

Aug. 23, 1927.

E. F. POTTER

1,639,858

PLUG

Filed June 12, 1924

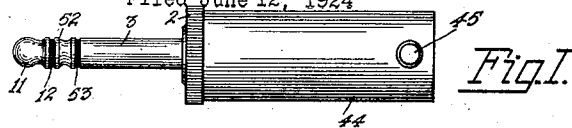


Fig. 1.

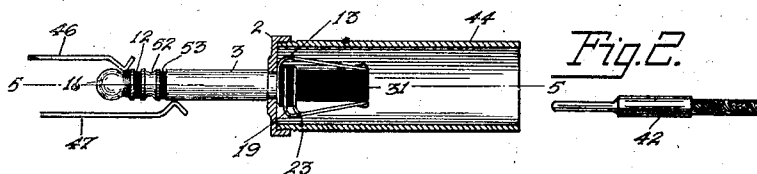


Fig. 2.

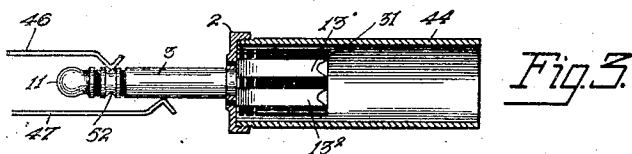


Fig. 3.

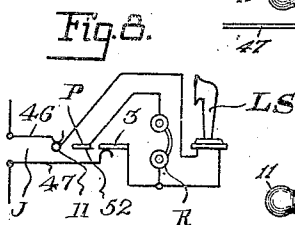


Fig. 4.

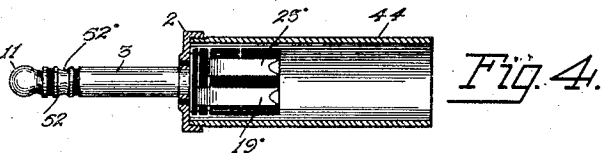


Fig. 5.

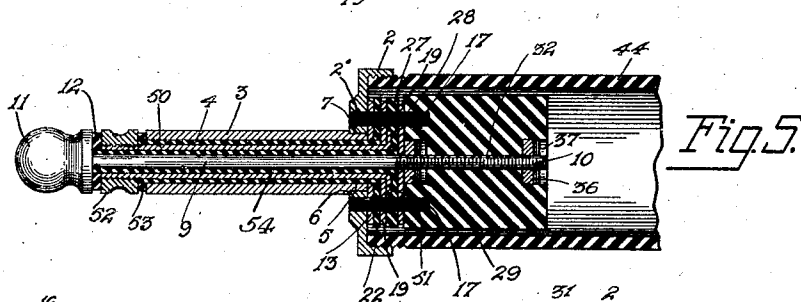


Fig. 6.

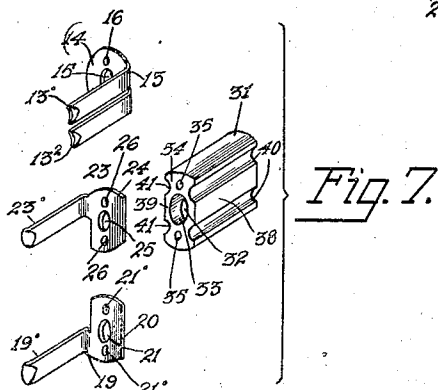


Fig. 7.

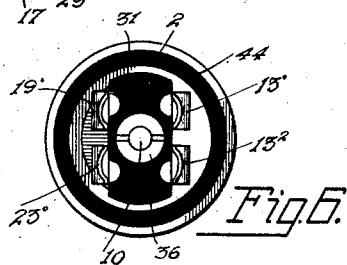


Fig. 8.

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By Antisolemp,
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UNITED STATES PATENT OFFICE.

EARL F. POTTER, OF GLENCOE, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PLUG.

Application filed June 12, 1924. Serial No. 719,465.

My invention relates to improvements in connecting plugs, and has to do more particularly with that class of plugs which are adapted to have connected thereto one or more instrumentalities. The plug of my invention is particularly adapted for use in connection with radio or wireless receiving sets to which may be connected a number of head phones or a loud speaker through the medium of the plug, and the jacks of the receiving set; and an object of my invention is to construct a connecting plug of a few and simple parts, so arranged as to be easily assembled and at the same time very durable.

