(No Model.)

4 Sheets—Sheet 1.

E. CHESTERMAN.

Fare Register.

No. 243,106.

Patented June 21, 1881.

Fig. 1

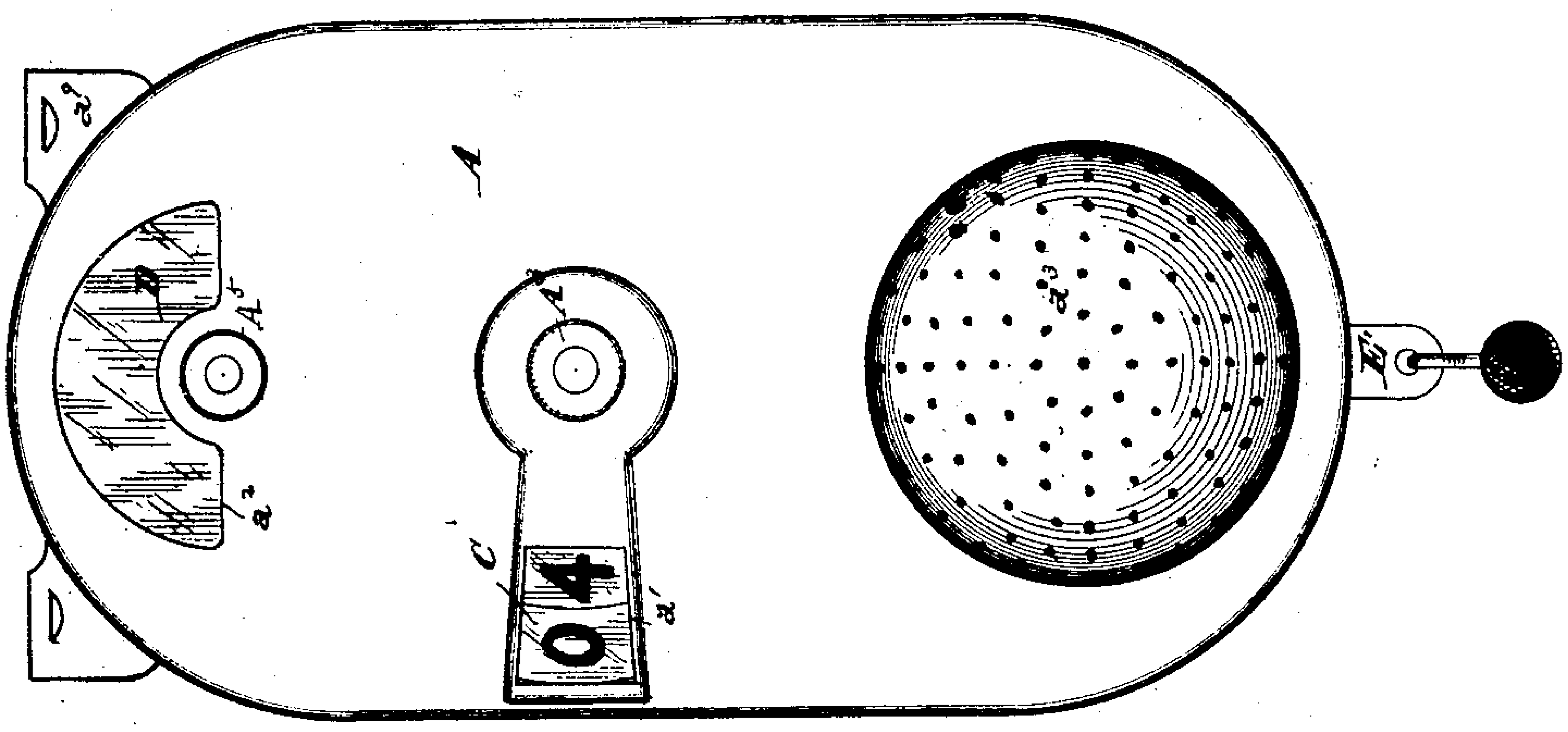


Fig. 2

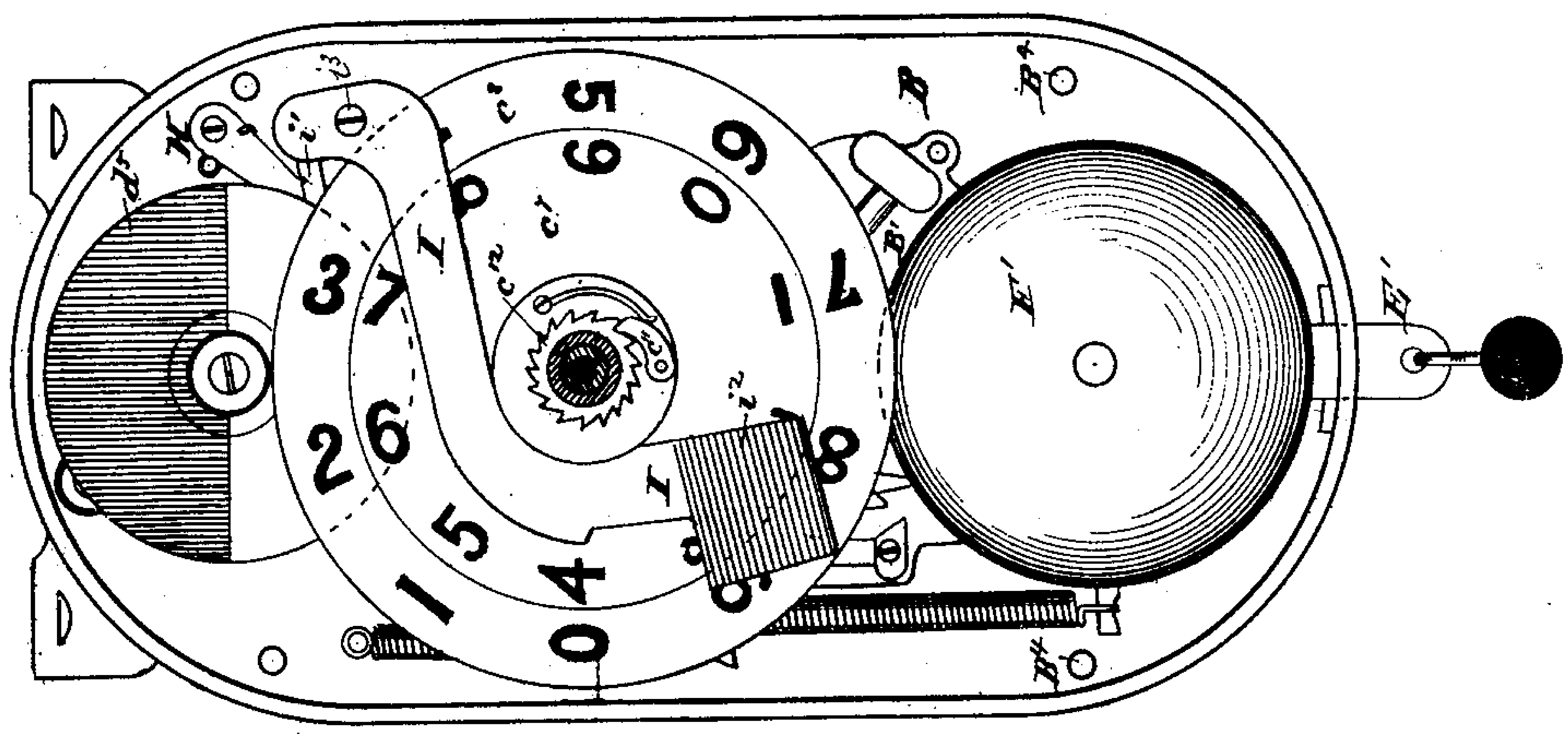
