Nov. 8, 1932. V. A. JOHNSON 1,886,959

MULTIPLE CONTACT PLUG

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Fig. 1.

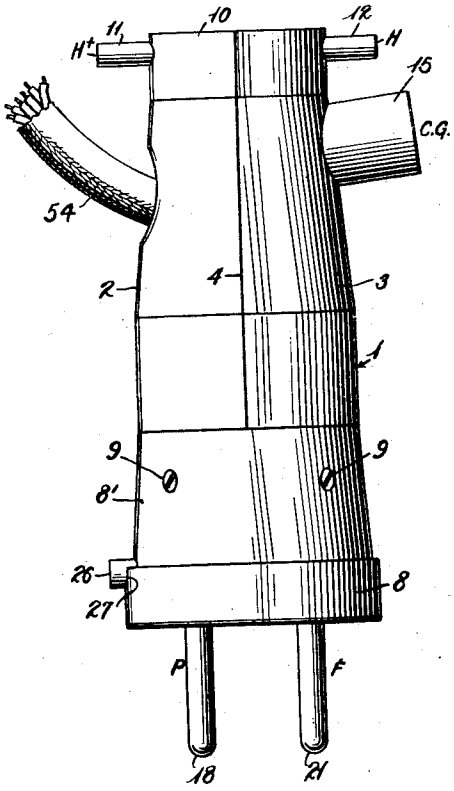


Fig. 2.

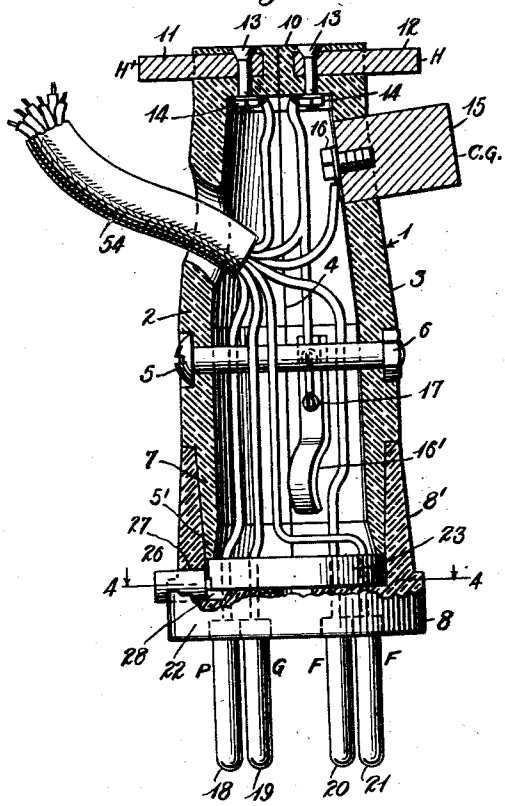


Fig. 3.

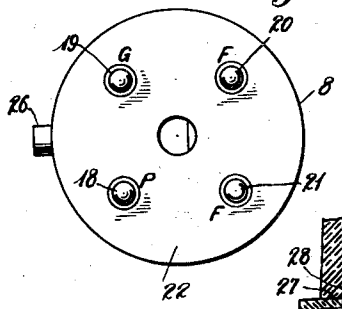


Fig. 4.

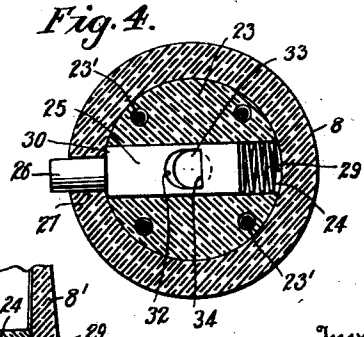
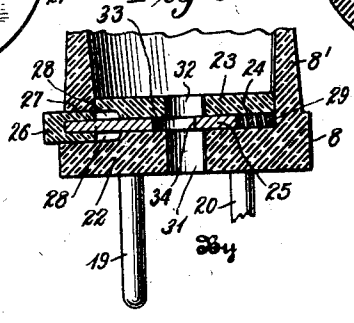


Fig. 5.



