

H. A. HUMPHREY.
ELEVATOR.
APPLICATION FILED DEC. 26, 1908.

963,568.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

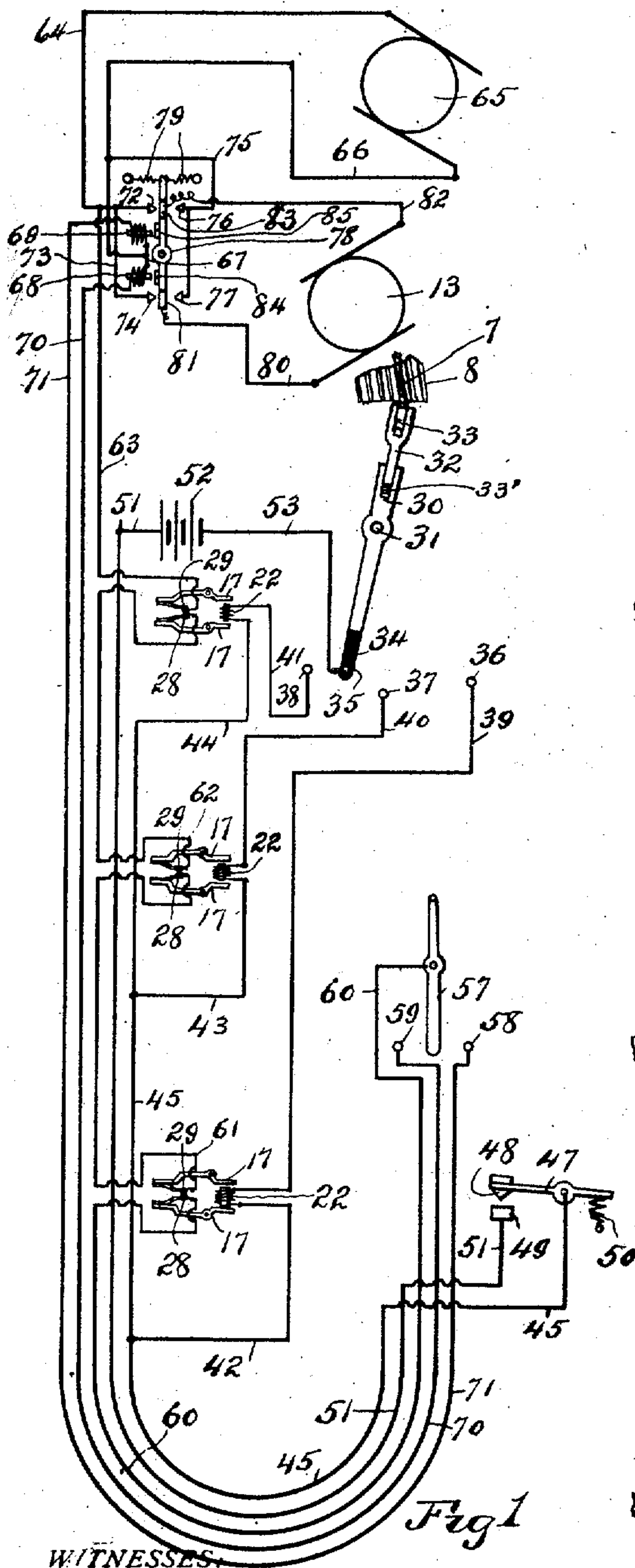


Fig 1

WITNESSES:

