Aug. 19, 1969 M. MARTINEZ 3,461,874

ELECTRIC CAUTERY

Filed Aug. 10, 1966 2 Sheets-Sheet 1

FIG. 1.

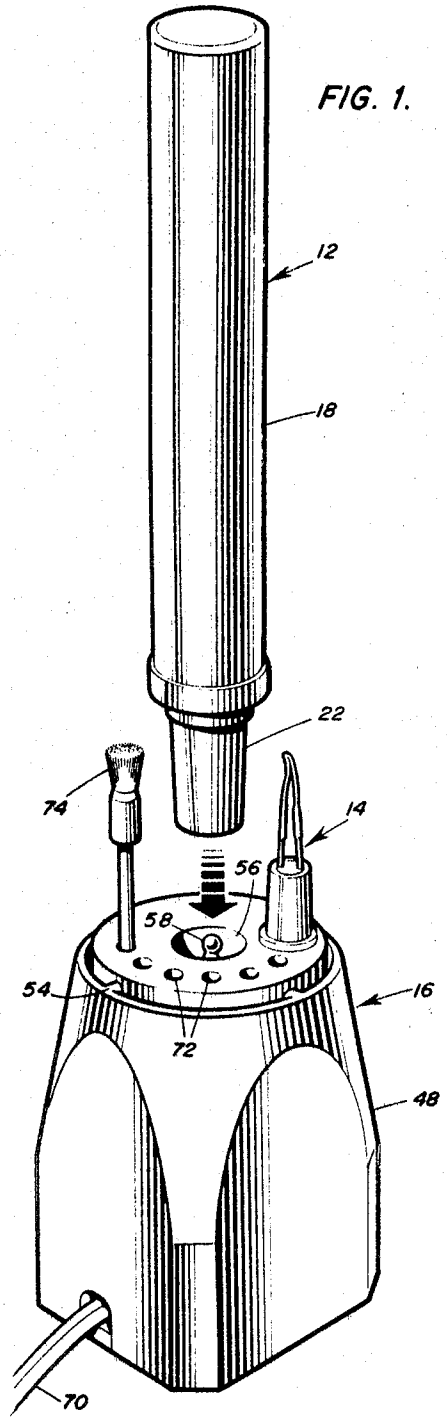


FIG. 2.

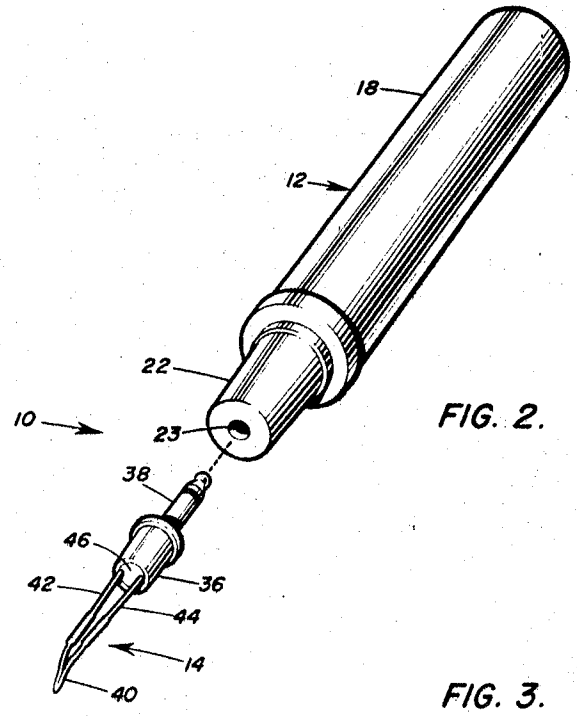
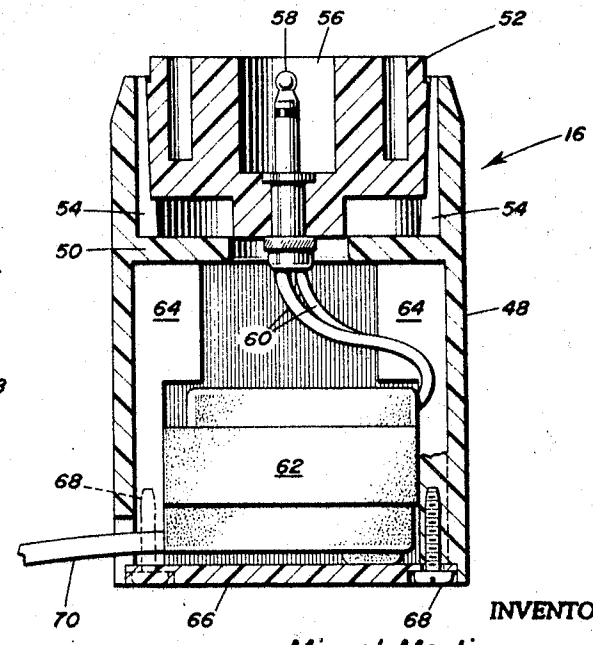


