ABSTRACT
A disposable electrosurgical cautery which functions in a dual capacity as a hollow sucker tube as well as a cautery, and is intended to be prepackaged in sterilized containers to be used once and disposed of. The cautery consists of an elongated metal electrode tube having an electrical conductor wire permanently connected to a premilal portion, and together are encased in a plastic housing which serves as an insulating handle. The handle is of special sculptured or contoured configuration to provide for deft and positive use of the distally projecting probe or point of the cautery without chance of short circuits or burns through inadequate wire connections or poor insulation. In operation, blood from a surgical incision or other wound is drawn by vacuum through the barrel of the electrode tube, clear of the severed vessels, and a high frequency current is passed through the electrode to cauterize and prevent further bleeding of the vessels.
DISPOSABLE ELECTROSURGICAL CAUTERY

This invention relates to an improved self-contained electrosurgical cautery of the disposable type which preferably is adapted to be prepackaged in sterilized ready-to-use condition, and is a continuation-in-part application of my application Ser. No. 288,543 filed Sept. 13, 1972 now abandoned.

BACKGROUND OF THE INVENTION

More specifically the invention relates to disposable electrical cauteries used in a dual capacity to effect the coagulation and/or closing off the terminal portions of severed blood vessels and to simultaneously draw off excess blood from the surgical opening or wound.

The prior art is known to encompass various electrosurgical instruments including some electrical cauteries embodying hand-held electrosurgical electrodes connected through an electrical conductor wire to an electrosurgical unit, some of which utilize an inactive electrode in plate form or the like beneath the patient, and further connect the latter electrode to the electrosurgical unit which is properly grounded.

While some of these prior art devices have provided innovative and improved surgical procedures and results, much of the currently available equipment still suffers from certain of the following disadvantages.

1. inadequate thermal insulation provided by only thin plastic coatings around relatively thin pencil-like electrodes. These electrodes get unbearably hot, particularly during heavy usage, and must be cooled before the operation can be completed. Such delays endanger the patient and are otherwise costly.

2. unsafe electrical insulation which evolves from repeated cycles of usage and resterilization, which tend to crack and chip the insulation on known prior art devices. These usually cause short circuits often resulting in electrical burns or shock to the user severe enough to burn holes in rubber operating gloves. Further, this tends to contaminate the operating field, and the surgeon often must continue to operate with painful burns.

3. unreliable electrical connectors, evolving from the electrical connectors and interconnecting wire being subjected to repeated resterilization whereby they become unreliable after a few uses. Operations are frequently delayed when one of the connectors shorts out and requires repair.

4. different to sterilize as a result of the time delay between completion of operations and cleansing of the instruments, during which delay blood and other tissue remaining in the sucker tube or barrel of the electrode tends to dry and cling to the inside wall thereof in spite of regular washing. This residue breeds bacteria which is frequently not killed in sterilization because steam and disinfectant gases do not adequately vent through the thin tubing of the barrel. In normal surgical procedure, the barrel often becomes clogged with tissue and must be cleared by inserting a thin wire. Withdrawing this wire brings with it the bacteria lodged there and contaminates the sterile operating field.

5. Poor human engineering has provided present electrodes which are unwieldy and difficult to use with precision. The very thin barrel of the electrode is too small to grip securely, especially with moist surgical gloves; and the heavy rubber tubing and wire connector at the rear of such prior art electrodes make them extremely unbalanced. Furthermore, the separately ex- tended or hanging vacuum tubing and electrical conductor wiring of the prior art cautery tends to interfere with and impede efficient surgical and operating room procedures.

6. The discomfort and possibility of infection associated with currently available electrodes forces many surgeons to use slower more difficult means of controlling bleeding in spite of the decided advantages offered by cautery afforded by prior art electrosurgical units such as the CSV BOVIE manufactured by the Ritter Equipment Company, a division of Sybron Corporation.

In order to alleviate the foregoing problems and disadvantages, the present improved inventions were developed and have been successfully used.

