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Patented Feb. 4, 1902.

C. W. KIRSCH.

MEANS FOR OPERATING ELEVATOR DOORS.

(Application filed Apr. 1, 1901.)

(No Model.)

2 Sheets—Sheet 1.

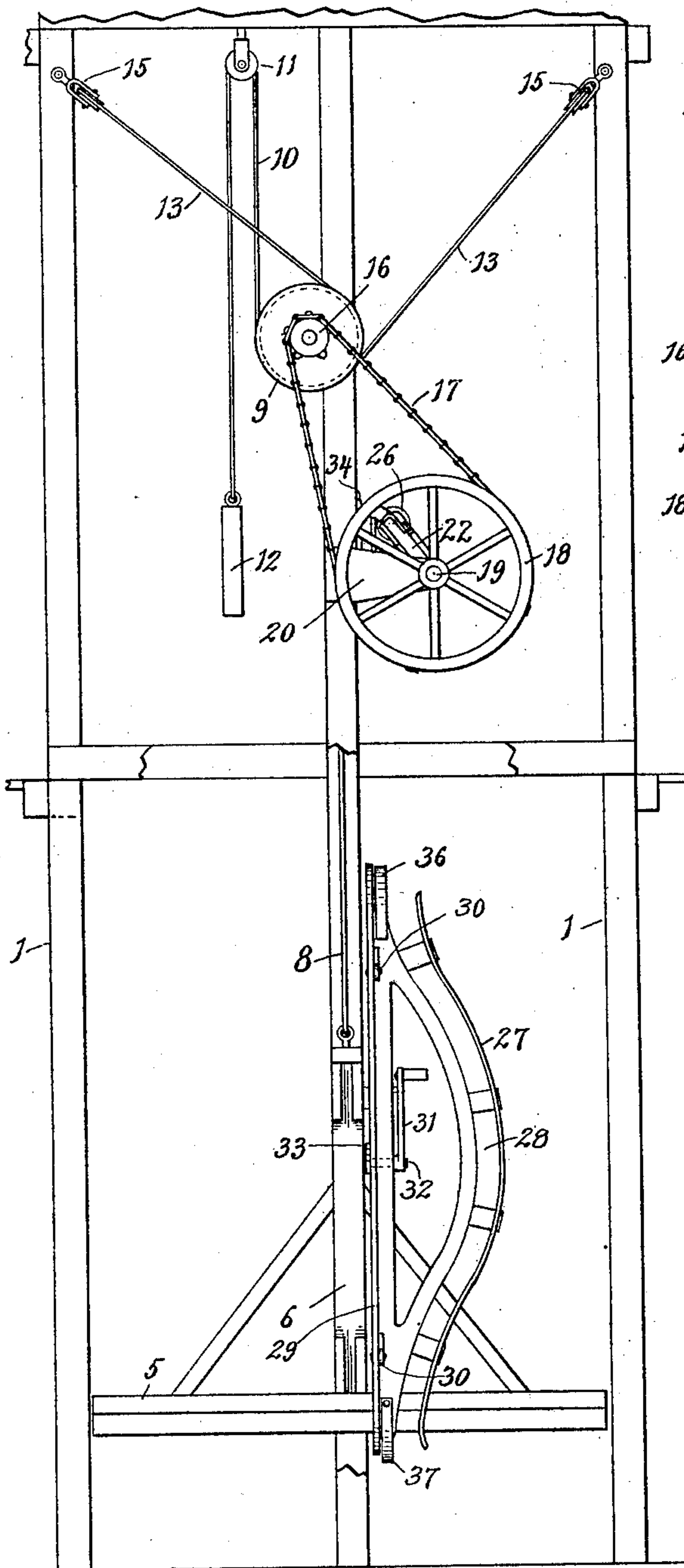


Fig. 1.

