

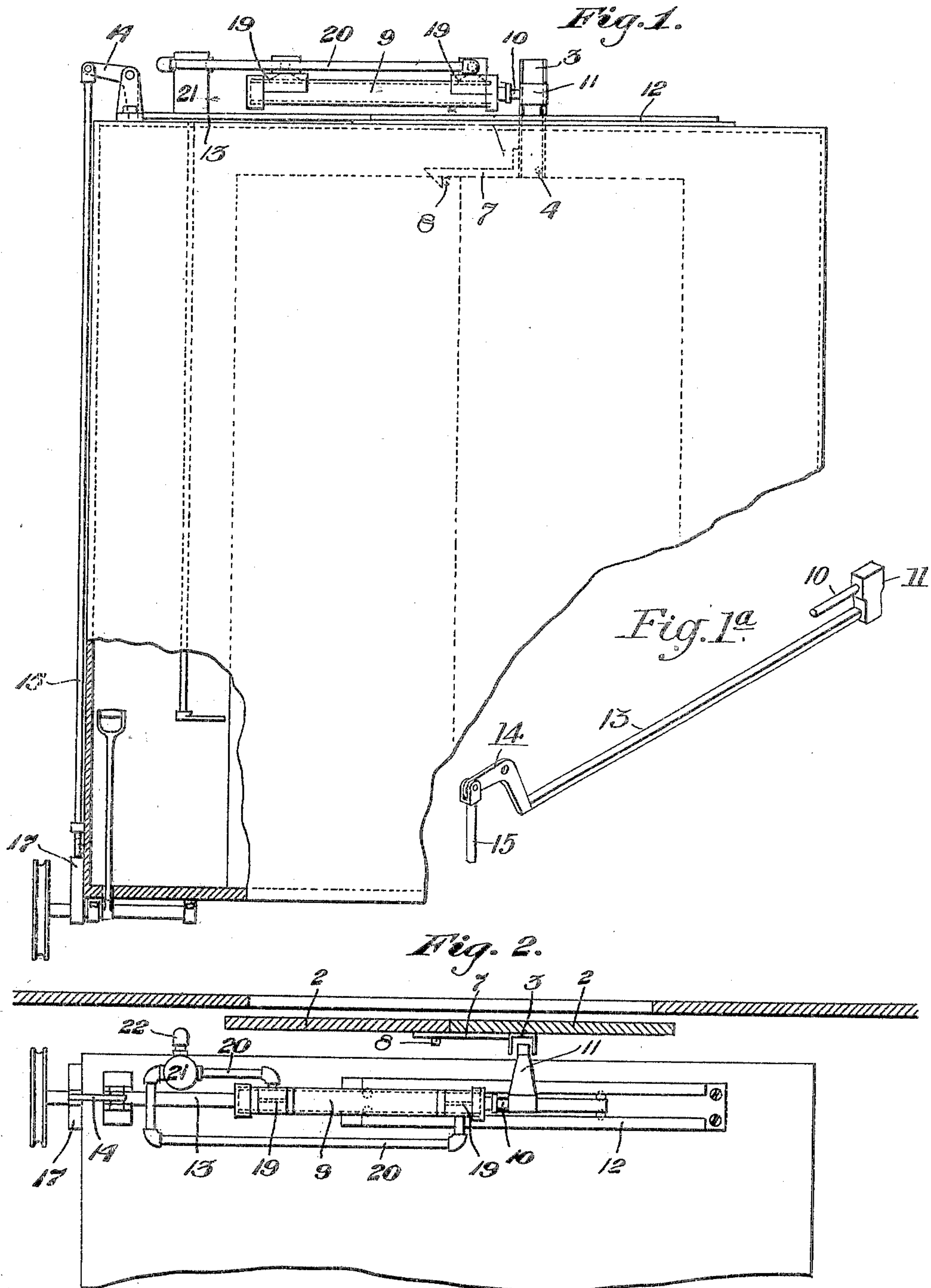
No. 793,846.

PATENTED JULY 4, 1905.

L. H. NIELSEN.
ELEVATOR.

APPLICATION FILED OCT. 6, 1904.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3.

