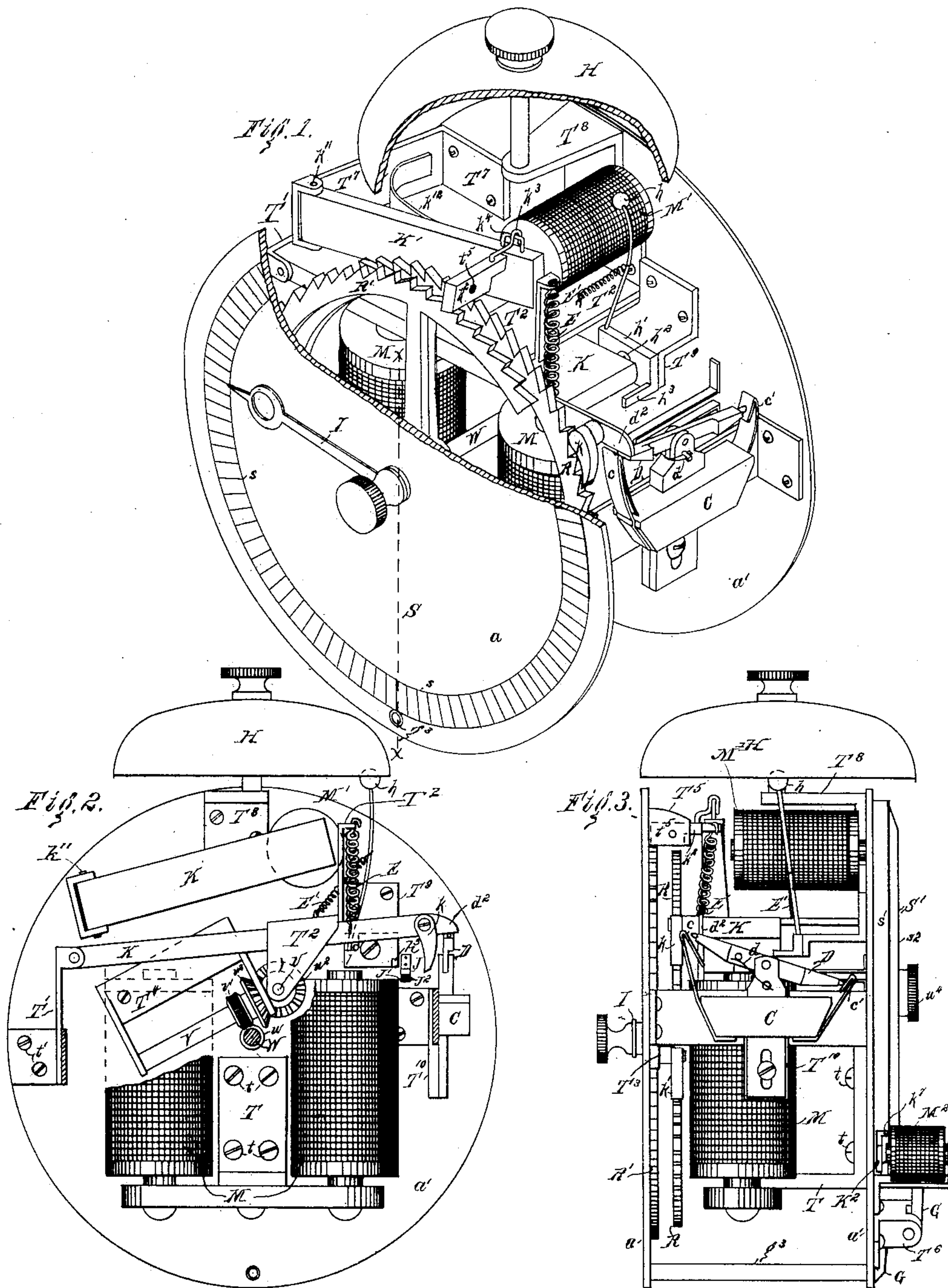


E. A. SCALES.

ELECTRIC REGISTER AND RECORDER FOR FARES, &c.

No. 331,826.

Patented Dec. 8, 1885.



Witnesses—

Hirshley Hyde,
Gertrude M. Day.

Inventor—
Edward A. Scales,
By Albert M. Moore,
His Attorney

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Fig. 4.