Witnesses.  
*C. A. Keeney.*  
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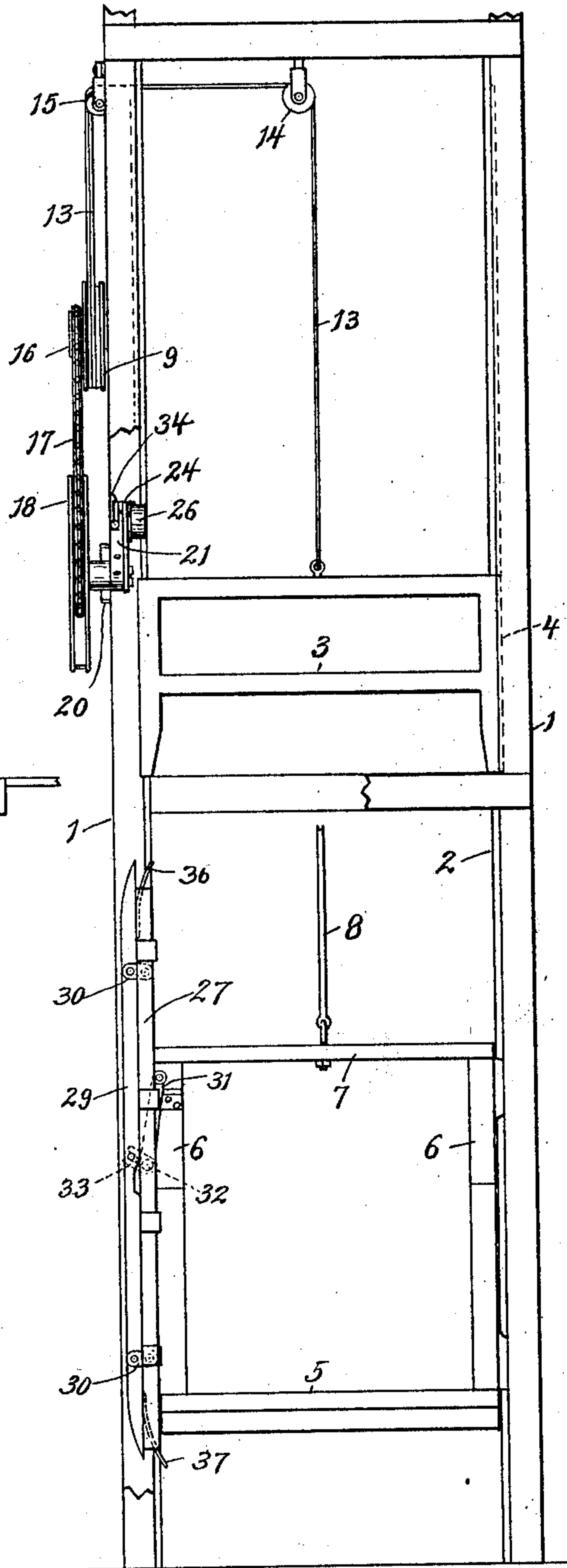


Fig. 2.

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2 Sheets—Sheet 2.

