

Oct. 27, 1925.

1,559,361

W. D. PARKER

STORAGE BATTERY CHARGING PLUG

Filed Aug. 21, 1920

2 Sheets-Sheet 1

Fig. 1.

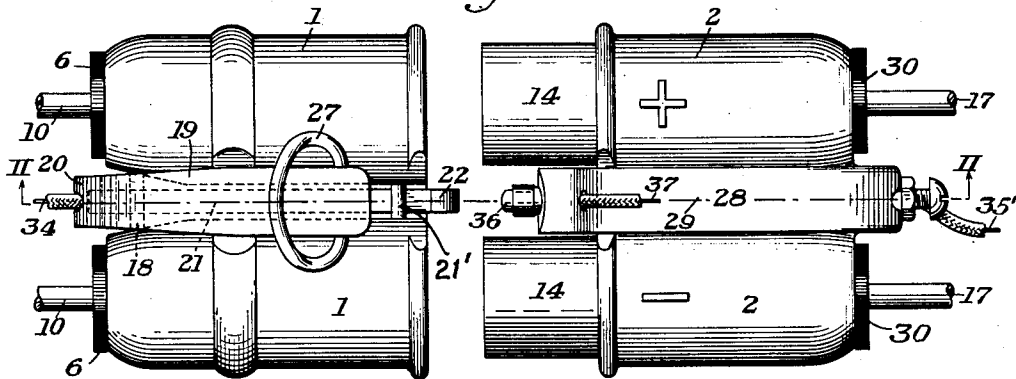


Fig. 2.

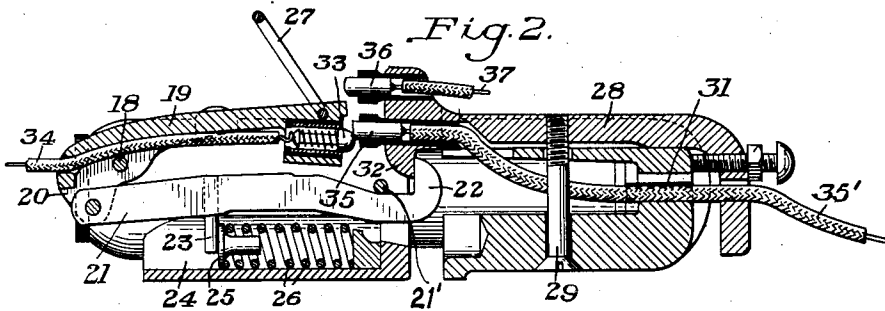
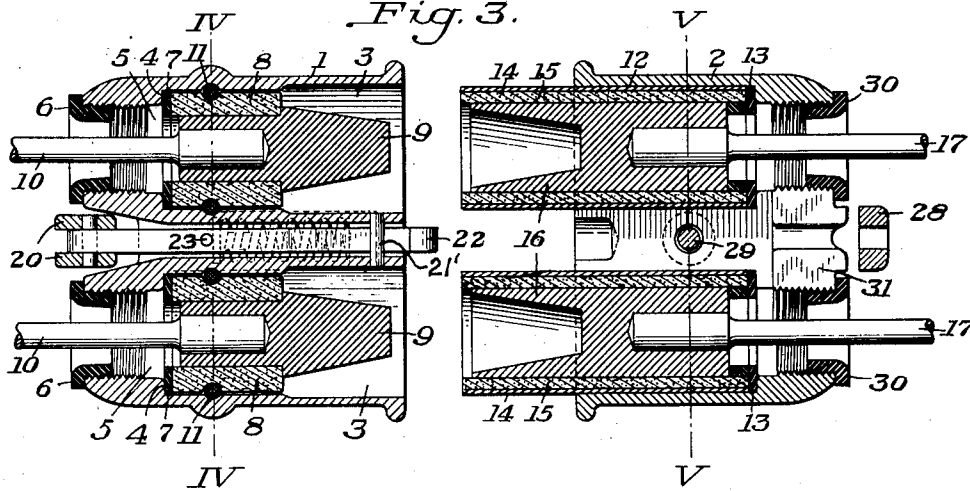


Fig. 3.



