Oct. 27, 1936. M. ALDEN 2,059,077

VACUUM TUBE CONDUCTOR AND SOCKET

Filed Nov. 7, 1933

Fig. 1.

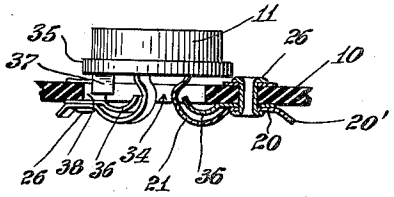


Fig. 4.

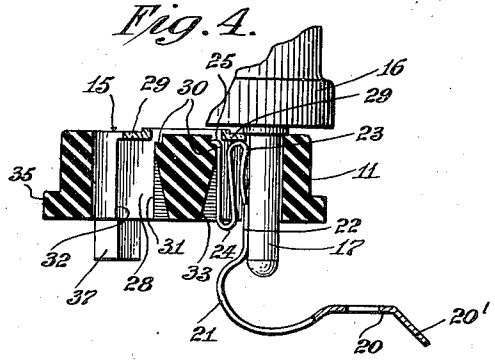


Fig. 2.

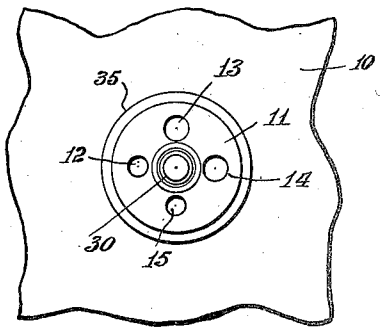


Fig. 5.

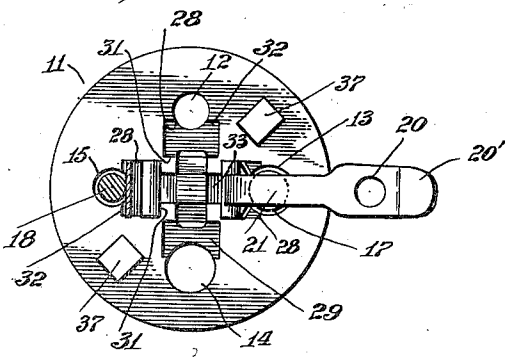


Fig. 3.

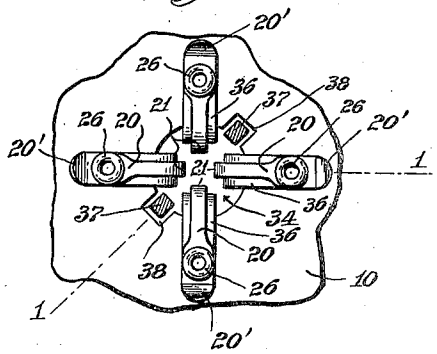
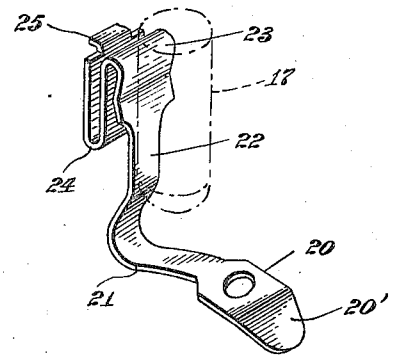


Fig. 6.



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UNITED STATES PATENT OFFICE

2,059,077

VACUUM TUBE CONDUCTOR AND SOCKET

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Application November 7, 1933, Serial No. 696,947

7 Claims. (Cl. 173—328)

The present application is a continuation in part of my application Serial No. 119,531 filed June 30, 1926, which matured into Patent 1,936,320, Nov. 21, 1933.

My invention relates to mounting devices for what are frequently called detectors, amplifiers and rectifiers and which are provided with projecting contact terminals, prongs or pins.

One object is to provide a one piece conductor which will serve as a circuit terminal and contact and which can be readily secured to insulating means forming the body of the socket.

Another object is to provide a socket contact and terminal member which can be connected to an insulating body by simply inserting it into a recess in which it is held by its own construction and resiliency.

Another object is to provide a one piece conducting strip which will serve as an efficient contact and at the same time provide a resilient support for a vacuum tube.

