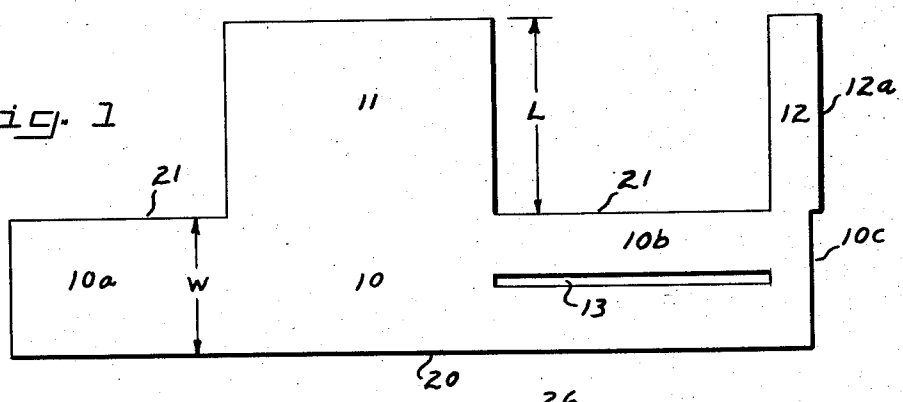
Oct. 2, 1945. D. O. HAGEDORN ET AL 2,385,915

CONNECTOR SOCKET

Filed March 20, 1944

Fig. 1



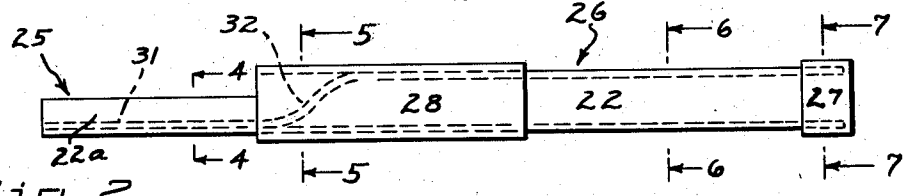


Fig. 2

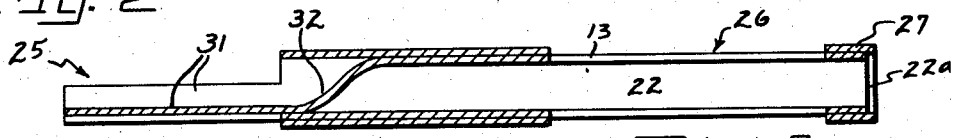


Fig. 3

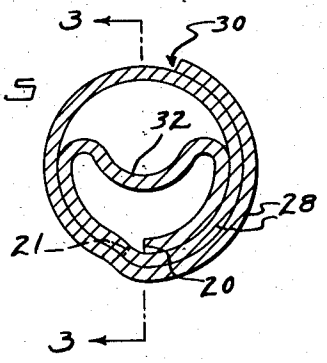


Fig. 5

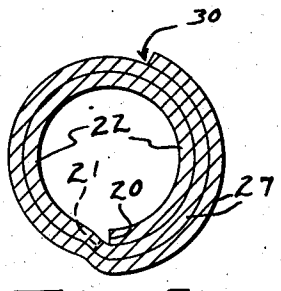


Fig. 7

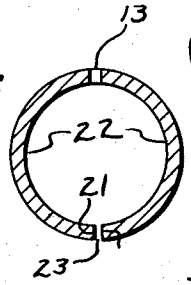


Fig. 6

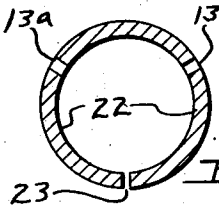


Fig. 6A

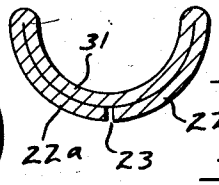


Fig. 4

Inventors
David Oakley Hagedorn
Elias Branco
By Bakewell & Townsend
Attys.

Patented Oct. 2, 1945 2,385,915

UNITED STATES PATENT OFFICE

2,385,915

CONNECTOR SOCKET

David Oakley Hagedorn and Elias Blanco,
Los Angeles, Calif.

