

No. 609,938.

Patented Aug. 30, 1898.

J. A. KEYES.
FARE REGISTER.

(Application filed Feb. 17, 1897. Renewed Nov. 13, 1897.)

(No Model.)

3 Sheets—Sheet 1.

FIG:1.

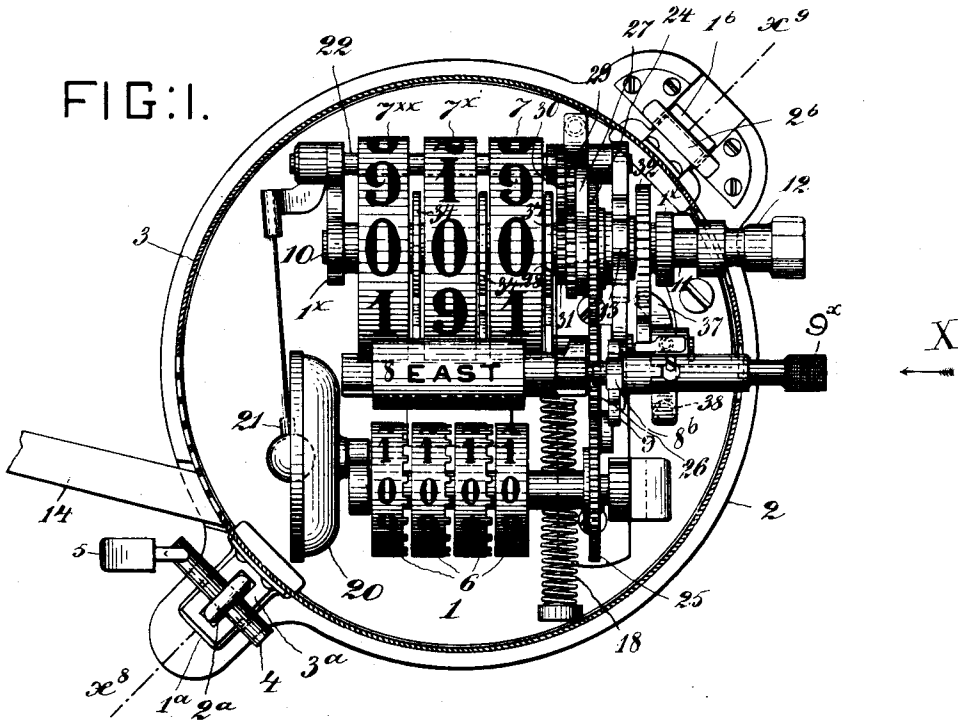
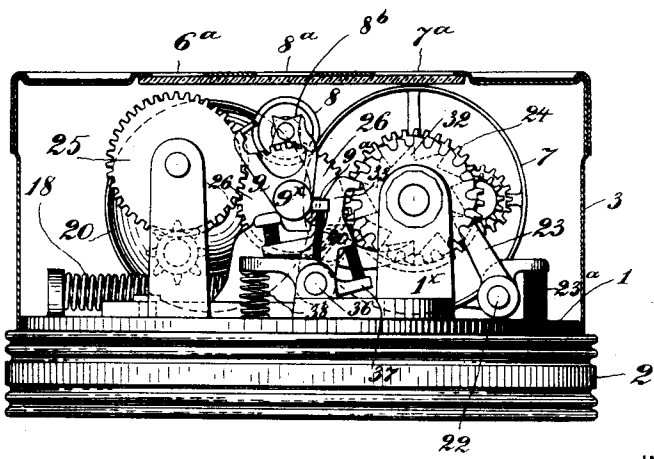


FIG:2.



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3 Sheets—Sheet 2.

FIG: 3.

