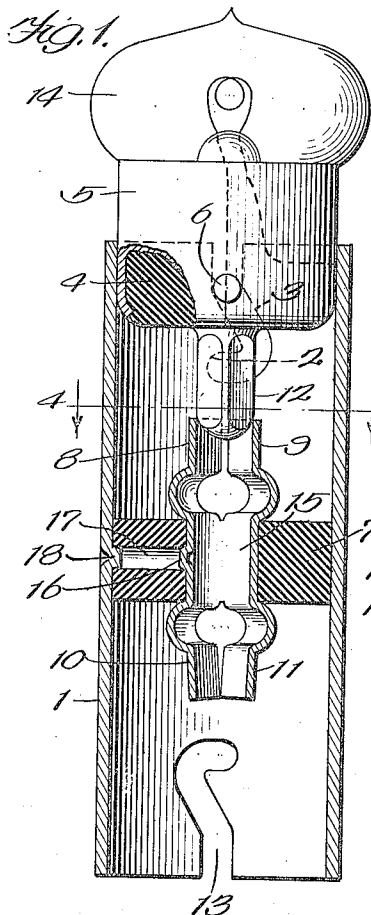
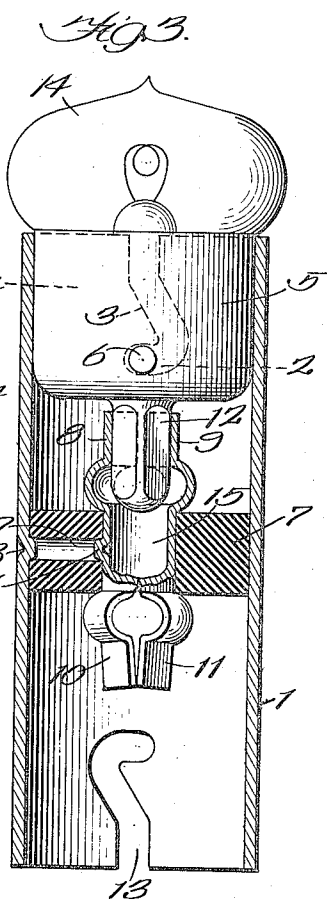
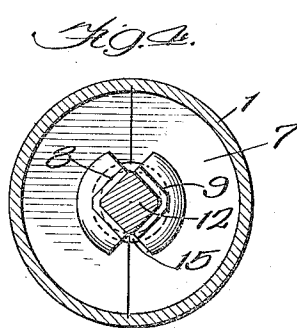
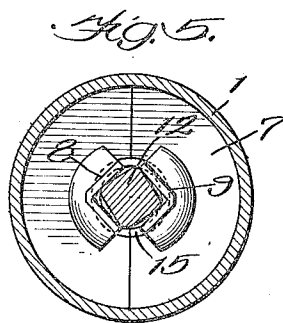
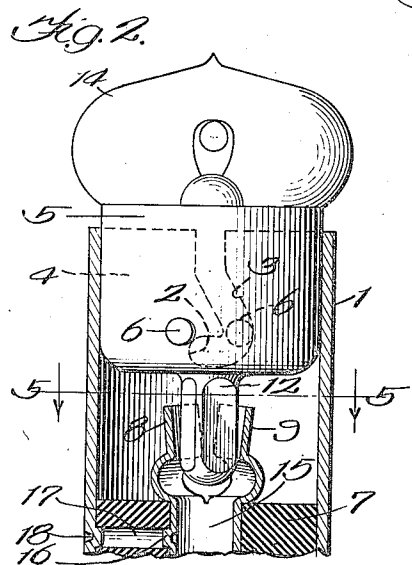
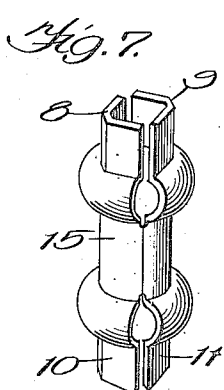
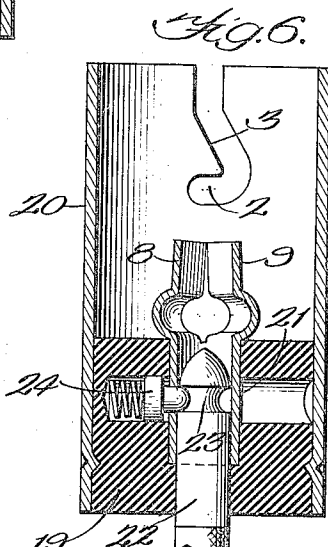


H. A. DOUGLAS.
CIRCUIT CONTINUING DEVICE.
APPLICATION FILED AUG. 15, 1918. RENEWED JAN. 19, 1920.

1,348,394.