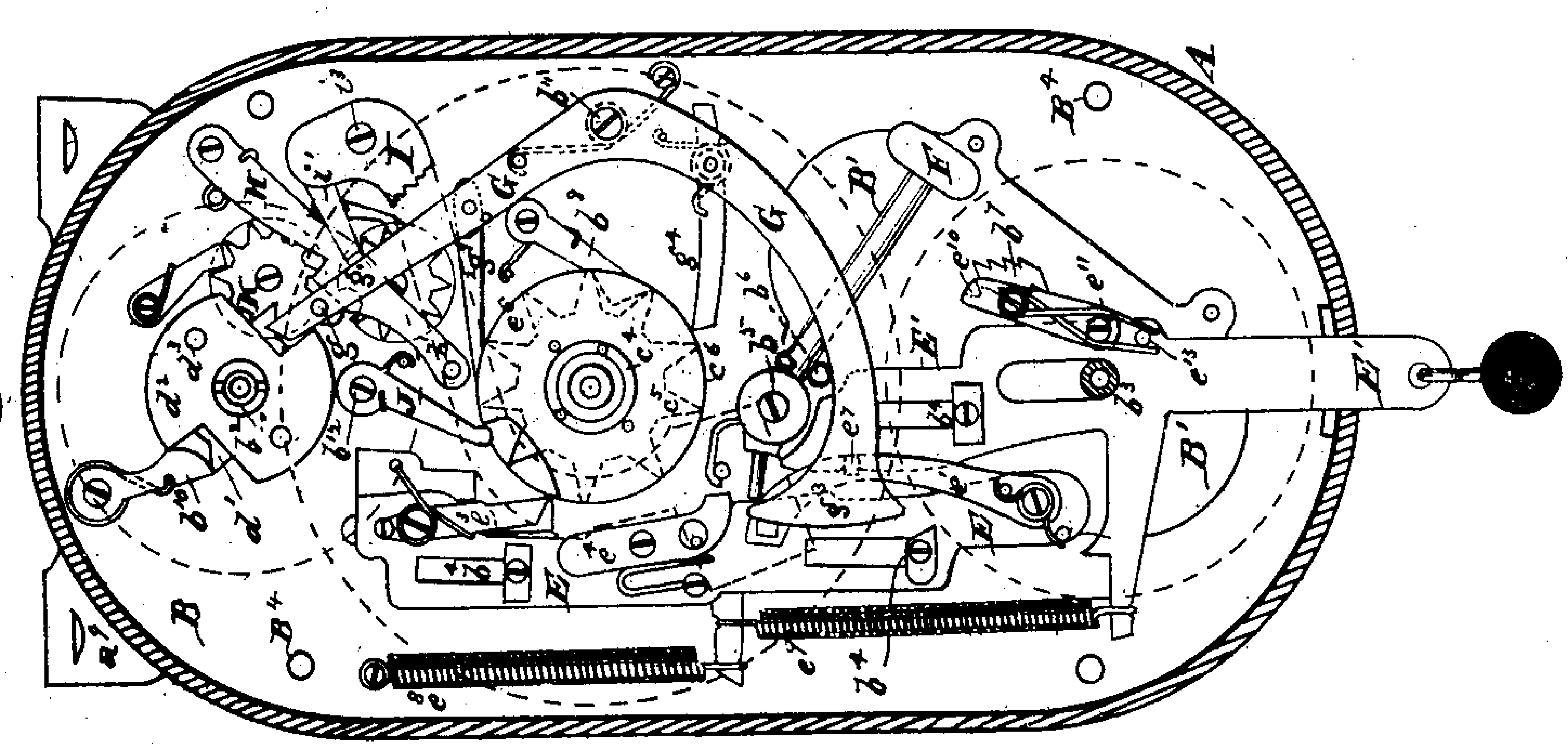


Fig. 3



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Edwin Chesterman

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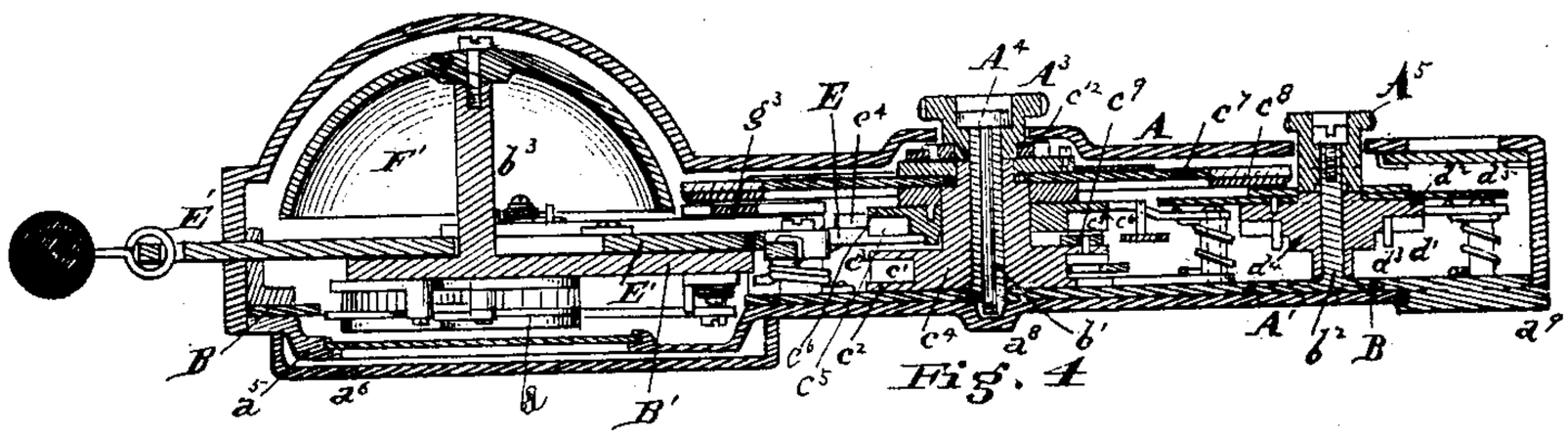