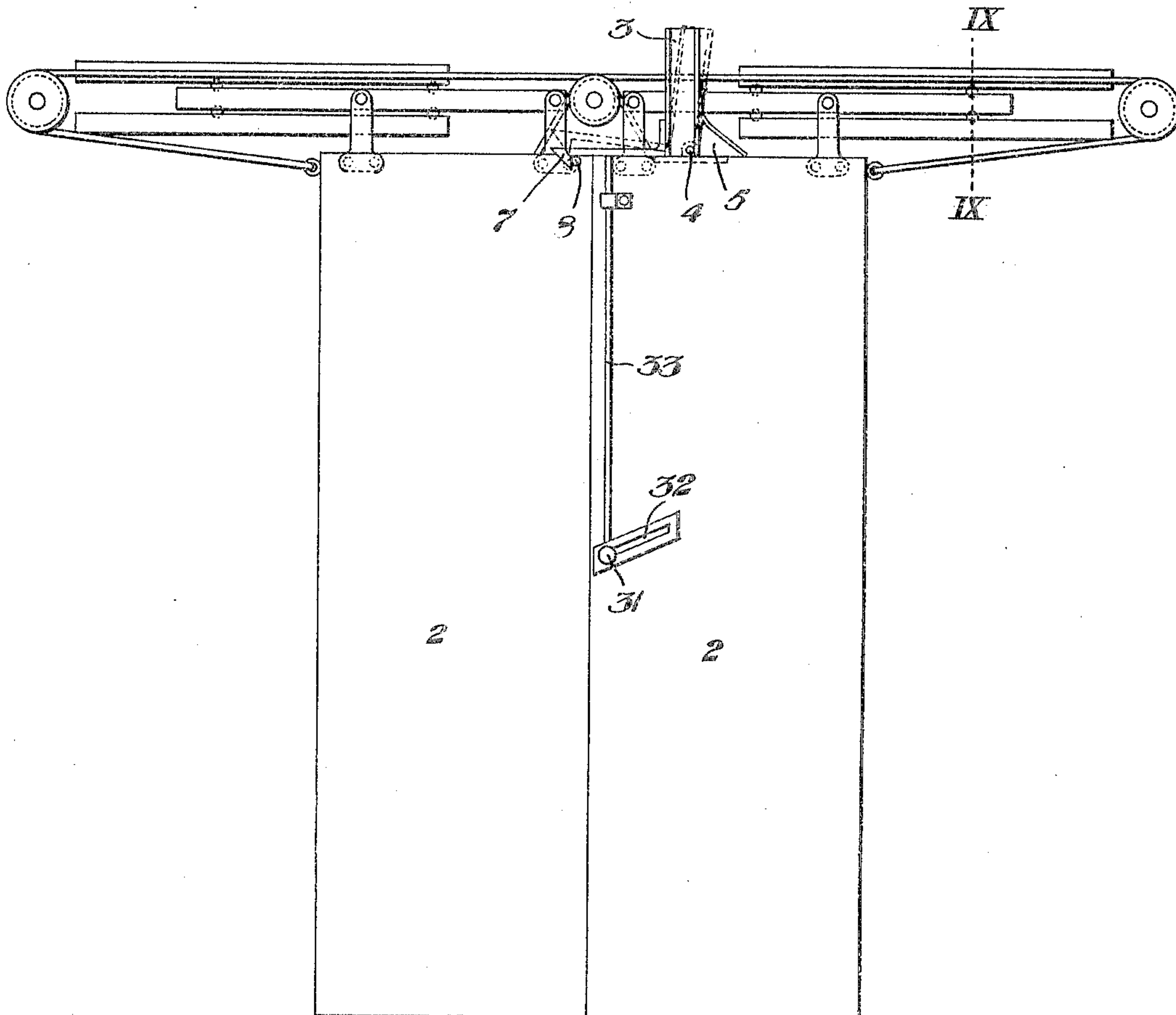
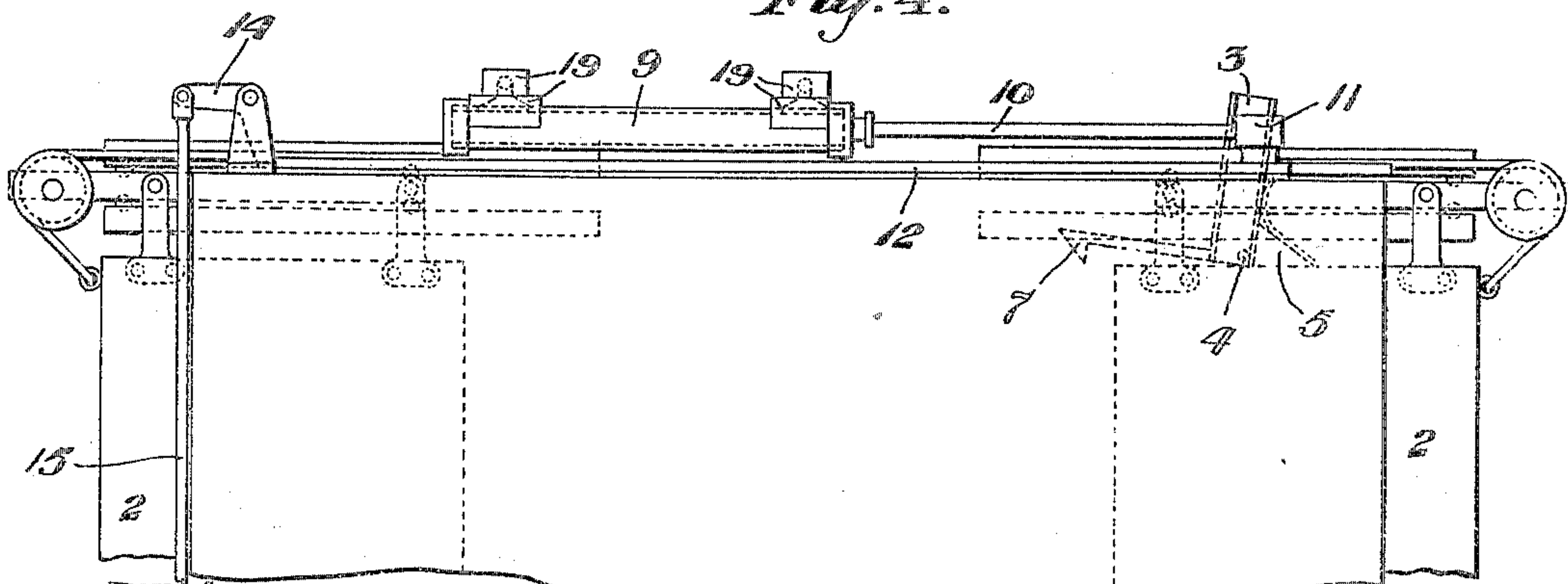