SUMMARY OF THE INVENTION

The improved disposable cautery of this invention overcomes all of the above problems, and basically consists of a metal tube with a conductor wire permanently attached, thus eliminating the bulky connector and avoiding the possibility of a short circuit. A specially contoured or sculptured plastic handle of generous proportions is molded over the tube and permanently covers the junction of the conductor wire. The thick handle provides more than adequate thermal and electrical protection, thereby making the electrode very easy to manipulate.

Prior to use, in one form a flexible hose or sucker tube, connectible with vacuum source, is attached to the proximal portion of the tubular electrode which projects from the proximal end of the handle, and the wire, which is suitable insulated, is connected to a high frequency power source. In another more preferred form, a preferably clear flexible plastic sucker tube is firmly connected to an electrode, the handle is initially made in two parts having complemental recessed areas and channels therein to receive the assembly of the sucker tube and preattached electrical conductor wire.

The hollow stainless steel electrode tube does not project proximally beyond the handle, but terminates approximately midway within the handle, and one end of the preferably clear electrically conductive flexible plastic sucker tube is firmly attached over the proximal portion of the electrode tube. Both the sucker tubing and electrical conductor wire are of predetermined lengths to reach the respective associated equipment, and provision is made on the sucker tubing to integrate therewith the electrical conductor wire, at least for preferably several feet in the immediate area of the operating table, to reduce the likelihood of interference by separate tubing and electrical conductor wires otherwise stretched out individually among the patient and operating staff members. In operation, blood from a surgical incision is drawn through the barrel of the electrode clear of severed vessels, and a high frequency current passing through the electrode cauterizes the ends of the vessels preventing further bleeding. The device of this type is most aptly described as a cautery or just BOVIE after the power supply with which it is often used.

This improved electrode is designed to be disposable after one use and will be shipped from the factory prepackaged in sterile containers. This guarantees the sterility of the instrument and insures that the connecting wire will not fail due to wear.
Accordingly, it is the principal object of this invention to provide an improved disposable type cautery which will overcome all of the aforementioned disadvantages, and, by embodying the foregoing improved features, may be used in conjunction with existing electrosurgical units.

This and other objects and advantages of the present invention will become apparent from a consideration of the following detailed description taken together with the illustrative drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one preferred embodiment of the improved suction-type cautery having a curved electrode probe;

FIG. 2 is a front elevational view taken on line 2—2 of FIG. 1;

FIG. 3 is a rear elevational view of the instrument of FIG. 1;

FIG. 4 is a top plan view of the instrument of FIG. 1;

FIG. 5 is a side elevational view of the instrument of FIGS. 1 and 4, the distal half of which is substantially symmetrical about a longitudinal center line;

FIG. 6 is a bottom plan view of the instrument shown in FIGS. 1, 4 and 5;

FIGS. 7, 8 and 9 are cross-sectional views as taken substantially on lines 7—7, 8—8, and 9—9 of FIG. 5;

FIG. 10 is a cross-sectional view taken on line 10—10 if FIG. 6;

FIG. 11 is a fragmentary side elevational view of the proximal portion of the instrument as viewed on line 11—11 of FIG. 4;

FIG. 12 is a fragmentary side elevational view similar to FIG. 5, but only of the forward half portion of a modified embodiment having a straight electrode probe, and having a portion of the body broken away;

FIG. 13 is a fragmentary side elevational view of the proximal end portion of a modified hose connection portion of the body;

FIG. 14 is a perspective view similar to FIG. 1, but depicting a modified form having a foreshortened handle and reduced size elongated electrode probe adapted more particularly for neurological use;

FIG. 15 is a bottom plan view of the modified form of FIG. 14;

FIG. 16 is a side elevational view of the FIG. 14 form as taken on line 16—16;

FIG. 17 is a perspective view, similar to FIGS. 1 and 14, of a further preferred embodiment fabricated of two body half members fused together to integrally unite the components therein, and depicting a straight electrode probe therewith;

FIG. 18 is an exploded perspective view of the embodiment of FIG. 17 better showing body recess details and the relative relationship of the component members thereof;

FIG. 19 is a side elevational view of the embodiment of FIGS. 17 and 18 showing folded predetermined lengths of the flexible sucker tubing and electrical conductor wiring associated therewith, and depicted within a broken outlined sterilized package schematically representative of the intended disposable character in which the cautery is preferably merchandised, and

FIG. 20 is an end view of novel form of flexible sucker tubing preferably having integrally molded or otherwise suitably formed therewith means for integrating the electrical conductor wire in association therewith.

