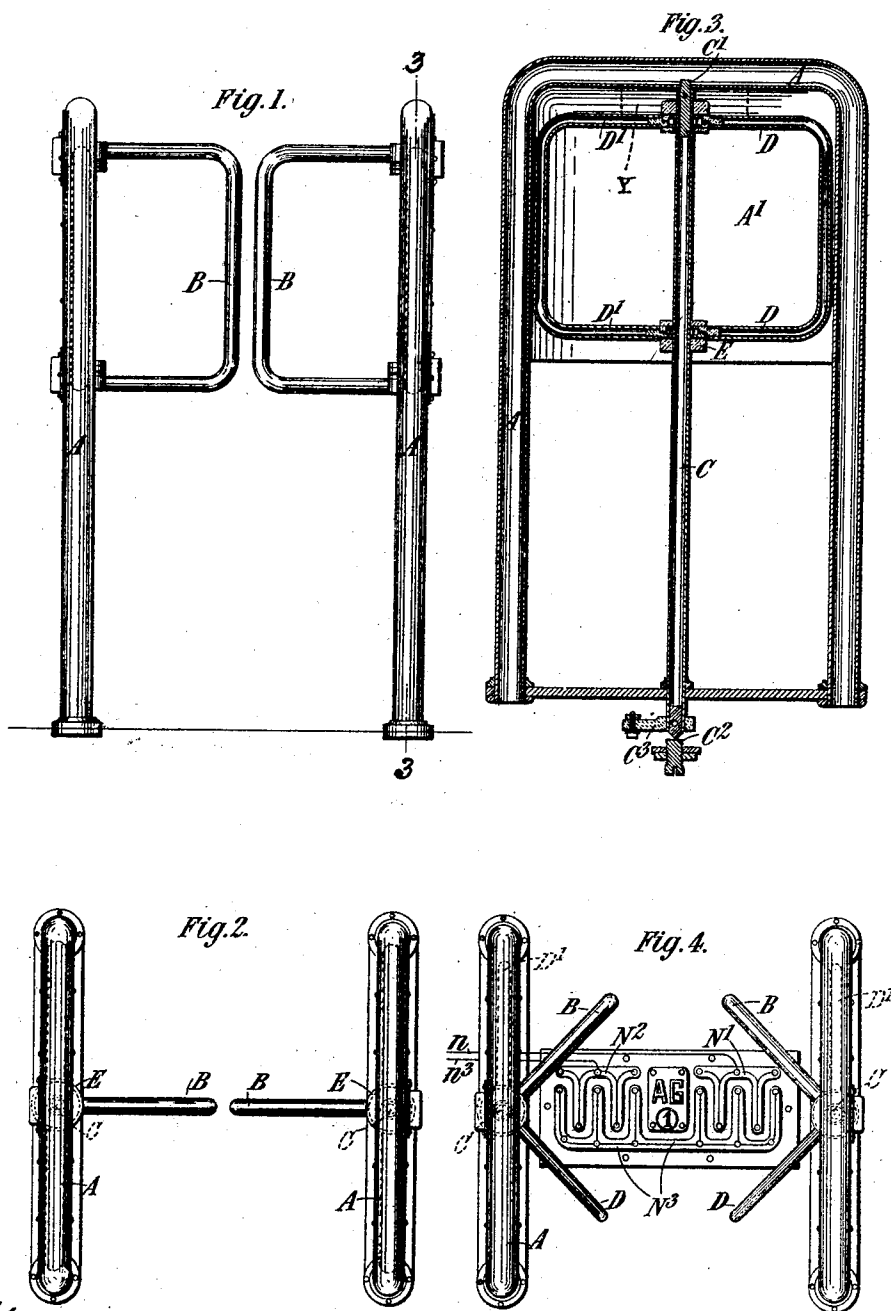


A. GAJARDO.

APPARATUS FOR REGISTERING THE NUMBER OF PERSONS PASSING
THROUGH GATES.

No. 552,431.

Patented Dec. 31, 1895.



Witnesses.
Philip Tilden.
Robert Conitt.

Inventor.
Adrian Gajardo.
By *James L. Norrie.*
Atty.

