

(No Model.)

2 Sheets—Sheet 1.

J. P. TIRRELL.
ELECTRIC TIME ALARM.

No. 489,423.

Patented Jan. 3, 1893.

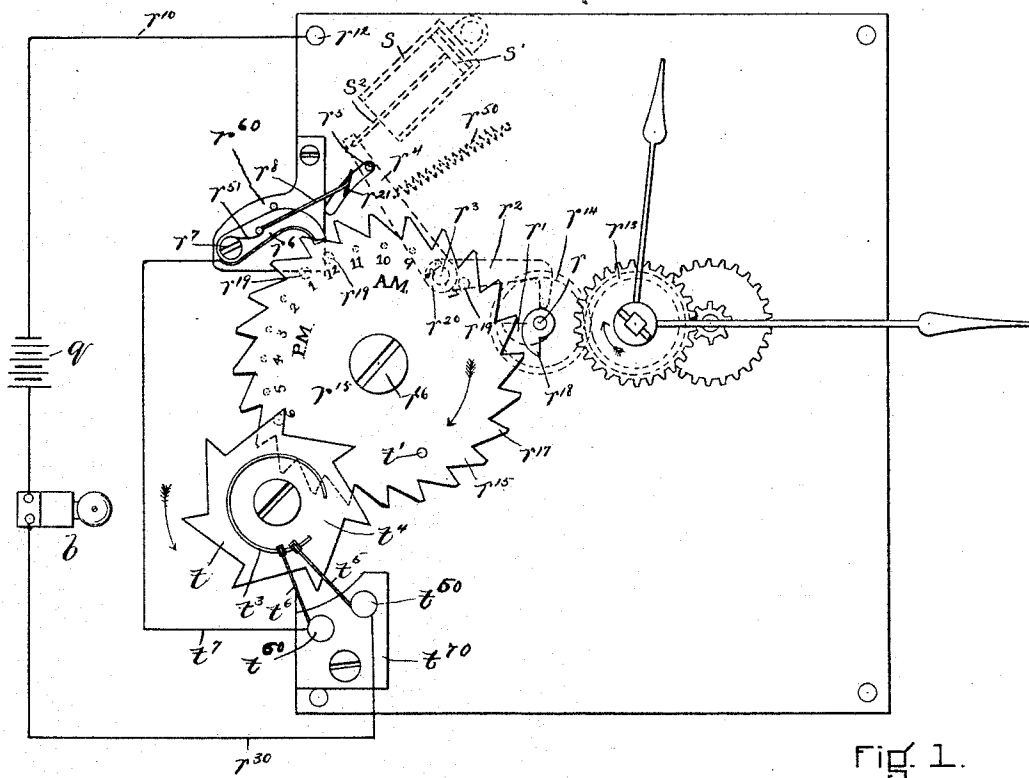


Fig. 1.

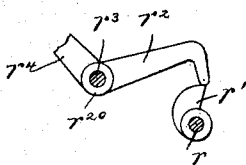


Fig. 3.

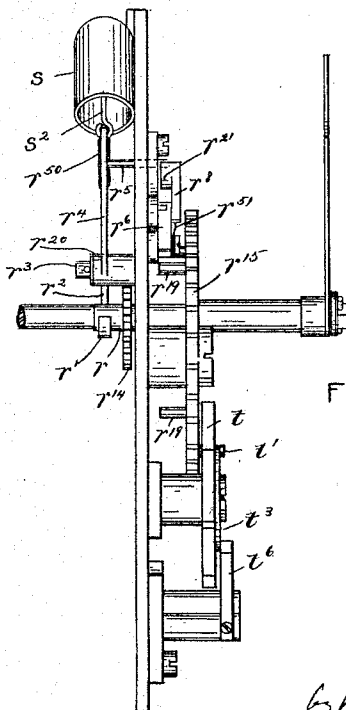


Fig. 2.

WITNESSES.

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2 Sheets—Sheet 2.

