

W. L. HORNE.  
FARE-REGISTER.

No. 175,861.

Patented April 11, 1876.

Fig. 1.

Fig. 7.

Fig. 5.

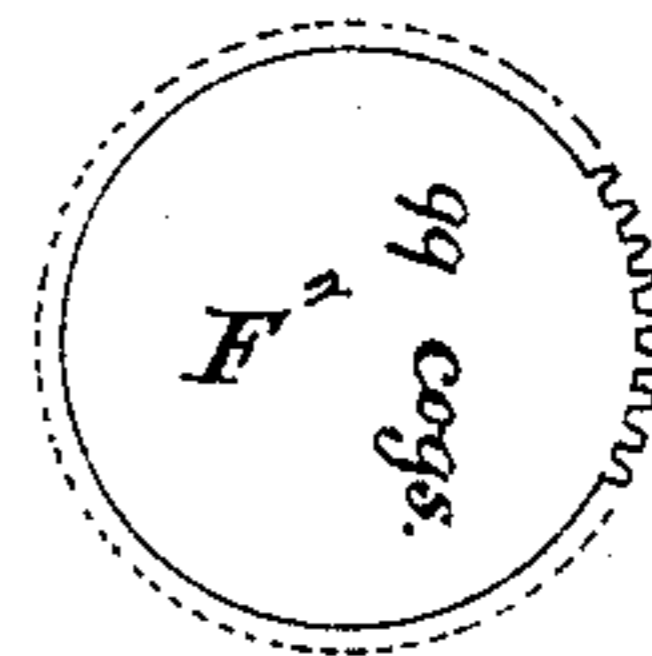
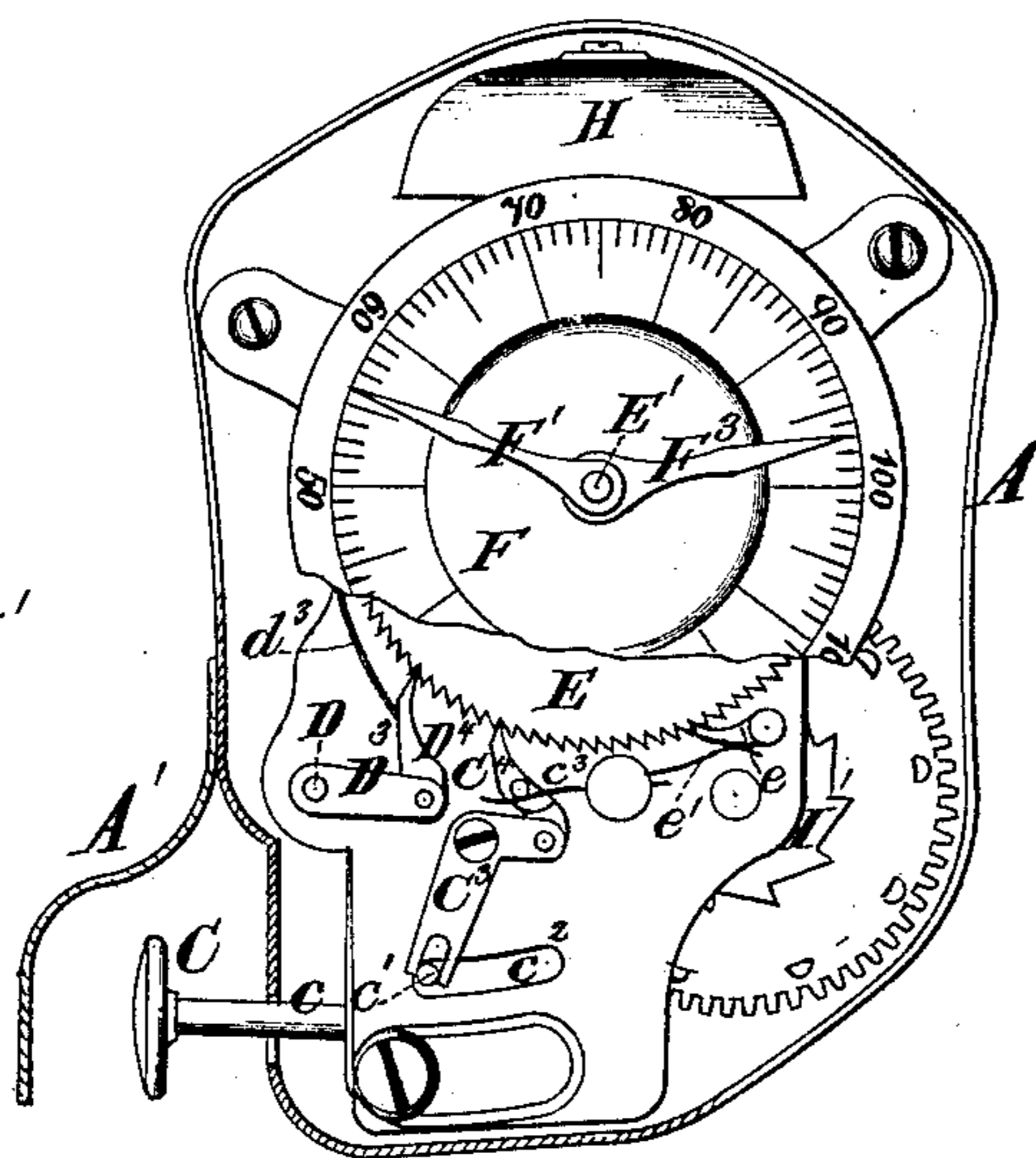
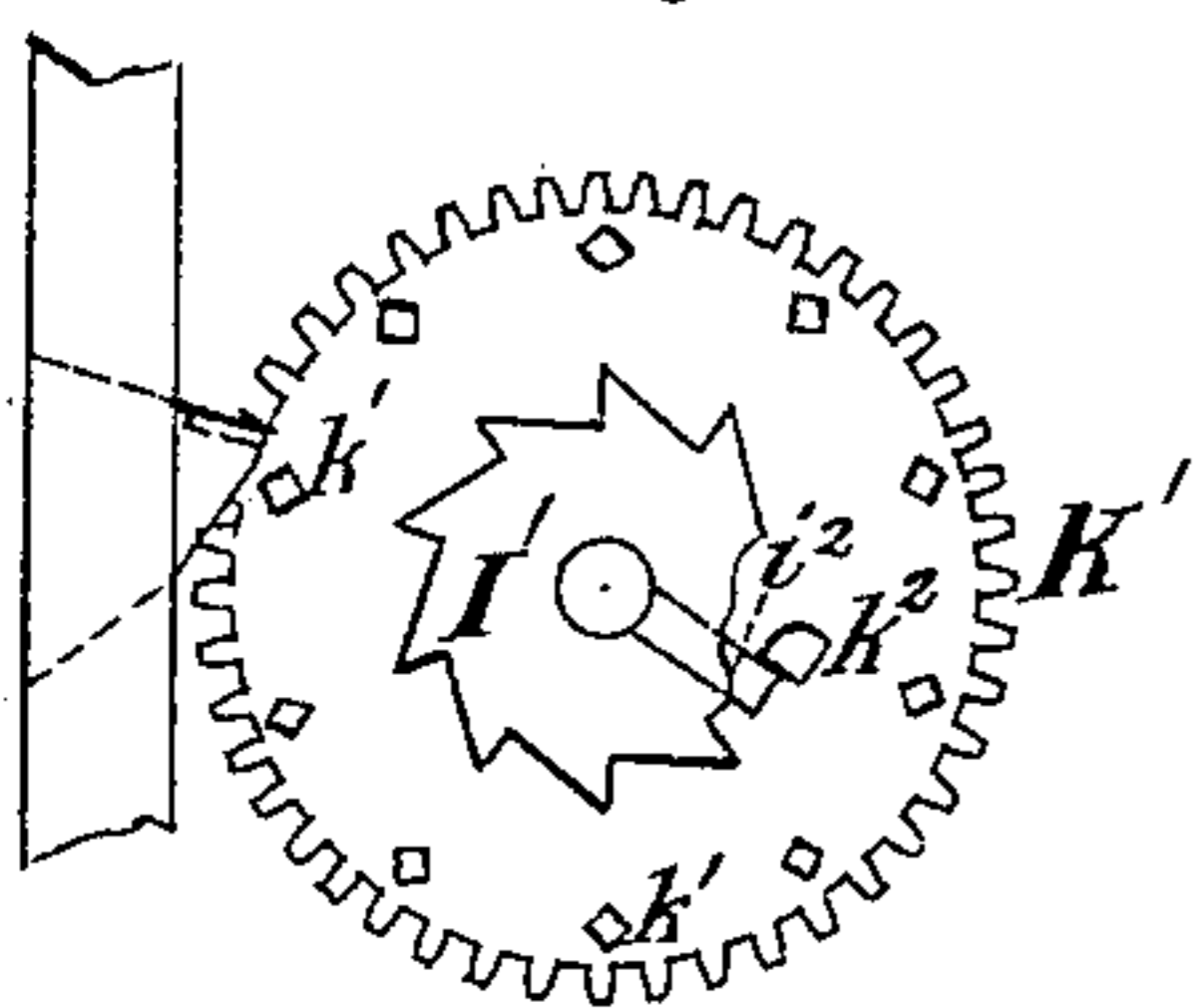


