

2 Sheets—Sheet 1

DEVICE FOR OPERATING THE DOORS OF ELEVATOR WELLS.

Patented Feb. 4, 1890

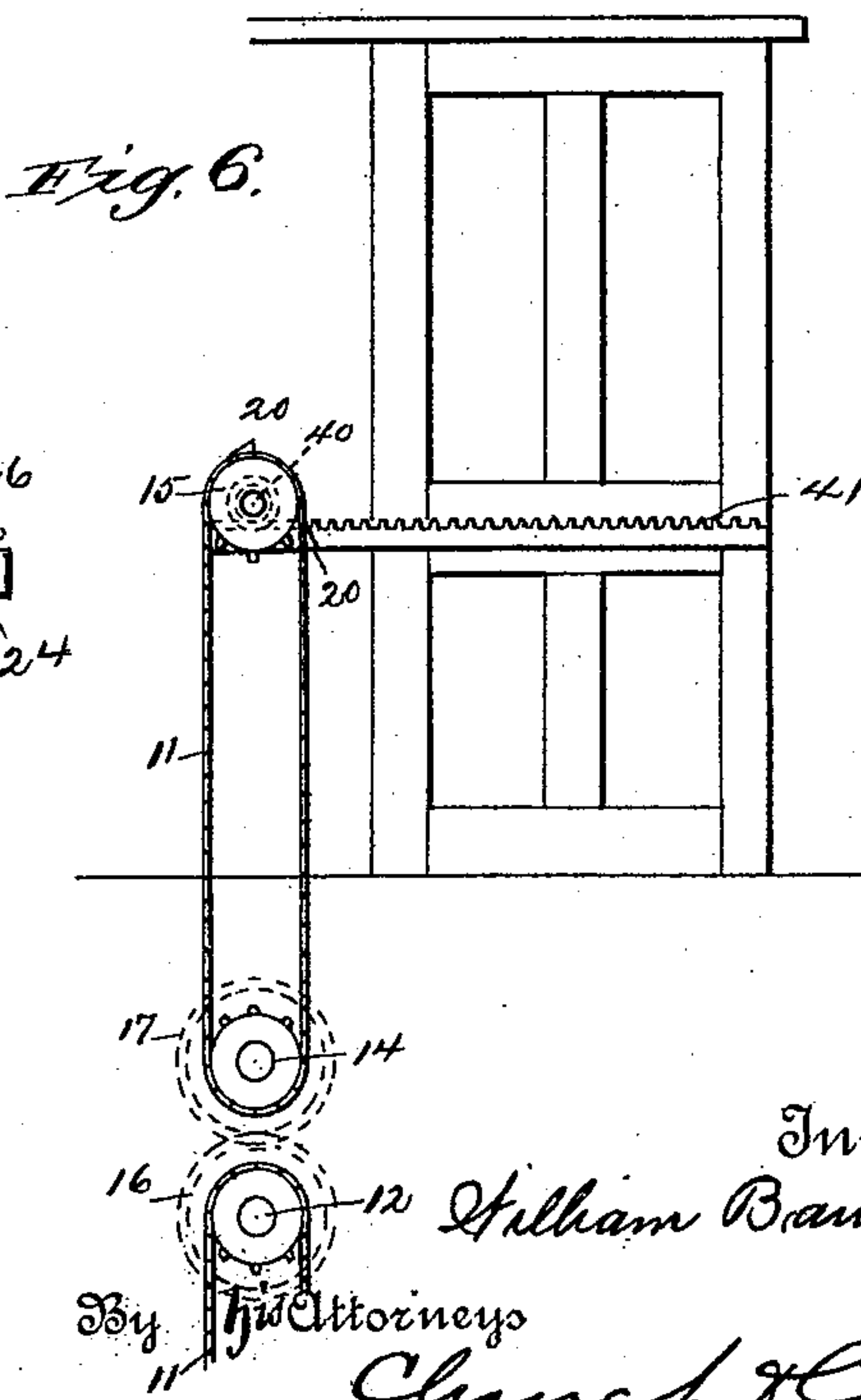