Another object is to provide a construction which can be readily and cheaply manufactured according to predetermined specifications.

A special object is to provide a cushion type socket which can be embodied in a panel construction.

Fig. 1 is a side view and partial section showing one form of socket embodying my invention, the section being taken on the plane of the line 1—1 of Fig. 3.

Fig. 2 is a plan view of the same.

Fig. 3 is a bottom plan view.

Fig. 4 is a cross sectional view on a larger scale showing the top piece of the insulating body of the socket and a fragment of a tube base and one prong in place. This also shows one of the conductor recesses without its conducting member.

Fig. 5 is a bottom plan view of the parts shown in Fig. 4 and also showing in section the conductor which is omitted from Fig. 4.

Fig. 6 is a perspective view of one of the conductor or contact members.

Panel member 10 and top 11 are preferably formed of insulating material and constitute the body of the socket. The top is provided with perforations such as 12, 13, 14 and 15 sized and located to receive the prongs of such device as is intended to be accommodated by the socket.

I have shown a fragment of a base 16 with a projecting prong or contact terminal 17. Fig. 5 also shows another prong 18.

Each conductor member consists in its preferred form of a single strip of resilient metal having an anchorage portion 20, a bowed spring arm portion 21, an inclined contact portion 22, folded or doubled compressible portions 23 and 24 and an anchorage hook or lip 25. The conductor strip also preferably has a projecting soldering terminal lug 20' integrally connected to the anchorage portion 20.

Each conductor strip is secured to the panel or insulating member 10 by suitable means such as a rivet 26.

The top piece is provided with a pocket or recess 28 at the inner edge of each of the perforations which receive the prongs. Each recess is adapted to receive one end of a conductor member including its compressible portions 23 and 24 and the hook 25. The recess opens downwardly and is partially closed by the web 29 at the top. The prong or pin hole passage 15 communicates with the pocket 28 and continues along the pocket wall so that in effect grooves are formed in the walls designed to hold the prongs in contact-making relation to the compressible portions 23 of the spring elements.

An abutment shoulder 30 at the inner edge of the recess near the upper surface of the top member serves to interlock with the hook 25 on the conductor member. The recess has shoulders 31 and 32 at its sides to engage the edges of the compressible parts 23 and 24 of a conductor member.

To facilitate assembly of the conductor member with the top member I provide an inclined wall 33 leading from the lower side of the top member to the edge of the abutment 30 which serves to automatically compress the spring portions 23 and 24 and direct the hook 25 to the abutment 30. The hook 25 automatically snaps into engagement with the abutment shoulder 30 when the spring has been thrust into the recess to its fullest extent at which time the upper end of the portion 23 abuts against the lower side of the web 29 at the top of the recess leaving the curved edge 23 projecting slightly into the side of the adjacent prong passage to act like a cam when a prong is inserted and so that the prong will compress the spring to provide a powerful grip.

It will be seen that the inward thrust of the prong is resisted by the action of the hook 25 against the shoulder 30. Similarly the stress developed when pulling the prong out of the socket will be resisted by the engagement of the part 23 against the abutment shoulder beneath the web 29.

The spring construction is such that when the prong is first inserted into the socket there is but slight resistance but as the prong is pushed in further it meets the inclined contact surface 22 and gradually compresses the spring. The effect of the spring portion 24 is to offer materially greater resistance. This facilitates the insertion of the tube prongs without straining the contacts or endangering the tube itself by rough handling.

As the springs yield inward radially when the

prongs are inserted there is no tendency to split the top piece.

In the form herein shown the spring arms **21** pass through the opening **34** and resiliently support the top piece **11** and the inserted tube. Flange **35** extends beyond the periphery of the passage **34** and serves to limit the downward movement of the top **11** when the tube prongs are inserted. Metal strips **36** form arched abutments for the spring arms **21** when the tube prongs are being withdrawn. These abutments **36** may be secured to the panel **10** by the rivets **26**.

Rotation of the top **11** with respect to the panel **10** is limited by projections **37** which extend downwardly from the top into recesses **38**.

