

No. 887,263

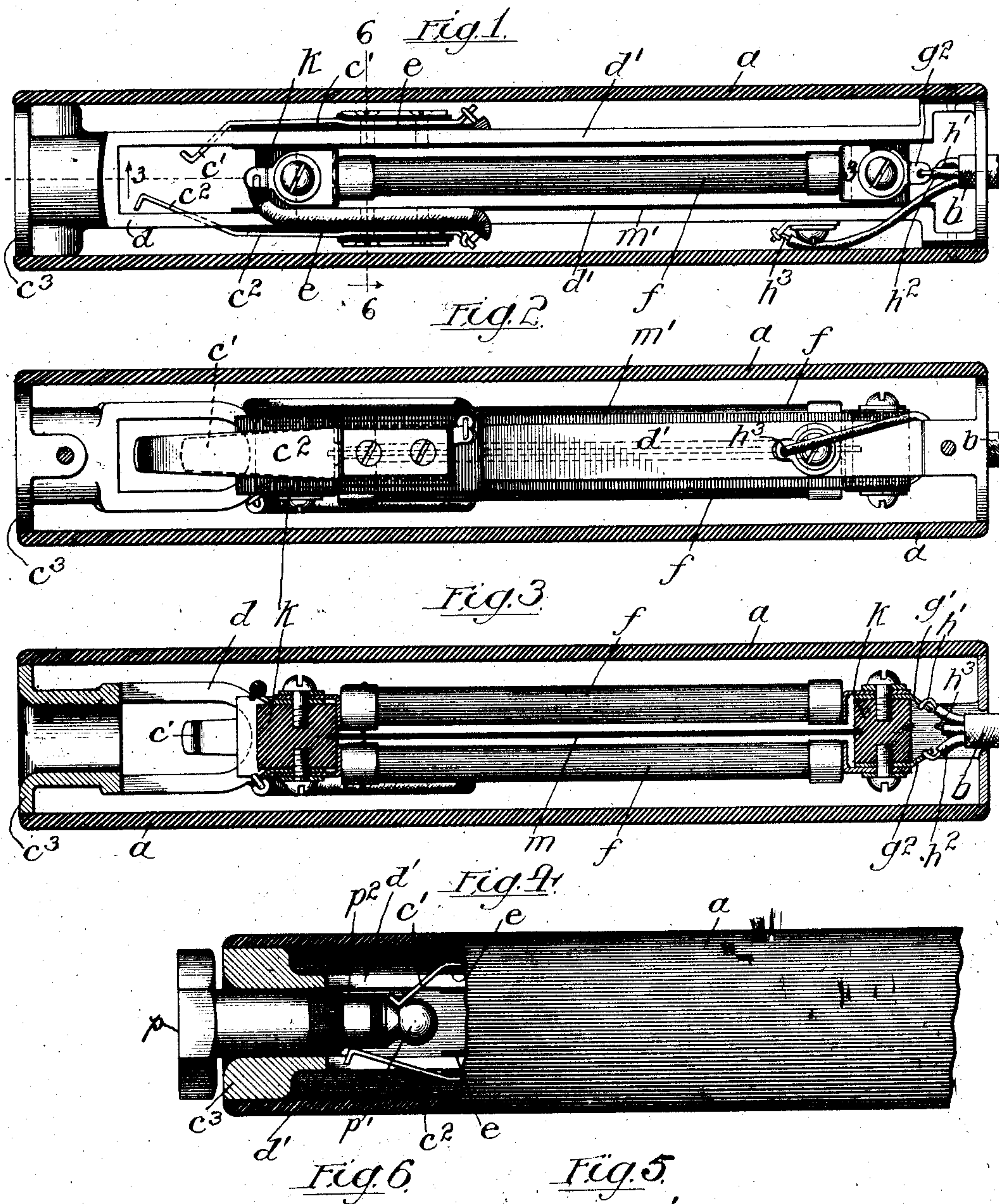
PATENTED MAY 12, 1908.

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CONNECTION SWITCH.

APPLICATION FILED DEC. 7, 1904.