Inventor

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Oct. 27, 1925.

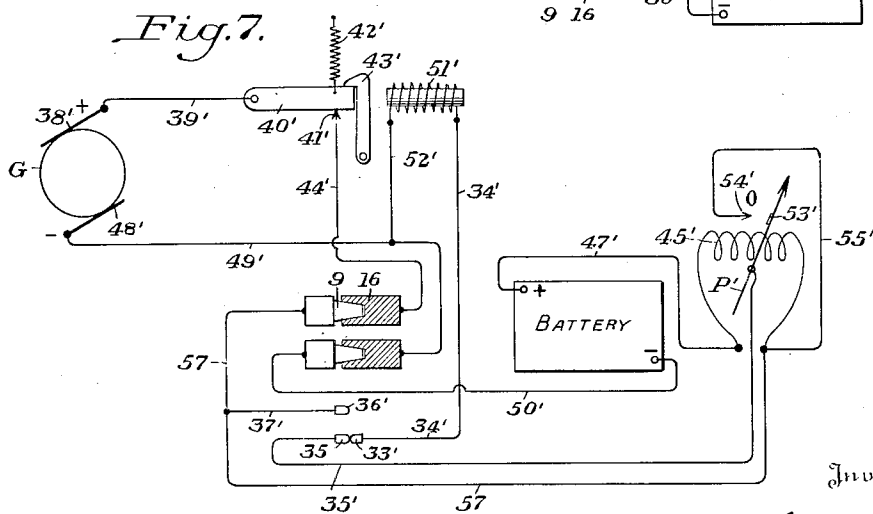
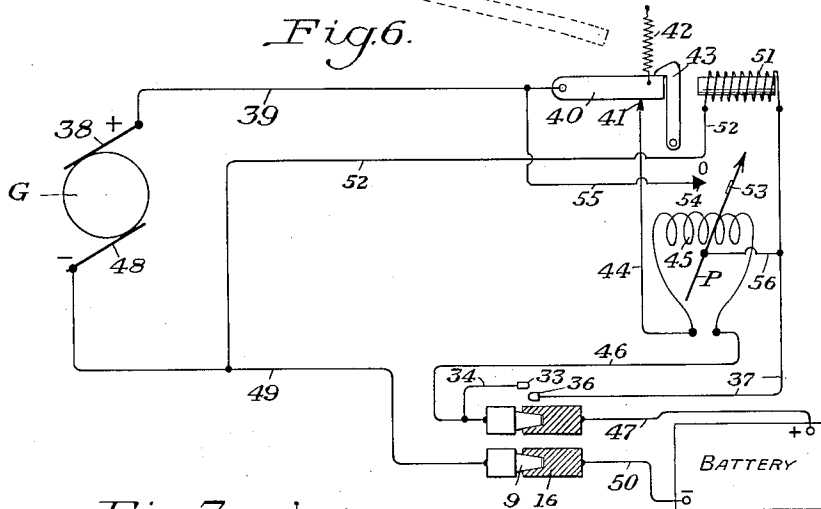
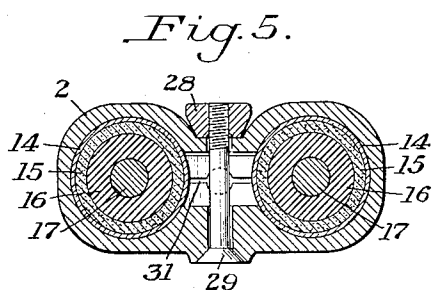
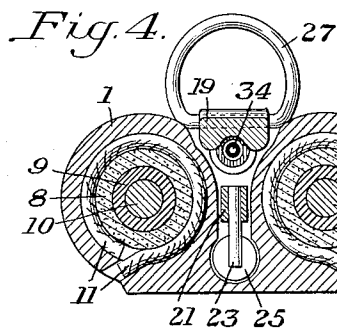
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STORAGE BATTERY CHARGING PLUG

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2 Sheets-Sheet 2



Inventor

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UNITED STATES PATENT OFFICE.

