Oct. 24, 1950 E. F. HUBACKER 2,526,869

TERMINAL CLIP

Filed Dec. 7, 1948

Fig. 1

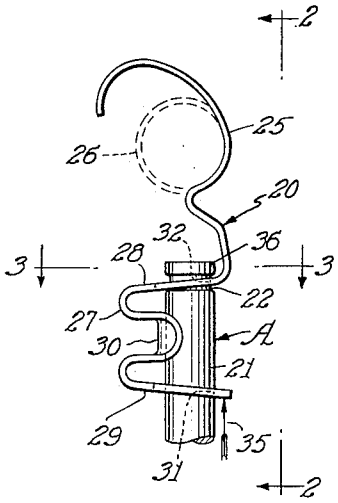


Fig. 2

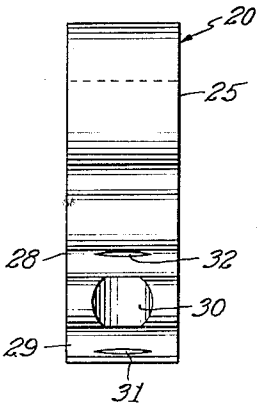
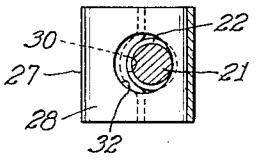


Fig. 3



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TERMINAL CLIP

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5 Claims. (Cl. 173—269)

1

This invention relates in general to electrical terminal clips and is concerned with terminal clips particularly characterized as being of the snap-off and snap-on type.

Heretofore, in prior art terminal clips of this general class, difficulties have been encountered in obtaining a clip which will effectively provide a tight contact without objectionable arcing after repeated removal from and replacement of the clip to the terminal. Moreover, the prior art terminal clips have been deficient in not providing a tight contact where the factor of vibrations of adjacent elements is introduced.

It is recognized that in the prior art numerous attempts have been made to provide a terminal clip of this general class, but to the best of the applicant's knowledge, only very few of the prior art structures have had limited successful application and have been accorded only limited commercial recognition. It is believed that this fact results from the deficiencies of the prior art structures, and their non-adaptability to effectively overcome the difficulties hereinbefore set forth.

The present improvement in terminal clips is directed to simplify the structural features thereof and their mode of operation while providing for an effective electrical contact between the clip and its related terminal which will overcome the deficiencies presently found in prior art structures.

It is, therefore, a particular object and accomplishment of this invention to provide a terminal clip arranged for operations entailing the snapping on and snapping off of the clip from its related terminal while providing an effective electrical contact even after repeated operations of this character.

Another object and accomplishment of the invention is to provide a terminal clip of the character contemplated herein having structural features effecting a locked-up arrangement between the clip and its related terminal, thereby to withstand factors of vibration which normally have heretofore caused the prior art clips to loosen their contact.

The invention seeks, as a further object and accomplishment, to provide a terminal clip as contemplated herein and characterized by an arrangement of parts to more advantageously and satisfactorily perform the functions required of it and adapted to provide a compact unit which will successfully combine the factors of structural simplicity and durability, and yet be economical to manufacture.

2

Additional objects, features and advantages of the invention disclosed herein will be apparent to persons skilled in the art after the construction and operation are understood from the within description.

With these objects in view, together with others which will appear as the description proceeds, the invention resides in the novel construction, combination of parts and arrangement thereof, as illustrated in the drawing, and which will be more fully described hereinafter, and particularly pointed out in the appended claims, reference being had to the accompanying drawing, which forms a part of this specification, wherein:

Fig. 1 is the elevational view of a terminal clip embodying the features of the invention and shown in its operative position associated with a conventional terminal;

Fig. 2 is an elevational view of the terminal clip depicted in Fig. 1 and being taken substantially on the plane of the line 2—2 in Fig. 1; and

Fig. 3 is a sectional elevational view of the terminal clip depicted in Fig. 1 and being taken substantially on the plane of the line 3—3 in Fig. 1.

