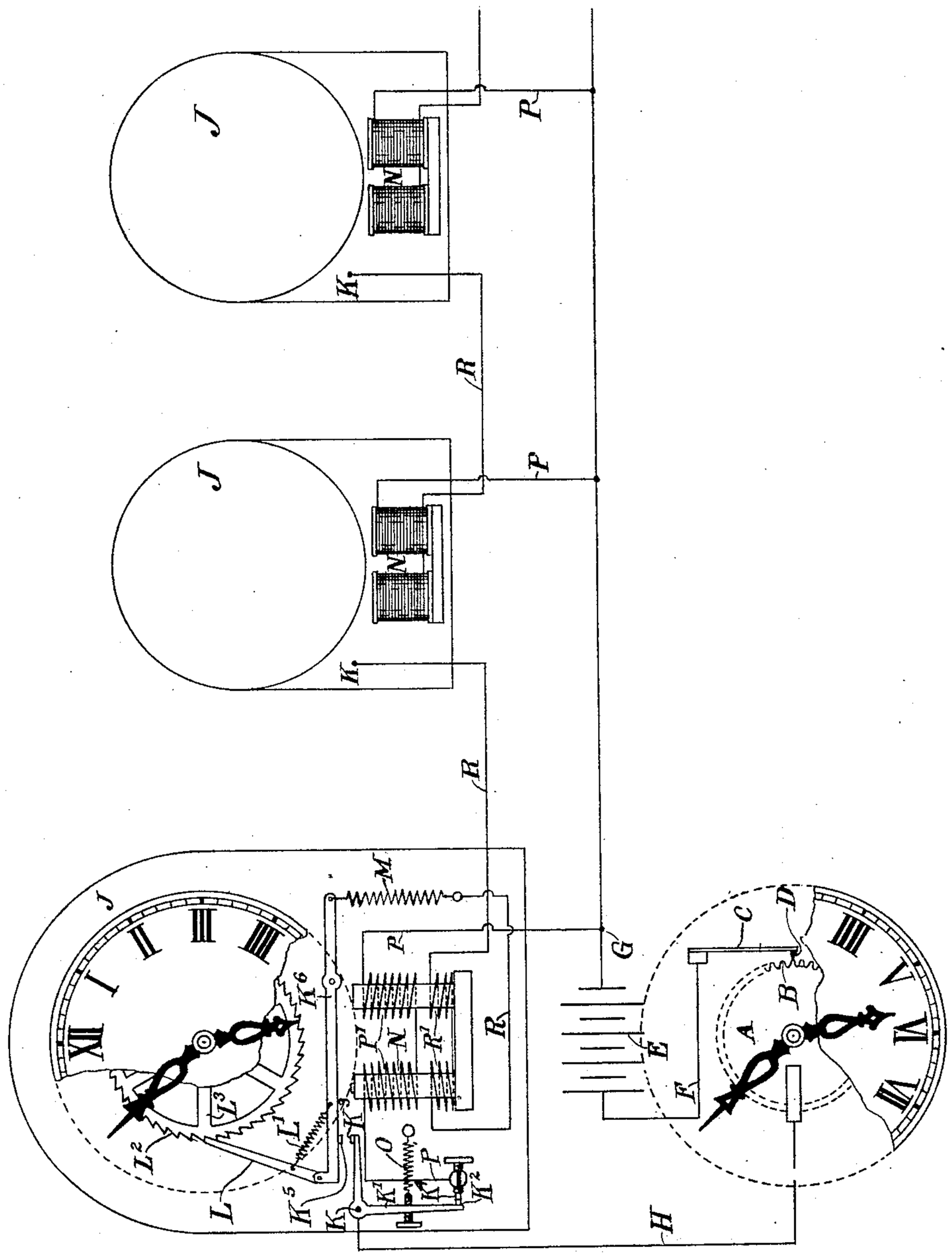
(No Model.)

J. A. SCHULTE.

ELECTRIC CLOCK.

No. 572,131. Patented Dec. 1, 1896.



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ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 572,131, dated December 1, 1896.

Application filed August 12, 1895. Serial No. 559,086. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. SCHULTE, a citizen of the United States, residing at Arcadia, in the county of Carroll and State of Iowa, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification.

My invention relates to electric clocks, and particularly to means or methods and devices for operating a series of clocks in the most economical manner.

