(No Model.) 3 Sheets—Sheet 1.

J. H. ELFERING.

COIN OPERATED ELECTRIC APPARATUS.

No. 528,911. Patented Nov. 6, 1894.

Fig. 1.

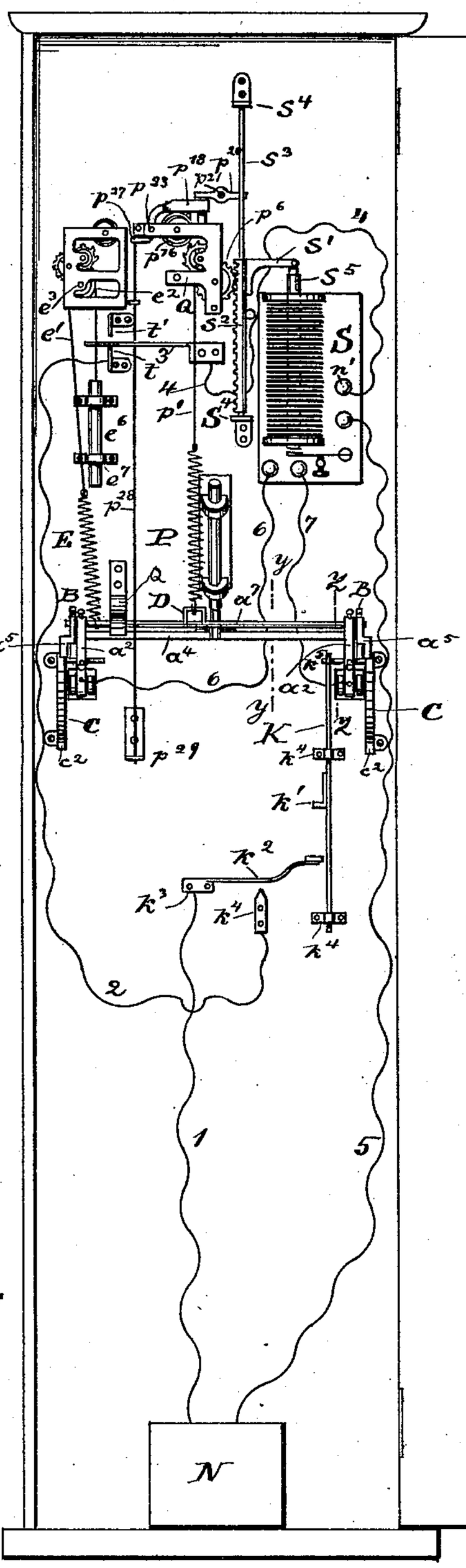


Fig. 10.

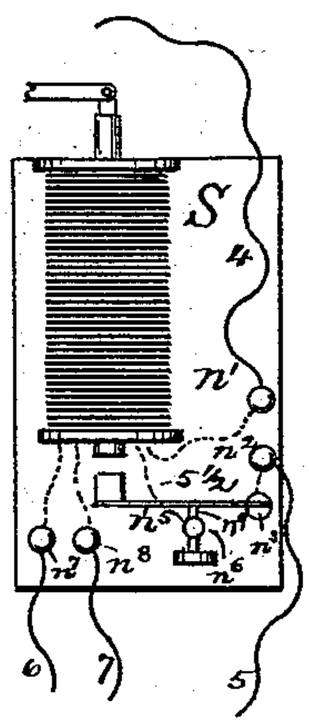
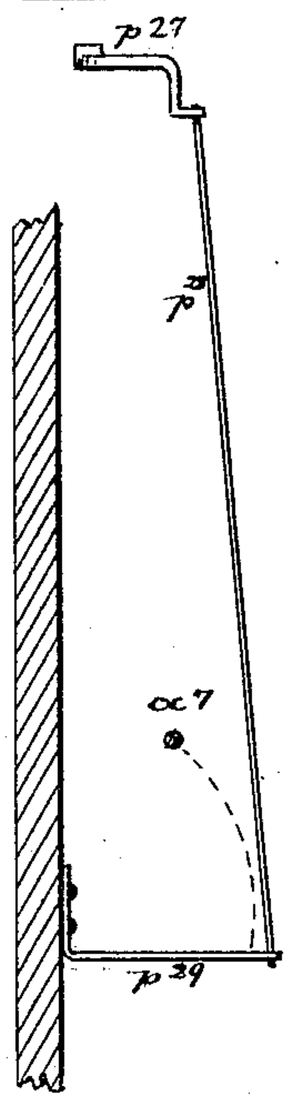


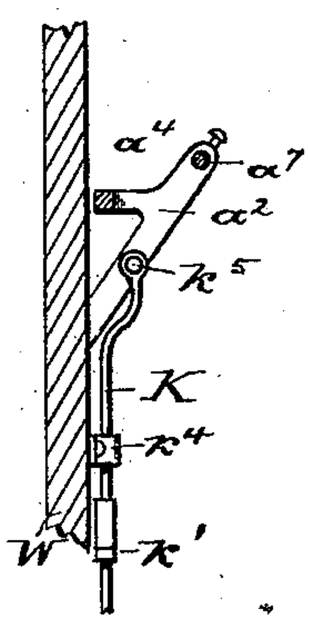
Fig. 12.



L7

M

Fig. 11.



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(No Model.) 3 Sheets—Sheet 2.

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COIN OPERATED ELECTRIC APPARATUS.

No. 528,911. Patented Nov. 6, 1894.

Fig. 2.

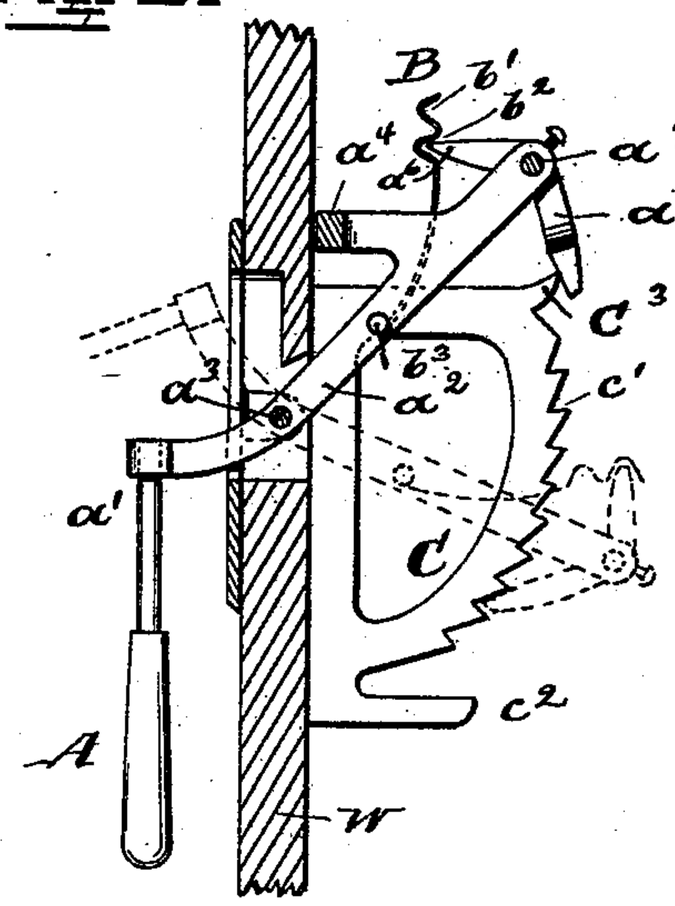


Fig. 4.

Fig. 3.