Application March 20, 1944, Serial No. 527,257

10 Claims. (Cl. 173—363)

The general purpose of this invention is the provision of a simple, effective socket for electrical connections, and one which is economical in manufacture and highly reliable in use. The typical and illustrative form of socket which is described in the following detailed description is adapted particularly to use as one member of a wire or cable connector; but it will be understood that that form and particular use of the invention are but typical and that the invention may be put to uses other than that of forming a wire or cable terminal.

There are several different aspects of novelty in the invention, which will be best understood after consideration of the specific and illustrative embodiment which will be explained in detail. For the purpose of that detailed explanation reference is made to the accompanying drawing in which,

Fig. 1 is a plan of a typical sheet metal blank from which the socket is formed;

Fig. 2 is a side elevation of a completed socket;

Fig. 3 is a longitudinal section of a completed socket, and taken on line 3—3 of Fig. 5,

Figs. 4, 5, 6 and 7 are enlarged cross sections taken respectively on lines 4—4, 5—5, 6—6 and 7—7 of Fig. 2, and

Fig. 6*a* is a section similar to that of Fig. 6, showing a variant.

In the present preferred form of the invention the major portion of the socket consists of a tubular formation, preferably cylindric. This cylindric formation is adapted at one end to receive a standard connector pin, also preferably cylindric. The other end of the cylindric formation is formed into a solder cup for the reception and soldering of a wire or cable, when the socket is used as a wire or cable terminal or as one member of a wire or cable connector. The formation of the wire-receiving solder cup is one of the novel aspects of my invention; the cup being so formed, by formation of the wall of the tubular body, that the solder cup is entirely isolated from the pin-receiving interior of the tubular body. The solder cup formation therefore completely excludes the possibility of solder entering the pin-receiving portion of the socket and thus interfering with the proper and free reception of the pin or interfering with the making of a good electrical connection.

Another feature of the invention resides in the formation of the tubular pin-receiving body of the socket. Although it is of course possible, as will be recognized, that the tubular body portion be constructed without joints or seams (as from a piece of seamless tubing) the feature of the invention to which I am now referring resides in improved formation of the tubular body. Preferably, as will be described, that tubular body is formed by rolling a sheet metal blank into tubular, and preferably cylindric, form, with the edges of the blank preferably in substantially abutting relation along a line which extends longitudinally of the formed tube. Then, instead of securing the tubular formation by welding, soldering or some similar operation, the tubular formation is secured by an extended rolling operation which rolls about the tube one or more straps which are initially formed as integral extensions of the original blank. In a tube which is formed in that manner, the wound straps perform the function of holding the rolled tube to its proper form and dimensions, and the slit (and/or the wound straps) give to the tube a certain amount of resilient diametral expansibility which assures good contact with a connector pin.

The foregoing and other and further detailed aspects of the invention will be now more fully understood from the following specific description of the particular illustrative embodiment of the invention which is preferred for practical use.

In the drawing the original sheet metal blank is shown in Fig. 1, comprising, in this case, a rectangular body portion 10 and two straps 11 and 12 which extend laterally from one of the longitudinal edges of body 10. In the form here shown, one of the straps 12, is located at or near one end of blank body 10; and the other strap 11 is spaced from strap 12 and located between the two ends of body 10. An end portion, 10*a*, of body 10 extends (to the left in the drawing) beyond strap 11. And the portion 10*b* of the body, lying between straps 11 and 12, is here shown as provided with a longitudinal slit 13, for purposes which will appear. The length of blank body 10 corresponds to the length of the finished socket including the solder cup, as will appear; and the transverse width dimension W of the blank body corresponds generally to the circumferential dimension of the formed socket. The length dimensions L of the straps 11 and 12 is preferably substantially greater than the dimension W, for purposes which will also appear.

