

April 20, 1954

M. ALDEN

2,676,310

CONNECTOR SOCKET FOR TELEVISION TUBES

Filed Oct. 21, 1949

2 Sheets-Sheet 1

FIG. 2

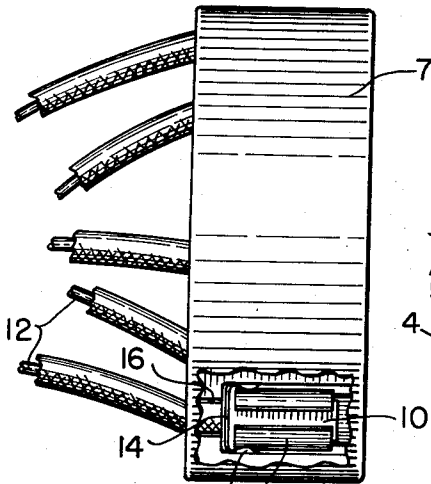


FIG. 1

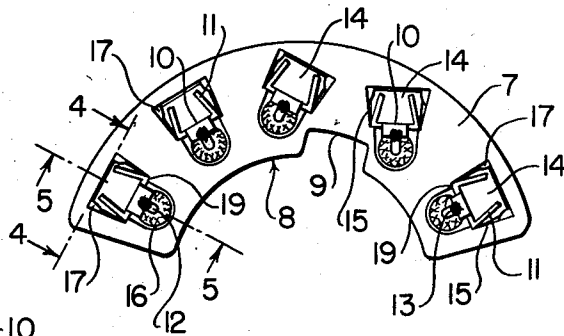


FIG. 3

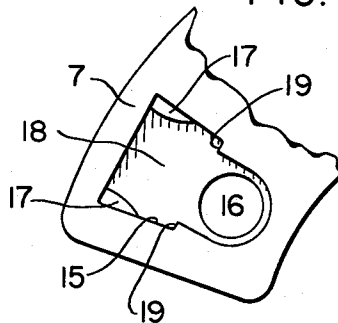


FIG. 4

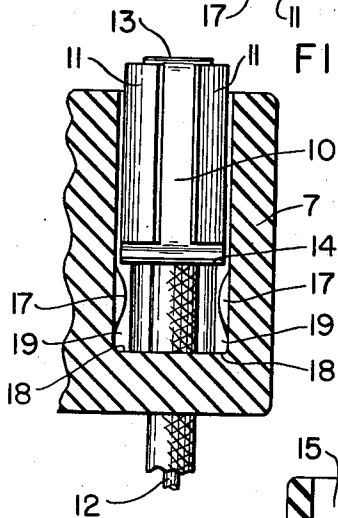


FIG. 5

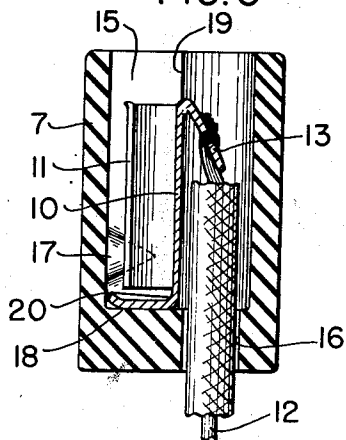
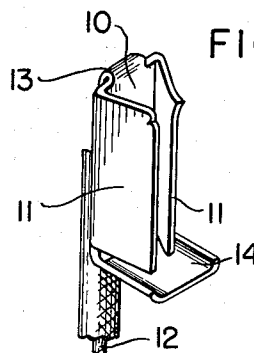


