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F. M. CLEMENT

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ELECTRICAL TORSION CONTACTOR

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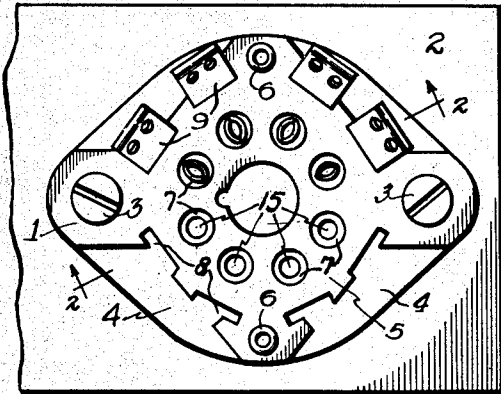


Fig. 1

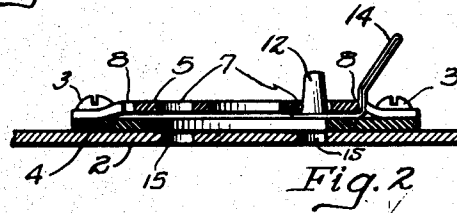


Fig. 2

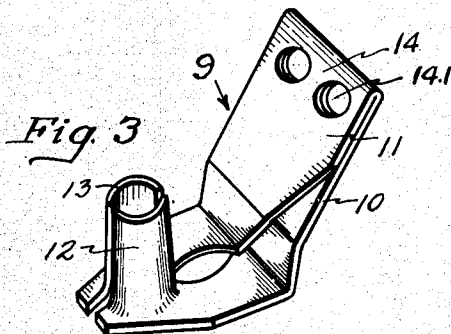


Fig. 3

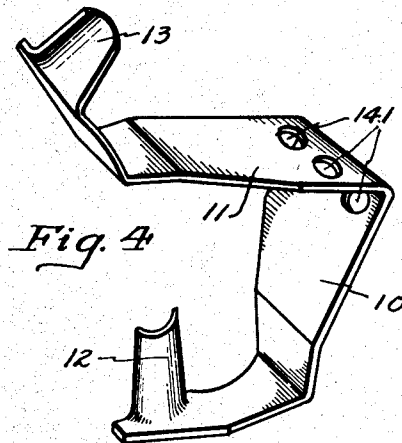


Fig. 4

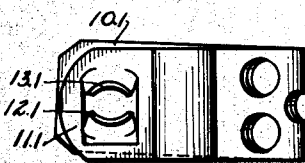


Fig. 5

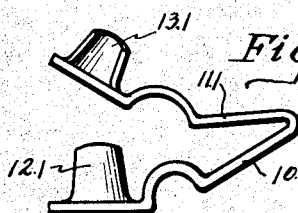


Fig. 6

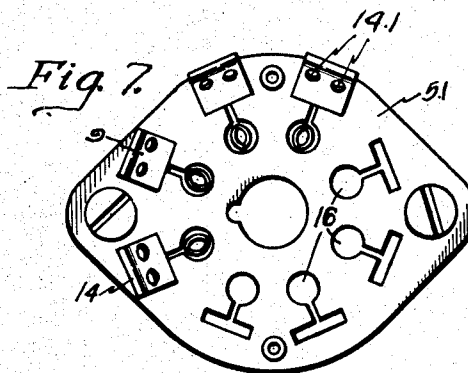


Fig. 7

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UNITED STATES PATENT OFFICE

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ELECTRICAL TORSION CONTACTOR

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Application December 6, 1935, Serial No. 53,220

10 Claims. (Cl. 173—328)

This invention relates to electrical connectors and particularly to those of the type that is adapted to engage the electrodes or prongs of a radio tube or the like.

5 The main objects of this invention are to provide an improved form of socket member for radio tubes and the like and having improved electrical terminals which grip the prongs of the tube in a superior manner; to provide an improved construction of this character in which greater force is required to detach the tube than is required for attaching it; to provide a construction of this character in which vibration or jarring of the tube tends to increase the grip of the connector; and to provide for multiple prong tube sockets an improved construction which may be simple in form and operation and inexpensive to manufacture.

10 An illustrative embodiment of the present invention is shown in the accompanying drawing, in which:

Fig. 1 is a bottom plan view of a multiple prong radio tube socket with some of the connectors omitted for the purpose of illustrating the structural details.

Fig. 2 is a sectional view of the same taken on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of a torsion grip connector unit which forms a part of the structure shown in Fig. 1.

Fig. 4 is a perspective view of the same as it appears at one step in the operation of forming it.

Fig. 5 is a top plan view of a modified form of the torsion grip connector.

Fig. 6 is a side edge view of the same.