The plug of my invention is of the series type and is provided with means for permitting the connection of more than one instrumentality at the same time. The plug is provided with spring terminal means which obviates the necessity of screw terminals. The cord tips of the instrumentalities desired to be connected to my plug, are inserted under the spring terminals and the tension of the spring terminals is such as to hold the cord tips in engagement therewith against displacement.

A feature of the plug of my invention is the provision of an auxiliary tip contact element in association with certain of the spring terminals of my plug so that a loud speaker may be connected to my plug and in circuit with said auxiliary tip element exclusive of a headphone set which may be connected in circuit with the tip conductor and tip contact of my plug. The tip contact of my plug is adapted to make contact with the tip contact spring of the jack of the radio receiving set and the sleeve contact of my plug is adapted to make contact with the sleeve contact spring of said jack when the plug is inserted into said jack and brought to rest in a certain position whereby an instrumentality, such as a headphone set, is connected in circuit with the radio or wireless receiving set while another instrumentality connected to my plug, such as a loud speaker or amplifier, remains in open circuit, or my plug may be inserted into the jack of said receiving set so that the auxiliary tip

contact and sleeve contact of said plug make contactual engagement with the tip and sleeve contact springs respectively of the said jack so that the said other instrumentality will be connected in circuit with said radio or wireless receiving set and the headphone set will be in open circuit.

The above features, as well as others, will be more specifically pointed out in the ensuing specification and appended claims, and for a more complete and clearer understanding of my invention reference may be had to the accompanying drawings in which like reference characters in the several views denote similar parts.

Referring to the drawings:

Fig. 1 is a view of my connecting plug assembled;

Fig. 2 is a view of the connecting plug with the handle or sleeve in section to clearly illustrate the plug and also showing the tip and sleeve contacts of the plug in engagement with the tip and sleeve contact springs respectively of a suitable two conductor jack for receiving said plug;

Fig. 3 is a view similar to Fig. 2 and illustrates another view of the plug and also shows the auxiliary tip contact and the sleeve contact of the plug in contactual engagement with the tip and sleeve contact springs of a suitable two conductor spring jack;

Fig. 4 is another view of the plug of my invention similar to Fig. 3 but taken from a different angle;

Fig. 5 is an enlarged sectional view taken on the line 4—4 of Fig. 2;

Fig. 6 is an enlarged end view of the plug of my invention;

Fig. 7 is a disassembled perspective view of the spring terminals and insulating block of my invention, and

Fig. 8 illustrates diagrammatically the plug of my invention and the circuit connections for operatively connecting either a head set unit or a loud speaker unit.

Referring now in detail to my invention as illustrated in the accompanying drawings, the plug comprises a shallow cup shaped member 2 internally threaded and a cylindrical conducting sleeve 3 which is

