

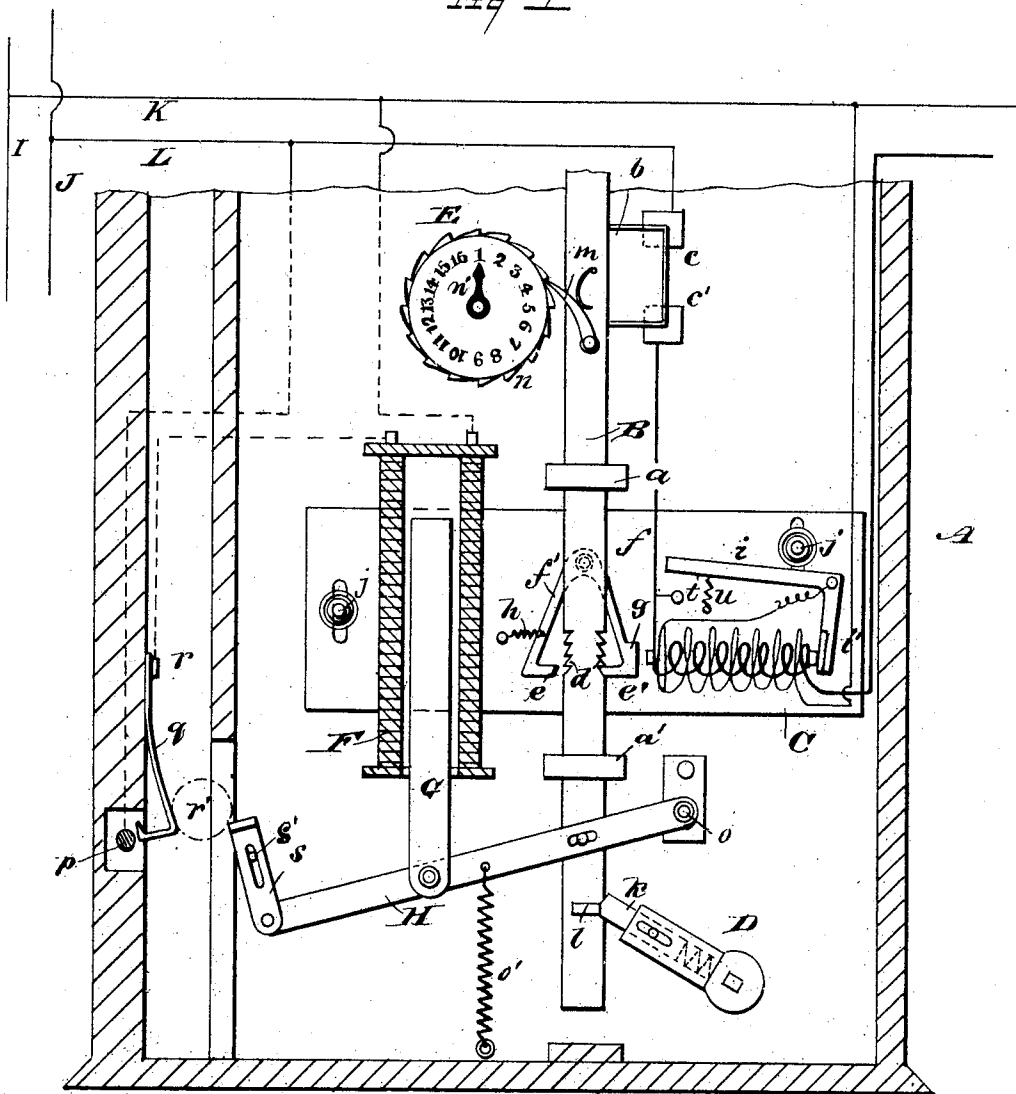
(No Model.)

W. McNEILL & J. H. TINDER.  
SWITCH FOR ELECTRIC CIRCUITS.

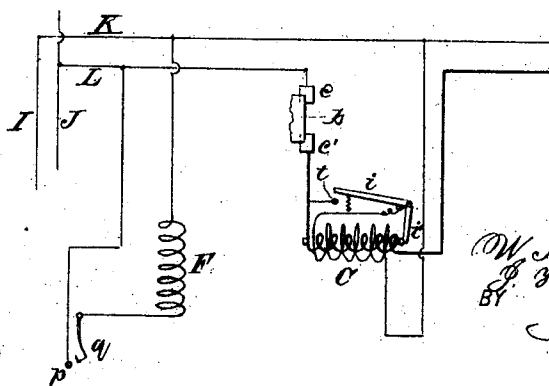
No. 503,157.

Patented Aug. 15, 1893.

Fig 1



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**WITNESSES:**

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# UNITED STATES PATENT OFFICE.