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

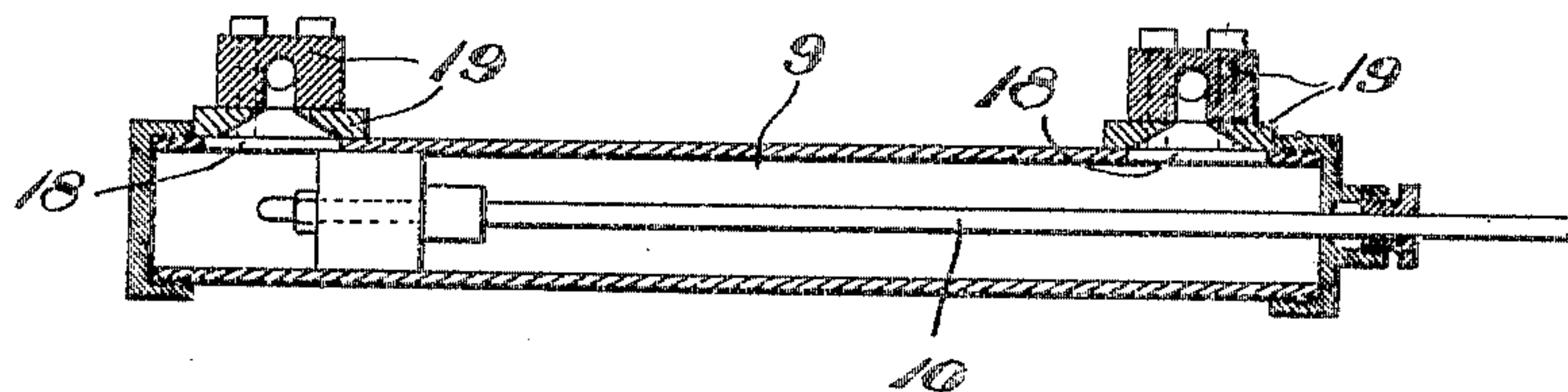


Fig. 7.

