

(No Model.)

2 Sheets—Sheet 1.

J. F. McLAUGHLIN.
ELECTRIC TIME SWITCH.

No. 501,291.

Patented July 11, 1893.

Fig. 2.

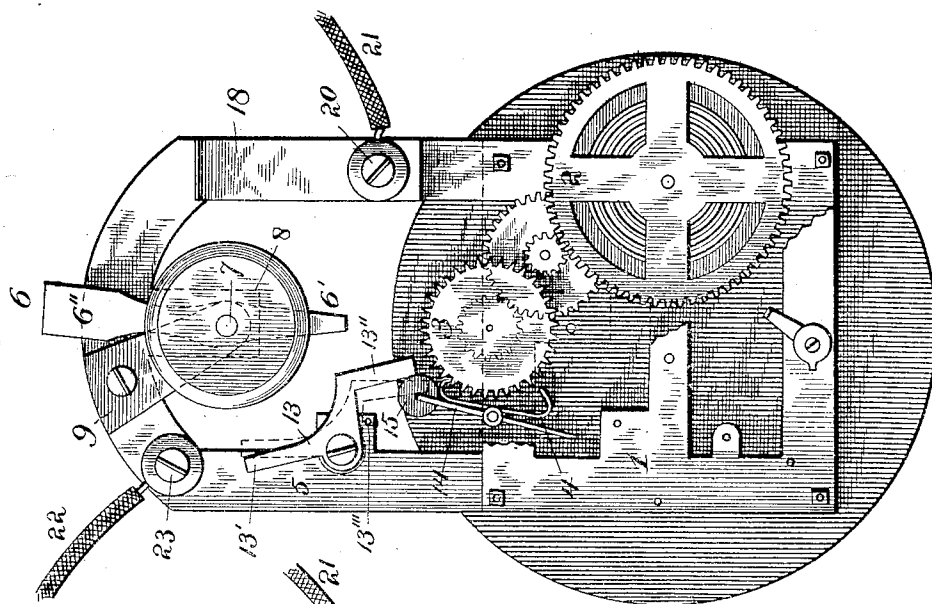
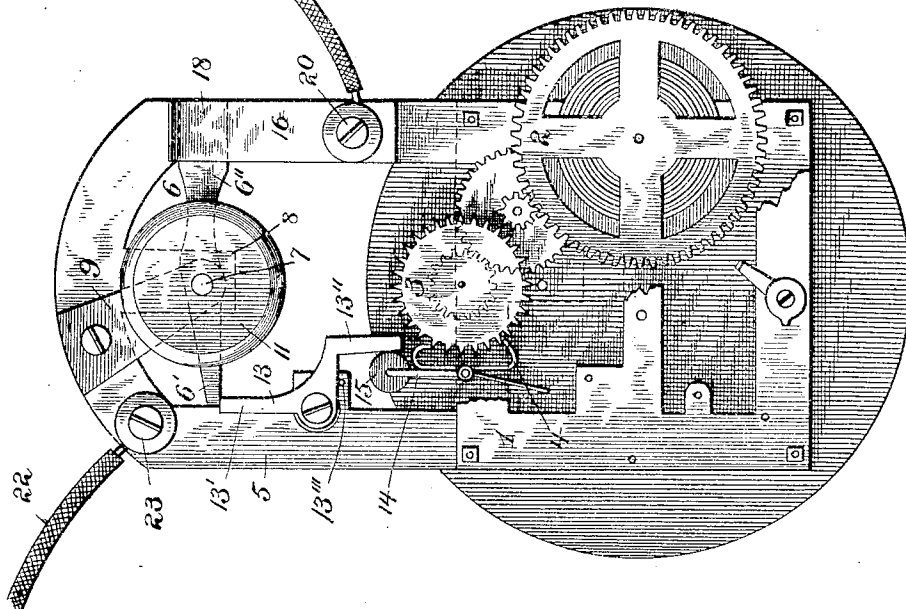


Fig. 1.



Witnesses:

J. B. McGirr.

H. D. Orr.

Inventor:

James F. McLaughlin,

by
Joseph Lyons,
Attorney.

(No Model.)

2 Sheets—Sheet 2.

J. F. McLAUGHLIN.
ELECTRIC TIME SWITCH.

No. 501,291.

Patented July 11, 1893.

Fig. 4.

