



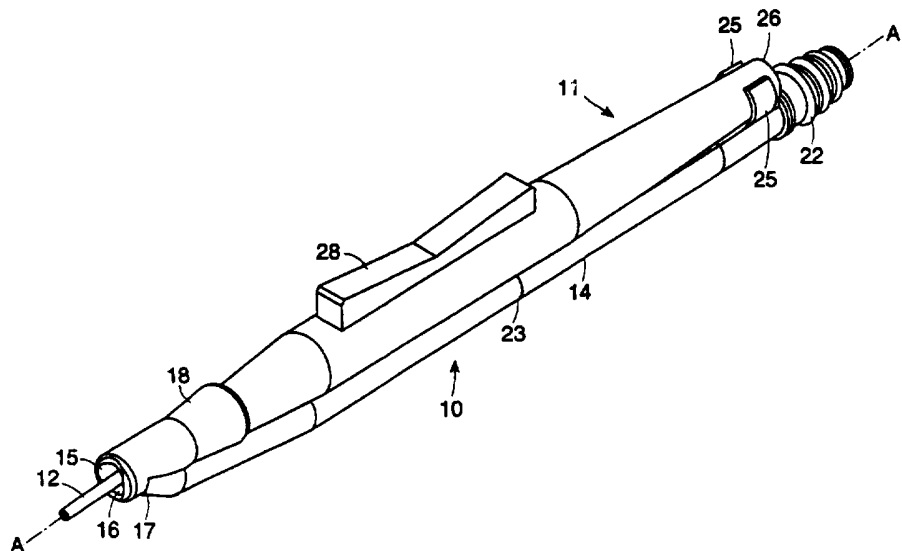
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(54) Title: ELECTROSURGICAL ASPIRATOR COMBINED WITH A PENCIL

(57) Abstract

An aspirator attachment (10) for an electrosurgical pencil (11) has an axis and an electrode (12) at a distal end (13) thereof to transmit vacuum to remove fluid from an operative site. A semi-rigid hollow body (14) extends parallel to the axis and is contoured to fit coextensively against the elongate pencil. A body passage (15) has an opening (16) at its distal part (17) that is about the electrode (12) and facing toward the patient. The part conjugates aft of the electrode (12) for generally fluid tight pencil engagement. The opening (16) is scalloped with opposed edges increasing visibility, decreasing tissue trapping and decreasing electrode (12) temperature. A part port (21) between the conjugating end (18) and its opening (16) communicates with the passage (15) and the opening (16). A connector (22) at the body end opposite the opening (16) is shaped for fluid communication with the passage (15) and vacuum. A body center section, between the port (21) and the connector (22) joins them. An offset transition (27) of the body, adjacent the pencil conjugating end (18), has the passage (15) therethrough for connecting the port (21) and the center section and alignment. The passage (15) has a uniform cross sectional area extending therein. A swivel (23) attached to the connector (22) permits relative rotation between the pencil and a vacuum hose. The center section at the connector (22) has a rib (24) to engage the pencil retaining the opening (16) about the distal end (13) and resisting movement. The passage (15) within the center section has a generally D shaped cross section. The pencil has controls along a side thereof and the body mates with the pencil opposite the controls. Methods of combining and using the pencil and aspirator include steps of engaging and nesting them together.



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ELECTROSURGICAL ASPIRATOR COMBINED WITH A PENCIL

1. Field of the Invention relates to an aspirator attachment for an
10 electrosurgical pencil having an electrode and more particularly to a passage
extending through a semi-rigid body from a distal part to a connector, so that the
semi-rigid body resists collapse during handling and use.

2. Background of the Disclosure U.S. Patent No. 5,242,442 has an
electrosurgical instrument integrated with a suction port consisting of a single small
15 aperture located above the electrode blade. The suction port is unable to trap smoke
and heat in an arc of 360° around the electrosurgical electrode. The suction port
limits the users field of vision of operative site and the electrosurgical electrode. The
'442 patent includes a electrosurgical instrument integrated with a suction port
encircling the electrode tip (figure 9). The integrated design allows the suction of
20 blood and saline to be in close proximity to the electrosurgical components of the
device which could result in an unwanted conductive electrical energy leakage path.
Cleanability and electrical component reliability would not be favorable for that
integrated design as compared to a reusable and/or disposable electrosurgical pencil
smoke/heat attachment design. Depending on the location of the encircled flat
25 ended nozzle design the user could encounter problems with electrode visibility and
trapping or clogging with tissue.

