

May 4, 1926.

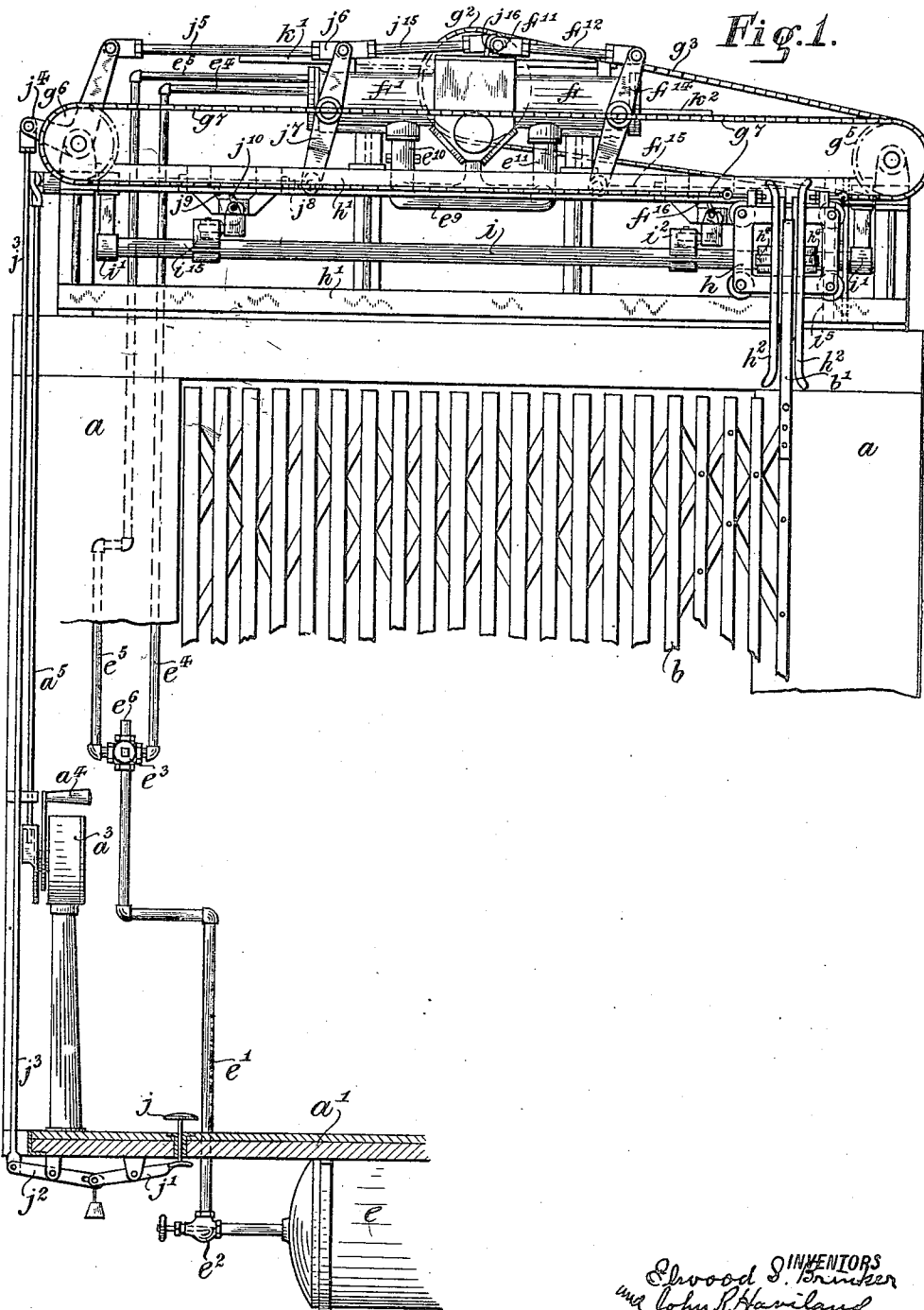
E. S. BRINKER ET AL

ELEVATOR

Filed March 30, 1925

7 Sheets-Sheet 1

1,582,966



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May 4, 1926.

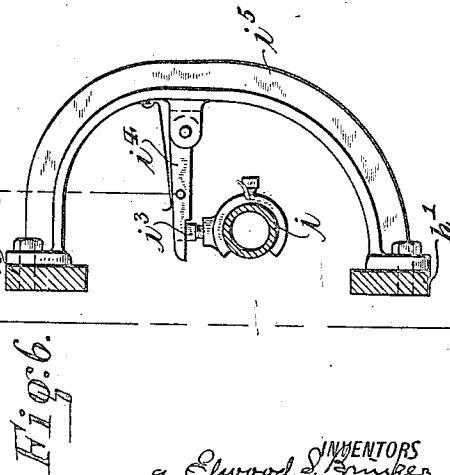
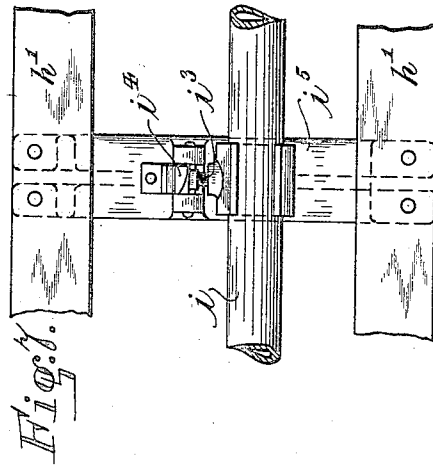
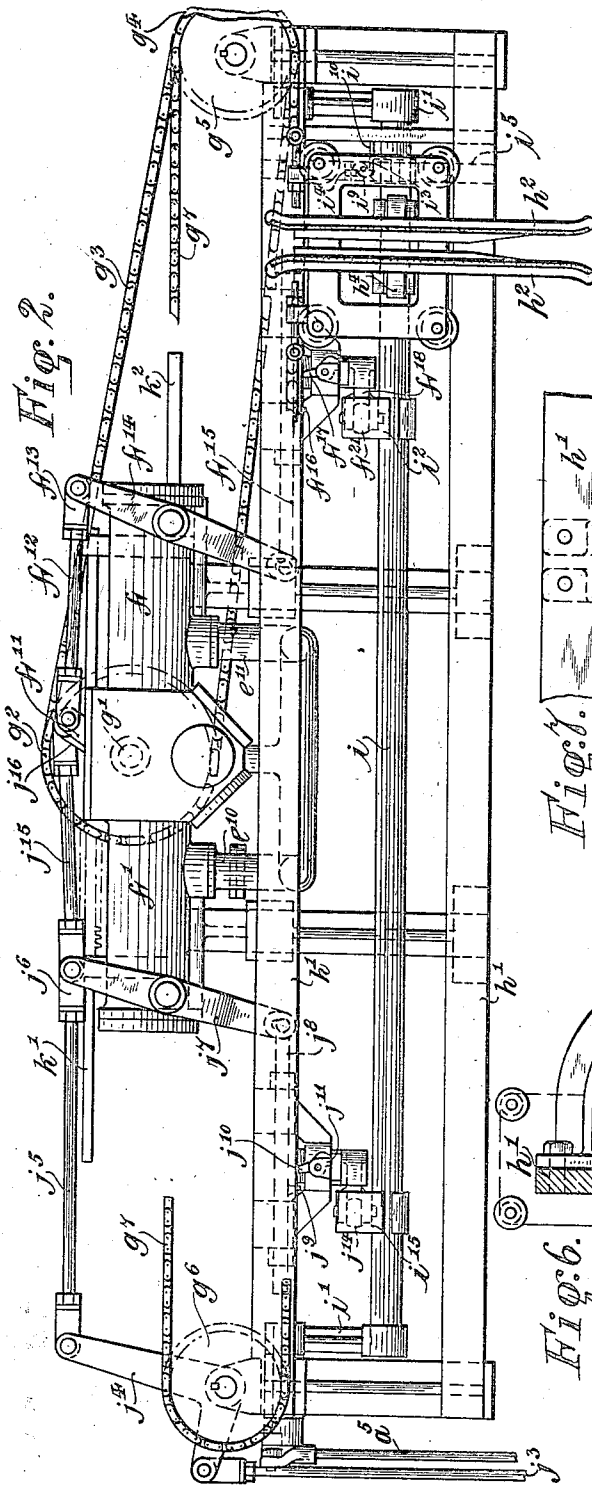
E. S. BRINKER ET AL