provided with a central opening for receiving the insulating sleeve 4. The sleeve 3 is provided with a reduced end portion 5 which provides an annular shoulder 6. A central orifice 7 is provided in the cup member 2 and is of a size to receive the end portion 5 of the member 3 and its annular shoulder 6 rests against the face of the cup member 2 when in position in said orifice 7. An auxiliary tip conductor member 50 of suitable conducting material and cylindrical in shape is provided and is of a size to permit its insertion into the central opening in the insulating sleeve 4, the said member 50 having a circumferential flange 51 formed integrally with one of its ends for purposes to be pointed out later, the other end of said member being threaded to receive the auxiliary tip contact member 52, said contact member 52 being separated and insulated from the sleeve contact member 3 by the insulating washer 53. A cylindrical non-conducting member 54 is provided which is adapted to fit into the auxiliary cylindrical tip conductor 50. A conducting stem or bolt 9 extends through the insulating member 54, its one end 10 being threaded, and its forward end being provided with an integrally formed and spherically shaped tip contact member 11 which is insulated from the auxiliary tip contact 52 by means of the insulating bushing 12, the insulating sleeve member 54 insulating said bolt 9 from the auxiliary tip conducting member 50. A spring terminal 13, angular in shape is provided and has a disk portion 14, in which disk portion 14 is a central orifice 15 of a size to receive the protruding end of the insulating sleeve 4 so that the disk portion 14 will engage the inner face of the cup member 2 and also engage the end of the sleeve member 3. The disk portion 14 is also provided with a pair of diametrically opposite orifices 16 which are adapted to receive the non-conducting studs 17. The sleeve 4 insulates the terminal 13 from the auxiliary tip conducting member 50. The terminal 13 serves as a terminal for the sleeve conducting member 3 of my plug. A spring terminal 19, having a disk portion 20, is provided, the disk portion 20 being provided with a central orifice 21 of a size to fit over the auxiliary tip conducting member 50 so that the said disk portion 20 will have contact engagement with the said member 50 and also with the flange 51 formed with said member 50. The disk portion 20 is also provided with a pair of diametrically opposite orifices 21' to receive the studs 17. An insulating plate or bushing 22 provided with a central orifice of a size to receive the protruding end of the insulating sleeve member 4 and a pair of diametrically opposite orifices of a size to receive the studs 17 rests between the disk portion 20 of the terminal 19 and the angular portion 14 of the terminal 13 to insulate the said terminals from each other. The terminal 19 serves as a terminal for the auxiliary tip conducting member 50.

A terminal 23, angular in shape and provided with a disk portion 24, is provided and has a central orifice 25 of a size to receive the conducting bolt 9, and a pair of diametrically opposite orifices 26 provided in said disk portion 24 are adapted to receive the studs 17. An insulating plate or bushing 27, provided with a central opening of a size to receive the conducting bolt 9 and a pair of diametrically opposite orifices of a size to receive the studs 17, rests between the disk portion 20, of the terminal 19 and the disk portion 24 of the terminal 23 to insulate one from the other. A suitable pocket or cut-out portion 28 is provided in the bushing 27 and is of a size to receive the flange 51 of the auxiliary tip conducting member 50 the said bushing 27 also insulating the said member 50 from the conducting bolt 9 and also from the disk portion 24 of the terminal 23. The threaded end 10 of the conducting bolt 9 protrudes through the aligned central orifices 15, 21 and 25 of the disk portions 14, 20 and 24 of the terminals 13, 19 and 23 respectively, and also extends through the central openings in the insulating bushings 22 and 27 and a slotted nut 29 having screw-threaded engagement with the threaded end 10 of the conducting bolt 9 is screwed down against the face of the disk portion 24 of the terminal 23 and clamps the terminals 13, 19 and 23 and insulating bushings 22 and 27 in position and at the same time forms a conducting means between the tip contact 11 of the conducting bolt 9 and its terminal 23. When the nut 29 is screwed down on the threaded end 10 of the conducting bolt 9 the tip contact 11 of said bolt 9 will hold the auxiliary tip contact 52 and its conducting member 50 in position against movement. The studs 17, which as before described are of suitable insulating material, extend through the aligned diametrically opposite orifices 2' of the cup member 2 and the orifices 16, 21' and 26 of the terminals 13, 19 and 23 and the insulating bushings 22 and 27 to hold the said terminals and bushings in position against rotary movement relative to each other. The terminal 13 is provided with a rearwardly extending bifurcated spring member which bifurcations form a pair of spring members 13' and 13" formed to bend inwardly; and the terminal 19 is provided with a rearwardly extending spring member 19' formed to bend inwardly. The ter-

terminal 23 is also provided with a rearwardly extending spring member 23' formed to bend inwardly.

