(No Model.)

2 Sheets—Sheet 1.

C. D. JENNEY.

ELECTRIC SWITCH.

No. 577,037. Patented Feb. 16, 1897.

Fig. 1.

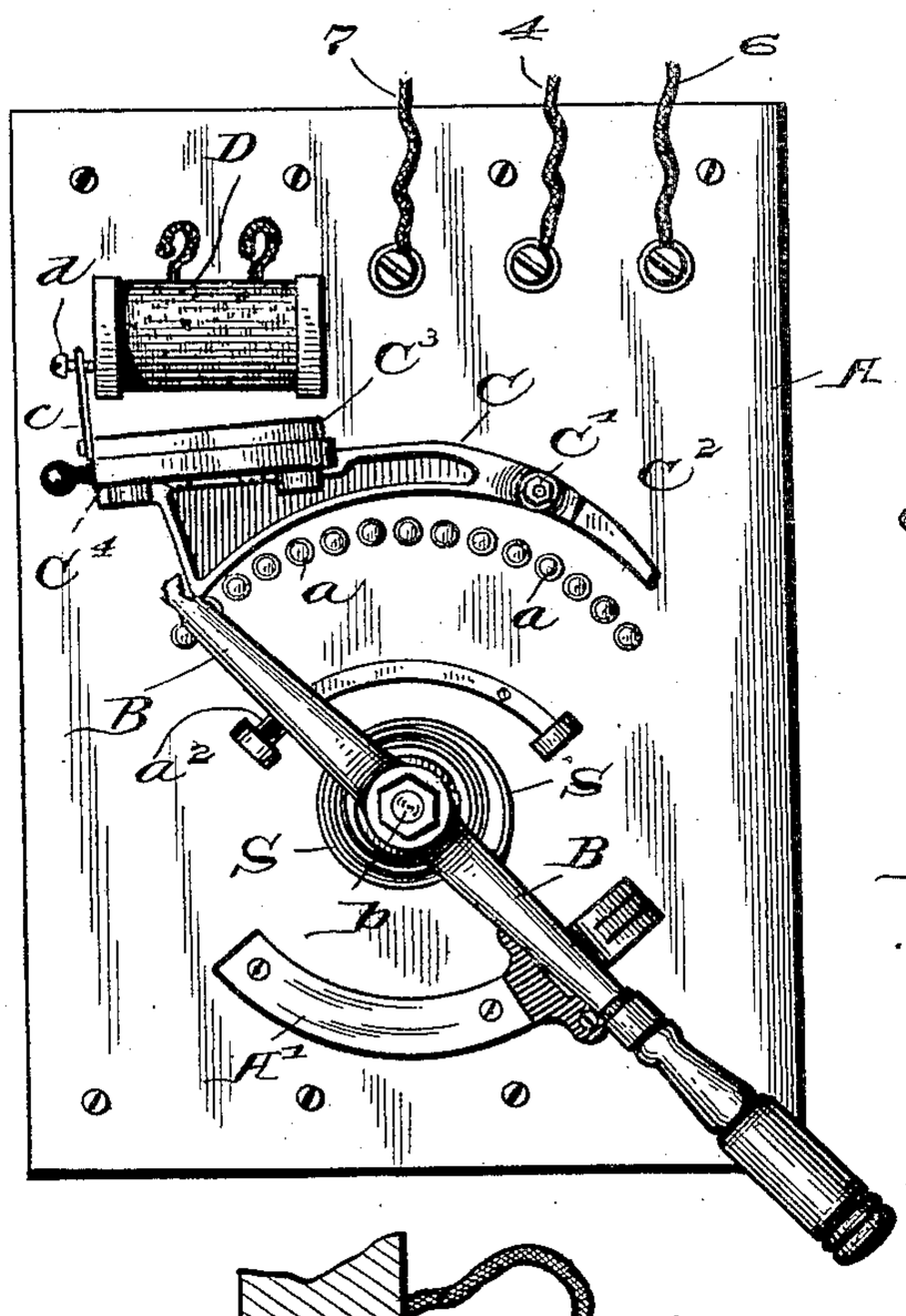


Fig. 2.

