

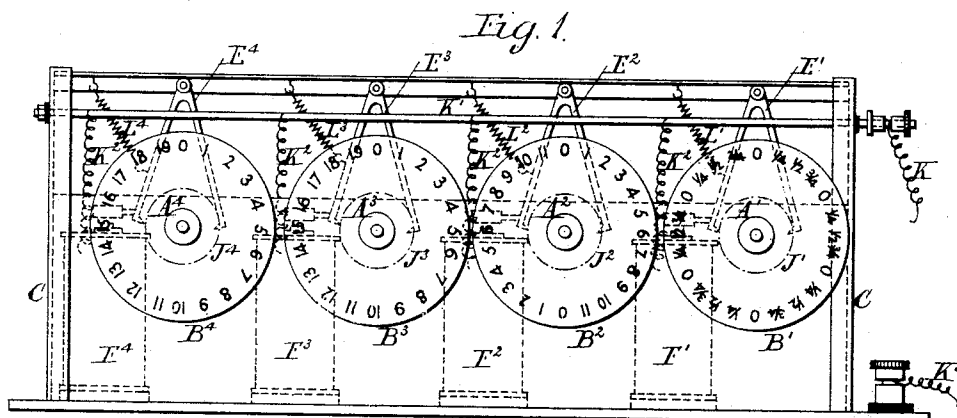
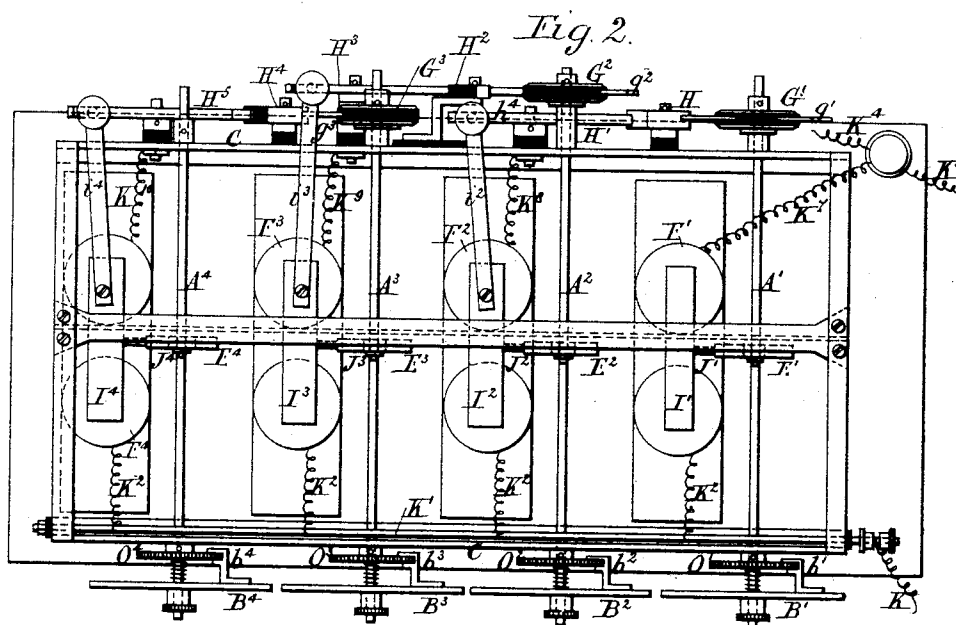
(No Model.)

3 Sheets—Sheet 1.

R. JEWELL.
REGISTERING MECHANISM OR COUNTER ACTUATED BY ELECTRIC
CURRENTS.

No. 444,358.

Patented Jan. 6, 1891.