I have illustrated in a sort of diagrammatic way my invention in one of its forms in the accompanying drawing, which is a diagrammatic view, except as to certain details.

It is usual in the operation of a series of electric clocks from a given or central station to place them in series, so that a current must traverse all the actuating-magnets of said clocks in order to control the clocks. This naturally requires a considerable current, since each magnet has quite a high resistance. Such heavy current, however, is only necessary in the first instance to energize the magnet, for after that the office of the magnet is only to hold the parts in position until all are to be simultaneously released. A much weaker current is sufficient for this purpose.

Referring to the drawing, A is the primary or central-station clock having this circuit-making wheel B and the spring circuit-maker C with a point D to successively engage the teeth on the circuit-making wheel.

E is the central-station battery or generator; F, the conductor leading thence to the primary clock; G, the conductor leading back to the battery, and H the conductor leading out of the battery.

J J indicate the successive electrically-actuated clocks of the system, and each is provided with a mechanism analogous to that shown in detail in the first or larger clock, as here illustrated.

The conductor H leads to the point K, where is pivoted the elbow crank-lever K′ with the contacts K^2 and K^3—the first to engage the set-screw K^4, and the second to engage the contact K^5 on the pivoted lever K^6. This lever is provided at one end with the pivoted dog L, controlled by the spring L′, adapted to engage the ratchet-teeth L^2 on the wheel L^3, which drives the clock J. The pivoted lever K^6 is drawn in one direction by the conductor-spring M and in the other by the magnet N.

O is a spring whereby the elbow crank-lever K′ is normally pushed into the position shown. From the set-screw K^4 leads the conductor P, which forms the coils P′ and the magnet N, and thence proceeds to the return-conductor G. From the end of the spring M leads the conductor R, which, after traversing the magnets which form the coils R′, enters the next clock at the contact K.

The circuits may be traced as follows, and by so doing the operation of the device will be shown: The current leaving the battery E at the point when the circuit is made by the wheel B will traverse the primary clock and pass along the conductor H to point K, thence through set-screws K^4, conductor P, coils P′, back to the battery through conductor G. The high resistance of the coils P′ P′ will energize the magnet, so as to draw down the lever K^6 until the contacts K^3 and K^5 are in engagement. By this action the dog L slips into the next tooth. The downward motion of the lever K^6 is continued far enough to separate the contacts K^2 from K^4 and break that circuit just after the holding-circuit is established, and this is as follows: from point K through contacts K^3 K^5, along lever K^6, through spring M to conductor R, through the low-resistance coils R′, thence by conductor R to the contact K of the next clock. Here the same action takes place. Thus each clock in the series is successively set by means by what I will call the "setting-circuit," and all are then held by means of what I would call the "holding-circuit" until the whole set of clocks are in readiness for action. Thereupon the circuit is broken to the primary clock by the rotation of the wheel B, and the current being no longer supplied all the levers K^6 are free to be forced upwardly by the springs M, and thus all of the clocks are simultaneously advanced one point, or, say, one minute. Of course this mechanism can be greatly varied without departing from the spirit of my invention, and I only desire to be understood as setting forth my invention in an illustrative manner by the accompanying drawing.

I claim—

1. In an electric clock the combination of a primary clock and a generator, a series of electrically-actuated clocks connected together by a single circuit, each having a setting-circuit successively closed and each having a holding-circuit, all such holding-circuits being in series when current is traversing them.

2. In a system of electrically-actuated clocks, the combination of a local generator with a local primary circuit making and breaking clock, a series of electrically-actuated clocks connected together by a single circuit and means for successively setting their mechanism by the action of the generator and means for holding all of the mechanism by the action of such generator and means for simultaneously releasing all of the mechanism.

3. In an electrically-actuated clock the combination of a magnet with two sets of windings, one a high-resistance winding, the other a low-resistance winding, a clock-actuating lever controlled by such magnet and a circuit making and breaking lever also controlled by said magnet and adapted when actuated to vary the circuits so as to successively energize said windings.

4. In an electrically-actuated clock the combination of a clock mechanism with a device for actuating same, a magnet with a high-resistance winding adapted to control said device, a magnet with a low-resistance winding adapted to hold such device a circuit making and breaking lever also controlled by said magnet and adapted when moved to vary the circuits so as to successively energize the high and low resistance windings.

