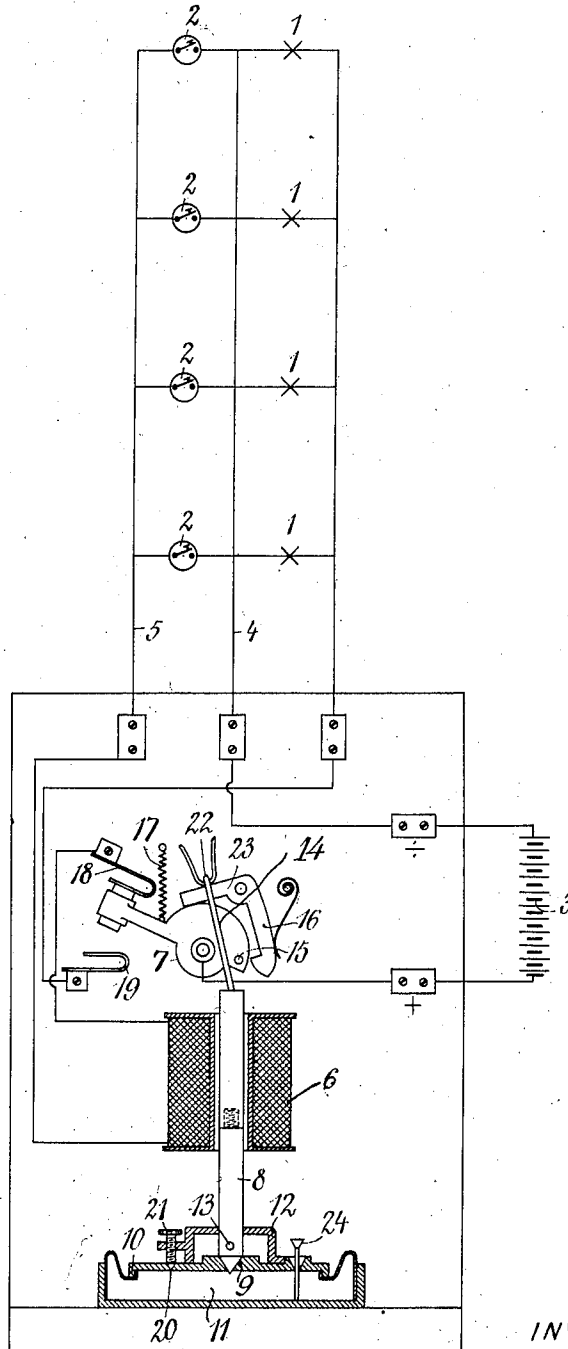


O. A. BRUUN.  
ELECTRIC TIME SWITCH.  
APPLICATION FILED MAR. 26, 1907.

927,486.

Patented July 13, 1909.



WITNESSES:

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*By his Attorneys*  
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# UNITED STATES PATENT OFFICE.

OTTO AUGUST BRUUN, OF COPENHAGEN, DENMARK, ASSIGNOR TO NIELS BENDIXEN, OF COPENHAGEN, DENMARK.

## ELECTRIC TIME-SWITCH.

No. 927,486.

Specification of Letters Patent.

Patented July 13, 1909.

Application filed March 26, 1907. Serial No. 364,651.

*To all whom it may concern:*

Be it known that I, OTTO AUGUST BRUUN, civil engineer, a subject of the King of Denmark, whose postal address is 41 Vimmelskiftet, Copenhagen, Denmark, have invented an Improved Electric Time-Switch, of which the following is a specification.

The present invention relates to electric long distance switches which close a circuit by a push button being pressed, and allow this circuit to remain closed for a certain period, three minutes for instance.

The invention consists in an especially simple construction whereby partly the switch becomes very cheap to manufacture, and partly its action very reliable. This is attained mainly by using, instead of the complicated clock works ordinarily employed, in the known long distance, time switches, to regulate the length of time during which the circuit is to remain closed, an air bag or bellows which is extended by the pressure on a push button and which determines the period of closure by the time it requires for being again contracted.

On the accompanying drawing is shown, by way of example, an outline diagram of one manner of execution of the automaton.

