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3,368,187

CONTACT CLIP FOR CIRCUIT TESTING

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FIG. 1

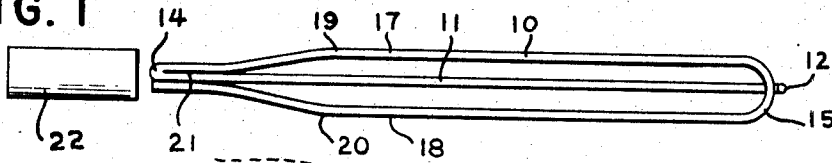


FIG. 2

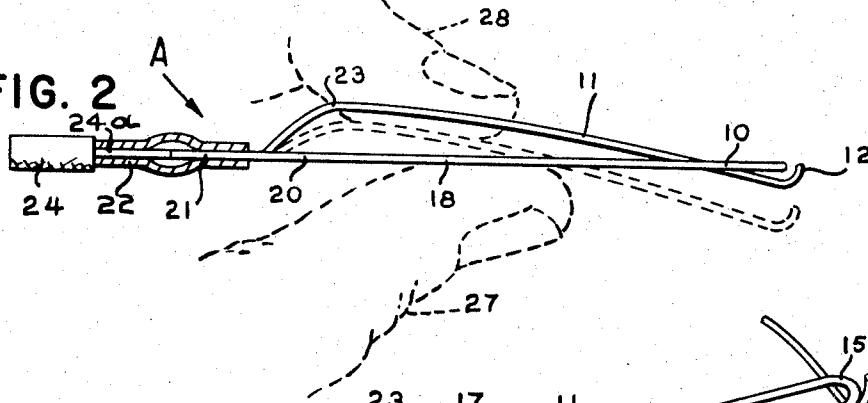


FIG. 3

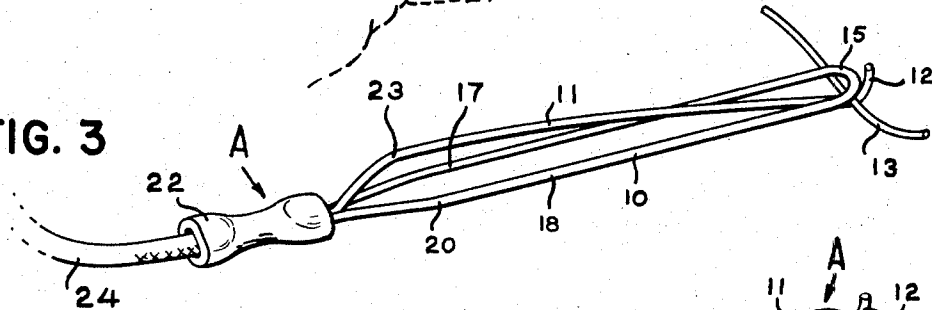


FIG. 4

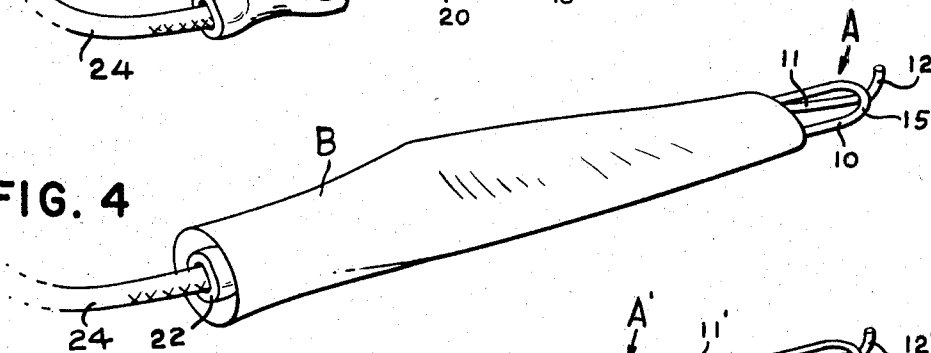
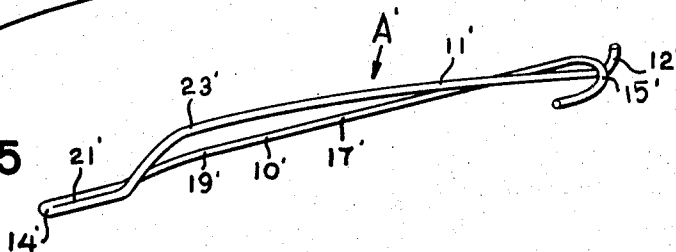


