

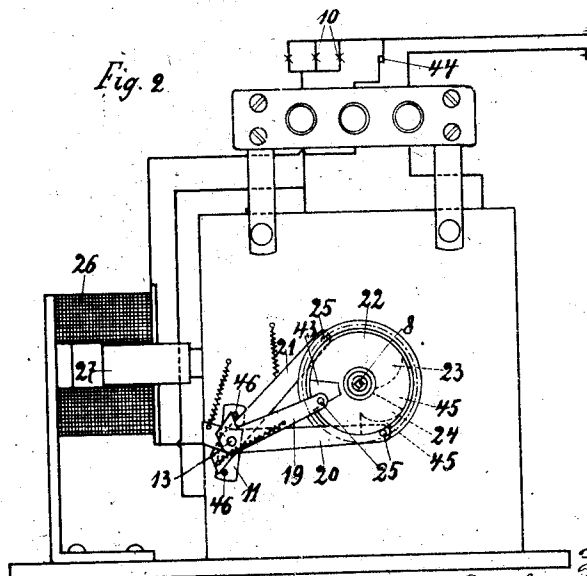
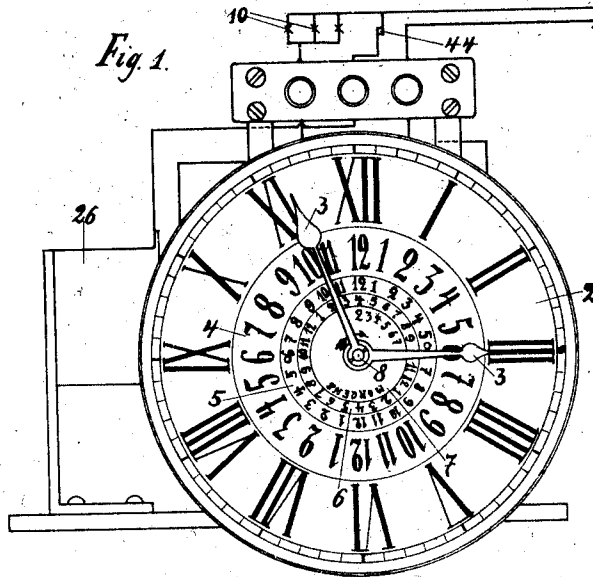
R. BUDERER, H. BRÖNNLE & C. W. REICH.
TIME SWITCH FOR LIGHTING CIRCUITS.

APPLICATION FILED OCT. 17, 1910.

Patented Dec. 3, 1912.

1,045,941.

3 SHEETS-SHEET 1.



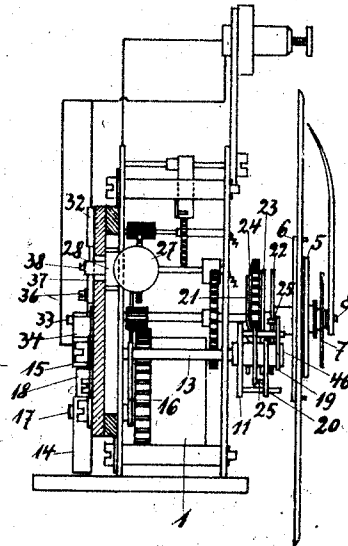
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TIME SWITCH FOR LIGHTING CIRCUITS.

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3 SHEETS—SHEET 3.

Fig. 5.

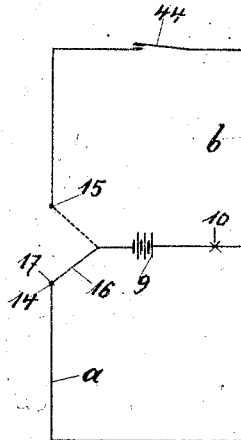


Fig. 6.

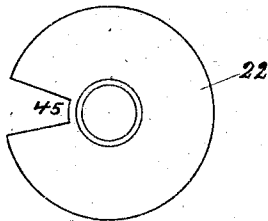


Fig. 7.

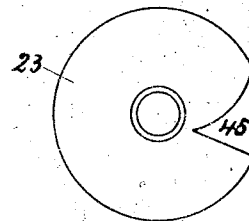
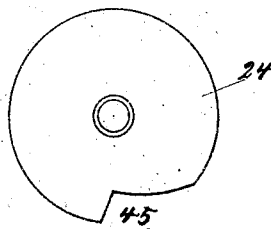


Fig. 8.



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UNITED STATES PATENT OFFICE.

