No. 681,555. Patented Aug. 27, 1901.

O. KAMMERER.

STEERING MECHANISM FOR GUIDELESS LIFTS.

(Application filed May 11, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

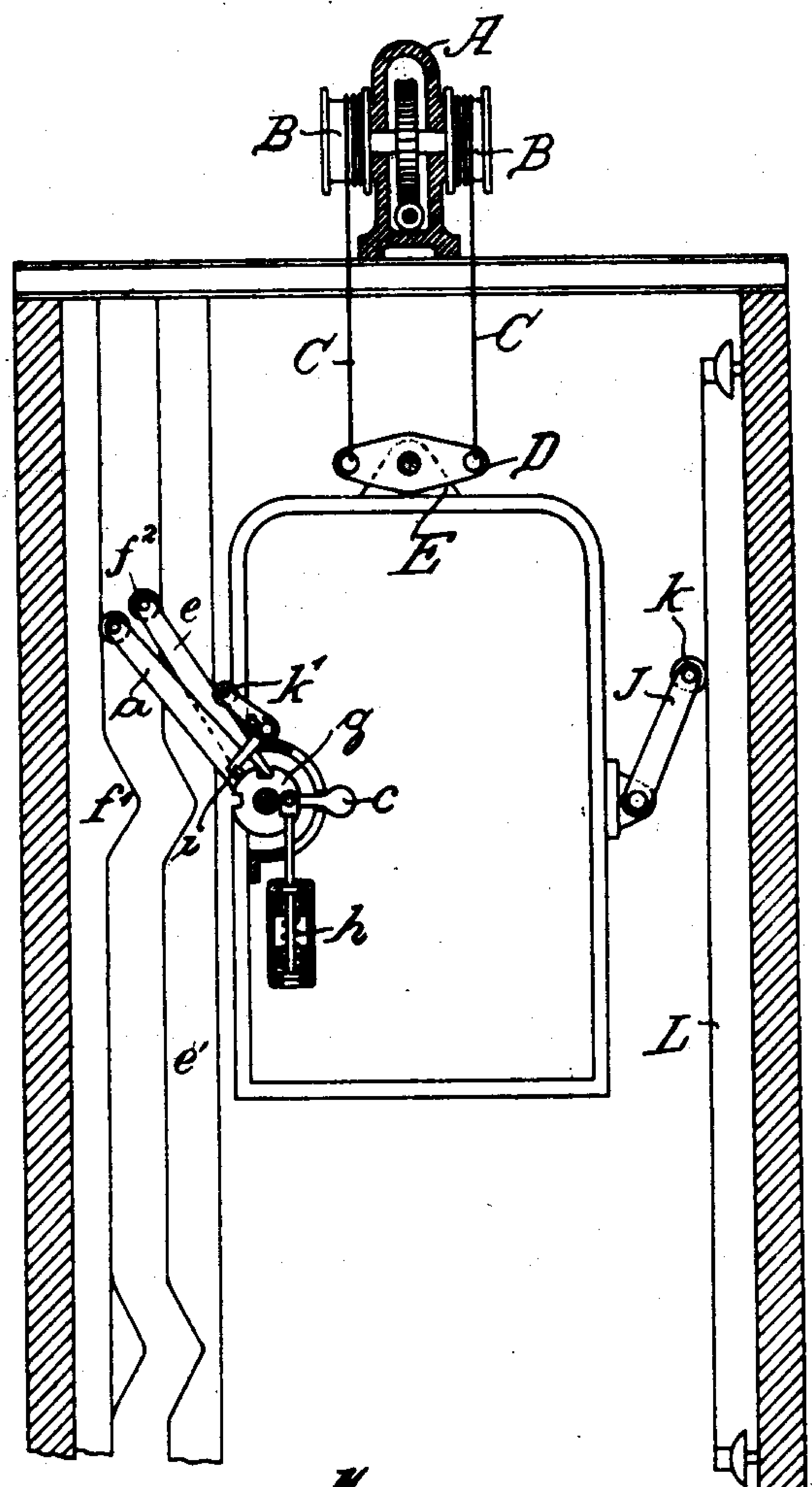
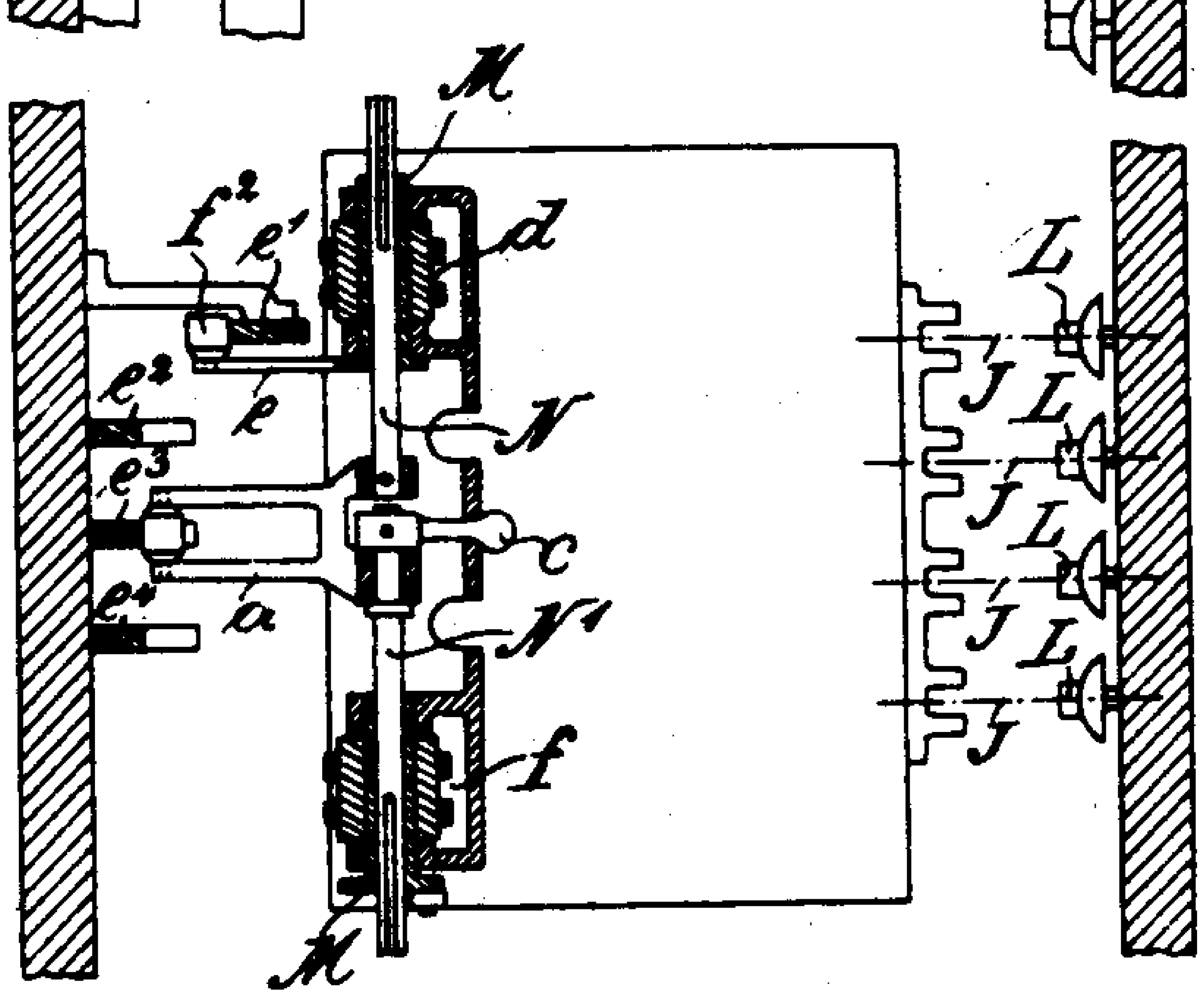


Fig. 2.