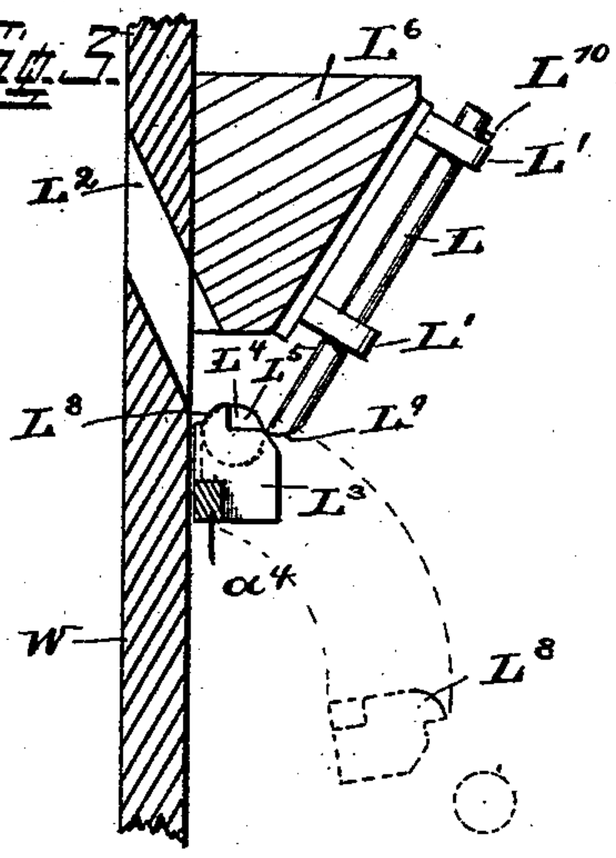
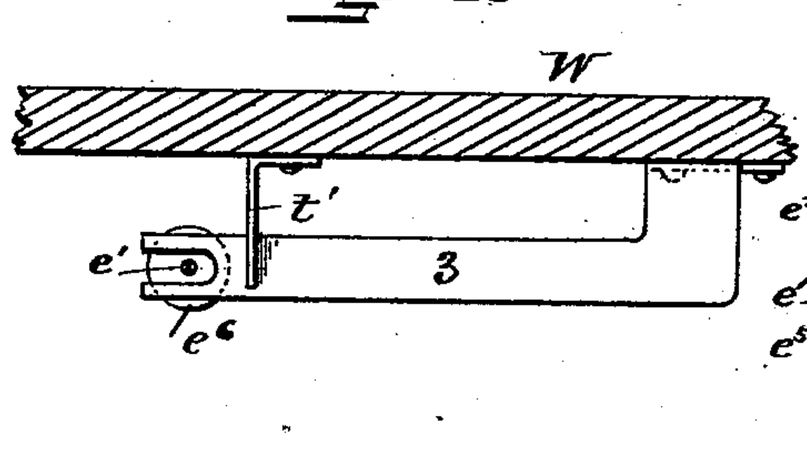


Fig. 5.



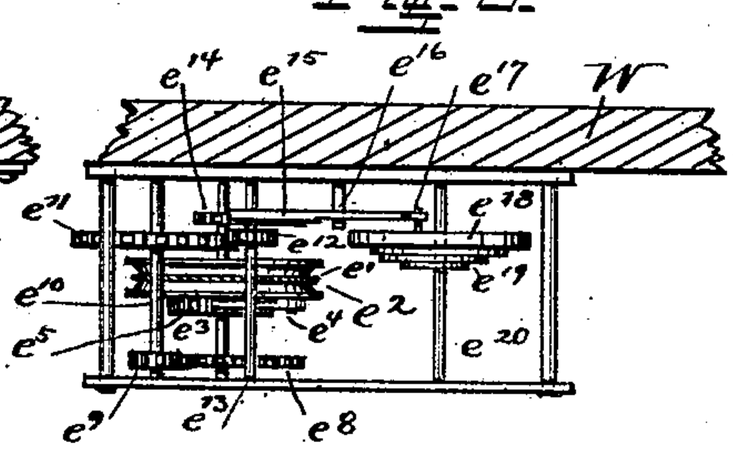


Fig. 6.

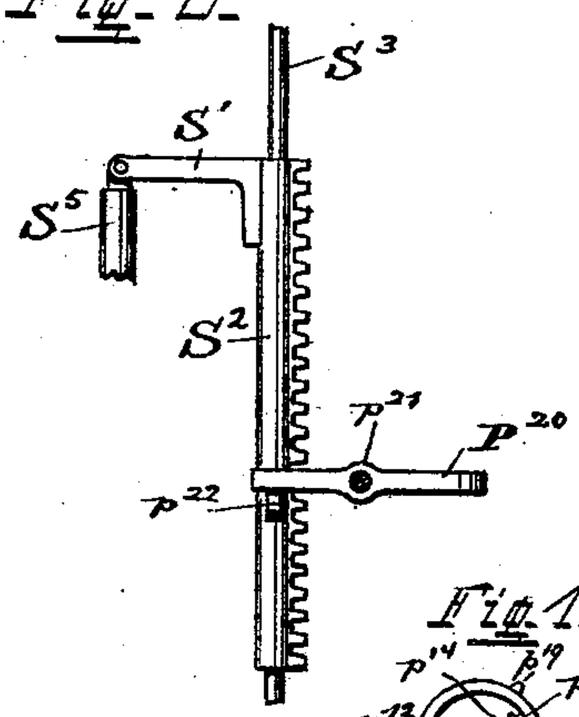


Fig. 12.

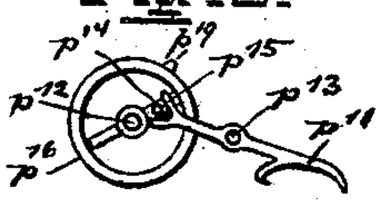
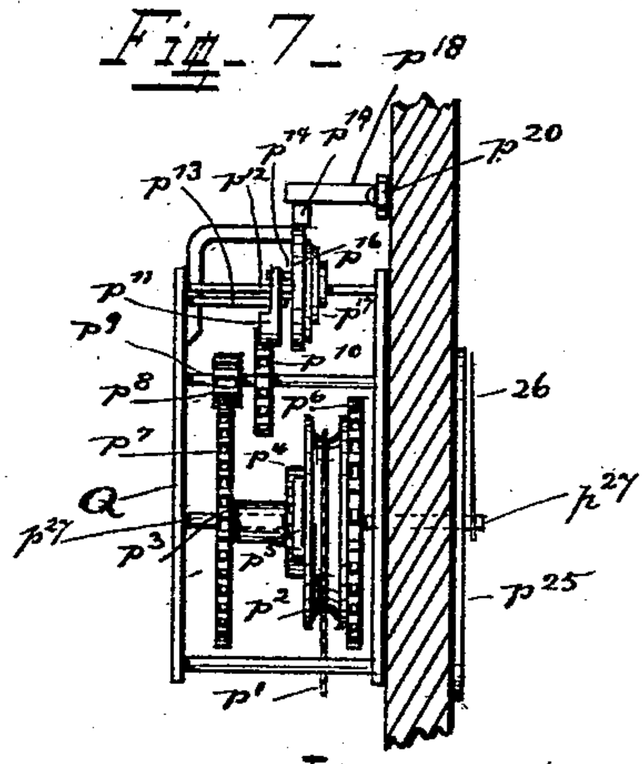


Fig. 7.



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COIN OPERATED ELECTRIC APPARATUS.

No. 528,911. Patented Nov. 6, 1894.

Fig. 8.