R. Hamilton.
E. B. House.

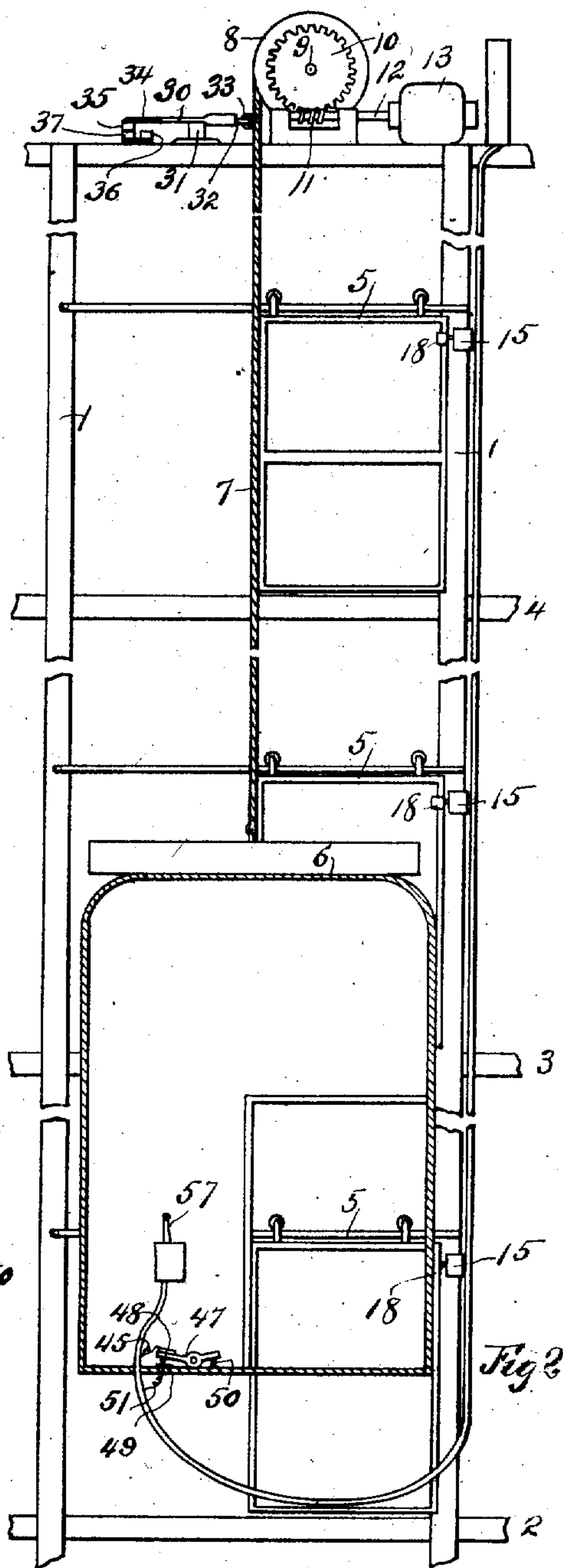


Fig 2

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