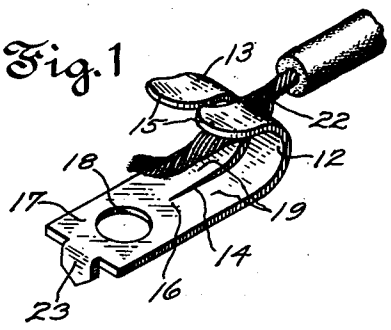
April 19, 1955 W. J. ZIEBELL 2,706,804

WIRE CONNECTION BINDING CLIP

Filed Sept. 27, 1952

Fig. 1



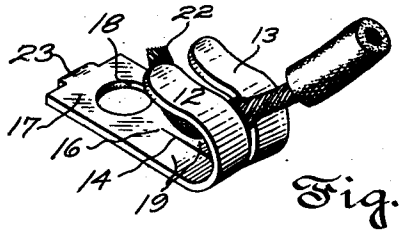
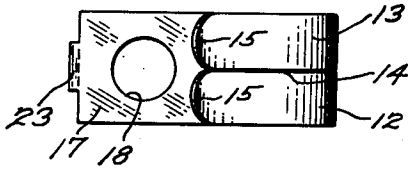


Fig. 2

Fig. 3



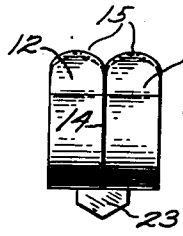
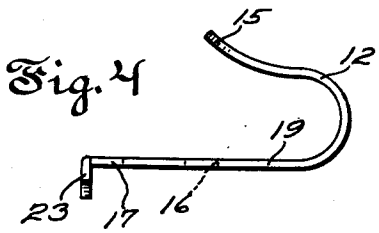


Fig. 5

Fig. 4



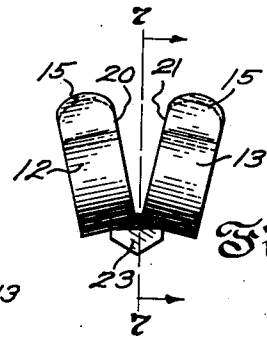
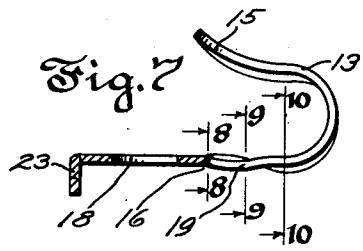


Fig. 6

Fig. 7



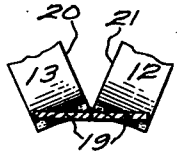


Fig. 8

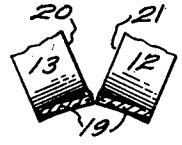


Fig. 9

Fig. 10

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WIRE CONNECTION BINDING CLIP

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3 Claims. (Cl. 339—256)

This invention relates to conductive binding clips for gripping wires to make electrical connections in a quickly detachable manner without soldering or the use of binding screws.

Spring clips have been proposed for analogous purposes heretofore but they have been space consuming, involving complex bends in complicated shapes of blanks along angularly related lines necessitating elaborate tools for their production. Some have required threading of the end of the attachable wire endwise through an "eye" or closed opening in the clip, while others have failed to grip the wire with mechanical positiveness or in a way to insure effective electrical contact.

An object of this invention is to provide a wire gripping clip of far greater simplicity and more efficiently operative in miniature sizes, than any heretofore known.

A contributary object is to make my improved clip out of a simple, continuous and preferably straight-edged strip of electrically conductive, thin, springy, sheet-metal stock bent along parallelly directed lines to such angular shape that separation of edge to edge jaw portions of such clip is yieldingly opposed by other portions of the clip that are resilient, thereby to permit an electric wire to be wedged between the edges of the jaw portions into clinging engagement therewith without causing a permanent set in the resilient portion of the clip by exceeding the elastic limits thereof.

A particular object of the present improvements is to utilize twisting distortion in a flat, leaf spring portion of the clip to yieldingly oppose the separation of the jaw edges so that only minute and temporary deformation of said leaf spring shall be caused even by relatively wide separation of the jaw edges, wherefore a very small clip is enabled to grip between its jaw edges bare electric wires of a variety of gages.

These and other aims and advantages of the present improvements will appear in greater particular from the following description of a successful embodiment of the invention wherein:

Figs. 1 and 2 are different perspective views of my improved solderless binding clip showing a stranded electric wire anchored therein.

Fig. 3 is a plan view of the clip.

Fig. 4 is a side elevation of the clip.

Fig. 5 is an end view of the clip showing its jaws normally closed together.

Fig. 6 is a view similar to Fig. 4 showing the jaws spread open to an exaggerated degree.