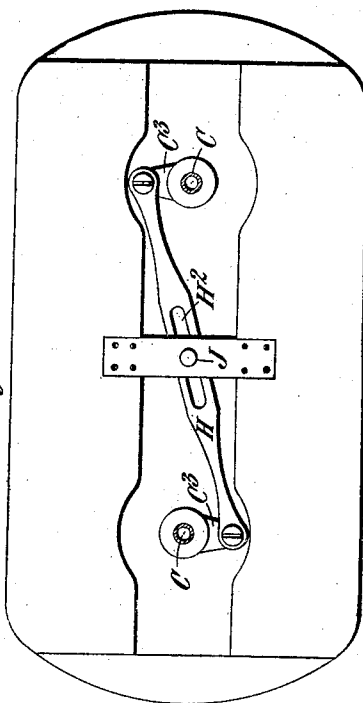
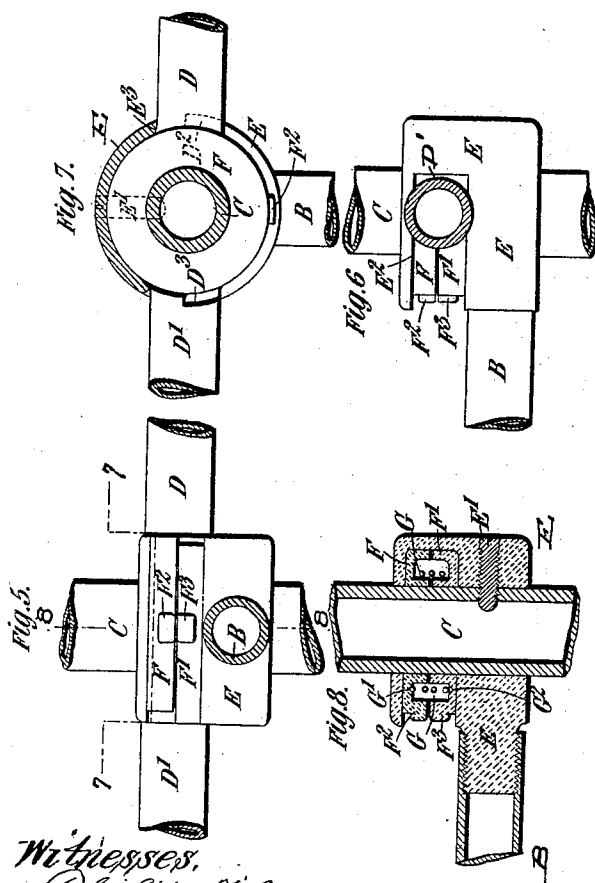
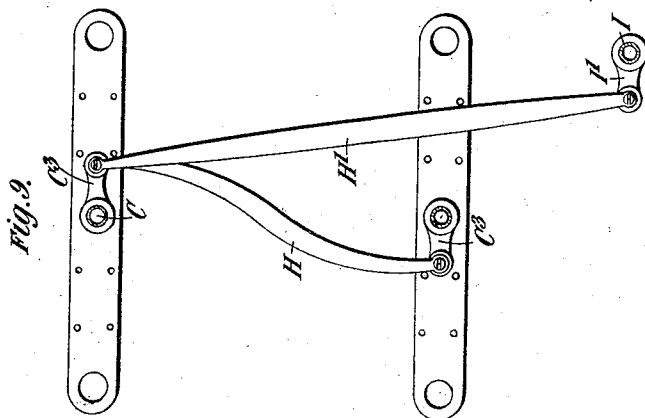
(No Model.)

5 Sheets—Sheet 2.

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Robert Emmett.

Inventor,
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(No Model.)