FIG. 3.



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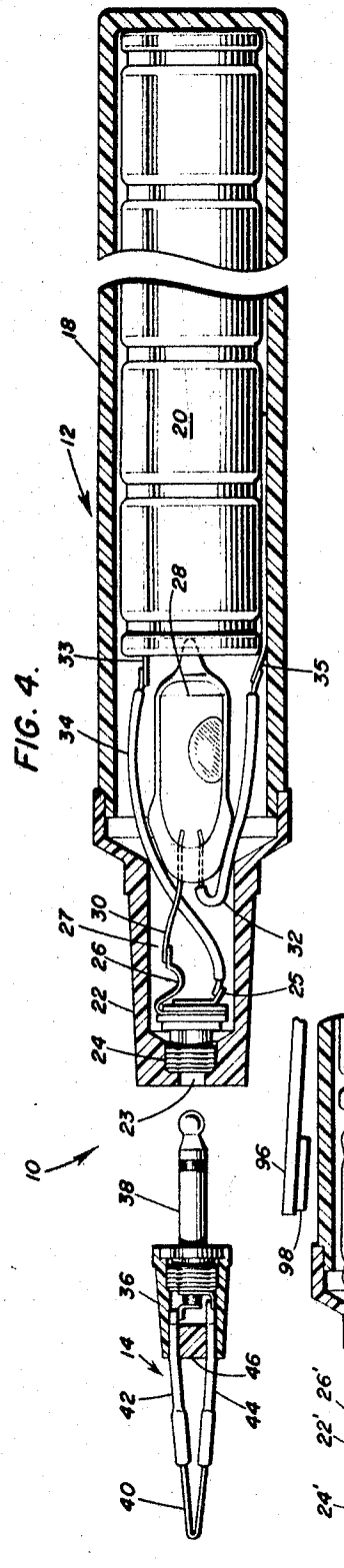

