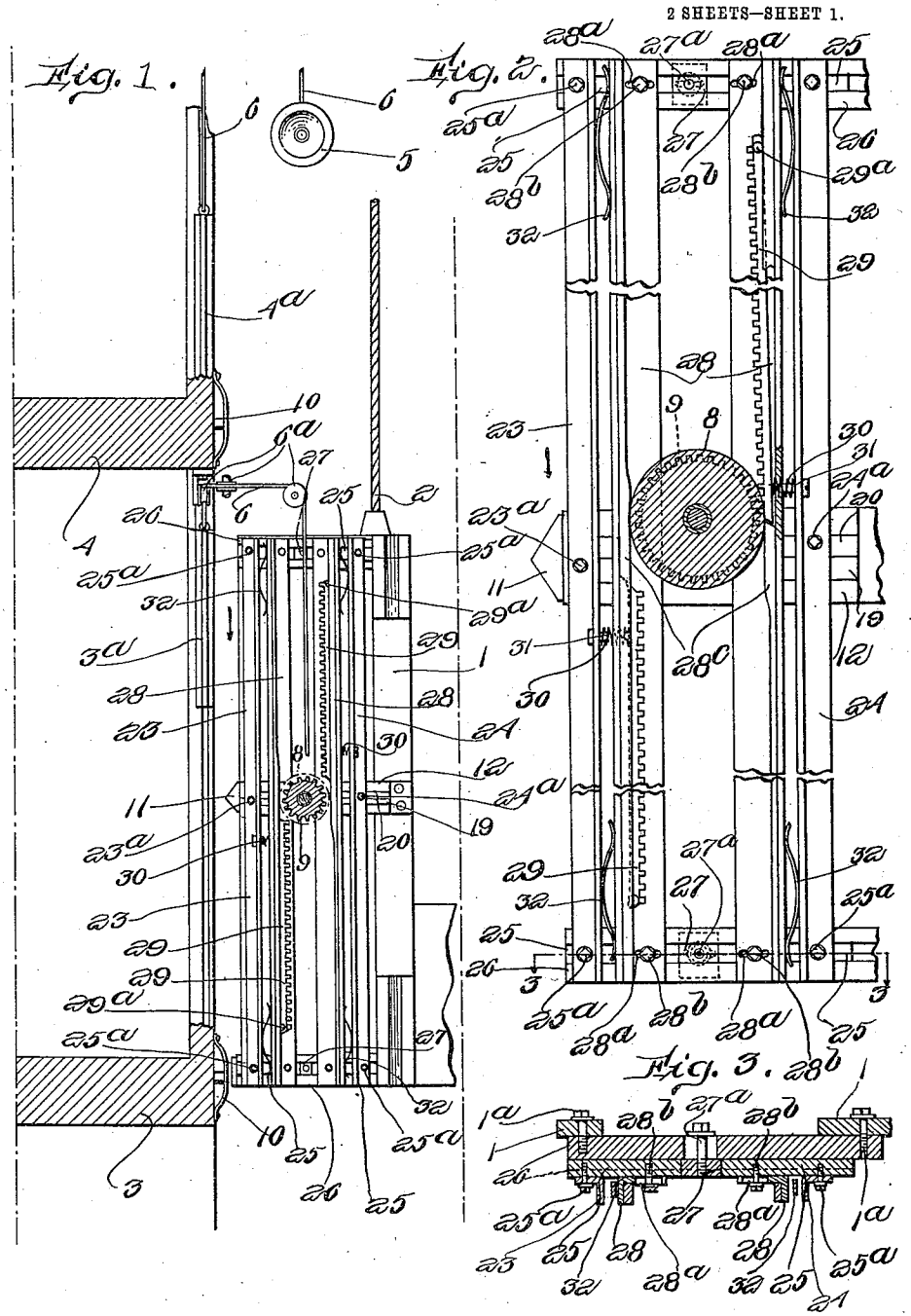
F. W. BOUGHTON.

OPTIONAL FULL AUTOMATIC GATE.

APPLICATION FILED APR. 14, 1910.

