March 10, 1959 R. W. BONNET ET AL 2,877,443

SEPARABLE CONNECTOR CLAMP

Filed Jan. 18, 1954

Fig-1

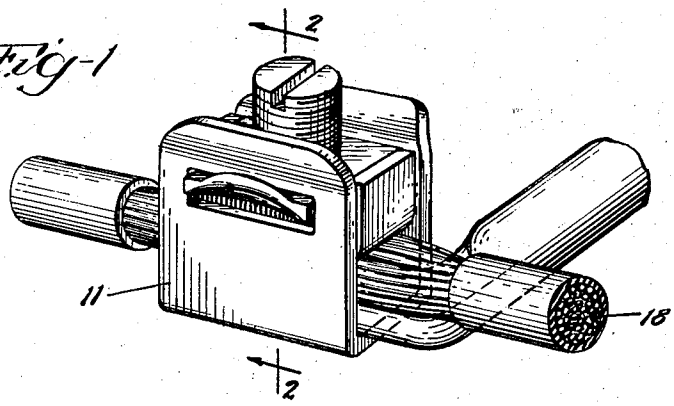


Fig-2

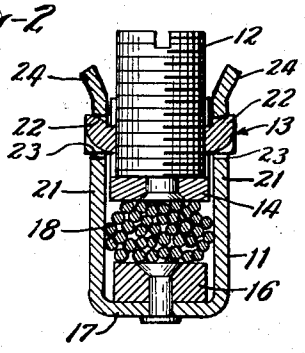


Fig-3

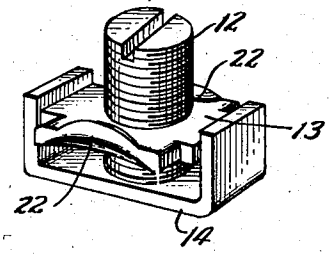


Fig-4

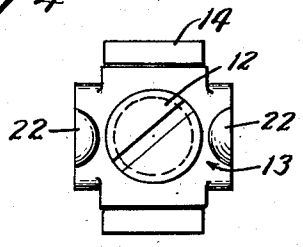
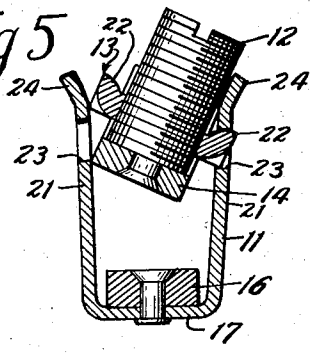


Fig 5



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SEPARABLE CONNECTOR CLAMP

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6 Claims. (Cl. 339—272)

There are many instances in the electrical industry in which connecting clamps are desirable for connecting two conductors. Sometimes the conductors are of such nature that the end of one may be slipped into the connecting clamp end first. The connecting clamp of the present invention, however, is especially suitable when the conductor cannot be inserted in that manner. For example, the conductor may have no end conveniently located. This might be the case, for example, when a service conductor supplies current to several meters, and a connection is to be made to this conductor in each of the meter cases through which it passes. Also, a conductor might be too stiff to be thrust into a connector end first where the space limitations are such that the conductor would have to be bent rather sharply for this purpose. In many such instances, it is desirable to have a separable connector, so that a part of the connector can be removed and the conductor can then be laid into the connector. For many purposes, it is desired that the connector be in the form of a clamp, so that the conductor can be firmly clamped when the connector is tightened.

There have in the past been many forms of separable connector clamps in existence or proposed. Compared to those of the past, the connector clamps made in accordance with the present invention combine to an unusual degree simplicity of assembly, dependability of high pressure clamping, and economy of manufacture.

Additional objects and advantages will be apparent from the following description and from the drawings.

Designation of figures

Fig. 1 is a perspective view showing the form of invention chosen for illustration, clamping an intermediate point of a movable conductor to a terminal conductor to which the connector clamp is secured.

Fig. 2 is a vertical sectional view taken approximately on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the removable part of the connector clamp.

Fig. 4 is a top view of the structure shown in Fig. 3.

Fig. 5 is a view similar to Fig. 2, but showing the structure of Fig. 3 being inserted toward the position in which it is seen in Fig. 2, the sides of the main body being sprung apart by the art of insertion.

General description

Although the law requires a full and exact description of at least one form of the invention, such as that which follows, it is, of course, one purpose of a patent to cover each new inventive concept therein no matter how it may later be disguised by variations in form or additions of further improvements; and the appended claims are intended to accomplish this purpose by particularly pointing out the parts, improvements, or combinations in which the inventive concepts are found.