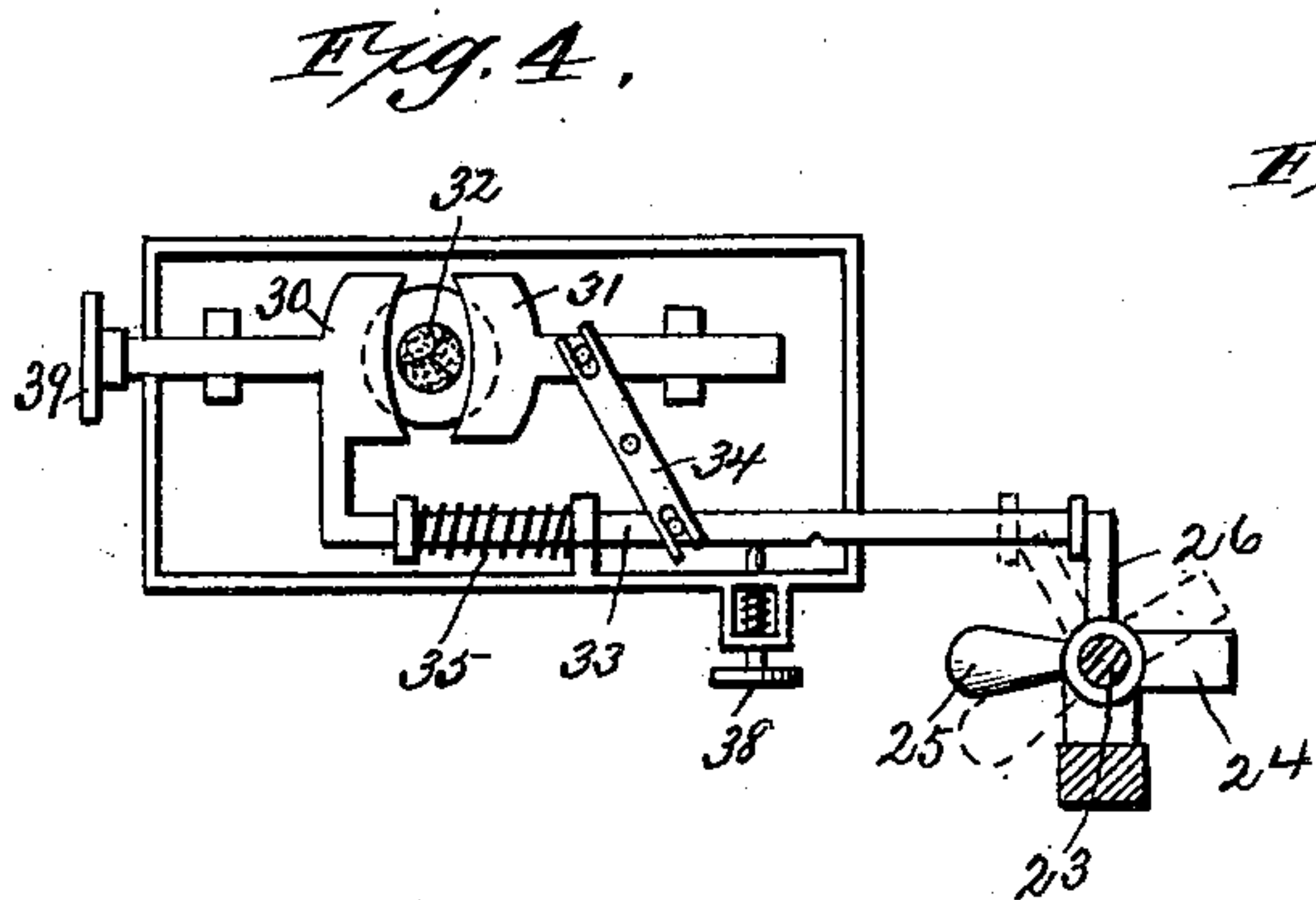
