No. 785,936. PATENTED MAR. 28, 1905.

J. DILLON.

ELEVATOR MECHANISM.

APPLICATION FILED JULY 22, 1904.

5 SHEETS—SHEET 1.

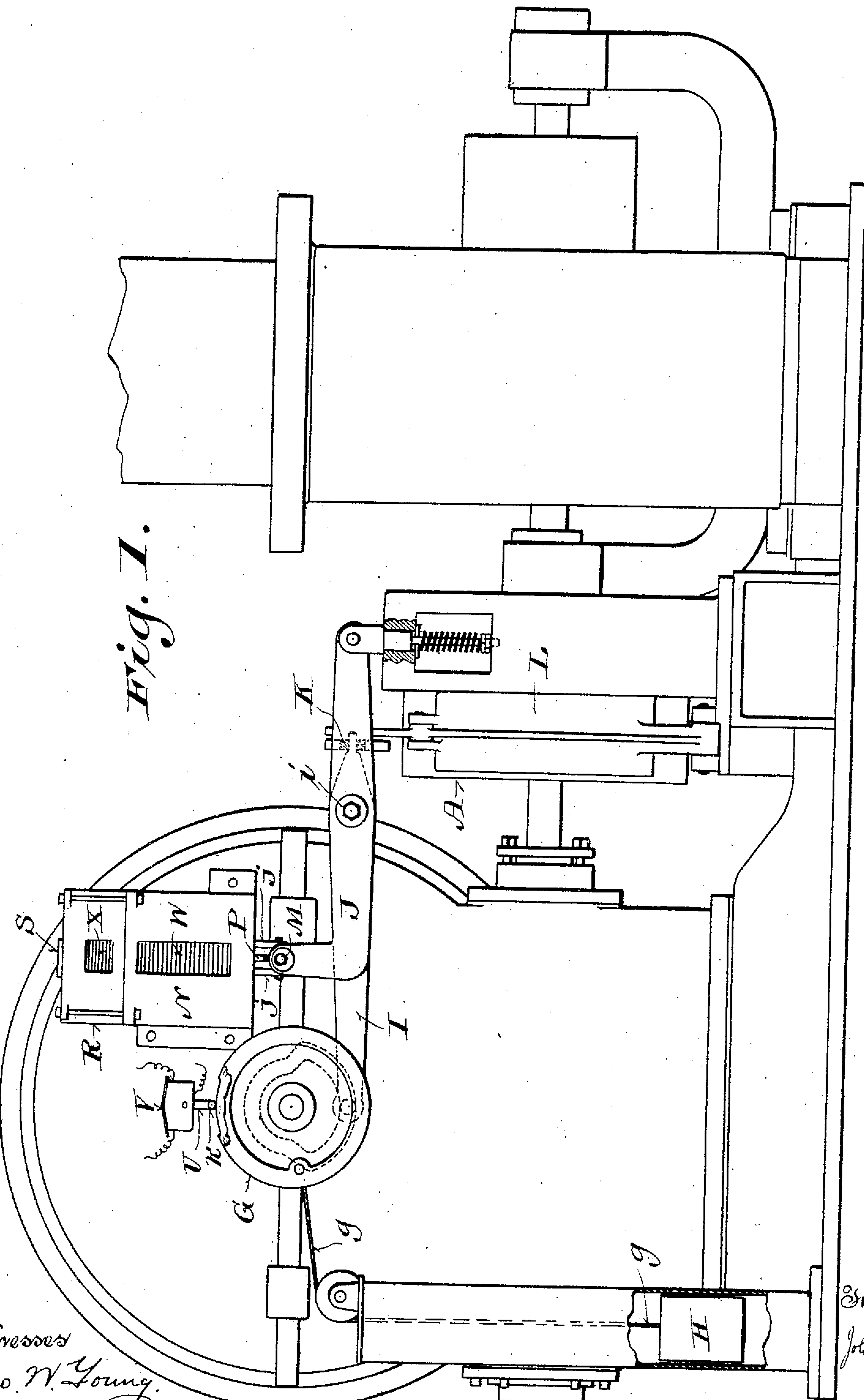


Fig. 1.

Witnesses
Geo. W. Young.
N.E. Oliphant

Inventor
John Dillon

By H.G. Underwood
Attorney

Aug. 10, 1904, Letter.
Sept. 13, 1904, Passed.

No. 785,936. PATENTED MAR. 28, 1905.

J. DILLON.

ELEVATOR MECHANISM.

APPLICATION FILED JULY 22, 1904.