An insulating block 31 is provided and has a central orifice 32 of a size to receive the end 10 of the conducting bolt 9. An annular recess 33 concentric with the orifice 32 is provided, into which the nut 29, which clamps the terminal members 13, 19 and 23 and bushings 22 and 27 together, extends to permit the block 31 to rest against the face of the disk 24 of the terminal 23. The face 34 of the block 31, which rests against the disk 24 of the terminal 23 is provided with a pair of diametrically opposite orifices 35, into which the end of the studs 17 extend to prevent turning of the block 31 on the conducting bolt 9. The block 31 is secured on the conducting bolt 9 by means of a slotted nut 36 which has screw-threaded engagement with the threaded end 10 of said bolt 9, the said nut 36 resting in a suitable annular recess 37 in the rear face of the block 31. The block 31 is provided with flat faces 38 and 39, the said face 39 adapted to be engaged by the free ends of the spring members 19' and 23' of the terminals 19 and 23 respectively, and the said face 38 adapted to be engaged by the free ends of the spring members 13' and 13² of the terminal 13. When the block 31 is inserted between the spring members 19' and 23' of the terminals 19 and 23 and the spring members 13' and 13² of terminal 13, the block 31 will force said spring members outward against their normal spring tension. The faces 38 and 39 of the block 31 are provided respectively with grooves 40 and 41, there being two grooves 40 in the face 38 in alignment with the spring members 19' and 23' of the terminals 19 and 23, and grooves 41 of which there are two in the face 39 of the block 31 are in alignment with the spring members 13' and 13² of the terminal 13. A form of cord tip that may be used is illustrated at 42 in Fig. 2.

Assuming that a headphone set and a loud speaker are to be connected to my plug the cord having the headphone set connected thereto will be provided with a pair of cord tips such as 42 (Fig. 2), and the cord having the loud speaker connected thereto will also have a pair of cord tips 42 connected thereto.

Now to connect the loud speaker to my plug one of the cord tips 42 connected to the cord of the loud speaker is forced into the groove 40 beneath the spring member 13' of the terminal 13 whereby the loud speaker is connected to the sleeve conductor 3 of my plug, and the other cord tip 42 is forced into the groove 41 beneath the spring member 19' of the terminal 19 whereby the loud speaker is connected to the auxiliary tip conducting member 50, and the said

cord tips 42 are held in the grooves by the spring tension of the said spring members 13' and 19' of terminals 13 and 19 respectively. One of the cord tips of the cord connected to the headphone set is now forced into the other groove 40 beneath the spring member 13² of the terminal 13 which will connect the headphone set to the sleeve conductor 3 of my plug, and the other cord tip of said cord will be forced into the groove 41 beneath the spring member 23' of the terminal 23 which will connect the headphone set to the tip conducting rod 9 of my plug. The tension of the spring members 13² and 23' will hold the cord tips 42 in the grooves 40 and 41 respectively, and insure positive connection between said cord tips and said terminals. Thus it will be seen that the headphone set and the loud speaker are both connected to the sleeve conductor 3 of my plug and that the headphone is connected to the tip conductor 9 while the loud speaker is connected to the auxiliary tip conductor 50. This connection arrangement may, however, be reversed by reversing the connection of the cord tips 42 of the headphone set and loud speaker relative to the spring members 19' and 23' of the terminals 19 and 23 respectively.

Referring now to Fig. 8 I illustrate the plug tip, auxiliary tip, and sleeve conductors 11, 52 and 3 associated with the tip and sleeve conductors 46 and 47 of a jack J which is connected to the output end of a receiving circuit. The plug P when connected as illustrated in Fig. 2 to the jack J with its tip conductor 11 engaging the tip conductor 46 of the jack and its sleeve conductor 3 engaging the sleeve conductor 47 of the jack connects the loud speaker unit LS in circuit with the output end of the receiving circuit. The plug when connected as illustrated in Fig. 3 to the jack J with its auxiliary tip conductor 52 engaging the tip conductor 46 of the jack and its sleeve conductor 3 engaging the sleeve conductor 47 of the jack now connects the head set unit R in circuit with the output end of the receiving circuit.

I provide a protective sleeve or handle 44 of suitable insulating material, one end of which is threaded and has screw-threaded engagement with the cup member 2 of the plug. This handle or sleeve serves as a cover or enclosing member for the plug and also as a handle for grasping the plug. The handle 44 is also provided with a pair of orifices 45 for the stay cords of the headphone set and loud speaker cords for purposes as will now be described.

To relieve the strain from the connecting cords, should the plug be accidentally withdrawn by grasping the cords instead of the handle 44 of the plug, each connecting cord is provided with a stay cord which is insert-

ed through one of the orifices 45 in the handle 44 and tied so as to allow slack in the individual conductors leading to the cord tips so that the cord tips will not be accidentally withdrawn from under the spring members of their respective terminals.

