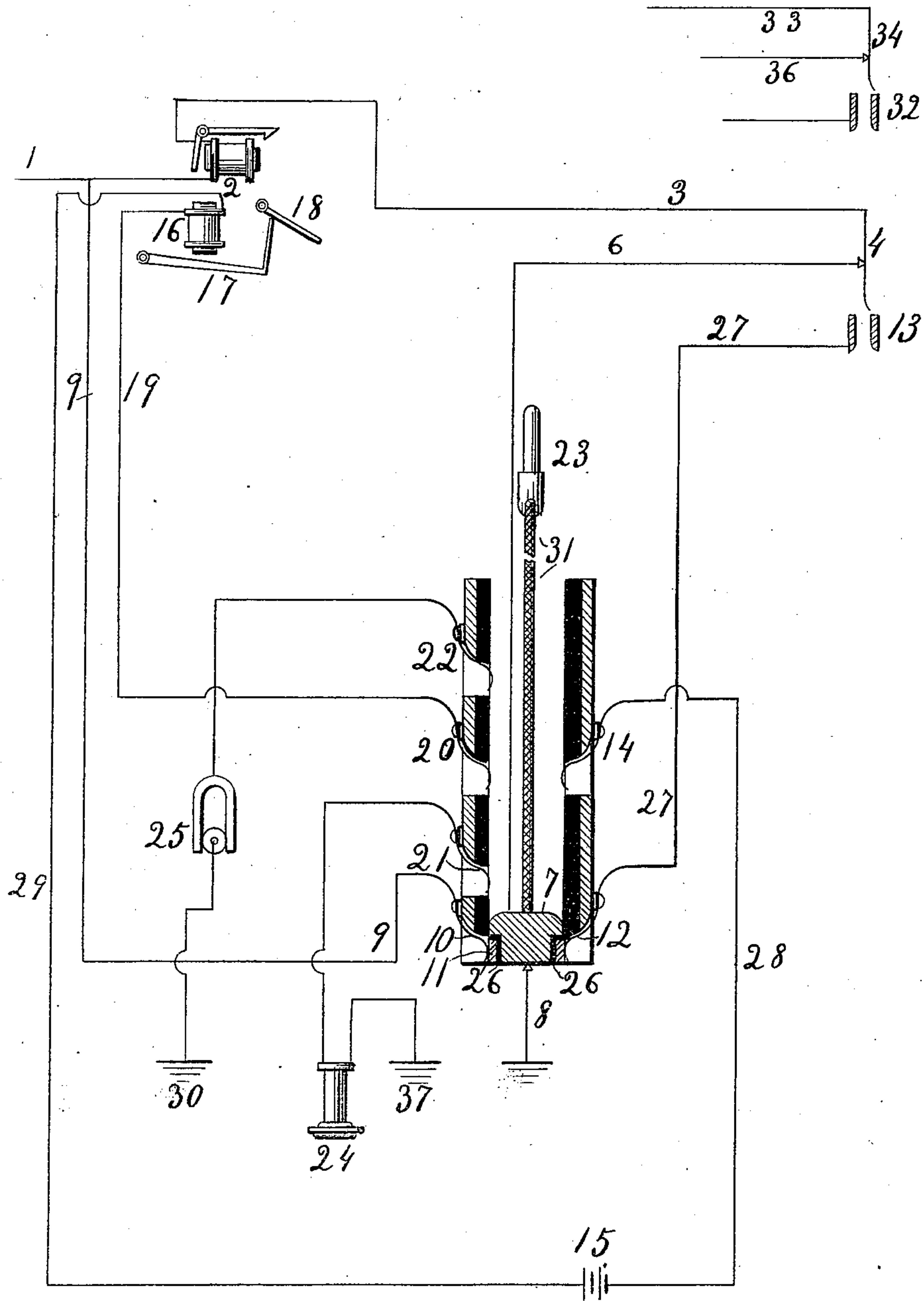


(No Model.)

G. S. MAXWELL.  
TELEPHONE SWITCHBOARD.

No. 562,010.

Patented June 16, 1896.



WITNESSES,

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INVENTOR.

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by W. R. Stevens. Atty.

# UNITED STATES PATENT OFFICE.

GEORGE S. MAXWELL, OF RICHMOND, VIRGINIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF THREE-TENTHS TO WILLIAM H. CULLINGWORTH AND JOSEPH N. CULLINGWORTH, OF SAME PLACE.

## TELEPHONE-SWITCHBOARD.

SPECIFICATION forming part of Letters Patent No. 562,010, dated June 16, 1896.

Application filed March 17, 1896. Serial No. 583,529. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE S. MAXWELL, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented a new and useful Improvement in Telephone-Switchboards; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, in which my invention is represented by a diagram of the working parts and connections of a switch-table at a central station, showing portions of two subscribers' lines.

This invention relates to that class of devices which are used at the central station of a telephone system for the purpose of receiving orders from subscribers and connecting their lines accordingly; and its object is, first, to prevent the annunciator or drop from being operated by the influence of a current which might be sent into the line at the spring-jack when another circuit-line is connected therewith; second, means for automatically closing the shutter or drop of the annunciator after service, and, third, means for using the same annunciator-drop as a clearing-out signal.

To this end my invention consists in the construction and combination of parts forming a telephone-switchboard hereinafter described and claimed, reference being had to the accompanying drawing, in which—

1 represents the calling-subscriber's line coming into the central station through an annunciator 2, having a drop 18. From the annunciator the subscriber's line continues over the wire 3, through the spring-jack 4, and over wire 6 to a sliding switch-weight 7, which is normally grounded by the wire 8.