5 SHEETS—SHEET 2.

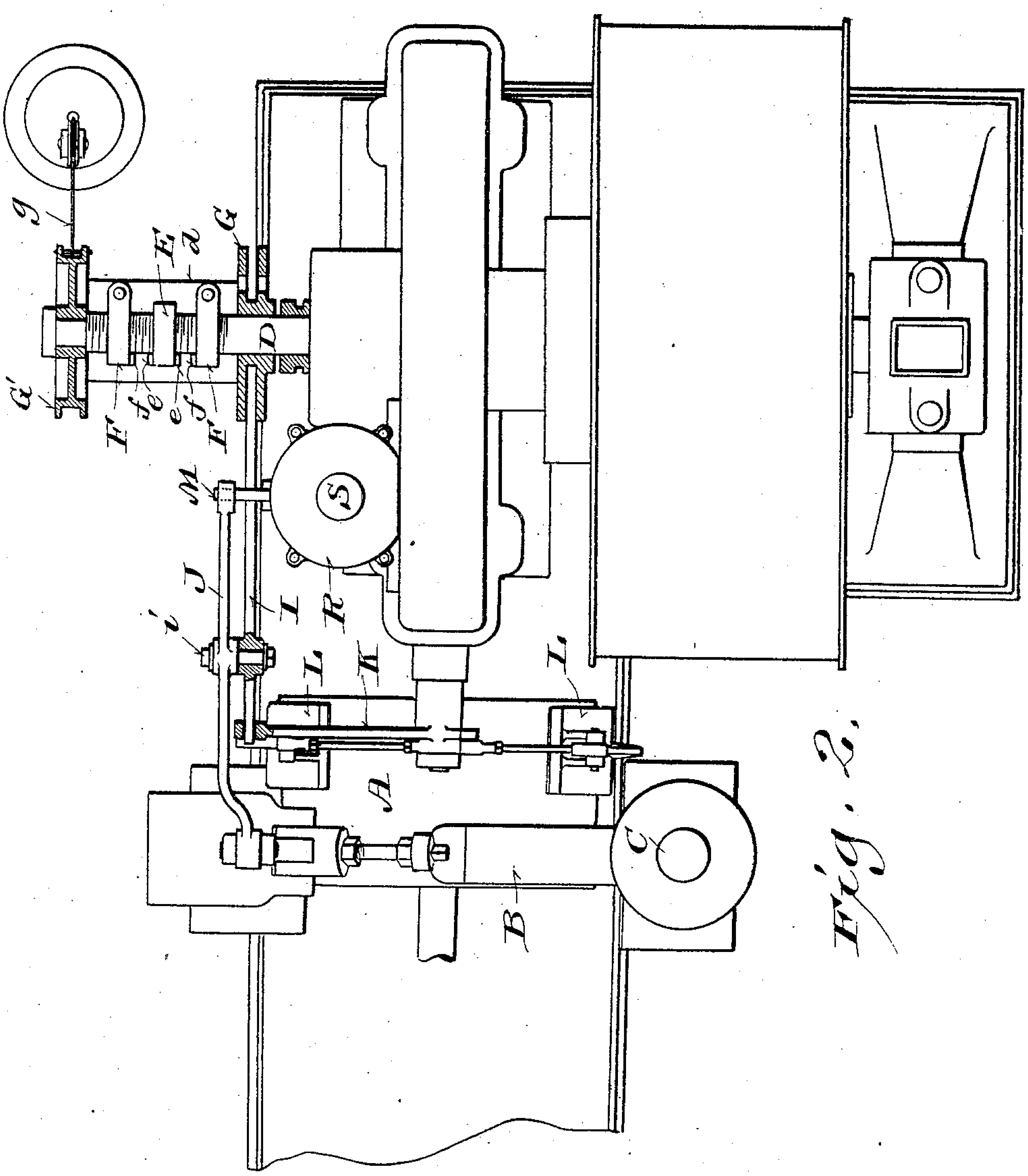


Fig. 2.

Witnesses
Geo W Young.
N. E. Oliphant

Inventor
John Dillon.
By H. G. Underwood.
Attorney

No. 785,936. PATENTED MAR. 28, 1905.

J. DILLON.

ELEVATOR MECHANISM.

APPLICATION FILED JULY 22, 1904.

