

No. 741,523.

PATENTED OCT. 13, 1903.

W. H. MECHLIN.
ELEVATOR GATE.

APPLICATION FILED JUNE 1, 1899.

NO MODEL.

Fig. 1.

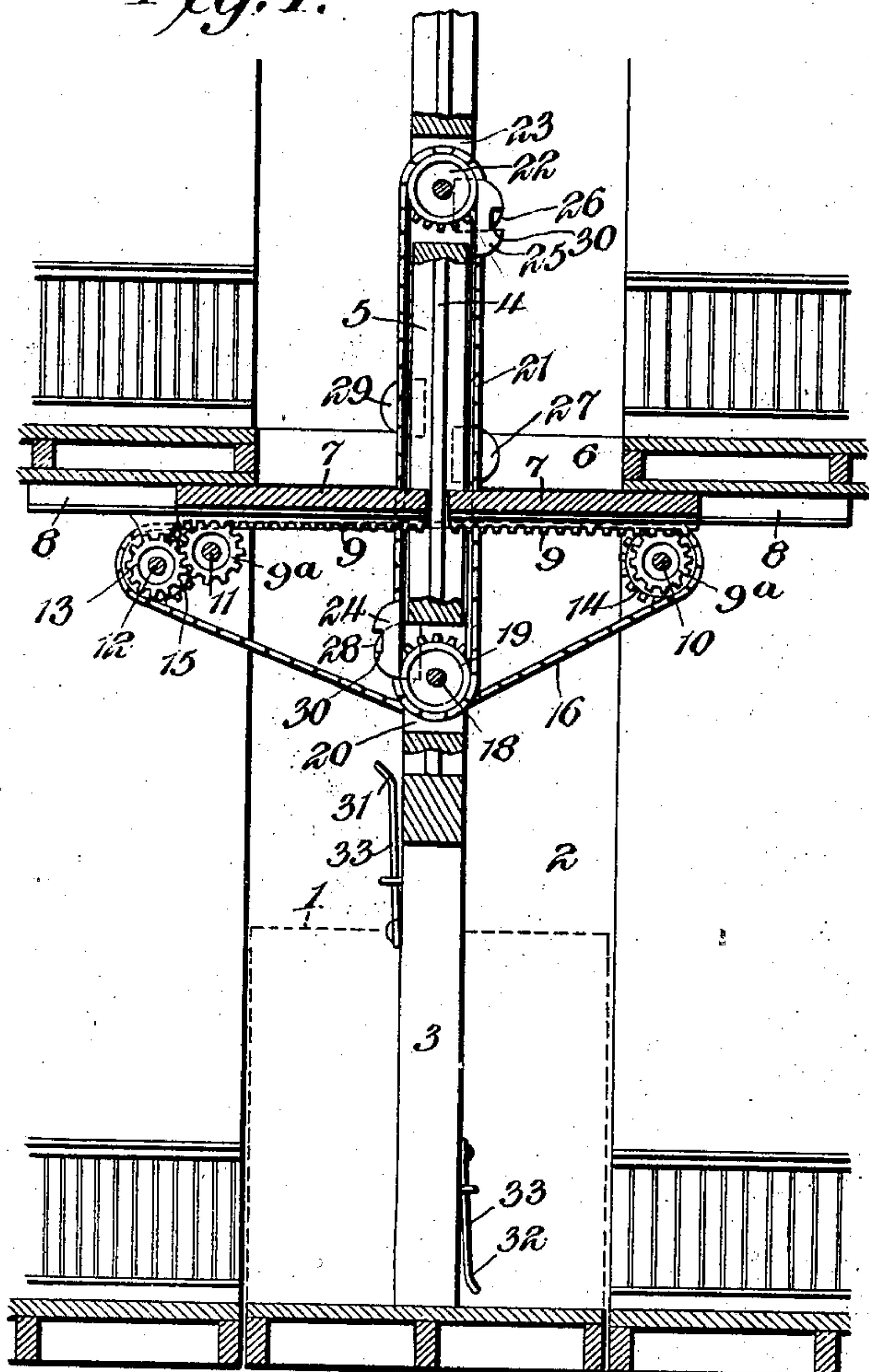


Fig. 2.