U.S. Patent No. 5,224,944 has a disposable aspirator used with an
electrosurgical handpiece. The aspirator includes a continuous flexible tube with the
electrode entering the back of the tube. This design could result in the lack of
30 suction due to collapse of or squeezing of the tube at the handpiece and/or tip
location. The position at which the electrode enters the tube could create a fluid leak
point for conductive blood and/or saline transferring electrosurgical energy from the
electrode to the patient or surgeon. The '944 patent includes a fluted holder for the
pencil to keep the tube under the pencil. This design could result in the lack of
35 suction due to pinching the soft tube. The '944 patent includes a design for an
offset tube connection to the electrode with a cylindrical elastomeric member that
connects to the pencil. U.S. patent 5,085,657 the opening at the patient end

of the tubular body has a shroud as a separate element being a tube. Alternately, the '657 patent describes a pencil with all of the functions included within a handle and is not a smoke attachment but is a pencil in an integrated unit. U.S. patent 4,562,838 has integrated ducts to direct air for dispersing smoke. U.S. patents
5 4,719,914 and 4,911,159 has a hollow pencil with a vacuum connection at one end and an electrode and movable nozzle at the other.

U.S. patent 5,055,100 has a tube attached to the pencil with clips; is not clear that the tube is semi-rigid. The tube is designed to be moved relative to the pencil. U.S. patent 3,906,955 has a pencil with a built in retractable smoke tube
10 exiting beneath and parallel to the electrode. U.S. Patent No. 4,307,720 has a retractable electrode associated with an integral vacuum wand.

U.S. Patent 5,234,428 requires that the passage and the source of vacuum are configured such that the velocity of the air flow into the shroud at the patient end is in a range approximately twice and greater than the expansion velocity of
15 smoke produced by the electrode blade. The '428 has an electrosurgical instrument integrated with a suction port encircling an electrode tip. The integrated design allows the suction of blood and saline to be in close proximity of the electrosurgical components of the device which could result in an unwanted electrical energy leakage path. Cleanability and electrical component reliability would not be helped
20 by that integrated design as compared to an attached disposable electrosurgical pencil smoke/heat design. Depending on the location of the encircled flatten end nozzle design the user could encounter problems with electrode visibility at the operative site and clogging and trapping of removed tissue.

25 SUMMARY OF THE INVENTION

An aspirator attachment for an electrosurgical pencil may have an axis therethrough. The pencil preferably includes an electrode at a distal end thereof. The aspirator attachment for most preferably transmits vacuum to remove fluid from a patient's operative site and about the electrode extending from the distal end. A
30 semi-rigid hollow body may extend predominately parallel to the axis and the body is contoured to fit coextensively against the elongate electrosurgical pencil. The semirigid hollow body may have a passage therethrough for the flow of fluid. An opening is preferred at the distal part of the semi-rigid body. The opening might be

generally about the electrode held in the pencil distal part and the opening faces to be preferably open toward the patient or operative site. The aspirator near the distal part may include a pencil conjugating end aft of the electrode and pencil conjugating end is shaped for generally fluid tight engagement about the distal end of the pencil.

5 A port is preferably located in the distal part between the pencil conjugating end and its opening toward the patient so that the port is in fluid communication with the passage and the opening. A connector at the end of the semi-rigid body opposite the opening is most preferably shaped for fluid communication with the passage and vacuum for removal of fluid. A center section on the semi-rigid body
10 may be located substantially adjacent to and coextensive with the electrosurgical pencil. The center section might be between the port and the connector for joining them and conjugating with the pencil. An offset transition, of the semi-rigid body adjacent the pencil conjugating end of the pencil, can have the passage therethrough for connecting the port and the center section and for alignment therebetween. The
15 passage could have a generally uniform cross sectional area extending therethrough from the opening to the connector, so that the flow therethrough is generally constant and so the semi-rigid body resists collapse from vacuum therewithin and during handling and use.