DETAILED DESCRIPTION OF EMBODIMENTS

Throughout this description, the terms "distal" and "proximal" are relative to the operator, i.e., "distal" is away from the operator and indicates the forward end of the instrument, whereas "proximal" is nearest to the operator and relates to the rearward end of the instrument.

Referring to the form of FIGS. 1-11, the suction cautery is generally designated at 10 and comprises an elongated, electrically conductive metal electrode/sucker tube 12 terminating in a distally end 14 and a proximal end 16, and having one end of a length of insulated electrical conductor wire 18 permanently attached at 20 (FIG. 4) to a proximal portion of the tube 12. The permanent connection thereof eliminates the necessity of a separate connector fixture, which is often bulky, and avoids the possibility of a short circuit, particularly when the major part of the tube 12 and the end portion of wire 18 are permanently encased in the well sculptured or specially contour-molded plastic handle 22. The projecting portion of tube 12 of this form is preferably of slightly acrute form in the vertical plane thereof.

Handle 22 is of generous proportions and includes opposed distally disposed identical recessed thumb and finger gripping portions 22, 24 and an arcuate raised projection 26 on the top side which smoothly forms a first concave finger rest 28 with the distally extremity of the handle. The handle 22 further includes a generally inverted pyramidal shaped projection 30 on the distal bottom side which blends smoothly with the main body of the handle to form a second concave finger rest 32 therebeneath. The specially contoured handle permits ambidextrous deft and positive gripping of the instrument in the various manners as depicted in FIGS. 1 and 5. While the instrument preferably will be handled primarily in the manners mentioned, the slightly trapezoidal shaped cross-section of the main body, as depicted in FIG. 9, further facilitates a comfortable and positive manipulative grip of the instrument when held at an intermediate portion of the handle.

Preferably, the proximal portion of handle 22 includes a pronounced laterally offset portion 34 which rigidly encases the conductor wire 18. The distal main body portion further preferably includes an integrally molded convoluted or annularly ribbed hose-connection nipple 36 to facilitate a good friction fit therewith of a flexible vacuum hose 38 shown in broken outline in FIGS. 1 and 4. The body handle is seen to have substantial thickness, and is fabricated of a plastic or other suitable rigid material having appropriate electrical and thermal insulating qualities. Therefore, it is very comfortable and easy to manipulate.

The distally projecting end of the suction/electrode tube 12 is usually covered with an insulation sleeve 40 beyond the handle 22 to within about 1/8 inches of the end. If desired, the insulation sleeve 40 may extend the full length of the tube and be molded or gripped partially or fully within the handle 22, although this is not necessary in view of the insulative qualities of handle 22. Sleeve 40 may be of tapering or otherwise non-uniform cross-section in an area exposed forwardly of the handle 22.
The improved disposable cautery electrode is to be factory packaged in sterile containers of envelopes, ready for use upon opening by the doctor. Prior to surgical use, the flexible vacuum hose is connected to the hose nipple, and the conductor wire, of predetermined length is connected to a high frequency source of electrical power, such as mentioned in the preamble hereof. During operative use, accumulating blood from a surgical incision is drawn through the hollow barrel of the tubular electrode, the severed blood vessels, and a high frequency electrical current is passed through the electrode to cauterize the vessels and prevent further bleeding.