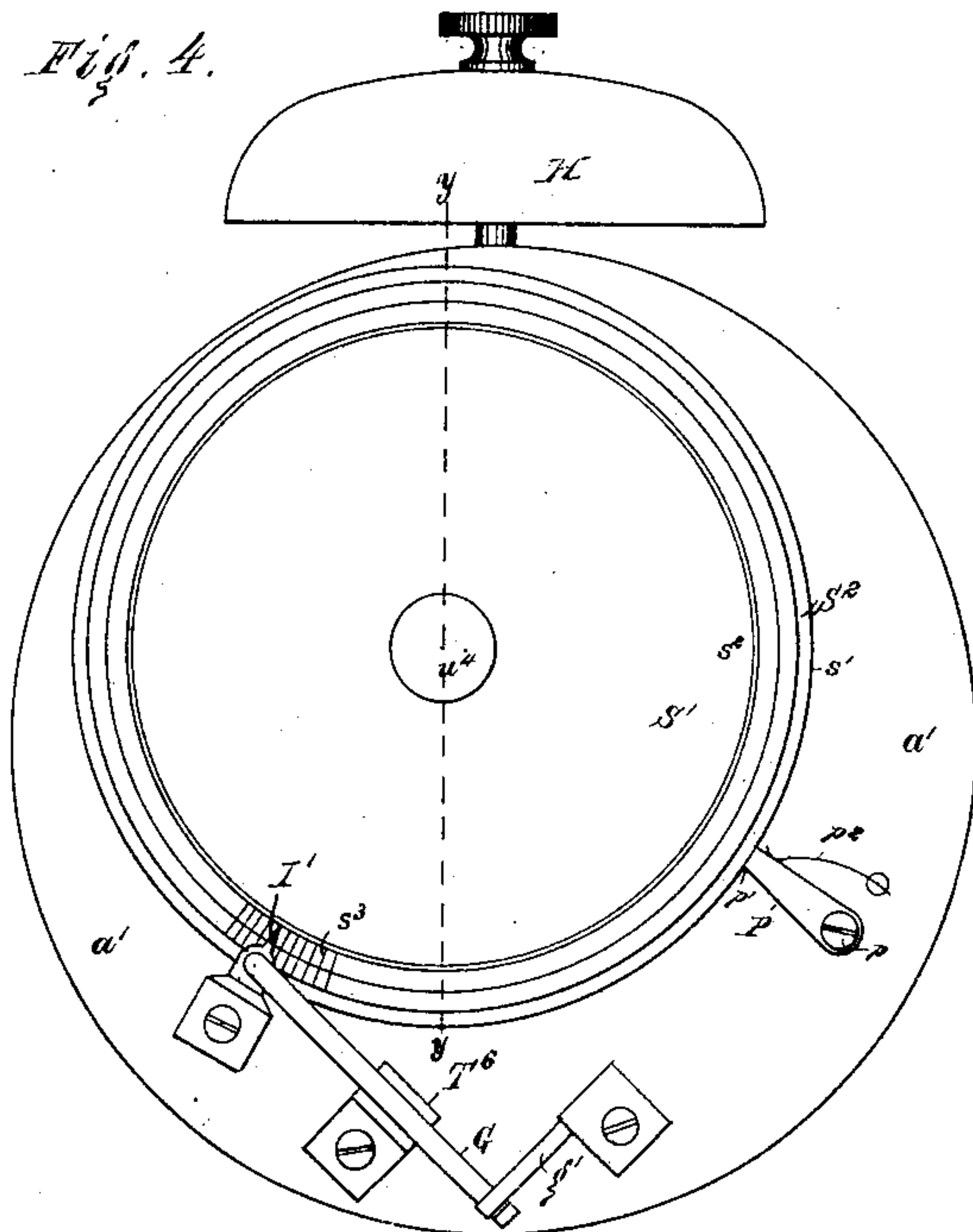


Fig. 5.

