G. A. PARKER.

TIME SWITCH.

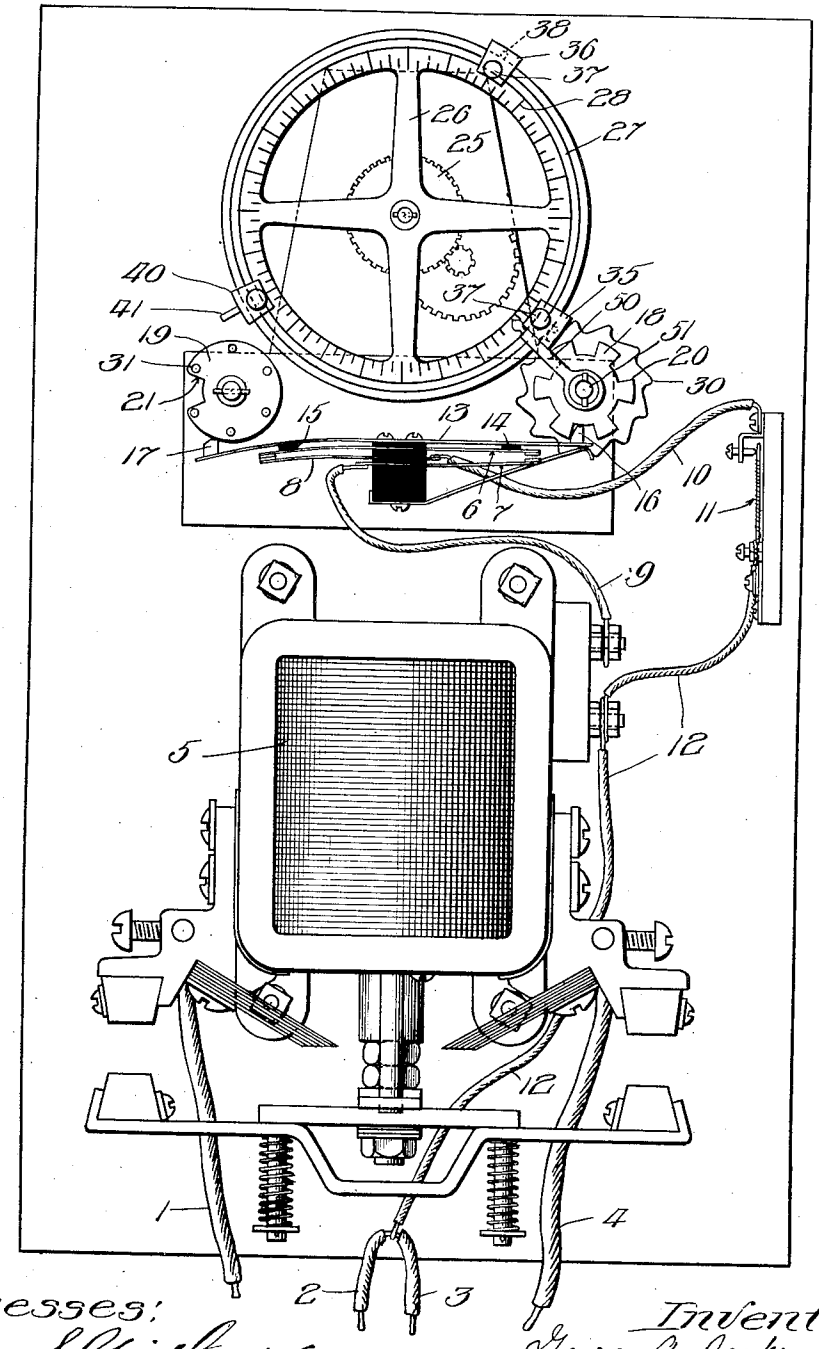
APPLICATION FILED MAR. 31, 1913.

1,180,420.

Patented Apr. 25, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



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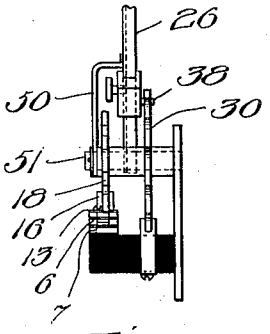


Fig. 2.

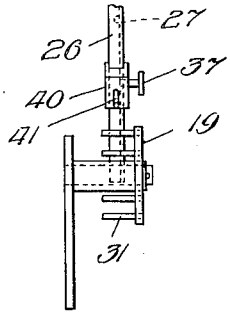


Fig. 3.

