

No. 879,645.

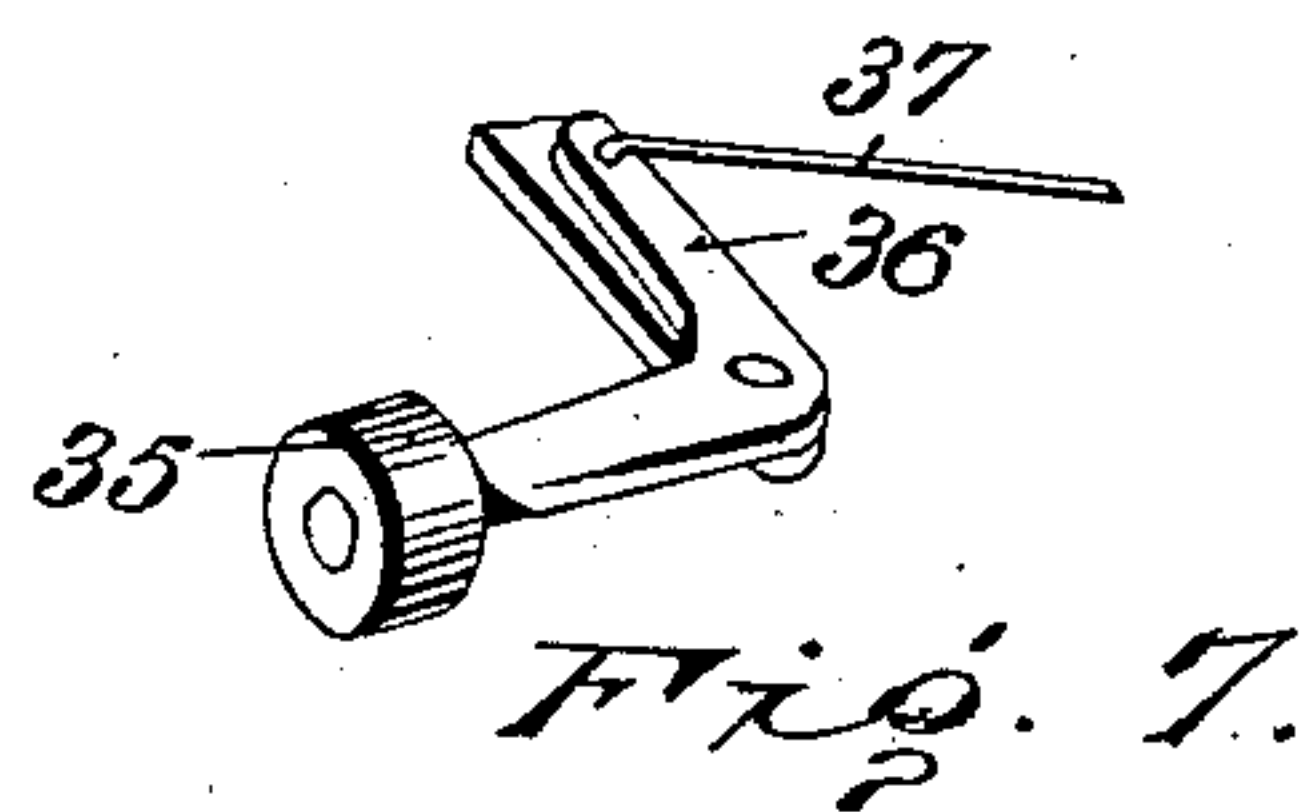
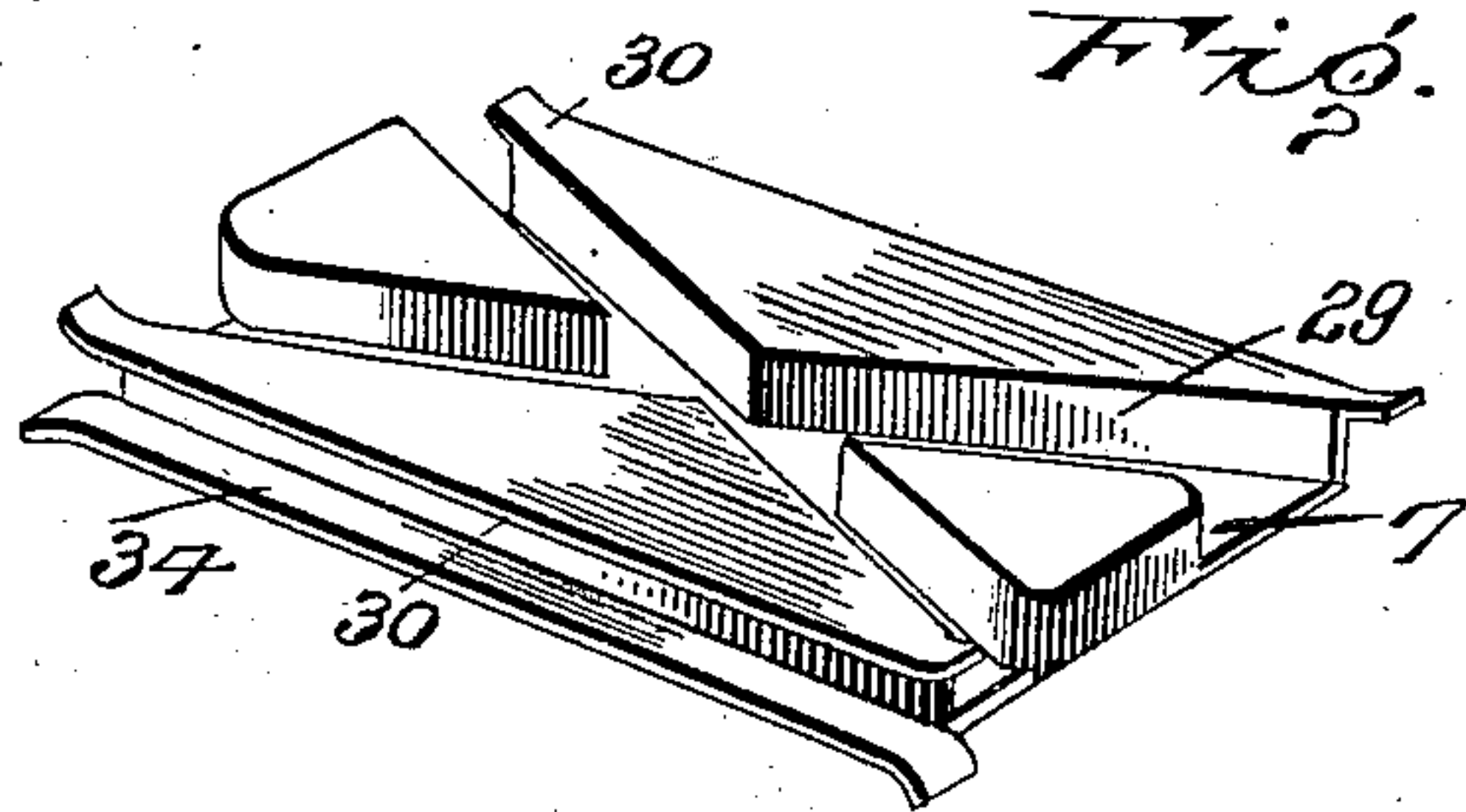