 The electrode is preferably coaxially within the opening. The center section
20 of the semi-rigid body at the connector could have an upstanding rib positioned to engage the electrosurgical pencil and retain the generally fluid tight engagement of the opening about the distal end of the pencil and resist relative axial movement between the pencil and the attachment. To resist transverse movement between the pencil and the attachment it is preferred that, a pair of upstanding clips near the
25 connector and on the center section are shaped to engage about the pencil for holding the aspirator attachment semirigid body against the electrosurgical pencil. The pair of clips may be curved to grip the electrosurgical pencil. The pair of clips can be flexible and resiliently spread apart to grip the electrosurgical pencil. A swivel may be attached to the connector to permit relative rotation between the pencil and
30 a hose for connecting to the vacuum. The pencil might include controls along a side thereof and the semi-rigid body is configured to mate with the pencil on a side opposite the controls in a nested engagement for minimizing the overall bulk and resisting rotation between the pencil and the semi-rigid body.

The pencil and the semi-rigid body are preferably elongate having their axial dimensions more than five times their combined thickness dimension. The opening is most preferably scalloped leaving opposite edges of the opening cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode with fluid flow convection along the electrode. The passage within the center section might have a generally D shaped cross section.

A method for combining an aspirator attachment and an electrosurgical pencil along an axis and an electrode at a distal end thereof so the aspirator attachment transmits vacuum to remove fluid from a patient's operative site and wherein the aspirator attachment has the semi-rigid body with the passage therethrough that extends predominately parallel to the axis, may include steps. Fitting the body coextensively against the elongate electrosurgical pencil is a step. Conjugating the opening at the distal part of the semi-rigid body generally about the electrode facing toward the patient is another step. Locating the opening by a pencil conjugating end aft of the electrode wherein the conjugating end shaped for generally fluid tight engagement about the distal end of the pencil may be a step. Positioning the electrode coaxially within the opening amid scalloped that leave opposite edges of the opening cut away so as to increase visibility of the electrode, decrease tissue trapping during fluid removal and decrease the temperature of the electrode with fluid flow convection along the electrode might be a step. Connecting in fluid communication a port, at the distal part between the pencil conjugating end and its opening, the passage and the opening can be a step. Locating a connector at the end of the semi-rigid body opposite the opening for a hose for connecting to the vacuum could be a step. Placing a center section substantially adjacent to and coextensive with the electrosurgical pencil and between the port and the connector for joining them is a preferred step. Conjugating the center section with the pencil may be a step. Engaging with an upstanding rib, at the center section connector, the electrosurgical pencil for retaining the generally fluid tight engagement of the opening about the distal end of the pencil and for resisting relative axial movement between the pencil and the attachment by configuring the semi-rigid body for mating with the pencil on a side opposite the controls in a nested engagement for minimizing the overall bulk and resisting rotation between the pencil and the semi-rigid body is preferably a step. Aligning the port and an offset transition of the semi-rigid body

adjacent the pencil conjugating end of the pencil for connecting the port and the center section can be a step. Extending the passage with a generally uniform cross sectional area therethrough from the opening to the connector, for flow that is generally constant might be a step. Including controls on the pencil along a side of the pencil opposite the mating engagement could be a step.

A method for using and combining an aspirator attachment and electrosurgical pencil has steps including placing the electrode coaxially within the opening to extend axially therefrom toward the operative site. Conjugating the aspirator with the end of the pencil opposite the distal end may be a step. Keeping the conjugated aspirator and pencil together in predominantly parallel relationship to the axis can be a step. Carrying the aspirator opposite the pencil controls for permitting undisturbed access to the controls might be a step. Locating the opening coaxially about the electrode at the distal end offset and parallel to the aspirator center section might be a step. Connecting to the opening with the parallel aspirator through a port in the opening with an offset transition extending the passage therebetween could be a step. Transmitting vacuum from a source through the passage, the offset transition and the opening to the environs of the operative site is a preferred step. Keeping the conjugated aspirator and pencil transversely together with the preferred steps of securing the aspirator to the pencil with the pair of clips and preventing the axial movement therebetween with an upstanding rib engaging the pencil at its end opposite the distal end.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of an aspirator attachment for an electrosurgical pencil showing them coupled together for use.

