Jan. 24, 1928. **1,657,053**

J. A. WEIGER

ELECTRICAL CONTACT

Filed Oct. 9, 1926

Fig. 1

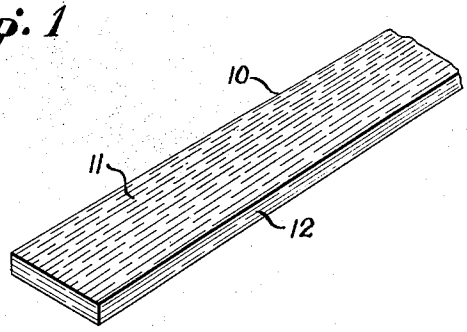


Fig. 2

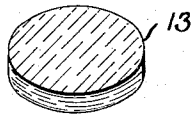
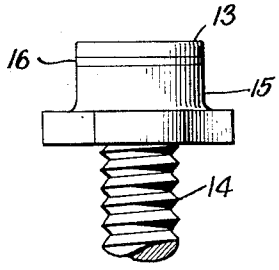


Fig. 3



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UNITED STATES PATENT OFFICE.

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ELECTRICAL CONTACT.

Application filed October 9, 1926. Serial No. 140,547.

This invention relates to electrical contact supports, and particularly to supports for so-called "tungsten contact points".

This invention has for its object generally to provide in devices of the character specified an improved construction and arrangement of parts which is efficient, economical and readily manufactured.

More specifically, an object of the invention is to provide an improved arrangement for mounting ordinary tungsten contact points, which have been punched from tungsten rods or so-called strip, upon supports of ferrous material.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 shows, in enlarged perspective, a fragment of tungsten strip from which tungsten contact points or members are punched for use in accordance with the present invention;

Fig. 2 is a similar view showing a tungsten contact point which has been punched from tungsten strip; and

Fig. 3 shows a tungsten contact point mounted on a ferrous support in accordance with the invention.

Referring now to the drawing, the fragmentary section of strip 10 shown in Fig. 1 is indicated as a relatively thin rod of tungsten, which has been formed by rolling a tungsten ingot so that a granular structure has developed parallel to the longitudinal axis of the strip. This is indicated by the marks at 11 and is generally designated the "grain" of the metal.

When working tungsten ingots into strip of the character here indicated there is developed in the strip not only the grain indicated at 11, but the strip actually develops lamina, in which the granular crystals apparently lie. The lamina are here indicated at 12 by lines drawn parallel in the side end of the tungsten strip shown.

It is well-known that the tungsten strip when properly heated can be worked in dies very much the same as ferrous material. For the purpose of making tungsten contact points it is preferable to use properly formed dies for punching the contact points directly from the tungsten strip. A tungsten "contact point" is a tungsten member in disk form having a diameter substantially that of the strip from which it is punched, if the strip is being economically used; such a member is shown at 13 in Fig. 2. It is seen from Fig. 2 that the dies which form the member cut it from the tungsten strip along lines lying directly across the grain. Consequently, the grain itself lies in the surface of the contact disk; the disk being composed of a series of lamina parallel to the surfaces of the disk.

Heretofore, tungsten contact points have been supported on ferrous material, such as the steel screw 14 formed to have a head or table 15 (see Fig. 3), by means of an interposed layer of copper. Copper is a material which is adapted to wet both the ferrous material and the tungsten, and diffuses slightly into the pores of the adjacent metals so as to braze them firmly together.

Tungsten contacts are preferably used in make-and-break service in electrical circuits, since the electric spark at the break has very little effect in the disintegration of terminals by fusion, pitting, etc., when formed of tungsten. Tungsten contacts, however, when made from tungsten strip and used as contact points in make-and-break service, disintegrate in another manner; namely, by sloughing off laminations from the surface. Tungsten contact points made from strip, as a result, generally have a relatively short life, since the lamina may slough off to a point where there is relatively little tungsten left.

In the practice of the present invention the sloughing off of the tungsten lamina is avoided, since the brazing material inserted between the tungsten member and the ferrous support is made of a material having a lower melting point than copper and having a higher capillarity. Suitable material for this purpose has been ascertained to be an alloy of copper and nickel; for example, one containing 70% copper

and 30% nickel. A disk of copper-nickel alloy inserted at 16 is shown in Fig. 3 between the tungsten contact and the ferrous support. By reason of the properties of this alloy a strong weld is made and the sloughing off of the tungsten lamina is avoided. This apparently results from the fact that the alloying material, by reason of its high capillarity and low melting point, permeates further into the tungsten contact member than would be the case for copper alone, with the consequence that the lamina in the tungsten contact member are firmly welded together in a manner which does not permit them readily to separate. Tungsten contact members, when mounted in accordance with the present invention, are hardy and have a long life and are adapted for severe usage in electric make-and-break service.

Since certain changes may be made in the above construction, and different embodiments of the invention could be made, without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In electrical contacts and the like having tungsten contact points the combination comprising a ferrous member having a supporting surface, a tungsten contact member adapted to be secured to said supporting surface and having its contact surface parallel to the grain of the tungsten stock, and uniting material interposed between said ferrous member and said tungsten member having a relatively low melting point and a capillarity, such that there is diffusion of said uniting material into the body of said tungsten contact member.

2. In electrical contacts and the like having tungsten contact points, the combination comprising a ferrous member having a supporting surface, a tungsten contact member adapted to be secured to said supporting surface and having a laminated disk formation, and a strip of uniting material interposed between said ferrous member and said tungsten member having a relatively low melting point and a capillarity, such that there is diffusion of said uniting material into the body of said tungsten contact member.

3. In electrical contacts and the like having tungsten contact points, the combination comprising a ferrous member having a supporting surface, a tungsten contact member adapted to be secured to said supporting surface having a laminar granular characteristic in its structure in which the grain is parallel to the contact surface, and a disk of an alloy interposed between said ferrous member and said tungsten member having a relatively low melting point and a capillarity, such that there is diffusion of said uniting material into the body of said tungsten contact member.

4. In electrical contacts and the like having tungsten contact points, the combination comprising a ferrous member having a supporting surface, a tungsten contact member adapted to be secured to said supporting surface having a laminar granular characteristic in its structure in which the grain is parallel to the contact surface, and a disk of nickel-copper alloy interposed between said ferrous member and said tungsten member adapted for uniting said members and imparting a relatively rugged characteristic to the laminar tungsten member.

In testimony whereof I affix my signature.

JOSEPH A. WEIGER.