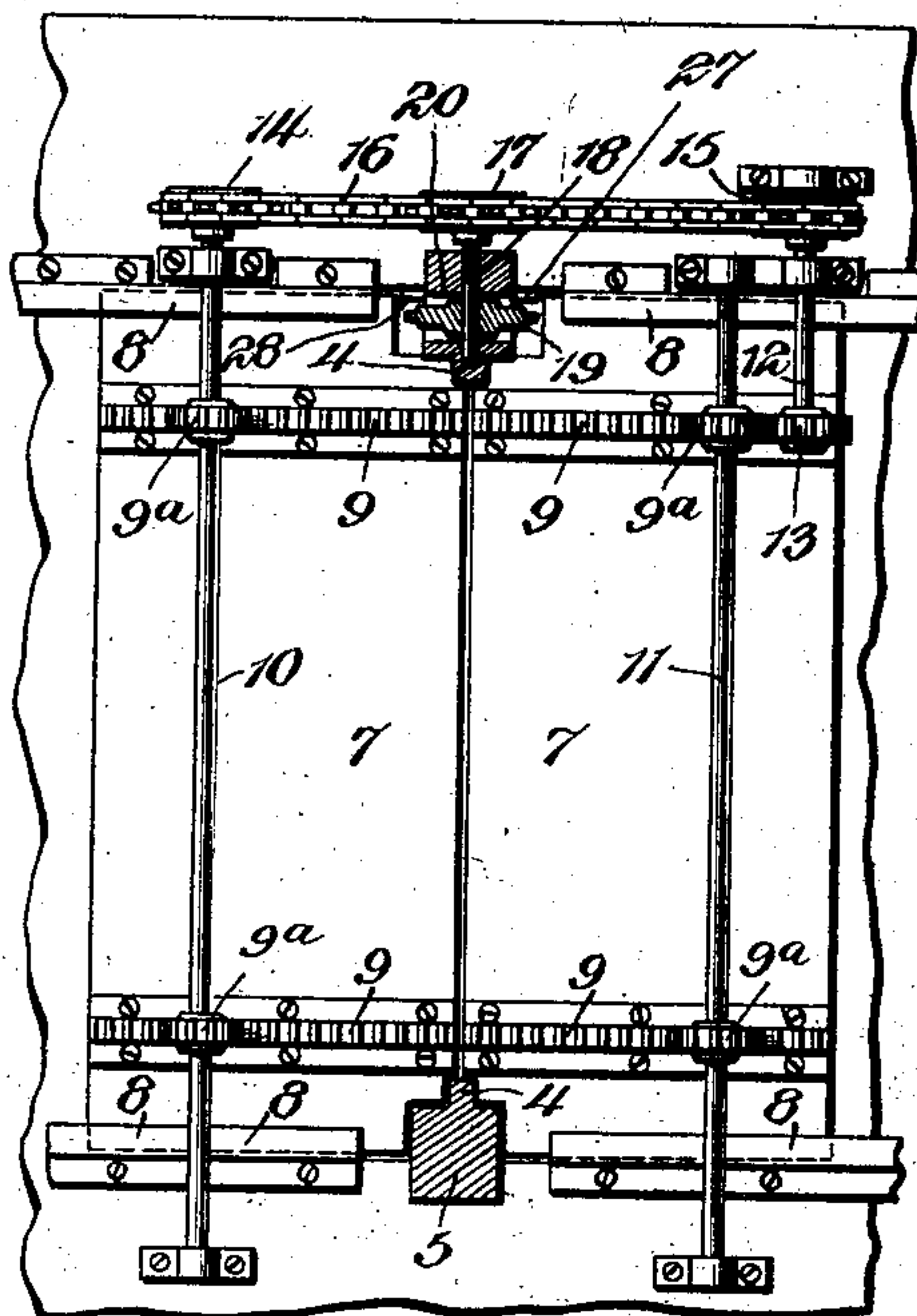


Fig. 4.

