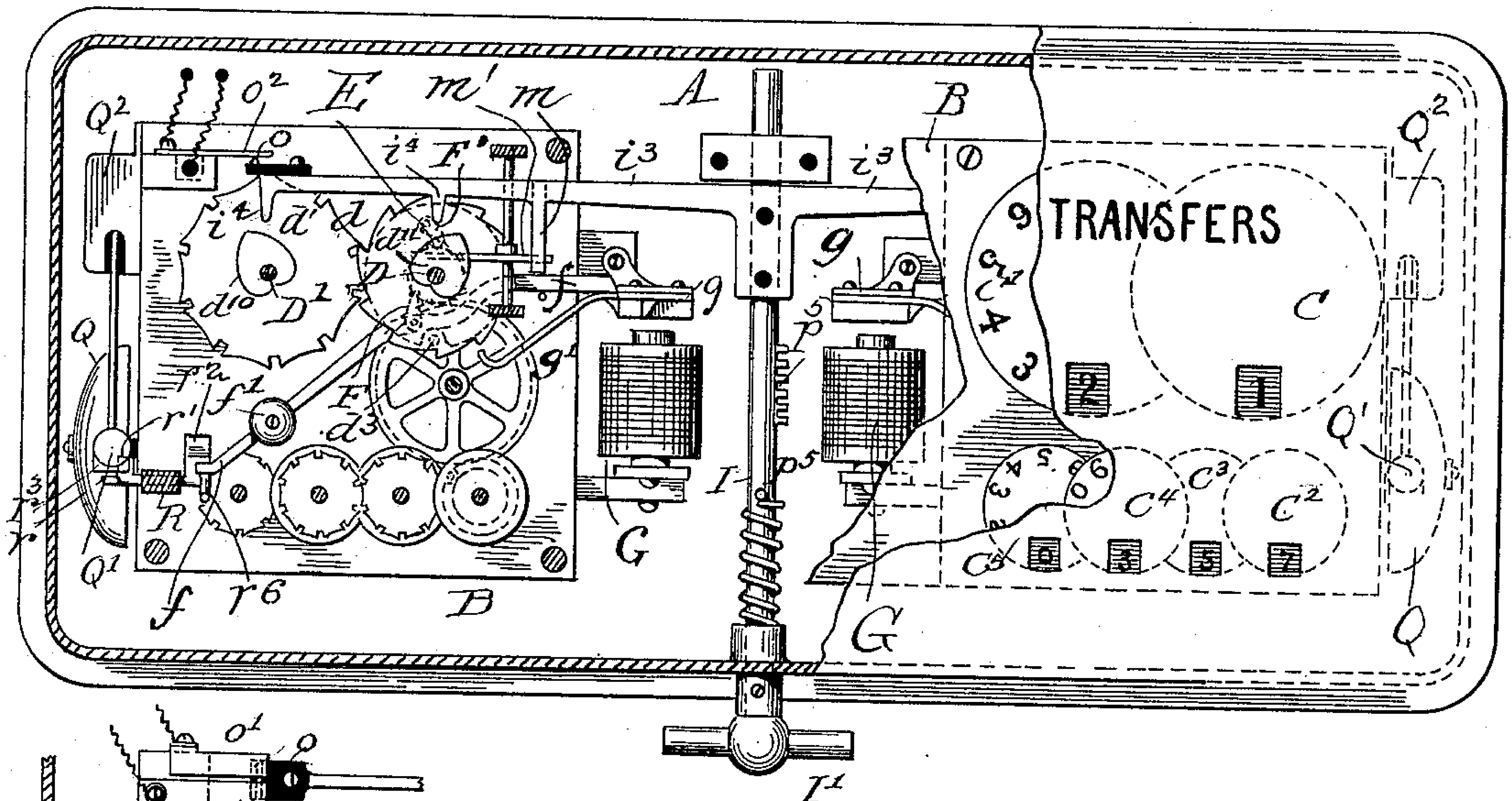
(No Model.)

S. C. HOUGHTON.
FARE REGISTER.

No. 545,291. Patented Aug. 27, 1895.

Fig. 1.