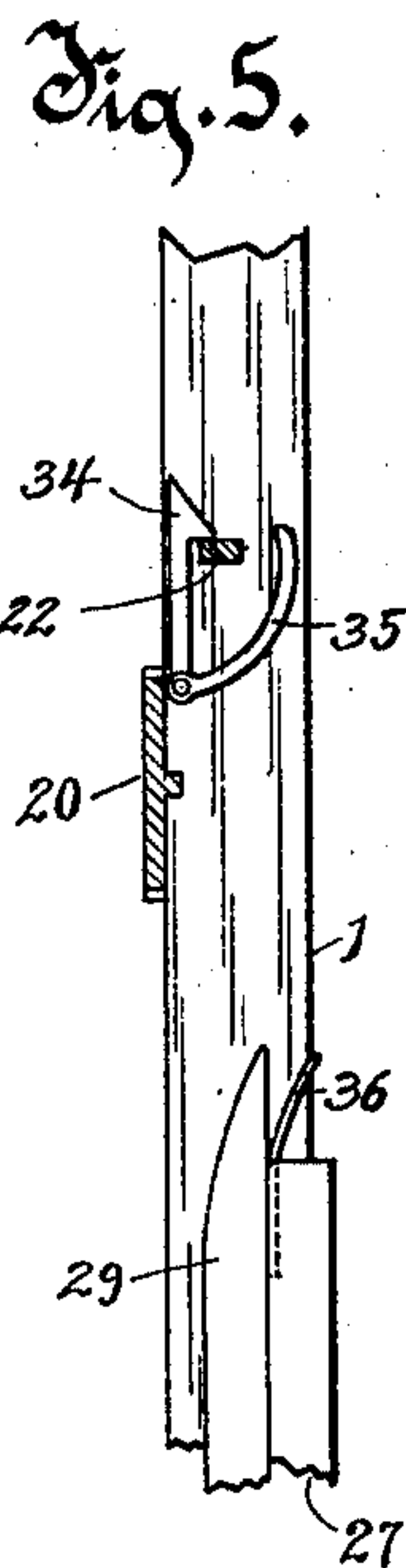
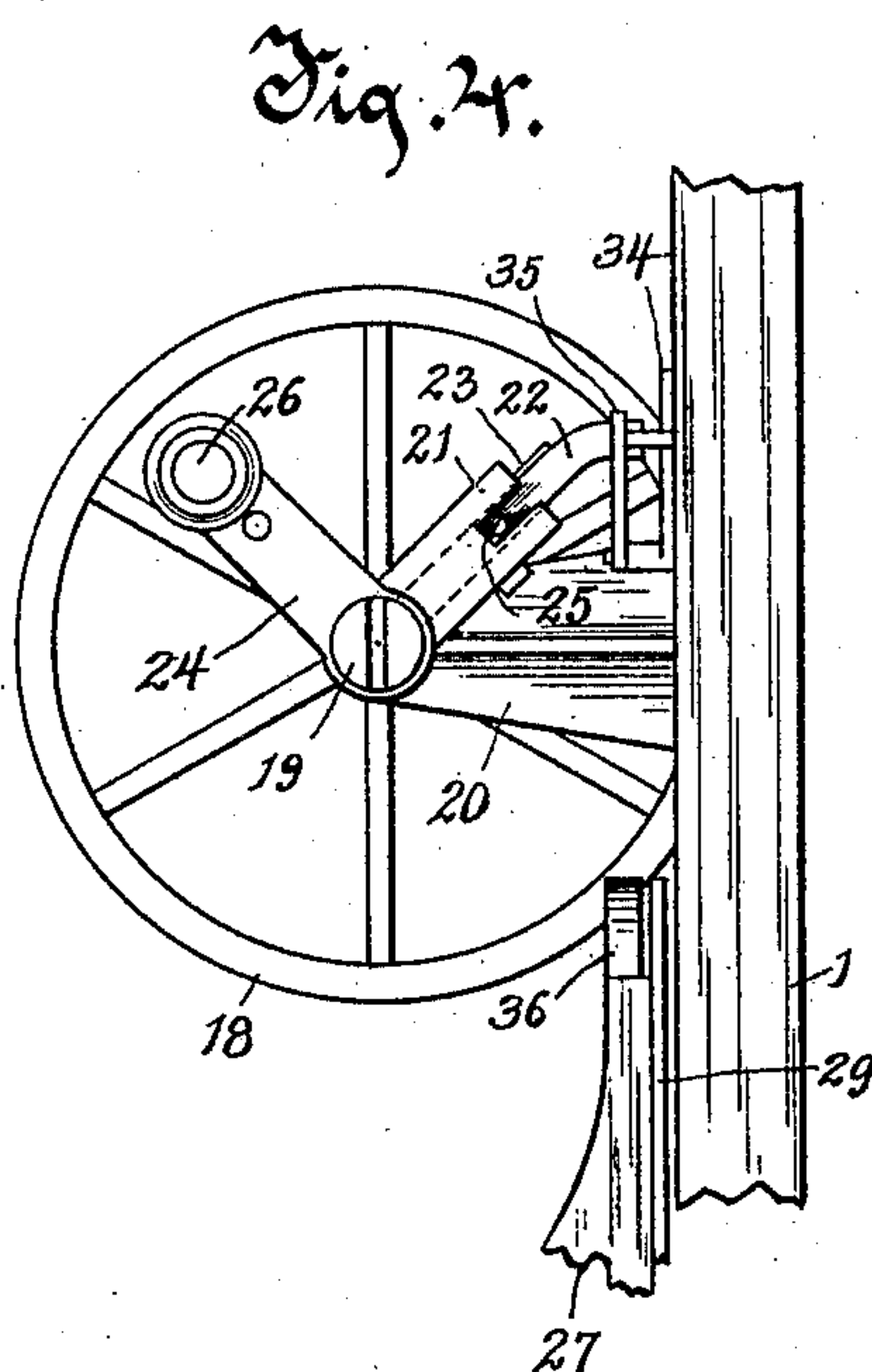
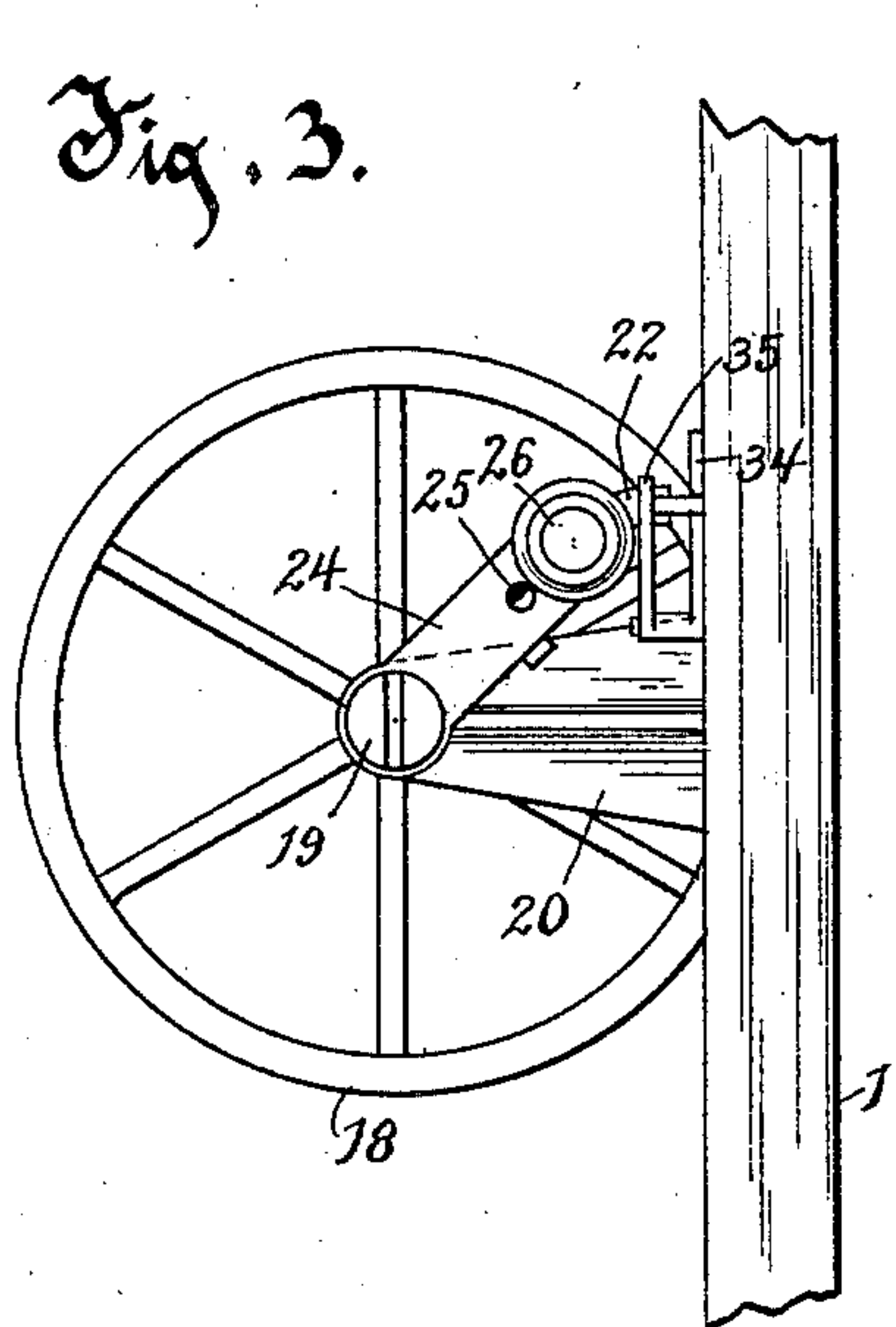