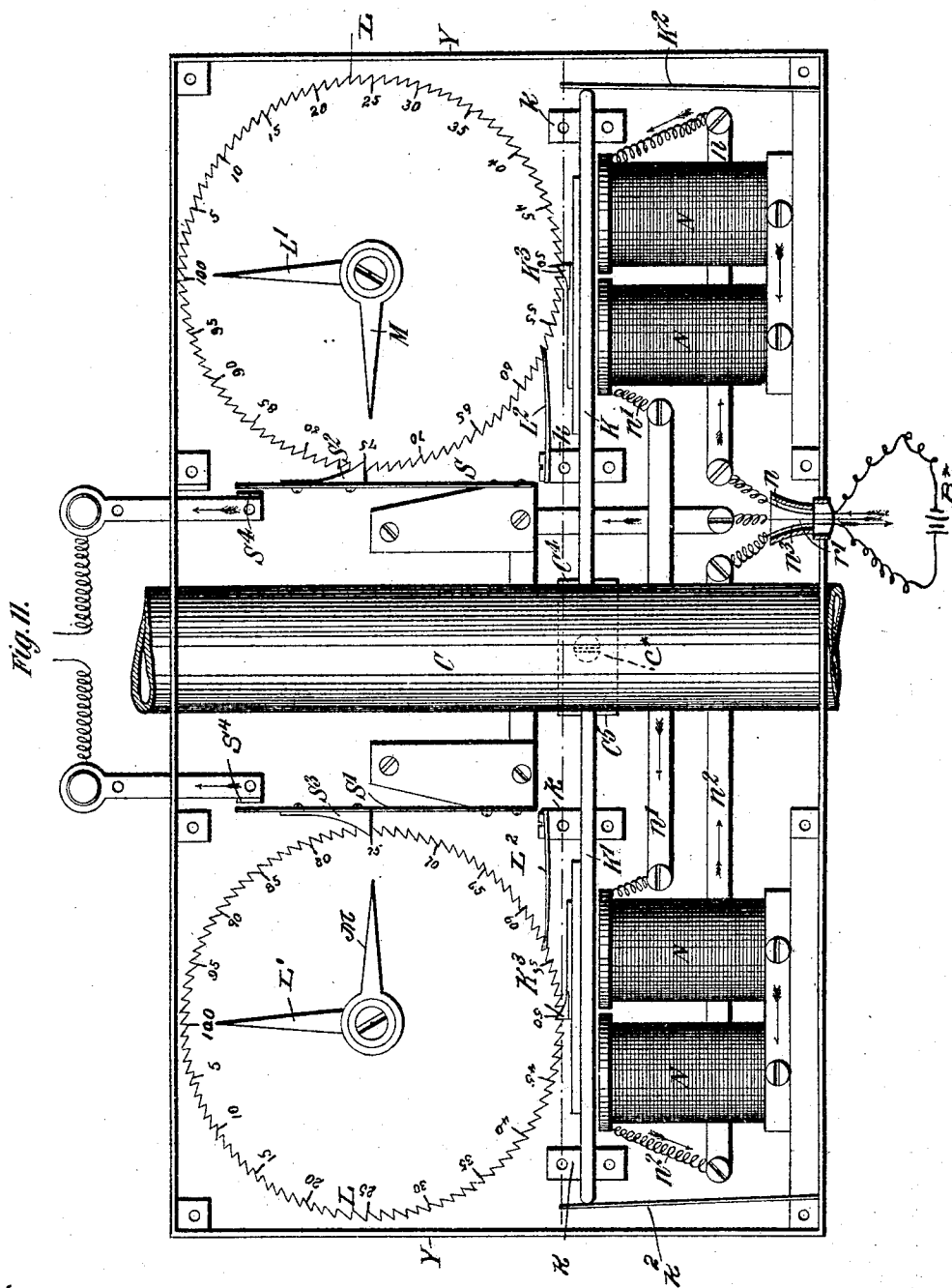
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No. 552,431.

Patented Dec. 31, 1895.



Witnesses.
Philip Tilden.
Robert Everett.

