

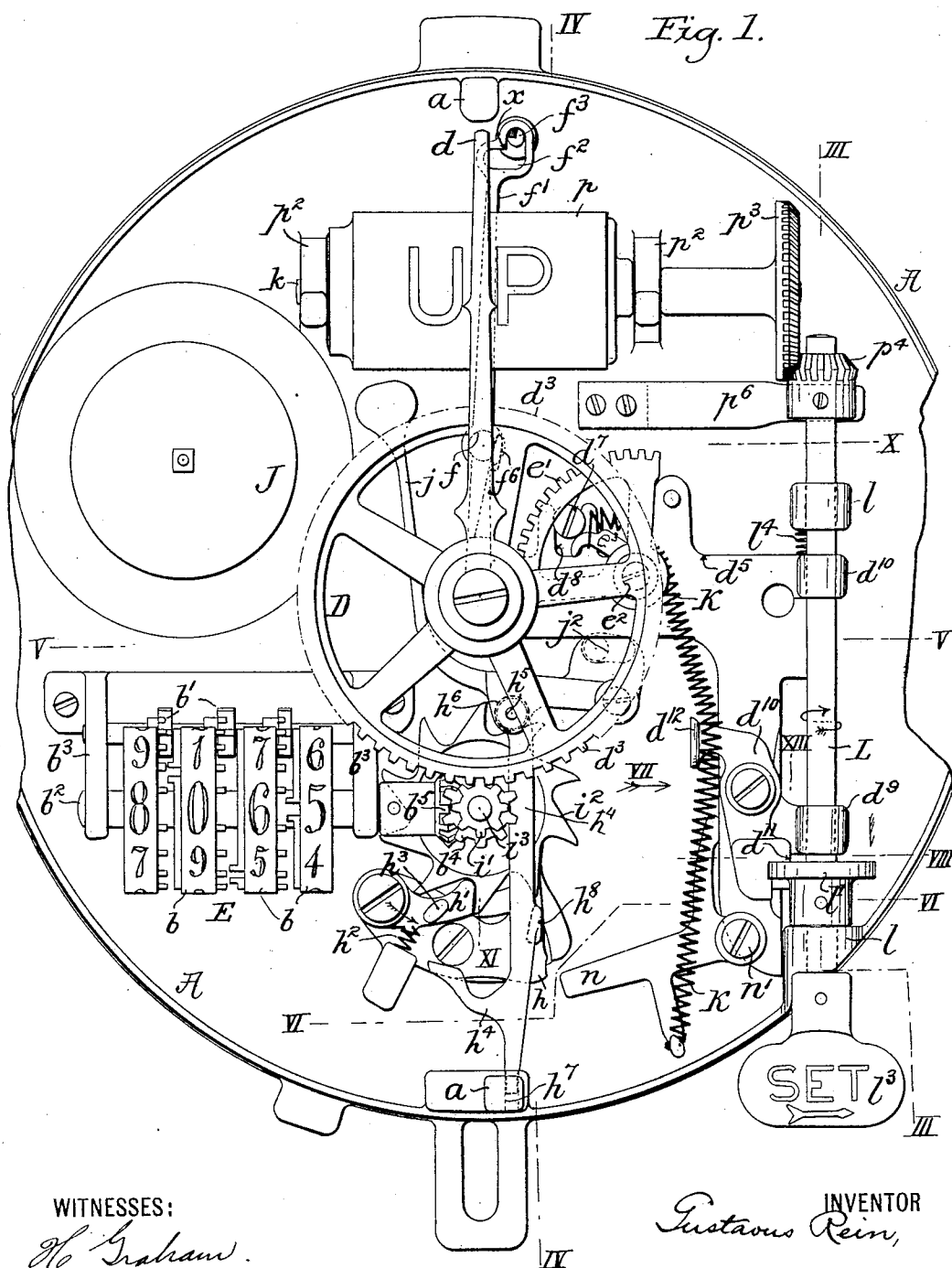
(No Model.)

6 Sheets—Sheet 1.

G. REIN.
STREET CAR REGISTER.

No. 561,129.

Patented June 2, 1896.



WITNESSES:

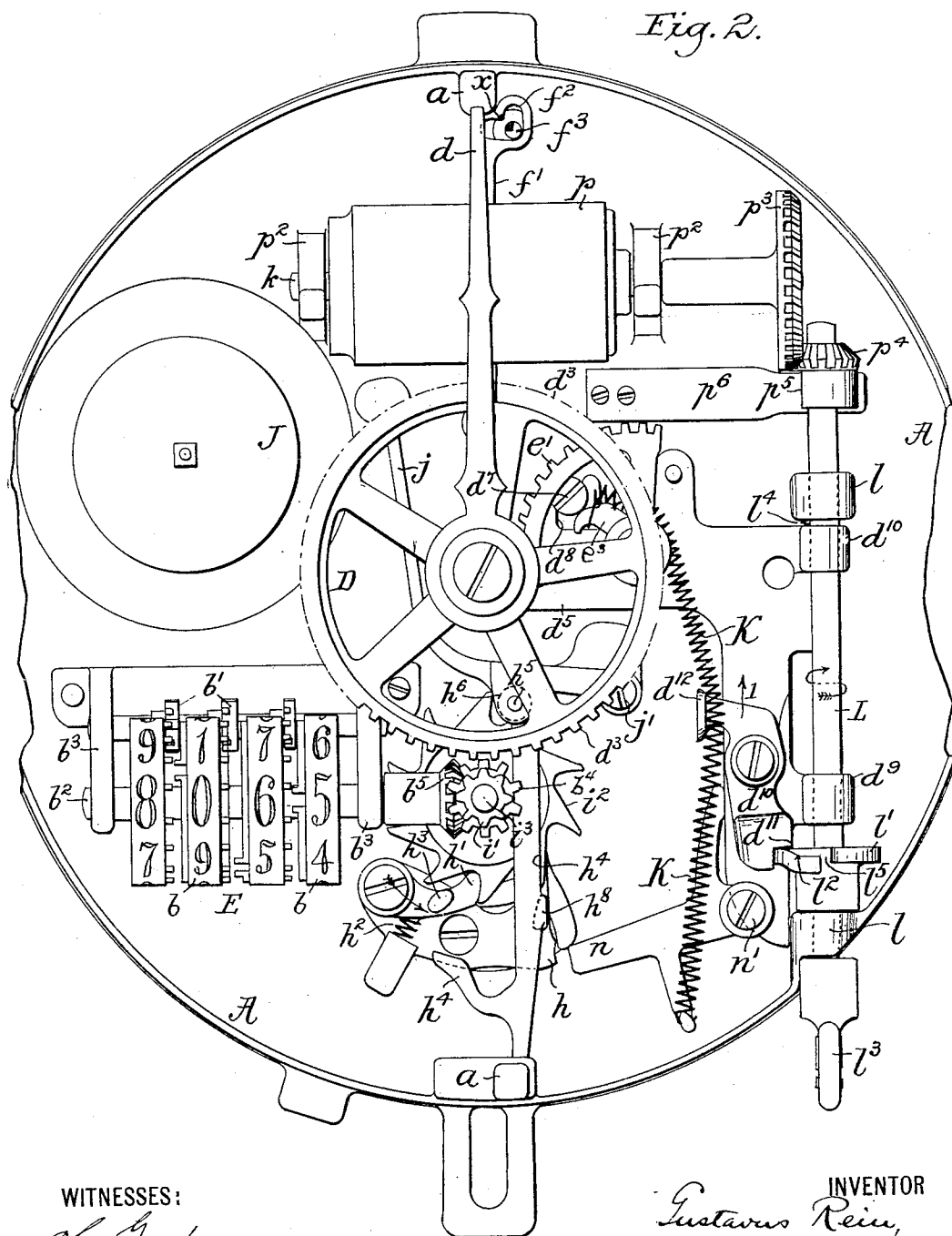
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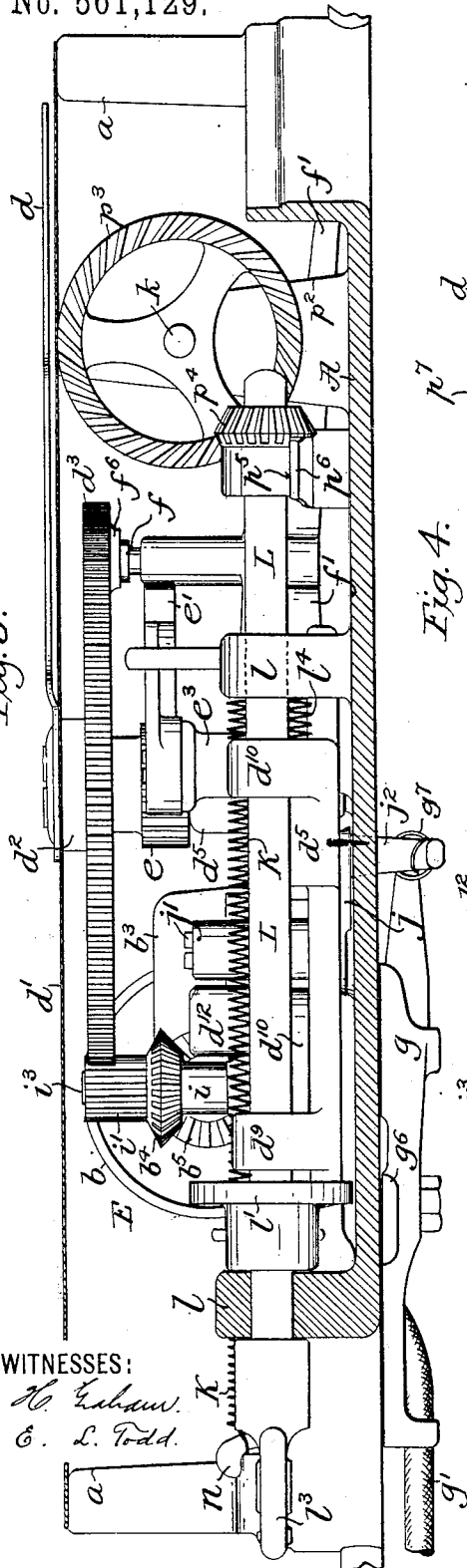
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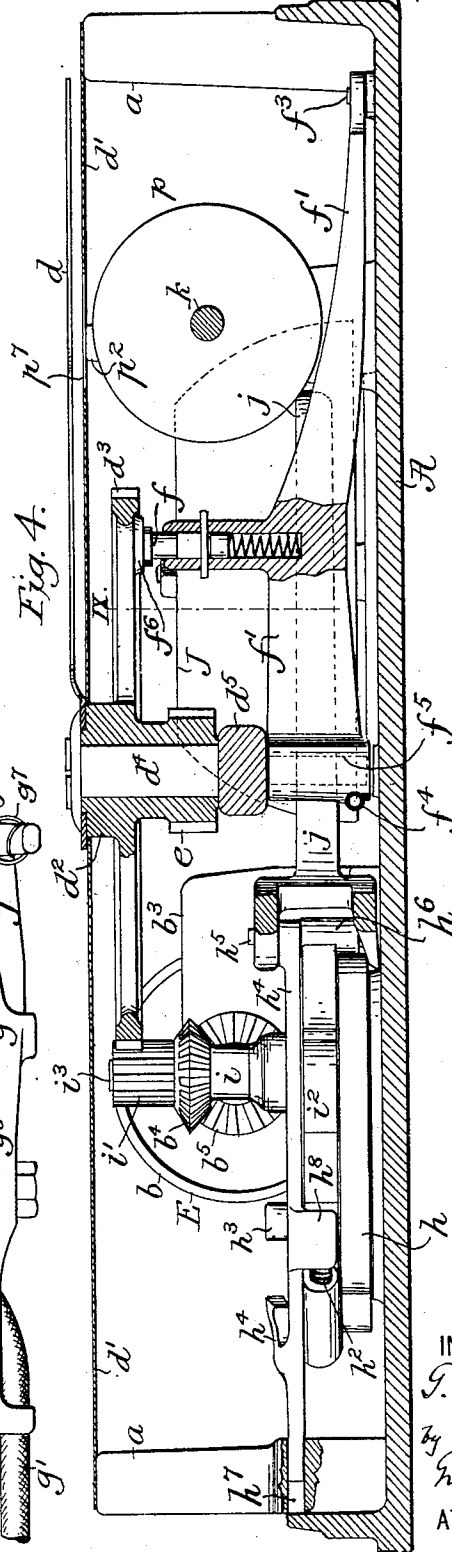
Fig. 3.