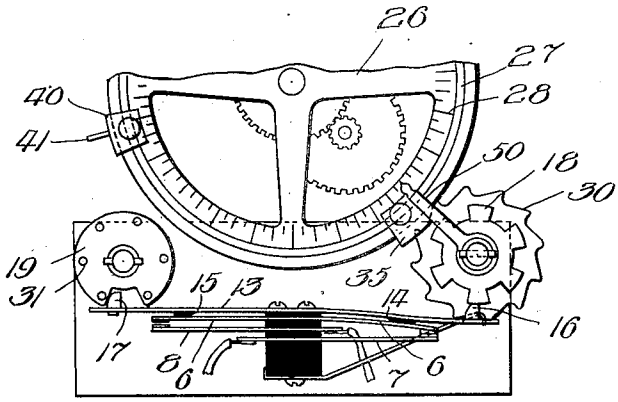


Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE A. PARKER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE CHICAGO ELECTRIC TIME SWITCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION.

TIME-SWITCH.

1,180,420. Specification of Letters Patent. Patented Apr. 25, 1916.

Application filed March 31, 1913. Serial No. 757,936.

To all whom it may concern:

Be it known that I, GEORGE A. PARKER, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Time-Switches, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

There are many fields in which it is desired to be able to connect a working circuit to supply mains for predetermined periods of time, the connection being automatically interrupted at the expiration of the predetermined period. It is also desirable, in many cases, to have the apparatus so arranged that the time switch may be set at any time when it is convenient to do so and thereafter have it complete the circuit connections at some predetermined time and then interrupt the circuit connections at some predetermined later time. It is also desirable to have a time switch mechanism which, after being once adjusted, will repeat its cycle indefinitely day after day and perhaps omit it on certain days as, for example, on Sundays. It is also sometimes desirable where electric signs are controlled by a time switch mechanism to make it possible to open and shut the main circuit at regular intervals throughout the period while the time-controlled master switch remains in its closed or working position.

One of the objects of my invention is to produce a simple and novel construction and arrangement by means of which circuits carrying comparatively heavy currents or currents of high voltage may successfully be controlled by a small simple time switch arranged in a circuit supplied from the main power-supplying conductors, requiring no considerable power for its operation and having no parts which will easily wear out or otherwise get out of order.

A further object of my invention is to produce a simple and novel arrangement of circuits and connections by means of which high power circuits may be controlled through light simple time switches operating in conjunction with simple current-controlled switches for the purpose of intermittently opening and closing the main circuit at regular intervals throughout any predetermined period of time.

A further object of my invention is to produce a simple and novel selective time switch mechanism, the clockworks of which do not require to be set in order to bring them in synchronism with the particular hours of a day.

A further object of my invention is to produce a time switch which shall be simple in construction, reliable in operation and which may quickly and conveniently be adjusted to give any desired cycle of operations.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a front elevation of a mechanism arranged in accordance with a preferred form of my invention; Fig. 2 is a view looking toward the left from the right hand side of Fig. 1 and illustrating the unit or daily switch-closing member and the portion of the actuating disk therefor; Fig. 3 is a view looking toward the right from the left hand side of Fig. 1 and illustrating the multiple unit or weekly switch-closing member; and Fig. 4 is a view corresponding to the upper portion of Fig. 1, illustrating the parts in different positions than those in which they appear in Fig. 1.

In the drawings I have illustrated only a single arrangement in which all of the various features of my invention are embodied and, for the sake of brevity, I shall confine the detailed description to this particular embodiment, although it will of course be understood it is not necessary in all cases to combine all of the features since some of them may be omitted whenever their use is not deemed desirable nor essential.

Referring to the drawings, 1 and 2 represent the main supply conductors and 3 and 4 represent the conductors of a working circuit adapted to receive current from the supply conductors.

5 is a main switch-controlling connection between the supply conductors and the working circuit, the switch being of the solenoid type having an actuating winding or coil, 5. The conductors, 2 and 3, are connected directly together while the conductors 1 and 4 are adapted to be connected together by the switch.