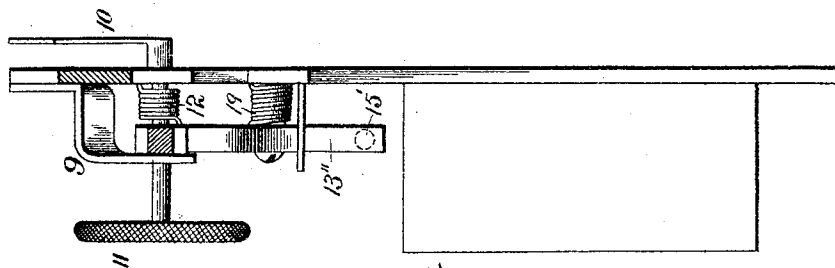


Fig. 6.

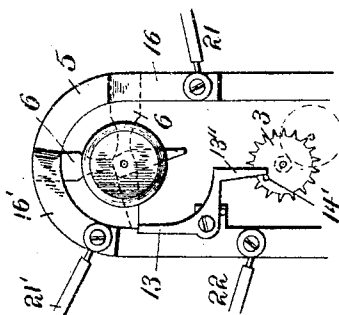


Fig. 3.

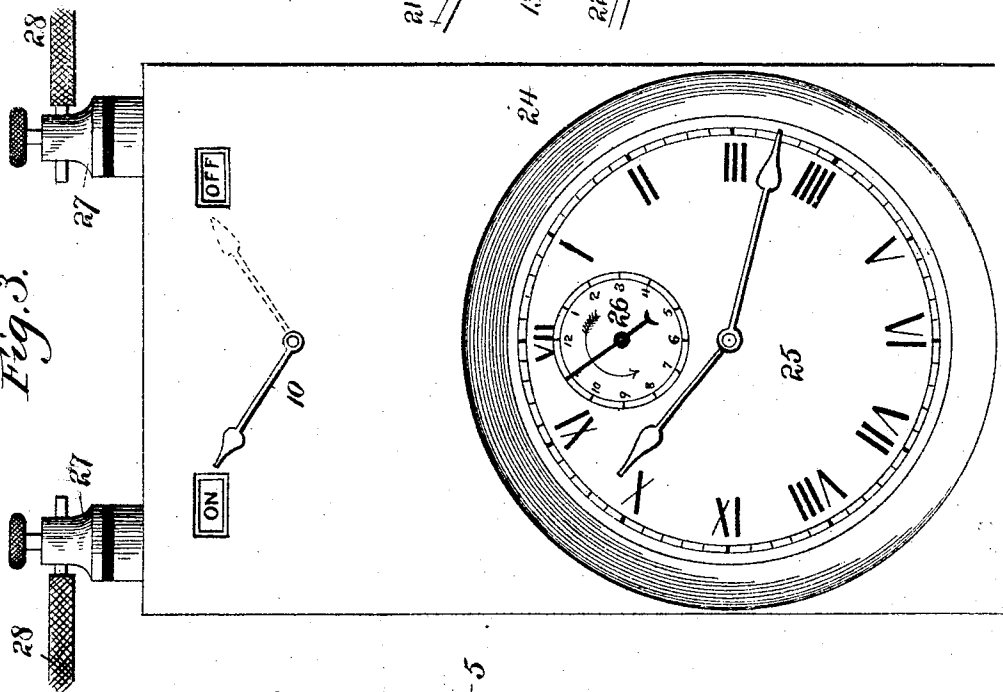
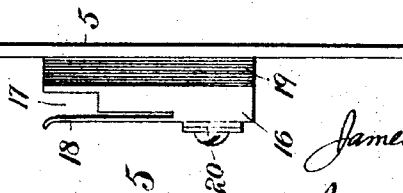


Fig. 5.



Witnesses:
J. B. McGirr.
H. D. Orr.

Inventor:
James F. McLaughlin,
by
Joseph Lyons,
Attorney.

UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC TIME-SWITCH.

SPECIFICATION forming part of Letters Patent No. 501,291, dated July 11, 1893.

Application filed September 29, 1892. Serial No. 447,261. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Electric Time-Switches, of which the following is a specification.

This invention has reference to improvements in time switches for electric circuits, and its object is to provide a switch that will automatically break the circuit at a predetermined time, but which may be used in the ordinary manner at any time either before or after the circuit has been automatically broken.

In the time switch constructed in accordance with my invention, I use a spring actuated switch-lever, the normal tendency of which is to open the circuit, and in connection with this switch-lever, I use a clock, having a let-off mechanism, similar to the ordinary alarm mechanism of alarm clocks, and a detent for holding the switch-lever in a closed position, and which is under the control of the let-off mechanism of the clock work, so that when the proper time arrives the clock work will release the let-off mechanism, and the latter will operate the detent to release the switch-lever, which latter being spring actuated, will immediately open the circuit.

