United States Patent [19]

Biba et al.

[11] **3,783,432**

[45] **Jan. 1, 1974**

[54] **CONNECTOR**

[75] Inventors: **Edward A. Biba,** Westchester; **Leonard A. Sowinski,** Chicago, both of Ill.

[73] Assignee: **Mandex Manufacturing Company, Inc.,** Chicago, Ill.

[22] Filed: **Dec. 22, 1971**

[21] Appl. No.: **210,939**

[52] **U.S. Cl.** ..... **339/12 V,** 339/74 R, 339/252 R, 339/259 R

[51] **Int. Cl.** **H01r 11/30**

[58] **Field of Search** ..... 339/12, 74, 75, 77, 339/78, 243, 252, 256, 258, 259, 254, 200, 201, 202; 24/73 CP

[56] **References Cited**

UNITED STATES PATENTS

3,258,732	6/1966	Martin	339/59
3,431,544	3/1969	Valle et al.	339/256
1,309,887	7/1919	Fulton	339/223
3,199,065	8/1965	Thompson	339/149 P

FOREIGN PATENTS OR APPLICATIONS

173,871	3/1935	Switzerland	339/252 P
575,287	2/1946	Great Britain	339/252 P

OTHER PUBLICATIONS

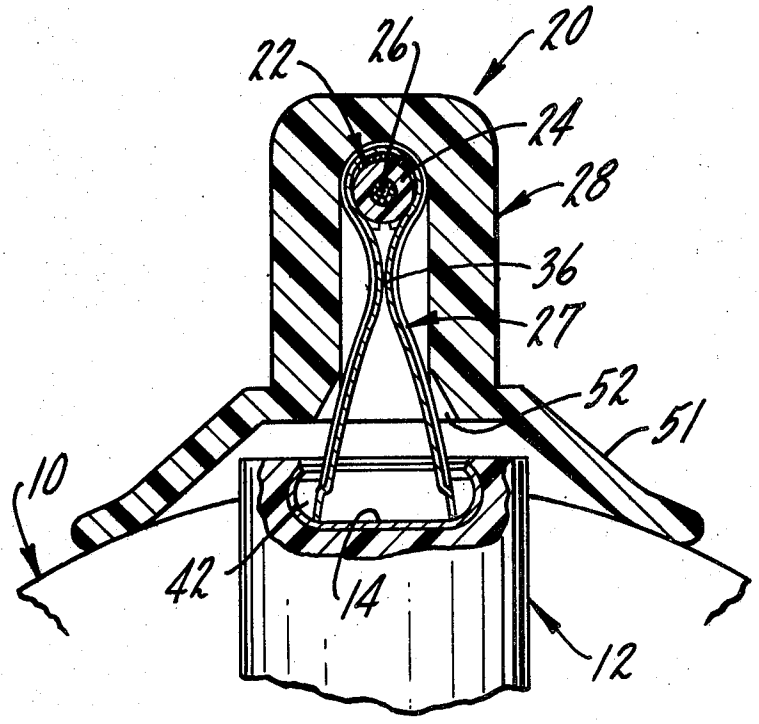
3,289,146 11/1966 Tuchel

Primary Examiner—Marvin A. Champion
Assistant Examiner—Robert A. Hafer
Attorney—Richard G. Lione

[57] **ABSTRACT**

A connector for connecting a lead wire to a terminal socket, such as an anode socket. The connector includes a clip formed of spring sheet metal and comprising legs which bow inwardly and then outwardly to flanged ends. Compression of the legs causes the bowed segments to engage and increase spring retention force of the clip. A crimp barrel fastens the clip to the conductor wire, and a bead around a portion of the crimp barrel and along the length of the legs provides an excellent electrical and mechanical connection between the lead wire and the connector clip, as well as flexural strength to the legs. The clip is seated in a flexible, insulating cup which controls the flexure of the legs.