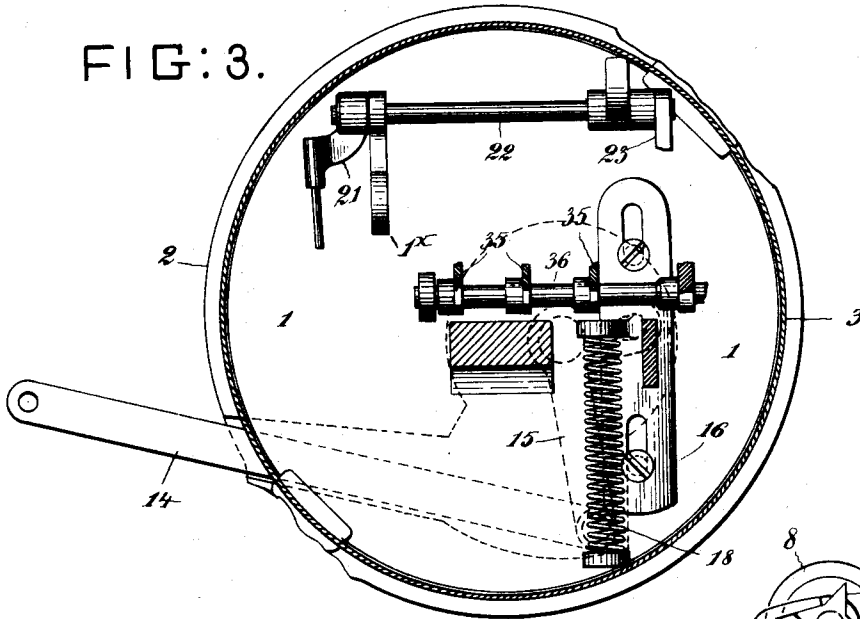
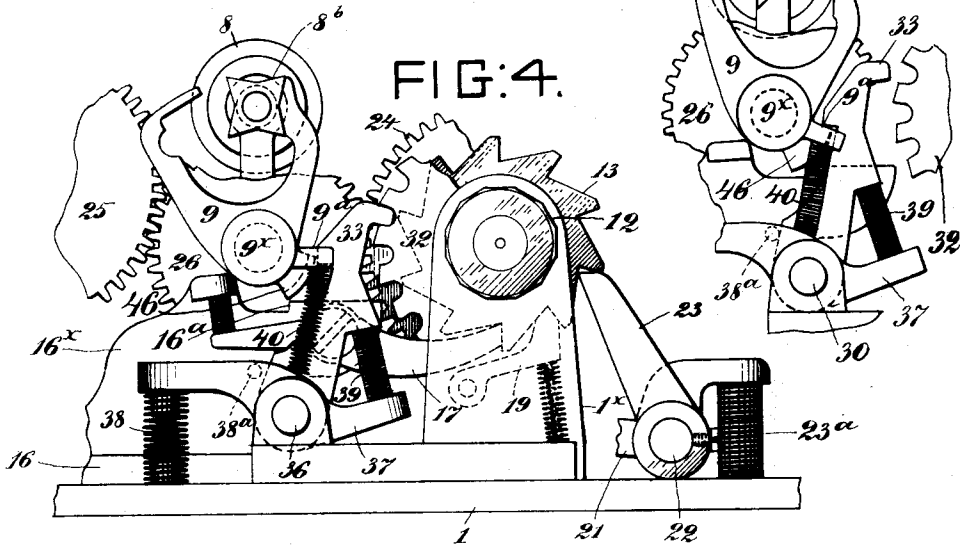


FIG: 4^a



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3 Sheets—Sheet 3.

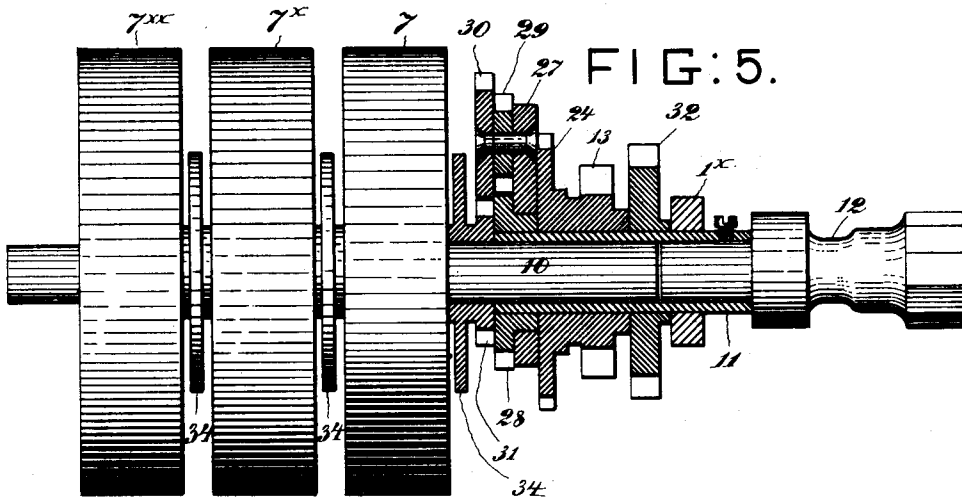


FIG: 6.