Fig. 4

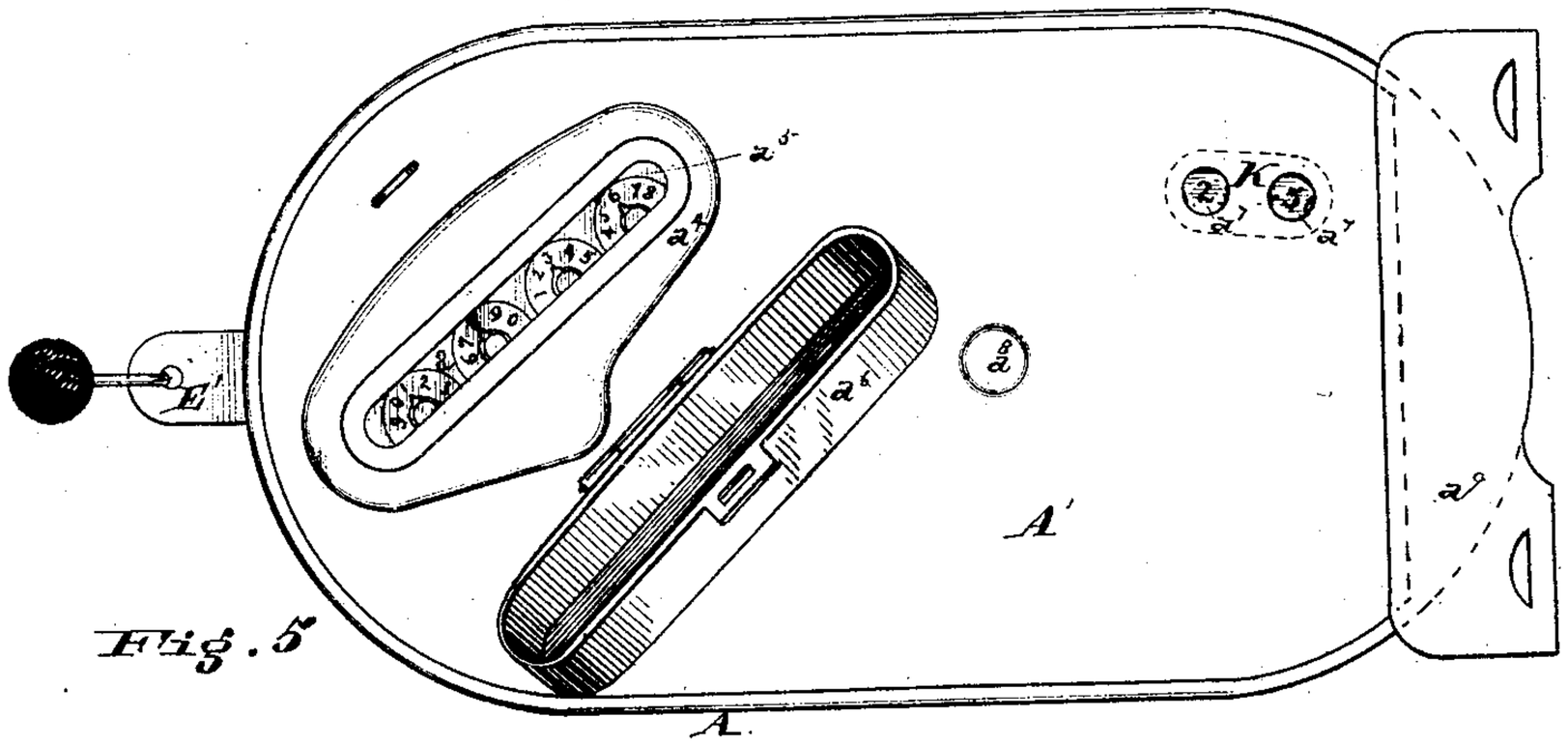

Fig. 5

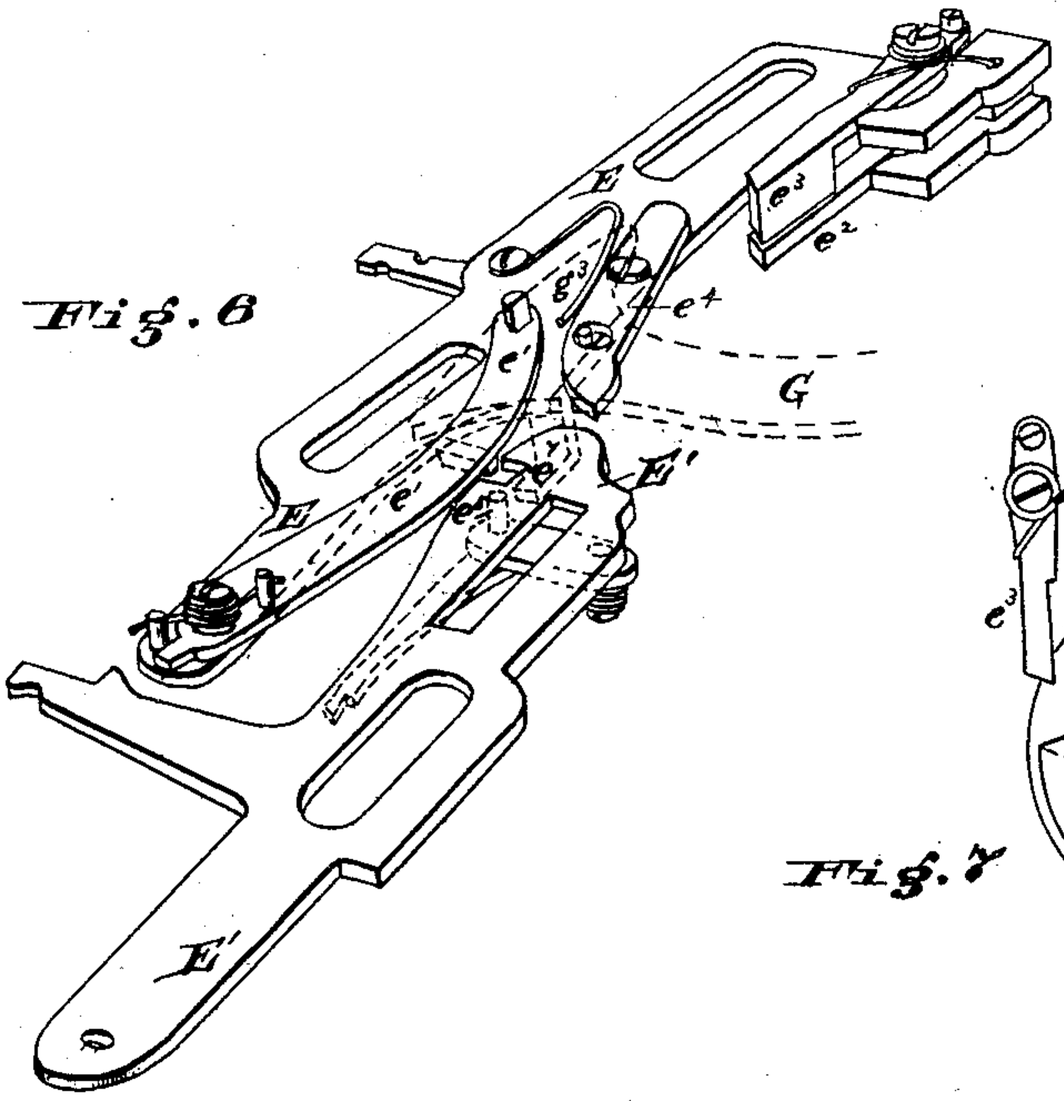

Fig. 6

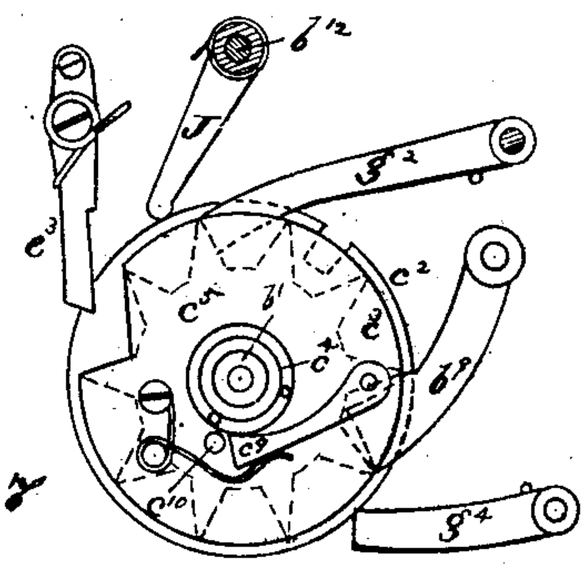

Fig. 7

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Edwin Chesterman

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No. 243,106. Patented June 21, 1881.

