

No. 864,048.

PATENTED AUG. 20, 1907.

**B. TROPP.**

## ELECTRIC TIME SWITCH.

APPLICATION FILED FEB. 1, 1908.

2 SHEETS—SHEET 1.

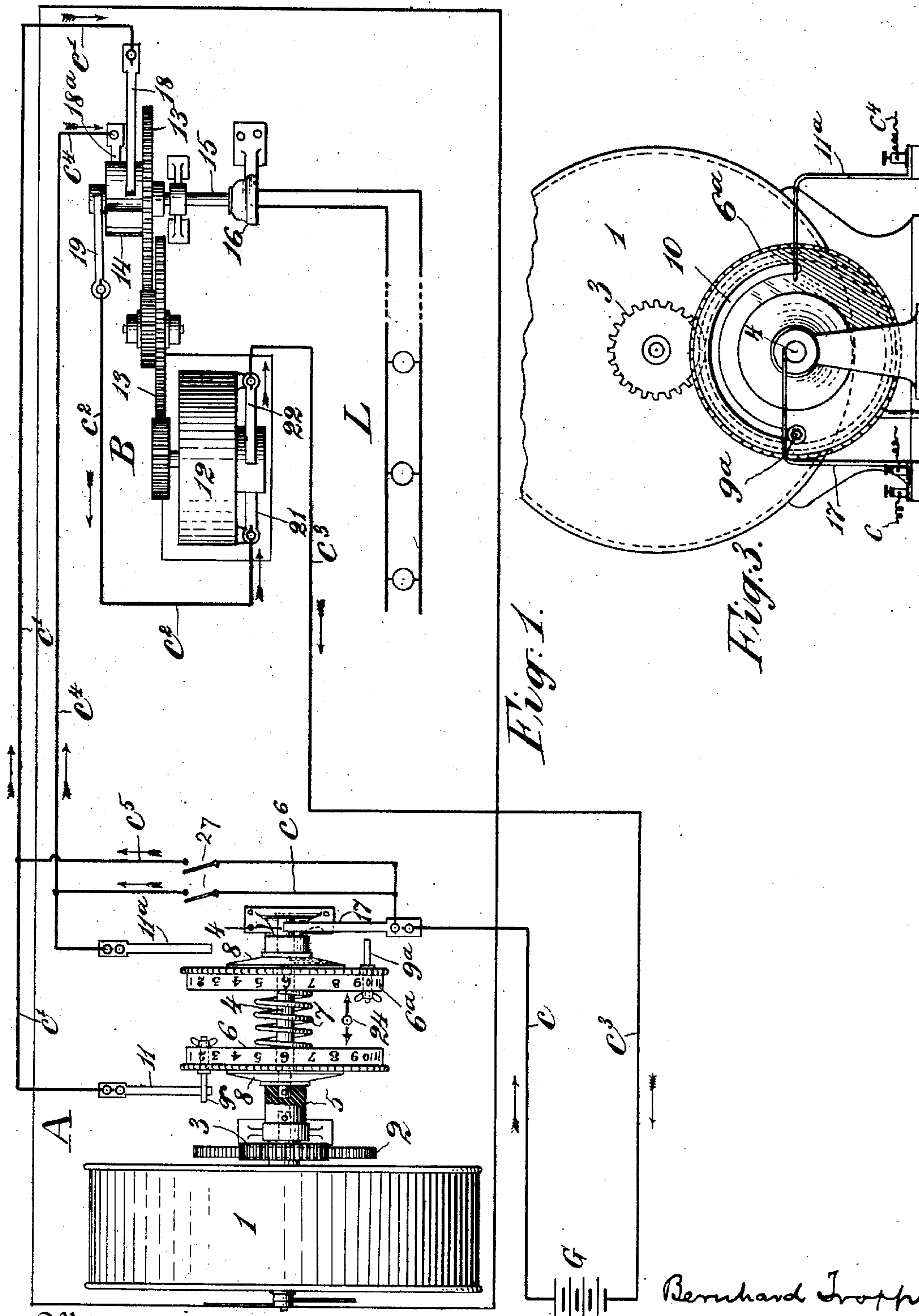


Fig. 3.

