

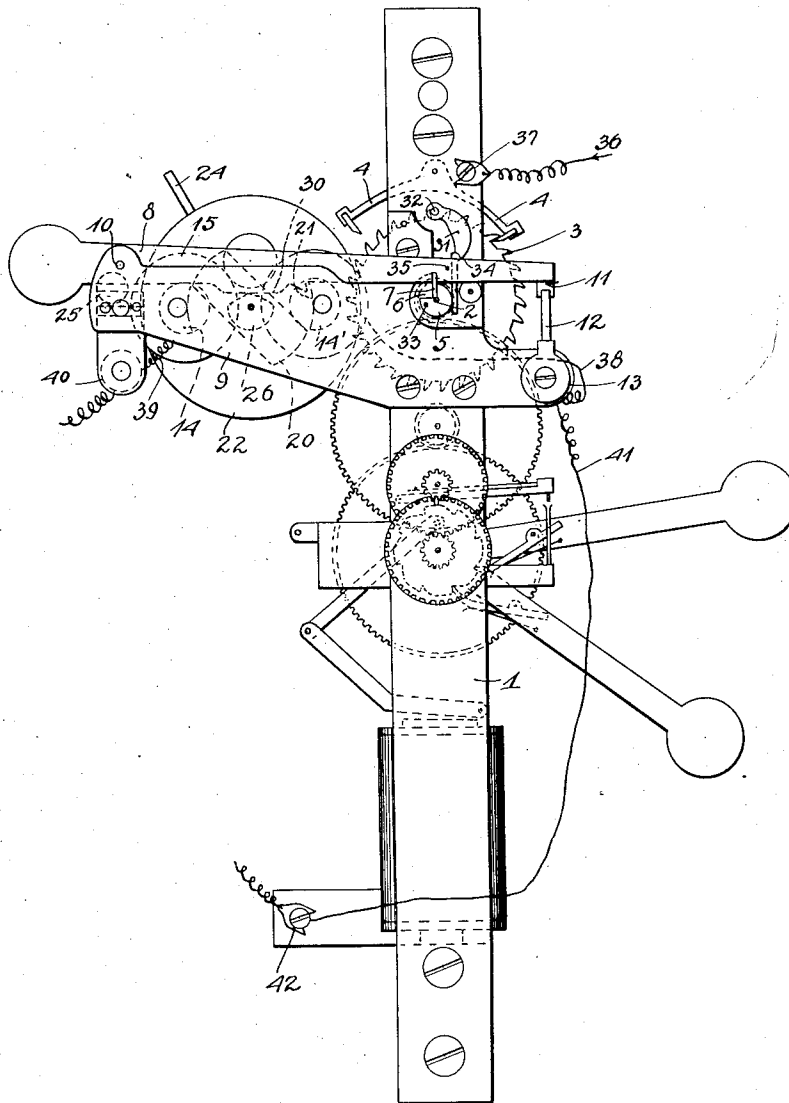
F. I. GETTY.
CIRCUIT CONTROLLER.
APPLICATION FILED JAN. 20, 1910.

961,951.

Patented June 21, 1910.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

Fig. 2.

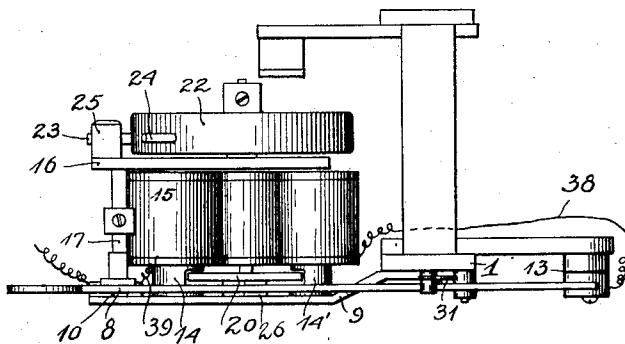


Fig. 3.

