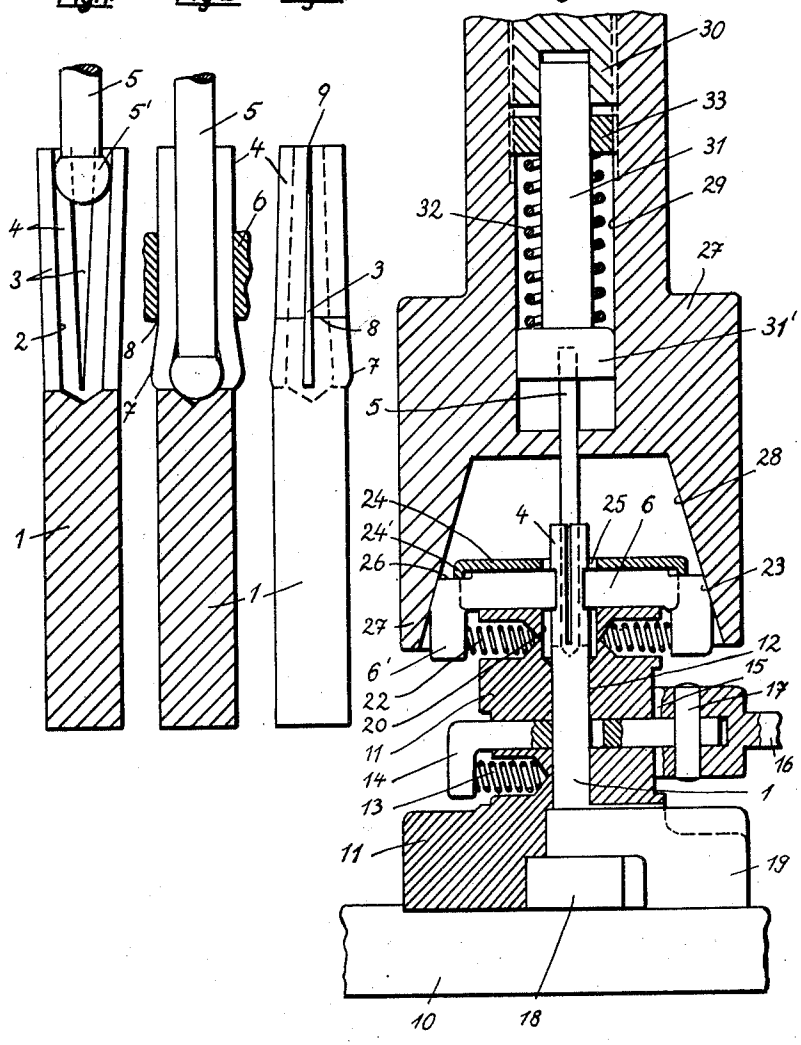
Dec. 21, 1954 F. UTZ 2,697,821

ELECTRICAL CONTACT SOCKET

Filed Oct. 7, 1949

Fig.1. Fig.2. Fig.3. Fig.4.



INVENTOR
FRIEDRICH UTZ
By Young, Emery & Thompson
Attys.

United States Patent Office 2,697,821 Patented Dec. 21, 1954

2,697,821

ELECTRICAL CONTACT SOCKET

Friedrich Utz, Oberndorf-Aistaig, Wurttemberg, Germany

Application October 7, 1949, Serial No. 120,044

Claims priority, application Germany April 22, 1949

1 Claim. (Cl. 339—258)

The present invention relates to electrical contact sockets provided with longitudinal slits to receive a plug pin for making electrical connections. Special elastic members, usually in the shape of spring rings applied on the outside, have hitherto been attached to the socket tongues in order to press the said socket tongues, produced by the longitudinal slits, elastically against the inserted plug pin and to thereby ensure a good electrical contact.

Apart from the fact that the production becomes more expensive by using and attaching an additional spring member, a perfectly good and tight contact of the contacting surfaces is not necessarily produced by these means.