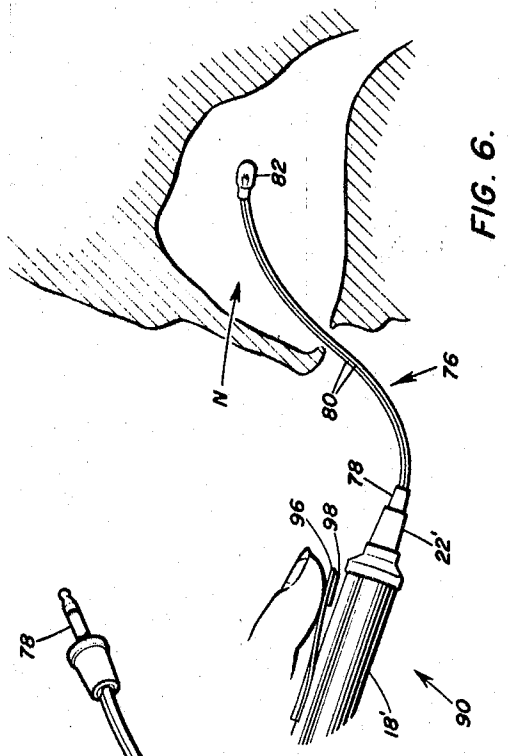

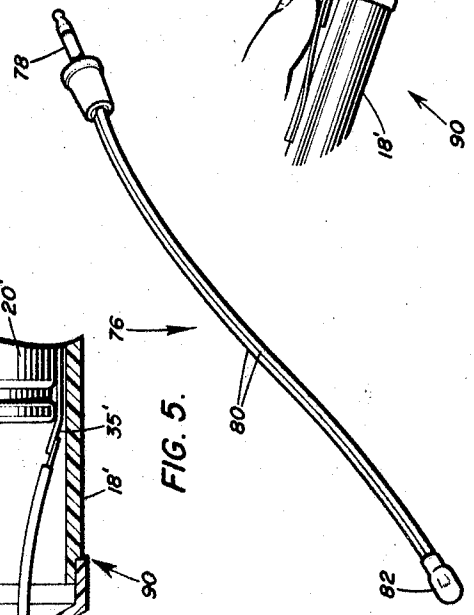

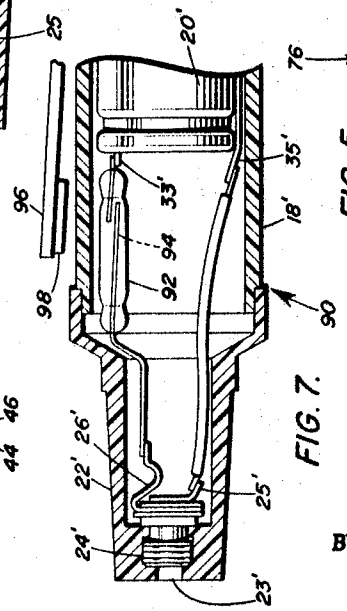

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ELECTRIC CAUTERY

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ABSTRACT OF THE DISCLOSURE

A hot wire cautery which is cordless having a tip separable from the handle which contains a storage battery. The jack arrangement used for this is also employed as a holder mount and a battery recharging connection for the handle when the latter is inserted into a charger stand. A light accessory comprising a sub-miniature incandescent lamp on a lead can be plugged into the handle for diagnostic use. A mercury switch in the handle permits control of the current merely by changing the attitude of the instrument. Where this form of control is not desired, a concealed reed switch and external magnetic actuator is provided.

This invention relates generally to surgery devices, and more particularly it pertains to a battery operated cautery.

With the advent of new types of storage batteries, it has become feasible to make many electrical devices "cordless," thus adding to the convenience of use. However, as is well known, electric heating requires considerable power. At low voltages, which is the usual case with a low resistance cautery heater loop, this power is represented by a heavy current. Therefore, the positive switching on and off of the power presents problems in a light-weight compact unit especially where reliability is important as in surgery.

Accordingly, it is a principal object of this invention to provide a cordless electric cautery of the pencil type which is reliable and always ready and easy to use.

Another object of this invention is to provide a storage and charging receptacle for a pencil type electric cautery and its accessories.

Still another object of this invention is to provide an attitude switchable electric cautery for surgery.

Yet another object of this invention is to provide a plug-in, interchangeable, electric cautery tip for practically instantaneous replacement in a cautery type device.

Other objects and attendant advantages of this invention will become more readily apparent and understood from the following detailed specification and accompanying drawings in which:

FIG. 1 is a perspective view of an electric cautery and charging arrangement embodying features of this invention;

FIG. 2 is a perspective view of the electric cautery showing a tip changing feature thereof;

FIG. 3 is a vertical section of the charger;

FIG. 4 is a longitudinal section of the cautery handle and tip;

FIG. 5 depicts an accessory diagnostic light for use with the handle of the electric cautery;

FIG. 6 illustrates the use of the light accessory of FIG. 5; and

FIG. 7 is a fragmentary detail in section showing a second embodiment of the cautery handle.

Referring now to the details of the invention as shown in FIG. 2, the novel electric cautery **10** consists of a handle assembly **12** and a plug-in cautery tip assembly **14**.

The handle assembly **12**, as best shown in FIG. 4, consists of a tubular plastic case **18** housing a chargeable

electric battery **20**. The end of the case **18** is fitted with a reduced tapering cap **22** having an end hole **23** behind which is mounted a two conductor jack **24**. The other end of the case **18** is closed.

