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DE-U- 7 637 798
FR-A- 1 252 284
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Description

The invention relates to a receptacle contact, in particular for a knife contact of a knife fuse for electrical systems, consisting of electrically conducting sheet metal bent into such a shape as to comprise two substantially parallel contact jaws, connected with one another by a connecting portion, and a connection strip, which is connected with the connecting portion, in which said receptacle contact is made from a rectangular plate having two parallel slits, which extend from one edge of the plate towards the opposite edge and thus from three separate parallel strips connected with one another by a cross strip extending along the said opposite edge, which cross strip is bent to a U-shape along lines which are substantially aligned with the two slits, in which both outer strips of the three parallel strips are bent towards one another in order to form the two substantially parallel contact jaws while the center strip is bent perpendicular to the cross strip, in order to form the connection strip, said cross strip forming said connecting portion.

Such receptacle contact is known from DE-U 7 637 798. These contacts are used mainly for knife fuse holders, but also for instance for safety fuse load switches. These known receptacle contacts are made for instance of sheet metal, for instance by punching a T-shaped primary part from copper tape or copper strip. Punching the primary part such that a rectangular plate is obtained having two parallel narrow slits, results in a saving in plate material. In order to obtain the necessary spring tension these receptacle contacts may comprise separate pressure springs, as known from NL-A 98 321. The application of separate springs for the necessary contact pressure is complicated because of the closed lower side of the contact. In order to mount the receptacle contact on a base plate, housing or like mounting material is necessary moreover, such as bolts and nuts. This also influences the cost price unsatisfactorily.

Above drawbacks are avoided now by the receptacle contact of the present invention, which is characterized in that the U-shaped bent cross strip of each receptacle contact is fitted in a fitting U-shaped recess in the belonging support part of an insulating support body of the device.

The receptacle contact can be mounted with ease on a base body of for instance the fuse holder by means of the U-shaped connecting portion, so that further mounting material can be dispensed with, which lowers the price of the fuse holder. Also the mounting operation by itself is easy because no additional mounting material is necessary.

It is remarked, that other receptacle contacts are known per se, also fabricated in a material saving method. However, also these known receptacle contacts are suitable only for lower nominal current values, for instance lower than 250 amperes. In case of current values above 250 amperes it is necessary to use several such con-

tacts in parallel so that the advantage of the material saving process is eliminated. On the contrary a receptacle contact of the present invention can be used for a plurality of current values, using the same contact shape.

The invention will now be elucidated on the basis of the drawings, showing an embodiment.

Fig. 1 shows a known contact in folded out configuration as described in document NL-A 98 321;

Fig. 2 shows a receptacle contact in folded out configuration of the present invention;

Fig. 3 shows a front view of a receptacle contact of the present invention mounted on a body;

Fig. 4 shows a side view of the receptacle contact of the present invention mounted on a support body;

Fig. 5 shows in perspective view a receptacle contact of the present invention, shown above a support part of the insulating supports of a fuse holder.

Fig. 1 shows in which way the primary part of the known receptacle contact is punched from a copper tape or copper strip. The continuous lines shows the folded out configuration of the said known contact 1. The interrupted lines show in which way further receptacle contacts can be punched from this tape material in the most economical way. The shaded portions clearly show that relatively much material is lost doing so. Because predetermined lengths are necessary for the contact jaws (6) and connection strip 5 to be formed, the material saving of the shaded portions is limited.

Fig. 2 shows a folded out configuration of a receptacle contact of the present invention, for a fuse holder for nearly the same nominal current value as the counter contact of fig. 1. Here also the shaded portions show the not used material and it appears clearly that this is substantially less than in the known contact. This results from the parallel position of the strips 6 and 5 in this primary part, forming after bending the respective contact jaws and the connection strip.

In fig. 1 and 2 it is shown by interrupted lines where the folded out configurations have to be bent in order to obtain the ultimate receptacle contacts.

Fig. 3 shows the receptacle contact 1 mounted on a support body, i.e. received in a U-shaped recess 8 of the belonging support part 2 of an insulated support body of a fuse holder for instance. 7 is a knife fuse, separation knife or the like. The contact jaws and connection strip are shown using the same reference numbers as in fig. 1 and 2.

Fig. 4 shows a side view of such a receptacle contact 1 received in a support part 2.

In fig. 3, 4 and 5 it is shown, that as distinct from the known receptacle contact, the receptacle contact of the present invention need not be mounted on top of the support part 2 of the fuse holder by means of bolts or screws, but fits with its lower portion, i.e. the U-shaped cross strip 3,

partly or wholly in the recess. Hereby the receptacle contact is supported largely in the support part, whereas for a firmer mounting within this support part it is necessary only to deform by upsetting or bending and the like. Also the support part 2, in case this is made of thermoplastic material, can be therefore plastically deformed.