3 Claims, 5 Drawing Figures



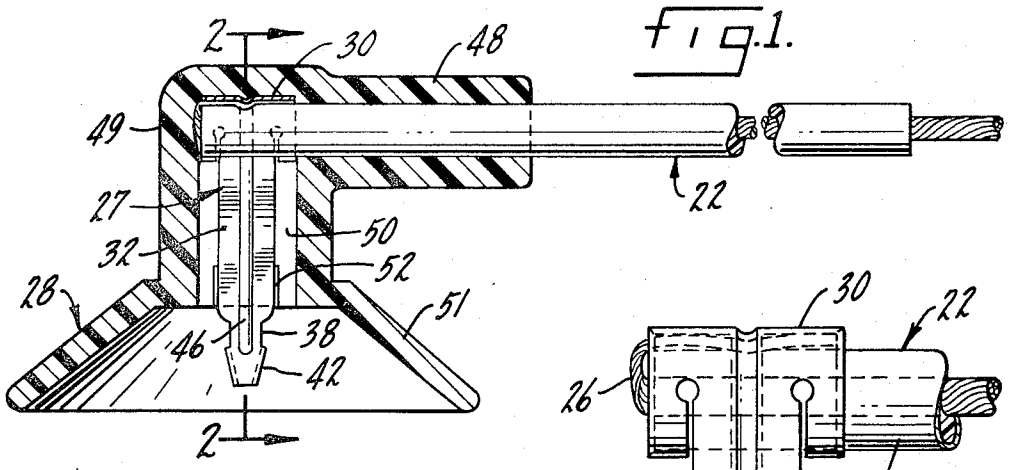


fig.1.

fig.4.

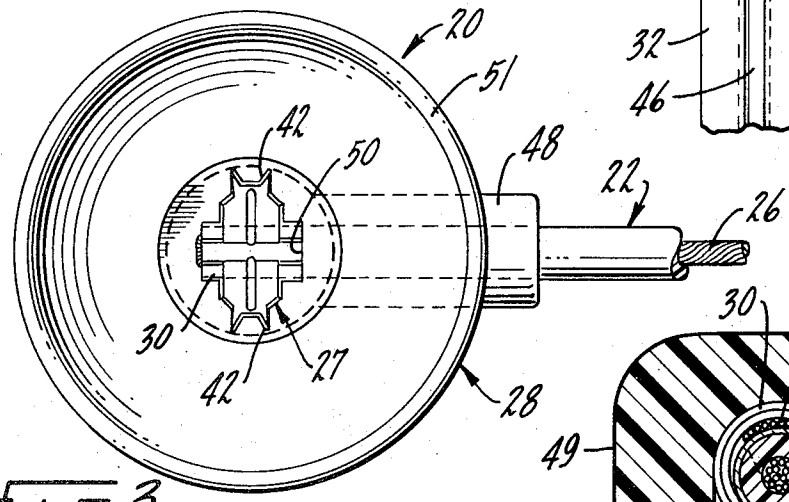


fig.3.

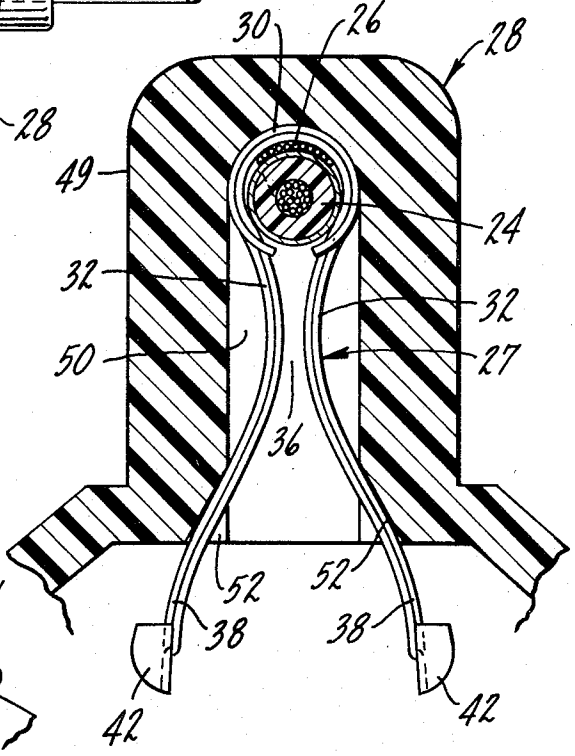


fig.2.