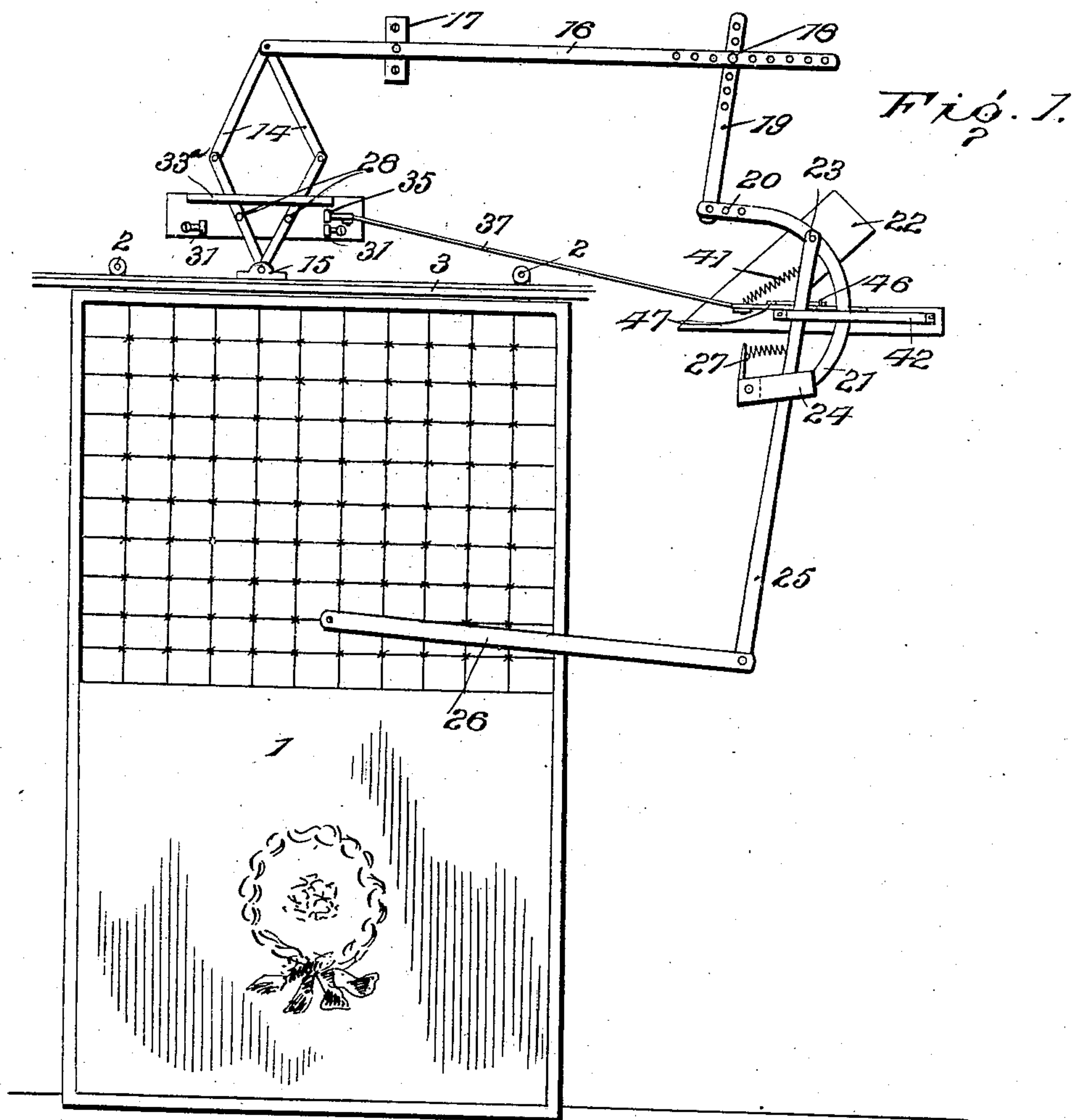
PATENTED FEB. 18, 1908.

