

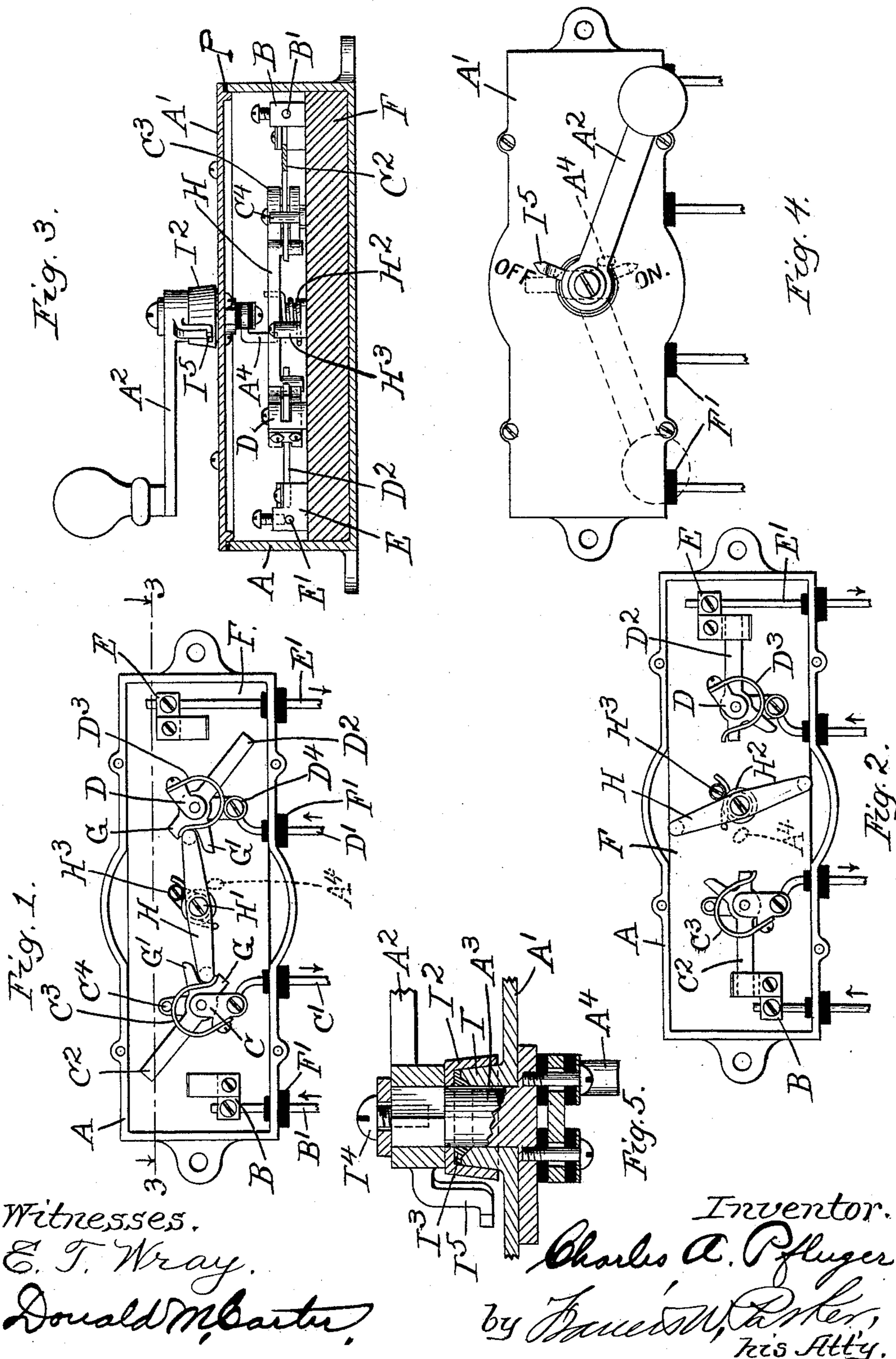
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Patented July 5, 1898.

C. A. PFLUGER.  
SWITCH FOR ARC LAMPS.

(Application filed Dec. 21, 1896.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## SWITCH FOR ARC-LAMPS.

SPECIFICATION forming part of Letters Patent No. 606,939, dated July 5, 1893.

Application filed December 21, 1896. Serial No. 616,447. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. PFLUGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Switches for Arc-Lamps, of which the following is a specification.

