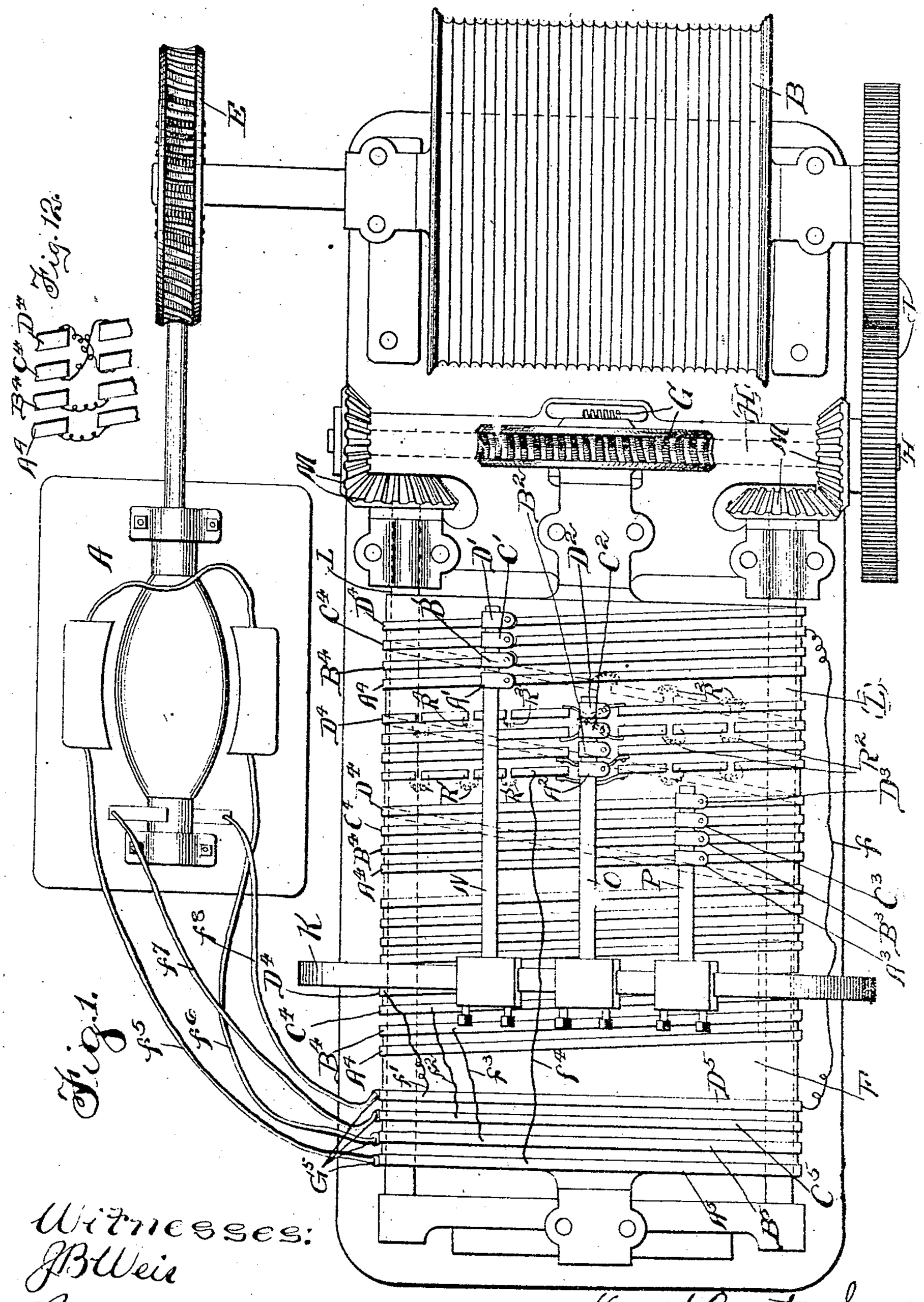
No. 778,073. PATENTED DEC. 20, 1904.

H. ROWNTREE.

ELEVATOR HOISTING MECHANISM.

APPLICATION FILED MAR. 4, 1902.

NO MODEL. 6 SHEETS—SHEET 1.



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Chas. D. Barry

Harold Rowntree, Inventor
By Brown & Darby Attys

No. 778,073. PATENTED DEC. 20, 1904.

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ELEVATOR HOISTING MECHANISM.

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NO MODEL. 6 SHEETS—SHEET 2.

Fig. 2.

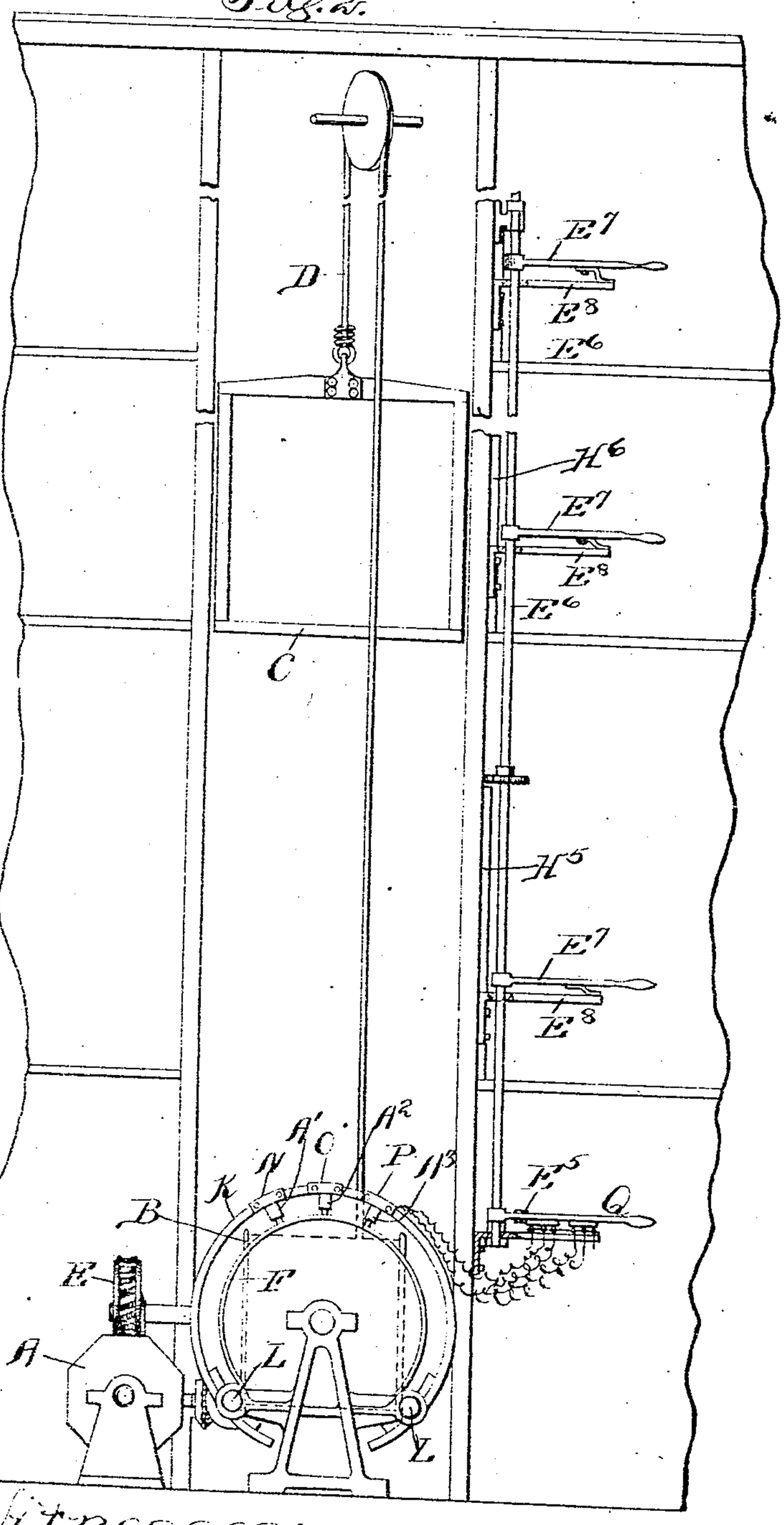
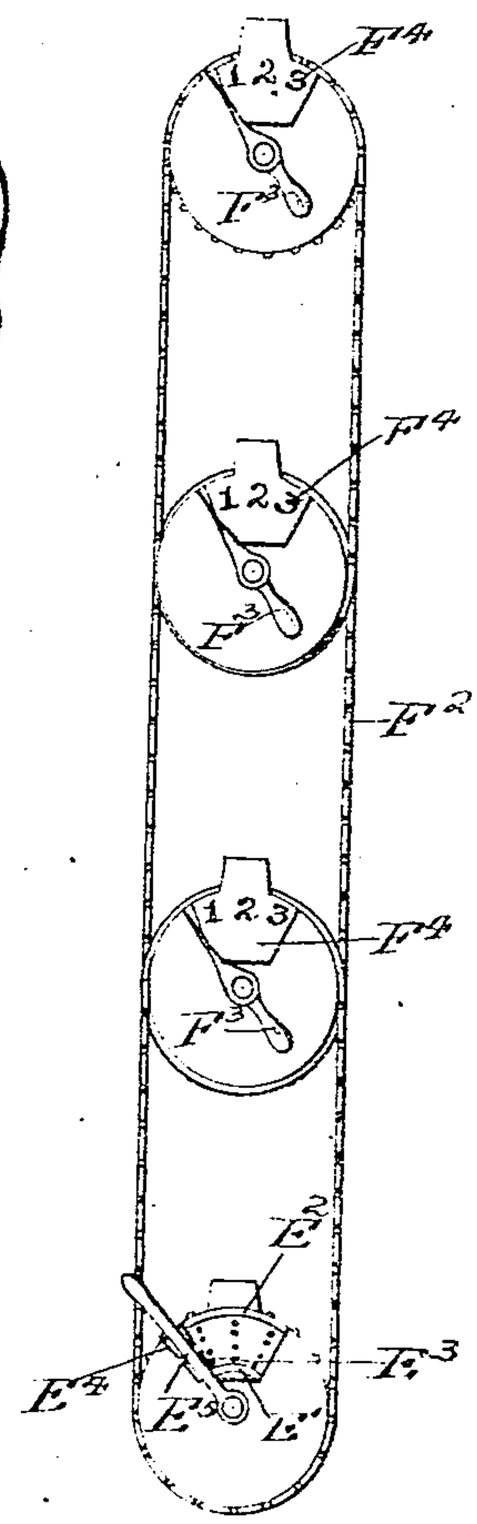