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ELEVATOR

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7 Sheets-Sheet 2



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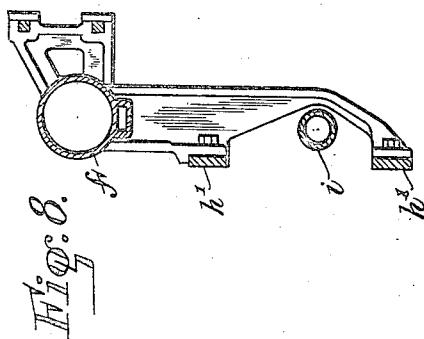
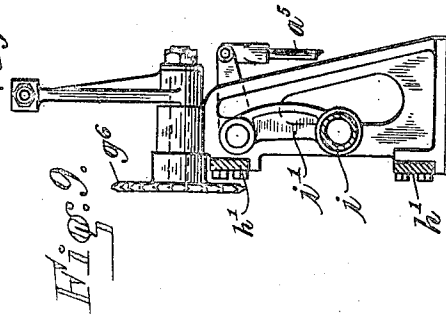
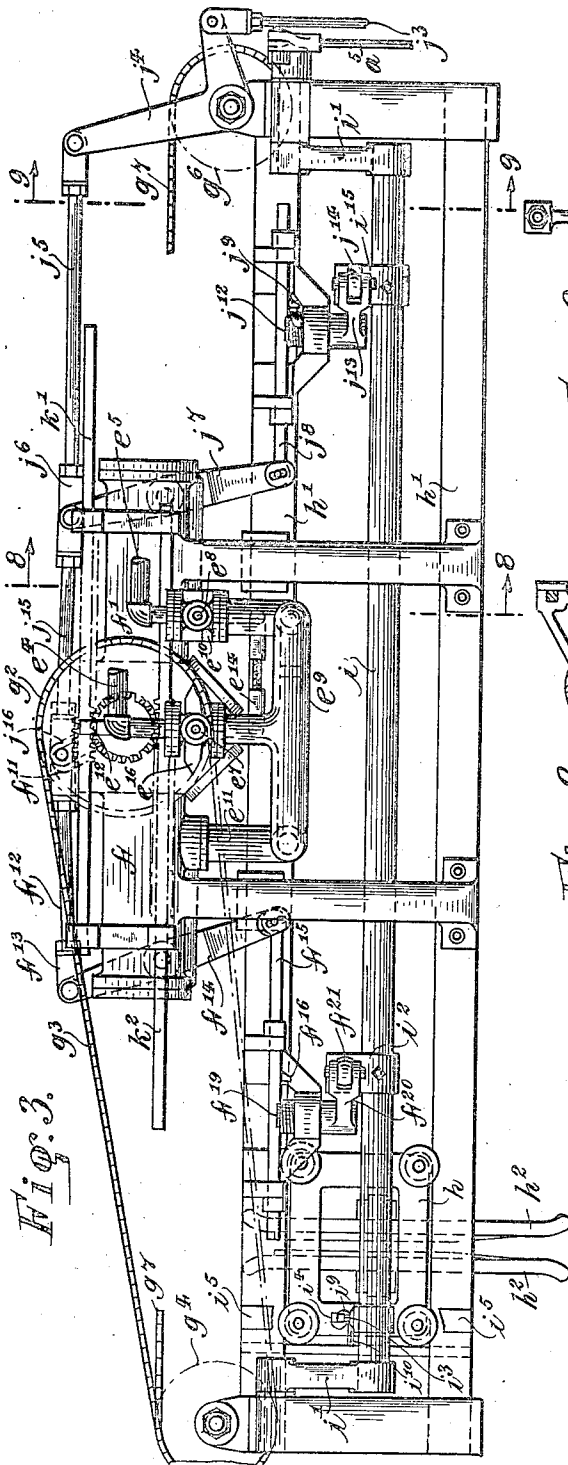
E. S. BRINKER ET AL

