(No Model.) 2 Sheets—Sheet 1.

# L. H. SPELLIER.

## TIME DISTRIBUTER FOR ELECTRIC CLOCKS.

No. 417,753. Patented Dec. 24, 1889.

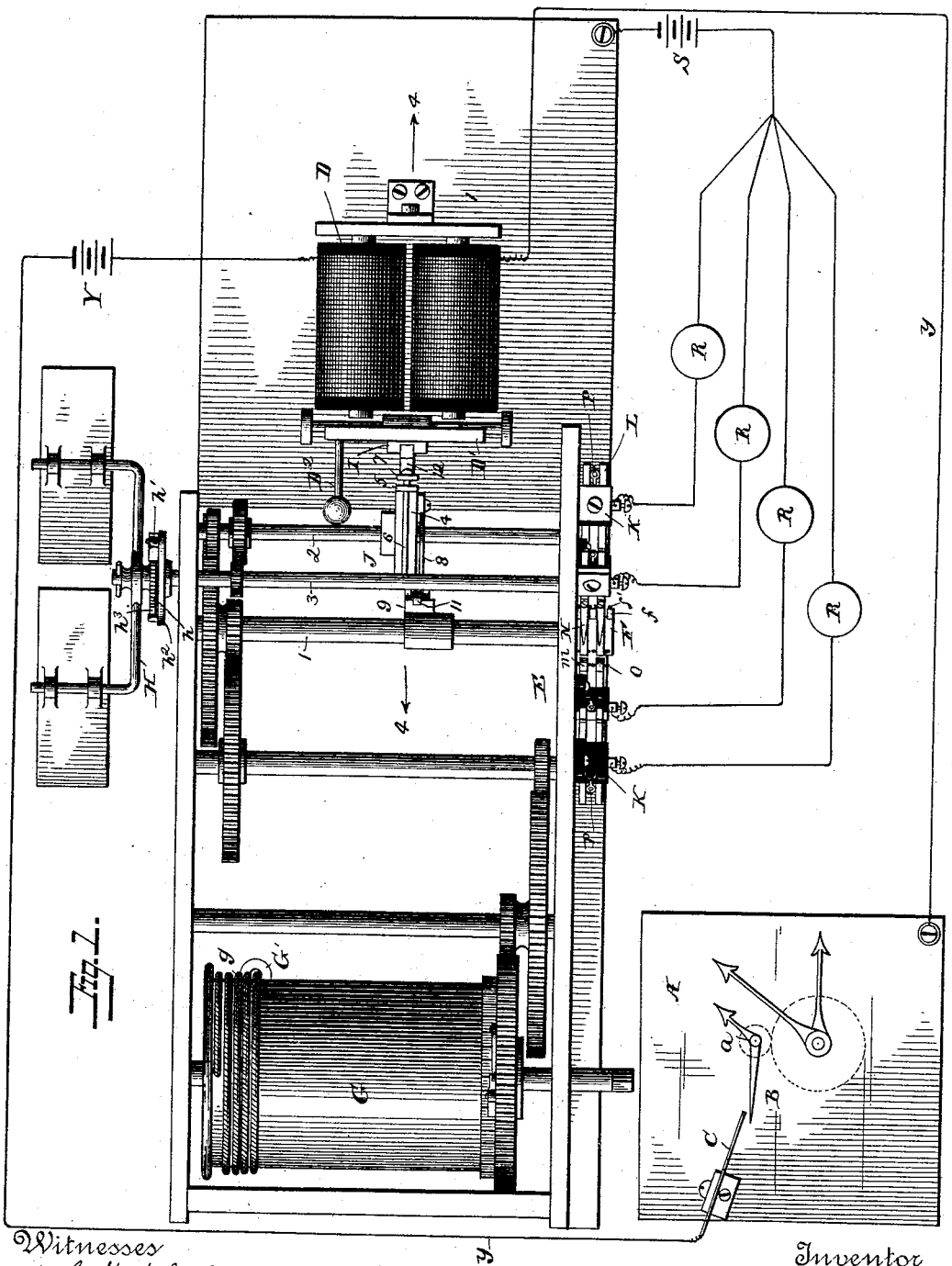

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

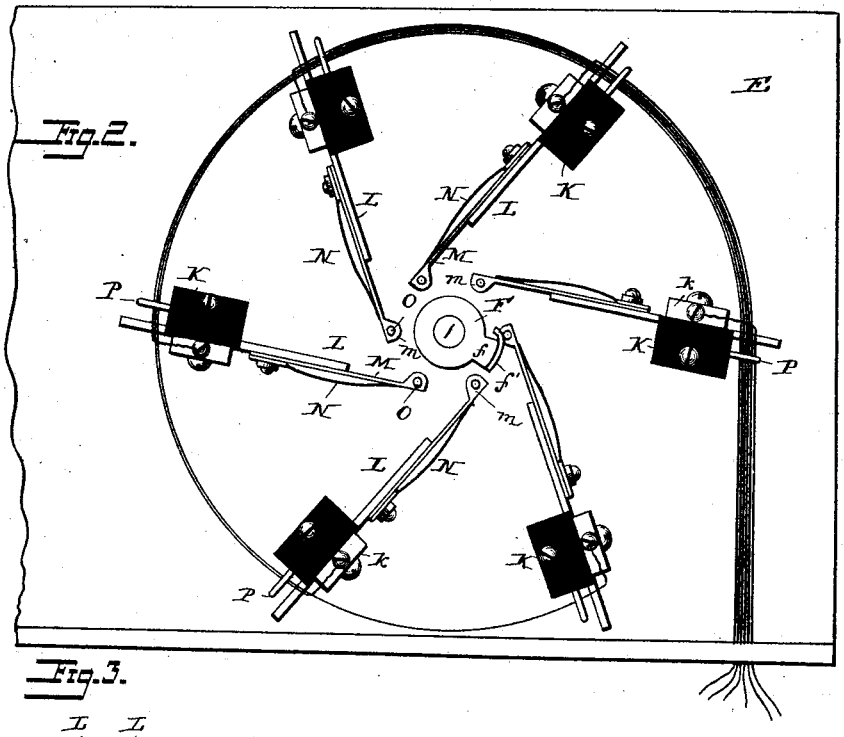

Fig. 3.

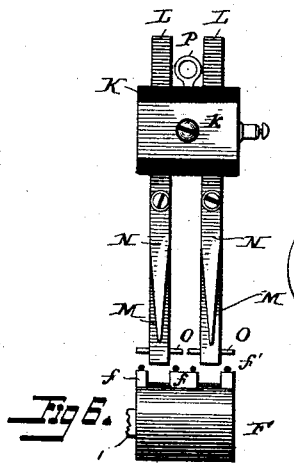

Fig. 4.

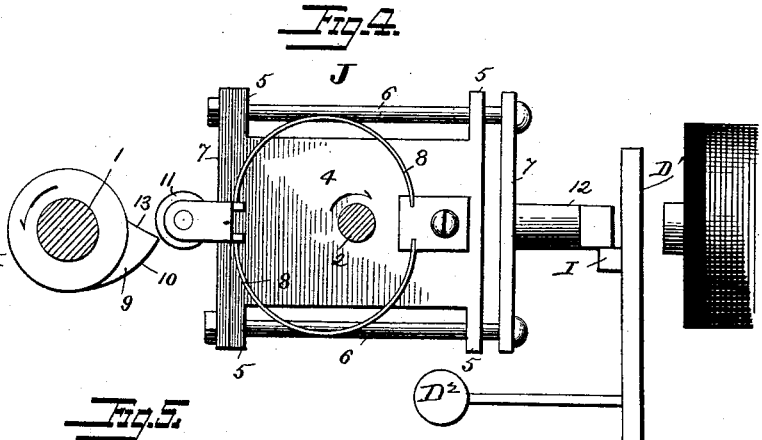

Fig. 5.

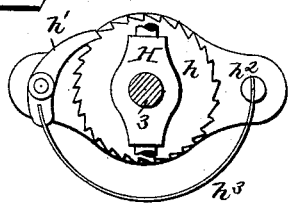

Fig. 6.



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# UNITED STATES PATENT OFFICE.

LOUIS H. SPELLIER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE SPELLIER ELECTRIC TIME COMPANY, OF SAME PLACE.

## TIME-DISTRIBUTER FOR ELECTRIC CLOCKS.

SPECIFICATION forming part of Letters Patent No. 417,753, dated December 24, 1889.

Application filed November 27, 1888. Serial No. 292,018. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS H. SPELLIER, a citizen of the United States, residing at Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Time-Distributers for Electric Clocks, of which the following is a full, clear, and exact specification.

