

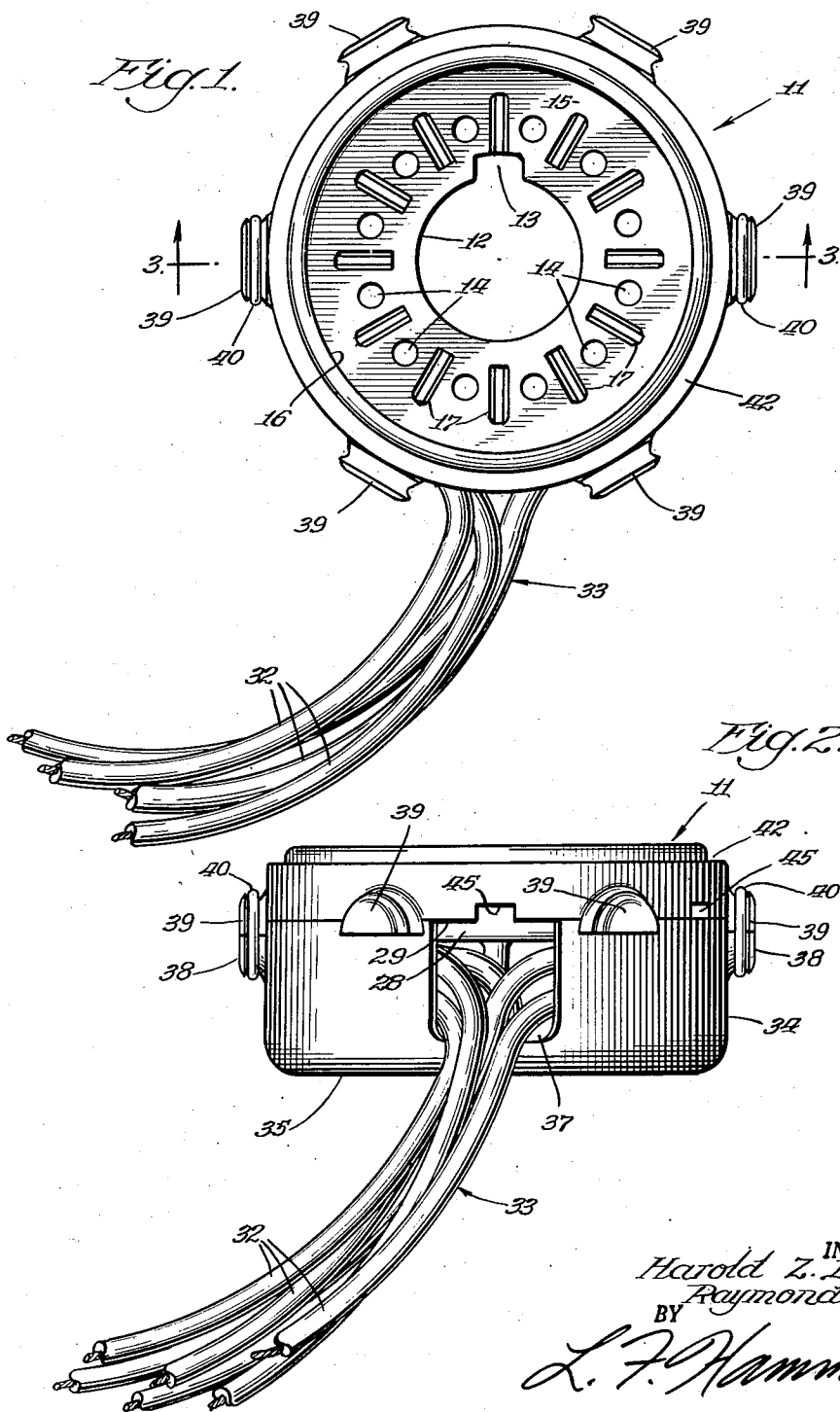
June 12, 1951

H. Z. BENTON ET AL
TUBE SOCKET

2,556,956

Filed April 21, 1947

3 Sheets-Sheet 1



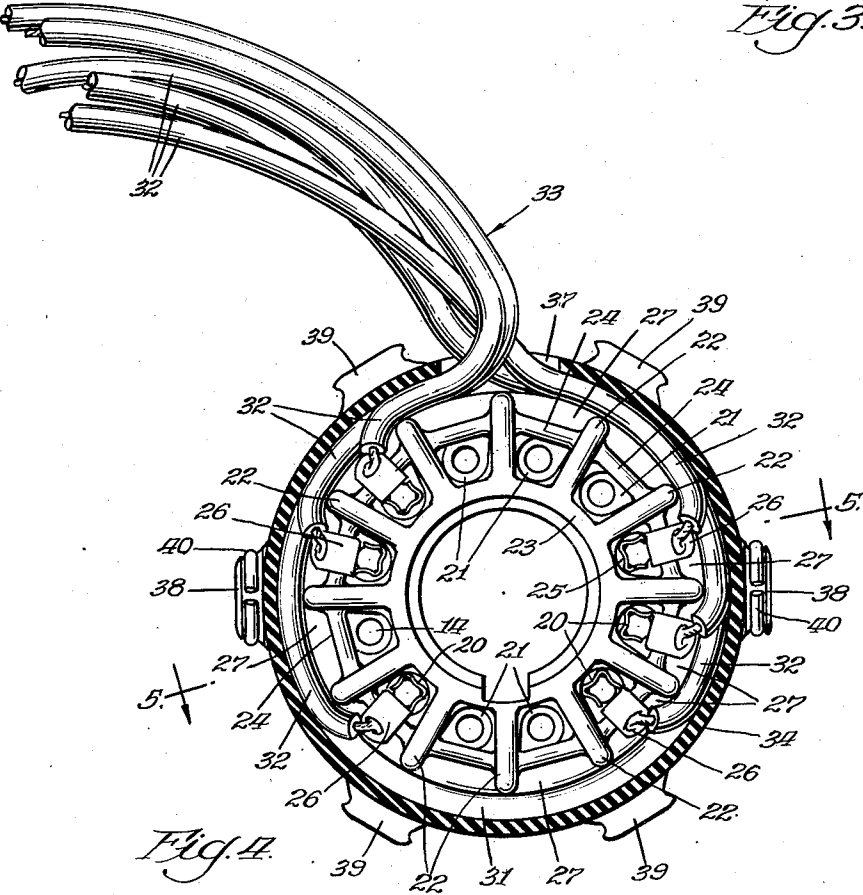
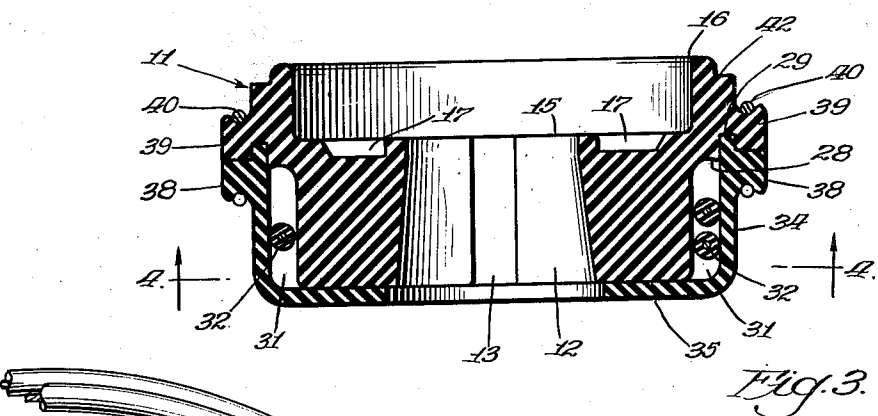
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3 Sheets-Sheet 2



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Fig. 5.

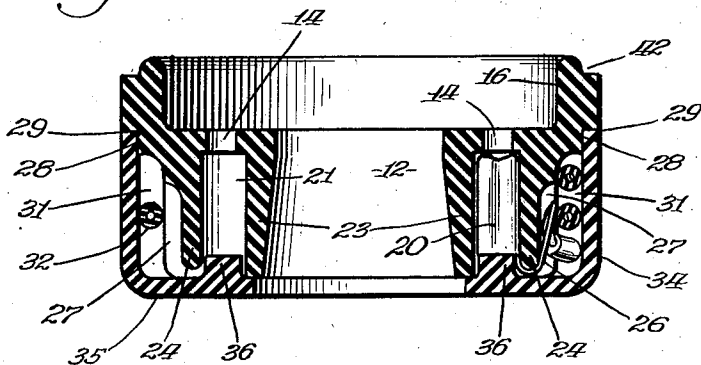


Fig. 6.