Figure 2 is a view in cross section as would be seen along line 2-2 of Figure 1 showing the conjugation between the aspirator attachment for an electrosurgical pencil.

Figure 3 is a cross sectional view of Figure 1 of the proximal end of the aspirator attachment for an electrosurgical pencil showing a swivel connector and the particular interengagement of the rib and the pencil.

Figure 4 is an enlarged cross sectional view of the distal part of the aspirator attachment for an electrosurgical pencil showing an offset transition and its particular

interengagement with the distal end of the pencil so that the electrode extends therefrom within an opening.

Figure 5 is an enlarged partial perspective view of the scalloped opposite edges of the aspirator opening to increase electrode visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode with fluid flow convection along the electrode.

Figure 6 is an enlarged cross sectional view along line 6-6 of Figure 1 of the center section of the aspirator attachment and in particular the D shaped cross section thereof.

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DETAILED DESCRIPTION OF THE INVENTION

An aspirator attachment 10 for an electrosurgical pencil 11 shown in Figure 1 has an axis "A". The pencil 11 shown in lighter lines with an electrode 12 extending from a distal end 13 thereof is manufactured by Valleylab, Boulder Colorado as model numbers E2515, E2516 or E2550. The aspirator attachment 10 is for transmitting vacuum to remove fluid from a patient's operative site (not shown). A semi-rigid hollow body 14 extends predominately parallel to the axis "A" and contoured to fit coextensively against the elongate electrosurgical pencil 11. The semi-rigid hollow body 14 has a passage 15 therethrough with an opening 16 at the distal part 17 of the semi-rigid hollow body 14. The opening 16 generally about the electrode 12 faces toward the patient.

The distal part 17 includes a pencil conjugating end 18, as best illustrated in Figure 2, aft of the electrode 12 and shaped for generally fluid tight engagement about the distal end 13 of the pencil 11. The cross section of Figure 2 is only one longitudinal half of the semirigid hollow body 14 and the complete assemble is formed of two components that are mirror images of one another made of plastic polymer such as styrene or liquid crystal polymer and ultrasonically welded into a sealed unit that has the fluid tight passage 15. The electrode 12 is coaxially positioned within the opening 16. The opening 16 is scalloped leaving opposite edges 19 and 20 of the opening 16 cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode 12 with fluid flow convection along the electrode 12, see Figure 5.

A port 21 is in the distal part 17 between the pencil conjugating end 18 and its opening 16 facing the patient. The port 21 is in fluid communication with the passage 15 and the opening 16. A connector 22 at the end of the semi-rigid hollow body 14 is located opposite the opening 16, see Figure 2. The connector 22 is shaped for fluid communication with the passage 15 and vacuum for removal of fluid (not shown). A swivel 23, in Figure 3, attaches to a ball shaped connector 22a and permits relative rotation between the pencil 11 and a hose (not shown) for connecting to the vacuum as per Figures 2 and 3. A center section 23 on the semi-rigid body 14 is located substantially adjacent to and coextensive with the electro-surgical pencil 11. The center section 23 between the port 21 and the connector 22 or 22a joins them and is shaped to conjugate with the pencil 11. The center section 23 of the semi-rigid hollow body 14 at the connector 22 or 22a has an upstanding rib 24 shown in Figures 2 and 3; the rib 24 is positioned to engage the electro-surgical pencil 11 and retain the generally fluid tight engagement of the conjugating end 18 about the distal end 13 of the pencil 11. The rib 24 resists relative axial movement between the pencil and the aspirator attachment 10. To resist transverse movement between the pencil 11 and the aspirator attachment 10 it is preferred that, a pair of upstanding clips 25 in figures 1, 2, and 3 near the connector and on the center section 23 are shaped to engage about the pencil 11 at its proximal end 26 for holding the aspirator attachment 10 and the semi-rigid hollow body 14 thereof against the electro-surgical pencil 11. The pair of clips 25 are curved to grip the electro-surgical pencil 11. The pair of clips 25 can be flexible and resiliently spread apart to enhance the grip of the electro-surgical pencil 11. The pencil 11 and the semi-rigid hollow body 14 are elongate, for ergonomics, having their axial dimensions roughly more than five times their combined thickness dimension.