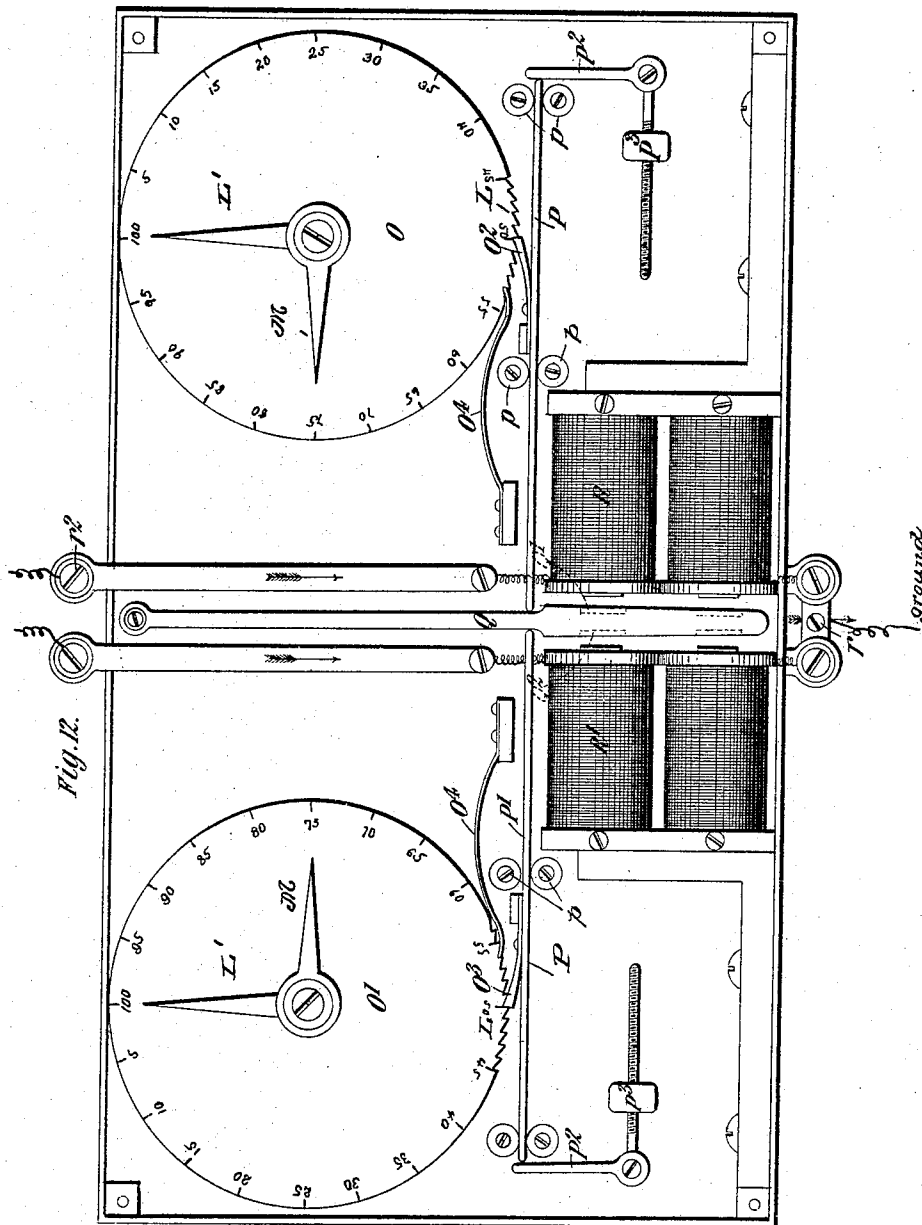
Inventor.
Adrian Caajardo.
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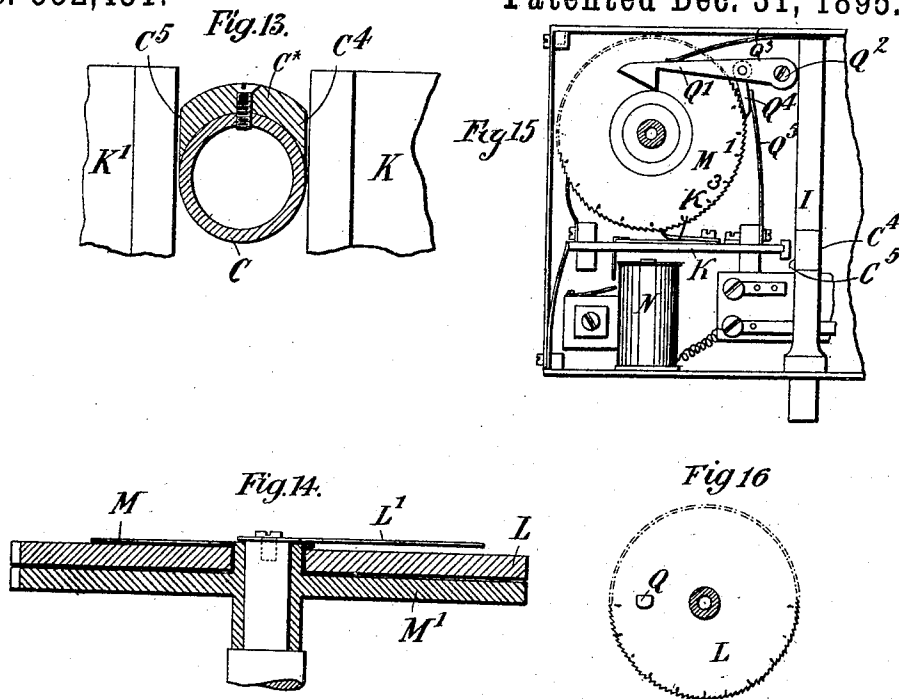
A. GAJARDO.

5 Sheets—Sheet 5.

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UNITED STATES PATENT OFFICE.

ADRIAN GAJARDO, OF VALPARAISO, CHILE.

APPARATUS FOR REGISTERING THE NUMBER OF PERSONS PASSING THROUGH GATES.

SPECIFICATION forming part of Letters Patent No. 552,431, dated December 31, 1895.

Application filed March 18, 1895. Serial No. 542,237. (No model.)

To all whom it may concern:

Be it known that I, ADRIAN GAJARDO, engineer, a citizen of the Republic of Chile, residing at 16 Calle Prat, Valparaiso, Chile, have invented certain new and useful improvements in automatic apparatus for registering the number of passengers in railway and other vehicles, and also the number of persons entering or leaving buildings or the like, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in automatic apparatus for registering the number of passengers in railway and other vehicles, and also the number of persons entering and leaving buildings or the like.