The object of the present invention is to produce a socket avoiding these disadvantages by making the socket tongues in such a way that the tongues themselves exert an elastic clamping effect. According to the invention this is accomplished by widening or bulging out the base of the socket tongues, produced by the longitudinal slits, and by slightly bulging them so that they clamp elastically towards each other.

The production of such sockets is a very simple one according to the new production method. The socket tongues are spread out by a press bar which has a thickened head and are then pressed down onto the unthickened part (shaft) of the press bar by pressing tools which move preferably in a direction vertically to the axis of the socket.

Further characteristics of the invention will be set forth in the following description. Especially to be mentioned is the fact that the press device is designed in such a way that the entire shaping of the socket tongues is made by a single operation.

In the accompanying drawing the new contact socket and the pertinent production device are shown in one example.

Figs. 1, 2 and 3 show a socket in various steps of production on an enlarged scale in which Figs. 1 and 2 are longitudinal cross sections and Fig. 3 is a side view of the finished socket.

Fig. 4 is a longitudinal cross section through the middle of the press device.

The socket consists of a cylindrical bar **1** on which the socket tongues **4** are made by means of a central drill hole **2** and for instance four radial longitudinal slits **3**.

The production method may be explained by referring to Figs. 1 to 3. A cylindrical press bar **5**, the head **5'** of which is slightly enlarged is inserted between the socket tongues **4**. Thereby the socket tongues **4** are spread out as shown in Fig. 1. In the shown example the enlarged head **5'** of the press bar **5** has a spherical shape (ball point) and the diameter of this sphere is slightly greater than the diameter of the other part (shaft) of the press bar **5**.

The socket tongues will be spread out more and more according to the deeper penetration of the press bar **5, 5'** until the press bar touches the end of the socket drill hole **2**. The spread out socket tongues will then be pressed together, and down onto the press bar **5** by press tools **6** which move from the outside radially and in a direction vertical to the axis of the socket tongues as shown in Fig. 2. By this the socket tongues **4** will be slightly enlarged at their base, indicated at **7** in Fig. 2. At the same time the tongues **4** will be slightly bent at a point indicated at **8** in Fig. 2. After having produced this effect the press tools **6** move outwards and the press bar **5, 5'** will be extracted from the socket in an upward-

ly direction. The socket tongues **4** have now been shaped as shown in Fig. 3. The tongues **4** touch each other at their upper ends **9** and exert an elastic clamping effect. The slits **3**, having had originally parallel sides, have now become wedge shaped tapered from the base to the top (Fig. 3).

It will be understood forthwith that a plug pin inserted between the elastically clamping socket tongues **4** will be elastically embraced and securely held. An arcing as it has been previously experienced and has destroyed the contact surfaces can not occur.

In order to avoid that the socket tongues **4** will be spread out too much by the insertion of the press bar **5, 5'** a ring shaped stop is provided to limit the outward movement of the said tongues. This stop will be more fully described in connection with the press device.

According to Fig. 4 the press device consists of a bottom tool and an upper tool. The bottom tool consists of a base plate **10** and a holding and guiding body **11** the centrally drilled hole **12** of which receives the socket **1, 4**. The socket **1, 4** is held by a clamping member **14** influenced by a helical compression spring **13** and can be tightened by means of a hand lever **16** designed as an eccentric **15**. The clamping member **14** is rotatably connected with the hand lever **16** by a bolt **17**.

In order to make it possible that sockets of different length can be held and worked, interchangeable supports **18, 19** are provided at the bottom of the holding body **11**. The support for the lower end of the socket **1** can, of course, be designed in another manner, for instance it could be made adjustable in height.

The upper part **20** of the drill hole **12** has a somewhat greater diameter than the lower part, the walls of which serve as a stop to limit the spreading movement of the socket tongues if a plate **24** is not used. In the example shown in Fig. 4 there are four pressing tools **6** guided in radially extending guides on the upper part of the holding body **11**. Each of the said pressing tools **6** has an angular shaped projection **6'** extending downwards and is influenced by a helical compression spring **22** arranged in the holding body **11**. The said projections **6'** of the pressing tools **6** each have at their upper outer edge a working plane **23**, which is either oblique or spherically shaped. In the shown example the pressing tools **6** are covered by a plate **24** which is rigidly connected with the holding body **11**. The said plate **24** has a central drill hole **25** the diameter of which is approximately the same as the diameter of the drill hole **20**.

