2 Sheets—Sheet 1.

W. H. HORNUM.

Fare-Register.

No. 213,657. **Patented Mar. 25, 1879.**

Fig. 1.

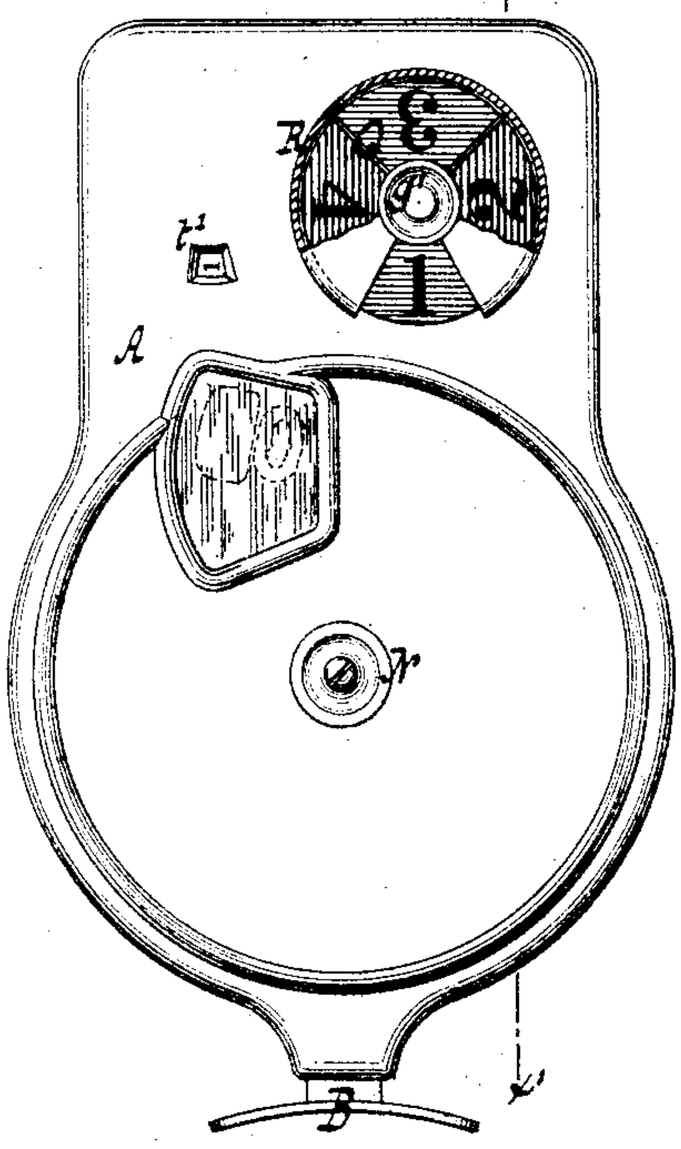


Fig. 2.

