



No. 841,084.

PATENTED JAN. 8, 1907.

C. E. GIERDING.

FARE REGISTER.

APPLICATION FILED SEPT. 28, 1906.

2 SHEETS—SHEET 2.

Fig. 4.

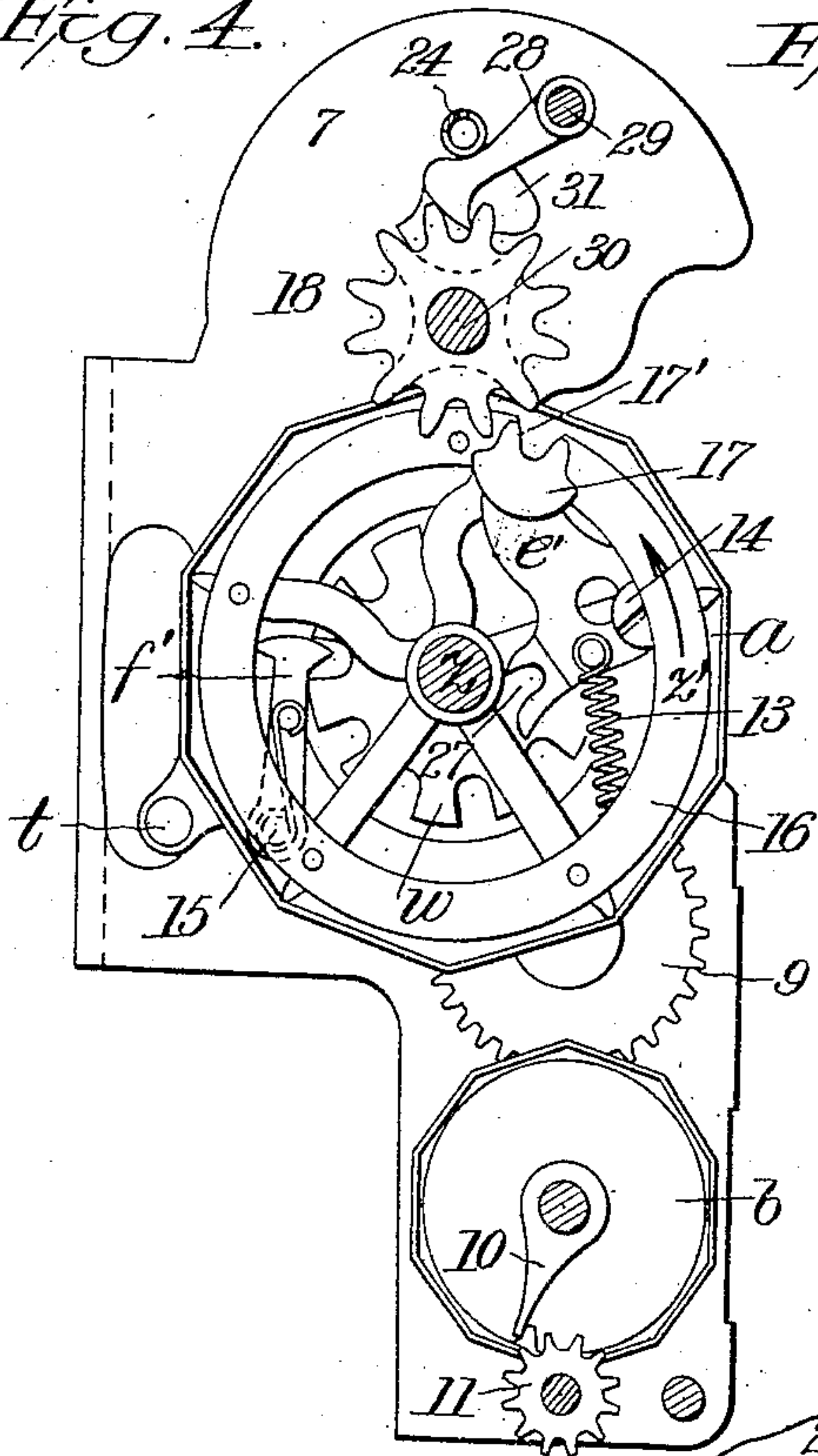


Fig. 5.

