D. W. KNEISLY.

LINE CONNECTOR.

APPLICATION FILED JAN. 5, 1912.

1,112,415.

Patented Sept. 29, 1914.

2 SHEETS-SHEET 1.

Fig. 1

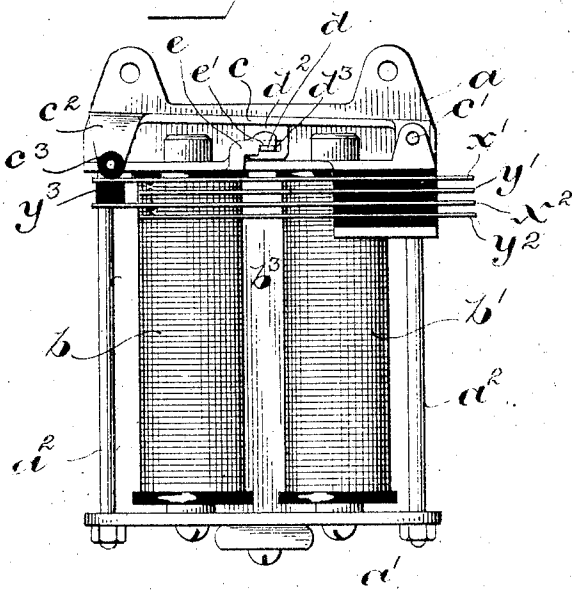


Fig. 2.

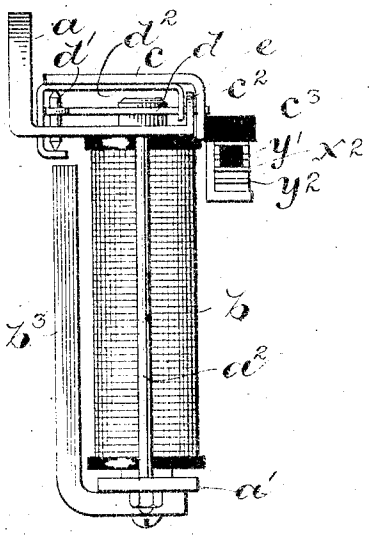


Fig. 3.

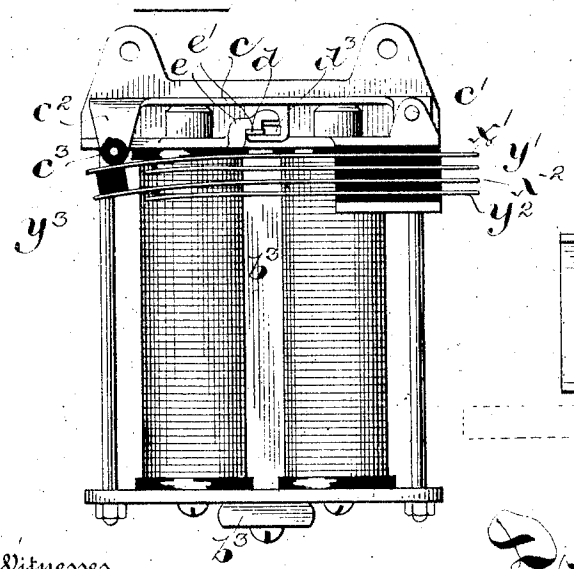
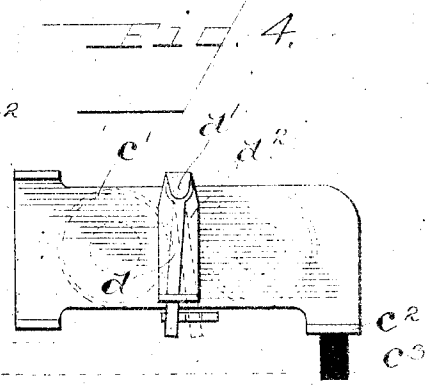


Fig. 4.