Witnesses.

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By his Attorney

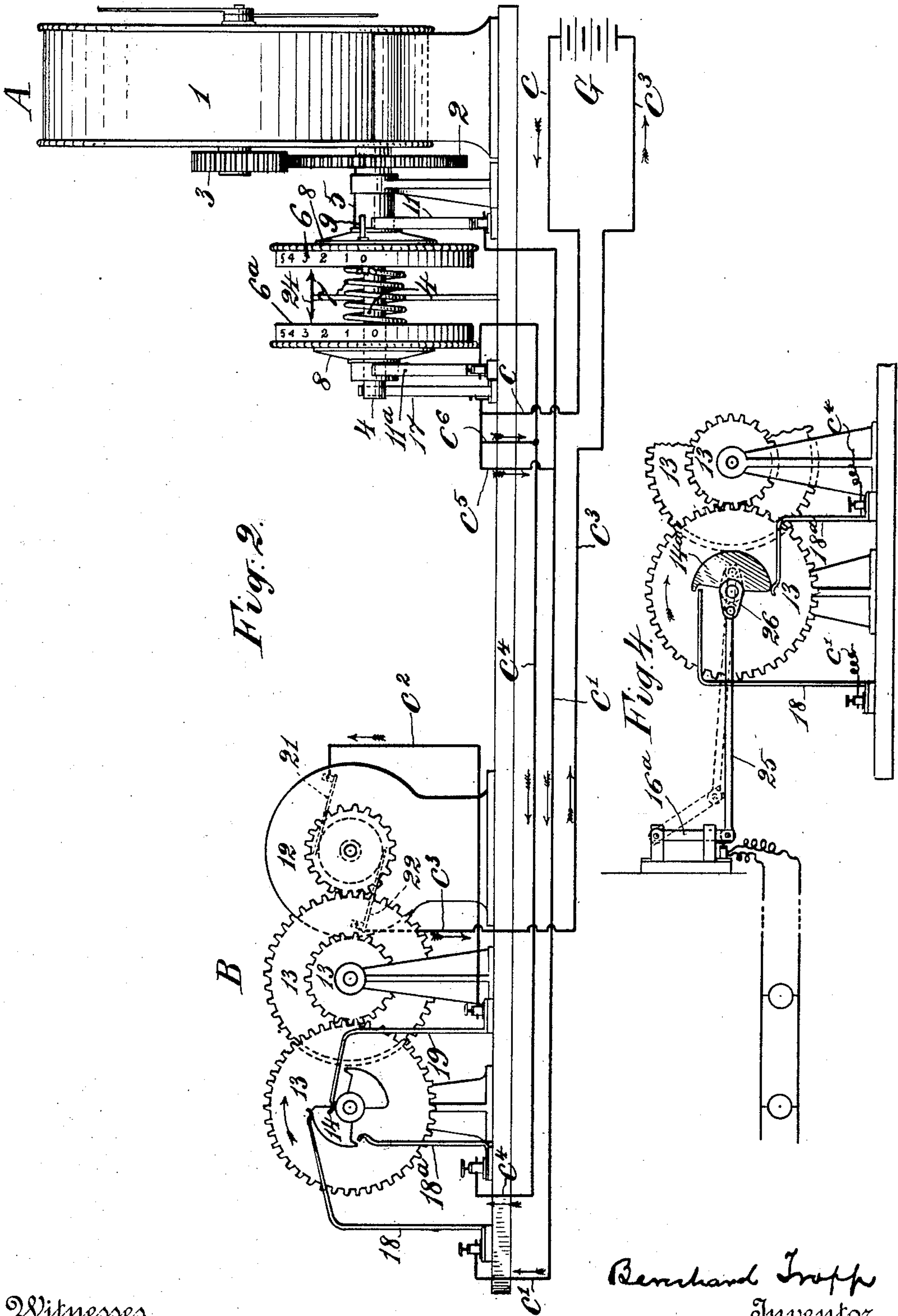
By his Attorney *Henry Connors*

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2 SHEETS—SHEET 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