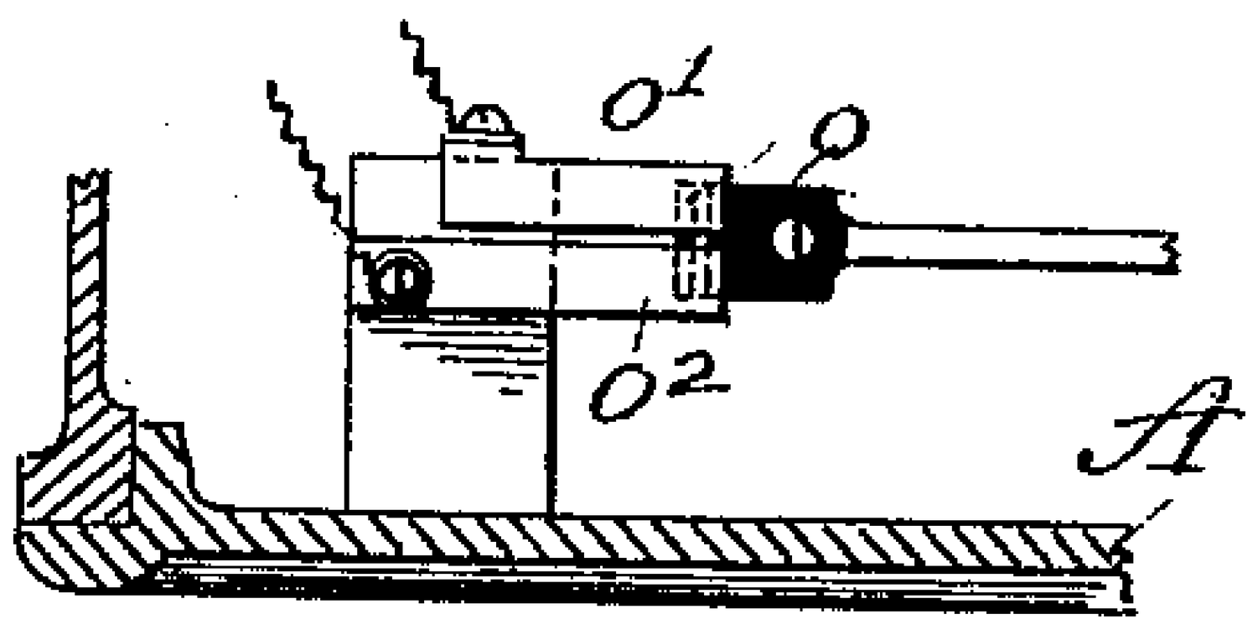


Fig. 6.

Fig. 2.