5. In a system of electrically-actuated clocks the combination of a local generator with a local primary circuit making and breaking clock, a series of electrically-actuated clocks connected together by a single circuit, a device associated with each of said clocks for actuating the mechanism thereof, a magnet with a high-resistance winding adapted to control said actuating device, a magnet with a low resistance adapted to hold such device, a circuit making and breaking lever connected with the clock-circuit and adapted to be moved by the high-resistance winding so as to change the circuits in such a manner as to cut out said high-resistance winding and cut in said low-resistance winding substantially as described.

6. In a system of electrically-actuated clocks, the combination of a local generator with a local primary circuit making and breaking clock, a series of electrically-actuated clocks, each provided with an electromagnet of comparatively high resistance, one terminal of each of said magnets being independently connected with one terminal of the local generator, a spring-controlled lever connected with the clock mechanism of each clock so as to operate the same, said lever so positioned that it is moved to an operative position when the said electromagnets are energized, an electromagnet of comparatively low resistance associated with each of said levers and adapted to hold said levers in their retracted positions, said low-resistance electromagnet having a conductor leading from one terminal to the adjacent clock and from the other terminal to the circuit making and breaking device, said circuit making and breaking device so constructed that when the circuit is completed in the primary circuit, the high-resistance electromagnets are successively energized so as to act upon the lever associated therewith and will then be cut out of circuit, the low resistance being cut in circuit so as to hold said lever in its retracted position, whereby the system of clocks may be operated by a comparatively weak local generator, substantially as described.

7. In a system of electrically-actuated clocks, the combination of a local generator with a local primary circuit making and breaking clock, a series of electrically-actuated clocks, each provided with an electromagnet of comparatively high resistance, one terminal of each of said magnets being independently connected with one terminal of the local generator, a spring-controlled lever connected with the clock mechanism of each clock so as to operate the same, said lever so positioned that it is moved to an operative position when the said electromagnets are energized, an electromagnet of comparatively low resistance associated with each of said levers and adapted to hold said levers in their retracted positions, said low-resistance electromagnet having a conductor leading from one terminal to the adjacent clock and from the other terminal to the circuit making and breaking device, said circuit making and breaking device comprising a pivoted lever provided at each end with contact-points, a stationary contact-point normally in contact with one end of said lever and connected to one terminal of the high-resistance magnet, the other end of said lever being opposed to the contact-point on the actuating-lever of the clock, said actuating-lever being connected with the low-resistance magnet, the parts so constructed that when said actuating-lever is attracted by the high-resistance magnet, it makes contact with the lever on the circuit making and breaking device, and at the same time moves the end of said circuit making and breaking device out of contact with its opposed stationary contact, whereby when the circuit is completed in the primary circuit, the high-resistance electromagnets are successively energized so as to act upon the lever associated therewith and will then be cut out of circuit, the low resistance being cut in circuit so as to hold said lever in its retracted position, whereby the system of clocks may be operated by a comparatively weak local generator, substantially as described.

8. In a system of electrically-actuated

clocks, the combination with a primary circuit making and breaking clock and a generator, a series of electrically-controlled clocks, each provided with a spring-actuated lever connected with the mechanism so as to actuate it when said lever is moved by said spring, comparatively high resistance electromagnets associated with each of said levers so as to move the same to an operative position when the magnets are energized, each of said magnets having one terminal connected with the primary generator so that they are energized independent of each other, an electromagnet of comparatively low resistance associated with each of said levers and adapted to hold the same in its retracted position, and a circuit making and breaking device associated with each set of magnets and adapted to alternately break the circuit through said high-resistance magnets and make the circuit through said low-resistance magnets when the circuit is completed through said primary circuit making and breaking clock.

9. In an electric-clock system the combination of a series of clocks, a movable spring-actuated arm associated with each clock and adapted when retracted and released to operate the mechanism of said clock, a comparatively high resistance magnet associated with each clock and adapted when energized to retract said movable arm, a circuit making and breaking clock and a source of electrical supply connected with said electromagnets in such a manner that when the circuit is completed the electromagnets are successively energized so as to successively retract said movable arms, a comparatively low resistance electromagnet associated with each clock and adapted when energized to hold said movable arms in a retracted position, and a circuit making and breaking device associated with each clock and operated by said high-resistance magnet so as to change the circuit from the high-resistance magnet to the low-resistance magnet, whereby the movable arms may be successively retracted and simultaneously released.

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