The object of my said invention is to provide improved apparatus for registering exactly and exhibiting a visible enumeration of the number of persons traveling, say, in tram-cars, omnibuses, or other vehicles, steamboats, and the like, to which the apparatus is applied, or the number of visitors entering or leaving exhibitions, parks, theaters, museums, and other places of public resort. The aforesaid improved apparatus also automatically duplicates the count and thereby effectively prevents any fraudulent attempt on the part of the employés or officials intrusted with the collection of the admission fees, or fares, to deceive their employers by reporting a less number of visitors or passengers than have really been admitted to the establishment, or carried by the conveyance, in question.

An important feature of this apparatus is that, while it automatically counts and registers every individual passenger or visitor who passes through it in either direction, it comprises improved means for allowing the conductor, or other authorized attendant, (furnished with suitable sole-plates on his boots,) to pass through without being counted or registered. Such attendant or official cannot, however, substitute any one else in his place, unless that person is in possession of the means for preventing the counting or registering device from operating in his case.

Another feature of the invention is the provision of improved means for notifying or announcing the passage of an authorized em-

ployé, whenever it occurs, by the sound of a bell, trumpet, or other signaling device.

The improvements herein described may be classified under three heads, viz: First, the improvements in the construction of the doors, gates, or turnstiles, which, as is usual in such apparatus, are opened to let only one person through at one time; second, the improved devices operated by the door or gate for counting the number of people passing through and improved means for throwing the counting device out of action when the attendant is passing through the gates, and, third, the improved device electrically connected with the counting device directly operated by the doors or gates and operative to reproduce at a central office or other place at a distance from said doors or gates the number which is registered by such counting device.

In the accompanying drawings, Figure 1 is a front view, and Fig. 2 is a plan, of a pair of entrance-gates constructed according to my invention, the gates being closed. Fig. 3 is a section on line 3 3, Fig. 1. Fig. 4 is a plan showing the gates partly open. Figs. 5 to 8 are detail views drawn to a larger scale of one of the hinges of the gates hereinafter fully described. Fig. 9 is an under plan view showing a device for connecting together the shafts of a pair of gates. Fig. 10 is a similar view showing an alternative form of such device intended for rotating gates or turnstiles. Fig. 11 is an elevation of my improved counting device. Fig. 12 is an elevation of my improved electrically-actuated duplicating-register. Fig. 13 is a section of the shaft C shown in Fig. 11, showing the cam thereon for operating the counting device. Fig. 14 is a section through the wheels of the counting device. Fig. 15 illustrates a modified counting device with the upper registering-wheel removed to show a pawl hereinafter described. Fig. 16 is an under side plan of the said upper registering-wheel.

Referring now to Figs. 1 to 8, A A is the framework forming the sides of the passage through which the people pass. B B are the gates secured to upright shafts C C. D D' D' are auxiliary gates mounted on the shafts C C and capable of rotating thereon. The shafts C C are turned when the gates B B are

opened and actuate the counting or registering device, as hereinafter described. The purpose of the auxiliary gates is to close the passage immediately in rear of the person passing through the same as soon as the gates B B are opened.

For the sake of clearness I will describe the construction and operation of one gate B only, premising that the other gate is constructed and operated in the same manner.

The shaft C is supported at the top in a bearing C' (see Fig. 3) in the frame A and at the bottom is pointed and supported on an adjusting-screw C² secured in a suitable foundation-plate. (Clearly shown in Fig. 3.)

The manner of mounting the gates D D on the shaft C is shown in Figs. 5 to 8, where Fig. 5 is an elevation of the hinge looking in a direction parallel with the gate B, Fig. 6 is an elevation looking in a direction parallel with the gates D D', Fig. 7 is a section on the line 7 7, Fig. 5, and Fig. 8 is a section on the line 8 8, Fig. 5. The figures illustrate the lowermost limbs of the gates. E is a collar firmly secured to the shaft C by a screwed pin E'. (See Figs. 7 and 8.) To it is attached the lower horizontal arm of the gate B. The said collar is slotted, as shown at E², to receive two rings F F', which are adapted to turn easily on the shaft C, and to which rings the horizontal arms of the gates D D' are respectively fastened—that is to say, one of the said gates D is secured to the upper ring F and the other of said gates D is secured to the lower ring F'. The said rings F F' are hollow or U-shaped in section, as shown in Fig. 8, and are so placed relatively to each other that an annular chamber is thereby formed. In this chamber is placed a helical spring G, one end of which is secured by a stud G' to one of the rings and the other of which is secured by a stud G² to the other ring. Other suitable means for securing the ends of the spring may be adopted. The spring is so arranged that it tends to maintain both the auxiliary gates D D' pressed against the wall A' (see Fig. 3) that extends across the frame A.