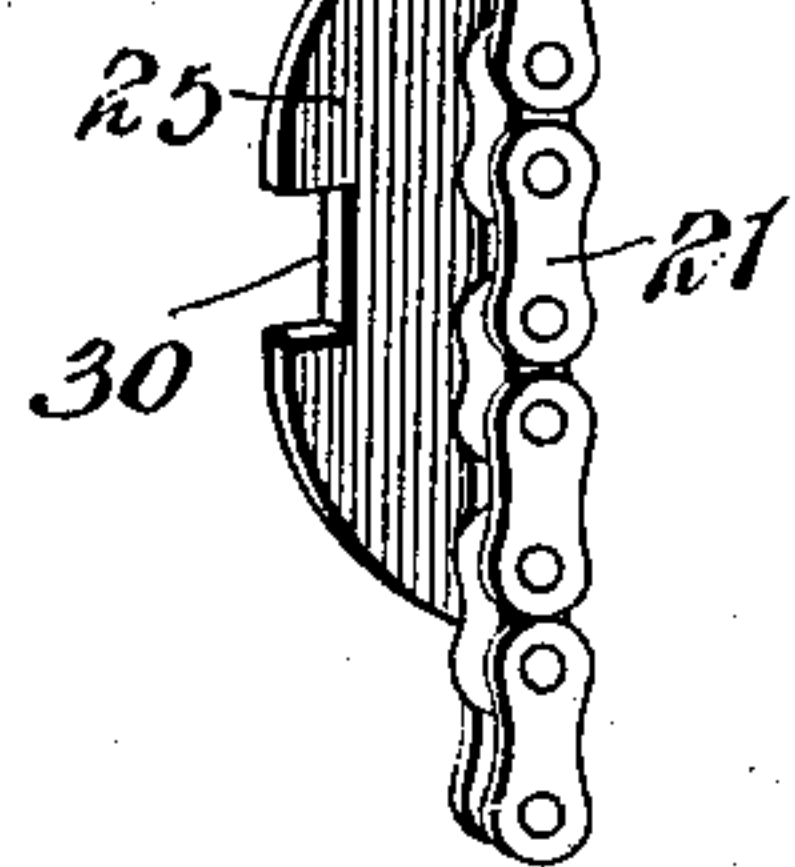


Fig. 3.