FIG. 6



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FIG. 7

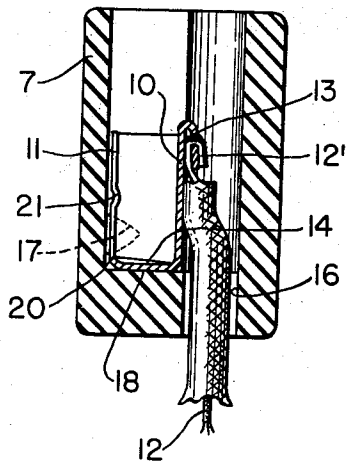


FIG. 8

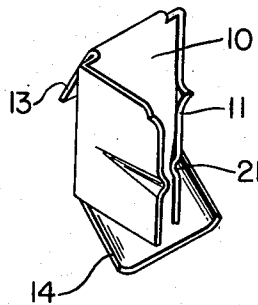


FIG. 9

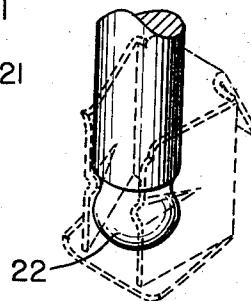
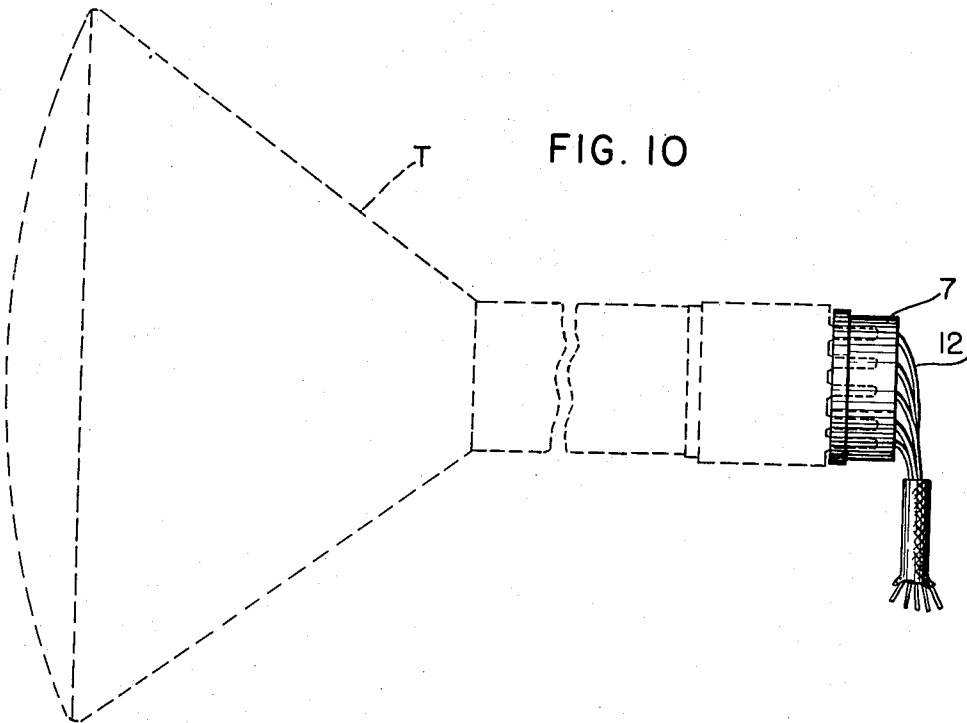


FIG. 10



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UNITED STATES PATENT OFFICE

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CONNECTOR SOCKET FOR TELEVISION TUBES

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6 Claims. (Cl. 339—193)

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Conventional sockets for radio tubes are seldom subjected to more than one or two hundred volts whereas television circuits employ much higher voltages sometimes exceeding several thousand volts. In one instance, 6600 volts is a specification of required breakdown with an allowance for safety. Consequently these new television requirements call for the invention of a socket or connector in which the surface path between the contacts may have a flash over breakdown voltage with sufficient safety factor for such higher voltage. Such sockets must operate at high humidity under conditions where the surfaces get covered with dust or other substances. Such tubes and connectors are frequently subjected to some vibrations tending to dislodge the tube or modify the contact connections and even to break the conducting wires.

Under the conditions of current competition, the cost of materials and labor becomes of prime importance.

The main object is to provide a satisfactory socket or connector for television use.

One object is to provide an effective low loss socket which can be made at minimum cost.

Another object is to provide a socket which is easy to handle and apply to a television tube.

Another object is to provide a socket which can be applied only to the proper tube prongs.

Another object is to provide a socket with contacts which are firmly held and yet which adapt themselves to adequately centering the prongs of a tube.

Another object is to provide a socket into which the contacts can be easily inserted and from which it is practically impossible to accidentally detach contacts.

Another object is to provide a socket having a novel shape thereby using a minimum of material in constructing it and which occupies a minimum of space in use.

Fig. 1 is a face view of one form of socket embodying my invention.

Fig. 2 is an edge view of the same, parts being shown in section.

Fig. 3 is a fragmentary view of one end of the body of the socket on a larger scale, the contacts being omitted.

Fig. 4 is a cross-sectional view on the plane of the line 4—4 of Fig. 1 showing a contact partially inserted in the body of the socket, on a larger scale.

Fig. 5 is a sectional view on the plane of the line 5—5 of Fig. 1 showing a contact in place, on a larger scale.

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Fig. 6 is a perspective view of one of the contacts before insertion into the socket.

Fig. 7 is a sectional view of the connector showing the preferred method of securing the conductor wire to a contact.