Patented Aug. 3, 1920.



Inventor:
Harry A. Douglas.
By G. L. Braggatto

UNITED STATES PATENT OFFICE.

HARRY A. DOUGLAS, OF BRONSON, MICHIGAN.

CIRCUIT-CONTINUING DEVICE.

1,348,394.

Specification of Letters Patent.

Patented Aug. 3, 1920.

Application filed August 15, 1918, Serial No. 250,021. Renewed January 19, 1920. Serial No. 352,577.

To all whom it may concern:

Be it known that I, HARRY A. DOUGLAS, citizen of the United States, residing at Bronson, in the county of Branch and State

of Michigan, have invented a certain new and useful Improvement in Circuit-Continuing Devices, of which the following is a full, clear, concise, and exact description.

My invention relates to circuit continuing devices employing sockets and contact carriers which are in rotative engagement. In devices of this class the sockets and contact carriers usually are in bayonet pin or projection and channel connection whereby the contact carriers may be moved outwardly to open circuits and inwardly and rotatively to establish or join circuit sections, the outer margin of the transverse branch of a bayonet channel and the corresponding bayonet projection constituting holding formations which are engaged when the contact carrier thus equipped is in its inner position and has been turned to hold the parts in assembly. In such devices the inward movement of the contact carrier and the subsequent rotative movement thereof are both manually effected, the extent of the rotative movement being determined solely by the manipulator.

In accordance with one feature of my invention spring mechanism is employed for effecting or promoting the desired relative turning movement of the socket and carrier to insure the full turning movement of the carrier with respect to the socket.

In circuit continuing devices it is common to employ contacts which are longitudinally pressed upon by coiled springs to effect and maintain the desired mechanical and electrical assembly. It is another object of my invention to eliminate the coiled springs, thereby to simplify the construction. I have been able to achieve both objects of my invention by making one of the contacts of a circuit continuing device in the form of a leaf spring disposed to press transversely of the socket upon the complementary contact, one of these contacts being upon the socket and the other upon the rotatable contact carrier within the socket, the leaf spring contact effecting rotative movement of the carrier when in its inner position. If the carrier has a bayonet pin or projection and the socket has a bayonet channel, this leaf spring will exert

pressure upon the bayonet pin effecting or promoting movement thereof along the transverse portion of such bayonet channel when the contact carrier is in its inner position. Not only does such a leaf spring serve positively to maintain the parts in firm mechanical assembly, but it also effects very good circuit connection since the spring rubs upon the contact complementary thereto in performing its function whereby the engaging circuit establishing or continuing contact portions are maintained bright and clean.

A structure containing these novel characteristics is more broadly claimed in my co-pending application Serial No. 250,020, filed August 15, 1918. The structure of said co-pending application is of especial utility when employed in connection with so-called two pole devices though that invention is not so restricted.

The device of my present invention is of especial utility in connection with so-called single pole devices although the invention of the present case is not to be so limited.

In carrying out my present invention the spring contact and the contact complementary thereto are so formed that when the contact carrier is in its innermost position relative rotation between these contacts will occur to cause the rotation of the contact carrier. When the device is embodied in a single pole structure these engageable contacts are at the axis of the contact carrier and socket which are cylindrical and coaxial. The spring contact is then desirably in the form of a split spring socket of polygonal contour or angular formation and the complementary plug contact is correspondingly formed and is so disposed that when the contact carrier is in an outer position the two contacts will interfit. The bayonet channel has a sloping portion which leads to the inner transverse portion of this channel whereby the carrier is turned on its way to its inner position. The carrier, in so turning, causes a relative twisting between said split spring sockets and contact plug whereby the contacting spring socket is spread apart during inward movement of the contact carrier. When the carrier reaches its inner position with the bayonet projection in register with the transverse portion of the bayonet channel the spring

socket will, due to its own resilience, close nearly to normal position, and in closing will turn the contact plug therein whereby the bayonet projection upon the contact carrier 5 is moved into the transverse branch of the bayonet channel whereafter the contact carrier is maintained in its inner position due to the holding engagement arising between the bayonet projection and the outer margin 10 of the transverse portion of the bayonet channel.