Fig. 6.

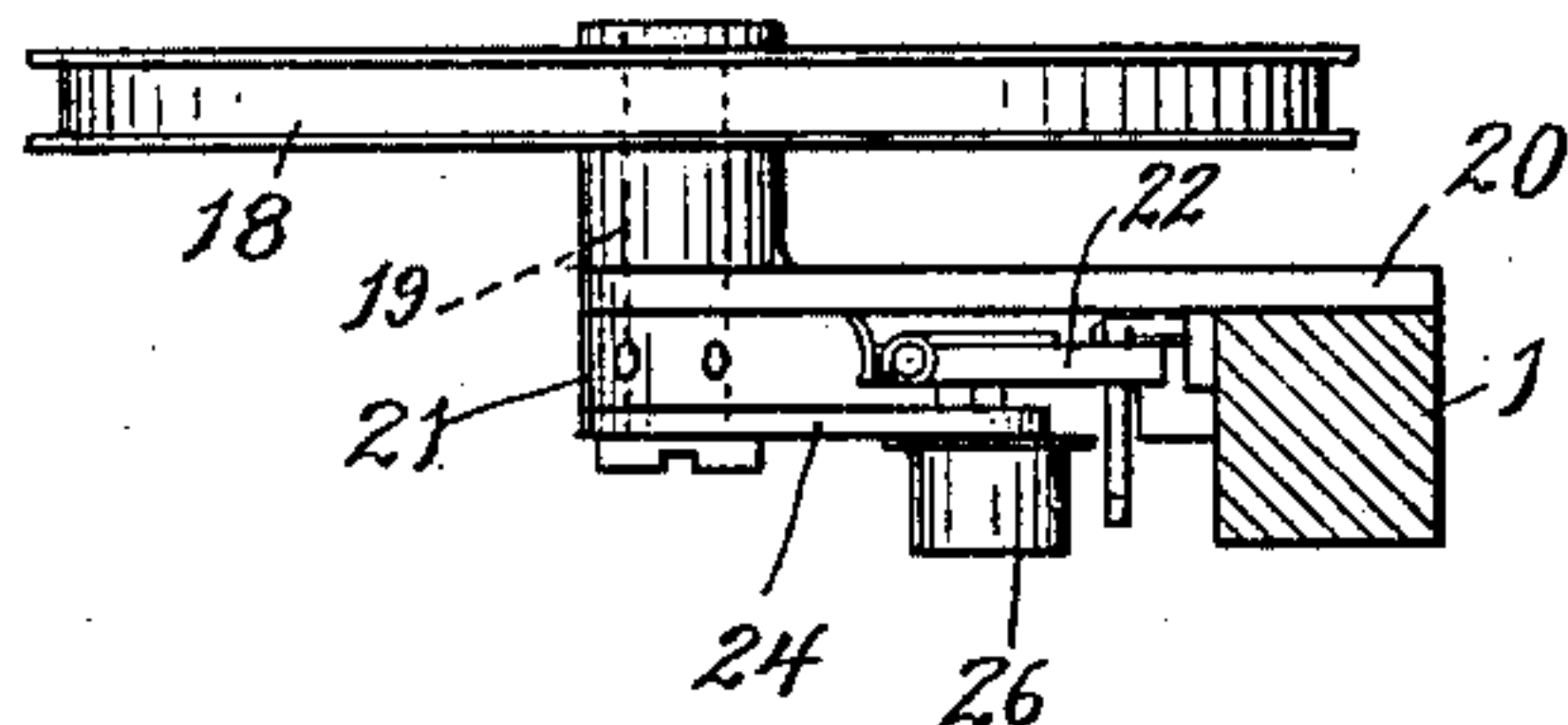


Fig. 7.