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Fig. 4.



INVENTOR

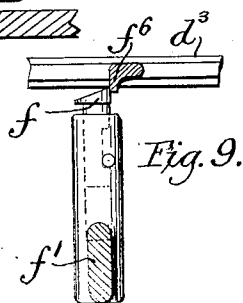
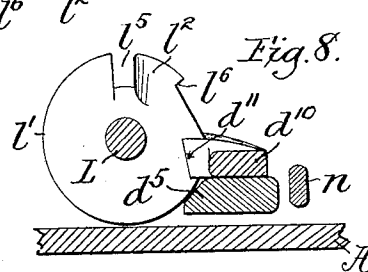
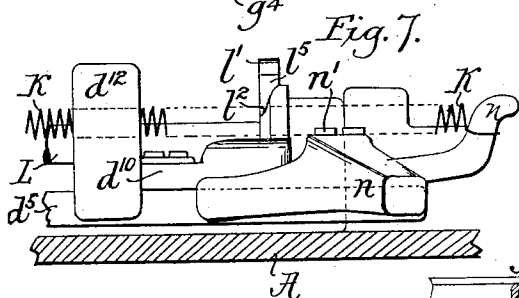
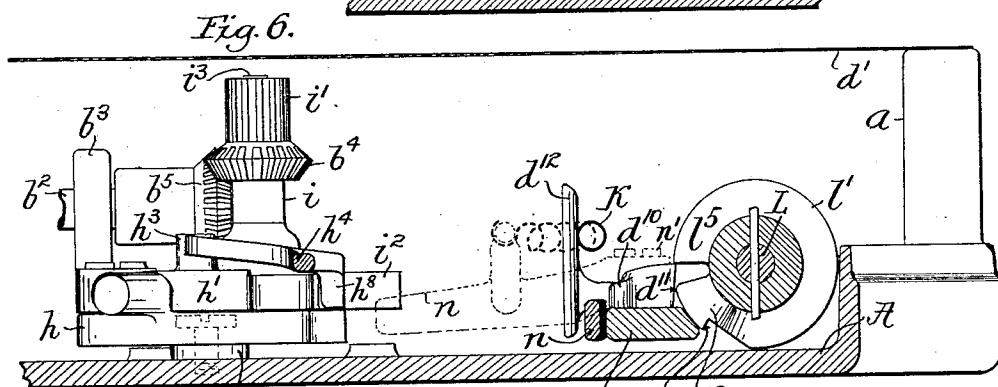
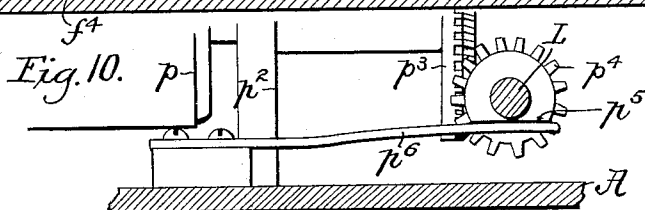
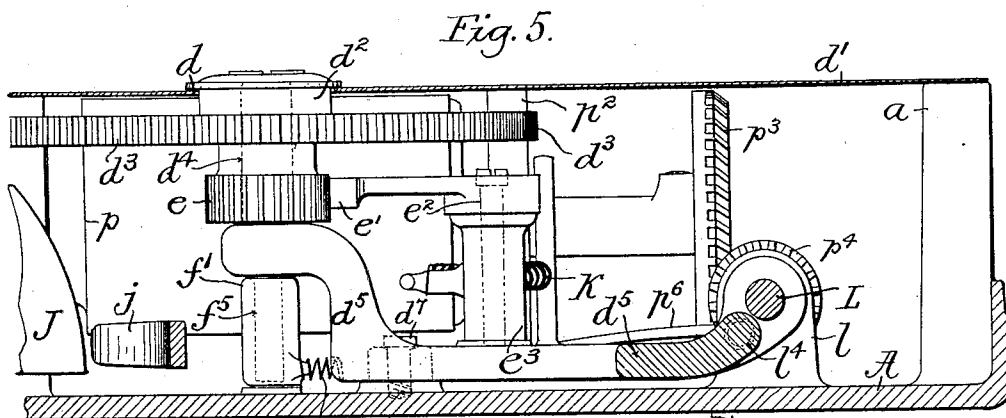
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Fig. 12.

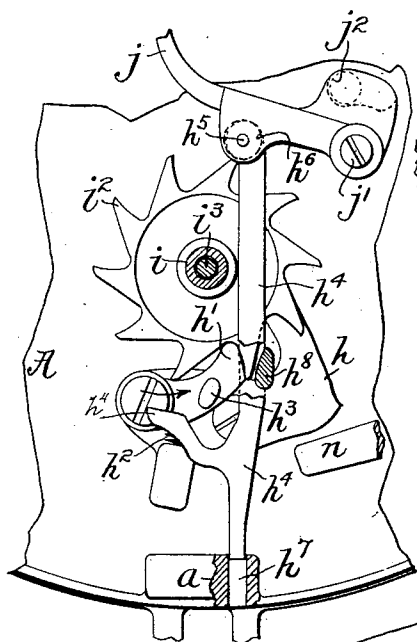


Fig. 11.