Witnesses

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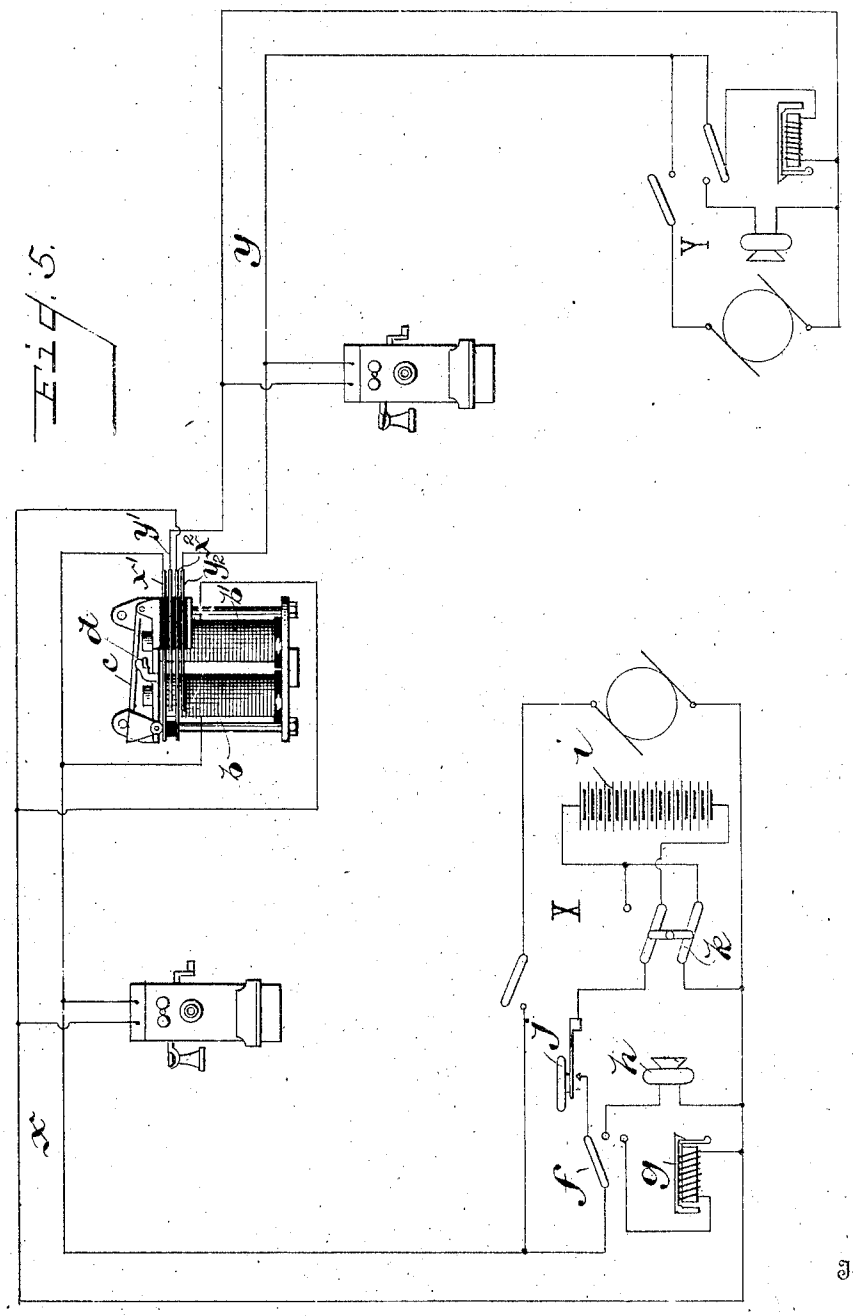
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2 SHEETS—SHEET 2.

Fig. 5.



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UNITED STATES PATENT OFFICE.

DANIEL W. KNEISLY, OF DAYTON, OHIO.

LINE-CONNECTOR.

1,112,415. Specification of Letters Patent. Patented Sept. 29, 1914.

Application filed January 5, 1912. Serial No. 669,635.

To all whom it may concern:

Be it known that I, DANIEL W. KNEISLY, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Line-Connectors, of which the following is a specification.

My invention relates to electrical apparatus and particularly to line connectors adapted to connect and disconnect electric circuits and controlled from a distant station.