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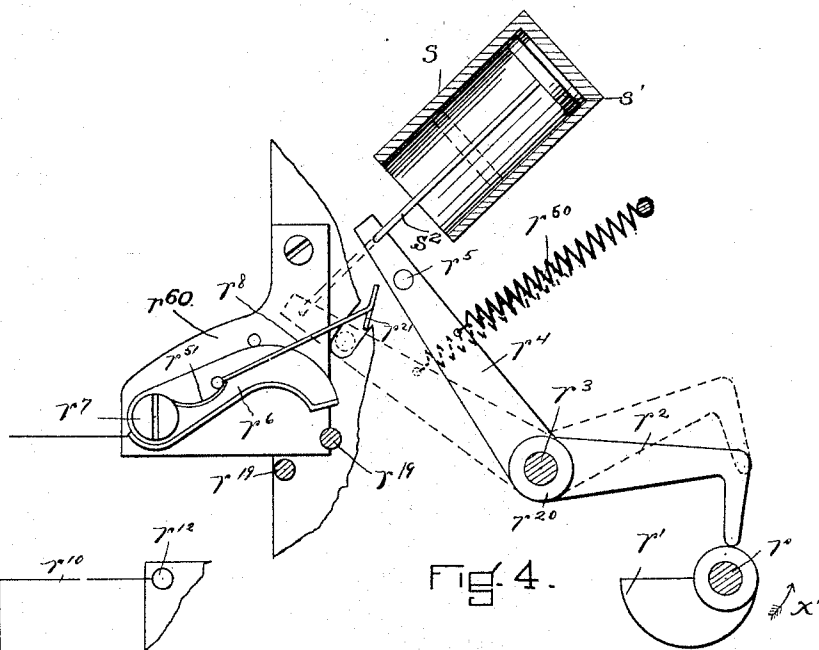


Fig. 4.

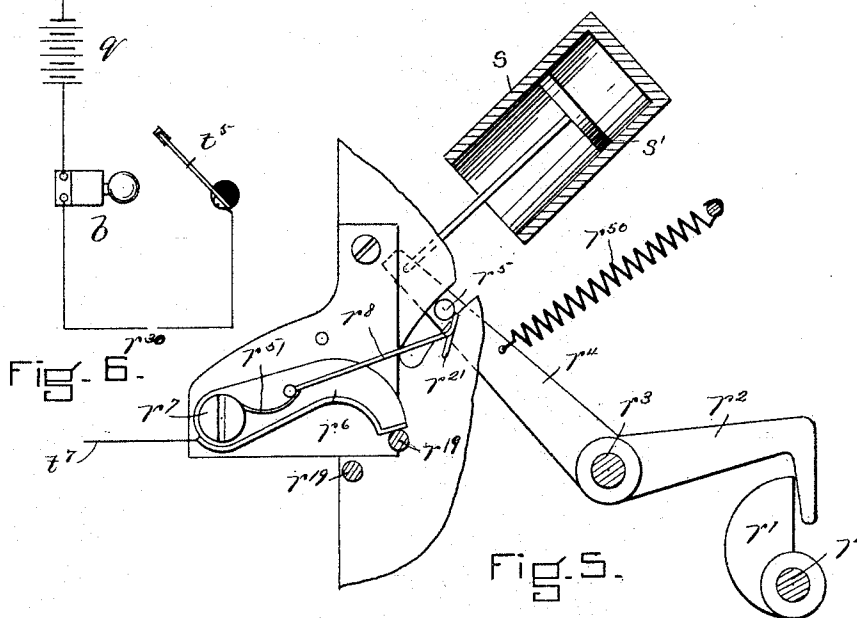


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

JACOB P. TIRRELL, OF BOSTON, ASSIGNOR TO HERBERT O. EDGERTON, OF GREENFIELD, MASSACHUSETTS.

ELECTRIC TIME-ALARM.

SPECIFICATION forming part of Letters Patent No. 489,423, dated January 3, 1893.

Application filed March 19, 1892. Serial No. 425,554. (No model.)

To all whom it may concern:

Be it known that I, JACOB P. TIRRELL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Closing and Breaking an Electric Circuit at Predetermined Times, of which the following is a specification.

This invention has for its object to provide a simple and reliable mechanism for periodically closing and breaking an electric circuit for various purposes, such as the operation of an electric signal bell or the movement of an electrically controlled mechanical device. The invention consists in the several improvements which I will now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification, Figure 1 represents a front elevation of an apparatus embodying my invention. Fig. 2 represents an edge view of the same; and Fig. 3 represents a front view of a part of the mechanism shown in Fig. 1. Figs. 4 and 5 represent front elevations of parts of the apparatus on a larger scale, and Fig. 6 represents a diagram of the connections.

The same letters of reference indicate the same parts in all of the figures.

