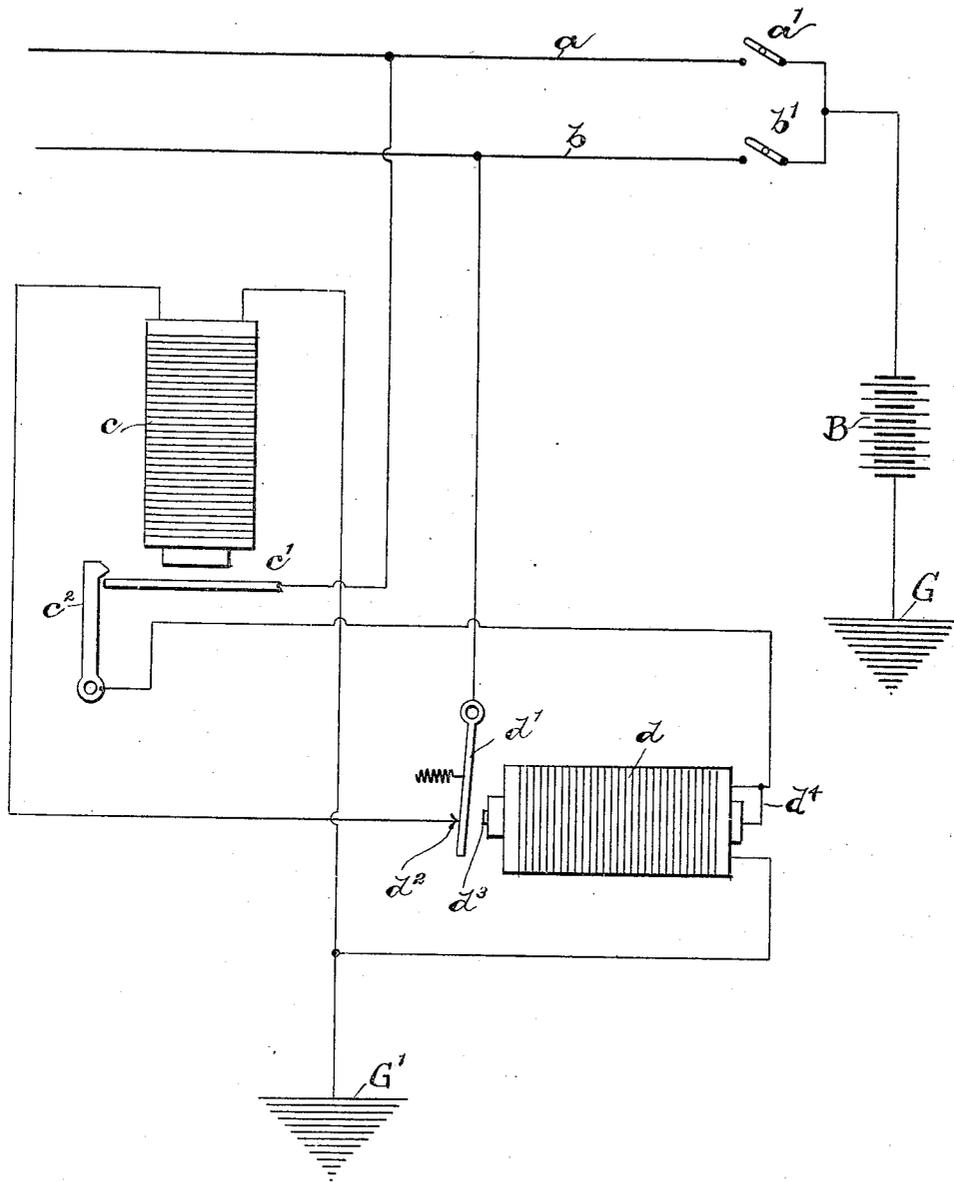


No. 806,950.

PATENTED DEC. 12, 1905.

W. M. BRUCE, JR.  
SELECTIVE SYSTEM FOR PARTY LINE TELEPHONES.  
APPLICATION FILED APR. 3, 1905.



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# UNITED STATES PATENT OFFICE.