Fig. 8 is a perspective view of one of the unmounted contacts with a modification for receiving and holding a bulbous-headed tube prong.

Fig. 9 is a view of such a prong.

Fig. 10 is a side view showing a socket with a tube in dotted lines.

It has been customary to form sockets in annular form with sufficient contacts for the tube or relay to be employed. I have discovered that for television tubes which have but few prongs that a much more convenient form has a body of a segment of an annulus having just enough contacts for the tube. This is not only much cheaper but easier to handle. It also leaves more clearance around the base of the tube.

In the form shown, the body 7 is formed of suitable molded material and has its inner wall 8 curved to fit the stem of the tube T and a groove 9 serving as a positioning guide. Such a form requires less than 50% of the material required by the usual annular body and produces less wear and tear on the dies. The body is provided with just enough contacts, in this case five.

Each contact has a main back plate 10 with two wings or side flanges 11, 11 bent inwardly so as to form three lines for engagement of the usual cylindrical tube prongs. The conductor 12 is insulated in the usual manner and soldered to a lug 13 which is bent over at the end of the main back portion 10. The inner end of the contact has a foot 14 which is bent at an incline for interlocking with the wall of the socket body.

The body of the socket has a number of spaced pockets or recesses 15, each recess being adapted to receive a contact at some distance from the mouth of the recess and having a communicating passage 16 for a conductor 12. These recesses are arranged on an arc corresponding with the position of the prongs of the tube and are arranged outwardly of the passages and made just wide enough to receive a contact.

A tapered and rounded shoulder 17 is provided at each side wall of each recess near its outer edge. Each shoulder is located a slight distance above the bottom 18 of the recess as shown in Fig. 4. At the back of the recess along the edges are walls 19 for supporting the edges of the back of the contact.

In assembling the parts, each contact is forced into its respective recess by a plunger engaging the foot 14 and exerting inward pressure thereon. During such inward movement, the normally flat corners meet the shoulders 17 thereby bending said foot portion slightly transversely and curling said corners. When the foot has passed the shoulders the curled up corners become jammed beneath the shoulders so that it is practically impossible to retract the contact. This locks the contacts so that they are securely held and cannot be withdrawn when removing the tube or pulling the socket from the tube and yet allows the contacts to float in a sort of ball and socket connection.

In the form shown in Fig. 7, the tip 12' of the strands of the conductor 12 is passed through the tab 13 and pressure is applied to the tip 12' so as to smash the tab 13 against the conductor and the conductor against the back of the part 10 of the contact. Solder is then applied to electrically and mechanically connect the strands, the tab and the contact. This joint securely anchors the parts. The friction of the insulated conductor and the anchorage of the contact in the pocket in the body prevent withdrawal of the contact from the body.

The side wings 11 may be provided with transverse ribs 21 for snapping over the bulbous head 22 of a dovetail prong to more securely hold the connector to the tube prongs.

From the foregoing, it will be seen that according to this improvement, the body of the connector is formed of a single molded piece of insulating material in which the contacts are locked in pockets and held at the bottom and spaced apart from the entrance to the pockets and is free at the top to move or rock and receive the tube prongs which may be irregularly spaced or bent. Being of one-piece, there are no cracks or openings likely to collect dirt or absorb moisture by capillary action.

The body is small and formed of a minimum amount of material. Even in the shallow pockets, the conductors are so housed that there is no danger of leakage even if the insulation is pulled or drawn back to the socket. There is a minimum likelihood of surface leakage.

The form of connection of the conductor to the contact is not only easy to form but ensures a maximum efficiency both mechanically and electrically.

It is well known that soldering tends to stiffen a wire so that vibration is likely to break it. According to my improvement, the wire is pinched and welded or soldered to the outer surface of tab 13 and clamped between the inner surface thereof and the back of the contact and thus securely held and a perfect connection formed comprising the clamped inner portion of the wire 12 and the soldered and snubbed tip portion 12' thereof.

The contact and wire are so held in the insulating body that there is no possibility of relative movement of the wire out of the plane of the connector or otherwise. There is no danger of destructive vibration or twisting of the leads or breaking the strands of the conductor.

By clamping the strands of the conductor, they are so held that a minimum amount of solder is required as only a small and incidental amount of solder can contact the inner clamped portion of wire 12. Still further the parts are so closely held that the solder flows more quickly. Furthermore, the contacts can be more rapidly sol-

dered since the solder cools quickly and there is no danger of a cold joint.

Although a minimum of solder is required, a perfect bond is formed electrically as well as mechanically.

The form of connection between the wire and the contact provides a strain relief by a snubbing action. It is practically impossible to pull one of the contacts out of its pocket in the body, the strength of the clamped portion of wire 12 being preserved by the partial exclusion of solder therefrom.