FIG. 5



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ABSTRACT OF THE DISCLOSURE

An elongated test clip for reaching deeply into electrical or electronic wired circuits is made by bending a single length of springy, electrically conductive wire so that a long, narrow loop of the wire has a single length of the wire disposed between the two sides of the loop and the free end of this single length formed into a hook which extends beyond, and engages the transverse end portion of the loop to grip a conductor wire therebetween when the clip is in its normal condition. A hump is provided on the single length of wire at a point remote from the hook end thereof, and projects upwardly beyond the loop, so that when the end of the clip thereon is inserted into wired circuitry, the hook may be separated from the transverse end of the loop by pressing the hump and the loop toward each other, thereby opening the clip to either grip or release a wire deep within the wired circuit. Insulating means are provided to cover the wires except at their gripping ends, and means are provided for connecting a test conductor to the other end of the clip.

The present invention relates to a contact clip, and pertains more particularly to a simple, inexpensive contact clip for electrical and electronic circuit test use.

In working with various electrical and electronic circuits such as those found in radios, television sets and others, a common implement employed is a spring clip having elongated, narrow electrically conductive jaws, frequently provided with teeth, and with spring means for urging the jaws toward closed condition. A well known type of such clip is known as an "alligator" clip. While useful for their intended purpose, many such clips have the jaws and also the handle portions thereof of greater width than is sometimes convenient for insertion into a position where it is desired to use them. Also, it is sometimes difficult to insulate such clips and still permit them to be manipulated.

An object of the present invention is to provide a simple, inexpensive, contact clip for electrical and electronic circuit test purposes.

Another object of the invention is to provide an electrical contact clip made of a single length of electrically conductive spring wire, folded upon itself, and bent in such a manner as to provide two jaws interacting in such a manner as to permit the clip to be fastened onto an electrical conductor.

Another object of the invention is to provide a electrical circuit test clip made of electrically conductive wire formed into two jaws, one jaw consisting of a length of wire with a terminal end portion bent upwardly toward a transversely extending portion formed at the end of a second jaw, the jaws being resiliently biased toward each other for gripping a conductor therebetween.

Another object is to make such a clip wherein one of the jaws has a hump therein intermediately of its length, so that when the humped portion of one jaw is squeezed toward the other jaw the tips of the jaws will be separated to receive a conductor therebetween.

The foregoing objects and advantages of the invention will be apparent from the following description and the accompanying drawings, wherein:

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FIG. 1 is a top plan view of a spring clip embodying the invention, and with the connector sleeve removed endwise therefrom.

FIG. 2 is a side elevational view of the clip shown in FIG. 1 as it appears when secured by its connector sleeve to a conductor wire, the broken lines showing the clip opened by squeezing it between the thumb and forefinger of the user's hand.

FIG. 3 is a perspective view of the clip shown in FIGS. 1 and 2 as it appears when gripping a conductor wire.

FIG. 4 is a view similar to FIG. 3 but without the conductor wire, and showing a length of plastic insulation sleeve material fitted thereon.

FIG. 5 is a perspective view of a modified form of the invention.

Brief description

Briefly, the illustrated form of the invention comprises a spring contact clip A preferably made from a single length of wire, and comprising an elongated loop 10 forming one jaw of the clip, and a wire portion 11 extending between the two sides of the loop 10, and forming the other jaw of the clip, the intermediate wire portion 11 terminating at its free end in an upwardly bent, hooked end portion 12. The intermediate wire portion 11 has a hump formed therein so that it can be opened as shown in dotted lines in FIG. 2 to receive a conductor 13 (FIG. 3) in gripped relation between its jaws.

Detailed description

In the form of the invention shown in FIGS. 1-4 the clip A is made from a single length of wire of suitable conductive material, such as, for example, spring bronze. This length of wire is bent sharply, reversely upon itself, at a point 14 approximating one-third of its length. The two-thirds portion of its length on one side of this reverse bend 14 is bent reversely upon itself to form the loop 10, having a curved end portion 15 and parallel, straight side portions 17 and 18. The straight side portions 17 and 18 are spaced apart a suitable distance, for example approximately six times the diameter of the wire employed, although this spacing is optional. The two side portions 17 and 18 of the loop are bent angularly inwardly toward each other at 19 and 20, respectively, and, then extend parallel, and in close, abutting, side-by-side relation with the base portion of the intermediate wire portion 11 to provide a plug portion 21 for insertion into a tubular connector sleeve 22 of electrically conductive material. The end portion of the tubular connector sleeve 22 into which the plug portion 21 is inserted is then flattened upon the plug portion 21 as shown in FIGS. 2 and 3 to lock the plug portion firmly within the connector sleeve.