Referring to the modified form of FIGS. 12 and 13, the instrument essentially is identical to the above-described embodiment, except that the distally protruding electrode or point is of straight form, and the proximally extending hose-connecting nipple is of slightly different form from that of the previously described form. Because of the near identical construction of these various forms, the same but primed and double primed reference numbers are being used to designate corresponding parts therein. While separate forms may be provided for different lengths of protruding probes, depending upon preferences of different surgeons, it is contemplated that the tubular electrode is of a sufficiently deformable material whereby the distal probe end can be manually bent or curved to adapt it to different use circumstances.

Further referring to the modified embodiment of FIGS. 14–16, this cautery handpiece, designated generally at 10', is very much the same as the previous forms except for embodying a foreshortened handle having an integrally formed, slightly arcuate tubular distally portion. The generally cylindrical form of said distal portion lends this embodiment more particularly to neurological use such as in craniotomies, whereby the reduced diameter of the probe end will readily pass through holes surgically drilled in the patient's skull.

Referring next to the further preferred embodiments depicted in FIGS. 17–20, they are representative of improved features now to be described in more detail.

The cautery assembly of this embodiment is quite similar in most respects to the first described embodiments, and is generally denoted by the numeral 40 having an initially two-part handle. Said handle includes an upper half member and a lower half member. Said members are suitably internally recessed and channelled to receive, and are subsequently fused together around, the preferably stainless steel electrode tube and adjoining flexible plastic sucker tubing and electrical conductor wiring. It is noted that the electrode tube is very similar in construction and identical in function to the counterpart tubes and of the other embodiments. The main difference is that tube has a proximal terminal end portion which terminates within a generally medial portion of the composite handle. The Prestirialized sucker tubing is preferably simply slip fitted over the end of tube, as shown, and the adjacent portion of the flexible plastic tubing is received within preferably snug-fitting complementary recessed channels and in the body members.

Distally of the connection of the flexible tubing upon the electrode tube end is the preferably permanent connection of the insulated electrical conductor wire to the metal electrode tube. The conductor wire is stripped of its insulation for a short area and wrapped and suitably soldered or brazed to said tube, as shown in FIG. 18. Recessed provision, preferably in the form of opposed complementary recesses and respectively, to receive and firmly grip therein the lead end portion of the electrical conductor wire.

Additionally, the distally portions of said handle members are provided with preferably complementary recesses and to receive therebetween both a major portion of the electrode tube, and also preferably a portion of the overlying insulating sleeve provided around the distally exposed portion of the electrode tube or probe. The forwardmost tip end is left bare, as mentioned in the first-described embodiments.

The general overall configuration and handle contours, particularly in the distally finger-gripping areas, remain essentially like those of the first-described embodiments, after the handle members are fused together.

It is contemplated that the handle members may be initially fabricated in vertically divided half members rather than in the illustrated horizontally divided manner, in which case any offset tail portion would be generally vertically disposed, if used, rather than horizontally as shown.

While the handle members may be joined together in any suitable manner, either mechanically or adhesively, a preferred form is by the fusing together by the application of ultrasonic vibrations to the assembled handle components.

Straight or curved probe ends of the electrode tube may be provided as desired, as well as a similar distally projecting reduced cross section of the body handle corresponding to that of member in the embodiment of FIG. 14.

In each of the foregoing embodiments, the flexible plastic tubing is to be of an electrically conductive nature so that when in use it will ground and dissipate any tendency to build up static electricity which is known to be capable of exploding ether or other ambient gases having a propensity to ignite or explode.

FIGS. 18 and 20 more particularly illustrate the novel form of the flexible tubing which I prefer to use in conjunction with all embodiments. Tubing comprises the usual basic full tubing conduit, and a second integrally formed longitudinally split conduit portion within which conduit portion the insulated electrical conductor wire is adapted to be substantially fully and removable disposed. In the illustrated FIG. 16 embodiment, due to the use of separate channel-like recesses for the tubing and wiring, the second split conduit portion is either removed from or not originally fabricated with the basic tubing conduit for the extent of which is housed within the handle. Preferably the second, split conduit portion commences closely behind the most proximal end of the handle, and may be co-extensive with the full length or any predetermined portion of the flexible tubing, dependent upon the particular circumstances relating
to the type and relative disposition of the vacuum and power source equipment with which they are attachable. Primarily the flexible tubing and electrical conductor wire are co-extensively joined for a sufficient common length so as to greatly reduce the degree of potential interference by otherwise using two lines separately in the immediate area of the operating table and attending staff members. While the second split conduit 61a is shown as a complete conduit which is longitudinally split, it also may be in the form of a discontinuous conduit, or spaced split rings or bands. Furthermore, in some other preferred forms, the split, designated 70, which may be oriented in different peripheral portions, is made to have a positive longitudinal spacing to better facilitate insertion and removal of the cable 62.