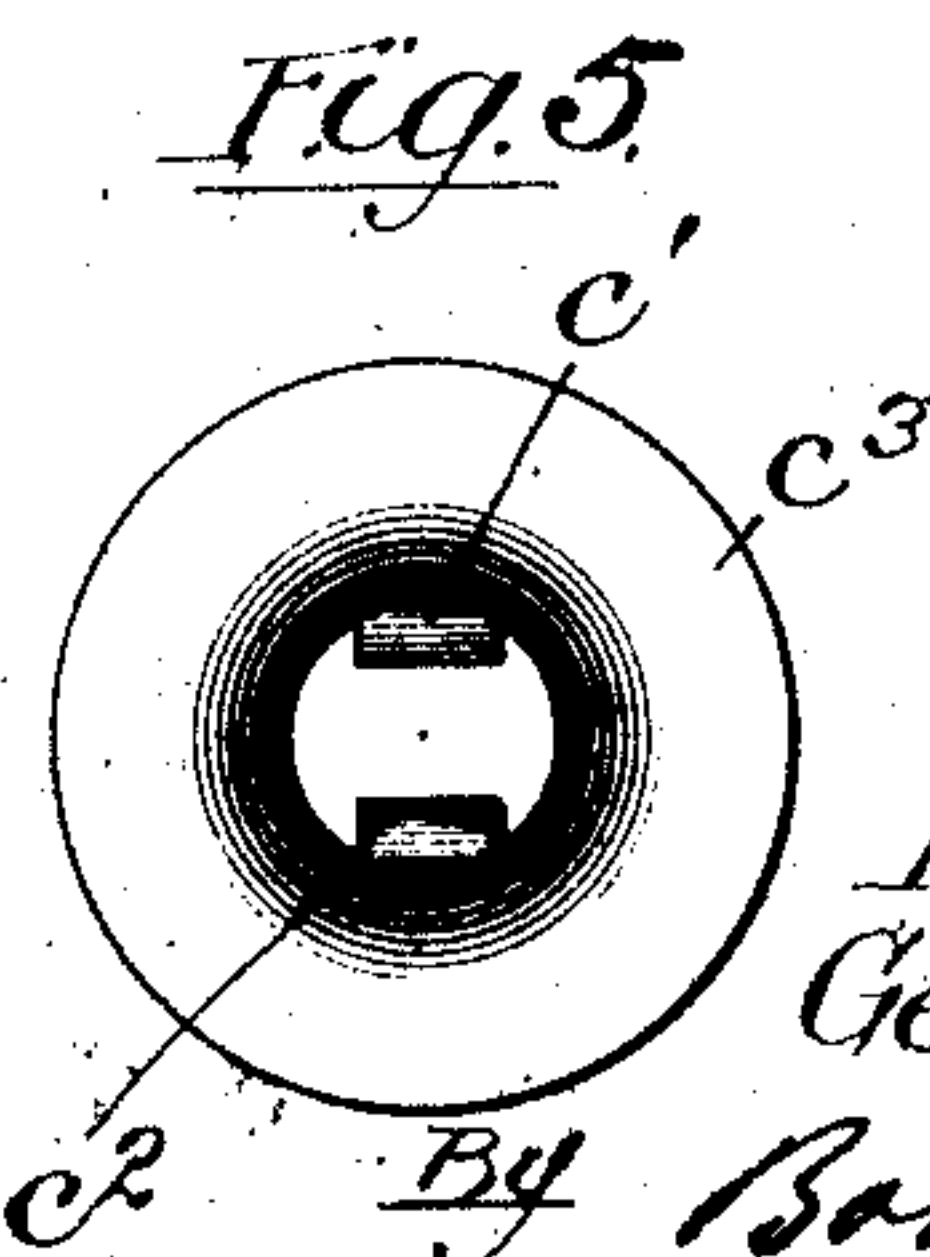
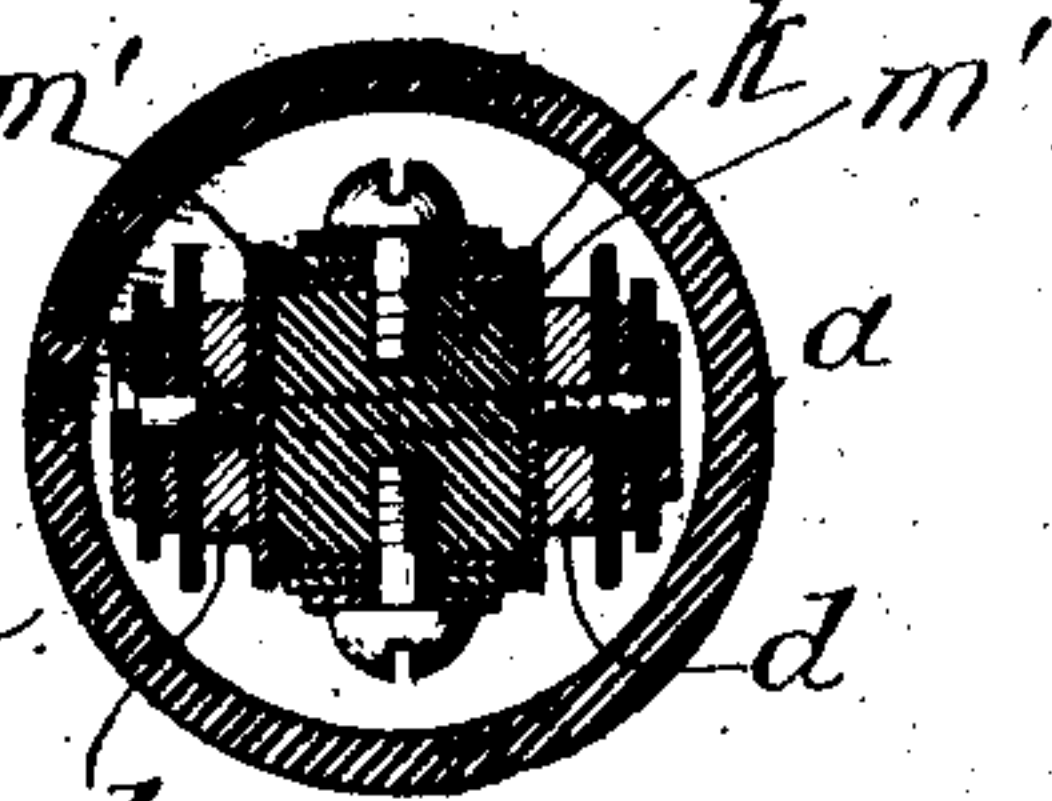
2 SHEETS—SHEET 1.