An offset transition 27 of the semi-rigid hollow body 14 is located adjacent the pencil 11 conjugating end 18 as best shown in the enlarged cross section of Figure 4. The offset transition 27 includes the passage 15 therethrough for connecting the port 21 and the center section 23 and for alignment therebetween. The passage 15 has a generally uniform cross sectional area extending therethrough from the opening 16 to the connector 22 or 22a, so that the flow therethrough is generally constant. As seen in Figure 6, the passage 15 within the center section

23 has a generally "D" shaped cross section and the pencil 11 includes controls 28 along a outside thereof. The semi-rigid hollow body 14 is configured to mate with the pencil 11 on an inside 30 opposite the controls 28 in a nested engagement for minimizing the overall bulk and resisting rotation between the pencil 11 and the semi-rigid hollow body 14.

A method for combining aspirator attachment 10 and electrosurgical pencil 11 having axis "A" requires the pencil 11 with its electrode 12 at the distal end 13 thereof. The aspirator attachment 10 transmits vacuum from a source that is not shown as it is not essential to the method but hospitals have vacuum systems including bioburden filtering means to remove air and eliminate hazardous waste products. Vacuum removes fluid including smoke from the operative site and the aspirator attachment 10 has its semi-rigid hollow body 14 with passage 15 therethrough extending predominately parallel to axis "A". The method has steps including fitting the body 14 coextensively against the elongate electrosurgical pencil 11 and conjugating the opening 16 at the distal part 17 of the semi-rigid hollow body 14 generally about electrode 12 to face toward the patient. Locating the opening 16 with the pencil conjugating end 18 aft of the electrode 12 is a step of the method. Conjugating the end 18 shaped for generally fluid tight engagement about the distal end 13 of the pencil 11 is a method step the results of which are shown in the cross sectional views of Figures 2, 3 and 4. The step of positioning electrode 12 coaxially within opening 16 having scalloped edges 19 and 20 leave opposite edges of the opening 16 cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of electrode 12 with fluid flow convection therealong is in the method. Connecting in fluid communication port 21, at distal part 17 between pencil conjugating end 18 and opening 16, passage 15 and opening 16 is a step. Another step of the method includes locating connector 22 or 22a at the end of the semi-rigid hollow body 14 opposite opening 16 for connecting to the vacuum. Placing center section 23 substantially adjacent to and coextensive with electrosurgical pencil 11 and between port 21 and connector 22 or 22a for joining them is a further step in combining them. Then the step of conjugating center section 23 with pencil 11 is performed. Thus engaging upstanding rib 24, at center section 23 near connector 22 or 22a, for retaining electrosurgical pencil in the generally fluid tight engagement with opening 16 about

distal end 13 of pencil 11 and for resisting relative axial movement between pencil 11 and aspirator attachment 10 by configuring semi-rigid hollow body 14 for mating with pencil 11 on inside 30 opposite controls 28 in a nested engagement for minimizing the overall bulk and resisting rotation between pencil 11 and semi-rigid hollow body 14 to realize the method. Aligning port 21 and offset transition 27 of semi-rigid hollow body 14 adjacent pencil conjugating end 18 for connecting port 21 and center section 23 is a step. Thereby extending passage 15 with a generally uniform cross sectional area therethrough from opening 16 to connector 22 or 22a, for flow generally constant through the combination is a step. Including controls 28 on pencil 11 along outside 29 opposite the mating engagement is a step.

A method for using and combining aspirator attachment 10 and electrosurgical pencil 11 having axis "A", includes electrode 12 extending from distal end 13 and aspirator attachment 10 for transmitting vacuum to remove fluid through opening 16 near the operative site. The aspirator attachment 10 has its semi-rigid hollow body 14 with passage 15 therethrough extending predominately parallel to the axis "A". The method has steps including placing electrode 12 coaxially within opening 16 to extend axially therefrom toward the operative site. Conjugating the aspirator attachment 10 with the proximal end 26 of the pencil 11 opposite distal end 13 and keeping conjugated aspirator attachment 10 and pencil 11 together in predominantly parallel relationship to the axis "A" are steps. Carrying the aspirator attachment 10 opposite pencil controls 28 for permitting undisturbed access to controls 28 and locating opening 16 coaxially about electrode 12 at distal part 17 offset and parallel to the aspirator center section 23 are steps. The method includes the steps of connecting to opening 16 with the parallel aspirator attachment 10 through port 21 with offset transition 27 extending passage 15 therebetween and transmitting vacuum from a source through passage 15, offset transition 27 and opening 16 to the environs of the operative site.