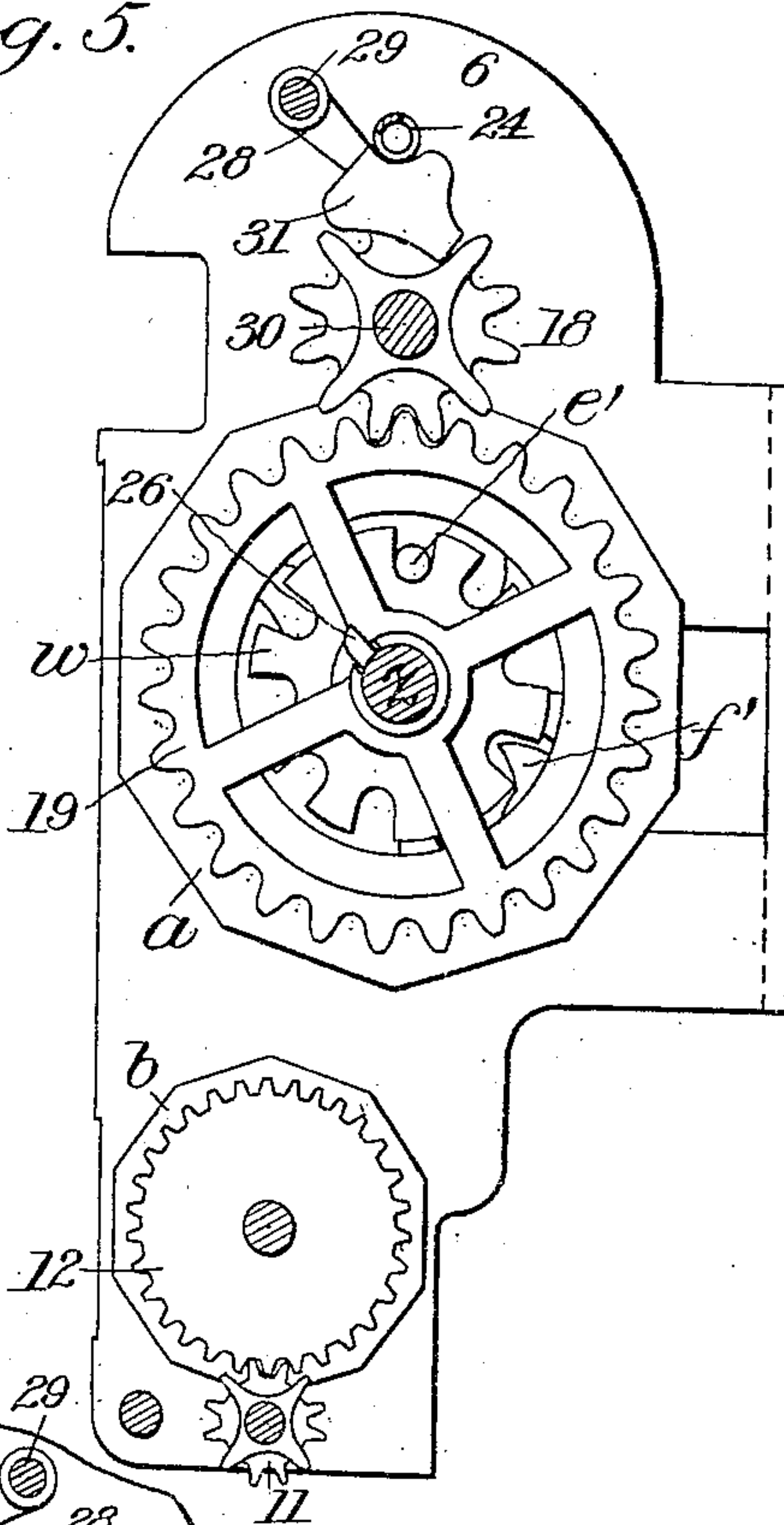
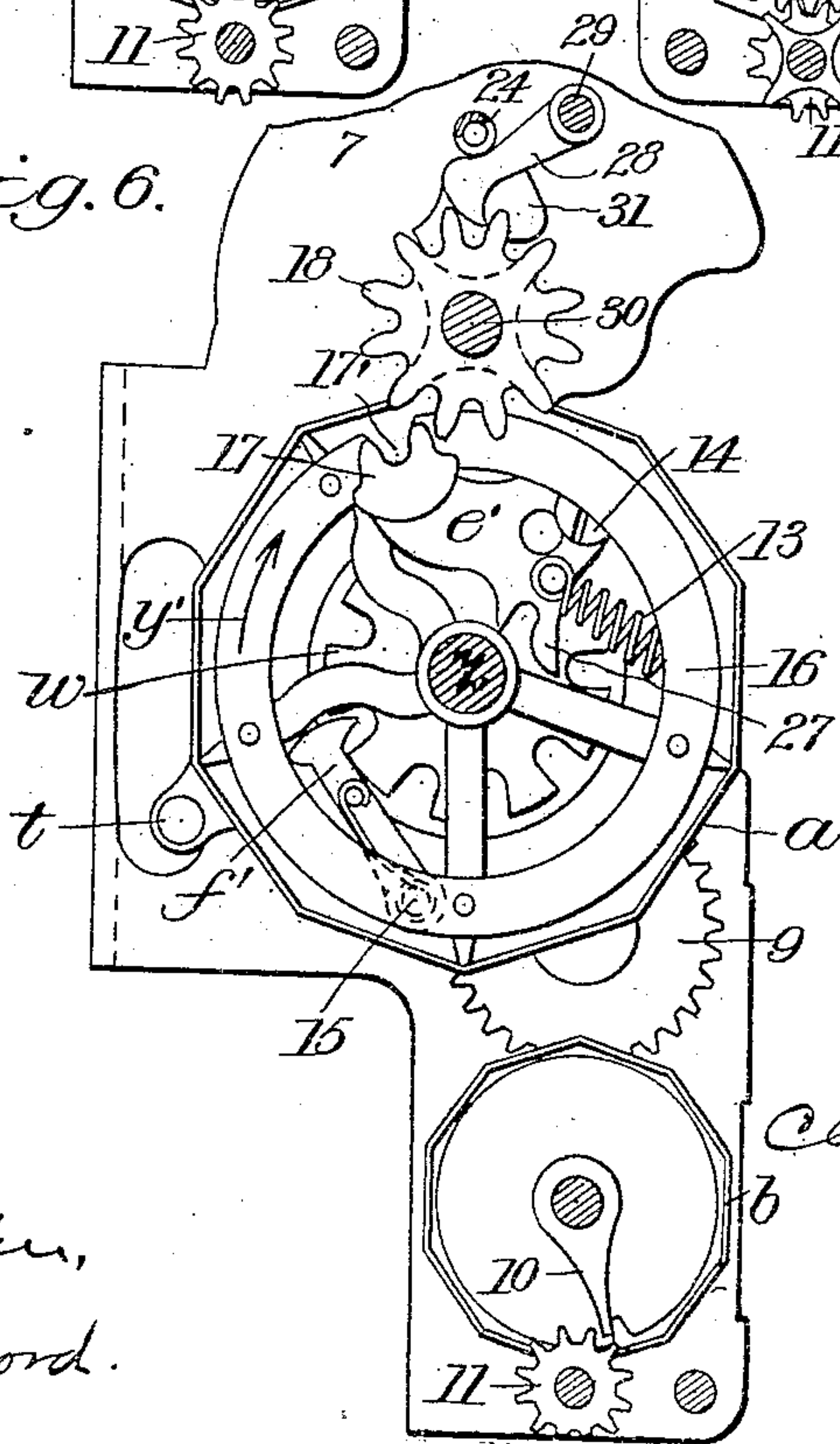