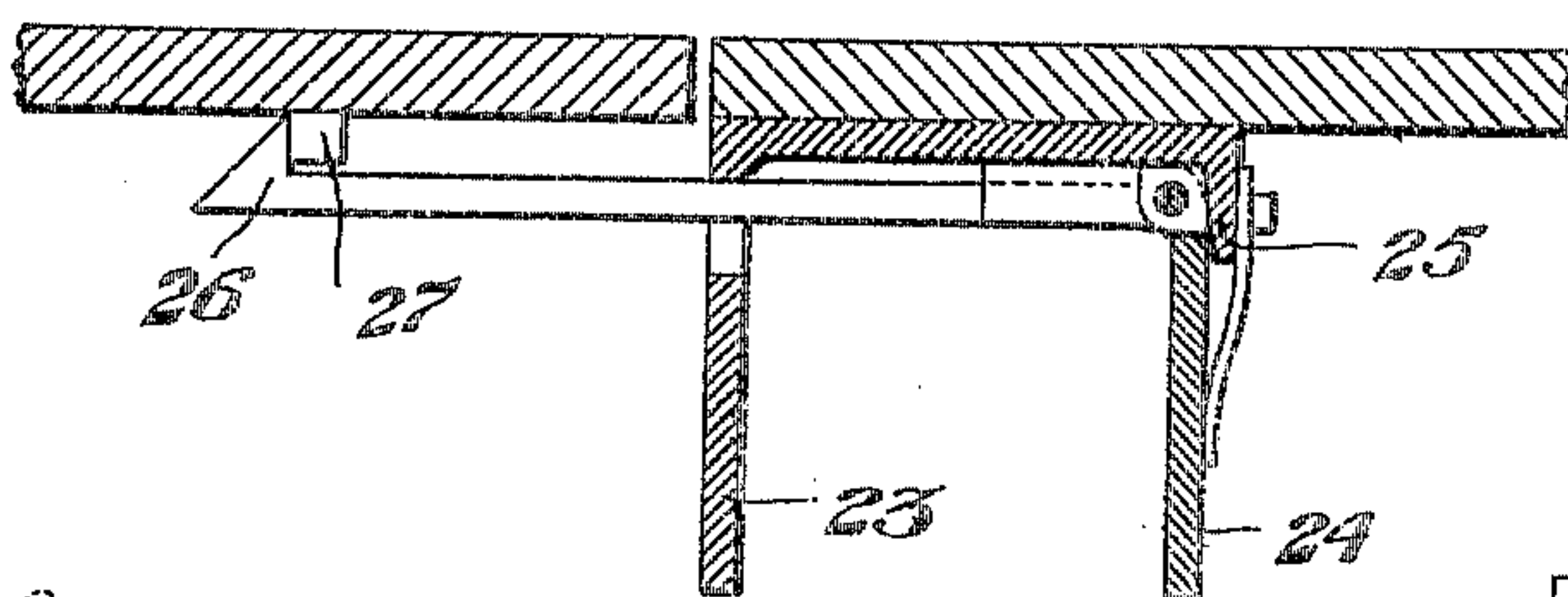


Fig. 10.