Fig. 8.

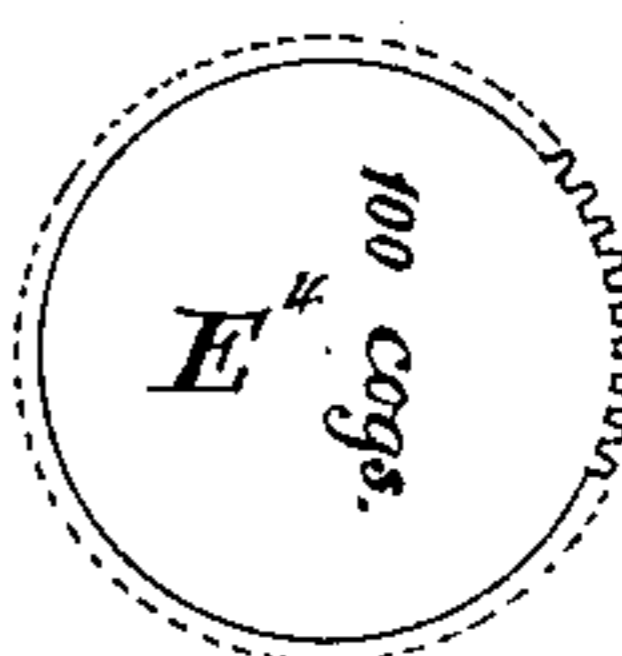


Fig. 2.