1,016,203. Patented Jan. 30, 1912.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

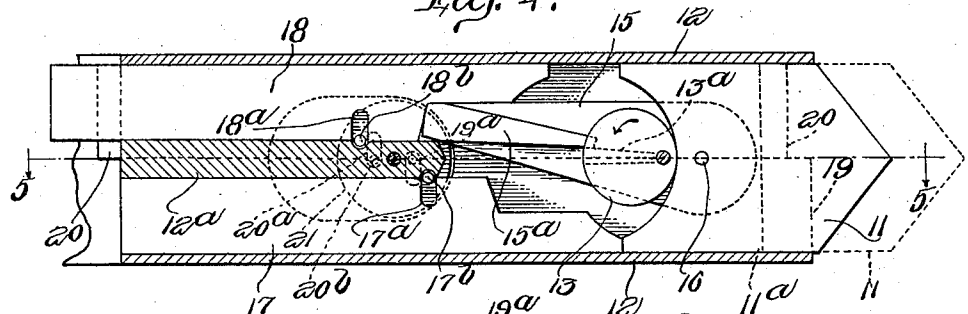


Fig. 5.

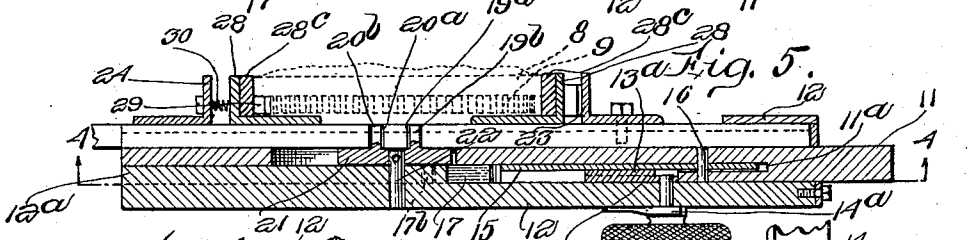


Fig. 6.

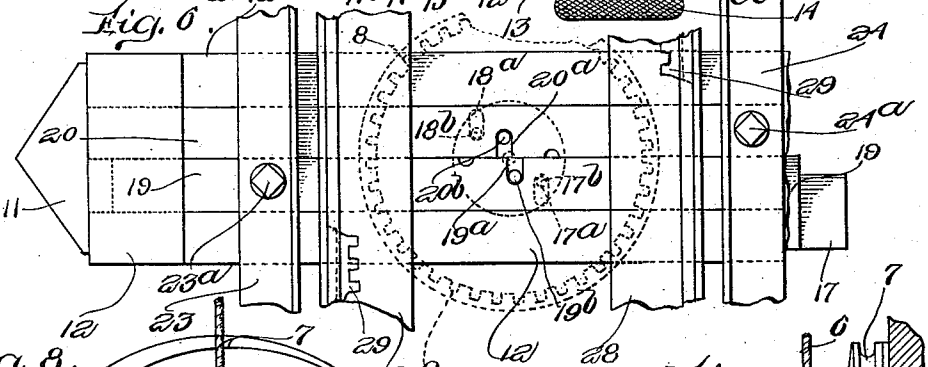


Fig. 8.

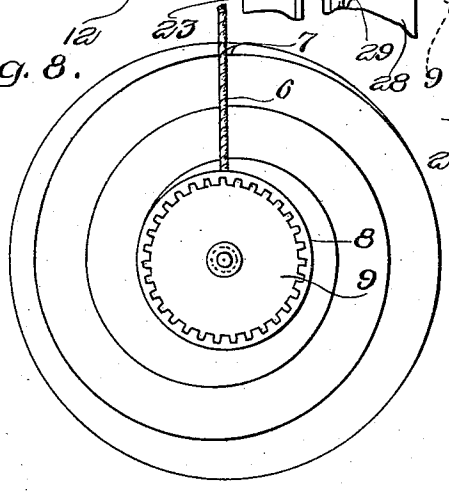


Fig. 7.

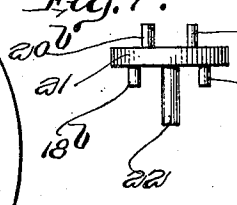
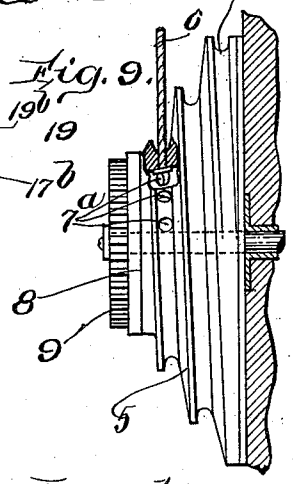


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRED W. BOUGHTON, OF BOSTON, MASSACHUSETTS.

OPTIONAL FULL-AUTOMATIC GATE.

1,016,203. Specification of Letters Patent. Patented Jan. 30, 1912.

Application filed April 14, 1910. Serial No. 555,508.

To all whom it may concern:

Be it known that I, FRED W. BOUGHTON, a citizen of the United States, and resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Optional Full-Automatic Gates, of which the following is a specification.