Starting with such a blank as is shown in Fig. 1, the blank is rolled about a longitudinal axis, using blank edge 20 as the starting edge. The rolling is preferably done at such a diameter that the resulting cylinder which is formed from body

10 has a circumference substantially equal to the dimension W and the starting edge 20 is preferably substantially abutted by the following edge 21 of the blank. This operation and formation is shown in Figs. 6 and 7, the resulting cylinder being designated 22, and the edges 20 and 21 shown in substantially abutting relation. When the blank is rolled in the manner just described, a longitudinal slit 23 is formed at the abutting edges throughout those portions of the body which correspond to the blank body portions 10*a* and 10*b*, and which body portions are designated generally in Figs. 1 and 2 by numerals 25 and 26. It is however within the purview of the invention that edges 20 and 21 may either be more widely separated than is shown, or that they may overlap. The substantially abutting relation is however preferred.

As the result of the foregoing described first portion of the rolling operation, a simple cylinder is formed of blank body 10, with straps 11 and 12 still, at that point in the operation, projecting tangentially. The rolling is then continued, with the result that the straps are rolled in spiral formation about the cylinder body, in such a formation as is shown in Fig. 7. The section of Fig. 7 is specifically taken at the indicated section line 7—7, but Fig. 7 also represents as well a section on the line indicated at 5—5, at the stage of formation which has so far been reached. It will be understood that at this stage of formation, body portion 25, which is shown in the drawing in its final form, is still in tubular or cylindric formation, such as the tubular formation shown in Fig. 6 for the body portion 26. In other words, a section taken on line 4—4 of Fig. 2 would, at this stage of formation, appear like Fig. 6.

In Fig. 7 the rolled straps (11 or 12), are designated by the numeral 27. As illustrated, the length of the strap is sufficient that, in finally rolled form, the strap extends one complete turn about cylinder 22 and then extends on, past leading edge 20, for a substantial distance of overlap, as shown. This formation is true of both straps; and at the instant stage of formation, Fig. 7 represents the formation of the body cylinder 22 and both the wound straps 11 and 12. Fig. 5 shows the final form of the completed socket, and also shows, at 28, the wound formation of strap 11 as it appears at the instant stage of formation. The blank slot 13, appears in the formation diametrally opposite slit 23, throughout the length of body portion 26, as shown in Figs. 3 and 6.

As further referred to later, the wound straps may, or may not, be finally secured in their wound positions. If it is desired to finally secure them, they may be so secured by soldering or brazing for instance at the points indicated 30 in Figs. 5 and 7.

As before stated, in the stage of formation which has so far been described, the section of body portion 25 would now appear as shown in Fig. 6, except for the absence of slot 13; that is, body portion 25 is at the instant of simple tubular section with a slit (narrow or wide, or with an overlap) at 23. The final forming operation is that of forming the solder cup. To do that, the tubular wall opposite slit 23 is depressed and reversed in sectional curvature to form the concave solder cup wall 31 as shown in Figs. 2, 3 and 4. As here shown, the solder cup may be said to be double-walled, its inner and effective wall being the wall 31, its outer wall being formed of the wall portions 22*a* which originally formed a part of a completely tubular wall like that shown at 22 in Fig. 6. It will be noted that the effective solder cup wall 31 is imperforate because the portion of the cylindric wall which contains the slit 23 has not been utilized for forming the direct solder cup wall.

By forming the solder cup in the manner explained (instead of for instance, forming it merely by cutting away a portion of the complete cylinder to form a cup) a closure wall is also formed at 32, that wall portion forming a continuous wall connection between the concave cup wall 21 and the convex wall of cylinder 22. Wall 32 thus forms a complete closure or stop wall between the solder cup 25 and the pin-receiving interior of cylinder 22. Consequently, in soldering a wire or cable into the solder cup, it is impossible to spill any solder into the pin receiving cylinder and no care need be exercised in that matter.

The body portion designated 26 is the portion which receives the connector pin, which will properly be of a diameter to make a tight sliding fit in portion 26. The slit at 23 and slot at 13 give portion 26 a resilient expansibility to make a good contact with the pin throughout a large proportion of the interengaging surfaces. The resilient actions of the spirally wound straps 27 and 28 also give portion 26 a resilient expansibility and therefore also are conducive to good contact of wide area. And this action may be particularly effective if the end edges of the wound straps are not secured. But even if so secured, there will usually remain in the spiral windings a certain amount of resilient internal expansibility, due to the fact that the spirals will not ordinarily be wound in such close convolution contact that no resilient expansibility remains. But even though the spirally wound straps be so secured that there remains substantially no resilient expansibility in them, there is still resilient expansibility in the body portion 26 due to the presence of slit 23 and slot 13. As shown in Fig. 6*a* more than one slot 13*a* may be provided. For instance, instead of the single slot 13, two such slots 13*a* may be provided, spaced equidistantly with slit 13 around cylinder 22.