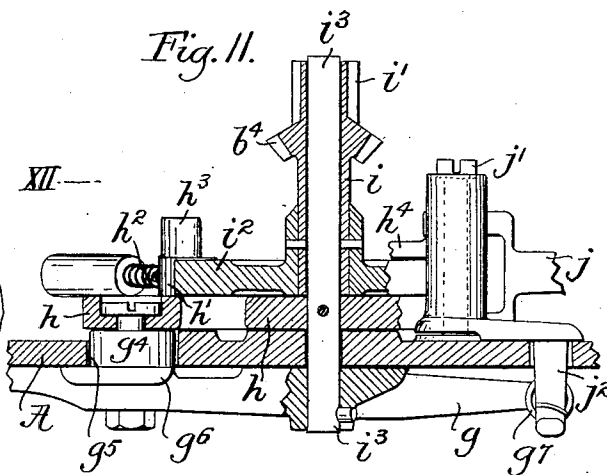


Fig. 13.

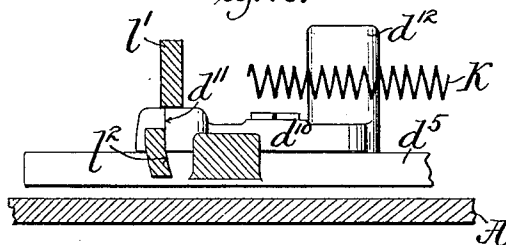
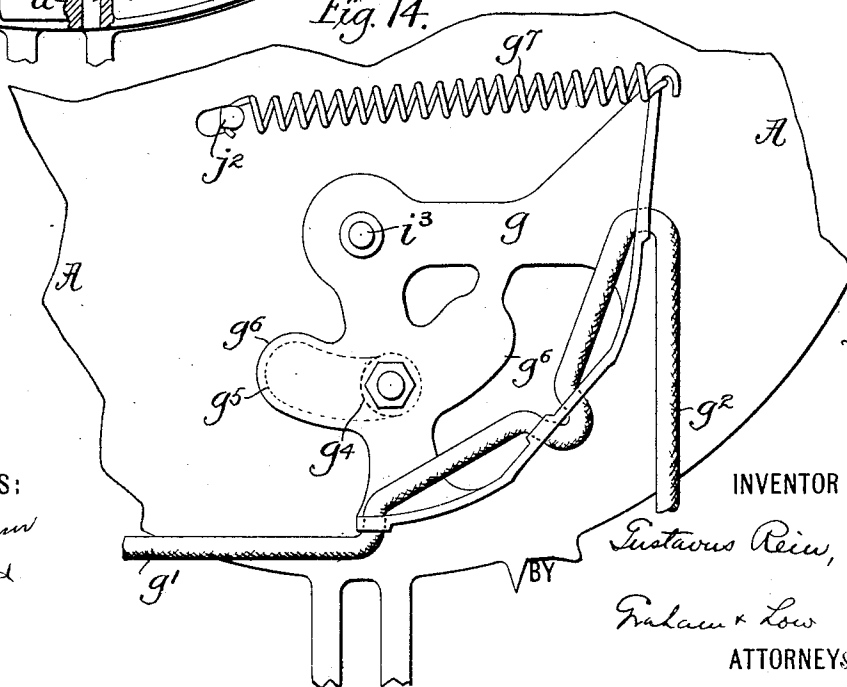


Fig. 14.



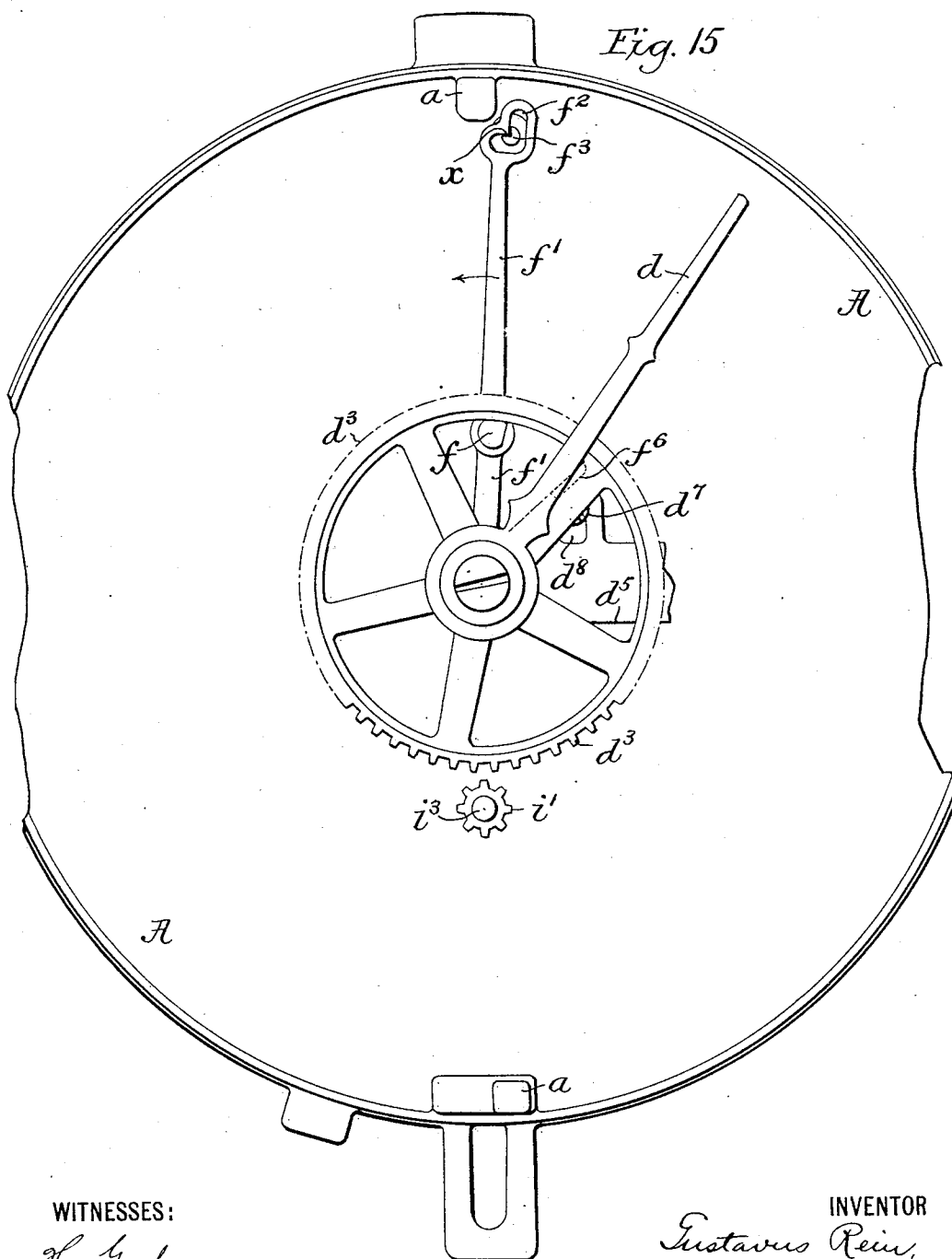
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UNITED STATES PATENT OFFICE.