Fig. 6.



Witnesses

C. M. Walker,  
A. M. Spofford.

Inventor

Charles E. Gierding  
by his attorney  
R. L. Ewin



# UNITED STATES PATENT OFFICE.

CHARLES E. GIERDING, OF NEWARK, NEW JERSEY.

## FARE-REGISTER.

No. 841,084.

Specification of Letters Patent.

Patented Jan. 8, 1907.

Application filed September 28, 1906. Serial No. 336,603.

*To all whom it may concern:*

Be it known that I, CHARLES E. GIERDING, a citizen of the United States of America, and a resident of Newark, in the State of New Jersey, have invented a new and useful Improvement in Fare-Registers, of which the following is a specification.

This invention relates primarily to the zero-stop mechanism or devices of fare registers or recorders or combined registers and recorders, herein referred to in common as "fare-registers;" but the improvement may be embodied in part in registers or recorders or combined registers and recorders other than fare-registers. These latter are herein referred to in common with fare-registers as "registers."

The improvement is confined to those fare-registers or other registers in which decimal numeral-wheels are employed and in which provision is made for turning such wheels backward to zero from time to time, as at the end of each trip or each period covered by a fare in the case of fare-registers; and the leading object of the invention is to adapt the nearly common intermittent spur-gear carrying or transmitting mechanism of such numeral-wheels to form effective zero-stops for the units-wheel and such other numeral-wheels as may have a wheel of higher value to the left of them.

Other objects of the invention will appear from the general description which follows.

The invention consists in certain novel combinations of parts hereinafter described and claimed.

Two sheets of drawings accompany this specification as part thereof.