Fig. 3.

Fig. 6.

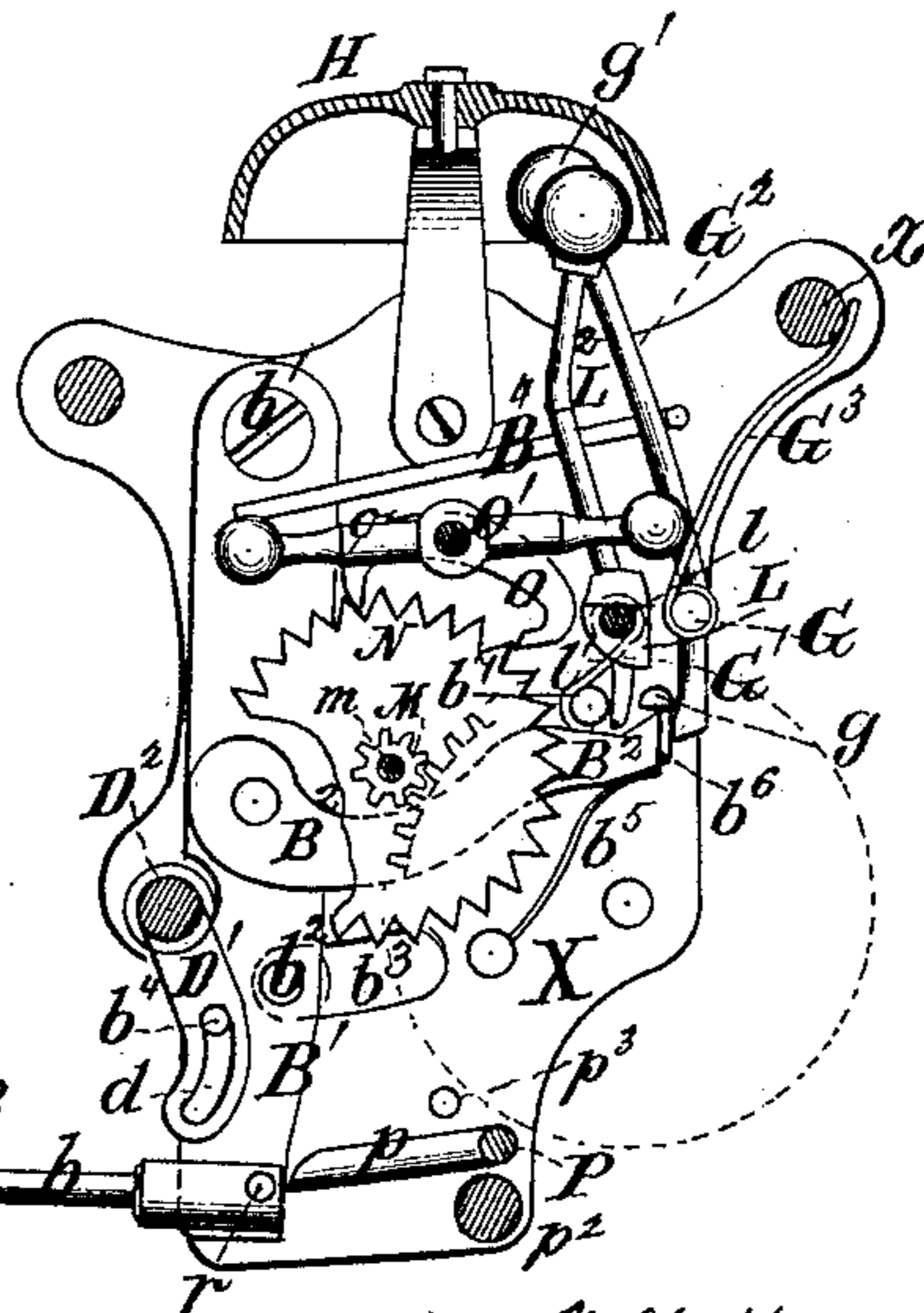