My invention relates to time-telegraphs of that class in which there is a master-clock which is electrically connected with a time-distributer, by means of which a number of clocks connected with the distributer are controlled; and my invention refers especially to the time-distributer and its connections; and it has for its object to improve the construction and operation of such devices, so that they will operate with accuracy and certainty and at the same time be simple and cheap in construction and not liable to derangement; and to these ends my invention consists in the various constructions and arrangements of devices, substantially as hereinafter set forth.

Referring to the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a time-distributer embodying my invention, the master-clock and circuits of the operated clocks being indicated also. Fig. 2 is a side view, enlarged, showing the commutator and distributing-circuits. Fig. 3 is an enlarged plan view of the brushes. Fig. 4 is an enlarged partial section on the line 4 4, Fig. 1. Figs. 5 and 6 are enlarged details.

The time-distributer is operated by a master-clock of any suitable or desired construction, and I have indicated in the drawings a clock A, having attached to the shaft *a* of the escape-wheel a contact-piece B, which is carried by the shaft, and is adapted to be brought in contact with the contact-spring C once every minute, and to thereby close the circuit of the battery Y through the conductors *y y*, which include the coils of the magnet D of the time-distributer. It will thus be seen that once every minute the circuit of the battery Y is closed by the master-clock and the magnet D energized. This arrangement, however, may be varied to suit the object or purpose of the clock, and is merely shown herein as illustrative of one means of controlling the time-distributer.

The time-distributer consists of a suitable frame-work E, in which is mounted a shaft 1, carrying a movable or rotating electrode F of the commutator, and this shaft is propelled or rotated in any suitable way, and, as indicated in the drawings, is connected by a train of gears, of usual construction, to a drum G, upon which is coiled a cord *g*, supporting a weight G′ at its end, which, when wound up, furnishes the power to rotate the shaft 1. It is obvious, however, that any other suitable means may be used to produce a stress upon the shaft 1, tending to rotate it. The shaft 1 is connected by suitable gears to a shaft 2, which carries a mechanism which I have called a "clutch device," and which serves to limit and control the number of the rotations of the shaft 1 and the movable electrode carried thereby. Connected to the shaft 2 by suitable gears is another shaft 3, which carries a fan, fly, or other speed-regulating device H, which serves to regulate the rate of rotation of the shaft 1, in a manner well understood. As this shaft is necessarily stopped suddenly at intervals in order to prevent any shock or jar to the mechanism, the fan, fly, or other retarding device is mounted loosely on the shaft 3, and is provided with a ratchet-wheel *h*, into which engages a pawl *h′*, mounted on a plate $h^2$, secured to the shaft 3, and a suitable spring $h^3$ insures the engagement of the pawl with the ratchet-wheel *h*. From this construction it will be understood that when the movement of the shaft 1, and consequently the movement of shaft 3, is suddenly checked the momentum of the fan or retarding device will carry it forward without straining or injuring in any way the parts to which it is connected, as the ratchet-wheel *h* will slip by the pawl *h′*, and when the shaft 1 is again started, and the shaft 3 with it, the pawl *h′* is found in engagement with the ratchet-wheel *h*, and the fly or fan is immediately operative to regulate the rotation thereof.

The electro-magnet D is provided with a pivoted armature D′, which is normally held at a distance from the poles of the magnet by a weight $D^2$, attached to the side of the armature or armature-lever opposite the magnet.

While I prefer a weight for this purpose, as I find it more positive in its operation, it is evident that a spring or other equivalent device may be used for accomplishing this result.

Normally the rod or projection forming part of the clutch device rests upon a block or stop-piece I, attached to the rear of the armature, so that when the magnet is not energized the shaft 1 and its connected train of mechanism is inoperative and held stationary until released by the impulse from the master-clock passing through the magnet and energizing the same, as before stated.