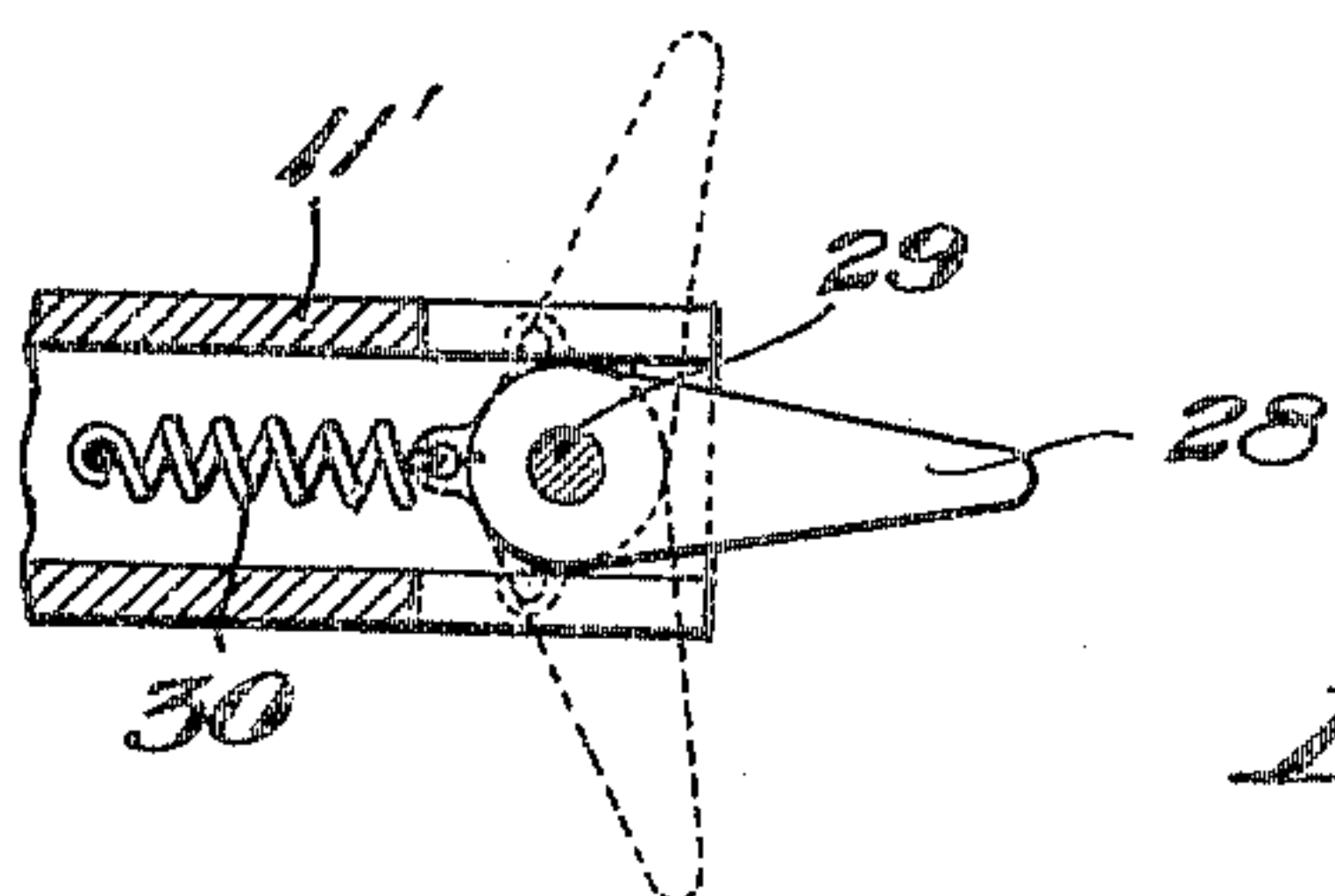


Fig. 11.

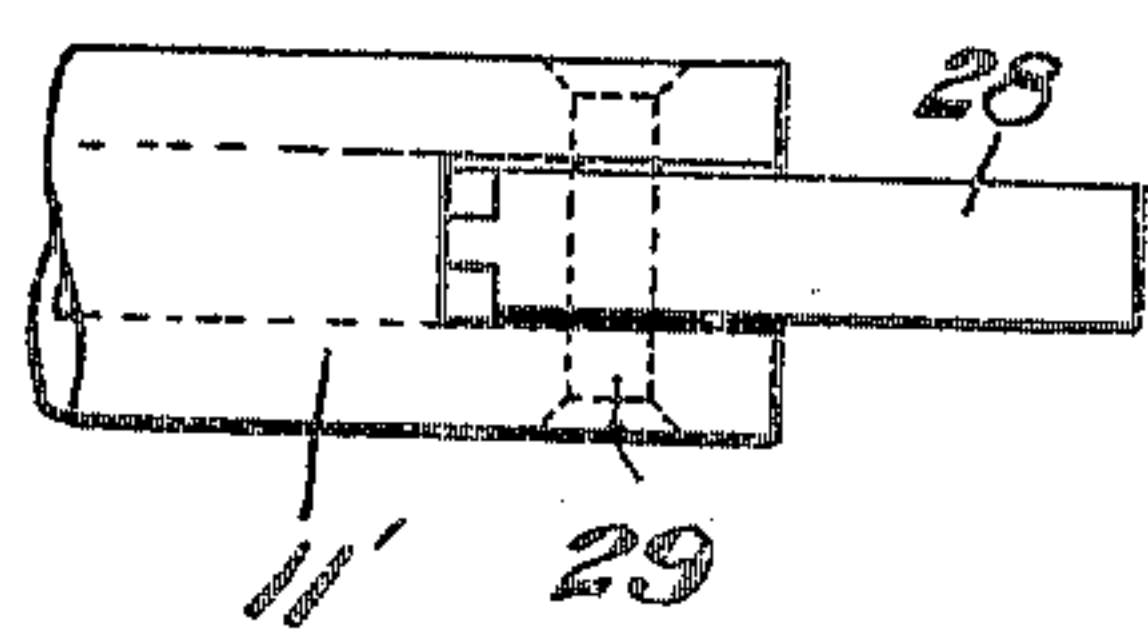


Fig. 6.