Assembly of the parts of the form shown is readily effected by first inserting and interlocking the upper ends of the conductor strips in the recesses in the top member, then bending the arms of the conductor strips and inserting the terminal ends downwardly through the opening in the panel and securing them in place beneath it.

This places the spring arms under compression tending to lift the top member and hold it spaced apart from the base. The flexibility of the spring arms makes it possible to vary the positions of the circuit terminal ends considerably and thus accommodate the parts to various conditions such as variations in the locations of rivet or screw holes or so as to bring the outer ends of the conductor strips into the most convenient position for circuit connection to shorten the leads, etc. The same perforated top piece and conductor members can be used either on a base as shown in the parent application or on a shelf or panel support such as shown herein.

As the soldering lug **20'** is remote from the contact and spring portions **22**, **23** and **24** the heat of the soldering operation does not effect the spring temper of the metal.

This construction of the conductor strip also affords a maximum utility of the resilient character of the metal because both ends of the strip are anchored to the insulation. It also allows for considerable variation in the size and location of the prongs of the inserted tube or plug. It also permits the prongs to be inserted very easily and yet holds them securely with a good contact engagement.

I claim:

1. As an article of manufacture a conductor member for sockets comprising a single resilient strip of metal having a circuit terminal portion, a compressible contact portion at substantially right angles to the terminal portion with a projecting anchorage hook and a double bowed spring arm portion connecting the anchorage hook and contact portions.

2. As an article of manufacture a conductor member for sockets comprising a single resilient strip of metal having a terminal portion, a contact portion at substantially right angles to the terminal portion, a double fold spring backing for the contact portion, a discrete anchorage portion adjacent the backing and a bowed spring arm portion connecting the terminal and contact portions, said contact portion lying between said bowed spring arm portion and said double fold spring.

3. A contact and terminal member for a vacuum tube socket comprising a single strip of resilient metal having a double bowed spring portion between its ends, a part of which constitutes a contact for slidably receiving the side of a tube prong inserted into the socket, one end of the strip having a part extending laterally substantially at right angles to the contact for interlocking with parts of an insulating body to hold the strip in place and prevent its movement longitudinally when a tube prong is inserted into or withdrawn from the socket, the opposite end of the strip having means for the attachment of a circuit wire and an anchorage portion adjacent thereto for attachment to a support.

4. A vacuum tube socket comprising an insulating member having passages for tube prongs and anchorage abutments beneath the top of the insulating member and adjacent the passages, one piece conductor strips formed as flat springs having doubly bowed resilient portions and having resilient contact portions as parts of said doubly bowed portions in line to be engaged by prongs inserted in said passages, each conductor strip having a tip at one end bent at an angle to its contact portion and engaged with one of the anchorage abutments so as to cause an interlock of said insulating member and said strip and also having between its contact portion and its end opposite said bent tip, a bowed spring portion and having a soldering lug at said opposite end of the strip projecting away from the insulating member.

5. A socket of the character described for mounting upon insulating material, comprising perforated insulating means for receiving and supporting a tube base having prongs and also comprising a number of one-piece conductor strips each strip having portions near its opposite ends secured respectively to said insulating means and to the insulating material upon which said socket is mounted, one such portion of each strip being secured at one side of a perforation and the other portion of said strip being secured beyond the other side of the perforation, each of said strips having a double bowed spring portion intermediate its ends, at least a part of the spring portion constituting a contact extending at right angles to the face of the socket to engage the side of an inserted prong and each strip having a soldering lug integral therewith and extending away from the insulating means.

6. As an article of manufacture a conductor member for sockets comprising a single resilient strip of metal having a circuit terminal lug portion at one free end, a double folded compressible portion including at least one contact surface at a substantial angle to the terminal portion and also including a discrete projecting anchorage hook at the other free end of said strip and a spring arm portion connecting the terminal and contact portions.

7. As an article of manufacture a conductor member for sockets comprising a single resilient strip of metal having at one end a terminal lug portion, a contact portion at an angle to the terminal portion, a double fold spring portion backing said contact portion and a spring arm portion connecting the terminal and contact portions, said contact portion lying intermediate said double fold spring portion and said spring arm portion.

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