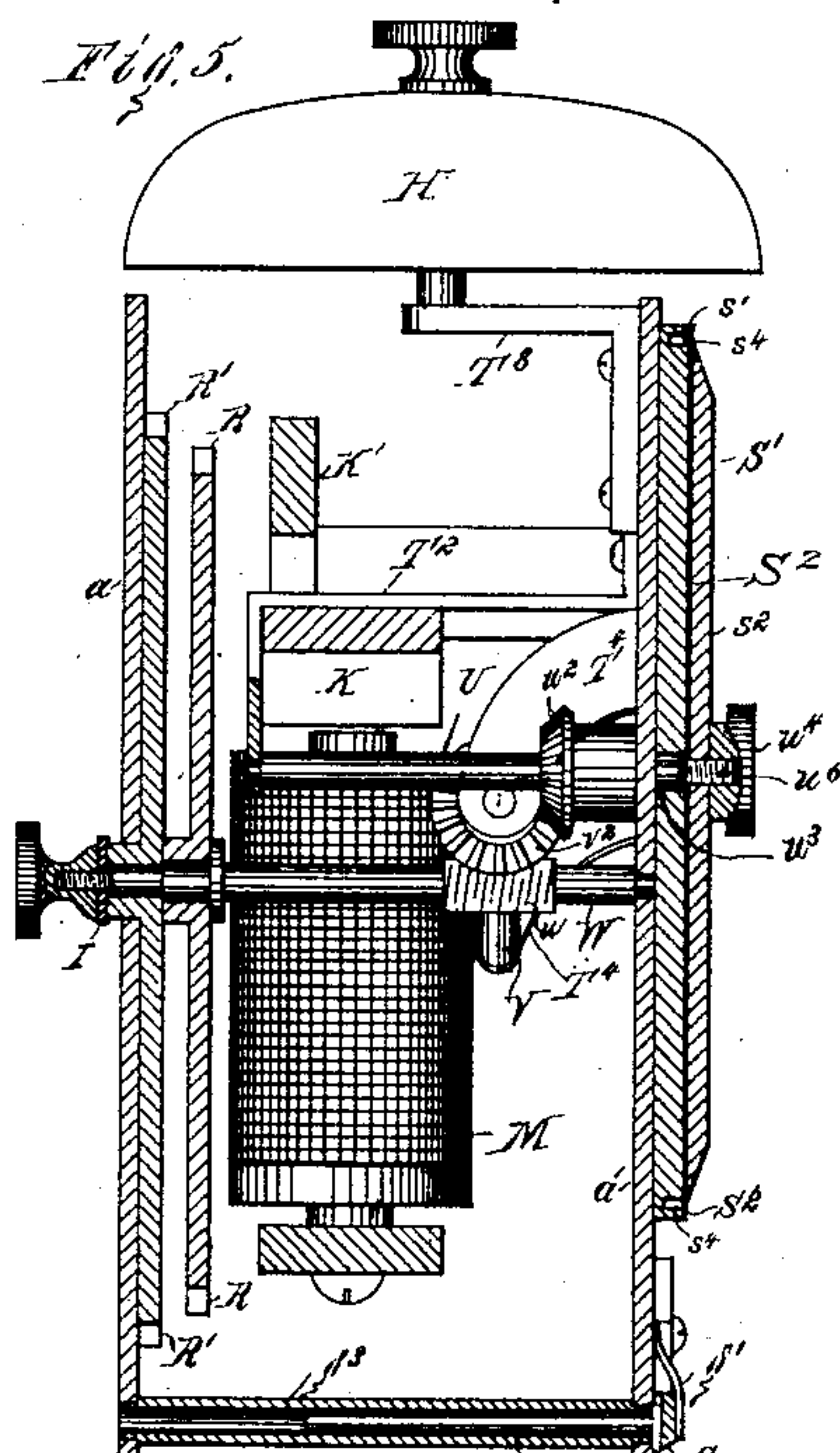


Fig. 6.

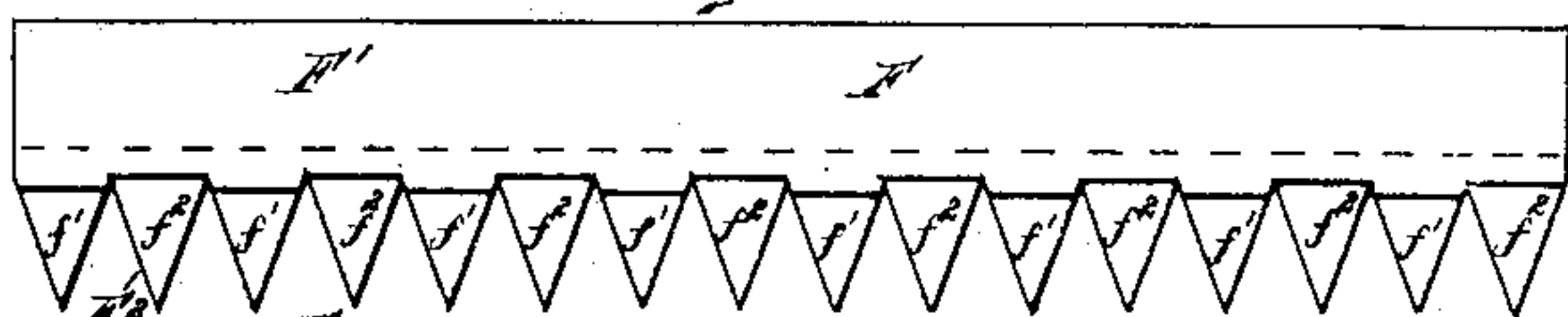


Fig. 7.

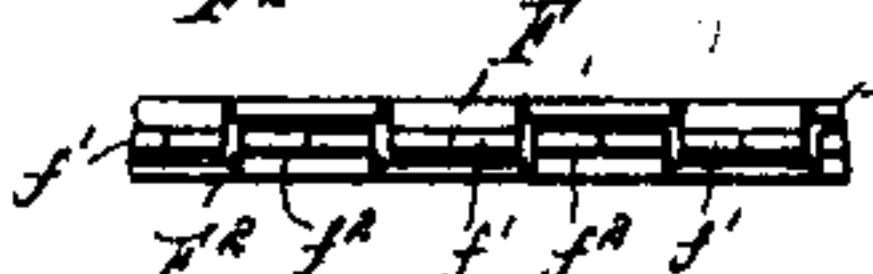


Fig. 8.

