Sept 10, 1957 H. S. CHURCH 2,806,203

CIRCUIT TRACER

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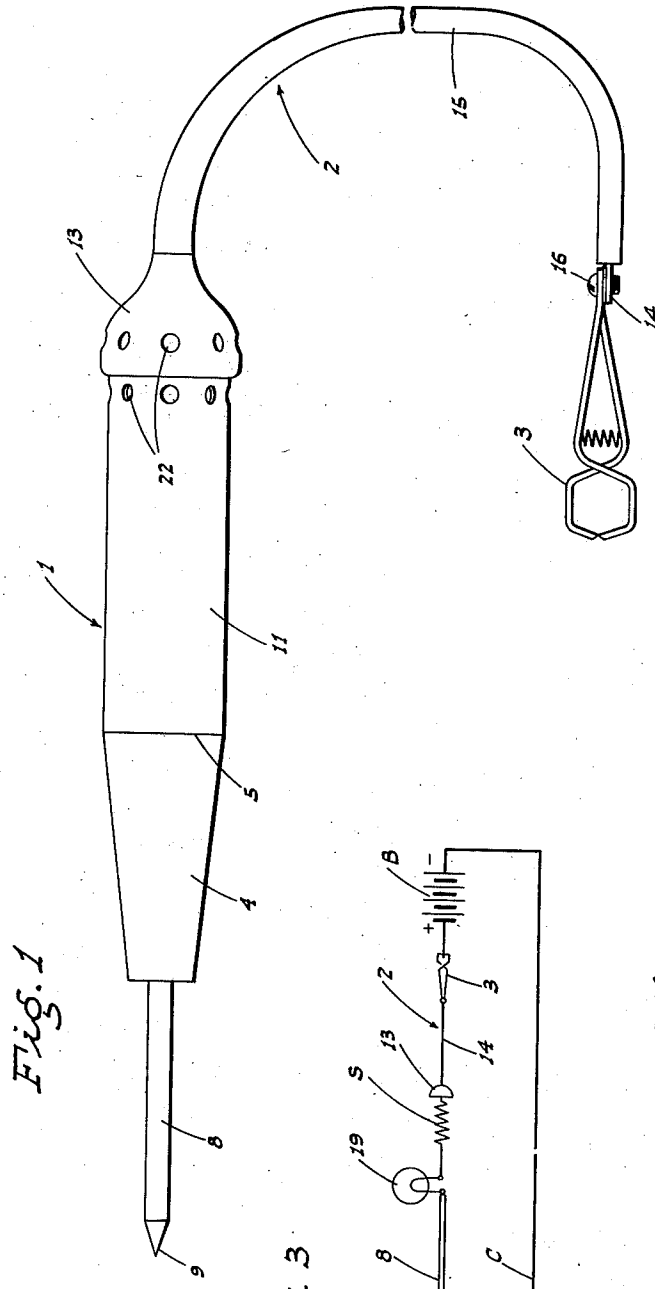


Fig. 1

Fig. 3

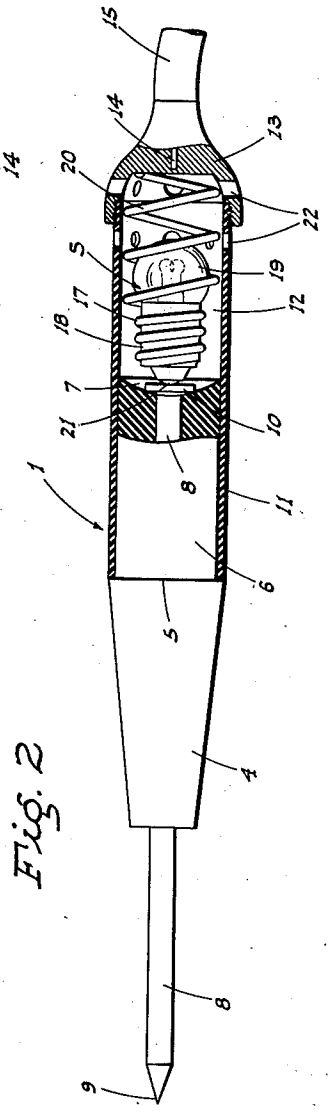


Fig. 2

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CIRCUIT TRACER

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1 Claim. (Cl. 324—51)

This invention relates to the electrical art, and is specifically directed to a simple but unique device useful in tracing the presence or lack of presence of electrical energy in wires or electrical conductors of all kinds.

The primary object of the invention is to produce a circuit tracer which will, in a simple and effective manner, visually indicate the presence or absence of electrical energy in a circuit, and also variant intensities or capacities of such circuits.

A further object of the invention is to produce such a circuit tracer in which the visual indicator is preferably an electric light bulb so mounted in the assembly that the tracer may be used on circuits of variant voltage capacity without danger of burning out the filament of the bulb; thus insuring long life of the bulb.

A still further object of the invention is to produce a tracer of the character noted and which, in addition to its function as a circuit tracer, may also be used for the purpose of passing a full flow of electric energy through a unit where needed in a test of the operative condition of such unit, or for any other purpose.