In carrying out my invention, I provide a time mechanism adapted to close an electric circuit at any predetermined period or periods of the day or night, for the purpose of giving a signal or permitting the operation of a mechanical device, such as a detent lever which may be controlled by the armature of an electro-magnet included in said circuit.

r represents a shaft, which is rotated at a predetermined rate by any suitable clock mechanism, said shaft being in this case rotated once each hour, in the direction indicated by the arrow x' (Fig. 4). The shaft r is provided with an arm r' , which is caused by the rotation of the shaft r to displace a lever r^2 , affixed to a hub or sleeve r^{20} , which is mounted on a fixed stud r^3 on the supporting frame. Said lever is moved by the action of the arm r' from the position shown in dotted lines in Fig. 1 and in full lines in Fig. 4 to that shown in full lines in Fig. 3 and in dotted lines in Fig. 4.

r^4 represents an arm rigidly attached to the sleeve r^{20} , and therefore movable with the arm r^2 , said arm being provided at one end with a pin or stud r^5 .

r^6 represents a contact arm or lever, which is pivoted at r^7 and carries an extension or spring r^8 , arranged to co-operate, as hereinafter described, with the stud r^5 . The arm r^6 is insulated from the metallic frame of the machine by an insulating plate r^{60} . To said frame is connected a wire r^{10} extending from binding post r^{12} to one pole of a battery q or other source of electricity.

r^{15} represents a wheel affixed to a stud r^{16} and provided with ratchet teeth r^{17} adapted to engage a tooth r^{18} affixed to the shaft r . Said shaft is rotated once each hour by a suitable clock train including the gears r^{13} r^{14} . There are twenty four ratchet teeth r^{17} , so that the wheel r^{15} is given a complete rotation once in twenty four hours. The wheel r^{15} is provided with any desired number of pins r^{19} , projecting from one of its sides, each pin being of a material which is a conductor of electricity and serving as an electrical contact piece to co-operate with the contact arm r^6 , as presently described, in closing an electric circuit including the wire r^{10} , the metallic frame of the apparatus, the wheel r^{15} which is of conducting material, the arm r^6 , a wire t' and a wire r^{30} insulated from the frame, as hereinafter described, and connected with the battery q , a wheel t , presently described, of conducting material in electrical contact with the frame, and contact springs connected with the wires r^{30} and t' and adapted to make contact with wheel t . The extension r^8 of the lever r^6 is provided with an offset or flange r^{21} (Figs. 1, and 5), which is arranged so that when the lever r^4 is moved by the spring r^{50} from the position shown in Fig. 3 and in dotted lines in Fig. 4, after the release of the arm r^2 by the arm or cam r' , the stud r^5 on the arm r^4 will strike one side of said flange r^{21} and thus swing the contact arm r^6 in such manner as to throw its swinging end into the path in which the contact pins r^{19} of the wheel r^{15} move, as shown in Fig. 5, this operation occurring once in each hour. It will be seen, therefore, that if a pin r^{19} is in position to make contact with the arm r^6 when the latter

is swung inwardly, the circuit will be closed, the latter being thus caused to operate a signal bell *b* included in the circuit, or to operate any other electrically controlled device which may be provided.

There may be as many of the electrodes r^{19} as may be desired, and said electrodes may be arranged so that the circuit will be closed at any predetermined time or times of the day or night. As here shown, the wheel r^{15} is provided with orifices to receive twelve electrodes r^{19} , each orifice being preferably numbered to indicate the hour with which it corresponds, it being understood that each orifice will be in position to cause the contact of a pin held therein with the contact arm r^6 at the hour which said orifice represents. For example, an electrode r^{19} , inserted in the orifice marked 7 in the general division of the disk marked A. M., will be in position to close the circuit at seven o'clock a. m., a pin in the orifice marked 12 will close the circuit at noon, a pin in the orifice in the P. M. division marked 1 will be in position to close the circuit at one o'clock p. m., and a pin in the orifice in the P. M. division marked 6 will close the circuit at six o'clock p. m.

The circuit closing movement of the lever r^4 is preferably retarded so that the contact arm r^6 will be held for a considerable length of time in its circuit closing position, to obviate the liability of its return to its inoperative position before time has been afforded for contact with a pin r^{19} . To this end I provide a cylinder *s*, which is affixed to the supporting frame and has a piston s' provided with a rod s^2 , the outer end of which is loosely connected with the lever r^4 . The cylinder *s* is closed at one end and constitutes an air chamber containing an air cushion which retards the inward movement of the piston s' . After the stud r^5 has passed beyond the inner end of the flange or off-set r^{21} on the arm r^8 , the contact arm r^6 is released and is moved by a spring r^{31} to the position shown in Figs. 2 and 5 the contact arm being thus withdrawn from the path in which the pins r^{19} move.