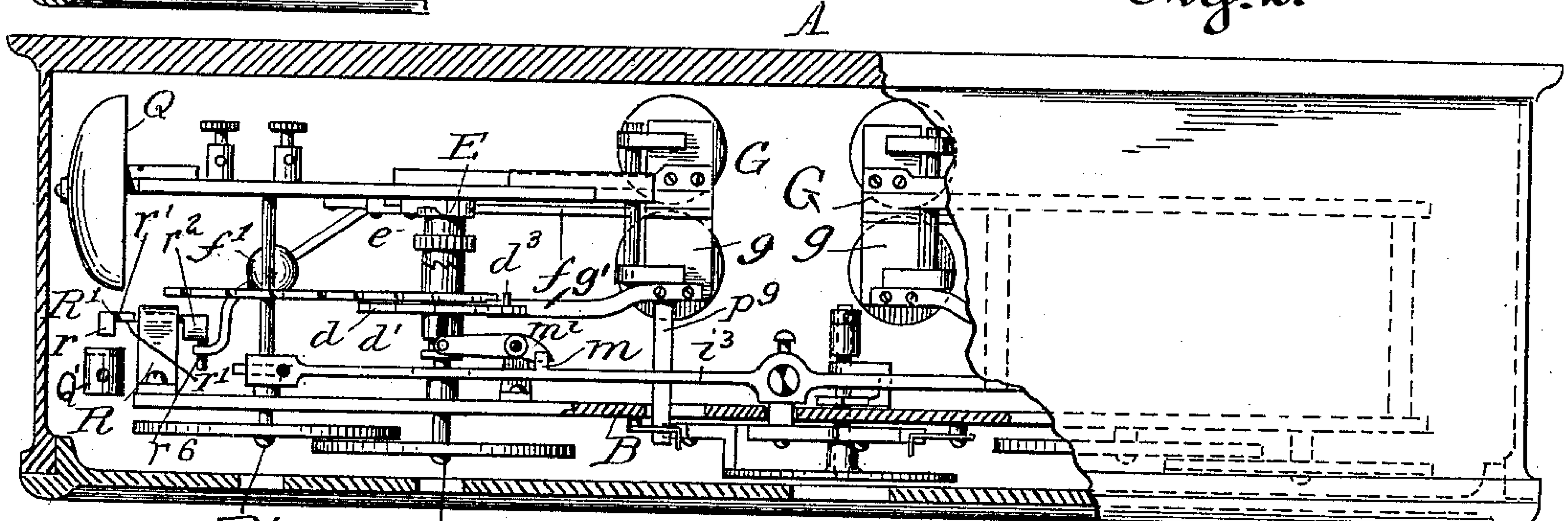


Fig. 3.

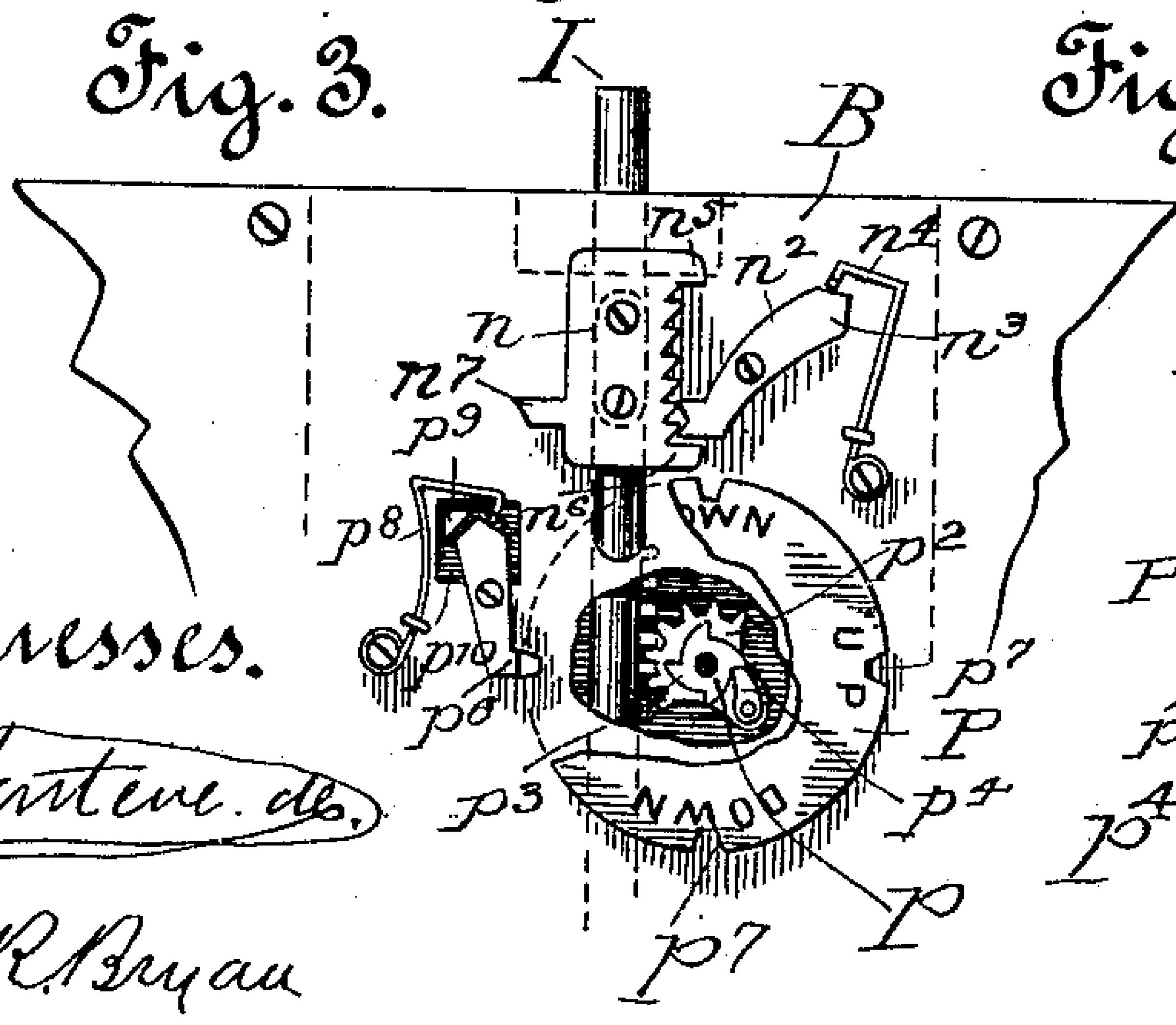


Fig. 4.