W. J. JEFFRIES.

DEVICE FOR AUTOMATICALLY OPENING AND CLOSING ELEVATOR DOORS.

APPLICATION FILED JULY 18, 1907.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

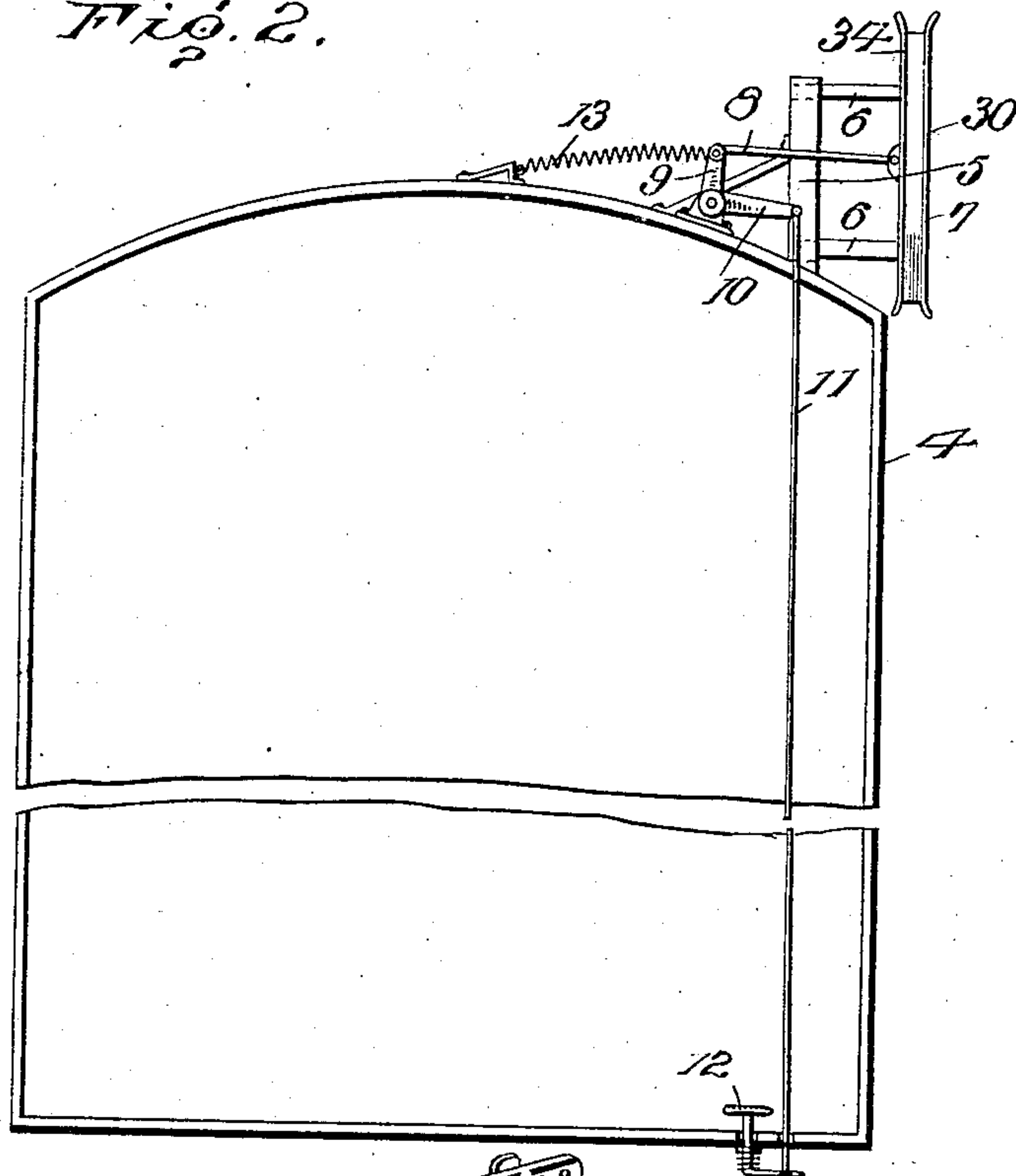


Fig. 3.