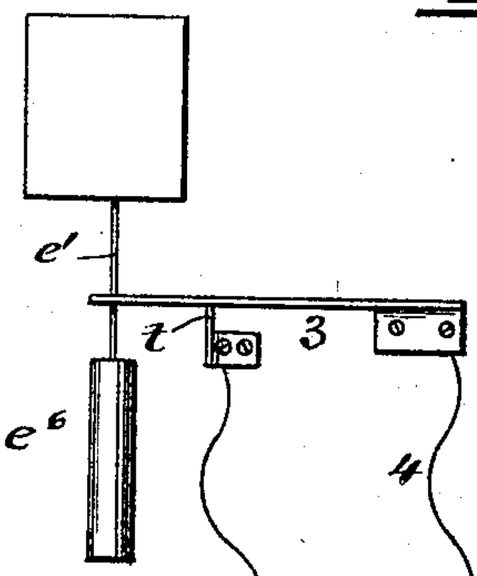
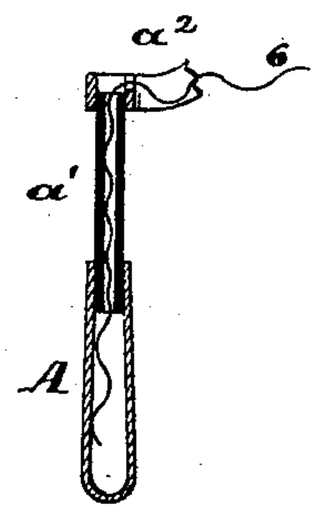
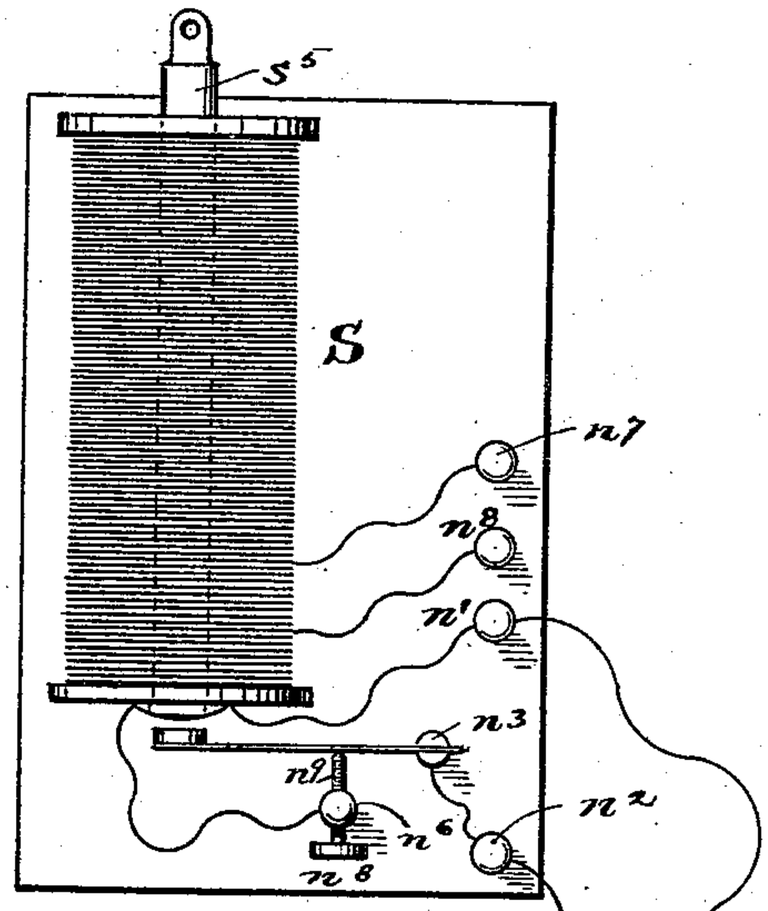


Fig. 14.





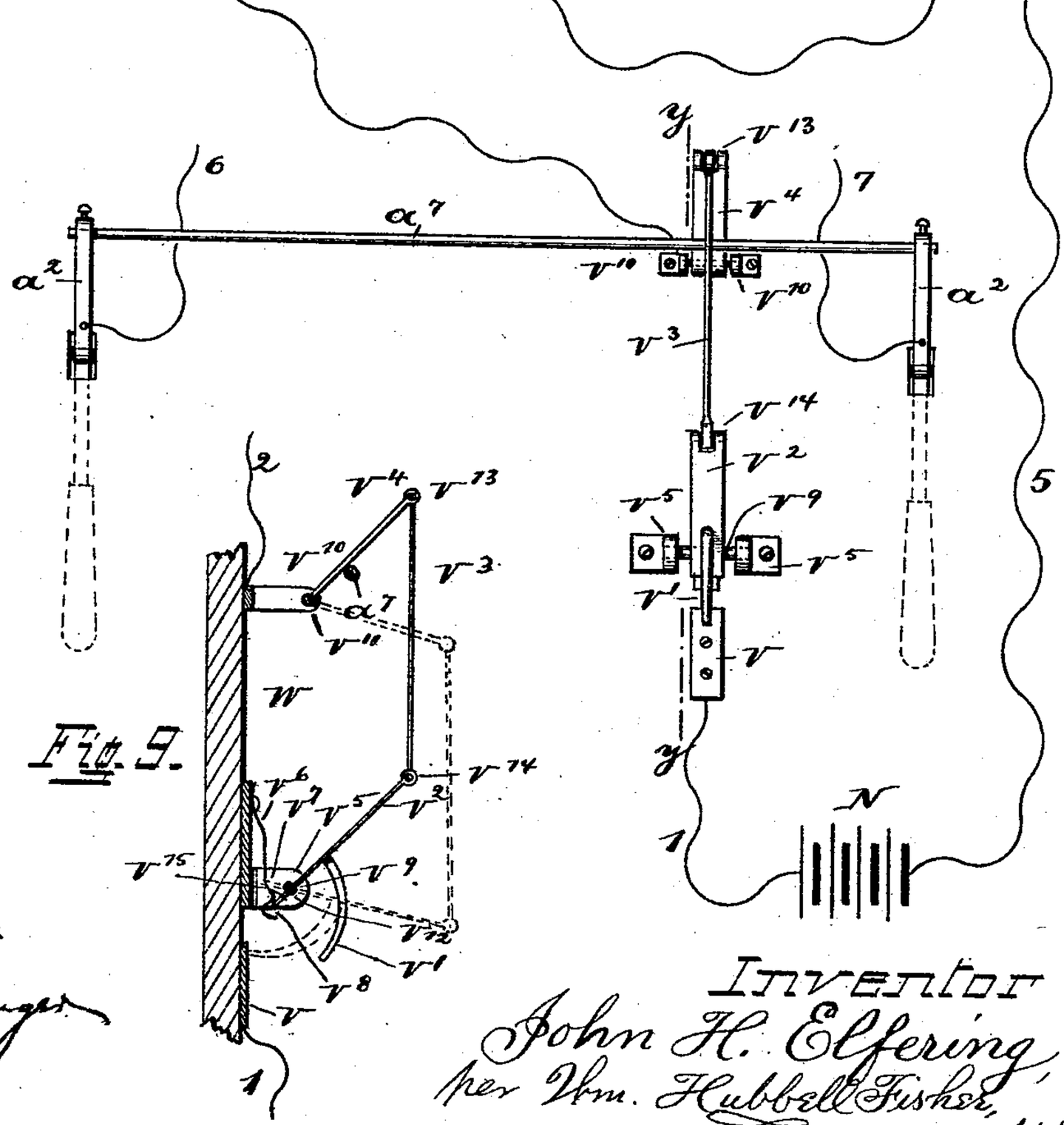


Fig. 9.

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UNITED STATES PATENT OFFICE.

JOHN H. ELFERING, OF CINCINNATI, OHIO.

COIN-OPERATED ELECTRIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 528,911, dated November 6, 1894.

Application filed August 30, 1889. Renewed April 7, 1894. Serial No. 506,774. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. ELFERING, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Coin-Operated Electric Apparatus, of which the following is a specification.

The several features of my invention and the various advantages resulting therefrom, will be apparent from the following description and claims.