Witnesses:

Carl Ruß.

Josef Lohre

Inventor

Otto Kammerer.

by [illegible]

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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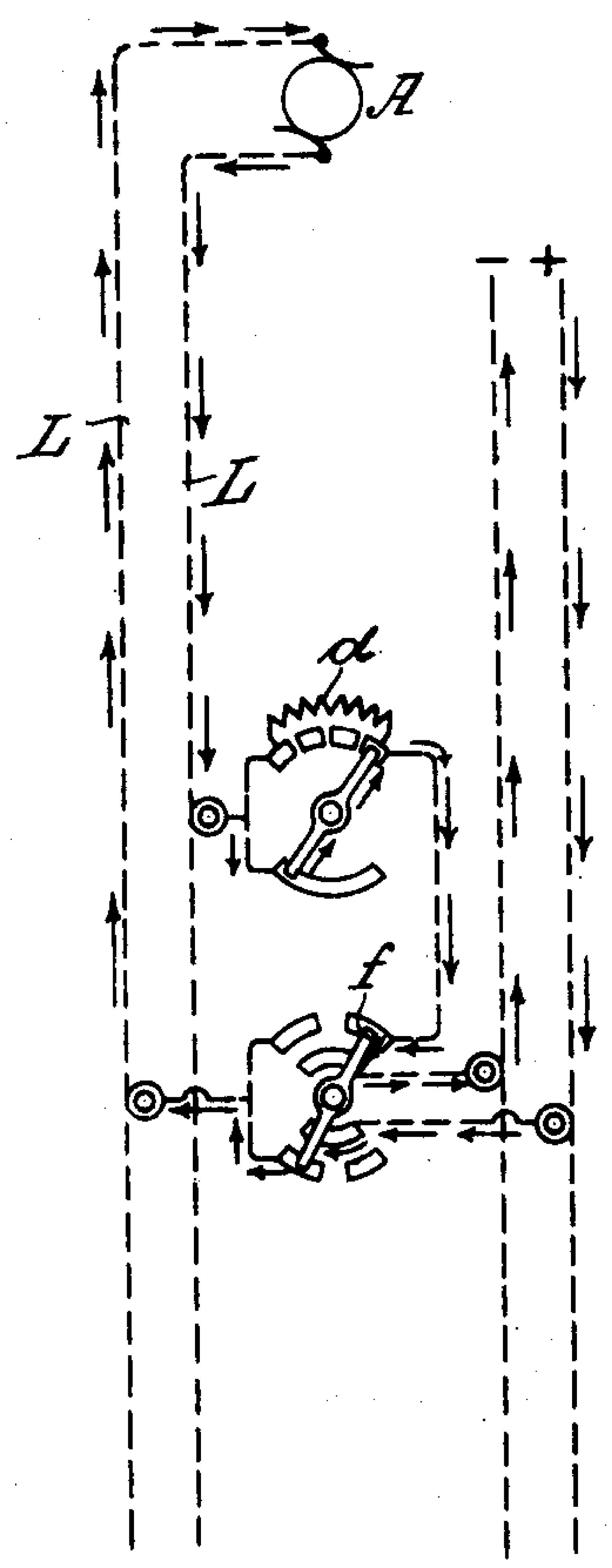


Fig. 3.

