United States Patent [19]

Frey

[11] 3,831,129

[45] Aug. 20, 1974

[54] **DEFLECTABLE JUMPER STRIP**

[75] Inventor: **William G. Frey**, Union, N.J.

[73] Assignee: **Thomas & Betts Corporation**, Elizabeth, N.J.

[22] Filed: **Sept. 14, 1973**

[21] Appl. No.: **397,243**

[52] **U.S. Cl.** ..... **339/19**, 339/242, 339/252 R

[51] **Int. Cl.** **H01r 31/08**

[58] **Field of Search** ..... 339/19, 222, 242, 22, 252; 24/81 B, 81 CC, 87 TB

[56] **References Cited**

UNITED STATES PATENTS

1,046,465	12/1912	Hoyt	339/222
3,133,778	5/1964	Seaver	339/19 X
3,562,873	2/1971	Cumber	24/81 B
3,597,722	8/1971	Walter	339/19
3,609,634	9/1971	Hovnanian et al	339/19
3,668,606	6/1972	Walter	339/19
3,728,656	4/1973	Neuber	339/19 X

Primary Examiner—Bobby R. Gay

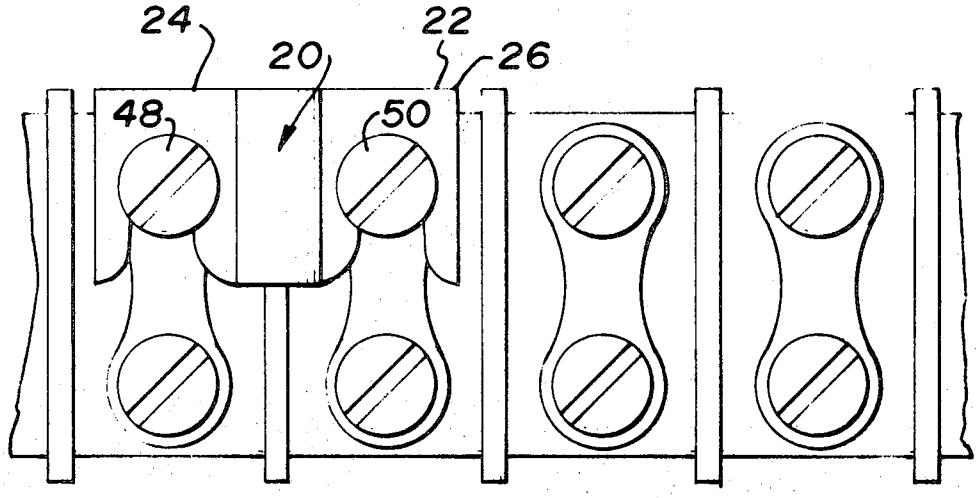
Assistant Examiner—Robert A. Hafer

Attorney, Agent, or Firm—David Teschner; Jesse Woldman

[57] **ABSTRACT**

A jumper strip for terminal blocks or the like comprises in one embodiment a pair of fastener engaging portions coupled together by a resiliently deflectable upstanding arched portion so that the spacing between the apertures may be selectively varied by exerting suitable pressure on the arched portion. The strip may be disposed over terminal screws having a center to center spacing slightly greater or smaller than the spacing between the apertures in the strip whereby upon release of the arched portion the strip is urged against the shank of the terminal screws and retained in position during the loosening and tightening of the screws. In another embodiment, a plurality of such fastener engaging portions are resiliently joined one to another in strip fashion to provide a multiple terminal shorting bar or jumper strip. The apertures are joined to a common edge of the jumper strip by a slot which may be aligned with or offset from the axis of the aperture.