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## SELECTIVE SYSTEM FOR PARTY-LINE TELEPHONES.

No. 806,950.

Specification of Letters Patent.

Patented Dec. 12, 1905.

Application filed April 3, 1905. Serial No. 253,700.

*To all whom it may concern:*

Be it known that I, WILLIAM M. BRUCE, JR., a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Selective Systems for Party-Line Telephones, of which the following is a specification.

My invention relates to improvements in circuits for telephone selective systems; and the object of my invention is to provide a simple form of circuit by means of which the controlling-magnets of the selector instrument may be operated without interfering with the usual talking-circuits and in such a manner that the talking-circuits cannot interfere with the effective working of the operating-magnets of the selector instruments.

My invention consists in the arrangements of magnets and circuits hereinafter described, and set forth in the claims.

The accompanying drawing is a diagram in a simple form of my circuit.

Like parts are represented by similar letters of reference.

In the said drawing, *a* and *b* represent the opposite sides of an ordinary telephone-circuit, which may be extended to as many stations as is desired on the line, the circuit in one such station only being illustrated.

*c* represents a magnet, which may be termed the "main" or "operating" magnet of the selector instrument, and having an armature *c'*. *d* is a magnet also, which may be termed the "auxiliary" or "releasing" magnet, and has an armature *d'*. The armature *c'* of the operating-magnet *c* is adapted to make electrical contact at each operation with a contacting device *c<sup>2</sup>*, and the armature *d'* of the auxiliary magnet *d* is adapted to normally make electrical contact with a contacting point *d<sup>2</sup>*. When the armature is operated by the magnetic force of the magnet *d*, it also makes electrical contact with a contacting point *d<sup>3</sup>*, forming another electrical connection, the contact *d<sup>2</sup>* at the same time being broken. This electrical contact *d<sup>3</sup>* is preferably formed through the core of the magnet, this core for the purpose being insulated from the other parts of the magnet and connected to an electrical circuit hereinafter described.

*G* represents the ground at a central or sig-

nal station. *G'* represents the ground at a substation or selector-station. A battery *B* at the central station has one pole connected to the ground and the other branched to switches or contacting devices, so that it may be connected to either or both sides of the main line *a b* by the switches or contacting devices *a'* and *b'*.

This form of circuit is intended to be used where a series of impulses are sent through an operating-magnet, the operation of which may be used to move a part of the mechanism to a position determined by the number of impulses, which when followed by the operation of another magnet releases the devices and permits them to return to zero. In my improved form of circuits this is accomplished as follows: By closing the switch *b'* the current is sent from one side of the grounded battery *B* through one side *b* of the main line, then through the armature *d'* of the magnet *d*, contacting devices *d<sup>2</sup>*, and operating-magnet *c*, and thence to the ground *G* at the substation. This impulse causes the armature *c'* to be attracted and make contact with the contacting device *c<sup>2</sup>*, which establishes a connection from the opposite side *a* of the line *a* through the magnet *d*. The switch *a'*, however, being open, this magnet *d* will not operate, and hence the magnet *c* may be operated as many times as desired from the battery and one side of the line without affecting the magnet *d*, except to close a circuit through the same from the other side of the line, making it possible to operate the same under certain conditions. If the switch *a'* be closed without the switch *b'*, the same side of the battery *B* would be connected to the opposite side *a* of the line; but with the switch *b'* open the circuit through the magnet *d* would be broken, because of the armature *c'* of the unenergized magnet *c* being away from the contact *c<sup>2</sup>*. If both switches should be closed, however, thus throwing one side of the battery *B* onto both sides *a* and *b* of the main line, the current would flow from the battery *B* through both sides of the line and would operate the magnet *c*, which in turn would close the circuit at *c<sup>2</sup>* and permit a current to pass from the line *a* through the magnet *d* to ground. As soon as the magnet *d* is energized the armature *d'* would be attracted and