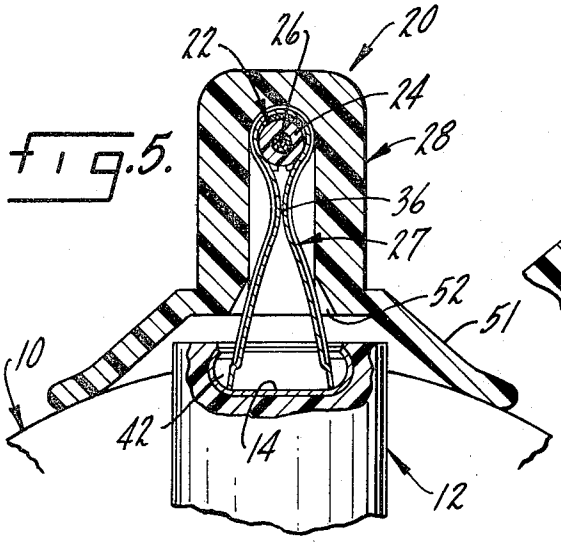


fig.5.

CONNECTOR

BACKGROUND OF THE INVENTION

The invention relates generally to a connector for electrically and mechanically connecting an insulated lead wire to a socket. It relates more particularly to an anode connector for connecting a lead wire to the electrode socket of a cathode ray tube or the like.

The anode conductor connected to the cathode ray tube in today's television receivers is designed to carry a high electrical current factor. Accordingly, it is important that the anode connector be securely seated. Yet in anode connectors presently in use, the legs of the connector clip which retain the connector in a concave or bowl-like anode socket are not capable of producing a really high retention force. They can become disengaged from the socket if a sharp pull is inadvertently applied to the lead wire. In addition, faulty connections between the lead wire and the clip are commonplace.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an anode connector which inherently increases the spring force retaining the clip in the anode socket of a cathode ray tube or the like. An additional object is to provide an anode connector which cannot inadvertently be removed from its socket without a substantial application of force. Still another object lies in the provision of means forming an improved electrical and mechanical connection between the lead wire, the wire insulation jacket, and the crimp barrel of an anode connector clip. An additional object is to provide a flexible insulating cup surrounding a spring type anode connector clip wherein the cup has beveled internal surfaces which accommodate the spread of the widely bowed legs of the connector clip.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects of the invention will appear from the following detailed description of a preferred embodiment of the invention, with reference to the accompanying drawings wherein similar reference characters have been employed to designate corresponding parts throughout the several views:

FIG. 1 is a sectional view of the anode connector embodying features of the present invention;

FIG. 2 is an enlarged sectional view taken along section 2—2 of FIG. 1, with parts removed;

FIG. 3 is a bottom plan view of the anode connector;

FIG. 4 is a detail view of the connection between the crimp barrel of the clip and the lead wire; and

FIG. 5 is a sectional view similar to FIG. 2, with the anode connector seated on a cathode ray tube.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and particularly to FIG. 5, a cathode ray tube is shown generally at **10.** Formed on the back of the tube **10** is an anode terminal **12** having a bowl-like socket or opening **14.** An anode connector **20** embodying features of the present invention forms a connection between the socket **14** and an insulated lead wire **22.**

The lead wire **22** comprises a sheath of insulating material **24** from which a portion **26** of bared wire extends. The connector **20** includes a clip **27** seated in a

suction cup **28** made of flexible plastic or rubber or the like. The suction cup **28** is designed to ahdere to the back of the cathode ray tube **10.**

The clip **27** is die-punched and formed from spring sheet steel and comprises a crimp barrel **30** which circumferentially engages the end portion of the insulating material **24.** Extending tangentially from crimp barrel **30** at points displaced approximately 120° from each other are identical, opposed clip legs **32.** The inner segments of legs **32** are bowed toward each other to intermediate segments and then outwardly again to the leg ends **38.** The clip leg ends **38** each have a pair of outwardly bent flanges **42** formed thereon to seat in and grip the socket **14.**

According to the invention, the legs **32** may be compressed together, due to the flexible character of the spring sheet metal from which they are made, until they contact one another at their intermediate segments in the region designated **36.** The leg ends **38** may then be brought even closer together by applying additional force to the clip ends. Additional force is needed to compress the leg ends **38** further together against the restraint of their intermediate segments in contact at **36.** The significance of this relationship is hereinafter discussed.