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Fig. 6.

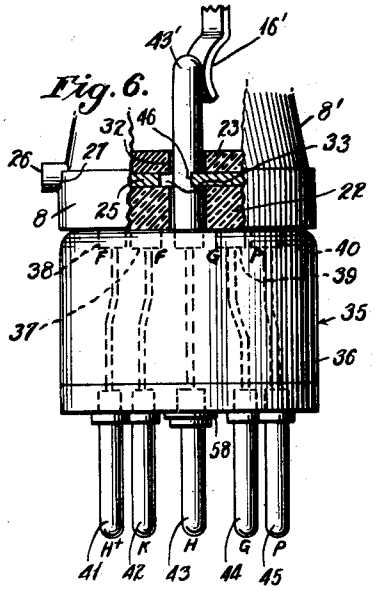


Fig. 9.

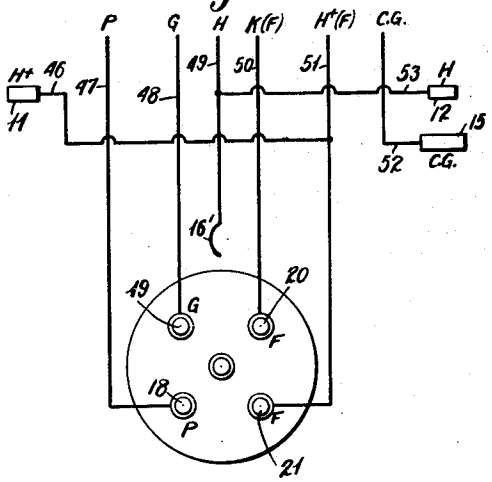


Fig. 10.

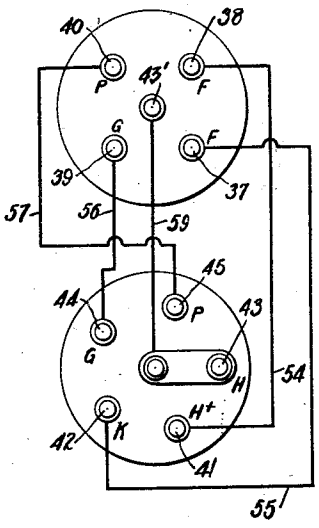


Fig. 7.

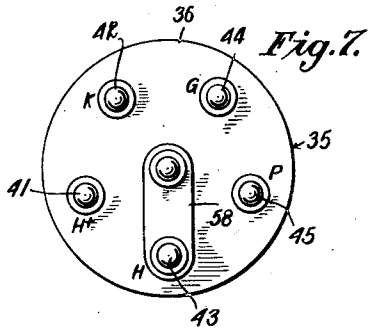
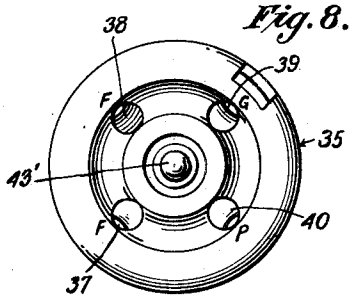


Fig. 8.



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UNITED STATES PATENT OFFICE

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MULTIPLE CONTACT PLUG

Application filed February 21, 1930. Serial No. 430,431.

This invention relates to a multiple contact plug to be used in connection with a radio testing set.

An object of my invention is to provide a plug that can be inserted into a radio set socket and lead the potentials existing at the socket terminals to similar terminals on a radio testing set.

A further object is to provide an adapter with said plug whereby the potentials from the five terminal heater tube socket may be led to the testing set.

A further object of my invention is to construct the plug with additional external contacts so that the connections which ordinarily go to the control grid of a tube and to overhead heater terminals of a tube may be led to the testing set.

A further object is to accomplish the above results with a minimum number of wires in the connector cable.

A further object is to provide locking means for locking said adapter to said plug.

Other objects will be apparent to those skilled in the art from the following description and appended claims.