Fig. 5.



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No. 778,073. PATENTED DEC. 20, 1904.

H. ROWNTREE.

ELEVATOR HOISTING MECHANISM.

APPLICATION FILED MAR. 4, 1902.

NO MODEL. 6 SHEETS—SHEET 3.

Fig. 3.

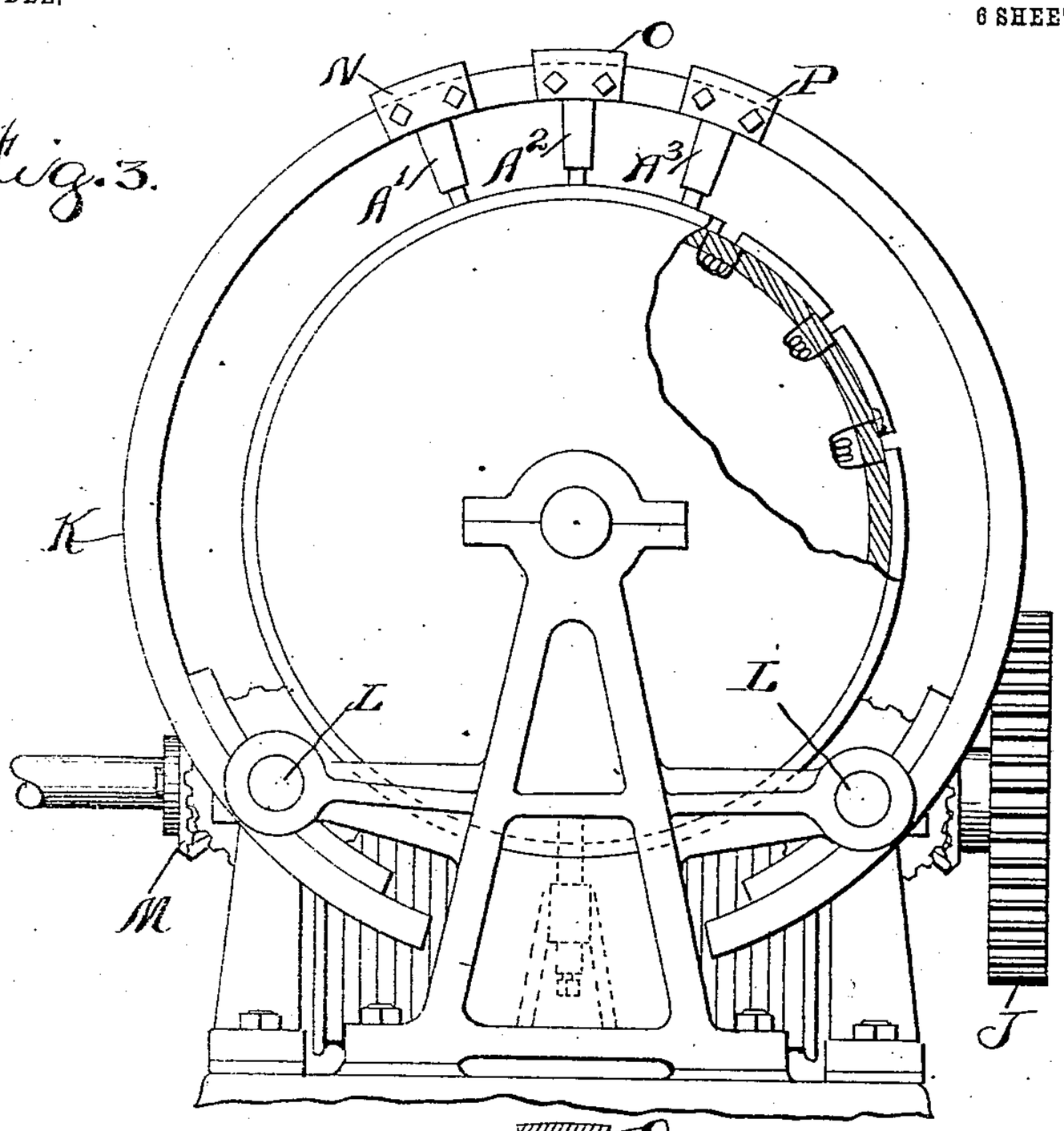
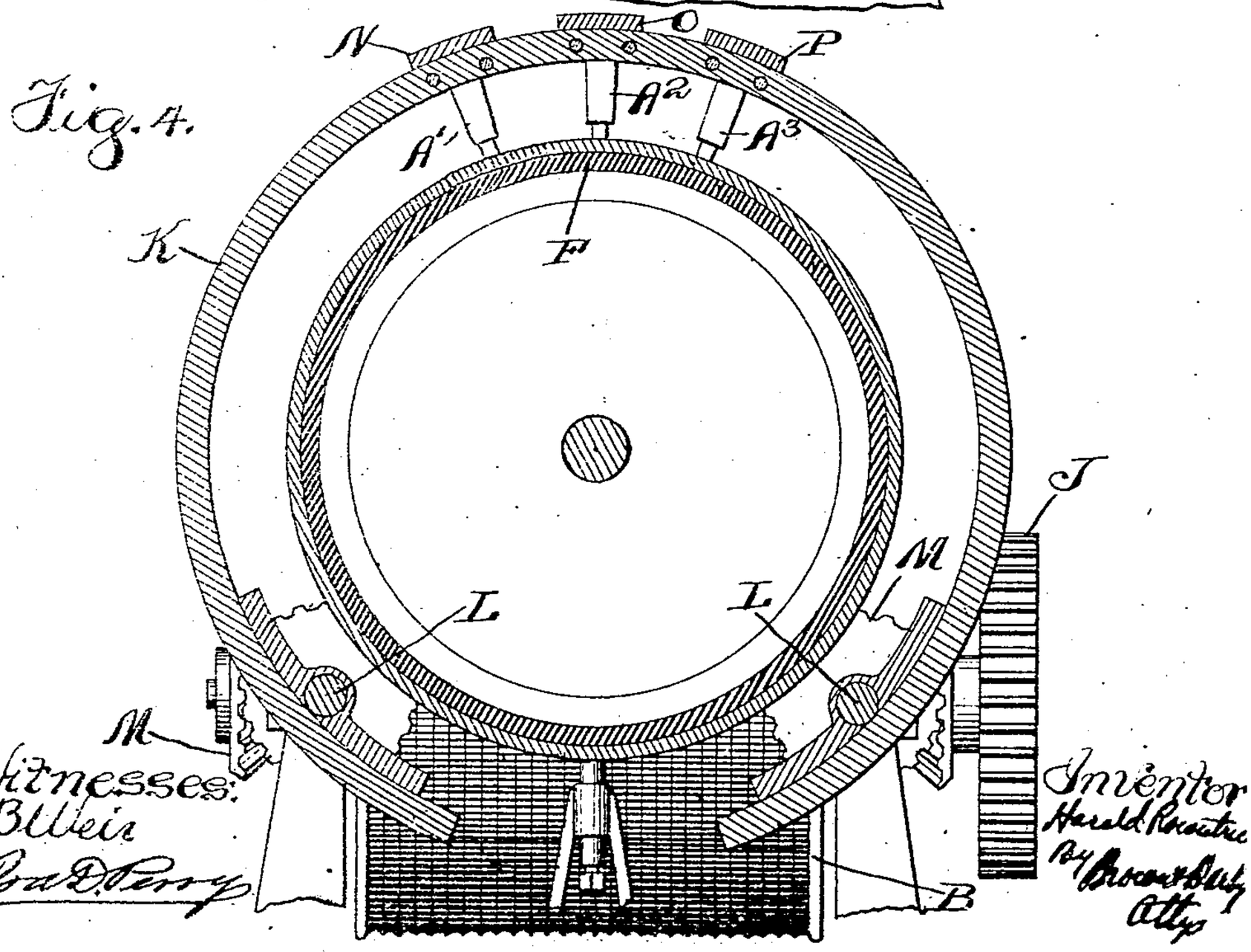