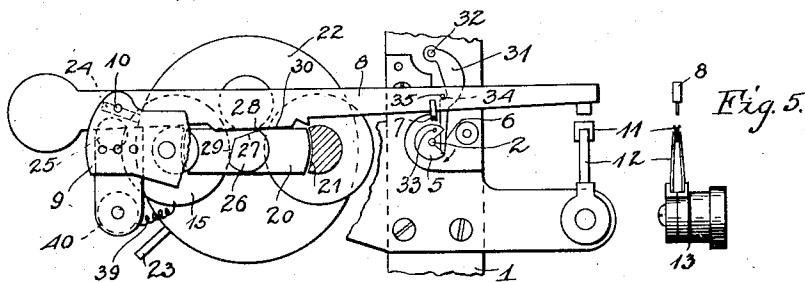


Fig. 5.

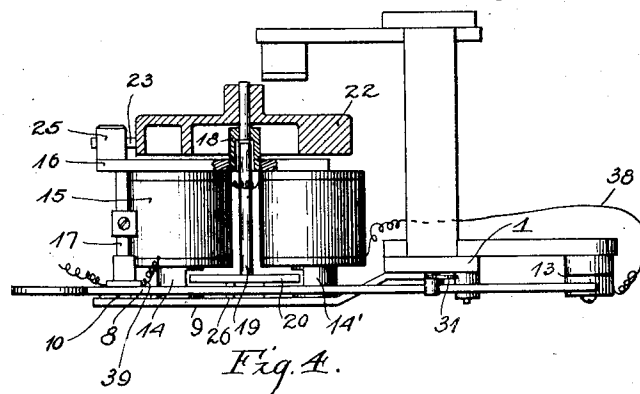


Fig. 4.

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CIRCUIT-CONTROLLER.

961,951.

Specification of Letters Patent. Patented June 21, 1910.

Application filed January 20, 1910. Serial No. 539,074.

To all whom it may concern:

Be it known that I, FRED I. GETTY, of Jennings, parish of Calcasieu, and State of Louisiana, have invented certain new and useful Improvements in Circuit-Controllers, of which the following is a full, clear, and precise specification.

This invention relates to improvements in circuit controllers, and refers more specifically to a clock mechanism which is constructed to automatically close an electric circuit at predetermined intervals, for the purpose of electrically actuating a series of secondary clocks or other analogous purpose.

Among the salient objects of the invention are to provide a construction in which the load of frictional resistance necessary to insure the operation of the electrical contact devices is reduced to a minimum so far as the movement imparted to the clock mechanism is concerned; to provide in a mechanism of this character, electrical contact devices which are of the rubbing or blade type, and which are forced into and out of contact with each other by electrical energy so as to relieve the clock mechanism of undue load; to provide a construction in which the electrical contacts are initially closed by clock mechanism, but in which the power required to bring the contacts into full engagement is derived from a magnet actuated by the current thus closed; to provide a construction in which the contacts are permitted to remain closed a definite interval of time, and are thereafter positively opened by electrical power and to an extent rendering arcing impossible; to provide an improved form of connection between the movable armature of the magnet and the device actuated thereby, and in general, to provide improvements in the construction and arrangement of an apparatus embodying the invention.

To the above ends the invention consists in the matters hereinafter described and more particularly pointed out in the appended claims, and the same will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of a clock mechanism equipped with my improved circuit controlling devices, Fig. 2 is a top plan view of the magnet, contact lever and connected parts, Fig. 3 is an elevation of certain parts

shown in Fig. 1, parts being broken away to more clearly disclose the construction, Fig. 4 is a view similar to Fig. 2 with certain parts shown in section, and Fig. 5 is a detail of the electrical contact devices.

Referring to the drawings, 1 designates as a whole a suitable frame opening within which is mounted a clock movement, which may be of any preferred construction but which in the present instance represents an electrically actuated clock movement substantially like that set forth and described in my prior Patent No. 637,454, dated November 21, 1899, to which reference is made for a more specific description of the construction thereof. 2 designates the second-hand arbor of said clock movement, which arbor in the particular instance shown carries the escapement wheel 3, and is controlled by the pallet 4, all as usual and as fully described in said prior patent. Upon said second-hand arbor is rigidly mounted a trip wheel 5, which is provided at one side with a cut-away portion or segmental shaped notch 6; the remainder of the periphery of said trip wheel smooth and cylindrical, and serving to support a wiper or cam projection 7 mounted upon a weighted lever 8 which is arranged to extend horizontally above and adjacent to said trip wheel, and is pivoted between its ends to a suitable frame support 9, as indicated at 10. The lever 8 is so constructed that its longer end, or that which carries the wiper 7, is slightly heavier than the shorter weighted end so that said wiper rides lightly upon the periphery of the trip wheel until the segmental notch thereof is brought into register with the wiper, whereupon the longer end of the arbor is permitted to descend a distance equal to the depth of the segmental notch.