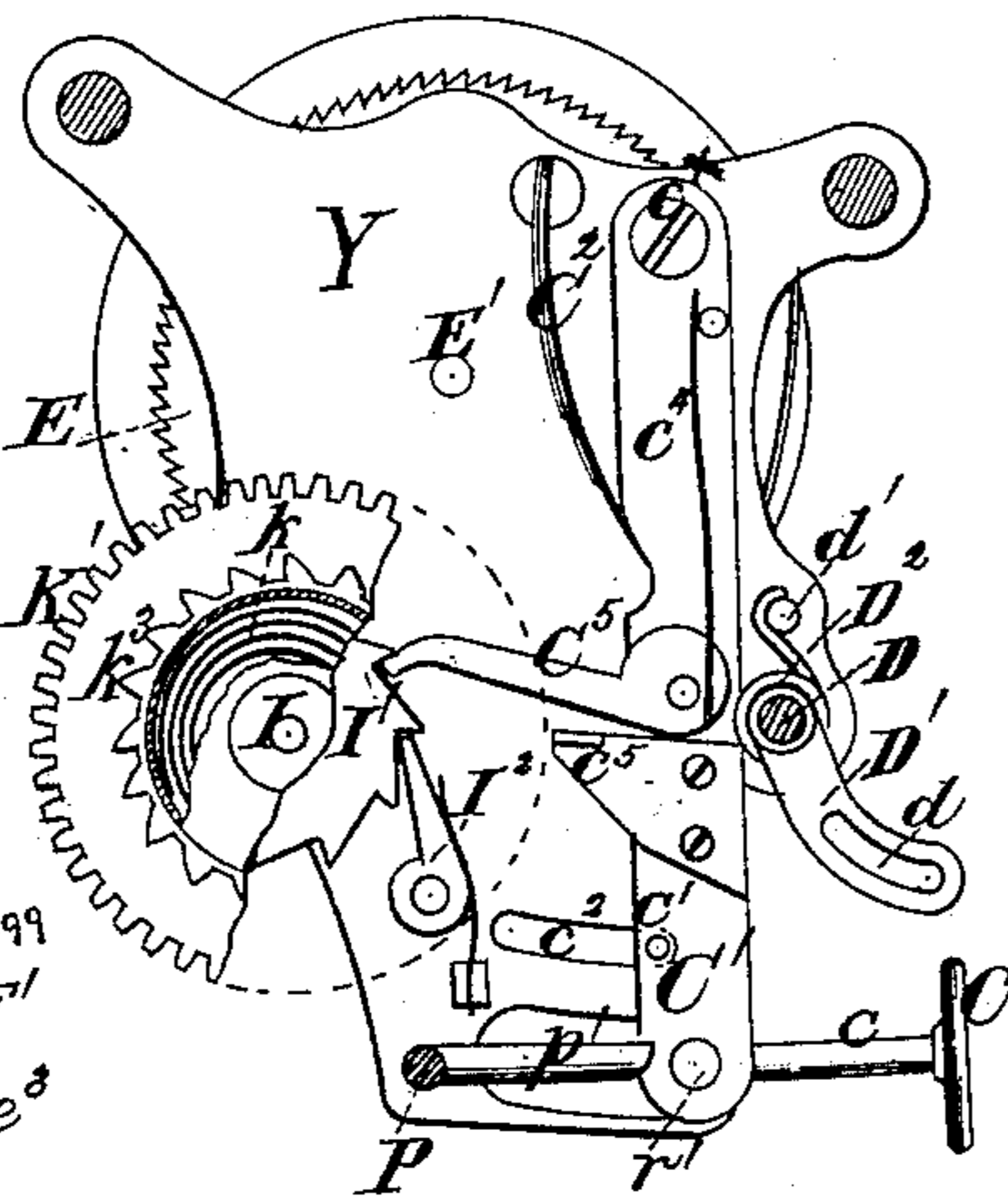
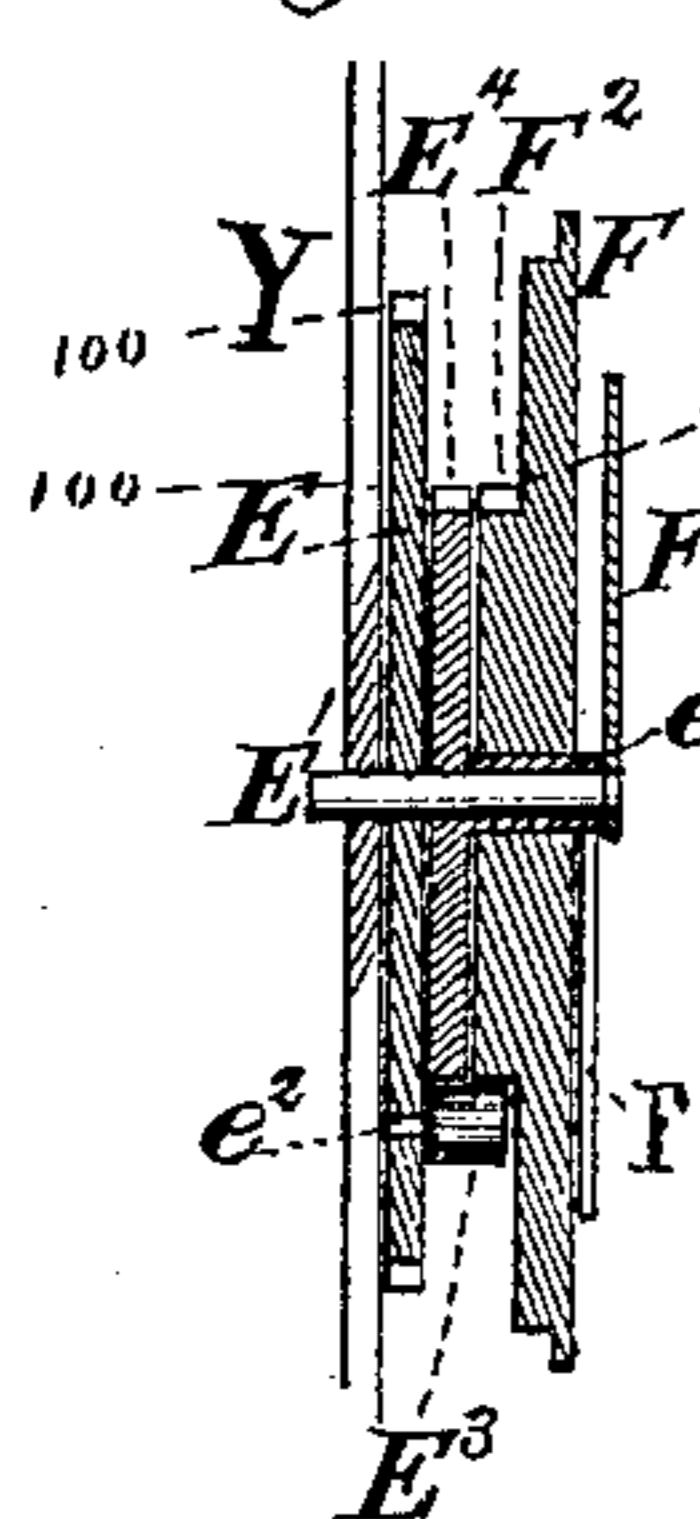