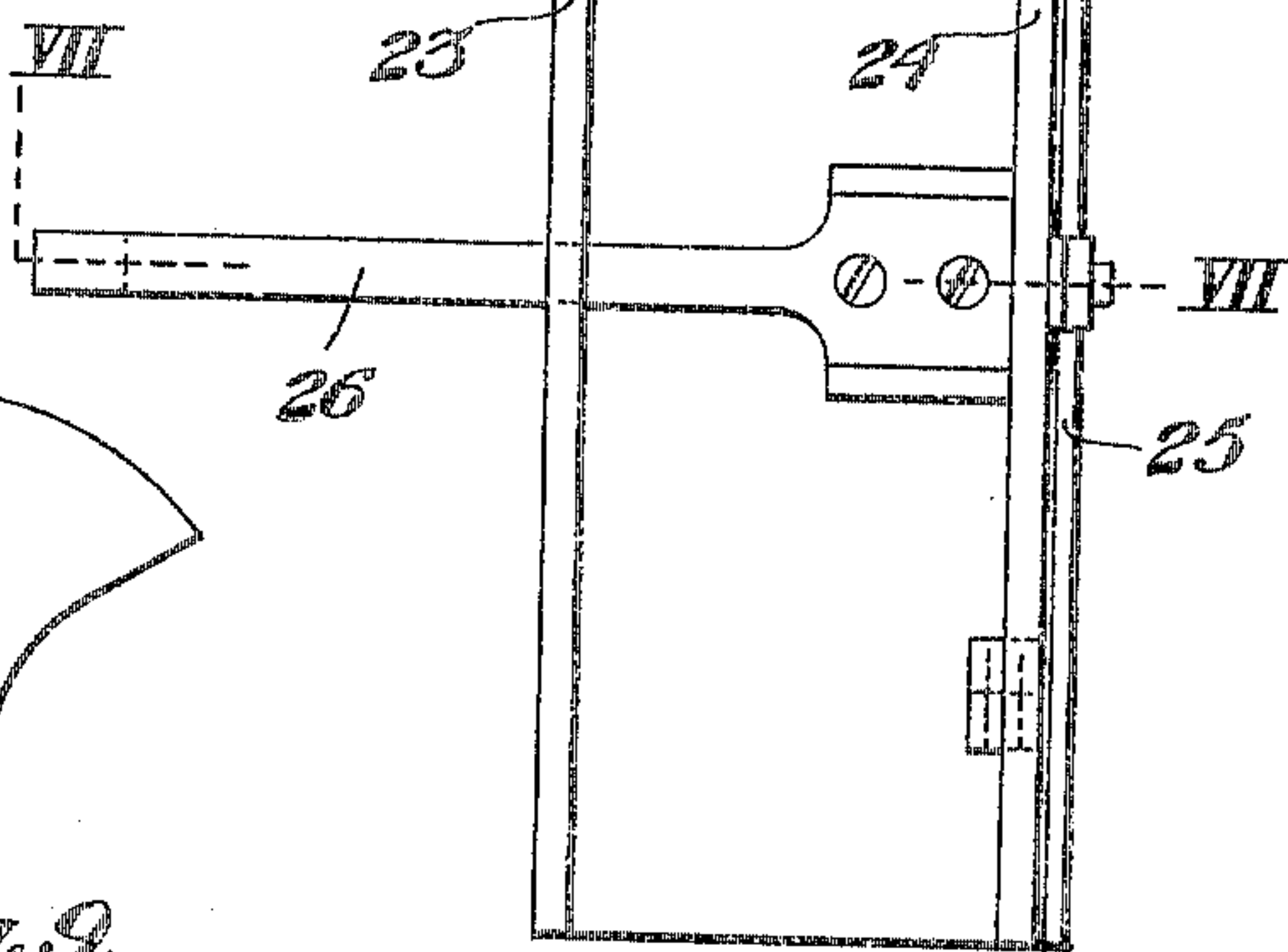


Fig. 8.