My invention relates to switches for electric circuits, and has for its object to provide a new and improved switch, of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a plan view of a switch embodying my invention with the cover removed. Fig. 2 is a similar view with the parts differently disposed. Fig. 3 is a section on line 3 3 of Fig. 1 with the cover in place. Fig. 4 is a plan view of the switch. Fig. 5 is an enlarged sectional view showing the manner of attaching the handle to the cover of the switch.

Like letters refer to like parts throughout the several figures.

As illustrated in the drawings, the switch is placed within a box A, having a cover A'. The switch is provided with the four terminals B, C, D, and E, to which are connected the wires B', C', D', and E', leading from the switch. The terminals of the switch are attached to a block F of insulating material—such, for example, as slate—and the wires leading from the terminals are provided with the insulating-bushing F'. The terminals B and E are preferably provided with the ordinary spring-fingers, between which are forced the arms C<sup>2</sup> D<sup>2</sup>, connected, respectively, with the terminals C and D. The arms C<sup>2</sup> and D<sup>2</sup> are provided at their adjacent ends with the projections G G'. An operating-arm H is pivoted at the point H' and is adapted to engage the projections G and G' on the arms C<sup>2</sup> D<sup>2</sup>. This controlling-arm H is provided with a coil-spring H<sup>2</sup>, said coil-spring being connected at one end with the arm and at the other with a stationary part and normally tending to force the arm into the position shown in Fig. 2, the further movement of the arm being prevented by the stop H<sup>3</sup>. The terminals C and D are provided with the springs C<sup>3</sup> D<sup>3</sup>, said springs being connected at one end to the terminals and being free at the other end, such free ends so positioned

as to make contact with the controlling-arm H when said arm is in the position shown in Fig. 1. Said springs C<sup>3</sup> and D<sup>3</sup> are held in the proper position by engagement with the stops C<sup>4</sup> and D<sup>4</sup>. The cover A' of the box A is provided with an operating-handle A<sup>2</sup>, said handle being connected to the piece A<sup>3</sup>, projecting through the cover of the box, said piece being provided with the finger A<sup>4</sup>, said finger being insulated from the part A<sup>3</sup>. This projection A<sup>4</sup> is so positioned as to engage the controlling-arm H and operate it when the operating-handle A<sup>2</sup> is moved.

I prefer to have the switch inclosed, so as to be waterproof, and have shown in Fig. 5 a construction by which the operating-handle is connected to the cover so as to prevent moisture from entering. As shown in this figure, the cover is provided with the upwardly-projecting ring I, over which fits the cap I<sup>2</sup>, the ring I being cut away or formed so as to form the washer or packing I<sup>3</sup>, to be interposed between said ring and the cap I<sup>2</sup>. The operating-handle A<sup>2</sup> is provided with a hole and is slipped upon the part A<sup>3</sup>, being held in place by means of the screw I<sup>4</sup>. The position of the switch is shown by means of a pointer I<sup>5</sup>, placed upon the operating-handle, the cover being provided with the words "On" and "Off," as shown in Fig. 4, or with some similar indicating-marks, the condition of the switch being shown by the position of the pointer I<sup>5</sup>.

I have described the several parts of my switch in detail; but it is evident that these parts may be varied in form, construction, and arrangement without departing from the spirit of my invention, for I have only endeavored to show one form of my invention, so as to make the explanation clear. I therefore do not wish to be limited to the form, construction, and arrangement of the switch as herein shown and described. I also provide a gasket or packing P, which is inserted between the lid and the remainder of the box, so as to make a waterproof connection. The insulating-bushings are also provided with packing, the whole box being waterproof, so that the switch is in no manner affected by exposure to the weather.

The use and operation of my invention are as follows: It is of course evident that this