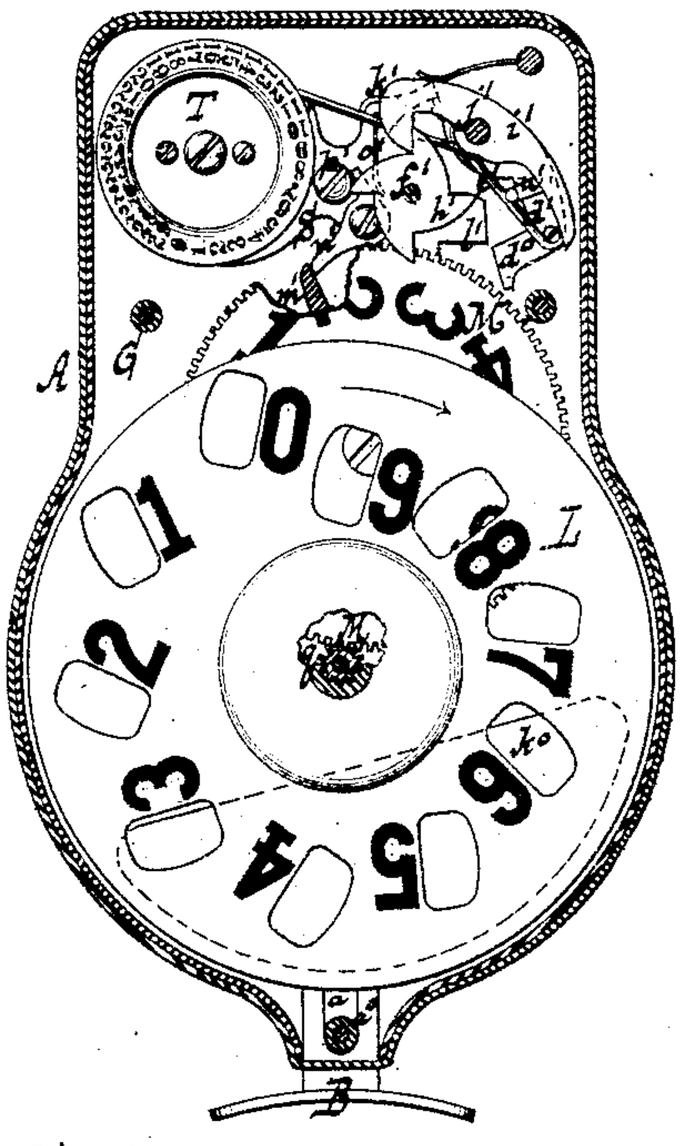
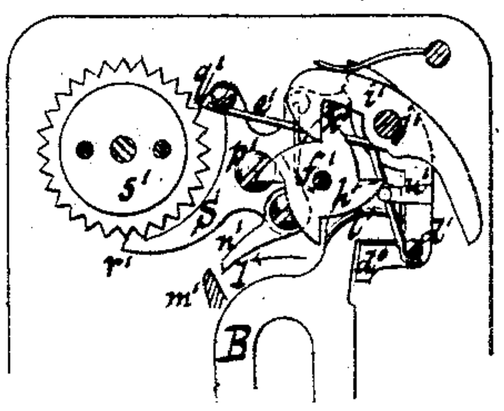


Fig. 3.

Fig. 5.

Fig. 4.



Witnesses.

Otto Stupeland.

William Meiller.

Inventor

William H. Hornum

by

Van Santvoord & Hauff

his attorneys.

2 Sheets—Sheet 2.

W. H. HORNUM.

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Fig. 6.