The improved time switch is particularly useful in electric lamp circuits. It is customary, for displaying or advertising purposes, to keep electric lamps burning after business hours and it is desirable, for economic or other reasons, to cut out the lamps at an earlier hour than the time when the general supply circuit is broken at the central station, and in order to do this the circuit must be broken at the point of consumption. This is done automatically by my improved time switch, and the consumer is therefore saved the annoyance and inconvenience of going himself or sending another person to the point of consumption in order to break the circuit. On account of the inconvenience of this proceeding, it is seldom done, and the consumer who, thus has his lamps in circuit two or three hours longer than he needs or desires them, is saved the additional expense of such unnecessary consumption of current. With my

improved time switch in the circuit, in place of the ordinary switch, the consumer has merely to wind the clock work and set the let-off mechanism, so that it will be released at the desired time; he then can turn on the switch and leave the device to operate automatically. If, however, it should be desired to turn off the current before the time determined upon, and perhaps to again complete the circuit, or if it be found desirable to turn on the switch and to turn it off again after the time switch has operated automatically, it can be done without any interference with the automatic mechanism employed in my improved device.

The invention is illustrated in the accompanying drawings forming a part of this specification, in which—

Figure 1, is a rear view of the improved time switch, with the switch shown in the closed position and portions of the mechanism being removed and broken away. Fig. 2 is a similar view with the switch open. Fig. 3, is a face view of the improved time switch in its inclosing case. Fig. 4, is an end elevation partly in section of the switch with the clock work shown conventionally. Fig. 5, is a side view of a spring contact for the switch arm, and Fig. 6, is a view illustrating modifications of the invention.

Like numerals of reference indicate like parts all throughout the drawings—

Referring to the drawings, there is shown in Figs. 1 and 2, a clock work frame 1, from which, for the sake of clearness, the ordinary gearing for actuating the time indicating hands, has been removed, only that portion which corresponds to the ordinary alarm or let-off mechanism being shown; this latter consists of a spring actuated gear wheel 2, a spur wheel 3, an intermediate train of gearing connecting the same and an escapement pawl 4, it being understood that the usual mechanism by means of which the let-off mechanism can be set to be released by the clock-work at a predetermined time, is present, though not shown in the drawings. The switch is mounted on a frame 5, secured to and projecting from one side of the frame 1, and it consists essentially of an arm 6, secured on an arbor 7, which latter is journaled near one end in a lug 8, formed on the frame 5,

and near the other end in an overhanging bracket 9, secured to the frame 5. On the end of this arbor which extends beyond the lug 8, there is secured a pointer 10, (see Figs. 3 and 4,) the purpose of which will be hereinafter set forth, and on the other end of the arbor there is secured a manipulating wheel 11, by means of which the switch-arm may be turned. This wheel is preferably made of rubber, or of other suitable insulating material. The switch arm 6, is secured to the arbor between the bearings of the latter and near the overhanging bracket 9, and surrounding the arbor, between the switch arm and the lug 8, is a coiled spring 12, having its ends connected to the switch arm and lug respectively, and tending to maintain the switch arm in the position shown in Fig. 2.

Pivoted to one side of the frame 5, is an angular latch dog 13, one end 13' of which is in the path of one end 6' of the switch arm 6, while the other end 13'' tends by gravity to swing the end 13' toward the switch arm, the movement, however, being limited in this direction by a stop pin 13'''. This latch dog 13, is so constructed that when the switch arm 6, is moved from the position shown in Fig. 2, to that shown in Fig. 1, the end 6', will engage the end 13', of the dog, and move it out of its path, but as soon as the switch arm end 6', has passed beyond the end 13' of the dog, the latter will be immediately returned by the overbalancing end 13'', so as to bring the other end 13' under the switch arm end 6', and thereby prevent its return, under the action of the spring, which is then under tension, to the upright position shown in Fig. 2. It will thus be seen that the dog is a gravity latch, which permits the switch to be turned in a direction to put the spring under tension, but which locks it against return movement.

In order to effect the automatic release of the switch arm, there is an arm 14 secured to the arbor of the pawl 4 and preferably terminating in a weight 15, so located that when the pawl 4 is oscillated by the spur wheel 3, this weight 15 will strike the end 13'', of the dog 13, thus forcing the end 13' from under the end 6' of the switch arm, thereby releasing the latter. Other means may be employed for causing the spur wheel to operate the latch or detent, such for instance as shown in Fig. 6, in which it will be seen that the spur wheel 3, which in this instance may be a plain disk without interfering with the operation of the device, is provided near its periphery with a pin 14', and the end 13'', of the latch dog is so constructed that it will be in the path of this pin when the switch arm is in the locked position, but is of such length that after it has turned the latch dog on its pivot sufficiently to release the switch arm, the pin 14', will escape therefrom.

