

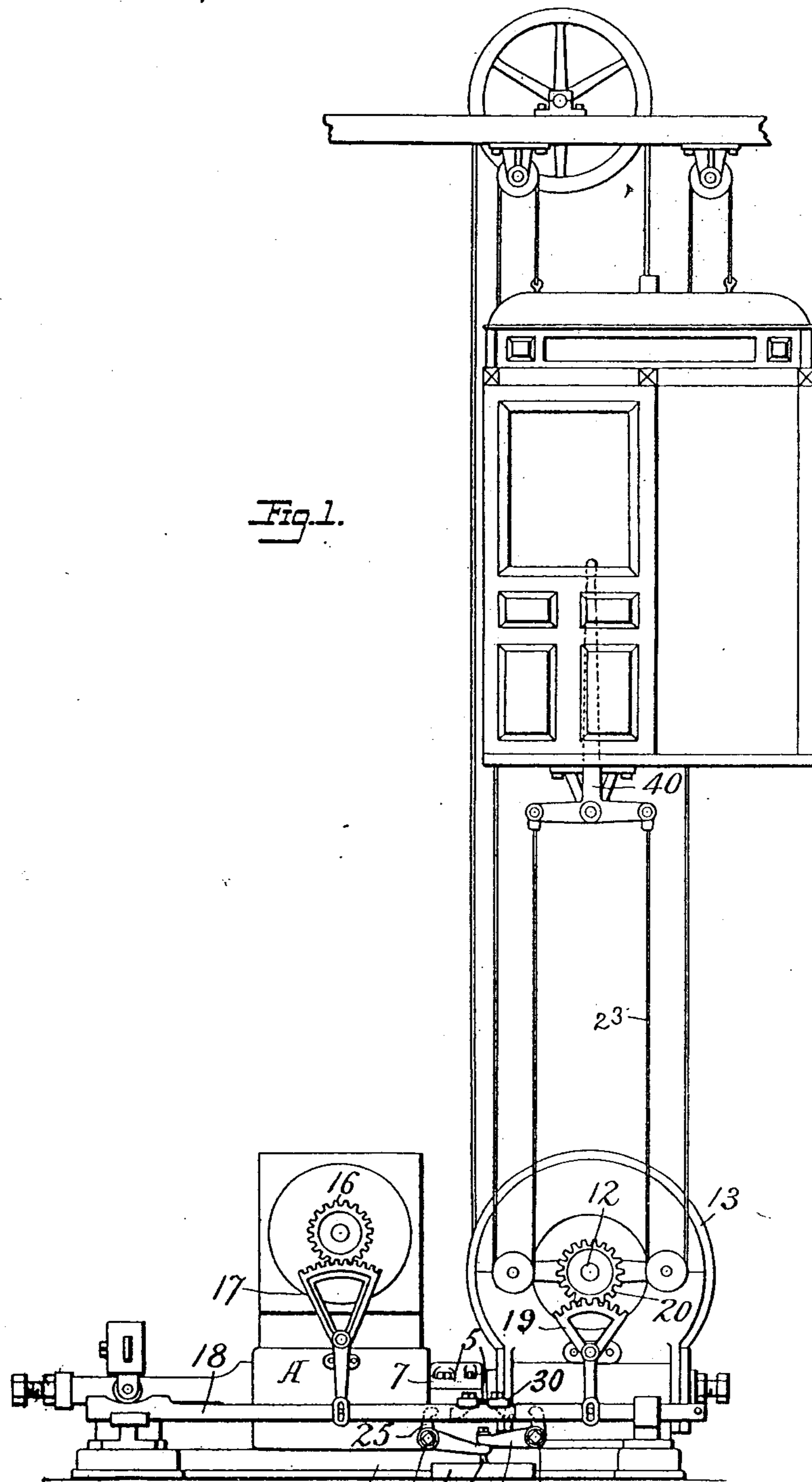
(No Model.)

2 Sheets—Sheet 1.

N. P. OTIS & R. C. SMITH.  
ELECTRIC ELEVATOR.

No. 467,192.

Patented Jan. 19, 1892.