5 SHEETS—SHEET 3.

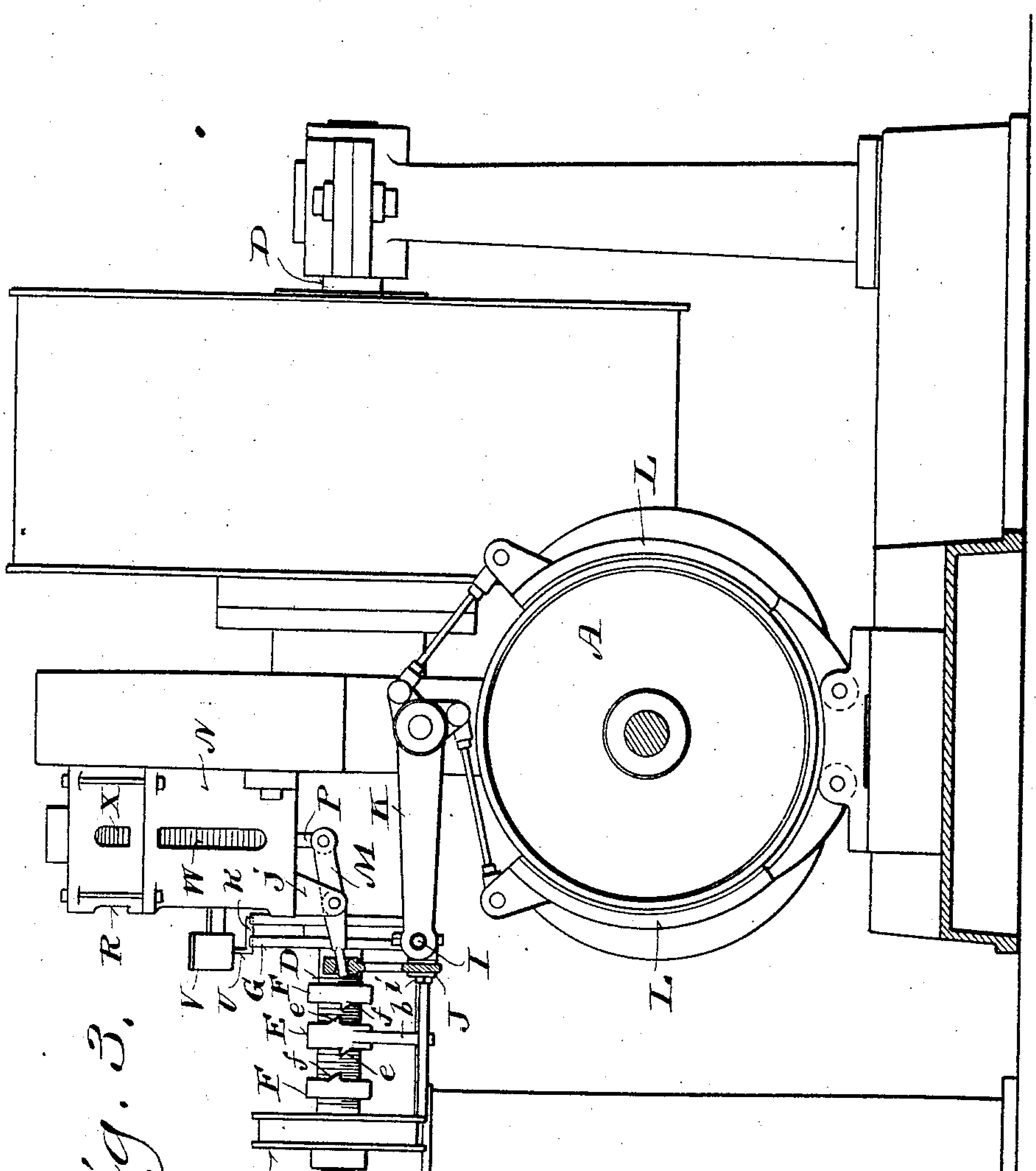


Fig. 3.

Witnesses
Geo. W. Young.
N. E. Oliphant

Inventor
John Dillon.
By H. G. Underwood.
Attorney

No. 785,936. PATENTED MAR. 28, 1905.

J. DILLON.

ELEVATOR MECHANISM.

APPLICATION FILED JULY 22, 1904.

5 SHEETS—SHEET 4.

Fig. 4.