Upon the extreme portion of the lower end of the lever is mounted an electrical contact blade 11, which is adapted to cooperate with two fixed contact devices or spring blades 12 mounted upon the frame support 9 vertically beneath the contact blade 11, and insulated therefrom by means of suitable insulating washers, as indicated at 13. The relative arrangement of the fixed and movable contacts 11 and 12 is such that when the wiper 7 occupies the notch of the trip wheel, the contact blades will be fully engaged, and when the wiper

is riding upon the periphery of the trip wheel said contact devices will be separated to such extent that sparking across the intervening space will be impossible.

5 The contact lever 8 is returned to its normal position by means of an electro-magnet, which magnet in the preferred embodiment shown is of the horse shoe type and comprises a pair of cores 14 and 14' arranged
10 parallel to each other and having their pole ends secured rigidly to the frame plate 9, spools or windings 15 upon said cores, and a base bar or heel piece 16 secured to the
15 other ends of said cores, and further united with said frame plate 9 by means of a cross bar 17. At a point in alinement with the space between the magnet spools 15 the heel piece is apertured and a nipple-like extension 18 seated therein, which said extension
20 is axially apertured and forms a journal within which is mounted a spindle or rock shaft 19, as indicated clearly in Fig. 4. One end of said rock shaft extends through the space between the magnet spools and carries at its end a transversely disposed armature 20 which extends and oscillates in the
25 same plane with the pole pieces or projecting ends of the cores 14 and 14' and normally stands out of alinement with the latter. In order that said armature may be
30 acted upon more effectively by the magnet, the pole pieces are cut away at their sides, as indicated at 21, in a usual manner, and in order to prevent a too sudden or abrupt
35 movement of the armature under the action of the magnet, the opposite end of the spindle 19 is extended out through the bearing 18 and provided with a rigidly mounted balance wheel or weight 22. At one side
40 said weight is cut out, as indicated at 23, so that the opposite side thereof is heavier; the heavier side of the balance wheel being coincident with the angular position of the armature, which latter is disposed in an approximately horizontal position, so that the
45 weight of the balance wheel tends to oscillate the armature into open position, as indicated in dotted lines in Fig. 1.

Stop pins 23 and 24 seated in the periphery of the balance wheel are arranged to cooperate with the stop stud 25 mounted upon the heel piece 16 and in position to arrest the armature at its limits of movement in each direction. Upon the central part of
55 the armature is rigidly mounted or formed a cam block or projection 26 which is arranged in the same plane with the contact lever 8 and is located closely adjacent to the lower edge of the latter. Said cam block
60 is provided at its side toward the contact lever with a flattened portion 27, which in the normal position of the armature is inclined or stands in divergent relation to the under side of the contact lever, as indicated in Fig. 1. Upon the closing of the

armature, said flattened surface is rocked upwardly so that the angle 28 formed at the juncture of the flattened portion with the periphery of the cam block engages the contact lever and lifts the latter positively; the
70 parts assuming the position shown in Fig. 3. The cam block is provided with a second cut-away or flattened portion 29 which affords clearance to prevent the cam block from acting upon the contact lever when the armature returns under the action of the counter-balancing wheel.
75

In order to insure a positive downward movement of the contact lever so as to insure full engagement of the contact devices
80 11 and 12, the contact lever is itself made of suitable metal to constitute an armature which is acted upon by the pole pieces when the magnet is energized and is therefore drawn downwardly toward the latter as soon as the circuit has been closed.
85 In order to insure a more effective action of the magnet upon said contact lever, the lower side of the latter is provided with an extension or offset portion 30, which
90 is adapted to pass between the pole pieces and extends in close proximity to the right-hand one of said pole pieces, as seen clearly in Fig. 3.