The connector clamp of the present invention has been illustrated as including a U-shaped main body **11**, a clamp screw **12** threaded through a cross piece or cap

13 and carrying a clamp plate **14** swiveled at the bottom of the screw **12**. A terminal **16** has been shown riveted to the base **17** of the main body **11**. A conductor **18** has been shown extending through the connector clamp and clamped by it against the terminal conductor **16**. The conductor **18** has been illustrated as a multiple-strand conductor which is normally round in overall cross section, but the pressure of the clamp flattens out the clamped portion of the conductor so that the strands assume such a position as illustrated in Fig. 2.

Separability features

By unscrewing the screw **12** to the position shown in Fig. 5, and by using a screw driver to spread apart the two legs **21** of the U-shaped main body, the cross piece **13** and the parts carried by it may be removed. To reinsert these parts, it is not even necessary to use a screw driver. One of the ears **22** may be slipped into a slot **23** in one of the legs **21** by tilting the cross piece **13**. As the cross piece is then pressed down toward its final position, it passes through the position shown in Fig. 5, at which position it is spreading the two legs **21** apart. It will be understood that the main body **11** is of a suitable resilient material, preferably phosphor bronze. As the cross piece **13** is pressed a little further, the other ear **22** will spring into its slot **23**.

Sturdiness features

In spite of the fact that the main body **11** is made of resilient material and is thin enough to be flexed by manual pressure applied to the cross piece **22** or to the screw **12**, it is highly desirable to have extremely dependable sturdiness, so that there will be no uncertainty in being able to attain a high clamping pressure on the conductor **18**.

One of the important considerations is that the two legs **21** must be dependably locked so that they will not spring out under the influence of upward pressure on the cross piece **13** as the screw **12** is screwed down. The simplest and most desirable method of accomplishing this interlock has been found to be merely a matter of shaping the ears **22** so that their upper surfaces slope inwardly and downwardly as clearly seen in Fig. 2. Even with the legs **21** thus firmly locked against spreading, there remains the problem of being sure that the cross piece **13** will not tear loose by tearing or excessively deforming the metal of the sides or legs **21** above the slots **23**. It has been found possible to accomplish this by the cooperation of several features:

One of the most important features is that the metal of legs **21** beyond the slots **23** lie in the plane which most effectively resists the pull of the ears **22** on this metal. Accordingly, it will be seen from Fig. 2 that a substantial length of metal above the slots **23** is, on each leg **21**, in the plane perpendicular to the base **17**, or in other words in the plane of the direction of the pull on ears **22**. Beyond the area in question, the legs **21** are flared outwardly as at **24**, so as to facilitate the insertion of the cross piece.

It is also important that the ears **22** avoid bearing on the legs **21** at the corners of the slots **23**. To this end it is desirable that the ears **22** be relieved somewhat in the vicinity of these corners. Accordingly to the preferred form of the present invention, this is accomplished by crowning the ears **22**, so that they are higher at their center area than at the sides, and hence the upper face slopes to the full extent only in the central area. It has been found practical and economical to shape the cross piece **13** to the desired shape by a coining operation. Preferably it is made of cold rolled steel. The coining preferably leaves the corners of the ears unaltered.

A further feature contributing toward the necessary

sturdiness is to avoid a sharp corner at the upper corners of the slots 23. In fact, all four corners of the slots are preferably provided with a slight radius, a radius of 1/64 inch having been found adequate.

Another dimension which may be mentioned as having been found satisfactory is the height of the flat part of legs 21 above slots 23. A height of .075 inch has been found to be sufficient where the material thickness was .050 inch, the horizontal length of slot .437 inch, and the width of the legs 3/4 inch. Of course all dimensions are subject to variation.

By this combination of features, the connector clamp of this invention has been found to be thoroughly dependable in permitting adequately firm clamping of the conductor, in spite of the fact that the main U-shaped body 11 is sufficiently flexible so that the separable parts can be sprung into place manually without undue effort. The ears 22 automatically center the separable parts within the main body, the downwardly and inwardly sloping central portions of the upper faces of ears 22 accomplishing the locking of the legs without the necessity of projecting more than slightly beyond the outer faces of the legs. The swivelled clamp member 14 avoids any danger of cutting through the conductor as the clamp screw 12 is tightened down.

I claim:

1. A separable connector clamp including a cross piece having oppositely disposed ears thereon and having a screw threaded therethrough, a clamp piece swivelled on the lower end of the screw and a U-shaped resilient member having a base and two legs extending upwardly therefrom, said legs each having a slot near the upper end thereof for receiving an ear of the cross piece; the resiliency of the U-shaped member permitting the cross piece to be sprung into place with its ears moving successively into the slots, the upper faces of the ears extending higher outwardly of the legs than at the inner faces of the legs to lock the legs on the ears when an upward force is exerted on the cross piece by screwing the screw downwardly to clamp a conductor within the clamp, the portions of the legs immediately above the slots lying substantially in vertical planes through a distance greater than the thickness of the legs to resist the upward thrust of the cross piece thereon, each of the ears having a relatively raised arcuate portion on its upper face positioned to engage the upper edge of the cooperating slot along an intermediate portion thereon to avoid placing the full load in shearing action on the metal adjacent the corner of the slot, and corners of the slots being rounded.