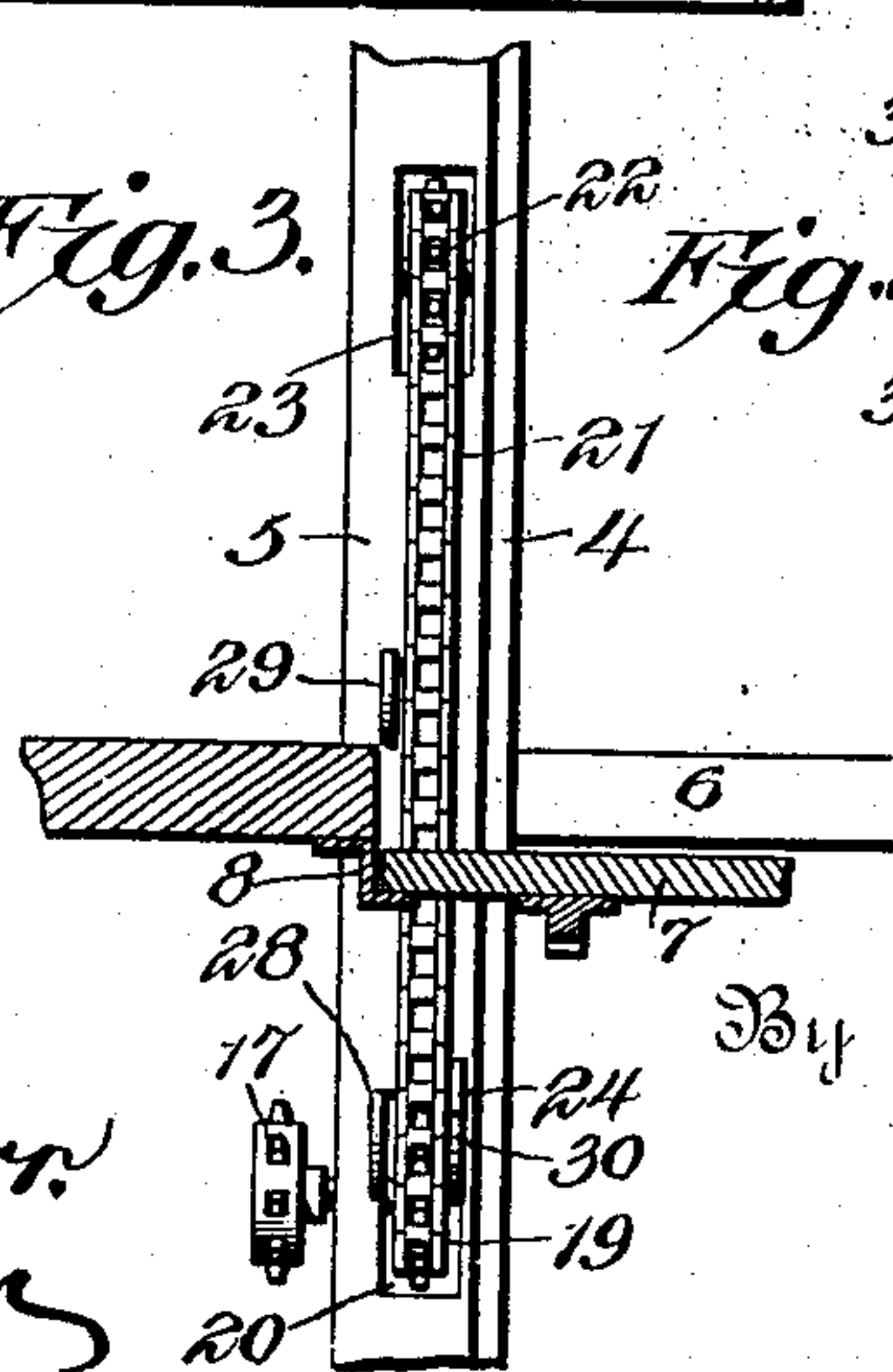


Fig. 5.

