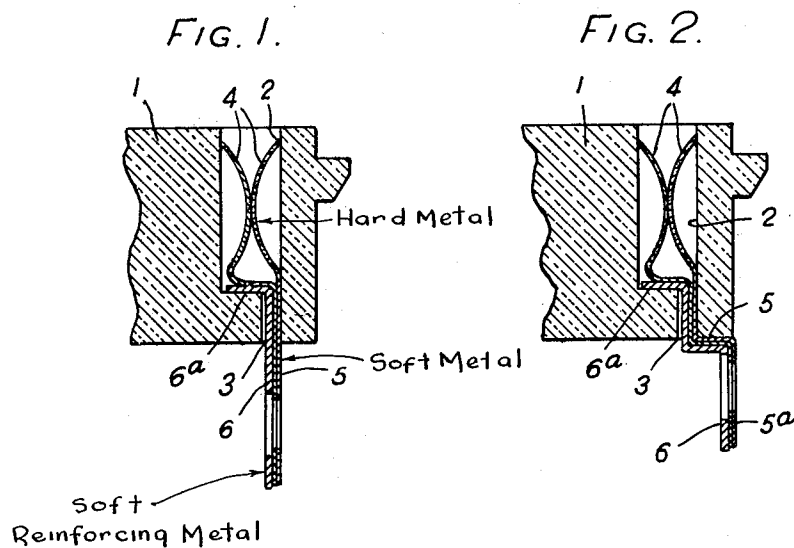


Dec. 6, 1955

C. W. HEATH
ELECTRICAL CONTACT MEMBERS

2,726,376

Filed Nov. 24, 1950



INVENTOR:
CLARENCE WILLANS HEATH,
By Philip C. Parker
ATTORNEY.

1

2,726,376

ELECTRICAL CONTACT MEMBERS

Clarence Willans Heath, Bleasby, England, assignor to United-Carr Fastener Corporation, a corporation of Delaware

Application November 24, 1950, Serial No. 197,198

3 Claims. (Cl. 339—220)

This invention relates to electrical contacts of the kind formed of metal or an alloy and comprising a socket portion adapted to be mounted in an aperture of a holder for thermionic valves, electrical plugs or the like to receive a projecting pin of the valve or the like and an integral tail-piece adapted to be bent to secure the contact in the holder.

Such contacts are normally made from metal or alloys which in their natural or untreated state are so soft that the socket and tail-piece become distorted and misshapen when relatively light pressure is applied and in consequence the socket portion is not capable of making spring engagement with an inserted pin and the tailpiece is not rigid enough to hold the contact in position in the holder. To overcome this drawback the contact is usually tempered or work hardened but in the case of beryllium and other similar alloys, the metal becomes very brittle when hardened and as a result the tailpiece readily fractures if it is bent through an angle of approximately 90° to secure the contact in the holder. As government departments and sections of the trade generally make it a standard requirement that these contacts must have tailpieces which will bend in opposite directions through angles of 90° without fracture, it has not been possible heretofore to use beryllium or similar metal or alloys which become brittle when hardened, in spite of their excellent electrical conducting properties.

It is an object of the present invention to provide a contact which overcomes this drawback.

According to the present invention an electrical contact of the kind referred to is formed of metal or an alloy which is soft in its normal state but which becomes brittle when subjected to hardening treatment wherein the pin-receiving socket portion of the contact is formed of hardened metal or alloy and the tailpiece is formed of unhardened metal or alloy, the tailpiece being reinforced by a separate strip of relatively hard bendable metal positioned in overlapping relation to the tailpiece.

The invention also includes an electrical contact of the kind referred to formed from a strip of beryllium wherein the pin-receiving socket portion is formed by a hardened portion of the strip and the tail-piece is formed by a portion of the strip which is in its unhardened state, a separate relatively hard bendable metal strip being provided adapted to overlap and extend substantially co-extensively with said tailpiece to reinforce the same, said separate strip having an integral portion adapted to be located in an aperture in the valve or plug holder.

To enable the invention to be fully understood it will now be described with reference to the accompanying drawing, in which:

Fig. 1 is a fragmentary sectional view of a valve holder showing the contact in its initial stage of assembly, and

Fig. 2 is a view similar to Fig. 1 but showing the tail-piece and reinforcing strip bent to secure the contact in position.

The term "hardened" is intended to mean metal which has been subjected to heat treatment, or otherwise worked

2

to convert it into a hard brittle state, and the term "unhardened" is intended to mean relatively soft metal which is in its natural soft state or has been treated, as by annealing, to re-soften it after a previous hardening treatment.