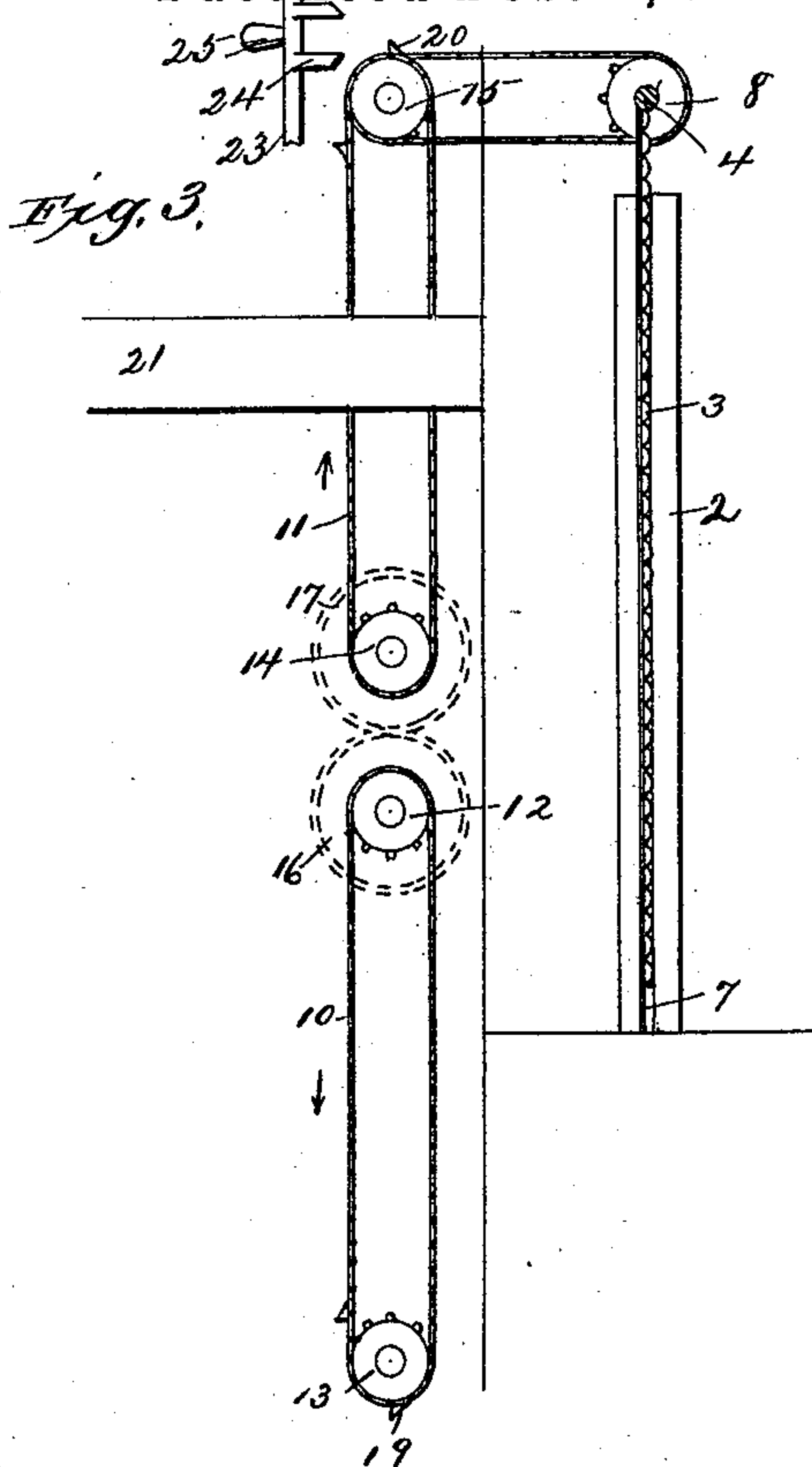
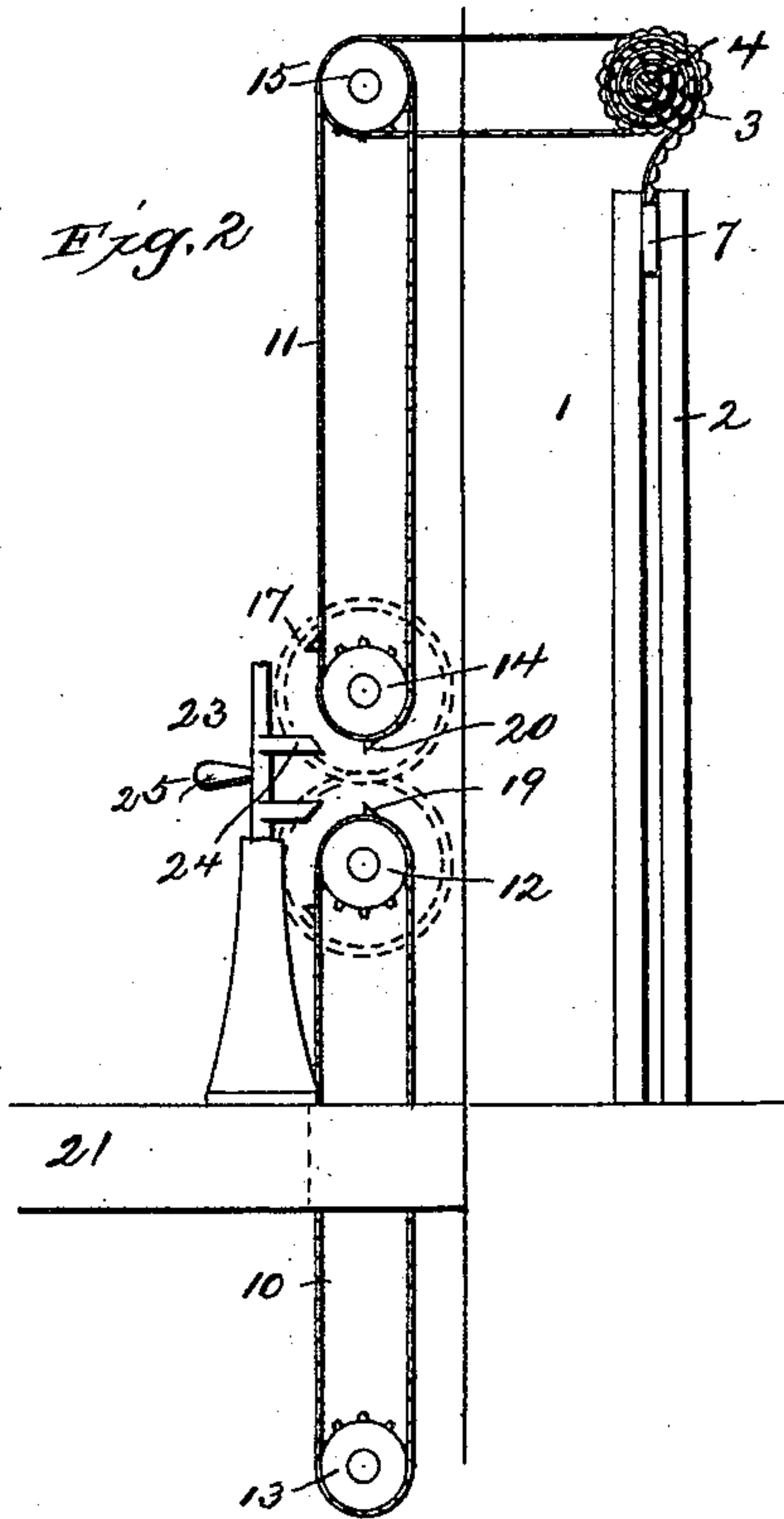