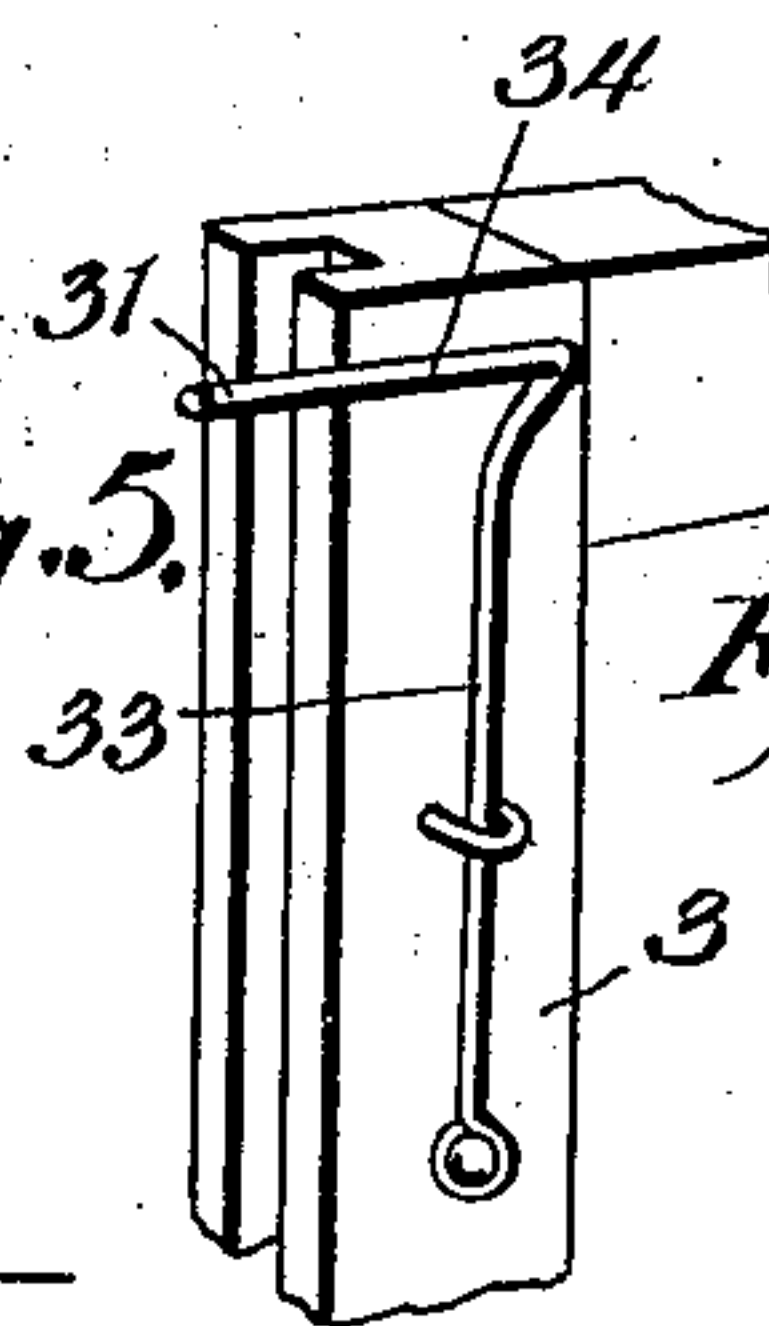
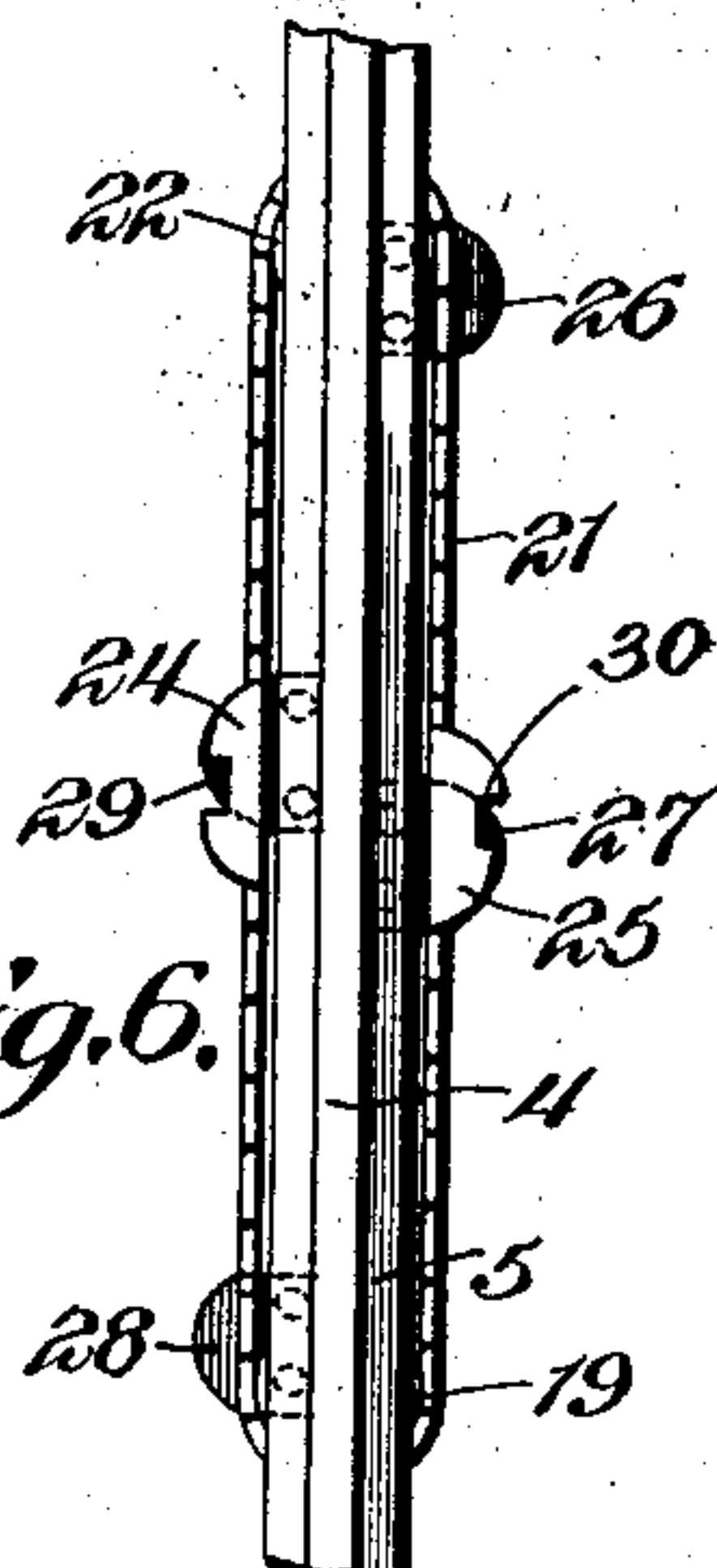