Fig. 4.



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No. 778,073. PATENTED DEC. 20, 1904.

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ELEVATOR HOISTING MECHANISM.

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NO MODEL. 6 SHEETS—SHEET 4.

Fig. 6.

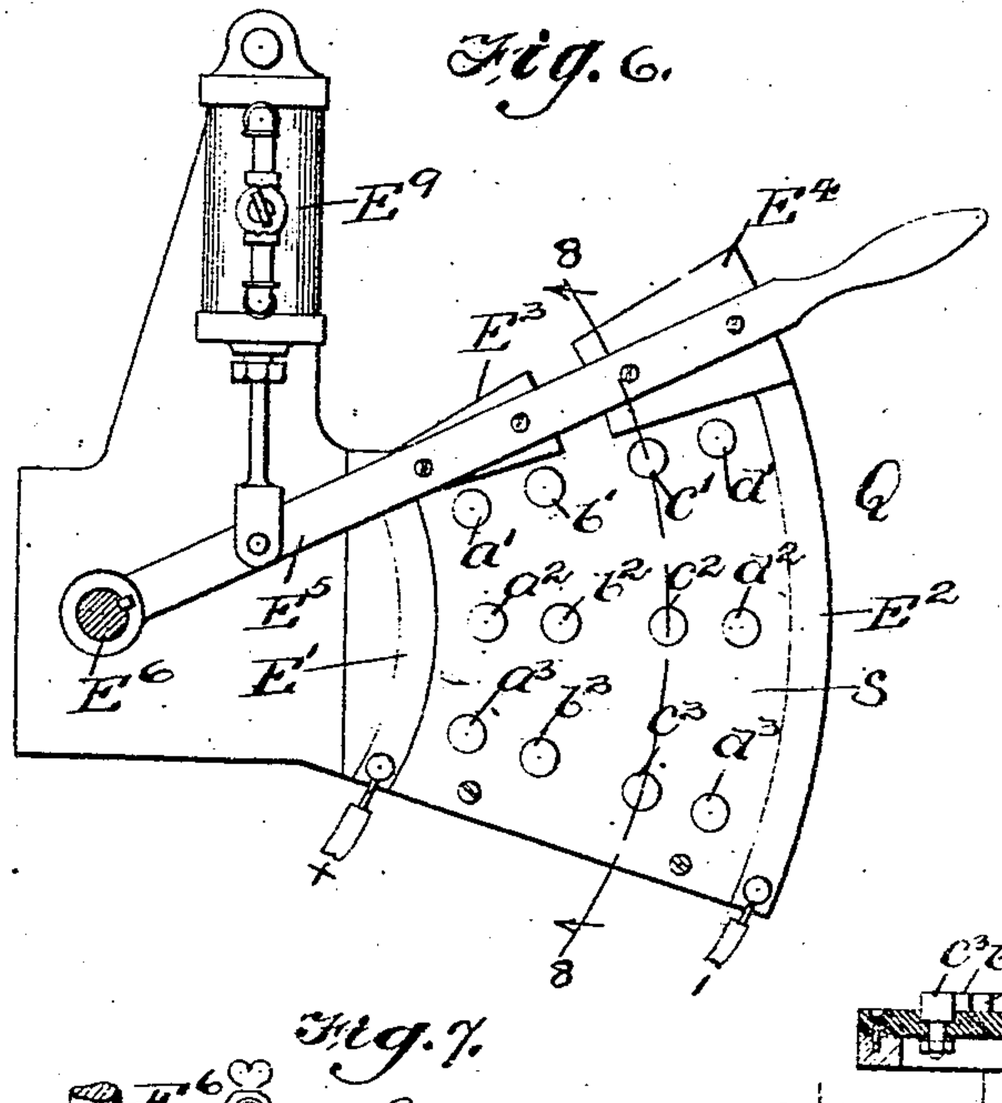


Fig. 8.

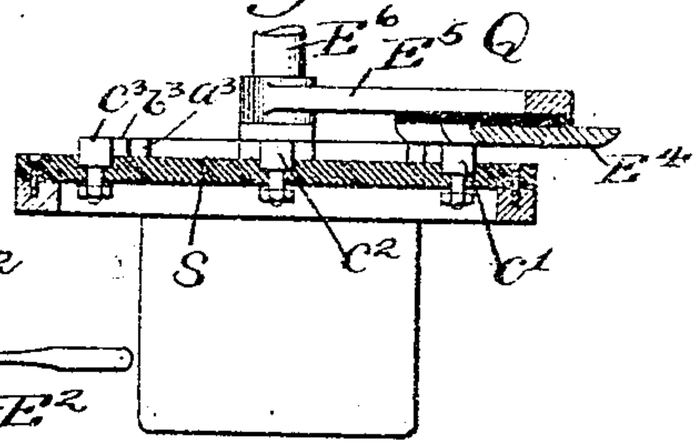


Fig. 7.