As shown in the accompanying drawing, 1 is the body of a holder for thermionic valves, electrical plugs or like devices having projecting pins.

The body 1 is provided with a series of valve pin apertures 2 opening on to the upper face of the body and slots 3 opening on to the under face of the body. Only one aperture and slot are shown, but it will be understood that a series of these will be provided (in known manner) according to the number of projecting pins on the valve or plug to be assembled with the holder.

An electrical contact is mounted in each aperture 2 and as shown comprises a single strip of metal bent upon itself to form a pair of spaced arms 4 adapted to form a socket to receive the valve or plug pins therebetween, and a double thickness integral tailpiece 5 which extends through the slot 3 and as shown in Fig. 2 is adapted to be bent through an angle of 90° to extend along the underface of the body 1 to secure the contact to the holder, and its end portion 5a bent through another 90° angle to form a depending wire-receiving portion.

The contact is made of beryllium-copper alloy or other metal or alloy which is a good electrical conductor and which is relatively soft in its normal state but becomes brittle when hardened by heat or other known hardening treatment. The contact may, for example, be made from a strip which includes 1.9 to 2.1% beryllium, 0.1 to 0.3% cobalt and the remainder copper.

The strip is pierced and bent to form the contact which is then hardened, as by heat treatment. The integral tailpiece 5, 5a is then annealed to soften it by exposing this part only of the contact to a gas flame. The contact accordingly comprises a hardened socket or pin-receiving portion and a soft tailpiece. As, however, the soft tailpiece would not be sufficiently rigid to retain the contact when the tailpiece is bent into the position shown in Fig. 2 a separate reinforcing strip is provided formed of metal or an alloy which will bend readily through an angle of 90° and will not crack or fracture easily when so bent. As shown the re-inforcing strip comprises a portion 6 extending co-extensively of the tailpiece 5, 5a and in overlapping relation therewith to form a three-ply thickness. The portion 6 is formed with an integral angularly bent end portion 6a which extends into the pin-receiving aperture 2 beneath the base of the arms 4. The portion 6a accordingly locates the strip 6 in assembled position with the holder. When the strip 6 is bent through angles of 90° as shown in Fig. 2 it will lock the soft tailpiece against the underface of the holder and not only secure the contact in the holder but also hold the tailpiece rigid and prevent any movement thereof, if the valve holder is subject to vibration. If the tailpiece is not held rigidly, there will be a tendency for the electrical connector to be faulty and also a tendency to produce a breakdown at the joint where the connecting lead is soldered to the tailpiece.

It will be understood that the invention is not limited to contacts formed of beryllium or beryllium alloys but is applicable to contacts formed of any metal or alloy which is suitable for use as a pin-receiving contact but when hardened becomes too brittle to be bent in the manner described without danger of fracturing.

I claim:

1. An electrical socket for use with a device having contact prongs comprising a socket body of insulating material having a prong-receiving opening and a terminal-receiving opening formed as a continuation of said prong-receiving opening, a contact element assembled with said socket having a prong-engaging portion disposed in said

3

prong-receiving opening and a flexible tailpiece disposed in and extending through said terminal-receiving opening, said prong-engaging portion being formed of hardened metal and said tailpiece being formed of unhardened metal, and a bendable reinforcing strip assembled with said socket body and having a portion in overlapping contact-
ing relation to said tailpiece so as to reinforce the same.

2. A socket device of the type described in claim 1 in which said reinforcing strip has an attaching portion dis-
posed in said prong-receiving opening and a reinforcing
portion disposed in said terminal-receiving opening in
overlapping contacting relation to said tailpiece.

3. A socket device of the type described in claim 1 in
which said tailpiece and said reinforcing strip have an
angular bend portion disposed outside of said socket body
in engagement with said body and a second angular bend

4

portion integral with said first angular bend portion and
disposed at the outer ends of said tailpiece and reinforcing
strip providing a wire-receiving terminal element.

References Cited in the file of this patent

UNITED STATES PATENTS

2,149,084	Cook	Feb. 28, 1939
2,203,996	Megow	June 11, 1940
2,275,163	Thomas	Mar. 3, 1942
2,371,469	Rogoff	Mar. 13, 1945
2,455,324	Wagstaff	Nov. 30, 1948
2,476,886	Miller	July 19, 1949
2,525,210	Del Camp	Oct. 10, 1950

FOREIGN PATENTS

559,562	Great Britain	Feb. 24, 1944
---------	---------------	---------------