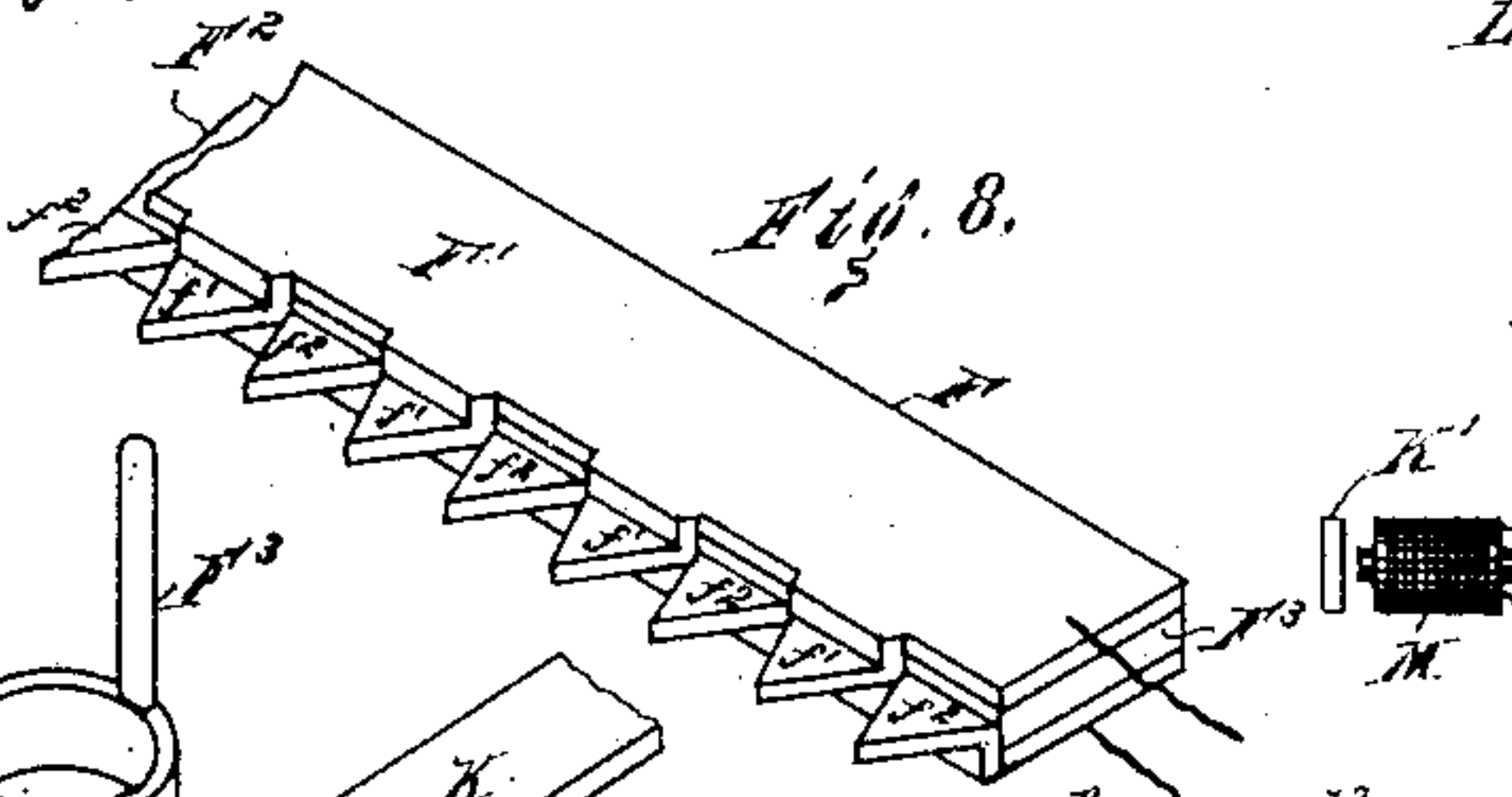


Fig. 9.



Fig. 10.