In Fig. 2 I show the tip contact spring 46 and sleeve contact spring 47 of a well known two conductor spring jack which is suitably and operatively associated with the radio or wireless receiving set. To connect the head-phone set in circuit with the radio or wireless receiving set my plug will be inserted into the spring jack to such an extent that the tip contact spring 46 of the said spring jack registers and makes contact with the tip contact 11 of the plug, and the sleeve contact spring 47 registers and makes contact with the sleeve contact member 3 of said plug as is shown in Fig. 2 of the drawings. The plug will be held in this position by the spring tension of the contact springs 46 and 47. The loud speaker will, when the plug is in the position illustrated in Fig. 2, be in open circuit since the auxiliary tip contact member 52 is free from contactual engagement and also free from conductive association with the said contact springs 46 and 47. Now should it be desired to connect the loud speaker in circuit with the radio or wireless receiving set and the head phone set disassociated therefrom, the same may be accomplished by inserting the plug into the spring jack to its full extent thereby causing the tip contact spring 46 to register and make contact with the auxiliary tip contact 52, and the sleeve contact spring 47 will still remain in contactual engagement with the sleeve contact member 3 of the plug but at a different point thereon. A circumferential groove 52' is provided in the auxiliary tip contact member 52 to effect a snap action of the plug when the said plug is inserted into the spring jack as illustrated in Fig. 3, and the contact springs 46 and 47 will hold the said plug in this position due to the tension of said contact springs. The head phone set will now be in open circuit since the tip contact member 11 of the plug will not engage the tip contact spring 46 and as the said member 11 is in no way conductively connected with the auxiliary tip contact member 52 no circuit is closed for the head phone set.

From the foregoing it will be seen that either the loud speaker or the head phone set may be connected to the radio or wireless receiving set by adjusting the plug in the spring jack having the contact springs 46 and 47, and that it is impossible to connect both the head phone set and loud speaker to the radio or wireless set at the same time. The advantages of this arrangement, of course, are at once obvious and apparent. The handling of the set is greatly facili-

tated and necessity for switches to cut from one instrument to the other obviated.

While I have described and illustrated a particular embodiment of my invention it is to be understood that I do not wish to be limited to the exact structure as shown and described, as changes and modifications will readily suggest themselves, therefore, I intend to cover all that which may come within the scope and spirit or the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is:

1. In a connecting plug of the character described comprising a hollow sleeve conductor member, a cup member for supporting said hollow sleeve member, a tip conductor member and an auxiliary tip conductor member extending through said hollow sleeve member but insulated therefrom, said tip and said auxiliary tip conductor members also insulated from each other, a spring terminal for each of said conductor members and insulated from each other, a block of insulation for separating said spring terminals and provided with grooves for receiving and connecting terminal members leading from different instrumentalities with said spring terminals, said tip conductor member and said auxiliary tip conductor member arranged so that a circuit may extend through said connecting plug to one of said instrumentalities via said tip conductor member and said sleeve conductor member or to the other of said instrumentalities via said auxiliary tip conductor member and said sleeve conductor member.

2. In a connecting plug of the character described including a hollow sleeve conductor member, a cup shaped member for receiving and supporting said sleeve conducting member, a tip conductor member having a conducting bolt extension, a cylindrical conductor member extending through said sleeve conductor member but insulated therefrom, an auxiliary tip conductor member secured to one end of said cylindrical conductor member, said conducting bolt extension extending through said cylindrical conductor member so that said tip conductor member is brought into close proximity to said auxiliary tip conductor member, means for insulating said conductor members from each other, a spring terminal for each of said conductor members and insulated from each other, means for engaging said bolt extension for clamping said conductor members and said spring terminals in their assembled position, a non-conducting block for separating said spring terminals and for connecting conducting members leading from different instrumentalities to said spring terminals, the connection with the spring terminal of said sleeve conductor member being common to the connec-

terminal 23 is also provided with a rearwardly extending spring member 23' formed to bend inwardly.