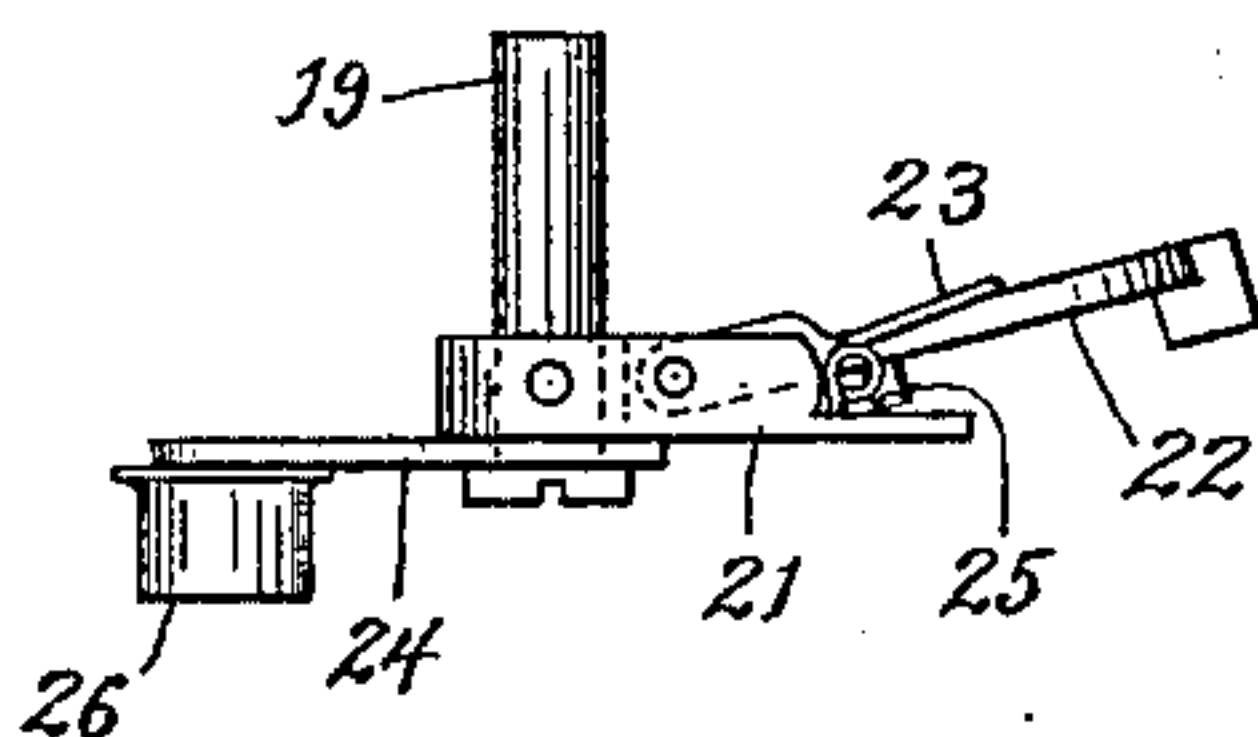


Fig. 9.

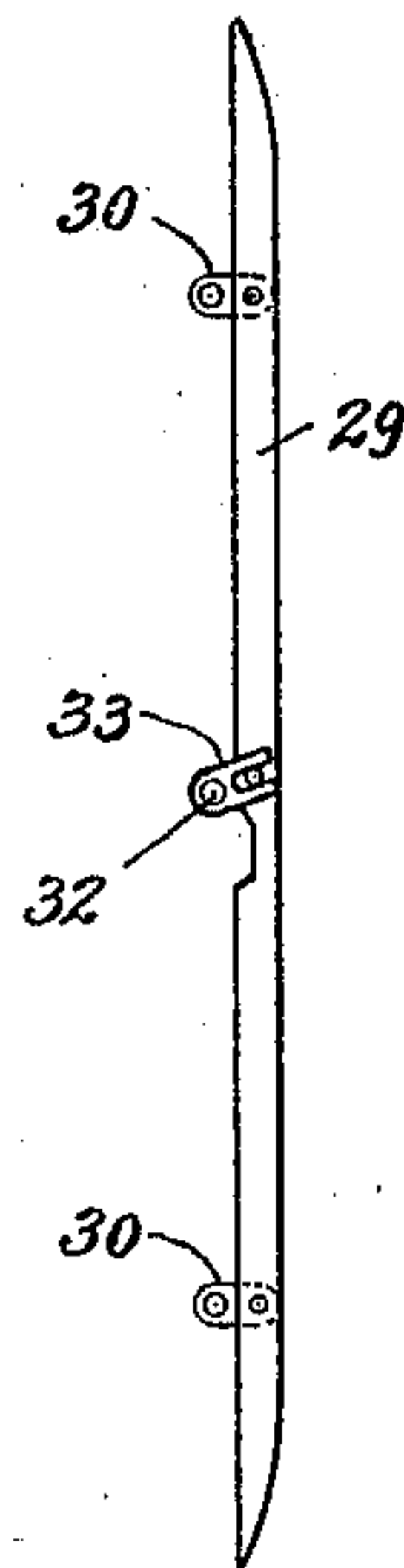
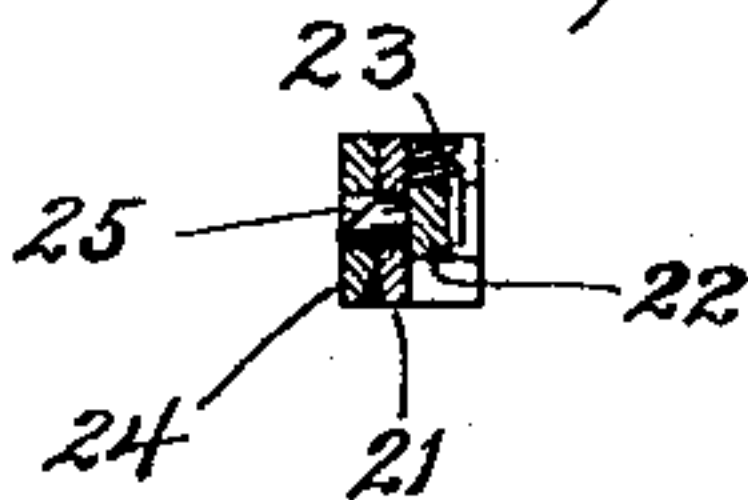