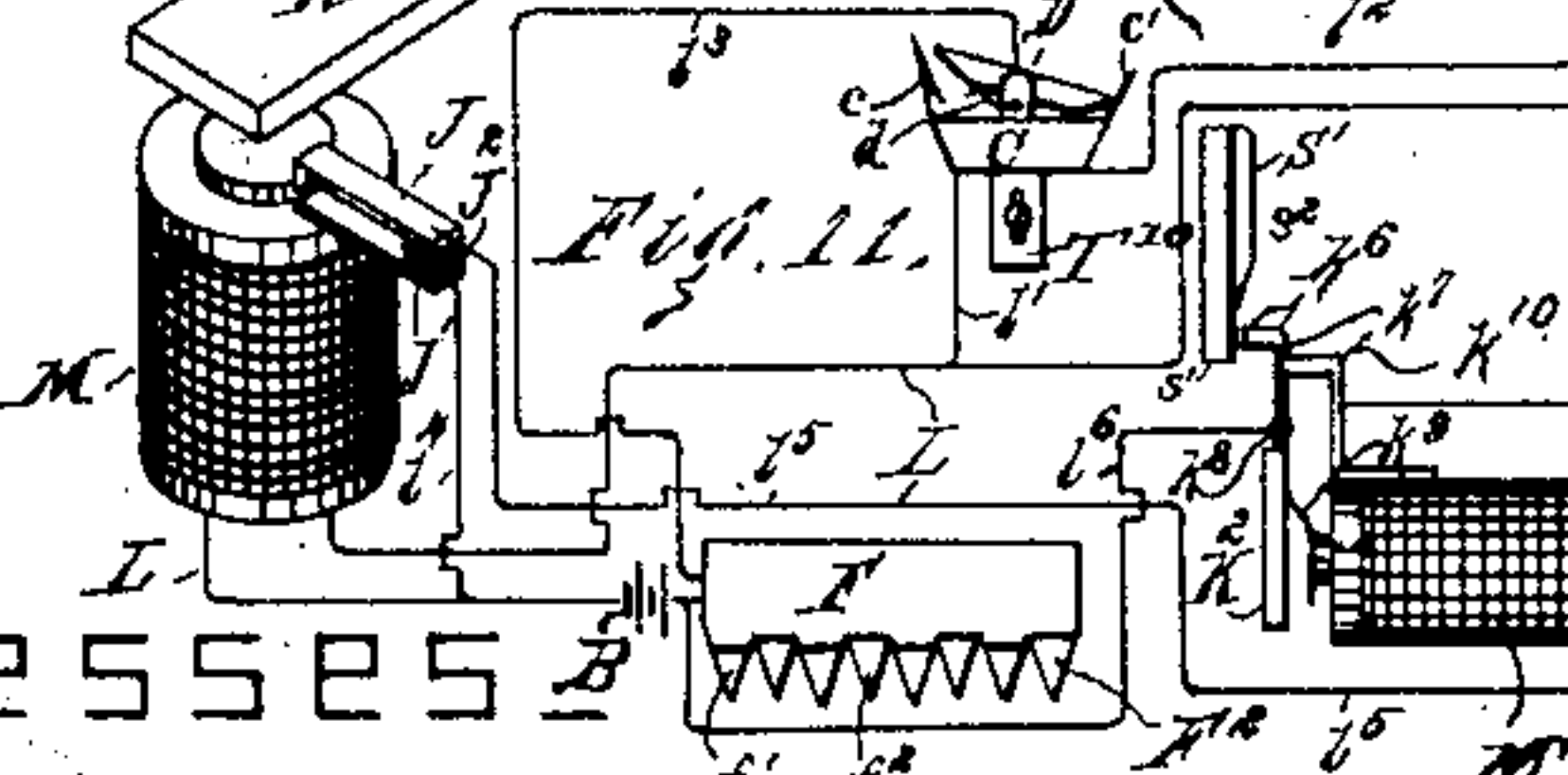
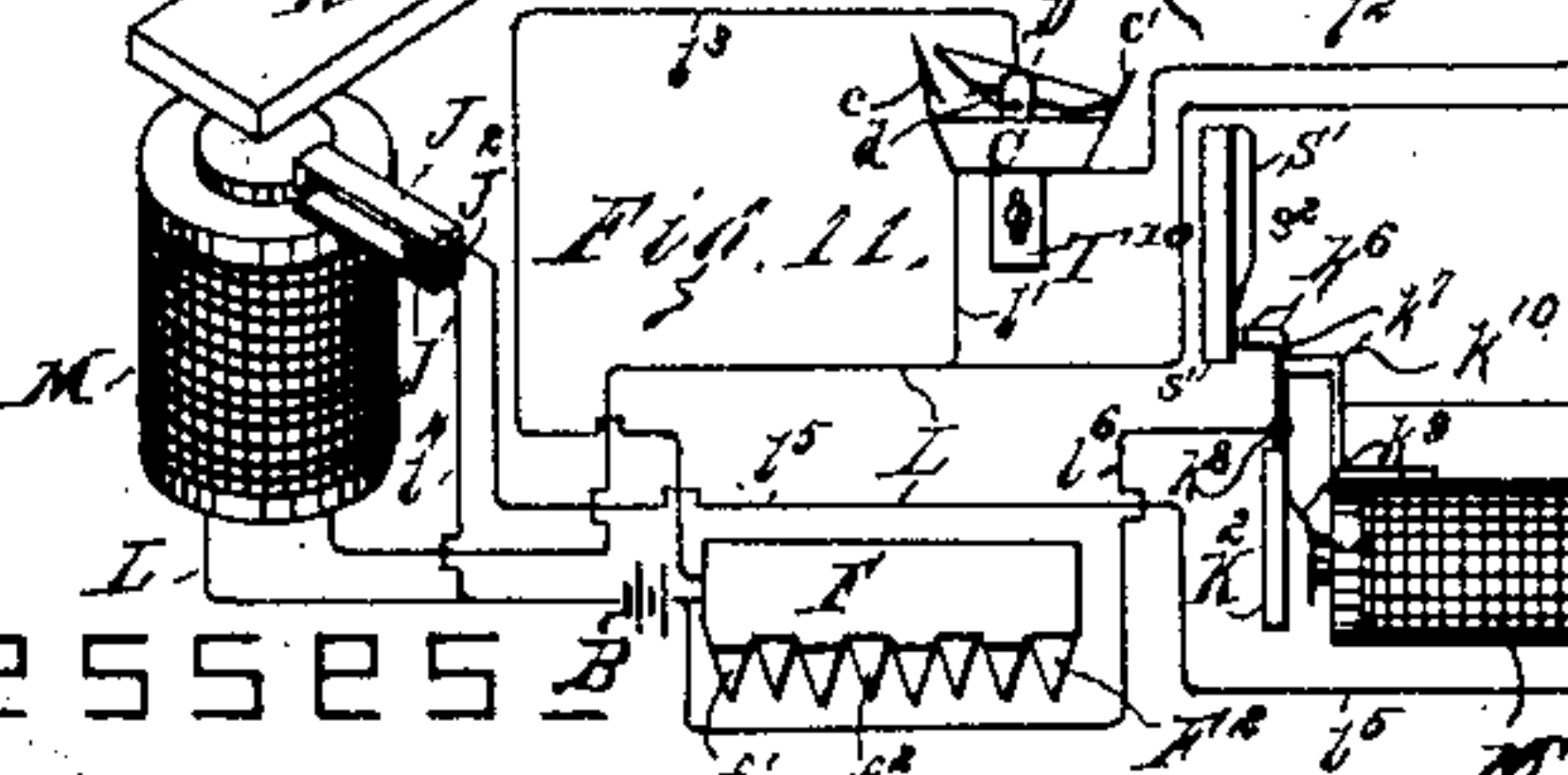


Fig. 11.



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UNITED STATES PATENT OFFICE.

EDWARD A. SCALES, OF LOWELL, MASS., ASSIGNOR, BY MESNE ASSIGNMENTS,
TO THE ELECTRIC FARE REGISTER COMPANY, OF PORTLAND, ME.

ELECTRIC REGISTER AND RECORDER FOR FARES, &c.

SPECIFICATION forming part of Letters Patent No. 331,826, dated December 8, 1885.

Application filed March 5, 1885. Serial No. 157,772. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. SCALES, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Electric Alarm-Registers, of which the following is a specification.

My invention relates to electric alarm-registers; and it consists in means for preventing the register from indicating or recording more than one fare at a single closing of the circuit; means for causing the apparatus to register before sounding the alarm; means for producing a permanent record of the number of times the circuit is closed, and means for recording a change of conductors.