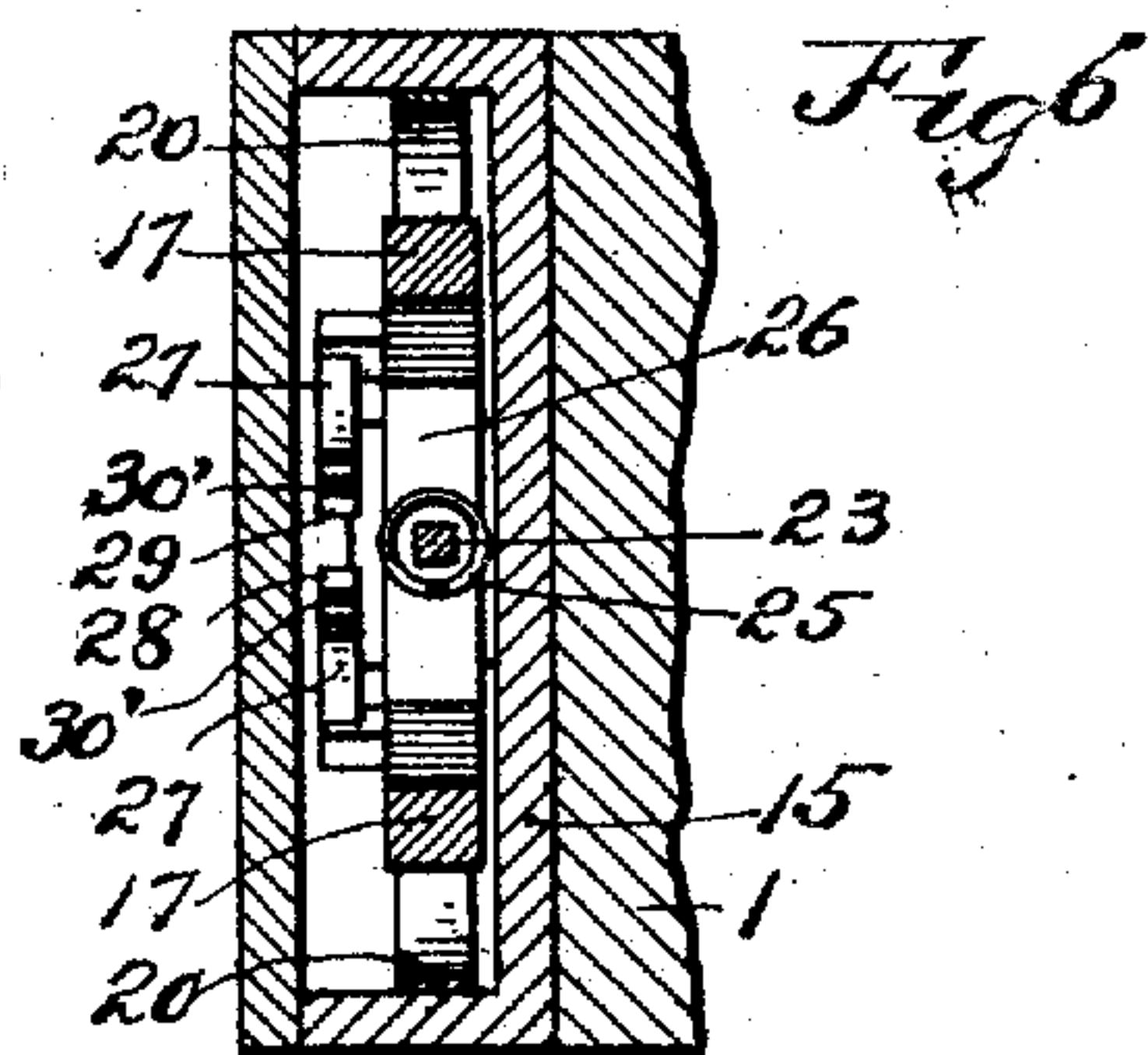
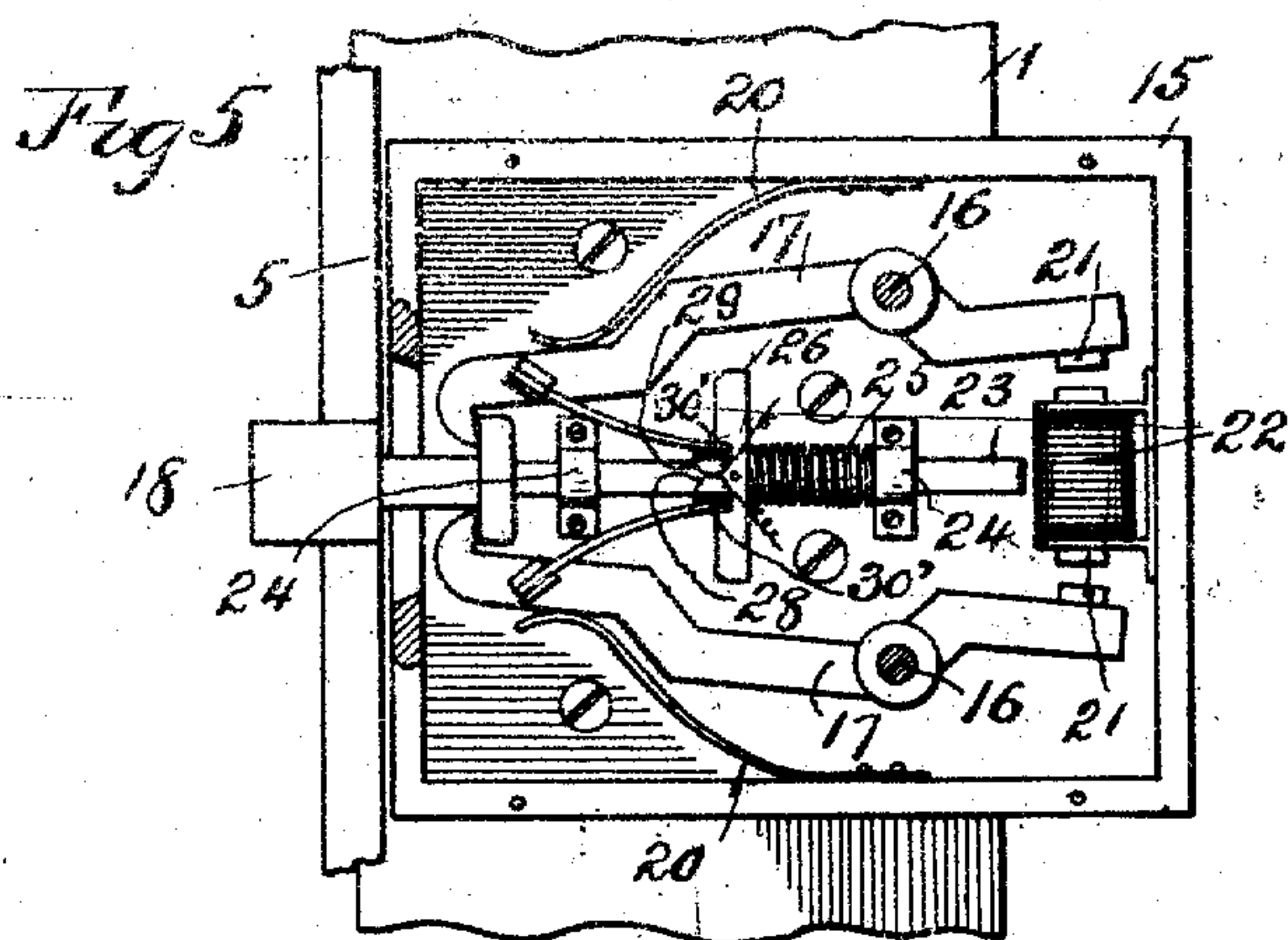
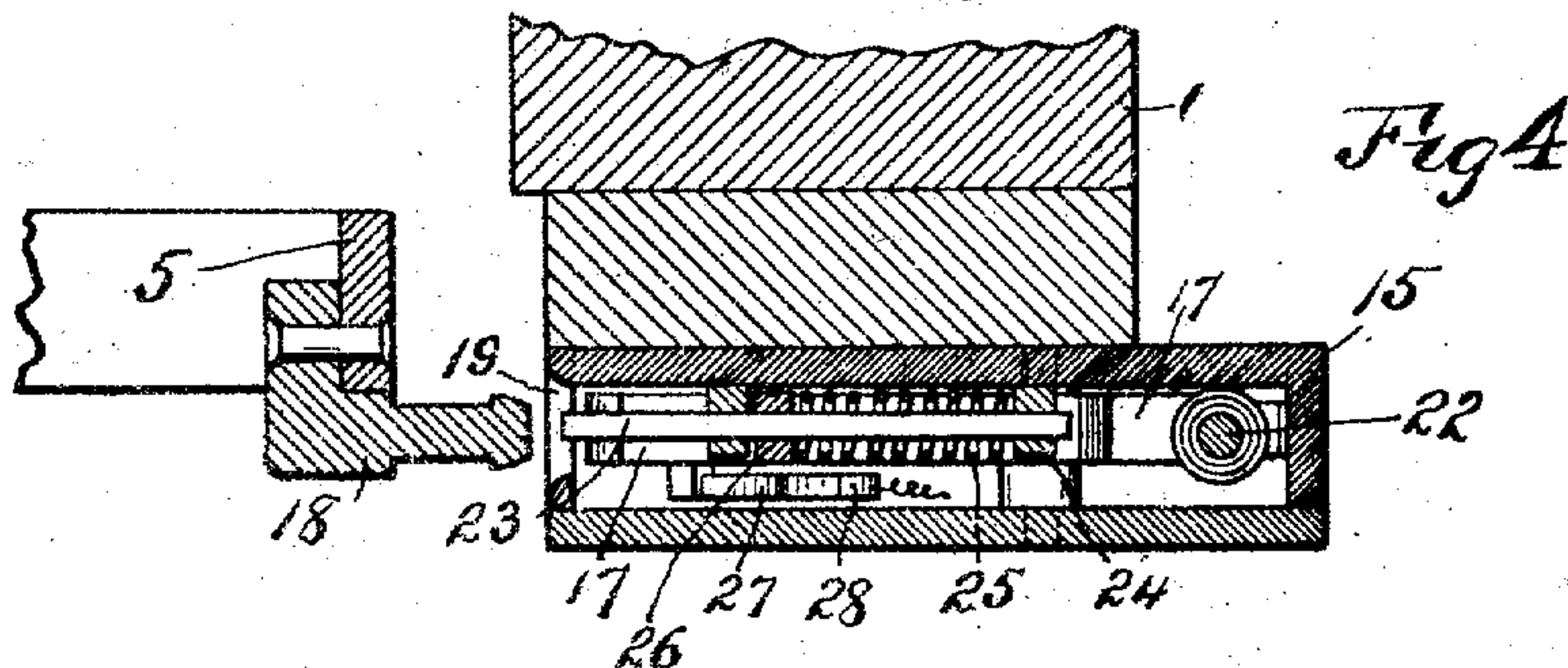
