

United States Patent [19]

Billin

[11] 3,752,160

[45] Aug. 14, 1973

[54] **DISPOSABLE ELECTRODE SWITCH**

[75] Inventor: **Arthur G. Billin**, Rochester, N.Y.

[73] Assignee: **Sybron Corporation**, Rochester, N.Y.

[22] Filed: **July 15, 1971**

[21] Appl. No.: **162,799**

[52] U.S. Cl. **128/303.17**, 200/61.85, 200/157,
200/DIG. 2

[51] Int. Cl. **A61b 17/36**, A61n 3/00

[58] Field of Search 200/61.85, 157, DIG. 2;
128/303.1, 303.13, 303.14, 303.17

[56] **References Cited**

UNITED STATES PATENTS

1,580,422 4/1926 Eckels et al. 200/61.85 X

2,012,937	9/1935	Beuoy	128/303.14 X
3,100,489	8/1963	Bagley	128/303.17
3,494,363	2/1970	Jackson	128/303.17 X

FOREIGN PATENTS OR APPLICATIONS

1,803,292	5/1970	Germany	128/303.17
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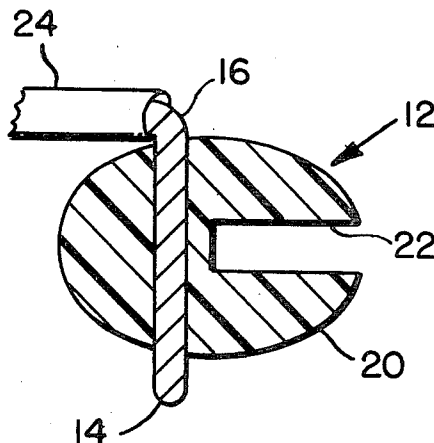
Primary Examiner—Channing L. Pace

Attorney—Theodore B. Roessel

[57] **ABSTRACT**

The invention is a disposable switch and conductor cord which clips on a forceps and connects the forceps to the working circuit of an electrosurgical device wherein any forceps made of a conducting material may be adapted for use as a cautery.