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELEVATOR-GATE.

SPECIFICATION forming part of Letters Patent No. 741,523, dated October 13, 1903.

Application filed June 1, 1899. Serial No. 719,013. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. MECHLIN, a citizen of the United States, residing at Greenfield, in the county of Highland and State of Ohio, have invented a new and useful Elevator-Gate, of which the following is a specification.

This invention relates to an improvement in elevators, and more particularly to the provision of hatch-doors normally closing the hatchway formed in a floor to accommodate the passage of an elevator-cab, and to novel mechanism operated by the elevator to open and close the hatch before and after the passage of the cab therethrough.

The primary object of the invention is to provide simple, inexpensive, and reliable hatch-door-operating mechanism, which will occupy but little space and will be capable of installation without extended modification of elevator constructions now in use.

Various other subordinate objects will appear hereinafter as the description of the preferred embodiment of the invention is developed.

In the accompanying drawings, Figure 1 is a sectional view through a portion of an elevator-shaft, one of the elevator-tracks being broken away to disclose the mounting of the door-operating mechanism, the elevator-guide coöperating with the track being shown in full lines and the position of the elevator being indicated in dotted lines. Fig. 2 is a bottom plan view of the hatch-doors, the mountings thereof, and the door-operating mechanism, the elevator-tracks being shown in section. Fig. 3 is a view partly in section showing the position of the door-actuating chain on one of the tracks. Fig. 4 is a detail view of a portion of the chain with one of the catch-plates attached thereto. Fig. 5 is a detail perspective view of a portion of one of the elevator-guides with a spring-catch mounted thereon; and Fig. 6 is a detail view illustrating the positions assumed by the catch-plates when the elevator has opened the hatch and before the lower catch on the elevator engages its catch-plate to reverse the movement of the operating mechanism, and thus close the hatch-doors behind the elevator.

Like numerals are employed to designate corresponding parts throughout the views.

The elevator proper or cab 1 is designed to travel up and down in the shaft 2, the mechanism for elevating the cab being omitted from the drawings, since it constitutes no part of my invention. At its opposite sides the cab is equipped with grooved guides 3, which receive, in a manner well understood in the art, the longitudinal flanges 4 of the elevator-tracks 5, the latter extending the length of the shaft to properly guide the elevator in its travel. At each floor is provided a hatchway 6 for the passage of the cab, and it is for the purpose of closing these hatchways, except when the elevator is actually passing there-through, that the present improvements have been devised. Each hatchway 6 is normally closed by a pair of hatch-doors 7, arranged to slide horizontally between guideways 8, constructed and mounted in any suitable manner. Upon their under sides the doors 7 are provided with toothed racks 9, meshing with pinions 9^a, carried by shafts 10 and 11, journaled in suitable bearings, as indicated in Fig. 2. Since each of the shafts 10 and 11 is thus provided with a rack-and-pinion engagement with a door 7, it follows that the rotation of these shafts in opposite directions will cause the doors 7 to be slid back to their open positions or moved forward to the positions indicated in Fig. 1 for the purpose of maintaining the hatchway 6 normally closed. In order that the door-operating shafts 10 and 11 may be rotated in opposite directions by motion transmitted from an actuating device common to both shafts, a short counter-shaft 12 is disposed parallel to the shaft 11 at one end thereof and is provided with a pinion 13, meshing with one of the rack-engaging pinions 9^a of the shaft 11.