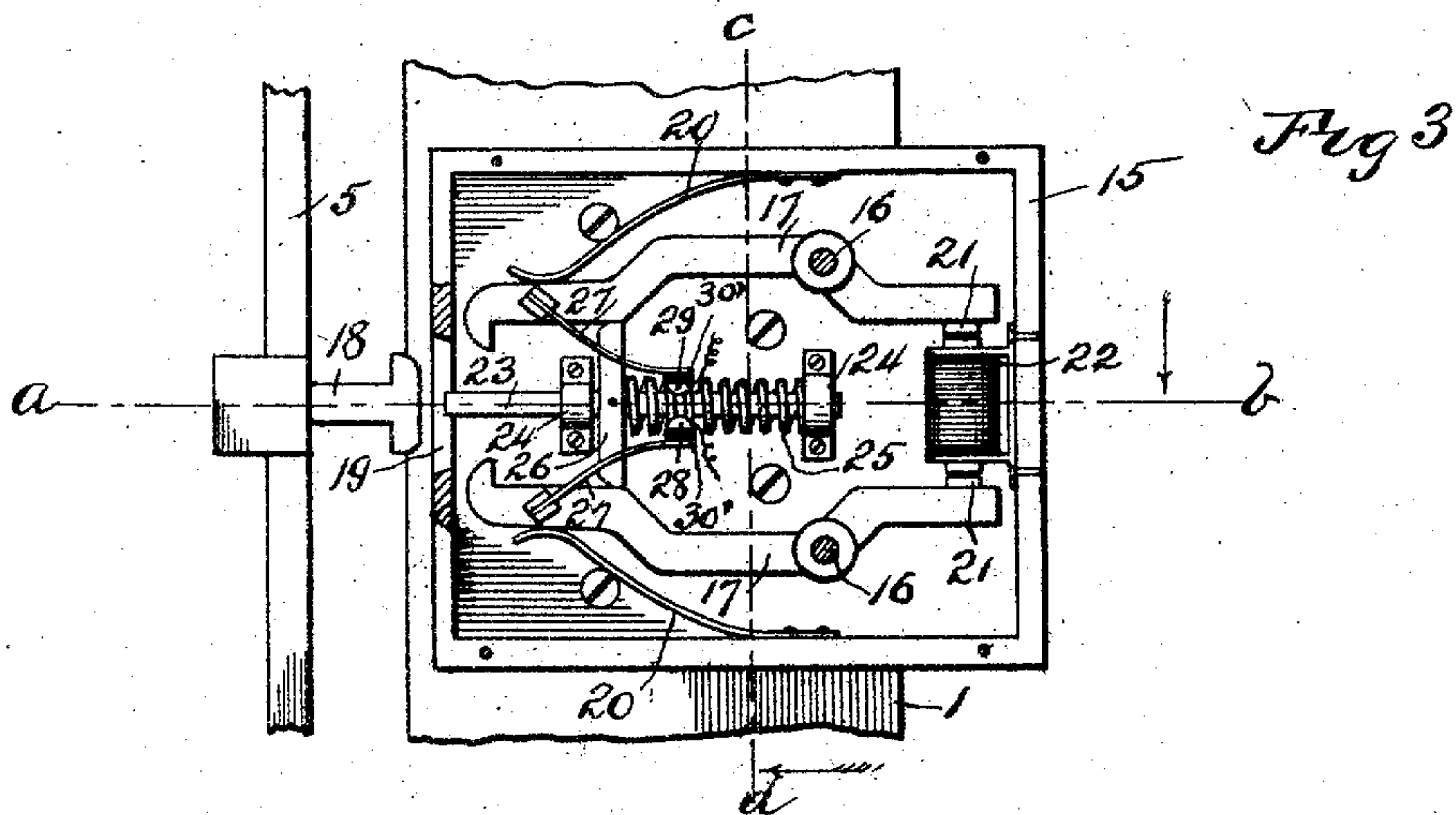
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2 SHEETS—SHEET 2.