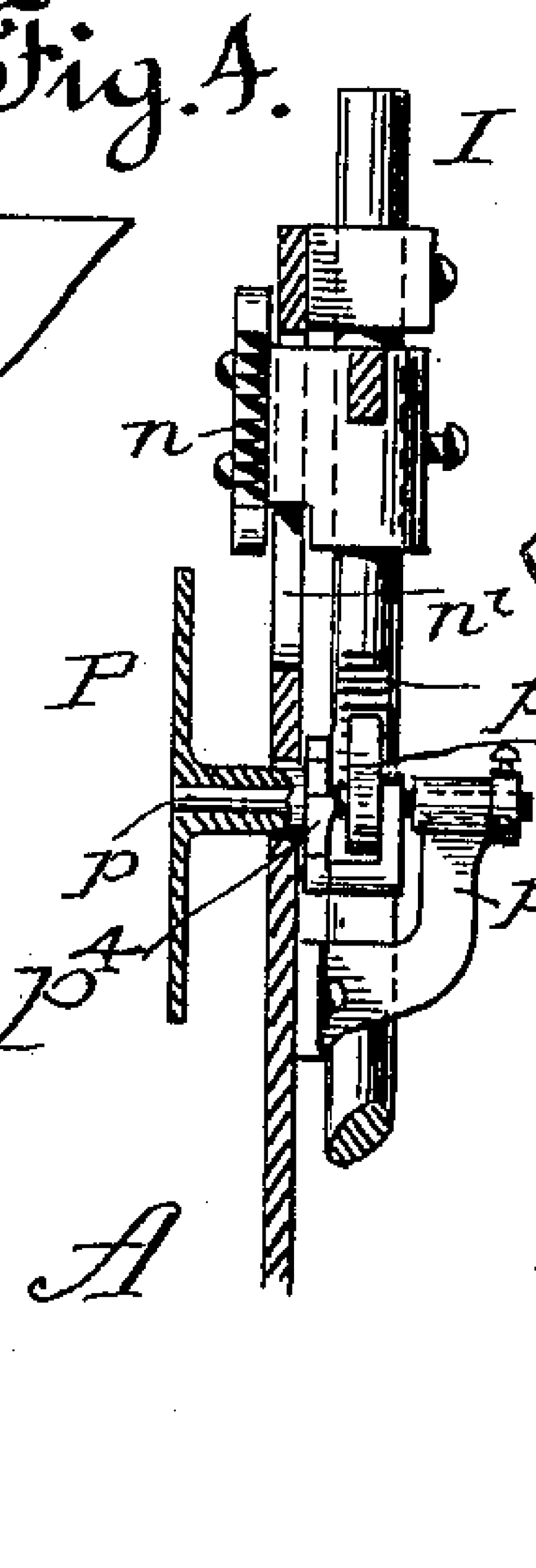
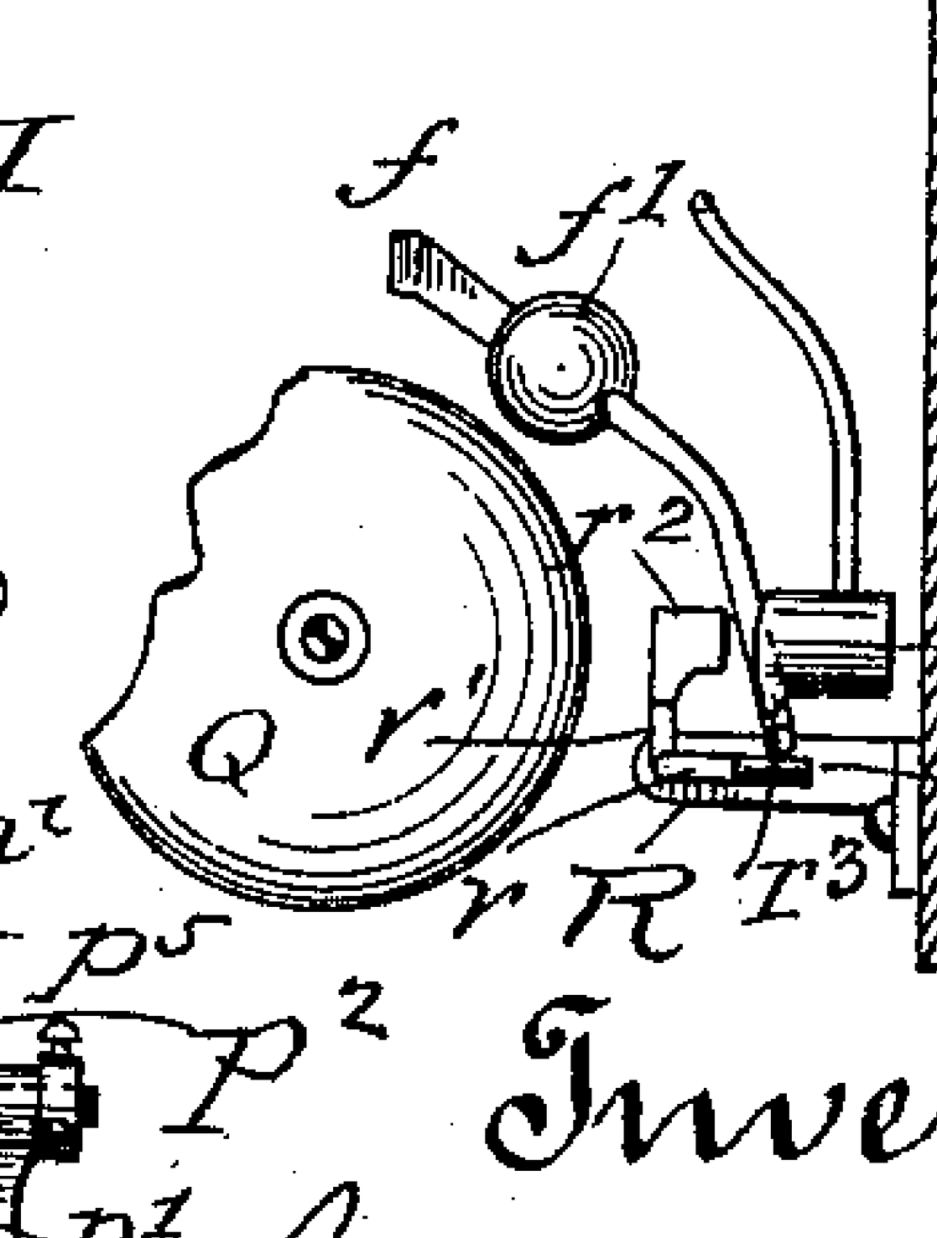