In merchandising the pre-sterilized cautery assembly of this invention in individual envelope or container form designated schematically at 72 in FIG. 19, it is to be understood that the conductor wire 62 would be integrated within the split conduit 61a, although not shown as such in said FIG. 19. The conductor wire 62 is preferably provided with an electrical jack 74 of a suitable form to fit complementally into a power source with which it is adapted to be used. While a preferred size of the flexible vacuum tubing 60 may be of 1/8 inch I.D., it also may be made of other various sizes or, may be provided with a suitable adaptor means 76 (FIG. 19) to facilitate joining with other size tubing or tubing connections of the associated equipment.

While the foregoing descriptions have been concerned primarily with the mechanical structure and details, it is understood that certain novel process procedures may be present attendant the fabrication of these various cautery embodiments.

The handles 22 and 52 are preferably made of an opaque plastic material and may be provided in various colors, if desired, although an opaque white has been found very acceptable and maintains a very antisectic appearance of the presterilized instruments. Due to the nature of the surgical use to which these instruments are subjected, and the problems encountered among various of the unsatisfactory prior art devices, it was necessary to evolve an expendable electrode cautery to completely avoid any possible contamination which otherwise might arise from a previous use. Accordingly, the improved cauteries of this application were simply and economically designed to be disposable while embodying the improved functional features lending themselves to be economically, functionally and aesthetically attractive.

From the foregoing detailed and illustrative drawings and descriptions, it is apparent that improved cautery means have been provided which achieve the objectives and advantages set forth in the preamble hereof. Various changes and alternations may be made to the various forms, which changes may include the formation of the contoured finger gripping areas by use of other than the visibly raised and/or depending projections on the handle, assuming at least the upper contour could be recessed and generally concealed in side view by horizontally and vertically extended handles or the like. Also, the laterally offset proximal handle portion could be divided equally to each side of the handle or the handle be made of slightly diverging form in the proximal part to encase the wire and tube without noticeable offset areas. And the curvatures of said distally tube portions may be in various planes is desired to suit specific surgical needs. Because those skilled in the art may make changes in details without departing from the spirit of the invention, reference should be had to the appended claims for the scope of coverage afforded thereby.

1. A hand-operated electrocautery cautery instrument constructed particularly for single occasion use as a disposable combination cautereizer electrode and sucker tube, adapted for use with remotely located vacuum source means and electrical high frequency current source and control means, the improvement in said cautery instrument comprising:
   a. sucker tube means including an elongated metallic tube of small diameter adapted for entry into surgical cavities, said tube constituting an electrode and at least a partial sucker tube combination having distally, intermediate and proximal portions; said proximal portion adapted to be connected with a flexible tubing for connection with said vacuum source means;
   b. handle means embracing at least an intermediate portion of said sucker tube;
   c. a flexible electrical conductor wire of predetermined length having one end electrically connected to a portion of said electrode tube which is embraced by said handle means; said wire extending from and being insulated exteriorly of said handle means, and having the other wire end free and adapted to be electrically connected with said source of high frequency power;
   d. said handle means including a specially contoured handle having substantial cross-sectional thickness and good thermal and electrical insulating characteristics, and unitarily surrounding a substantial portion of said electrode tube length, including complete fail-proof enclosure of said conductor wire connection with said electrode tube, said handle terminating short of and freely exposing a substantial distally portion of said electrode tube, and having a generally elongated intermediate portion, and said handle further having a generally distally end portion embodying plural compound curvatures defining plural digital gripping portions to provide for positive deft manipulation of said instrument in use.