WAVEARD D. PARKER, OF CLEVELAND, OHIO.

STORAGE-BATTERY-CHARGING PLUG.

Application filed August 21, 1920. Serial No. 405,010.

To all whom it may concern:

Be it known that I, WAVEARD D. PARKER, a citizen of the United States, residing at Cleveland, Cuyahoga County, Ohio, have invented a new and useful Improvement in Storage-Battery-Charging Plugs, of which the following is a full, clear, and exact description.

The present invention relates broadly to electrical conductors, and more particularly to separable connections for use in charging storage batteries.

An important object of the present invention is to provide a separable connection of the character referred to, comprising a plug having means for drawing the members thereof into engagement and holding the same in such engagement for insuring proper electrical contact.

A further object of the present invention is to provide a plug constructed to permit a self-aligning action during the connection of the different members.

A still further object of the present invention is to provide a plug having separable members yieldingly maintained in connection by a spring lock, which lock is so positioned as to prevent accidental reversal of the parts.

Another object of the invention is to provide a plug construction in which all of the parts are readily removable so that substitution or repair may be made as required.

Still another and important object is to provide a construction with which it is impossible to separate the plug members without first breaking the charging circuit.

The foregoing and other objects, together with their attendant advantages, will be apparent as the invention becomes better understood, by reference to the accompanying specification and drawings forming a part thereof, it being premised that changes may be made in the various details and the manner of operation, within the scope of the appended claims, without departing from the spirit of the invention.

Figure 1 is a top plan view of the plug members in separated position;

Figure 2 is a longitudinal sectional view on the line II—II of Figure 1 with the plug members in assembled position;

Figure 3 is a transverse sectional view through the plug members in the position shown in Figure 1;

Figure 4 is a cross sectional view on the line IV—IV of Figure 3;

Figure 5 is a cross sectional view on the line V—V of Figure 3;

Figure 6 is a diagrammatic view illustrating one type of circuit connection; and

Figure 7 is a similar view illustrating a slightly modified type of circuit.

Referring more particularly to the drawings, there is illustrated a plug comprising a socket member 1 and a plug member 2. Both of these members in their preferred embodiment are formed of suitable castings of any desired metal, such for example as aluminum. The socket member 1 has formed therein two longitudinally extending openings 3, both of which are entirely closed by the walls of the casting. Each of these openings is formed with a shoulder 4 providing supplemental openings 5 of smaller diameter which are preferably threaded to receive suitable bushings 6. Mounted on the shoulders 4 are gaskets 7, preferably of rubber or similar material, adapted to support tubular sleeves of insulating material 8, each having pressed thereinto a male contact member 9. These contact members each have a conductor 10 soldered into a suitable opening formed therein. Due to the construction provided, the sleeves 8 with the contact members 9 are inserted loosely into the openings 3 and then held in place by pushing rings 11 of suitable material into the half grooves formed in the casing 1 and the sleeves 8 respectively, as clearly shown in Figure 4. These rings securely hold the male contact members in position but permit a limited movement thereof which renders the contacts self-aligning during assembling of the plug members as will be more fully described hereinafter.

The plug member 2 has similar longitudi-

nally extending openings 12 formed therein, and provided with shoulders for the reception of gaskets 13. Mounted within each of the openings 12 are female contact members each comprising a metallic casing 14 having a sleeve 15 of insulating material pressed thereinto for sustaining the contacts 16 having conductors 17 soldered therein. It will be apparent that the tubular sleeves 14 engage the walls of the openings 3 during assembly of the plug members, thereby causing the contacts to properly align during this operation.