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ELEVATOR

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7 Sheets-Sheet 3



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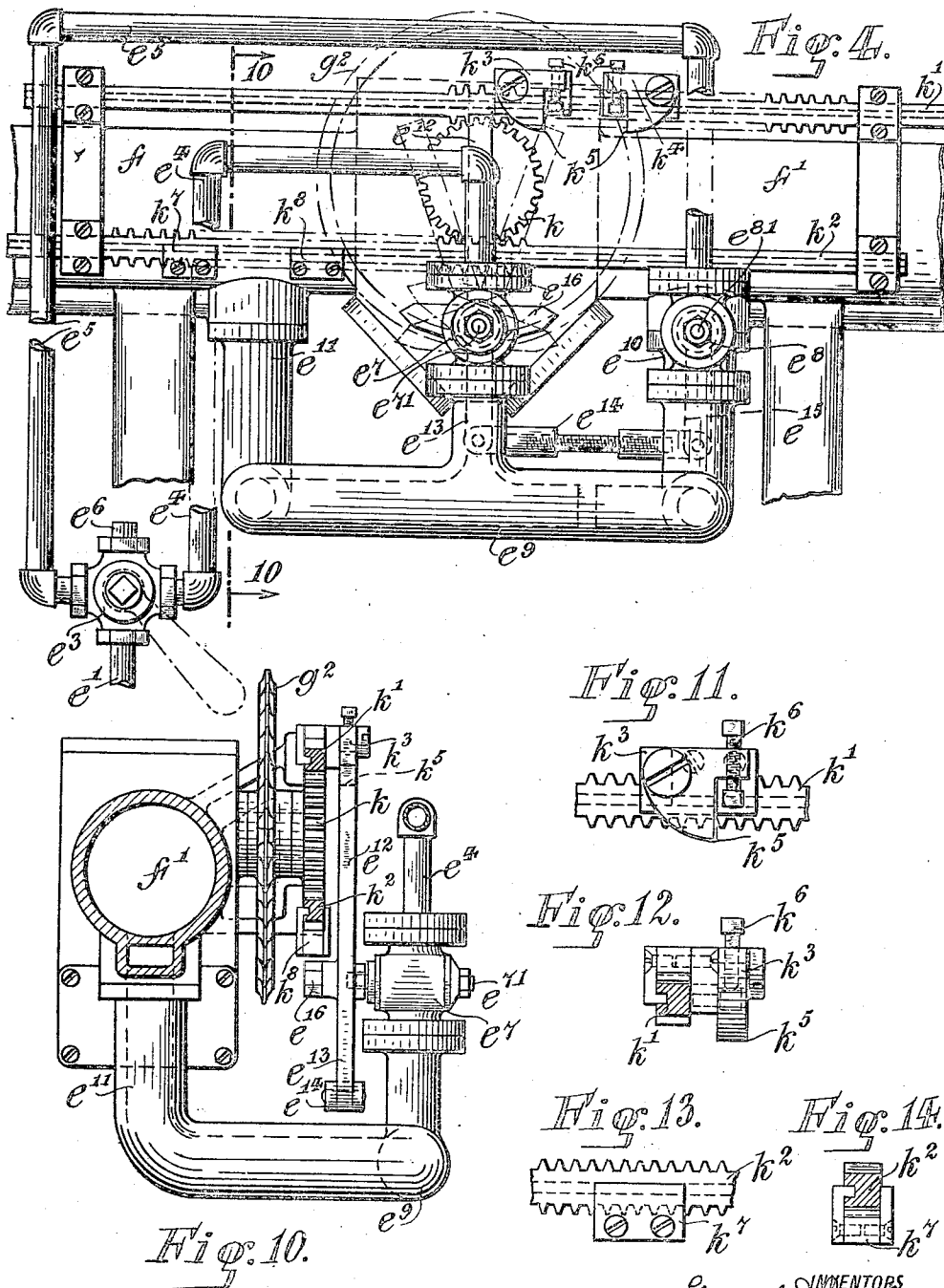
E. S. BRINKER ET AL

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ELEVATOR

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7 Sheets-Sheet 4



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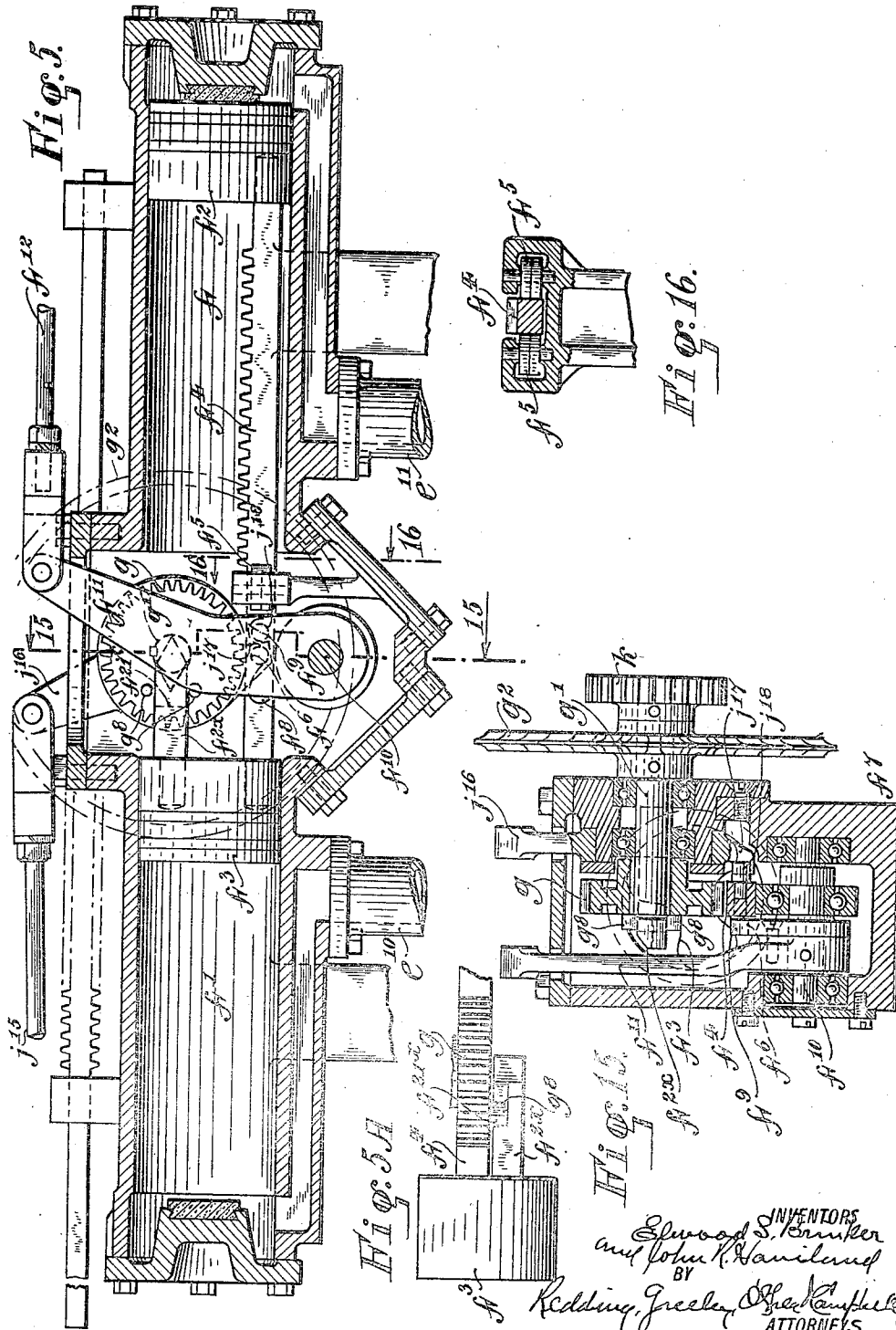
E. S. BRINKER ET AL

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ELEVATOR

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7 Sheets-Sheet 5



May 4, 1926.