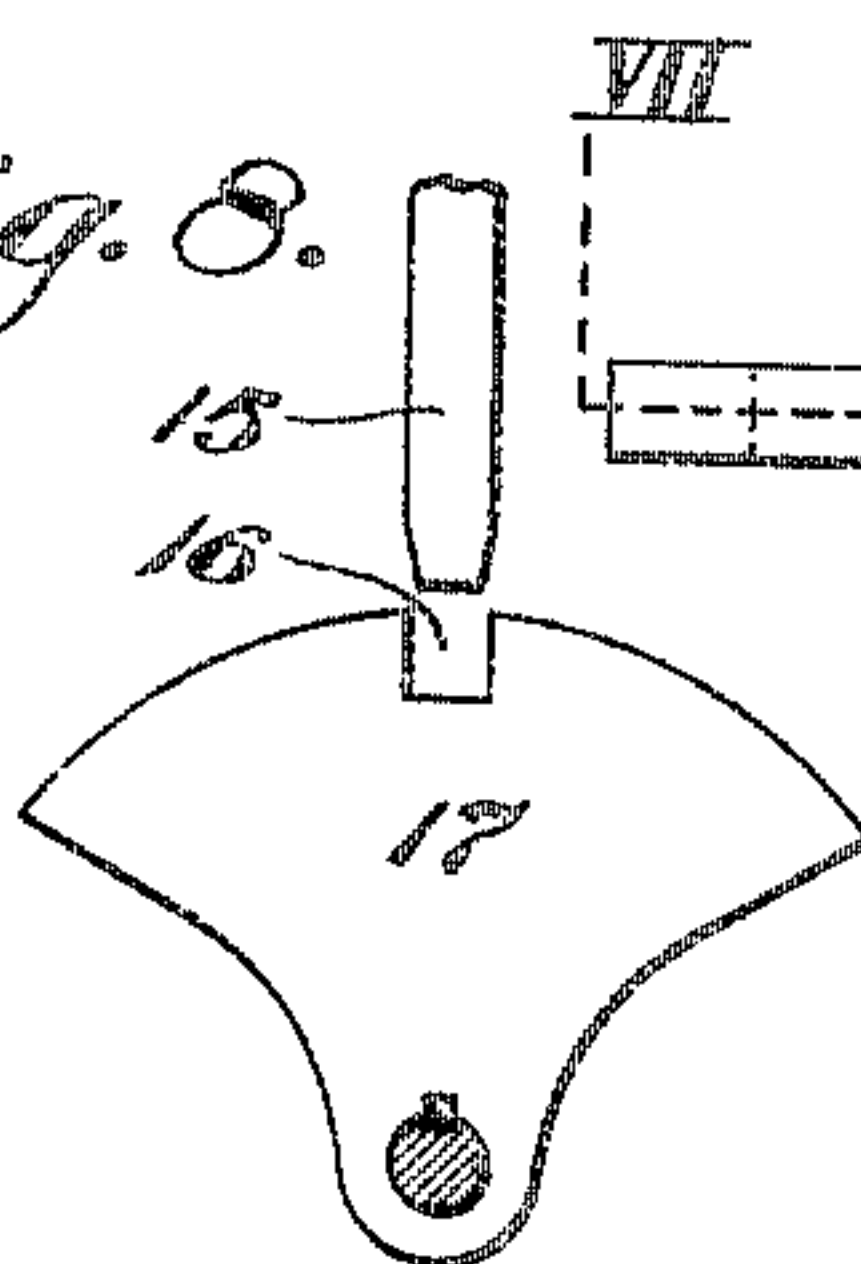


Fig. 9.



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UNITED STATES PATENT OFFICE.

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ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 793,846, dated July 4, 1905.

Application filed October 6, 1904. Serial No. 227,347.

To all whom it may concern:

Be it known that I, LUDVIG H. NIELSEN, a citizen of the United States, residing at McKees Rocks, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Elevators, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of the specification, in which—

Figure 1 is a view in elevation, partly in section, of an elevator-car equipped with my improved door-opening apparatus. Fig. 1^a is a detail view showing the connection between the motor and the shifting bar. Fig. 2 is a plan view of a portion of the car, the doors being shown in section. Fig. 3 is a face view of the doors in their closed position with the locking and shifting mechanism adapted to be engaged by the actuating mechanism mounted on the elevator-car. Fig. 4 is a partial view similar to Fig. 1, showing the piston of the cylinder extended to its limit of movement, the doors being indicated as open. Fig. 5 is a sectional detail view of the cylinder. Fig. 6 is a face view of a modified construction of the door-shifting shoe. Fig. 7 is a cross-section on the line VII VII of Fig. 6. Fig. 8 is a detail view of the lock for the operating mechanism. Fig. 9 is a sectional view on the line IX IX of Fig. 3. Figs. 10 and 11 are detail views of a modified form of door-shifting lever.

My invention relates to improvements in apparatus or mechanism designed for the purpose of opening and closing the doors of elevator-shafts or other similar structures, the invention being particularly designed to adaptation to the shafts of passenger-elevators.

A feature of importance and novelty in connection with the invention consists in means for engaging and locking the elevator operative mechanism so as to prevent the starting of the car until the doors have been closed.

Referring to the drawings, 2 2 represent sliding doors of the elevator-shaft, suitably mounted in any desirable manner, as by means of sheave-wheels or door-hangers of any preferred construction. One of such doors, if double, is provided with a vertical pivotally-

mounted flanged shoe 3, having a tilting bearing 4 on the door and limited range of movement against an abutment or stop 5. The shoe is provided with an extended latch 7, arranged to engage a pin or abutment 8 by gravity on the other door, so as to securely lock both together, and it will thus be seen that they cannot be opened until the shoe is first partially tilted, as indicated in dotted lines in Fig. 3.