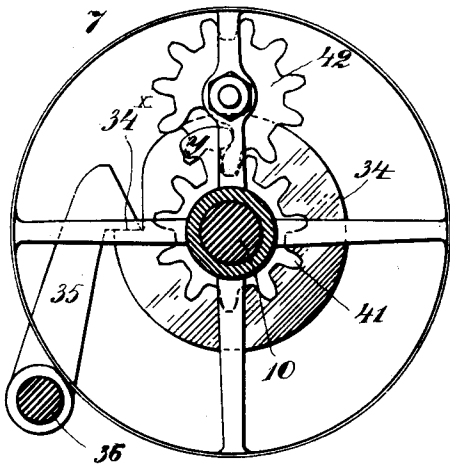


FIG: 7.

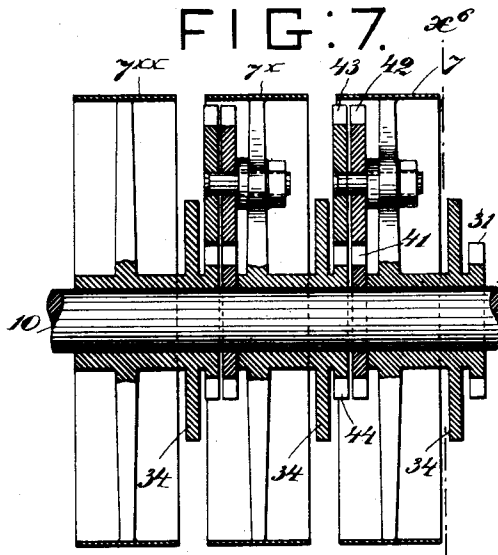


FIG: 8. ga

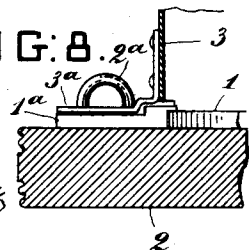
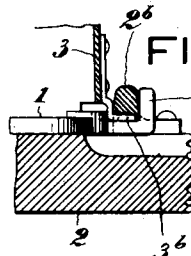


FIG: 9.



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FARE-REGISTER.

SPECIFICATION forming part of Letters Patent No. 609,938, dated August 30, 1898.

Application filed February 17, 1897. Renewed November 13, 1897. Serial No. 658,438. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. KEYES, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Fare-Registers, of which the following is a specification.

This invention relates to fare-registers such as are used on street-cars, and more particularly to that class of registers in which a trip-register is combined with a permanent register and a direction-indicator, although some parts of my invention are also capable of use in other registers.

One object of my invention is to provide the apparatus with a resetting mechanism of simple and efficient construction and which when combined with a permanent register permits the trip-register to be set back to zero at the end of the trip without requiring the uncoupling of the gears which connect with the permanent register.

My invention has also the object to improve the machine in various other respects.

In the accompanying drawings, consisting of three sheets, Figure 1 is a face view of the register with the inclosing casing in section. Fig. 2 is a side view of the register as seen in the direction of the arrow X, Fig. 1, with the casing in section. Fig. 3 is a face view of the back plate and parts in rear of the registering mechanisms. Fig. 4 is a fragmentary side view similar to Fig. 2, on an enlarged scale. Fig. 4^a is a view showing the escapement mechanism and connecting parts in a different position from that shown in Fig. 4. Fig. 5 is a sectional view of the trip-register on an enlarged scale. Fig. 6 is an end view of the mechanism which connects two of the number-bearing wheels of the trip-register, on an enlarged scale and partly in section, the section being taken in line $x^6 x^6$, Fig. 7. Fig. 7 is a longitudinal section through the same. Figs. 8 and 9 are detail sectional views of the locking devices of the casing, the planes of the sections being respectively indicated by the lines x^8 and x^9 in Fig. 1.

Like numerals and letters of reference refer to like parts in the several figures.