The invention is applicable to electric circuits of any character such as signal circuits, telegraph circuits, lighting circuits, circuits controlling motors or other electrical machinery but is particularly applicable to telephone construction whereby it enables the central office operator to quickly connect a line of his office with a line out of a neighboring exchange for toll purposes or with a branch line which is normally disconnected and when the conversation is completed to positively and quickly disconnect such lines without the necessity of employing a party at the intermediate point to operate the connecting switch.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they will not only be cheapened in construction but will be more positive in operation, quickly and easily operated, applicable to existing circuit lines, positive in operation, and unlikely to get out of repair.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

In the drawings, Figure 1 is a front elevation of the assembled line connector in its normal or unoperated position. Fig. 2 is a side elevation thereof. Fig. 3 is a front elevation of the assembled device in its operated condition. Fig. 4 is a bottom plane view of the control armature removed from the apparatus. Fig. 5 is a diagrammatic view illustrating the installation of the line connector whereby two telephone lines from neighboring exchanges may be connected and disconnected at will.

Like parts are indicated by similar characters of reference throughout the several views.

In constructing the apparatus there is employed a main frame comprising a head portion a connected to a transverse yoke a' by connecting rods a^2. Supported in said main frame is an electromagnet comprising two coils b and b^1. There is also carried on the main frame a permanent magnet b^3. Pivotally connected to the head portion a at the point c^1 is an armature c attracted by the electromagnet coils b and b^1 upon the closing of the circuit therethrough. Carried upon a suitable bracket projecting from the main frame and insulated one from the other and from said main frame are four contacts x^1, x^2, y^1 and y^2 representing the terminals of the two circuits or two portions of a single circuit to be connected by the apparatus. The contacts x^1 and x^2 are connected one with the other by an intermediate insulated connector y^3 whereby said contacts will be flexed in unison. The armature c carries a pendant finger c^2 which in turn supports a stud c^3 of insulating material which rests upon the uppermost contact x^1. When the coils b, b^1 are energized by the closing of the circuits therethrough the armature c is attracted by said coils b, b^1 and drawn downward against the tension of the flexible contact blades x^1, x^2, thereby bending said contacts x^1, x^2, into engagement with the alternating contacts y^1 and y^2 and closing the circuit between x^1 and y^1 and between x^2 and y^2. In order to maintain the apparatus in its operated condition until released by the operator there is pivotally supported upon the control armature c a polarized armature d. The polarized armature d is provided with a trunnion d^1 mounted in a suitable bracket d^2 secured to the under side of the control armature c. The outer end of the bracket d^2 is bent downward and provided with an opening d^3 through which the polarized armature d projects. The slotted opening d^3 in the downward projecting extremity of the bracket d^2 limits the oscillation of the polarized armature in either direction. Projecting upward from the head portion a of the main frame is a shouldered projection e under the shoulder e^1 of which the polarized armature d is adapted to engage to lock the control armature c in its operated position.

In installing the apparatus the coils b and b^1 are bridged across the main or operating

circuit while the terminals of said main circuit are connected to one set of the contacts while the terminals of the other circuit to be connected with the main circuit are connected with the second set of terminals. It is immaterial whether the main circuit be connected with the contacts x^1 and x^2 or with y^1 and y^2. The apparatus being so connected an electric impulse is transmitted in one direction over the line energizing the coils b, b^1 which attract the control armature c. The control armature c approaching the coils b, b^1 flexes the contact blades x^1 and x^2. The same impulse causes the polarized armature d to be oscillated upon its trunnion d^1 toward the coil b whereby it will be engaged beneath the shoulder e^1 of the projection e. Thus the armature is held in its depressed or operated position after the coils b, b^1 are deënergized. It is seen that the oscillation of the control armature c closes the contact between the flexible blade x^1 and y^1 and x^2 and y^2 thereby connecting the main or operating circuit with the second circuit, and the armature is locked in its operated position by the operation of the polarized armature d. This is the condition of the parts as shown in Fig. 3. When it is desired to disconnect the circuit an impulse is transmitted over the main line in the opposite direction again energizing the coils b, b^1 but causing the polarized armature d to swing in the opposite direction or toward the coil b^1 and from under the shoulder e^1 of the projection e thereby releasing the control armature c which will be elevated by the elasticity of the spring contact blades x^1 and x^2.