It follows from the foregoing that as soon
95 as the armature is brought into closed position, the contact lever is lifted to its normal uppermost position, but it requires a substantial interval of time for the trip wheel to rotate far enough to carry the notch thereof out of register with the wiper so that the contact lever will be supported by the trip wheel and prevent it from returning to closed position. A latch mechanism is provided for temporarily holding the contact
105 lever in raised position; said latch mechanism comprising a latch member 31 pivotally supported at its upper end, as indicated at 32, upon the main frame, and extending thence downwardly alongside of the trip wheel in position to be engaged by a stud 33 upon the latter, and swung outwardly by the rotation of the wheel, pendulum fashion; the latch 31 provided at a point intermediate its length with a notch 34 adapted
115 to swing under and engage a stud 35 upon the side of the contact lever; the latch being weighted so as to tend to swing toward said stud. In the normal position of the contact lever the wiper rests upon the periphery of the trip wheel, and the stud 35 thereof engages the latch at a point below the notch 34. When the notch is brought into register with the wiper, therefore, the contact lever is free to descend, but upon its immediate return it is lifted high enough to permit the latch to engage with the stud 35, in which position it is retained until the further movement of the trip wheel brings the stud 33 thereof into engagement with
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130

the latch and releases it from the stud of the contact lever, whereupon the latter descends until its wiper rests upon the periphery of the trip wheel.

5 Describing now the circuit connections through the mechanism, 36 designates a conductor with any suitable source of current supply and leading to a binding post 37 mounted upon the main frame. The contact
10 lever 8 is in metallic connection with the main frame upon which it is mounted. From the insulated fixed contact device 12 two branch conductors extend, one conductor 38 leading to and through the coils of
15 the magnet, and an extension conductor 39 leading from the magnet to a binding post 40, shown in dotted lines in Figs. 1 and 3. From a binding post 40 a return conductor leads off; this circuit being in practice em-
20 ployed for energizing the magnets only. The other branch conductor referred to, and designated 41, leads from a fixed contact device to a second binding post 42, and thence to and through the secondary clocks or other
25 apparatus included in said circuit and back to the source of supply.

The operation of the apparatus has been fully set forth in connection with the foregoing description of the mechanism, but cer-
30 tain peculiarities of operation may be briefly referred to. When the trip wheel in its regular rotation by the clock movement is brought into position to release the contact lever, the latter descends by gravity and this
35 initially closes the circuit when its contact blade 11 engages the fixed contact blades 12. This results in closing the circuit through the magnet and energizing the latter, whereupon, before the armature of the magnet can
40 respond, the contact lever which is itself an armature, is drawn downwardly, thereby bringing the contact blades into fully engaged position. The inertia of the balance
45 wheel and the armature itself prevents the armature from closing for a perceptible interval, and furthermore, the construction of the cam block is such that the contact lever will not be engaged and forced up until the
50 armature approaches the limit of its closing movement. When, however, it does engage the contact lever, the latter is forced open positively, very rigidly and to its full extent, so that the circuit is broken between
55 the contact devices in an effective manner which reduces sparking to a minimum. The fact that the circuit remains closed during a perceptible interval is a matter of great importance, since it insures ample time for the
60 instrument controlled by the circuit to be properly operated. That feature of construction which insures that the contact lever shall be drawn down electrically, is also a feature of importance since it insures that
65 the contact blades will make an effective rubbing contact with each other, thereby keep-

ing the surfaces bright and effective. It will be noted, furthermore, that I have entirely dispensed with the use of springs for effecting operation of any of the parts, thus eliminating the uncertainty due to their use. 70

While I have herein shown a preferred embodiment of the invention, yet it will be understood that the details of construction may be modified without departing from the invention, and I do not, therefore, limit 75 myself to these details except to the extent that they are made the subject of specific claims.

I claim as my invention:

1. In a circuit controlling mechanism, the 80 combination of an electro-magnet, a contact carrying member having an armature portion movably mounted within the field of said magnet, a contact device upon said contact carrying member, a fixed contact device 85 arranged to cooperate therewith, other circuit connections including said contact devices and magnet, an armature proper co-operating with said magnet, and operative connections between said armature and said 90 contact carrying member, for the purpose set forth.