In the accompanying drawings, on two sheets, Figure 1 is an isometric view of my improved alarm-register, a part of the front dial, a part of one of the ratchets, and a part of the bell being broken away to show the internal construction; Fig. 2, a front view of the same, the front dial being removed and the electro-magnet being broken to show the operating mechanism; Fig. 3, a side elevation of the same; Fig. 4, a rear elevation of the same, showing the conductor-registering punch and the friction-brake; Fig. 5, a vertical section through the front dial and ratchets on the line *x x* in Fig. 1, and through the rear dial on the line *y y* in Fig. 4. Fig. 6 is a diagram showing my circuit-closer, the unlocking-magnet, the switch, the operating-magnet, the connections, and battery; Fig. 7, an edge view of a part of the circuit-closer. Fig. 8 is an isometric view of the circuit-closer; Fig. 9, an isometric view of the circuit-closing plug and its ring; Fig. 10, a rear elevation of the fare-registering punch and conductor's punch; Fig. 11, a diagram showing the operating and unlocking magnets and armatures, the switch, the fare-registering punch, and the electrical connections.

My invention is particularly adapted for registering fares in horse-cars, but may be used for registering sales in a liquor-saloon, or for many similar purposes.

The frame of the alarm-registering device

consists of two plates, which are preferably disks, *a a'*, connected by suitable ties. On a bracket, *T*, secured by screws *t* to the front side of the rear disk, *a'*, is supported an electro-magnet, *M*. Upon another bracket, *T'*, secured by screws *t'*, is pivoted the armature *K* of said magnet *M*. The armature *K*, when the magnet ceases to attract it, is raised by the spring *E*, the lower end of which is attached to said armature and the upper end to a projection, *T²*, on the plate *a'*. The free end of the armature *K* has a pawl, *k*, pivoted thereto, which pawl, when the armature *K* is attracted by the magnet *M*, engages with the ratchet *R*, secured on and turning with the shaft *W*, revolves said ratchet, and causes an index-finger, *I*, secured to the front end of said shaft at right angles thereto, to move over a graduated scale, *s*, on the front dial, *S*, from one graduating-mark to the next. The ratchet *R* is prevented from moving in the reverse direction by a retaining-pawl, *k'*, Fig. 3, pivoted on a stud, *T³*, which projects from the back of the front disk, *a*. There is another or front ratchet, *R'*, secured on the same shaft *W*, but its teeth are set in the opposite direction from those of the ratchet *R*.

Upon a stud or bracket, *T⁵*, Fig. 3, is pivoted at *t⁵* the locking-pawl *k²*, the lower edge of which engages with the front ratchet, *R'*, except when the front end of said pawl *k²* is raised by the backward motion of the unlocking-armature *K'*, when the latter is attracted by its magnet *M'*, the rear end of said pawl *k²* above its pivot being connected by a hook, *k³*, to a staple, *k⁴*, in the top of said unlocking-armature. The shaft *W* is also provided with a worm, *w*, which takes into a worm-gear, *v'*, on the shaft *V*. The shaft *V* is supported by and turns in a bracket, *T⁴*, secured to the disk *a'*, and is provided with a bevel-gear, *v²*, which engages with a bevel-gear, *u²*, secured to the horizontal shaft *U*. The shaft *U* is supported and turns in the disk *a'* and a bracket, *T²*, secured to the front side of said disk *a'*.

To the rear end of the shaft *U*, concentrically therewith, and back of the disk *a'*, is removably attached the dial *S'*, Figs. 3, 4, and 5, formed in two parts, *s' s²*, or concentric cir-

cles, the front one, s' , or one nearest the disk a' , resting against a shoulder, w^3 , on said shaft U, and the back or outer circle, s^2 , being held in place by a nut, w^4 , which turns on the threaded outer end, w^6 , of said shaft. The circle s^2 is smaller than the circle s' , and is provided with a graduated circular scale, s^3 , the graduations of which are much finer than those of the front dial, S, the rear dial being intended to register several times as many fares or sales as the front dial. There is a stationary index-finger, I', Fig. 4, secured to the disk a' , which reaches over the scale s^3 and indicates the divisions thereon.

In order that it may be known how many fares are chargeable to a particular conductor, a paper disk, S^2 , as large as the front circle, s' , is clamped between the two circles s' s^2 of the rotating dial S' . The rear face of the inner circle, s' , is provided with an annular groove, s^4 , a little larger in diameter than the circle s^2 , and a lever, G, pivoted on a bracket, T^6 , secured on the back of the disk a' , has a pointed pin, g' , at one end at right angles to the paper disk, and at the other end is pressed upon by a spring, g' , which causes the point of said pin to draw back and the end of the lever G under the spring to be pressed against the enlarged head of the rod g^2 , which slides in the hollow tube g^3 , the ends of which tube g^3 are supported in the disks a a' . The rod g^2 does not project in front of the dial a , where it might be tampered with by unauthorized persons, but may be pushed back by a pointed instrument inserted in the front open end of the tube g^3 , causing the lower end of the lever G to be thrown back and the point g to be driven forward through the paper into the groove s^4 , when, the pointed instrument being withdrawn, the point g is drawn out of the paper by the spring g' pressing upon the lower end of said lever. This enables each conductor to mark upon the paper disk the point at which he begins and ceases to take fares; but the principal use of the paper disk S^2 is to make thereon a permanent record of the fares taken in a given time—say a day—after which said paper disk may be stamped with the date of the day and preserved for reference. The record of the fares upon the paper disk S^2 is made by a puncturing-blade, k^6 , secured to an arm, k^7 , projecting from the recording-armature K^2 , which is pivoted at k^8 , and which, being drawn backward by the magnet M^2 , throws the knife or blade k^6 forward through the paper disk into the groove s^4 , above named, and leaves a permanent record in the paper disk. It will be seen that the knife k^6 , being at about right angles to the armature K^2 , and being connected to the arm k^7 near the pivot k^8 , will move in the arc of a circle and make a drawing cut, the paper being cut more easily in this way and the mark being more apparent. After the cutting above described the armature K^2 is swung away from its magnet by the spring k^9 , secured to said armature and pressing against the core of said magnet, and

withdraws the knife from the paper disk. It is only necessary to say here that the arm k^7 normally rests against the post k^{11} , and that the circuit through the magnet M^2 is completed through said arm and post when they are in contact with each other, but broken when said armature is attracted by said magnet, and the arm is thereby moved away from said post. The different circuits are explained below.