Extending transversely of the casing 1 is a headless pin 18 supported in the side walls of the openings 3 and held in position therein by the bushings 6. Pivotaly mounted on this pin is a lever 19 having a tail 20 to which is pivoted a latch 21 having a hooked end 22. The latch 21 is provided with a pin 23 projecting into an opening 24 formed intermediate the opening 3 and slightly below the same, and engaging a follower 25 which co-operates with a compression spring 26. The lever 19 may be provided with a ring 27 facilitating the operation thereof. It will be apparent that upon lifting the ring 27 the lever 19 may be swung in a counter-clockwise direction about the pin 18, as viewed in Figure 2, thereby moving the latch 21 longitudinally against the action of the spring 26.

Intermediate the openings 12 in the plug member 2 is mounted an angular bar 28, which is held in position by a locking screw 29 passing upwardly through the plug casing. In forcing the locking screw to its final position, the sides of the casing will be drawn together about the bushings 30, thereby preventing accidental removal thereof. This clamping action is permitted by providing the member 2 with a transverse slot 31, as clearly shown in Figures 2 and 5. The bar 28 at its inner end has a downwardly extending projection 32 adapted to co-operate with the hooked end 22 of the latch 21. In assembling the plug members, the lever 19 is first operated as described, and the plugs forced into engagement. As soon as they are in engaging position the spring 26 will press pin 23 toward the left, to the position shown in Fig. 2. This tends to draw the parts together and insure proper contact and at the same time tends to rock the lever 19 in a clockwise direction to the position shown in Fig. 2. A pin 21' serves as a keeper and depressing guide for the latch member 21.

Due to the provision of tubular bushings 8 and 15, it will be noted that the opposite ends of the male and female contact members are at all times exposed to the air at their opposite ends, thereby insuring the cooling thereof.

Carried by the lever 19 is a spring pressed

contact 33 connected in any desired manner to a conductor 34. This contact is adapted to engage a fixed contact 35 on the bar 28 when the plug members are in assembled position. The contact 35 is in electrical connection with a suitable conductor 35'. Mounted above the contact 35 is a second contact 36 in electrical connection with a conductor 37. This second contact is in such position that upon swinging the lever 19 upwardly it will be engaged by the contact 33. These contacts constitute an important feature of the present invention and their use and operation will now be described more particularly with reference to the diagrammatic charging circuits illustrated in Figures 6 and 7.

In Figure 6 there is illustrated a generator G, having the positive brush 38 connected through a wire 39 to a pivotally mounted armature 40, which is normally maintained out of engagement with a contact 41 by a spring 42. In charging the battery, however, after the plug members have been assembled, the pivoted armature 40 is manually pressed downwardly in engagement with the contact 41 and held in this position by a pivoted latch 43. From the contact 41 the current flows through a wire 44 to an ammeter coil 45 and then through wire 46 to one set of plug contacts and then through wire 47 to the positive pole of the battery. The negative brush 48 of the generator is directly connected through wire 49 and the second set of contact members with wire 50 leading to the negative pole of the battery. With this type of connection, current will continuously flow from the generator to the battery thereby charging the same, the ammeter needle P during the charging action being swung in a counter-clockwise direction by the coil 45. After completion of the charging, the ring 27 on the lever 19 will be lifted to unlock the plug members. During this unlocking movement the contact 33 will be temporarily brought into engagement with the contact 36, as the contact 33 is connected by the conductor 34 to the positive wire 46, during this engagement current will flow from the positive wire through the contacts 33 and 36 to the conductor 37, which is connected to one terminal of a magnet coil 51 having its opposite side connected by a wire 52 to the negative wire 49. This magnet coil is so positioned that when energized it will attract the latch 43 and release the pivoted armature 40, thereby breaking the charging circuit. Since the lever 19 cannot be operated without bringing contacts 33 and 36 into engagement, it will be obvious that the plug members cannot be separated without first breaking the charging circuit. This will prevent arcing between the male and female contacts, such as ordinarily occurs

when the plug members are separated. With the connections described, the ampere meter and the circuit breaking device, which as described is of the ordinary shunt trip type may both be mounted on the panel board in the power house, while the storage battery and charging plug may be at a distance therefrom.