GUSTAVUS REIN, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE ST. LOUIS REGISTER COMPANY, OF SAME PLACE.

STREET-CAR REGISTER.

SPECIFICATION forming part of Letters Patent No. 561,129, dated June 2, 1896.

Application filed December 13, 1894. Serial No. 531,704. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVUS REIN, a citizen of the United States of America, residing at the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Street-Car Registers, of which the following is a specification.

The present invention relates generally to registers, and more particularly to street-car registers of that class of which Letters Patent to Leo Ehrlich, No. 490,342, is an exemplification as improved by the structures set forth in the patent to me, No. 538,283, dated April 30, 1895.

These improvements have for their object, among other things, to simplify the structure and arrangements of parts described in said Patent No. 538,283, and to provide means by which the trip and permanent registers may not be reconnected until the trip-register index or other trip-indicating member actually reaches the zero position.

As a better understanding of the invention will be had from a detailed description thereof, such description will now be given, reference being had to the accompanying drawings, illustrating a practical embodiment thereof.

In said drawings, Figure 1 is a front elevation of the interior mechanism of the register in its normal position, the dial, glass front, and inclosing case being removed. Fig. 2 is a similar view showing the parts in one of their moved positions, the trip-register index having returned to the zero position and the trip-register wheel not yet returned into mesh with the actuating-pinion. Fig. 3 is an enlarged cross-section taken on the line III III of Fig. 1, showing the interior parts in elevation, the dial being in place. Fig. 4 is a similar section taken on the line IV IV of Fig. 1, certain parts being shown in section to disclose otherwise obscure features. Fig. 5 is an enlarged transverse section on the line V V of Fig. 1, the trip-register wheel and parts connected therewith being in elevation. Fig. 6 is a similar section on the line VI VI of Fig. 1, showing only the parts adjacent the line of the section and the position of another part by dotted lines. Fig. 7 is an enlarged detail sectional elevation of certain parts,

viewed in the direction of the arrow VII, Fig. 1.

Fig. 8 is an enlarged detail cross-section on the line VIII of Fig. 1, looking in the direction of the arrow. Fig. 9 is a detail sectional elevation on the line IX of Fig. 4. Fig. 10 is an enlarged detail section on the line X of Fig. 1. Fig. 11 is an enlarged sectional elevation taken substantially on the line XI of Fig. 1, certain parts being shown in elevation. Fig. 12 is a section, on a smaller scale, on the line XII of Fig. 11, the parts being moved from the position shown in Fig. 1. Fig. 13 is an enlarged section on the line XIII of Fig. 1. Fig. 14 is a rear elevation of a portion of the back plate, showing particularly the actuating-segment. Fig. 15 is a skeleton view of the trip-register wheel and index, the main actuating-pinion, and the device for controlling the reconnection of the trip-register with said pinion.

Referring to said drawings, the improved register, Figs. 1 and 2, consists of a trip-register D and a permanent register E, geared together, so that normally when the machine is actuated by the conductor they will both move in unison. The parts are supported by a back or base plate A and inclosed by a surrounding inclosing case (not shown) and usually having a false back, which is secured vertically to the side or end of a vehicle, all as is well known in this art, such false back not being shown, as it forms no part of the present invention and is not needed for an intelligent understanding thereof. The trip-register D consists in the main of an index or pointer *d*, arranged to move step by step over a dial *d'*, (see Figs. 3 to 6,) that is secured to posts *a'*, projecting from the base-plate A, the face of the dial not being shown, as it is of well-known form. The index *d* is secured fixedly to the hub *d''* of the trip-register gear-wheel *d'''*, that is arranged to rotate behind the dial *d'* on a central stud *d''*, (see Fig. 4,) that projects from a bracket *d''*, which is held in bearings on the face of the base-plate A, in a manner hereinafter explained. This gear-wheel *d'''* is constructed with a pinion *e*, Figs. 3 to 6, that is in gear with the teeth of a segment *e'*, (see also Figs. 1 and 2,) that is pivoted on a stud *e''*, extending from the bracket *d''*, (see dotted lines, Fig. 5,) and it has a long

hub e^3 , to which one end of a motor-spring K is secured, the other end of said spring being fastened to some part of the machine—as, for instance, to a stop-arm n , Figs. 1, 2, 6, and 7.

5 The arrangement of this mechanism is such that during the step-by-step movement of the index d over the dial d' from the zero position the pinion e rotates the segment e' on its stud e^2 and gradually coils the spring K

10 around its hub e^3 , thus putting said spring under tension, so that when it is desired to return the index d to its zero position the spring K, acting on the segment e' , will, through the pinion e , suddenly move the index to said position.

15 The construction is also such that the index d may make nearly an entire rotation without its pinion e becoming disengaged from the teeth of the segment e' . Having then stored up the maximum tension in the spring

20 K, any further movement of the index d in a forward direction causes the pinion e to move without being in gear with the segment e' , its teeth slipping past the teeth of the segment, but which segment, notwithstanding, stands

25 ready to immediately gear with the pinion e as soon as the index d is free to rotate back to the zero position. In this manner it is immaterial how many complete turns the index d may have been caused to make while its

30 pinion e is out of gear with the segment e' , and hence it is not material how many teeth the segment may have for gearing continuously with the pinion e . The index d is always arrested in its backward or return rotation by a zero-stop f , arranged to meet a

35 projection f^6 on the rear side of the gear-wheel d^3 , (see Figs. 3, 4, and 9,) and is to be further described.