At a point beyond the limits of the elevator-shaft the shafts 10 and 12 are provided with sprocket-wheels 14 and 15, around which are passed an endless sprocket-chain 16, which likewise engages a sprocket-wheel 17, keyed upon one end of a short shaft 18, journaled in one of the elevator-tracks 5 at a point below the hatchway. The shaft 18 is provided with a second sprocket-wheel 19, for the accommodation of which the track-rail 5 is recessed, as indicated at 20, and around this last-mentioned sprocket-wheel is passed an endless door-operating chain 21, carried

around an upper sprocket 22, mounted within a recess or opening 23 in the track at a point above the hatchway. This character of mounting of the door-operating chain dis-
 5 poses it lengthwise of the elevator-shaft and provides vertically-disposed runs, to each of which is fixed in any suitable manner a catch-plate 24 or 25. It will now be seen that by
 10 reason of the gearing between the door-operating chain 21 and the two sliding hatch-doors 7 said doors will be moved to their open or closed positions accordingly as the door-operating chain is urged in one direction or the other. It is for this reason that I have
 15 equipped the chain with the catch-plates 24 and 25, since these plates constitute elements of an operative connection which is established between the chain 21 and the elevator-cab to effect the automatic opening of the
 20 hatch-doors as the elevator approaches the hatch and to effect the automatic closing of the doors as soon as the elevator has cleared the hatch in its movement in one direction or the other.

25 At the right-hand side of the track which carries the chain 21 are mounted two trip-plates 26 and 27, provided with arcuate faces and approximating in shape, but of somewhat less size than the catch-plates on the
 30 chain. The trip-plate 26 is located adjacent to the upper end of the right-hand run of the chain 21, and the trip-plate 27 is located at a point below the plate 26 and preferably at or adjacent to the hatchway. At the oppo-
 35 site side of the track and adjacent to the left-hand run of the chain 21 are two similar trip-plates 28 and 29, one being located adjacent to the lower end of the left-hand run of the chain and the other being arranged at or ad-
 40 jacent to the hatchway or in a plane slightly above the plate 27 at the other side of the track. Each of the catch-plates 24 and 25 is formed with a rectangular notch 30, designed to be engaged by a spring-catch movable with
 45 the elevator. In the present embodiment of the invention two of these catches are provided, one, 31, adjacent to the top of the elevator at the left-hand side of a guide 3, and the other, 32, at the bottom of the elevator
 50 and at the opposite side of the guide. One of these spring-catches is shown in detail in Fig. 5 and will be seen to comprehend a stem 33, fixed at its lower end to the guide and having its upper end bent to form a spring-
 55 arm 34, extending horizontally beyond the outer edge of the guide to a position opposite the elevator-track 5, with which the guide is in sliding engagement.

Briefly, the operation of the mechanism de-
 60 scribed is as follows: Assuming that the elevator is rising from the position shown in dotted lines in Fig. 1, the horizontal arm of the spring-catch 31 will move up into engagement with the edge of the catch-plate 24, located
 65 at the lower end of the left-hand run of the chain 21, and riding upon said edge will be sprung back until it arrives opposite the