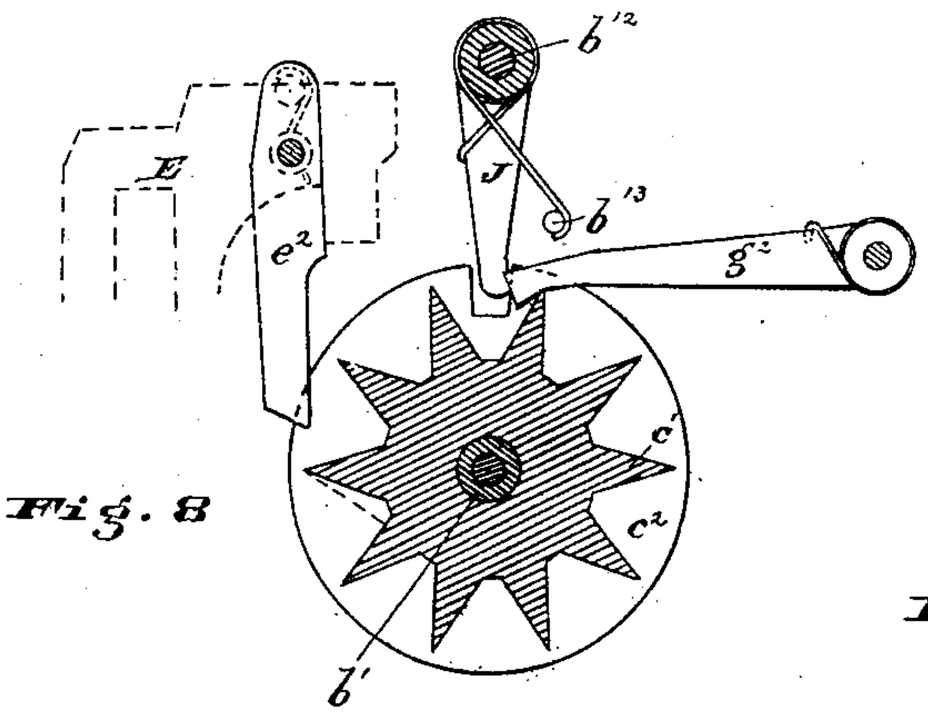
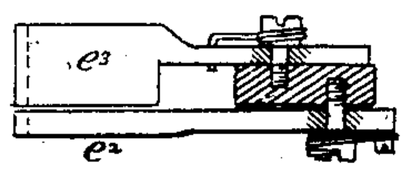


Fig. 8

Fig. 9



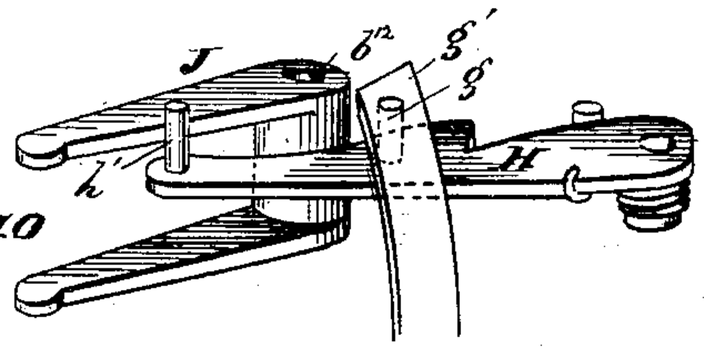


Fig. 10

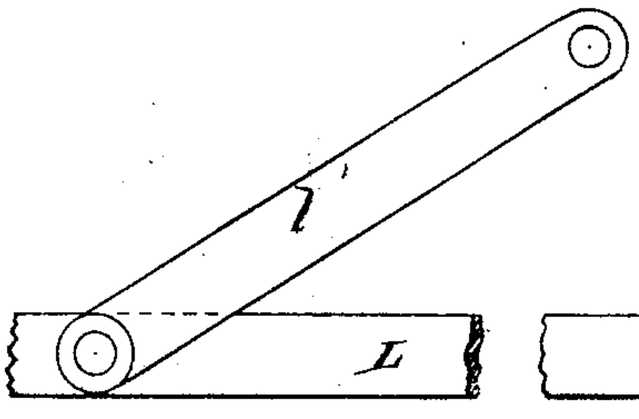
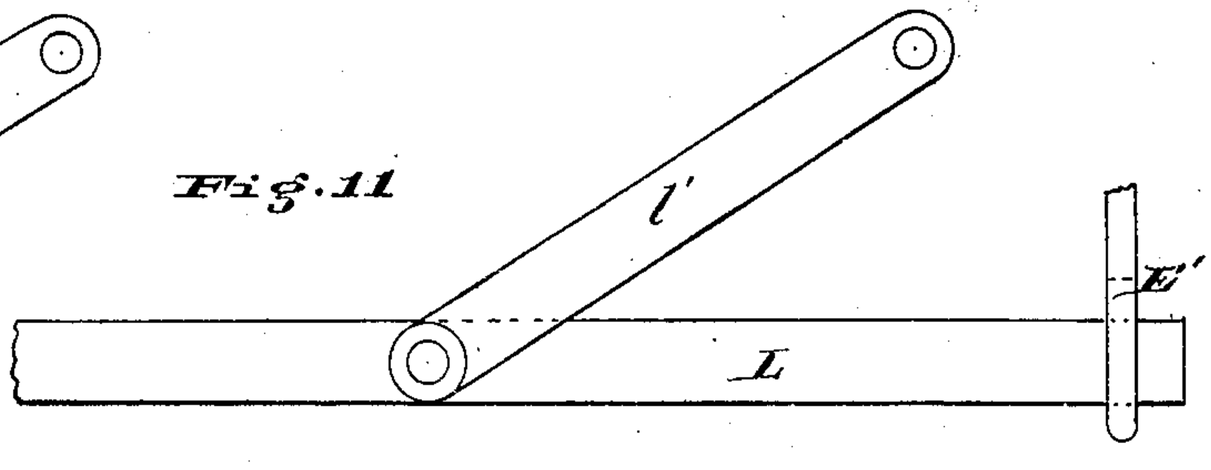