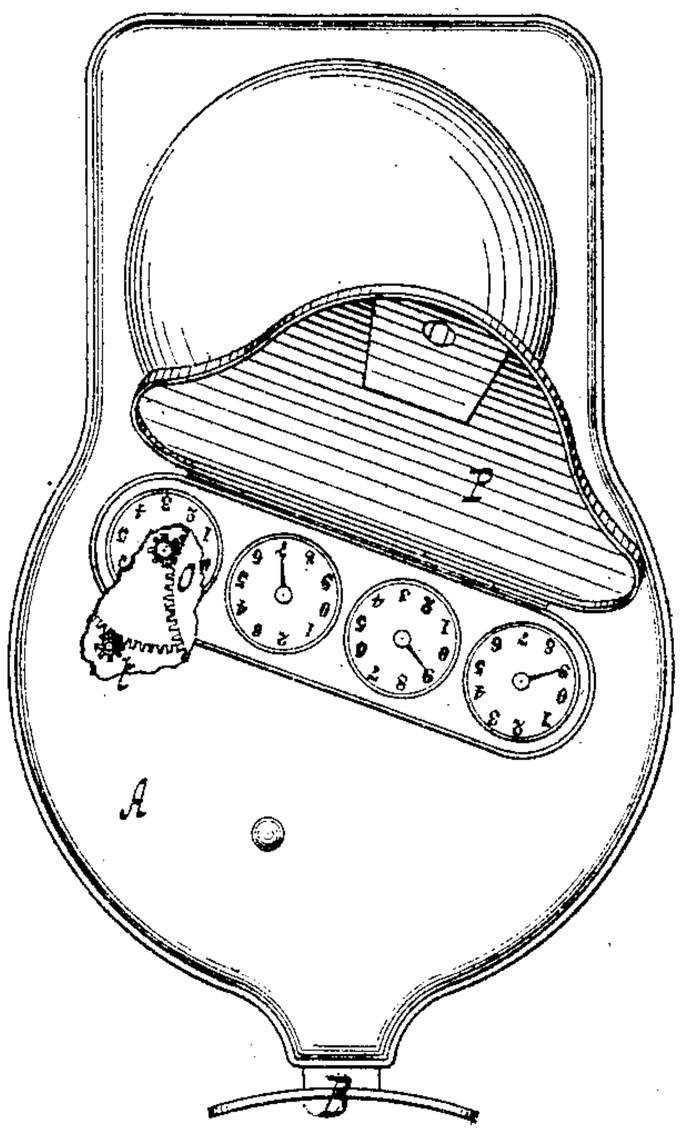
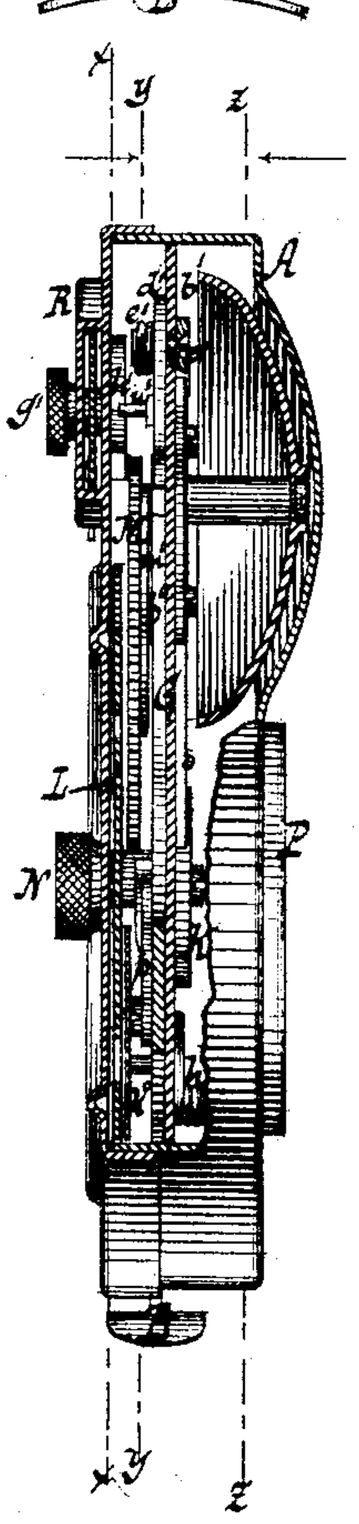


Fig. 7.



Witnesses
Otis Stupeland
William Meilen.

Inventor.
William H. Hornum
by
Van Santvoord & Hauff
his attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM H. HORNUM, OF NEW YORK, N. Y., ASSIGNOR TO THE HORNUM PATENT REGISTER MANUFACTURING COMPANY.

IMPROVEMENT IN FARE-REGISTERS.

Specification forming part of Letters Patent No. **213,657,** dated March 25, 1879; application filed January 29, 1879.

To all whom it may concern:

Be it known that I, WILLIAM H. HORNUM, of the city, county, and State of New York, have invented a new and useful Improvement in Fare-Registers, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a face view. Fig. 2 is a similar view when the face-plate is removed, the line *x x*, Fig. 7, indicating the parts removed. Fig. 3 is a front view of the partition-plate, with the working parts attached thereto, without the indicating-dials. Fig. 4 is a similar view, showing the working parts in a different position, the line *y y*, Fig. 7, indicating the parts cut away. Fig. 5 is a rear view of the partition-plate, with the working parts attached to it, the line *z z*, Fig. 7, indicating the parts cut away. Fig. 6 is a rear elevation of my fare-register, showing the general register. Fig. 7 is a transverse section in the plane *x' x'*, Fig. 1.