2. In a circuit controlling mechanism, the combination of an electro-magnet, a contact 95 carrying member having an armature portion movably mounted within the field of said magnet, a contact device upon said contact carrying member, a relatively fixed contact 100 arranged to cooperate therewith, circuit connections including said contact device and said magnet in the same circuit, means for causing the initial movement of said contact carrying member to bring said contact devices into touch, an armature 105 proper movably mounted in the field of said magnet, and operative connections between said armature proper and said contact carrying member whereby the closing movement of the armature operates to positively 110 force the contacts into complete engagement.

3. In a circuit controlling mechanism, the combination with a clock movement, of fixed and movable contact devices, the initial 115 movement of said movable contact device being controlled by said clock movement, and an electro-magnet operatively connected with said movable contact to force the latter into more positive engagement with the relatively fixed contact, for the purpose set 120 forth.

4. In a circuit controlling mechanism, the combination of an electro-magnet, a member 125 having an armature portion movably mounted within the field of said magnet, a contact device upon said contact member, a relatively fixed contact device arranged to co-operate therewith, circuit connections including said contact device and said magnet, a clock actuated trip mechanism operating 130 to release said contact carrying member at

predetermined intervals, said contact carrying member being constructed to move by gravity into closed position when released, and means for restoring said contact carrying member to its normal uplifted position.

5 5. In a circuit controlling mechanism, the combination with an electro-magnet, a relatively fixed contact device, and a clock controlled contact device, of circuit connections
10 including said contact devices and magnet, an armature portion connected with said movable contact and arranged in a field of said magnet whereby said movable contact is drawn into more positive engagement
15 with the fixed contact by the energizing of the magnet, a second armature proper arranged in the field of said magnet, and operative connections between said movable contact and said second armature whereby
20 the moving of the armature into closed position operates to positively move the contact into open position, said connections embracing lost motion mechanism, for the purpose set forth.

25 6. In a circuit controlling mechanism, the combination with movable and relatively fixed contact devices, clock mechanism effecting the movement of said movable contact device into one position, an electro-
30 magnet included in circuit with said contact device, operative connections connecting the armature of said magnet with said movable contact device whereby said parts move together, and a balancing wheel mounted
35 upon the armature to rotate positively therewith, for the purpose set forth.

7. In a circuit controlling mechanism, the combination with a clock movement provided with a lever tripping mechanism, of a
40 contact lever carrying a contact device and arranged to cooperate with said trip mechanism, a fixed contact adapted to cooperate with said movable contact, an electro-magnet the pole pieces whereof are mounted
45 adjacent to one side of said lever, a cam block mounted to move with the armature of

said magnet and operating to move said contact lever positively in one direction, and means tending to normally move said contact lever to closed position.

50 8. In a circuit controlling mechanism, the combination with a clock movement provided with a lever tripping mechanism, of a contact lever carrying a contact device and
55 arranged to cooperate with said trip mechanism, a fixed contact adapted to cooperate with said movable contact, an electro-magnet the pole pieces whereof are mounted adjacent to one side of said lever, an armature portion mounted upon said contact
60 lever and adapted to cooperate with said pole pieces, a cam block mounted to move with the armature proper of said magnet and operating to move said contact lever positively in one direction, and means tending
65 to normally move said contact lever to closed position.

9. In a circuit controlling mechanism, the combination with a clock movement, of a trip wheel mounted upon one of the arbors
70 of said movement and provided with a peripheral notch, a contact lever provided with a wiper arranged to cooperate with the periphery of said trip wheel and with the electrical contact member, a relatively fixed
75 contact device adapted to cooperate with the contact device of the lever, a latch member arranged to automatically engage said lever to hold the latter free from the trip wheel, a cooperating projection upon the trip wheel
80 to disengage said latch, a magnet included in the circuit controlled by said contact lever, an armature member operating upon said contact lever to move it into closed position and a second member operating to force the
85 contact lever into open position.

In witness hereof, I hereunto subscribe my name this 14th day of January, A. D., 1910.

FRED I. GETTY.

Witnesses:

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