Fig. 7 is a bottom plan view of a multiple prong tube socket, having a modified form of plate for holding the connector terminals.

40 In the form shown in the drawing, the tube socket 1 is fastened on a mounting plate 2 by means of screws 3 and consists of lower and upper insulation plates 4 and 5, both plates being preferably constructed of perforated sheets of insulating material, such as "Bakelite", fiber or the like, secured together by rivets 6. The plate 5 as shown is provided with a plurality of symmetrically spaced prong apertures 7 and an equal number of adjacent apertures or slots 8 which cooperate in securing the connectors 9. The torsion grip connectors or clips 9 are preferably formed of unitary punchings stamped from sheet-metal, as shown in Fig. 4, and each comprising two leaves 10 and 11 folded upon each other and together bent at an angle, on a line

parallel to the fold, and resiliently bendable relative to each other. Semi-tubular prong grips or lips 12 and 13 of arcuate section are formed on outer ends of the leaves 10 and 11 and stand out from the plane thereof. As will be apparent, when the leaves 10 and 11 are folded these two grips face each other and form a split socket adapted to receive the prong of a radio tube or the like. The grips 12 and 13 are at opposite edges of different leaves of the folded clip and they are inclined toward each other at their ends.

When a prong of a radio tube or the like is inserted into the socket the extremities of the grips 12 and 13 are spread apart, but this spreading is resisted by the side twist or torsional strain of the parallel leaves 10 and 11. The connectors 9 are placed between the insulating plates 4 and 5 in the position shown in Figs. 1 and 2, and the sides of apertures 7 prevent any lateral movement of the leaves, but the plates 4 and 5 are spaced apart as shown, to permit a limited amount of torsional bending of the leaves 10 and 11. The marginal edges of the apertures 7 serve as fulcrums about which the prong grips may rock.

The butt end portion 14 of the connector 9 extends through the slot 8 and downwardly beyond the bottom plate 5, to form a soldering lug. The end portion 14 is provided with apertures 14.1 to receive and hold the wires which are to be soldered to the connector. The open slots 8 prevent the connectors from skewing. Another method of preventing skewing is shown in Fig. 7, where the bottom plate 5.1 has a single T-slot punched hole 16 of irregular form to receive and hold the connector, and permits a free spring action between the grips 12 and 13.

A modified form of my torsion connector is shown in Figs. 5 and 6 in which the upper leaf 11.1, instead of being sheared away to tapering form as shown in Fig. 4, is left intact and the prong grip or lip 13.1 is punched and struck up from the metal in the cut. Prong grip 12.1 is produced in a similar manner on the lower leaf 10.1, and is adapted to pass through the aperture formed by the punching to produce prong grip 13.1.

The panel 2 is provided with apertures 15 to receive the prongs of the tube and to register with the apertures 7.

The insulating punching hole 16 shown in Fig. 7 has an additional advantage in that the rate of cooling during the soldering operation is increased, due to a greater area exposed to the air.

Although but two specific embodiments of this

invention have been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims:

I claim:

1. An electrical connector comprising a pair of superimposed spring metal leaves rigidly joined at one end and at their other end carrying outstanding semitubular prong-grips one on each leaf and mutually disposed for coaction with each other to embrace an interposed contactor prong, a pair of apertured insulating plates connected together with an aperture in one plate in substantial registration with that in the other plate and forming a holder for said connector, said plates being spaced apart sufficiently for reception of the spring metal leaves of said connector and to permit torsional bending of said leaves, the spring leaves being disposed in the space between the plates and the semi-tubular prong grips of said connector being disposed in the aperture of one of the insulating plates in alignment with the registering aperture in the other plate.

2. The method of making a socket-like contact which consists in die-stamping a blank from spring sheet metal, said blank being oblong with oppositely disposed lateral arms at its ends respectively, bending these arms in opposite directions on an axis disposed lengthwise of said plate and also bending each of said arms somewhat cylindrically to face oppositely on their concave sides, and then bending said blank on its middle transverse axis to bring the cylindro-concave faces of said arms opposite and adjacent to each other and thereby forming from the complementary arms a socket adapted to so receive a terminal rod.

3. The method of making a socket-like contact which consists in die-stamping a blank from spring sheet metal, said blank being oblong with oppositely disposed lateral arms at its ends respectively, bending these arms in opposite directions on an axis disposed lengthwise of said plate and also bending each of said arms somewhat cylindrically to face oppositely on their concave sides, then bending said blank on its middle transverse axis to bring the cylindro-concave faces of said arms opposite and adjacent to each other and thereby forming from the complementary arms a socket adapted to so receive a terminal rod, and together bending the two resulting adjacent leaves of the device on a medial transverse axis to incline the socket part toward the opposite end of the device.