An additional spring for additional contact pressure of the contact jaws, as used in the receptacle contact of above-said NL-A 98 321, also can be used in this receptacle contact of the present invention in a simple way and placed in position from the open lower edge, before the receptacle contact is received in the U-shaped recess 8 of support part 2.

In fig. 3, 4 and 5 the U-shaped recess 8 extends over the whole height of support part 2. This is not necessary, however. At the lower side this recess can be enlarged by leaving out the center portion, vide reference number 9 in fig. 3 and 4. This facilitates the deformation of the lower edge of the U-shaped cross strip 3.

The receptacle contact of the present invention is fabricated in the following way.

First the folded out configuration, shown in fig. 2, is punched from sheet material. Upon this punching operation at the same time a connection opening 4 in the connection strip 5 can be made, and openings for a spring to increase the contact pressure of the contact jaws 6, in case this is considered necessary. For clearness' sake these springs and belonging openings are not shown in the drawings.

When punching also the necessary curvatures and camber can be made in the contact jaws 6. The connection strip 5 is bent perpendicular to the plane of the folded out configuration, which means perpendicular to the cross strip 3.

Hereafter the contact can be silver-plated where necessary, whereafter in the last fabrication step both contact jaws 6 are bent towards one another by bending the cross strip 3 such that a U-shape is obtained. In this way it is guaranteed that at all locations of the contact the necessary thickness of the silver-plating is obtained.

In case the distance between the contact jaws 6 is large with respect to the width of the contact jaws, which means in particular in case of receptacle contacts for low current values, the silver-plating can be applied also in a last fabrication step.

The receptacle contact thus obtained can be placed with the perpendicularly bent parts a, b and c in the recess 8 of the support part 2 and fastened therein. This offers a satisfying initial fastening of the contacts and it need be guaranteed only that the contact is not drawn from the support part 2 upon removing a knife fuse or knife contact.

By deformation of the lower edge of the contact to be received in the support part 2, this relatively small force upon removing the knife contact or knife fuse can be taken care of.

Also the support part 2 can be deformed plasti-

cally, for instance by ultrasonic vibrations such, that the cross strip 3 with parts a, b and c are firmly held in place. A light curvature of parts a, b and c is of advantage here for accepting draw forces.

The cross strip 3 also can have a short transversely bent edge at its lower side, which after pushing in the U-shaped recess 8 will snap below the upper wall of recess 9. This also will take care of forces upon removing a knife contact of a knife fuse, so that the receptacle contact is not drawn out then. As a matter of course other snap connections are possible with adapted modifications of the support part 2 or the recess 8.

By means of other modifications, for instance broadening or narrowing the contact jaws 6 as well as the connection strip 5, the contact can be made appropriate for different current values.

Claims

1. Receptacle contact (1), in particular for a knife contact of a knife fuse (7) for electrical systems, consisting of electrically conducting sheet metal bent into such a shape as to comprise two substantially parallel contact jaws (6), connected with one another by a connecting portion (b), and a connection strip (5), which is connected with the connecting portion, in which said receptacle contact (1) is made from a rectangular plate having two parallel slits, which extend from one edge of the plate towards the opposite edge and thus form three separate parallel strips (6, 5, 6) connected with one another by a cross strip (a, b, c) extending along the said opposite edge, which cross strip (a, b, c) is bent to a U-shape along lines which are substantially aligned with the two slits, in which both outer strips (6, 6) of the three parallel strips are bent towards one another in order to form the two substantially parallel contact jaws while the center strip (5) is bent perpendicular to the cross strip (a, b, c), in order to form the connection strip, said cross strip (a, b, c) forming said connection portion, characterized in that the U-shaped bent cross strip (a, b, c) of each receptacle contact (1) is fitted in a fitting U-shaped recess (8) in the belonging support part (2) of an insulating support body of the device.

2. Device as claimed in claim 1, characterized in that the receptacle contacts (1) are secured by mechanical plastic deformation of the U-shaped cross strip (a, b, c) fitted in the U-shaped recess (8).

3. Device as claimed in claim 2, characterized in that the deformation is obtained by upsetting the said opposite edge of the cross strip (a, b, c).

4. Device as claimed in claim 1, characterized in that said opposite edge of the cross strip (a, b, c) is bent, so that after pushing in the recess this bent portion can snap behind a surface (9) of the support part (2).

5. Device as claimed in claim 1, characterized in that the receptacle contacts (1) are secured by

ultrasonic plastic deformation of the support part (2).