Fig. 8.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## MEANS FOR OPERATING ELEVATOR-DOORS.

SPECIFICATION forming part of Letters Patent No. 692,306, dated February 4, 1902.

Application filed April 1, 1901. Serial No. 53,754. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. KIRSCH, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Means for Operating Elevator-Doors, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improved means for automatically opening and closing doors or gates through which access is had to elevators in buildings for elevating or lowering freight or passengers and locking the mechanism. The improved means employed for opening and closing the door or gate and locking the mechanism is so related to the cage or car of the elevator that the movement of the cage or car up or down automatically opens and closes the door or gate and locks the mechanism.

The invention consists of the mechanism, its parts and combinations of parts, as herein described and claimed, and the equivalents thereof.

In the drawings, Figure 1 is a side view of a frame or well with an elevator-car or freight-platform therein with my improved means for opening and closing a gate in connection therewith, parts being broken away for convenience of illustration. Fig. 2 is a front view of the same elevator-frame with a gate in connection therewith, freight platform or car, and improved mechanism for opening and closing the gate, parts being broken away for convenience of illustration. Fig. 3 shows a fragment of one of the posts of the elevator-frame, an oscillating winding-wheel, and related mechanism employed in my improved means for opening and closing a gate and locking the mechanism. Fig. 4 shows a fragment of a post of the frame, the same wheel and mechanism as shown in Fig. 3, a part being in a different position, and also a fragment of the car, showing the relation of parts of the mechanism thereon to the mechanism attached to the post; but the fragment of the car is in the position that would not occur with reference to the outwardly-tilted crank-pin arm in use. Fig. 5 shows a fragment of

a post of the frame with details of the mechanism employed in locking and releasing the mechanism. Fig. 6 is a top plan view of the mechanism shown in Fig. 3, with the post in cross-section. Fig. 7 is a detail of the mechanism shown in Fig. 6, parts of the mechanism being in other positions than those shown in Fig. 6. Fig. 8 is a detail of a rail-cam. Fig. 9 is a transverse section of mechanism shown in Fig. 7.

While my improved mechanism may be employed with an elevator of any form running up and down in a well or in ways therefor, either for carrying freight or passengers, it is more especially adapted for use with freight-elevators, and I have shown the mechanism in connection with an elevator-frame provided with ways and a freight-elevator arranged to travel vertically on the ways in the frame. The means for closing the apertures or doorways by which access is had from the floor of a building or at a landing to the car or platform may be either a door or a gate; but as gates are commonly employed in connection with freight-elevators I have shown a gate, which will sufficiently illustrate the method of use of my improved mechanism. Freight-elevators of this character as frequently employed are made to travel vertically in a frame having ways therefor, which frame is so located in a building that access is had to the car or platform from two opposite sides, which I have denominated the "front" sides of the elevator. When so used, two gates are employed, one in each opening, by which access is had to the car or platform, one gate being at one side and the other gate at the other side of the elevator-frame.

In the drawings, 1 is the frame for the elevator, which is provided on opposite sides with vertically-extending rails or ways 2, on which the car travels and by which it is guided in its vertical movements. At the floors or landings gates 3 are provided, which slide vertically on ways 4 therefor in the frame. In the drawings only one gate 3 is shown; but it should be understood that another gate directly opposite this one at the other side of the frame may also be employed for closing the passage-way to the car at that side.



As shown in the drawings, the car may consist of a platform or floor 5, with upright posts 6 6 at the two sides thereof and a cross-bar 7 secured to the posts at the top thereof. The car is provided with means secured to the posts 6 6, by which the car is guided to travel vertically on the ways 2. A cable 8 is secured to the cross-bar 7, and running vertically to the top of the frame or elevator-well runs thence to some means of winding up or drawing on the cable for elevating the car and lowering it.

Elevator-frames with gates and cars with the means of raising and lowering the cars in substantially the form shown are in common use and form no part of my invention except as related to the improved means for moving and locking the gates.