An insulating block 31 is provided and has a central orifice 32 of a size to receive the end 10 of the conducting bolt 9. An annular recess 33 concentric with the orifice 32 is provided, into which the nut 29, which clamps the terminal members 13, 19 and 23 and bushings 22 and 27 together, extends to permit the block 31 to rest against the face of the disk 24 of the terminal 23. The face 34 of the block 31, which rests against the disk 24 of the terminal 23 is provided with a pair of diametrically opposite orifices 35, into which the end of the studs 17 extend to prevent turning of the block 31 on the conducting bolt 9. The block 31 is secured on the conducting bolt 9 by means of a slotted nut 36 which has screw-threaded engagement with the threaded end 10 of said bolt 9, the said nut 36 resting in a suitable annular recess 37 in the rear face of the block 31. The block 31 is provided with flat faces 38 and 39, the said face 39 adapted to be engaged by the free ends of the spring members 19' and 23' of the terminals 19 and 23 respectively, and the said face 38 adapted to be engaged by the free ends of the spring members 13' and 13² of the terminal 13. When the block 31 is inserted between the spring members 19' and 23' of the terminals 19 and 23 and the spring members 13' and 13² of terminal 13, the block 31 will force said spring members outward against their normal spring tension. The faces 38 and 39 of the block 31 are provided respectively with grooves 40 and 41, there being two grooves 40 in the face 38 in alignment with the spring members 19' and 23' of the terminals 19 and 23, and grooves 40 of which there are two in the face 39 of the block 31 are in alignment with the spring members 13' and 13² of the terminal 13. A form of cord tip that may be used is illustrated at 42 in Fig. 2.

Assuming that a headphone set and a loud speaker are to be connected to my plug the cord having the headphone set connected thereto will be provided with a pair of cord tips such as 42 (Fig. 2), and the cord having the loud speaker connected thereto will also have a pair of cord tips 42 connected thereto.

Now to connect the loud speaker to my plug one of the cord tips 42 connected to the cord of the loud speaker is forced into the groove 40 beneath the spring member 13' of the terminal 13 whereby the loud speaker is connected to the sleeve conductor 3 of my plug, and the other cord tip 42 is forced into the groove 41 beneath the spring member 19' of the terminal 19 whereby the loud speaker is connected to the auxiliary tip conducting member 50, and the said

cord tips 42 are held in the grooves by the spring tension of the said spring members 13' and 19' of terminals 13 and 19 respectively. One of the cord tips of the cord connected to the headphone set is now forced into the other groove 40 beneath the spring member 13² of the terminal 13 which will connect the headphone set to the sleeve conductor 3 of my plug, and the other cord tip of said cord will be forced into the groove 41 beneath the spring member 23' of the terminal 23 which will connect the headphone set to the tip conducting rod 9 of my plug. The tension of the spring members 13² and 23' will hold the cord tips 42 in the grooves 40 and 41 respectively, and insure positive connection between said cord tips and said terminals. Thus it will be seen that the headphone set and the loud speaker are both connected to the sleeve conductor 3 of my plug and that the headphone is connected to the tip conductor 9 while the loud speaker is connected to the auxiliary tip conductor 50. This connection arrangement may, however, be reversed by reversing the connection of the cord tips 42 of the headphone set and loud speaker relative to the spring members 19' and 23' of the terminals 19 and 23 respectively.

Referring now to Fig. 8 I illustrate the plug tip, auxiliary tip, and sleeve conductors 11, 52 and 3 associated with the tip and sleeve conductors 46 and 47 of a jack J which is connected to the output end of a receiving circuit. The plug P when connected as illustrated in Fig. 2 to the jack J with its tip conductor 11 engaging the tip conductor 46 of the jack and its sleeve conductor 3 engaging the sleeve conductor 47 of the jack connects the loud speaker unit LS in circuit with the output end of the receiving circuit. The plug when connected as illustrated in Fig. 3 to the jack J with its auxiliary tip conductor 52 engaging the tip conductor 46 of the jack and its sleeve conductor 3 engaging the sleeve conductor 47 of the jack now connects the head set unit R in circuit with the output end of the receiving circuit.

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To relieve the strain from the connecting cords, should the plug be accidentally withdrawn by grasping the cords instead of the handle 44 of the plug, each connecting cord is provided with a stay cord which is insert-

ed through one of the orifices 45 in the handle 44 and tied so as to allow slack in the individual conductors leading to the cord tips so that the cord tips will not be accidentally withdrawn from under the spring members of their respective terminals.