2. A separable connector clamp including a cross piece having oppositely disposed ears thereon and having a screw threaded therethrough and a U-shaped resilient member having a base and two legs extending upwardly therefrom, said legs each having a slot near the upper end thereof for receiving an ear of the cross piece; the resiliency of the U-shaped member permitting the cross piece to be sprung into place with its ears moving successively into the slots, the upper faces of the ears moving successively into the slots, the upper faces of the ears extending higher outwardly of the legs than at the inner faces of the legs to lock the legs on the ears when an upward force is exerted on the cross piece by screwing the screw downwardly to clamp a conductor within the clamp, the portions of the legs immediately above the slots lying substantially in vertical planes through a distance greater than the thickness of the legs to resist the upward thrust of the cross piece thereon, each of the ears having a relatively raised arcuate portion on its upper face positioned to engage the upper edge of the cooperating slot along an intermediate portion thereon to avoid placing the full load in shearing action on the metal adjacent the corner of the slot.

3. A separable connector clamp including a cross piece having oppositely disposed ears thereon and having a screw threaded therethrough and a U-shaped resilient member having a base and two legs extending upwardly therefrom, said legs each having a slot near the upper end thereof for receiving an ear of the cross piece; the resiliency of the U-shaped member permitting the cross piece to be sprung into place with its ears moving successively into the slots, the upper faces of the ears extending higher outwardly of the legs than at the inner faces of the legs to lock the legs on the ears when an upward force is exerted on the cross piece by screwing the screw downwardly to clamp a conductor within the clamp, and each of the ears having a relatively raised arcuate portion on its upper face positioned to engage the upper edge of the cooperating slot along an intermediate portion thereon to avoid placing the full load in shearing action on the metal adjacent the corner of the slot.

4. A separable connector clamp including a cross piece having oppositely disposed ears thereon and having a screw threaded therethrough, a clamp piece swivelled on the lower end of the screw and a U-shaped resilient member having a base and two legs extending upwardly therefrom, said legs each having a slot near the upper and thereof for receiving an ear of the cross piece; the dimension of the slot crosswise of the leg being only slightly greater than the corresponding dimension of the ear; the resiliency of the U-shaped member permitting the cross piece to be sprung into place with its ears moving successively into the slots, the upper faces of the ears extending higher outwardly of the legs than at the inner edges of the legs to lock the legs on the ears when an upward force is exerted on the cross piece by screwing the screw downwardly to clamp a conductor within the clamp, the portions of the legs immediately above the slots lying substantially in vertical planes through a distance greater than the thickness of the legs to resist the upward thrust of the cross piece thereon, each of the ears having a relatively raised arcuate portion on its upper face positioned to engage the upper edge of the cooperating slot along an intermediate portion thereon to avoid placing the full load in shearing action on the metal adjacent the corner of the slot, and corners of the slots being rounded.

5. A separable connector clamp including a cross piece having oppositely disposed ears thereon and having a screw threaded therethrough and a U-shaped resilient member having a base and two legs extending upwardly therefrom, said legs each having a slot near the upper end thereof for receiving an ear of the cross piece; the dimension of the slot crosswise of the legs being only slightly greater than the corresponding dimension of the ear; the resiliency of the U-shaped member permitting the cross piece to be sprung into place with its ears moving successively into the slots, the upper faces of the ears extending higher outwardly of the legs than at the inner edges of the legs to lock the legs on the ears when an upward force is exerted on the cross piece by screwing the screw downwardly to clamp a conductor within the clamp, the portions of the legs immediately above the slots lying substantially in vertical planes through a distance greater than the thickness of the legs to resist the upward thrust of the cross piece thereon, each of the ears having a relatively raised arcuate portion on its upper face positioned to engage the upper edge of the cooperating slot along an intermediate portion thereon to avoid placing the full load in shearing action on the metal adjacent the corner of the slot.

6. A separable connector clamp including a cross piece having oppositely disposed ears thereon and having a screw threaded therethrough and a U-shaped resilient member having a base and two legs extending upwardly therefrom, said legs each having a slot near the upper end thereof for receiving an ear of the cross piece; the dimension of the slot crosswise of the leg being only slightly greater than the corresponding dimension of the ear; the resiliency of the U-shaped member permitting

the cross piece to be sprung into place with its ears moving successively into the slots, the upper faces of the ears extending higher outwardly of the legs than at the inner edges of the legs to lock the legs on the ears when an upward force is exerted on the cross piece by screwing the screw downwardly to clamp a conductor within the clamp, and each of the ears having a relatively raised arcuate portion on its upper face positioned to engage the upper edge of the cooperating slot along an intermediate portion thereon to avoid placing the full load in shearing action on the metal adjacent the corner of the slot.

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