Figures 1 and 2 are respectively a face view and an edge view of a fare-register embodying the invention. Fig. 3 is a face view, on a larger scale, of the back part of the register-casing shown at the right in Fig. 2 and of the parts within the same, omitting those parts which do not form elements of any of the combinations hereinafter claimed and are not considered necessary for a full understanding of the present invention. Fig. 4 represents a section through the mechanism of the fare-register on the line A B, Fig. 3, looking in the direction of the arrow  $x$ , Fig. 3, with some of the parts in the plane of section in elevation. Fig. 5 represents a section on the same line looking in the direction of the arrow  $x'$ , Fig. 3; and Fig. 6 represents the same section as

Fig. 4 with the numeral-wheel in the foreground in a different angular position, illustrating the registering operation.

Like reference characters refer to like parts in all the figures.

The external characteristics of the fare-register shown in the drawings include a circular drum or casing (shown complete in Figs. 1 and 2) and composed of separable back and front parts 1 and 2, made, respectively, of cast metal and sheet metal, together with a transparent dial-cover 3, of glass, behind which the indications of trip-register numeral-wheels  $a$ , totalizer numeral-wheels  $b$ , and a direction-indicator  $c$  are exposed to view through the respective apertures  $a'$ ,  $b'$ , and  $c'$  of an apertured dial-plate 4 as in Fig. 1.

Other external characteristics are means for actuating said trip-register and totalizer wheels to register each fare on both, such actuating means being represented by the customary rearwardly-protruding stud 5, Fig. 2, and means for periodically resetting the trip-register wheels to zero and operating said direction-indicator  $c$ , such resetting and operating means being represented by the customary external resetting knob or key  $k$ , Figs. 1, 2, and 3. Said back part 1 of the register-casing is provided internally with the movable part, (not shown,) from which said actuating-stud 5 projects through the customary slot or suitable opening in the back plate, and means for retracting the same, including an amplifying-lever  $p$ , Fig. 3, connected with a retracting-spring. (Not shown.)

The other parts of the register mechanism include a pair of frame-pieces 6 and 7, Figs. 3 to 6, inclusive, perpendicular to the back plate of said back part 1 and rigidly attached thereto in the working register. When said moving part within the back part 1 is "pulled" through the medium of the customary operating back and said stud 5, its motion is transmitted primarily to a pawl-carrier  $t$ , which rocks on an axis concentric with that of the trip-register wheels  $a$ . Said pawl-carrier  $t$  carries a working pawl  $u'$ , which interacts with a ratchet-wheel  $u$ , Fig. 3, and is further supported by a bracket or bridge-piece 8, fixedly attached to said right-hand frame-piece 7, and a spring-pressed detent-pawl  $u^2$  is pivotally attached to said right-hand frame-piece 7 and interacts with



said ratchet-wheel *u* to prevent retrogression, the whole constituting a pawl-and-ratchet device of known construction.

The step-by-step movements of the ratchet-wheel *u* are transmitted directly to the units-wheel of the trip-register wheels *a*, with which said ratchet-wheel *u* is concentric, and by a train of spur-gearing, represented at 9, in Figs. 3, 4, and 6, to the units-wheel of the totalizer-wheels *b*, which is thus made to rotate synchronously with the units-wheel of the trip-register in the registering operation.

Motion may be transmitted from wheel to wheel in the totalizer by any known or improved means. Intermittent spur-gear carrying or transmitting means of known construction is represented at 10, 11, and 12 in Figs. 3 to 6, inclusive.

To provide for resetting the trip-register numeral-wheels *a* backward to zero independently of the actuating mechanism, said ratchet-wheel *u* is connected with the units-wheel of said numeral-wheels *a* through the medium of the first gear of said gearing 9, a stop-wheel *v* adjoining the same in the form of a reversed ratchet-wheel and a notched clutch-wheel *w* adjoining said stop-wheel, which are loose on the shaft *z* of said numeral-wheels *a* and are normally coupled to said units-wheel by a tumbler *e'*, a stud-pin on the latter being interlocked with the notched periphery of said clutch-wheel by a spring 13, stretched from said tumbler to a stud within the units-wheel. The tumbler *e'* is attached to the units-wheel by a pivotal screw 14, and a spring-pressed detent-pawl *f'*, attached to said units-wheel by a pivotal screw 15, interacts with the notched periphery of the clutch-wheel *w* to limit the rotation of the numeral-wheel in the resetting operation to the backward direction. The registering motion of said numeral-wheels *a* is transmitted from wheel to wheel by suitable intermittent spur-gearing, to which the present invention more particularly relates, interacting with like clutch-wheels *w*, tumblers *e'*, and detent-pawls *f'* within the several numeral-wheels. The elements of said intermittent spur-gearing connecting the numeral-wheels *a* with each other include a side ring 16, fixedly attached to the left-hand side of each numeral-wheel having a numeral-wheel of higher value to its left and constructed with a transmission device 17, preferably in the form of two spur-teeth united with each other at the bases of the teeth, the interdental space being coincident with the customary notch 17', the whole being conveniently integral with said ring 16. A pinion 18, herein termed a "trip-pinion," arranged to interact with said transmission device at each transmission-point, is preferably and conveniently of known construction in the form of a small spur-wheel of twelve teeth and a star-wheel of four teeth coincident with