In Fig. 5 there are represented two telephone exchanges X and Y from which extend subscribers' lines x and y respectively. These subscribers' lines x and y normally independent of each other are adapted to be connected one with the other to form an inter-communicating line between the two exchanges. In the present instance the connection of these lines is under the control of the operator of exchange X. The coils b and b^1 are bridged across the subscriber's line x and the two sides of said subscriber's line x are connected to the contact blades x^1 and x^2. The two sides of the subscriber's line y are connected to the contact blades y^1 and y^2. Referring to the exchange X, f is the master switch adapted to bring into the circuit either the annunciator g, the operator's instrument h or to connect with the subscriber's line the circuit from the battery i in which is included an impulse transmitting key j and a pole changer k. The master switch f being closed with the circuit the impulse key j is operated to send an impulse over the subscriber's line x, such an impulse momentarily energizes the coils b and b^1 which attracting the armature c serves to close the contacts between the contact blades x^1, y^1 and x^2, y^2 thereby joining the two subscribers' circuits x and y. The same impulse causes the polarized armature d to swing toward the coil b and under the shoulder e^1 of the projection e thereby locking the armature c in its operated position. When it is desired to release the apparatus or to disconnect the subscribers' lines x and y the pole changer k is shifted reversing the polarity of the circuit whereupon an impulse transmitted over the line by again closing the key j will momentarily energize the coils b and b^1 and cause the polarized armature d to swing toward the coil b^1 and from under the shoulder e^1 of the projection e thereby releasing the armature c. It is obvious that an additional instrument may be bridged across the line y thereby enabling the lines to be connected from either exchange.

From the above description it will be apparent that there is thus produced a machine of the character described possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

Having thus described my invention, I claim:

1. In a line connector, an electric circuit, an electromagnet bridged across the line, a second circuit, a switch adapted to connect said circuits, an armature attracted by said electromagnet and by its movement adapted to close the switch to connect the circuits, a polarized armature carried by the first mentioned armature, a fixed stop adapted to be engaged by the polarized armature when the latter is oscillated in one direction during the time that the first mentioned armature is attracted, to lock said first mentioned armature in its operated position, said polarized armature being withdrawn from engagement with the stop to release the first mentioned armature by a reversal of the current.

2. In a line connector, an electric circuit, an electromagnet in said circuit, an armature controlled by said magnet, a switch controlled by the movement of the armature, a latch comprising a polarized armature for locking the switch in its operated position and for releasing same from a distant point through the operation of said magnet, substantially as specified.

3. In a line connector, an electric circuit, an electromagnet, a switch, an armature governed by the electromagnet and by its movement adapted to operate said switch, a polarized armature carried by the switch operating armature, but capable of movement independent thereof for locking said switch operating armature by an impulse

through said magnet in one direction and for releasing it by an impulse through the magnet in the opposite direction, substantially as specified.

4. In a line connector, an electric circuit, an electromagnet, a switch controlled by said magnet, a polarized armature and a detent engaged by the polarized armature to lock said switch, the construction and arrangement being such that when an impulse is transmitted through the magnet in one direction the armature is shifted into engagement with the detent and when an impulse is transmitted in the opposite direction, the armature is disengaged therefrom to release the switch.

5. In a line connector, an electric circuit, an electromagnet, a switch, a movable armature attracted by the magnet and by its movement adapted to control the switch, a polarized armature movably mounted on said control armature and means engaged by the polarized armature when it is moved in one direction whereby the control armature will be locked to maintain the switch in closed position, substantially as specified.

6. In a line connector, two converging electric circuits, a switch adapted upon operation to connect the corresponding sides of said circuits to form a single circuit, electrically controlled switch operating mechanism, a polarized arm armature adapted to be operated to lock the switch by a preliminary impulse over one of said circuits, and to open said switch by a final impulse over the same circuit, substantially as specified.

In testimony whereof, I have hereunto set my hand this 14th day of December 1911.

DANIEL W. KNEISLY.

Witnesses:
HARRY F. NOLAN,
EFFIE B. LUTTINGER.