In the accompanying drawings making a part of this specification,—Figure 1, Sheet 1, represents a view of the apparatus embodying my invention, as seen after the rear portion of the box inclosing said apparatus is removed. This figure may be described as a rear elevation of the apparatus proper. Fig. 2, Sheet 2, is a vertical transverse section from front to rear, of the apparatus, showing one of the operating handles and its connecting levers, and novel rack and pawl combinations, whereby certain novel and advantageous results hereinafter specified are attained, said section being taken at the line z, z, of Fig. 1, that side of the section which faces toward the left in Fig. 1 being shown. Fig. 3, Sheet 2, is a vertical transverse section of my apparatus, showing the mechanism whereby the coin dropped into the apparatus, unlocks the handles and permits them to be raised. This section is taken at the dotted line z, z, of Fig. 1, and that side of the section shown is the one which faces toward the left in Fig. 1. Fig. 4, Sheet 2, is a top view of the spring circuit breaker of the limiting device for making or breaking the electrical current controlled thereby. Fig. 5, Sheet 2, is a top view of the clock mechanism operating as a part of said limiting device. Fig. 6, Sheet 2, is a rear view of the operating tube or rack which carries the core-sheath of the coil, and of the lever for engaging a stud on the said rod when the latter reaches a certain elevation. Fig. 7, Sheet 2, is an end elevation of the clock mechanism for operating the tube or rack which carries the core-sheath of the coil. This elevation is of that end of said mechanism which is at the right hand thereof in Fig. 1. In Fig. 7 the cord is shown wrapped around the pulley p^2, as is necessarily the case before the cord is drawn down, and before the pulley p^2 has been turned. Fig. 8, Sheet 3, represents in rear elevation, means of employing electric currents in my apparatus, and also means for starting the electric current through my apparatus, and for stopping the further flow of said current, as hereinafter fully explained. Fig. 9, Sheet 3, is a vertical transverse section of a portion of the apparatus shown in Fig. 8, said section being taken at the dotted line y y, and that side of the section being shown which faces toward the left in said Fig. 8. Fig. 10, Sheet 1, is an enlarged elevation of the coil and its connections, and showing by solid and dotted lines, the directions in which the primary and induced currents move. Fig. 11, Sheet 1, is a section taken at the dotted line y, y, of Fig. 1, that face of the section which faces toward the left being shown, the purpose of the section being to illustrate the junction of the lever a^2 of the operating handle, and of the rod designed to close the electrical circuit and the immediate connections of the said rod. Fig. 12, Sheet 2, is a side elevation of the oscillating pendulum arbor and its connections with the balance wheel. Fig. 13 is a side detail view of the device for positively setting free the brake wheel from the action of the brake, in readiness for allowing the device for increasing the intensity of the current to be duly set in operation. Fig 14 is a vertical central section from front to rear of one of the handles, whereby the person desiring to receive the electric shock operates the apparatus, a portion of the lever to which the handle is connected being shown in similar section, the figure illustrating the preferred mode in which electrical connection is made with the handle.

A, A, are the handles to be grasped by the person who is to receive the electrical shock or current. Each handle A is rigidly connected to a bent lever, having portions a', a^2, the lever being pivoted on a bearing a^3. (See Fig. 2.) At the inner end of each lever a', a^2, is pivoted at a^7, a double pawl having the pawls or limbs respectively marked a^5 and a^6, rigidly connected together. A spring rack B has two recesses, respectively marked b' and b^2, adapted to receive the pawl a^6. This spring rack is fastened at b^3 to lever a^2, and accom-

panies the lever a^2 and pawl a^6 in their ascent and descent. This spring rack B exerts its elastic tendency pressing against the pawl a^6, and the point of said pawl will be either in the recess b^2 or recess b' as shown. A convexly curved stationary rack whose radius is approximately the same as that of the curve described by the inner end of the portion a^2 of lever a', a^2, has recesses c' adapted to receive the pawl a^5. At the foot of this rack is a fixed arm c^2, located as shown, and adapted to engage the pawl a^5 as the limb a^2 of lever a', a^2 descends. The ends of the two arms a^2 of the levers a', a^2, are connected to a rod D, thereby securing among other objects unison in the ascent and descent of the handles A. These handles therefore rise together and descend together.

Before passing to a description of the other portions of my apparatus, I will describe the mode in which the said handles, pawls and racks operate in connection.

When the handles are dropped, they hang down as shown in Fig. 2, and the other parts of the mechanism are in the position shown in Fig. 2. As the handles are raised, the point of the pawl a^5, being held in an elevated position by reason of pawl a^6 being in the depression b^2 of the rack, will pass down in front of and without touching the rack. When the handles have been raised to a horizontal position, the point of the pawl a^5 will impinge against the deflecting plate c^2, and be turned toward the portion a^2 of the lever a', a^2. As the point of said pawl is thus turned, the end of the pawl a^6 is forced out of depression b^2 and into b', the elasticity of the rack B causing the depression b' to fit over the point of the pawl a^6 and hold it in position. As the handles are depressed part way, as shown by dotted lines in Fig. 1, the pawl a^6 will be lifted, and will successively engage the successive teeth c' of the stationary rack C. By these means the handles cannot be again raised to a horizontal position until they have been dropped to their lowest position. When thus dropped all the way down, the point of the pawls a^5 is moved outward from the lever a^2 by means of the deflecting stud or projection c^3, and the point of the pawl a^6 is consequently changed from the recess b' to the recess b^2 of the rack. At the same time a suitable look, which forms a part of the apparatus, prevents the handles being again raised until a coin of a designated denomination is dropped into the apparatus. The preferred description of such lock to be employed is as follows, viz:—An inclined bolt L whose operative end points downwardly and inwardly toward the front wall W of the apparatus, slides in bearings L′, L′, secured to a suitable support as L^6. A slit or passage way L^2 is present in the said front wall of the apparatus and inclines downward and inward toward the coin holder L^3. The coin holder L^3 is provided with a vertical slit of a size sufficient to receive the coin. The coin holder is provided with a transverse notch L^4. This coin holder is rigidly connected to the respective levers a', a^2, of the respective holders, by means of the bar a^4. When the handles are at their lowest point of depression, the holder L^3 is in the position shown in solid lines in Fig. 3. The point of the bolt L then rests against the edge of the coin holder L^3 as shown in Fig. 3. When no coin is in the holder L^3, the elevation of the handles will be prevented by the point of the bolt L entering the notch L^4 and engaging the upper or vertical walls thereof, as the top of the holder is moved toward the bolt by the attempt to elevate the handles. After a coin has been dropped in the holder L^3 the coin indicated by L^5 fills the center of the notch and presents a rounded surface to the point of the bolt L. An attempt to raise the handles A will now be successful, for the reason that as they are elevated and the coin holder turned toward the bolt, the periphery of the coin acts as a cam and raises the bolt, the point of the latter slipping over the periphery of the coin and at the same time retreating upward, sliding in its bearings. As the handles continue to be raised, the coin holder descends, and assumes the position shown by dotted lines in Fig. 3, and the coin drops out of the holder and falls into a suitable receptacle L^7, in the present instance consisting of a box attached to the rear side or door M of the apparatus, as shown in Fig. 1. When the door M is closed, the box is in position beneath the coin holder. When the handles A are again dropped down, the coin holder slides back under the bolt L, raising the latter by means of the beveled surface L^8 on it and the beveled portion L^9 of the lower end of the bolt impinging against one another, and the surface L^8 of the holder acting as a wedge or cam by lifting the bolt and at the same time passing by it. Thus the coin holder is returned to place, as shown by solid lines in Fig. 3, in readiness for another coin to be dropped therein, and in the meantime the coin holder is securely locked as aforesaid and the handles prevented from descending until the insertion of another coin in the coin holder. The bolt L is at all times prevented from falling too low by means of the pin L^{10} fixed thereto immediately above the upper bearing L′.