9 is a branch wire leaving each subscriber's line 1 just before the latter enters the annunciator 2 and terminating in a spring 10.

11 is a metallic ring surrounding the switch-weight 7 as a part thereof, but separated from the main body of the same by insulating material 26.

12 is a spring in opposition to the spring 10, to be connected in circuit therewith by the ring 11 and with the spring-jack ferrule 13 by a wire 27.

14 is a spring connected with the local battery 15 by a wire 28, and the circuit passing over a wire 29, through an electromagnet 16, and over a wire 19 terminates in a spring 20 opposite to the said spring 14.

17 is an armature hung within attracting distance of the magnet 16 and adapted to strike and close the drop 18 when attracted by the said magnet.

21 represents a spring connected with the central-operator's telephone 24, which is grounded at 37.

22 is a spring connected with a magneto-generator 25, whose opposite terminal is grounded at 30.

23 is a connecting-plug of the cord 31, both belonging, with the switch-weight 7, as parts of the switch.

The parts 33, 34, 36, and 32 represent portions of a called-subscriber's line, corresponding, respectively, with the parts 3, 4, 6, and 13 of the hereinbefore-described calling-subscriber's line.

The operation is as follows: An incoming signal over the line 1 throws down the drop 18 of the annunciator 2, the circuit being normally completed through wire 3, spring-jack 4, wire 6, switch-weight 7, and wire 8 to the ground. The branch circuit over wire 9, spring 10, ring 11, spring 12, wire 27, and jack-ferrule 13 is intended to act as a shunt or short circuit around the drop 2 and prevent its being opened by the influence of a current sent into the line at any spring-jack 34 when that circuit-line is connected with the first line. Such connection is made by inserting the plug 23 in the ferrule 32 against the spring 34. When the central office is called, a drop or shutter 18 falls and the operator takes a plug 23, and drawing up on it raises the switch-weight 7 away from its ground connection and from the springs 10 and 12 into contact with the spring 21 of her telephone 24. After inquiring the number wanted she places the plug 23 in the proper ferrule, which we will suppose to be 32, to make the desired connection, and in doing so she has drawn the switch-weight 7 up through between the contact-springs 14 and 20, whereby the local circuit was completed through the battery 15 and



electromagnet 16 and the armature 17 was operated and the drop-shutter 18 is closed. The spring-jack 34 has also been opened, disconnecting the line 36 and the corresponding weight 7 of the called subscriber, leaving it grounded, as at 8.

While in service, the caller's switch-weight 7, hanging on the cord 31, is located between the springs 20 and 22 and in contact with neither one of them; but a little more raising of the cord 31 brings the switch-weight 7 in contact with the spring 22 and a current from the magneto-generator 25 enters the circuit and sounds a call to the subscriber thus connected. The operator now drops the switch-cord and the weight 7 hangs freely between springs 20 and 22. The circuit in the first-subscriber's line is now cut out from the shunt-circuit 9, springs 10 and 12, and ferrule 13, and passes through the annunciator 2, spring-jack 4, connecting-wire 6, weight 7, plug 23, and spring-jack 34 to the answering subscriber, and the drop 18 being now closed will serve as a clearing-out drop to notify the central operator when these subscribers are through with the line; but the answering-subscriber's shutter will not then be dropped, because his switch-plug 7 has not been raised and his shunt-line, similar to line 9 10 11 12 27, forms a short circuit around his annunciator.

It will be understood that if the call came in on line 33 and the corresponding plug to 23 thereof be inserted in ring 13, spring-jack 4 would be opened, leaving a shunt-circuit through ring 11 around the weight 7, which remains grounded, as herein shown. By this arrangement the calling-subscriber's drop is the only one that falls, the falling of both drops when the subscriber rings off being prevented, and this shunt-circuit forms a path of low resistance around the drop for the current coming over the line.

Having thus fully described my invention, what I believe to be new, and desire to secure by Letters Patent, is the following:

1. In telephone-switchboards, a subscriber's line; an annunciator-drop and a spring-jack thereon and a switch connected therewith and

normally in contact with a ground-wire; a metallic ring upon the switch; a spring at each side of the ring normally in contact therewith; a wire connecting one of the springs with the subscriber's line before it enters the said drop, and another wire connecting the other spring with the ferrule of the said spring-jack, substantially as described.

2. In telephone-switchboards, a subscriber's line; a drop and a spring-jack thereon and a switch connected therewith; an insulated metal portion to the switch and a shunt-circuit line between the said spring-jack and the subscriber's line beyond the drop, the said metal portion of the switch, located in and normally completing the said shunt-circuit, substantially as described.

3. In telephone-switchboards, a subscriber's line; a drop and a switch connected therewith the latter being hung for reciprocating movement; an operator's telephone grounded at one side and connected at the other side with a spring terminal located in the path of the said switch; a pair of spring terminals located in the path of the said switch and connected with a magneto drop-restoring circuit, and a call-spring also located in the path of the said switch and a grounded magneto-generator connected therewith, substantially as described.

4. In telephone-switchboards, a switch adapted for reciprocating movement, a plug connected with the switch, and a series of spring terminals connected respectively with the operator's telephone, a drop-closing device and a calling device, the said springs being located in the path of the said switch in the order of their service substantially as described, whereby a single reciprocating movement of the switch and placing of its plug completes the duty of the operator in response to a call.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE S. MAXWELL.

Witnesses:

R. J. ACORE, Jr.,

FRED W. COLLOTON.