The method keeps the conjugated aspirator attachment 10 and pencil 11 together transversely with the steps of securing the aspirator attachment 10 to the pencil 11 with clips 25 and preventing the axial movement therebetween with upstanding rib 24 engaging pencil 11 at its proximal end 26 opposite distal end 13.

5 **What is claimed is:**

1. An aspirator attachment 10 for an electrosurgical pencil 11 having an axis, the pencil with an electrode 12 at a distal end 13 thereof, the for transmitting vacuum to remove fluid from a patient's operative site comprising:
- 10 a semi-rigid hollow body 14 extending predominately parallel to the axis and contoured to fit coextensively against the elongate electrosurgical pencil 11, the semirigid hollow body having a passage 15 therethrough;
- an opening 16 at the distal part 17 of the semi-rigid body, the opening 16 generally about the electrode 12 and facing toward the patient, the distal part 17
- 15 including a pencil conjugating end 18 aft of the electrode 12 and shaped for generally fluid tight engagement about the distal end 13 of the pencil;
- a port 21 in the distal part 17 between the pencil conjugating end 18 and its opening 16 toward the patient, the port 21 in fluid communication with the passage 15 and the opening 16;
- 20 a connector 22 at the end of the semi-rigid body opposite the opening 16, the connector 22 shaped for fluid communication with the passage 15 and vacuum for removal of fluid;
- a center section on the semi-rigid body located substantially adjacent to and coextensive with the electrosurgical pencil 11, the center section between the
- 25 port 21 and the connector 22 for joining them and conjugating with the pencil;
- an offset transition 27 of the semi-rigid body adjacent the pencil conjugating end 18 of the pencil, the offset transition 27 with the passage 15 therethrough for connecting the port 21 and the center section and for alignment therebetween, and
- 30 the passage 15 having a generally uniform cross sectional area extending therethrough from the opening 16 to the connector 22, so that the flow therethrough is generally constant and so the semi-rigid body resists collapse from vacuum therewithin and during handling and use.
2. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim
- 35 1 wherein the electrode 12 is coaxially within the opening 16.
3. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim
- 1 wherein the center section of the semi-rigid body at the connector 22 has an

upstanding rib 24 positioned to engage the electrosurgical pencil 11 and retain the generally fluid tight engagement of the opening 16 about the distal end 13 of the pencil and resist relative axial movement between the pencil and the attachment.

4. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 1 wherein a swivel 23 attached to the connector 22 permits relative rotation between the pencil and a hose for connecting to the vacuum.

5. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 1 wherein the pencil includes controls along a side thereof and the semi-rigid body is configured to mate with the pencil on a side opposite the controls in a nested engagement for minimizing the overall bulk and resisting rotation between the pencil and the semi-rigid body.

6. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 1 wherein the pencil and the semi-rigid body are elongate having their axial dimensions more than five times their combined thickness dimension.

7. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 1 wherein the opening 16 is scalloped leaving opposite edges 19 and 20 of the opening 16 cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode 12 with fluid flow convection along the electrode 12.

8. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 1 wherein the passage 15 within the center section has a generally D shaped cross section.

9. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 1 wherein a pair of upstanding clips 25 near the connector 22 and on the center section are shaped to engage about the pencil for holding the aspirator attachment 10 semirigid body against the electrosurgical pencil 11.

10. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 9 wherein the pair of clips are curved to grip the electrosurgical pencil 11.

11. The aspirator attachment 10 for an electrosurgical pencil 11 of Claim 9 wherein the pair of clips are flexible and resiliently spread apart to grip the electrosurgical pencil 11.

