strikes the arm or projection b^2, the switch *a* is operated and the motor slowed down. The further movement of the car causes it to pass beyond said switch until the projection *e* strikes the lever *l*, returning it and the operating-shaft to their central position and stopping the motor. When the lever is in the left-hand dotted-line position, the car ascends until the projection *f* strikes the arm or projection *e*, when the switch *a* is operated and the motor and car slowed down. The further movement causes the projection *f* to strike the lever *l*, returning it to its, and the operating-shaft to its, central position, stopping the motor. By this arrangement I am enabled automatically, at the end of the travel of the car in either direction, to first bring it to a slow speed and then cut off the power.

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

1. The combination with an elevating apparatus and an electric motor for operating the same, of a source of current supply, electrical connection between the source of current supply and field of the motor, a resistance device in said circuit, a shunt-circuit to the field independent of the resistance device, said last-mentioned circuit being normally open, switches in said last-mentioned circuit, one controlled by the motor-controlling mechanism and the other in alinement with the operating mechanism, and adapted to be struck by said mechanism in its movement.

2. The combination with an elevating apparatus and an electric motor for operating the same, of a source of current supply, electrical connection between the source of current supply and the field of the motor, a resistance device in said circuit, a shunt-circuit to the field independent of the resistance device, said last-mentioned circuit being normally open, switches in said last-mentioned circuit, one controlled by the motor-controlling mechanism and the other in alinement with the operating mechanism and adapted to be struck by said mechanism in its movement, a lever connected with the switch device controlled by the motor-controlling

mechanism in path of movement of the elevating apparatus and adapted in the movement of the elevating apparatus to be struck by it, returning the switch and motor-controlling mechanism to its central position.

3. The combination with an elevating apparatus and an electric motor for operating the same, of a source of current supply, electrical connection between the source of current supply and field of the motor, a resistance device in said last-mentioned circuit, a shunt-circuit to the field independent of said last-mentioned circuit, a contact as 3 in electrical connection with one side of said shunt-circuit, a contact as *j* in electrical connection with the other side of said shunt-circuit, contacts as 1 and 2 and *h* and *i*, contact 1 being in electrical connection with contact *h*, and contact 2 being in electrical connection with contact *i*, a brush controlled by the motor-controlling mechanism and adapted, dependent upon the direction of movement of the operating mechanism, to electrically connect contacts 3 and 2 or contacts 3 and 1, a switch device carrying a brush adapted, dependent upon the direction of movement to electrically connect contacts *j* and *h* or contacts *j* and *i*, said last-mentioned switch being in alinement with the elevating apparatus, and adapted to be struck and moved by said elevating apparatus.

4. The combination with an elevating apparatus and an electric motor for operating the same, a source of current supply, electrical connection between the source of current supply and field of the motor, a resistance device in said last-mentioned circuit, a shunt-circuit to the field independent of said last-mentioned circuit, a contact as 3 in electrical connection with one side of said shunt-circuit, a contact as *i* in electrical connection with the other side of said shunt-circuits, contacts as 1 and 2 and *h* and *i*, contact 1 being in electrical connection with contact *h*, and contact 2 being in electrical connection with contact *i*, a brush controlled by the motor-controlling mechanism and adapted, dependent upon the direction of movement of the operating mechanism, to electrically connect contacts 3 and 2, or contacts 3 and 1, a switch device carrying a brush adapted, dependent upon the direction of movement, to electrically connect contacts *j* and *h* or contacts *j* and *i*, said last-mentioned switch being in alinement with the elevating apparatus, and adapted to be struck and moved by said elevating apparatus, a lever connected with the brush device controlled by the operating mechanism in alinement with the elevating apparatus, and adapted in the movement of the elevating apparatus to be struck by it, returning the brush and the operating mechanism which controls it to its central position.

In testimony of which invention I have hereunto set my hand.

FRANK E. HERDMAN.

Witnesses:
C. D. HOYT,
J. J. O'MEARA.