four of the teeth of the spur-wheel, both of one diameter, the two being integral with each other and the teeth of the spur-wheel portion about twice as wide as those of the star-wheel. The other elements of the transmission-gearing are spur-rings 19, connected by spiders with the clutch-wheels *w* of those numeral-wheels which have a numeral-wheel of less value at their right, and thus rendered movable only in the registering operation, these spur-rings being in constant mesh with the spur-wheel portions of the respective trip-pinions 18.

In the registering operation motion is transmitted through the units clutch-wheel *w* or its equivalent to the units-wheel and to the transmission device 17, which it carries, the latter revolving in the direction indicated by the arrow *y'* in Fig. 6, and when it contacts with the spur-wheel portion of the contiguous trip-pinion 18, as in Fig. 6, this trip-pinion is turned on its axis, and an adjacent tooth common to the spur-wheel portion and the star-wheel enters the interdental space 17' of the transmission device 17 and passes out of contact with the trip-pinion with the parts in the relative positions shown in Fig. 4, the contiguous spur-ring 19 and the clutch-wheel *w* and its appurtenances of the tens-wheel to which said spur-ring is attached having been meanwhile turned, and there-with the tens-wheel itself, so as to indicate the registration of the tenth fare. It will be understood that registering motion is transmitted from wheel to wheel throughout the series in like manner.

For resetting the numeral-wheels *a* to zero said shaft *z*, which is common to said wheels, is rotatable by means of the resetting-key *k*, which is screwed into its right-hand end, and is also movable endwise by means of said key. In the registering operation it occupies the position in which it is shown in full lines in Fig. 3 and is locked against rotation by a notched collar 20, fast on the shaft, and an interlocking stud 21, attached to said yoke-piece 8, for example. It is held in this position through the medium of a lever 22, pivoted to a lug 23 on the right-hand frame-piece 7 near the lower edge of the register by a tensile spring 24, stretched horizontally from the upper end of said lever 22 near the top of the register to the left-hand frame-piece 6. A locking-bolt 25 is attached to said lever 22 near its spring end and interlocks with a flange on the pawl-carrier *t* when the shaft *z* is pulled outward to unlock the shaft for the resetting operation. The pawl-carrier *t* is thus locked against registering actuation when the resetting-shaft *z* is unlocked, and vice versa. The resetting positions of the shaft *z* and the parts movable therewith, so far as the latter are shown in the figure, are indicated by dotted lines in Fig. 3.



Within each of the numeral-wheels *a* or immediately at the left of each numeral wheel the resetting-shaft *z* carries a stud 26, Fig. 5, which during the registering operation is out of contact with the numeral-wheel to which it is appropriate and parts turning therewith, but in the resetting position of said shaft is located in the plane of the notched inner end 27, Figs. 4 and 6, of the appropriate tumbler *e'* and interacts therewith in the resetting operation, serving first to turn the tumbler on its pivot 14, so as to unlock the numeral-wheel from the clutch-wheel *w* and then transmit motion from the shaft *z* through said tumbler to the numeral-wheel itself to which the tumbler is pivotally attached. When the numeral-wheels *a* are thus turned backward to zero, the transmission devices 17 carried by the several numeral-wheels to which they are attached contact with the trip-pinions 18 in the manner represented by Fig. 4. The resetting movement of each numeral-wheel and the parts turning therewith is represented by the arrow *z'*, Fig. 4.

To prevent the trip-pinions 18 from being turned by the transmission devices 17 in the resetting operation, and thus to adapt these trip-pinions to constitute effective zero-stops for the several numeral-wheels other than the numeral-wheel at the left dogs 28 are pivoted on a rod 29, parallel to the supporting-rod 30, on which the trip-pinions turn and are so located as to interact with the spur-wheel teeth of said trip-pinions in such a way as to freely permit the rotation of the trip-pinions 18 in the registering operation, but to resist and prevent their rotation by the impact of the transmission devices 17 therewith at the end of the resetting operation. To prevent injury to the trip-pinions 18 by giving them this function, the strain due to the interaction of the dogs 28 therewith is distributed by a suitably-shaped lateral extension 31 on each dog, contacting with a pair of the star-wheel teeth of the trip-pinion 18 in each zero position of the latter, as best shown in Fig. 5. Such dogs need to be spring-pressed, and said horizontally-stretched tensile spring 24 by which the resetting-shaft *z* is retracted and is held in its retracted position for the registering operation is conveniently so located with reference to said dogs 28 and the backs of the latter are so shaped that said spring contacts sidewise with the dogs, as in Figs. 4, 5, and 6, and holds them to their work in an effective manner.