I will explain my invention more fully by reference to the accompanying drawing showing the preferred embodiments thereof and in which Figure 1 is a view, mainly in section of a circuit continuing device employing a shell adapted for coupling engagement at each of its ends with a contact carrier, the contact carrier at the forward end of the shell being shown partially inserted therein; Fig. 2 is a view illustrating the contact carrier and socket of Fig. 1, the carrier being moved nearly to its innermost position, in which operation the leaf spring contact element is moved or spread from its normal position preparatory to turning the carrier to position when it is fully inserted; Fig. 3 is a view generally similar to Fig. 1 but showing the contact carrier in its innermost position and turned by the spring contact; Fig. 4 is a sectional view on line 4—4 of Fig. 1; Fig. 5 is a sectional view on line 5—5 of Fig. 2; Fig. 6 is a sectional view of a modification; and Fig. 7 is a perspective view of the leaf spring contact structure which I preferably employ in the structure of Figs. 1 to 5.

Like parts are indicated by similar characters of reference throughout the different 40 figures.

In the form of the invention illustrated in Figs. 1 to 5 inclusive there is employed a cylindrical shell 1 which is preferably metallic. This shell is formed at its forward end preferably with two diametrically opposite bayonet channels each having an inner transverse portion 2 and a portion 3 leading from the outer end of the channel to said inner or transverse channel portion 50 and sloping inwardly away from the inner termination of the bayonet channel—the semi-circular end of the channel portion 2. The cylindrical contact carrier 4 formed of insulating material happens to be surrounded by a metallic sheath 5. This contact carrier is surrounded by the shell 1 and is movable in and out and is movable rotatively when diametrically aligned bayonet pins or projections 6 project from the contact carrier 4 and are receivable in the aforesaid bayonet channels.

In the form of the invention shown in Figs. 1 to 5 inclusive, a second contact carrier 7, also cylindrical and made of insulating material, is permanently assembled with

the shell within an intermediate portion thereof, this contact carrier being desirably formed into halves which meet on a plane containing the axis of the shell. Leaf spring contacts 8, 9 are carried by the contact carrier 70 7 on the front side thereof and leaf spring contacts 10 and 11 are carried by the contact carrier 7 on the rear side thereof. The leaf spring contacts 8 and 9 engage the same contact 12 upon the contact carrier 4. 75 The leaf spring contacts 10 and 11 engage the same contact similar to contact 12 upon another contact carrier (not shown) at the rear end of the shell 1, the bayonet projections of this rear contact carrier being receivable in bayonet channels 13 at the rear end of the shell 1, these bayonet channels being similar in formation and function to the bayonet channels formed at the forward end of the shell. The contact carrier 7 is 85 thus provided with leaf spring contacts upon each end thereof. The contacts upon the inner ends of the contact carriers at the ends of the shell have similar cooperation with the leaf spring contacts upon the opposing ends of the contact carrier 7 and it will therefore suffice specifically to describe the interrelation and interaction of the contacts upon the inner end of the contact carrier 4 and the opposed end of the contact 95 carrier 7. When the bayonet projections 6 are in the outer longitudinal portions of the bayonet channels at the front ends of the shell 1 the contact 12 may be directed into initial engagement with the contacts 8 and 9 but when these bayonet projections reach the sloping portions of the bayonet channels the contact 12 engages the contacts 8 and 9 in a manner to deflect them laterally from the idle positions initially occupied thereby 105 whereby these contact springs 8 and 9 exert pressure transversely of the shell upon said contact 12 and cooperate therewith in a manner to force rotation of the contact carrier 4 when the bayonet projections 6 come into register with the transverse portions 2 of the forward bayonet channels. These bayonet projections 6 then engage the forward or outer margins of the transverse channel portions 2. Said projections and 115 channel margins act as holding formations which are brought into engagement by the action of the springs 8 and 9 to prevent outward or withdrawing movement of the contact carrier 4, the holding formations 6 being adjustable to engaging positions inwardly of the holding formations afforded by said outer margins of said bayonet channel portions by means of said springs. Hitherto the contact carrier was turned by 125 hand until the bayonet pins or projections were brought to holding position, it being believed that I am the first to provide spring mechanism for accomplishing this result.