3 Claims, 9 Drawing Figures



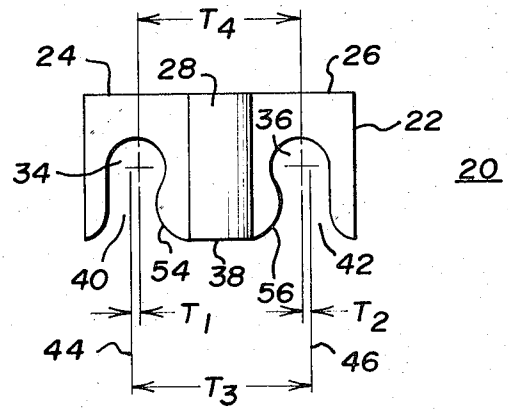


FIG. 1

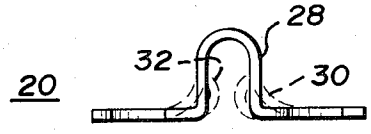


FIG. 2

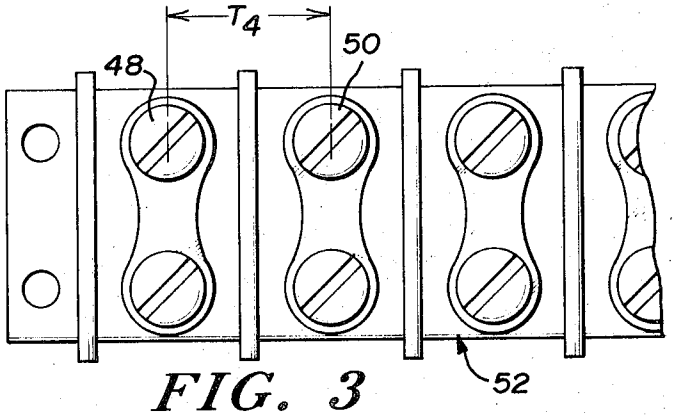


FIG. 3

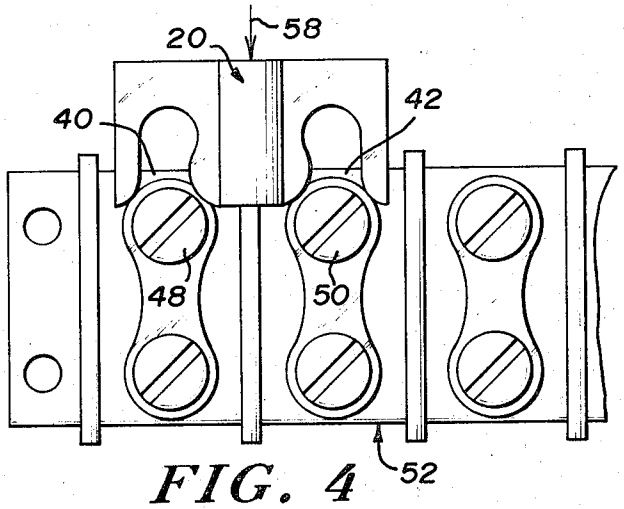


FIG. 4

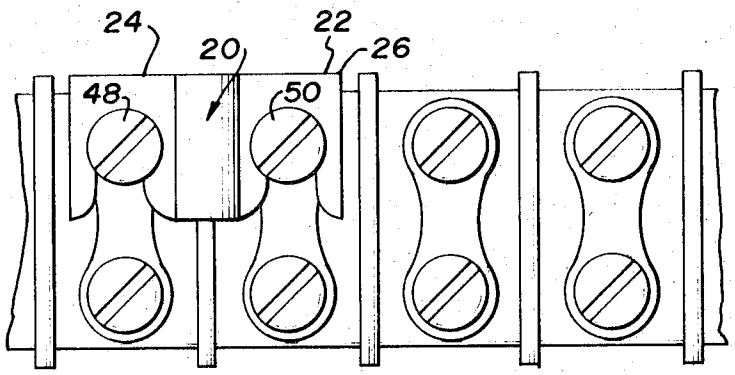


FIG. 5

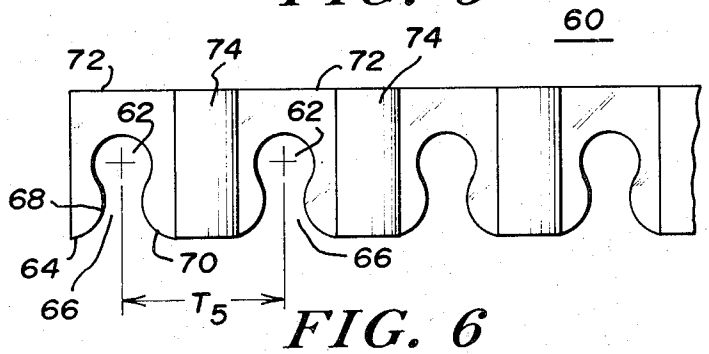


FIG. 6

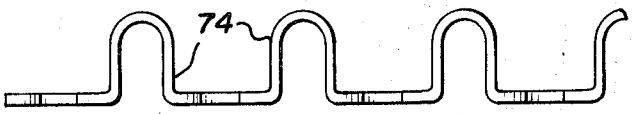


FIG. 7

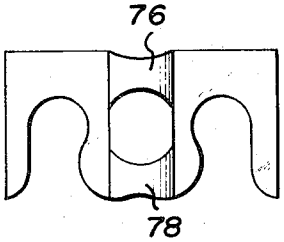


FIG. 8

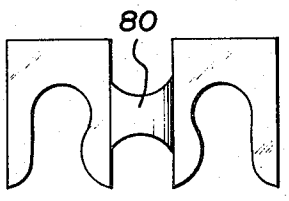


FIG. 9

DEFLECTABLE JUMPER STRIP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is directed to the field of interconnecting means for terminal blocks and the like.