The remaining approximately one-third portion of the length of the wire which forms the clip A comprises the intermediate wire portion 11. The latter is bent initially slightly upwardly at the end of the plug portion 21, and then downwardly to form the hump 23. From the hump 23 the wire portion 11 extends angularly downwardly to pass beneath the curved end portion 15 of the loop 10, where it is again bent upwardly to form the hooked end 12, which extends just beyond the curved end portion 15 of the loop 10. The intermediate wire portion 11 is biased, as by bending, so that the hooked end portion 12 tends to resiliently grip a conductor wire 24 or other work piece positioned between the two jaws formed by the loop 10 and the intermediate wire portion 11.

To connect the clip A to a conductor, such as an insulated wire 24 (FIG. 2) an end portion 24a of the conductor wire is stripped of its insulation and is inserted in the opposite end of the connector sleeve 22 from that

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which grips the plug portion 21. The opposite end portion of the connector sleeve 22 is then flattened to grip the conductor wire 24 as shown in FIGS. 2 and 3.

The operation of the clip A is best illustrated in FIGS. 2 and 3. To open the clip the latter is seized between the thumb 27 and a finger 28 of a user's hand, with one thereof positioned on the hump 23, and the other beneath the loop 10. The thumb and finger are then squeezed together, as shown in broken lines in FIG. 2, thereby opening the jaws to their dotted line position of FIG. 2. Release of the pressure permits the spring bias of the clip to urge it toward its closed position of FIGS. 1, 3 and 4.

In FIG. 4 the clip is shown enclosed in an insulative sleeve B of well known, thin, plastic sleeving of a type commonly employed for similar purposes by electricians. This insulative sleeve B increases the size of the clip very little, and permits it to be used in its normal manner shown in FIG. 2. The insulative sleeve can be slidably moved as close to the gripping end of the clip as desired, or even over the gripping end of the clip while the latter is being inserted through wires in a circuit, which wires otherwise might be accidentally shorted if touched by the conductive material of the clip itself. The narrow structure of the present clip permits the use of a small sleeve for this purpose which is not true of clips having the usual widely separated gripping handles.

In the modified form of the invention shown in FIG. 5 the clip A' is generally similar to that shown in FIGS. 1-4, the only difference being that one side of the loop 10 from a point just beyond the curved end portion 15 thereof is omitted. Otherwise the clip A' is similar to, and operates in the same manner as the clip A shown in FIGS. 1-4. This modified structure shown in FIG. 5 results in a substantial saving in the amount of wire required for making the clip, and for many uses is quite satisfactory. The various parts of FIG. 5 are designated by the same reference numerals as corresponding parts of FIGS. 1-4 with the prime (') added thereto.

The invention provides a simple, extremely inexpensive, narrow and effective contact clip for electrical test use. It also provides a clip which is well adapted to high speed, automatic production.

While we have illustrated and described a preferred embodiment of the present invention and one modified form thereof, it will be understood, however, that various changes and modifications may be made in the details thereof without departing from the scope of the invention as set forth in the appended claims.

Having thus described the invention, what we claim as new and desire to protect by Letters Patent is defined in the following claim:

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1. A contact clip for probing deeply into a wired electrical circuit for gripping and electrically contacting a selected conductor wire of the circuit comprising:

- a length of springy, electrically conductive wire,
- a sharp reverse bend formed in the length of wire at a point intermediate its ends,
- a rounded reverse bend formed substantially medially in the portion of the length of wire on one side of the sharp bend to form thereof an elongated, narrow loop,
- the portion of the length of wire on the other side of the sharp reverse bend therein extending substantially medially lengthwise of the loop, and extending slightly beyond the reversely bent portion of the length of wire forming the loop,
- a hook formed on the end portion of the medially extending portion of the length of wire remote from the sharp reverse bend,
- the portions of the length of wire on opposite sides of the sharp reverse bend being formed to bias the hook formed on the medially extending portion of the length of wire toward the rounded reverse bend in the portion of the length of wire forming loop,
- a hump formed in the medially extending portion of wire remote from the hook end thereof, said hump projecting through, and laterally beyond the loop, so that when pressure is exerted by gripping the hump and urging it toward the loop it will separate the hook from the end of the loop, and insulating means covering the loop and the medially extending wire portion with the exception of the hook and the rounded reverse bend in the loop, both of which are bare for electrical contact with a circuit wire gripped therebetween.

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