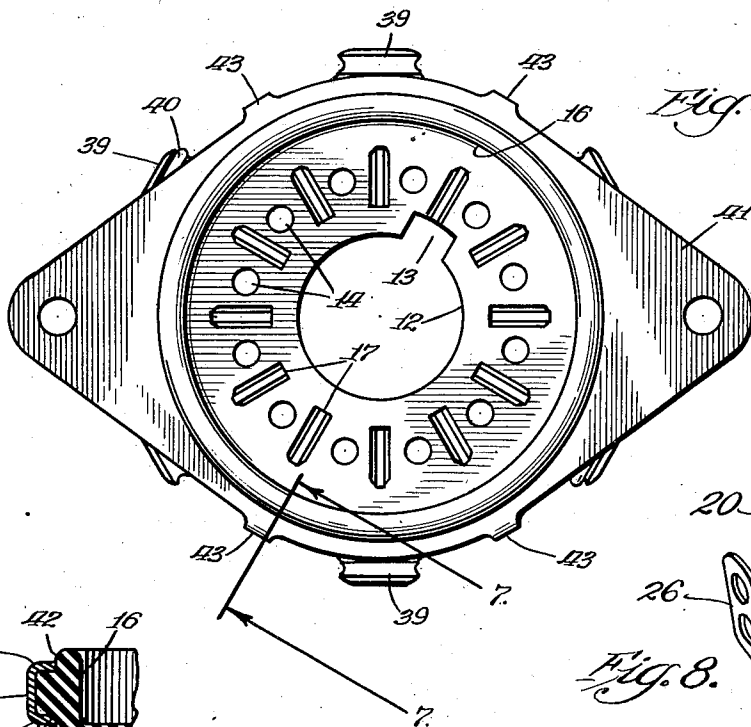


Fig. 8.

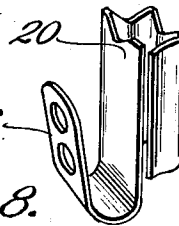
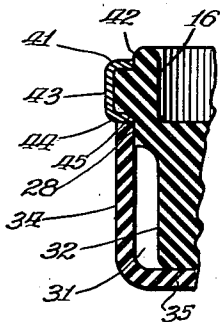


Fig. 7.



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TUBE SOCKET

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3 Claims. (Cl. 173—328)

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The present invention relates to electronic tube sockets and is specifically directed to the provision of a novel and improved multiple contact socket having features making it particularly suited for use in connection with the larger sizes of cathode ray tubes such as television viewing tubes.

It is the general aim of the invention to provide a kinescope tube socket capable of high performance standards and having a construction and arrangements of parts whereby the socket is easily adaptable to different arrangements of parts encountered in various designs of television units, so that the sockets will be commercially acceptable to manufacturers in this field. More specifically, it is the primary object of this invention to provide multiple electrode socket having a completely enclosed housing and novel means for grouping the electrical leads within the socket housing, so that they may be brought out radially from the housing in a single unitary cable. The space required for the tube and socket are thus held at a minimum, and the wiring may be done in a convenient and workmanlike manner.

A further object of the invention resides in the provision of a socket including plurality of socket contacts with terminals adapted to be soldered to flexible wire leads, together with a socket cap shaped to fully enclose all of the connections between the terminals and the leads, so that electrical shock hazards are eliminated but the wiring is easily accessible for servicing by removing the cap.

A further object of the invention resides in the provision of a socket of the general type indicated wherein the several socket contacts are electrically isolated from each other and are enclosed within a cap formed to provide an enclosed circular raceway extending entirely around the socket so that flexing of the individual wires at the soldered contact terminals is eliminated. This construction minimizes the possibility of breakage at the points of union between the soldered terminals and the wire leads.

Another object of the invention resides in the provision of a multiple contact socket having a back cap formed to provide a circular raceway in which all of the electrical leads may be grouped into a single cable within the socket structure wherein the socket and cap are formed so that the opening for the lead wire cable can be positioned in any one of a plurality of angular locations. With this arrangement the lead cable to the socket may be taken off in the most

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convenient direction, as determined by the position of the other parts of the apparatus with respect to the viewing tube.

A further object of the invention resides in the provision of a multiple contact socket of the general type indicated wherein the insulating elements of the socket comprise only two pieces, yet these pieces are formed to support and insulate the several contacts, provide a raceway for the leads, and are constructed so that they may be firmly held together merely by a pair of snap rings, so that no screws, drive pins or other auxiliary means of fastening are required.

The foregoing objects are accomplished in the present invention by the provision of a socket in which the socket body is formed of a single piece of insulating material having a plurality of contact wells with creepage barriers between them, so that the contacts are effectively isolated from each other. An insulating cap is formed so that it may be secured to the back of the socket body to completely enclose all of the contacts and soldered terminals and to provide a circular raceway for the individual flexible leads to the contacts.