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

STEPHEN C. HOUGHTON, OF SAN FRANCISCO, CALIFORNIA.

FARE-REGISTER.

SPECIFICATION forming part of Letters Patent No. 545,291, dated August 27, 1895.

Application filed September 10, 1894. Serial No. 522,577. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN C. HOUGHTON, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Fare-Registers; and I do hereby declare that the following is a full, clear, and exact description thereof.

This invention relates to apparatus for registering fares for any purpose—such, for instance, as fares taken in street-railway or other cars. In a certain patent obtained by me, granted May 2, 1893, and numbered 496,688, I have described and shown a fare-register and electrical means for operating it as each fare is received. In the present case I have made improvements upon the construction shown and described in that patent, which I shall set forth hereinafter. It is a well-known fact at the present day that in all cities arrangements are made for the transfer of passengers from a car of one line to that of another on payment of a single fare on the first car, the receipt of a transfer-check by the passenger, and the delivery of that check to the conductor of the other car. As a check upon the conductors of these cars such devices as bell-punches and dial-registers have been introduced and are in constant use. These devices register the fares collected correctly when in fare-tickets or coin; but so far as I am aware no device has yet been invented which will register in order the transfer-checks as they are delivered. Thus a dishonest conductor upon receiving a fare is enabled to register a transfer-check without attracting attention from the passengers.