2. Description of the Prior Art

In many cases it is desired to bridge two or more terminals on a terminal block or the like to provide a common electrical connection thereto. This may be accomplished either by the use of conventional wires connected to each of the desired terminals by twisting a portion thereof around each of the shanks of such terminals, or by the use of a solid shorting bar suitably apertured to correspond to the spacing between the terminals to be shorted or connected together. The former method is quite tedious and time consuming and requires the unwrapping of the wire from the terminal post to open or otherwise interrupt such connection. In the latter case, the strips must be formed with slotted apertures having a center to center spacing corresponding to the spacing between the terminals to be shorted or connected. Thus, where differently spaced terminals are employed a rather large quantity or stock of such shorting strips must be maintained to ensure the proper fit in any particular case. Additionally, when assembling such prior art strips to a terminal block or the like, the strip must be continuously supported in the desired position against the shank of the terminal screws to be connected or shorted together until the heads of the screws or threaded fasteners have been brought into sufficient contact with the strip to hold the strip in the desired position. Where such terminal block is disposed in a generally vertical plane in an electrical assembly or the like, extreme care must be exercised when loosening the terminal screws or fasteners to disengage the strip therefrom to avoid having the strip fall away from the terminal block and contact electrically energized terminals or elements adjacent thereto. Attempts to avoid this problem by supplying an unslotted aperture in the jumper strip causes additional inconvenience in that the terminal screws must be completely removed from the terminal block to provide for the assembly or disassembly of the strip to and from the terminal block.

SUMMARY OF THE INVENTION

The invention overcomes the problems and limitations noted above with respect to prior art devices by providing a deflectable jumper strip which is more reliable, convenient, efficient, and safer than such prior art devices. The strip is formed with a resiliently deflectable upstanding arched portion disposed intermediate each two apertured fastener engaging portions each having apertures spaced from one another a first given distance when the arched portion is undeflected and a second given distance when the arched portion is either compressed or expanded in response to a force applied thereto. The strip may thus be employed to bridge two or more terminals whose center to center spacing corresponds generally to the deflected spacing between the apertures in the strip by subjecting the arched portion to a suitable force to cause the slots in the jumper strip to be aligned with the shank portion of the threaded fasteners in the terminal block or the like. The strip may thus be urged against the terminals and

snapped into place wherein upon removal of the force on the arched portion of the jumper strip the strip will tend to return to its undeflected state causing the side walls of the fastener receiving apertures to bear tightly against the terminal block screws. The jumper strip is thus maintained in position throughout the tightening and loosening of such terminal block screws so that the loss or displacement of such strip is effectively and simply prevented. The slots joining the apertures in the strip to a common edge of the strip may either be aligned with the apertures or offset therefrom which, in the latter case, will tend to further lock the strip onto the terminal block or the like. The degree of force required to selectively deflect the arched portion of the jumper strip may be readily controlled by varying the height, width, and physical configuration of such arched portion thereby effectively controlling the resiliency thereof. It is therefore an object of this invention to provide an improved jumper strip.

It is a further object of this invention to provide a deflectable jumper strip for interconnecting terminals of a terminal block or the like.

It is another object of this invention to provide a self-locking jumper strip.

It is yet a further object of this invention to provide means for deflectably varying the spacing between the fastener engaging apertures of a jumper strip.

Other objects and features will be pointed out in the following description and claims and illustrated in the accompanying drawings which disclose, by way of example, the principle of the invention and the best mode contemplated for carrying it out.

BRIEF DESCRIPTION OF THE DRAWINGS

In the Drawings

FIG. 1 is a top plan view of a deflectable jumper strip constructed in accordance with the concepts of the invention.

FIG. 2 is a front elevational view of the device of FIG. 1.

FIG. 3 is a fragmentary top plan view of a terminal strip which may be employed in conjunction with the device of FIG. 1.

FIG. 4 is a fragmentary top plan view showing a method of assembling the device of FIG. 1 to the terminal strip of FIG. 3.

FIG. 5 is a fragmentary top plan view showing the device of FIG. 1 assembled to the terminal strip shown in FIG. 3.

FIG. 6 is a fragmentary top plan view showing a further embodiment of a deflectable jumper strip constructed in accordance with the concepts of the invention.

FIG. 7 is a fragmentary front elevational view of the device of FIG. 6.