The structure illustrated is a so-called 130

single pole structure to which, however, the invention is not to be limited. The contact carrier 4 happens to be the base of a single pole incandescent lamp 14, one terminal of the lamp filament being connected with a metallic sheath 5 that is in circuit with one terminal of the battery through the metallic shell 1. The other terminal of the lamp filament resides in the contact 12 carried upon the base 4. The opposing contacts 8 and 9 constitute a split spring contact socket at the axis of the shell as do the contacts 10 and 11 upon the other side of the carrier 7, the two split spring contact sockets being joined by a metallic sleeve 15 integrally formed therewith. For the purpose of assembly, the carrier 7 is split diametrically, the sleeve 15 being received between the split portions of the carrier and held in fixed relation therewith by means of a projection 16 entering the channel 17 in one of the halves of the carrier. By this construction the split spring contact sockets upon the ends of the contact carrier 7 are maintained in fixed relation with such carrier. This carrier in turn is maintained in fixed relation with the shell 1 by means of a projection 18 upon the shell that enters the channel 17. The contacts upon the carriers 4 and 7 are co-axial with the cylindrical socket or socket shell 1 and the cylindrical contact carriers 4 and 7. The split spring contact sockets are polygonal in formation, the springs forming these sockets being angular, the complemental contacts entering the sockets being in the form of polygonal or angular plugs. The contact portion 12 and the complemental split spring contact socket 8 and 9 are square. The lower end of the contact plug portion 12 is rounded so that when the contact carrier 4 is being initially moved inward the contact plug 12 may readily enter said split spring contact socket since said contact plug and contact socket are then in similar disposition as illustrated clearly in Figs. 1 and 4. When the bayonet projections 6 encounter the sloping portions 3 of the bayonet channels the contact carrier 4 is turned as is also the contact plug 12, a position to which this plug and carrier is turned being illustrated in Figs 2 and 5 where the split spring contact socket 8, 9 is shown as being spread against the force of its own resilience. When the bayonet projections 6 are brought into alinement with the transverse portions 2 of the bayonet channels the split spring contact socket 8, 9 will tend to resume its normal contracted position and in so doing will turn the contact plug 12 received therein, this contact plug carrying with it the carrier 4 to bring the projection 6 in the transverse branches of the channels whereby the contact carrier 4 is held from outward or withdrawing movement. The members 8, 9 of said split

spring contact socket act in opposite directions upon the contact 12 to effect the rotation thereof and when these portions 8 and 9 have turned the plug 12 to a position similar to the contracted contact socket they cooperate with each other to hold the bayonet projections 6 in the transverse portions of the bayonet channels 2, the contact socket being still somewhat spread by the contact plug. In order that the socket members 8, 9 may have full range of operation the inner semi-circular ends of the transverse portions of the bayonet channels are extended beyond the positions to which the bayonet projections are brought by the approached socket members 8, 9, there thus preferably being no bayonet seats for the bayonet projections except such as are afforded by the transverse margins of the inner transverse portions of the bayonet channels.

In Fig. 6 I have illustrated a single pole socket adapted for the reception of only one movable and rotatable contact carrier, the fixed contact carrier 19 being at one end of the socket shell 20. This contact carrier 19 holds the split sleeve 21 which carries the split spring contact socket 8, 9 at the forward end of the carrier 19. The split sleeve 21 receives a conducting plug 22 having an annular groove 23 at its forward end that is engaged by a spring pressed plunger 24 to hold the plug in mechanical and electrical assembly with the sleeve 21. In each construction shown the rotation of the rotatable element is secured because of the engagement of the motive spring and the part engaged thereby, upon one side of the axis of rotation of the rotatable element.

The plug, sleeve and plunger construction 21, 22 and 24 is set forth in my co-pending application Serial No. 250,022 filed August 15, 1918.

While I have herein shown and particularly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction shown as changes may readily be made without departing from the spirit of my invention, but having thus described my invention I claim as new and desire to secure by Letters Patent the following:—

1. A circuit continuing device including a cylindrical shell; a cylindrical contact carrier surrounded by the shell and movable in and out and rotatively when in an inner position; a holding formation upon the shell; a holding formation upon said contact carrier engageable with the other holding formation and adjustable to engaging position inwardly of the holding formation upon the shell when said contact carrier is turned while in an inner position to obstruct outward movement of said carrier; a second contact carrier connected with the shell; a contact upon one carrier at the axis of the

shell; and a complemental contact upon the other carrier in the form of a leaf spring at the axis of the shell and disposed to press transversely of the shell upon the complemental contact upon the other carrier when said movable carrier is in its said inner position in a direction to engage said holding formations, said contacts having engaging formations that force the rotation of said contacts relatively and thereby of said movable contact carrier.