Fig. 11



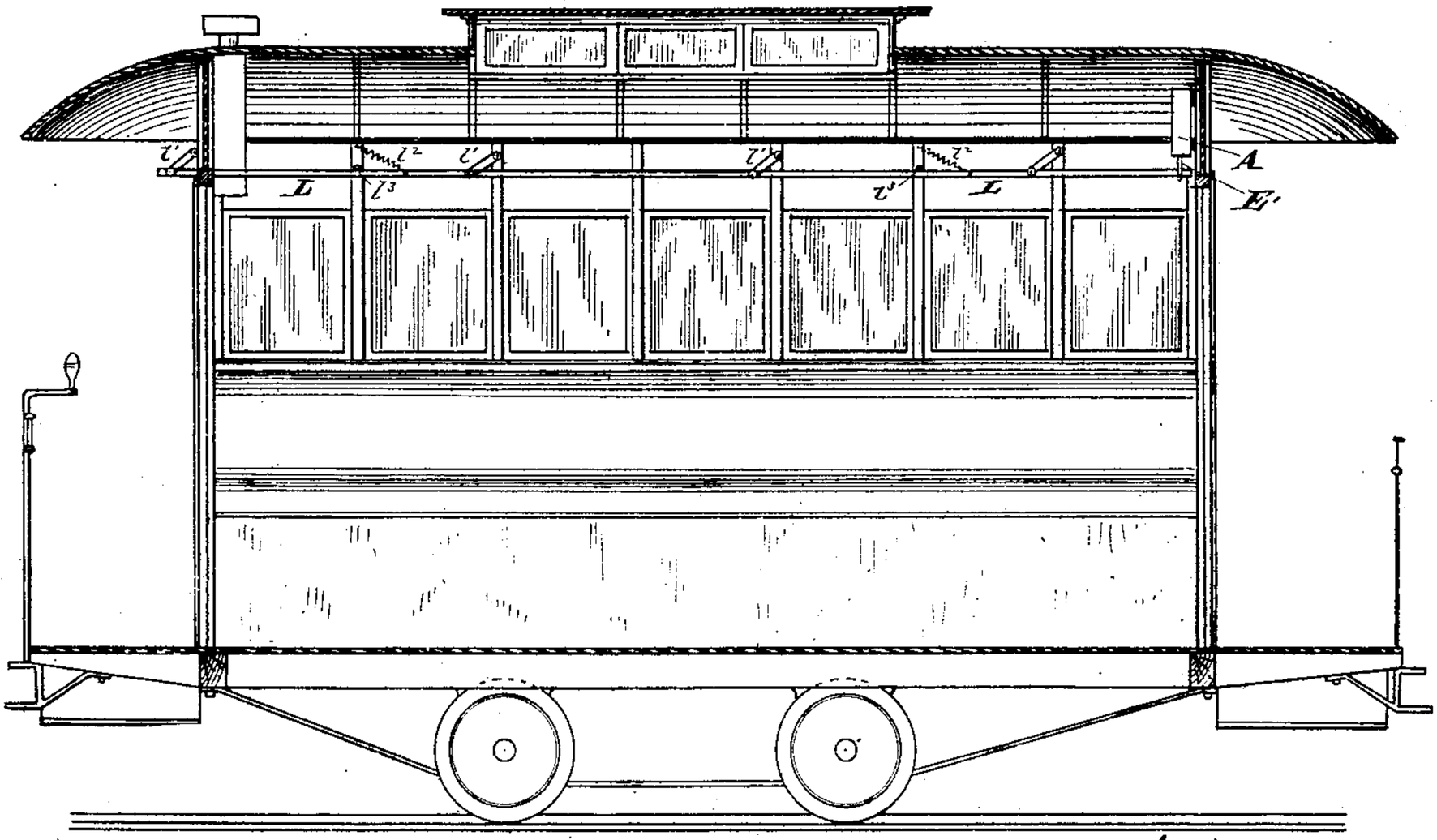


Fig. 12

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Fare Register.

No. 243,106. Patented June 21, 1881.

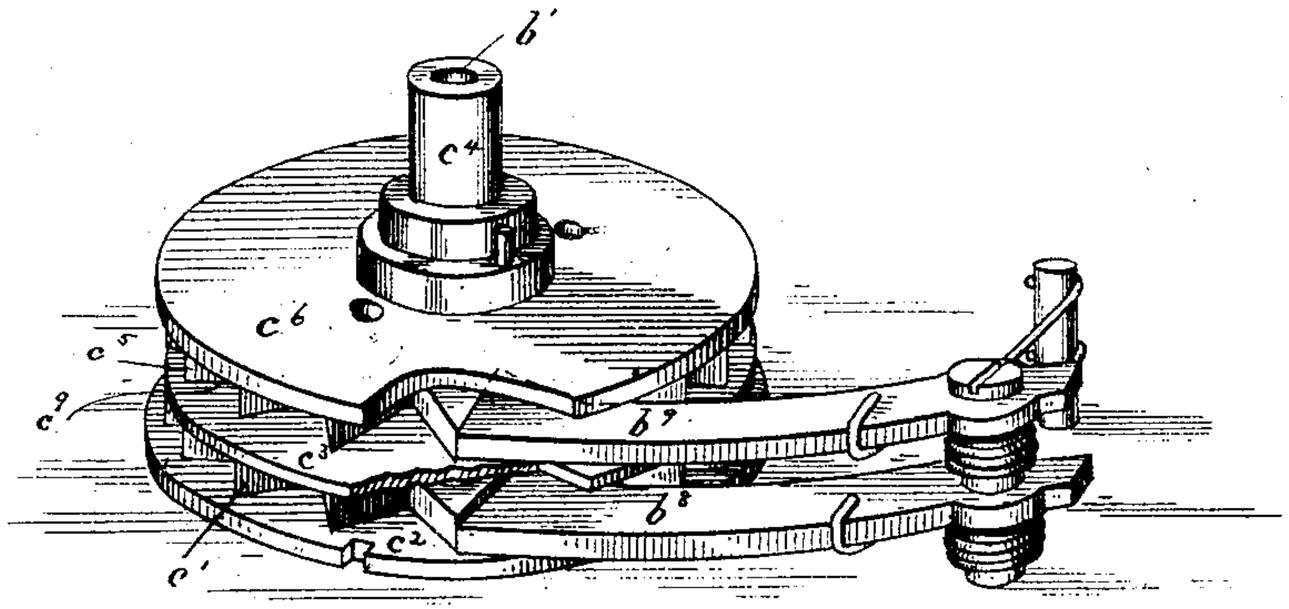

Fig. 13.