2. An instrument as defined in claim 1, wherein said forward or proximal portion of said electrode tube which is not enclosed by said handle is enveloped by a sleeve of an electrically insulative material.

3. An instrument as defined in claim 1, wherein said forward or proximal portion of said electrode tube which is not enclosed by said handle is enveloped by a sleeve of an electrically insulative material having a generally uniform and substantially less cross-sectional thickness than that of said handle.

4. An instrument as defined in claim 1, wherein said handle is provided with a proximal portion having an integrally formed friction fit hose-connecting nipple extending generally longitudinally therefrom.

5. An instrument as defined in claim 1, wherein said contoured handle is provided with a laterally widened portion to fixedly and unitarily encase therein said interconnected wire and proximal portion of said electrode tube, in a fail-safe permanent manner.
6. An instrument as defined in claim 1, wherein said handle-formed, plural digital gripping portions include at least a pair of oppositely disposed finger-and-thumb gripping portions symmetrically formed in laterally opposed distal sides of said handle to provide for ambidextrous use of said instrument.

7. An instrument as defined in claim 6, further including a second pair of digital receiving contoured areas formed in opposed top and bottom surfaces of said handle adjacent said first-mentioned gripping portions, said second pair of recesses being longitudinally offset from one another in the distally portion of said handle, to particularly receive forefinger and index finger gripping thereof along with simultaneous thumb gripping in one of said laterally opposed recesses.

8. An instrument as defined in claim 1, wherein said electrical conductor wire of paragraph (b) is permanently electrically connected to a generally proximal portion of said electrode tube.

9. An instrument as defined in claim 1, wherein said distally portion of said electrode tube which is not enclosed by said handle is of slightly curved form.

10. An instrument as defined in claim 9 wherein said curved tube portion is in a vertical plane so as to tend to point downwardly when held in one operative use.

11. An instrument as defined in claim 10, wherein said electrode tube is also curved slightly downwardly along a distally portion and generally co-planar with the proximal end curvature, said distal curvature being such as to be embodied and generally concealed within said handle.

12. An instrument as defined in claim 1 wherein said handle at its distally portion further includes a substantially reduced and generally circular cross-sectional portion integrally formed there within and projecting longitudinally distally therefrom, said reduced cross-sectional portion being of a size to facilitate insertion into surgically drilled holes in a patient’s skull during the performance of craniotomies.

13. An instrument as defined in claim 12 wherein said reduced cross-sectional distally handle portion and said distal portion of said electrode tube are both of gently arcuate form.

14. An instrument as defined in claim 12, wherein said distally portion of said electrode tube which is not enclosed by said handle is enveloped by a sleeve of electrically insulative material having a generally uniform cross-sectional thickness which is substantially less than that of said handle portions.

15. An instrument as defined in claim 1, wherein said handle means include generally horizontally complemental adjoining upper and lower half members.

16. An instrument as defined in claim 15 wherein said handle members are provided with complementally opposed recessed areas throughout at least a substantial length of each handle portion, said recessed areas adapted to receive at least portions of both said combined electrode and sucker tube means and also said attached portion of said electrical conductor wire.

17. An instrument as defined in claim 1, wherein said metal electrode tube has its proximal portion terminating within said handle, and said sucker tube means further includes a predetermined length of said flexible tubing as an integral part thereof, one end of which is affixed in operative connection with said proximal portion of said electrode tube, and said flexible tubing having a portion integrally enclosed within said handle, and said tubing further including a length extending from a generally proximal portion of said handle.

18. An instrument as defined in claim 17, wherein said flexible sucker tubing is basically of non-metallic material but includes integrally formed means enabling it to have electrically conductive characteristics which when ground precludes build-up of electrostatic charges.

19. An instrument as defined in claim 17, wherein said flexible sucker tubing includes a basic fluid conduit, and a second longitudinally split conduit integrally formed coextensively therewith for at least a partial predetermined extent thereof exteriorly of said handle, said split conduit adapted to removable receive therein in an integrated manner the said electrical conductor wire for at least part of said predetermined length adjacent to said handle.