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DEVICE FOR OPERATING THE DOORS OF ELEVATOR WELLS.

No. 420,856.

Patented Feb. 4, 1890.



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DEVICE FOR OPERATING THE DOORS OF ELEVATOR-WELLS.

SPECIFICATION forming part of Letters Patent No. 420,856, dated February 4, 1890.

Application filed September 3, 1889. Serial No. 322,860. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BAUSCH, of the city of Rochester, county of Monroe, and State of New York, have invented certain
5 new and useful Improvements in Elevator-Doors; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to figures of reference marked
10 thereon.

My present invention relates to improvements in the doors of elevator-shafts and the devices for operating them by the movement of the car, the operation, however, being under the control of the operator or conductor; and it has for its object to provide a door easily operated and one which when open will occupy very little space; and it further has for its object to provide an apparatus under the control of the conductor of the car whereby the doors at each floor may be automatically opened and closed by the movement of the car, if desired, or, when an automatic catch for the shifting-cable is operated
20 to stop the car at any floor, this same operation will cause the opening of the door at that point.

To these and other ends the invention consists in certain constructions and combinations of parts, all as will be hereinafter fully described, and the novel features pointed out in the claims at the end of this specification.

In the drawings, Figure 1 is a view of the improved door-operating device with the elevator-car approaching a floor from below; Figs. 2 and 3, diagrammatic views showing the position of the parts with the car at the floor and after having passed it going up;
40 Fig. 4, a horizontal sectional view taken on the line $x x$ of Fig. 1; Fig. 5, a detail view, and Figs. 6 and 7 views of modifications.

Similar letters of reference in the several figures denote similar parts.

45 In carrying out my invention I provide at the elevator-well opening at each floor a suitable door or barrier arranged to be opened and closed by the movement of the car in approaching or leaving it, and in the present
50 instance prefer to make this door flexible

and capable of being rolled or wound upon a suitable shaft or roller hung above or to one side of the door-casing, and while any other form could as well be used in connection with the hereinafter-described operating devices I prefer this, for the reason that it can be made light and fire-proof, and, further, will occupy very little space and can be very easily operated.

1 represents the casing of the well-opening at a floor, and 2 the grooved plates or guides formed at the sides thereof, in which the ends of the slats or plates 3 of the door travel and are guided, 4 being the roller (in this instance arranged in bearings 5 at the top) on which
60 the door is adapted to be rolled. As stated, these strips 3 may be hinged together in any suitable manner to secure lightness and flexibility; but I prefer to secure them to a backing 6, of asbestos or similar strong fire-proof material, which may itself, if desired, form
70 the only connection between the plates.

The lower plate 7 of the door may be made heavy, if desired, to insure the proper operation when the roller is rotated in a direction
75 to unwind it. On the end of the roller 4 is arranged a sprocket-wheel 8, from which extends a chain 9, adapted to be moved in one or the other direction by the operating devices and at the other a cable attached to a
80 counter-weight 50, for steadying the operation of the door if made of light material.

Within the elevator-well are arranged two sprocket-chains 10 and 11, the one 10 passing around sprocket-wheels 12 and 13 and the
85 other 11 passing around wheels 14 and 15, all arranged on suitable journals, preferably secured to the side of the well. The wheels 12 and 14 are preferably formed with or attached to gears 16 and 17, intermeshing as shown,
90 so as to be moved in opposite directions, and the sprocket-wheel 15 is formed with or attached to a similar sprocket 18, around which the chain 9, engaging sprocket 8 on the door-roller, passes. Upon the chain 10, and preferably
95 attached to separate links thereof, are arranged two projections 19 19, having their outer sides beveled and their proximate sides parallel or slightly recessed, as shown, and upon the chain 11 are two similar projections
100

20 20, said projections and the connection between the chains being so arranged that when the elevator-car is either side of the floor and the door closed projections 19 will
5 be at the lower sprocket and the projections 20 at their highest position near sprocket 15.

Upon the elevator-car (represented in the drawings by 21) is provided a vertical rock shaft or rod 23, in the present instance at-
10 tached to one of the hangers or standards of the car, and provided on one side with two projections or lugs 24, being constructed in a manner similar to those on the chains—that is, with the outer ends beveled and the proximate
15 sides parallel or slightly recessed. This shaft is also further provided with an operating-handle 25, another arm or lug 26, preferably arranged at an angle to the first-mentioned projections, and also with an angular portion
20 45, engaged by a flat spring 27, adapted to keep said shaft turned in one or the other of the positions indicated by the full and dotted lines, Fig. 4. The operation of this portion of the invention will now be under-
25 stood.