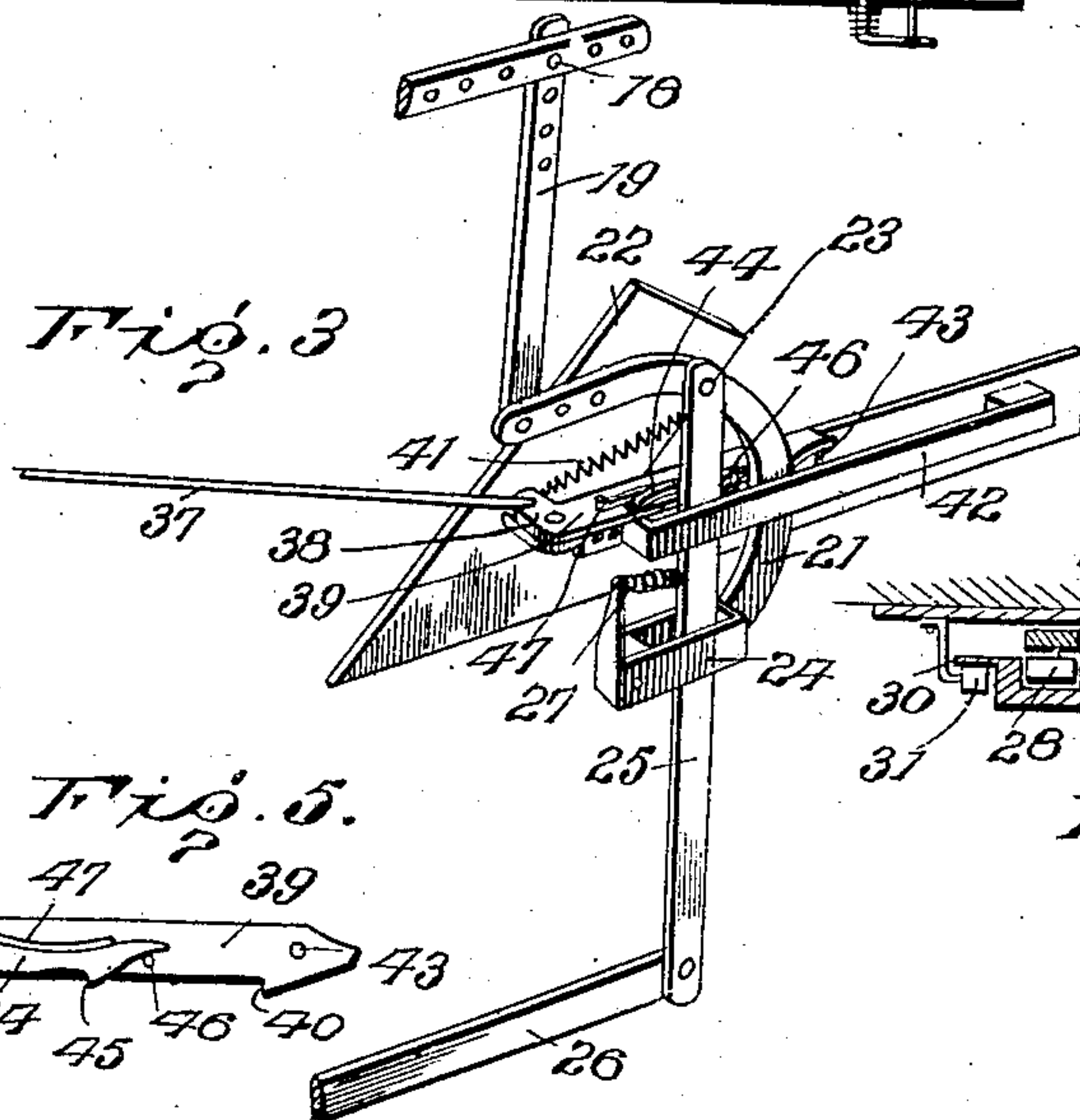


Fig. 5.