WILLIAM MCNEILL AND JAMES H. TINDER, OF WINCHESTER, KENTUCKY,  
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PLACE.

## SWITCH FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 503,157, dated August 15, 1893.

Application filed May 31, 1892. Serial No. 434,972. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM MCNEILL and JAMES H. TINDER, both of Winchester, in the county of Clark and State of Kentucky, have invented a new and Improved System of Switches for Controlling Electric Light and Power Circuits, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a side sectional elevation; and Fig. 2 is a diagram of the electrical connections.

Similar letters of reference indicate corresponding parts in both views.

The object of our invention is to provide a switch or a series of switches for electric circuits, which may be operated from a central station so as to extinguish the lights by the momentary interruption of the main circuit, and which may be readjusted so as to again send the current through the lamps by means of a hand lever or coin operated device.

Our invention consists in a switch adapted to be operated from a central point, such for example as an electric light station, by the momentary interruption of the main circuit, the parts being constructed and arranged as hereinafter described, so that the lamps belonging to any consumer may be extinguished at any predetermined time; also in the combination with the switch mechanism, of registering mechanism whereby a record is made of the number of times the switch is operated.

The invention also consists in the combination with the switch mechanism, of electrically operated switch replacing mechanism controlled by a coin, all as will be hereinafter more fully described.

In the casing A, which in the present case contains the working parts of the mechanism, are placed guides *a, a'*, for receiving the sliding switch bar B. The contact spring *b*, attached to the bar B but electrically insulated therefrom, is capable of closing the circuit between two fixed contact plates *c, c'*, secured to the back of the casing A, and connected with the service wire in the manner presently to be described.

In opposite sides of the bar B, are formed teeth *d*, and to a plate *f* adjustably secured to

the back of the casing A, is pivoted a lever *f'*, carrying the pallets *e, e'* which are adapted to engage the teeth *d*, and which together with the said teeth form an escapement for lowering the bar B one tooth at a time for each complete vibration of the lever *f'*. To the said lever *f'* adjoining the pallet *e'*, is secured an armature *g*, and to the lever *f'* at the opposite side of its pivot, is attached one end of a spiral spring *h*, the other end of which is secured to the plate *f*.

To the plate *f* opposite the armature *g*, is secured an electro-magnet C, provided with two coils, one of coarse wire arranged in series with the lamps or other service, and traversed by the main current, the other of fine wire connected in multiple arc with the lamps through the angled switch lever *i*, but normally kept out of the circuit by the attraction of the armature *i'* carried by the shorter arm of the switch lever, and drawn forward by the attraction of one of the poles of the magnet C. The adjustable plate *f* is moved up or down to regulate the height of the pallets *e, e'*, relative to the toothed portion of the bar B, so as to control the number of teeth engaged by the pallet, the said plate *f* being fastened in the required position by clamping screws *j*, which pass through the said plate into the back of the casing A.

A hand lever D pivoted in the lower part of the casing A, is provided with a spring bolt *k* for engaging the lug *l* on the bar B, and the end of the spring bolt *k* is beveled on its under surface. When the lever D is raised, the bar B is elevated, bringing the pallet *e'* into engagement with one of the teeth *d*, also bringing the contact spring *b* into electrical contact with the plate *c*, thus establishing the house circuit.

In the upper part of the casing A is placed a dial E, having on its periphery a ratchet *n*. The index *n'* in front of the dial is supported in a fixed position so that when the switch bar B is raised, the spring-pressed pawl *m* carried by the said bar engages the ratchet dial and turns it one notch forward.

The solenoid F, secured to the casing A is provided with a movable soft iron core G, which is pivoted to a lever H, of insulating material, fulcrumed on the stud *o* projecting

from the back of the casing A. The said lever H is pivotally connected with the bar B, and to the free end of the said lever H is pivoted a slotted auxiliary lever s, which is capable of sliding and turning on a pivotal pin s'. The lever H is connected with one end of a retractile spring o', the other end of which is attached to a fixed support.

In one side of the casing A is formed a coin slot r, into which projects a contact spring q at a point opposite the upper end of the auxiliary lever s. The lower end of the contact spring q is bent outwardly and in the path of this end of the contact spring is arranged a contact point p. The said contact point is connected with one of the electric light leads; the spring q is connected with one terminal of the solenoid F, the other terminal being connected electrically with the remaining light lead.