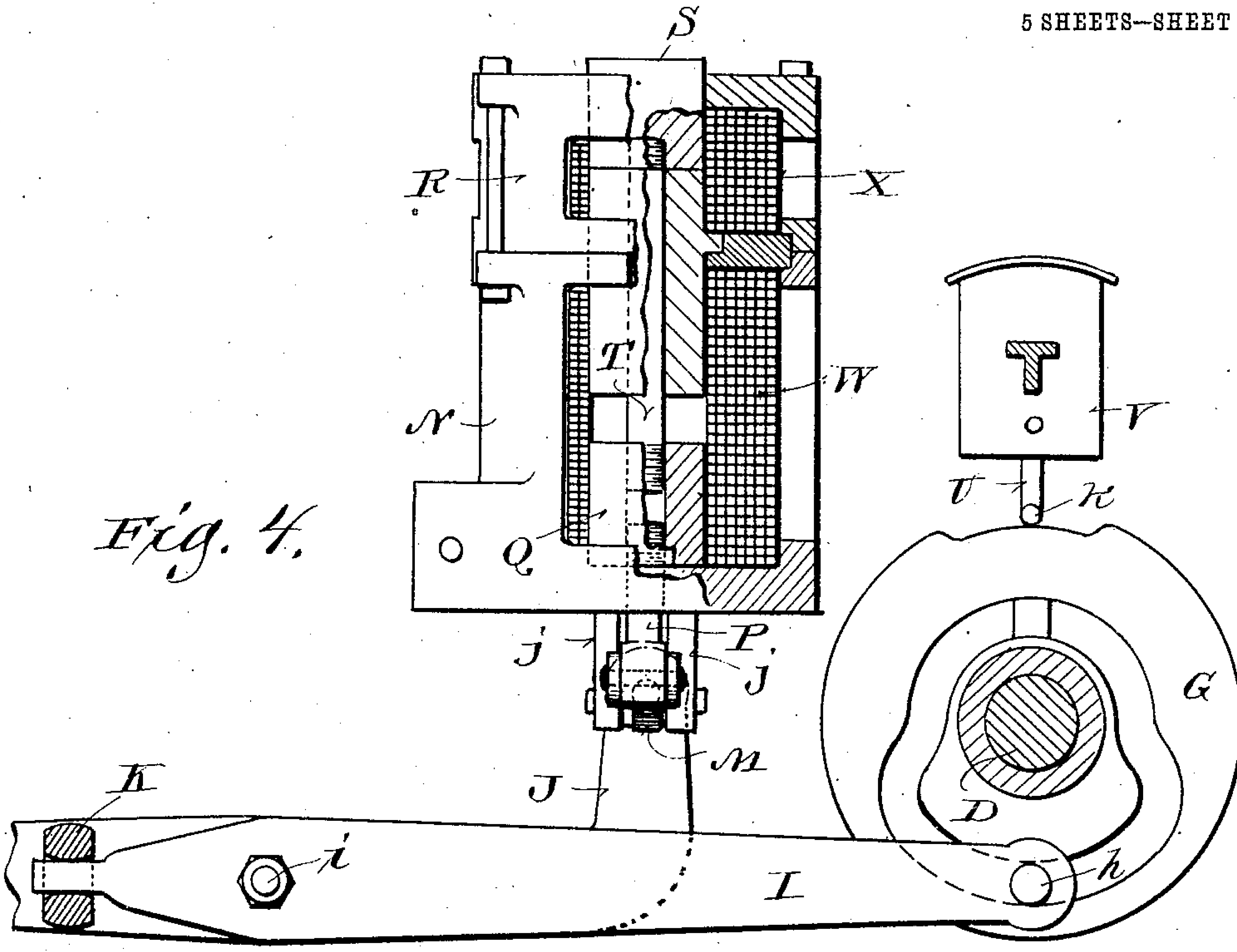


Fig. 6.