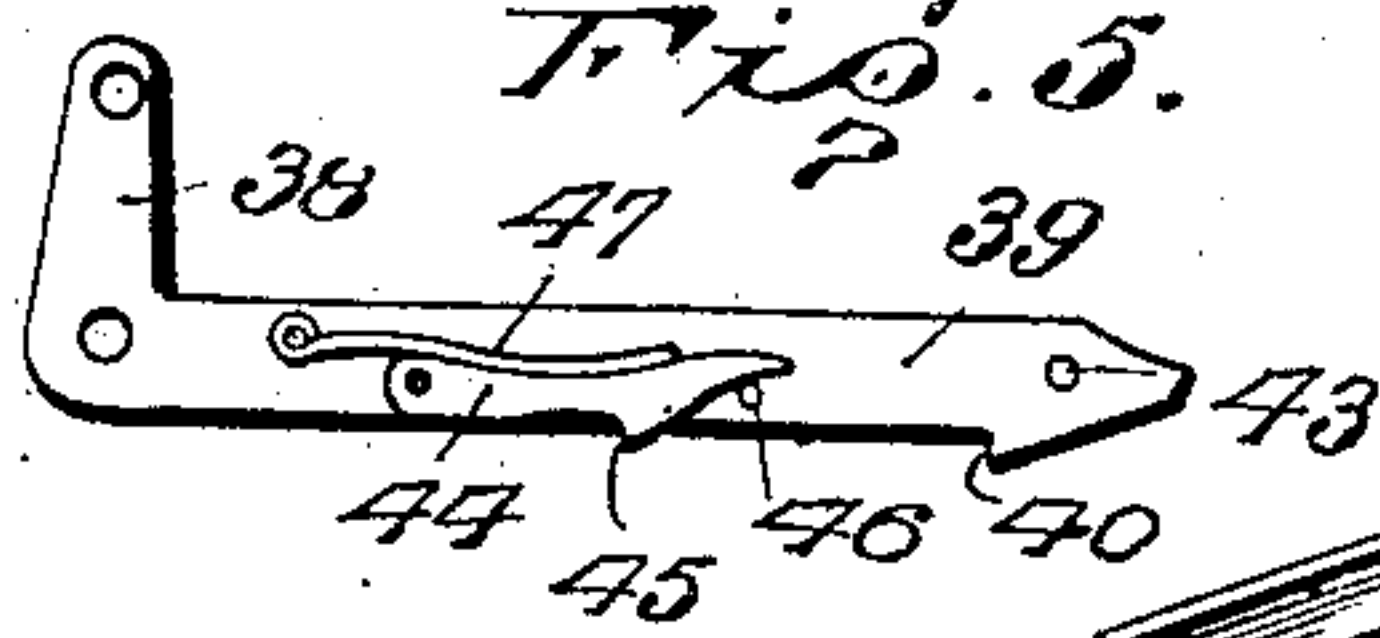
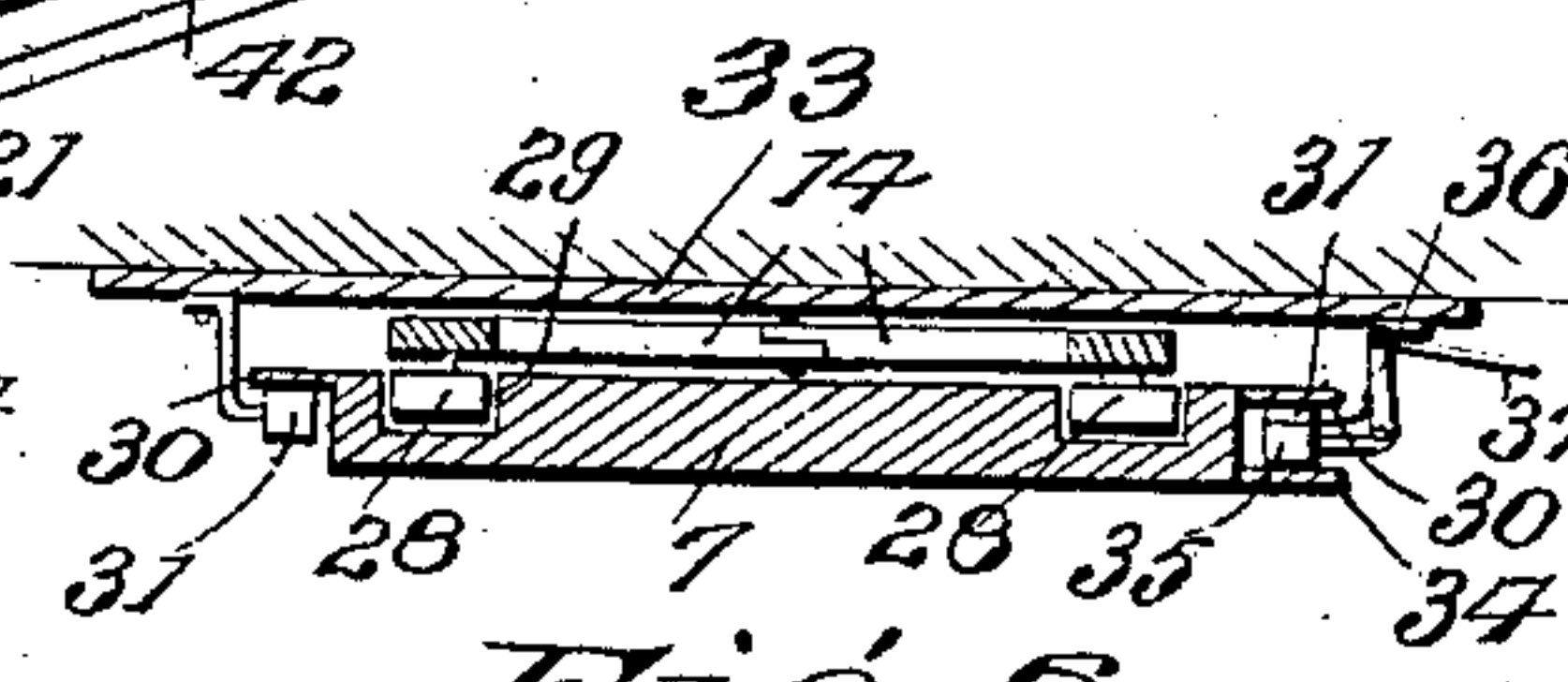