In the drawings accompanying the description

Fig. 1 is an elevation of my new plug,

Fig. 2 is a vertical cross section of the plug shown in Fig. 1,

Fig. 3 is a bottom view of the plug,

Fig. 4 is a cross section taken along line 4—4 of Fig. 2,

Fig. 5 is a cross section of the lower part of the plug showing the locking bar,

Fig. 6 is an elevation of my adapter shown in cooperative relationship with the locking bar of the plug,

Fig. 7 is a bottom view of the adapter,

Fig. 8 is a top view of the adapter, and

Figs. 9 and 10 are wiring diagrams of the connections in the plug and adapter respectively.

The plug 1 has an insulating body portion composed of a shell comprising two halves 2 and 3 formed with abutting faces at 4 and held together by the bolt 5 and the nut 6. The shell has a reduced end 7 which is received into the hollow sleeve 8′ of the base 8. Screws 9 are provided in the sleeve 8′ and screw into the end 7 to hold the base 8 and the shell firmly together.

In the upper wall 10 of the shell are two contacts 11 and 12, each held in place by a bolt 13 carrying a nut 14 at its inner end for the purpose of securing a conductor thereto. The contacts correspond to the heater terminals of an overhead heater type of tube and therefore are labeled H^+ and H. In the side wall of 3 is a contact 15, carrying a screw 16 at its inner end to connect a conductor to said contact. This contact 15 corresponds to the control grid terminal of a screen grid tube and is labeled C. G. On the inner side wall of 3 is a spring contact 16′ carrying a screw 17 for the purpose of securing a conductor to said contact. In the base 8 are four prongs 18, 19, 20 and 21. The contacts are adapted to be received in the four terminals of a radio tube socket or else into the adapter to be described later. The prongs 18, 19, 20 and 21 correspond to the plate, grid and the two filament prongs of a radio tube and are therefore labeled P, G, F, F.

Resting on the bottom wall 22 of the base 8 is an insulating disk 23 having holes 23′ for the passage of conductors attached to the contact prongs 18, 19, 20 and 21. Said disk is provided with a transverse groove 24 which receives the locking bar 25 carrying a button 26 at one end. The lower end 5′ of the shell rests on the upper face of the disk 23, thus retaining it in place. Base 8 has an aperture 27 through which said button extends to the exterior of said base. Base 8 and disk 23 have cooperating recesses 28 to receive the inner end of the button 26. Placed between the opposite end of the bar 25 and the side wall of base 8 is a spring 29 tending to force

the end 30 of the locking bar against the opposite wall of base 8. Wall 22 and disk 23 have apertures 31 and 32 respectively in alinement for a purpose to be set forth below. The bar 25 has an aperture 33 therein with an edge 34 which in the normal position extends across the alined apertures 31 and 32.

An adapter 35 is to be used in connection with this plug in certain cases. This adapter has an insulating body 36, and four socket terminals 37, 38, 39 and 40, adapted to receive respectively the contacts 21, 20, 19, 18 of the plug 1. The socket terminals are correspondingly labeled F, F, G, P. In the center of the upper side of the adapter is the upper prong 43′, and on the lower side of said adapter are the five prongs 41, 42, 43, 44, 45 adapted to be received in the five socket terminals of a heater tube socket. The prongs 41, 42, 43, 44 and 45 correspond to the heater, cathode, heater, grid and plate terminals of a heater tube and are respectively labeled H^+, K, H, G, P.

The prong 43′ has a slot 46 in the side thereof. This prong is adapted to pass through the alined apertures 31 and 32 and into engagement with the spring contact 16′. The prongs 18, 19, 20, and 21 are likewise adapted to be received in the socket terminals 40, 39, 38 and 37 respectively, as stated above. In the assembled position the edge 34 of the bar 25 engages in the slot 46 of the prong 43′. The spring 29 tends to maintain this engagement and thus the adapter is securely locked in the plug. The locking bar 25 may be released by pressing on the button 26.