The left-hand wheel of the numeral-wheels *a*, which may be the hundreds-wheel, as shown in Figs. 1 and 3, or the tens-wheel or a wheel of a higher denomination, is provided with a zero-stop ring 32, Fig. 3, on its left-hand side having a suitably-located peripheral notch, and a stop-dog 33 interacting with this notch is pivoted to the inner side of

the left-hand frame-piece 6 and pressed against the periphery of said zero-stop ring and into said notch by a spring 34 stretched therefrom to a stud on said frame-piece 6. A simple and effective provision is thus made for stopping said left-hand numeral-wheel at zero in the resetting operation if it has been moved from zero by registrations without interfering with the continuous rotation of the wheel in the registering operation.

If the series of numeral-wheels be extended, the left-hand wheel may obviously have a zero-stop, preventing its rotation beyond zero in either direction. It will be understood that the number of the numeral-wheels *a* may be increased to any desired extent or may be reduced to two wheels, as in some fare-registers, and other like modifications will suggest themselves to those skilled in the art.

The herein-described combinations of parts for connecting the numeral-wheels *a* with the actuating mechanism through the medium of the clutch-wheels *w* and for unclutching the same preliminary to the resetting operation are more fully described in substance in my specification forming part of Letters Patent No. 800,565, dated September 26, 1905, and constitute part of the invention claimed in that specification.

The combination with the endwise-movable resetting-shaft *z* of the lever 22, retracting-spring 24, and locking-bolt 25, as hereinbefore described, are more fully described in my specification forming part of Letters Patent No. 834,118, dated October 23, 1906, and form parts of the invention claimed therein.

All the parts and combinations of parts hereinbefore described or shown in the accompanying drawings that are claimed in said previous specifications, or either of them, are hereby disclaimed in favor of said previous specifications.

Parts omitted in the drawings forming part of the present specification are or may be of constructions shown and described in said specification forming part of said Letters Patent No. 834,118.

Having thus described said improvement, I claim as my invention and desire to patent under this specification—

1. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from said units-wheel to the trip-register tens-wheel and so on, including a transmission device carried by the left-hand side of each wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried



by the right-hand side of each wheel to the left, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and means whereby the trip-pinions are prevented from turning backward, whereby said trip-pinions are adapted to interact with said transmission devices as zero-stops for the interacting numeral-wheels.

2. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from said units-wheel to the trip-register tens-wheel and so on, including a transmission device carried by the left-hand side of each wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of each wheel to the left, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and a dog interacting with each trip-pinion to prevent the same from turning backward, whereby the trip-pinions are adapted to interact with said transmission devices as zero-stops for the interacting numeral-wheels.

3. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from said units-wheel to the trip-register tens-wheels and so on, including a transmission device carried by the left-hand side of each wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of each wheel to the left, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and a spring-pressed dog interacting with each trip-pinion to prevent the same from turning backward, whereby the trip-pinions are adapted to interact with said transmission devices as zero-stops for the interacting numeral-wheels.

4. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side,

means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from said units-wheel to the trip-register tens-wheels and so on, including a transmission device carried by the left-hand side of each wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of each wheel to the left, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, a rod parallel to the axis of said trip-pinions, dogs pivoted on said rod and interacting with the teeth of said trip-pinions to prevent the same from turning backward in the resetting operation, and a tensile spring stretched parallel to said rod and arranged to hold said dogs to their work by sidewise pressure of the spring.

5. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from said units-wheel to the trip-register tens-wheel and so on, including a transmission device carried by the left-hand side of each wheel having a wheel of higher value at its left, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of each wheel to the left, said transmission device being adapted to contact with the star-wheel teeth of said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and a spring-pressed dog adapted to interact with the teeth of said spur-wheel portion of each trip-pinion and constructed with a lateral extension adapted to interact with a pair of the teeth of said star-wheel portion of the trip-pinion to prevent the same from turning backward in the resetting operation.

6. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from wheel to wheel, including a suitably-spaced pair of spur-teeth carried by the left-hand side of each numeral-wheel having a



wheel of higher value at its left, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with the space between said pair of teeth and a spur-ring in constant mesh with the spur-wheel teeth of said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said pair of teeth being adapted to contact with the star-wheel teeth of said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and means whereby said trip-pinions are prevented from turning backward in the resetting operation.

7. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from wheel to wheel, including a suitably-spaced pair of spur-teeth carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with the space between said pair of teeth and a spur-ring in constant mesh with the spur-wheel teeth of said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said pair of teeth being adapted to contact with the spur-teeth of said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and a dog interacting with each trip-pinion to prevent the same from turning backward in the resetting operation.

8. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from wheel to wheel, including a suitably-spaced pair of spur-teeth carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with the space between said pair of teeth and a spur-ring in constant mesh with the spur-wheel teeth of said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said pair of teeth being adapted to contact with the star-wheel teeth of said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually

backward to zero, and a spring-pressed dog interacting with each trip-pinion to prevent the same from turning backward in the resetting operation.

9. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from wheel to wheel, including a suitably-spaced pair of spur-teeth carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with the space between said pair of teeth and a spur-ring in constant mesh with the spur-wheel teeth of said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said pair of teeth being adapted to contact with the star-wheel teeth of said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, a rod parallel to the axis of said trip-pinions, dogs pivoted on said rod and interacting with each trip-pinion to prevent the same from turning backward in the resetting operation, and a tensile spring stretched parallel to said rod and holding said dogs to their work by sidewise pressure.

10. A fare-register having, in combination with a totalizer, a series of decimal trip-register numeral-wheels arranged side by side, means for actuating said totalizer and simultaneously actuating the trip-register units-wheel step by step for the registration of fares, means for transmitting such motion from wheel to wheel, including a suitably-spaced pair of spur-teeth carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with the space between said pair of teeth and a spur-ring in constant mesh with the spur-wheel teeth of said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said pair of teeth being adapted to contact with the star-wheel teeth of said pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and a spring-pressed dog interacting with the teeth of said spur-wheel portion of each trip-pinion to prevent the trip-pinion from turning backward in the resetting operation and constructed with a lateral extension adapted to interact with a pair of the star-wheel teeth of said trip-pinion when the trip-pinion is at rest.



11. A register having, in combination, a series of decimal numeral-wheels arranged side by side, means for turning the units-wheel forward in the registering operation, means for transmitting such motion from said units-wheel to the adjoining tens-wheel and so on, including a transmission device carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, means whereby each trip-pinion is prevented from turning backward and is thus adapted to interact with the corresponding transmission device as a zero-stop for the interacting numeral-wheel, and means for stopping the left-hand numeral-wheel at zero in the resetting operation.

12. A register having, in combination, a series of decimal numeral-wheels arranged side by side, means for turning the units-wheel forward in the registering operation, means for transmitting such motion from said units-wheel to the adjoining tens-wheel and so on, including a transmission device carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, means whereby each trip-pinion is prevented from turning backward and is thus adapted to interact with the corresponding transmission device as a zero-stop for the interacting numeral-wheel, and means for stopping the left-hand numeral-wheel at zero in the resetting operation while it permits the same to be turned forward past zero in the registering operation.

13. A register having, in combination, a series of decimal numeral-wheels arranged side by side, means for turning the units-wheel forward in the registering operation, means for transmitting such motion from said units-wheel to the adjoining tens-wheel, and so on, including a transmission device carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of the adjoining

numeral-wheel, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, means whereby each trip-pinion is prevented from turning backward and is thus adapted to interact with the corresponding transmission device as a zero-stop for the interacting numeral-wheel, a ring attached to the left-hand side of the left-hand numeral-wheel and constructed with a zero-stop notch, and a spring-pressed dog interacting with said notch to prevent turning said wheel backward beyond zero while it permits the same to be turned forward past zero in the registering operation.

14. A register having, in combination, a series of decimal numeral-wheels arranged side by side, means for turning the units-wheel forward in the registering operation, means for transmitting such motion from said units-wheel to the adjoining tens-wheel, and so on, including a transmission device carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, a rotatable shaft common to said numeral-wheels, a resetting-key by which said shaft is turned, means for transmitting backward resetting motion from said shaft to said numeral-wheels individually, and means whereby said trip-pinion is prevented from turning backward, whereby each trip-pinion is adapted to form an effective zero-stop for the interacting numeral-wheel.

15. A register having, in combination, a series of decimal numeral-wheels arranged side by side, actuating means for turning the units-wheel forward in the registering operation, means for transmitting such motion from said units-wheel to the adjoining tens-wheel, including a transmission device carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, a rotatable shaft common to said numeral-wheels, a resetting-key by which said shaft is turned, means for disconnecting the numeral-wheels from the registering-actuator and for transmitting backward resetting motion from said shaft to said



numeral-wheels individually, and means whereby said trip-pinion is prevented from turning backward, whereby each trip-pinion is adapted to form an effective zero-stop for the interacting numeral-wheel.