The operation of our improved switch system is as follows: When the consumer desires to turn on his lamps or other service, the lever D is turned so as to raise the bar B to the prescribed limit, and the pallet e' is brought into engagement with the teeth d by the action of the spring h. A current flowing through the low resistance coil of the magnet C, and also through the high resistance coil of the magnet C, imparts sufficient magnetism to the core of the said magnet to draw forward toward the core, the armature g, dropping the bar B one tooth, also drawing forward the armature i', at the same instant breaking the circuit of the high resistance coil, allowing the current to continue through the low resistance coil, thus energizing the magnet C sufficiently to hold the switch lever i away from the contact point t, but not with such force as to draw forward the armature g of the pallet lever f. Under these conditions the current flows from the main wire J through the wire L, the contact plate c, contact spring b, contact plate c', through the magnet coil of low resistance to the lamps in the circuit, returning by the wire K to the wire I, thus holding the armature i' to the pole of the magnet C, and preventing the re-establishment of the circuit of the high resistance coil of the magnet C, until the main circuit is broken at the central station. At a prescribed time the attendant at the central station momentarily interrupts the main circuit, the core of the magnet C loses its magnetism, and the retractile spring u connected with the longer arm of the switch lever i, draws the said arm downward into contact with the contact point t. The current being instantly re-established, and the switch lever i being at that moment in contact with the point t, the current flows through the wire L, contact plate c, contact spring b, the point t, the switch lever i, thence by a wire connected with the said switch lever to the coil of high resistance on the magnet C, through the said coil and back to the wire K. Owing to the increased number of ampère turns, the

magnet C is thoroughly energized, and attracting the armature g draws forward the pallet e' and releases one of the teeth d. The pallet e engages the tooth next above the one released, and when the armature g is released, the spring h draws forward the pallet lever f', causing the pallet e' to engage the second tooth of the series on that side. It will be understood that when the current passes through the coarse wire of the magnet C, the magnet has only strength enough to hold the armature lever i out of contact with the contact point t, but after an interruption of the circuit and the consequent falling of the said lever i on the said contact point t, the increased number of turns then brought into the circuit, gives the magnet the strength requisite for operating the escapement lever f.

In the normal working of our improved system of switches, it is proposed to make the first interruption of the main circuit, say at nine o'clock in the evening. When it is desired to have the lights extinguished at nine o'clock, the plate f is adjusted so that only a single tooth of the bar B is engaged by the pallet e; the release of this single tooth would cause the contact spring b to leave the contact plate c as the bar B falls. If the impulses are to be made hourly after the first release of the bar B, a bar constructed like that shown in the drawings would require four interruptions of the main circuit to cause an interruption of the consumer's circuit. It will thus be seen that in the case represented the lamps would be extinguished at twelve o'clock, but the bar B can be replaced at any time by the consumer by turning the lever D in the manner already described. This operation moves forward the ratchet dial E one notch, thereby making a second record of the prescribed period of illumination.

When it is desired to turn on the current by the action of a coin instead of the hand lever D, the coin r' (shown in dotted lines) is dropped into the chute r, and when it comes into contact with the spring q, it forces the said spring into electrical contact with the point p, thus closing the circuit on the solenoid F. The movable core G is immediately drawn into the solenoid, the lever H is raised, the auxiliary lever s is slid upward, and at the same time turned on the pivotal pin s', thus allowing the end of the lever s to pass the coin and allow it to drop into the box. The circuit of the solenoid being broken, the lever H, the movable core G and auxiliary lever s are retained in their positions by the engagement of the pallets e and e' as before described, until released by the action of the magnet C. In its upward movement, the lever H carries up the bar B, and brings one of its teeth into engagement with the pallet e' in the manner already described, and the current flows through the consumer's circuit for the prescribed time as in the other case, and it continues to flow until the main circuit is again momentarily interrupted at the central station. The interrup-

tion of the main circuit is so brief as to not perceptibly affect the lights on any of the consumers' circuits.

Although we have described our invention in connection with electric lighting, we do not confine it to this application, as it may be used with equal advantage in electric power service.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The method of metering electric light service, by making at stated intervals extremely short interruptions of the circuit, and causing such interruptions to produce a record in the house circuit during the time the house circuit is taking current from the main or distributing circuit, as herein specified.

2. The method of metering electric light service, which consists in breaking the main circuit at stated intervals for a period of such short duration as to not perceptibly affect the lights on the circuit, and causing such interruptions to make a record, as herein specified.

3. In an electric switch, the combination of

a sliding bar provided with ratchet teeth and a switch arm, a pair of contacts in the path of the switch arm, pallets arranged to engage the ratchet teeth, an armature carried by the pallet arm, a releasing electro-magnet arranged to act upon the armature, a pawl pivoted to the sliding bar, and an indicating disk for registering the movements of the bar, substantially as specified.

4. In a circuit controlling switch, the combination with the main circuit wires, of a switch arm, a switch operating magnet provided with a coil of low resistance connected in series with the lamps, and a coil of high resistance held normally out of the circuit and arranged to be thrown into the circuit by momentarily interrupting the circuit of the coil of low resistance, substantially as specified.

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Witnesses:

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