The drawing is to be understood as being more or less of a schematic character for the purpose of illustrating and disclosing a typical or preferred form of the improvements contemplated herein, and in the drawing like reference characters identify the same parts in the several views.

Referring to the drawing, particularly Fig. 1, I have illustrated the terminal clip with which the present invention is particularly concerned and designated in its entirety by the numeral 20, as being adjunctively employed, for example, to a conventional terminal designated in its entirety by the letter A.

A conventional terminal as at A may comprise a projecting stud member 21 having adjacent its end portions an annular groove 22, said projecting stud member 21 normally being connected by any suitable means to a plate means (not shown) or any other similar means which, in some cases, may support one or more terminals as at A.

Suffice it to say, since the invention is not particularly concerned with the precise construction of the terminal as at A and/or its associated parts, they will not be further described in detail, and it is deemed sufficient for all intentions and purposes herein contained to show only portions thereof adjacent to and cooperating with the terminal clip contemplated herein. It is to be understood that details of construction of such terminals as at A and their associated parts may be

modified to suit particular conditions, and I do not wish to be limited to the construction of these elements as set forth, except where such construction particularly concerns the invention contemplated herein.

Having thus described, by way of example, a possible adaptation of the terminal clip, and having described the general environment surrounding the adaptation, the specific construction and cooperating functions of the parts of said terminal clip with which the present invention is particularly concerned, will now be described in detail.

In the exemplary embodiment of the invention depicted in Fig. 1, the terminal clip **20** with which the present invention is particularly concerned comprises, in general, an electrical wire gripping portion **25** first formed in an open convolution as illustrated in full lines and arranged to receive and grip end portions of a suitable electric wire upon the deformation of this portion to assume the position as shown in dotted lines at at **26**, and a terminal contacting and locking portion **27** formed integral with the electrical wire gripping portion **25** to define convolutions providing two legs **28** and **29** and a central terminal contacting means, the leg **29** being provided with an aperture **31** arranged to receive and be in intimate contact with portions of the stud member **21**, and the leg **28** being provided with an aperture **32** arranged to receive and be in intimate contact with portions of the stud member **21** particularly the annular groove **22**, thereby to effect a locking action of the clip to the terminal by the cooperative effort and relative disposition of the aperture **32** disposed in the leg **28**, the annular groove **22**, the central contact means **30** and the aperture **31** disposed in the leg **29**. It will be noted that the central terminal contacting means **20** takes the particular form shown in Fig. 1 wherein it is apparent that in addition to the reverse bend this portion of the strip is also arcuately deformed in the direction of its thickness to define the concave seat which comprises the central contacting means. This seat engages the stud member A in frictional surface to surface contact so that the region **30** hugs the side of the stud as clearly shown in Fig. 3. An arrangement of this character provides a smooth and generally cylindrical surface for contact with the stud over a considerable area thereof.

In order to remove the terminal clip from its operative position as illustrated in Fig. 1, the extreme end portions of the leg **29** are caused to move upward slightly in the direction of the arrow **35** which will change the relative disposition of the aperture **32** with respect to the central contact means **30** which will relieve the wedging action facilitated by the normal angular disposition of the leg **29** cooperating with the disposition of and the contact arrangement between the central portion **30** and the stud member **21**, thereby to permit slight movement to the right of portions of the leg **28** so that the part of the aperture **31** in contact with the annular groove **22** may be moved out and over the head portion **36** of the stud member **21**. This final action will conclude all wedging action caused by the cooperative effort of the various parts as hereinbefore described and the balance of the clip may be conveniently and easily withdrawn from the stud.

Replacement of the terminal clip to its operative position is advantageously accomplished by inserting the stud into the aperture **32** of the leg **29** and cause the clip to be moved downwardly until portions of the leg **28** will be in contact with end portions of the stud **21**. The final action of bending slightly to the right of portions of the leg **28** to cause the aperture **31** to slip over the head **36** of the stud **21** and assume its position in intimate contact with the annular groove **22** will reinstate the cooperative effort of the various parts to wedgingly contact the stud member **21**.