N indicates a battery of any suitable description, preferably located as shown on the floor of said box containing my apparatus. From one pole of this battery, the wire 1 runs to the spring armature k^2, with which latter it connects, being preferably connected to the stationary base of the spring armature k^2 through a screw connection as k^3. A wire 2 is connected at one end to a fixed stud k^4, and at the other end to a fixed stud t. Against this stud, presses at all times, except when removed by human agency, the spring 3. To the rear end of this armature 3 is connected one end of a wire 4, whose other end is con-

nected to the coil S. That portion of this wire 4, which extends from the post n', (see Fig. 10,) to the coil is shown in dotted lines. A wire 5 is at one end connected to the other pole of battery N, and at its other end is connected to armature n^5. That portion of the wire 5 extending from post n^2 to the post n^3 of the armature is shown by dotted lines in Fig. 10. A wire $5\frac{1}{2}$ (shown in dotted lines in Fig. 10) connects the post n^6 of the armature to the coil. When the coil is not magnetized, the armature is separate from the coil, as shown in Figs. 1 and 10, and the wire 5 will then be in communication with the coil by way of armature post n^3, armature n^5, post n^6, and wire $5\frac{1}{2}$. It will be observed that the connection between said post n^3 and the armature n^5 will be usually established (as shown) by means of the screw n^9 of said armature, against the end of which screw n^9 the armature (when not drawn to the coil) presses, the purpose of this screw being to adjust and keep the armature nearer to or farther from the coil as desired. The coil S is constructed in any of the well known methods for use in connection with a primary current and a secondary, or as the latter is otherwise termed, an induced current.

One of the handles A is put into connection with wire 6, one end of said wire being fastened to handle a^2 and the other to the coil S, that portion of the wire 6 which extends from post n^7 to the coil being shown in dotted lines in Fig. 10. The other of the handles A is put into connection with wire 7, one end of said wire being fastened to the handle a^2, and the other end to the coil S. That portion of the wire 7 which extends from the post n^8 to the coil S is shown by dotted lines in Fig. 10.

The elevation of the handles A depresses the vertical rod K. This rod K slides in journals as k^4, k^4. This rod is connected to one of the levers a', a^2, of one of the handles at the point k^5, by a pivotal connection. The upper end of the rod is elastic, and this accommodates itself to the curve described by the pivot k^5. Farther down on the rod K, a stud k' is fixed to it. Depression of the rod therefore depresses this stud k'. The latter in its descent strikes against the free end of spring armature k^2, and forces the latter against the stud k^4. In this way, an electrical circuit is immediately formed, the circuit extending through conductors 1, 2, 3, 4 and coil S, and thence through the coil by wire $5\frac{1}{2}$ through the armature and its posts to wire 5, and thence by the latter to the battery. This circuit magnetizes the cores of the coil S, which latter then attract the free end of armature n^5, and said free end moves forward and into contact with them. When the free end of the armature is in contact with the cores of the coil, the armature has left the post n^6, and being out of contact with said post n^6, the primary circuit is broken. An induced current passes through wire 6, to the adjacent handle A, thence through the operator grasping the handles, thence through the other handle A, and thence through wire 7, to the coil. In this way, the raising of the handles communicates an electrical shock to the person holding them. When the primary circuit is broken, the core is demagnetized, and the armature is permitted to again spring back to the screw n^9 of the post n^6. The induced current which passes through the partial circuit formed by the wires 6, 7, and handles A, as heretofore mentioned, and the person holding the handles and completing the circuit, is induced as frequently as the armature n^5 interrupts the primary current.

The apparatus is provided with means for automatically causing the intensity of the electric current to be increased or diminished after the circuit through the operator has been formed. The preferred form of this mechanism is as follows, viz: To the rod a^7 connecting the handles, is connected one end of a spiral spring P. The bar at the point where the spring is thus connected, is preferably formed into a crank as shown, or eye to prevent the cord from slipping along the bar, in either direction from its proper place. The other end of this spring is connected to the lower end of a cord p', which latter passes up and over and around a pulley p^2, and the upper end of the cord is fastened to the periphery of this pulley. This pulley p^2 turns loosely on its shaft p^{27}. At the side of the pulley p^2 and concentric with the latter, is a pinion p^4 fixed to the sleeve p^3 turning on shaft p^{27}. A pawl p^5 pivoted to the loose pulley p^2 engages the pinion p^4, when the pulley p^2 is turned (when looking at Fig. 1) from the right over to the left, that end of the cord p', which is attached to the spring P, being subjected to a downward draft by the elevation of the handles and the depression of the rod a^7. A toothed wheel p^6 is fixed on the pulley p^2. A rack S^2 slides vertically, its reciprocating movement being kept in a vertical line by means of a suitable guide, which latter, in the present instance, consists of a vertical rod S^3 fixed at each end to the frame of the apparatus and passing through the rack S^2. The rack S^2 thus slides upon the rod S^3, the reciprocal movement of the rack S^2 being limited by means of stops S^4, S^4. The rack S^2 is provided at or near its upper end with an arm S', and the latter extends over a portion of the adjacent end of the core and is connected to the sheath S^5, surrounding the core of the coil S. Teeth of the rack S^2 engage the teeth of the wheel p^6. In connection with the wheel p^6 is a train of wheels and an escapement for regulating the rotation of the wheel p^6, rotated by pulley p^2. One description of such train is shown and consists of gear wheel p^7 fixed on sleeve p^3 turning on shaft p^{27}, pinion p^8 fixed on shaft p^9, which last named shaft also carries the escape-wheel p^{10}. The escapement pawl p^{11} is fixed to and suspended from the shaft or pivot p^{13}. The shaft p^{12} carries a balance wheel p^{16}, which latter pref-

erably carries on its periphery a half tooth or stud p^{19}, for the better making frictional contact with the brake rod p^{18}. Adjacent to the wheel p^{16} is the balance coiled spring p^{17}, connected and operating in a mannner common to clock work. The pawl p^{11} of the escapement beyond the point p^{13} where it is pivoted, is provided with an extension rigid with it. The end of this extension is provided with a fork p^{15}, between the prongs of which is a pin p^{14}, rigidly fixed in the balance. Thus the oscillation of the escapement pawl p^{11} in one direction, turns the balance wheel p^{16} against the spring p^{17}, and this spring operates to oscillate the pawl in the opposite direction.

As the operation of the escapement pawl and its wheel p^{10} is well known, further mention thereof is herefrom omitted.