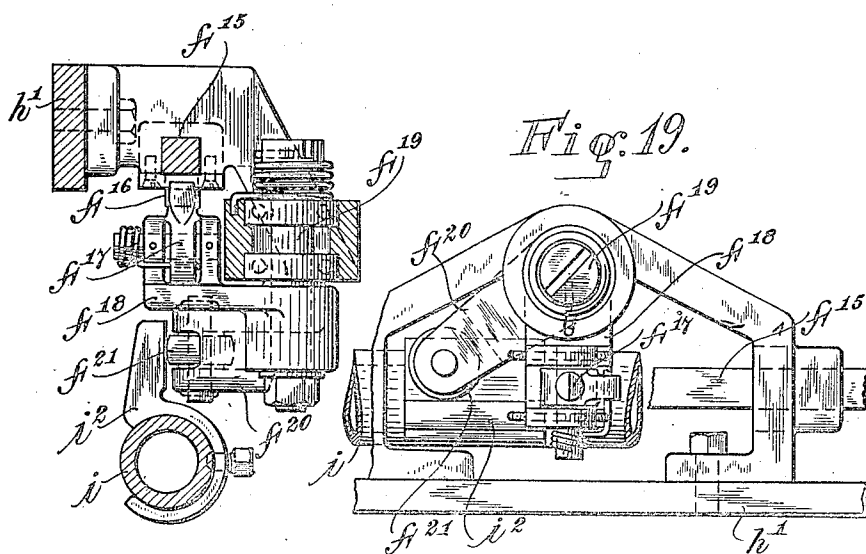
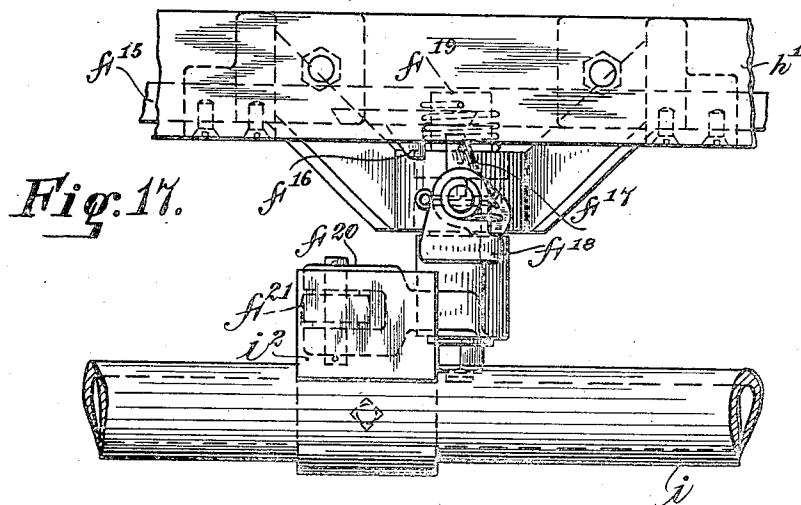
E. S. BRINKER ET AL

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ELEVATOR

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7 Sheets-Sheet 6



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ELEVATOR

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7 Sheets-Sheet 7

Fig. 20.

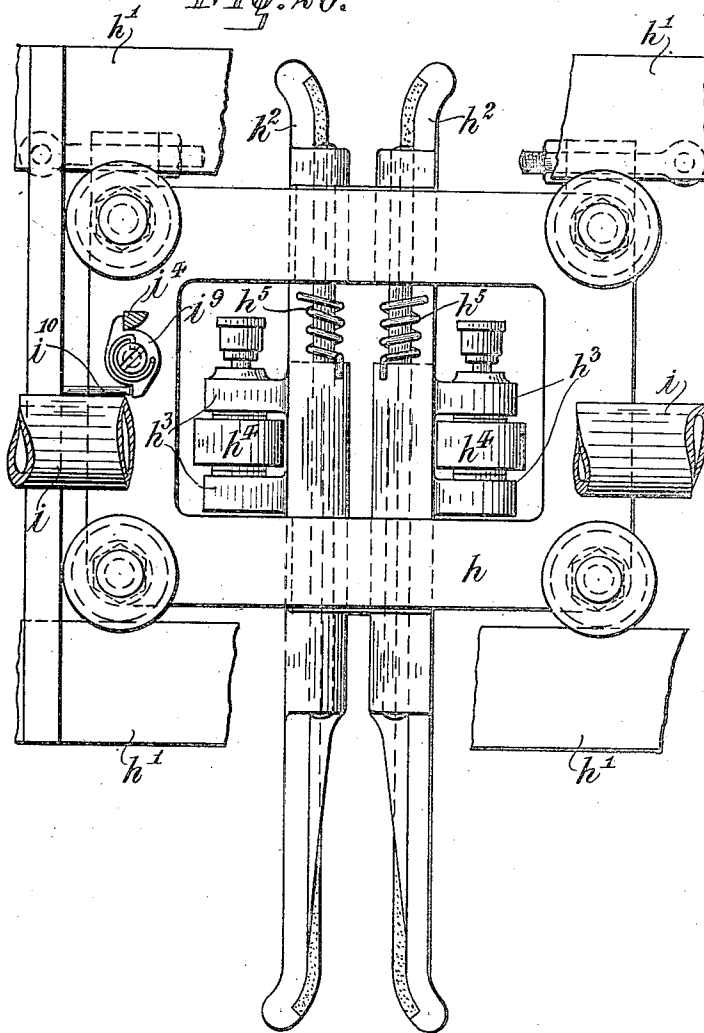


Fig. 21.

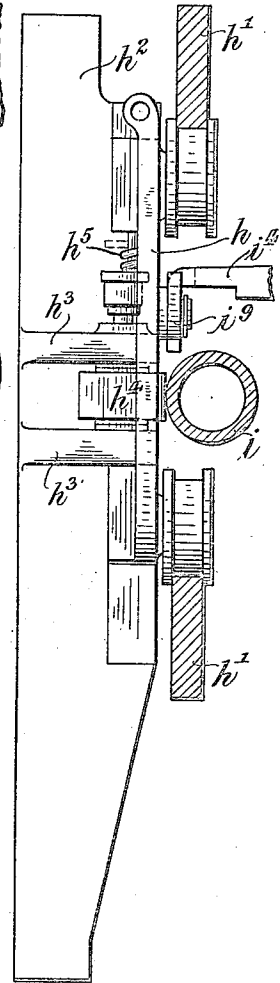
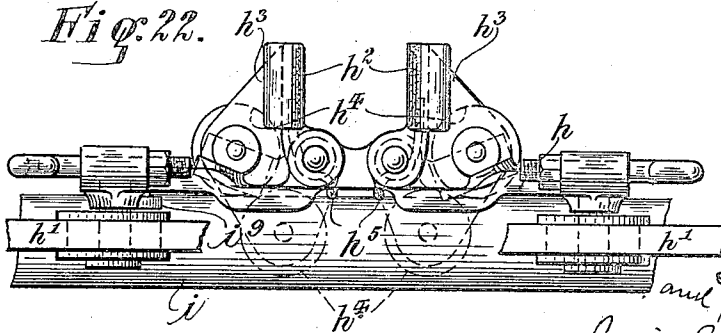


Fig. 22.