As shown in the drawing, it may be preferred to position the end strap 12 with its outer longitudinal edge 12*a* beyond the end 10*c* of blank body 10. This formation results in the wound strap 27 projecting somewhat beyond the end 22*a* of cylindric portion 22, to form a guide for the entering pin.

We claim:

1. In electric connector sockets of the type comprising the combination of a tubular pin receiving body and a conductor-receiving solder cup formed as an integral extension of the body; the improvement which comprises a solder cup having a double wall of arcuate section, the outer wall being an extension of an arcuate portion of the tubular body wall and the inner cup wall being an integral extension of the remaining arcuate portion of the tubular body wall but relatively reversed in curvature.

2. In electric connector sockets of the type comprising the combination of a tubular pin receiving body and a conductor-receiving solder cup formed as an integral extension of the body; the improvement which comprises a solder cup having a double wall of arcuate section, the outer wall being an extension of an arcuate portion of

the tubular body wall and the inner cup wall being an integral extension of the remaining arcuate portion of the tubular body wall but relatively reversed in curvature, the inner cup wall being integral with the outer cup wall and in direct contact with it.

3. An electric connector socket, comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, and the outer cup wall body wall being longitudinally slitted with a continuous slit throughout their lengths.

4. An electric connector socket comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, and the outer cup wall and body wall being longitudinally slitted with a continuous slit throughout their lengths, and a spirally wound strap extending integrally from the tubular body wall at one edge of the slit and surrounding the tubular wall.

5. An electric connector socket comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, and the outer cup wall and body wall being longitudinally slitted with a continuous slit throughout their lengths, and a spirally wound strap extending integrally from the tubular body wall at one edge of the slit and surrounding a portion of the tubular body wall adjacent its other end.

6. An electric connector socket comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, and the outer cup wall and body wall being longitudinally slitted with a continuous slit throughout their lengths, and a spirally wound strap extending integrally from the tubular body wall at one edge of the slit and surrounding a portion of the tubular body wall adjacent the cup.

7. An electric connector socket, comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, and the outer cup wall and body wall being longitudinally slitted with a continuous slit throughout their lengths, and two spirally wound straps extending integrally from the tubular body wall at one edge of the slit and, respectively, surrounding portions of the tubular wall adjacent the cup and adjacent the opposite body end.

8. An electric connector socket, comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, the outer cup wall and body wall being longitudinally slitted with a continuous slit throughout their lengths, and the body wall having at least one other longitudinally extending wall slit spaced circumferentially from the first mentioned slit.

9. An electric connector socket, comprising as one integral unit a tubular body and a semi-tubular conductor-receiving solder cup extending from one end of the tubular body, the cup being of arcuate cross-section and double-walled, the outer and inner cup walls being integral with each other and with the body wall, and the outer cup wall and body wall being longitudinally slitted with a continuous slit throughout their lengths, and two spirally wound straps extending integrally from the tubular body wall at one edge of the slit and respectively, surrounding portions of the tubular wall adjacent the cup and adjacent the opposite body end, and the body wall having another wall slit extending longitudinally between the two wall-surrounding straps and spaced circumferentially from the first mentioned slit.

10. In electric connector sockets of the type comprising a tubular pin-receiving body, the improvement which comprises that the tubular body wall has a longitudinal slit extending throughout its length, and two spirally wound straps extending integrally from the tubular body wall at one edge of the slit and, respectively, surrounding portions of the tubular wall adjacent the two body ends, and the body having also at least one other longitudinal wall slit extending between the two wall-surrounding straps and circumferentially spaced from the first mentioned slit.

DAVID OAKLEY HAGEDORN.
ELIAS BLANCO.