In accordance with one feature of my invention I arrange the winding or coil of the main switch in a circuit which is permanently connected to the supply conductors 1 and 2 and contains suitable master-controlling switches to be hereinafter described. The coil of the main switch is of high resistance so that the voltage across the master switches connected in series therewith is only a small fraction of the voltage of the main circuit, only a small current flowing through the actuating circuit for the main switch when the master switches are closed, and therefore the master switches may be made small and light so as to require but little energy for their operation and without danger that they will wear out rapidly because of the amount of current passing through the circuit which they control.

The particular arrangement illustrated is one in which the main switch may be kept closed during any desired part or parts of six days of the week and also on Sundays if desired. The main master switch therefore consists of a main arm, 6, with which cooperate two separate arms or members, 7 and 8, insulated from each other and from the member 6. The member 7 is electrically connected to one terminal of the coil of the solenoid by means of a wire, 9, the other terminal of the coil of the solenoid being connected in any suitable way to the main supply conductor 1. The member 8 is connected to a wire, 10, leading to a current-controlled interrupting switch, 11, of any suitable construction, from which current-controlled switch a wire, 12, leads to the main supply conductor 2. It will therefore be seen that when the switch member, 6, makes contact with both the members 7 and 8, the actuating circuit for the solenoid switch is completed, subject to the condition of the thermostatic current-controlled switch, 11. If either the arm 7 or the arm 8 is out of engagement with the switch member 6 the actuating circuit for the main switch is interrupted. Means are provided for bringing either or both of the arms 7 and 8, at will, into engagement with the member 6.

The member 6 is preferably made of a piece of spring metal and above it is arranged a spring bar, 13, fixed at the middle and having blocks of insulating material, 14 and 15, engaging with the member 6 near the ends of the latter. The member 13 is made longer than the member 6 and has at its ends projecting cam lugs, 16 and 17. The disks 18 and 19 are revolubly mounted adjacent to the lugs 16 and 17, respectively; the disk 18 having a plurality of deep notches, 20, cut into the periphery, there being in the arrangement shown six of these notches; and the disk 19 having in its periphery a single notch, 21. The parts are so arranged that when the cam lug 16 lies in one of the notches in the disk 18, the corresponding end of the spring switch member 6 is permitted to move out of engagement with the coöperating switch member 7; a similar condition existing on the other side between the members 6 and 8 when the cam lug 17 lies in the notch 21.

The disks 18 and 19, or either of them, are adapted to be actuated by a suitable clockwork mechanism. In the arrangement shown, 25 represents an element of a clock train which rotates once in twenty-four hours and secured to this element is a wheel, 26, of considerable diameter having in the upper surface near the edge thereof a groove, 27, and being graduated adjacent to the groove so as to divide it into arcs representing hours and any desired fraction of hours, the graduations being represented at 28. The wheel 26 lies in proximity to both of the disks 18 and 19 and has its axis parallel with the axes of these two disks. Connected to the disk 18 is a toothed wheel, 30, having twice as many teeth as there are notches in the disk, the toothed wheel preferably lying in a plane somewhat below the plane of the wheel 26. The disk 19 is provided with a series of pins, 31, which project laterally therefrom past the plane of the member 26. In the arrangement shown, there are seven of these pins equally spaced around the disk and one lying on each side of the notch 21.

The disk 18 is adapted to be actuated by means of U-shaped clips adapted to be detachably connected to the wheel 26 at any desired points on this wheel. There may be any desired number of these clips although only two, indicated at 35 and 36 are illustrated. Each of the clips is provided with a small thumb screw, 37, passing through one of its jaws and adapted to enter the groove, 27, in the wheel so as to hold the clip securely against displacement. Secured to the other jaw of each of the clips and projecting therefrom in the direction to bring it at right angles to the plane of the wheel 26 when the clip is placed on the wheel, is a finger, 38, so located that it will engage

with one of the teeth on the actuating wheel for the disk 18 and turn the disk the length of one tooth during each revolution of the wheel 26. Therefore, since each of the clips serves to turn the disk 18 through an angular distance corresponding to the length of one of the teeth during each revolution of the wheel 26, the total angular movement of the disk during each revolution of the wheel 26 will depend upon the number of clips used.

The disk 19 is adapted to be actuated by a clip, 40, similar to the other clips except that the pin or finger 41 extends radially with respect to the axis of the wheel 26, thus being in a position to engage with the pins 31 on the disk 19 without affecting the other disk or its toothed actuating member.