16. A register having, in combination, a series of decimal numeral-wheels arranged side by side, actuating means for turning the units-wheel forward in the registering operation, means for transmitting such motion from said units-wheel to the adjoining tens-wheel, and so on, including a transmission device carried by the left-hand side of each numeral-wheel having a wheel of higher value at its left, a trip-pinion adapted to interact with said transmission device and a spur-ring in constant mesh with said trip-pinion carried by the right-hand side of the adjoining numeral-wheel, said transmission device being adapted to contact with said trip-pinion when the numeral-wheel carrying the same is turned in either direction, an endwise-movable and rotatable shaft common to said numeral-wheels, a resetting-key by which said shaft is turned, means for transmitting backward resetting motion from said shaft to said numeral-wheels individually, means for holding said shaft in its registering position including a tensile spring stretched horizontally above said numeral-wheels, a rod parallel therewith, and dogs pivoted upon this rod interacting with the trip-pinions to adapt the same to operate as zero-stops and held to their work by the lateral pressure of said spring.

17. The combination, in a register, of decimal numeral-wheels arranged side by side, means for transmitting the registering motion from wheel to wheel including a transmission device carried by the left-hand side of one wheel, a trip-pinion interacting with said transmission device and a spur-ring carried by the right-hand side of the adjoining wheel to the left in constant mesh with said trip-pinion, said transmission device being adapted to contact with said trip-pinion when the wheel carrying the same is turned in either direction, means for turning said numeral-wheels individually back to zero, and means whereby said trip-pinion is prevented from turning backward, whereby said trip-pinion is adapted to form an effective zero-stop for the interacting numeral-wheel.

18. The combination, in a register, of decimal numeral-wheels arranged side by side, means for transmitting the registering motion from wheel to wheel including a transmission device carried by the left-hand side of one wheel, a trip-pinion interacting with said transmission device and a spur-ring carried by the right-hand side of the adjoining wheel to the left in constant mesh with said trip-pinion, said transmission device being adapted to contact with said trip-pinion when the wheel carrying the same is turned in either

direction, means for turning said numeral-wheels individually backward to zero, and a spring-pressed dog interacting with said trip-pinion to prevent the same from turning backward.

19. The combination, in a register, of decimal numeral-wheels arranged side by side, means for transmitting the registering motion from wheel to wheel including a transmission device carried by the left-hand side of one wheel, a trip-pinion interacting with said transmission device and a spur-ring carried by the right-hand side of the adjoining wheel to the left in constant mesh with said trip-pinion, said transmission device being adapted to contact with said trip-pinion when the wheel carrying the same is turned in either direction, means for turning said numeral-wheels individually backward to zero, a supporting-rod parallel with the axis of said trip-pinion on which said dog is pivoted, and a tensile spring stretched parallel with said rod holding said dog in mesh with said trip-pinion by sidewise pressure.

20. The combination, in a register, of decimal numeral-wheels arranged side by side, means for transmitting registering motion from wheel to wheel including a transmission device carried by the left-hand side of one wheel, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with said transmission device and a spur-ring carried by the right-hand side of the adjoining wheel to the left in constant mesh with the spur-wheel teeth of said trip-pinion, said transmission device being adapted to contact with said star-wheel teeth of the trip-pinion when the wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually backward to zero, and a spring-pressed dog interacting with the spur-wheel teeth of said trip-pinion to prevent the same from turning backward and constructed with a lateral extension adapted to contact with the star-wheel teeth of said trip-pinion in its zero positions.

21. The combination, in a register, of decimal numeral-wheels arranged side by side, means for transmitting registering motion from wheel to wheel including a transmission device carried by the left-hand side of one wheel, a trip-pinion in the form of a small spur-wheel and a star-wheel of the same diameter side by side adapted to mesh by its star-wheel teeth with said transmission device and a spur-ring carried by the right-hand side of the adjoining wheel to the left in constant mesh with the spur-wheel teeth of said trip-pinion, said transmission device being adapted to contact with said star-wheel teeth of the trip-pinion when the wheel carrying the same is turned in either direction, means for turning the numeral-wheels individually



backward to zero, a spring-pressed dog interacting with the spur-wheel teeth of said trip-pinion to prevent the same from turning backward and constructed with a lateral extension adapted to contact with the star-wheel teeth of said trip-pinion in its zero positions, a supporting-rod parallel with the axis of said trip-pinion on which said dog is

pivoted, and a tensile spring stretched parallel with said rod holding said dog in mesh with said trip-pinion by sidewise pressure, substantially as hereinbefore specified.  
CHARLES E. GIERDING.

Witnesses:

WALTER BAYERS,  
R. T. STOWE.