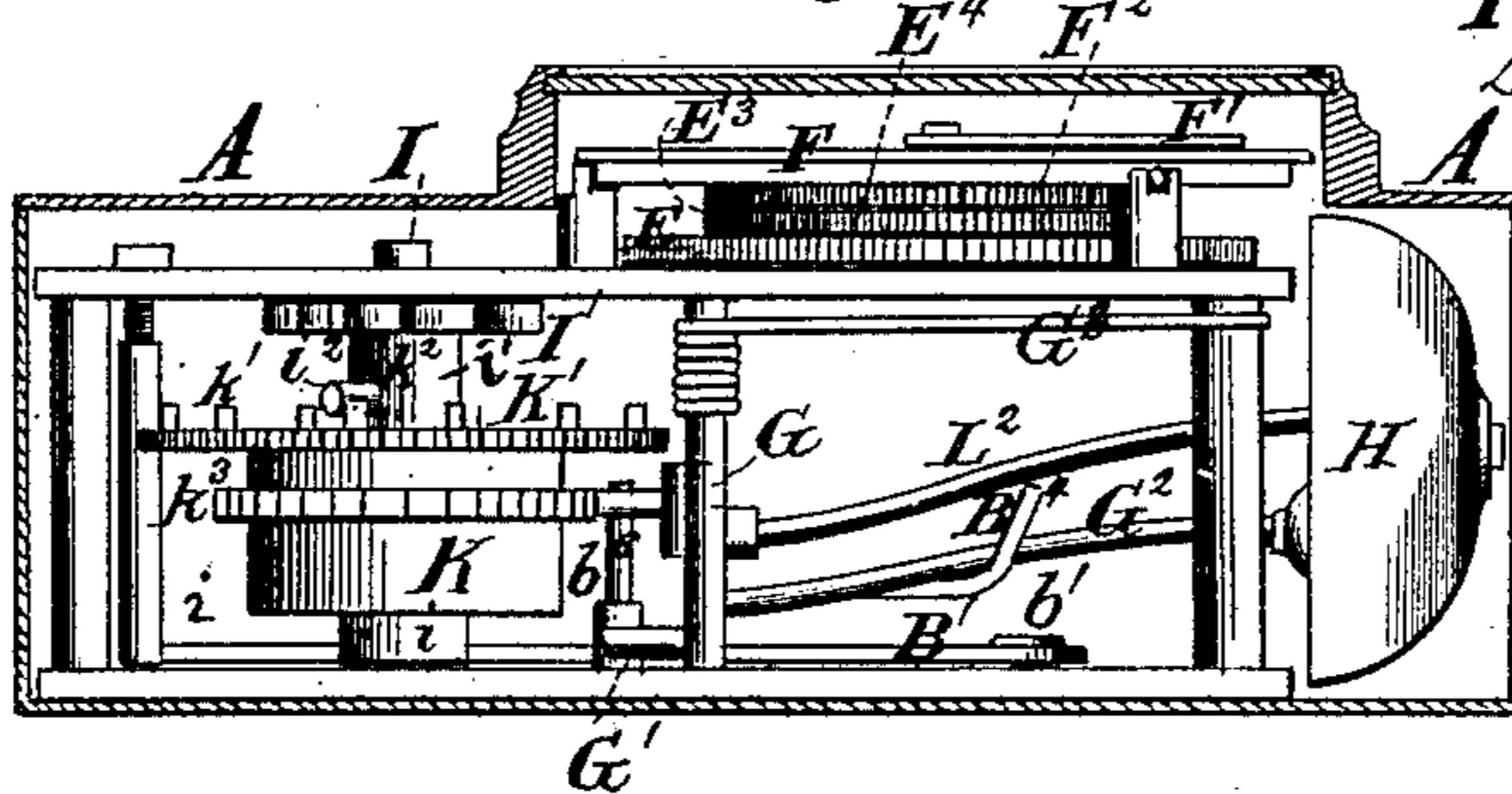