Similar letters indicate corresponding parts.

This invention consists in the combination, in a fare-register, of a registering mechanism adapted to be set to zero at will and an indicator which is adapted to be moved step by step entirely independent of the registering mechanism, and which is so constructed that the said registering mechanism cannot be changed independent of its actuating mechanism or prime mover without first moving the indicator a full step; also, in the combination, in a fare-register, of a registering disk or index adapted to be set to zero at will by a knob or key, a slide or prime mover for moving said registering-disk, a zero-guard for arresting the registering disk or index at zero when the same is turned by hand, an indicator adapted to be moved step by step entirely independent of the registering device, and mechanism for locking the prime mover whenever said indicator is moved one step, and for releasing the prime mover when the registering disk or index is turned to zero by hand, knob, or key, so that whenever the indicator is moved one or more steps any motion of the registering disk or index by means of the prime mover is rendered impossible until said registering disk or index has been turned to zero by hand, knob, or key.

With the indicator above named, and with the registering disk or index, and the mechanism for locking and unlocking the prime mover is combined a trip-dial, which is caused to move one step every time the prime mover is locked by moving the indicator, and then unlocked by turning the registering-disk to zero by hand, knob, or key. With the indicator is combined a stop, which prevents the same from being moved more than one step at a time. The mechanism which connects the prime mover with the alarm is so constructed that a reciprocating motion within certain limits can be imparted to the prime mover during its back stroke.

In the drawings, the letter A designates a case made of sheet metal, or any other suitable material, in the form best adapted for the purpose for which it is to be used. In this case is situated a slide or prime mover, B, which serves to actuate the single-trip register, the alarm, and the general register, if such is used. Said prime mover is guided by slots *a b*, catching over pins a^0 b^0, which are secured in a plate, G, Figs. 3, 5, and 7, that is secured in the case A, and forms a partition between the single-trip register on one side and the alarm and general register on the opposite side, and which supports the principal working parts of my apparatus. The end of the prime mover extends through a slot in the edge of the case, and is provided with a finger-piece, which serves to operate the same. In the under surface of the prime mover is secured a pin, *g*, which extends through a slot in the partition-plate G, Fig. 5, and is exposed to the action of a spring, *h*, that has a tendency to throw the prime mover up to the position shown in the drawings.

To the prime mover is pivoted a dog, *c*, from the under side of which projects a pin, *d*, through a slot, *e*, in a disk, *f*, and into an oval guide-groove, *i*, in the partition-plate G. (See Fig. 5.) To the under surface of this partition-plate is firmly secured a plate, j^0, with an oval projection, *j*, which extends into the oval guide-groove *i*, and occupies a slightly-oblique position, as shown in Fig. 5. When the

prime mover is drawn out, the pin *d* of the dog *c* passes down over the inner edge of the projection *j*, and when the prime mover has been drawn clear down and is then released, so as to follow the action of its spring *h*, the pin *d* passes up on the outer edge of the projection *j*, and at the same time the disk *f* is caused to make a complete revolution, and the dog *c* receives an oscillating motion—that is to say, during the first half of the outward stroke of the prime mover said dog swings inward, and during the second half of said outward stroke and the first half of the back stroke of the prime mover the dog swings outward, while during the last half of the back stroke of the prime mover the dog is again caused to swing inward. One-half of the circumference of the disk *f* is provided with ratchet-teeth *k*, and as soon as the prime mover is drawn out a short distance a pawl, *l*, engages with these ratchet-teeth, so that the prime mover cannot move back until it has been completely drawn out; but during the back stroke of the prime mover the pawl *l* strikes the plain portion of the disk *f*, and a reciprocating motion can be imparted to the prime mover within certain limits. The object of this arrangement will be hereinafter more fully explained.