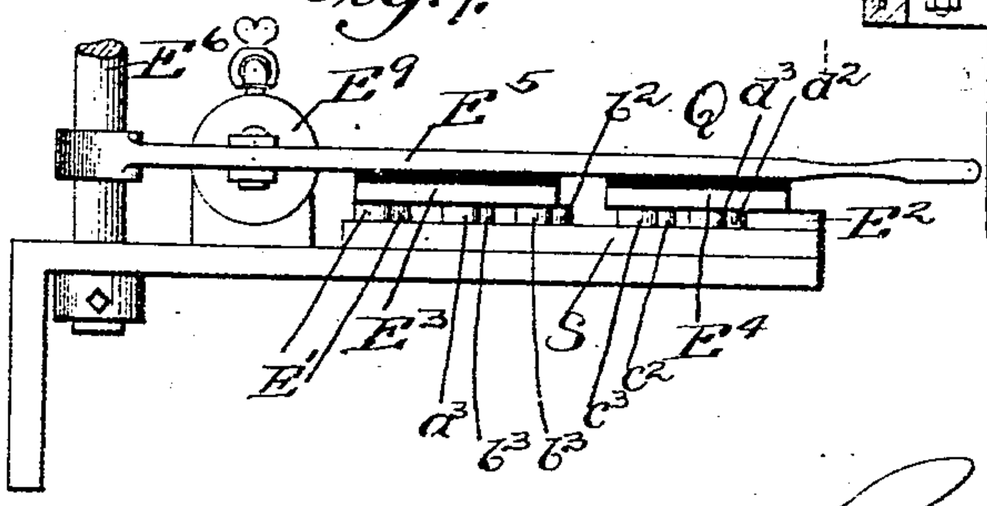


Fig. 9.

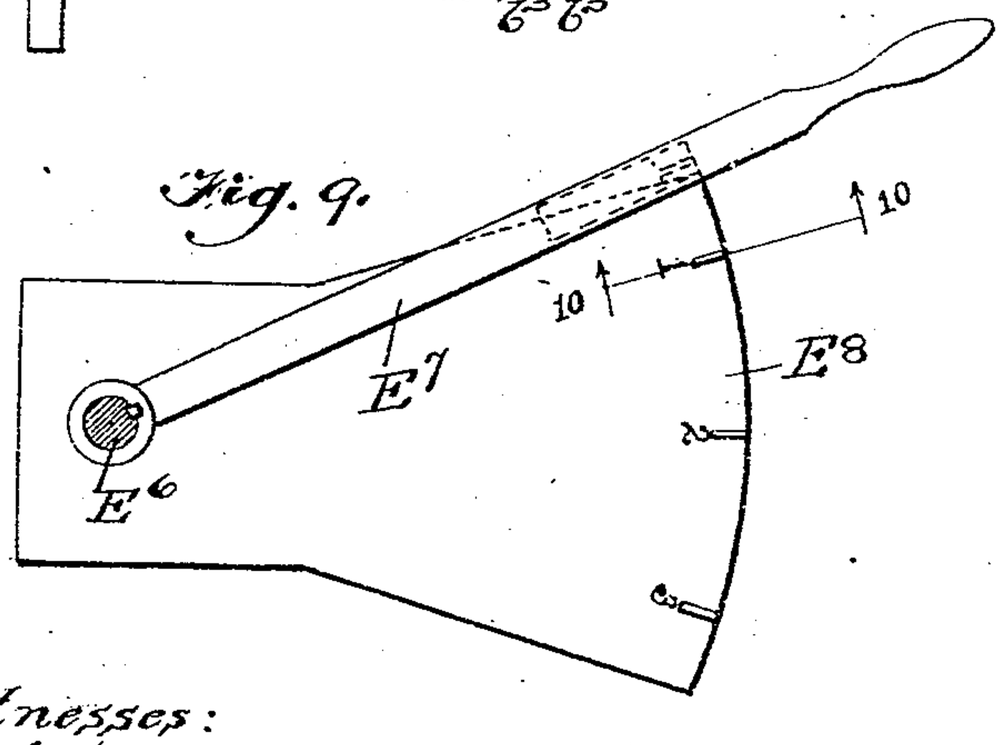


Fig. 10

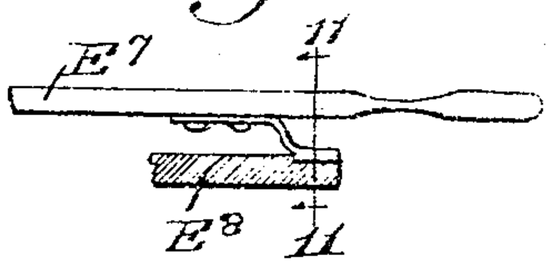
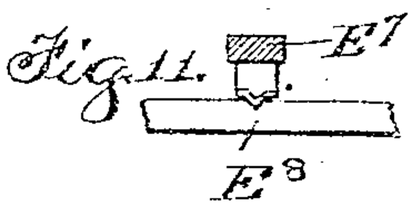


Fig. 11.



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No. 778,073. PATENTED DEC. 20, 1904.

H. ROWNTREE.

ELEVATOR HOISTING MECHANISM.

APPLICATION FILED MAR. 4, 1902.

NO MODEL. 6 SHEETS—SHEET 5.

Fig. 13.

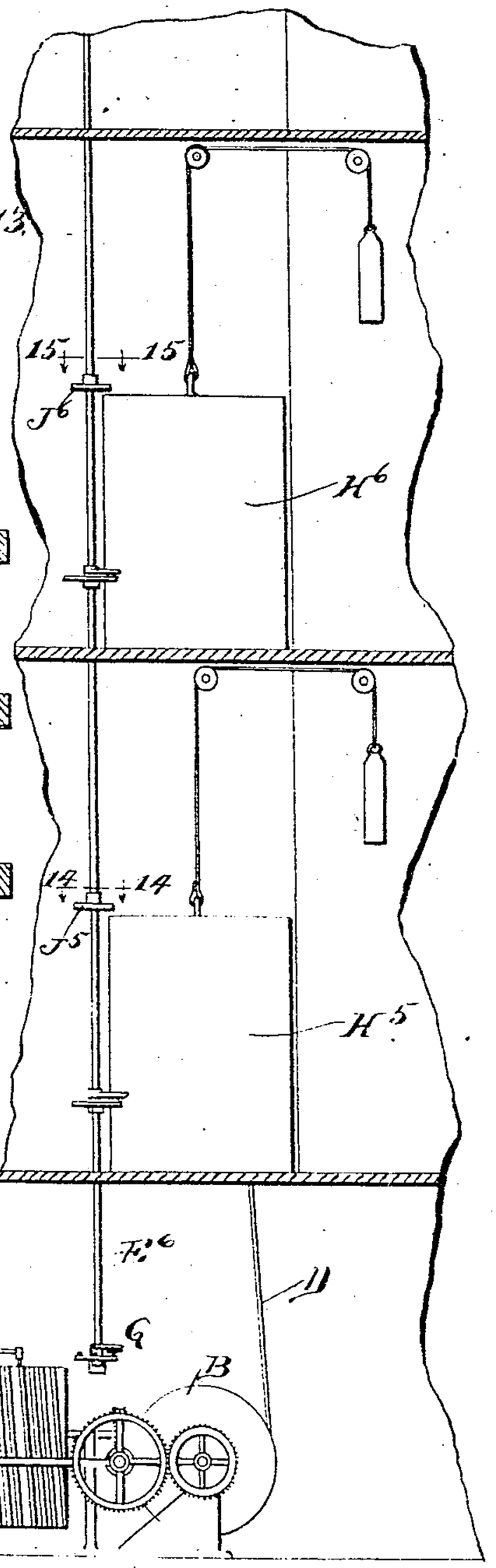


Fig. 14.

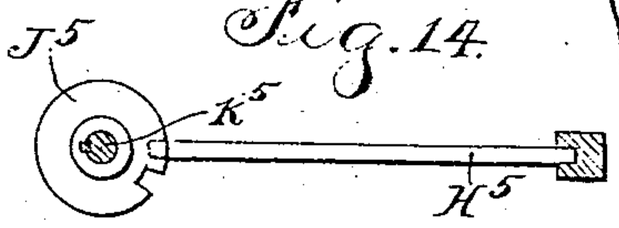


Fig. 15.