Extending around the crimp barrel **30** intermediate its ends is an indented bead **46.** The bead **46** extends into and along the length of the legs **32** and imparts maximum flexural strength to the legs **32** and the clip barrel **30.**

In addition the bead **46** provides an excellent electrical and mechanical connection between the wire portion **26** extending beyond the insulating material **24** and the crimp barrel **30.** As best seen in FIG. **4,** the wire portion **26** is bent back and laid against the outer circumference of the insulating material **24.** When the lead wire **22** end is slipped into the barrel **30,** with the legs slightly spread, and then the legs are released, the bead **46** presses tightly against the wire portion **26** and holds it securely against the insulation material **24.**

The clip **27** is seated in the insulating suction cup **28,** as has been pointed out. The cup **28** includes a hollow, tubular section **48** which extends radially from the body **49** of the cup. The body **49** of the cup **28** is cylindrical and contains a generally rectangular cross-section chamber **50** in internal communication with the tubular section **48.** The chamber **50** opens at its other end into the skirt section **51** of the cup.

The wire lead **22** and insulating material **24** extend through the tubular section **48** of the cup **28** into the crimp barrel **30** of the clip which is seated against the roof of the chamber **50** in the cup. In this relationship, the barrel **30** is crimped onto the wire end portion **26** and the insulation material **24** which it overlies.

With the clip **27** seated in the cup **28** in this manner, the legs **32** are normally disposed as illustrated in FIG. **2,** spaced somewhat apart. Beveled recesses **52** are formed in the end of the chamber **50** to receive these legs and permit them to nestle uncompressed within the chamber **50.**

To seat the connector **20** in the socket **14,** as seen in FIG. **5,** a slight compressive force is applied to clip legs **32** through flexible insulated cup **28,** causing leg ends **38** to be forced toward each other. The bowed configuration of the legs **32** soon causes them to contact one another in region **36.** Additional pressure is then ap-

plied to bring leg ends **38** even closer together against this additional bias.

The leg end flanges **42** are then placed in socket **14** and the compressive force is released, permitting leg ends **38** to move outwardly and the flanges **42** to complete the connection. The bowed configuration of legs **32** causes the legs to remain in contact with each other in region **36** when connector **20** is seated in socket **14** (FIG. 3). This greatly increases the spring force tending to retain connector **20** in socket **14.**

While we have shown and described a preferred embodiment of our invention, it will be understood that various modifications and rearrangements may be made therein without departing from the spirit and scope of the invention.

What is desired to be claimed and secured by Letters Patent of the United States is:

1. An electrical connector assembly, comprising:

a. socket means having an opening of predetermined width,

b. lead means including an insulation covering on wire means with an end portion of said wire means extending from said insulation covering,

c. a connector clip seated in an insulating member,

d. said clip including crimp barrel means into which said lead means extends with said crimp barrel means extending substantially around the circumference of said lead means, and

e. a pair of legs extending from said crimp barrel means,

f. said legs terminating in socket gripping ends which, when said clip is in its unstressed position, are spaced a predetermined greater distance apart than said width and adapted to seat in said socket or be removed therefrom only when spaced a predetermined lesser distance apart than said width,

g. said legs being bowed inwardly toward each other at opposed intermediate segments thereof whereby with said socket gripping ends of said legs seated in said socket the intermediate segments are in engagement increasing the spring force required to compress said ends and the contact force between said gripping ends and said contact.

2. The connector assembly of claim **1** further characterized by and including:

a. indented bead means extending around a portion of said crimp barrel and substantially along the length of said legs,

b. said end portion of said wire means beinb bent backwardly upon said insulation within said crimp barrel,

c. said bead means firmly engaging said insulation over said end portion of said wire means to form a secure mechanical and electrical connection between said clip and said wire means.

3. The connector assembly of claim **1** further characterized in that:

a. said insulating member comprises a suction cup,

b. said cup having a chamber in which said clip is seated,

c. beveled recesses formed in the walls of said chamber and receiving corresponding legs when said legs are spread their normal distance.

* * * * *