A pointer, 50, mounted on some stationary part such as the shaft 51 on which the disk 38 and its actuating wheel rotate, extends into proximity to the graduations on the wheel 26; the shape of the pointer being such that it will clear the clips and not interfere with them. The pointer indicates the point at which the toothed wheel, 30, will be operated by a clip on the wheel 26; that is, when one of the clips approaches the pointer it begins to turn the toothed wheel 30 and, when it is directly beneath the pointer, it has caused the disk 18 to be turned far enough either to bring the switch members 6 and 7 into contact with each other or allow them to separate, depending upon the angular position of the disk before the clip began to turn it. Consequently, the pointer always denotes present time and there is no necessity for setting the clock mechanism in a manner corresponding to the setting of the hands of a clock to make them indicate the proper hour and minute.

The operation is as follows, assuming that it is desired to set the switch to close the lighting circuit of an electric sign during a predetermined number of hours: If, for example, it is 10:45 o'clock in the morning at the time the clips are adjusted and it is desired to cause the main circuit to be closed during the hours from 5:45 in the evening to midnight, the clip 35 is fixed upon the wheel 26 at an angular distance, measured in the counter-clockwise direction from the pointer corresponding to the seven hours elapsing before the circuit is to be closed and the clip 36 is then adjusted at an angular distance, measured in the counter-clockwise direction from the clip 35, equal to six and one-fourth hours as represented by the graduations. With the disks initially in the positions indicated in Fig. 1 the energizing circuit for the solenoid being interrupted between the switch members 6 and 7: the wheel 26 will turn slowly until at a quarter to six in the evening the clip 35 engages with one of the teeth of the wheel 30 and turns this wheel and the disk through one-twelfth of a revolution, causing the lug 16 on the switch mechanism to ride up on the periphery of the disk, as indicated in Fig. 4, and bring the switch members 6 and 7 together. The actuating circuit for the solenoid is now closed and it remains closed until six and one-fourth hours later when the clip 36 reaches the toothed wheel and turns it through a farther angle of 30 degrees, allowing the cam lug 16 again to drop into one of the notches in the periphery of the disk and opening the circuit of the solenoid. By simply winding the clock mechanism, this cycle will be repeated day after day. If the cycle is not to be repeated on Sundays, the clip 40 is placed on the wheel 26 and each day turns the disk 19 through one-seventh of a revolution so that during one twenty-four hour period during each seven the cam lug will lie in the notch 21 and thus allow the switch member 6 to move away from the switch member 8 and interrupt the actuating circuit for the solenoid during a complete twenty-four hour period.

Since the current which passes through the master switches is small and the voltage is low, it permits a current-controlled thermostatic switch, 11, of any usual or suitable construction to be placed in a series with the master switch devices so that during the period or periods for which the actuating circuit is held closed by the time-controlled switch devices, the current-controlled switch will make and break the circuilt at regular intervals and thus cause the lights of the sign to flash.

It will of course be understood that the flash switch or current-controlled switch will not be used in all cases and furthermore that the switch contacts controlled by the disk 19 may either be omitted or this disk be left in a circuit-closing position; this adapting the mechanism as a controlling device for circuits employed for charging batteries, the clips 35 and 36 being set apart a distance corresponding to the number of hours during which current is to flow into the batteries and the current being thus automatically turned on and then shut off again when the charging of the batteries is completed.

I claim:

1. In a time switch mechanism, a switch, a switch-actuator having switch-opening and switch-closing positions, a clockwork having a graduated wheel, a plurality of clips adapted to be detachably secured to said wheel at any desired distances apart to move the said actuator successively into switch-closing and switch-opening positions as said wheel revolves, a second switch, a second switch actuator, and a clip adapted to be de-

tachably secured to said wheel so as to move said second actuator as the wheel revolves.

2. In a time switch, a graduated revoluble wheel, two switches arranged in series with each other located adjacent to said wheel, switch-actuators arranged between said switches and said wheel, one of said switch-actuators having a series of switch opening positions alternating with switch closing positions, the other actuator having a single switch opening position and a plurality of switch closing positions, and adjustable slips on said wheel, each arranged to move one of said actuators from one of its positions to the next during each revolution of said wheel.

In testimony whereof, I sign this specification in the presence of two witnesses.

GEORGE A. PARKER.

Witnesses:

WM. F. FREUDENREICH,

RUTH E. ZETTERWALL.