Fig. 4.



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN FARE-REGISTERS.

Specification forming part of Letters Patent No. 175,861, dated April 11, 1876; application filed September 25, 1875.

*To all whom it may concern :*

Be it known that I, WILLIAM L. HORNE, of Ypsilanti, in the county of Washtenaw and State of Michigan, have invented a new and useful Improvement in Fare-Registers, of which the following is a specification :

This invention relates to that class of fare-registers which are adapted to record different kinds of fare, and have an alarm or alarms sounded once or several times, according as one or the other kind of fare is being registered. In these registers, as heretofore made, the multiple sounds were merely two or more distinct sounds separated by a short period of time, so that by depressing the key, causing two sounds at each operation, the fraudulent intelligence might be conveyed that two fares of a particular kind had been recorded, whereas in reality only one fare of another kind was registered. They have also been so made that by a partial operation of a key, causing, if fully operated, multiple sounds, a single sound only might be given, and another sound produced subsequently by completing the operation. This feature also might be taken advantage of to record fraudulently.

My improvement is intended to so modify these registers that no fraudulent use can be made of them; and to this end it consists, first, in connecting the distinct multiple sounds by a continuous intermediate sound; secondly, in having the multiple sounds produced by a separate spring movement, so combined with the recording and alarm mechanisms that it cannot be stopped from giving a full alarm after it has once begun the alarm.

My invention also consists of certain details of construction, which will be generally explained in the ensuing description, and specifically pointed out by separate claims.

In the annexed drawings, Figure 1 is a plan view, the top plate of the casing and part of the dial being broken away to better expose some of the working parts. Fig. 2 is a sectional bottom view of the mechanism of the register. Fig. 3 is a horizontal section of the same. Fig. 4 is a longitudinal section. Figs. 5 to 8 are detail views.

The same letters of reference are used in all the figures in the designation of identical parts.

All the mechanism of the register, except the keys, will be inclosed in a suitable casing, A, made tight everywhere, except that it is provided with a number of perforations opposite to the back of the bell to let out the sound. The register which I have illustrated to make clear my invention will record two different amounts of fare—full fare or five cents, and half-fare or three cents—and has, therefore, two keys, B and C, covered by a suitable guard, A'. The stem *b* of the key B, which is intended to operate the mechanism for registering full fares, is connected inside of the casing A to the lever-arm B<sup>1</sup>, which is pivoted at *b*<sup>1</sup>, and has a projecting stud, *b*<sup>2</sup>, which plays in a slot, *b*<sup>3</sup>, in the plate X of the framework. The slot *b*<sup>3</sup> limits the play of the lever-arm B<sup>1</sup>, which has another stud, *b*<sup>4</sup>, engaging a slot, *d*, in an arm, D<sup>1</sup>, secured to the shaft D, which has its bearings in the plates X and Y of the framing, and is encircled by a spiral spring, D<sup>2</sup>, one end of which is secured to the arm D<sup>1</sup>, while the other end engages a fixed stud, *d*<sup>1</sup>, on the plate Y. The stress of the spring D<sup>2</sup> tends to keep the key B projected as far as the outer terminus of slot *b*<sup>3</sup> permits. On the exterior side of plate Y the shaft D carries a crank-arm, D<sup>3</sup>, to which a pawl, D<sup>4</sup>, is pivoted, which engages the teeth of a ratchet-wheel, E, being held to its work by a spring, *d*<sup>3</sup>, in the usual way. A stationary pawl, *e*, held in gear by a spring, *e*<sup>1</sup>, with the teeth of ratchet-wheel E, prevents retrograde movement of the latter.

The ratchet-wheel E is fixed to a shaft, E<sup>1</sup>, which projects through the dial-plate F, and has fixed to it the hand F<sup>1</sup>, which thus moves in unison with the said ratchet-wheel. The dial is covered by a glass face. The dial is divided into one hundred spaces in this instance, and the ratchet-wheel has a corresponding number of teeth. Now, each full stroke of key B, which is determined by the length of the slot *d*<sup>3</sup>, moves the ratchet-wheel forward a distance equal to five of its teeth, so that each such stroke will set the hand F<sup>1</sup> forward five spaces on the dial F, counting up five cents, or a full fare. On the face of the ratchet-wheel E is a fixed stud, *e*<sup>2</sup>, which supports a cog-wheel, E<sup>3</sup>, turning freely on it. This wheel E<sup>3</sup> engages the spur-wheels E<sup>4</sup> and

F<sup>2</sup>. The wheel F<sup>2</sup> is fixed on or forms part of the dial-plate F, and has ninety-nine cogs. The wheel E<sup>4</sup> turns on shaft E<sup>1</sup>, and has one hundred cogs. As the planet-wheel E<sup>3</sup> engages both these wheels F<sup>2</sup> and E<sup>4</sup>, it follows that in making its circuit around the fixed wheel F<sup>2</sup> it will turn the loose wheel E<sup>4</sup> the distance of one cog, or, in other words, during one hundred circuits it will give one entire revolution to the loose wheel E<sup>4</sup>. By means of this arrangement it is intended to indicate the amount of fares in dollars on the dial, the loose wheel E<sup>4</sup> being provided with a sleeve, e<sup>3</sup>, to which the hand F<sup>3</sup> is secured. By a multiplication of these wheels and hands, and suitable readings on the dial, the register may be made to record the whole amount of money collected up to any figure, and thus become a check on the cashier and higher officers of a company, as well as on the conductor.