12. An aspirator attachment 10 for an electrosurgical pencil 11 having an axis, the pencil with an electrode 12 at a distal end 13 thereof, the aspirator

attachment 10 for transmitting vacuum to remove fluid from a patient's operative site comprising:

5 a semi-rigid hollow body 14 extending predominately parallel to the axis and contoured to fit coextensively against the elongate electrosurgical pencil 11, the semirigid hollow body having a passage 15 therethrough;

an opening 16 at the distal part 17 of the semi-rigid body, the opening 16 generally about the electrode 12 and facing toward the patient, the distal part 17 including a pencil conjugating end 18 aft of the electrode 12 and shaped for generally fluid tight engagement about the distal end 13 of the pencil, wherein the electrode 10 12 is coaxially within the opening 16, wherein the opening 16 is scalloped leaving opposite edges 19 and 20 of the opening 16 cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode 12 with fluid flow convection along the electrode 12;

15 a port 21 in the distal part 17 between the pencil conjugating end 18 and its opening 16 toward the patient, the port 21 in fluid communication with the passage 15 and the opening 16;

20 a connector 22 at the end of the semi-rigid body opposite the opening 16, the connector 22 shaped for fluid communication with the passage 15 and vacuum for removal of fluid, wherein a swivel 23 attached to the connector 22 permits relative rotation between the pencil and a hose for connecting to the vacuum;

25 a center section on the semi-rigid body located substantially adjacent to and coextensive with the electrosurgical pencil 11, the center section between the port 21 and the connector 22 for joining them and conjugating with the pencil, wherein the center section of the semi-rigid body at the connector 22 has an upstanding rib 24 positioned to engage the electrosurgical pencil 11 and retain the generally fluid tight engagement of the opening 16 about the distal end 13 of the pencil and resist relative axial movement between the pencil and the attachment, wherein the pencil and the semi-rigid body are elongate having their axial dimensions 30 more than five times their combined thickness dimension;

an offset transition 27 of the semi-rigid body adjacent the pencil conjugating end 18 of the pencil, the offset transition 27 with the passage 15

therethrough for connecting the port 21 and the center section and for alignment therebetween, and

the passage 15 having a generally uniform cross sectional area extending therethrough from the opening 16 to the connector 22, so that the flow therethrough is generally constant and wherein the passage 15 within the center section has a generally D shaped cross section and the pencil includes controls along a side thereof and the semi-rigid body is configured to mate with the pencil on a side opposite the controls in a nested engagement for minimizing the overall bulk and resisting rotation between the pencil and the semi-rigid body.

10 13. A method for combining an aspirator attachment 10 and an electro-surgical pencil 11 having an axis, the pencil with an electrode 12 at a distal end 13 thereof, the aspirator attachment 10 for transmitting vacuum to remove fluid from a patient's operative site and the aspirator attachment 10 having a semi-rigid body with a passage 15 therethrough extending predominately parallel to the axis, including the steps of:

fitting the body coextensively against the elongate electro-surgical pencil 11;

conjugating the opening 16 at the distal part 17 of the semi-rigid body generally about the electrode 12 facing toward the patient;

20 locating the opening 16 by a pencil conjugating end 18 aft of the electrode 12, the conjugating end 18 shaped for generally fluid tight engagement about the distal end 13 of the pencil;

positioning the electrode 12 coaxially within the opening 16 amid scalloped that leave opposite edges 19 and 20 of the opening 16 cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode 12 with fluid flow convection along the electrode 12;

connecting in fluid communication a port 21, at the distal part 17 between the pencil conjugating end 18 and its opening 16, the passage 15 and the opening 16;

30 locating a connector 22 at the end of the semi-rigid body opposite the opening 16 for a hose for connecting to the vacuum;

placing a center section substantially adjacent to and coextensive with the electro-surgical pencil 11 and between the port 21 and the connector 22 for joining them;

conjugating the center section with the pencil;

5 engaging with an upstanding rib 24, at the center section connector 22, the electro-surgical pencil 11 for retaining the generally fluid tight engagement of the opening 16 about the distal end 13 of the pencil and for resisting relative axial movement between the pencil and the attachment by configuring the semi-rigid body for mating with the pencil on a side opposite the controls in a nested engagement
10 for minimizing the overall bulk and resisting rotation between the pencil and the semi-rigid body;

aligning the port 21 and an offset transition 27 of the semi-rigid body adjacent the pencil conjugating end 18 of the pencil for connecting the port 21 and the center section;

15 thereby extending the passage 15 with a generally uniform cross sectional area therethrough from the opening 16 to the connector 22, for flow generally constant, and

including controls on the pencil along a side of the pencil opposite the mating engagement.