In Fig. 2 I show the tip contact spring 46 and sleeve contact spring 47 of a well known two conductor spring jack which is suitably and operatively associated with the radio or wireless receiving set. To connect the head-phone set in circuit with the radio or wireless receiving set my plug will be inserted into the spring jack to such an extent that the tip contact spring 46 of the said spring jack registers and makes contact with the tip contact 11 of the plug, and the sleeve contact spring 47 registers and makes contact with the sleeve contact member 3 of said plug as is shown in Fig. 2 of the drawings. The plug will be held in this position by the spring tension of the contact springs 46 and 47. The loud speaker will, when the plug is in the position illustrated in Fig. 2, be in open circuit since the auxiliary tip contact member 52 is free from contactual engagement and also free from conductive association with the said contact springs 46 and 47. Now should it be desired to connect the loud speaker in circuit with the radio or wireless receiving set and the head phone set disassociated therefrom, the same may be accomplished by inserting the plug into the spring jack to its full extent thereby causing the tip contact spring 46 to register and make contact with the auxiliary tip contact 52, and the sleeve contact spring 47 will still remain in contactual engagement with the sleeve contact member 3 of the plug but at a different point thereon. A circumferential groove 52' is provided in the auxiliary tip contact member 52 to effect a snap action of the plug when the said plug is inserted into the spring jack as illustrated in Fig. 3, and the contact springs 46 and 47 will hold the said plug in this position due to the tension of said contact springs. The head phone set will now be in open circuit since the tip contact member 11 of the plug will not engage the tip contact spring 46 and as the said member 11 is in no way conductively connected with the auxiliary tip contact member 52 no circuit is closed for the head phone set.

From the foregoing it will be seen that either the loud speaker or the head phone set may be connected to the radio or wireless receiving set by adjusting the plug in the spring jack having the contact springs 46 and 47, and that it is impossible to connect both the head phone set and loud speaker to the radio or wireless set at the same time. The advantages of this arrangement, of course, are at once obvious and apparent. The handling of the set is greatly facili-

tated and necessity for switches to cut from one instrument to the other obviated.

While I have described and illustrated a particular embodiment of my invention it is to be understood that I do not wish to be limited to the exact structure as shown and described, as changes and modifications will readily suggest themselves, therefore, I intend to cover all that which may come within the scope and spirit or the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is:

1. In a connecting plug of the character described comprising a hollow sleeve conductor member, a cup member for supporting said hollow sleeve member, a tip conductor member and an auxiliary tip conductor member extending through said hollow sleeve member but insulated therefrom, said tip and said auxiliary tip conductor members also insulated from each other, a spring terminal for each of said conductor members and insulated from each other, a block of insulation for separating said spring terminals and provided with grooves for receiving and connecting terminal members leading from different instrumentalities with said spring terminals, said tip conductor member and said auxiliary tip conductor member arranged so that a circuit may extend through said connecting plug to one of said instrumentalities via said tip conductor member and said sleeve conductor member or to the other of said instrumentalities via said auxiliary tip conductor member and said sleeve conductor member.

2. In a connecting plug of the character described including a hollow sleeve conductor member, a cup shaped member for receiving and supporting said sleeve conducting member, a tip conductor member having a conducting bolt extension, a cylindrical conductor member extending through said sleeve conductor member but insulated therefrom, an auxiliary tip conductor member secured to one end of said cylindrical conductor member, said conducting bolt extension extending through said cylindrical conductor member so that said tip conductor member is brought into close proximity to said auxiliary tip conductor member, means for insulating said conductor members from each other, a spring terminal for each of said conductor members and insulated from each other, means for engaging said bolt extension for clamping said conductor members and said spring terminals in their assembled position, a non-conducting block for separating said spring terminals and for connecting conducting members leading from different instrumentalities to said spring terminals, the connection with the spring terminal of said sleeve conductor member being common to the connec-

tions with the spring terminals of said tip and auxiliary tip conductor members, so that a circuit may be closed through said connecting plug to one of said instrumentalities via said sleeve conductor member and said tip conductor member or to the other of said instrumentalities via said sleeve conductor member and said auxiliary tip conductor member.