Witnesses:
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J. W. Wren

Inventor:
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Attorney

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

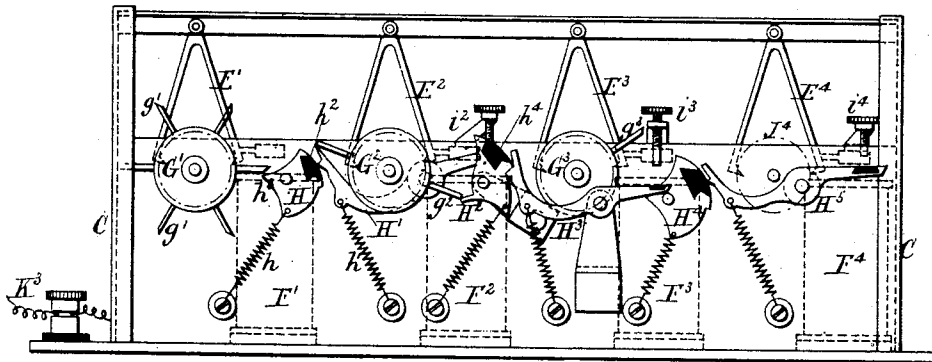
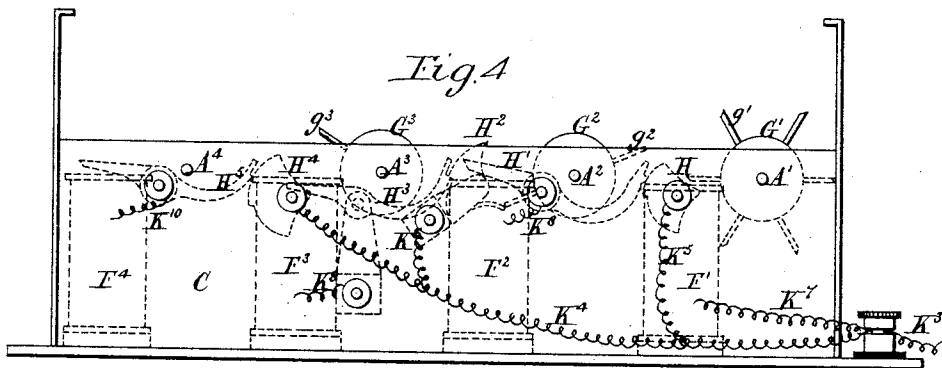


Fig. 4



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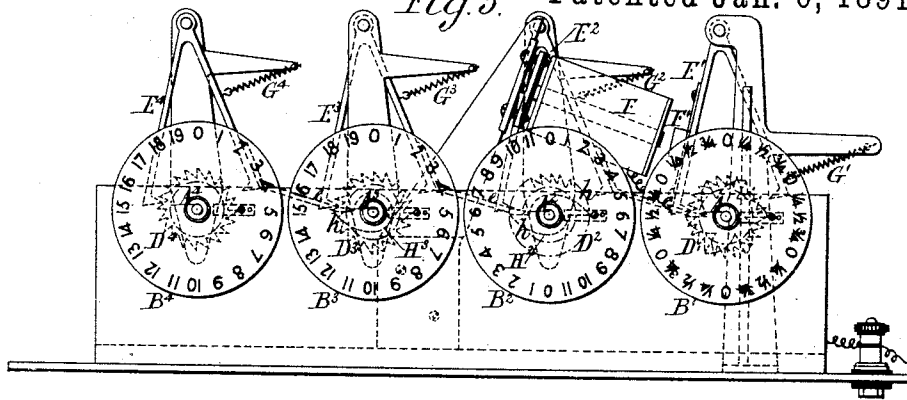
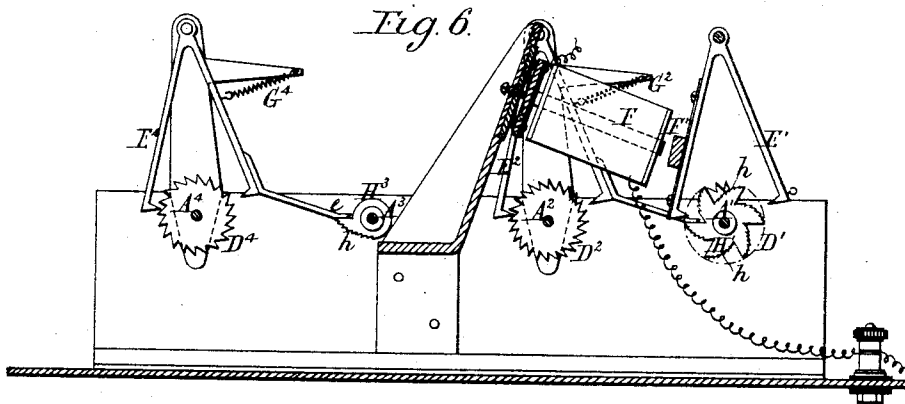
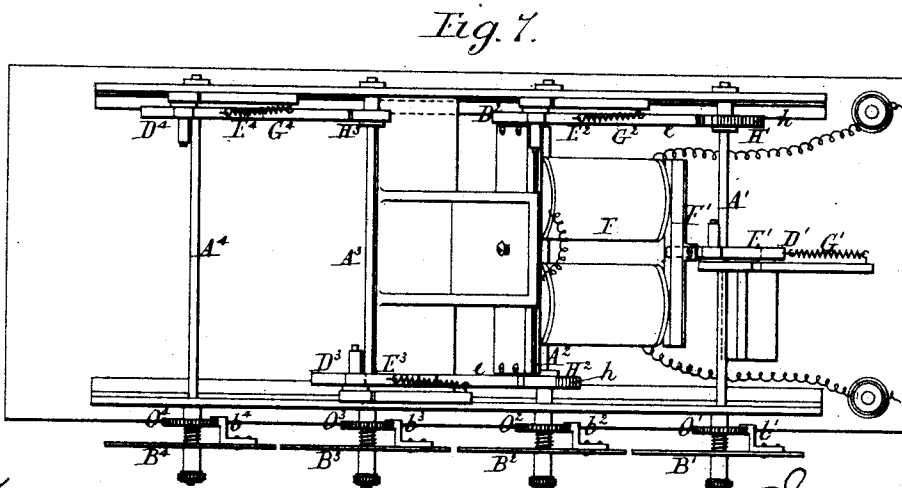
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UNITED STATES PATENT OFFICE.