In the drawings, 9 is a drum axled in a box therefor fixed on the frame. A weight-cord 10, attached at one end to the drum 9, runs over a pulley 11 at the top of the frame, and a weight 12 on the other end of the cord serves as a counterbalance to the gate or gates. Gate-ropes 13 13, attached at one end severally to a gate 3, each runs thence vertically over a pulley 14, supported on the frame, and thence to another pulley 15, also supported on the frame, and therefrom runs and is attached to the drum 9. These ropes are so attached to the drum 9 that by its rotation in one direction both of the ropes are wound up, thereby raising the gates, and by its rotation in the other direction both of the ropes are unwound, permitting the gates to descend. The drum 9 is provided with a sprocket-wheel 16, and a sprocket-chain 17, running on the sprocket-wheel, is fastened to an oscillating wheel 18, the two lines of the chain running segmentally, one on one side and the other on the other side of the rim of the wheel. The wheel 18 is provided with an axle 19, journaled in a bracket 20, fixed on the frame. A radial arm 21, fixed on the axle 19, is provided with a radially-extending recess, in which is pivoted a locking member 22. This locking member is capable of swinging in a plane cutting the axle 19 longitudinally, but is held to rotation on the axle 19 with the radial arm 21, of which it forms a part. The member 22 is held normally to the arm 21 and in the recess thereof by a spring 23. A crank-pin member 24 of the arm 21 is revolvably loose on the axle 19 adjacent to the arm 21 and is held thereto rotatively by a pin 25, fixed in the member 22 and projecting therefrom through an aperture in the arm 21 and releasably into an aperture therefor in the crank-pin member 24. The member 24 is provided with a crank-pin 26, advantageously having an antifriction-roller thereon. Normally the crank-pin member 24 is alongside of the arm 21 and is locked thereto by the pin 25 on the member 22, so that it forms a part of the radial arm 21, projecting from the axle 19. An elongated arm-rocking cam 27 is secured to the post of the car. This cam has a curved groove or way 28, so disposed that as

the car moves upwardly or downwardly past the crank-pin 26 that pin is received in the open end of the groove or way, and following this groove or camway the axle 19 and the oscillating wheel 18 thereon is thereby oscillated or rocked, so as first to wind the chain 17 on the wheel 18 in such manner as to wind up the ropes 13 on the drum 19, and thereby lift the gates 3, and thereafter as the crank-pin 26 passes beyond the middle of the cam rocking the axle 19 and the wheel 18 in the other direction, thereby rotating the drum 9 reversely, lifting the counterweight and permitting the gates 3 by gravity to descend into their normal closed positions.

As elevators of this character are frequently employed in buildings of several stories in height and the elevator runs past several floors or landings it often occurs that it is not desired to open the gate or gates at intermediate landings, and I therefore provide means under the control of the attendant on the car whereby the mechanism adapted to open the gates can be put out of action, thus permitting the car to pass the landings without opening the gates. For this purpose a bar of metal beveled at its ends, forming what I have denominated an "elongated cam" 29, is mounted by means of parallel arms 30 30 on the rear part of the frame of cam 27, which forms a part of the car, the cam-bar being pivoted to the arms 30, which arms in turn are pivoted on the car. The bar is so disposed that by shifting it laterally (toward the left, Fig. 2) it is put in position as the car is raised or lowered to contact with the extremity of the locking member 22 and push it laterally away from the crank-pin member 24, thereby withdrawing the pin 25 from the crank-pin member 24, so that as the pin 26 passes the cam 27 the member 24 is swung thereby freely on the axle 19 without carrying the arm 21 therewith or in any manner oscillating the wheel 18, and hence not disturbing the gates. For conveniently shifting the elongated cam 29 out of or into position to contact with the member 22 I provide a crank-handle 31, fixed on a short rock-shaft 32, journaled in the car-frame, which rock-shaft is provided with a radial furcate finger 33, that engages a pin on the bar 29. By the rocking of the crank-handle 31 the elongated cam is readily shifted out of and into position for actuating the locking member 22. To provide against the improper displacement of the radial arm 21, including the members 22 and 24, I provide means for locking that arm when not being actuated by the cam 27, so that it will always be in place to be contacted and actuated by that cam when the car comes thereto either in going up or coming down. Incidentally this construction permits an attendant to lift a gate and at such time prevents the relieved counterbalance from shifting the arm 21 out of the path of the cam 27. For this purpose a catch 34, formed on one arm of a bell-crank 35, is adapted normally to engage



the member 22, and thus prevent the arm 21 from tilting. The bell-crank 35 is pivoted on a post of the frame and by gravity assumes the position shown in Fig. 5, in which the catch 34 normally engages the member 22 as this member comes thereto when the gates are closed. It becomes necessary to tilt this bell-crank 35, throwing the catch 34 out of engagement with the member 22 whenever the car goes past the catch, and for this purpose cams 36 and 37 are provided on the car, which contact one arm of the bell-crank and tilt the catch 34 out of engagement with the member 22, the bell-crank being held in this position while the car is passing it by bearing against the side of the car. If as the car goes up or down past a landing, thereby tilting the catch 34 away from engagement with the member 22 and at the same time while passing the landing, the elongated cam 29 is in action, forcing the member 22 away from the crank member 24, the construction is such that the member 22 remains in engagement with the catch 34, though both of them are tilted laterally, and if the car is stopped at the landing and the attendant lifts one of the two gates the other gate will not be lifted by the relieved counterbalance, because the member 22 will be still in engagement with the catch 34.