It follows that all of the leads may all be brought together into a single cable and taken off radially from the socket through a single opening in the side wall of the cap. The cap and socket body are locked together by a pair of spring wire rings snapped over matching lugs on the socket body and cap. These lugs are spaced at regular intervals around the socket body so that the cap may be positioned in any one of several angular positions in order that the lead harness can be taken out of the socket in the most convenient direction. The circular raceway around the socket not only serves to group all of the leads into a convenient unitary cable, but is also advantageous in that it prevents the flexing of the leads at the soldered joint between the lead and the contact terminal and thus avoids the danger of breakage at this vital point. Also, the cap completely encloses the contacts, soldering terminals and ends of the lead wires so that all surfaces otherwise uninsulated are completely protected and the socket may be removed or placed on the viewing tube without fear of short circuit or electrical shock. The socket face is recessed, which not only serves as a guide for easy insertion of the tube, but also provides a protective safety barrier surrounding the pins of the viewing tube as the socket is applied or removed.

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These advantages are obtained by a comparatively simple housing structure that may be molded in only two pieces. While the socket is particularly suited for television or oscilloscope tubes, it will provide a highly satisfactory socket for any one of the various types of multiple contact electronic tubes. Thus, although the principles of this invention are applicable to various different physical formations of sockets, they are best described in connection with a preferred embodiment of the invention such as illustrated in the drawings attached to and forming a part of this specification, wherein

Figure 1 is a plan view of a tube socket constructed in accordance with the teachings of this disclosure.

Figure 2 is a side elevational view thereof.

Figure 3 is a central sectional view taken substantially on the plane of line 3—3 of Figure 1.

Figure 4 is a detail sectional view taken substantially on the plane of the line 4—4 of Figure 3.

Figure 5 is a central sectional view taken substantially on the plane of the line 5—5 of Figure 4.

Figure 6 is a plan view of the socket provided with a flanged mounting plate.

Figure 7 is a detail sectional view taken substantially on the plane of the line 7—7 of Figure 6, and

Figure 8 is a perspective view of one of the socket contacts.

The socket includes a block or body portion 11, which is illustrated as being molded of a single unitary piece of electrical insulating material. It includes a conventional central opening 12, with a key way 13 and a plurality of openings 14 receive the individual contact pins. The face surface 15 of the socket is recessed to provide an annular flange 16 surrounding the base of the tube, so that the flange will act as a protective barrier to prevent touching with the contact pins as the tube is inserted in or removed from the socket. The surface 15 may also be provided with radial channels 17 between the individual contacts so that the electrical creepage path between the individual contacts is lengthened.

The tube pin openings 14 each enter a contact well 21 positioned between radially extending barrier walls 22 formed integrally with a circular barrier 23 around the opening 12. The radial barriers are joined by outer barrier walls 24 to completely isolate the contact well. The socket block is preferably molded as a single piece so that barriers 22, 23 and 24 are formed as unitary parts.

Metallic contacts 20 corresponding to the pins of the tube for which the socket is wired are positioned in the wells 21, with their soldering terminals 26 extending downwardly and around the lower edge of the barrier 24 and then upwardly against the outer side of the barrier to a terminal pocket 27 between the outer surface of the barrier 24 and the ends of the radial barriers 22. The radial barriers 22 do not extend across the full diameter of the socket block, but terminate somewhat short of a circular shoulder 28 of slightly less diameter than the outer wall of the socket, providing an annular seat 29 for the back cap. The space between the shoulder 28 and the ends of the radial barriers 22 provides an annular raceway 31 extending entirely around the socket block, yet outside of the terminal pockets 27 so that the several flexible leads 32 may be brought around the ends of

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the radial barriers 22 and grouped into a cable generally indicated at 33 without danger of shorting between the contacts. The raceway is within the diameter of the cap supporting shoulder 28 so that it may be completely enclosed by a back cap. The back cap of the socket consists of an outer cylindrical flange 34 and an open centered flat bottom portion 35. The inner surface of the bottom is provided with a number of contact supporting shelves 36 positioned under the individual contact wells so that the shelves extend upwardly into the contact wells and support the pin contacts.

An opening 37 is made in the flange 34 of the back cap to clear the cable 33 when the cap is in position.

The back cap is secured to the socket body by a pair of outwardly extending lugs 38 on the opposite sides of the cap and near the top of the cylindrical side wall 34. The socket block is similarly provided with a plurality of matching lugs 39 and the cap is held on the socket by a pair of snap rings 40 seated in grooves in the lugs 38 and 39. It is to be noted, however, that while only two of the lugs 38 are required, the socket block may be provided with additional lugs at equally spaced intervals so that the back cap may be positioned at any one of several angular positions around the socket. By this means, it is feasible to take off the cable of contact leads in the most convenient direction and, since viewing tubes of the type for which this socket is specifically designed must be maintained in a fixed position, it follows that the ability to take the leads in any convenient direction is of advantage in designing equipment so that maximum utilization of the space is obtained and unnecessarily long leads are avoided.