2. A circuit continuing device including a cylindrical shell; a cylindrical contact carrier surrounded by the shell and movable in and out and rotatively when in an inner position; a holding formation upon the shell; a holding formation upon said contact carrier adjustable to engaging position inwardly of the holding formation upon the shell when said contact carrier is turned while in an inner position to obstruct outward movement of said carrier; a second contact carrier connected with the shell; a contact upon one carrier at the axis of the shell; and a complemental contact at the axis of the shell and upon the other carrier in the form of a leaf spring disposed to press transversely of the shell upon the complemental contact upon the other carrier when said movable carrier is in its said inner position in a direction to engage said holding formations, one of said contacts having a socket and the other having a plug portion for entering said socket, said plug and socket contact portions being substantially in alinement when said movable contact carrier is in outer position, said contacts having engaging formations that force the rotation of said contacts relatively and thereby of said movable contact carrier.

3. A circuit continuing device including a shell; a contact carrier surrounded by the shell and movable in and out and rotatively when in an inner position, said contact carrier and shell having engageable holding formations, the holding formation upon said contact carrier being adjustable to engaging position inwardly of the holding formation upon the shell when said contact carrier is turned while in an inner position to obstruct outward movement of said carrier; a second contact carrier connected with the shell; contacts upon the adjacent ends of said carriers, a contact upon one carrier being in the form of a leaf spring disposed to press transversely of the shell upon the complemental contact upon the other carrier when said movable carrier is in its said inner position in a direction to engage said holding formations, one of said contacts having a split spring socket of polygonal formation and the other having a plug portion of polygonal formation for entering said socket, said plug and socket contact elements being substantially in alinement and in similar

disposition when said movable contact carrier is in outer position to enable the plug to enter the socket; and means for turning said plug portion and socket portion relatively as the movable contact carrier is being moved to its inner position to enable said socket portion to turn the plug portion when the contact carrier is in its innermost position to bring said holding formations into engagement.

4. A circuit continuing device including a cylindrical shell; a cylindrical contact carrier surrounded by the shell and movable in and out and rotatively when in an inner position, said contact carrier and shell having engageable holding formations, the holding formation upon said contact carrier being adjustable to engaging position inwardly of the holding formation upon the shell when said contact carrier is turned while in an inner position to obstruct outward movement of said carrier; a second contact carrier connected with the shell; contacts upon the adjacent ends of said carriers and located on the axis of the cylindrical shell, a contact upon one carrier being in the form of a leaf spring disposed to press transversely of the shell upon the complemental contact upon the other carrier when said movable carrier is in its said inner position in a direction to engage said holding formations, one of said contacts having a split spring socket of polygonal formation and the other having a plug portion of polygonal formation for entering said socket, said plug and socket contact elements being substantially in alinement and in similar disposition when said movable contact carrier is in outer position to enable the plug to enter the socket; and means for turning said plug portion and socket portion relatively as the movable contact carrier is being moved to its inner position to enable said socket portion to turn the plug portion when the contact carrier is in its innermost position to bring said holding formations into engagement.

5. A circuit continuing device including a shell; a contact carrier surrounded by the shell and having bayonet projection and channel connection therewith; a second contact carrier connected with the shell; and contacts upon the adjacent ends of said carriers, the contact upon one carrier being in the form of a polygonal plug and the contact upon the other carrier being in the form of a split spring polygonal socket for receiving said plug, said plug and socket being substantially in alinement and in similar disposition when said movable contact carrier is in outer position, a portion of the bayonet channel leading to the inner or transverse part thereof sloping inwardly away from the inner termination of the bayonet channel whereby spreading of said

socket is forced as the movable carrier is moved inwardly, said socket contracting to force rotation of this carrier when this carrier in its inner position to bring the bayonet projection into the transverse portion of the bayonet channel.