BERNHARD TROPP, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO WILLIAM HENRY LAIRD,  
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## ELECTRIC TIME-SWITCH.

No. 864,048.

Specification of Letters Patent.

Patented Aug. 20, 1907.

Application filed February 1, 1906. Serial No. 298,974.

*To all whom it may concern:*

Be it known that I, BERNHARD TROPP, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have  
5 invented certain new and useful Improvements in Electric Time-Switches, of which the following is a specification.

This invention relates to means adapted for automatically switching on and off an electric current, at pre-  
10 determined intervals of time; as for example a current which supplies an incandescent light circuit.

One of the main objects of such a device or apparatus is to provide a clock, or clock-mechanism, which will act, at a certain hour of the twenty-four—say at 8  
15 o'clock p. m.—to switch the current onto lamps, or the like, and at a later hour—say 11 o'clock p. m.—to switch off the current, the device operating automatically after the clock-mechanism is wound up and the contact-devices set for operation at the hours deter-  
20 mined upon for switching on and off the current supplying the lights.

In the switch-controlling device herein shown, and embodying the present invention, there is a clock, or clock-mechanism, to be wound up by hand, and this  
25 clock controls two contact-devices, each operated once in every twenty-four hours, for completing a circuit through a small electric motor which mechanically actuates a switch in the lamp-circuit. The motor runs long enough to actuate the lamp-switch and then auto-  
30 matically switches itself out of the branch circuit. There are, or may be a manually operated switch or switches for cutting out the contact-devices at the clock momentarily, and permitting the motor to be set in motion independently of the clock, for turning on or  
35 off the lights.

In the accompanying drawings, which illustrate an embodiment of the invention—Figure 1 is a plan of the device, and Fig. 2 is a side elevation of the same as seen  
40 from above in Fig. 1. Fig. 3 is a rear view of the clock and the contact devices it operates. Fig. 4 is a view illustrating the operation when a knife switch is employed in the lamp-circuit.

The apparatus may be considered, for convenience of description, as in two sections, namely, the clock-  
45 section A, and the motor-section B; but these may be mounted on one base for convenience, if desired. The clock-section consists in part, of a clock 1, which may or may not have an ordinary dial and hands; the time-mechanism is all that is really needed. This clock  
50 has a wheel 2 which makes one rotation in twenty-four hours, and this wheel may, conveniently, be driven from a wheel 3 of the clock which makes one rotation in each twelve hours, the wheel 2 having twice as many teeth as the wheel 3. This arrangement enables an  
55 ordinary clock-mechanism to be used with the wheel 3

on the same arbor with the hour-hand. The arbor of the wheel 2 is connected with an alined metal shaft 4 through a block 5 of insulating material. As the shaft 4 conveniently forms a part of the motor-circuit, this block 5 interposes between said shaft and the metal of  
60 the clock-mechanism and thus avoids risk of a shock to one winding the clock.

Rotatably mounted on the shaft 4, are two like contact wheels 6 and 6\*. These are driven frictionally with the shaft 4, being pressed outward by a spring 7  
65 against collars 8 on said shaft. It may be here stated that the wheels 6 and 6\* are provided, respectively, each with a contact stud 9, 9\*, and for purposes of angular adjustment such studs are mounted, as seen in Fig. 3, each in a curved slot 10 in the contact-wheel. There  
70 are two light spring terminals 11 and 11\* in the paths of the respective studs 9 and 9\*.