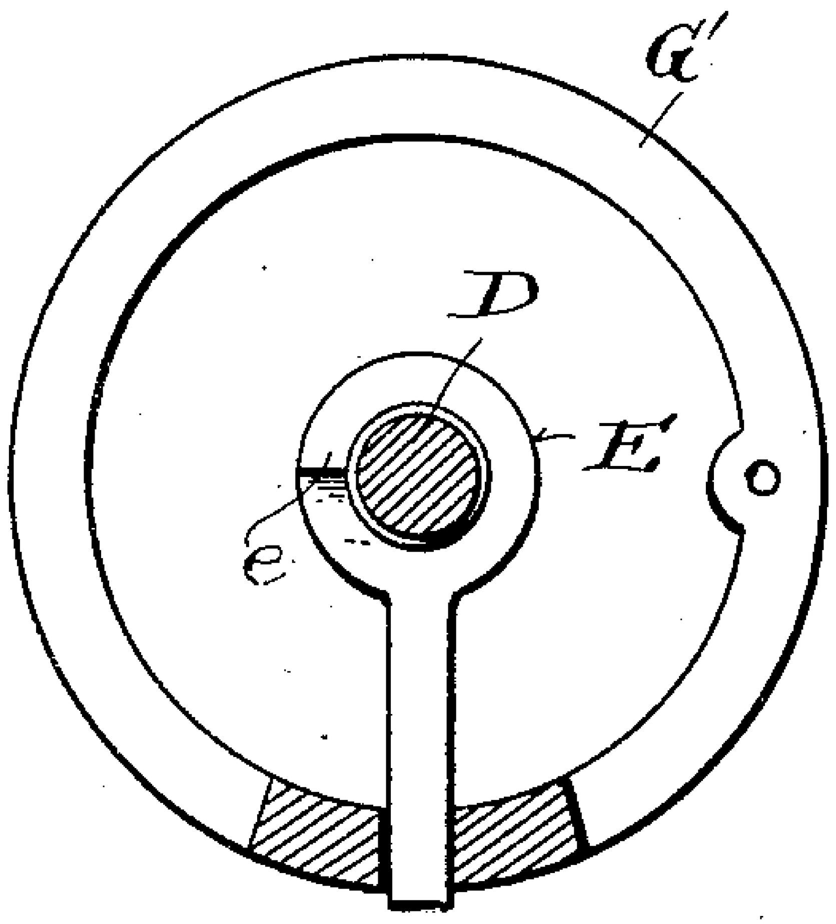
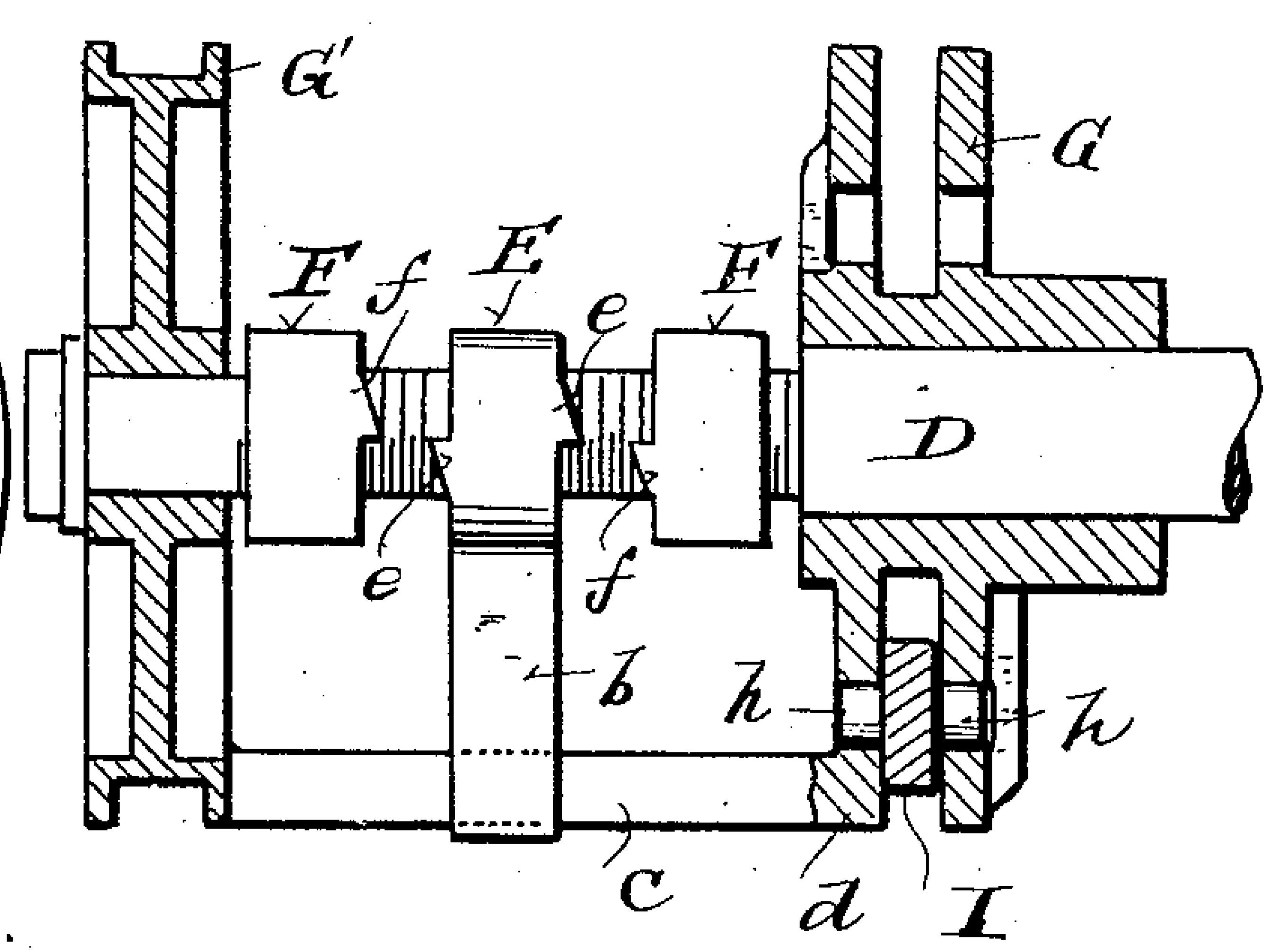


Fig. 5



Witnesses
Geo. W. Young,
N. E. Oliphant

Inventor
John Dillon,
By H. G. Underwood.
Attorney

No. 785,936. PATENTED MAR. 28, 1905.