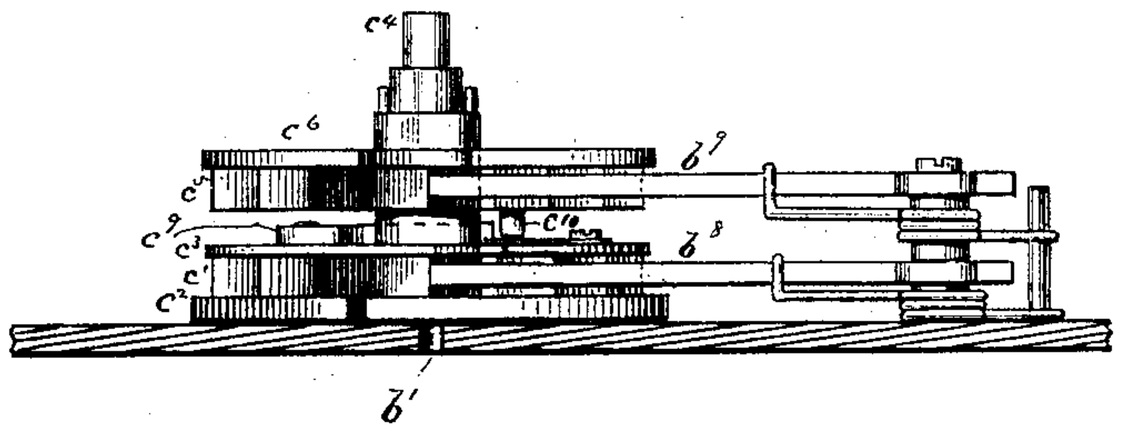

Fig. 14.

Attest:

Inventor

Edwin Chesterman

UNITED STATES PATENT OFFICE.

EDWIN CHESTERMAN, OF PHILADELPHIA, PENNSYLVANIA.

FARE-REGISTER.

SPECIFICATION forming part of Letters Patent No. 243,106, dated June 21, 1881.

Application filed March 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWIN CHESTERMAN, of Philadelphia, Pennsylvania, have invented certain Improvements in Fare-Registers, of which the following is a specification.

The improvements are shown in an organization known as a "duplex register," in which an alarm is registered on a continuous or general register, and also on a trip or set-back register. The form of the register may be changed to adapt it for any special position in a car, or for other purpose, and some parts of the invention may be used without the others. The object is to produce a register that cannot be successfully tampered with, sure in operation, simple in construction, and of great durability.

The invention consists in the combination of a set-back register, a case having a window through which the figures of the register are seen, a lever which covers the figures when the register is started backward, and uncovers said figures when the register is turned back to zero; also, in the combination of a set-back register, a case having a window through which the figures of the register are seen, a trip-signal, a lever which covers the figures when the trip-signal is changed and uncovers said figures when the register is turned back to zero; also, in the combination of a set-back register, a lever which disconnects the actuating-handle of the register when said register is started backward, and reconnects said handle when the register is turned back to zero; also, in the combination of a set-back register, a trip-signal, a lever which disconnects the actuating-handle of the register when the trip-signal is changed, and reconnects said handle when the register is turned back to zero; also, in the combination of a set-back register, a lever carrying a detent which is thrown against the ratchet-wheel when the register is started backward, and removed from the ratchet-wheel when the register is turned back to zero; also, in the combination of a set-back register, a trip-signal, a lever carrying a detent which is thrown against the ratchet-wheel when the trip-signal is changed and removed from the ratchet-wheel when the register is turned back to zero; also, in the combination of a register, an actuating-rod running through and hinged to a car by parallel links, a stop and spring to hold said links at such an angle that a downward pressure on the bar will cause a downward and endwise movement of said bar and actuate the register; and of other devices, as will be more particularly set forth in the following specification and accompanying drawings, in which—

Figure 1 is a front view of the register. Fig. 2 is a plan with the case removed. Fig. 3 is a plan with the dials and bell removed. Fig. 4 is a vertical section. Fig. 5 is a back view of the register. Fig. 6 is a perspective showing the slides and connecting-pawl. Figs. 7, 8, 9, and 10 are details of parts of the mechanism on an enlarged scale. Figs. 11 and 12 show the rod passing through a car to actuate the register. Fig. 13 is an enlarged perspective, showing the two retaining-pawls in engagement with the two ratchet-wheels of the trip-register. Fig. 14 is an enlarged elevation of the ratchet-wheels and cams and their arbor.

A is the front cover or case of the register. It is provided with two glazed openings—a', that through which the figures of the trip-register are seen, and a^2, that through which the trip-signal is seen.

a^3 is a projection over the bell. It is perforated for the passage of sound.

A′ is the back of the case, provided with a projection, a^4, and a glazed opening, a^5, through which the general register a is seen. A hinged lid, a^6, provided with a lock, prevents unauthorized persons examining the general register.

a^7 is a glazed opening, through which the figures of the signal-register are seen.

a^8 is a projection to cover the pin which fastens the set-back knob.

a^9 is a plate riveted to the base-plate of the register. Its lower edge is rabbeted to receive the upper end of the back of the case, and its upper edge is pierced with holes to receive the attachments by which the register is suspended.

B is the base-plate, on which the working parts of the register are supported. It is fastened to the front case by screws B^4.

C is the trip-register working around the hollow post b'.

c' is the units ratchet-wheel, (see Figs. 13 and 14,) which, together with notched plates

or cams c^2 c^3, is rigidly fastened to hollow arbor or sleeve c^4.

c^5 is the tens ratchet-wheel, to which is firmly fastened notched plate or cam c^6, and which is loosely arbored on sleeve c^4. On the upper side of cam c^3 is pivoted a spring-pawl, c^9, and on the under side of ratchet-wheel c^5 is a pin, c^{10}. (See Figs. 13 and 14.) When the units ratchet-wheel is turned forward the pawl c^9 passes the pin c^{10}, but when said ratchet-wheel is turned backward the pawl c^9 engages the pin c^{10} and the tens-ratchet is turned backward.

The tens-dial c^8, figured from 0 to 9, is fastened by pins or screws to cam c^6. The units-dial c^7, also figured from 0 to 9, is fastened by pins or screws to the sleeve c^4, which extends upward through the tens-dial for that purpose. The units-dial is provided with a spring-pawl, c^{11}, which engages a ratchet-wheel, c^{12}, fitted on the inner end of set-back knob A^3. A bolt, A^4, passes through the knob A^3 and hollow post b', and is keyed at the back of the base-plate.

D is the trip-signal, working around the post b^2, and is actuated by knob A^5 outside the case.

d' is a ratchet-wheel, which, with cam d^2 and tappet d^3, is rigidly fastened to arbor or sleeve d^4. The signal-disk d^5, of two colors or devices, is fastened to cam d^2.

B′ is a plate supported by posts from plate B, and carries the general register.

b^3 is a post carrying the alarm-bell.

E is the actuating-slide. It is composed of two parts detachably connected together by a spring-pawl, e'. The part E′ extends outside the case, and serves, with its attached knob, as an actuating-handle. This slide is fitted over guide-posts b^4, which also limit the extent of its movement.

e^2 is a spring-pawl to actuate the units ratchet-wheel, and e^3 is a spring-pawl to actuate the tens ratchet-wheel. This pawl is made with a wide point to engage the cam c^3 on the units-wheel, and also the tens-ratchet. A single notch in the periphery of cam c^3 permits the pawl e^3 to engage the tens-ratchet once for each revolution of the units-ratchet, in a manner too well known to need further description.

e^4 is a spring-pawl to actuate the bell-hammer.

F is the bell-hammer centered on post b^5.

b^6 is a post to hold the hammer from resting on the bell.