switch can be used in any manner desired. The switch is particularly adapted for circuits to which it is desired to add and subtract other circuits—as, for example, in the case of arc-lamps. As illustrated in the drawings, the main circuit is connected with the terminals C and D, and when the switch is in the position shown in Fig. 1 the main circuit is completed through the arm II. The branch circuit is connected to the terminals B and E. When it is desired to cut in the branch circuit, the operating-handle  $A^2$  is moved so that the indicating-finger  $I^5$  points to the word "On." The movement of this operating-handle causes the finger  $A^4$  to engage the arm II and move it to the position shown in Fig. 2. This movement of the arm II causes the arms  $C^2$  and  $D^2$  to be moved so as to connect the terminals B and C and D and E, as shown in Fig. 2. The switch is so constructed that the circuit is completed through the terminals B and E before it is broken between the terminals C and D, thereby preventing a spark at the terminals B and E. As the arm II moves so as to force the arms  $C^2$  and  $D^2$  in contact with their opposed terminals, the contact with the arms  $C^2$  and  $D^2$  is not broken until after said arms make contact with the terminals B and E. After said arms  $C^2$  and  $D^2$  are forced into contact with their opposed terminals the arm II, which at this point is in contact with the projections  $G G'$ , is released from said projections and is suddenly moved in contact with the stop  $II^3$ , as shown in Fig. 2, by means of the spring  $II^2$ . It will therefore be seen that I have here a switch which cuts in the branch circuit before the main circuit is opened and which also instantly breaks the main circuit, thereby forming a quick-break switch and avoiding injurious sparks. When it is desired to cut out the branch circuit, the arm  $A^2$  is moved until the pointer  $I^5$  is opposite the word "Off." During this movement the finger  $A^4$  engages the arm II and moves it into engagement with the arms  $C^2 D^2$ , the ends of the arm II passing between the projections  $G G'$ . The further movement of the controlling-handle brings the ends of the arm II in contact with the spring  $C^3 D^3$ , at the same time moving the arms  $C^2$  and  $D^2$  so as to disengage them from the terminals B and E. The parts are so arranged that the ends of the arm II make good contact with the springs  $C^3 D^3$  before the branch circuit is broken, thereby completing the main circuit before there is any break, thus preventing injurious sparks.

It will be seen that I have here a switch having many advantages and which may be used for many different purposes.

My switch is particularly adapted to be placed outside of buildings, as it is weather-proof and the switch so constructed as to eliminate any element of danger in the making and breaking of the circuits.

I claim—

1. A switch for electric circuits, comprising

four terminals divided into two pairs, an arm associated with each pair of terminals and adapted to connect the terminals of the respective pairs together, a conducting controlling-arm located between the pairs of terminals and adapted to become part of the circuit at predetermined times, said controlling-arm adapted to operatively engage said arms when in a predetermined position and move them both into and out of contact with their opposed terminals.

2. A switch comprising four terminals, two of which are adapted to be connected with the main circuit and two with the branch circuit, arms associated with the main-circuit terminals and adapted to connect them with one of the branch-circuit terminals, a controlling-arm between the main-circuit terminals and said arms, but free therefrom, said controlling-arm adapted when in a predetermined position to electrically connect the main terminals together, said controlling-arm also adapted to operatively engage the arms associated with the main-circuit terminals and move them in either direction, so as to disconnect or connect each main-circuit terminal with its associated branch-circuit terminal, the parts so constructed that the connection between the main-circuit and branch-circuit terminals is completed before the controlling-arm becomes disengaged from said arm, so as to disconnect the main-circuit terminals.

3. A switch comprising four terminals, two of which are adapted to be connected with the main circuit and two with the branch circuit, an arm associated with each of the main-circuit terminals and adapted to connect it with one of the branch-circuit terminals, a controlling-arm between the main-circuit terminals and adapted when in a predetermined position to electrically connect them together, said controlling-arm adapted to operatively engage said arms and move them so as to disconnect the main-circuit terminals from the respective branch-circuit terminals.

4. A switch comprising two main-circuit terminals, branch-circuit terminals associated therewith, an arm associated with each of said main-circuit terminals and adapted when in predetermined positions to connect the main-circuit terminals with the branch-circuit terminals, each of said arms provided at one end with projections, a controlling-arm intermediate between said main-circuit terminals and adapted when in a predetermined position to engage said projections, a spring-piece associated with each of said main-circuit terminals, and adapted to engage said controlling-arm when said arm is in a predetermined position, thereby connecting the main-circuit terminals, said controlling-arm adapted to control the position of the arms associated with the main-circuit terminals by means of its engagement with said projections so as to make or break said branch circuit, the parts so arranged that the branch circuit is com-

pleted before the main circuit is broken and is not broken until after the main circuit is completed.