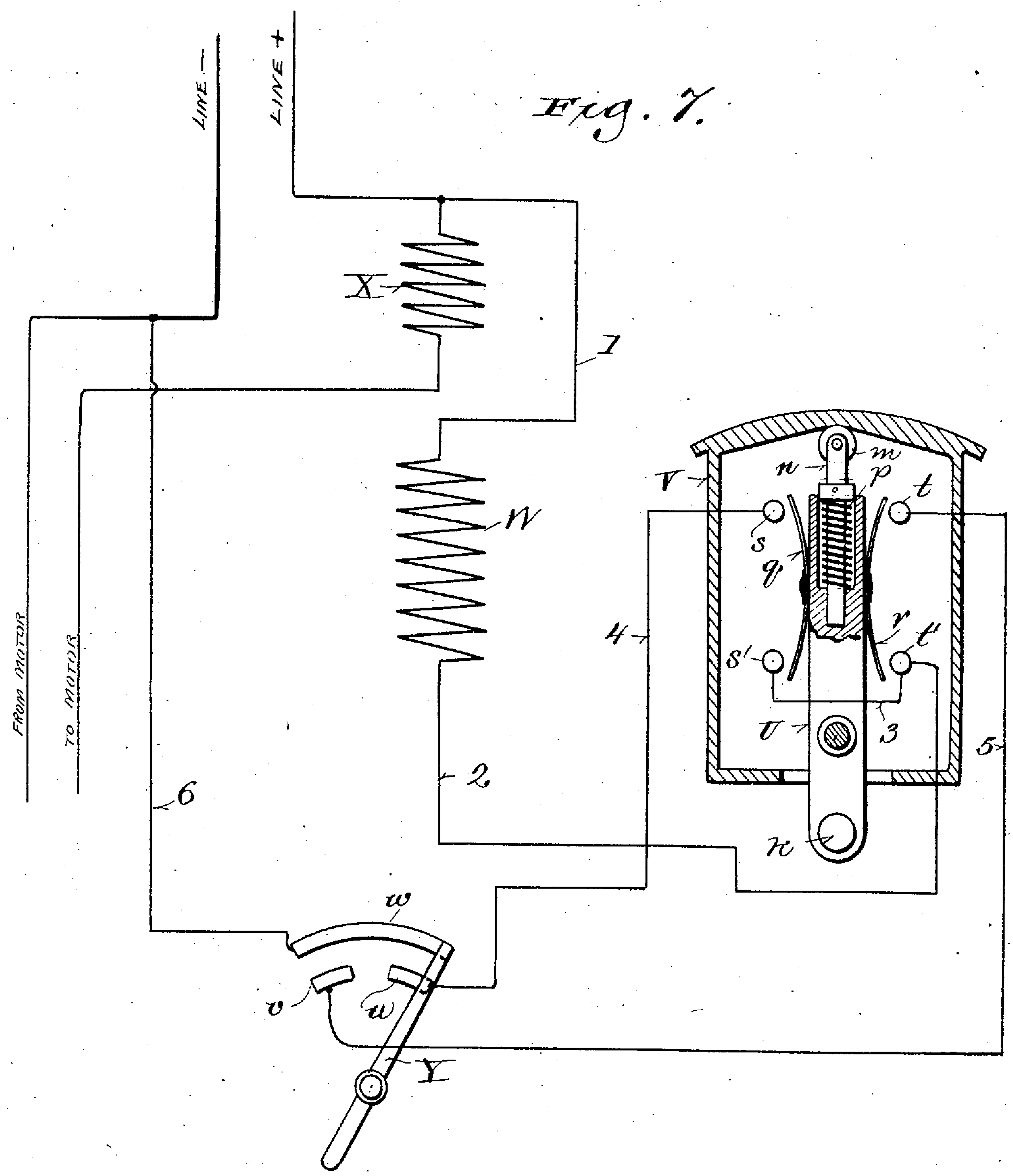
J. DILLON.

ELEVATOR MECHANISM.

APPLICATION FILED JULY 22, 1904.

5 SHEETS—SHEET 5.

Fig. 7.



Witnesses
Geo. W. Young,
N. E. Oliphant

Inventor
John Dillon.
By H. G. Underwood.
Attorney

No. 785,936. Patented March 28, 1905.

UNITED STATES PATENT OFFICE.

JOHN DILLON, OF MILWAUKEE, WISCONSIN.

ELEVATOR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 785,936, dated March 28, 1905.

Application filed July 22, 1904. Serial No. 217,690.

To all whom it may concern:

Be it known that I, JOHN DILLON, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Elevator Mechanism; and I do hereby declare that the following is a full, clear, and exact description thereof.

Like in my Patent No. 742,173, issued October 27, 1903, and in my application, Serial No. 237,496, filed December 19, 1904, the invention hereinafter particularly set forth, with reference to the accompanying drawings, and subsequently claimed has especial reference to electric elevators, its object being to prevent overrunning of an elevator-car at terminal landings and to provide for automatic setting of an auxiliary or emergency brake on the elevator-engine should the operator fail to do the work necessary for a stop at either terminal landing.

Figure 1 of the drawings represents an elevation of an elevator-engine in which my improvements are embodied; Fig. 2, a plan view of the engine, partly in horizontal section; Fig. 3, a partly-transverse section of said engine; Figs. 4, 5, and 6, partly-sectional views of fragments of the engine, and Fig. 7 a wiring diagram.

The mechanism illustrated in the drawings is similar in some respects to what is shown in the patent aforesaid, and my improvements have particular reference to automatic predetermined application of an auxiliary brake in an electric engine, the engine being actuated by an electric motor controlled from within an elevator-car by switch mechanism, as is common practice and known as "full magnet control." The mechanism aforesaid is for the most part arranged and connected on a suitable supporting-frame, and the controller for the electric motor is shown mounted on said motor, although it may be otherwise conveniently located, the electric connections (not shown) of said controller, motor, and switch being had by suitable wiring.