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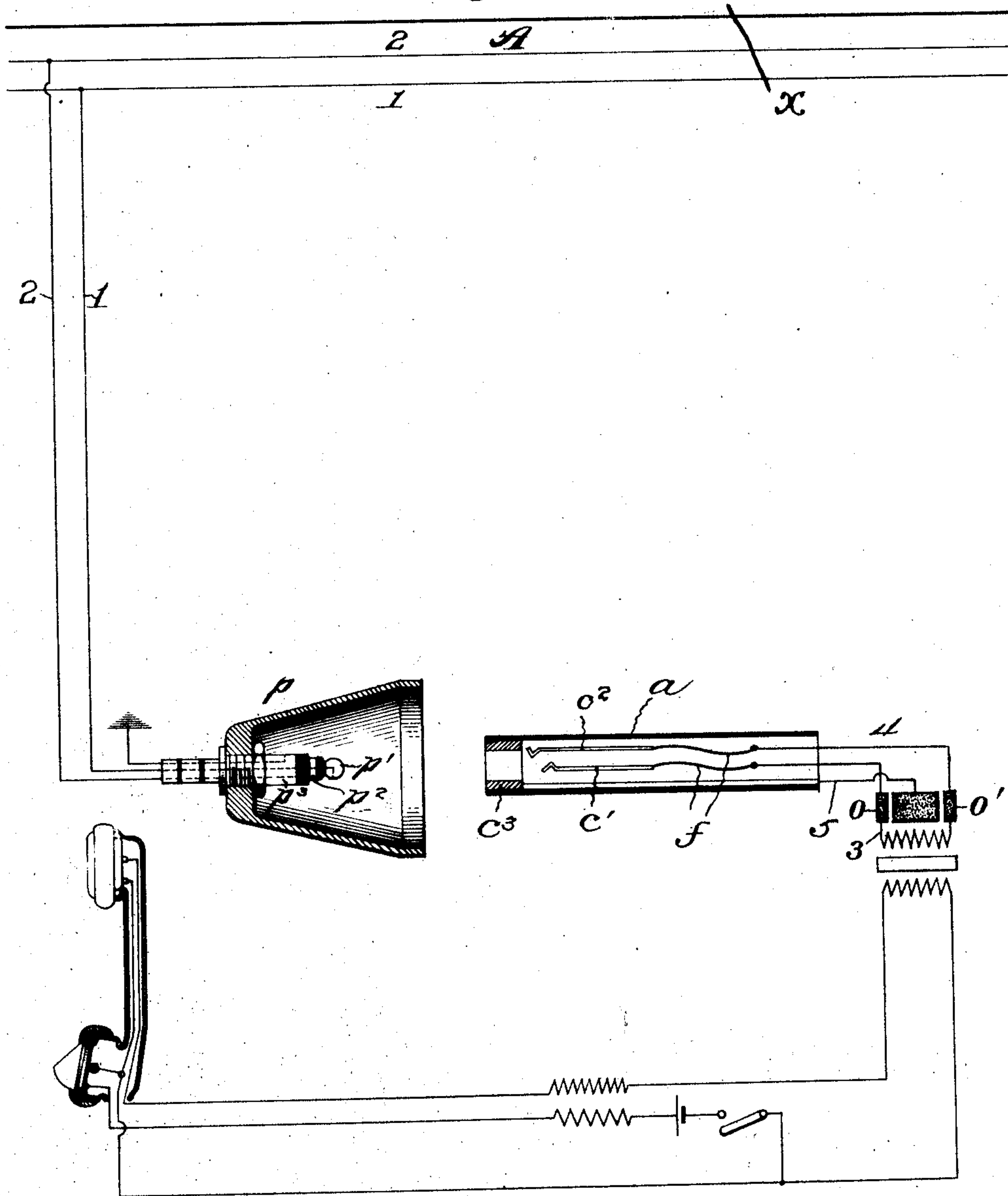
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2 SHEETS—SHEET 2.