The brake rod p^{18} is pivoted at one end p^{23} to the clockwork frame Q. (See Fig. 1.) The middle portion of the brake rod rests upon the periphery of the wheel p^{16}. Upon the opposite, viz: the free end of the brake rod rests one end of the lever p^{20}, pivoted at p^{21} to the frame of the apparatus. The other end of this lever p^{20} projects across the rack S^2, and close thereto, and is subject to impingement by the stud p^{22} of the rack S^2 as the latter rises. The manner in which this portion of my apparatus operates is as follows, viz:

As the operator lifts the handles A, A, the rod a^7 of levers a', a^2, is depressed, and pulls the spring P and stretches it. When the handles have been raised, the circuit aforementioned is closed, and the operator receives the induced current as aforementioned. The spring P, being strained, pulls upon cord p' and rotates the pulley p^2 and wheel p^6. The rotation of this is rendered slow and uniform by means of the clock work train of wheel, escapement, balance wheel and spring aforementioned. The wheel p^6, by its rotation, moves the rack S^2 upward thereby continually increasing the intensity of the current, passing through the operator until the stud p^{22} on the rack S^2 strikes and elevates the adjacent end of the lever p^{20}. The other end of the latter then presses down the brake rod p^{18} upon the wheel p^{16}, and thereby stops all rotation of the latter, the stud p^{19} aiding in preventing the wheel p^{16} from slipping under the brake. Thus further elevation of the rack S^2 is prevented, and the maximum degree of intensity of the electric current to which the operator is subjected, is reached. When the rod a^7 is elevated to the position shown in Fig. 2, all upward strain on rack S^2 will have ceased, and the rack S^2 will then descend to the lowest point of its movement, and reassume the position shown in Fig. 1. When the handles are dropped, the tension on spring P being gone, the weight of the rack S^2 and the connections rigidly attached to it, causes it to descend. As it descends, it turns the pulley p^2 and winds the cord p' thereon. The pulley being loose on the shaft p^3, and the pawl p^5 sliding over the pinion p^4, does not, during the operation of rewinding the cord, turn the clock work, and is not retarded by said clock work. The front end of the shaft p^3 carries at the outside of the front wall of the machine, an index finger p^{26}, which indicates on a dial on the outside of the said wall, the intensity of the current to which the operator is subjected. The finger and dial being at the front of the machine, are in full view of the operator.

The pressure of the brake p^{18} on the brake wheel p^{16}, is preferably always positively relieved at the time the apparatus is put into position for giving a fresh electrical shock. The rear end of the brake beyond the point p^{23} where the latter is pivoted to the frame, is provided with an arm p^{27}. To the free end of this arm is attached the upper end of a rod or cord p^{28}, whose lower end is connected to the outer end of the spring arm p^{29}, the inner end of this spring arm being properly connected to the frame of the apparatus. When the handles A are elevated by the operator, the free ends of levers a', a^2, and the rod a^7 are depressed. The rod a^7 strikes the arm p^{29}, and thereby draws down the rod p^{28}, and the arm p^{27} of the brake p^{28}. Thus the brake is lifted sufficiently to be out of contact with the brake wheel, and the mechanism for increasing the intensity of the electric current is immediately free to operate.

I will now describe certain novel means for limiting the duration of the electric current.

To the bar a^7 connecting the levers a', a^2, of the handles A is connected (see Fig. 1) the lower end of a spiral spring E, and the upper end of this spring is connected to one end of a cord e', which latter extends up and around a loose pulley e^2, and fastened thereto at one point and down the other side thereof, and thence extends down and its other end is there connected to the weight e^6, sliding vertically in the guideways e^7, e^7, connected to the frame of the apparatus. The loose pulley e^2 turns loosely on shaft e^3, carrying pinion e^5 fixed thereto. A pawl e^4 pivoted to the pulley e^2, engages with pinion e^5. A suitable train of clock work, &c., regulates the rapidity and uniformity of the rotation of pulley e^2, when turning in the direction in which the pawl e^4 engages the pinion e^5. Such a train consists as follows:—Rigidly fixed to shaft e^3 is gear wheel e^8, which latter meshes with pinion e^9, fixed on shaft e^{10}. To this latter shaft is also fixed gear wheel e^{11} meshing with pinion e^{12} on shaft e^{13}, which latter also carries escape-wheel e^{14}, fixed to said last named shaft. On a pivot shaft e^{16} oscillates the escapement pawl e^{15}. An extension of said pawl located on the other side of said shaft e^{16} from where the pawl proper is located, is provided with a fork whose prongs have between them a pin e^{17} fixed in the side of the balance wheel e^{18}, the latter being fixed on pivot shaft e^{20}, and connected to a balance spring e^{19}, combined and operating in the man-

ner well known to all clock work. The manner in which this portion of my apparatus operates is as follows:

The handles being elevated and the rod a^7 depressed, the spring E is stretched. The latter draws elastically upon the cord e' and rotates the pulley e^2 as fast as the clock work will permit. As the cord on one side of the pulley is drawn down by the spring E, it is drawn up on the other side of the pulley and draws with it the weight e^6. It will be remembered that the elevation of the handles closed the circuit, and started the induced current through the operator. After a given time, the top of weight e^6 will have risen to the bottom of spring circuit breaker 3. The cord e' passes freely through a small opening in the end of this armature 3; but this opening is too small to allow the weight e^6 to pass through it. Consequently as the weight e^6 rises and strikes the bottom of the armature, it lifts the spring circuit breaker 3 off of the connecting stud t', and breaks the electrical circuit. The circuit now no longer passes through the apparatus, nor through the operator. For the latter to obtain a new electrical shock, he must drop the handles, whereupon they will be locked. He must then drop in a second coin in order to unlock the handles, so that he can raise them. When the handles are raised, the strain on the spring E is withdrawn and the weight falls, the pulley rotating with it and its pinion e^5 raising the pawl and slipping beneath it, the clock work standing still. The stud t' above the spring circuit breaker, 3, performs the office of a detent and prevents the weight e^6 as it lifts the spring circuit breaker, 3, from lifting the latter too high.

By the mechanism heretofore described, the operator in order to prevent the intensity of the electrical circuit increasing, has been obliged to cut it off altogether by dropping the handles, as shown in Fig. 2.

I will now describe a means whereby the operator, while experiencing the electrical current, can, at will, prevent the current from increasing without breaking the electrical circuit, and can therefore enjoy any given degree of intensity of electrical force indicated on the dial during the entire time allotted by the mechanism, of which spring E, weight e^6 and spring circuit breaker 3 are elements. These means are illustrated in Figs. 8 and 9.

It may be here remarked, that the use of the means aforesaid is not to be confined to the modification of electrical circuits shown in Fig. 8, but is to be used in connection with those circuits employed in Fig. 1, or any other suitable circuits employed in the apparatus.

The mechanism shown in Fig. 9, and in elevation in Fig. 8, is in the latter figure shown in connection with said modification of electrical currents for the sake of compactness. It may be here premised that when this mechanism shown in Fig. 9 is to be employed the mechanism consisting of rod K, stud k', guideways k^4, k^4, armature k^2, part k^3, and stud k^4 will be dispensed with and the mechanism of Fig. 9, will take their place. To the frame of the apparatus is attached an upper bracket V^{10} and a lower bracket V^5. In the upper bracket V^{10} is journaled one end of an arm V^4, whose outer end is pivoted at V^{13} to the upper end of a vertical rod V^3, the lower end of the latter being pivoted at V^{14} to one end of an arm V^2, pivoted at V^9 to the lower bracket V^5. The other end of the arm V^2 extends beyond the pivot V^9 and toward the wall W of the apparatus. This free end of the arm V^2 is continually engaged by a spring arm rack V^6, suitably attached, preferably as shown, to the bracket V^5, and having a single tooth on the lower side of which is the depression V^8 of this rack. On the upper side of the said tooth is the depression V^7. The spring rack V^6 continually presses outward against said free end of said arm V^2. This arm V^2 carries the curved downwardly projecting circuit-closer V' so located, as shown, in relation to the stationary conductor V, as that when the arm V^2 descends, the circuit closer V' will descend and come into contact with the conductor V and close the circuit. To the conductor V is connected the wire 1, which latter thereby connects one pole of the battery to the said conductor. To the bracket V^{10} is connected the lower end of the conducting wire 2 whose upper end is connected to stud t, as aforementioned. The cross-rod a^7 of levers a^2, a^2, passes between the arms V^4 and V^2. The mode in which this portion of my apparatus operates is as follows:

When the handles A are down as shown in Fig. 2, the position of the mechanism will be that shown in solid lines in Fig. 9, the rod a^7 having lifted the parts to that position, the free end of the arm V^2 being in the notch V^8 of the rack V^6, and the circuit closer V' being elevated and out of contact with the conductor V. As the handles A are lifted, the rod a^7 gradually descends. The arms V^4, rod V^3, arm V^2, and circuit closer V' remain stationary and do not descend with the rod a^7, being held in position by the spring rack V^6 which notch V^8 and the free end of arm V^2 continue interlocked, until as the handles A are continued to be elevated, the rod a^7 in its downward descent strikes against the upper side of arm V^2, forcing the free end of said arm out of the notch V^8, and depresses the arms V^4, V^2, rod V^3 and circuit closer V' to the position shown by dotted lines in Fig. 9, the circuit closer resting against and in electrical contact with conductor V. This circuit closer together with arms V^2, V^4, and rod V^3, continues to maintain this position, being held therein by the spring rack pressing against the free end of the arm V^2, and pressing said free end upward. The electrical circuit is from the battery and wire 1 through the mechanism shown in Fig. 9, viz: conductor V, circuit closer V', arm V^2, rod V^3, arm V^4, and bracket

V^{10}, and thence by way of wire 2, to the coil and thence to the battery, the induced current being carried through the operator, all substantially as heretofore already shown and described in connection with Fig. 1.