The mechanism of the register is mounted on a plate 1, secured to a back plate 2, preferably of wood, and it is inclosed in a casing

3 in the usual way. The locking device for the casing is represented in Figs. 1, 8, and 9 and is constructed as follows: On the wooden base 2 is a hasp-loop 2^a, and at the opposite side of the register is a stirrup-keeper 2^b. On the plate 1 are a hasp 1^a to engage the hasp-loop 2^a and a hooked lug 1^b to engage the keeper 2^b. The casing 3 fits down over the mechanism on the plate 1 and has a hasp 3^a, (see Fig. 8,) which also engages the hasp-loop 2^a, and a lug 3^b, (see Fig. 9,) which engages the keeper 2^b on the base. The hasp and lug on the casing rest on the corresponding parts on the plate 1 when the casing is in place, and in assembling the parts the casing is first placed over the mechanism with the hasp and lug on the casing resting on the corresponding parts of the plate 1. The whole is then placed on the wooden base, the lugs being first made to engage the keeper 2^b and the hasps afterward brought down and made to engage the hasp-loop 2^a. A key 4, Fig. 1, is now passed through the hasp-loop and a padlock 5 locked therein in a well-known way. The specific novel feature is the providing of the casing 3 with the hasp 3^a and lug 3^b for locking, in connection with the corresponding parts on the plate 1 and the devices on the base 2.

The registering mechanism is constructed as follows: The permanent or continuous register is composed in the usual way of numeral-bearing wheels 6, which, as here shown, are visible at sight-apertures (6^a in Fig. 2) in the casing, and the trip-register is composed of numeral-bearing wheels 7 7^x 7^x, which are visible through sight-apertures (7^a in Fig. 2) in the casing. Between the two registers is situated the ordinary direction-indicator 8, also visible at a sight-aperture (8^a in Fig. 2) in the casing. This indicator indicates the direction in which the car is traveling—that is, up or down, easterly or westerly, &c. In the present case the indicator is a roller having on its sides in alternate order the words "East" and "West," and it is adapted to be rotated intermittently a quarter-way round by an escapement device comprising a four-sided block 8^b on the journal of the roller and a vibratable fork 9, the branches of which embrace said block. This fork 9 has a projecting handle 9^x, which extends out through

a hole in the casing 3, so that the operator may grasp it and rock the fork, each vibration of which imparts a quarter-rotation to the indicator-roller 8 and brings up the proper inscription to the sight-aperture 8^a. I do not broadly claim this indicator nor the means for operating it.

The wheels 7 7^x 7^{xx} of the trip-register are rotatively mounted on a rod, arbor, or fixed shaft 10, mounted in bearings 1^x on and raised above the plate 1. Fig. 5 illustrates in longitudinal section the construction seen in face view at the right in Fig. 1. In the construction as illustrated a tubular resetting-shaft 11 embraces the arbor 10 in the manner of a sleeve, and said tubular shaft rotates in the bearing 1^x. (Seen at the right in Figs. 1 and 5.) A suitable handle 12 has a short stem, which is socketed in the outer projecting end of the tubular shaft 11 and is fixed thereto by a screw. On the resetting-shaft 11 is rotatively mounted the actuating ratchet-wheel 13, and intermittent rotation is imparted to this wheel through the medium of the ordinary register-operating mechanism, sufficiently well illustrated in Figs. 3 and 4. This mechanism comprises a pull 14, coupled to one arm of a bell-crank lever 15. (Seen in dotted lines in Fig. 3.) This lever is fulcrumed on the base, and a hole in the other arm thereof engages a pin which projects through the plate 1 from a pawl-slide 16 on the said plate. This slide carries a spring-pressed pawl 17, which engages the teeth at the under side of the wheel 13, Fig. 4, and after the slide 16 has been drawn back by the pull 14 and the latter freed a compression-spring 18, connected with the pawl-slide, drives the latter forward (or upward as the fare-register is usually mounted) and causes the pawl 17 to advance the wheel 13 one tooth. A spring-pressed stop-pawl 19 (seen in dotted lines in Fig. 4) prevents back rotation of the wheel 13. A gong 20 is also sounded at each operation by a hammer 21, the helve of which is fixed to a rock-shaft 22, carrying an arm 23, which bears on the ratchet-wheel 13, being pressed up thereto by a spring 23^a.

Fixed to or integral with the ratchet-wheel 13 is a toothed wheel 24, which drives a similar wheel 25 on the permanent register through an intermediate gear-wheel 26.

The above-described mechanism for operating the wheel 13 and through it the permanent register and the gong and its mechanism possess no specially novel features.