ROBERT JEWELL, OF LONDON, ENGLAND.

REGISTERING MECHANISM OR COUNTER ACTUATED BY ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 444,358, dated January 6, 1891.

Application filed June 20, 1890. Serial No. 356,098. (No model.) Patented in England August 15, 1889, No. 12,903, and in France June 14, 1890, No. 206,378.

To all whom it may concern:

Be it known that I, ROBERT JEWELL, a citizen of England, residing at 9 Victoria Road, Battersea Park, in the county of Surrey, England, have invented new and useful Improvements in Registering Mechanism or Counters Actuated by Electric Currents, (for which I have obtained patents in Great Britain, dated August 15, 1889, No. 12,903, and in France, dated June 14, 1890, No. 206,378,) of which the following is a specification.

My invention relates to the construction of electrically-actuated registering mechanism or counters for registering or totalizing at a distance numbers of any kind, such as amounts of money received, quantities of beer, wine, spirits, &c., dispensed, and numbers of persons passing through turnstiles, &c.

The main object of the improvements is to arrange the mechanism in such a manner that it can be actuated by a comparatively weak current.

To accomplish this object my invention involves the features of construction, the combination or arrangement of devices, and the principles of operation hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a front elevation of the register or counter. Fig. 2 is a top plan view of the same. Fig. 3 is a rear elevation. Fig. 4 is a detail side elevation showing the electrical connections between the magnets. Fig. 5 is a front elevation of a modified construction. Fig. 6 is a longitudinal sectional view of the same, and Fig. 7 is a top plan view of the same.

A' A² A³, &c., are spindles carrying counter-disks B' B², &c., and mounted in bearings in the framing C.

F' F², &c., are a series of electro-magnets, one to each counter-spindle, whose armatures I' I², &c., are carried by actuating-levers E' E², &c., the motion of which imparts a step-by-step rotary motion to ratchet-wheels J' J², &c., fixed on the spindles A' A², thus imparting the requisite step-by-step motion to the counter-disks B' B² when the electro-magnets are excited in the manner to be presently explained.

On the end of the main or initial spindle A' is fixed a disk G', of insulating material, having six arms or spikes g', corresponding in number to the number of sets of divisions on the counter-disk B', which in the present case is shown with six sets of four divisions, it being intended that disk B² shall be moved one division every time B' has moved four divisions. Pivoted in an insulated manner to the framing C is a contact-piece H, which is held by a spring h in the position shown, in which a second pivoted contact-piece H', also insulated from the framing C and held by a spring h', is made to rest upon an insulated part h² of H, so that there is then no conducting-connection between the two parts. The electric circuit for actuating the apparatus is connected to the one end of all the electro-magnet coils by the lead K, rod K', and wires K², while the other lead K³ of the circuit is put by wire K⁴ and branch wires K⁵ K⁶ in conducting-connection with the pivots of contact-pieces H H² H⁴ and by wire K' with the other end of the coil of electro-magnet F'. The pivot of contact-piece H' is connected by wire K⁸ with the other end of the coil of electro-magnet F². From this arrangement it will be seen that every time the electric circuit is closed at a distance by the action of the apparatus whose movements the counter is required to register the electro-magnet F' will be excited, and will turn the counter-spindle A' and disk B' one division, the return motion of the armature I' after the cessation of the current being effected by a spring L'.

