Sept. 13, 1938. M. ALDEN 2,129,725

SOCKET FOR VACUUM TUBES, ETC

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Fig. 1.

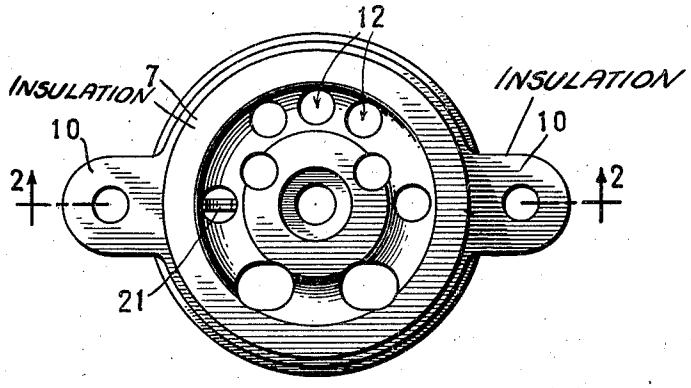


Fig. 4.

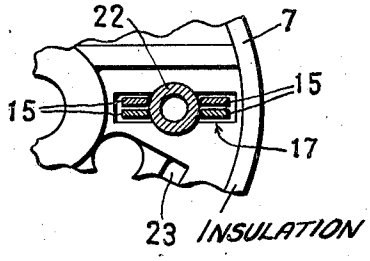


Fig. 2.

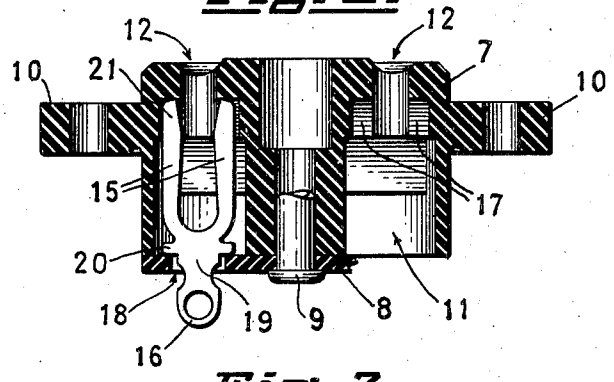


Fig. 5.

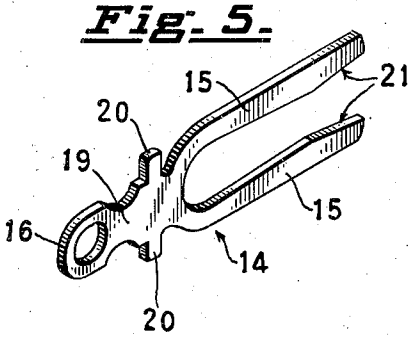
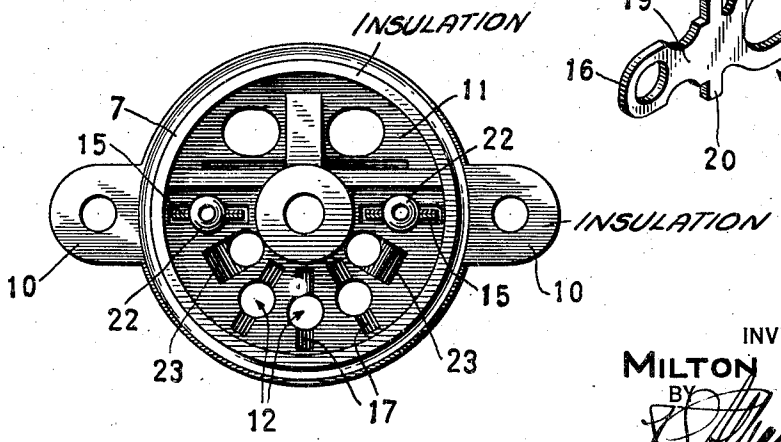


Fig. 3.



INVENTOR
MILTON ALDEN,
BY
ATTORNEY

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UNITED STATES PATENT OFFICE

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SOCKET FOR VACUUM TUBES, ETC.

Milton Alden, Brockton, Mass.

Application November 28, 1934, Serial No. 755,126

12 Claims. (Cl. 173—328)

My invention relates particularly to electrical connecting devices commonly called sockets which are adapted to receive the prongs of tubes or plugs.

One object of my present invention is to provide a type of construction adapted to accommodate tubes or plugs having a large number of prongs such as six or more. Such devices are for many reasons limited in size so that very little room is left between adjacent contacts. As a result of this cramping or crowding of a large number of contacts into a small space, difficulties of manufacture and use arise.

One object therefore of my invention is to provide a type of contact which occupies a minimum space.

Another object is to provide a type of contact which can be made at a minimum cost.

Another object is to provide a construction which will permit of repeated insertion and withdrawal of prongs for a long period of time without deterioration or injury.

One object is to provide a contact which will not fail or become set and distorted by careless insertion of tube prongs and the like.

Another object is to provide a construction which will afford an effective electrical connection.