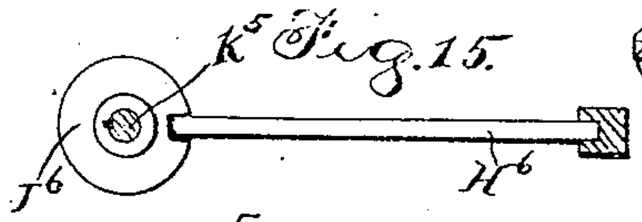
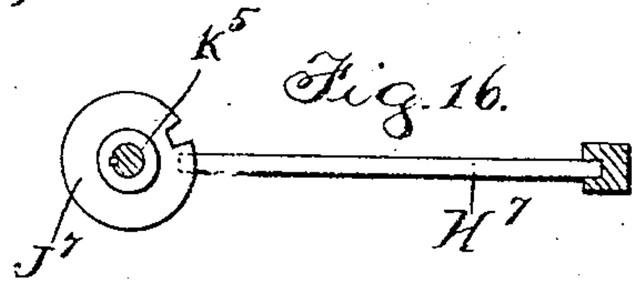


Fig. 16.



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No. 778,073. PATENTED DEC. 20, 1904.

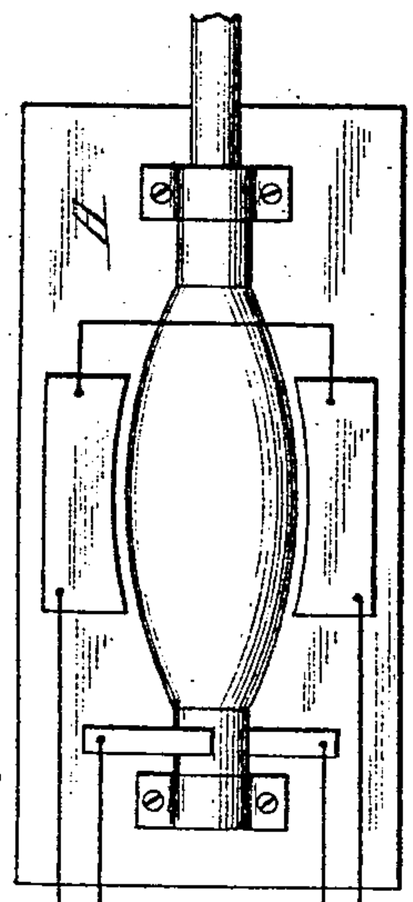
H. ROWNTREE.

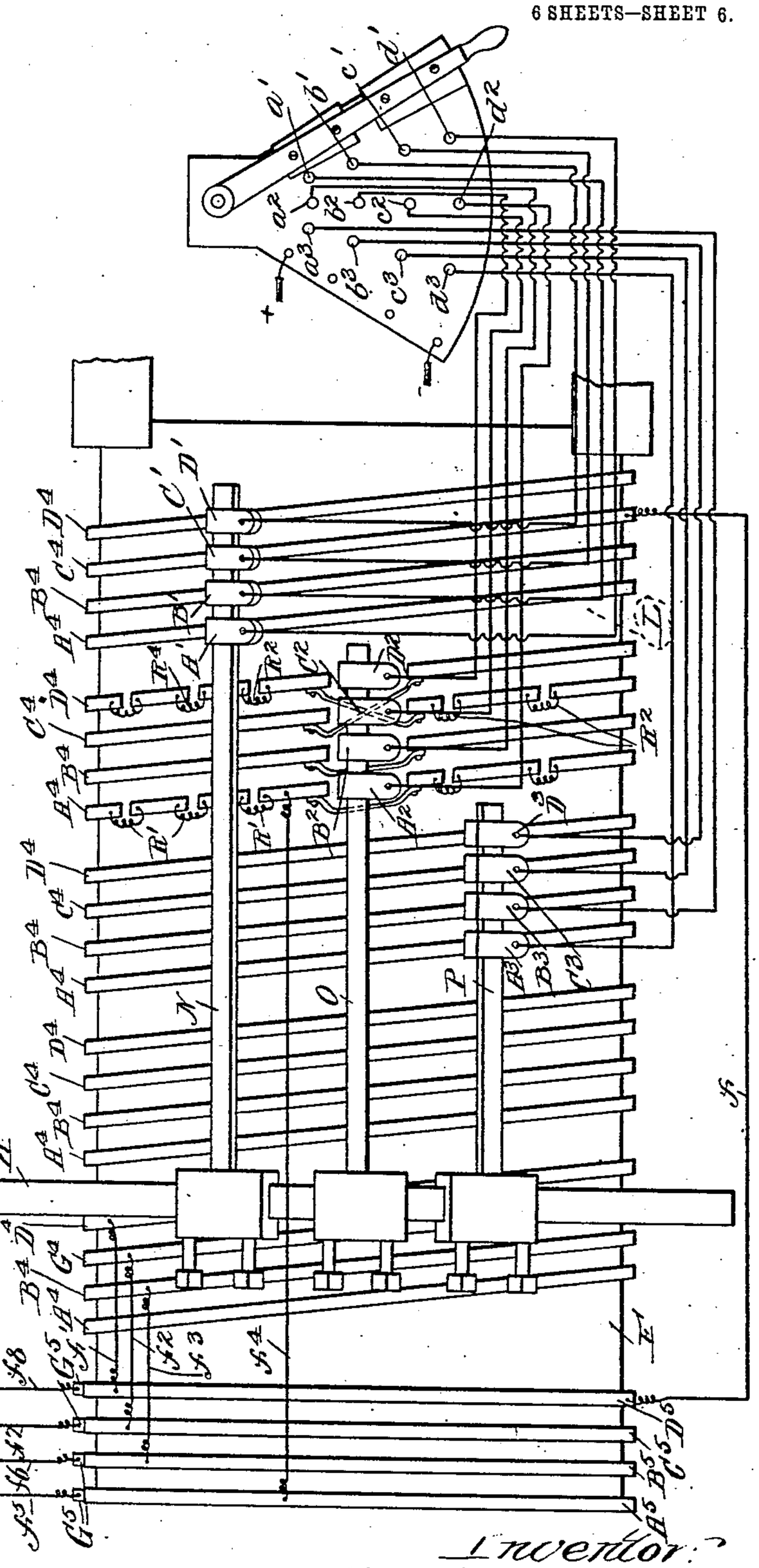
ELEVATOR HOISTING MECHANISM.

APPLICATION FILED MAR. 4, 1902.

NO MODEL. 6 SHEETS—SHEET 6.

Fig. 17.





Witnesses:
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Harry B. White.

Inventor:
Harold Rowntree
By Brown & Derby Atty's.

No. 778,073. Patented December 20, 1904.

UNITED STATES PATENT OFFICE.

HAROLD ROWNTREE, OF CHICAGO, ILLINOIS, ASSIGNOR TO BURDETT-ROWNTREE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELEVATOR HOISTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 778,073, dated December 20, 1904.

Application filed March 4, 1902. Serial No. 96,648.

To all whom it may concern:

Be it known that I, HAROLD ROWNTREE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Elevator Hoisting Mechanism, of which the following is a specification.

This invention relates to elevator hoisting mechanism.

The object of the invention is to provide a construction of elevator hoisting mechanism which is simple and efficient and wherein is included means controllable from any landing or floor for starting the hoisting-motor in operation and automatically arresting the same when the car reaches a predetermined stopping-point.

A further object of the invention is to provide means whereby when the motor-control mechanism is set from any floor to start the car upon its travel to any desired or predetermined stopping-point the particular floor to which the car is traveling or at which the car is at rest will be indicated at each floor or point from which the motor is controlled.

A further object of the invention is to provide means whereby as the car approaches its predetermined stopping-point the motor will automatically decrease its speed.

A further object of the invention is to provide a combined speed or motor controller and floor-controller.