F′ is the bell.

e^5 is a stud extending from under side of slide E, to actuate the general register a, which register is identical with that set forth in my Patent No. 176,426, April 25, 1876, and needs no further description.

e' is a spring-pawl hinged to slide E, and engages with hook e^7 of slide E′, to connect the two parts of the slide together.

e^8 e^9 are springs to return the actuating-slides.

e^{10} is an oscillating detent provided with springs e^{11} and a post, e^{13}, against which the springs rest when the actuating-slide is at rest and the detent in a neutral position; but as soon as the slide is drawn outward the detent is forced to one side against the ratchet b^7 and receives the force of the spring to hold it to engage said ratchet. When the slide is drawn out its full distance the detent has passed the end of the ratchet and the spring returns it to a neutral position. When the slide returns inward the detent is forced to the other side of the ratchet b^7, and receives the force of the other spring to hold it to engage the other side of said ratchet. When the slide has returned its full distance the detent has passed the other end of the ratchet, and the spring returns it to a neutral position ready for a fresh actuation.

b^8 and b^9 (see Figs. 13 and 14) are retaining-pawls to the ratchet-wheels of the trip-register. b^{10} prevents backward movement of trip-signal.

G is a rock-lever centered on post b^{11}. Its upper end, g', engages the cam d^2 on trip-signal. Near its upper end is a pin, g, adapted to engage retaining-hook H. The upper end also carries a spring-pawl, g^2, which engages the units ratchet-wheel c'. The lower end also carries a spring-pawl, g^4. When the trip-register is in position to be actuated forward by the actuating-handle the upper end of the rock-lever is held by a spring against the cam d^2. The spring-pawl g^2 yields as the ratchet-wheel c' moves forward, and the spring-pawl g^4 is out of engagement with said ratchet-wheel; but when the trip-register is turned backward by the knob A^3 the ratchet-wheel c' presses against pawl g^2, which, being rigid in that direction, causes the rock-lever G to turn upon its center b^{11}, and its pin g is caught by retaining-hook H, the spring-pawl g^4 is thrown against the teeth of ratchet-wheel c', and, being rigid in that direction, prevents a forward movement of the trip-register. Said pawl yielding in the other direction permits a continued backward movement, the lower end, g^3, of the rock-lever is forced against a pin in connecting-pawl e' and disengages it from slide E′, and the upper end of rock-lever G comes in contact with short end i' of shutter-lever I, turns it upon its center i^3, and throws its long end i^2 in front of the index-figures of the register at window a'. A spring on said shutter-lever keeps its short end in engagement with rock-lever G. When the trip-signal is at either of its indications the upper end, g', of rock-lever G rests in one of the notches of cam d^2, and the trip-register is ready for a forward movement; but as soon as the trip-signal is moved the said lever is turned upon its center by the cam d^2, its pin is caught by hook H, the pawl g^4 is thrown against ratchet-wheel c', the connecting-pawl e' is disengaged, and the shutter-lever is thrown before the index-figures at a' in the same manner as above described in turning the register backward.

J is a two-pronged lever centered on post b^{12}; a spring holds it to engagement with cams c^2 c^6 of trip-register. When the trip-register shows the unit at window a', the two prongs of the lever engage the notches in cams c^2 c^6, and when the register is turned back to the zero the two-pronged lever J is turned upon its center and comes in contact with pin h' in retaining-hook H, trips it, and releases rock-lever G, which, under the influence of its spring, turns upon its center, the pawl g^4 is moved away from ratchet-wheel c', the connecting-pawl e' is under the influence of its spring, re-engages the slide E', the shutter-lever I is moved away from the index-figures at a', and the two-pronged lever comes in contact with post b^{13} and prevents further backward movement.

It will be seen that when the register has been started backward or the trip-signal been moved, the register cannot be actuated by the handle, nor the figures of the register be seen until the register has been turned back to zero and the trip-signal has been turned to a fresh indication.

K is a register to record the changes of the trip-signal. It is actuated by tappets d^3 on signal-ratchet. The general register is actuated each time the trip-register is actuated by the handle, but remains stationary when the trip-register is turned by the set-back mechanism, so that while the trip-register shows the number of passengers on a single trip the general register shows the total for a number of trips.

The register may be carried by the conductor, or it may be suspended in a car, and as in the latter case it is desirable that it may be actuated from any part of the car, a rod, L, is passed lengthwise through the car and attached thereto by two or more parallel links, l'. A spring, l^2, attached one end to the car, the other end to the rod, holds or returns the rod against the stop l^3 and the links at an angle of forty-five degrees, more or less.

To actuate the register the conductor places his hand or a hook on top of the rod and pulls downward. The links are brought to an angle of thirty degrees, more or less, which causes a downward and endwise movement of the rod, which, resting on the handle E' of the register, actuates it. The pressure on the rod being removed, the spring l^2 returns it to position ready for a fresh actuation.

If it be desired to remove the register to the other end of the car, the spring l^2 and stop l^3 may be changed so as to incline the links l' in a contrary direction.

The operation is as follows: The trip-register being at zero, and the trip-signal D being set to one of its indications, to register a fare the actuating-slide E' is pulled outward, when the pin in oscillating detent e^{10} engages the teeth on the inner side of ratchet b^7, (and prevents a return movement of slide E' until a full outward movement has been had.) The hook e^7 on the inner end engages a pin in connecting-pawl e', and this pawl, being articulated to slide E, causes said slide E to be drawn down with slide E', and the pawl e^4 engages a tooth on the bell-hammer F and raises said hammer. The pawl e^3 slides upon the periphery of cam c^3, and is thereby prevented from engaging the teeth of the tens ratchet-wheel of the trip-register. The pawl e^2 engages the unit ratchet-wheel of the trip-register and turns it one tooth, in which position it is held by retaining-pawl b^8. (See Figs. 13 and 14.) The stud e^5 on the under side of slide E engages the pawl-carrier of the general register and actuates it. The pull on the handle being continued, the pawl e^4 passes out of engagement with the bell-hammer, which, under the influence of its spring, strikes the bell, and the oscillating detent passes down out of engagement with the ratchet b^7. The pull on the handle being released, it is drawn inward by spring e^8. The oscillating detent now engages the outer teeth of ratchet b^7, (and prevents a return movement until a full inward movement has been had.) The stud e^5 passes out of contact with the pawl-carrier of the general register, which, under the influence of its spring, re-engages the unit-wheel of said general register. The pawl e^3 slides up on the periphery of cam c^3. The pawl e^4 re-engages the tooth of the bell-hammer and the oscillating detent passes up out of engagement with the ratchet b^7, and the machine is ready to register another fare. At each tenth movement of the actuating-handle the pawl e^3, instead of sliding on the periphery of cam c^3, will fall into the notch of said cam and engage a tooth in the tens ratchet-wheel of the trip-register and turn it one tooth. A retaining-pawl, b^9, (see Figs. 13 and 14,) holds said ratchet-wheel in position.