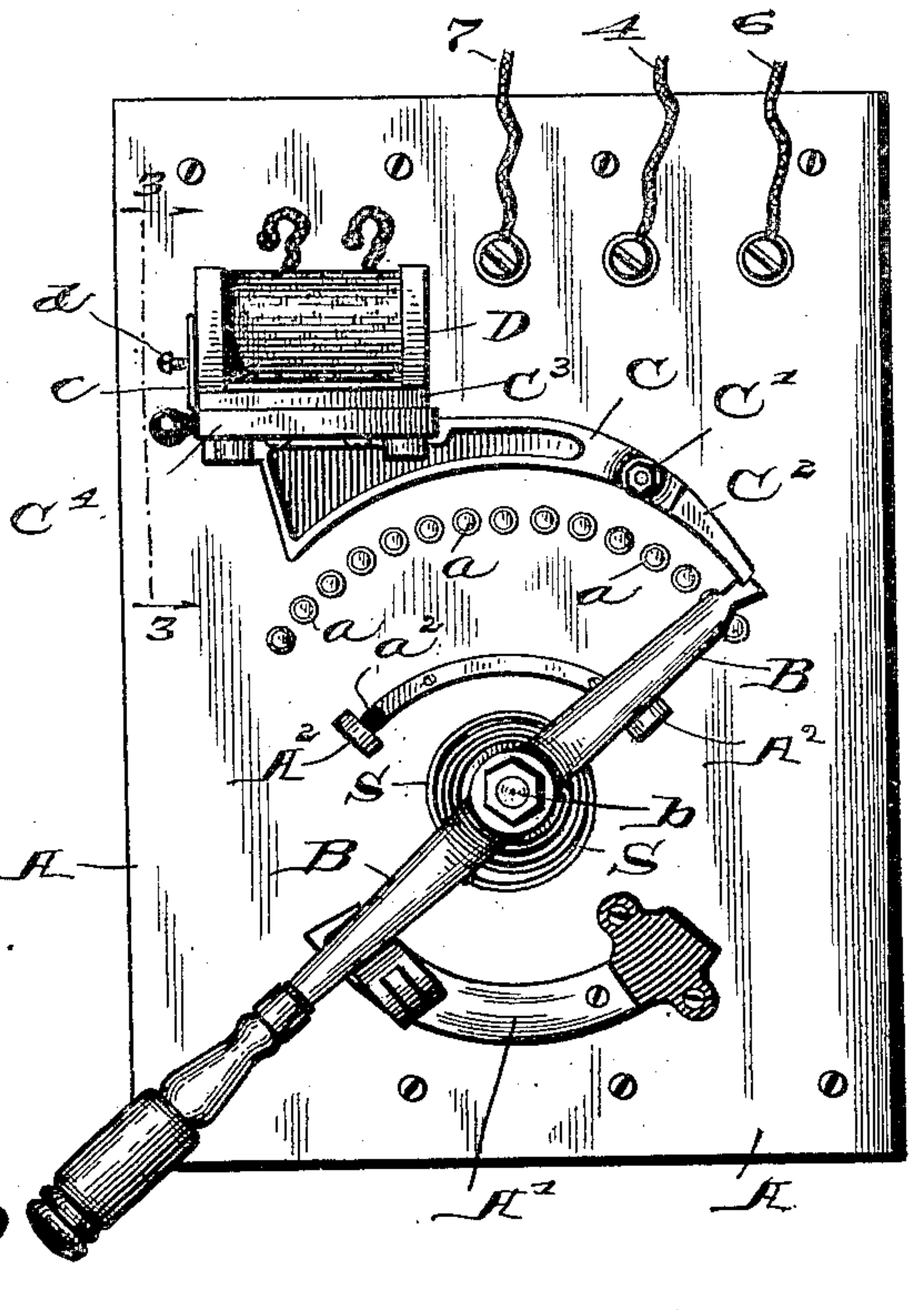


Fig. 3

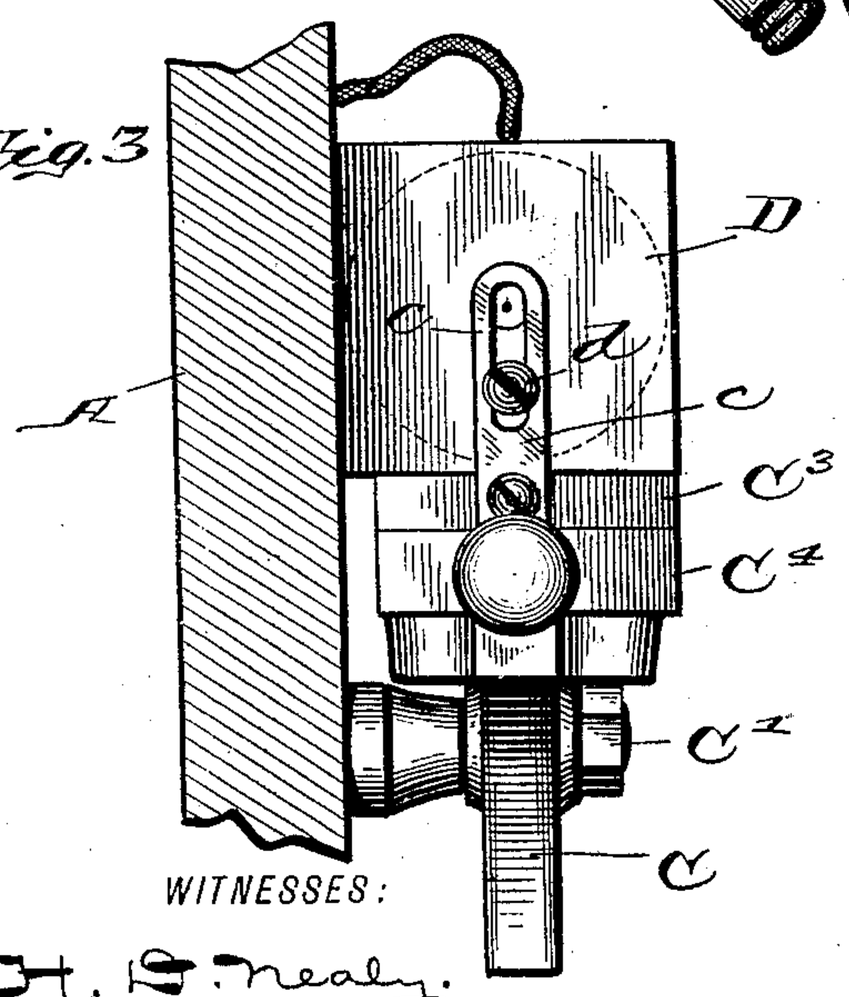