This invention relates to elevators, more particularly to freight or other elevators in connection with which gates are used; and its objects are to provide for opening and closing such of the gates as the operator may desire to open or close, while the car is ascending or descending; also to provide for raising or lowering the gates at a variable speed; and also to provide for determining the initial speed to be given to any gate.

The invention is illustrated by the accompanying drawings in which:

Figure 1 is a side elevation partly in section showing a building equipped with an elevator car and gates. Fig. 2 is an enlarged view of the mechanism shown in Fig. 1. Fig. 3 is a section on the line 3—3 Fig. 2. Fig. 4 is a section on the line 4—4 Fig. 5. Fig. 5 is a section on the line 5—5 Fig. 4. Fig. 6 is an enlarged detailed view of part of the mechanism shown in Figs. 1 and 2. Fig. 7 is a detailed view of part of the mechanism. Fig. 8 is a front elevation of the drum with cord attached thereto. Fig. 9 is a side elevation of the drum attached to the wall of the elevator shaft.

Similar characters refer to similar parts throughout the several views.

In Figs. 1 to 5, inclusive, the uprights 28 are shown in their innermost position, therein enabling racks 29 and raised tracks 28^c to engage, respectively, gear or pinion 9 and friction wheel 8, as the car ascends or descends; while in Fig. 6 said uprights are shown in their outermost position, therein preventing such engagements.

The car 1 is operated by any suitable mechanism through the cord 2. The floors 3 and 4 of a building are equipped with gates 3^a and 4^a. On one side of the elevator shaft and midway between the floors of the building are mounted conical cord drums 5 to which are attached cords 6 connected by suitable guide pulleys 6^a with the gates 3^a and 4^a. The conical cord drum 5 is furnished with a spiral groove 7, which guides the cord 6 as the drum rotates, and which is furnished with holes 7^a, in any one of which the end of the cord may be secured. The drum is furnished also with the friction wheel 8 and the gear or pinion 9. Cams 10 project from the several floors of the building into the elevator shaft and are adapted to engage and actuate the plunger 11, which is carried by the car and extends into the elevator shaft. The plunger 11 (Figs. 4 and 5) has a recess or pocket 11^a near one end, is slotted near the other end, and is slidingly mounted in the case 12, which is fixed to the car and furnished with a partition 12^a. The plunger is actuated in one direction (outwardly) by the eccentric 13, mounted in the case 12, and operated by the knob 14 affixed thereto; the plunger is actuated in the opposite direction (inwardly) by cam 10 on the wall of the elevator shaft. The eccentric 13 has a raised portion or lug 13^a adapted to engage either side of a similarly raised portion or lug 15^a on the pawl 15 and thereby actuate said pawl in either direction. The spring 14^a is fixed to the case 12 and frictionally engages the shank of the knob 14 to hold it in place when not being turned by the operator. The pawl 15, disposed in the recess 11^a (Figs. 4 and 5) in the plunger 11, is pivoted at 16 to said plunger and travels back and forth therewith, being employed to alternately engage and actuate the sliding bars 17 and 18 disposed in the case 12 adjacent to one side of the plunger and separated by the partition 12^a, said sliding bars being furnished, respectively, with slots 17^a and 18^a. The sliding bars 19 and 20 are disposed in the case 12 adjacent to the other side of the plunger and extend the length of the case (Figs. 4, 5 and 6) being furnished, respectively, with slots 19^a and 20^a. The crank wheel 21 is fixed on the shaft 22 journaled in the case 12, and is furnished with crank pins 17^b, 18^b, 19^b and 20^b, which engage respectively, the slots 17^a, 18^a, 19^a and 20^a. The outer ends of the sliding bars 19 and 20 are pivoted, respectively, at 23^a and 24^a to the uprights 23 and 24 which are secured by pivots 25^a to the cross pieces 25 slidingly mounted in grooves in cross pieces 26 secured by bolts 1^a to the car 1. These sliding cross pieces 25 are separated by slotted blocks 27 adjustably secured by bolts 27^a to cross pieces 26

(Figs. 2 and 3). The uprights 28 are furnished with slots 28^a and thereby given a lateral movement on pivots 28^b by which they are secured to the cross pieces 25. Springs 32 are arranged between the uprights 23 and 28 and the uprights 24 and 28. The outer ends of racks 29 are pivoted at 29^a to the uprights 28 and the free inner ends of these racks rest on springs 30 mounted on studs 31 (Fig. 2) on the uprights 23 and 24 and extending through holes in the uprights 28. These uprights 28 have a raised portion 28^c (Fig. 2) in the form of a track to engage the friction wheel 8 on the drum 5. The free ends of the rack and the ends of the raised track are adjacent to one another and are made diagonally as shown (Fig. 2) to limit the inward travel of the free end of the rack.