20. In an electrosurgical cautery instrument constructed particularly for single use as a disposable combination cautery/electrode and sucker tube, adapted for use with remotely located vacuum source means and electrical high frequency current source and control means, the improvement in said cautery instrument comprising:

a. sucker tube means including an elongated combination electrode and sucker tube of relatively small diameter adapted for entry of a distal end into surgically cavities, said tube including a proximal end portion adapted to be connected with said vacuum source means;

b. handle means embracing at least a major part of the distal end portion of said tube;

c. a flexible electrical conductor wire of predetermined length having one end firmly electrically connected to a portion of said electrode tube, said wire extended from and insulated exteriorly of said handle means, and having the other wire end free and adapted to be electrically connected to said source of high frequency electrical power;

d. said handle means including a composite handle of substantial cross-sectional size and having good thermal and electrical insulating characteristics, said handle unitarily surrounding a substantial portion of said electrode tube length including complete fail-proof enclosure of said conductor wire connection therewith; and

e. said composite handle including a pair of longitudinally divided complementary handle members each having complementally mating opposed recessed channels throughout a substantial length thereof to receive said sucker tube means and an adjoining portion of said electrical conductor wire.

21. An instrument as defined in claim 20, wherein said division of said handle is horizontal so as to have complemental upper and lower half members, and said flexible conductor wire attachment to said electrode tube is within enlarged portions of said recessed channels in the general mid-portion of said handle members, said first-mentioned recessed channels extending both distally and proximally from said enlarged mid-portion recess.

22. A novel form of extensively elongated flexible tubing particularly useful in association with electrosurgical cauterities and the like requiring close associa-
tion of both a flexible hollow conduit sucker tube and a related generally flexible member such as an electric wire conductor, said novel tubing comprising:

a. first and second flexible conduit means of which at least said first conduit means comprises a continuous and extensive multiple footage length of hollow flexible conduit which is fully closed around its cross-sectional periphery throughout its length, and is adaptable to convey fluids therethrough in a leakproof manner,

b. said first and second conduit means including common juncture means for fixedly and coextensively essentially integrally adjoining said first and second conduit means in parallel with one another;

c. said second conduit means including a second flexible length of conduit which is provided with a longitudinally extending interruption in its cross-sectional peripheral at a position spaced from the juncture with said first conduit means; and

d. said flexible second conduit means adapted to be opened along said longitudinal interruption so as to flexibly receive therein another continuous member to be related thereto in an integrated manner.

23. A novel tubing as defined in claim 22, wherein said longitudinal interruption in said second conduit means is defined by slightly spaced-apart generally parallel edges.

24. A novel tubing as defined in claim 23, wherein said longitudinal interruption in said second conduit means is disposed generally opposite to the common juncture means between said first and second conduit means.

25. A novel tubing as defined in claim 23, wherein said first conduit means is of generally circular cross-sectional configuration, and said second conduit means is of generally C-shape cross-sectional configuration.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,825,004

Dated July 23, 1974

Inventor(s) John G. Durden III

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the ABSTRACT, line 7, "preliminal" should read --proximal--.

Column 4, lines 15 and 32, "distally" should read --distal--;
line 48, "distal" should read --proximal--.

Column 6, line 24, "distally" should read --distal--;
line 56, "aadapted" should read --adapted--.

Column 8, lines 19, 41, and 43, "distally" should read --distal--
lines 50 and 54, "proximal" should read --distal--.

Column 9, lines 12, 21, 34, 42 and 46, "distally" should read
--distal--;
line 29, "distally" should read --proximal--;
line 30, "proximal" should read --distal--; and
"distal" should read --proximal--.

Signed and sealed this 22nd day of October 1974.

(SEAL)
Attest:

McCoy M. Gibson Jr. C. Marshall Dann
Attesting Officer Commissioner of Patents
UNITED STATES PATENT OFFICE
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