1 Claim, 3 Drawing Figures



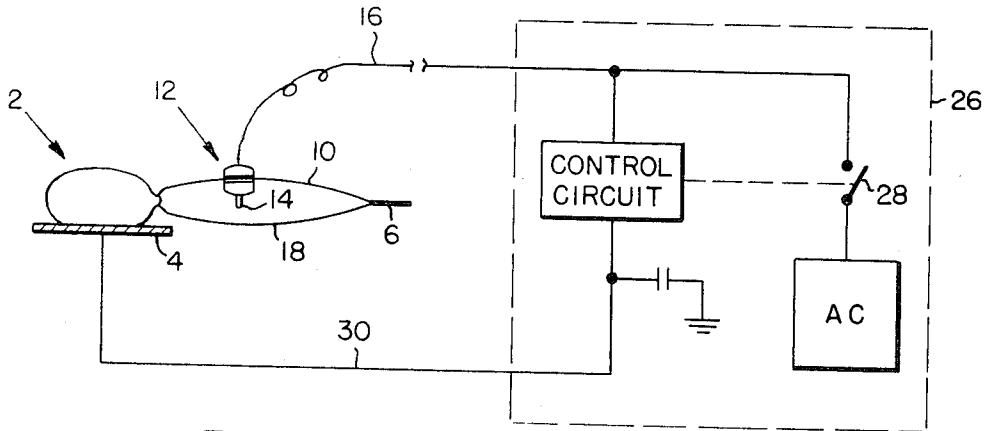


FIG 1

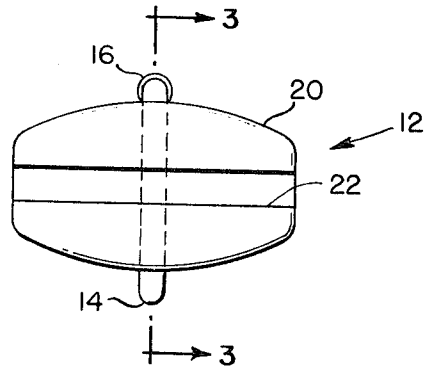


FIG 2

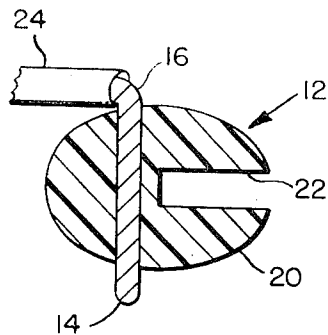


FIG 3

INVENTOR.
ARTHUR G. BILLIN

BY

Robert B. Roedel

ATTORNEY

DISPOSABLE ELECTRODE SWITCH

BACKGROUND OF THE INVENTION

The present invention relates to electrosurgical equipment and more particularly to a disposable clip-on device which may be attached to any conducting forceps to convert the forceps for use as an electrosurgical instrument.

It is a common practice during surgical procedures to seal off small bleeders by cauterizing the bleeder with the use of the coagulating current of an electrosurgical unit. When the bleeder is encountered, the usual practice is to clamp the bleeder with a hemostat and then cauterize the bleeder by touching an electrode carrying a high frequency current to the hemostat or directly to the bleeder. Switch means such as a foot switch is operated to apply power to the electrode. The drawbacks of such a system is that the operation requires three separate steps and may involve two persons; one person to hold the hemostat and the other to apply the electrode, with one of these to operate the foot switch to apply the power.

One method of making this procedure simpler is to provide a special forceps which incorporates the contacts to control the electrosurgical device through a system of relays. Such a forceps as shown, for example, in U.S. Pat. No. 3,100,489, is not entirely satisfactory because it must be especially made to incorporate two conductors; one conductor for supplying the high frequency power to perform the cauterizing and the other to supply the low voltage of the control circuit to the contacts. This makes the device relatively heavy, expensive and awkward to manipulate.

Another device, as illustrated in U.S. Pat. No. 2,827,056, uses a single conductor to carry both a high frequency current to the bleeder and a low voltage direct current used to power the control means. With the circuitry shown in this patent the electrosurgical apparatus can be made to discharge the high frequency current from the electrode into the body automatically when the electrode is touched to the body or the hemostat. However, this device still requires that two devices be used, that is, the hemostat and the discharge electrode and in all cases it may not be desired to trigger the discharge as soon as the electrode is touched to the hemostat or the body.

SUMMARY OF THE INVENTION

The present invention may be characterized by a disposable device for converting any conducting forceps into a discharge electrode of an electrosurgical device of the type wherein both the high frequency working current and the low voltage DC control current pass through a common conductor, the patient being in the control circuit. The device includes a switch terminal common to both the control and working circuits which is detachably attachable to a conducting forceps. The switch terminal is normally open and is closed upon squeezing the forceps to contact the switch terminal against a leg of the forceps.

OBJECTS OF THE INVENTION

One object of the present invention is to provide means which may be detachably attached to an ordinary metal forceps to convert said forceps to an electrosurgical discharge electrode.

Another object of the present invention is to provide a disposable lead and switch which can be clipped to one leg of a metal forceps for purposes of converting the forceps to a discharge electrode wherein the discharge occurs when the forceps are closed to contact the switch against one leg of the forceps.

A further object of the present invention is to provide an electrode discharge control means which may be readily attached to a metal forceps, wherein both the control and working current are carried by a single conductor.

These and other objects, advantages and characterizing features of the present invention will become more apparent on consideration of the following detailed description thereof considered in conjunction with the accompanying drawings depicting the same.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view showing the disposable lead and clip of the present invention attached to a forceps;