The lugs 40 are formed on the socket body so that they extend downwardly below the surface of the cap seat 29 on which the upper edge of the cap flange 34 bears. Thus the multiple lugs on the socket body overhang the upper flange of the socket cap at regular points around its circumference and aid in strengthening the joint between the two pieces. Also, since these lugs bear against the outer surface of the side wall 34 at points closely spaced on either side of the opening 38, the flange is strengthened and any tendency of the edges of the opening to spread is checked.

The socket is most commonly utilized in the form illustrated in Figures 1 to 5 since the television viewing tubes with which it is used are ordinarily placed in fixed mountings and the socket held in place on the tube only by the friction by the pin contacts. In some installations, however, it is desirable to mount the sockets in fixed position and in this event the socket may be provided with a mounting plate 41 seated over an annular centering notch 42 in the upper edge of the barrier 16. The socket and plate are held together by a plurality of tabs 43 struck downwardly from the plate and having end hook portions 44 extending into recesses 45 on the socket body.

In certain instances, it is desirable to isolate one of the leads from the terminals, as in the event that it becomes desirable to segregate a high voltage grid lead from the main trunk of the lead wires. In this event it is feasible to cut an individual opening in the upper edge of the flange 34 at any desired point so that the high voltage lead may be taken off at an angle to or opposite to the main trunk.

From the foregoing, it will be seen that the teachings of this invention provide an improved and novel socket having features not heretofore found in the art. It is first noted that the entire socket is of simple yet extremely rugged construction wherein the insulating elements of the socket comprise only two pieces, yet they are so related that all of the electrical contacts and leads are completely enclosed, with the result that the equipment may be handled when the leads are energized without fear of accidental shock. The entire structure is compact and neat in appearance, and the exterior lugs aid in maintaining a firm manual grip on the socket as it is positioned on or removed from the base of the tube. The several leads from the socket are all completely enclosed at the points at which they are soldered to the contact terminals so there is no flexing of the leads at these vital points and the risk of breakage is greatly reduced. Moreover, the circular raceway provides a convenient and efficient means for grouping all of the leads into a single radially extending cable, yet effectively isolates the several different soldered terminals.

The form of the invention illustrated in the drawings and described in this specification has been selected as a typical embodiment of the inventive concept and is believed to be well illustrative of the means by which these teachings can best be utilized, but it is recognized that various modifications are possible without sacrifice of all of the advantages of the invention, and it is accordingly pointed out that the scope of the inventive thought extends to any variations of structure coming within the terms of the appended claims.

Having thus described the invention, what we claim as new and desire to protect by United States Letters Patent is:

1. In an electronic tube socket including a body portion and a cap, the improvement that resides in the provision of a rearwardly disposed cap seat extending marginally around the socket body and a back cap including a flange adapted to bear against the cap seat; the cap including a plurality of semicircular lugs positioned with their axes perpendicular to the outer surface of the cap; the socket body including matching semicircular lugs overhanging the cap seat to engage the outer surface of the flange of the cap; said lugs being regularly spaced so that the cap may be fitted to the socket body in any one of several angular positions, and the lugs having matching grooves around their outer surfaces whereby they may be held together by locking

rings to maintain the cap in position on the socket body.

2. In an electronic tube socket including a circular body portion and a cap, the improvement that resides in the provision of a circular cap seat extending around the socket body and a cap including a cylindrical side flange adapted to bear against the cap seat; the cap including a plurality of lugs positioned at regular angular intervals around the outer surface of the cap; the socket body including plural sets of matching lugs, said matching lugs also being regularly spaced so that the cap may be fitted to the socket body in any one of several angular positions, together with means to secure the lugs, together to maintain the cap in position on the socket body.

3. In an electronic tube socket including a body and a back cap, the combination of a circular socket body having a face surface with a plurality of pin openings therein, a cap supporting shoulder of less diameter than the outer surface of the socket body and a circular cap seat between the outer surface of the socket body and said shoulder, together with a back cap including a flat bottom portion and an outer cylindrical flange adapted to bear on the cap seat to completely enclose the back surface of the socket body; the cap including a plurality of grooved lugs on its outer surface and the socket body including matching grooved lugs overhanging the cap seat to engage the outer surface of the cap flange and adapted to be joined to the lugs of the cap by locking rings to maintain the cap in position on the socket body.

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