On the side of the frame 5, opposite that to which the latch dog is pivoted, there is a contact block 16 in the path of the end 6'', of the switch arm 6. This contact block (see Fig. 5),

is provided at one end with a recess 17 to receive the end 6'' of the switch arm, which end it will be seen, is enlarged to insure good contact, and this contact is further improved by a spring 18, extending opposite the recess 17 and preferably, though not necessarily, formed in one piece with the block 16. A block 19, of insulating material, is interposed between the contact block 16, and the frame 5, and a binding screw 20, on the block 16, is provided for connecting a conductor 21 thereto, while another conductor 22, is connected to the frame 5 by a binding screw 23, so that when the switch is closed the circuit from one conductor to the other will be through the frame 5, switch arm 6, and contact block 16.

The switch and clock work are contained within a case 24, which may be either provided with a door or be itself hinged to a base plate so that access to its interior may be conveniently had, and on the front of this case is a clock face 25 with the usual small dial 26, with the time indications for setting the let-off mechanism. The index hand 10, is also on the exterior or face of this case and when the switch arm is in an upright position this hand points to the word "Off" on the face of the case, and when the case is closed, the hand 10 points to the word "On," both of which are suitably marked or painted on the face of the case. On top of the case, but insulated therefrom, are two binding posts 27, connected to the conductors 21, 22, and receiving the ends of the leading conductors 28.

The operation of the device will be readily understood from the foregoing description and hence will only be briefly outlined. To set the time switch, the clock spring is wound and the let-off mechanism is set to be released at the time desired. This may be done at any time within twelve hours of the time the switch is to be automatically operated, with the mechanism shown in the drawings, but it is quite practicable to use a clock movement which will operate the let-off mechanism only once in twenty-four hours. When the time for lighting the lamp has arrived, the switch is turned to close the circuit and is locked in the closed position and cannot be opened again without exposing the interior of the case when the detent can be easily operated by hand. The lamps therefore will burn until the let-off mechanism is reduced, which in turn will release the switch arm, and cut the lamps out of circuit automatically.

The mechanism thus far described is particularly adapted to incandescent lamp circuits, but in Fig. 6, an arrangement is shown by which lights can be cut out. In addition to the contact block 16, there is another contact block 16' secured to the frame 5 but insulated therefrom. This contact block 16 is so located that the switch arm 6 will make contact with it when in the upright position. When the switch arm is in the horizontal position the circuit will be from

the conductor 21, through the block 16, switch arm 6 and frame 5, to the conductor 22, but when the switch arm 6 is in contact with the block 16', the circuit will be through a conductor 21', secured to the block 16', and from thence by the switch arm 6 and frame 5 to the conductor 22. In this construction the contact block 16 is in circuit with the lamp, while the conductor 21 forms a shunt around the same, so that, as will readily be seen, the time switch may be employed in an arc light circuit to cut out a lamp, or a series of lamps without breaking the continuity of the same, except for an instant. Even this momentary break can be avoided, by so spacing the contact blocks 16 and 16', with reference to the width of the contact end of the switch arm, that contact with one block is established before contact with the other is broken; the automatic movement of the switch arm, however, is so rapid, that this provision is not absolutely necessary.

In order to insure a quick return of the dog 13, without depending on gravity, a coiled spring 19, may be connected to the same, though this is not absolutely necessary, and the end 13'', of this dog at the point where the weight 15 or pin 14' strikes it, may be provided with a buffer of leather, or other suitable material as indicated by dotted lines 15', in Fig. 4.

Having now fully described my invention,

I claim and desire to secure by Letters Patent—

1. In an automatic electric time switch, the combination of a spring actuated pivoted switch arm, and two contact blocks in the path of the switch arm, and circuit connections whereby in one position of the switch arm, one circuit is closed and another open and vice-versa; with a gravity latch intercepting the movement of the switch arm in one direction, and a tripping mechanism actuated by an alarm clock for releasing the switch arm, substantially as described.

2. In an automatic electric time switch, the combination of a spring actuated switch arm and two contact blocks in the path of the same, and circuit connections whereby in one position of the switch arm one circuit is closed and another opened and vice versa; with a latch intercepting the movement of the switch arm in one direction, and a tripping mechanism actuated by an alarm movement for releasing the switch arm, substantially as described.

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

JAMES F. McLAUGHLIN.

Witnesses:

JOHN MURRAY,

MICHAEL G. PLUNKETT.