Referring to Fig. 9, conductors 46, 47, 48, 49, 50, 51, 52, and 53 are connected to the contacts 11, 18, 19, 16′, 20, 21, 15 and 12 respectively. Conductor 53 is connected to conductor 49, and conductor 46 is connected to the conductor 51. Conductors 47, 48, 49, 50, 51 and 52 are gathered into a cable 54 as indicated in Figs. 1 and 2. This cable leads to a testing set (not shown). The leads 47, 48, 49, 50, 51 and 52 are the plate, grid, negative heater, cathode, positive heater, and control grid leads for a heater tube socket in the control set, and are correspondingly labeled P, G, H, K, H^+ and C.G. respectively. Leads 47, 48, 50 and 51 are the plate, grid and the two filament leads for a four pronged socket in said grid, and the leads 50 and 51 are therefore also labeled (F), (F).

Referring to Fig. 10, the prongs 41, 42, 44, and 45 are connected to the socket terminals 38, 37, 39, and 40 respectively by the conductors 54, 55, 56, and 57. Prong 43 is connected to prong 43′ by the strip 58 and the conductor 59.

My plug is contemplated as being used to take the various potential leads of a radio set and conduct them to a testing set.

When the radio set is one provided with the four terminal socket, the plug is used without the adapter and plugged directly into the radio set socket. Thus the prong 18 and conductor 47, the prong 19 and conductor 48, the prong 20 and conductor 50, the prong 21 and conductor 51, will lead the plate, grid and the two filament terminals respectively of the radio set to the plate, grid and two filament terminals of the testing set.

If the radio set is provided with a control grid lead, this is connected directly to the contact 15, from which by the conductor 52 it is led to the control grid terminal of the testing set.

If the radio set has two heater leads for a heater tube of the overhead heater type, these are connected directly to the two contacts 11 and 12 and are led by the conductors 46 and 51 and conductors 53 and 49 respectively, to the heater terminals of the testing set. In this case the contact prong 20 conducts the cathode terminal of the radio set by means of the conductor 50 to the cathode terminal of the testing set.

If the radio set is provided with a five terminal heater tube socket, the adapter is used. This adapter is first assembled with the plug and then inserted in the radio set socket. The various terminals of the socket are led to the testing set terminals as follows. The positive heater terminal contacts with the prong 41 and is led by the conductor 54, socket terminal 38, prong 21 to the conductor 51. The negative heater terminal contacts with the prong 43 and is led by the strip 58, conductor 59, prong 43′ contact 16′ to the conductor 49. The plate terminal contacts with the prong 45 and is led by the conductor 57, socket terminal 40, prong 18 to the conductor 47. The grid terminal contacts with the prong 44 and is led by the conductor 56, socket terminal 39, prong 19 to the conductor 48. The cathode terminal contacts with the prong 42 and is led by the conductor 55, socket terminal 37, prong 20 to the conductor 50. The conductors 47, 48, 49, 50, and 51 lead to the plate, grid, negative heater, cathode, and positive heater terminals of the testing set as stated above. The control grid contact 15 is used as before.

Thus it is apparent that with my plug, connections may be made readily with the potential terminals of practically all known types of radio sets. The plug is made about the same size as standard radio tubes so that the external connections to the control grid contact and the overhead heater contacts occur at practically the same point as when a tube is used in the set. All that is necessary in the use of my plug is to remove the tube from the socket and place either the plug alone or the plug with the adapter, as the case demands, in the socket. If any external connections were made on the tube, they are made at the same points on the plug.

Various changes may be made in this embodiment of my invention, as will be apparent to those skilled in the art, within the scope of the appended claims.

Having described my invention, I claim:—

1. A plug comprising an insulating body portion, a chamber within said body portion, a spring contact within said chamber, a plurality of contact prongs projecting from one end of said plug, an aperture in said end in alinement with said spring contact, an adapter for said plug comprising a body member, a plurality of sockets in one end of said body member receiving said contact prongs, an upper contact prong on the said end of said body member passing through said aperture and contacting with said spring contact, a plurality of contact prongs projecting from the opposite end of said adapter, one of said latter contact prongs connected to said upper contact prong, each of the remaining of said latter contact prongs being connected to one of said sockets.