What I claim as my invention is—

1. In combination, a vertically-movable elevator-car, one or more vertically-movable gates, a drum, a rope attached to each gate and winding on the drum adapted to lift the gates, a gravity-counterbalance provided with a rope winding on said drum, an oscillating wheel, a sprocket-wheel fixed on the drum-shaft, a chain secured to and running from opposite sides of the oscillating wheel on and about the drum-shaft, whereby the oscillation of the wheel rotates the drum back and forth, a radial arm fixed on the oscillating wheel and provided with a crank-pin, and an upwardly and downwardly extending camway on the car consisting of a curved trough with two operating-faces adapted to take and swing said crank-pin, thereby moving the oscillating wheel in each direction, whereby the gates and the counterbalance are alternately positively lifted as the cam on the car passes the crank-pin.

2. In combination, a vertically-movable elevator-car, one or more vertically-movable gates, a drum, a rope attached to each gate and winding on the drum adapted to lift the gates, a gravity-counterbalance provided with a rope winding on said drum, an oscillating wheel, means connecting the oscillating wheel operatively to the drum, a crank-pin on the oscillating wheel, and an upwardly and downwardly extending curved grooved camway on the car, the camway having two operating-faces adapted to take and guide the crank-pin whereby the gates are lifted when the wheel is oscillated in one direction and the

counterbalance is lifted when the wheel is oscillated in the other direction.

3. In mechanism for opening an elevator-gate, an oscillating drum-rotating wheel, a radial arm fixed on the axle of the oscillating wheel, a crank-pin member revolubly loose on the axle of the oscillating wheel, and a locking member hinged to and oscillable with the radial arm and having a pin adapted to engage and hold the crank-pin arm releasably to oscillation with the radial arm.

4. In mechanism for opening an elevator-gate, an oscillating drum-rotating wheel, a recessed radial arm fixed on the axle of the oscillating wheel, a crank-pin member revolubly loose on the axle of the oscillating wheel, and a spring-holding locking member hinged in the recess to and oscillable with the radial arm and having means adapted to engage and hold the crank-pin arm releasably to oscillation with the radial arm.

5. In combination in mechanism for opening an elevator-gate, an oscillating drum-rotating wheel, a radial arm rigid on the axle of the wheel, a crank-pin member revolubly loose on said axle, a locking member hinged on and oscillable with the radial arm and provided with means engaging the crank-pin member and holding it releasably to oscillation with the radial arm, and a cam on the car adapted as the car moves up or down to contact with the crank-pin and oscillate the arm.

6. In combination in mechanism for opening an elevator-gate, an oscillating drum-rotating wheel, a radial arm rigid on the axle of the wheel, a crank-pin member revolubly loose on said axle, a locking member hinged on and oscillable with the radial arm and provided with means engaging the crank-pin member and holding it releasably to oscillation with the radial arm, a cam on the car adapted as the car moves up or down to contact with the crank-pin and oscillate the arm, and a shiftable elongated cam on the car adapted to be put into position to contact with said locking member as the car passes it, and put it out of engagement with the crank-pin member permitting the crank-pin member to rotate alone.

7. In combination in mechanism for opening an elevator-gate, an oscillating drum-rotating wheel, a radial arm rigid on the axle of the wheel, a crank-pin member revolubly loose on said axle, a locking member hinged on and oscillable with the radial arm and provided with means engaging the crank-pin member and holding it releasably to oscillation with the radial arm, a cam on the car adapted as the car moves up or down to contact with the crank-pin and oscillate the arm, a shiftable elongated cam on the car adapted to be put into position to contact with said locking member as the car passes it and put it out of engagement with the crank-pin member permitting the crank-pin member to ro-



tate alone, a rock-shaft, a crank-handle on the rock-shaft, and a finger on the rock-shaft adapted by contact with a pin on the elongated cam to shift it into and out of action.

5 8. In combination, a vertically-traveling elevator-car, an opening gate, a swinging arm in means for automatically opening the gate, a counterweight to the gate so mounted as when relieved of the weight of the gate to  
10 tilt said arm when not locked, a catch adapted automatically to engage said arm and hold it and the counterweight against movement, and means on the car for automatically putting the catch out of work.

15 9. In mechanism for opening an elevator-

gate, an oscillating wheel, a recessed radial arm fixed on the axle of the wheel, a crank-pin member loose revolubly on said axle, a locking member hinged to said radial arm in said recess and rotatable with said radial arm 20 and provided with a pin adapted to engage said crank-pin member and hold it to rotation with said radial arm, and a spring holding said locking member to its work.

In testimony whereof I affix my signature 25  
in presence of two witnesses.

CHARLES W. KIRSCH.

Witnesses:

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