In order to drive the first numeral-bearing wheel 7 of the trip-register from the ratchet-wheel 13 an arm or carrier 27, Fig. 5, is fixed to the gear-wheel 24 and rotates with it. As here shown the arm 27 has a boss which turns freely about the hub of a gear-wheel 28, fixed on the tubular shaft 11, and said arm carries a pinion 29, which gears with the wheel 28 and rolls about it when the arm 27 is carried around in the ordinary operation of the trip-register. Fixed to the pinion 29 is a toothed

wheel 30, which gears with a toothed wheel 31, belonging to and fixed to the wheel 7 of the trip-register, whereby rotation of this wheel 7 is effected, the movement of wheel 7 being opposite to that of the ratchet-wheel 13.

In order to enable the car-conductor to set back the trip-register to zero at the end of his trip without the necessity of specially uncoupling or disengaging it from the permanent register, the following mechanism is employed:

Fixed on the resetting-shaft 11 is a toothed locking-wheel 32, with which engages a locking-dog 33, as seen best in Figs. 2 and 4. This dog prevents the rotation of the shaft 11 in either direction and makes this shaft and the wheels 28 and 32 fixed elements during the ordinary operation of registering fares; but when the dog 33 is disengaged from the teeth of the wheel 32 the resetting-shaft 11 may be turned by means of the handle 12. This has the effect to rotate the wheel 28, and it acts through the pinion 29 and wheels 30 and 31 to rotate the wheel 7 of the trip-register back to zero. When brought to zero, the shoulder 34^x on the cam-disk 34, (see Figs. 5 and 6,) fixed to the wheel 7, engages a spring stop-pawl 35 and prevents further rotation backward. The pawl 35 is fixed on a rock-shaft 36, (seen best in Fig. 6,) on which the dog 33 is loosely mounted. Fixed on the rock-shaft 36, Fig. 4, is a rocking lever or rocker 37, under one arm of which is a spring 38, which tends to keep the stop-pawl 35 pressed up to the disk 34, and between the other arm of the rocker 37 and a lug or shoulder on the dog 33 is a spring 39, which tends normally to press the dog 33 away from and out of engagement with the toothed wheel 32. Normally a lug 9^a on the escapement-fork 9 takes behind the dog 33 and prevents it from being pressed back out of engagement with wheel 32, the escapement being held in the rocked position seen in Fig. 4 by a spring 40 under the lug 9^a.

The operation of the mechanism so far as described is as follows: Let us suppose the car has been making its trip "east," for example, and some fares have been registered. At the end of the trip the conductor first proceeds to shift the direction-indicator 8 by turning the handle 9^x thereof to the right. The effect of this is to throw down the lug 9^a and allow the dog 33 to be pressed back out of engagement with the notches or teeth in wheel 32, as seen in 4^a, which shows this position of the parts. It may be explained here, by reference to Fig. 6, that at all times except when the wheels of the trip-register are at zero the nose of the pawl 35 rides on the periphery of the disk 34, thus rocking the shaft 36 and rocker 37, Fig. 4, in such a manner as to compress the spring 39, whereby as soon as the pressure back of the dog 33 is relieved the spring 39 forces it back and frees the wheel 32. The operator cannot complete the setting of the direction-indicator 8, as a

shoulder on the back of the dog 33 (see Fig. 4^a) now takes over the lug 9^a and prevents the fork 9 from rocking or vibrating back again. The operator now seizes the handle 12 and rotates it, (to the left in Figs. 2 and 4,) and this has the effect to rotate the resetting-shaft 11 and the wheels 28 and 32 fixed thereon, the wheel 28 driving the register-wheel 7 backward through the intermediate wheels 29, 30, and 31. The arm 27 being rigidly connected with the ratchet-wheel 13 will be held stationary during this operation.

When the wheel 7 returns to zero, the pawl 35 (see Fig. 6) will engage the shoulder 34^x on the disk 34 and thus allow the spring 38 to rock the shaft 36 and rocker 37, so as to relieve the tension on spring 39. At the same time a pin 38^a on the rocker (seen in dotted lines in Fig. 4) strikes the dog 33 and throws it forward into engagement with the wheel 32, thus locking the shaft 11. As soon as the dog 33 moves out of the way the spring 40 rocks the fork 9 and completes the movement of the direction-indicator 8.