For automatically breaking the charging circuit when the battery is completely charged, the pointer P of the ammeter is provided with a contact 53 adapted to engage a zero contact 54 on the dial and establish a shunt circuit around the contacts 33 and 36 through the wire 55 connected to the positive wire 39 and the contact 54, and through the wire 56 connected to the pointer and to the conductor 37. When the zero contact is engaged, current will flow from the positive line 39 through wire 55 and contacts 54 and 53 to wire 56. From this wire the current will flow through the magnet coil 51 to the negative wire 49 as before described, thereby functioning the same as contacts 33 and releasing the pivoted armature 40 and breaking the circuit automatically.

In Figure 7 there is illustrated diagrammatically a circuit such as utilized when the ampere meter is placed adjacent the battery being charged instead of on the panel board in the power house. In this figure parts corresponding to the parts described in connection with Figure 6 are referred to by the same reference characters with a prime affixed thereto. In this form, the current flows from the positive pole of the generator G' to the pivoted armature 40' and thence through wire 44' to one set of the contact members having a wire 57 leading to the amperemeter coil 45', the opposite side of which is connected by wire 47' to the positive pole of the battery. From the negative brush 48' of the generator current flows through the wire 49' directly to the second pair of contacts and thence through wire 50' to the negative pole of the battery. With this circuit the second contact 35 is utilized while with the circuit previously described this contact is not utilized. In the present circuit the contact 36' is connected by the conductor 37' with the positive wire 57, and the contact 33' is connected by conductor 34' with magnet coil 51' having its opposite side connected by wire 52' to the negative wire 49'. During disengagement of the plug members, the contacts 33' and 36' will be brought into engagement and the circuit breaker energized to break the charging circuit as before described. While charging, however, the contact 33' is in engagement with the contact 35 connected by conductor 35' with the pointer P' of the ammeter. When the pointer P' swings into engagement with the zero contact 54', cur-

rent will flow from the positive brush of the generator to wire 57 and then through wire 55' connected to the zero contact 54', to contact 53' on the pointer P'. From the pointer the current will flow to the negative brush of the generator through wire 35', contacts 35 and 33' and the magnet coil 51'.

The two circuits described are merely illustrative of connections which may be made in using my improved plug, it being apparent that various modifications in the manner of connecting the various instruments and terminals may be made as desired.

The advantages of the present invention arise from the simplicity of construction facilitating the assembly and repair of the plug, and from the provision of combined means for holding the plug members in electrical contact and insuring the breaking of the circuit before such contact is broken.

I claim:

1. A separable connector comprising co-acting plug and socket members having circuit making contacts therein, and cooperating means on said members for yieldably urging and holding said members together, the means on at least one of said members being longitudinally movable.

2. In a device of the character described, a socket member having an electrical contact carried thereby, a plug member having a second electrical contact carried thereby for cooperation with said first mentioned contact, said contacts being adapted to form a part of an electrical circuit, means for holding said contacts yieldingly in engagement, and circuit-controlling means adapted to be brought into operative engagement before said contacts can be separated, substantially as described.

3. A device of the character described, comprising a socket member having a movable male contact carried thereby, a plug member having a female contact carried thereby, and means interconnecting said members for yieldingly urging them together to bring said contacts into engagement and maintain them in such engagement, substantially as described.

4. A separable connector comprising co-acting plug and socket members having terminal portions therein adapted to contact when said members are together, latching means for releasably holding the members together, and circuit controlling means associated with and operable by said latching means.

5. A charging plug for storage batteries, comprising a socket member having a plurality of electrical contacts, a plug member having a plurality of contacts for engagement with said first mentioned contacts, and co-operating means on each of said members intermediate said contacts for holding and urging said contacts yieldingly in engage-

ment, the means on one of said members being longitudinally movable, substantially as described.