WITNESSES  
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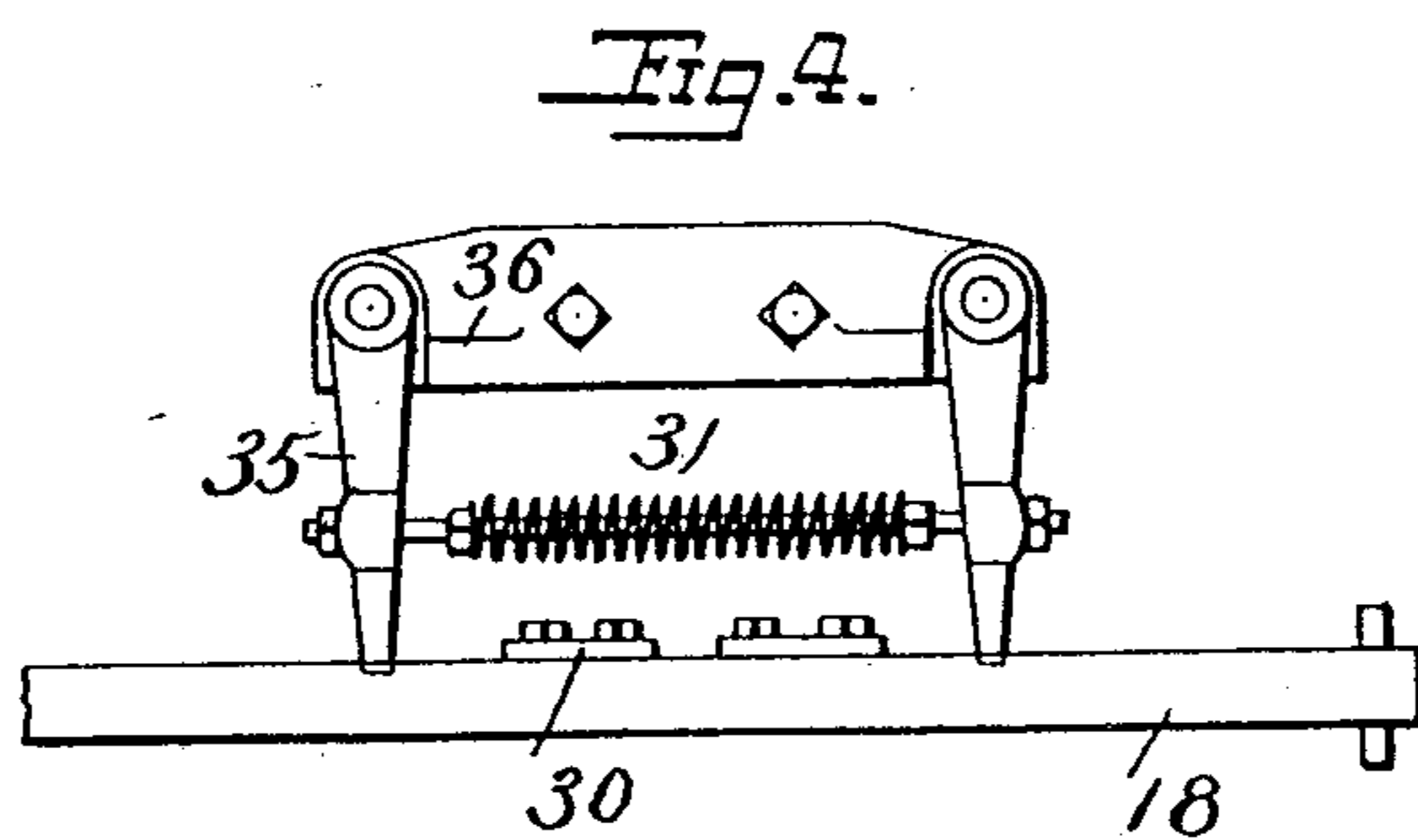
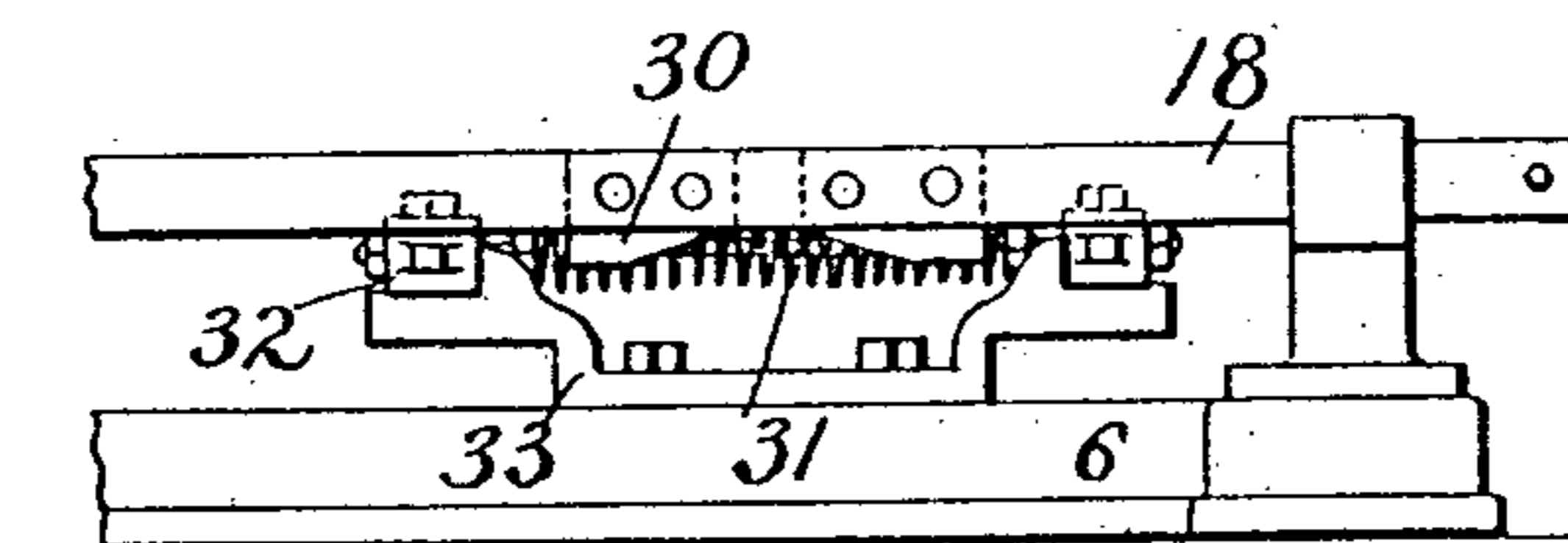
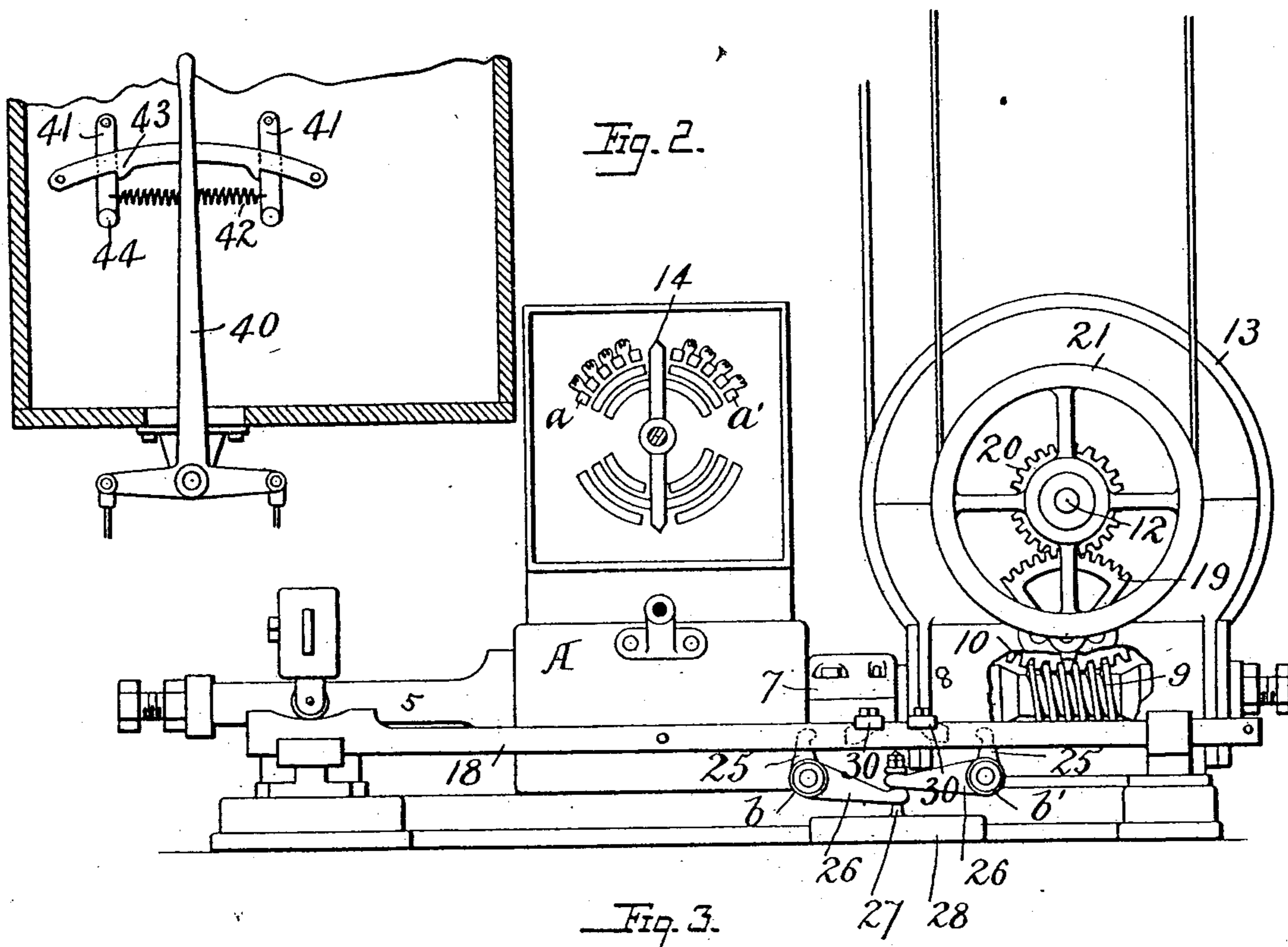
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WITNESSES  
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# UNITED STATES PATENT OFFICE.