FIGS. 8 and 9 are top plan views of further embodiments of a jumper strip constructed in accordance with the concepts of the invention.

Similar elements are given similar reference characters in each of the respective drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to FIGS. 1 and 2 there is shown a resiliently deflectable jumper strip 20 constructed in accordance with the concepts of the invention. For electrical applications, the strip 20 may be manufactured prefer-

ably from electrically conducting flat resilient metallic stock stamped or formed essentially in the shape shown. As illustrated, the strip **20** comprises a body member **22** comprising a pair of generally flat fastener engaging portions **24, 26** respectively, joined together by an upstanding resiliently deflectable arched portion **28**. The arched portion **28** may be deflected outwardly or inwardly as shown for example, by the dotted outlines **30** and **32**, respectively, in FIG. **2** either manually or by the use of a suitable tool (not shown). Each of the fastener engaging portions **24, 26** comprises a fastener receiving aperture **34, 36**, respectively. Joining each of the apertures **34, 36** to a common edge **38** of the strip **20** is a slot **40, 42**, respectively. In the embodiment illustrated in FIGS. **1** and **2**, the bisecting axes of the slots **40, 42** shown respectively as **44, 46**, are each offset from the center line of its associated fastener receiving aperture **34, 36** by a distance shown as T1, T2, respectively, the distance T3 between the axes of the respective slots **40, 42** being shown in this case as greater than the distance T4 between the centers of fastener receiving apertures **34, 36**. The arrangement may, of course, be reversed wherein the distance T4 between the centers of the adjacent apertures is greater than the distance T3 between the axes of the respective slots. Consequently, the strip **20** may be disposed adjacent a pair of terminals **48, 50** (See FIG. **3**) attached to a terminal block **52**, the terminals **48, 50** being disposed on centers spaced apart, for example, a distance equal to T4, and urged into engagement with the terminals **48, 50** by deflecting the arched portion **28** inwardly so that the sides thereof approach one another as shown, for example, by the dotted outline **32** whereby the axes **44, 46** defining the respective centers of the slots **40, 42** are brought into coincidence with the shanks of the terminals **48, 50** so that the terminals may be advanced freely through the slots **40, 42** and into engagement with the fastener receiving apertures **34, 36**. By releasing the arched portion **28**, the strip **20** tends to assume its original shape thereby locking the strip **20** against the terminals **48, 50**. The terminals **48, 50** may then be tightened down to more securely hold the strip **20** thereto. To disengage the strip **20** from the terminal block **52** it is then merely necessary to loosen the terminal screws **48, 50** and deflect the arched portion **28** inwardly until the slots **40, 42** coincide with the spacing between the terminals **48, 50** whereby the strip **20** may then be urged out of engagement with the terminals. As illustrated in FIG. **5**, the assembly of the strip **20** to the terminals **48, 50** provides a direct connection therebetween and due to the locking action provided enables the user to loosen each of the terminal fasteners **48, 50** to insert further conductors thereunder, if necessary or desirable, while being assured of the continued engagement of the strip **20** with the terminals **48, 50**, during this operation. The relationship between the slots **40, 42** of the strip **20** and the terminal screws **48, 50** of the terminal block **52** prior to the assembly of the strip to the board is shown more clearly in FIG. **4**. By providing a relatively large opening between the slots **40, 42** and the common edge **38** of the strip **20**, which edge **38** tapers smoothly as at **54, 56** (FIG. **1**) to the necked down portion of the slot **40, 42**, the assembly of the strip **20** to the terminals **48, 50** may be accomplished in an alternative manner, that is, by urging the strip **20** against the terminal screws **48, 50** in a direction indicated by the arrow **58** in FIG. **4** whereby the pressure of the tapered surfaces **54, 56** against the shank of the screws **48, 50** will cause the fastener engaging portions **24, 26** to be urged towards one another due to the resiliency of the arched portion **28** therebetween so that the terminal screws **48, 50** may enter the slots **40, 42** in the strip **20** and be advanced to the fastener receiving apertures **34, 36** at which time the strip **20** will tend to spring outwardly to its original state causing the strip **20** to be locked to the terminal screws **48, 50** as described hereinabove. By reversing the offset relationship between the fastener receiving apertures **34, 36** and the slots **40, 42**, that is, where the distance between the axes **44, 46** of the slots **40, 42**, respectively, is less than the distance between the centers of the fastener receiving apertures **34, 36**, the outer edges of the slots **40, 42** bear against the shank of the respective screws **48, 50** causing the fastener receiving portions **24, 26** of the strip to be deflected away from each other during assembly of the strip to the terminal block and then returned to their original state after the shank of each of the screws **48, 50** has entered its respective fastener receiving aperture.