When the prime mover is drawn out the dog *c* strikes an arm, *m*, which extends from an anchor, H, that is pivoted to the partition-plate G, Fig. 3, and subjected to the action of a spring, *n*, which keeps the pallet *o* of said anchor in gear with an escapement-wheel, I. As the dog *c* strikes the arm *m* of the anchor the pallet *o* is thrown out of gear with the escapement-wheel I, and at the same time the other pallet, o^0, of the anchor is thrown in gear with said escapement-wheel so as to propel the same one half of a tooth; and when the arm *m* is released by the dog *c* the pallet *o* is thrown back in gear with the escapement-wheel by the spring *n*, and said escapement-wheel is caused to turn the remaining half tooth. If the spring *n* should give out or fail to work, the anchor is thrown back to its original position by the safety-dog *p*.

The escapement-wheel I turns on a gudgeon which projects through a hole in the partition-plate G, and to the lower square end of this gudgeon is firmly secured a ratchet-wheel, K. (See Fig. 5.) On the surface of the escapement-wheel I is firmly secured a pinion, *q*, Fig. 3, provided with a corrugated hub to fit into a correspondingly-corrugated socket in the center of the unit-disk L, so that by the action of the prime mover this unit-disk, together with the pinion *q*, the escapement-wheel I, and the ratchet-wheel K, are turned step by step in the direction of the arrow 1, Fig. 2. The pinion *q* gears into cogs on the periphery of the ten-disk M, and is so proportioned that for each complete revolution of the unit-disk said ten-disk is caused to make one tenth of a revolution. In the example shown in the drawings, the unit-disk is provided with ten apertures, and in order to prevent these apertures from catching in the screws or other parts below, I have placed beneath said unit-disk a screen, K^0. (See Figs. 2 and 7.)

To the under surface of the partition-plate G is pivoted a spring-pawl, *s*, which engages with the ratchet-wheel K, and the corrugated hub of the escapement-wheel extends through a hole in the cover of the case A, and serves to support a knob, N, Figs. 1 and 7. If the pawl *s* is thrown out of gear with the ratchet-wheel K, the unit-disk L can be turned by means of the knob N in the direction opposite the arrow 1, Fig. 2; but it cannot be turned by said knob in the direction of arrow 1, being retained by pallet *o* and escapement-wheel I. In some cases a key may be used in place of the knob, or the unit-disk may be turned by the direct application of the hand; and in the subsequent part of this description the term "turning the unit-disk by hand" will be used in contradistinction to the term "turning the unit-disk by the prime mover;" and in the term "turning by hand" I desire to include a knob or a key, or any means which allow of turning said unit-disk by the direct application of the hand, or of any instrument held in the hand, to the disk itself or to any part connected with said disk.

The arbor of the disk *f*, Fig. 3, extends through the partition-plate G and through the plate j^0, Fig. 5, and it carries a pinion, *t*, Fig. 6, which transmits the motion of the disk *f* to the general or concealed register O, which can be inspected by raising a lid, P, secured to the back plate of the case A.

On the under surface of the prime mover B is pivoted a spring-dog, *u*, which projects through a slot, *v*, in the partition-plate G, Fig. 5, and when the prime mover is drawn out this spring-dog acts on the shoulder *w*, formed in the butt of the shank of the hammer P, so as to raise said hammer against the action of its spring *a'*. During this outward motion of the prime mover the dog *l* sweeps over the ratchet-teeth *k* of the disk *f*, Fig. 3, and prevents the hammer from moving back and from sounding the alarm before the registering-disk has been turned one step, which takes place when the prime mover is drawn clear out, and when this is done the hammer is released and the alarm is sounded. When the prime mover is permitted to recede the spring-dog *u* passes the butt of the hammer-shank, and the dog *l*, Fig. 3, bears upon the smooth portion of the disk *f*, so that a reciprocating motion can be imparted to the prime mover within certain limits without producing any effect either on the registering-disk or on the hammer.