2. A device as set forth in claim 1, in which said plug has an additional contact adjacent the opposite end of said plug from said contact prongs.

3. A device as set forth in claim 1, in which said plug is provided with a locking device, said device engaging with said upper contact prong of said adapter to lock said adapter to said plug.

4. A plug comprising a base member, contacts on said base member, a hollow sleeve on said member, a hollow body portion having one end received in said hollow sleeve, a locking bar in said base member to retain a projection inserted in said plug, a plate retaining said bar in said member, the said end of said hollow body portion resting on said plate, and means for fastening said end to said sleeve.

5. A plug comprising an insulating body portion, a plurality of contact prongs projecting from one end of said plug, an aperture in said end, an adapter for said plug comprising a body member, a plurality of sockets in one end of said body member receiving said contact prongs, an upper contact prong on the said end of said body member passing through said aperture, means in said plug for electrical connection with said upper prong, a plurality of contact prongs projecting from the opposite end of said adapter, one of said latter contact prongs connected to said upper contact prong, each of the remaining of said latter contact prongs being connected to one of said sockets, and a locking latch in said plug for detachably engaging said upper contact prong of said adapter to lock said adapter to said plug.

6. A plug comprising an insulating body portion, a plurality of contact prongs projecting from one end of said plug, an aperture in said end, an adapter for said plug comprising a body member, a plurality of sockets in one end of said body member receiving said contact prongs, an upper contact prong on the said end of said body member passing through said aperture, a plurality of contact prongs projecting from the opposite end of said adapter, one of said latter contact prongs connected to said upper contact prong, each of the remaining of said latter contact prongs being connected to one of said sockets, and a locking latch in said plug for detachably engaging said upper contact prong of said adapter to lock said adapter to said plug.

7. A plug comprising an insulating body portion, a plurality of contact prongs projecting from one end of said plug, an aperture in said end, an adapter for said plug comprising a body member, a plurality of sockets in one end of said body member receiving said contact prongs, an upper prong on said end of said member passing through said aperture, a plurality of contact prongs projecting from the opposite end of said adapter, electrical connections between said latter contact prongs and corresponding sockets in said body member, and a locking latch in said plug for detachably engaging said upper prong of said adapter to lock said adapter to said plug.

8. A device as set forth in claim 7 in which said plug has an additional contact discrete from the end of said plug having said contact prongs.

9. A plug comprising an insulating body portion, an adapter associated with said plug, prong and socket means for interconnecting said adapter and plug including a plurality of prongs extending from said plug designed to be inserted in the receptacle of a tube of a radio receiver, a plurality of contact prongs on said adapter upon the end thereof remote from said plug designed to be selectively inserted in the receptacle of a tube of a radio receiver, and latch means in one of said sockets for locking a corresponding prong therein.

10. An audion tube adapter having a body member, a plurality of contact prongs in one end of said body member, and a plurality of sockets and a contact prong in the other end of said body member.

11. An audion tube adapter having a body member, a plurality of contact prongs in one end of said body member, a plurality of sockets and a contact prong in the other end of said body member, a plug connected to said adapter, a plurality of contact prongs projecting from one end of said plug inserted into said sockets of said adapter, and a socket contact behind said end of said plug receiving said last mentioned prong in the adapter.

12. An audion tube adapter having a body member, a plurality of contact prongs in one end of said body member, a plurality of sockets and a contact prong in the other end

of said body member, a plug connected to said adapter, a plurality of contact prongs projecting from one end of said plug inserted into said sockets of said adapter, a socket contact behind said end of said plug receiving said last mentioned prong in the adapter, and a locking latch in said plug for detachably engaging said last mentioned contact prong to lock said adapter to said plug.

The foregoing specification signed at Greenwood, Mississippi, this 28th day of January, 1930.

VIVION A. JOHNSON.