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DIP TERMINAL FOR TESTING WIRES

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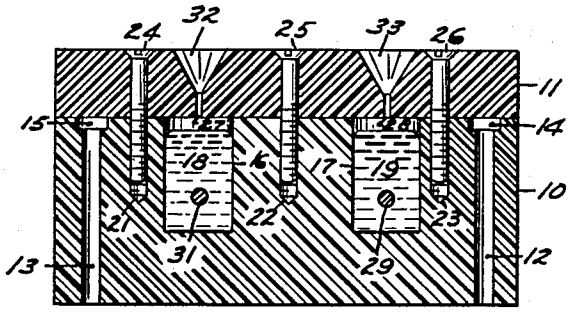


FIG. 3

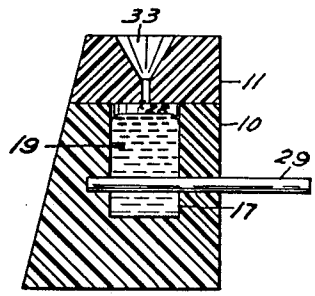


FIG. 2

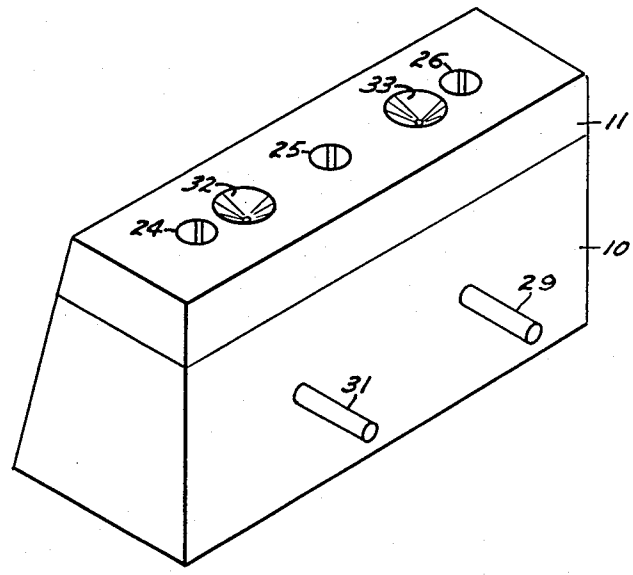


FIG. 1

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DIP TERMINAL FOR TESTING WIRES

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3 Claims. (Cl. 339—118)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates generally to testing terminals, and more particularly to a transparent dip terminal embodying mercury as a fluid electrical contact medium.

The purpose of this invention is to provide a terminal means for expediently repeating a multiplicity of electrical connections during the progress of testing, altering, modifying or matching a particular electrical component, such as a wire coil, to a preselected electrical value.

Electrical components, such as coils, must be manufactured to have a predetermined design value of inductance, flux, reactance, phase shift, etc. In the manufacturing process this design value is arrived at by cutting off portions of the coil wire until the component on test affects its design value. In the case of very fine coated wire, such as No. 22 AWG or finer, the repeated shortening, for the purpose of arriving at the preselected value, results in a tedious and time consuming series of operations especially in so far as the preparation of the wire for connection into the test circuit is concerned.

This invention provides a new way of handling this very fine coated wire during the testing operation. Such a very fine wire is usually covered with a varnish-like insulating coating which heretofore needed to be removed before connecting to a conventional terminal post. This removal of the insulation is not only a time consuming operation but is also a dangerous and damaging operation. The old method of performing the function of this invention was to remove the varnish-like insulating coating from the wire around a conventional terminal post to complete the circuit. Burning off the varnish-like insulation by means of a flame creates a fire hazard to the environs as well as a personal danger to the individual operator inadvertently reaching over the flame. Sandpapering the end of a very fine wire, such as No. 22 AWG or finer, is a very difficult operation because of its very small diametral dimension, and is otherwise inadequate for a clean removal job. Scraping the end of a very fine wire, such as No. 22 AWG or finer, with a knife edge is unsatisfactory because of the great possibility of cutting too deeply and developing weak points, particularly where the knife edge first bears down on the fine wire, thereby inducing breakage of the wire when it is wound around the terminal.

An object of this invention is to provide terminal means that allow a testing operator to make repeated electrical connections thereby without the necessity of preparing the wire for connection into a circuit.

Another object of this invention is to provide terminal means that eliminate the annoying operation of winding a fine wire around a terminal post.

A further object of this invention is to provide terminal means that allows tthe making of a multiplicity of repeating electrical connections with great expediency.

Yet another object of this invention is to provide terminal means whose electrical contact characteristics are at an optimum.

A still further object of this invention is to provide transparent dip terminal means that allows an observer to witness the penetration of an electrical lead into a fluid contact medium therein, thereby assuring electrical contact therewith.

A final object of this invention is to provide a non-spilling mercurial dip terminal thereby promoting health and safety in avoiding mercury poisoning.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

Fig. 1 shows a perspective view of a preferred embodiment of the invention.

Fig. 2 illustrates a longitudinal sectional view through the device, showing the mercury receiving chambers.

Fig. 3 is a cross-section view of the device, showing one of the mercury receiving chambers.