The object of this arrangement is to prevent unnecessary wear of the dog *l* and ratchet-teeth on disk *f* by the rapid retrograde movement of the prime mover B when suddenly released by the operator, and to remove unnecessary resistance to the return movement, which which would be produced by success-

ively lifting the spring-pawl *l* over the teeth against the tension of its spring. The return movement of the prime mover by the spring *h* thus meets with the least possible resistance.

For the purpose of throwing the pawl *s*, Fig. 5, out of gear with the ratchet-wheel K, (which is necessary before the registering-disk can be turned by hand,) I use the following mechanism: The tail end of said pawl bears against a cam, *b'*, Figs. 5 and 7, which is secured on a pivot, *c*, Figs. 3 and 7, that turns in a socket in the partition-plate G. On this pivot is secured a lever, *d'*, which is situated on the upper side of the plate G, Figs. 2, 3, and 4, and which is subjected to the action of a spring, *e'*, that has a tendency to throw the same into the position shown in Figs. 2 and 3 and to retain the cam *b'* in the position shown in Fig. 5. By turning the lever *d'* to the position shown in Fig. 4 the cam *b'* is turned in the direction of the arrow marked on it in Fig. 5, and the pawl *s* is thrown out of gear with the ratchet-wheel K.

For the purpose of throwing the lever *d'* into this position I use an indicator, Q, which is moved entirely independent of the registering and alarm mechanism. In the example shown in the drawings, this indicator consists of a disk which is situated on the outer surface of the cover of the case A, and which is covered by a secondary case, R, Figs. 1 and 7, the top of which is partly cut away, so as to expose one section of the indicator. This indicator is mounted on an arbor, *f'*, the inner end of which has its bearing in a hole in the partition-plate G, while on its outer end, which extends through the top plate of the secondary case, R, is firmly secured a knob, *g'*, which serves to turn the indicator.

On the arbor *f'*, close to the inner surface of the cover of the case A, is mounted a cam-disk, *h'*, which acts on a spring-dog, *i'*, Figs. 2 and 4, that turns on a pivot, *j'*, secured in the cover of the case A.

When the cam-disk *h'* is turned, the tail of the dog *i'* bears against the lever *d'* and throws the same into the position shown in Fig. 4, thereby turning the cam *b'* and throwing the pawl *s* out of gear with the ratchet-wheel K.

As soon as one of the high portions of the cam-disk *h'* has passed the head of the dog *i'*, however, this dog returns to its original positions; but the lever *d'* is retained in the position shown in Fig. 4 by a pawl, *k'*, (best seen in Fig. 3,) which engages with teeth formed in the outer edge of said lever; otherwise said lever on being released by the dog *i'* would immediately be thrown back to its original position by its spring *e'*.

On the lever *d'* is formed a toe, d^0; and if said lever is thrown into the position shown in Fig. 4, this toe catches behind a hook, *l'*, of the prime mover B, and thereby said prime mover is locked, and consequently the alarm cannot be sounded, and the registering-disk L cannot be turned in the direction of arrow 1, Fig. 2; but it can be turned in the direction opposite to this arrow by hand, the pawl *s* being held out of gear with the ratchet-wheel K, as previously stated.