The object of my present invention is to insure the proper registry of fares, and transfers as well, by registers in view of the passengers in the car, the separate registrations being announced by bells of different tones, so that as each fare (whether ticket, coin, or transfer) is received it will be registered upon a dial in full view of the occupants of the car.

Figure 1 is a front view with the front of the box partly broken away to show the mechanism complete upon one side. Fig. 2 is a top view, partly broken away, with upper contact-points and bell-box removed. Fig. 3 is a front elevation of inner front plate to show the trip-indicating plate, the pull-rod which operates it, and the check mechanism for both. Fig. 4 is an end view of the devices shown in Fig. 3, partly in section and partly in elevation. Fig. 5 is a detail view of the bells, showing the locking mechanism for the bell-striker. Fig. 6 is a top plan of the upper contacts and the pull-bar arm forming a circuit-controller.

A represents a box located in any convenient position within the car. It must be understood that this box contains duplicate registering mechanisms electrically operated, one for registering fares and the other for registering transfers. Consequently when I describe the apparatus upon the left side of Fig. 1, it must be understood as a description of that only partially shown upon the right side.

As in my patent referred to, there are two series of dials upon each side, the upper ones, which are trip-registers, being lettered C and C′, and the four lower or total registers being lettered C^2, C^3, C^4, and C^5. These dials are located between the face-plate of the box and the front plate of the frame B, which supports all the mechanism; and sight openings are formed in the face-plate to allow the dials to be read. (See right-hand side of Fig. 1.) The arrangement of the dials and the manner of operating them is fully described in my patent referred to. It is in this case sufficient to say that the two upper dials C and C′ are mounted, respectively, upon shafts or spindles D D′, journaled in the frame B. The units-dial C is driven by a pawl F, which engages with a ratchet-wheel E on the inner end of spindle D. The pawl is carried by a lever *f*, secured to and operated by the armature *g* of the electromagnet G. A retaining-pawl F′ holds the ratchet-wheel after each impulse or forward movement. The lever *f* is weighted, as shown at *f*′, so as to return it to position after the armature has been attracted, and thereby retract the pawl in readiness for another forward motion. The magnet is in open electric circuit with a battery, and circuit-closers are provided in the car, by which the circuit can be closed and the dials moved by the armature and its connections as each fare or transfer is collected. As in my patent referred to, the dial C is prevented from

turning too far by a stop ratchet-wheel d on the spindle D, with which a stop-pawl g secured to the armature engages. The dial C′ is, as in my patent referred to, operated through a notched disk d upon the spindle D′, which is controlled by a pin d^8 upon the stop ratchet-wheel D. The dial C′ is thus moved one step or one of its units at each complete rotation of the dial C.

Although I have shown the lower series of dials forming the total register I have not considered it necessary to illustrate the details of the gearing by which they are driven by the rotation of the trip-registers. Such gearing is fully described and shown in my patent referred to, and forms no part of the present invention. It is sufficient to say that the lower series of registers forms a register for totals, which operates until the whole possible total of fares or of transfers has been registered upon the series of dials which compose the said register.

At the end of a trip my trip-dials are reset by the pull-down bar I, substantially as shown in my former patent. In this case the cross-arm, controlled by the pull-down rod, resets the trip-dials in both registers at zero. Besides turning the trip-dials back to zero this rod I further operates an indicating-disk, which shows the direction of the trip, and with its cross-arm it also forms a part of the main circuit, so that the latter is broken as soon as the down-pull commences. It is also provided with a special mechanism for holding it against its retracting-spring as it is pulled down, so that it is necessary to pull it down the whole distance and thus reset the trip-dials at their zero points before the spring can operate to throw it up. The rod I extends through the bottom of the case, outside of which it is provided with any suitable kind of handle I′. The cross-arm i^3 extends longitudinally in the box and has projections i^4, which bear upon the heart-shaped cams d^{10} and d^{11} in each register and turn said cams from whatever position they may be in to a vertical one, at which time the projections rest in the depressions of the hearts.

The sliding-clutch mechanism required to free the spindles and dials and thus permit them to be reset is best shown in Fig. 2.