5. A switch comprising two main-circuit terminals, branch-circuit terminals associated therewith, an arm associated with each of said main-circuit terminals and adapted when in predetermined positions to connect the main-circuit terminals with the branch-circuit terminals, each of said arms provided at one end with projections, a controlling-arm intermediate between said main-circuit terminals and adapted when in a predetermined position to engage said projections, a spring-piece associated with each of said main-circuit terminals, and adapted to engage said controlling-arm when said arm is in a predetermined position, thereby connecting the main-circuit terminals, said controlling-arm adapted to control the position of the arms associated with the main-circuit terminals by means of its engagement with said projections so as to make or break said branch circuit, the parts so arranged that the branch circuit is completed before the main circuit is broken and is not broken until after the main circuit is completed, a box completely inclosing said switch and insulated therefrom, an operating-handle outside of the box and connected with said controlling-arm, an indicating-finger associated with said handle, indicating-points on the box adapted to show the condition of the switch, said indicating-points and indicating-finger so positioned that the finger shows the condition of the switch.

6. A switch comprising two main-circuit terminals, branch-circuit terminals associated therewith, an arm associated with each of said main-circuit terminals and adapted when in predetermined positions to connect the main-circuit terminals with the branch-circuit terminals, each of said arms provided at one end with projections, a controlling-arm intermediate between said main-circuit terminals and adapted when in a predetermined position to engage said projections, a spring-piece associated with each of said main-circuit terminals and adapted to engage said controlling-arm when said arm is in a predetermined position, thereby connecting the main-circuit terminals, said controlling-arm adapted to control the position of the arms associated with the main-circuit terminals by means of its engagement with said projections so as to make or break said branch circuit, the parts so arranged that the branch circuit is completed before the main circuit is broken and is not broken until after the main circuit is completed, a spring associated with said controlling-arm and adapted to move it suddenly at the point where the main-circuit terminals are disconnected thereby suddenly breaking the circuit, a box completely inclosing said switch so as to make it weatherproof, and being insulated from the parts of said switch, a controlling arm or handle projecting through said box and provided with a finger which en-

gages said controlling-arm, but which is unconnected therewith.

7. A switch comprising four terminals, two of which are adapted to be connected with the main circuit and two with the branch circuit, arms associated with the main-circuit terminal and adapted to connect it with one of the branch-circuit terminals, a controlling-arm between the main-circuit terminals adapted when in a predetermined position to connect them together but adapted to be moved so as to disconnect the main-circuit terminals, said controlling-arm being connected with the arms associated with the main-circuit terminals so as to move them and connect each main-circuit terminal with its associated and branch-circuit terminal, the parts so constructed that the connection between the main-circuit and branch-circuit terminals is completed before the main-circuit terminals are disconnected, a box entirely inclosing said switch mechanism, an operating-handle connected with a piece which projects through the box and engages said controlling-arm, said piece free from said controlling-arm and provided with a water-tight joint which prevents the admission of moisture to the switch.

8. The combination with a switch mechanism of an inclosing box or case, an operating part projecting through the case and provided with a handle by which the switch mechanism is controlled, a projecting ring on said box surrounding said operating part, a cap-piece surrounding said controlling part and projecting downwardly over said ring, a gasket or packing surrounding said operating part and interposed between said cap and ring so as to make the joint water-tight, said cap being held in position by means of the operating-handle.

9. A switch for electric circuits comprising four terminals divided into two pairs, an arm associated with each pair of terminals and adapted to connect the terminals of the respective pairs together, a controlling-arm located between the pairs of terminals but free therefrom, said controlling-arm adapted to operatively engage said arms associated with the pairs of terminals and move them both into and out of contact with their opposed terminals and an operating-arm free from said controlling-arm but adapted to engage the same when in a predetermined position.

10. A switch for electric circuits comprising four terminals divided into two pairs, an arm associated with each pair of terminals and adapted to connect the terminals of the respective pairs together, a controlling-arm located between the arms associated with said terminals but free therefrom, each of said arms provided with projecting parts so positioned as to be operatively engaged by said controlling-arm whereby said arms are positively moved into and out of contact with their respective opposed terminals by the movement of said controlling-arm.

11. A switch for electric circuits, comprising four terminals arranged substantially in line with each other and divided into two pairs, an arm associated with each pair of  
5 terminals adapted to connect the terminals of the respective pairs together, said arms each provided with two projecting parts, a controlling-arm located between the pairs of terminals, one end of said controlling-arm  
10 adapted to pass between the two projecting

parts on each of said arms and operatively engage one of said projecting parts when moved in either direction, so as to move said arms to disconnect and connect the two pairs of terminals.

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