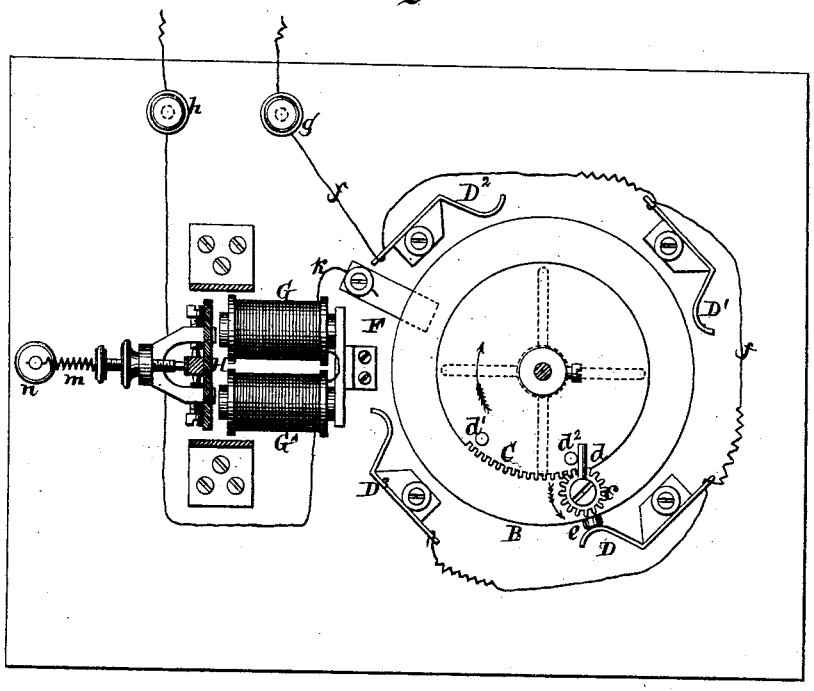
2 Sheets—Sheet 1.

B. F. CARD.

ELECTRO-MAGNETIC REGISTERING APPARATUS FOR TURNSTILES.

No. 192,361. Patented June 26, 1877.

Fig. 1.



Witnesses.
Charles B. Doe
Louis W. Frost

Inventor.
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2 Sheets—Sheet 2.

B. F. CARD.

ELECTRO-MAGNETIC REGISTERING APPARATUS FOR TURNSTILES.

No. 192,361. Patented June 26, 1877.

Fig. 2.

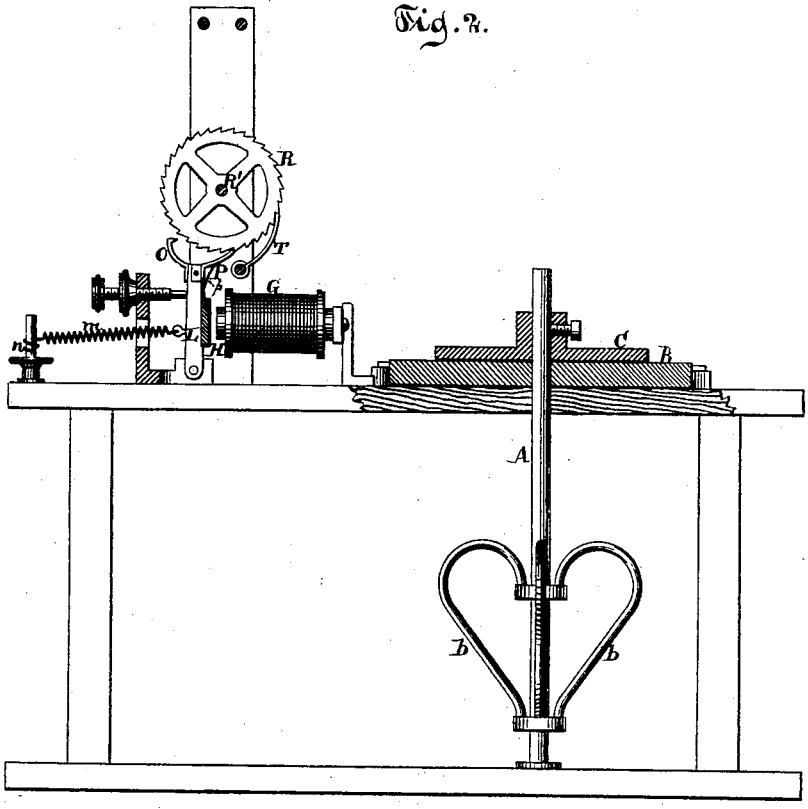
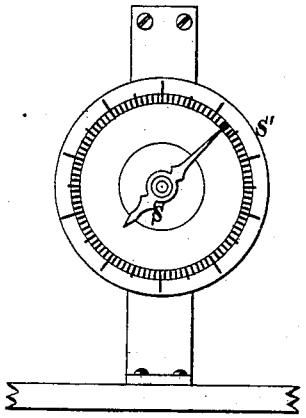