As in my former patent, the actuating-ratchet E is loose on the spindle D and has a toothed sleeve e, forming one member of a clutch engaging with a similar sleeve upon the stop-ratchet wheel d, the latter sleeve forming the other member of the clutch and being capable of a sliding motion upon the spindle to engage and disengage the clutch members. The movement of the stop-ratchet is in this case controlled by a projection m upon the cross-arm i^3, which has a wedge-shaped or inclined lower end. This incline, when the rod I is pulled down, bears upon a horizontally-pivoted lever m', connected to the sleeve of the stop-ratchet and thereby produces the sliding motion of the sleeve and consequent disengagement of the clutch. This special construction is an obvious improvement upon that shown in my former patent, because it is much simpler and obviates the necessity of making a cam-slot in the bar I.

In order to insure the complete resetting of the trip-dials, I make it necessary to pull the rod I completely down before its spring can restore it to position. The mechanism by which this is done is shown in Figs. 3 and 4. To the rod I is secured a ratchet-plate n, which moves up and down with the rod through a slot n' in the front frame A′, Fig. 4. The ratchet-teeth on the plate n are engaged by a pivoted pawl n^2, having a wedge-shaped end n^3, against which presses a spring n^4. Two projections n^5 n^6 are formed on the plate at the ends of the ratchet. Now, as the rod is pulled down the pawl and ratchet will hold it securely at any point until it has been pulled down to its utmost extent, when its upper projection n^5 strikes the pawl and throws it over enough to cause the end of the spring n^4 to bear against the other inclined face, thus throwing the pawl out of engagement, where it is held until the rod has been pushed or sprung up to its fullest extent. When this has taken place the projection n^6 in turn strikes the pawl and shifts it into engagement again.

The ends of the cross-arm i^3 are normally in the main electrical circuit and form circuit-breakers. That is, as soon as the pull-down rod is moved downward the circuit is instantly broken and neither register can be operated until the trip-dials are correctly reset and the bar I returned to position. Upon each end of the arm i^3 is an insulated contact o, Figs. 1 and 6, which normally makes contact between the plates o' o^2, to which the circuit-wires are connected. The operation of this device as a circuit closer and breaker, controlled by the movement of the pull-down rod, will be clearly understood from the drawings; and it is evident that in connection with the holding pawl and ratchet for the rod I it is made impossible for such rod to be manipulated in any way excepting by a complete down-pull and return and also impossible to operate the register after the down-pull has begun until such down-pull and return have taken place and contact has again been made between the plates o' o^2.

I have shown in Figs. 3 and 4 a device by which the pull-down rod is caused to operate the single direction-indicating disk P, bearing the words "Up" and "Down." This disk P is frictionally mounted upon a pin p, journaled in a bracket p' of the inner front plate. On the pin is a quadrant rack p^3 and a holding-pawl p^4 and ratchet p^3. The pull-down rod is provided with a rack p^5, adapted to engage with the rack p^2. A pawl or dog p^6, pivoted upon the frame, has a tooth which is adapted to enter recesses p^7 in the edge of the disk and thus lock it into position. The dog has a wedge-shaped upper end, and a

spring p^8 is provided, which is adapted to hold the dog whether it is in engagement with the disk or released. Connected to the armature of the magnet is an arm p^9, which projects through a hole p^{10} in the front plate of the frame. This arm is triangular in cross-section and is so placed as to bear upon one of the inclines of the dog p^6 and thus disengage it. During the trip of the car the dog remains out of engagement and the arm p^9 simply moves as the armature moves at each closing of the main circuit to register a fare. During this time the disk is held in position by frictional contact with the pin upon which it is mounted. At the end of a trip, when the pull-down rod is operated, the quadrant rack is turned (in this case ninety degrees) and thus changes the indicator to show the direction of the new trip.

It is a matter of choice how many "up" and "down" indications shall be carried by the disk; but in the present case I have provided for four of such signs. Thus the descent of the pull-down rod I not only brings the direction-indicator to its new position, but also locks it in such position until the first fare has been registered on the new trip. For thus locking the indicator I provide the projection n^7, which, when the rod is pulled down, strikes the other incline of the disengaged dog p^6 and throws it into engagement again. The direction-indicator therefore remains locked while the rod I is returning to its original position and also until the first fare on the new trip shall have been registered. After that it remains in place by frictional contact with its pin until the end of the trip.