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UNITED STATES PATENT OFFICE.

ELWOOD S. BRINKER, OF NEWARK, AND JOHN R. HAVILAND, OF JERSEY CITY, NEW JERSEY, ASSIGNORS TO SHUR LOC ELEVATOR SAFETY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELEVATOR.

Application filed March 30, 1925. Serial No. 19,255.

To all whom it may concern:

Be it known that we, ELWOOD S. BRINKER and JOHN R. HAVILAND, citizens of the United States, residing, respectively, at 311 Mount Prospect Avenue, Newark, New Jersey, and 1 Booraem Avenue, Jersey City, New Jersey, have invented certain new and useful Improvements in Elevators, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates particularly to the operation of the shaft doors of elevators and has for its general object the provision of improved power actuated means for the operation of such doors under such control of the operator, whereby the doors shall be opened and closed quickly. The invention is concerned not only with the construction of the power devices and means for initiating and controlling their operation, but also with interlocking devices to prevent the movement of the car from any floor when the shaft door is open; means whereby the opening of the doors manually is permitted should the power devices fail; and means whereby, in an emergency, the movement of the car from a floor or landing is permitted even if the door is not closed. These main features of improvement will be explained fully hereinafter, together with minor features of details, with reference to the accompanying drawings in which the invention is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a view in sectional elevation showing in part an elevator car equipped with devices adapted for the practice of the invention, the car being shown as if with the side nearest the observer removed, a portion of the shaft door being also shown.

Figure 2 is a view in elevation and on a larger scale, partly broken out, of the power devices shown in Figure 1.

Figure 3 is a view in elevation, partly broken out, and on the same scale as Figure 2, of the power devices as seen from the opposite side.

Figure 4 is a detail view in elevation from

the same side as in Figure 3, but on a larger scale, of some of the power devices.

Figure 5 is a detail view in longitudinal section, partly in elevation, of a portion of the power devices.

Figure 5^A is a detail top view of the device for positioning the door operating gear for engagement by the power rack.

Figures 6 and 7 (Sheet 2) are detail views showing particularly the latch devices for holding in its operative position the tubular rod which actuates the door engaging devices on the traveler.

Figures 8 and 9 (Sheet 3) are detail views in section on the planes indicated by the broken lines 8—8 and 9—9 of Figure 3.

Figure 10 (Sheet 4) is a detail view in section on the plane indicated by the broken line 10—10 of Figure 4.

Figures 11, 12, 13 and 14 (Sheet 4) are detail views of devices to be referred to.

Figure 15 (Sheet 5) is a detail view in section on the plane indicated by the broken line 15—15 of Figure 5.

Figure 16 is a detail view on the plane indicated by the broken line 16—16 of Figure 5.

Figures 17, 18 and 19 are detail views illustrating particularly some of the devices involved in the operation of the tubular rod which actuates the door engaging devices on the traveler.

Figures 20, 21 and 22 (Sheet 7) are detail views on a larger scale of the traveler and the door engaging devices and some of their associated parts as seen respectively in elevation from the inside of the car, in vertical central section, and in horizontal section.

In Figure 1 of the drawings there is shown at *a* a portion of the frame or body of an elevator car of ordinary construction, the floor being indicated at *a'*. It is assumed that the car is raised and lowered by any usual or suitable means which are not necessary to be shown herein, since the present invention is not concerned therewith. The car is shown as having a controller box *a*² with a handle *a*⁴ and an interlocking rod *a*⁵ which operates in the usual manner to pre-

vent the movement of the controller handle to start the car when the shaft door is not in closed position. At each floor or shaft landing, there is a suitable door b , which is movable horizontally to open or to close the shaft opening. For clarity this is shown as a collapsible gate but in practice it is usually a sliding door.

In the embodiment of the invention illustrated in the drawings the power devices by which the movement of the shaft door or of the car door or of both is effected under the control of the operator, are actuated by compressed air which may be delivered from any suitable source and through any suitable conductor to a tank e on the car and the air conductor to the power devices from the tank e through a pipe e' which is provided with a needle valve e^2 for the purpose of enabling the air to be throttled as conditions may require and thereby the operation of the power devices to be steadied and the acceleration of the power devices to be controlled. The supply pipe e' is connected to a four-way valve e^3 under the control of the operator for the purpose of enabling him to direct the delivery of air through one or the other of two branch pipes e^4 , e^5 , to one or the other of two power cylinders hereinafter mentioned, to cause the power devices to move the door for opening or for closing as the case may be, the controlling valve serving also to connect that one of the branch pipes e^4 , e^5 through which air is not delivered to one or the other of the power cylinders, with an exhaust indicated at e^6 . Through valves e^7 , e^8 , to be referred to hereinafter, and a manifold e^9 , the branch pipes e^4 , e^5 are connected, as at e^{10} , e^{11} , to power cylinders f , f' , mounted on the car, and shown most clearly in Figure 5, the one exhausting as the other is charged with air under pressure to move the door in the desired direction. The two pistons f^2 and f^3 are connected by a rack bar f , which is toothed for a portion of its length as shown in Figure 5, the bar being guided at an intermediate point by suitable guide rollers f^5 .

Assuming the parts to be in the positions shown in Figure 5 with the shaft door closed and about to be opened, the first part of the movement of the rack bar f^4 , before the rack teeth come into engagement with the co-acting element, effects operative engagement between the traveler hereinafter mentioned and the door to be moved, through devices to be described. When this function has been accomplished the rack bar f^4 , in its continued movement, engages a gear g fixed on a shaft g' on which is also fixed a sprocket wheel g^2 . The latter is connected by a chain g^3 with a sprocket wheel g^4 which is mounted on a spindle supported on the car and has secured to it a sprocket wheel g^5 . A similar sprocket wheel g^6 is supported

on the car at the other side and the two sprocket wheels g^5 and g^6 are engaged by a chain g^7 the ends of which are connected, as best shown in Figures 1 and 2, to a traveler h which is mounted to travel to and fro across the top of the car or rails h' .