It will be seen from what has been said that the mechanism employed to raise and lower the gates comprises co-acting gears, namely, racks and pinions. The racks may be laterally separated such a distance that they will not engage the pinion on the drum as the car passes up and down the elevator shaft, or they may be brought together to engage said pinion whenever desired; and this provision forms the "optional" feature of the invention. It will also be observed that the uprights, which are arranged in pairs, namely, 23 and 28 and 24 and 28, are laterally adjustable by means of the slotted blocks 27 and bolts 27^a (Fig. 2), enabling the racks to be adjusted laterally for proper engagement with the pinion.

The operation is as follows: Normally, when operative, as shown in Figs. 1, 2, 4 and 5, the plunger 11, pawl 15, sliding bars 17, 18, 19 and 20 are all in their innermost (laterally) position within the case 12, the eccentric 13 engaging the plunger 11 and the pawl 15, which engages the inner end of the sliding member 18; the uprights 23 and 24 (Fig. 2) to which are pivoted, respectively, the sliding bars 19 and 20, are likewise in their innermost (laterally) position, as are also the uprights 28 carrying the racks 29 and the raised tracks 28^c. In Figs. 1 and 2 the car is represented as descending, the lower rack having engaged and rotated the pinion and drum and thereby raised the gate 3^a; the friction wheel 8 is rolling on the tracks 28^c, being thereby frictionally prevented from rotating too rapidly and permitting the gate to drop suddenly. As the car descends, and while the friction wheel still engages the tracks, as described, the upper rack comes into engagement with the pinion and thereby controls its rotation until the gate is lowered; the gate being presumably lowered by gravity and the rack acting simply as a brake. In this way, the car, whether going up or down, raises each gate as it approaches a floor and lowers it as it leaves the floor. The free inner ends of the racks are enabled by means of the springs 30 to readily and properly engage the pinion. Assuming that the car shown in Fig. 1 is going up, it will be seen that the upper rack has raised the gate 3^a, that the friction wheel 8 is rolling on the tracks 28^c (Fig. 2), and that the lower rack is about to lower the gate; or, assuming that the car shown in Fig. 1 is going down, as indicated in the drawing, it will be seen that the lower rack has just raised the gate and that the upper rack is about to lower it. To render the racks inoperative, that is to prevent their engaging the several pinions, as described, the operator turns the knob 14 (Fig. 5) nearly one complete rotation in the direction of the arrow (Fig. 4) and with it the eccentric 13, thereby throwing the plunger out into the position shown in dotted lines Fig. 4 and thereby, through lugs 13^a and 15^a, bringing the pawl 15 into engagement with the sliding bar 17. The plunger in its outermost position engages a cam 10 on the elevator shaft and is thereby thrown inwardly; driving sliding bar 17 to the left (Fig. 4) and, by means of the crank pins 17^b, 18^b, 19^b and 20^b engaging respectively the slots 17^a, 18^a, 19^a and 20^a, driving sliding bar 18 to the right; driving sliding bar 19, pivoted to the upright 23, to the left; and driving sliding bar 20, pivoted to the upright 24, to the right; thereby more widely separating the uprights 28 and the racks 29, carried by said uprights 28. In this way the plunger 11 is returned to its original position (Fig. 4). In order to again throw the racks into operative position, the operator turns the knob nearly one complete rotation in the direction opposite to that indicated by the arrow in Fig. 4, thereby throwing out the plunger 11 and raising the pawl 15 into engagement with the sliding bar 18 which has assumed a position corresponding to the position of the sliding bar 17 in Fig. 4. When, now, the plunger 11 engages the cam 10 on the wall of the elevator shaft and is thereby thrown inwardly, it moves the sliding bar 18 outwardly, thereby bringing the racks together, as shown in Fig. 4, all as just described. The operator is thus enabled at will to throw the racks into and out of operative relation to any particular pinion, thereby opening and closing only such gates as he may desire to open and close, as the car ascends or descends.

It may be here again stated that the plunger in its outermost position engages cam 10 in passing, while in its innermost position no such engagement takes place.

By the use of the conical drum, a gate in being raised travels gradually more rapidly and in being lowered travels gradually more slowly. The initial speed to be given to the gate is determined by the point in

the spiral groove of the conical drum at which the cord is attached. Each gate may be given a different speed.