Fig. 4.

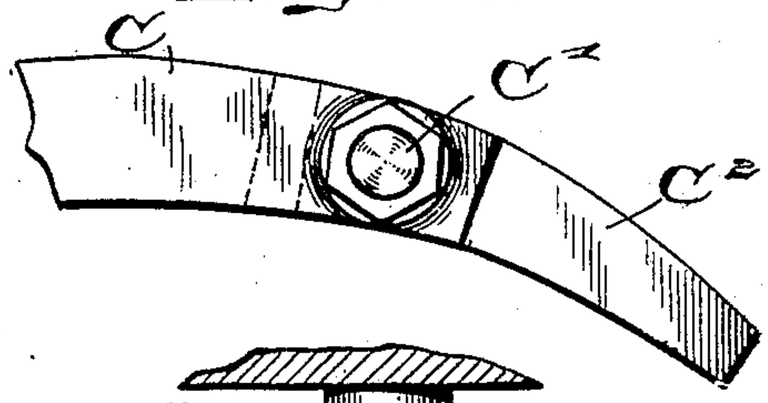
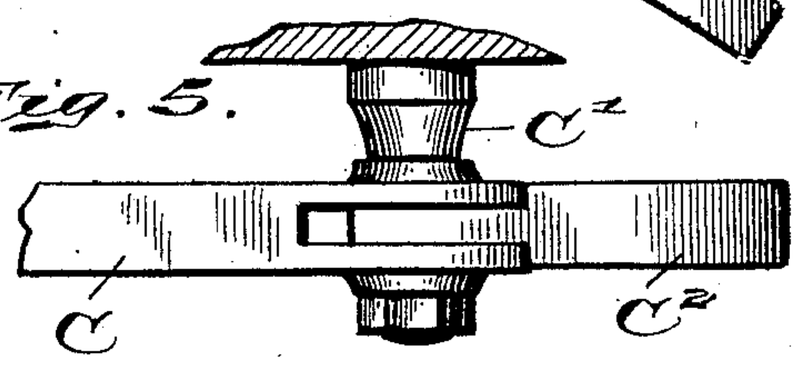