The circuit-closer described below is not claimed herein, but is intended to form the subject of another application for a patent.

The circuit-closer and operating and stop magnets and their connections are shown in Fig. 6, where the circuit-closer F is shown formed of two toothed plates, F' F^2 , separated by a strip, F^3 , of insulating material, the teeth f' of one plate, F' , alternating with spaces equal in width to the teeth f^2 on the other plate, and the teeth of each plate being offset to come in line with those of the other plate. One of the plates, F' , is connected with one pole of a battery, B, and the other with the other pole of the same, and the circuit is closed by touching the plates F' F^2 by a metallic rod between the teeth.

In Fig. 9 a rod, F^3 , is shown attached to a ring, F^4 , to be worn on the finger of the conductor or fare-taker. A stick provided with a metallic ferrule will serve the same purpose as the rod F^3 , the ferrule being struck against the teeth of the circuit-closer. The circuit-closer may be placed in the top of the car, in a position where it is not likely to be touched by accident. From the battery B the line L runs in one direction to a plate, F^2 , of the circuit-closer, and in the other direction to the operating-magnet M, and beyond the last-named magnet it branches, one branch, l , running to the unlocking-magnet M' , and the other, l' , to a metallic spring, c , supported upon a non-conducting block, C. The unlocking-magnet M' is connected by wire l^2 to another spring, c' , supported upon said block C. The block C is supported upon a metallic bracket, T^{10} , and upon the top of said bracket T^{10} is pivoted a metallic lever or switch, D, between said springs c c' , and said bracket T^{10} is connected by the wire l^3 to the other plate, F^2 , of the circuit-closer. The lever D is normally held by a leaf-spring, d , secured to the bracket T^{10} and pressing against the under side of the front arm of said lever D, in the position shown in Figs. 3 and 6, its rear end touching the contact-spring c' , and its front end not touching the contact-spring c . When the circuit is closed by touching a rod to the plates F' F^2 , as above described, a current from the battery will go through the operating-magnet M, thence through the unlocking-magnet M' , contact-spring c' , lever D, and circuit-closing plates and rod back to the battery, with the result of moving the unlocking and operating armatures, as above described, both of these armatures moving immediately upon the closing of the circuit. The pawl of the operating-

armature, however, is so short as not to be in contact with a tooth of the ratchet K when said operating-armature is in a raised position, and does not strike such tooth until said operating-armature has moved downward for some distance. This allows the locking-pawl to be entirely lifted out of the teeth of the retaining-ratchet before the other ratchet begins to move. A projection, d^2 , on the free end of the operating-armature in its descent strikes upon the front end of the lever D and brings said front end in contact with the spring c , lifting the rear end of said lever D out of contact with the other spring, c' , whereby the unlocking-magnet M' is cut out and its armature K' is restored to position, being swung on its pivot k^{11} forward by the leaf-spring k^{12} , which is supported upon a bracket, T^7 , (projecting from the rear disk, a' ,) and presses against the rear faces of said armature K' . When the armature K' swings forward, it causes the front end of the locking-pawl k^2 to drop between the teeth of the ratchet R' , and this occurs before the operating armature K is raised by the spring E, as above described. The bell or gong H is supported upon the bracket T^8 , secured to the rear disk, a' , and the bell-hammer h is secured to one end of a short lever, h' , which is pivoted by a horizontal pivot, h^2 , upon a bracket, T^9 , also secured to the rear disk, a' . When the operating-armature K descends, it strikes a horizontal projection, h^3 , on the lever h' and causes the hammer h to strike the inside of the gong H. When the armature K is raised, the hammer is drawn away from the gong by a spiral spring, E' , connecting said hammer and said bracket T^2 .

When the puncturing device above described is used, the connections are made, as shown in Fig. 11, and the circuit through the magnet M^2 , which operates the knife k^6 , is closed by the descent of the operating-armature K, which presses the circuit-closing spring J down upon the circuit-closing spring J' , these being separated at one end by a block, J^2 , of insulating material. The lower spring, J' , is connected by line l^4 to the line L, and thereby to one pole of the battery B, and the other spring, J^2 , is connected by the line l^5 through the magnet M^2 to the post k^{11} , thence through the arm k^7 of the armature by line l^6 to the line L, thence to the other pole of the battery B. Hence when the springs J J' are in contact with each other the magnet M^2 will attract its armature K^2 , puncturing the paper, as above described; but when the movement of said armature K^2 takes the arm k^7 out of contact with the post k^{11} , the circuit is broken and said armature returns to its former position, withdrawing the knife from the paper. When the operating-armature K is again raised, the spring J, by its own elasticity, rises out of contact with the spring J' and breaks the circuit. A friction-brake, P, pivoted at its outer end at p to the disk a' , touches with its inner end, p' , the periphery of the dial S' , and is nearly in the line of a radius thereof; but

the inner or free end of said brake is slightly in advance of its pivoted end, and is pressed against the same by a spring, p^2 . Hence said disk is prevented from being moved in a reverse direction by the crowding of the inner or free end of said brake against said disk, and by the friction of said brake upon said disk.