When main or initial spindle A' has moved three divisions and is completing its fourth movement, one of its arms g' comes in contact with the tail h³ of the contact-piece H, and in depressing it turns H so as to move the insulating-piece h² from under contact-piece H' and cause the two parts to assume the locked position shown at H² H³, the two parts being then in conducting contact. The electric current then passes from K³ through K⁴, K⁵, H, H', and wire K⁸ to the coil of electro-magnet F², thus completing the direct connection hereof with the main circuit, and by the consequent attraction of armature I² the turning of supplementary or secondary spin-

dle A^2 and disk B^2 one division will be effected. By the attraction of the armature I^2 also an arm i^2 thereon is caused by means of a screw carried thereby to press upon the tail h^4 of H' , thereby throwing $H H'$ out of the conducting contact described back into the non-conducting contact shown, in which position consequently electro-magnet F^2 is thrown out of circuit again, and will remain so until main spindle A' has again completed a set of four movements.

The disk B^2 has two complete sets of twelve divisions, and is consequently required to effect the turning of the supplementary or secondary spindle A^3 and disk B^3 one division at every semi-revolution. Its disk G^2 is therefore provided with only two opposite arms g^2 , one of which on the completion of twelve movements of A^2 causes the contact-pieces $H^2 H^3$ to be brought from the position shown at $H H'$ to that in which $H^2 H^3$ are shown. The current now passes from K^4 through K^6 , H^2 , H^3 , and wire K^9 to the coil of electro-magnet F^3 , which is now also in direct connection with the main circuit. In attracting its armature it first causes supplementary or secondary spindle A^3 and disk B^3 to turn one division, and, secondly, it causes the arm i^3 of the armature to act upon H^3 so as to throw it out of conducting contact with H again, thus breaking the connection between the circuit and F^3 . The disk B^3 has a single set of twenty divisions, so that spindle A^3 has to make a complete revolution before it causes supplementary or secondary spindle A^4 and disk B^4 to advance one division. For this purpose its disk G^3 has only a single arm g^3 , which on completing one revolution acts upon contact-piece H^4 so as to make conducting contact with H^5 in the same manner as above described with reference to $H H'$ and $H^2 H^3$. The current then passes through wire K^4 , contacts $H^4 H^5$, and wire K^{10} , leading from the latter to the coil of electro-magnet F^4 , thus connecting this directly with the main circuit and causing its armature I^4 first to turn spindle A^4 and disk B^4 one division and secondly to throw the contacts $H^4 H^5$ out of gear again by acting upon H^5 with its arm i^4 , thus cutting electro-magnet F^4 out of circuit again.

From the above-described mode of action it will be seen that the counter can be worked by a comparatively weak electric current, as the full strength of current is made available for actuating each electro-magnet separately instead of requiring the current to actuate the whole mechanism of the counter simultaneously or to pass through all the coils of the several electro-magnets in series.

The counter-disks, as shown, are arranged to indicate on the first one fractions of a penny, on the second one pence, on the third shillings, and on the fourth pounds; but it will be understood that any other arrangement of divisions may be employed, the number of arms on the several disks $G' G^2 G^3$ being modified accordingly.

The several disks $B' B^2$ can be set to zero in any suitable known manner. In the arrangement shown the disks are loose on their spindles, which have fixed thereon notched disks $O' O^2$, &c., into the notches of which takes a tooth $b' b^2$, &c., fixed to the disk, which is thereby carried round by the spindle. The tooth is kept in gear with the disk by a small spring pressing the counter-disk $B' B^2$ outward. On pressing the disk inward the tooth is moved out of the notch of O' , so that B' can then be turned round upon A' into zero position, and then be allowed to gear with O' again.