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM J. JEFFRIES, OF OREGON CITY, OREGON.

DEVICE FOR AUTOMATICALLY OPENING AND CLOSING ELEVATOR-DOORS.

No. 879,645.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed July 18, 1907. Serial No. 384,456.

To all whom it may concern:

Be it known that I, WILLIAM J. JEFFRIES, citizen of the United States, residing at Oregon City, in the county of Clackamas and State of Oregon, have invented certain new and useful Improvements in Devices for Automatically Opening and Closing Elevator-Doors, of which the following is a specification.

10 This elevation contemplates certain new and useful improvements in elevators and relates particularly to the means for opening and closing doors of an elevator shaft upon the passage of a car past the floors.

15 The invention has for its primary object a simple, durable and efficient construction of mechanism for automatically opening and closing the said shaft doors, the automatic device being actuated by the approach of a car towards the floor, but only when manipulated or set by the operator of a car in position for its automatic actuation. And a further object of the invention is a simple, and durable construction of automatic locking device, 20 working in conjunction with the opening and closing means.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and then point out the novel features in the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

40 Figure 1 is a rear elevation of the door of an elevator shaft, equipped with the improvements of my invention; Fig. 2 is a transverse sectional view of the car with the parts of the mechanism which it carries; Fig. 45 3 is a perspective view of a portion of the door opening, closing, locking and unlocking mechanism; Fig. 4 is a detail perspective view of a cam plate employed; Fig. 5 is a detail side elevation of the latch for the door; 50 Fig. 6 is a horizontal sectional view, the section being taken through the cam plate; and, Fig. 7 is a detail perspective view of the trip lever for the latch.