Fig. 7.



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# UNITED STATES PATENT OFFICE.

GEORGE K. THOMPSON, OF NEWTON HIGHLANDS, MASSACHUSETTS, AND FRANK R. McBERTY, OF EVANSTON, ILLINOIS, ASSIGNORS TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## CONNECTION-SWITCH.

No. 887,263.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed December 7, 1904. Serial No. 235,859

*To all whom it may concern:*

Be it known that we, GEORGE K. THOMPSON, residing at Newton Highlands, Suffolk county, Massachusetts, and FRANK R. McBERTY, residing at Evanston, Cook county, Illinois, citizens of the United States, have invented a certain new and useful Improvement in Connection-Switches, of which the following is a full, clear, concise, and exact description.

Our invention relates to a connection switch for electric circuits, and more particularly to a switch adapted for use where telephone instruments are to be connected with circuits which are so placed as to be liable to crosses with other circuits carrying heavy currents, such as electric railway or power circuits.

It is frequently considered desirable in electric railway work, to have a telephone line extending alongside the track with switch terminals at intervals, at any one of which a portable telephone set may be temporarily connected.

Our invention is directed particularly toward a device which will be well adapted to serve as the terminal connector of the portable telephone set, to engage and cooperate with any of the stationary switch terminals of the telephone line, to establish a connection.

Our object is to provide a connector which will be simple, strong, reliable and efficient, and which will afford the user adequate protection against injury from high tension currents which may accidentally come upon the telephone line.

We will describe our invention particularly by reference to the accompanying drawings, and the parts, improvements or combinations considered to be novel will be pointed out in the appended claims.

In the drawings, Figure 1 is a side view of our improved connector, the inclosing holder being shown in section to reveal the working parts; Fig. 2 is a similar view taken at right angles to Fig. 1; Fig. 3 is a longitudinal sectional view on line 3-3 of Fig. 1; Fig. 4 shows the connector in engagement with a stationary plug terminal of a telephone circuit to make connection therewith, the inclosing case being partly broken away; Fig. 5 is an end view; Fig. 6 is a cross-section on line 6-6 of Fig. 1; and Fig. 7 is a diagram showing the

circuits of a telephone set with which our improved connector may be employed. 55

The same letters of reference are used to designate the same parts whenever they are shown.

The switch is essentially a sort of movable springjack, having its contact parts arranged to be connected respectively with the several conductors of a flexible switchcord leading to the telephone instrument. The contact parts are mounted upon a frame which is inclosed in a tube *a* of insulating material, open at one end for the reception of the plug, and having the conducting cord *b* led in through a hole in the rear end. The plug *p* with which this springjack connector is adapted to engage, is provided with tip, ring and sleeve contacts similar to an ordinary three part plug, such as used in telephone switchboards, except that it is preferably about twice as large. The tip and ring contacts *p'* *p''* of the plug will in practice be connected to the two sides of the metallic circuit telephone line, while the shank or sleeve contact will be grounded. 60 65 70 75