A further object is to provide means coöperating with the motor-controller means whereby when any door of the elevator-shaft or well is open all the other doors are locked in closed position and the motor-controlling means are also locked.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in plan, somewhat diagrammatical, of an elevator hoisting mechanism embodying the principles of my invention. Fig. 2 is a broken view in elevation, showing the application of my invention and the means for controlling the motor from any landing or stopping-point. Fig. 3 is a broken view in end elevation, parts broken out, of the combined motor and floor controller. Fig. 4 is a view in transverse section of the same. Fig. 5 is a view illustrating a modified form of means for controlling the motor from any desired floor or landing and embraced within the spirit and scope of my invention. Fig. 6 is a detached detail view in plan of the switch for controlling the circuits. Fig. 7 is a side elevation of the same. Fig. 8 is a broken detail view in section on the line 8 8, Fig. 6, looking in the direction of the arrows. Fig. 9 is a detail view in plan of a form of switch-operating mechanism located at a floor or controlling-point and by which the switch may be operated. Fig. 10 is a broken detail view of the same on the line 10 10, Fig. 9, looking in the direction of the arrows. Fig. 11 is a broken detail view on the line 11 11, Fig. 10, looking in the direction of the arrows. Fig. 12 is a broken detail view, somewhat diagrammatic, of a portion of the combined motor and floor controller. Fig. 13 is a broken view, partly in elevation and partly in section, showing the application of a combined door and motor controller locking means embraced in the scope of my invention. Figs. 14, 15, and 16 are detail views in section, Figs. 14 and 15 being on the lines 14 14 and 15 15, respectively, of Fig. 13 and showing relative arrangement of the combined door and motor controller locking means at the various floors. Fig. 17 is a view in plan, somewhat diagrammatic, illustrating the circuit connections, parts being broken off.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

Referring to the accompanying drawings, A designates a motor, which may be of any suitable type or construction.

B designates the hoisting-drum; C, the car; D, the hoisting-cable, connected to the car and operating over drum B. The drum B may be suitably geared to be driven from the motor—as, for instance, through the gear E—in a well-understood manner.

The combined motor and floor controller may be of any suitable or convenient construction and arrangement. In the particular form shown, which I have found efficient for the purpose, it comprises a drum F, suitably geared to be rotated from the motor. A convenient arrangement is shown wherein drum F is driven through gears G from a shaft H, receiving rotation from the shaft of hoisting-drum B—as, for instance, through the intermeshing gears J. These gears should be so relatively proportioned as that a definite relation will exist between the rotation of the controller-cylinder F and the hoisting-drum B. For instance, during the travel of the car from one extreme limit of its movement to the other the controller-cylinder should be given a definite and correlative number of complete rotations.

K designates a holder frame or support mounted to travel lengthwise with respect to the controller-cylinder F. The travel of this support or holder lengthwise of the controller-cylinder should bear a definite relation in speed and extent to the rotations imparted to said cylinder.

Any convenient form of mechanism for imparting travel to the holder or support K may be provided. I have shown a simple arrangement wherein said holder, support, or ring K is engaged by screw-rods L, driven by gears M from shaft H. Mounted upon holder, ring, or support K are a series of arms N O P, corresponding in number to the number of floors or landings at which the car is to stop. Carried by each arm N O P, but insulated therefrom, are a series of contacts marked, respectively, $A' B' C' D'$ for arm N, $A^2 B^2 C^2 D^2$ for arm O, $A^3 B^3 C^3 D^3$ for arm P, said contacts being also insulated from each other. Mounted upon the peripheral surface of cylinder F, but insulated therefrom, is a series of conducting-strips $A^4 B^4 C^4 D^4$, corresponding in number to the insulated contacts carried by the various arms. These contact-strips are spirally arranged upon the surface of cylinder F, as clearly indicated in Fig. 1, and in length they bear a definite relation to the length of travel of support or carrier K. These contact-strips are continuous throughout their entire spiral length, except that strip D^4, at a suitable point in its length, is broken and is cross-connected to strip C^4, as most clearly indicated in Figs. 1 and 12, and, similarly, contact-strip C^4 is interrupted intermediate its length and is cross-connected to strip D^4. The strips A^4 and B^4 are interrupted intermediate their length, their interrupted ends being directly connected across the gap in series with each other, as clearly shown in Figs. 1 and 12. The interruptions in these strips should be so relatively located as that the contacts carried by the various arms N O P will occupy a position over the interruptions when the car arrives at the floor or landing corresponding thereto. Thus in the arrangement illustrated in Fig. 1 the arm O is in position over the interruptions in the cylinder-strips, and consequently the car is at the floor corresponding to the arm O, the interruptions in the strips serving to break all the circuits controlled by the contacts carried by said arm O. Similarly, when the car reaches the floor corresponding to the arm N of the combined motor and floor controller the interrupted space in the controller-strips will be brought under the contacts carried by said arm N, so as to break all the circuits controlled by said contacts, and so on throughout all the floors and contact supporting-arms. In addition to the interruptions in the length of the contact-strips, as above explained, the strip A^4 is interrupted at various points on opposite sides of the floor-controlling interruptions, as indicated in Fig. 1, the sections of said strip being connected in series through resistances R'. Similarly, contact-strip C^4 is formed in sections connected in series through resistances R^2 on one side of the floor-controlling interruption, and on the opposite side of said floor-controlling interruption the strip D^4, to which said strip C^4 is cross-connected, is formed into sections coupled or connected up in series with each other through the resistances R^4. At one end the cylinder F is provided with a series of conducting-rings $A^5 B^5 C^5 D^5$. The ring D^5 is in electrical connection through a wire or other conductor f with the contact-strip C^4 at a point adjacent to the opposite end of the controller-cylinder. Said conductor-ring D^5 is also in electrical connection through wire f' with strip D^4 at the end of the cylinder adjacent to ring D^5. Similarly, ring C^5 is in electrical connection, as through wire f^2, with strip C^4 and ring B^5 is in electrical connection, through wire f^3, with strip B^4, and ring A^5 is in electrical connection, through wire f^4, with the section of strip A^4 next adjacent the floor-controlling interruptions therein, as clearly indicated. The rings A^5 and B^5 are respectively connected, through suitable brushes G^5 and wires f^5 f^6, to the terminals of the motor-field windings, and rings $C^5 D^5$ are respectively connected through similar brushes G^5 and conductors f^7 f^8, with the brushes of the motor-armature circuit.

Circuit is completed from a source of electrical pressure by any suitable or convenient switch. In practice, however, and in accordance with the principles of my invention I propose to employ a switch which is control-

lable from any desired floor or landing at which the car is to stop, or any suitable controlling-point, and my invention contemplates the employment of means arranged at each floor, landing, or controlling-point for operating the switch or for completing circuit to the motor and floor controller. I have shown a simple arrangement embodying these principles wherein I employ a switch (designated generally by reference-sign Q, Figs. 2, 6, 7, and 8) comprising an insulated plate S, upon which are mounted conducting-strips E' E², respectively connected to the main supply and return wires. Mounted upon the insulated plate S are contacts $a' b' c' d'$, $a^2 b^2 c^2 d^2$, $a^3 b^3 c^3 d^3$, arranged in sets corresponding to the contacts carried by the various arms N O P, &c. E³ E⁴ are contact bridging-plates adapted to be moved over the sets or series of contacts $a' b' c'$, &c., to bridge the circuit therebetween and between the contact-strips E' E². Thus the bridging-plate E³ when moved into proper position will bridge the space between strip E' and contacts $a' b'$ or between said strip E' and contacts $a^2 b^2$ or strip E' and contacts $a^3 b^3$, according to the position to which said bridging-contact is moved. Similarly, bridging-contact E⁴ may bridge the space between contact-strip E² and either pair of contacts $c' d'$, $c^2 d^2$, or $c^3 d^3$, according to the position to which said bridging-contact may be moved. As above indicated, each set of contacts, $a' b' c' d'$ or $a^2 b^2 c^2 d^2$ or $a^3 b^3 c^3 d^3$, corresponds to a floor or landing for the car. Consequently the position to which the bridging-contacts E³ E⁴ are moved controls the supply of current to the floor-controller for any desired predetermined floor or landing. I have shown a convenient arrangement for actuating the switch wherein said bridging-contacts E³ E⁴ are carried upon a lever E⁵, mounted upon a shaft E⁶, said shaft being arranged to extend to or past each floor or landing, and at each floor or landing said shaft may be provided with a lever E⁷, by which said shaft may be rocked, and associated with each lever E⁷ may be a dial-plate E⁸, carrying indications for the various floors or landings at which the car is to stop. From this construction and arrangement it will be seen that the shaft E⁶ may be rocked from any floor or landing-place into position corresponding to any other floor or landing-place and that the switch-arm E⁵ will be correspondingly rocked when any one of said levers is manipulated. It will also be seen that the lever at each floor will indicate the position to which the switch-lever is rocked, and consequently will indicate the location of the car, thus enabling me to predetermine the point, landing, or floor at which the car is to stop. If desired, the movements of the switch-arm E⁵ may be regulated by any convenient arrangement of dash-pot, (indicated at E⁹, Figs. 6 and 7.)