The permanent register E consists of a series of adding-wheels b , with suitable carrying-wheels b' , as usual, the adding-wheels b being mounted on a shaft b^2 , that is supported in bearings b^3 , fixed to the base-plate A. The units-wheel of the adding-wheels b is fixed to the shaft b^2 , as is common, and each rotation of said shaft and units-wheel transmits through the proper carrying-pinion b' a step movement to the tens-wheel, and so on. The inner end of the shaft b^2 has secured to it a

40 bevel-pinion b^5 , that meshes with a like pinion b^4 , Figs. 1 to 4, 6, and 11. The pinion b^4 is carried by an actuating-sleeve i , which sleeve also carries at its outer end a pinion i' for mesh with the trip-register gear-wheel d^3 , and at its inner end near the base-plate A a ratchet-wheel i^2 . (See Fig. 12.) This actuating-sleeve i turns loosely on an arbor i^3 , mounted to rock in bearings in the base-plate

45 A, and its end projects rearward through said base-plate, Figs. 6, 11, and 14, and has secured to it an actuating-segment g , now to be described.

The actuating-segment g , Figs. 3, 11, and 14, lies snugly against the rear of the base-plate and is arranged to rock within fixed limits by the pull upon either one of two portions g' g^2 of a single cord or strap, Fig. 14,

the center of which cord is secured by interlacing with the rim of the segment with its ends or portions led in opposite directions.

70 The segment g carries a rigid projection g^4 , Figs. 3, 11, and 14, and 6 to 8, that extends through a guide-slot g^5 in the base-plate A, the segment having flanges g^6 , which always overlie and protect said slot to prevent fraudulent ingress to the interior mechanism, and

75 said projection g^4 is rigidly connected to a pawl-carrier h , that lies against the front face of the base-plate A behind the ratchet-wheel i^2 , and is also secured to the post i^3 to rock bodily with the segment g and said post. This pawl-carrier h carries a pawl h' , pivoted thereto, Figs. 6 to 8, which engages with the ratchet-wheel i^2 and is spring-pressed by a

80 spring h^2 . The outer side of the end of the pawl h' has a projection h^3 , that extends within the guarding action of a curved finger extending from an arm h^4 , that passes to one side of the actuating-sleeve i , immediately adjacent and in front of the ratchet-wheel i^2 , and is connected at one end by a pin h^5 with a bell-hammer arm j , that is pivoted at j' to the base-plate A, its opposite end being guided by the walls of a hole h' in one of the posts a . (See Fig. 12.) The pin h^5 also carries an anti-

85 friction-roll h^6 , (see Figs. 4 and 12,) arranged to bear against the face or tooth of the ratchet-wheel i^2 at a point substantially diametrically opposite the engaging pawl h' , so that said bell-hammer arm j is positively

90 rocked away from the axis of the ratchet-wheel i^2 , and the arm h^4 , connected to said bell-hammer arm, is moved longitudinally in the direction of its length to carry its guarding-finger toward the pawl projection h^3 by

95 the action of a passing tooth of said ratchet-wheel as the pawl h' is moving said ratchet-wheel forward one step. The high part of the passing ratchet-tooth, as in Fig. 12, is passing the roll h^6 just before the pawl h' completes its forward actuating-stroke in one

100 direction, so that a slight further movement of said pawl and the ratchet-wheel i^2 will remove said passing tooth from contact with the roll h^6 , whereupon the bell-hammer arm, under the tension of a spring, to be described, will be free to suddenly move toward the low

105 part or recess between adjacent teeth of said ratchet-wheel i^2 , as in Fig. 1, thereby bringing the hammer in forcible contact with the bell J, Figs. 1 and 2. This return of the bell-hammer arm j also moves the arm h^4 back to its normal position.

The rocking of the bell-hammer arm j is had against the force of a spring j^1 , (see Figs. 3, 11, and 14,) one end of which is attached to a lug j^2 on the rear side of the arm j , (see also Fig. 12,) which projects through a slot in the base-plate A, the other end of said spring j^1 being connected to the actuating-segment g and thus serves two purposes—one to return the segment g to normal position after being moved by the conductor in one direction in registering a fare, and also to exert pressure

125 130

on the bell-hammer arm j to cause its hammer to strike the bell J .

The arm h^4 is connected to move with the bell-hammer arm j , as before specified, so that its finger forms at certain times a guard for the actuating-pawl h' . Thus in the normal resting position of the parts, as in Figs. 1 and 2, the pawl projection h^3 is away from the arm h^4 and its finger, and as the pawl h' is moved in the direction of the arrow thereon, moving with it the ratchet-wheel i^2 , the arm h^4 is simultaneously moved longitudinally inward in the direction of its length, bringing its curved finger toward the pawl projection h^3 , so that the pawl h' is guarded during its effective action from being moved entirely out of engagement with the ratchet-wheel i^2 , and the arm and its finger remain in substantially this position, as in Fig. 12, up to the completion of the forward or active movement of the pawl, at which time the said finger of the arm h^4 retires on the sudden reverse longitudinal movement of said arm when the roll h^6 moves into the low part of a tooth of the ratchet-wheel i^2 , as before explained. This last movement of the arm h^4 leaves sufficient space between its said finger and the pawl projection h^3 to allow the pawl h' to rock out of engagement with the ratchet-wheel i^2 on the backward or return stroke of said pawl in moving idly to the position shown in Figs. 1 and 2. This arm h^4 also carries a rearward projection or locking-flange h^8 , arranged, when said arm is moved, to engage a tooth of the ratchet-wheel i^2 and lock the same against overmovement as the pawl h' arrives at the end of its operative throw.