NORTON P. OTIS AND RUDOLPH C. SMITH, OF YONKERS, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE NATIONAL COMPANY, OF CHICAGO, ILLINOIS.

## ELECTRIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 467,192, dated January 19, 1892.

Application filed July 31, 1891. Serial No. 401,300. (No model.)

*To all whom it may concern:*

Be it known that we, NORTON P. OTIS and RUDOLPH C. SMITH, citizens of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Electric Elevators, of which the following is a specification.

Our invention consists in the means whereby to secure the necessary amount of power to overcome the inertia in starting electric motors and to thereafter automatically reduce the current to the extent required for normal running; and our invention consists in providing means whereby the controlling device of the motor, after being shifted to its full extent to permit the maximum power to be applied in starting, is automatically returned to a slight extent toward its mid-position, and also in providing means whereby our improvement may be applied in connection with elevator-engines.

In the accompanying drawings, Figure 1 is an elevation illustrating our improvement in connection with an electric elevator. Fig. 2 is an enlarged side elevation of the electric engine, showing part of the cage in section. Figs. 3 and 4 are detail views illustrating modifications of the motor devices for setting back the controlling device of the electromotor.

The elevator-engine may be of any suitable construction. As shown, it consists of an electric motor A, having its armature-shaft 5, turning in suitable bearings on a base 6 and coupled by a coupling 7 with a worm-shaft 8, the worm 9 of which gears with a worm-wheel 10 upon a shaft 12, turning in suitable bearings and carrying the winding-drum 13.

The stopping and starting device of the engine, as shown, is a switch 14, which in its central or mid position opens the circuit of the line communication with the motor, and which, when moved to either side over a series of contacts *a a'*, gradually cuts out the resistance.