The motor-section B comprises a small electric motor 12, which drives, through a reducing train of gears 13, a rotary circuit-breaker 14, on a shaft 15, which forms the  
75 operating spindle of a rotating switch 16 in the lamp-circuit L. It must be understood that this electric motor 12 is a rotary motor of a known kind having a rapidly rotating armature. This form of motor is essential to the proper operation of the present switch. The  
80 switch 16 may be the well known kind which operates at each quarter of a rotation of the spindle 15, to alternately close and break the lamp-circuit. Such a switch or make-and-break device is a common article in trade and a very brief description of it will suffice. The shaft  
85 15 carries two oppositely disposed and laterally projecting spring blades of metal which are connected electrically and which, in one position, connects the wire-terminals of the lamp-circuit electrically; when the shaft  
90 15 is turned a quarter way round, the said blades are moved out of contact with the wire-terminals and the lamp-circuit thus broken. These switches in the market are not alike in all details; any one will serve the purpose.

The motor-circuit of the apparatus will now be de-  
95 scribed. The supply of electric energy may be from any source, as a generator G, for example, fed by a conductor c to a brush 17 bearing on the shaft 4, thence (as the parts are herein shown) through said shaft to the wheel 6 and stud 9, to the spring terminal 11, and  
100 thence by a conductor c<sup>1</sup> to a brush 18 which is in contact with the circuit-breaker 14. From this device, which is of metal, the current is taken off by a brush 19, and carried by a conductor c<sup>2</sup> to one of the brushes 21 of the motor; thence through the motor to the other brush  
105 22 thereof, and thence by a conductor c<sup>3</sup> to the other pole of the generator G. As the wheels 6, 6\*, are constantly (though slowly) rotating, when the stud 9 contacts with the spring terminal 11 the circuit will be completed through the motor 12, and the latter, through the  
110



train 13, will set the circuit-breaker 14 to rotating. This has the effect to operate the switch 16 to turn on the current to the light-circuit L.

The device 14, which has been called a rotating circuit-breaker, is here shown as a wheel or cylinder of metal with two opposite quadrants cut out or removed; as it rotates, the brush 18 remains in contact until the device makes a quarter of a complete rotation, when the brush falls or passes off and the circuit through the motor is thereby broken. The lights being now turned on and the motor at rest, the lights will remain turned on until the stud 9<sup>a</sup> on the wheel 6<sup>a</sup> shall come in contact with the spring terminal 11<sup>a</sup>, when the current will flow from said terminal by a conductor c<sup>1</sup> to a brush 18<sup>a</sup>, which will now be in contact with a segment of the circuit-breaker 14, and thence through the motor as before. The motor is thus set in motion and turns off the lights, the circuit through the motor being broken when the brush 18<sup>a</sup> passes off from the segment of the breaker 14. There will always be one of the brushes, 18 or 18<sup>a</sup>, in contact with the breaker 14.

As stated, the wheels 6, 6<sup>a</sup>, are free to be rotated by hand on the shaft, 4, so as to permit of setting the device for turning on and off the lights at certain hours; and to facilitate this, there will be, by preference, hour-graduations on the rims or peripheries of the wheels 6 and 6<sup>a</sup>, and a double-ended indicator or pointer 24 will be mounted on the base. The slots 10 in the wheels are only of advantage to enable the contact-studs to be set in proper relations with the terminals 11, 11<sup>a</sup>, and with the hour graduation marks on the rims of the contact-wheels.

With the construction seen in the principal views, the switch 16 is rotative, but any other form of switch may be employed in the light-circuit L, as for example a knife-switch. This construction is illustrated in Fig. 4, where 16<sup>a</sup> is a knife-switch, operated by a link or rod 25, which couples the arm of the switch to a crank 26 on the rotary circuit-breaker 14<sup>a</sup>. This device is semi-circular, instead of quadrantal, as it requires a half rotation thereof to operate the switch for breaking the circuit through the motor.