Instead of the battery being permanently in the line, a portable battery may be carried in the pocket of the conductor or fare-taker, its opposite poles being connected to the opposite poles of a plug, such as is shown in Patent No. 258,931, granted June 6, 1882, to Henry W. Leland for plug for electrical switch-boards, or any similar well-known plug having two contact-surfaces insulated from each other and connected to opposite poles of a portable battery. Such a plug is to be struck against the teeth of the circuit-closer in such a manner that one contact-surface will touch one tooth and the other will touch the next tooth of said circuit-closer. The use of such a plug and pocket-battery renders it impossible for meddlesome or malicious persons to operate the register by means of a metal-tipped cane or umbrella-stick.

I claim as my invention—

1. The combination of a stationary graduated dial, the main shaft, an index-finger secured to said shaft and adapted to be moved by the rotation thereof over the graduations of said dial, two ratchets secured to said shaft, the teeth of one of said ratchets being turned in the opposite direction from the teeth of the other of said ratchets, the operating-magnet and its pivoted armature, a pawl pivoted to the free end of said armature and adapted, when said armature has moved through a part of its course, to engage with a tooth of one of said ratchets and to rotate said shaft, a pivoted locking-pawl, one end of which normally engages the other of said ratchets, and the other end of which is provided above said pivot with a hook, the unlocking-armature provided with a staple which engages said hook, and the unlocking-magnet to draw said locking pawl out of said last-named ratchet, as and for the purpose specified.

2. The combination of a stationary graduated dial, the main shaft, an index-finger secured to said shaft and adapted to be moved by the rotation thereof over the graduations of said dial, two ratchets secured to said shaft, the teeth of one of said ratchets being turned in the opposite direction from the teeth of the other of said ratchets, the operating-magnet and its pivoted armature, a pawl pivoted to the free end of said armature and adapted, when said armature has moved through a part of its course, to engage with a tooth of one of said ratchets and to rotate said shaft, a pivoted locking-pawl, one end of which normally engages the other of said ratchets, and the other end of which is provided above said pivot with a hook, the unlocking-armature provided with a staple which engages said

hook, and a spring adapted to force said unlocking-armature away from its magnet, and the unlocking-magnet to restore said locking-pawl to engagement with said last-named ratchet, as and for the purpose specified.

3. The combination of an electric circuit, the operating-magnet always in said circuit, the unlocking-magnet in a shunt-circuit, a pivoted switch normally arranged to include said shunt-circuit in the main line, and the operating-armature provided with a projection and adapted, when attracted by its magnet, to strike said switch, and by moving the same to cut out said unlocking-magnet, as and for the purpose specified.

4. The combination, in an electric circuit, of a circuit-closer, the operating-magnet connected to the battery, the unlocking-magnet connected to said operating-magnet, a contact-spring connected to said unlocking-magnet, a pivoted switch-lever normally in contact with said contact-spring, the pivot of said lever being connected with said circuit-closer, the circuit-closer being connected with said battery, another contact-spring insulated from the last-named contact-spring and connected with the line between said operating-magnet and said unlocking-magnet, the operating-armature provided with a projection adapted, when said armature is attracted by the operating-magnet, to strike said switch-lever to rock the same upon its pivot, and to bring the same out of contact with the first-named contact-spring and into contact with the other contact-spring to cut out said unlocking-magnet, the unlocking-armature, the locking-pawl, pivoted, as described, and loosely connected above its pivot to said unlocking-armature, the main shaft provided with two ratchets, the teeth of one of said ratchets being turned in the opposite direction from those of the other ratchet, the operating-armature being provided with a pawl adapted to engage with one of said ratchets, and the locking-pawl adapted to engage with the other of said ratchets, as and for the purpose specified.

5. The combination of the frame, the lever pivoted to the back of said frame and provided at one end with a point, the tube extending through said frame from front to back thereof, and the rod sliding in said tube, and provided

with a head larger than said tube, the other end of said lever resting against said head, whereby a paper disk, caused to rotate at the back of said frame, between said frame and point, may be pricked by said point, when said rod is pushed backward by a pointed instrument inserted in the front end of said tube and thrust against said rod, as and for the purpose specified.

6. The combination of the frame, the lever pivoted to the back of said frame and provided at one end with a point, the tube extending through said frame from front to back thereof, the rod sliding in said tube, and provided with a head larger than said tube, the other end of said lever resting against said head, whereby a paper disk, caused to rotate at the back of said frame, between said frame and point, may be pricked by said point, when said rod is pushed backward by a pointed instrument inserted in the front end of said tube and thrust against said rod, and a spring connected to the back of said frame, and pressing the end of said lever against said head to withdraw said point from said paper disk, as and for the purpose specified.

7. The combination of an armature pivoted and provided above its pivot with an arm having a puncturing-knife, the electro-magnet of said armature, a metallic post secured to said magnet and normally in contact with said arm, the pivot of said armature being connected with one pole of a battery, said post being electrically connected with said magnet, and said magnet being connected with a circuit-closing spring, another circuit-closing spring parallel with said last-named spring, and insulated therefrom and connected with the other pole of said battery, the operating-magnet, and the operating-armature, adapted, when attracted by the operating-magnet, to bring said circuit-closing springs in contact with each other, whereby said knife may be caused to puncture the edge of a paper disk rotated in the path of said knife when the circuit is closed through said operating-armature, as and for the purpose specified.

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