Referring now to the drawings, wherein like reference numerals designate like or corresponding parts throughout the several views, there is shown a block or body portion 10 having a cover portion 11. At the extreme ends of the block portion are provided bores 12 and 13, respectively, adapted to receive mounting bolts (not shown). The upper ends of said bores are counterbored as at 14 and 15 to receive said bolt heads therein, so as not to interfere with the fitting of the cover on the body.

Between said mounting bolt bores are provided recesses 16 and 17 for the containing of a non-wetting fluid electrical conducting medium, such as mercury 18 and 19, or the like, therein.

A plurality of threaded bores 21, 22 and 23, are provided in said body member to receive screws 24, 25 and 26, respectively, for securing the cover 11 to the body 10. Said cover is provided with countersunk bores, in registry with the threaded body bores 21, 22 and 23, to receive the screws 24, 25 and 26, therethrough.

A pair of funnel-like apertures, or countersunk bores, 27 and 28, are also provided in the cover, disposed to communicate with body recesses 16 and 17, respectively. The countersunk portions 32 and 33 are of a substantial diameter so as to function as a guide to conveniently direct the testing leads to the small tubular portions 27 and 28 of the funnel, and thence into the mercury.

The bores 27 and 28, in this the preferred construction, are of a very small diameter, such as to receive a No. 22 AWG wire or finer. In the event the dip terminal device, having mercury therein, should overturn, the mercury therein will not escape through the bore 32 and 33 because the capillary force due to the surface tension is greater than all the other forces tending to force the mercury out through the bore. In its broadest conception then, for any particular non-wetting conducting fluid medium used, the diameter of the bore, for a spill-proof design, shall be sufficiently small so that the sum of the forces tending to project the fluid from the tube is less than the capillary force resulting from surface tension tending to hold the liquid in the bore.

The body and cover portions are preferably made of a transparent material such as glass, Plexiglass, Lucite, or the like, to permit the observation of a wire being thrust into the mercury. However, metals, such as stainless steel, that do not contaminate the mercury with metallic oxides and other foreign matter, may also be used.

Electrical connecting bars 29 and 31 are provided extending through the front wall of the Lucite body, and through the mercury bath, and into the rear wall of the

body. The bars are snugly fit in receiving bores to prevent leakage of mercury.

Operation: In repetitious testing operations where repeated electrical connections are necessary to be made such as in impedance matching of coils, a portion of the wire coil will necessarily have to be progressively removed. With the subject dip terminal at hand, the operable end of the coated coil is merely cut with a snipper, exposing a freshly cut cross-sectional face of the coil end. The wire end, with its insulation coating untouched, is then expediently directed into the funnel tube, guided by the conical funnel-like walls, and thence into the mercury. The penetration of the wire into the mercury can be witnessed by observation through the transparent nature of the subject dip terminal.

After repeated shortenings of the coil, an indicating instrument in the test circuit (not shown) will indicate the desired impedance value. The test coil is then withdrawn from the mercury and detached from the test circuit. Another untested component is then inserted in the test circuit and the operation repeated.

The features characterizing this dip terminal are the provision of plastic body and cover which will not contaminate mercury, thereby always maintaining a low electrical resistance mercury surface; the provision of funnel-like guide means to expediently guide a wire end into the mercury chamber; a transparent structure to permit the observation of a wire being thrust into the contact mercury; the provision of an apertured cover for removably retaining a wire in a terminal during testing operations; and the embodiment of a fluid contact medium which readily flows against the fresh cross-sectional cut face of a wire without necessitating the removal of the insulation from the periphery of the wire as in the conventional method of terminal connections.

It should be understood, of course, that the foregoing disclosure relates to only a preferred embodiment of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and the scope of the invention.

What is claimed and desired to be protected by Letters Patent of the United States is:

1. A dip terminal, comprising: a body member having a recess for the containment of a fluid therein; a wetting resistant liquid electrical conducting medium having a high surface tension in said recess; a cover over said recess secured to said body, said cover being apertured by a countersunk aperture to communicate with said recess, said aperture being of a dimensional measure so

that when said body member is inverted the sum of all forces tending to project said liquid through said aperture is less than the capillary force resulting from the surface tension tending to hold the liquid in said aperture; and one terminal means electrically connected with said conducting liquid through said body member.

2. A dip terminal, comprising: a body member having a recess for the containment of a fluid therein; mercury in said recess; a cover having an aperture therein over said recess, said cover being secured to said body, said cover aperture being countersunk at the top end and of a dimensional measure so that when said body member is inverted the sum of all forces tending to project said mercury through said aperture is less than the capillary force resulting from the surface tension tending to hold said mercury in said aperture; and one terminal means electrically connected with said mercury through said body member.

3. A dip terminal, comprising: a transparent block body member having at least one recess therein for the containment of a fluid; mercury in said recess; a transparent cover over said recess removably secured to said body, said cover being apertured to communicate with said recess, and said aperture being countersunk at the top end thereof and of a dimensional measure so that when said body is inverted the sum of all forces tending to project said mercury through said aperture is less than the capillary force resulting from the surface tension tending to hold the mercury in said aperture; and a terminal bar means passing through the body member wall and into contact with said mercury.

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