The resetting-shaft is preferably tubular, as shown, in order to support it on the stationary arbor, thereby dispensing with bearings for the adjacent ends of the arbor and resetting-shaft; but this special construction of the parts is merely a matter of convenience and not essential.

Heretofore I have referred only to the wheel 7 of the trip-register; but this register usually consists of three wheels, as herein shown, 7 being the "units-wheel," 7^x the "tens-wheel," and 7^{xx} the "hundreds-wheel." The units-wheel 7 is driven intermittently by the means described one-tenth of a rotation at each operation of the pull 14, and at the last impulse of each complete rotation it imparts one impulse to the tens-wheel 7^x in the opposite direction through the medium of mechanism I will now describe, with especial reference to Figs. 6 and 7 for illustration.

On the fixed shaft 10 is secured a toothed wheel 41, which has eleven teeth, one of which is long and broad at its end. This tooth is marked *y* in Fig. 6. On an arm of the wheel 7 are rotatively mounted two wheels 42 and 43, of the same size as the wheel 41. These wheels are secured together and are alike, except that the wheel 42, which gears with the wheel 41, has a deep recess to receive the long tooth *y* on the wheel 41, this recess cutting away one of the teeth of wheel 42. The wheel 43 gears with a wheel 44 having eleven teeth fixed to the boss of the tens-wheel 7^x of the trip-register. The effect of this construction is that the wheels 42 and 43, carried by the units-wheel 7, roll around the respective wheels 41 and 44 until the last impulse of the rotation of wheel 7, when the engagement of the recess in wheel 42 with the long tooth *y* on wheel 41 causes the wheels 42 and 43 to be moved thereby to the extent of two teeth, and thus the wheel 43 is also moved, but in the opposite direction, to the extent of two teeth.

The ultimate effect is that at each rotation of the register-wheel 7 the wheel 7^x is rotated one impulse or one-tenth of a full rotation in the opposite direction.

At each full rotation of the wheel 7^x the wheel 7^{xx} is rotated to the extent of one impulse and by the same kind of mechanism as that just described. I have not deemed it necessary to describe the mechanism by which the wheel 7^x drives the wheel 7^{xx}, for the reason that it is identical with that already described. Of course the trip-register may be composed of any number of these numeral-bearing wheels.

I have not deemed it necessary to show the numerals on the faces of the wheels 7 7^x 7^{xx} in Fig. 5. They are clearly shown in Fig. 1.

It is desirable that the register-operating mechanism—that is, the pull 14, slide 16, and pawl 17—shall be locked against movement when the trip-register is being set back to zero, and to effect this the device seen in Fig. 4 is employed. The pawl 17 is mounted on an elevated portion or rib 16^x on the slide 16, and the top or upper edge of this rib is recessed, so as to form a shoulder 16^a; and on the boss of the rocking fork 9 is a projecting lug 46, which under the normal position of the fork seen in Fig. 4 stands clear of the said shoulder 16^a, but which when the fork is rocked to the position seen in Fig. 4^a will take behind said shoulder and prevent the slide 16 from being drawn back.

It will be noted that when the trip-register is set at zero the direction-indicator may be operated freely. This is necessary, as the car may take no fares on its trip in one direction, and the direction-indicator will then have to be changed without operating the register.

It will also be noted that compression on the spring 39 tending to disengage the dog 33 from the wheel 32 will continue until all of the numeral-bearing wheels of the trip-register are brought to zero, as all of the pawls must engage the notches in the disks 34 before the spring 38 can tilt the rocker 37, so as to relieve the compression on spring 39.

In Fig. 6 the pawl 35 is represented as a hook-pawl, for the reason that in this view the pawl belonging to the disk 34 of wheel 7^x is seen. This wheel 7^x rotates in the opposite direction to wheels 7 and 7^{xx}.

Having thus described my invention, I claim—

1. The combination with the trip-register, of a resetting-shaft which is connected by gears with the trip-register, an actuating ratchet-wheel which turns independently of said shaft but is connected with the gears which connect said shaft with the trip-register, and means whereby the resetting-shaft is locked against rotation while the actuating ratchet-wheel turns in registering, or released for rotation in resetting while the actuating-wheel is stationary, substantially as set forth.

2. The combination with the trip-register

and the permanent register, of a resetting-shaft which is connected by gears with the trip-register, an actuating ratchet-wheel which turns independently of said shaft but is connected with the gears which connect the shaft with the trip-register, gears whereby the actuating ratchet-wheel is permanently connected with the permanent register, and means whereby the resetting-shaft can be locked against rotation while registering or released for rotation in resetting, substantially as set forth.