The springjack is provided with a metallic tube or guide *c*<sup>1</sup> at the mouth, and two contact springs *c'* *c''* are arranged in the inside of the device, with their free ends at different distances from the front of the tube in position to engage the tip and ring contacts, respectively, of an inserted plug. The framework *d* of the springjack is preferably brass, having annular enlargements at each end, adapted to fit closely in the inclosing hard rubber tube *a*; the enlargement at the forward end constituting the thimble of tubular guide *c*<sup>1</sup> to receive the plug. The body portion of the frame preferably consists of two flat parallel plates or strips *d'* *d''* uniting the end portions. The contact springs *c'* *c''* are supported upon the outer sides of these flat plates, which are cut away or provided with openings near the forward end, through which inwardly-bent free ends of the springs project nearly to the axis of the tube. The springs are insulated from the supporting plates *d'* *d''* by suitable insulating plates or strips *e* *e'*, which are preferably of micanite. The contact springs *c'* *c''* are electrically connected through fuses *f* *f'* with terminal pieces *g'* *g''* at the rear, to which the conductors *h'* *h''* of the flexible cord *h* may be attached, pref- 80 85 90 95 100 105



erably by soldering. The third conductor  $h^3$  of the cord may be connected to a terminal piece which is mounted directly upon the frame  $d$  and so is in electrical connection with the tubular guide  $c^3$  at the front. The fuses are preferably of the well-known type shown, the fuse wire being inclosed in fiber insulating tubes with terminal washers at each end. In the device shown the fuses are mounted in the channels between the two side plates or strips  $d' d'$  of the frame, separated by a micanite plate  $m$ . The inner sides of the two brass strips are lined with micanite side plates  $m' m'$ , and the plate  $m$  extends in a transverse plane along the middle between the plates  $m' m'$ , and is supported at the ends in insulating blocks  $k k$  which are fastened between the side strips. Said blocks  $k k$  may be provided with slots to receive the ends of the plate  $m$ , and may also have mounted thereon the binding screw terminals which hold the end plates or terminals of the fuses.

Referring to Fig. 7, we have illustrated a telephone line A extending in two limbs 1 2 parallel to a high tension circuit, such as a trolley line, with branches leading to the line contacts  $p' p^2$  of a stationary switch member or plug  $p$ ; the third contact  $p^3$  whereof is connected to earth. The telephone set shown is equipped with the connector of our invention, whereby it may be temporarily united with the telephone line through the medium of said stationary switch member. The main conductors 3 4 lead from the telephone apparatus to the connector and thence through the fuses  $f f$  to the line springs  $c' c^2$  thereof, the thimble or tubular contact piece of the connector being connected by conductor 5 with the ground plate of a lightning arrester, whose line plates  $o o'$  are connected with the conductors 3 4, respectively. Thus when the telephone line A is accidentally crossed with the trolley line, as indicated at X, and the terminal connector is united with the stationary switch member, to connect the telephone set with the line, the heavy current present in the line will pass through the fuses and lightning arresters to earth by way of the third contacts of the switch members, blowing the fuses and thereby disconnecting the telephone apparatus from the line and protecting the user of the set from injury. It will thus be apparent that the fuses are so located that when blown, all the apparatus and conductors of the telephone set will be dead—that is, totally disconnected from the telephone line,—with the exception of the third conductor 5, which is grounded by way of contacts  $c^3 p^3$  before the other conductors are joined to the line, in order to conduct the heavy current to earth.

We claim:—

1. In a springjack connector, the combination with a frame, of contact springs carried

thereby, protective devices supported by said frame and included in the circuits leading to said contact springs, and a cover for said connector adapted to serve as a handle therefor.

2. In a springjack connector, the combination with a frame, of contact springs carried thereby, the free ends of said springs lying behind an opening in one end of the frame, protective devices carried by the frame and included in the circuits leading to said contact springs, and a cover inclosing said frame and protective devices.

3. In a springjack connector, the combination with a metallic frame, of a tubular contact piece or thimble formed by one end of the frame, contact springs mounted upon but insulated from said frame, with their free ends lying behind the said tubular contact piece, and fuses carried by said frame, one of said fuses being included in the circuit of each of said contact springs.