It is obvious that many other devices may be provided for effecting the operation of the switch, or the circuits may be carried to each floor or landing. I prefer, however, to employ a switch for controlling the current and located in the basement of the building or other convenient point with reference to the motor and without carrying the current up the elevator shaft or well to the various floors or landings.

In Fig. 5 I have shown a modified arrangement of means for actuating the switch-arm E⁵, wherein an endless belt, band, or chain F² is arranged to engage over pulleys or sprockets on the shaft of switch-arm E⁵ and, similarly, over sprocket-wheels or pulleys at each floor or landing and to which sprocket-wheels or pulleys are connected pointers or operating-levers F³, coöperating with dial-plates F⁴, each carrying indications corresponding to the various floors or landings at which the car is to stop. It is obvious that many other forms of construction may be readily devised for effecting the proper actuation of the switch from any floor or landing, while at the same time indicating at each floor or landing the position to which the switch has been actuated.

The various contacts carried by the dial-plate S are in electrical connection with the contacts carried by arms N O P, &c., as follows: Contacts $a' a^2 a^3$ are respectively connected to contacts B' B² B³, contacts $b' b^2 b^3$ are respectively connected to contacts D' D² D³, contacts $c' c^2 c^3$ are respectively connected to contacts C' C² C³, and contacts $d' d^2 d^3$ are respectively connected to contacts A' A² A³.

The electrical operation will now be explained. It will be understood from the foregoing description that with the combined motor and floor controller in the position shown in Fig. 1 the car is at the floor corresponding to arm O—that is, in the particular arrangement illustrated in the drawings the car is at the second or intermediate landing of the three landings shown. Suppose, now, it is desired for the car to go from the second to the top landing or the landing corresponding to arm N. It will be seen from the foregoing description that the particular landing to which the car is to proceed may be predetermined from any floor or landing and the apparatus put in operation and controlled from any landing. Therefore the switch-arm E⁵ is manipulated so as to bring the bridging contacts E³ E⁴, respectively, into bridging relation between strip E' and contacts $a' b'$, and from strip E² with contacts $c' d'$. Thereupon circuit is completed as follows: From the main-supply-strip E' to bridging contact E³, where the current will divide, one part passing to contact a', thence to brush B', thence to contact-strip B⁴ throughout its length, connection f^3 to ring B⁵, connection f^5 the motor-field, connection f^5, ring A⁵, wire f^4, the segment or portion of strip A⁴ which is next

adjacent the interruption therein, thence through all the resistances R′ on one side of said interruption to contact A′, to *d′* of the switch, bridging contact E^4, and return-strip E^2. The other part of the current, which divided at bridging-contact E^3, proceeds as follows: From contact *b′* to contact D′, strip D^4, through the cross connection at the interruption in the length of said strip to strip C^4, through connection f^2, ring C^5, connection f^7, the motor-armature, connection f^8, ring D^5, connection *f* to strip C^4, contact C′, *c′* to return-strip E^2. Under these conditions the motor starts up in the direction determined by the direction of flow of current through the circuits above indicated, thereby setting in rotation the hoisting-drum B and also imparting rotation to the controller-cylinder F, as above explained, and the car proceeds upon its travel, the various contacts A′ B′ C′ D′ traveling along in constant contact with the strips A^4 B^4 C^4 D^4, respectively, the entire current being carried through these strips and contacts, the contacts carried by the arms O P not performing any duty, inasmuch as their circuits are broken at the switch. As the car approaches the landing corresponding to arm N, and at which it is to stop, the brush C″, which is in contact with strip C^4, will ride over the successive breaks in said strip and cut into the circuit which includes said brush and strip successively, the resistances R^2 thereby slowing down the motor gradually as said brush C″ approaches the interruption in said strip or the point at which said strip is cross-connected to strip D^4. Thus when said contact C″ is in the position indicated in Fig. 1 there is no resistance in the circuit controlled thereby, and the motor is operating at full speed. When, however, said brush passes over the first break in said strip C^4, a resistance will be cut in which would slow down the motor to some extent, and thereafter the motor will continue to travel at reduced speed, but a uniform speed of travel, until the next break is passed, when a further resistance is cut in, thereby again slowing down the motor to a more greatly-reduced speed, and the motor continues at that reduced speed until the next break occurs, and so on, the speed being gradually reduced until finally the interruption in the circuit occurs, at which point all the circuits through the various contacts A′ B′ C′ D′ are broken, and the motor is arrested and the car brought to a stop at the landing previously predetermined as its stopping-point. In the same way resistance is being cut out of the field-circuit by brush A′ riding over the resistances R′, interposed in strip A^4. The current passing along wire f^4 from the field has less resistance to pass through to reach brush A′ as said brush approaches the interruption or position corresponding to the stopping-point. In the same manner the operation can be readily traced for any other stopping-point or landing for the car; but it is not believed necessary to specifically trace out the various circuits for each landing-place, as they will be readily comprehended by persons skilled in the art.

In the operation of elevators it is desirable to provide means for guarding against accidents due to carelessly leaving the elevator shaft or well doors open. In accordance with the principles of my invention I propose to provide means whereby when any shaft or well door is open all the other doors, as well as the motor-controller, are locked and remain locked as long as the particular door which is open remains open. Such a result insures that all the doors must be closed before the motor or the car starts, and my invention also contemplates and includes means whereby the doors at all landings are locked in closed position until the motor-controlling means are set to cause the car to stop at any particular landing, and then only the door-lock of that particular landing is released. These results may be accomplished in many specifically different ways. As illustrative of one form of mechanism for accomplishing the desired objects and as the best form in which I at present contemplate applying my invention, but to which I do not desire to be limited or restricted, I have shown in Figs. 13, 14, 15, and 16 a simple arrangement wherein shaft E^6, through which circuits of the motor are controlled, has mounted thereon adjacent to the door H^5 H^6 H^7 of each landing a disk J^5 J^6 J^7. Each disk is provided with a notch K^5 in the peripheral edge thereof adapted to receive the edge of the door when the latter is moved toward open position. The shaft E^6 should be so relatively positioned with respect to the several doors that the disks J^5 J^6 J^7 will respectively occupy a position over the doors when they are closed to form locks therefor or to prevent the same from being opened until the notches K^6 are brought into proper position for the doors to be moved, and the notches K^5 of the various disks should be so relatively arranged that when the shaft E^6 is rocked into position to bring the notch of one disk into place to permit its corresponding door to open the notches of all the other disks are out of line with their doors, as will be readily understood. In the particular form of my invention shown, to which, however, my invention is not to be limited, I employ vertically-sliding doors. Thus when any door is open the edge thereof is received in the notch of its corresponding disk, thereby locking shaft E^6 against rotation and also holding all the other disks in such position as to prevent any other door from being opened.

From the foregoing description it will be observed that the cylinder F, with its associated strips spirally arranged upon the surfaces thereof, and the coöperating sets of contacts, the various sets corresponding to the

various floors at which the car is to stop, and the interruption in the contact-strips carried by the cylinder, together with the contact-rings, constitute a combined motor, direction, and speed controller, as well as a floor-controller, because the position of the interruptions in the conducting-strips with reference to the contacts carried by the various arms N O P, &c., determines the point at which the motor-circuits are broken, and consequently the floor or landing at which the car is to stop. Accessories of the switch and the means controllable from any landing or stopping-place for actuating the switch or for completing circuit to the combined motor and floor controller may be varied throughout a wide range in the specific details thereof without departure from the spirit or scope of the invention. It will also be observed that my invention contemplates the provision of means whereby the motor may be put into operation to move the car without interruption from one end or limit of its travel to the other, or it may be so controlled that the car will stop at any predetermined intermediate stopping-point or landing. It will also be seen that my invention contemplates the provision of automatic means independent of the stopping means for changing the rate of movement of the car as it approaches certain predetermined stopping-points, whether at the limits of its travel or intermediate points. It will also be seen that the means which effect a slowing down of the motor as the car nears the end of its travel, whether proceeding to the extreme limit of its travel or to any intermediate stopping-point, are actuated automatically by the hoisting-motor. It will also be observed that the switch which controls the motor-circuits is locked when any one of the elevator shaft or well doors is open and that at the same time all the other doors are locked in their closed positions.