notch 30 in the catch-plate, into which notch it will spring to effect an operative connection between the elevator and the door-operating
 70 chain. As the upward movement of the elevator continues the catch-plate 24 will be carried up and the chain will be moved in the proper direction to slide back the doors
 75 7 through the intermediate gearing. As the hatch-doors will be completely opened by the time the top of the elevator reaches the hatch, the passage of the elevator through the latter will be permitted. As the doors reach their
 80 open positions the catch-plate 24 will arrive opposite the trip-plate 29, and since the latter extends outwardly to the edge of the catch-plate the spring-catch will be engaged by the trip-plate and will be forced out of
 85 the notch of the catch-plate, and the connection between the elevator and the chain 21 will thus be broken to permit the independent upward movement of the cab. It will be seen, however, by reference to Fig. 6 that the dis-
 90 engagement of the spring-catch from the catch-plate will be effected before the lower end wall of the notch 30 of the catch-plate reaches the edge of the trip-plate, and by reason of this relation of the parts the catch-
 95 plate will be in position to be engaged by a catch, provided the latter is moving in a downward direction. Obviously the upward movement of the catch-plate 24 in the man-
 100 ner just described to effect the opening of the doors will be accompanied by a corresponding downward movement of the catch-plate 25, carried by the opposite run of the chain, so
 105 that when the spring-catch is released from the chain at the left side the catch-plate 25 will have reached a position opposite the trip-plate 27, as indicated in Fig. 6. As the up-
 110 ward movement of the elevator continues the lower spring-catch 32 at the right-hand side of the cab will be brought into engagement with the notch in the plate 25, carrying the
 115 latter upward and reversing the movement of the chain 21 for the purpose of effecting the closing of the doors 7 as soon as the bottom of the elevator has cleared the hatch. As the doors reach their closed positions the
 120 catch-plate 25 will arrive opposite the trip-plate 26, the catch-plate 24 will move back to its initial position, and the catch 32 will be automatically released from the plate 25 in a manner which will now be clear. The ele-
 125 vator will now proceed to a point above the entire apparatus and the doors will remain closed. If now the elevator descends, the catch 32 at the bottom of the cab will engage the plate 25, moving the latter down to the
 130 trip-plate 27, where a disengagement will be automatically effected, as heretofore described, just as the doors reach their open positions. This downward movement of the catch-plate 25 will be accompanied by a cor-
 135 responding upward movement of the catch-plate 24, which will now have arrived opposite the trip-plate 29, as shown in Fig. 6. As soon as the downwardly-moving cab has

reached a position below the doors the catch 31 will engage the trip-plate 28, drawing it down from the position indicated in Fig. 6 to that indicated in Fig. 1 to reverse the door-
5 operating mechanism and close the doors. At the completion of this movement the catch 31 will be disengaged from the plate 24 and will leave the latter in position to be reëngaged by the catch of the elevator-cab when
10 the latter again ascends.

It is thought that from the foregoing the construction and operation of the illustrated embodiment of the invention will be clearly apparent; but while such embodiment ap-
15 pears at this time to be preferable I do not wish to be understood as limiting myself to the structural details defined, as, on the contrary, I reserve the right to effect such changes, modifications, and variations as may
20 be properly embraced within the scope of the protection prayed.

What I claim is—

1. The combination with slidable horizontal elevator-door sections, of parallel shafts
25 having a rack-and-pinion engagement therewith, a chain running lengthwise of one of the elevator-tracks and geared to said shafts, shoulders on said chain on opposite sides of the track, and spring-catches on the lift hav-
30 ing their free ends bent to coöperate with the

shoulders on the chain, substantially as described.

2. The combination with a hatch-door, and a vertically-disposed endless actuating-chain geared thereto, of catch-plates extending from 35 the opposite runs of the chain, and each provided with a notch, a vertically-movable cab, a spring-catch mounted at the top of the cab and arranged to engage one of the catch-plates, a second catch mounted at the bottom 40 of the cab and arranged to engage the other catch-plate, fixed trip-plates disposed adjacent to the opposite runs of the chain at the opposite ends thereof, and other trip-plates located adjacent to the opposite runs of the 45 chain between the first-named trip-plates, each of said trip-plates being arranged to disengage a catch from a catch-plate as the cab proceeds in one direction, and to leave said catch-plate in position to be reëngaged by the 50 catch when the cab is moving in the opposite direction.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM H. MECHLIN.

Witnesses:

F. O. MECHLIN,
M. L. MATTHEWS.