The features of the invention are—First—the optional feature, so called, whereby the operator may open and close such gates as he desires, leaving the others as they are. Second—the provision for frictionally holding the pinion while out of engagement with both racks. Third—the conical drum providing a variable speed for the gates. Fourth—determining the initial speed to be given to the gates, or any of them.

The title "optional full automatic gate" is employed to describe the invention as one enabling the operator at will to open and close any and as many gates as and when he desires.

Owing to the variable speed given to the gates, as described, the openings into the elevator shaft are completely guarded at all times, either by the gate or by the car.

It is obvious that, when the racks are set to engage one pinion, they will continue to engage successive pinions until separated, as described, and vice versa.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. In an elevator of the character described, a car; a gate; means for raising and lowering the gate operatively connected therewith and arranged in the shaft; means arranged on the car adapted to engage and actuate said first named means and to be thrown into and out of engaging relation thereto; a plunger operatively connected with said last named means and arranged on the car; and a cam arranged in the shaft and adapted to engage and actuate said plunger; substantially as described.

2. In an elevator of the character described, a car; a gate; means for raising and lowering the gate operatively connected therewith and arranged in the shaft; means arranged on the car adapted to engage and actuate said first named means and to be thrown into and out of engaging relation thereto; a plunger operatively connected with said last named means and arranged on the car; and a cam arranged in the shaft and adapted to engage and actuate said plunger; with means for setting said plunger; substantially as described.

3. In an elevator of the character described, a car; a gate; means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion; laterally movable racks vertically and oppositely disposed in the car adapted to engage and actuate said pinion and to be thrown into and out of engaging relation thereto; a plunger operatively connected with said racks and arranged on the car; and a cam arranged in the shaft and adapted to engage and actuate said plunger; substantially as described.

4. In an elevator of the character described, a car; a gate; means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion; laterally movable racks vertically and oppositely disposed in the car adapted to engage and actuate said pinion and to be thrown into and out of engaging relation thereto; a plunger operatively connected with said racks and arranged on the car; and a cam arranged in the shaft and adapted to engage and actuate said plunger; with means for setting said plunger; substantially as described.

5. In an elevator of the character described, a car; a gate; means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion and a friction wheel; racks and tracks vertically and oppositely arranged on the car and adapted to engage respectively said pinion and friction wheel; substantially as described.

6. In an elevator of the character described, a car; a gate; means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion and a friction wheel; laterally movable racks and tracks vertically and oppositely arranged on the car and adapted to engage respectively said pinion and friction wheel and to be thrown into and out of engaging relation thereto; with means for accomplishing said last named movements; substantially as described.

7. In an elevator of the character described, a car; a gate; and means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion and a friction wheel; bars vertically and oppositely disposed on the car and having a raised portion adapted to engage said friction wheel; racks pivoted to said bars and having their free ends adjacent to the raised portion thereof and adapted to alternately engage said pinion; substantially as described.

8. In an elevator of the character described, a car; a gate; and means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion and a friction wheel; bars vertically and oppositely disposed on the car and having a raised portion adapted to engage said friction wheel; racks pivoted to said bars and having their free ends spring-controlled and adapted to alternately engage said pin-

ion; together with such controlling springs; substantially as described.

9. In an elevator of the character described, a car; a gate; and means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion and a friction wheel; laterally movable bars vertically and oppositely disposed on the car and having a raised portion adapted to engage said friction wheel; racks pivoted to said bars and having their free ends adjacent to the raised portion thereof and adapted to alternately engage said pinion; with means for laterally moving said bars comprising a plunger operatively connected therewith and mounted on the car and a cam mounted in the shaft and adapted to engage and actuate said plunger; substantially as described.

10. In an elevator of the character described, a car; a gate; and means for raising and lowering said gate operatively connected therewith and comprising a rotary drum mounted in the shaft and furnished with a pinion and a friction wheel; laterally movable bars vertically and oppositely disposed on the car and having a raised portion adapted to engage said friction wheel; racks pivoted to said bars and having their free ends spring-controlled and adapted to alternately engage said pinion; together with such controlling springs; with means for laterally moving said bars comprising a plunger operatively connected therewith and mounted on the car and a cam mounted in the shaft and adapted to engage and actuate said plunger; substantially as described.

11. In an elevator of the character described, a car; a gate; and means for raising and lowering said gate; said means comprising a rotary conical cord drum disposed in the shaft and furnished with a spiral cord guiding groove with means for attaching a cord to said groove at various points thereof; a cord attached to said gate and to said drum; with means disposed on the car for rotating said drum; substantially as described.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FRED W. BOUGHTON.

Witnesses:
RALPH W. FOSTER,
GEORGE G. CLARK.