F² F³ are projections or stops secured to the rings F F', respectively, and adapted to be received in notches D² D³ in the auxiliary gates D D' when the said rings are turned. The gates D D' cannot turn through more than a right angle or thereabout since the projection F² or F³, as the case may be, will at the end of that amount of rotation come into contact with the end of the notch D² or D³ in the other auxiliary gate which is bearing against the wall A' or against a simple bar extending across the frame. The said wall or bar is furnished with rubber or leather or other suitable buffers to receive the shock when the auxiliary gates D D' strike thereagainst.

The operation of the gates is as follows—that is to say: When the gates B are opened, in the direction shown, for example, in Fig.

7, the part E³, Fig. 7, of the collar E of each gate pressing on the corresponding auxiliary gate D causes the latter to turn and follow the same course as the gate B, and, finally, when the gate B is fully open to take up the same position as that which the said gate B occupied before being opened. The other auxiliary gate D' meanwhile remains at rest against the wall A'. If the gate B is opened in the opposite direction, the auxiliary gate D' is moved in a similar manner to close the opening and the gate D remains stationary. Therefore immediately the gate B is turned to open the passage, the gate D or gate D' moves out to close the passage. This arrangement prevents more than one person passing at a time, since either one or the other of the auxiliary gates must impede the passage of a second person at the moment when the gate B is open to afford a free passage for the first person. The gate D in turning with its ring F upon the shaft C while the other gate D' is at rest will distort the spring G in such a manner that as soon as the gate B is released the spring will act to return the gate D and with it the gate B to its initial position. When the gate B is opened in the opposite direction the gate D' operates to distort the spring and is in turn forced back by the spring when the gate B is released.

I prefer to provide two gates B B and two sets of auxiliary gates D and D', as shown in Figs. 1, 2, and 4, and in this case, in order to insure that when one of the gates B is opened the other shall also be opened, I couple them together by crank-arms C³ C³, secured to the shafts C C, as shown in Figs. 3 and 9, and a link H.

Referring now to Fig. 11, I will proceed to describe the counting device which is actuated when one of the shafts C is turned or partly rotated by the opening of the gate B. The counting device comprises two dials L, mounted in a suitable casing Y carried by the frame A. One of the said dials L counts the number of persons admitted or, in other words, the number of times the entrance-gate and shaft C are rotated through a right angle or thereabout in one direction, and the other of which counts the number of persons passing out or, in other words, the number of times the entrance-gate and shaft C are rotated through a right angle or thereabout in the other direction. The shaft C is provided with a cam-piece C⁴, having two faces C⁴ C⁵, (see Fig. 13,) one of which C⁴ acts on the bar or rod K of the admission counting device, and the other C⁵ acts on the corresponding bar or rod K' of the exit counting device. The two counting devices are similar in their construction and action, so that the description of the device that counts the number of admissions will apply also to the exit counter.

The rod K is mounted to slide in suitable guides k and is pressed against the cam-piece C⁴ by a spring K².

K³ is a spring-pawl carried by the rod K

and adapted to engage with a ratchet-wheel L, as shown. The said ratchet-wheel L is provided with a suitable number of teeth—one hundred, for example—and is graduated on its upper flat face.

L' is a stationary pointer which registers from 1 to 100. Below the wheel L is another toothed wheel M', (see Fig. 14,) having, say, one hundred and one teeth. Its boss projects through the center of the wheel L and is furnished with a pointer M to register hundreds on an inner graduated circle on the upper face of the wheel L. The pawl K³ engages with the teeth of both wheels L M' and rotates them simultaneously. Since, however, the wheel M' has one tooth more than the wheel L it follows that when the latter wheel has completed one rotation the wheel M' will be a tooth short of completing its rotation, and hence the pointer M will have traveled one division over the scale on the disk L and will register one hundred thereon.

The operation of the apparatus is as follows—that is to say, when the gate B is pushed open to admit a person the shaft C is rotated through a right angle or thereabout and the cam-face C⁴, say, slides the rod K in its bearings against the force of the spring K², thus causing the pawl K³ to turn the wheels L M' one tooth forward, and thereby registering one unit. When the gate B closes, the cam-face recedes from the rod K and the latter is returned to its initial position by the spring K². A suitable spring-pawl L² prevents the backward rotation of the wheel L when the pawl K³ is drawn back over the ratchet-teeth by the return of the rod K. If the gates B be moved in the opposite direction the cam-face C⁵ operates to move the rod K', which controls the other register, and thus the number of persons passing out are registered. In some instances, instead of applying the register direct to the shaft C, I place it some distance away from the gates—on a wall, for example—and operate it by a shaft I, Figs. 9 and 15, on which is fixed a crank I', Fig. 9, connected by a link H' with one of the cranks C³.