Corresponding and like parts are referred to in the following description and indicated

in all the views of the drawings by the same reference characters.

Referring to the drawings, the numeral 1 designates the door of an elevator shaft, the door for the purpose of illustration being shown suspended on the rolling hangers 2 from the rail 3. 60

4 designates a car.

Upon the top of the car 4 a standard 5 is mounted. This standard has guides or bearings for the supporting rods 6 of the cam plate 7 designed to be brought by the operator into and out of operative relation with the door opening and closing means for the automatic actuation thereof. To the cam plate is secured a rod 8, the said rod in turn being secured to one arm 9 of a bell crank lever fulcrumed on the roof of the car, the other arm 10 of said lever being connected by a link rod 11 or other suitable connecting means to a foot treadle 12 at the floor of the car. By depressing the treadle 12, the bell crank lever may be rocked so as to push the cam plate outwardly into operative engagement with the door opening and closing means. The said cam plate is pulled rearwardly into an inoperative position, preferably by means of a coil spring 13 secured to one arm of the bell crank and to a bracket or other support on the roof of the car 4. 85

Toggle levers 14 are mounted upon some stationary portion of the shaft at the front thereof, the lower ends of said levers being preferably mounted in a bracket 15, and the upper ends of said levers being pivotally connected to the rocking beam 16 fulcrumed intermediate of its ends on a plate 17 or the like. The beam 16 is connected by a pin and slot, or other adjustable connection 18 to the upper end of the depending link 19. The lower end of the link 19 is similarly connected as at 20 to the upper end of the actuating bar 21 which is fulcrumed intermediate of its ends on the plate 22. The bar 21 is preferably curved as shown and is mounted to rock in a vertical plane or about a horizontal axis. 23 designates the fulcrum pin or stud of the said bar. The bar 21 is provided at its lower end with a guide loop 24, and an arm 25 extends through said loop and has movement therein, the said arm being preferably suspended from the same stud 23 on which the bar 21 is fulcrumed. The lower end of the arm 25 is connected by the link 26 to the door 1. 110

27 designates a yielding connection between the arm 25 and the loop portion of the bar 21, such connection permitting the arm 25 to yield rearwardly, as clearly illustrated in the drawings.

The toggle levers 14 are provided with rollers 28 designed to work in the divergent cam grooves 29 of the cam plate 7 when the latter is moved outwardly into proper relation for such engagement. The cam plate 7 is provided with guide rails 30 designed for guiding connection with rollers 31 mounted on the base plate 33, said base plate 33 being provided with a guide loop 33^a extending over the lower members of the toggle levers. The cam plate 7 is also provided at one side with a cam rail 34 designed to be moved into engagement with a roller 35 on the rocking trip device 36 fulcrumed on the base plate 33. One arm of this trip device is connected by means of a rod or cable 37 to the angularly disposed end 38 of a main latch 39. This latch is designed to lock the door of the elevator shaft in closed position and for this purpose, it is provided with a shoulder or hook 40 adapted to engage the rear side or edge of the door opening and closing bar 21 when the latter has been moved to the closed position. The latch 39 is pressed towards its locking position by means of a spring 41 secured to the upper end of its member or part 38 and to some stationary portion of the apparatus. A guide loop 42 is preferably secured to the plate 22 and extends over the arm 25 and bar 21 and is designed to form a rest for the pin 43 of the latch 39 to limit the movement of the latch towards its locking position. The main latch 39 carries an auxiliary or safety latch 44 which is pivoted thereto at one side and which is provided with a shoulder or hook 45 designed to engage the arm 25. A pin 46 projects from the main latch 39 and is adapted to engage the auxiliary latch 44 to limit the movement thereof when pressed upon by the spring 47.

Under normal conditions, it will be understood that the cam plate 7 is out of the path of the rollers 28 of the toggle levers 14, so that the car may move up and down in the elevator shaft without the actuation of the doors. Whenever it is desired to open one of the doors, the elevator operator will depress the treadle 12 when the car is approaching the floor. This movement of the treadle 12 will, as above set forth, move the cam plate 7 outwardly into a position where it will receive in its cam grooves 29, the rollers 28, no matter whether the car be going upwardly or downwardly. As soon as the rollers 28 have entered and begun to work through the cam groove 29, it is obvious that the operator may release his foot from the treadle 12. The working of the rollers 28 in the cam grooves 29 will obviously tend to draw the toggle levers 14 to-