Q represents the bell, one being provided at each end of the box. The bell-striker Q′ is operated by local bell-circuits through local magnets in the boxes Q^2, in connection with the main circuit. The bells (whether for fares or for transfers) strike once as each fare or transfer is registered. A locking device for the bell-striker is illustrated in Figs. 2 and 5. The purpose of this is to lock the bell-striker immediately after it has been sounded and obviate the possibility of any repetition of the bell-stroke until the lever f has been released from the magnet and returned by the weight to position ready for the next registry.

R is a support, shown here as a bracket upon the front plate of the frame, and R′ is the lock, which may be made of sheet metal or wire, as may be preferred. This lock, formed in a single piece, has projections r r' at right angles to each other and a weight r^2, and the lock is pivoted in the bracket R. The lever f, when in its normal position, rests upon the arm r^6 at the weighted end of the lock and holds it, with its projection r', in line with a lip r^3 on the bell-hammer. When a fare is registered and the lever f operated, the latter is raised from the lock. The bell-hammer at the same time moves forward to strike the gong and the lip r^3 tilts the lock by striking against the projection r', the action bringing the projection r into a vertical position just behind the bell-striker. The latter on its recoil slips over the extreme end of the projection r, since the weight can yield a little in one direction to permit it to do so. The part r now stands vertically and in line with the striker, which cannot repeat the stroke (since the lock will not yield toward the bell) until the release of the lever f moves the weighted end r^2, bringing the projection r' into vertical position once more with the lock open.

Having described my invention, what I claim as new is—

1. In a fare register, a box, two sets of trip registers, and two sets of total registers in said box, and a re-setting device acting simultaneously upon the said two trip registers, substantially as described.

2. In combination with a box, registering dials as C, and C′, forming a trip register, detachable clutch mechanism upon the spindle of one of such dials, a re-setter consisting of a pull-down rod, having a cross-arm, a projection upon said cross-arm for positively operating said clutch mechanism, and cams upon the spindles of said dials, all substantially as set forth.

3. In a fare register, operated by an electric circuit and having two sets of trip registers, a pull-down rod having an electrical contact with and forming a part of the main circuit at both ends of the box, and connections between said pull-down rod, and the trip registers, substantially as and for the purposes set forth.

4. In combination with a box, and with duplicated registering mechanisms, a pull-down or re-setting rod having a cross arm, connections between each end of the said arm and the registering mechanism for re-setting the latter by the movement of the pull-down rod and a contact point at each end of the rod, whereby such rod is placed in the main circuit and breaks such circuit at the beginning of its downward movement, substantially as set forth.

5. In a fare register and in combination, a pull-down rod having a rack, a direction-indicating disk frictionally mounted upon a pin, a quadrant gear upon said pin adapted to engage with said rack, and a lock for holding the disk stationary during the ascent of the pull-down rod, substantially as described.

6. In a fare register, a box having trip registers or dials, a pull-down rod for resetting such dials, a direction-indicating disk having a notched edge and frictionally mounted upon a shaft, a rack upon the pull-down rod, a toothed quadrant upon said shaft adapted to engage with said rack, a locking pawl for said disk, an arm connected to the operating lever of the machine for unlocking said pawl and disk, and a projection carried by the pull-down rod for re-locking said pawl to the disk, substantially as set forth.

7. In combination in a fare register a gong and striker, the magnet and armature, an armature lever and a lock to prevent a second stroke of the striker, said lock being controlled by the armature lever, substantially as described.

8. In combination in a fare register, the gong, the striker, the armature and armature lever, and the lock arranged when set to yield in one direction, the said lock being controlled by the armature lever, substantially as described.

9. In combination in a fare register, the gong, the striker, the armature lever, the pivoted stop arranged to be released by the armature lever and to be set in locking position by contact with the moving striker, the said armature lever returning the lock to normal position, substantially as described.

10. In a fare register and in combination, a magnet and armature, a lever f connected to said armature, a gong, a bell striker, and a pivoted lock having projections r, r' and a weight r^2, said lock being controlled by the armature lever substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 24th day of August, 1894.

STEPHEN C. HOUGHTON.

Witnesses:
JOHN COFFEE,
F. H. SEELY.