My improved device for permitting the conductor or other official to pass through the gates without being registered is shown in Figs. 4 and 11.

N N are electromagnets which are energized when a current flows in the circuit $n\ n'\ n^2\ n^3$. The said circuit includes a suitable battery B and terminates in two insulated comb-shaped bars N' N², between which extend the teeth of another insulated comb-shaped bar N³. (See Fig. 4.) The said bars N' N² N³ form a foot-plate. The armatures of the said electromagnets are formed by the rod K carrying the spring-pawls K³.

The gate-keeper or other official who should be able to pass through the gates without affecting the registering apparatus has metallic plates fixed on the soles of his boots, and when he steps with both feet on the plates N' N² in passing the gates the circuit $n\ n'\ n^2\ n^3$

is completed. The magnets N N then become energized and attract their respective armatures, whereupon the pawls K³ are withdrawn from their ratchet-wheels. Hence, although the gate is moved and the shaft C rotated, neither of the ratchet-wheels is operated and the marking-pointers L and M do not move.

It is necessary for the gate-keeper to place both feet on the foot-plate, as there are two gaps in the circuit—viz., the gap between the plates N' and N³ and that between the plates N² and N³—both of which must be simultaneously bridged over to complete the circuit. Hence it will not be possible for the attendant to pass any friend through without affecting the register, because when he has both feet in position to complete the circuit his body will entirely block the passage through the gates. At the same time the stepping-plates are so conveniently placed that the attendant cannot fail to withdraw the operating-pawls before opening the gate.

I will now describe the arrangements which I provide for marking at a distant place the number of persons passing through the gates.

Referring now to Fig. 12, O O' are ratchet-wheels having graduated disks and pointers and other toothed wheels underneath, arranged in the same manner as the ratchet-wheels L M' hereinabove described. P P' are rods mounted between rollers $p\ p$ and provided with spring-pawls O² O³ adapted to engage with the ratchet-wheels O O'. The rods P P' are pressed toward each other by pivoted L-shaped levers P² P³ furnished with adjustable weights P³ P³, as shown. O⁴ O⁴ are spring-pawls which prevent a return movement of the ratchet-wheels. The rods P P' are separated by a pendulum Q, which constitutes the armature for the electromagnets R R'. The coils of the said electromagnets are united at r and joined to earth.

r' , Fig. 11, is a wire joined to two springs S S' on opposite sides of the shaft C. The said springs are furnished with projections or pawls S² S³, which engage with the teeth of the ratchet-wheels of the counting device, so that when the wheel L, for example, turns the spring S is pushed away from the wheel and caused to make contact with a point S⁴, from which a wire is led to the second terminal r^2 , Fig. 12, of the electromagnet R of the distant counting device and closes the circuit of the said electromagnet, whereupon the said magnet is energized by the battery contained in its circuit. The spring S' operates in a similar manner to close the circuit of the other electromagnet R' of the distant counting device during the movement of the other ratchet-wheel of the counting device at the gate. Therefore when any person is admitted at the gate and the ratchet-wheel L is operated, the circuit of the electromagnet R is closed by the spring S. The pendulum Q is then attracted by the electromagnet R and is thus drawn aside and caused to slide the rod P between its rollers p . This movement of the

rod operates through the pawl O^2 and causes the wheel O to turn one division farther and thus register another admission. As soon as the movement of the wheel L is completed the spring S breaks the circuit of the electromagnet R . In a similar manner when the other wheel of the counting device moves during the exit of any person, the circuit of the electromagnet R' is closed and the pendulum Q is attracted with the ultimate effect of moving the wheel O' , which thereupon registers a departure.

The battery B^x is connected to the wire r' , Fig. 11, which wire is common to the circuits of both electromagnets R R' . The springs S S' are electrically connected together in any suitable manner.

I prefer to place an electric bell or other signaling device in the circuit that is closed by the attendant when he steps on the footplate N' N^2 N^3 between the gates, so as to afford an audible indication of the fact that the attendant is passing through. The same signal would be given were any unauthorized person to succeed in passing through without effecting the register, and by this means the attendant would be notified of the fact in time to rectify the mistake or stop the intruder.

In some instances a separate signaling-circuit is provided, which is closed by the movement of the spring-pawl K^3 , when the latter is drawn back by its electromagnet.

It will be readily observed from the foregoing description that the duplicate register at the central or distant office is operated only when the counting device at the gate operates.

The aforesaid duplicate registering device may be placed at any station, however distant from the gates, and will operate as a check on the instrument at the gates. It will also serve to show the manager or proprietor, for example, how many people are passing through the gates at any time.