It is well known that when a shaft or other device is under tension and normally held stationary it does not always start to rotate upon the instant the retarding device is removed from control thereof with the desired speed, owing to the inertia of the parts and other causes which hinder its instantaneous movement. It is evident that in devices of this character it is extremely important that immediately upon the receipt of the impulse from the master-clock the commutator or distributer should be set in motion, so that there can be no delay or practical difference in time between the impulse of the master-clock and the signals or impulses sent out by the time-distributer. One of the special objects of my present invention is to overcome this difficulty, and this I accomplish by the use of the clutch device J, before referred to, the construction of which is illustrated more particularly in Fig. 4. Mounted upon the shaft 2 and fixed to rotate therewith is the body portion 4 of the clutch, and this is shown as provided with extensions or arms 5 5, through which pass rods 6 6, carrying the end pieces 7 7 of the clutch, and these end pieces are mounted upon the rods, so that they may be moved backward and forward to occupy different relations to the fixed or body portion of the clutch, as hereinafter explained.

Secured to the body portion and bearing upon one of the end pieces are springs 8 8, which normally tend to press the end pieces toward the shaft 1, upon which shaft is mounted a cam 9. This cam is constructed so that at the proper time the gradually-inclined face 10 thereof comes in contact with the friction-wheel 11, secured to the sliding frame of the clutch, and forces it toward the right, so that the stop 12 comes in contact with the projection I on the armature of the magnet, and the gears are so arranged that when the clutch device is at rest the friction-wheel 11 will bear a little beyond the apex of the cam 9 and toward the shorter inclined portion 13 thereof, as clearly indicated in Fig. 4.

When an impulse from the master-clock traverses the electro-magnet D, the armature D′ is instantly attracted and the projection I is removed from contact with the arm 12 of the clutch, and the train of gears is then at liberty to rotate; but, as before stated, the inertia may not be instantly overcome, and to insure this operation the springs 8, which constantly press the friction-wheel 11 against the cam, then come into operation and force the wheel 11 down the inclined portion 13 of the cam 9, causing the clutch to rotate in the manner indicated by the arrow and thereby start the train of gears, which in turn causes the shaft 1, carrying the movable electrode, to rotate. As soon as the clutch is released from contact with the cam the springs 8 have performed their functions and the clutch can rotate several times, depending upon the proportions of the gears connecting shafts 1 and 2, and it will be observed that the arm 12 is withdrawn, so as not to come in contact with the lug I on the armature, even if that is returned to its normal position; but after a sufficient number of rotations have been accomplished the surface 10 of the cam 9 comes in contact with the friction-wheel 11 and gradually forces the arm 12 outward, so that the moment the shaft 1 has completed its rotation the arm 12 will impinge upon the projection I and cause a stoppage of the parts, holding them in the position indicated in Fig. 4, ready to be released again and go through the same operation upon the receipt of the next impulse from the master-clock.

The movable electrode F of the commutator is shown fixed upon the end of the shaft 1, and is provided with a number of projections *f*, upon the faces of which I secure strips or wires *f′*, of platinum or other suitable material, which will furnish good electric contact with the brushes.

Arranged adjacent to the movable electrode are a series of brushes K, corresponding with the number of circuits to be controlled, and while these brushes may be variously constructed I have shown more particularly in detail in Figs. 2 and 3 a form which I have found exceedingly simple and effective.

Secured to the face of the frame are insulated blocks *k*, each pair supporting strips of metal L, which may be comparatively thick to furnish a good support for the spring-extensions M N, which are secured thereto. The spring-arms M are provided with bosses or enlargements *m* at their ends, through which are passed strips or rods O, of platinum or other suitable material, and which form the electrodes or bearing-surfaces of the brushes and come in contact with the platinum strips upon the movable electrode. The spring-strips N serve to aid in maintaining the spring-strips *m* in proper relation to the moving electrode, so that as the latter rotates it comes in contact with the electrodes O in succession; and this particular construction I have found insures positive and certain electric contact which is not liable to deterioration or failure.

Secured to the insulated blocks *k* are eye-bolts P, through which the various wires or conductors forming the circuits of the clocks

to be regulated may conveniently be passed, one conductor terminating at each block or brush. These conductors lead to the various clocks indicated at R, connected to the different circuits which are to be regulated or controlled from the distributer, and I have shown the various circuits as connected to one pole of the battery S, so that they are all supplied therefrom, the other pole of said battery being connected to the frame-work E of the distributer, and thence to the electrode F of the commutator, thus completing the circuit. By this arrangement it is apparent that it is only necessary to use a battery or other source of electric power of sufficient capacity to energize and operate the clocks of a single circuit, each circuit being supplied with electrical energy in succession at every rotation of the movable electrodes. While it is apparent by this arrangement that all the circuits to which the clocks R are attached will not be energized at the same instant by the use of my improved distributer, the time elapsing between the impulse of the master-clock and the operation of the distributer in transmitting the time through the different circuits of the clocks is so small as to be practically inappreciable, and all the clocks are therefore maintained in synchronism.