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WITNESSES:

R. Hamilton
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UNITED STATES PATENT OFFICE.

HENRY A. HUMPHREY, OF KANSAS CITY, MISSOURI, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO SAFETY ELEVATOR LOCK AND SIGNAL COMPANY, A CORPORATION OF MISSOURI.

ELEVATOR.

963,568.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed December 28, 1908. Serial No. 469,461.

To all whom it may concern:

Be it known that I, HENRY A. HUMPHREY, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a certain new and useful Improvement in Elevators, of which the following is a specification.

My invention relates to improvements in elevators.

The object of my invention is to provide an elevator construction which will eliminate the danger of persons falling through open gateways in elevator shafts. This is accomplished by providing means by which the hoisting mechanism will become inoperative at such times as the gates are opened, the opening of the gates being controlled by the operator on the car.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings illustrating a preferred form of my invention, Figure 1 is a diagrammatic view of the different circuits. Fig. 2 is a view partly in elevation, partly in vertical section and partly broken away, of my improved elevator mechanism. Fig. 3 is a view, enlarged, partly in vertical section and partly in side elevation of one of the gate locking devices, the locking members being shown in the unlocked positions. Fig. 4 is a horizontal sectional view on the dotted line *a-b* of Fig. 3. Fig. 5 is a view similar to Fig. 3, excepting that the gate is shown locked to the locking members. Fig. 6 is a view on dotted line *c-d* of Fig. 3. Similar characters of reference denote similar parts.