To the lever-arm B<sup>1</sup> is pivoted a push-bar, B<sup>2</sup>, on the back of which a spring, b<sup>5</sup>, operates, to throw it toward a fixed post, b<sup>6</sup>. Its end abuts against an arm, G<sup>1</sup>, on the shaft G, which has its bearings in the plates X and Y, and is encircled by a spiral spring, G<sup>3</sup>, one end of which is secured to it, while its other end engages the post x of the frame work. The tendency of the spring G<sup>3</sup> is to turn the shaft in the direction of the arrow in Fig. 3; but its motion in that direction is checked by a post g, in the sweep of its arm G<sup>1</sup>. A hammer, G<sup>2</sup>, is fixed to shaft G, the ball g' of which is within the bell H. On pushing the key B inwardly, the push-bar B<sup>2</sup>, operating against the arm G<sup>1</sup>, will turn the shaft G and set up its spring. The push-bar has an incline, b<sup>7</sup>, opposite to the post b<sup>6</sup>, so that on being projected its end gradually slides toward the extreme end of arm G<sup>1</sup>, and just before the stud b<sup>2</sup> brings up against the end of slot b<sup>3</sup> the push-bar releases the arm G<sup>1</sup> altogether, and the recoil of the spring G<sup>3</sup> causes the hammer G<sup>2</sup> to strike a blow on the bell H. In returning, the push-bar slides past the end of arm G<sup>1</sup>, and again arranges itself in front of it into the position shown in Fig. 3.

To prevent a signal being produced by a sudden jar of the register causing a stroke of the hammer on the bell, a guard, B<sup>4</sup> is fixed on the lever-arm B<sup>1</sup>, having a hook, (see Fig. 4,) which prevents the arm of the hammer from moving toward the bell so far that its ball can strike, except at the instant of time when the push-bar B<sup>2</sup> releases arm G<sup>1</sup>, and the key B is just completing its inward stroke. It will be understood that in this instance the collection of a full fare, or five cents, is signalized by a single stroke on the bell. The stem c of the key C, which actuates the mechanism for recording half-fares, (three-cent fares in this instance,) is fixed at its inner end to the free end of a lever-arm, C<sup>1</sup>, pivoted at c<sup>x</sup> to the plate Y of the frame, and bearing against a spring, C<sup>2</sup>, the stress of which tends to force the lever-arm outward, so as to keep the key C

projected to its outer limit. The lever-arm C<sup>1</sup> has a stud, c<sup>1</sup>, which plays in a slot, c<sup>2</sup>, in plate Y, whereby the oscillations of the arm are limited to definite lengths. This stud c<sup>1</sup> also engages a fork on one arm of a bell-crank, C<sup>3</sup>, to the other arm of which a pawl, C<sup>4</sup>, is pivoted. This pawl C<sup>4</sup>, held to its work by a spring, c<sup>3</sup>, engages the teeth of the ratchet-wheel E. The length of slot c<sup>2</sup> is such that a full inward stroke of the key C will move the ratchet-wheel a distance equal to three teeth, and cause the hand F<sup>1</sup> to advance three spaces on the dial, indicating the collection of a three-cent fare. A pawl, C<sup>5</sup>, pivoted on lever-arm C<sup>1</sup>, and actuated by a spring, c<sup>4</sup>, engages the teeth of a ratchet-wheel, I<sup>1</sup>, which is fixed on the shaft I, which has its bearings in the plates X and Y.

Between a collar, i, and the hub i<sup>1</sup> of the ratchet-wheel I<sup>1</sup> a barrel, K, is placed on shaft I, containing a spring, k, one end of which is fixed to the barrel, and the other end to the shaft. On pushing key C inward the shaft I is turned by pawl C<sup>5</sup>; but the barrel is prevented from turning at such times, until just before the limit of the inward stroke, by a projection, c<sup>5</sup>, on lever-arm C<sup>1</sup> passing in front of one of the studs k<sup>1</sup> on the face of spur-wheel K', which is fixed to or forms part of the barrel K. The barrel being thus locked, as it were, the spring it contains will be wound up, and its recoil, which occurs at the moment when the projection c<sup>5</sup> releases the stud k<sup>1</sup> it for the time engaged, will turn the barrel on the shaft. The hub i<sup>1</sup> of the ratchet-wheel I<sup>1</sup> has a laterally-projecting arm, i<sup>2</sup>, and the spur-wheel K' a projecting stud, k<sup>2</sup>, which, in the normal condition of the shaft I and the barrel, interlock each other. Thus the barrel will be turned by the recoil of the spring only the distance which the arm i<sup>2</sup> had gained on the stud k<sup>2</sup>. The ends of the projection c<sup>5</sup> should be made sharp, and the studs k<sup>1</sup> are best made angular in cross-section, as shown in Fig. 5, the angles being so arranged that it will be impossible, practically, to lock the barrel by pressing the end of projection c<sup>5</sup> against one of these studs k<sup>1</sup>. A stationary pawl, I<sup>2</sup>, bearing against a spring, i<sup>3</sup>, is used to prevent retrograde motion of the shaft I. The barrel K is provided with an annular series of teeth, k<sup>3</sup>, which operate on the arm L<sup>1</sup> of the hub L on post l, to which hub the hammer L<sup>2</sup> is also secured. The hub is actuated by a spring, l', to throw the hammer against the bell H every time the arm L<sup>1</sup> escapes from a tooth, k<sup>3</sup>, the action of the spring being limited by the arm L<sup>1</sup> striking the post b<sup>6</sup>. The movement of the mechanism is limited in extent, so that each full inward stroke of key C will cause the barrel K to turn a distance equal to two of its teeth k<sup>3</sup>, and the bell H will, consequently, be struck twice thereby. The spring l' may be somewhat weaker than the spring G<sup>3</sup>, so that the strokes delivered by the hammer L<sup>2</sup> will be feebler than the strokes of hammer G<sup>2</sup>. The spur-wheel K'