In order to prevent the possibility of failure of the rack f^4 to mesh properly with the gear g in the forward movement of the rack, through possible shifting of the gear when disengaged from the rack, there is provided a device, actuated by the movement of the rack, for correctly positioning the gear as the rack is disengaged therefrom and for holding it in position until it is again engaged by the rack. As shown in Figure 5 and 5^A, there is carried by the piston f^3 a pointed bar f^{2x} which, in the last of the closing movement of the rack bar f^4 to the right hand in Figure 5, enters between two pins g^8 on the side of the gear g and so positions the gear accurately and holds it in position until, in the left hand movement of the rack bar f^4 , it is withdrawn from between the two pins. In order to permit such movement of the gear as may take place after it is engaged by the rack bar and before the bar f^{2x} is completely withdrawn from its operative position, the bar f^{2x} is provided on one side with a rather wide notch f^{21x} which is so positioned as to permit the passage of the pins therethrough at the proper time.

The traveler h is adapted to be operatively connected with the door to be moved, preferably by a device or member which normally is retracted so that in the movement of the car it will not collide with any portion of the shaftway, and is capable of being moved to extended position or into operative relation with the door to be moved. In the embodiment of the invention shown the door engaging device or member consists of two shoes h^2 , suitably shaped as shown in Figures 1, 2 and 20 to 22, and hung so as to swing upon vertical axes from the retracted or inoperative position indicated by full lines in the same figure, the two shoes being spaced apart, when in operative position, so as to receive between them the co-acting device or devices on the shaft door, as shown at b' in Figure 1. Arms h^3 on the shoes h^2 are provided with rollers h^4 adapted for contact with a bar or rod i , preferably tubular, which is hung by pivoted arms i' from the supporting framework on top of the car and is adapted to be swung from its normal, inoperative position, to its operative position to bear against the rollers h^4 to cause the shoes h^2 to swing from their normal, inoperative position, to their operative position, against the pressure of the springs h^5 which hold the shoes normally in their inoperative position. As the bar or rod i extends across the top of the car

throughout the length of travel of the traveler h it will, while in its operative position, hold the shoes h^2 in their operative position throughout the movement of the traveler and until released as hereinafter explained.

The rod bar i is moved to operative position at the initial movement of the rack bar f^4 , before that rack bar engages the gear g , by the devices now to be described. The rack bar f^4 is provided with a pin f^6 , shown in the dotted lines in Figures 5 and 15, which, in the initial movement of the bar, coacts with a forked, cam-like plate, having two unequal fingers f^8 and f^9 and carried by a shaft f^{10} . The latter has secured therewith an arm f^{11} which has connected thereto a link f^{12} which in turn is connected through a connection piece f^{13} with a lever f^{14} . The other end of the lever f^{14} is connected, through a slotted connection, with a sliding bar f^{15} . The latter, see particularly Figures 2, 3, 17, 18 and 19, has on its under side a toe or projection f^{16} which, in its forward movement, engages a spring pressed latch f^{17} , the latch yielding in the opposite movement of the bar f^{15} to permit the toe f^{16} to pass by the latch. The latch or pivoted stop f^{17} is mounted in an arm f^{18} , which is supported by a vertical, spring pressed shaft f^{19} , which also carries an arm f^{20} provided with a roller f^{21} adapted for coaction with an arm i^2 on the swinging bar i . Thereby, in the initial movement of the rack bar f^4 , the bar f^5 is caused to move longitudinally and, through the described devices, to swing the rod i from its inoperative to its operative position and thereby to move the shoes h^2 to their operative positions, in engagement with the door b .

In order that the bar i may be held in its operative position until released as will be described, the bar i is provided, as shown in Figures 6 and 7, with a stop i^3 for engagement by a spring pressed latch i^4 , supported by a bracket i^5 (see right hand end of Figure 2).

The means for disengaging the latch and releasing the bar i will now be described. There is pivoted on the traveler h a spring pressed trip i^6 (see Figures 2, 20 and 21) which, as the traveler reaches the limit of its movement to the right hand in Figure 2, stands under the latch i^4 and at the same time collides with a fixed pin i^{10} . Thereby the trip is rocked and lifts the latch i^4 , thereby releasing the rod i . The trip stands normally in an inoperative position and is moved to operative position only when it strikes the pin i^{10} . It will be understood that when the bar i is released as above described it will permit the shoes or door engaging devices to be returned by their springs to their retracted or inoperative position, whereby the door, as it reaches its closed position, is disengaged from the

traveler and the traveler is free to move with the car and is in readiness to be engaged with another shaft door at the will of the operator.

The occasion may arise, as in the event of failure of air pressure, when it is desirable that the operator may move the door independently of the power devices. In order that this may be done without requiring the operator to move the power devices as well as the door it is necessary to provide means whereby the operator may disconnect the door from the power devices. Accordingly there is provided on the car a device to be actuated by the operator, such as a pedal j , by pressure on which, through levers j' and j^2 , a rod j^3 is pulled down and a bell crank lever j^4 , to one arm of which the rod is connected, is rocked. The other arm of the bell crank j^4 is connected by a rod j^5 with a connection piece j^6 . The connection piece j^6 is operatively connected through a lever j^7 with a sliding bar j^8 which is provided on its under side with a projection j^9 . In the movement of the bar j^8 the projection j^9 makes contact with a latch piece j^{10} on an arm j^{11} of a shaft j^{12} which has at its lower end an arm j^{13} with a roller j^{14} for coaction with an arm i^{15} on the rod i . The bar j^8 and the devices through which its movement causes the rod i to be rocked, are the same in all respects as the devices through which the movement of the rod f^{15} causes the rod i to be rocked and are therefore sufficiently illustrated in Figures 2 and 3 without enlarged detail views which would be identical with Figures 17, 18 and 19. The primary effect of pressure on the pedal j is, therefore, through the described devices to rock the shaft i and thereby to move the door engaging devices h^2 into extended or operative position for engagement with the shaft door.

A secondary effect of pressure on the pedal j is to disconnect the door from the power devices. For this purpose the connection piece j^6 , to which the link j^7 is connected, is itself connected by a link j^{15} , with a lever j^{16} shown in Figures 1, 2, 5 and 15. Below the supporting shaft g' the lever j^{16} is provided with a projection j^{17} for operative engagement with a pin j^{18} of the rack bar f^4 , as shown clearly in Figure 15, so that the rack bar f^4 is moved sufficiently (to the right hand in Figure 5), to assure disengagement of the rack bar from the gear g . By the application of the operator's hand to the gate, movement of the gate can now be effected with movement only of the gear g , the sprocket wheel g^2 and the connected chains and sprockets, without requiring movement of the pistons f^2 , f^3 and the overcoming of such air resistance as there might be in the cylinders. It will be observed furthermore, that while, provision is thus made for the

movement of the shaft door either manually or by power, the interlock with the controller is maintained whether the shaft door is moved by hand or by power, and the car therefore cannot be moved when the door engaging devices are in extended or operative position whether they are moved to operative position by hand or by power.