It is obvious that many variations and changes in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact and specific details of construction and arrangement herein shown and described; but,

Having now set forth the object and nature of my invention and a construction embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, conductors upon said drum arranged in a plurality of independent rows or series, a brush for each row or series, and means for connecting said brushes into the electric circuit of the electric motor, as and for the purpose set forth.

2. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, a plurality of conductors on said drum, a series of brushes cooperating therewith, a switch for throwing different sets of brushes into an electric circuit, and a mechanical connection for operating said switch from different floors, as and for the purpose set forth.

3. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, a spirally-arranged conductor thereon having a cut-away portion, the conductor having a series of segments at each side of the cut-away portion and resistances interposed between said segments, as and for the purpose set forth.

4. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, a pair of spirally-arranged conductors thereon having a cut-away portion, the conductors being cross-connected at said cut-away portion, and a pair of brushes contacting respectively with the said conductors and lying in the electric circuit of the elevator-motor, whereby the motor is driven in a direction to bring the gap in the conductors beneath the brushes, as and for the purpose set forth.

5. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, conductors upon said drum, a plurality of sets of brushes contacting with said conductors and a single switch for throwing any desired set of brushes into the electric circuit of the elevator-motor, as and for the purpose set forth.

6. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, conductors upon said drum, a plurality of sets of brushes contacting with said conductors, and a single switch operable from any floor for throwing any desired set of brushes into the electric circuit of the elevator-motor, as and for the purpose set forth.

7. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, conductors upon said drum, a plurality of sets of brushes contacting with said conductors and a single switch mechanically operable from any floor for throwing any desired set of brushes into the electric circuit of the elevator-motor, as and for the purpose set forth.

8. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, conductors upon said drum, a plurality of sets of brushes contacting with said conductors and adjustably mounted upon an annular ring, whereby their position with relation to the drum may be adjustable, as and for the purpose set forth.

9. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, conductors thereon,

and brushes coöperating with said conductors, a vertical shaft adjacent to the elevator-well, a switch controlled by said shaft, and an elevator-motor-circuit made through said switch, said brushes and said conductors, as and for the purpose set forth.

10. In an elevator hoisting mechanism, a drum having conductors arranged in spiral form thereon, a series of sets of brushes coöperating with said conductors, each set coöperating with a particular convolution of the spiral, an elevator-motor, and means for cutting the latter into an electric circuit through the said conductors and any desired set of the brushes, as and for the purpose set forth.

11. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, spirally-arranged conductors thereon, one pair included in the field-circuit of the elevator-motor and the other in the armature-circuit, the latter conductors having cut-in resistance-segments, and brushes coöperating with the said conductors whereby the speed and direction of motion of the car are automatically controlled, as and for the purpose set forth.

12. In an elevator hoisting mechanism, a drum arranged to rotate synchronously with the movement of the car, spiral conductors on said drum, an annular ring surrounding said drum and supporting a series of sets of brushes, a pair of revolving lead-screws engaging nuts in said annular ring whereby the latter is given an endwise movement corresponding to the pitch of the spiral conductors on the drum, as and for the purpose set forth.

13. In an elevator hoisting mechanism, a hoisting-drum, an electric motor therefor, and a plurality of electric circuits including said motor, and a single electric switch for putting any desired circuit in connection with the electric mains, as and for the purpose set forth.

14. In an electric hoist, a series of resistances in the motor-circuit, a contact movable over the resistances, and actuating connections between the contact and the hoisting-drum arranged to move the contact over the resistances and cut in resistance as the car or hoist nears the end of its travel, as and for the purpose set forth.

15. In a hoisting apparatus, a motor, a controller therefor, said controller operating to break the motor-circuits when the car reaches a predetermined stopping-point or landing, and means mechanically controllable from any floor or landing at which the car is to stop for completing the motor-circuits to said controller, as and for the purpose set forth.

16. In an elevator hoisting mechanism, a motor, a controller for the circuits of said motor, connections between said motor and controller for actuating the latter from the former, said controller operating to automatically break the motor-circuits when the car reaches any predetermined stopping-point, and means mechanically controllable from any landing for completing the motor-circuits to said controller, as and for the purpose set forth.

17. In an electric hoisting mechanism, a motor, circuits therefor, a reversing-speed and floor controller arranged in said circuits, a switch for completing the motor-circuits to said controller, and means controllable from any floor or landing at which the car is to stop for actuating said switch, as and for the purpose set forth.

18. In an elevator hoisting mechanism, a motor, a controller, connections between said motor and controller for operating the latter, contact-strips carried by said controller and arranged in the motor-circuits, a series of movable contacts coöperating with said strips, means for automatically moving said contacts coincidently with the movement of said controller, a switch for completing the motor-circuits to said contacts, and means controllable from any floor or landing for operating said switch, as and for the purpose set forth.

19. In an elevator hoisting mechanism, a motor, a controller carrying contact-strips arranged in the motor-circuits, means actuated by said motor for moving said controller, coöperating contacts arranged in sets corresponding to the various landings at which the car is to stop, means for moving said contacts coincidently with the movement of said controller, said strips being interrupted to permit the motor-circuits to be broken when the car reaches a predetermined landing or stopping-point, a switch for completing the circuit of the motor to said contacts, and means controllable from any landing for actuating said switch, as and for the purpose set forth.

20. In an elevator hoisting mechanism, a control-cylinder carrying spirally-arranged contact-strips, a hoisting-motor, said strips being included in the motor-circuits, means actuated by said motor for rotating said cylinder, coöperating contacts arranged in sets, each set corresponding to a floor or landing at which the car is to stop, means for moving said contacts lengthwise of said cylinder coincidently with the rotation of the latter, and means for completing the motor-circuits to said contacts, as and for the purpose set forth.

21. In an elevator hoisting mechanism, a control-cylinder having spirally-arranged contact-strips, a hoisting-motor, said strips being included in the motor-circuits, coöperating contacts, means for moving said contacts lengthwise of said cylinder coincidently with the rotation of the latter, said contact-strips being interrupted to cause the motor-circuits to be broken when the car reaches any predetermined stopping-point, and means controllable from any floor or landing for completing the motor-circuits to said contacts, as and for the purpose set forth.

22. In an elevator hoisting mechanism, a

motor, a controller-cylinder having spirally-arranged insulated conducting-strips, said strips being included in the motor-circuits and provided with interruptions, sets of coöperating contacts corresponding to the various floors or landings at which the car is to stop, means for moving said sets of contacts lengthwise of the cylinder coincidently with the rotation thereof, whereby when the set of contacts corresponding to a particular floor at which the car is to stop reaches the interrupted portion of said strips the motor-circuits are broken, and means controllable from any floor or landing for completing the motor-circuit to said contacts, as and for the purpose set forth.

23. In an electric hoisting mechanism, a motor, a controller for controlling the circuits of said motor and comprising a cylinder having spirally-arranged insulated conducting-strips, connections between said motor and controller for imparting rotations to the latter when the former is in operation, a support carrying arms corresponding to the various floors at which the car is to stop, contacts carried by said arms and coöperating with said strips, gearing for moving said support coincidently with the rotation of said cylinder, and means controllable from any floor or landing for completing the motor-circuits to said contacts, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 27th day of February, 1902, in the presence of the subscribing witnesses.

HAROLD ROWNTREE.

Witnesses:
E. C. SEMPLE,
S. E. DARBY.