drives a pinion, M, on shaft *m*, to which is also secured the scape-wheel N, engaged by the pallet O, which is fixed to the shaft O', provided with weighted arms *o*, one of which, during the action of the escapement, delivers rapid blows on the shaft G. The motion of this escapement can be controlled by loading the arms *o* more or less. In this particular instance this escapement effects two very important results: first, it curbs the action of the spring *k* in barrel K, so that the latter will turn slow enough to cause two distinct strokes on the bell; and, secondly, it gives a continuous rattling sound, connecting the two strokes on the bell. Were it not for this intermediate sound the half-fare key might sometimes be used fraudulently for the purpose of giving two strokes of the bell, with the intention of conveying to the passengers the idea that two full fares had been recorded. This is made absolutely impossible by the presence of this intermediate rattle.

It is obvious that, instead of a rattle produced by an escapement, a separate bell might be added to give a continuous jingle between the strokes of the half-fare alarm, or that this jingling sound might be produced on the bell H itself.

I have provided means to prevent both keys from being manipulated, so as to depress one part way while the other is recording a fare, and then holding it thus depressed until a fare is to be recorded by it, which would have the effect to record less than its honest operation is intended to do.

The device I have shown consists of a shaft, P, with two arms, *p* and *p*<sup>1</sup>, placed between the posts *p*<sup>2</sup> and *p*<sup>3</sup> on the frame-work, which permits a limited working of the shaft. The lever-arm B<sup>1</sup> has a stud, *r*, projecting beyond the arm *p*. The lever-arm C has a similar stud, *r*', projecting beyond the arm *p*<sup>1</sup>. The arms *p* and *p*<sup>1</sup>, which have oppositely-beveled ends, are so arranged on the shaft P that either lever-arm may be moved freely, while the other remains at rest; but when it is attempted to depress both keys at once, the studs *r* and *r*' will become locked between the arms *p* and *p*<sup>1</sup>, so that no signal can be given by either key. Instead of this mechanism a simple rocking beam, with its ends under the lever-arms B<sup>1</sup> and C<sup>1</sup>, might be used, it being so hung that at the full inward stroke of one key it would hold the other key projected to its utmost limit.

In the register shown the fares are all recorded on a single dial. It is obvious that the different classes of fares might be recorded on separate dials. Again, instead of only two denominations of fares, three or more might be recorded by multiplying the registering mechanisms. In such cases the multiple strokes on the bell will always be connected by a continuous intermediate sound from the first to the last stroke.

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

1. The combination, substantially as hereinbefore set forth, with separate mechanisms for registering different kinds of fares, and a bell or bells, of a secondary sounding mechanism, to connect, by a continuous intermediate sound, the distinct multiple strokes on the bell.

2. In a mechanism for signaling the registry of certain kinds of fares by two or more distinct sounds, the combination, with a recording-key and the alarm, of a spring movement, which is first wound up and then released by the depression of the recording-key, and when once released cannot be stopped until it has caused the full required number of sounds to be given by the alarm, substantially as specified.

3. The combination, with the keys, of the armed rock-shaft, or its equivalent, operating so as to admit of the depression of only one key at a time, substantially as described.

4. The combination of the lever-arm B<sup>1</sup>, guard B<sup>4</sup>, hammer G<sup>2</sup>, and bell H, substantially as specified.

5. The combination of pawl C<sup>5</sup>, ratchet-wheel I<sup>1</sup> *i*<sup>1</sup> *i*<sup>2</sup> on shaft I, projection *c*<sup>5</sup> on lever-arm C<sup>1</sup>, barrel K, containing spring *k*, and provided with studs *k*<sup>1</sup> and *k*<sup>2</sup> and teeth *k*<sup>3</sup>, hammer L<sup>2</sup>, and bell H, substantially as and for the purpose specified.

6. The combination, with the hammer L<sup>2</sup>, and the spring movement for operating it, of the escapement for regulating the speed of the spring movement, as well as for producing a continuous sound connecting the strokes of the hammer on the bell, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. L. HORNE.

Witnesses:

B. EDW. J. EILS,  
JOHN EILS.