Fig. 3.



Witnesses.
Charles S. Lose
Louis W. Frost

Inventor.
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UNITED STATES PATENT OFFICE.

BENJAMIN F. CARD, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN ELECTRO-MAGNETIC REGISTERING APPARATUS FOR TURNSTILES.

Specification forming part of Letters Patent No. **192,361**, dated June 26, 1877; application filed March 30, 1877.

To all whom it may concern:

Be it known that I, BENJAMIN F. CARD, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Electro-Magnetic Registering Apparatus and Turnstile; and that the following, taken in connection with the accompanying drawing, is a description of the same.

My improvement relates to the application of an electro-magnetic battery, in connection with suitable mechanical devices, and a suitable registering mechanism, for the purpose of registering the number of persons entering or leaving a bridge, ferry, hall, room, or other inclosure.

In the drawing, Figure 1 represents a plan or top view of my improvement, partly in section. Fig. 2 is a longitudinal vertical section. Fig. 3 is a side view of the dial-plate and its frame.

My invention is described as follows: At the entrance of the ferry, bridge, or inclosure is placed a turnstile consisting of a revolving vertical shaft, A, provided with four arms, *b*, so situated with regard to each other that a person entering from either side of the entrance shall push against one of said arms *b* and cause the shaft A to perform one-quarter of a revolution. The upper part of the shaft A passes through a suitable frame-work made so as to support a circular disk, B, of wood or metal, which turns loosely on shaft A. Directly above the disk B, and in contact with it, is a smaller circular disk, C, which is fixed to and turns with shaft A. This disk C has a portion of its periphery cut into cogged teeth, which engage with corresponding teeth of a pinion-wheel, *c*, which is vertically secured to the lower and larger disk B. The object of the cogged teeth on disk C and the pinion-wheel *c* is to prevent the registering mechanism, which will be hereinafter described, from registering until the shaft A has performed nearly one-quarter of a revolution, thus preventing the registering mechanism from acting on any slight movement of the shaft A, and doing away with any tendency to accidental registration.

The pinion-wheel *c* is provided also with a pin, *d*, fixed horizontally to it, which pin *d* strikes against either of the two pins, d^1 or d^2, secured vertically to the disk C.

The object of these pins *d* d^1 d^2 is to save the cogs on the disk C and on pinion *c* from excessive strain or wear.

On the periphery of the large disk B, fixed horizontally, is a pin, *e*, which, as the disk B is made to revolve with shaft A, at every quarter of a revolution of shaft A, strikes against a button or circuit-closer, D, D^1, D^2, and D^3, which are placed at proper distances apart and around the disk B. These circuit-closers are connected by a wire, *f*, with each other and with one of the poles, *g*, of a galvanic battery.

The disk B is connected with the other pole, *h*, of the battery, by means of the button or circuit-closer *f*, to which is connected the wire *k*, which passes through the electro-magnets G and G′ and thence to the pole *h*.

Working in connection with the electro-magnets G and G′ is the armature H, to which is secured a vertical lever, L. Attached to this lever L is one end of spring *m*, which has its other end secured to a standard, *n*. (See Fig. 2.) At the upper end of the vertical lever L are two pawls, O and P, one of which pawls, O, is secured to one side of the vertical lever L by screws or other suitable means, and the other pawl, P, is pivoted to said vertical lever L through a slot cut in its top, and is supported by a spring, *p*, placed under it.