1 denotes the elevator walls, 2, 3 and 4 the several floors of the building, 5 the gates, preferably of the horizontally slidable type, 6 the elevator car, 7 the wire cable supporting the car and mounted on a drum 8 supported on a horizontal shaft 9 to which is secured a worm wheel 10 meshing with a worm 11 provided on the armature shaft 12 of an electric motor 13.

15 denotes a plurality of casings secured to the walls 1 at the different floors adjacent respectively to the gates 5. The casings 15 contain the gate locking devices, and a description of one of said devices will answer for all.

In the casing 15 are pivoted respectively by means of horizontal pins 16 supported by opposite walls of the casing, two locking

members 17 having hooked outer ends for respectively engaging opposite sides of and holding a T shaped bracket 18 secured to the adjacent gate 5. The casing 15 is provided with a vertical slot 19 for receiving the bracket 18 therethrough.

Springs 20 secured to the inner wall of the casing 15 normally force the members 17 into positions engaging the bracket 18. Secured respectively to the members 17 are two armatures 21 disposed adjacent to opposite ends of an electromagnet 22 supported in the casing 15 intermediate the members 17 adjacent to their rear or inner ends. Intermediate the members 17 is a horizontal bar 23 slidably mounted in bearings 24 secured to the inner wall of casing 15. A coil spring 25 mounted on the bar 23 bears at one end against the rear bearing 24 and at its other end upon a vertical bar 26. The tension of spring 25 is such as to force the bar 23 to a position in which it will be struck and rearwardly forced by the bracket 18 when the gate is moved to the closed position shown in Fig. 5. The bar 26 is disposed on the bar 23 so that when the gate 5 is moved to the open position shown in Fig. 3, the bar 26 will strike and swing to the unlocked position the locking members 17. Secured respectively to the members 17 are two spring plates 27 respectively carrying two contacts 28 and 29 which are insulated from the plates 27 by blocks of insulation 30'. When the members 17 are in the locked position shown in Fig. 5, the contacts 28 and 29 will be against one another, thus closing the circuit in which they are located. When the members 17 are swung to the open position shown in Fig. 3, the contacts 28 and 29 will be separated from each other, thus breaking the circuit containing them.

For controlling the swinging of members 17 to the unlocked position, when the gates 5 are in the closed position the following mechanism is provided:—30 denotes a lever pivoted on a vertical axis to a suitable support 31 disposed adjacent to the drum 8. One end of the lever 30 is longitudinally slotted, and in the slotted end has mounted a longitudinally slidable bar 32 having mounted thereon a roller 33 provided with a peripheral groove for receiving the cable 7. A spring 33' serves to normally force outwardly the bar 32 so that the roller 33 is always engaged with the cable 7. As the

cable is wound and unwound relative to the drum 8, the lever 30 will be swung to and fro. Secured to the lever 30 is a block of insulation 34 to which is secured a contact plate 35 adapted as the lever 30 is swung to consecutively strike the contacts 36, 37 and 38 connected respectively by conductors 39, 40 and 41 with one set of ends of the windings of magnets 22 contained respectively in casings 15. The other sets of ends of said windings are connected respectively by conductors 42, 43 and 44 with a conductor 45 which is connected to a lever 47 pivoted on the floor of the car 6 and carrying a contact 48 adapted to strike a contact 49 from which it is normally separated by means of a spring 50 which is connected to lever 47 and to the car 6, so as to swing the lever to the position shown in Fig. 1. A conductor 51 connects contact 49 with a battery 52 connected by a conductor 53 with the contact 35 on lever 30.