According to my invention the contacts are securely held deep in the socket body where they are as far as possible removed from the base of the inserted tube so that under favorable circumstances there is no likelihood of moisture, grime, etc. making a conductor path between contacts.

The contacts are held at the bottom in such a manner as to permit a sort of ball and socket reception for the tube prongs which may be irregularly spaced or bent.

Connection is made at the forward end of the contacts to provide in a short depth protective insulation of the molding so that if the wire insulation pulls back on the individual lead, the leads so bared will not contact either with each other or with the surface of the molded insulation over which leakage might occur. The body being formed of a single piece, there are no interstices to collect dirt or tend to accumulate conductive films or attract moisture.

The wire being positioned snugly in the passage 16 restricts movement common in conventional sockets which tends to break the leads.

The result of the combination of the contact and the method of support and connection with and positioning of the conductor not only makes the socket compact but trouble-free as well as securing minimum cost of production.

I claim:

1. A tube socket body formed of molded insulation with passages for conductors and communicating recesses for contacts, a contact mounted in each recess having a back portion with a foot having corners and with two side wings forming three lines for engagement with the prong of a tube, a conductor in each passage connected to the back of an adjacent contact, said body having spaced inclined shoulders extending toward each other at opposite sides of said recess near the bottom of each recess, the corners of the foot being bent and jammed beneath said shoulders.

2. A tube socket body formed of molded insulation with recesses and communicating passages, a contact in each recess having an elongated back portion and two side wings forming three lines of engagement with the prong of a tube, a soldering lug at one end of said back portion, a conductor in each passage connected to the lug of an adjacent contact, an integral foot on the other end of said back portion and disposed at an angle thereto, and opposed tapered shoulders near the bottom of each recess, said foot having a square free edge with curled corners beneath and in interlocking relation with said shoulders.

3. A television tube socket comprising a body of molded insulating material of the form of a segment of an annulus, said body having a series of spaced recesses in one face thereof arranged in the arc of a circle and a series of opposed passages in the opposite face thereof in communication with the recesses and arranged in the arc of a cir-

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cle, spaced tapered shoulders on the side walls of each of said recesses adjacent its inner end, a contact in each of said recesses, each contact consisting of a hollow body having side walls for engagement with the prong of a tube, a soldering lug at the outer end of the contact and a foot portion integrally formed on the inner end of the contact and extending forwardly beneath the ends of the side walls and slanting downwardly therefrom at a slight angle to a point beyond the long edges of the side walls, said foot having its free edge curled upwardly at the corners into interlocking engagement with the tapered shoulders of the recess and a conductor in each passage connected to the lug of the adjacent contact.

4. A television tube socket comprising a body of molded insulating material, said body having a series of spaced recesses in one face thereof arranged in the arc of a circle and a series of opposed passages in communication with the recesses and arranged in the arc of a circle, spaced tapered shoulders on the side walls of each of said recesses adjacent its inner end, a contact in each of said recesses, each contact having side walls for engagement with the prong of a tube, a soldering lug at the outer end of the contact and a foot portion integrally formed on the inner end of the contact and extending forwardly beneath the ends of the side walls and slanting downwardly therefrom at a slight angle to a point beyond the edges of the side walls, said foot having its free edge curled upwardly at the corners into interlocking engagement with the tapered shoulders of the recess and a conductor in each passage connected to the lug of the adjacent contact.

5. In an electrical socket, a connector for a pronged device comprising a sheet metal body having a back wall, side walls formed integrally therewith and extending forward thereof and yieldingly toward each other at their free ends and with said back wall forming a three-sided contact, a soldering lug formed integrally with

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the top end of the back wall and extending rearwardly thereof, and a foot member formed integrally with the back wall at its bottom end and extending forwardly thereof and forming a bottom closure for the contact, said foot member extending beyond the outer free ends of the side walls and having a square outer free edge whereby the corners of the free edge may be curled upon meeting resistance upon insertion into a socket.

6. In an electrical socket, a contact for a pronged device comprising a sheet metal body having a rigid back wall, wing members formed integrally with the side edges of the wall and extending forwardly thereof and yieldingly toward each other at their outer free ends thereby forming a three-sided socket contact, with yieldable side wings for receiving a prong of an electrical device, a bottom wall formed integrally with the bottom end of the back wall and providing a closure for the bottom of the contact, said bottom wall having a square free outer edge with yieldable corners whereby the corners may curl upon meeting resistance, and transverse ribs formed on the side wing members for coaction with the head of an inserted prong.

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