RUDOLF BUDERER, HERMANN BRÖNNLE, AND CARL WILHELM REICH, OF STUTTGART, GERMANY.

TIME-SWITCH FOR LIGHTING-CIRCUITS.

1,045,941.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed October 17, 1910. Serial No. 587,638.

To all whom it may concern:

Be it known that we, RUDOLF BUDERER, HERMANN BRÖNNLE, and CARL WILHELM REICH, residing at Stuttgart, in the Empire of Germany, have invented certain new and useful Improvements in Time-Switches for Lighting-Circuits, of which the following is a specification.

This invention relates to a time switch for use in electric lighting circuits, of the type in which full light is supplied for a predetermined period with automatic ignition and extinction while at the end of the said period lights are provided for the necessary time in store-rooms, cellars and so forth as may be required. Further, the current is completely shut off in daytime.

The improvement consists in that all the arrangements are controlled without the use of a transmission gear but solely through a clockwork.

Time switches have previously been operated without a transmission gear but these provide only the means for automatically lighting and extinguishing the lamps and no provision was made for preventing the use of the device during daytime. This is a serious objection in such apparatus where now and then a lamp is required for a short time such as on stair cases where the lamp on being lighted by hand, burns for 3 or 4 minutes and then becomes automatically extinguished. To prevent unauthorized use during daytime with an arrangement of this kind, the time switch according to this invention is constructed in such a manner that the current is automatically shut off during daytime, the circuit being closed again at night time. According to this invention, this is effected with a single clockwork which latter also controls the intermediate 3 or 4 minutes' service. This clockwork has contrivances such as adjustable eccentric contact arms and the like for operating the various mechanisms, said contrivances being well known by themselves.

The time switch is contrived by fitting upon a single part of a 24 hour clockwork a

plurality of devices for igniting the lamps, extinguishing same and for interrupting and reclosing the circuit at predetermined periods. The said devices may advantageously be driven by eccentric disks which execute one complete revolution in 24 hours. The eccentric disks are all mounted upon the axle of the hand of the clockwork whereby the operation is greatly simplified.

An embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a front elevation of the time switch. Fig. 2 is the same with the hour dial removed. Fig. 3 is a rear elevation. Fig. 4 is a side elevation. Fig. 5 is a diagram of a circuit. Figs. 6 to 8 show the operating disks or eccentrics.

The time switch is driven only by means of the ordinary clockwork 1 (Fig. 4) which is provided with the ordinary dial 2 (Fig. 1), the pointers 3, and with an hour-dial 4 advantageously divided into twice twelve hours for day and night. In the dial 4 are fitted time-disks 5, 6 and 7 for setting the time for lighting, for extinguishing and for daily interruption of the circuit. These disks are connected with hollow shafts (Fig. 2) mounted one upon another on the clock arbor 8, the disks having graduations and being adapted to be turned so as to bring one of their graduations exactly under the number of the dial 4.

Two circuits *a* and *b* (Fig. 5) are so arranged in connection with a source of electricity 9 as to alternately light the lamps 10 according to the position of the contact lever 16. The circuit *a* serves for continuous lights and circuit *b* serves for temporary service, for example a 3-minute service followed by automatic extinction.

The alternate closing of the two circuits *a* and *b* is effected by the same switch member such as the lever 11 (Fig. 2). This member turns around the axle 13 and remains stationary in such a position until it is again actuated. The lever 11 works in conjunction with two contact springs 14 and 15 (Fig. 3) for which purpose a contact lever

16 is provided which has a contact nipple 17. This nipple slides upon the springs 14 and 15 and so keeps the contacts always bright. The contact springs 14 and 15 are at the middle so far apart from each other that the contact 17 in its middle position is nowhere in contact and completely cuts off the current. In this position a suitable locking spring 18 retains it by reason of its triangular shape.

The lever 11 is suitably reversed for each purpose by the levers 19, 20 and 21 (Fig. 2). These levers are loosely mounted on the pivot pin 13 of the lever 11 and they are under the influence of springs made to bear with their pins 25 against cams 22, 23 and 24 which have notches 45 (Figs. 6-8) and which are suitably connected with the axles of the time disks 5, 6 and 7. The other ends of said levers act on pins 46 of the lever 11.