Although I have illustrated the terminal clip as at A as having an annular groove **22**, the terminal clip disclosed herein may be employed to equal advantage with plane terminals without the annular groove. In this connection the spring-like action of the legs **28** and **29** to assume their angular disposition will cause the necessary wedging action to effectively lock the clip to the terminal in its operative position as hereinbefore described.

From the foregoing disclosure it may be observed that I have provided a terminal clip which efficiently fulfills the objects thereof as hereinbefore set forth and which provides numerous advantages which may be summarized as follows:

1. Structurally simple, efficient and durable;

2. Economical to manufacture and readily adaptable to mass production manufacturing principles; and

3. The provision of a terminal clip arranged for operations entailing the snapping on and snapping off of the clip from its related terminal while providing an effective electrical contact even after repeated operations of this character.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but wish to avail myself of all changes within the scope of the appended claims.

I claim:

1. A terminal clip formed of a single elongate blank to define a wire gripping portion and a terminal contacting portion pendent from said gripping portion, said terminal contacting portion comprising a central terminal contacting region formed by a reverse bend arranged between angularly disposed legs, said reverse bend having therein an arcuate seat inscribed upon a radius perpendicular to the axis of said reverse bend and effecting surface contact of substantial area with a related terminal, the relative disposition of the legs and the central terminal being arranged for cooperative effort of these elements to lock the clip to the terminal, said legs being manually movable toward each other to release the locking action for removal of the clip from its related terminal.

2. An electrical clip arranged to be removably secured to a terminal, comprising an electrical wire gripping portion, and a terminal contacting and locking portion defined by a plurality of reverse bends in an elongate strip providing two angularly disposed legs and a pair of arms intermediate said legs and joined by one of said bends, said joining bend being deformed inwardly and providing a central terminal contacting concave seat in a plane between the legs, said legs each being apertured to receive and be in intimate contact with portions of the terminal at each side of said seat, whereby the relative disposition of the legs and the central terminal contacting means and the cooperative effort of the legs and

the central terminal contacting means effect a locking action of the clip to the terminal.

3. A clip for an electrical terminal stud comprising an elongate strip having spaced reverse bends between its ends to provide an intermediate terminal contacting portion of generally U-shape and two diverging legs spaced therefrom, each leg having therein an aperture to receive the terminal stud and being integrally connected by a reverse bend to the end of an arm of the U-shape contacting portion; said U-shape portion being defined by a reverse bend of the strip intermediate of and offset from the first-mentioned reverse bends; and an arcuate concave seat in said terminal contacting portion, the axis of which seat intersects the axis of the reverse bend which defines said intermediate contacting portion, and the curvature of said seat comprising a segmental portion of a cylinder inscribed on a radius coaxial with the terminal stud for effecting substantial surface to surface contact with said stud.

4. In combination, an electrical terminal stud having a generally cylindrical surface; and a terminal clip adapted for mounting on said stud, said clip comprising an elongate strip having three spaced reverse bends therein, the intermediate bend being deformed inwardly to define an arcuate concave seat having a curvature which is concentric with the surface of the terminal stud; the remaining two reverse bends extending in directions opposite to said intermediate bend, and the portions of the strip beyond said remaining two reverse bends defining diverging legs with apertures therein to receive said terminal stud at locations which are spaced from opposite sides of said arcuate seat.

5. A clip for an electrical terminal stud comprising an elongate strip having a first reverse bend intermediate its ends and defining a terminal contacting region of U-shape for substantial surface contact with the stud; an oppositely formed second reverse bend at each side of said first reverse bend defining diverging legs which are apertured to receive the terminal stud; said reverse bends all lying within the planes of the longitudinal side edges of the strip, whereby said terminal contacting region and said apertured legs provide three contact regions with the terminal stud.

EARL F. HUBACKER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
661,126	Heany	Nov. 6, 1900
802,736	Cook	Oct. 24, 1905
2,428,022	Harrison et al.	Sept. 30, 1947