3. A connecting plug in combination with a spring jack, a hollow sleeve conductor member for said plug, a cup shaped member for receiving and supporting said sleeve conducting member, a tip conductor member having a conducting bolt extension, a cylindrical conductor member extending through said sleeve conductor member but insulated therefrom, an auxiliary tip conductor member secured to one end of said cylindrical conducting member, said conducting bolt extension extending through said cylindrical conductor member so that said tip conductor member is brought into close proximity to said auxiliary tip conductor member, means for insulating said conductor members from each other, a spring terminal for each of said conductor members and insulated from each other, means for engaging said bolt extension for clamping said conductor members and said spring terminals in their assembled position, a non-conducting block for separating said spring terminals and for connecting conducting members leading from different instrumentalities to said spring terminals, a spring terminal jack having contact springs, said tip conductor member and said auxiliary tip conductor member being so arranged that a circuit may be closed through said connecting plug via said contact springs and said tip and sleeve conductor members, or via said contact springs and said auxiliary tip and sleeve conductor members.

4. A connecting plug in combination with a spring jack, a sleeve conductor member for said plug, a tip conductor member having an extension integrally formed therewith and extending through said sleeve member, a cylindrical conductor member interposed between said tip conductor extension and said sleeve conductor member, an auxiliary tip conductor member secured to said cylindrical conductor member, means for insulating said sleeve, tip and auxiliary conductor elements from each other, a spring terminal for each of said conductor elements insulated from each other, a block of insulation secured to the extension of said tip conductor member and adapted to separate said spring terminals and to secure terminals of different instrumentalities to said spring terminals, a pair of contact springs adapted to be engaged by said plug so that a circuit may be established through said plug for one of the instrumentalities via

said tip and sleeve conductor members exclusive of said auxiliary tip conductor member, or adapted to be engaged by said plug so that a circuit may be established for the other of said instrumentalities via said auxiliary tip conductor member and said sleeve conductor member exclusive of said tip conductor member.

5. A connecting plug in combination with a spring jack, a sleeve conductor member for said plug, a tip conductor member having an extension integrally formed therewith and extending through said sleeve member, a cylindrical conductor member interposed between said tip conductor extension and said sleeve conductor member, an auxiliary conductor member secured to said cylindrical conductor member, means for insulating said sleeve, tip and auxiliary conductor elements from each other, a spring terminal for each of said conductor elements insulated from each other, a block of insulation secured to the extension of said tip conductor member and adapted to separate said spring terminals and to secure terminals of different instrumentalities to said spring terminals, a pair of contact springs, said plug adapted to engage said contact springs in one position to close a circuit through said plug and one of said instrumentalities while said other instrumentality is in open circuit, and adapted to engage said contact springs in another position, to close a circuit through said plug and said other instrumentality while said one instrumentality is in open circuit.

6. The combination of a two conductor spring jack and a three conductor plug, a pair of instruments connected to said plug, said plug and jack cooperating to permit either of said instruments to be operatively associated with said two conductor jack independent of the other, two of the contacts of said plug having grooves therein for co-operation with one of the springs of said spring jack to maintain said plug in either of its operative positions.

7. The combination of a two conductor spring jack and a three contact plug, a pair of instruments connected to said plug so that one conductor of each instrument is common to one conductor of said plug, said plug and jack cooperating to permit either of said instruments to be operatively associated with the springs of said two conductor jack independent of the other depending upon the position of said plug relative to said jack, two of the contacts of said plug having grooves therein for co-operation with one of the springs of said spring jack to maintain said plug in either of its operative positions.

8. The combination of a two conductor spring jack and a three contact removable plug for operating therewith, a pair of in-

struments having a common connection to one contact of said plug and separate connections to the other contacts of said plug, said plug cooperating with said jack so that either of said instruments may be operatively connected through said plug to said jack, said plug and jack having cooperating projections and grooves whereby said plug will remain in either of its operative positions to effect said connection between the springs of said jack and the instruments connected to said plugs. 10

Signed by me at Chicago, county of Cook,
State of Illinois, this 10th day of June, 1924.

EARL F. POTTER.