A final object of the invention is to produce a tracer made up of few parts, and one which may be cheaply manufactured and readily assembled or disassembled at will for any purpose.

These several objects are attained by the combination of parts described in the following specification and defined in the appended claims.

In the drawings:

Fig. 1 is a side elevation of the complete tracer unit including the cable (foreshortened) for connection with a source of current.

Fig. 2 is a similar view, partly in section, of the unit with the cable broken off.

Fig. 3 is a diagrammatic outline of a typical circuit established through use of the tracer.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the numeral 1 designates generally the main body of the tracer unit, while the numeral 2 indicates generally the cable leading from the unit 1 to a spring claw clamp or other connecting member 3.

The body 1 is made up of a solid element of insulating material, and preferably comprises a frustoconical portion 4 at one end and which solid portion is stepped down at the other end by a shoulder 5 to a cylindrical portion 6, which latter is cupped out at its free end, as at 7.

The numeral 8 designates an electrode which is mounted axially through the solid element 4—6 and projects some distance beyond the end of the frusto-conical portion 4 and is provided with a sharp point 9 at its outer end, and with a flanged head 10 at its other end, which head is countersunk into the cup 7.

A cylindrical sleeve 11 is fitted over the portion 6 and rests at its inner end against the shoulder 5. The outer end of this sleeve projects some distance beyond the portion 6 to form a chamber 12.

A cap 13 of non-insulating material is fitted over the

extreme outer end of the sleeve 11. A wire 14 is suitably connected with the cap 13 and extends through a flexible insulating tube 15 to a connection with the clamp 3, as at 16.

A compression spring wire coil S within the chamber 12 has one end, as at 17, wound tightly around the base 18 of a small incandescent lamp or bulb 19 so that the coil supports the bulb. From the end 17 the coil wire then circles the bulb 19 with widely spaced convolutions, as at 20, and the free end of the coil S is in contact with the cap 13. The spring action of the coil S holds the contact point 21 in engagement with the flange 10 of the electrode 8.

The sleeve 11 and cap 13 are each provided with orifices 22 near their adjacent ends. Through these orifices any light from bulb 19 may be observed.

Although not limited thereto, the tracer has been developed preferably for use in tracing and testing the various electrical circuits in motor vehicles, and as an illustration of its usefulness in that respect its mode of operation will now be described.

When the presence or absence of a flow of current through any circuit is to be tested, the user first fastens the clip 3 to a proper point in a circuit to be tested, for instance, to one side of a storage battery B. The user then grasps the insulated body 1 in his hand and touches the point of electrode 8 to such other point in the circuit to be tested as he may select. If current is flowing through the circuit it is therefore shunted through the tracer, flowing as typically illustrated in Fig. 3. In the showing of this figure it is assummed that the clip 3 is attached at some point in a circuit leading from the positive side of the battery B, and that the electrode 8 is contacted at some point in a circuit C connected with the battery.

Thus, the tracer will shunt a circuit of electrical energy which will flow from battery B, through clip 3, wire 2, cap 13, resistor spring S, filament of lamp bulb 19, electrode 8, circuit C and to ground. If the circuit is thus completed the lamp bulb 19 will be illuminated, and this illumination may be observed through orifices 22. The intensity of the light will indicate the quality or capacity of the circuit.

The spring S not only serves its function of supporting the light bulb 19 and holding its contact point against the electrode 8, but also acts as a resistor so that the tracer may be used on either circuits of six or twelve volt capacity without overloading the lamp filament; thus assuring the latter of long life. The spring also sustains the light bulb against severe shock should the tracer be dropped.

The cap 13 being uninsulated, it is possible with the use of the tracer to pass a full flow of energy through a unit where needed in a test. For instance, the clip 3 may be fastened on the live side of the coil on the starting mechanism of a motor, and by touching the cap to the battery a full flow of current may be provided for the starting of the motor.

The tracer is ideal for so-called "trouble shooting" in the shop or on the road. It can be used for locating dead spots in wires by pressing the point of the electrode 8 through the insulation of the wire and into contact with the wire. It is readily usable to locate bad switches, corroded junctions, burned out units, and various other abnormal conditions existent in various electrical equipment. It may also be used in setting the timing position on a motor which uses electricity for its ignition, and in this case the ignition switch can be in "on" or "off" position.

From the foregoing description it will be readily seen that there has been produced such a device as will sub-

stantially fulfill the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of such device, still in practice such deviations therefrom may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

In an electrical circuit tracer which includes a body having a chamber initially open at its outer end, an electrode mounted in the body and exposed at its inner end to the inner end of the chamber, and a cap removably mounted over the outer end of the chamber and having an electric cable connected thereto and in contact with the cap; an electric light bulb in the chamber between its inner end and the cap and having a base in contact with

the inner end of the electrode, and a helical compression spring having a portion of its length surrounding the base in holding contact therewith, and a relatively large-diameter portion surrounding the bulb in clearance relation and substantially fitting the wall of the adjacent portion of the chamber; said last named spring portion extending beyond the bulb and at its outer end engaging the cap.

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