Fig. 5.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

C. D. JENNEY.

ELECTRIC SWITCH.

No. 577,037. Patented Feb. 16, 1897.

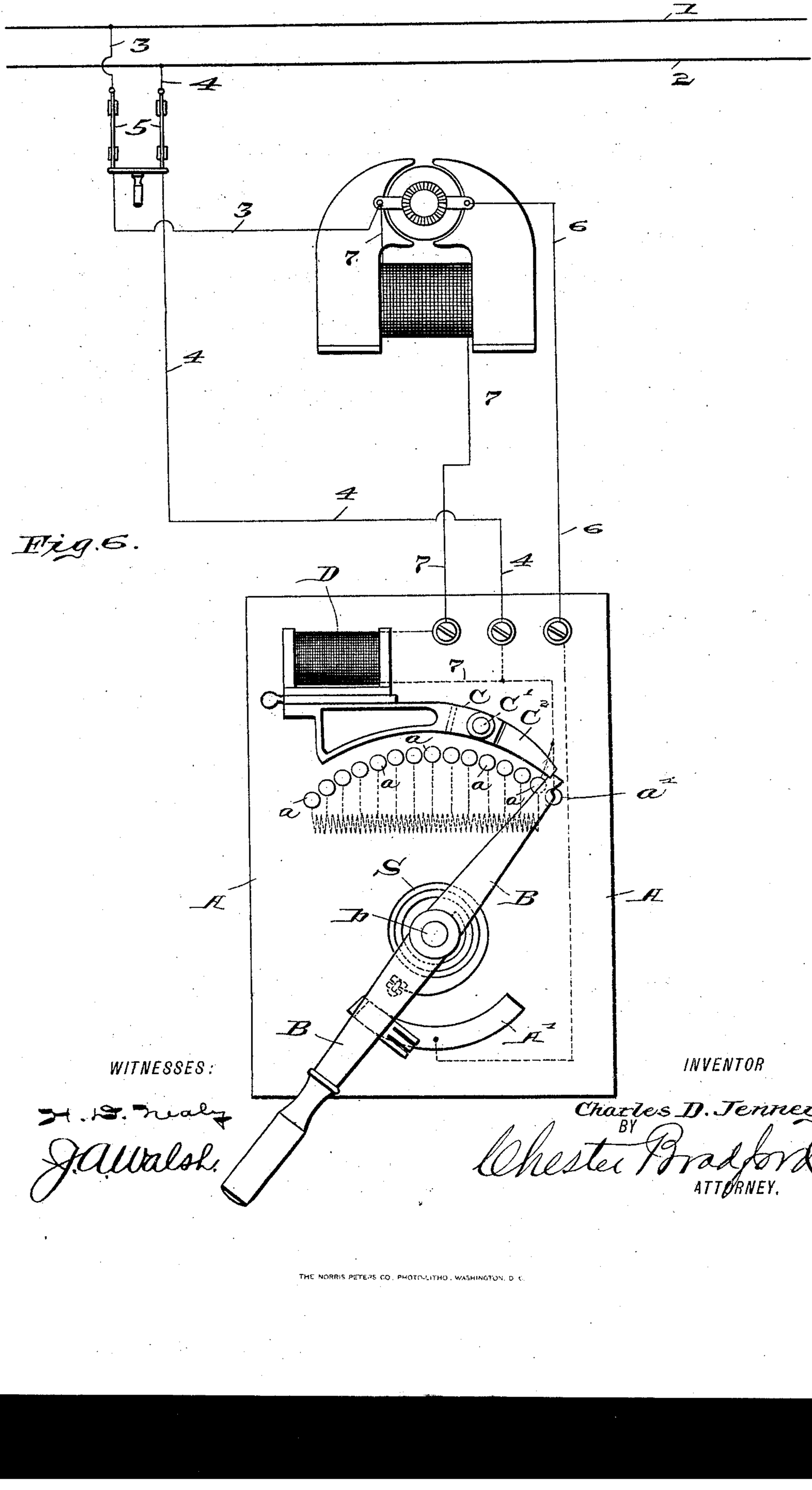

Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES D. JENNEY, OF INDIANAPOLIS, INDIANA.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 577,037, dated February 16, 1897.

Application filed April 7, 1896. Serial No. 586,499. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. JENNEY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

The object of my said invention is to produce a device whereby an electric switch may be securely locked either in the "on" or "off" position, and also whereby, when the electrical circuit is broken, it will be automatically unlocked from the "on" position and caused to return to the "off" position. Such a switch is most commonly used in connection with rheostats forming part of an electric-motor equipment.

Said invention will be first fully described in connection with such an equipment, and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a front elevation of an electric switch mounted on the front plate of a rheostat, said switch being in the "off" position; Fig. 2, a similar view with the switch in the "on" position; Fig. 3, a detail view, on an enlarged scale, as seen from the dotted line 3 3 in Fig. 2; Fig. 4, a fragmentary view, also on an enlarged scale, of the point of the locking device; Fig. 5, a top or plan view of the same, and Fig. 6 a diagrammatic view illustrating an electric-motor outfit in which my invention forms a part of the equipment.

In said drawings the portions marked A represent the front plate of a rheostat; B, the switch-lever thereto; C, a locking device for said switch-lever, and D an electromagnet for operating said locking device.