The trip being finished, it is desired to set the trip-register to zero, and to change the indication of the trip-signal without interfering with the general register or the alarm. The trip-register is set back by turning knob A^3 to the right, when a tooth of the units ratchet-wheel comes in contact with pawl g^2 on the under side of rock-lever G and turns said lever on its center, and the pin g in said lever is caught by retaining-hook H, and the lower end, g^3, of said rock-lever G comes in contact with a pin in connecting-pawl e', and throws said pawl out of engagement with the hook e^7 of actuating-slide E, and disconnects said actuating-slide E outside the case from the slide E' inside the case. The pawl g^4 is thrown against a tooth of units ratchet-wheel and prevents it from being turned forward. The upper end of rock-lever G comes in contact with a pin in the short end i' of shutter-lever I, and turns it upon its center i^3, and throws the long end i^2 in front of the index-figures of the register, so that they cannot be seen at the opening a'. The turning of the knob being continued, the pawl c^9 on unit-cam c^3 engages pin c^{10} on the tens ratchet-wheel, (see Fig. 14,)

and the units-ratchet and the tens-ratchet are turned back together until the unit of the register-dial is under the window-opening, at which point the two ends of pronged lever J engage with notches in cam-disks c^2 c^6. Turning the knob still further until the zero of the register-dial is reached, the two-pronged lever is turned upon its center and comes in contact with pin h' of retaining-hook H, presses it outward and releases the rock-lever G, which, under the influence of its spring, turns upon its center and releases the connecting-pawl e', which is caused by its spring to re-engage the hook e^7 of actuating-slide E. The pawl g^4 is moved away from the teeth of the units ratchet-wheel, and the pressure of the rock-lever being removed from short end of shutter-lever I, the long end of said shutter-lever, under the influence of its spring, is thrown from before the index-figures. The trip-signal is changed to another indication by turning the knob A^5 to the left, when the cam d^2 raises the upper end, g', of rock-lever G out of the notch in said cam, in which it rested, and said rock-lever turning upon its center disconnects the actuating-slide E from the inner slide, E', throws the pawl g^4 in front of a tooth of the ratchet-wheel of the trip-register, and the shutter-lever before the index-figures in the same manner as just described in starting the trip-register backward. Continuing to turn the knob A^5 until a fresh indication (red or white) is shown at window a^2, the upper end of rock-lever G will bear upon the periphery of cam d^2 until the other notch in said cam is reached, when the rock-lever, under the influence of its spring, will turn upon its center and fall into the notch in said cam. The connecting-pawl will reconnect the actuating-handle, the pawl g^4 be moved away from the tooth of units ratchet-wheel, and the shutter-lever be removed from the index-figures in the same manner as just described in turning the trip-register to zero, and one of the tappets, d^3, on the signal-ratchet will actuate the signal-register H.

It will be seen that when the trip-signal is changed to another indication while the trip-register is at zero the two-pronged lever holds the retaining-hook from engaging the pin in rock-lever G; but if the trip-signal is changed while the trip-register is not at zero the retaining-hook will engage the pin in rock-lever, and cannot be released therefrom until the trip-register is turned to zero, when it will be released by the two-pronged lever J. Consequently, if the trip-register is started backward or the trip-signal moved, the actuating-handle is disconnected and the index-figures hidden, and the register cannot be actuated or the figures seen until the trip-register has been turned all the way back to zero, and the trip-signal has been turned all the way to a fresh indication.

Several devices not new in themselves enter into the construction of the machine herein described. It may therefore be proper to state that in Filliette's French Patent No. 50,126, January 19, 1861, the prime mover and the alarm is locked by means of a key while the trip register is set to zero. In Deschamps's United States Patent No. 10,503, February 7, 1854, the register-wheel is locked by means of a key, and the openings in case through which the figures are seen are covered by a movable slide. In English Patent No. 592 of 1858 are two ratchet-wheels on the same arbor. The first ratchet-wheel has a plate fastened to it. A notch in this plate permits a pawl to fall into it and turn the second ratchet-wheel one tooth for each tenth movement of the first ratchet-wheel. Schmitz's United States Patent No. 45,868 has a reversible pawl with two series of ratchets to compel a complete reciprocation in either direction, and the same device insures setting the register all the way to zero, when a backward movement is begun. English Patent No. 3,183 of 1869 sets forth a toothed wheel and double oscillating ratchet, to insure a complete movement of the handle in either direction. English Patent No. 1,217 of 1864 has a movable signal or indicator giving information as to travel, changing which sets one register to zero. English Patents No. 2,541 of 1869 and No. 82 of 1870 set forth duplex registers, one of which is set back independent of actuating-handle; a yielding zero-stop permits the register to pass zero when actuated by the handle, but stops the register at zero when reset independent of said handle, and a zero-register actuated by setting the trip-register to zero, but not actuated when the register is carried to or past zero by the actuating-handle. English Patent No. 82 of 1870 has two springs resting against a stop, to prevent engagement with a lever when said lever is in a neutral position, but as soon as the lever is moved from its neutral position in either direction the springs exert their force to restore it.

I claim as of my invention—

1. The combination of a trip or set-back register, a case having an opening (serving as an index to and) through which the proper figures of the register are seen, a lever actuated by said register to cover said index-figures by starting said register backward, and mechanism actuated by said register to remove the lever to expose said figures when the register is turned back to zero, substantially as set forth.

2. The combination of a trip or set-back register, a case having an opening (serving as an index to and) through which the proper figures of the register are seen, a trip-signal or detecter, a lever actuated by said trip-signal to cover the index-figures by starting the trip-signal to a fresh indication, and mechanism actuated by said trip-register to remove the lever to expose said figures when the register is turned back to zero, substantially as set forth.

3. The combination of a trip or set-back reg-

ister, a lever actuated to disconnect the actuating-handle of the register by a backward movement of said register, and mechanism to reconnect the actuating-handle when the register is turned back to zero, substantially as set forth.

4. The combination of a trip or set-back register, a trip-signal or detecter, a lever actuated to disconnect the actuating-handle of the register by turning the trip-signal to a fresh indication, and mechanism to reconnect the actuating-handle when the register is turned back to zero, substantially as set forth.

5. The combination of a trip or set-back register, a lever carrying a spring-detent which, by a backward movement of the register, is thrown in the pathway of the ratchet-wheel of the register independent of the actuating-handle, permitting its backward movement, but preventing its forward movement until the detent is removed, and mechanism to remove the detent when the register is turned back to zero, substantially as set forth.

6. The combination of a trip or set-back register, a trip-signal or detecter, a lever carrying a spring-detent which, by turning the trip-signal to a fresh indication, is thrown against the ratchet-wheel of the register independent of the actuating-handle, permitting its backward movement, but preventing its forward movement until the detent is removed, and mechanism to remove the detent when the register is turned back to zero, substantially as set forth.

7. The combination of register C, cams c^2 c^6, rock-lever G, pawls g^2 g^4, retaining-hook H, and two-pronged lever J, substantially as set forth.

8. The combination of register C, cams c^2 c^6, rock-lever G, pawl g^2, retaining-hook H, two-pronged lever J, and shutter-lever I, substantially as set forth.

9. The combination of register C, cams c^2 c^6, rock-lever G, pawl g^2, retaining-hook H, two-pronged lever J, and connecting-pawl e', substantially as set forth.

10. The combination of a register, an actuating-rod running through a car, two or more parallel links by which the rod is hinged to the car, a stop and a spring to hold or return the links to an angle of forty-five degrees, more or less, adapted that a downward pressure on the rod at any part of the car will bring said links to an angle of thirty degrees, more or less, and cause a downward and endwise movement of said bar to actuate the register, substantially as set forth.

EDWIN CHESTERMAN.

Witnesses:
G. H. CHESTERMAN,
JAS. S. BREEN.