4. In a springjack connector, the combination with a metallic frame, of a tubular contact piece formed by the front end of said frame, contact springs mounted upon but insulated from said frame, said springs lying on opposite sides of the axis of the frame and parallel therewith, the free ends of said springs lying behind said tubular contact piece, connection terminals carried at the rear end of the frame and electrically connected with said contact parts, fuses mounted within the frame between said contact springs and said connection terminals, and a cover of insulating material for said frame adapted to serve as a handle for the switch.

5. In a springjack connector, the combination with a metallic frame, of a tubular contact piece formed by the front end of said frame, contact springs mounted upon but insulated from said frame, said springs lying on opposite sides of the axis of the frame, and parallel therewith, the free ends thereof projecting into the axial plane of the frame and lying behind said tubular contact piece, binding screws carried at the rear of the frame and electrically connected with said contact parts, insulating blocks mounted within said frame, fuses secured thereto, one of said fuses being included in the circuit of each of said contact springs, said frame having an opening in the rear thereof permitting the entry of conducting wires, and a tubular cover of insulating material for said frame adapted to serve as a handle for the connector.

6. In a springjack connector, the combination with a frame comprising end pieces and plates uniting the same, said end pieces having openings therein, springs mounted upon said plates with their free ends lying behind the opening in the front end piece, fuses supported between said plates and included in the circuits leading to said springs, the open-

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ing in the rear end piece permitting the entry of conducting wires leading to said contact parts, and a cover for said frame adapted to serve as a handle for the connector.

5 7. In a springjack connector, the combination with a metallic frame comprising annular end pieces and plates uniting them, a tubular contact piece or thimble formed by the front end-piece, a spring mounted upon the  
10 outside of each of said plates and insulated therefrom, said springs extending through openings in the plates, with their free ends lying immediately behind said tubular contact piece, fuses supported between said side  
15 plates and included in the circuits leading to said springs, and a tubular cover of insulating material for said frame.

8. In a springjack connector, the combination with a metallic frame, of a tubular contact piece formed by the front end of said  
20 frame, contact springs mounted upon but insulated from said frame, said springs lying on opposite sides of the axis of the frame and parallel therewith, the free ends thereof lying  
25 behind said tubular contact piece, and a tubular insulating cover for said frame adapted to serve as a handle for the connector.

9. In a springjack connector, the combination with a frame comprising end pieces and  
30 plates uniting them, said end pieces having openings therein, springs mounted upon said plates with their free ends lying behind the opening in the front end piece, the opening in the rear end piece permitting the entry of  
35 the conducting wires leading to said contact parts, and a cover for said frame adapted to serve as a handle for the connector.

10. In a springjack connector, the combination with a metallic frame comprising annular end pieces and plates uniting them, a tubular contact piece or thimble formed by the front end piece, a spring mounted upon the outside of each of said plates and insulated therefrom, said springs extending  
40 through openings in the plates, with their free ends lying immediately behind said tubular contact piece, and a tubular cover of insulating material for said frame.

11. The combination with the frame of a  
50 springjack connection, of contact springs carried thereby adapted to engage a plug, protective devices supported by said frame, and included in the circuits leading to said springs, and a cover for said connector.

12. A springjack connector, comprising 55 contact springs in position to engage contacts of a plug, protective devices associated with said springs, and a cover for said connector.

13. A movable springjack connector comprising contact springs adapted to engage the contacts of a stationary plug, protective devices connected with said springs, and a cover for said connector adapted to serve as a handle therefor. 65

14. A springjack connector comprising a frame, a contact piece at one end of said frame, contact springs mounted upon said frame, said contact piece and springs being adapted to engage contact pieces of a plug, 70 and protective devices connected with said springs.

15. In a springjack connector, the combination with a frame, of a contact piece formed at one end of the frame, contact springs 75 mounted upon said frame, with their free ends lying behind said contact piece, and protective devices carried by said frame, one of said protective devices being included in the circuit of each of said contact springs. 80

16. A springjack connector comprising a frame, a contact piece formed at the front end of the frame, contact springs mounted upon said frame on opposite sides of the axis thereof, the free ends of said springs lying 85 behind said contact piece, and a handle for said connector.

17. The combination with the frame of a movable springjack connector, of contact springs carried by said frame, protective devices supported by said frame and connected serially with said springs, and a cover for said parts adapted to serve as a handle for the connector. 90

18. In a springjack connector, the combination with contact springs adapted to engage corresponding contact parts of a plug, of protective devices included in the circuits leading to said springs, and a cover for said connector. 100

In witness whereof, we hereunto subscribe our names this 23rd day of September A. D., 1904.

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