6. Receptacle contact as claimed in claim 1, characterized in that the line of bending between the connection strip (5) and the cross strip (a, b, c) is located more closely to the said opposite edge of the plate than the lines of bending between the outer contact jaws strips (6, 6) and the cross strip (a, b, c).

7. Receptacle contact as claimed in claim 1 or 6, characterized in that the center strip (b, 5) forming the connection strip is shorter than the outer contact jaw strips (a, 6; c, 6).

Revendications

1. Contact récepteur (1), en particulier destiné à un contact à couteau de fusible à couteau (7) pour systèmes électriques, consistant en une feuille de métal électriquement conductrice pliée en une forme telle qu'elle comprenne deux mâchoires de contact (6) sensiblement parallèles, raccordées l'une avec l'autre par une pièce de connexion (b), et une bande de connexion (5) qui est raccordée avec la partie de connexion, ce contact récepteur (1) étant fabriqué à partir d'une plaque rectangulaire qui a deux fentes parallèles qui s'étendent d'un bord de la plaque en direction du bord opposé et qui forment ainsi trois bandes parallèles séparées (6, 5, 6) raccordées les unes avec les autres par une bande transversale qui est pliée en forme de U le long de lignes qui sont sensiblement alignées avec les deux bandes extérieures (6, 6) faisant partie des trois bandes parallèles, tandis que la bande centrale (5) est pliée perpendiculairement à la bande transversale (a, b, c), pour former la bande de connexion, cette bande transversale (a, b, c) formant cette partie de connexion, caractérisé en ce que la bande transversale pliée en forme de U (a, b, c) de chacun des contacts récepteurs (1) est fixée dans un logement de fixation en forme de U (8) pratiqué dans la pièce formant support (2) appartenant au corps du support isolant de l'appareil.

2. Appareil conforme à la revendication 1, caractérisé en ce que les contacts récepteurs (1) sont immobilisés par une déformation plastique mécanique de la bande transversale en forme de U (a, b, c) fixée dans le logement en forme de U (8).

3. Appareil conforme à la revendication 2, caractérisé en ce que la déformation est obtenue par refoulement du bord opposé de la bande transversale (a, b, c).

4. Appareil conforme à la revendication 1, caractérisé en ce que le bord opposé de la bande transversale (a, b, c) est courbé de telle sorte que, après avoir été poussée dans le logement, cette partie pliée peut s'encliqueter derrière une surface (9) de la pièce formant support (2).

5. Appareil conforme à la revendication 1, caractérisé en ce que les contacts récepteurs (1) sont immobilisés par déformation plastique ultrasonore de la pièce formant support (2).

6. Contact récepteur conforme à la revendica-

tion 1, caractérisé en ce que la ligne de pliage qui se trouve entre la bande de connexion (5) et la bande transversale (a, b, c) est située plus près du bord opposé de la plaque que ne le sont les lignes de pliage qui se trouvent entre les bandes format les mâchoires de contact extérieures (6, 6) et la bande transversale (a, b, c).

7. Contact récepteur conforme à la revendication 1 ou à la revendication 6, caractérisé en ce que la bande centrale (b, 5) formant la bande de connexion est plus courte que les bandes extérieures (a, 6), (c, 6) des mâchoires de contact.

Patentansprüche

1. Gegenkontakt (1), insbesondere für einen Messerkontakt einer Messersicherung (7), für elektrische Anlagen, bestehend aus einem elektrisch leitenden Metallblech, das in eine derartige Form gebogen ist, dass es zwei im wesentlichen parallele Kontaktspannbacken (6) aufweist, die miteinander durch einen Verbindungsabschnitt (b) verbunden sind und mit einem Verbindungsstreifen (5), der mit dem Verbindungsabschnitt verbunden ist, wobei der Gegenkontakt (1) aus einer rechteckigen Platte hergestellt ist, die zwei parallele Schlitze hat, die sich von einem Rand der Platte zu dem gegenüberliegenden Rand erstrecken und somit drei gesonderte parallele Streifen (6, 5, 6) bilden, die miteinander durch einen Querstreifen (a, b, c) verbunden sind, der sich längs des gegenüberliegenden Rands erstreckt, dass der Querstreifen (a, b, c) zu einer U-Form längs Linien gebogen ist, die im wesentlichen mit den beiden Schlitten fluchten, und dass die beiden äusseren Streifen (6, 6) der drei parallelen Streifen aufeinandergebogen sind, um die beiden im wesentlichen parallelen Kontaktspannbacken zu bilden, während der Mittelstreifen (5) senkrecht zum Querstreifen (a, b, c) gebogen ist, um den Verbindungsstreifen zu bilden, wobei der Querstreifen (a, b, c) den Verbindungsabschnitt bildet, dadurch gekennzeichnet, dass die U-förmige Aussparung (8) im zugehörigen Tragteil (2) eines isolierenden Tragkörpers der Vorrichtung eingepasst ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die Gegenkontakte (1) durch eine mechanische plastische Verformung des U-förmigen Querstreifens (a, b, c) festgelegt sind, der in die U-förmige Aussparung (8) eingepasst ist.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, dass man die Verformung dadurch erhält, dass der gegenüberliegende Rand des Querstreifens (a, b, c) gestaucht wird.

4. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass der gegenüberliegende Rand des Querstreifens (a, b, c) gebogen ist, so dass nach dem Eindringen in die Aussparung der gebogene Abschnitt eine Fläche (9) des Tragteils (2) durch Schnappen hintergreifen kann.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die Gegenkontakte (1) durch

plastische Ultraschallverformung des Tragteils (2) festgelegt werden.

6. Gegenkontakt nach Anspruch 1, dadurch gekennzeichnet, dass die Biegelinie zwischen dem Verbindungsstreifen (5) und dem Querstreifen (a, b, c) näher zum gegenüberliegenden Rand der Platte als die Biegelinien zwischen den äusse-

ren Kontaktspannbackenstreifen (6, 6) und den Querstreifen (a, b, c) liegt.

7. Gegenkontakt nach Anspruch 1 oder 6, dadurch gekennzeichnet, dass der Mittelstreifen (b, 5), der den Verbindungsstreifen bildet, kürzer als die äusseren Kontaktspannbackenstreifen (a, b; c, b) ist.

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fig-1

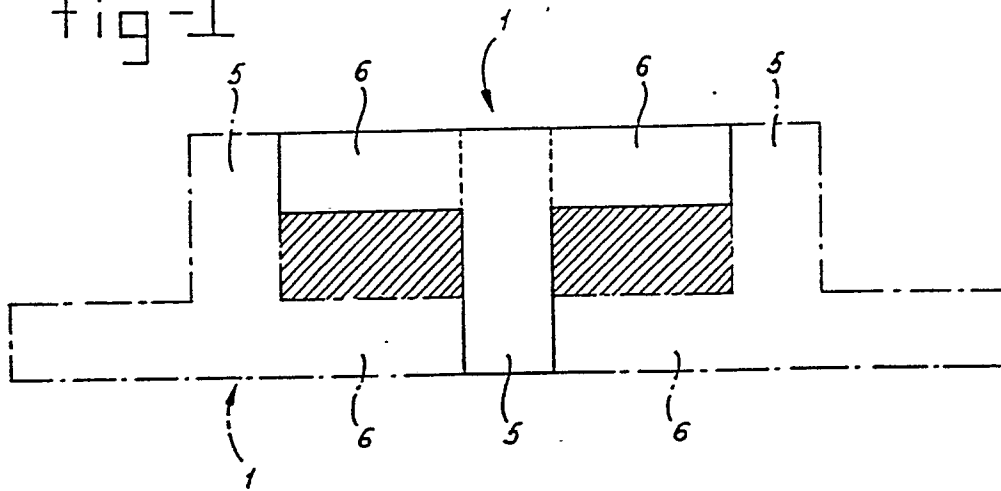


fig-2

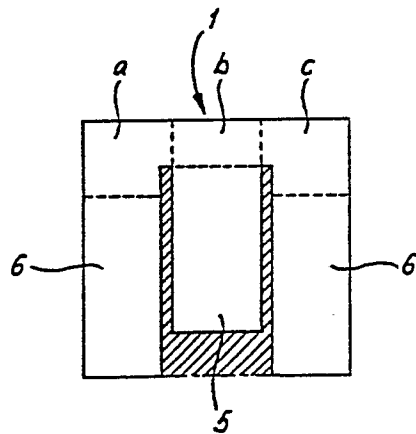


fig-3

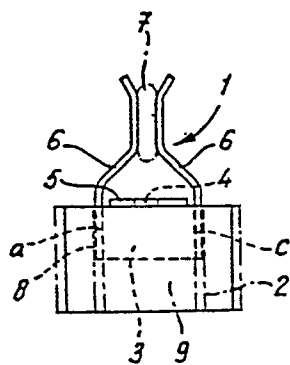


fig-4

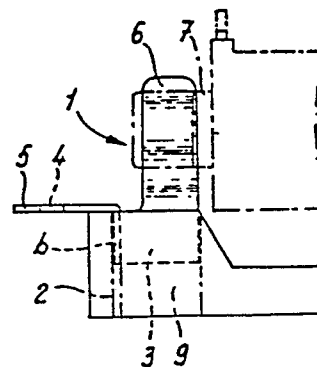


fig-5