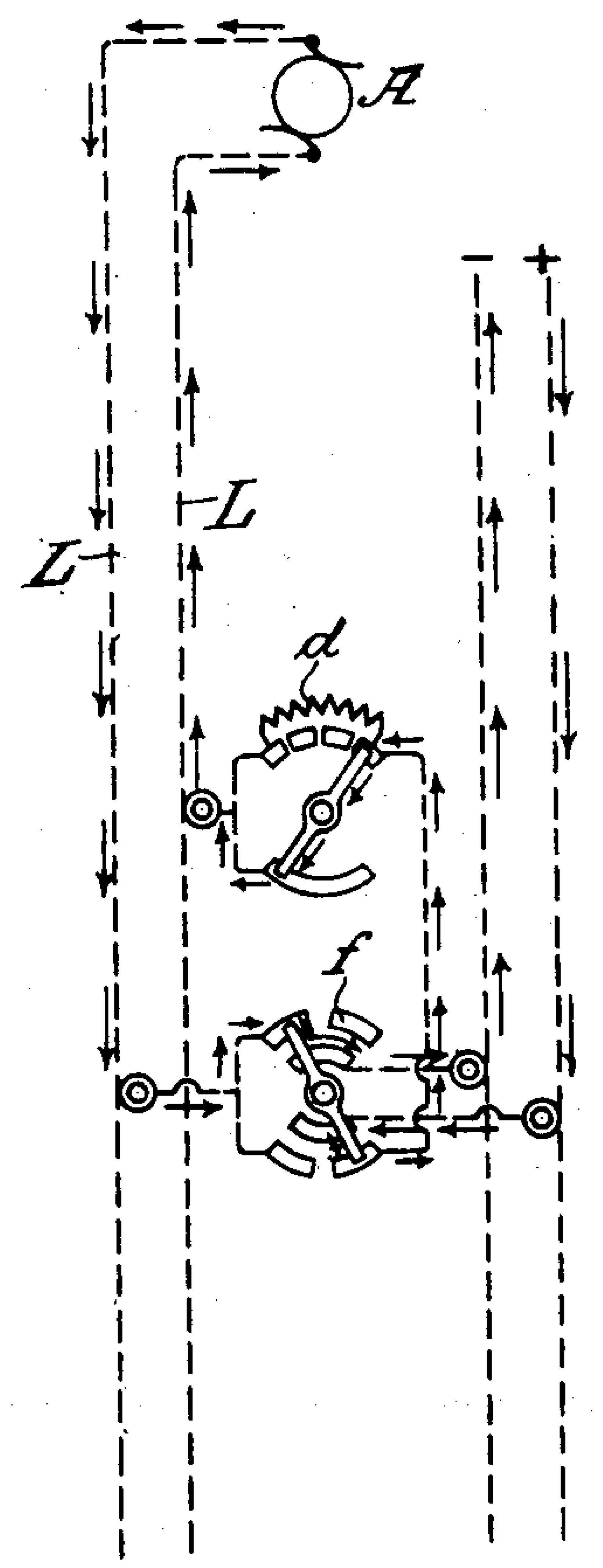
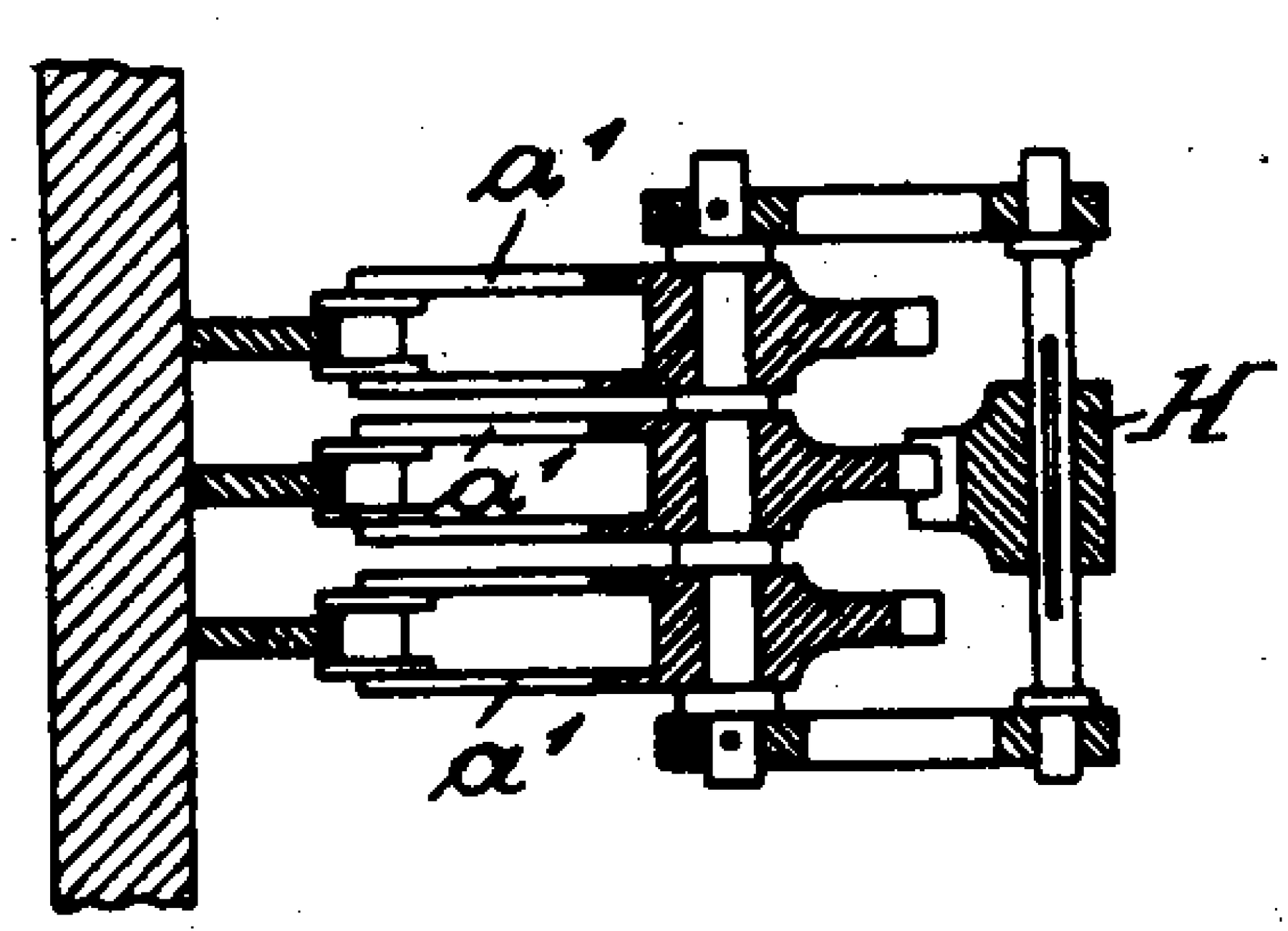