6. A charging plug for storage batteries comprising plug and socket members having coacting contacts, movable means for holding said members together, and circuit controlling contacts operated by said holding means.

7. A device of the character described comprising coacting plug and socket members separably held together, a second set of contacts normally out of engagement when said members are together, and means operable with the separation of the members for bringing said contacts temporarily into engaging position.

8. A device of the character described, comprising a socket member having an electrical contact, a plug member having an electrical contact, means for holding said contacts in electrical engagement, and normally disengaged supplemental contacts carried by said members and adapted to be brought temporarily in engagement during the operation of said holding means, substantially as described.

9. A device of the character described, comprising a socket member, a latch slidably carried thereby, a spring co-operating with said latch, a lever for operating said latch, a plug member, means on said plug member adapted to be engaged by said latch, a contact on said plug member, and a contact on said lever, said contacts being positioned to co-operate during the operation of said lever, substantially as described.

10. A device of the character described, comprising a socket member, a latch slidably carried thereby, a lever for operating said latch, a plug member, means on said plug member adapted to be engaged by said latch, a contact on said plug member, and a contact on said lever, said contacts being positioned to co-operate during the operation of said lever, substantially as described.

11. A device of the character described comprising a plug member having parallel terminals thereon, a socket member having parallel coacting terminals therein, and co-operating means on said members between the respective terminals thereof for yieldably urging and maintaining the two members together, the means on one of said members being longitudinally movable.

12. A device of the character described, comprising a socket member having a pair of male contacts, a plug member having a pair of female contacts, co-operating means carried by said members intermediate said male and female contacts respectively for yieldingly holding said contacts in engagement, and circuit controlling means automatically operable during disengagement of said contacts, substantially as described.

13. A device of the character described, comprising a socket member, a plug member, electrical contacts carried by each of said members, a plurality of supplemental contacts on one of said members, and a supplemental contact on the other of said members for engagement with either of said first mentioned supplemental contacts, substantially as described.

14. A device of the character described, comprising a socket member, a plug member, electrical contacts carried by each of said members, a plurality of supplemental contacts on one of said members, a supplemental contact on the other of said members for engagement with either of said first mentioned supplemental contacts, and means for yieldingly holding said members together, substantially as described.

15. A device of the character described, comprising a socket member having an electrical contact carried thereby, a plug member having a second electrical contact carried thereby for co-operation with said first mentioned contact, said contacts being adapted to form part of an electrical circuit, means for holding said contacts yieldingly in engagement, and circuit controlling means operative upon operation of said holding means to release the plug and socket members, substantially as described.

16. A device of the character described, comprising a socket member having a movable male contact carried thereby, a plug member having a female contact carried thereby, means for yieldingly urging said members together to bring said contacts into engagement, and circuit controlling means automatically effective upon operation of said first mentioned means, substantially as described.

17. A charging plug for storage batteries comprising a socket member having a plurality of electrical contacts, a plug member having a plurality of contacts for engagement with said first mentioned contacts, co-operating means on each of said members intermediate said contacts for holding said contacts yieldingly in engagement, said contacts being adapted to form part of an electrical circuit, and circuit controlling means automatically effective upon release of said holding means, substantially as described.

18. A device of the character described, comprising a socket member, a plug member, electrical contacts carried by each of said members, means for holding said members in engagement, a plurality of supplemental contacts on one of said members, and a supplemental contact on the other of said members for engagement with one of said first mentioned supplemental contacts during the operation of said holding means, substantially as described.

19. A device of the character described,

comprising a socket member, a plug member, electrical contacts carried by each of said members, a plurality of supplemental contacts on one of said members, a supplemental contact on the other of said members for engagement with any of said first mentioned supplemental contacts, and means for yieldingly holding said members together, said supplemental contacts being operated upon release of said holding means, substantially as described. 10

In testimony whereof I have hereunto set my hand.

W. D. PARKER.