Referring by letter to the drawings, A indicates the brake-pulley in an elevator-engine, and B C the band and magnet-core of an ordinary electric brake applied to said pulley by a spring and released by energization of the electromagnet element of said brake. Such a brake being common in the art and not forming any part of my invention, further illustration and description of the same is deemed unnecessary.

A portion of the cable-drum shaft D of the engine is screw-threaded and engages a traveling nut E, that has its play between a pair of other nuts, F, adjustable on said shaft but made fast thereto by any suitable means in adjusted position. The traveling nut is provided with a shank *b*, that plays in a longitudinal slot *c* of a web *d*, connecting a cam G with a pulley G′, this cam and pulley being loose on the drum-shaft. Clutch-lugs *e* on opposite sides of the traveling nut are for engagement with similar lugs *f* of the nuts F aforesaid. The distance apart of the nuts F is proportionate to the distance between terminal landings for the elevator-car, and at about the time this car arrives at either of said landings a clutch engagement of the traveling nut with one of said nuts F will result in a rotary motion of the cam G and pulley G′ therewith. This motion is against yielding resistance, herein shown as a weight H, connected by a sheave-supported flexible device *g* with the pulley G′; but any suitable yielding resistance may be employed.

Engaging grooves of the cam G are lugs or rollers *h*, extending from opposite sides of one end of a lever I, connected by a pivot-bolt *i* with another lever, J, that has one end thereof in connection with a yielding resistance, herein shown as a spring-controlled rod loose in a guide; but some other form of yielding resistance may be employed in practice. The other end of the lever I is connected to a lever K in toggle connection with friction-shoes L, that oppose the brake-pulley A of the engine. These shoes and the mechanism described in connection therewith constitute the auxiliary brake, to which especial reference is had herein. The lever J is offset at one end, and this end of said lever is provided with an aperture engaged by an end of another lever, M, in fulcrum connection with brackets *j*, depending from a casing N, containing an electromagnet. The other end of the lever M is coupled to a pin P, that has screw-thread connection with a sliding core Q of the magnet in the casing aforesaid. Surmounting the casing N is the casing R of another electromagnet, having a sliding core S, and the ends of a coupling-pin T are in screw-thread connection with said core and the core Q of the magnet aforesaid.

The perimeter of the cam G is effective on a lateral lug *k* of a pivotal switch-arm U, one end of which extends through a play-slot in the bottom of a box V, and the top of this box is inclined in opposite direction from its center. An antifriction-roller *m* opposes the box-top and is hung in a fork *n*, having a shouldered tang that engages a spiral spring *p*, set in a recess of the switch-arm U aforesaid, whereby this switch-arm is automatically restored to normal position when released after swinging in one direction or the other on its pivot. The switch-arm U is provided on opposite sides with contact-blades *q r*, that respectively close on contacts *s s'* and *t t'* in the switch-box. The contacts *s t* are connected by wires 4 5 with contacts *u v* of the controller-switch that is placed in the elevator-car, and another contact, *w*, of this controller-switch is connected by a wire 6 with the negative side of the line, by which current is supplied to the motor.

The coils W X of the electromagnets aforesaid are connected to each other and the positive side of the current-supply line by a wire 1, and a wire 2 connects the coil W with the contact *t'*, that is connected to contact *s'* by a wire 3, the coil X being in the main or motor circuit. The pivotal arm Y of the controller-switch is adjusted to be on contacts *u w* or *v w*, according to the direction of travel on the part of the elevator-car.

In practice when the elevator-car approaches a terminal landing the traveling nut E engages with one of the nuts F, stationary on the drum-shaft, and this engagement of said nuts causes rotary motion of the cam G, whereby the switch-arm U is actuated to close a circuit through the magnet-coil W, and the sliding core Q of the magnet being attracted the lever M is actuated to press down on lever J, this motion being communicated to lever I and by it to lever K, that causes the shoes L of the auxiliary brake to bear on the brake-pulley. The pressure thus applied is not sufficient at all times to stop the movement of the machinery; but continued rotary motion of the cam G will result in a further tilt of levers I and K to increase the pressure of the shoes L on the brake-pulley until such time as the desired result is obtained. It is also to be understood from the foregoing that if the operator of the elevator fails to do the work necessary for a stop at a terminal landing the automatic auxiliary brake accomplishes the desired result, and that the setting of this brake is at no time dependent upon said operator. To release the auxiliary brake, the circuit through the magnet-coil W is broken by means of the controller-switch and the machinery is started in the opposite direction to disengage the traveling nut E from a stationary nut on the drum-shaft, at which time the cam G and the various levers are automatically restored to normal position.