As so far described, the trip and permanent registers are adapted to be moved step by step in unison and the bell sounded each time the conductor actuates the actuating-segment g by pulling on one or the other of the cord portions g' g^2 , the two registers being in gear with the actuating-sleeve i , as before explained, and as this step-by-step movement continues the motor-spring K is being gradually placed under more and more tension by the rotation of the segment e' , thus storing up power to return the trip-register to zero at the desired time.

The means for returning the trip-register to zero in the present case consist of a rotatable shaft L , having connection with the support for the trip-register gear-wheel d^3 , whereby the teeth of said gear are removed from mesh with the pinion i' , thereby freeing said wheel d^3 of all backward restraint and allowing the motor-spring K , acting through the segment e' and pinion e , to automatically rotate the gear-wheel d^3 and index d backwardly until the projection f^6 on the trip-register wheel d^3 or other suitable place strikes a zero-stop f and brings the index d to rest at the zero position.

The index d , gear-wheel d^3 , pinion e , segment e' , and zero-stop arm f are mounted and carried by the bracket d^5 . This bracket d^5 (see

Figs. 1 to 5 and 15) is mounted to slide bodily on the back plate A from the normal position, (shown in Figs. 1, 3, and 4,) with the gear-wheel d^3 in mesh with the pinion i' , into the position shown in Figs. 2 and 15, with said gear and pinion out of mesh. The bracket d^5 is guided in this sliding movement by a screw-stud d^7 , Figs. 1, 2, 5, and 15, that passes through a slot d^8 in the foot of said bracket, and also by a pair of separated hubs d^9 d^{10} , projecting from the foot of the bracket d^5 , which embrace and slide loosely on the rotatable shaft L . The shaft L is mounted in fixed bearings l , Figs. 1 to 3, projecting from the back plate A , and carries near its outer end a flanged collar l' , which in this instance is provided with an incline or cam-face l^2 , arranged to act on a coacting projection d^{11} , that is pivoted to and carried by the bracket d^5 , Figs. 1, 2, 6 to 8, and 13. When the shaft L is rotated, as by means of a grasping-piece l^3 , secured to its outer end on the exterior of the inclosing case, the collar l' is also rotated, causing its incline l^2 in bearing against the pawl d^{10} to force the bracket d^5 in the direction of the arrow 1, Fig. 2, into the position shown in said figure against the force of a spring l^4 , that is interposed between the bracket d^5 and one of the bearings l , Figs. 1 and 3, to be held temporarily in such position by the projection d^{11} , riding on the flat face of the collar l' , until a recess l^5 in the face of said collar l' arrives adjacent the projection d^{11} and allows said spring l^4 to act to force the bracket d^5 back to its normal position. This reciprocation of the bracket d^5 upward and back to its normal position has occurred during a complete rotation of the shaft L , during which time the trip-register gear d^3 has been disconnected from the pinion i' , the motor-spring K has acted to return the index d to the zero position, and the gear d^3 has been returned in mesh with the pinion i' .

To prevent backward rotation of the shaft L , there is provided a pawl and ratchet, the functions of which in this instance are performed by a tooth l^6 on the periphery of the collar l' , (see Figs. 6 and 8,) and the coacting pawl d^{10} , carried by the bracket d^5 , before referred to. The free end of the pawl d^{10} has an outward projection d^{12} , (see Fig. 2,) around and in contact with which the motor-spring K is led from the segment e' to the stop-arm n , before referred to, whereby said pawl is held to duty against the cam l' . The pawl d^{10} has a long face, so as to constantly engage with the periphery of the flanged collar l' during the reciprocation of the bracket d^5 .

A safeguard against fraudulent manipulation of the register is provided by the stop n , Figs. 1, 2, 6, and 7, arranged, when the trip-register gear d^3 is disconnected or moved to be disconnected from the pinion i' , to form an abutment at one side of the pawl-carrier h , so that any attempt at such time to move

the pawl-carrier to operate the ratchet i^2 is prevented. This stop n is in the form of a bell-crank that is pivotally attached at n' to the lower end of the bracket d^5 and arranged to move bodily with the bracket d^5 from its normal inactive position, Fig. 1, into its active stopping position, Fig. 2, with one of its arms directly opposed to the path of movement of the pawl-carrier h to obstruct and prevent its movement, thereby in effect locking the permanent register against any movement through the medium of the pawl-carrier. The other arm of the bell-crank stop n is held yieldingly, bearing against the side of the bracket d^5 under the tension of the motor-spring K. This yielding hold of the stop n in one position renders it possible to move the shaft L, and hence the bracket d^5 , should the pawl-carrier h be not in its normal idle position. On the return of the bracket d^5 to its normal position the stop n is bodily removed from its active position into the position shown in Fig. 1.

In order to prevent a sufficiently quick rotation of the shaft L as to enable a reengagement of the trip-register wheel d^3 with the pinion i' before the spring K or other returning device has had time to wholly return the trip-register to the zero position, means are provided to positively hold the trip-register disengaged from the permanent register, or, as in this case, from the actuating device, until the trip-register is fully set or returned to zero. Without intending to limit this part of my invention to the particular construction shown or to the particular form of fare-register with which it is embodied, these improved means are conveniently associated with the zero-stop f , before referred to. Thus the zero-stop f is carried by an arm f' , constituting a movable catch, (see Figs. 1 to 4 and 15,) the inner end of which arm is pivoted to the bracket d^5 on an inwardly-projecting stud f^5 , from which stud it extends radially upward, and at its outer end is formed with an L-shaped slot f^2 , one wall of which forms a shoulder to engage at a certain time with a stud f^3 , constituting the catch-engaging shoulder or abutment that projects from the base-plate into said slot f^2 , a spring f^4 (see Figs. 4 and 5) being interposed between the bracket d^5 and the arm f' on the lower side of its pivot-stud f^5 , tending to hold the arm, with its slot f^2 , occupying the position with respect to the stud f^3 shown in Fig. 15. In the normal position of the parts, with the index-pointer d at zero, and also during the step-by-step operations of the machine, the zero-stop arm f' occupies the position shown in Fig. 1, the stud f^3 holding said arm f' against movement; but whenever the trip-register is to be returned to zero and as soon as the disengagement of the trip and permanent register takes place, or in the act of effecting such disengagement, the zero-stop arm f' is moved bodily longitudinally with respect to the stud f^5 , so that the spring f^4