While I have thus particularly described and illustrated one preferred embodiment of my invention, it is evident that the principles thereof may be applied to various constructions and arrangements without materially departing therefrom, and I therefore do not limit myself to the precise details shown and described. It is further evident that the special features of my invention may be used in combination with each other or separately, or in combination with other equivalent features.

What I claim is—

1. In a time-distributer, the combination of a power-driven shaft, a stopping and releasing device for said shaft, having a master-clock for controlling said stopping and releasing devices, and a device for overcoming the inertia of the said shaft, substantially as described.

2. In a time-distributer, the combination of a power-driven shaft, stopping and releasing devices electrically controlled by a master-clock, and intermediate devices between the stopping and releasing devices and the shaft to overcome the inertia of the shaft, substantially as described.

3. In a time-distributer, the combination, with a power-driven shaft, of an electro-magnet for stopping and releasing said shaft, and a clutch device interposed between the magnet and the shaft and arranged to overcome the inertia of said shaft, substantially as described.

4. In a time-distributer, the combination, with the power-driven shaft, of an electro-magnet for stopping and releasing said shaft, and a clutch device interposed between the magnet and shaft and mounted upon a shaft connected to be driven by the power-driven shaft, substantially as described.

5. In a time-distributer, the combination, with the power-driven shaft, of a cam upon the shaft, an electro-magnet for stopping and releasing the shaft, and a clutch device interposed between the magnet and shaft, the said clutch device having a spring-actuated roller arranged to bear upon the said cam, substantially as described.

6. In a time-distributer, the combination, with the power-driven shaft having a cam thereon, of a clutch device consisting, essentially, of a body secured to another shaft connected to be driven by the first, and a spring-actuated sliding frame provided with a roller, the said roller being arranged to be forced against the short surface of the cam to overcome the inertia of the power-driven shaft, substantially as described.

7. In a time-distributer, the combination, with the power-driven shaft provided with a cam, of an electro-magnet, the armature of which is provided with a stop, and a clutch device mounted on a shaft driven by the first and provided with an arm on one side to engage the stop on the armature and with a wheel on the other to engage the cam, substantially as described.

8. In a time-distributer, the combination, with a power-driven shaft having a cam constructed substantially as described, an electro-magnet controlled by the master-clock, the armature of which is provided with a stop, and a clutch device mounted on a shaft between the magnet and the power-driven shaft, the said clutch device consisting of a body fixed to the shaft, and a sliding spring-actuated frame having a projecting arm on one side engaging the stop on the armature and a friction-wheel on the opposite side to engage with the cam, substantially as described.

9. In a time-distributer, the combination, with a power-driven shaft, of a stopping and releasing device, a fly mounted on a shaft connected with the power-driven shaft to regulate the motion thereof, the said fly being connected to the shaft by a pawl-and-ratchet connection, substantially as described.

10. In a time-distributer, the combination, with a power-driven shaft, an intermittently-operating stopping and releasing device for said shaft, an electrode connected to said shaft, and a series of brushes arranged around the electrode in the path thereof, substantially as described.

11. In a time-distributer, the combination, with a rotating shaft, of a commutator having a series of projections provided with platinum strips, and a series of brushes of spring material arranged in the path of the projections, the said brushes being provided with bars of platinum arranged to make contact with the platinum strips of the commutator, substantially as described.

12. In a time-distributer, the combination,

with a rotating electrode, of a series of brushes arranged in the path of the electrode, the brushes consisting of metal strips *m m* and spring-strips *n n*, secured thereto, the ends of the strips *m m* being provided with enlargements and platinum or other suitable metal rods secured to said enlargements, substantially as described.

13. In a time-distributer, the combination, with a power-driven electrode, of a stopping and releasing device controlled electrically by the master-clock, a series of brushes arranged in the path of said electrode, and a series of circuits connecting each of said brushes with a series of clocks to be controlled, the said circuits being energized by a single battery in succession as the commutator operates, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS H. SPELLIER.

Witnesses:
S. SPENCER CHAPMAN,
N. C. LANE.