The rheostat in itself embodies well-known features of electrical construction. Its front plate A carries a contact-plate A′ and numerous contact-points *a*, (connected with the resistance-coils,) over which the switch-lever B sweeps, and preferably a similar final contact-point *a*, having direct connection with a circuit-wire. Said switch-lever is mounted on the pivot-stud *b* and is provided with suitable contact-surfaces to engage with said contact-plate and contact-points. Stops A^2 are provided to limit its movement, and one of these is preferably provided with a soft-rubber buffer a^2 to receive the impact of the switch-lever when it is thrown back to that position. The point of said switch-lever should be given a notched formation, enabling it to better engage with the locking device C, as shown. Said locking device is mounted on a stud-pivot C′, located to one side of its center of gravity, and is adapted, when in the position shown in Fig. 1, to hold the switch-lever to its "off" position, and when in the other position to hold said switch-lever to its "on" position, as shown in Fig. 2. It is preferably constructed in two parts, united by a rule-joint at the pivot-point, so that the outer end C^2 may have a limited movement independent of the main portion thereof, thus enabling the said outer end to be lifted somewhat, as the end of the lever sweeps under it, without breaking the magnetic union between the armature on its other end and the electromagnet, and also to automatically drop into engagement with said end of said lever as it reaches the proper position, as illustrated in Fig. 2. This locking device has a suitable plate C^3, which serves as an armature to the electromagnet, and this is electrically separated from the main portion of said locking device by an insulating-plate C^4. Suitably attached to the outer end of this locking device is a slotted strip *c*, which engages with a stud *d* on the end of the electromagnet and thus limits the movement of the locking device when the magnetic contact is broken.

The electromagnet D is or may be of an ordinary construction, and should, in the apparatus illustrated, be set into the field-circuit of the motor.