is free to immediately rock the arm f' , so that the corner, angle, or shoulder a of the L-shaped slot f^2 engages with the notch in the stud f^5 , as seen in Fig. 15, and holds the zero-stop arm in such position until the index-pointer d arrives at the zero position, whereupon the projection f^6 on the trip-register wheel d^3 strikes the zero-stop f under the power of the return of the index pointer or wheel d^3 to zero position or by the force of the motor-spring K and rocks said zero-stop arm f' in the direction of the arrow, Fig. 15, against the weaker force of the spring f^4 , into the position shown in Fig. 2, ready to permit the zero-stop arm f' to move longitudinally inward to its normal position. (Shown in Fig. 1.)

The register is provided with a direction-indicator in the form of a horizontal roll p , having a shaft k , mounted in fixed bearings provided by brackets p^2 , projecting from the base-plate A, Figs. 1 to 4. The surface of the roll p bears indications, such as "Up," "Down," arranged in this instance at diametrically opposite points on the roll to show, as usual, through an opening p^7 in the dial d' . (See Fig. 4.) One end of the shaft k of this roll p carries a gear p^3 , that is constantly engaged by a gear p^4 , fast to the end of the shaft L, so that each time the shaft L is rotated the direction-indicator roll p is rotated a half-turn to bring another indication to view.

In order to provide a yielding stop determining the normal position of the shaft L, a projection on said shaft, such as the hub of the gear p^4 , has a flattened portion p^5 , against which bears a flat spring p^6 , secured to the face of the base-plate A. (See Figs. 1, 2, and 10.)

It is to be understood that while the several novel features of invention are shown embodied in a particular form of fare-register they are not necessarily limited thereto.

What is claimed is—

1. The combination with the trip-register, the permanent register and means for separating one from the other to return the trip-register to zero, of a catch movable with the separated register and a coacting fixed abutment for temporarily maintaining such separation, as set forth.

2. The combination with the trip-register, the permanent register and means for separating one from the other to return the trip-register to zero, of a catch movable with the separated register and a coacting fixed abutment for temporarily maintaining such separation, and means movable with the trip-register to release the catch, as set forth.

3. The combination with the trip-register, the permanent register and means for separating one from the other to return the trip-register to zero, a catch movable with the separated register and a coacting fixed abutment for temporarily maintaining such separation and a movable zero-stop for the trip-register to release the catch, as set forth.

4. The combination with the trip-register, the permanent register and means for moving the trip-register from gear with the permanent register, of a catch movable with the trip-register and a coacting fixed abutment for temporarily maintaining the trip-register out of gear, as set forth.

5. The combination with the permanent register, a trip-register movable with respect to the permanent register during the resetting operation, of a catch with a coacting fixed abutment for retaining the trip-register in its moved position and means for releasing the catch on the return of the trip-register to zero, as set forth.

6. The combination with the permanent register, of the trip-register wheel, means for moving said wheel with respect to the permanent register in the operation of resetting said wheel to zero position, a catch movable with said wheel, a coacting fixed abutment and means for releasing the catch and abutment on the arrival of the wheel at the zero position, as set forth.

7. The combination with the main actuating-shaft of a register-wheel normally in gear with said shaft, means for separating said shaft and wheel to rotate the wheel independent of the shaft, a catch and coacting fixed abutment for temporarily maintaining such separation, as set forth.

8. The combination with the main actuating-shaft, and a permanent register in gear therewith, of a trip-register normally in gear with said shaft, means for moving the trip-register out of gear therewith, a movable catch and coacting fixed abutment for temporarily holding the trip-register out of gear, and a zero-stop for releasing the catch, as set forth.

9. The combination with the permanent register and the trip-register, of a rotatable shaft and cam for separating one register from the other, means for returning the trip-register to zero and a catch and coacting abutment temporarily holding the two registers separated, as set forth.

10. The combination with a permanent register, a reciprocatory bracket and a trip-register carried by the bracket, means for reciprocating the bracket and register, and a catch and coacting abutment temporarily holding the bracket in its moved position, as set forth.

11. The combination with the reciprocatory

bracket and register-wheel mounted therein, of a catch carried by said bracket, a coacting abutment for the catch, a zero-stop connected to release the catch, and means for moving the wheel to the zero-stop, as set forth.

12. The combination with the actuating pawl-carrier, and the trip-register rotated by moving the pawl-carrier, of a movable bracket carrying the register, a yielding stop for the pawl-carrier moved with the bracket, and means for moving the bracket and for returning the trip-register to zero.

13. The combination with the trip-register, a bracket carrying the same, and an actuating device for the register, of a yielding stop for the actuating device and a single spring connected to the register and stop adapted to return the trip-register to zero and yieldingly hold the stop, as set forth.

14. The combination with the trip-register, a bracket carrying the same and an actuating device for the register, of a yielding stop for the actuating device, a handle and connections for moving the bracket and stop, a pawl preventing backward movement of the handle, and a single spring connected to the register-stop and pawl adapted to return the trip-register to zero, hold the pawl to duty and hold the stop yieldingly in position, as set forth.

15. The combination with the permanent and trip registers and the main actuating-sleeve and ratchet therefor, of a shaft supporting the sleeve, the back plate supporting the shaft, a pawl-carrier and pawl mounted on the shaft on one side of the back plate, an actuating-segment on the shaft on the opposite side of the back plate, and connections between the segment and pawl-carrier, as set forth.

16. The combination with the pawl-carrier and pawl, the ratchet engaged by the pawl, of a locking-flange to engage a tooth of the ratchet to prevent overmovement, and connections with the ratchet for moving said flange into active position, as set forth.

In witness whereof I have hereunto signed my name in the presence of two witnesses.

GUSTAVUS REIN.

Witnesses:

J. A. STEPHENSON,
E. M. TRACY.