It is evident that for the arm in its upward movement to impinge against the arm V^4, and elevate it and thus break the circuit, it, the said arm, must travel much the larger portion of the arc through which it travels when the handles are depressed. This construction of the parts thereby enables the operator, after elevating the handles and closing the circuit, to at any time once partially depress the handles and elevate rod a^7 sufficiently to remove the tension from the spring arm p^{29} and thus allow the brake p^{18} to act on the brake wheel. The instant the operator does this, the rack S^2 will cease to rise and all further increase of intensity in the current will be stopped. The rack S^2 could be again started in its ascent, by a second partial elevation of the handles and a corresponding depression of the rod a^7 and a consequent renewed release of brake-wheel, without breaking the circuit, that is, disturbing the position of the parts of Fig. 9, as shown in dotted lines therein, were it not for the fact that the pawl a^5, after the first complete elevation of the handles necessary to close the circuit has assumed the position shown in dotted lines in Fig. 2, thereby permitting the handles to be dropped as far as desired, but preventing their elevation again, and consequent further depression of the rod a^7 until the handles A, A, have been entirely dropped and the rod a^7 elevated to its highest point of movement as shown in Fig. 2, and as heretofore fully specified. Thus it will be observed that the operator is thereby enabled to check the increasing intensity of the electrical current and at the same time enjoy the electric current at any of the given rates of intensity indicated on the dial, until the mechanism in which spring E and weight e^6 and spring circuit breaker 3 play a part, or mechanism the equivalent thereof, after a given time, break the circuit, and cut off the electrical current from the operator until the handles are dropped and the apparatus unlocked by the insertion of another coin.

I will now proceed to describe a modification of the electrical circuit, which modification although not as desirable as the system of circuits shown in Fig. 1 and heretofore described, I may yet wish at times to employ. This modification consists in attaching the wire 6 to the post n^6 of the armature, and the wire 7 to the post n'. In this way, a primary or galvanic current is transmitted to the person holding the handles. If I employ this modification, I do not use the secondary wire on the coil, and said secondary coil may be omitted. In such event, the coil wrapped with a single wire, in connection with the core and circuit breaker as described, transmits an intermittent primary current, the intensity of which is regulated by the sheath as in the induction coil.

While the various features of my invention are preferably employed together, one or more of said features may be employed without the remainder, and in so far as applicable, one or more of said features may be employed in connection with apparatus for similar purposes, but of construction differing in many respects from that hereinbefore specified.

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

1. In a coin controlled electric device, the handles A, levers a', a^2 connected thereto, transverse bar a^4 connecting said levers, the coin receptacle L^3 attached to the bar a^4, and having a transverse notch L^5, the sliding bolt L, which when the coin receptacle is empty engages said notch when one attempts to raise the levers a', the coin receptacle L^3 being provided with the vertical slit or receptacle intersecting said notch, for enabling a part of the periphery of the coin to fill said notch so far as the bolt L is concerned, and coin passage way leading from the exterior of the case to said coin receptacle, substantially as and for the purposes specified.

2. In a coin controlled electric device, the handles A, levers a^2, connected thereto, transverse bar a^4 connecting said levers, the coin receptacle L^3, carried by the bar a^4, and having vertical slit and transverse notch L^5, and beveled surface L^8, sliding bolt L, in guideways L', and having its lower end in proximity with the said transverse notch L^5, and wall opening L^2 for conducting the coin to the coin receptacle, substantially as and for the purposes specified.

3. In an apparatus for the purposes mentioned, the handles A, levers a^2, connected thereto, cross rod a^7, connected to and operated by said levers, curved rack C, having stop c^2, near its lower extremity, and upper stop C^3, double pawl a^5, a^6, pivoted at the end of lever a^2, spring racks B respectively accompanying levers a^2, and engaging limb a^6 of said double pawl, the limb a^5 of the pawl being for engaging the rack C and stops c^2 and C^3, substantially as and for the purposes specified.

4. In a coin controlled electric device, the handles A, levers a', a^2, connected thereto, transverse bar a^4 connecting said levers, the coin receptacle L^3 attached to the bar a^4, and having a transverse notch L^5, the sliding bolt L, which when the coin recepatcle is empty engages said notch when one attempts to raise the levers a', the coin receptacle L^3 being provided with the vertical slit or receptacle intersecting said notch, for enabling a part of the periphery of the coin to fill said notch so far as the bolt L is concerned, and coin passage way leading from the exterior of the case to said coin receptacle, the cross rod a^7 connected to and operated by said levers a' a^2, curved rack C, having stop c^2, near its lower extremity, and upper stop C^3, dou-

ble pawl a^5, a^6, pivoted at the end of lever a^2, spring racks B respectively accompanying levers a^2, and engaging limb a^6 of said double pawl, the limb a^5 of the pawl being for engaging the rack C, and stops c^2 and C^3, substantially as and for the purposes specified.

5. In an electrical device for the purposes specified, the handles A, and levers a^2 connected thereto, cross rod a^7 carried by the levers, and device for limiting the duration of the electrical current, the spring E having one end in connection with said rod a^7, cord c' connected to the other end thereof, pulley e^2, around which said cord e' runs, pawl e^4 pivoted to said pulley, ratchet wheel e^5 engaging said pawl and concentric with pulley e^2, shaft e^3 of said pulley e^2, and ratchet wheel e^5, weight e^6, connected to the opposite end of the cord e', armature 3 and contacting stop t, located in the path of the said weight or actuating piece e^6, substantially as and for the purposes specified.

6. In an electrical device for the purposes specified, the handles A, and levers a^2 connected thereto, cross rod a^7 carried by the levers, and device for limiting the duration of the electrical current, the spring E having one end in combination with said rod a^7, cord e' connected to the other end thereof, pulley e^2, around which said cord e' runs, pawl e^4 pivoted to said pulley, ratchet wheel e^5 engaging said pawl and concentric with pulley e^2, shaft e^3 of said pulley e^2, and ratchet wheel e^5, weight e^6 connected to the opposite end of the cord e', and a train of clock work with escapement connected with said pulley e^2, and for regulating the rapidity and uniformity of the latter, and armature 3, and contacting stop in the path of the weight or actuating piece e^6, substantially as and for the purposes specified.

7. In an electrical device for the purposes mentioned, the handles A, levers a^2 connected thereto, rod a^7, spring P connected at one end to the rod, cord p', connected at one end to the spring, ratchet wheel p^4, pawl p^5, pulley p^2, on shaft p^3, the cord p' running over said pulley, train of clock work with escapement connected with said pulley, and with pinion p^6, rack S^2, coil S, and sheath S^5 within said coil, brake p^{18} in conjunction with brake wheel p^{16} of said train, lever p^{20}, engaging the brake p^{18}, and stud on reciprocating rack S^2 also engaging said brake, substantially as and for the purposes specified.