Referring now to Fig. 6, 1 and 2 are the electrical mains, having branches 3 and 4 leading toward the motor. A preferably double-pole switch 5 is set into these branches, as usual. The line 3 continues to the motor and one branch 6 passes through the armature, while the other 7 goes to the field-coil. The line 6 continues on and terminates at the contact-plate A′. The line 7 continues to the electromagnet D, and thence to the extreme "on" position of the switch, where it terminates in the final one of the contact-points *a*, to which the resistance-coils of the rheostat

are connected, while a branch leads to a contact-point a', disconnected from said resistance-coils. The line 4 continues to and unites with the line 7 before it reaches its termination at the two contact-points last above described. These electrical circuits are shown and described by way of illustration merely, and not as forming any part of my present invention.

Assuming the machine to be shut down and the apparatus in the position shown in Fig. 1, and it being desired to start the machine, the operation is as follows: The current is turned on (by means of the switch 5 in the apparatus illustrated) and the locking device C raised to the position shown in Fig. 2. If the apparatus is in order, the electromagnet D will have been energized, and will thus, through the armature C^3, support the locking device in the position shown in Fig. 2. The next operation is to move the switch-lever B gradually from the position shown in Fig. 1 to the position shown in Fig. 2, when the point C^2 of the locking device C will first be slightly raised by and then drop into engagement with the point of said switch-lever and lock the same in that position. After the current is shut off the magnet D at once becomes deënergized, the hold on the armature C^3 loosened, and the locking device C will fall from the position shown in Fig. 2 to that shown in Fig. 1, raising the point C^2 of the locking device and permitting the lever B to return to its initial position, to which it is at once driven by the force of the spring S. The descent of the locking device is limited by the link *c* and stud *d*, as before described, and the end of the lever B, being suitably formed for the purpose, is caught and held to the "off" position by a suitable projection on said locking device, as shown in Fig. 1. It will thus be seen that the lever is mechanically locked both to the "on" and the "off" positions by means of the locking device. The locking device is held in position to lock the lever to the full "on" position by the energy of the electromagnet. The weight of the locking device, after the circuit is broken and the magnet thus deënergized, is sufficient to automatically unlock the lever, and the spring S is suitably proportioned to return it to position. By this arrangement the electromagnet is only required to support the weight of the locking device and is not opposed to the spring, which should be of considerable strength and require considerable more power to overcome.

My invention differs from previous devices for the purpose in that it embodies both a positive mechanical lock for the switch and an electrically-operated automatic detaching device for the lock, whereas former devices have either depended upon a mechanical fastening, which could only be removed by hand, or upon an electromagnet-holder for the switch, which itself was required to resist both the force of the retractile spring and the disturbing jars of the mechanism.

As is well known, springs and weights are almost universally considered mechanical equivalents, and they would be equivalents in a switch embodying the purpose of my invention. That is to say, a weight might be attached to the switch-lever B, and would there be the equivalent of the spring S. Likewise the end of the locking device upon which the armature C^3 is mounted might be made of equal or substantially equal weight as the end C^2 and a spring then connected thereto so as to operate in the same manner as does the weight embodied in the construction illustrated. In other words, a weight might be substituted for the spring S and a spring might be substituted for the weight embodied in the locking device without in any manner departing from my invention.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electrical switch, the combination, of the switch-lever mounted to swing on a pivot over a series of contact-points arranged in the arc of a circle, a locking-arm pivoted adjacent to the path of the end of said lever and formed with its adjacent side substantially parallel with the arc in which said points are arranged, and of a length to extend from one end of said arc to the other, so that its ends are substantially opposite terminal points of said arc, and are arranged to engage opposite sides of said lever as it reaches said terminals and lock it in position, an electromagnet for holding said parts locked in one position, and mechanical means for holding them locked in the other position, substantially as set forth.

2. The combination, with the switch-lever of an electric switch, of a pivoted locking device therefor having a point jointed thereto and thus enabled to have a limited independent movement, substantially as set forth.

3. In an electrical switch, the combination of the lever the pivoted locking-arm formed with a joint near one end, the magnet for holding said device in position to lock said lever in one position, and mechanical means for holding it in the other, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 3d day of April, A. D. 1896.

CHARLES D. JENNEY. [L. S.]

Witnesses:

CHESTER BRADFORD,

JAMES A. WALSH.