9 is a cylinder mounted upon the top of the elevator-car, having a fluid-actuated piston, to the rod 10 of which is secured a shifting arm 11, adapted in the vertical movement of the elevator to register within the sides of the shoe 3 when the elevator is stopped opposite to one of the doors. The arm 11 is mounted in any suitable sliding cross-head or guides 12, and the moving portion of the motor is provided with a backwardly-extending bar 13, connected to piston 10 or shifting arm 11, as shown, arranged to come into contact with the downwardly-extending leg of a bell-crank lever 14, so as to unlock a locking-bar 15 from a notched segment 17 when the piston of the cylinder is thrown backwardly into its initial position, as shown in Fig. 1. When the piston is advanced, as in Fig. 4, the bar 13 travels forwardly away from contact with the lever 14, allowing latch 15 to drop into the notch of segment 17, thereby preventing the starting of the car either up or down until the doors are again closed. The cylinders are provided at each end with elongated slotted ports 18, with which connection is made, through supplemental blocks 19, from pipes 20 20, leading from the controlling-valve 21, supplied with constant pressure by flexible tube or connection 22. These long narrow slots tend to throttle the fluid in its escape, thus cushioning the piston against either end of the cylinder and preventing shock or knocking. If desired, cushioning substance of any suitable material, as rubber, or metallic springs may be inserted to accomplish the same object.

It will be understood that any other suitable motor may be used as a solenoid-magnet or any convenient means for utilization of electrical or mechanical power, and I do not

desire to be limited to the particular motor shown and described.

As thus constructed it will be seen that when the elevator is brought into register between the flanges of the shoe 3 and stopped, the shoe being sufficiently long to insure engagement, and pressure is applied behind the piston of the cylinder the arm 11 will travel forward, first tilting the shoe and unlocking the other door and then moving both doors open until it has reached the limit of its travel. Upon reversing the direction of the piston, arm 11 still being in register, the doors will be closed, again locking them together by latch 7 falling down by gravity, latch 15 having been raised out of engagement, whereupon the elevator may again be started up or down.

In Figs. 10 and 11 I have shown a detail construction of a modified form of shoe-engaging arm in which the arm 11' is provided with a pawl extension 28, pivoted at 29 and provided with a spring device 30, arranged to hold the pawl normally extended. The arm is so constructed as to allow the pawl to be deflected to one side or the other, as indicated in dotted lines, upon meeting with any obstruction in a vertical direction in the elevator-shaft, but to be operative laterally to engage the flanges of the door-shoe in either direction to move the door.

In Figs. 6 and 7 I have shown a modified construction of the door wherein one of the flanged sides 23 is stationary, the other side 24 being pivoted thereto and being capable of a slight backward movement before coming into contact with a block or abutment 25, the movable part having secured to it a latch 26, arranged to engage and lock a pin 27 on the other door in the same manner as has been already described. In Fig. 3 I have shown means for opening the doors by hand, consisting of a handle 31, mounted in a cam-slot 32 and connected with rod 33, which raises the latch 7 as the handle is drawn back to open the door.

Having described my invention, what I claim is—

1. The combination in an elevator, of a sliding door, and a moving device for the door provided with a latch, an elevator-car, a motor mounted thereon arranged to engage the mov-

ing device, and means controlled by the movement of the motor for locking the stopping and starting mechanism of the elevator, substantially as set forth. 55

2. The combination with the sliding door of an elevator-shaft provided with a flanged shoe, of a motor mounted upon the elevator-car provided with means for registering with and engaging said shoe to move the door, means for stopping and starting the mechanism of the car, and means connecting the shoe-moving mechanism and the stopping and starting mechanism, substantially as set forth. 65

3. The combination with the door of an elevator-shaft provided with a flanged shoe, of a car, a fluid-actuated piston and cylinder mounted on the car, an arm connected therewith adapted to engage the shoe, a locking device arranged to engage the controlling mechanism of the car, and an element connected with the movable piston arranged to actuate said locking mechanism, substantially as set forth. 75

4. The combination with an elevator-car and a shifting door opening thereinto; of a cylinder provided with a fluid-actuated piston mounted on the car and provided with a door-shifting terminal, means mounted on the door arranged to be engaged by said terminal, a movable bar connected therewith, a locking-arm, and a lever connected with said arm arranged to be actuated by said movable bar, substantially as set forth. 85

5. The combination with an elevator-car and a shifting door opening thereinto; of a cylinder provided with a fluid-actuated piston mounted on the car and provided with a door-shifting terminal, means mounted on the door arranged to be engaged by said terminal, a movable bar connected therewith, a locking-arm, and a lever connected with said arm arranged to be actuated by said movable bar, with controlling mechanism for the elevator provided with a locking device adapted to be engaged by said locking-bar, substantially as set forth. 95

In testimony whereof I affix my signature in presence of two witnesses.

LUDVIG H. NIELSEN.

Witnesses:

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C. M. CLARKE.