8. In an electrical device for the purposes mentioned, the handles A, levers a^2 connected thereto, rod a^7 moved by the levers a^2, cord p', spring P having one end connected to rod a^7 and the other end connected with the cord p', ratchet wheel p^4, pawl p^5 engaging the latter, pulley p^2, connected with the said ratchet and pawl, train of clock work with escapement combined therewith substantially as described, wheel p^6, operated with pulley p^2, reciprocating rack S^2, coil S, and sheath S^5, combined with said rack, brake p^{18} in conjunction with brake wheel as p^{16}, lever p^{20}, operating on said brake wheel and stud p^{22} of said rack and operating on the brake, and extension p^{27} of brake, connection p^{28}, spring arm p^{29}, united to said connection, and rod a^7 of the levers a^2, substantially as and for the purposes specified.

9. In an electrical apparatus for the purposes mentioned, the coil S, sheath S^5 working therein, reciprocating rack S^2 combined therewith, pinion p^6 engaging said rack, lever p^{20}, operated by said rack, brake p^{18}, subject to the working of said lever, spring arm p^{29}, connection p^{28} between said brake and said arm, and rod a^7 of the levers a^2, substantially as and for the purposes specified.

10. In an electrical apparatus for the purposes indicated, the handles A, levers a^2, rod a^7 carried thereby, devices substantially as herein described for limiting the duration of the electrical current, having cord e', spring E connected at one end to rod a^7, and at the other end to said cord, weight e^6, armature 3, in the path of said weight or projection e^6, on said cord, and the device substantially as described for increasing the intensity of the current, having cord p', spring P, attached thereto and to the rod a^7 of the levers a^2, pulley p^6, ratchet wheel p^4, with pawl, rack S^2, coil S and sheath S^5 combined with rack, substantially as and for the purposes specified.

11. In a coin controlled electrical apparatus, the handles A, levers a^2 connected therewith, rod a^7 carried thereby, cord e', spring E connected to said rod a^7 and to cord e', weight e^6, armature 3 in the path of the weight, rod a^4, cord p', spring P connected to said rod a^4 and cord p', reciprocating rack S^2, coil, sheath, pinion p^6 engaging said rack, brake p^{18} operated by said rack, brake wheel p^{10}, substantially as and for the purposes specified.

12. In a coin controlled electrical apparatus, the handles A, levers a^2 connected thereto, rod a^7 carried by the levers a^2, core e', spring E strained between the rod a^7 and said cord, pulley p^2 over which said cord runs, weight e^6 attached to said cord, armature 3 in the path of the weight, cord p', pulley e^2, receiving said cord, lever p^{20}, stud p^{22} of rack S^2, rod K, connected to lever a^2, and having stud, armature k^2, substantially as and for the purposes specified.

13. In a coin controlled electrical apparatus, the handles A, levers a^2 connected thereto, rod a^7 of said levers, rack C having upper stop c^3 and lower stop c^2, pawl a^5, a^6, pivoted to lever a^2 and for engaging said rack C, and spring rack B for also engaging said pawl a^5, a^6, devices for limiting the duration of the electrical current and the cord p', spring p attached to rod a^7, and to said cord, pinion p^6 with pulley p^2, receiving said cord, rack S^2, and coil and sheath S^5 connected to the rack, substantially as and for the purposes specified.

14. In an electrical apparatus for the purposes mentioned, the combination of the han-

dles A, and a rod a^7 elevated and depressed by them, and the device consisting of the arms V^4, V^2, rods V^3 connecting the free ends of the said arms, circuit closer V′ carried by said arms, conductor V for contact with said circuit closer, spring rack V^6, and extension V^8 of the arm V^2, substantially as and for the purposes specified.

15. The combination of the handles A, levers a^2, connected thereto, rod a^7 carried by said levers, arms V^2, V^4, connected by rods V^3, spring rack V^6, circuit closer V′ carried by arm V^2, stationary rack C, provided with stops c^2, c^3, pawl a^5, a^6, pivoted to lever a^2, spring rack B for engaging with one arm of the said last named pawl, substantially as and for the purposes specified.

16. The handles A, levers a^2, rod a^7 carried thereby, arms V^2, V^4, having extension V^8, spring rack V^6, circuit closer V^5 connected with said arms V^4, V^2, and cord p', spring P connected to said cord, pulley p^2 over which said cord runs, pinion p^6 connected to said cord, reciprocating core, sheath S^5 of the core of the coil, constructed and united substantially as and for the purposes specified.

17. The combination of the handles A, levers a^2, connected therewith, rods a^7, oscillating arms V^2, V^4, rod p^3 connecting the free ends of said arms, spring rack V^6, circuit closer V′, carried by the said arms, stationary rack C, in combination with stops c^2, c^3, pawl a^5, a^6, spring rack V, for engaging said pawls, and spring P attached to rod a^7, pinion p^6, rack S^2, meshing with said pinion and carrying the sheath S^5 of the coil core, substantially as and for the purposes specified.

18. The combination of the handles A, levers a^2 attached thereto, rod a^7 connected to the levers, arms V^2, V^4 attached to a stationary part of the apparatus, rod V^3 connecting said arms V^2, V^4, spring rack V^6, circuit closer V′ attached to and moved by the arms, curved stationary rack C provided with lower stop c^2 and upper stop c^3, pawl a^5, a^6 pivoted to lever a^2, spring rack B for engaging the pawl, cord e', spring E connected to the rod a^4, also to cord e', pulley e^2, around which cord e' runs, armature 3, and stop conductor t, substantially as and for the purposes specified.

19. The combination of the handles A, levers a^2 attached thereto, rod a^7 connected to the levers, arms V^2, V^4 attached to a stationary part of the apparatus, rod V^3 connecting said arms V^2, V^4, spring rack V^6, circuit closer V′ attached to and moved by the arms, cord p', spring P connected to rod a^7 and to said cord p', pinion p^6 operated by said cord, rack S^2 engaging said pinion and carrying the sheath S^5 of the coil core, connected to said rack, substantially as and for the purposes specified.

20. The combination of the handles A, levers a^2, rod a^7 attached to the levers, cord e', spring E connected to said rod, pulley e^2 receiving said cord, weight e^6 connected to the arm, armature 3 in the path of the said weight, and cord p', spring P attached to rod a^7 and to said cord p', pulley p^2 and pinion p^6, rack S^2 engaging said pinion, and coil and sheath S^5 of the core coil, said sheath connected to said rack, brake operated by said rack, brake rod and arm p^{29}, arms V^2, V^4 fixed to a stationary part of the machine, rod V^3 connecting said arms, and circuit closer operated by the said arms, and rack V^6 in connection therewith, the springs E and P and the arms V^4, V^2 and arm p^{29} being located for receiving a direct impulse from rod a^7, substantially as and for the purposes specified.

21. The handles A, levers a^2, bar a^4, carried by the said levers, coin receptacle L^3 of the coin controlled mechanism connected to the said levers, rod a^7 connected to the said levers, in combination with the mechanism for limiting the duration of the current, and increasing the intensity thereof, substantially as and for the purposes specified.

22. The combination of the handles A, levers a^2, rod a^7 connected therewith, arms V^4, V^2, pivoted to a stationary part of the device, rod V^3 connecting said arms, elastic rack V^6, in connection therewith, circuit closer V′, operated by said arms, cord p', spring P connected to the rod a^7 and to the said cord p', pinion p^6 operated by the cord p', rack S^2, coil and sheath core S^5, operated by the rack, shaft p^3 carrying pinion p^6, and dial or index finger p^{26} on the said shaft, substantially as and for the purposes specified.

JOHN H. ELFERING.

Attest:

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