The magnet comprising the coil X and core S, connected as described, is a means to prevent sticking of the core Q of the magnet that embodies the coil W; but other suitable means may be substituted for the same purpose. Assuming the employment of the auxiliary magnet, it will be seen that if the core Q, the main magnet, or any part of the auxiliary brake mechanism should stick after an application of said mechanism the elevator-engine would be unable to run in the opposite direction, as the power applied to the aforesaid mechanism would be sufficient to overcome the power of the motor and high currents would flow. Therefore at the instant such currents started to flow they would strengthen the auxiliary magnet and cause downward movement of its core, thus forcing the core Q of the main magnet to drop, the strength in said auxiliary magnet being sufficient to overcome any residual magnetism left in said main magnet or the friction of the various parts of the auxiliary brake mechanism.

Supposing the blade *q* of the switch-arm U is closed on contacts *s s'* and the controller-switch contacts *u* and *w* are bridged by the arm Y, current from the positive side of the line will flow through wire 1, magnet-coil W, wires 2 and 3, contact *s'*, blade *q*, contact *s*, wire 4, contact *u*, switch-arm Y, contact *w*, and out on wire 6 to the negative side of the line. The switch-arm Y being reversed on contacts *v w* and the brake-switch arm U swung to close its blade *r* on contacts *t t'*, current from the positive side of the line will flow through wire 1, magnet-coil W, wire 2, contact *t'*, blade *r*, contact *t*, wire 5, contact *v*, switch-arm Y, contact *w*, and out on the negative side of the line.

From the foregoing it will be understood that whenever the brake-switch is closed by movement of the cam G it cannot be again opened until the said cam is restored to normal position. This operation necessitates breaking the circuit completed by the closing of said brake-switch, and this breaking of said circuit is effected by a reversal of the arm Y of the controller-switch.

While I have herein shown an electromagnet as the preferred electrical means used in applying the brake, it will be understood by any one versed in the art that any electric power, such as an electric motor, can be used as such electrical means in place of the said electromagnet, if desired in any particular case.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. An elevator mechanism embodying a brake, and combined mechanical and electric means for automatic predetermined application of the brake.

2. An elevator mechanism embodying a brake, and combined mechanical and electric means for automatic predetermined application of the brake and gradual increase of its pressure.

3. An elevator mechanism embodying a brake, combined mechanical and electric means for automatic predetermined application of the brake, and mechanical means for automatically increasing pressure of the applied brake.

4. An elevator mechanism embodying a brake, an electromagnet, means in connection with the brake and magnet for applying said brake, and means for automatic predetermined energization of said magnet.

5. An elevator mechanism embodying a brake, an electromagnet, means in connection with the brake and magnet for applying said brake, means for automatic predetermined energization of said magnet, and means for automatically increasing pressure of the applied brake.

6. An elevator mechanism embodying a brake, an electromagnet having a sliding core, a system of levers connecting the brake and said core of the magnet, and means for automatic predetermined energization of said magnet to apply the brake.

7. An elevator mechanism embodying a brake, an electromagnet having a sliding core, a system of levers connecting the brake and said core of the magnet, means for automatic energization of said magnet to apply the brake, and means independent of the magnet for gradually increasing leverage on the applied brake.

8. An elevator mechanism embodying a brake, an electromagnet, means in connection with the brake and magnet for applying said brake, a switch for closing a circuit through said magnet, and means for automatic predetermined closing of the switch.

9. An elevator mechanism embodying a brake, an electromagnet, means in connection with the brake and magnet for applying said brake, a switch for closing a circuit through said magnet, means for automatic predetermined closing of the switch, and means independent of the magnet for gradually increasing pressure of the applied brake.

10. An elevator mechanism embodying a brake, an electromagnet, means in connection with the brake and magnet for applying said brake, a switch for closing a circuit through said magnet, means for automatic predetermined closing of the switch, and another switch by which to manually break and reverse said circuit.

11. An elevator mechanism embodying a brake, an electromagnet having a sliding core, means in connection with the brake and magnet-core for applying said brake, a switch for closing a circuit through the magnet, means for automatic predetermined closing of the switch, another switch by which to manually break and reverse said circuit, and means for insuring release of the aforesaid brake when the aforesaid circuit is broken.

12. An elevator mechanism embodying a brake, an electromagnet in loop-circuit and having a sliding core, means in connection with the brake and said magnet-core for applying said brake, an auxiliary electromagnet connected in the loop and main circuit and having a sliding core coupled to the one aforesaid, a switch for closing circuit through the magnet in loop-circuit, means for automatic predetermined closing of the switch, and another switch by which to manually break and reverse the local circuit.

13. An elevator mechanism comprising a brake, a traveling clutch on a drum-shaft between clutch devices fast on the same shaft, a cam loose on said shaft, a clutch-guide extending laterally from the cam, a cam-controlled system of levers in connection with the brake, a yielding resistance in connection with one of the levers in the system, an electromagnet having a sliding core connected to another lever in said system, a switch controlled by the aforesaid cam to close a circuit through the magnet, and another switch by which to manually break and reverse said circuit.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

JNO. DILLON.

Witnesses:
H. G. UNDERWOOD,
GEORGE FELBER.