Devices are also provided for checking the movement of the door as it approaches the limit of its movement in either direction so as to prevent slamming, and will now be described with particular reference to Figures 3, 4 and 10 to 15. Such devices comprise means, actuated by the movement of the door operating devices or some part moving with the door, to cut off the admission of air to the power cylinders, to retain the air therein to cushion the movement of the pistons and therefore the movement of the door, and finally, to readmit the air so as to permit the complete closing of the door when its momentum has been reduced. On the shaft g' which carries the first sprocket wheel g^2 , as shown in Figures 4, 10 and 15, there is fixed a gear k which therefore rotates with the sprocket g^2 in the movement of the door. In suitable guides supported on the car there are mounted two rack bars, one, k' , above the gear k , and the other, k^2 , below the same. Both rack bars are always in engagement with the gear k and therefore are moved by the same in opposite directions, and are toothed only for a limited portion of their lengths, as shown in Figure 4. On the bar k' are pivotally mounted, relatively close together, two overbalanced, oppositely acting latches k^3 and k^4 , each having a shoulder as at k^5 , and each provided with an adjustable bearing k^6 . The function of the latches k^3 , k^4 is to effect, through devices to be described, a closing or a partial closing of the valves e^7 e^8 which control the admission of air and the exhaust of air from the respective cylinders. The bar k^2 is armed with blocks or contact faces k^7 , k^8 , also relatively close together but spaced somewhat further than the latches k^3 , k^4 . To the spindle e^{11} of the air controlling valve e^7 is fixed a lever e^{12} , the lower portion e^{13} of which is connected by a link e^{14} , with a lever e^{15} fixed to the spindle e^{11} of the valve e^8 . The lever e^{12} is formed with or has secured to it a double cam shaped arm e^{16} . It will now be seen that in the movement of the rack bar k' to the left hand in Figure 4, through the rotation of the gear k with the sprocket g^2 the latch k^3 will slip over the upper end of the lever e^{12} without disturbing the same, while the latch k^4 , as its shoulder k^5 makes contact with the end of the lever e^{12} and its adjusting stop k^6 rests against the upper end of the lever, will cause the lever to swing from its full line position in Figure 4 to the left hand position

indicated by broken lines, thereby closing or partly closing the valves e^7 and e^8 . The cross arm e^6 will be swung to a corresponding inclined position so that when it is reached by the restoring block k^8 in the opposite movement of the rack bar k^2 , as the door approaches the limit of its movement in a corresponding direction, the restoring block k^8 will make contact with the inclined cross arm e^{10} and will restore it to its horizontal position, the lever e^{12} to its vertical position, and the valves e^7 and e^8 to their open condition, thereby releasing the air from one cylinder and readmitting air to the other and permitting the door to move with reduced momentum to its extreme position. In the opposite movement of the door the valves will be moved to closed position by the latch k^3 and will later be moved to open position by the restoring block k^8 .

It will be understood that in the normal operation of the elevator the car is moved under the control of the operator to the desired landing and is brought to rest in the usual manner through movement of the controller handle a^4 . Through the air controlling valve e^3 , the operator then admits air to the cylinder f , the first effect of the movement of the piston f^2 being to rock the rod i so as to move the normally retracted door engaging devices k^2 into extended or operative position, in engagement with the co-acting portion b' of the shaft door b . Through the connection of the shaft i with the interlocking rod a^2 the latter is moved at the same time to lock the controller in neutral position so that the car cannot be moved. In the continued movement of the piston f^2 the rack f^4 engages the gear g and through the described connections effects the movement of the door from the closed position shown in Figure 1 to the fully open position. As the door approaches the fully open position the valves e^7 and e^8 are closed or partly closed, cutting off the admission of air to the cylinder f and closing the exhaust of the cylinder f' so that the continued movement of the pistons and therefore of the door is cushioned until, as the door approaches its fully open position, the valves are opened, relieving the pressure in the cylinder f' and readmitting sufficient air to the cylinder f to complete the opening movement of the door but with a reduced momentum. If at any time the air should fail, making it impossible to open the door by the power devices, the operator by pressure on the pedal j , can effect the engagement of the door engaging devices with the door through the rocking of the rod i and at the same time lock the controller so that the car cannot be moved. Then the operator can move the door to open it and thereafter to close it, unlocking the controller as the door closes and the door engaging devices are released,

so that the movement of the car can be continued under the control of the controller α^3 .

It will be understood that various changes in details of construction and arrangement can be made to suit different conditions of use and that, except as indicated in the claims, the invention is not restricted to the particular construction shown and described herein.

10 We claim as our invention:

1. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power
15 cylinder and piston, transmitting devices between the piston and the traveler, means under the control of the operator to admit air under pressure to the cylinder, said means including a cutoff valve, and means
20 actuated with the transmitting devices to close said valve so as to prevent the admission of air and thereafter to open the same, to check and thereafter to continue the movement of the traveler.

2. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power
30 cylinder and piston, transmitting devices between the piston and the traveler, means under the control of the operator to admit air under pressure to the cylinder, said means including a cutoff valve, a device actuated with the transmitting devices
35 in one direction to close said valve so as to prevent the admission of air and a device actuated with said transmitting devices in the opposite direction thereafter to open said valve.

3. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power
45 cylinder and piston, transmitting devices between the piston and the traveler, means under the control of the operator to admit air under pressure to the cylinder, said means including a cutoff valve, a gear actuated with the transmitting devices, a rack
50 bar engaged by the gear, an operating lever for the valve, and a device carried by the rack bar to engage the operating lever and shift the valve.

4. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power
55 cylinder and piston, transmitting devices between the piston and the traveler, means under the control of the operator to admit air under pressure to the cylinder, said means including a cutoff valve, a gear actuated with the transmitting devices, a rack
60 bar engaged by the gear, an operating lever for the valve, and a latch pivotally mounted
65 for the valve, and a latch pivotally mounted

on the bar to effect operative engagement with the lever in one direction of movement and to slip over the same in the opposite direction of movement.

5. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power cylinder and piston, transmitting devices between the piston and the traveler, means
75 under the control of the operator to admit air under pressure to the cylinder said means including a cutoff valve, a gear actuated with the transmitting devices, a bar rack engaged by the gear, an operating lever for the valve,
80 and two opposed latches pivotally mounted on the rack bar to engage the lever operatively in opposite directions of movement of the rack bar and alternately to slip over the same.

6. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power
90 cylinder and piston, transmitting devices between the piston and the traveler, means under the control of the operator to admit air under pressure to the cylinder including a cutoff valve, a gear actuated with the transmitting devices, rack bars engaged by the
95 gear on opposite sides of the axis thereof, an operating lever for the valve, a latch carried by one of said rack bars to engage operatively the operating lever to close the valve, and a restoring device carried by the
100 other rack bar thereafter to engage operatively the operating lever to open the valve.

7. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a power
105 cylinder and piston, transmitting devices between the piston and the traveler, means under the control of the operator to admit air under pressure to the cylinder including a cutoff valve, a gear actuated with the transmitting devices, rack bars engaged by the gear on opposite sides of the axis thereof,
110 an operating lever for the valve having a cross arm, a latch carried by one of the rack bars to engage operatively the operating lever to close the valve, and a restoring block carried by the other rack bar to engage operatively the cross arm of the operating lever to open the valve.

8. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, opposed
125 power cylinders and pistons, transmitting devices between the pistons and the traveler, and means under control of the operator to admit air under pressure to one of the cylinders and to open the exhaust of the other
12. of the cylinders.

9. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, opposed
5 power cylinders and pistons, transmitting devices between the pistons and the traveler, a source of air under pressure, branch pipes severally connecting the source of air under pressure with the cylinders, and a single
10 valve under the control of the operator to admit air to one of the cylinders and to open the exhaust of the other of the cylinders.

10. In an elevator, the combination of a door, a car, a traveler mounted on the car,
15 means to effect operative engagement between the traveler and the door, opposed power cylinders and pistons, transmitting devices between the pistons and the traveler, a source of air under pressure, branch pipes
20 severally connecting the source of air under pressure with the cylinders, valves included in the branch pipe connections to the cylinders, and means actuated with the transmitting devices to close the valves and there-
25 after to open the same.

11. In an elevator, the combination of a door, a car, a traveler mounted on the car, power devices mounted on the car, means
30 to effect operative engagement between the traveler and the door, transmitting devices between the power devices and the traveler, means operated in the initial movement of the power devices to actuate the means to
35 effect operative engagement between the traveler and the door, and means operated in the continued operation of the power devices to effect operation of the transmitting devices.

12. In an elevator, the combination of a door, a car, a traveler mounted on the car,
40 power devices mounted on the car, means to effect operative engagement between the traveler and the door, a lever operated in the initial movement of the power devices and connections to actuate said means and
45 gearing operated in the continued movement of the power devices and connections to effect movement of the traveler.

13. In an elevator, the combination of a door, a car, a traveler mounted on the car,
50 a power cylinder, piston and piston rod mounted on the car, an arm engaged by the piston rod in its initial movement, and connections to effect operation of said means,
55 a rack bar carried by the piston rod, a gear engaged by the rack bar in the continued movement of the piston rod, and connections to effect movement of the traveler.

14. In an elevator, the combination of a door, a car, a traveler mounted on the car,
60 power devices mounted on the car, normally inoperative transmission devices between the power devices and the traveler, and manually operated devices independent of the
65 power devices to effect movement of the

transmitting devices without movement of the power devices.

15. In an elevator, the combination of a door, a car, a traveler mounted on the car, power devices mounted on the car, normal-
70 ly inoperative transmission devices between the power devices and the traveler, manually operated devices independent of the power devices to effect movement of the transmitting devices without movement of
75 the power devices, and means actuated by the initial movement of the manually operated devices to insure disengagement of the transmitting means from the power devices.
80

16. In an elevator, the combination of a door, a car, a traveler mounted on the car, power devices mounted on the car, means
85 to effect operative engagement between the traveler and the door, a longitudinally disposed rod mounted to swing toward and from the traveler, intermediate devices whereby the movement of the rod operates the means to effect operative engagement
90 between the traveler and the door, and means actuated in the initial movement of the power devices to swing the rod to operative position.

17. In an elevator, the combination of a door, a car, a traveler mounted on the car, power devices mounted on the car, means
95 to effect operative engagement between the traveler and the door, a longitudinally disposed rod mounted to swing toward and from the traveler, intermediate devices whereby the movement of the rod operates the means to effect operative engagement
100 between the traveler and the door, means actuated in the initial movement of the power devices to swing the rod to operative position, a latch to hold the rod in operative
105 position during the movement of the traveler, and a device actuated in the movement of the traveler to disengage the latch and release the rod to permit disengagement
110 between the traveler and the door.

18. In an elevator, the combination of a door, a car, a traveler mounted on the car, power devices mounted on the car, means
115 to effect operative engagement between the traveler and the door, a longitudinally disposed bar mounted to swing toward and from the traveler to actuate said means to effect operative engagement between the
120 traveler and the door, a longitudinally movable bar operated in the initial movement of the power devices, and means operated by the movement of the last named bar to cause said rod to swing to operative
125 position in relation to the traveler.

19. In an elevator, the combination of a door, a car, a traveler mounted on the car, power devices mounted on the car, means
130 to effect operative engagement between the traveler and the door, a longitudinally dis-

posed bar mounted to swing toward and from the traveler to actuate said means to effect operative engagement between the traveler and the door, a longitudinally movable bar operated in the initial movement of the power devices, a pivoted latch adapted to be engaged by the bar in its movement, and means operated by the latch in the movement of the last named bar in one direction to cause the rod to swing to operative position in relation to the traveler, the latch being free to yield in the opposite movement of the bar.

20. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a longitudinally disposed rod mounted to swing toward and from the traveler, intermediate devices whereby the movement of the rod operates the means to effect operative engagement between the traveler and the door, and manually operated means to swing the rod to operative position.

21. In an elevator, the combination of a door, a car, a traveler mounted on the car, means to effect operative engagement between the traveler and the door, a longitu-

dinally disposed rod mounted to swing toward and from the traveler, intermediate devices whereby the movement of the rod operates the means to effect operative engagement between the traveler and the door, transmission devices to effect movement of the traveler, and manually operated means to swing the rod to operative position and thereafter to actuate the transmission devices.

22. In an elevator, the combination of a door, a car, a controller for controlling the movement of the car, a normally retracted device on the car movable into extended operating position with respect to the door, mechanism for moving said device to extended position, power operated devices to actuate said mechanism, manually operated devices to actuate said mechanism, and means intermediate said mechanism and the controller whereby the controller is locked in neutral position when said mechanism is actuated to move said device to extended position.

This specification signed this 27 day of March A. D. 1925.

JOHN R. HAVILAND.
ELWOOD S. BRINKER.