6. A circuit continuing device including a cylindrical shell; a cylindrical contact carrier surrounded by a shell and having bayonet projection and channel connection therewith; a second contact carrier connected with the shell; and contacts upon the adjacent ends of said carriers and located on the axis of the cylindrical shell, the contact upon one carrier being in the form of a polygonal plug and the contact upon the other carrier being in the form of a split spring polygonal socket for receiving said plug, said plug and socket being substantially in alinement and in similar disposition when said movable contact carrier is in outer position, a portion of the bayonet channel leading to the inner or transverse part thereof sloping inwardly away from the inner termination of the bayonet channel whereby spreading of said socket is forced as the movable carrier is moved inwardly, said socket contracting to force rotation of this carrier when this carrier is in its inner position to bring the bayonet projection into a transverse portion of the bayonet channel.

7. A circuit continuing device including a shell; a contact carrier surrounded by the shell and movable in and out and rotatively when in an inner position, said contact carrier and shell having engageable holding formations, the holding formation upon said contact carrier being adjustable to engaging position inwardly of the holding formation upon the shell when said contact carrier is turned while in an inner position to obstruct outward movement of said carrier; a second contact carrier connected with the shell; interfitting angular contacts upon the adjacent ends of said carriers, a contact upon one carrier being in the form of a leaf spring disposed to press transversely of the shell upon the complementary contact upon the other carrier when said movable carrier is in its said inner position in a direction to engage said holding formations, said plug and socket contact elements being substantially in alinement and in similar disposition when said movable contact carrier is in outer position to enable the plug to enter the socket; and means for turning said angular contacts relatively as the movable contact carrier is being moved to its inner position to enable one angular contact to turn the other angular contact when the contact carrier is in its innermost position to bring said holding formations into engagement.

8. A circuit continuing device including

a cylindrical shell; a cylindrical contact carrier surrounded by the shell and movable in and out and rotatively when in an inner position, said contact carrier and shell having engageable holding formations, the holding formation upon said contact carrier being adjustable to engaging position inwardly of the holding formation upon the shell when said contact carrier is turned while in an inner position to obstruct outward movement of said carrier; a second contact carrier connected with the shell; interfitting angular contacts upon the adjacent ends of said carriers and located on the axis of the cylindrical shell, a contact upon one carrier being in the form of a leaf spring disposed to press transversely of the shell upon the complementary contact upon the other carrier when said movable carrier is in its said inner position in a direction to engage said holding formations, said plug and socket contact element being substantially in alinement and in similar disposition when said movable contact carrier is in outer position to enable the plug to enter the socket; and means for turning said angular contacts relatively as the movable contact carrier is being moved to its inner position to enable one angular contact to turn the other angular contact when the contact carrier is in its innermost position to bring said holding formations into engagement.

9. A circuit continuing device including co-axial cylindrical contact carrier and socket members in rotative engagement; engageable contacts, one on each member, at the axis of the socket, one of these contacts being a spring contact exerting pressure transversely of the socket upon the other contact upon one side of the axis of rotative movement to effect rotative movement of the contact carrier with respect to the socket.

10. A circuit continuing device including co-axial cylindrical contact carrier and socket members in rotative engagement and carrying engageable contacts at the axis of the contact carrier and socket, one of these contacts being a spring contact exerting pressure transversely of the socket upon the other contact upon one side of the axis of rotative movement to effect rotative movement of the contact carrier with respect to the socket; and holding formations upon the contact carrier and socket that are brought into engagement upon such rotative movement of the contact carrier with respect to the socket.

11. A circuit continuing device including co-axial cylindrical contact carrier and socket members in rotative engagement and carrying engageable contacts at the axis of the contact carrier and socket, one of these contacts being in the form of a leaf spring exerting pressure transversely of the socket upon the other contact upon one side of the

axis of rotative movement to effect rotative movement of the contact carrier with respect to the socket.

12. A circuit continuing device including
5 co-axial cylindrical contact carrier and
socket members in rotative engagement and
carrying engageable contacts at the axis of
the contact carrier and socket, one of these
10 contacts being in the form of a leaf spring
exerting pressure transversely of the socket
upon the other contact upon one side of the

axis of rotative movement to effect rotative movement of the contact carrier with respect to the socket; and holding formations upon the contact carrier and socket that are brought into engagement upon such rotative movement of the contact carrier with respect to the socket. 15

In witness whereof, I hereunto subscribe my name this twelfth day of August, A. D., 20 1918.

HARRY A. DOUGLAS.