When the registering-disk is turned by hand it is arrested at zero by the zero-guard *m'*, Figs. 2 and 4, which, in the example shown in the drawings, is secured to the under surface of the disk M, and strikes a dog, *n'*, which is pivoted to the pawl *k'*, and subjected to the action of a spring, *o'*, so that if the zero-guard strikes said toe in the direction of arrow 1, Fig. 4, said dog can yield, and the registering mechanism can be turned in the direction of arrow 1, Fig. 2, without obstruction; but if the zero-guard strikes said dog in the direction opposite to arrow 1, Fig. 4, or if the registering mechanism is turned by hand in the direction opposite to arrow 1, Fig. 2, the dog becomes rigid and the registering mechanism is arrested at zero. At the moment the zero-guard strikes the dog *n'* the pawl *k'* is turned on its pivot *p'*, and it is moved from the position shown in Fig. 4 to that shown in Figs. 2 and 3, the lever *d'* returns to its original position by the action of spring *e'*, the pawl *s* drops back in gear with the ratchet-wheel K, the prime mover is released, and the registering mechanism is ready to be operated by said prime mover, but it cannot be turned any longer by hand.

The sections of the independent indicator Q are marked with figures 1 2 3 4 and they may also be distinguished by different colors, so that it can be readily observed whenever the person handling the fare-register has returned the registering mechanism to zero.

The pawl *k'* is connected to an anchor, S, (best seen in Fig. 3,) the pallets *q' r'* of which are adapted to engage with an escapement-wheel, *s'*, to which is firmly secured the trip-dial T. The figures on this dial pass successively beneath an aperture, *t'*, in the cover of the case A.

When the lever *d'* is thrown in its locking position, Fig. 4, the pallet *r'* is thrown in gear with the escapement-wheel *s'* by the action of the spring *e'*, and said escapement is turned half a tooth; and when the anchor S is thrown back to the position shown in Fig. 3 by the action of the zero-guard *m'* on the dog *n'*, the lever *d'* is returned to its original position by the spring *e'*, and the pallet *q'* acts on the escapement-wheel and propels the same half a tooth, so that every time the locking-lever *d'* is moved inward by the action of the independent indicator Q', and then released by the action of the zero-guard *m'*, the escapement-wheel *s'* is turned one tooth, and a new figure of the trip-dial T is brought in view through the opening *t'*. The trip-dial therefore keeps a permanent record of the number of times the registering mechanism has been turned to zero by hand, while the independent indicator enables every person in the car to observe at once, and without a close inspection of the

fare-register, whenever the registering mechanism has been returned to zero.

On the locking-lever *d'* is secured a stop, *u'*, which is thrown in the path of the cam-disk *h'* whenever the lever *d'* is thrown in its locking position, so that the independent indicator Q can be turned only one step at a time.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a fare register, of a registering mechanism adapted to be set to zero at will, another indicator adapted to be moved step by step entirely independent of the registering mechanism, and so constructed that the said registering mechanism cannot be changed independent of its actuating mechanism or prime mover without first moving the indicator one full step, substantially as set forth.

2. The combination, in a fare-register, of a registering disk or index adapted to be set to zero at will by hand, a slide or prime mover for imparting motion to said registering disk or index, a zero-guard for arresting the registering disk or index at zero when the same is turned by hand, an indicator adapted to be moved step by step entirely independent of the registering device, and mechanism for locking the prime mover whenever said indicator is moved one step, and for releasing the prime mover when the registering disk or index is turned to zero by hand, all constructed and adapted to operate substantially in the manner and for the purpose herein set forth.

3. The combination, with the independent indicator Q, with the registering disk or index, and with the mechanism for locking and unlocking the prime mover, of a trip-dial, T, constructed and adapted to operate substantially as and for the purpose shown and described.

4. The combination, with the independent indicator Q, of a stop connected to and operated by the mechanism for locking the prime mover, for preventing said indicator from being moved more than one step at a time, substantially as set forth.

5. The combination, with the indicator disk or index L, the prime mover B, and alarm P, of a disk, *f*, provided with ratchet-teeth on about one-half of its circumference, a pawl, *l*, a dog, *c*, and an anchor, E, all constructed and adapted to operate substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 22d day of January, 1879.

WILLIAM H. HORNUM. [L. S.]

Witnesses:

W. HAUFF,

CHAS. WAHLERS.