FIG. 2 is a side view of the attachable clip portion; and

FIG. 3 is a sectional view taken along lines 3—3 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, FIG. 1 shows schematically a patient generally indicated at 2 resting on a conductive patient plate 4. A lead 30 capacitively connects the patient plate to ground within an electrosurgical device 26. The hemostat or forceps member 6 is shown with its operative end 8 gripping a portion of the patient such as a bleeder which is to be cauterized. Attached to one leg 10 of the forceps is a clip-on member generally indicated at 12. This clip-on member is insulated from the body of the forceps and has a switch terminal 14 connected to a lead 16. Lead 16 is in turn connected to electrosurgical device 26 which has a circuit of the type illustrated in U.S. Pat. No. 2,827,056, wherein the single conductor 16 carries both the DC low voltage control current and the AC high voltage working current, the patient being in the control circuit. The operation of such a circuit or modification thereof is readily apparent to one skilled in the art by reference to U.S. Pat. No. 2,827,056 and it is sufficient for purposes of the present invention merely to say that in such circuit as used in the present invention touching the patient with the electrode completes a circuit for the DC control current through the patient. Completing the DC control circuit energizes a relay which closes the working circuit and supplies the AC working current to the electrode through lead 16. However, as used in the present invention lead 16 and switch terminal 14 are normally insulated from the body of the forceps so that grounding occurs only when the forceps is touched to the patient and the switch terminal is brought into contact with an opposing forcep leg 18.

Referring to FIGS. 2 and 3, the clip-on device 12 is shown to include a body member 20 made of a non-conducting slightly resilient material such as plastic or plastic coated metal. A groove 22 is formed along one edge of the body member for attaching the member in clip-on fashion to a leg of the forceps. Lead 16 which is otherwise coated with insulation 24 is imbedded in the body member during the molding or forming process.

cess in a fashion which insures that the only portion of the lead which is exposed is terminal 14.

OPERATION

In operation, lead 16 is connected to the forceps by clipping member 12 to one leg of the forceps as shown in FIG. 1. The other end of lead 16 is plugged into an appropriate electrosurgical apparatus 26 which utilizes a electrode discharge control circuit of the type shown in U.S. Pat. No. 2,827,056.

When a bleeder is encountered, slight pressure is applied to the legs of the forceps to grip the bleeder as shown in FIG. 1.

Since the legs of the forceps are slightly bowed, terminal 14 at this point is not in contact with the opposed forceps leg 18 so there is no current flow. Accordingly, the forceps may be manipulated and readjusted as desired by the surgeon until he is certain the bleeder is properly closed off. Now, further pressure may be applied to the legs of the forceps to bring terminal 14 into contact with leg 18. This completes a circuit and permits the flow of the DC control current from the electrosurgical control circuit through lead 16, terminal 14, forceps leg 18, the patient, and lead 30 back to the control circuit. Closing the control circuit results in the energization of a relay in the control circuit which closes a switch 28. Closing switch 28 closes the working circuit to supply the high frequency working current through lead 16 and the tips 8 of the forceps to cauterize the bleeder. Opening the forceps to remove terminal 14 from against the opposed forceps leg opens the control circuit and deenergizes the relay to open switch 28. When the surgical procedure is completed, the lead and clip-on member may be removed and discarded and the forceps sterilized along with the other surgical instruments.

While not specifically shown nor described, it should be understood that appropriate filter means are provided to prevent the AC current in conductor 30 from passing into the control circuit.

Thus, it should be appreciated that the present invention accomplishes its intended objects in providing a simple, inexpensive throw-away switch means for converting any standard surgical forceps made of a conducting material to an electrosurgical discharge electrode. The switch means may be readily attached to one leg of the forceps and then is removed and discarded after use to permit sterilization of the forceps by conventional means.

Having thus described the invention in detail, what is claimed as new is:

1. Means for discharging current into a human body including a surgical forceps made of electrically conducting material and having two opposed legs joined together at one end and adapted to be brought together at their said opposite ends by pressure applied to said legs, said forceps being connected to an electrosurgical circuit of the type having a direct current control portion, an alternating current work portion and means for triggering flow of said alternating current in said work portion when said control circuit portion is completed through said patient, the improvement comprising a disposable switch means for connecting said forceps to said electrosurgical circuit, said switch means comprising:
 - a. a body member of an insulating material having a groove adapted to receive therein one leg of said forceps in snap-on fashion so that said body member is detachably attachable to said forceps;
 - b. a switch terminal on said body member insulated from said one leg and adapted to contact the opposed leg of said forceps when pressure is applied to said forceps to bring the free ends of said legs together; and
 - c. a single lead insulated from said forceps and having one end electrically connected to said switch terminal and another end attachable to said electrosurgical circuit for conducting both direct and alternating currents.

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