Fig. 4.

Fig. 5.



Witnesses:
Carl Ruß
Josef Lohre

Inventor
Otto Kammerer.
by [illegible]
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OTTO KAMMERER, OF CHARLOTTENBURG, GERMANY.

STEERING MECHANISM FOR GUIDELESS LIFTS.

SPECIFICATION forming part of Letters Patent No. 681,555, dated August 27, 1901.

Application filed May 11, 1900. Serial No. 16,389. (No model.)

To all whom it may concern:

Be it known that I, OTTO KAMMERER, a subject of the King of Prussia, German Emperor, and a resident of 148 Berliner street, Charlottenburg, near Berlin, Kingdom of Prussia, German Empire, have invented a new and Improved Steering Mechanism for Guideless Lifts, of which the following is an exact specification.

The controlling mechanism of guideless lifts for passengers generally employed in dwelling-houses has to fulfil the following demands:

First. The controlling of the motor must be effected by hand only, while the setting of the same to full speed must be carried out automatically.

Second. The cutting out of the motor must be effected automatically at the desired floor.

Third. The controlling must be effected very easily, avoiding regulating-bolts or regulating-rods.

Fourth. The whole arrangement must be mechanically and electrically so simple as to allow the whole mechanism to be overlooked quickly. All complicated switch arrangements worked by means of auxiliary motors and all complicated switchboards and magnets or switch-gears must be avoided.

Fifth. The stopping at a certain desired floor and the starting must be effected by employing only one handle.