When the car approaches a higher floor at which it is desired to stop, the operator turns the shaft 23 to the position in full lines, Fig. 4, either by means of the handle 25, (or
30 other means presently described,) throwing the projections 24 out into line with those on the chains, in which position they will be kept by the spring 27 bearing against one of the flat sides of the shaft, as shown. The
35 door-operating devices being in the position shown in Fig. 1, the upper projection 24 on the car will first strike the upper projection 19 on the lower chain, but being beveled will move it backward, the elasticity of the chain
40 permitting this; but projection 19 will then move in again and engage the upper side of the lower projection 24, which latter moving upward will carry the chain with it, moving all the connected parts in the direction
45 indicated by the arrows, Fig. 1, and opening the door by winding it on its shaft. The movement of the car is now arrested by the operator leaving the door open and the lugs 24 out of engagement with either chain, but
50 with the upper projection 20 and the lower projection 19 of the chains in position to be engaged by the projections 24, should the car start in either direction, as shown in Fig. 2. If the car is to move upward, the upper pro-
55 jection 24 will, as before, pass by the projection 20 presented, and the lower one engaging it the chain 11 will be moved upward, returning the projections 19 to first position and closing the door, the directions of the
60 movements being indicated by the arrows in Fig. 3.

If the operator desires to pass any floor provided with the door-operating devices, it is only necessary for him to turn the shaft 23
65 to the position shown in dotted lines, Fig. 4,

thereby moving the projections 24 out of line with the chain projections, in which position it will be held by the spring 27. As it is desirable to provide for opening the doors only at the floors where the car is to stop, I prefer
70 when the elevator is provided with an automatic stop to locate the latter in such position relative to the door-operating devices as that when the stop is set to arrest the elevator at a floor the door-operating devices will
75 be so set as to cause the door to be opened.

In the present embodiment of my invention I have shown the device in connection with the stop described in Patent No. 331,672, dated December 1, 1885; but any other form
80 could be equally well employed with perhaps slight modifications. This stop consists generally of two sliding jaws or stops 30 31, between which the elevator-shafting rope 32 passes, said stops being connected for simul-
85 taneous operation in opposite directions by rod 33 and lever 34 pressed toward each other by a spring 35, and arranged to engage projections 37 37 on the shifting-rope, shift the latter and arrest the movement of the car. 90 Rod 33 is provided at one side with a notch, with which co-operates a spring-latch 38, operating to hold the stops separated when desired to pass the projections 37 on the rope; and its end is extended outward, this exten-
95 sion, in the usual construction of stops, serving as the means for separating the jaws; but I arrange it in such position as that it will, when projected, (this leaving the jaws to-
100 gether and in position to arrest the car,) engage the lug 26 on shaft 23 and turn the latter into the position in Fig. 4 with the lugs 24 in line with the chain projections. Of course it will be understood that by moving
105 the handle 25 in one direction the opening of the stop-jaws can be accomplished, this causing rod 33 to be pushed inward, and, if desired, positive connection could be made between the shaft and stop; but I prefer to ar-
110 range it as shown, and to separate the stop-jaws by a knob 39 connected to one of them.

This arrangement of devices is advantageous in that if moving in either direction the operator, just before reaching the floor at
115 which he is to stop, has only to release the latch 38, thus allowing the spring 35 to close the stop-jaws and turn the shaft 23 with lugs 24 in position to operate the door as the car moves toward it from either direction.

While I prefer the form of door shown in
120 Fig. 1, it will be understood that any other form could as well be operated by the other-described devices—for instance, a sliding door, as shown in Fig. 6, the sprocket-wheels on which the chains travel being arranged
125 with their axes parallel with the door-opening, the projections 19 and 20 on edges of the chains presented to the lugs 24 on the car, and the upper sprocket 15, connected to a gear 40, which latter meshes directly with a rack 130

41 secured to the door. In this construction of chains and gearing the same operations take place as before.