According to another modification only the main or initial spindle of the counter is worked directly by the electric current, the other spindles being worked successively by an arrangement of cams and springs, which I will describe with reference to Figs. 5 to 7 of the drawings. In this case only the main or initial spindle A' of the counter has its motion imparted to it by the electric current, for which purpose the ratchet-wheel D' on the spindle is acted upon by the actuating-lever E' , to which is attached the armature F' of the electro-magnet F , so that each time the armature is attracted by the closing of the circuit the one arm of the actuating-lever moves the ratchet-wheel and its spindle through the distance of half a tooth, and on the breaking of the circuit again the other arm of the escapement actuated by the spring G' causes the wheel to move through the distance of half a tooth, thus completing the registration. The spindle A' carries a cam-shaped wheel H' , the curved sides h of which are formed with serrations, into which takes the tail e of the actuating-lever E^2 , the two arms of which act alternately upon the ratchet-wheel D^2 of the supplementary or secondary counter-spindle A^2 . Thus as the main spindle A' receives its step-by-step motion from the electro-magnet one curved side h of the wheel H' gradually moves the lever E^2 outward against the action of a spring G^2 until, when in the extreme outward position, the one arm of the lever moves the ratchet-wheel D^2 and its spindle through the distance of half a tooth, whereupon as the curved side of H' releases the lever E^2 this is drawn back again by its spring G^2 , and thereby effects the completion of the movement of the ratchet-wheel D^2 and supplementary or secondary spindle A^2 , so as to move the dial of the latter forward one division. In the arrangement shown the dial B^2 is supposed to move one division every time the dial B' completes four movements, and as A' has six sets of four divisions the wheel H' has six cam-shaped faces h . In like manner spindle A^2 carries a cam-shaped wheel H^2 , with two opposite serrated faces h , which operate in the same manner as above described upon the tail e of the actuating-lever E^3 , so as to cause this to turn ratchet-wheel D^3 and the supplementary or secondary spindle A^3 one tooth at every semi-revolution of H^2 , the disk B^2 of A^2

having two sets of twelve divisions. Spindle A³ carries a cam-wheel H³, having one cam-surface *h*, acting on lever E⁴ of ratchet-wheel D⁴ of the supplementary or secondary spindle A⁴, so as to move this through the distance of one division at every complete revolution of A³, the disk B³ of the latter having only one set of twenty divisions. The counter-disks are adjustable on their spindles in the same manner as described with reference to the first arrangement. In this arrangement it will be seen that although the movements of main spindle A' and supplementary or secondary spindles A², A³, and A⁴ are derived from the electro-magnet actuating the main one, instead of each one being actuated separately by the current, as in the preceding arrangement, yet the momentary energy required by the current is only that necessary for actuating the main counter-spindle plus the very small energy required for causing the cam H' to move the escapement E' forward one step at each movement of the armature F', and is consequently very small as compared with the energy required for transmitting at one time the entire motion to all the counter-spindles, as is required when these are connected by ordinary gear.

Having thus described the nature of this invention and the best means I know for carrying the same into practical effect, I claim—

1. In an electrical register, the combination of a main counter-spindle having a counter-disk and a ratchet-wheel, an actuating-lever for engaging and imparting a step-by-step movement to the wheel, an electro-magnet, an armature connected with and operating the lever when attracted by the energized magnet, a series of supplementary counter-spindles, each having a counter-disk and a ratchet-wheel, an actuating-lever for each ratchet-wheel of the supplementary spindles, and means for successively operating the actuating-levers for the ratchet-wheels of the supplementary counter-spindles, substantially as described.

2. In an electrical register, the combination of a main counter-spindle and a series of supplementary counter-spindles having counter-disks and projecting arms, an electric circuit, an electro-magnet for each spindle, a pair of movable contact-pieces for directly connecting each magnet to the electric circuit, one of each pair being operated by an arm on a counter-spindle, and an armature for each magnet, the armatures for the magnets of the supplementary spindles being provided with arms to operate the contact-pieces of the pairs pertaining to said armatures for the magnets of the supplementary counter-spindle, substantially as and for the purpose specified.

3. In an electrical register, the combination of the main counter-spindle and the supplementary counter-spindles having counter-disks, projecting arms, and ratchet-wheels, an actuating-lever for each wheel, an electric circuit, an electro-magnet for each spindle, pairs of movable contact-pieces for connecting the magnets directly to the electric circuit, and an armature connected to and operating each actuating-lever, the armatures for the actuating-levers of the ratchet-wheels on the supplementary spindles having arms to operate some of the contact-pieces, while the others are operated by the projecting arms on the spindle, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of June, A. D. 1890.

ROBERT JEWELL.

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