Any suitable means may be provided for connecting in circuit the contacts 28 and 29 and the motor 13. The following system is a preferred one. A lever 57 pivotally mounted on the car 6 is adapted when swung to and fro to strike alternately contacts 58 and 59 which are adjacent thereto. A conductor 60 connects the lever 57 with contact 28 of the lower set. A conductor 61 connects the contact 29 with the contact 28 of the next higher set, and a conductor 62 connects conductor 29 of the last named set with the contact 28 of the uppermost set. A conductor 63 connects the uppermost contact 29 with a conductor 64 which is connected to one brush of a generator 65, the other brush of which is connected by a conductor 66 with a conductor 67, the ends of which are respectively connected to one set of ends of the windings to electromagnets 68 and 69, the other set of ends of which windings are connected respectively by conductors 70 and 71 with the contacts 59 and 58. A contact 72 is connected to conductor 64. A contact 74 is connected to a conductor 73 which is connected to conductor 64. A conductor 75 connected to conductor 66 is connected to two contacts 76 and 77 disposed respectively opposite to contacts 72 and 74. A bar 78 is pivoted between the magnets 68 and 69. Two coil springs 79 disposed at opposite sides of the bar 78 serve to normally hold it in a central position, shown in Fig. 1. Carried by but insulated from the bar 78 is a contact 81 connected by a conductor 80 to one brush of the motor 13, the other end of which is connected by a conductor 82 with a contact 83 carried by but insulated from the bar 78. Two armatures 84 and 85 carried by the bar 78 are disposed respectively in the magnetic fields of the magnets 68 and 69. When the said magnets are alternately energized, the

armatures 84 and 85 will be alternately attracted so as to first bring the contacts 81 and 83 into contact with contacts 74 and 76 respectively. When armature 85 is attracted the contacts 81 and 83 are brought against contacts 77 and 72 respectively. Thus the direction of the current through motor 13 may be changed by swinging bar 78, thereby changing the direction of movement of the car 6.

The operator on the car 6 controls the motor through the lever 57. By swinging lever 57 onto contact 59 the current from generator 65 will pass by conductor 66 and conductor 67 to magnet 68, thence as follows:—conductor 70, contact 59, lever 57, conductor 60, lower contact 28, adjacent contact 29, conductor 61, contacts 28 and 29 of the next higher set, conductor 62, contacts 28 and 29 of the uppermost sets, conductor 63 and conductor 64 to generator 65. The magnet 68 being energized, the armature 84 will be attracted to swing bar 78 to a position in which contacts 81 and 83 will strike contacts 74 and 76. The current will then pass from generator 65 by conductors 66 and 75 to contacts 76 and 83, thence by conductor 82 to motor 13, thence by conductor 80 contacts 81 and 74, and conductors 73 and 64 to generator 65.

When the lever 57 is swung against contact 58, the circuit will be completed as follows:—from generator 65 by conductors 66 and 67, magnet 69, conductor 71, contact 58, lever 57, thence through conductor 60 by the path hereinbefore described back to generator 65. The magnet 69 being energized, the armature 85 will be attracted swinging lever or bar 78 to a position in which contacts 81 and 83 will strike contacts 77 and 72 respectively. The current will then pass by conductors 66 and 75 from generator 65 to contacts 77 and 81, conductor 80, motor 13, conductor 82, contacts 83 and 72 and conductor 64 back to generator 65. As the car 6 passes upwardly from floor 2, the contact 35 will strike contacts 36, 37 and 38 successively, thus completing the circuits by the magnets 22 at the different floors. Thus when the car reaches floor 3, the contact 35 will rest on contact 37. The circuit will then be completed from battery 52, if the lever 47 is swung so that contacts 48 and 49 are together, through conductor 53, contacts 35 and 37, conductor 40, middle magnet 22, conductors 43 and 45, lever 47, contacts 48 and 49, and conductor 51 back to battery 52. The energizing of magnet 22 at floor 3 will cause the adjacent locking members 17 to swing to the unlocked position shown in Fig. 3, whereupon the adjacent gate 5 may be moved to the open position. At the same time the adjacent contacts 28 and 29 will be separated, thus breaking at that point the circuit containing

said contacts and the motor 13. The motor will thus be inoperative, so that the car can not be moved until the operator again closes the adjacent gate 5. When this has been done, the bar 23 which in the meantime has been in the position shown in Fig. 3, in which position the bar 26 will retain the members 17 in the open position, will be forced rearwardly by the bracket 18 on the gate 5 to the position shown in Fig. 5, in which position the contacts 28 and 29 will again be in contact with each other, and the locking members 17 will engage and hold the bracket 18. The operator may now move the car upwardly or downwardly by operating the lever 57 as already described.

From the above description it will be understood that when the car is at a floor opposite a gate 5, the operator may release the gate by depressing lever 47, after which the gate may be opened, but the operator can not move his car from a floor while a gate is open. Accidents are thus prevented due to open gateways in the elevator shaft.

I do not confine my invention to the specific construction shown and described, as it is obvious that such construction may be varied in many ways, within the scope of the appended claims, without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, gate locking means, means for breaking said circuit when the locking means is in the unlocked position, and electro-magnetic means for moving said locking means to the unlocked position to break said circuit independently of the position of the gate.

2. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, gate locking means, electromagnetic means for moving said locking means to the unlocked position, and means for breaking said circuit when the locking means is in the unlocked position.

3. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, gate locking means, electromagnetic means for moving said locking means to the unlocked position, means for breaking said circuit when the locking means is in the unlocked position, means for moving said locking means to the locked position to close said circuit, and means controlled by the gate for holding said locking means in the unlocked position.

4. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, a locking member for holding said gate in the closed position, means actuated by said member for control-

ling said circuit, and electromagnetic means for moving said member to actuate said circuit controlling means.

5. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, gate locking means, means for breaking said circuit when the locking means is in the unlocked position, means controlled by said gate for forcing said locking means to the unlocked position when the gate is in the open position, electromagnetic means for forcing said locking means to the open position independently of the position of said gate, and means for forcing said locking means to the locked position.

6. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, a gate locking member, for holding the gate in the closed position, means for breaking said circuit when the said member is moved in one direction, electromagnetic means for moving said member in said direction, and means for moving said member in a direction to close said circuit.

7. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, a gate locking member, for holding said gate in the closed position, means for breaking said circuit when said member is moved in one direction, electromagnetic means for moving said member in said direction, means for moving said member in the opposite direction to close said circuit, and means controlled by said gate for releasably holding said member in one of said two positions when the gate is in the open position.

8. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, a pivoted gate locking member, circuit controlling means actuated by the swinging of said pivoted member, electromagnetic means for swinging said member in one direction, and means for swinging said member in the opposite direction.

9. In elevators, the combination with an electric hoisting motor, of a circuit containing said motor, a gate, a pivoted gate locking member, means for breaking said circuit when said member is swung in one direction, electromagnetic means for swinging said member in said direction, means for swinging said member in the opposite direction to close said circuit, and releasable means controlled by said gate for holding said member in the unlocked position when the gate is in the open position.

10. In an elevator, the combination with a hoisting motor, of an electric circuit containing said motor, a gate, gate locking means, electromagnetic means for moving said locking means to the unlocked position

independently of the position of the gate, means for breaking said circuit when the locking means is in the unlocked position, and means controlled by the position of said gate for moving said locking means to the locked position to close said circuit.

11. In elevators, the combination with a hoisting motor, of an electric circuit containing said motor, a gate, hoisting means operated by said motor, a car, means carried by said car for controlling said circuit, gate locking means, means for breaking said circuit when the locking means is in the unlocked position, electromagnetic means for moving said locking means to the unlocked position, means controlled by the gate for moving said locking means to the locked position to close said circuit, and means carried by the car for controlling said electromagnetic means.

12. In elevators, the combination with a gate, of a pivoted member for locking said gate in the closed position, circuit controlling means actuated by said locking member, electromagnetic means for swinging said member to the unlocked position, means for swinging said member to the locked position, and means controlled by the gate for controlling the swinging of said pivoted member.

13. In elevators, the combination with a gate, of two pivoted members for locking said gate in the closed position, means for normally forcing said locking members to the closed or locked position, an electric circuit, a hoisting motor in said circuit, means for breaking said circuit when said members are swung to the unlocked position, electromagnetic means for swinging said members to the unlocked position, and means controlled by the gate for holding said members in the unlocked position when the gate is in the open position.

14. In elevators, the combination with a gate, of two pivoted members for locking the gate in the closed position, means for normally forcing said members to the locked

position, an electric circuit, means carried by said members for opening and closing said circuit when said members are swung to and from the locked position, means controlled by the gate for holding said members in the unlocked position when the gate is open, hoisting means, a car operated thereby, a motor in said circuit for operating said hoisting means, means carried by the car for controlling said circuit, electromagnetic means for moving said pivoted members to the unlocked position, and means carried by the car for controlling said electromagnetic means.

15. In elevators, the combination with an electric hoisting motor located in an electric circuit, of a gate, gate locking means, a car, and means actuated when the car is in a predetermined position for automatically and simultaneously breaking the circuit and operating the locking means to release the gate.

16. In elevators, the combination with an electric hoisting motor located in an electric circuit, of a gate, gate locking means, a car, and means controllable by a person on the car and actuated when the car is in a predetermined position for automatically and simultaneously breaking the circuit and operating the locking means to release the gate.

17. In elevators, the combination with an electric hoisting motor located in an electric circuit, of a gate, a car, circuit controlling means in said circuit, gate locking means for holding the gate closed, and means actuated automatically when the car is in a predetermined position for simultaneously operating the circuit controlling means to stop the motor and the gate locking means to release the gate.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

HENRY A. HUMPHREY.

Witnesses:

E. B. HOUSE,
R. B. DOLSEN.