gether and effect the rocking of the beam 16, which, through the instrumentality of the link 19, will rock the actuating bar 21 and the latter in turn will swing the arm 25 in a position to move the link 26 outwardly and thereby slide the door to an open position. Manifestly, the door must be unlocked before it is moved outwardly, and for this purpose the cam plate 7 is provided with its cam rail 34, which will engage the roller 35 just preparatory to the engagement of the rollers 28 in the cams 29 so as to rock the trip device 36 and release the latch 39 from its engagement with the actuating bar 21. The reverse of this movement is obvious. As soon as the actuating bar 21 has been moved in the reverse direction to effect the closing of the door 1, the latch 39 will engage the said actuating bar. If perchance someone's foot should be caught in the opening of the door, to prevent the complete closing of the latter, no injury to the person will result, owing to the arrangement of the arm 25 and its yielding connection with the loop portion 24 of the actuating bar 21. The said arm 25 will merely yield until the obstruction shall have been removed whereupon the spring connection will exert its force and move the door to its completely closed position. At the same time the auxiliary latch 44 will snap down over the rear edge of the arm 25 and lock the door closed.

From the foregoing description in connection with the accompanying drawings, it will be seen that I have provided a very simple, durable and efficient construction of mechanism for not only effecting the opening and closing of the doors of an elevator shaft in an automatic manner, completely under the control of the operator of the car, but which provides means for the locking and unlocking of the door automatically and also provides safety means in case any of the passengers or the operator should become caught between the door and shaft or door casing.

Having thus described the invention, what is claimed as new is:

1. In elevator mechanism, the combination with a door, and a cage or car, of door opening and closing means connected to said door and including a pair of toggle levers, rollers connected to the complementary members of said levers, a cam plate mounted on the car and provided with cam grooves designed to receive the said rollers, for the purpose specified, and means under the control of the operator of a car for moving said cam plate into and out of operation with the said rollers.

2. In elevator mechanism and in combination with a shaft door and car, means for opening and closing said door, said means including toggle levers provided with rollers, a cam plate carried by the car and provided with cam grooves designed to be engaged by

said rollers, for the purpose specified, means for moving said cam plate into and out of operative relation to said rollers, the cam plate being provided with guide rails, and other rollers designed to bear against said guide rails with the cam plate in operative relation to the rollers of the toggle levers, whereby to retain the plate in such operative position.

3. In elevator mechanism and in combination with a shaft door and car, means for opening and closing the door, said means including toggle levers provided with rollers, a cam plate provided with cam grooves and mounted on the roof of the car, a support for said cam plate and in which said plate is designed to move forwardly and rearwardly, a rod connected to said cam plate at one end, a bell crank lever fulcrumed on the roof of the car and having one arm connected to the other end of said rod, a pull spring connected to the car and to the said arm of the bell crank, a foot treadle mounted in the car, and a connection between said foot treadle and the other arm of said bell crank.

4. In elevator mechanism, the combination with a door and a car, of means for opening and closing the door, said means including a pair of toggle levers, a rocking beam connected to one end of said levers, an actuating bar fulcrumed intermediate of its ends and having one end operatively connected with one end of said rocking beam, a depending arm having a link connection with the door, and a yielding connection between said arm and the actuating bar.

5. In elevator mechanism, the combination with a door and a car, of means for opening and closing the door, said means including a pair of toggle levers, a rocking beam connected to one end of said levers, an actuating bar fulcrumed intermediate of its ends and having one end operatively connected with one end of said rocking beam, a depend-

ing arm having a link connection with the door, and a connection between said arm and the actuating bar.

6. The combination with an elevator door and car, of door locking and unlocking means, the same consisting of an actuating bar for opening and closing the door, an arm operatively connected to the door and having a yielding connection with the actuating bar, a main latch adapted to engage the actuating bar to hold the same in closed position, an auxiliary latch carried by the main latch and adapted to engage the arm to hold the latter in completely closed position, and a trip device connected to said main latch and adapted to be actuated by the car.

7. The combination with an elevator door and car, of door locking and unlocking means, the same consisting of an actuating bar for opening and closing the door, said bar being provided at one end with a guide loop, an arm extending through said guide loop and having an operative connection with the door to open and close the same, a support for said guide loop and actuating bar, a spring connection between the loop and the arm, a main latch adapted to engage the actuating bar to hold the same in closed position, an auxiliary latch adapted to engage the arm to hold the latter in completely closed position, a trip device adapted to be actuated by the car, and a connection between said trip device and the latches, whereby the actuation of the former will release both of the latter, said latches being independently movable into locking engagement with their respective parts.

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

WILLIAM J. JEFFRIES. [L. s.]

Witnesses:

C. W. EASTHAM,
H. F. LATOURETTE.