Referring now to FIGS. **6** and **7** there is shown a further embodiment of a deflectable jumper strip **60** constructed in accordance with the concepts of the invention. The strip **60** may be of almost any length and comprises a plurality of preferably similarly dimensioned fastener receiving apertures **62** disposed in alignment along a common longitudinal axis, each of the fastener receiving apertures **62** being joined to a common edge **64** of the strip **60** by a slot **66** having smoothly tapering sides **68, 70**. Between each pair of fastener receiving apertures **62** extending transversely through their respective fastener engaging portions **72** is an upstanding resiliently deflectable arched portion **74** similar to element **28** illustrated in FIGS. **1** and **2**. In this arrangement, however, the axes of the slots **66** coincide with the centers of the respective apertures **62** which are shown separated by a distance T5. When employed in conjunction with a terminal block such as **52** illustrated in FIG. **3**, the distance T5 is arranged to be either slightly greater or slightly less than the distance T4 between the terminal screws **48, 50**. In this way, each pair of fastener receiving portions **72** may be deflected either slightly inwardly or slightly outwardly, depending upon the particular dimension of T5, to cause the slots **66** to coincide with the respective shanks of the terminal screws **48, 50**, and the strip thereafter urged against such terminal screws until their shanks are seated within the apertures **62** of the strip **60**. The strip **60** will then tend to return to its original undeflected state urging the side walls of the apertures **62** against the shanks of the respective terminal screws **48, 50** to lock the strip in position thereat. The strip **60** may thus be employed to interconnect three or more adjacent terminals to one another in a manner similar to that set forth above with respect to the embodiment illustrated in FIGS. **1** and **2**. Since many terminal blocks now in common use are generally constructed with relatively standard center to center terminal spacings, the fabrication of a strip such as **60** with suitably spaced apertures becomes a simple matter of determination to provide the locking action described hereinabove. The strip **60** may be further modified wherein given sets of apertures **62** are spaced on centers equivalent to the spacing T4 between terminal screws such as **48, 50**, and other sets of apertures **62** on the strip **60** are spaced on

centers different than the spacing T4 between the terminal screws **48, 50** where it may be necessary or desirable to reduce the force required to assemble the strip to the terminal block. It has been found that a variation in the spacing between the fastener receiving apertures **62** and the spacing between the terminal screws **48, 50** in the order of from ten to twenty thousandths of an inch is generally sufficient to provide the necessary locking action.

Referring now to FIGS. **8** and **9**, the deflectable upstanding arched portion **28** and **74** illustrated respectively in FIGS. **1** and **6** may be modified to provide, for example, two spaced arched portions such as **76, 78** illustrated in FIG. **8**, or a relatively narrow arched portion **80** spanning less than the full width of the jumper strip. Additionally, although the arched portions described heretofore have been shown as integral with the remainder of the jumper strip, such portions may be fabricated independently of the remainder of the jumper strip, and of different material where, for example, greater resiliency is desired, and such arched portion fastened to the fastener engaging portions by soldering, welding, brazing, or the like, to provide the necessary integrity therebetween.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A deflectable jumper strip comprising: a body member formed from generally flat, resilient metallic stock, said body member having a pair of generally flat fastener engaging portions lying in a common first plane and coupled together by at least one resiliently deflectable upstanding arched portion having sides extending generally parallel to a second plane which is disposed substantially perpendicular to said first plane, said arched portion being disposed intermediate said fastener engaging portions, there being an aperture extending transversely through each of said fastener engaging portions, said apertures having centers spaced a first given distance from one another when said arched portion is in an undeflected state, and a second given distance from one another when said arched portion is selectively deflected, there being a slot joining each of said apertures with a common edge of said jumper strip, the axis bisecting each of said slots and lying in said first plane being selectively offset from an axis parallel to said slot bisecting axis and passing through the center of a corresponding one of said body member apertures and lying in said first plane so that by selectively deflecting said body member arched portion, said slots may be aligned with and cooperatively coupled to terminals disposed on centers spaced from one another a distance generally equivalent to said first given distance, wherein upon the release of said arched portion, said apertures are caused to be aligned with and cooperatively coupled to such terminals, said slots thereby restricting the removal of said jumper strip from such terminals prior to redeflection of said arched portion.

2. A deflectable jumper strip as defined in claim **1** wherein the center to center distance between said aperture is less than the center to center distance between said corresponding slots.

3. A deflectable jumper strip as defined in claim **1** wherein said fastener engaging portions are coupled together by two of said arched portions.

* * * * *