The operation is as follows:—As an example it will be presumed that regular light is required from 8 to 11 o'clock every night, and at times only from 11 p. m. to 3 a. m. after which the circuit is completely interrupted. For this purpose the disk 5 is set for 8 p. m. the disk 6 for 11 p. m. and the disk 7 for 5 a. m. With the turning in unison of the reversing disks 22, 23 and 24, at 8 p. m., the pin 25 of the lever 19 drops into the recess 45 of the disk 22 and the lever 11 will then be brought into the position shown in Fig. 2 with the contact piece 17 resting on the spring 14 (Fig. 3). This closes the circuit for the regular light (Fig. 5) through the conducting casing and the pivot pin 13 of the pawl 11 (Fig. 3). At the further rotation of the reversing disks, the pin 25 of the lever 19 is withdrawn from the recess 45 of the disk 22 but the lever 11 remains in the same position. At 11 p. m. the lever 20 (Fig. 2) is through its spring drawn with its pin 25 into the corresponding recess 45 of the reversing disk 23 and the lever 11 is thereby turned in the opposite position *i. e.*, the contact 17 (Fig. 3) slides off the contact spring 14 and onto the contact spring 15 so that the arrangement for a 3-minutes' service is now established, the action of which will be hereinafter described. At 3 a. m. the lever 21 (Fig. 2) is reversed in the same manner and brings the lever 11 into the middle position so that the circuit is completely interrupted.

For the non-regular lighting of the lamps from 11 to 3 o'clock, there is interpolated in the circuit *b* (Fig. 5) a solenoid 26 (Fig. 3) with axially moving core 27 which by the action of the current is moved into the solenoid 26. The core 27 is furnished with a bar 28 fitted with a pin 29 which at the inward movement of the core 27 strikes against the contact lever 30 which is turnable on the pin 31 and is controlled by a contact spring

32. The free end of the lever 30 has a contact piece 33 which passes over a contact spring 34 and so closes the circuit *b* while at the same time the contact parts are constantly rubbed bright. The contact lever 30 is fitted with a hook 12 which works in conjunction with the hook 35 of a bellcrank pivoted on a pin 36 (Fig. 4) and swinging with its arm 37 in the path of a second pin 38 of the bar 28. The latter is fitted with a lever 39 loosely mounted on the spindle 40 of a ratchet 41 which is rotated by the clockwork at a speed such that the core 27 is drawn out of the solenoid 26 by the spring 42 at a rate such that its pin 38 moves lever 35—37 and releases contact 33 at the end of a predetermined interval of time after the push-button 44 has been released; in this movement, the pawl 43 follows the wheel 41, as the latter rotates (contra-clockwise in Fig. 3), to the limit of motion of the core 27, said pawl 43 being on the lever 39.

The action is as follows:—By pressing one of the pushes 44, the solenoid 26 over the contacts 15 is excited and the core 27 draws inward. Hereby the contact lever 30 through the intervention of the pin 29 is caused to close the contact 33, 34 and also the lamp circuit and is locked in this position by the hooks 12, 35. At the same time the pawl-lever 39 has moved and cannot swing back by reason of the engagement of the pawl 43 with ratchet 41. When the latter turns, the pawl-lever 39 follows by reason of the action of spring 42 and thus draws the core 27 out of the solenoid 26. This causes the pin 29 to move away from the contact lever 30 and the pin 38 gradually turns the arm 37 of the bellcrank until after 3 or 4 minutes the contact-lever 30 is disengaged and moved back by its spring 32 whereby the contact 33, 34 and the lamp circuit is opened.

We claim:—

1. A time switch for lighting circuits comprising in combination with the circuit for regular lighting the lamps, a circuit for predetermined periodical lighting, a single clockwork, adjustable cams operating from said clockwork, a lever for controlling the regular lighting operated by said cams, a lever for controlling the lighting at predetermined periods operated by said cams and a lever operated by said cams and serving for interrupting circuit in daytime and preventing unauthorized lighting of the lamps, substantially as described and shown and for the purpose set forth.

2. A time switch comprising in combination with the conduits for regular lighting, a circuit for predetermined periodical lighting, a single clockwork, adjustable cams operated from said clockwork, three levers acted upon by said cams and a switch consist-

ing of a pawl which automatically stops in
its two end positions one of which closes the
circuit for regular lighting and the other
for pre-determined periodical lighting, the
5 middle position of said pawl interrupting
the circuit completely, said pawl being
moved into the various positions by means
of said levers, substantially as described and
shown and for the purpose set forth.

In witness whereof we have hereunto set 10
our hands in the presence of two witnesses.

RUDOLF BUDERER.
HERMANN BRÖNNLE.
CARL WILHELM REICH.

Witnesses:

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PAULINE KLAIBER