break the current through the magnet *c*, allowing the armature *c'* to drop, which would in turn break the connection at *c*<sup>2</sup>. The circuit which passes from the contacting devices *c*<sup>2</sup> through the auxiliary magnet *d* to ground is branched, as shown at *d*<sup>4</sup>, to the contact *d*<sup>3</sup>. Hence when the armature *d'* is attracted a new circuit is established from the side *b* of the line through armature *d'*, the contact-point *d*<sup>3</sup>, branch *d*<sup>4</sup>, through the magnet *d* to ground, which circuit will allow the magnet *d* to continue to be energized so long as the switch *b'* remains closed after the closing of both switches. It will be seen that in the operation of these operating and auxiliary magnets by the use of one side of the line of the battery with grounded connections the two line-wires are never used in circuit; but the two wires are tied together when both switches are operated; but both sides of the line are used as one line from a single pole of the battery to ground, thus insuring the operating of the main and auxiliary magnets in any position which they may occupy and without interfering with the currents which may be passing through both sides of the lines *a b* for the purpose of talking or otherwise. The use of both sides of the line, however, is only for the purpose of moving into operative position the auxiliary or releasing magnet *d*, and by using both sides of the main line with the grounded connection this is effectively accomplished and in a way that cannot be interfered with at any substation by short-circuiting the line, which might be the case when one side only of the line is used. As soon as the magnet *d* has been energized a new circuit is established by which the current passes through one side of the line only, so that the full strength of the current is obtained in the operation of the auxiliary magnet *d*.

It will be understood that any number of these stations having a main and auxiliary magnets may be employed, connected, as shown, to the respective sides of the lines *a b*, operated from the circuit-closing devices *a'* *b*<sup>2</sup>, each of the instruments being operated exactly alike when the circuit-closing devices are operated.

Having thus described my invention, I claim—

1. In a system for selective signals, a main circuit, a source of electrical supply, one pole of which is grounded and the other pole adapted to be connected to either or both sides of said main circuit, a grounded connection from one side of said main circuit, including a circuit-breaker and a main operating-magnet, and a grounded connection from the

other side of said main circuit including a circuit-breaker and an auxiliary magnet, the circuit-breakers in each of said circuits being adapted to be controlled by the magnet in the other circuit, and means for sending an impulse from said source of electrical supply in the same direction through either or both sides of said circuit, substantially as and for the purpose specified.

2. In combination with a telephone-circuit, an operating-magnet in a grounded circuit connected to one side of said main circuit, an auxiliary magnet in a grounded circuit normally disconnected from the other side of said main circuit, but adapted to be brought into connection therewith by the operation of the main magnet, a circuit-breaker operated by said auxiliary magnet to break the circuit through the main magnet from one side of said telephone-circuit and establish a connection from the same side of said telephone-circuit to said auxiliary magnet, and means for sending an electrical impulse over both sides of said telephone-circuit through said main and auxiliary magnets, substantially as and for the purpose specified.

3. The combination with a main telephone-line of main and auxiliary magnets, branch lines including circuit-breakers from each side of the main line to said main and auxiliary magnets, respectively, and to ground, the circuit-breaker in one branch line being adapted to be controlled by the magnet in the other branch line, and an auxiliary circuit adapted, when the auxiliary magnet is operated, to change the connection of the auxiliary magnet from one side of the main line to the other side, substantially as and for the purpose specified.

4. The combination with a main telephone-line of an operating-magnet and a releasing-magnet located in grounded branch lines, including circuit-breakers, which branch lines are connected to opposite sides of said main telephone-line, said releasing-magnet being adapted to be brought into circuit by the operating-magnet, and when operated to cut out said operating-magnet, and an auxiliary circuit through the core of said releasing-magnet adapted to establish an electrical connection with the opposite side of the main telephone-line when the armature of said releasing-magnet is operated, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 14th day of March, A. D. 1905.

WILLIAM M. BRUCE, Jr.

Witnesses:

F. LLEWELLYN WALKER,  
CHAS. I. WELCH.