4. The method of making a socket-like contact which consists in die-stamping a blank from spring sheet-metal, said blank being oblong with oppositely disposed lateral arms coplanar with said blank at its ends respectively, bending these arms in opposite directions on an axis disposed lengthwise of said plate and central thereof and also shaping each arm somewhat cylindrically to face oppositely on their concave sides, and then bending said blank on its middle transverse axis to superimpose one part on the other and to bring the cylindro-concave faces of said arms opposite each other and thereby form from the complementary arm members a spring socket adapted to so receive a terminal rod.

5. An electrical connector comprising a pair of oblong spring metal leaves disposed face to face and rigidly joined at one end and at their other end having struck-up complementary out-

standing transversely curved complementary prong-grips one on each leaf and mutually disposed for coaction with each other to embrace an interposed contactor prong, a pair of apertured insulating plates connected together with certain apertures in one plate in substantial respective registration with certain of those in the other plate and forming a holder for said connector, said plates being spaced apart sufficiently for reception of the spring metal leaves of said connector and to permit torsional bending of said leaves, said spring leaves being disposed in the space between the plates and said prong-grips being held respectively in the apertures of one of said plates to resist spreading at their bases.

6. A female electrical contact element comprising a pair of legs of sheet metal, each of said legs having an end joined to the corresponding end of the other leg, the free ends of said legs extending in substantial parallelism in a substantially common plane, each leg, toward its free end, having an integral transversely at least partially rounded offset portion at the edge adjacent the edge of the other leg, the said offset portions being complementary and defining a conoidal channel adapted to receive a male contact element and having a line of cleavage extending completely through both sides of the channel and the free end of the legs, the axis of said channel being angularly disposed with respect to the substantially common plane of the said free ends, whereby the extensions of the legs are adapted to resiliently engage a male contact element above the said substantially common plane so that the resilient engagement on the male element is as a resultant of stresses comprising those arising from separation of the legs in their substantially common plane and from torsional bending of the legs.

7. A contact for socket receptacles comprising a pair of juxtaposed resilient sheet metal legs in substantial planar parallelism, said legs being connected at one end and separated by a line of cleavage at the other end, a hollow tapering split substantially frusto-conical member being formed in spaced relation to the leg connection substantially symmetrically of the line of cleavage from material of the adjacent parts of the legs to form a contact-prong-engaging embracing resilient area or surface spaced from the substantial plane of the legs, said contact being formed of substantially intersecting normally eccentric arcs arranged to grip an inserted prong contact element on two diametrically spaced points as a resultant of the separation of the legs in the common plane as well as torsional of the legs through lateral displacement of the sides of the conical member out of the common plane.

8. A female contact element comprising a pair of legs lying in a substantially common plane, means joining the legs at one end, the legs being provided with respectively integral juxtaposed at least partially curved up-standing portions defining a tapering channel completely split by a line of separation between the legs, the channel converging above the substantially common plane of the legs so that the grip on the male element is as a resultant of stresses comprising resilient resistance of the legs against separation in their substantially common plane the resilience of the off-set portions relative to the legs and the torsional bending of the legs distorted by separation of the off-set portions above the said common plane.

9. A female electrical contact element com-

prising a pair of legs of sheet metal, each of said legs having an end joined to the corresponding end of the other leg, the free ends of the legs having an elongated substantial line of separation and extending in substantial parallelism in a substantially common plane, the legs toward their free ends having complemental respectively integral confronting transversely at least partially rounded off-set portions rising angularly out of the substantial plane of the legs defining a substantial channel having a split substantially coincident with said line, the line of separation having such length that the ends of the legs can be independently bent on substantial axes lying in said substantial plane to permit independent substantially perpendicular adjustment of the respective off-set portions, the substantial channel being adapted to be entered and widened by a male contact element, and the off-set portions being arranged to resiliently engage and contact with such male member at a point spaced from said substantial common plane so that the engagement on such male member is as a resultant of stresses comprising resilience of the legs

against separation in the substantial plane, torsional bending of the legs, resilience of the legs and resilience of the off-set portions relative to the legs.

10. An electrical connector comprising a pair of spring metal leaves rigidly joined at one end and lying in a substantially common plane and at their other end carrying outstanding semi-tubular prong grips one on each leaf and mutually disposed for coaction with each other to embrace an interposed contactor prong by torsion of said leaves, a pair of apertured insulating plates connected together with certain apertures in one plate in substantial respective registration with certain of those in the other plate and forming a holder for said connector, said plates being spaced apart sufficiently for reception of the spring metal leaves of said connector and to permit torsional bending of said leaves, the spring leaves being disposed between the plates and the semi-tubular prong grips of said connector being disposed in the aperture of one plate in alignment with the registering aperture in the other plate.

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