To fulfil all these demands the starting mechanism has been generally arranged near the windlass and actuated by means of controlling-ropes or electrical auxiliary currents. In the first case a simple and safe construction is obtained, but owing to the ropes the controlling is difficult. An exact stoppage is therefore impossible, particularly at great speeds and changing loads. By electrical means the controlling is effected very easily and precisely; but the arrangement is very complicated and unsafe, owing to the auxiliary motors, magnetic couplings, and magnets. In both cases two handles are necessary for stopping and starting at a certain floor.

All the disadvantages mentioned above are done away with by the object of the present invention, in which uninsulated conducting-rails for the main current are provided in the lift-shaft, which rails convey the current from the main source to the switch situated in the lift-cage and thence to the driving-motor. Therefore this arrangement will be advantageously employed only when the unavoidable sparks between the contact-pieces—that is to say, between the conducting-rails and the levers sliding upon them—cannot cause dangerous effects. The self-acting movement of the switch can be obtained in a very simple manner by arranging several rails provided with noses in the climbing-shaft, upon which rails a lever connected to the shaft of the switch is guided. The stopping at a certain floor is effected by employing as many sliding rails as there are floors and by placing the lever of the switch onto that sliding rail which has its nose at the desired floor.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the different views, and in which—

Figure 1 shows a front view of my apparatus. Fig. 2 is a top view of the same. Figs. 3 and 4 show diagrams of the circuits of the driving-current. Fig. 5 shows a modified constructional form of part of my apparatus.

In Fig. 1 the motor A, on the shaft of which two rope-drums B are arranged, is located above the lift-shaft. The ropes C are fastened to a double-armed lever D, pivoted in the boss E of the lift-cage F, in which a switch is arranged. By means of the latter the starting and the stopping at a certain floor, as well as the reversal of the movement, is obtained. On the right-hand side of the cage levers J, provided with rollers *k*, are arranged, which levers are adapted to glide upon uninsulated rails L, by means of which rails the electric current for driving the motor A is led to the switch situated in the lift-cage and thence to the motor A, so that this motor can be started, stopped, and reversed directly by means of this switch, situated in the lift-cage. In order to regulate the resistance opposed to the current and to herewith regulate the velocity of the lift-cage, a resistance regulator or rheostat *d* is connected with the switch, which rheostat is automatically inserted before the cage is stopped, so that the velocity of the cage gradually diminishes before the entire stopping of the same and

also automatically cut out after the cage has started to move, so that the cage begins to move slowly and gradually reaches its full speed. The circuits of the electric current may clearly be seen from Figs. 3 and 4, in which the circuit of the current is shown in both directions—that is to say, the circuit which the current has to pass for moving the lift-cage upward or downward. In Fig. 3 the circuit from the positive line (+) goes through the switch *f* and from there to the motor A through one of the rails L. Another rail L leads the current back to the lift-cage—that is to say, it leads the current to the rheostat *d*. From there it is led to the switch again and goes from there through one of the rails L back to the negative line (—). As may be seen from the arrows the current passes the motor in the direction of the watch-hand. In Fig. 3 the switch *f* is turned so that the circuit of the current is changed. In this position of the switch the circuit goes from the positive line (+) through the switch, from there through the rheostat *d* to the motor, which, as may be seen from the arrows, is passed in the direction opposite to that of the watch-hand, and is lead from there back through the switch *f* to the negative line (—.)

The automatic operation of the switch, as well as of the rheostat, is attained by means of the following arrangement:

On the left-hand side of the cage shafts N N′, capable of being moved in longitudinal direction and of being rotated, are arranged in bearings M. The resistance regulator or rheostat *d* is fixed upon the shaft N, while the switch *f* is fixed upon the shaft N′. The switch and the rheostat are both adapted to rotate with the shafts N N′. A double-armed lever *a* is on one hand rigidly connected to the shaft N, the latter being adapted to move longitudinally and to rotate with said lever, and on the other hand is connected to the shaft N′ in such a manner that this shaft will longitudinally move with the lever, but not rotate with it. For every floor a special sliding rail e^2 e^3 e^4, provided with a nose *f*′, is arranged, which noses are adapted to operate the lever *a* of the switch. For operating the rheostat one guide-rail *e*′ only, provided with curved grooves in each floor, is employed. On the latter rail a lever *e*, provided with a roller f^2, is guided. This lever cannot be moved longitudinally and is rigidly connected to the shaft of the rheostat *d*. On the shaft N′ of the switch *f* a click-wheel *g* is arranged, which the spring *h* always tends to draw back into its normal position—that is to say, into the position in which the circuit is broken. By rotating the shaft N′ of the switch in either direction the lever-catch *i* engages in one of the two recesses of the click-wheel *g* and stops it. In these positions either the circuit shown in Fig. 3 or that shown in Fig. 4 is restored, so that the cage either moves upward or downward. When the cage has arrived at the desired floor, the nose of the respective rail raises the lever *a*, thereby pressing back the roller *k*′ of the lever-catch *i*, which roller leans against the lever *a*, so that the catch *i* is freed from the recess. The shaft of the switch *f* then jumps back into its normal position and interrupts the circuit. The whole controlling of the lift-cage—that is to say, the starting, the stopping at a certain floor, and the reversal of the movement of the cage—is effected by the handle *c*. By moving the latter longitudinally and adjusting herewith the roller *k*′ of the lever *a* to that rail the nose of which is situated at the desired floor the stopping of the cage at the desired floor is effected by means of the respective nose, whereas by turning it the circuit is closed. The reversal of the circuit depends upon the direction of the rotation of the handle.

The manner in which the lift is operated is as follows: The traveler places the lever *a* by moving the handle *c* in longitudinal direction so as to touch that rail the nose of which is situated at the desired floor. He then turns the shaft N′, also by means of the handle *c*, so that the contact-pieces of the switch *f* close the circuit in the desired direction, as shown in Figs. 3 and 4. During this time the rheostat *d* is fully inserted, owing to roller f^2 of the lever *e* being situated on the lowest part of that curve of the rail *e*′ arranged in the floor at which the cage stands. As soon as the circuit is closed by means of turning the handle *c* the cage starts slowly to move upward or downward, so that the lever *e* is gradually raised by the curve of the rail *e*′, thus causing the contact-piece of the rheostat to rotate with the shaft N until the resistance is perfectly cut out, whereby the cage attains its full speed. When the cage has reached the desired floor, the lever *a* is gradually raised by the nose arranged upon the respective rail and influences the roller *k*′ in such a manner that the lever-catch *i* is freed from the click-wheel *g*. Owing to the spring *h* the wheel turns back into the position shown in the drawings, thereby turning the shaft N′, as well as the contact-pieces of the switch, into the normal position—that is to say, into the position in which the circuit is broken. Simultaneously with the rising of the lever *a* the shaft N is caused to rotate, so that the lever *e* follows the way of the curve of the rail *e*′, and thus turns the contact-pieces of the rheostat until the resistance is fully inserted. By inserting the resistance the velocity of the cage is naturally gradually diminished. Now as the lever *a* touches the roller *k*′ and hereby frees the catch *i* from the click-wheel *g* only on the highest part of the nose *f*′—that is to say, when the resistance of the rheostat is already nearly fully inserted—the interrupting of the circuit takes place after the velocity of the cage, having been diminished before by the insertion of the rheostat.

In Fig. 5 a modified form of construction is illustrated in which instead of one lever *a* several levers *a*′ *a*′, corresponding in number

to that of the rails, are arranged. A cam H, adapted to be moved longitudinally, connects the respective rail with the switch.

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is—

In a steering mechanism for passenger-lifts, the combination with a switch and a rheostat arranged within the cage of a series of sliding rails corresponding in number to that of the floors, each rail being provided with a nose adapted to cut out the motor, and a sliding rail provided with a series of noses corresponding in number to that of the floors, said noses being adapted to insert or cut out the rheostat, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

OTTO KAMMERER.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.