When the apparatus is fully in motion, as a general thing only a portion of the whole current is required to maintain it in operation, and therefore the switch in such cases need

only occupy a position, so as to keep in a portion of the resistance; but when the apparatus is started the surplus of power necessary to overcome the friction of rest and inertia of the mass demands that all or a greater portion of the resistance be cut out, after which the normal running condition of the engine can be maintained with a current of less power. Different means may be employed for securing such a movement of the switch or stopping and starting device, as will insure the surplus of power necessary in starting and bring the automatic switch or device to a position to cut off or out a portion of the current and reduce the power for normal running. Thus in Fig. 1 the switch is connected through the medium of a pinion 16 on the switch-shaft, and a sector-toothed lever 17 pivoted to the frame, with a shifting bar 18 sliding in bearings on the frame, and said shifting bar is connected by a rack-lever 19 and pinion 20 with a pulley 21, turning on shaft 12. Around this pulley passes the cable 23, leading to the cage of the elevator, and the adjustment of which shifts the bar 18 and the switch 14. Below the bar 18 are pivoted two bell-crank levers *b b'*, each having a short arm 25, projecting upward, and a long arm 26, projecting horizontally and forked or recessed for the passage of a rod 27, extending from a weight 28, that normally occupies a position upon the base. To the bar 18 are secured two tappets or contacts 30 30, so arranged that when the bar and switch are in a mid-position the said tappets will be between the two upright arms 25 and out of contact therewith, so that when the operating-rope is moved the bar 18 will be shifted to one side or the other to carry the switch to its extreme position to either side, thereby throwing the entire current into the motor and giving the surplus power necessary to start the engine. As the bar 18 approaches its extreme position, however, one of the contacts 30 meets one of the arms 25, and thereby tilts the lever *b*, so as to lift the weight 28, and when the operating-cord is released the weight will restore the lever to its original position and carry the bar 18 back to a slight extent from the extreme position from which it was moved,

thereby cutting in a portion of the resistance and reducing the current to the extent required for normal operations.

In the construction shown in Fig. 3, the return movement of the shifter-bar is effected by means of a spring 31, connecting two blocks 32 32, mounted upon a bracket 33, in position to be struck by the lugs 30 30. In the construction shown in Fig. 4 the return movement of the shifter-bar is effected through the medium of two pivoted arms 35 35, connected by the spring 31, which brings both against bearings 36 36, and the contacts 30 are brought against the ends of the arms by the movements of the shifter-bar.

Instead of arranging the weight, springs, or other motor means to act upon the shifter-bar to carry the switch back to a certain extent from its extreme position, such means may be arranged to act upon any other part of the apparatus that is moved with the switch or other stopping and starting device. For instance the said motor means may act upon the operating-lever 40 in the cage.

In the construction shown in Figs. 1 and 2 there are two pivoted arms 41 41, connected by a spring 42, which holds each in contact with a stop 43, and when the lever 40 is carried toward its extreme position it strikes a stud 44 on one of the arms and swings the latter so as to extend the spring, and when the lever is released the spring carries it back part way toward its central position, thereby shifting the rope or cable and the switch connected therewith.

While we have illustrated and referred to the above-described improvement in connection with an elevator apparatus, it will be evident that it may be employed with various electromotors where it is necessary to temporarily use a maximum power to start the motor and thereafter decrease the power to maintain the motor in its normal running condition.

Without limiting ourselves to the precise construction and arrangement of parts shown and described, we claim—

1. The combination, with an electromotor and with the controlling device thereof, of

means, substantially as described, for automatically moving said controlling device from the extreme position in which it is set in throwing the full current into the motor toward a mid-position where less than the full current will be supplied, substantially as and for the purposes set forth.

2. The combination, with an electromotor and with a controlling device provided with contacts and constructed to regulate the current passing through the motor, of a weight or spring and movable parts connected with the weight or spring and arranged in position to be struck by the contacts connected with the controlling device, substantially as set forth.

3. The combination, with an elevator-cage, electromotor for moving said cage, the controlling device of said motor, and connections for operating it from within the cage, of appliances, substantially as set forth, for automatically shifting the controlling device to a limited extent after it has been set in its extreme position, substantially as described.

4. The combination, with an electromotor and controlling device, of a shifting bar connected with said controlling device and provided with contact-pieces and movable pieces in position to be struck by said contact-pieces as the bar approaches the limit of its movement in each direction, and a weight or spring connected to restore the parts to their normal position, substantially as set forth.

5. The combination of the electromotor and its switch, the bar 18, connected to turn the switch and provided with contacts, and two movable arms arranged to be struck by said contacts, and a weight or spring connected to the said movable arms, substantially as described.

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

NORTON P. OTIS.  
RUDOLPH C. SMITH.

Witnesses:

W. J. MORGAN,  
W. S. MCARTHUR.