I sometimes modify the counting device so that the wheel which registers the hundreds is moved only when the hundredth person passes through the gates. This modification is shown in Figs. 15 and 16. In this instance the driving-pawl K^3 does not engage with the lower wheel M' , but only with the upper or units wheel L . The latter wheel is furnished with a projection Q on its lower face, which projection passes once each rotation of the wheel under a latch Q' , pivoted at Q^2 and raises the said latch against the pressure of its spring Q^3 . As soon as the projection has passed from under the hooked end of the latch the latter is forced inward again by its spring. To the latch Q' is pivoted a pawl Q^4 , that engages with the teeth of the wheel M' , being maintained in engagement by a spring Q^5 . When the latch Q' is raised, as aforesaid, by the projection Q it carries the pawl Q^4 back over one tooth of the wheel M' , and then when the latch Q' is released and forced inward by its spring the pawl Q^4 operates to

turn the wheel M' through one tooth and thereby registers one hundred more on the dial.

The shaft I , Fig. 15, is connected with and controlled by the shaft C of the gate, said shaft C having affixed thereon a crank C^3 , to which is pivotally connected one end of a link H' , the other end of which is in like manner connected to a crank I' , rigidly mounted on the shaft I .

To cause the turnstiles to move in unison the shafts C are connected together by a link H . (See Fig. 10.) The link H is pivotally connected to the cranks C^3 , rigidly mounted on the shafts C , and midway between its ends is slotted, as at H^2 , and fitted over a pin J fixed in the base of the apparatus. The pin J acts as a fulcrum upon which the link works, and the slot H^2 permits of the longitudinal movement of the link.

By my invention I effect a saving of capital or working expenses by enabling the staff of officials or attendants employed in issuing and collecting tickets or checks and receiving the entrance fees or fares to be reduced, and that class of officials who have been hitherto appointed to examine, check, and countersign tickets, and who are generally called "inspectors," to be altogether dispensed with; and a further saving will result from the fact that this device enables the proprietor or management to avoid the necessity of providing at a considerable cost special checks or slips for the prevention of fraud.

My invention is also particularly adapted to operate in connection with electrical railways, wherein the current is sent through conducting wires and coils, as the means for operating the counting device, in addition to registering the number of travelers in the vehicle itself, can, as hereinabove described, simultaneously make the same duplicate enumeration at some permanent office or station electrically connected with the vehicle or car. The number of persons who have entered the car up to any given moment, and of those who have alighted and consequently of those who are still traveling at the time under consideration, may be therefore readily ascertained at the station, office, or place where the duplicate device is stationed. The device may also be used at exhibitions, theaters, and other similar establishments, so that a permanent record is kept at the station or counting-house as well as at the gates of all the persons who have entered and left, and of those who still remain in the building or establishment in question.

I claim—

1. The combination of a gate B carried by a shaft C , auxiliary gates D , D' mounted on the said shaft, rings F , F' to which the auxiliary gates are attached and a spring G connecting said rings together and operating to turn them in opposite directions, substantially as described.

2. The combination of a gate B carried by

collars E mounted on a shaft C, auxiliary gates D, D' secured to rings F, F' that are mounted on the shaft C within the collars E, stops F² F³ on the rings F, F', and a spring G operating to turn said rings in opposite directions, substantially as described.

3. The combination of the shaft C, the slotted collars E, the gate B, the rings F, F', the auxiliary gates D, D', the stops F², F³, the notches D², D³ in the auxiliary gates, and the spring G, substantially as described.

4. The combination of a gate, an electrically controlled registering device operated thereby, and a stepping plate consisting of two insulated comb-shaped terminals forming a break in the electric circuit and so arranged that the teeth of one terminal project into the spaces between the teeth of the other terminal, substantially as described.

5. The combination of a gate, a registering device, an electro-magnet, and a reciprocating pawl carried by the armature of said magnet, all constructed and arranged in such manner that when the electric circuit is closed the electro-magnet is energized and disengages

the pawl from the registering device, whereby the latter is thrown out of operation, substantially as described and for the purpose specified.

6. The combination of a gate, a pawl, a primary registering device controlled by said pawl which is actuated each time the gate is opened, a distant registering device comprising a pendulum Q, a sliding bar P, and a spring pawl o² engaging with and actuating the registering wheels, and means for swinging the said pendulum each time the first registering device is actuated, substantially as described.

7. The combination with the gate shafts C, C, of the cranks C³, C³, the connecting rod H slotted at H² and the fixed pin J passing through said slot, substantially as described.

In testimony whereof I have hereunto set my hand this 16th day of July, 1894.

ADRIAN GAJARDO.

Witnesses:

ARTHUR ALFD. BERGIN,
PAUL DEVIN.