Referring to the drawing, 1 represents the lamps in the stair case, 2 the push buttons in the different stories. The wiring diagram is of the usual design, the current passing from the one pole of the generator 3, through a common wire 4 to the one terminal of all the lamps and the push buttons while, by means of a conductor 5, the other terminals of the said push buttons are connected to the other pole of the battery or the like, there being inserted in the said conductor a magnetizing coil or solenoid 6 and a switch 7. When a button is pressed a circuit is closed causing the coil 6 to attract its iron core 8. The latter terminates at the bottom in a valve cone resting on a corresponding valve seat 9 in the cover 10 of the bellows or bag 11. Through the lower end of the iron core passes a pin 13 striking, when lifted somewhat, a stop 12 fastened on the cover 10, so that the armature 8, on its further passage upward, extends the bellows, the air entering, at the same time, through the valve 9.

To the top end of the armature is fastened a bar 14 of brass or other non-magnetic material, and this bar has at its top a striking head hitting when the armature 8 is lifted,

a pin 15 on the lever 7 of the switch, by which means the switch is shifted from its normal position to the other one, where a pawl 16 catches it and keeps it. A spring 17 counteracts the lever's motion. When the lever 7 tips over, it breaks the connection from the generator's one pole through the lever 7 and the contact spring 18 to the coil 6, so that the latter is deprived of current, and at the same time contact is effected by means of another contact spring 19 whereby the lamp circuit is closed, so that the lamps are lighted. When the solenoid 6 is thus deprived of current, its core 8 drops down, until it rests on the valve seat 9 whereby the valve is closed and the bellows would then remain extended, if there were not provided in the cover a minute hole 20 through which the air escapes slowly, so that the cover sinks very slowly. Above the hole 20 is a screw 21, by means of which the escape of air, and thereby the speed of collapse of the bellows, may be regulated.

To the top end of the bar 14 connected with the core or armature 8 is fastened a hook 22 reaching over an arm 23 extending from the pawl 16, so that the pawl is released at a certain point of its downward motion. When the pawl is released, the spring 17 draws the lever 7 back into its normal position, whereby the lamps are extinguished. The apparatus is now in its original state, and may again be set into action by a new pressure on one of the push buttons 2. It is evident that all the push buttons are set out of action, as long as the lamps burn, it is further readily understood that the current through the solenoid or magnetizing coil 6 is never interrupted in the push buttons proper, and that the coil carries current only for a short while. These properties are of main importance for stair-case automatons, because the latter, if not possessing these properties, are hardly capable of working regularly for any considerable time.

Besides the valve 9, in the cover 10, there may be provided another valve 24 whose cone is extended downward by a bar. When the cover is in its upper position, this valve is kept closed by its weight or by a spring, but when the cover, during its downward passage, has reached a certain point, the valve cone's bar strikes the bellows bottom, and during further motion of the cover,

the valve is thus opened, the air enters and the bellows collapse quickly on account of the weight of the armature 8 etc. This arrangement has for its object to increase the stroke against the arm 23 of the pawl 16, so that the pawl is certain to be released.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with an electric circuit of a time switch having a solenoid, means for closing said circuit when the solenoid is operated, and for demagnetizing the latter when the circuit is closed, a fluid retarding device for delaying the return movement of the solenoid core, and means for opening the circuit during such return movement.

2. The combination with an electric circuit of a time switch having a solenoid, means for closing said circuit when the solenoid is operated, and for demagnetizing the latter when the circuit is closed, a fluid retarding device for delaying the return movement of the solenoid core, means for opening the circuit toward the end of such return movement, and means for accelerating the movement of the solenoid core toward the end of its return movement, whereby the switch is operated to open the circuit with a short jerk.

3. The combination with an electric circuit of a time switch having a solenoid, means for closing said circuit when the solenoid is operated, and for demagnetizing the latter when

the circuit is closed, a fluid retarding device for delaying the return movement of the solenoid core, means for opening the circuit toward the end of such return movement, and a valve adapted to quickly release said fluid retarding device toward the end of the return movement of the solenoid core, whereby the switch is operated with a short jerk.

4. The combination with an electric circuit of a time switch having a solenoid, means for closing said circuit when the solenoid is operated, and for demagnetizing the latter when the circuit is closed, means for opening the circuit during the return movement of the solenoid core, a fluid retarding device for delaying the return movement of the solenoid core, said device comprising a collapsible air chamber connected to the lower end of the solenoid core, and a valve in said collapsible air chamber adapted to permit a quick flow of air therefrom toward the end of the return movement of said core, whereby the latter is permitted to drop quickly to actuate said switch.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

OTTO AUGUST BRUUN.

Witnesses:

JULIUS LEHMANN,  
HERMAN RÉE.