The terminal **25** of the jack **24** is connected by means of a lead **34** directly to a battery terminal **33**. The other terminal **26** of the jack **24** connects with a switch lead **30** to a mercury switch **28** and thence by the other switch lead **32** to battery terminal **35**. The mercury switch **28** is oriented so as to be "on" when the closed battery end of the case **18** is uppermost and "off" when the case **18** is horizontal or downwardly inclined toward the battery end, or any range of conditions between 90° and 0°, and preferably between 40° to 35° and 15° to 10°.

The tip assembly **14** consists of a ferrule **36** in one end of which is mounted a two-terminal plug **38** which mates with the previously mentioned jack **24** of the handle assembly **12** and which may advantageously be of the telephone plug type.

Stiff leads **42** and **44** from the plug **38** extend out from the other end of the ferrule **36** through a plastic plug **46** and are welded to a loop heater element **40** of platinum or similar refractory resistance wire or strip.

As shown in FIG. 1, a charger stand **16** is provided for storing the handle assembly **12** when it is not in use as well as for holding various accessories such as tips **14**, a cleaning brush **74**, etc. in bores **72**. This charger stand **16** consists of a hollow plastic case **48** of rectangular at the base and tapering to round configuration at the top thereof. Within the case **48**, as best shown in FIG. 3 a diametrical supporting flange **50** is provided for a cylindrical receptacle **52**, centrally positioned and held flush at the top by means of ribs **54**.

Within a central bore **56** in receptacle **52**, there is vertically mounted a plug **58** similar to the previously mentioned plug **38**. Leads **60** connect this plug **58** to a charger unit **62**. The charger unit **62** is retained in the rectangular portion of the case **48** by internal ribs **64** and it is secured by a cover plate **66** and screws **68**.

An electric cord **70** extends externally from the charger unit **62** for attachment to a mains supply.

When the cautery **10** is to be placed in use, a tip assembly **14** is plugged into the handle assembly **12** and when the loop element **40** is directed downwardly to be applied to a patient, the mercury switch **28** closes the circuit from the battery **20** causing the element **40** to incandesce. To shut off the circuit, the operator needs only to bring the handle to horizontal or direct the tip upwardly.

With the tip **14** removed and stored in a bore **72** of the charger stand **16** and the handle assembly **12** jacked into the plug **58**, a continuous trickle charge is automatically applied to the battery **20** maintaining it always in readiness for use.

A handy accessory **76** for use with the handle assembly **12** as illustrated in FIG. 5 is a diagnostic lamp consisting of a plug **78**, with a "grain of wheat" subminiature lamp bulb **82** interconnected by a length of leads **80**. This accessory **76** is shown in use to view the interior of a body cavity such as the nasal passage N in FIG. 6.

FIG. 6 and detail view FIG. 7 also illustrate another embodiment or modification of the handle **90** which is useful where working upwardly and the previously mentioned mercury switch **28** would not turn on (unless installed inverted).

Here a reed switch **92** which works by magnetic proximity is employed instead. A resilient blade **96** having a magnet tip **98** is mounted on the case **18**. When this blade **96** is depressed by the thumb of the operator toward the case **18'** and the switch **92** therein, the paramagnetic reed **94** of the latter is attracted and caused to

close the circuit to battery 20' in any attitude of the instrument.

The reference numerals 22', 23', 24', and 26' correspond to their unprimed reference counterparts of the previously recited first embodiment.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. In a cautery system comprising handle structure containing an electric circuit having a re-chargeable source of electrical power including a socket connected therewith and a cautery tip assembly including plug-in means for electrically connecting in said electrical circuit socket to heat said cautery tip assembly, a base on the handle structure opposite the said socket, and a charging means, the improvement comprising: plug-in means interchangeable with said cautery tip for recharging said source of electric power including an upwardly facing electric element affixed in a stand, and gravity switch means in the handle structure adapted for breaking said electric circuit when the said socket is oriented upwardly and for establishing said electric circuit when the said socket is oriented downwardly, whereby the said circuit is broken automatically when the handle is stood on the base for removal of the cautery tip and the said circuit is established automatically when the socket end of the handle is directed downwardly onto the said upwardly facing electric element for recharging.

2. In an electric cautery as recited in claim 1, wherein said switch means is of the mercury type.

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L. W. TRAPP, Primary Examiner

U.S. Cl. X.R.

128—23; 174—46