In order that the circuit through the motor may be closed by hand at any time independently of the clock, means for this purpose are or may be employed as will now be described. In branch or shunt circuits about the terminals 11, 11<sup>a</sup>, and formed of conductors c<sup>5</sup> and c<sup>6</sup>, respectively, are circuit-closers 27, one in each branch circuit. Any suitable form of closer may be employed for this purpose.

Obviously the above described device may be employed for making and breaking, through a switch like 16 or 16<sup>a</sup>, an electric circuit used for any purpose whatever. This need not necessarily be a lamp-circuit. Indeed the rod 25 may as well be employed to open and close a gas-cock.

It will be noted that, in the functions of the device, the motor-circuit is branched, and the clock-mechanism operates to close a break first in one branch and then in the other, alternately, and the motor acts,

through the device 14, which is a current-changer, to break the supplying or active branch of the motor-circuit and at the same time to close a break in the inactive branch. The clock-mechanism completes the motor circuit through the branch closed at the switch or circuit-changer 14.

The lamp-circuit L is wholly independent of the motor circuit in the electrical sense. They may be supplied from the same generator or from different generators so far as the present invention is concerned.

Having thus described my invention, I claim—

1. Means for the purpose specified, comprising an electric circuit L, a switch controlling the same, a rapidly operating rotary electric motor, rotating mechanism between the said switch and motor, whereby the latter operates the switch, a motor-circuit, means whereby the motor breaks said motor-circuit after a predetermined period, a clock-mechanism, and means actuated by said mechanism for completing the motor circuit twice in each twenty-four hours, said mechanism comprising a shaft driven by the clock mechanism and making one rotation in twenty-four hours, two contact-wheels frictionally mounted on said shaft and each provided with a contact-stud, and spring terminals in branches of the motor-circuit, said terminals being in the paths of the respective contact-studs and the latter being also in the motor-circuit.

2. Means for the purpose specified, comprising an electric circuit L, a switch controlling the same, a rapidly operating rotary electric motor, a circuit-breaker rotatively mounted and driven by the motor, a branched motor-circuit including in it said circuit-breaker and having two brushes in branches of said circuit, said brushes being adapted to contact alternately with the said circuit-breaker as the latter rotates, means operatively connecting the said switch with the said rotative circuit-breaker, a clock-mechanism, and means actuated by said clock-mechanism for closing the branches of the motor-circuit alternately at predetermined intervals.

3. Means for the purpose specified, comprising an electric lamp circuit to be controlled, a rotary switch for controlling same, a rapidly operating rotary electric motor for operating said switch, rotating mechanism operatively connecting said motor and switch, a branched motor-circuit, a rotating device driven by the motor for breaking one of said branches of the motor-circuit and closing the other branch, a clock-mechanism, and means operated by the said mechanism for closing alternately the branches of the motor circuit at predetermined intervals of time.

4. In mechanism for the purpose specified, an electric circuit L to be controlled, a switch for controlling it, a rapidly operating rotary electric motor for operating said switch, a branched motor-circuit, and means whereby the motor, after running a predetermined time, opens that branch of the motor-circuit through which the current is flowing and closes the outer branch, in combination with a clock-mechanism provided with a wheel which completes one rotation in twenty-four hours, a shaft 4, driven by said wheel, two contact-wheels 6 and 6<sup>a</sup> mounted on said shaft, said wheels being capable of angular adjustment and having on them hour graduation marks, and each wheel provided with a contact stud which is in one of the branches of the motor-circuit, and terminals 11 and 11<sup>a</sup> in the respective branches of the motor-circuit and in the respective paths of the said studs.

In witness whereof I have hereunto signed my name this 31st day of January 1906, in the presence of two subscribing witnesses.

BERNHARD TROPP.

Witnesses:

H. G. HOSE,

WILLIAM J. FIRTH.