I prefer to employ a device for automatically making the above described mechanism inoperative at predetermined intervals, such as every seventh day. Said device includes a ratchet wheel *t*, having seven teeth, each corresponding to one day of the week. Said wheel is arranged to receive a partial rotation once in every twenty four hours, by means of a tooth or pin t' attached to the wheel r^{15} . To the ratchet *t* is affixed a segmental metallic rib t^3 , having its periphery interrupted by a recess t^4 corresponding with the tooth of the ratchet which represents Sunday. t^5 represents a contact spring, which is in electrical connection with the wire r^{30} , and is arranged to bear upon the rib t^3 , and t^6 represents a similar spring connected by wire t^7 with the arm r^6 and also arranged to bear on the rib t^3 . The springs t^5 and t^6 are supported re-

spectively by posts t^{50} , t^{60} , which are attached to and insulated from the supporting frame by an insulating plate t^0 . So long as the spring t^5 , t^6 , are in contact with the rib t^3 , the circuit is closed whenever the arm r^6 strikes a pin r^{19} , the circuit including the spring t^6 , wire t^7 , arm r^6 , pin r^{19} , wheel r^{15} , the metallic frame of the machine, wire r^{10} , battery, wire r^{30} , spring t^5 and rib t^3 ; but when the recess t^4 reaches a position to coincide with one of said springs, the circuit is broken, so that the contact between the arm r^6 and pins r^{19} will produce no result. The recess t^4 may be of such length as to keep the apparatus inoperative from midnight on Saturday to midnight on Sunday, or for any other desired length of time.

I do not limit myself to the particular devices shown for rotating the wheel r^{15} and for moving the contact arm at predetermined times into the path of movement of the contact pins or pieces r^{19} , and may adopt any other suitable means for effecting these results.

The details of construction of other parts of the apparatus, such as the retarding device and the device for making the circuit inoperative at predetermined intervals, may be variously modified without departing from the spirit of my invention.

I claim:

1. A circuit closing and breaking apparatus, comprising a wheel provided with one or more contact pieces or pins, all arranged in a single row or series which is concentric with the axis of the wheel, all of said pins moving in a single path; means for rotating said wheel at a predetermined rate; a contact arm pivotally connected to a fixed support at a point removed from the axis of the wheel and having its contact surface normally out of the path of movement of said pins, said arm being adapted to be moved so as to carry said surface into said path; means for moving the contact arm at predetermined intervals; and electrical connections, constituting with said arm and wheel an electric circuit which is closed by contact of the arm with a contact piece on the wheel as set forth.

2. In a circuit-closing and breaking apparatus, the combination of a wheel, adapted to hold a series of contact pieces or pins; mechanism for rotating said wheel at a predetermined rate; a contact arm, adapted to be moved into the path of movement of said contact pins, and held normally out of said path, said arm having an extension provided with an incline or off-set; a lever, and mechanism for oscillating it at predetermined periods, said lever having a projection which, during one of the movements of the lever, engages said incline and thereby forces the contact arm into the path of the pins; as set forth.

3. In a circuit-closing and breaking apparatus, the combination of a wheel, adapted to hold a series of contact pieces or pins, and provided with ratchet teeth; a contact arm,

adapted to be moved into the path of movement of said pins, and held normally out of said path, said lever having an extension, provided with an incline or off-set; a lever adapted to be oscillated and provided with a projection adapted to engage said incline; and a time train, one arbor of which is provided with a tooth, adapted to rotate said wheel step by step, and with another tooth adapted to move said lever; as set forth.

4. In a circuit-closing and breaking apparatus, the combination of a wheel, provided with one or more contact pieces or pins; means for rotating said wheel at a predetermined rate; a contact arm, pivoted to a fixed support at a point removed from the axis of the wheel and having its contact surface normally out of the path of movement of said pins and adapted to be moved into said path; means for moving the contact surfaces into and out of said path at predetermined intervals; and a device to retard the inward movement of the contact arm; as set forth.

5. A circuit-closing and breaking apparatus, comprising a wheel, provided with one or more contact pieces or pins; means for rotating said wheel at a predetermined rate; a contact arm,

which is normally out of the path of movement of said pins, and is adapted to be moved into said path; means for moving the contact arm into and out of said path at predetermined intervals; electrical connections, constituting with said arm and wheel an electric circuit, which is closed by contact of the arm with a contact piece on the wheel; and a device for making said circuit inoperative at predetermined times, said device comprising a segmental contact piece, such as t^8 , adapted to be partly rotated by each complete rotation of said wheel, and having its continuity interrupted by a recess or opening, and contact springs co-operating with said contact piece, whereby the contact arm is thrown out of circuit when said recess reaches a given point; as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 10th day of March, A. D. 1892.

JACOB P. TIRRELL.

Witnesses:

C. F. BROWN,
A. D. HARRISON.