In carrying out the invention the body of the socket is formed of two parts of insulation with an inner chamber containing the contacts, one part of the body having entrance passages for the prongs leading in to the contacts. The contacts themselves are flat and shaped something like a tuning fork, the ends of which are held in place in the body and the prongs of the tube or plug are introduced through the openings in one part of the body into the spaces between the fingers of the contacts.

Fig. 1 is a plan view of a socket embodying my invention.

Fig. 2 is a longitudinal sectional view of the same, showing, however, only one contact in place.

Fig. 3 is a bottom view of the upper part of the socket and showing two contacts in place but in cross section with tube prongs inserted.

Fig. 4 is a fragmentary view showing one of the contacts and an inserted prong in a fragment of the socket.

Fig. 5 is a perspective view of one of the contacts.

The parts 7 and 8 of the socket body are formed of insulating material, preferably the part 7 being molded to the shape desired and the part 8 stamped or otherwise formed from sheet material. The invention, however, is not intended to be limited to the use of special materials.

The two parts of the body are secured together in a suitable manner for instance by means of a rivet 9 and one part is provided with means for attaching the socket to a suitable support as for instance the anchorage lugs 10.

The body is provided with an interior chamber 11 containing the contacts and one part of the body is provided with a number of passages 12 through which the prongs of the tube or plug are inserted.

Each contact consists of one or more stampings 14 of sheet metal and each contact has a pair of fingers 15, 15 spaced apart from each other for the reception of a tube prong between them. The opposite end 16 of each contact constitutes a convenient means for the attachment or anchorage of the circuit wire in any suitable manner.

The body part 7 is provided with recesses 17 for the tips of the fingers 15. Each recess is preferably of rectangular outline but slightly larger than the tips of the contact fingers so as to loosely hold the tips of the contacts in place.

The insulating disc 8 is provided with passages 18 through which the heads of the contacts project. The neck 19 of each contact is positioned in one of these passages 18 and the contact is provided with a shoulder 20 which withstands the longitudinal thrust of the contact when a tube prong is inserted.

The entrance between the tips of the fingers 15, 15 is tapered or inclined at 21 to facilitate introduction of a tube prong. The prong 22 represents a typical plug or tube prong adapted to be inserted into the space between the fingers 15, 15. In many cases it has been found especially advantageous to provide two members for each contact as shown in Figs. 3 and 4. These two contacts are laid side by side and loosely positioned in the insulation. The pair of contacts afford especially effective electrical connections in that when the cylindrical base of the tube prong is inserted, the two contacts tend to separate from each other as shown in Fig. 4 and thus embrace the tube prong along four lines where the inner edges of the fingers grip the metal of the prong. In this way it is possible to obtain tight contact capable of yielding without straining the metal.

The advantages of this type of construction

will be especially appreciated when it is recalled that at the present time tube prongs are frequently irregularly located and are sometimes bent.

In my improved form of construction the contacts readily adjust or adapt themselves to the position of the prongs even if the prongs are misplaced or bent.

My present form of contact is designed for high speed manufacture and yet the contacts are bound to be very accurate as no bending is required.

Applicant's construction has been tested for a long period of time without destruction or damage.

The material of the contacts is preferably harder than that of the tube prongs so that the prongs themselves usually become worn before the contacts. As an extra precaution the contacts are preferably silver plated. This type of contact is especially desirable in view of the fact that the conductivity is not materially interfered with even if the contacts become somewhat oxidized. The brass contacts, even after the silver is apparently worn off the surface, are effective.

By the construction and arrangement shown it is practically impossible to insert the prongs of a tube or plug in such a way as to strain or injure the contacts.

It should be understood that although the invention relates primarily to the flat contact structure and method of support, the socket may have in addition any well known form of contact anchored for instance in a recess 23.

The flat contacts take up so little space that several of them can be inserted in an ordinary socket in the space that would be required for a single contact of the ordinary type. The loosely mounted flat contacts afford in effect a floating support for the tube and its prongs. These contacts it will be seen lend themselves especially to the complicated pattern of combination sockets and adapters. In fact these flat fork-like contacts may be used in combinations where the conventional type of contacts are impracticable.

I claim:

1. In a socket, an insulating body formed of two parts one of which is provided with an interior chamber and having prong passages passing through the face of one part only and leading into the chamber, two fork-like flat contact plates having spaced apart fingers the tips of which are loosely positioned alongside of one of the passages, whereby said plates may move as a whole to adjust themselves to prongs not in perfect alignment therewith, the two plates being adapted to separate when a prong is inserted and to make direct metallic contact therewith, said contact having a portion adapted for external connection thereto projecting through the other part of the body.

2. In a socket, an insulating body formed of two parts one of which is provided with an interior chamber and having prong passages leading into the chamber, and having slits extending for at least a portion of the length of said passages, a fork-like flat contact having spaced apart fingers the tips of which are positioned alongside of one of the passages and are situated with the major portion of their material lying in said slits, said contact having a connecting portion projecting through the other part of the body for external electrical connection, said contact being of flat metal so that its expansion is in the plane of the metal when a prong enters therein.