These pawls engage with the teeth of the ratchet-wheel R. The object of these pawls O and P is to communicate a rotary motion to the ratchet-wheel R, and at the same time to prevent the ratchet-wheel R from moving more than the space of one of its teeth at one motion. The ratchet-wheel R is attached to a shaft, R′, to which is fixed a registering index-hand, S, which moves around the face of a dial-plate, S′, which dial-plate is furnished with a suitable index for registering the number of persons entering or leaving the ferry, bridge, or other inclosure. In connection with the ratchet-wheel R is a pawl, T, the purpose of which is to prevent the ratchet-wheel R from turning back after having moved the space of one of its teeth.

The shaft R′ may be provided with a pinion, to which may be attached suitable mechanism for registering up to any number desired.

The operation of my invention is as follows: When a person enters the entrance-way where the turnstile is placed and attempts to pass the turnstile he imparts motion to the shaft A, and as he passes through causes it to perform one-fourth of a revolution. The movement of the shaft A turns with it the circular disk C, fixed to the shaft A. The motion of the disk C is communicated by means of the cogged teeth cut in, and one of the pins d^1 or d^2 fixed to said disk C, to the pin *d* on pinion-wheel *c*, secured to the disk B. The circular disk B is thus caused to revolve. This movement of the disk B causes the pin *e*, projecting horizontally from the circular disk B, to strike against one of the buttons or circuit-closers D, D^1, D^2, or D^3, arranged at proper intervals around the disk B.

A current of electricity then immediately passes from the pole *g* of the galvanic battery through the wire *f*, and through the disk B and button F, and thence through the wire K to the electro-magnets G and G′. The passage of the current of electricity immediately causes these magnets G and G′ to attract the armature H. The attraction of the armature H to the electro-magnets G and G′ causes the lever L to move and the pawl P, connected with it, to engage with one of the teeth of the ratchet-wheel R, and to move the said ratchet-wheel R the space of one of its teeth, and imparts a rotary motion to said ratchet-wheel R.

The movement of the lever L also causes the pawl O to engage with the teeth of the ratchet-wheel R, and prevents it from moving more than the space of one of its teeth at one motion of the armature H and lever L. At the same time the movement of the pawl T prevents the ratchet-wheel R from turning back after having moved the space of one of its teeth.

The rotary motion of the ratchet-wheel R on its shaft or arbor R′ causes the index-hand S to move over the face of the dial-plate S′ and register.

By the above means a perfect and accurate automatic register is formed.

Having thus described my invention, what I claim is—

1. The shaft A and circular disk C, having a portion of its periphery cut with cog-teeth and provided with pins d^1 and d^2, in combination with the circular disk B, provided with the pin *d* and pinion-wheel *c*, substantially as described.

2. A turnstile consisting of the shaft A and disks B and C, in combination with the magnets G and G′, and connected therewith by means of a current of electricity passing through suitable circuit-closers, and actuating the armature H, pawls O, P, and T, lever L, ratchet-wheel R, and any suitable registering mechanism.

3. A turnstile consisting of shaft A and disks B and C, in combination with the magnets G and G′, and connected therewith by means of a current of electricity passing through suitable circuit-closers, and actuating the armature H, pawls O, P, and T, lever L, ratchet-wheel R, index-hand S, and dial-plate S′, substantially as described.

4. A turnstile consisting of the shaft A and disks B and C, in combination with the electro-magnets G and G′, and connected therewith by means of a current of electricity passing through circuit-closers D, D^1, D^2, and D^3, and pin *e* on disk B, and button F, and actuating the armature H, lever L, pawls O, P, and T, ratchet-wheel R, and any suitable registering mechanism.

5. A turnstile consisting of shaft A and disks B and C, in combination with the electro-magnets G and G′, and connected therewith by means of a current of electricity passing through circuit-closers D, D^1, D^2, and D^3, and pin *e* on disk B, and button F, and actuating the armature H, lever L, pawls O, P, and T, ratchet-wheel R, and any suitable registering mechanism.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of March, 1877.

BENJAMIN F. CARD.

In presence of—
CHARLES G. COE,
LOUIS W. FROST.