3. The combination with the trip-register, and the direction-indicator, of a resetting-shaft which is connected by gears with the trip-register, an actuating ratchet-wheel which turns independently of said shaft but is connected with the gears which connect the shaft with the trip-register, a locking-wheel secured to the resetting-shaft, a locking-dog engaging with said wheel, and an escapement mechanism by which the direction-indicator is actuated and which controls said locking-dog, substantially as set forth.

4. In a fare-register, the combination with the units-wheel of the trip-register, of a resetting-shaft 11, alined with the axis of said wheel, the ratchet-wheel 13, mounted loosely on said shaft, means for imparting intermittent rotary motion to said ratchet-wheel, a toothed wheel 28, fixed on said shaft 11, a toothed wheel 31, fixed to said units-wheel, a carrier attached to the ratchet-wheel 13, two wheels 29 and 30 secured together and rotatively mounted on said carrier, the former gearing with the wheel 28 and the latter with the wheel 31, and means for holding said shaft 11 against rotation during the normal operation of the register, substantially as set forth.

5. In a fare-register, the combination with a resetting-shaft 11, the toothed wheels 28 and 32, fixed thereon, the ratchet-wheel 13, mounted loosely thereon and provided with a carrier the rotatably-mounted units-wheel of the trip-register provided with the toothed wheel 31, and the toothed wheels 29 and 30, secured together and gearing, respectively, with the wheels 28 and 31, of the locking-dog 33, adapted to engage the teeth of the wheel 32, the direction-indicator 8, the vibrating escapement-fork 9 for intermittently rotating the indicator 8, said fork having a lug 9^a, adapted to engage the dog 33 at its back, as described, the spring 39 under the dog 33 and means, substantially as described, for putting said spring 39 under compression except when the trip-register is at zero.

6. In a fare-register, the combination with the numeral-bearing wheels of the trip-register, each carrying a disk 34 with a notch and a shoulder 34^x, the rock-shaft 36, the pawls 35 thereon and bearing on the respective disks

34, the rocker 37, fixed on the shaft 36, the spring 38 under one arm of said rocker, the locking-dog 33, the spring 39, between the other arm of said rocker and a shoulder on the dog 33, the toothed wheel 32, with which the locking-dog engages, the rotary direction-indicator 8, having the square 8^b, the vibratable fork 9, and the spring 4, under a lug on said fork, said fork being provided with a lug which takes behind the locking-dog and holds the latter in its locking position normally, substantially as and for the purposes set forth.

7. In a fare-register, the combination with two rotatively-mounted numeral-bearing wheels of a trip-register, as the units and tens wheels, and mechanism for imparting intermittent rotation to the said units-wheel, of a fixed wheel 41 arranged concentrically with the units-wheel and having one long tooth, y , with an enlarged extremity, a wheel 42, rotatively mounted on the units-wheel and gearing with the fixed wheel 41, said wheel 42 having in it a recess to receive the enlarged tooth y , of wheel 41, the wheel 43, fixed to the wheel 42 and rotating concentrically therewith, and the wheel 44, fixed to and concentric with the tens-wheel of the register, whereby, at each rotation of the units-wheel the tens-wheel is rotated through a predetermined extent in the opposite direction.

8. In a fare-register, the combination of the rotatively-mounted numeral-bearing wheels 7 and 7^x, of means whereby at each full rotation of the wheel 7, the wheel 7^x will be rotated in the opposite direction through a predetermined portion of its rotation, said mechanism comprising a fixed wheel 41, concentric with the wheels 7 7^x, said wheel having one elongated and enlarged tooth y , the wheel 42 mounted on the wheel 7, in gear with wheel 41, and having a recess to receive the enlarged tooth on the latter, the wheel 43, fixed to and concentric with the wheel 42, and the wheel 44 on and concentric with the wheel 7^x, and in gear with the wheel 43, substantially as set forth.

9. In a fare-register, the combination with the ratchet-wheel 13, the pawl-slide 16, having a shoulder 16^a, and the pawl 17, all arranged to operate as described, of the vibrating or rocking fork 9, having a part 46, adapted to be moved into the path of the shoulder 16^x, when the fork is rocked, substantially as set forth.

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

JAMES A. KEYES.

Witnesses:

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