The walls of the hole **25** serve as a stop to limit the spreading movement of the socket tongues. The shoulder **24'** of the disc **24** is curved downwardly and cooperates with recesses **26** of the pressing tools **6**.

The upper tool consists of a body **27** the inner lower part of which has a conically shaped cavity **28**. The said body **27** has a central drill hole **29** into which a guide member **30** is threaded. This guide member **30** guides a movable shaft **31** on the lower end of which the press bar **5** is fixed. A helical compression spring **32** abutting against a collar **31'** of the shaft **31** always presses the shaft **31** downwardly. The said helical compression spring **32** abuts with its upper end against a nut **33** screw threaded into the drill hole **29**. By turning the said nut **33** the pressure of the helical spring **32** can be varied.

After having described the various parts of which the press device consists, the operation is as follows:

When the upper and the bottom tool of the press device are separated (for instance the upper tool **27** is lifted) a socket **1, 4** will be inserted in the hole **12** of the holding body **11** and clamped by the eccentric clamping lever **15, 16**. The upper tool will then be moved downwards and in connection herewith the press bar **5** with its spherically shaped head **5'** will be inserted between the socket tongues **4** and will spread them outwardly. The outwardly spread tongues **4** contact the wall of the drill hole **25** of the cover plate **24** so that the upper part of the tongues **4** are prevented from spreading out further. The strength of the helical spring **32** is so great that it will not be compressed before the press bar **5** has come to rest at the bottom of the socket drill hole **2**. From this moment on the press bar **5** will stop its downwards movement while the body **27** continues to move down-

wards. The oblique or spherically shaped planes **23** of the pressing tools **6** touch against, and glide on, the inner cone **28** and will, therefore, be pressed radially inwards by the downward movement of the body **27**. In this way the spread out socket tongues **4** will be compressed again and pressed down onto the press bar **5**.

The operation is thus finished. The body **27** moves up again, the clamping tools **6** will be pushed outwardly by the springs **22** and the press bar will be extracted out of the socket. The finished shaped socket will be removed from the holding body **11** and replaced by another unfinished one, and a new operation can begin.

I claim as my invention:

Electrical contact socket for receiving a cylindrical insertable rod comprising a cylindrical bar, and a plurality of tongues each having a free end and a base end and being integral with the bar at the base end of each tongue and separated by longitudinal slits, the tongues being arranged adjacent each other in an annular arrangement and each tongue bulging slightly outwardly at the base in a radial direction as a curved portion and projecting slightly inwardly to a point just beyond the bulge and then sloping in a gradual direction to the free end of each tongue, each slit being approximately elongated V-shaped with the apex of the V at the free ends of two adjacent tongues and the open part of the V at the base end of two adjacent tongues formed by the two adjacent tongues bulging slightly outwardly and then inwardly, and said tongues each having a spring action at its free end due to the bulge at the base and the inwardly directed free end of the tongue to resiliently grip the rod by means of the free ends of the tongues.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
340,065	Stupakoff	Apr. 13, 1886
969,787	Leppert	Sept. 13, 1910
1,104,720	Turner	July 21, 1914
1,900,099	Ferguson	Mar. 7, 1933
1,973,890	Tormyn et al.	Sept. 18, 1934
2,007,848	Cromartie	July 9, 1935
2,339,146	Carlisle et al.	Jan. 11, 1944
2,366,269	Lawson	Jan. 2, 1945
2,415,404	Baller	Feb. 11, 1947

FOREIGN PATENTS

Number	Country	Date
443,968	Germany	Oct. 9, 1925
496,636	Great Britain	Dec. 2, 1938