3. A socket structure as described in claim 2, in which said fork-like contact member is free to floatingly move within the limits of said slits and said passages whereby it may adjust itself to irregularities of an entering prong.

4. A flat one-piece vacuum tube socket contact formed of sheet metal lying substantially in a single plane and comprising two spaced fingers having tip portions with interior edges tapering towards their extremities, a connecting lug at one end and a shoulder portion adjacent said lug, said fingers being materially greater in size in the direction of said plane than in their thickness, said fingers being spaced apart for substantially all their length beyond said tip portions a distance slightly less than the thickness of a prong to be inserted therein, whereby said prong upon complete insertion will engage and spread said fingers so that their inner edges become substantially parallel and the longitudinal axis of the prong and the longitudinal direction of the fingers lie substantially in one plane and so that the points of contact form substantially straight lines.

5. A flat one-piece vacuum tube socket contact for use to receive a rod-like tube connector prong, said contact being formed of sheet metal and having two flat arms joined together at one end of each arm and lying in a common plane throughout their lengths and spaced apart a distance slightly less than the diameter of a vacuum tube prong, said arms being designed to embrace the opposite sides of said prong so that the longitudinal axis of the prong will lie substantially wholly between said arms, and said arms having near their point of common jointure a cross section less than at any other portion of their length which is designed to make contact with said tube prong when said prong is completely inserted into said contact.

6. A flat one-piece vacuum tube socket contact for use to receive a rod-like tube connector prong, said contact being formed of sheet metal and having two flat fingers joined together at one end lying in a common plane throughout their lengths and spaced apart a distance slightly less than the diameter of a vacuum tube prong, said fingers being formed so as to embrace the opposite sides of said prong in such fashion that the longitudinal axis of said prong will lie substantially wholly between said fingers, and said contact having a soldering lug at the rear end, the cross sectional area of said fingers being less near their point of juncture than at any other point along their length which is formed so as to make contact with said tube prong, when said prong is completely inserted into said fingers.

7. In a socket, an insulating body having prong passages leading through one face only thereof, each passage being provided for at least part of its length with lateral extensions of slot-like form, a flat fork-like metallic contact having spaced apart fingers the tips of which are positioned alongside one of said passages and are loosely held in said extensions, said contact also having a connecting portion passing through the opposite face of said body.

8. A vacuum tube socket having a body formed of insulating material with passages for the reception of the tube prongs and relatively narrow grooves extending laterally from opposite sides of at least a part of the length of each passage, flat fork-like contact members loosely supported in said body each member having its

fingers spaced apart from each other with their tips positioned in said grooves on opposite sides of a passage for the tube prong, the inner edges of the fingers of each contact member being inclined to provide a tapered entrance for a tube prong, said body having portions constituting means positioning a part of each contact member remote from the tips of the fingers and each contact member having a head portion projecting from the body and constituting means for the attachment of a connecting wire thereto.

9. A socket having an insulating body provided with passages for receiving tube prongs and grooves longitudinally extending along a portion of the length of each passage, flat fork-like contact making members having fingers on opposite sides of said passages and having the tips of the fingers wider than the rest of the fingers, whereby said contacts can be inserted from the ends of said passages remote from the ends wherein the tube prongs enter and whereby said tips lie at least partly in said grooves and are loosely supported in said passages in a position suitable for receiving the tube prongs, said contact members also being provided with portions projecting from said body, for connection of external wires thereto.

10. In a socket, an insulating body portion formed with a roof portion, a skirt portion and a base portion having passages, said portions forming an interior chamber, said roof portion having prong passages leading into the chamber and also having slots extending along at least a portion of the prong passages, a fork-like flat contact plate composed of spaced apart fingers materially larger in their flat dimension than in their thickness and a connecting portion, said contact plate being disposed in said chamber with the tips of its fingers lying at least partly in said slots so that the space between the fingers is in alignment with the prong opening and its connecting portion is extending exteriorly of the base through the passages therein.

11. In a socket, an insulating body portion formed with a roof portion, a skirt portion and a base portion forming an interior chamber, said roof portion having prong passages leading into the chamber and also having slots extending along at least a portion of the prong passages, said base portion having passages opposite to said prong passages, a fork-like flat contact plate in said chamber, said contact plate composed of spaced apart fingers materially larger in their flat dimension than in their thickness, positioned in alignment with said prong passages and having the tips of its fingers lying in said slots, said plate having a connecting portion extending through the passages in the base for external electrical connection, and shoulders formed on said contact plate adapted to engage the inside of the base to prevent displacement of the contact plate.

12. A vacuum tube socket including contact members fashioned in a fork-like form and cut from sheet metal, the spaced fingers of the fork lying in a common plane and the inwardly facing edges of said fork constituting the prong engaging contact portions of the structure over a portion of their length materially greater in extent than their thickness, the cross sectional area of said fingers being less near their point of juncture than at any other point along the prong engaging contact portions of said structure, when a prong is fully inserted therein.

MILTON ALDEN.