Fig. 7 is a view taken in section on the plane **7—7** in Fig. 6, looking in the direction of the arrows.

Figs. 8, 9 and 10 are fragmentary views taken in section respectively on the planes **8—8**, **9—9** and **10—10** in Fig. 7, looking in the direction of the arrows.

It will be apparent from Fig. 3 that a binding clip constructed according to this invention can be made from a continuous straight edged strip of thin, springy, sheet metal stock bent along parallel directed lines to the ogee shape shown in Fig. 4, and split lengthwise midway of its width so as to divide the wire receiving portion of the length of the clip into two jaws **12** and **13**, respectively, which are merely component parts of the strip. While the split **14** is herein shown to be a mere slit it can, particularly in larger sizes of the improved clip, constitute a narrow notch than opens through the wire receiving end **15** of the clip and extends to a dead end **16** at the section plane **8—8** in Fig. 7. While the jaws **12** and **13** are seen in Fig. 4 to possess a hooked or ogee curvature

they may be bent to other shapes along parallelly directed lines or they may be straight flat jaws angularly related to the mounting base portion **17** of the clip.

The mounting base **17** contains a hole **18** for a screw (not shown) which will secure the clip to any flat conductive supporting surface to form a terminal for an electric circuit. The flat portion of each side of the clip on opposite sides of the split or notch **14** constitutes a flat leaf spring **19** extending from the dead end **16** of the split or notch to the beginning of curvature or point of angular deviation of the jaw from the plane of the mounting base. The leaf spring **19**, whether it be integral and homogeneous with the metal of the rest of the clip or whether it be a specially tempered or intervening element connecting the clip jaws **12** and **13** to the mounting base **17**, is disposed in such angular relation to the jaws that each of such springs resiliently biases its own jaw edgewise toward the other jaw. Thus twisting distortion of the flat leaf spring **19** is able yieldably to oppose separation of the adjacent jaw edges **20**, **21** with but minute deformation of the leaf spring and without exceeding the elastic limit thereof when an electric wire **22** is forced between the jaw edges into clinging engagement therewith as shown in Figs. 1 and 2.

A flat leaf spring such as **19** when twisted performs its flexure diagonally as is apparent from Figs. 8, 9 and 10. Such flexure is assured of taking place crosswise of the grain of the sheet metal stock and the flexure distributes itself over a larger extent of the area of the leaf spring than would be the case with flexure along straight lines otherwise directed. The twisting nature of the distortion in the flat leaf spring enables a leaf spring **19** of given small size to accommodate a wider separation of jaws **12** and **13** than would otherwise be possible in a clip of given size without exceeding the elastic limit of the spring.

Further details of preferred practice in making my improved clip include the blunt tapering shape of the wire receiving ends **15** of the clip jaws which facilitates the entrance of a bare stranded electric wire in wedging position between the jaws edges **20** and **21**. There is also shown a bent-over ear **23** that is adapted to overlap closely the flat side surface of whatever suport the clip base **17** may be attached to by means of a holding screw (not shown) passing through hole **18** thereby to prevent swiveling of the clip about such holding screw.

In making use of my improved clip, its base **17** is secured fixedly to an electrically conductive support by means of a screw, rivet, eyelet or the like aided by the staying engagement of ear **23** with a side surface of the support. The bared end portion of an electric wire **22**, either solid or stranded, is forced between the adjacent edges **20** and **21** of the clip jaws, which normally may be in mutual contact as shown in Figs. 3, 4 and 5 and this wedges the jaws apart as shown in Figs. 1, 2 and 6 where twisting deformation is caused in and resisted by leaf springs **19** as shown in Figs. 8, 9 and 10. A single one of these two leaf springs may suffice in some styles of clip. The wire will be gripped firmly and dependably by the jaw edges yet the wire can be forcibly withdrawn without injuring the clip but only when purposely moved in a line of direction that follows the curvature of the jaws.

The appended claims are directed to and intended to cover all equivalents and substitutes for the shapes and arrangement of the component parts of the clip as fairly come within the broadest interpretation of the wording of the claims.

I claim:

1. A conductive binding clip for gripping electric wires of differing sizes in a quick detachable manner, comprising a substantially straight elongate thinnish strip of resilient metal formed permanently into a return bend having one free end and having an end portion at the opposite side of said bend comprising in part a mounting base continuous with said bend, said strip having a continuous slit opening through said free end and extending therefrom longitudinally of the strip throughout said return bend well into and along said mounting base in a manner to divide the latter into independently twistable individual

partial widths of said strip contiguous to said mounting base.

2. A conductive binding clip as defined in claim 1, in which the said end portion including said mounting base is flat.

3. A conductive binding clip as defined in claim 1, in which the said free end and the said return bend conform to an ogee curve.

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