Instead of relying upon the beveled side of the projections and the elasticity of the chains to allow the first projection to pass the chain projections, I sometimes make the projections 24 on the rock-shaft in the form of pivoted spring-latches, as in Fig. 7, allowing the first one reaching the chain projections to turn on its pivot against spring 46 and the next one to positively engage and move the chain, its shoulder 47 engaging its supporting-block 48, as shown.

Other modifications could readily be made without departing from the spirit of my invention.

By reason of the connection between the stop and the door-operating device shown, it will be seen that the stop can never be employed to actuate the shifting-cable without throwing the door-operating device into position to operate the door, as the bringing together of the stop-jaws for the purpose projects rod 33 and throws the rock-shaft into position.

I claim as my invention—

1. The combination, with an elevator-car, of a door for affording access to the well in which said car operates, consisting of a series of slats hinged together, a rotary shaft to which the door is connected, and connections between the car and shaft independent of the door for positively rotating the shaft in opposite directions by the movement of the car to open and close the door, substantially as described.

2. The combination, with an elevator and a door for affording access to the elevator-well, of two chains or belts having projections thereon, arranged in the same vertical plane and connected for simultaneous operation in opposite directions, connections between said chains and the door for causing the operation of the latter from the former, and a projection on the car for co-operating with the chain projections successively as the car moves by them, substantially as described.

3. The combination, with an elevator-car and a flexible rolling door for affording access to the elevator-well, of two chains or belts having the projections thereon and connected together for simultaneous operation in opposite directions, connections between one of said chains and the shaft on which the door is rolled, and a projection on the elevator-car co-operating with those on the chains for causing the rolling and unrolling of the door by the movements of the car, substantially as described.

4. The combination, with an elevator-car and a door for affording access to the elevator-well, of the two pairs of projections arranged in the same vertical plane and connected for simultaneous operation in opposite directions, connections between the projec-

tions and door for operating the latter positively in opposite directions, and a projection on the elevator-car for engaging the movable projections and operating the door by the movement of the car, substantially as described.

5. The combination, with an elevator-car and a door for affording access to the elevator-well, of the chain or belt connected to the door having a pair of projections thereon, and the pair of projections on the car for co-operating with those on the chain, one of said pairs having substantially straight proximate sides and beveled outer sides, substantially as described.

6. The combination, with an elevator-car and a door for affording access to the elevator-well, of the two chains or belts connected to the door for operating it positively, arranged in the same vertical plane, connected for simultaneous operation in opposite directions, and each having two projections thereon, and two projections on the car co-operating with those on the chain, substantially as described.

7. The combination, with a car, a door for affording access to the elevator-well, and devices operated from the car for moving said door, of a stop for arresting the movement of the car, a projection on the car for engaging the door-operating device, and connections between said stop and projection for causing the engagement of the latter with the door-operating device when the car is to be arrested, substantially as described.

8. The combination, with the shifting-rope, an elevator-car, a door for affording access to the elevator-well, and devices operated from the car for moving said door, of a stop for engaging the shifting-rope and arresting the car, a projection on the car for engaging the door-operating device, and connections between said stop and projection for causing the engagement of the latter with the door-operating device when the car is to be arrested, substantially as described.

9. The combination, with an elevator-car, a door for affording access to the elevator-well, and devices operated from the car for moving said door, of a stop for arresting the movement of the car, a projection on the car for engaging the door-operating device, and connections between the projection and stop for preventing the arrest of the car by the stop when the projection is out of position to open the door, substantially as described.

10. The combination, with an elevator-car, a door for affording access to the elevator-well, and devices operated from the car for moving said door, of a stop for arresting the movement of the car, the rock-shaft on the car having the projection thereon for engaging the door-operating device, and the portion engaged by the stop when the car is to be arrested, substantially as described.

11. The combination, with an elevator-car, 130

a flexible door for affording access to the elevator-well, and a shaft on which the door is wound, of connections between the car and shaft, independent of the door, for rotating
5 the shaft, substantially as described.

12. The combination, with a door, a movable projection actuated by the car, and connections between the projection and door for causing the operation of the latter, of the

car, the two latched projections thereon for engaging the movable projection and causing the operation of the door, substantially as described.

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