20 14. An aspirator attachment 10 for an electro-surgical pencil 11 having an axis, the pencil with an electrode 12 at a distal end 13 thereof, the aspirator attachment 10 for transmitting vacuum to remove fluid from a patient's operative site comprising:

a semi-rigid hollow body 14 extending predominately parallel to the
25 axis and contoured to fit coextensively against the elongate electro-surgical pencil 11, the semi-rigid hollow body having a passage 15 therethrough;

an opening 16 at the distal part 17 of the semi-rigid body, the opening 16 generally about the electrode 12 and facing toward the patient, the distal part 17 including a pencil conjugating end 18 aft of the electrode 12 and shaped for generally
30 fluid tight engagement about the distal end 13 of the pencil, wherein the opening 16 is scalloped leaving opposite edges 19 and 20 of the opening 16 cut away so as to increase visibility, decrease tissue trapping during fluid removal and decrease the temperature of the electrode 12 with fluid flow convection along the electrode 12;

a port 21 in the distal part 17 between the pencil conjugating end 18 and its opening 16 toward the patient, the port 21 in fluid communication with the passage 15 and the opening 16;

5 a connector 22 at the end of the semi-rigid body opposite the opening 16, the connector 22 shaped for fluid communication with the passage 15 and vacuum for removal of fluid;

a center section on the semi-rigid body located substantially adjacent to and coextensive with the electrosurgical pencil 11, the center section between the port 21 and the connector 22 for joining them and conjugating with the pencil;

10 an offset transition 27 of the semi-rigid body adjacent the pencil conjugating end 18 of the pencil, the offset transition 27 with the passage 15 therethrough for connecting the port 21 and the center section and for alignment therebetween, and

15 the passage 15 having a generally uniform cross sectional area extending therethrough from the opening 16 to the connector 22, so that the flow therethrough is generally constant and so the semi-rigid body resists collapse from vacuum therewithin and during handling and use.

20 15. An aspirator attachment 10 for an electrosurgical pencil 11 having an axis, the pencil with an electrode 12 at a distal end 13 thereof, the aspirator attachment 10 for transmitting vacuum to remove fluid from a patient's operative site comprising:

a semi-rigid hollow body 14 extending predominately parallel to the axis and contoured to fit coextensively against the elongate electrosurgical pencil 11, the semirigid hollow body having a passage 15 therethrough;

25 an opening 16 at the distal part 17 of the semi-rigid body, the opening 16 generally about the electrode 12 and facing toward the patient, the distal part 17 including a pencil conjugating end 18 aft of the electrode 12 and shaped for generally fluid tight engagement about the distal end 13 of the pencil;

30 a port 21 in the distal part 17 between the pencil conjugating end 18 and its opening 16 toward the patient, the port 21 in fluid communication with the passage 15 and the opening 16;

a connector 22 at the end of the semi-rigid body opposite the opening 16, the connector 22 shaped for fluid communication with the passage 15 and vacuum for removal of fluid;

a center section on the semi-rigid body located substantially adjacent
5 to and coextensive with the electrosurgical pencil 11, the center section between the port 21 and the connector 22 for joining them and conjugating with the pencil, wherein the center section of the semi-rigid body at the connector 22 has an upstanding rib 24 positioned to engage the electrosurgical pencil 11 and retain the generally fluid tight engagement of the opening 16 about the distal end 13 of the
10 pencil and resist relative axial movement between the pencil and the attachment;

an offset transition 27 of the semi-rigid body adjacent the pencil conjugating end 18 of the pencil, the offset transition 27 with the passage 15 therethrough for connecting the port 21 and the center section and for alignment therebetween, and

15 the passage 15 having a generally uniform cross sectional area extending therethrough from the opening 16 to the connector 22, so that the flow therethrough is generally constant and so the semi-rigid body resists collapse from vacuum therewithin and during handling and use.

16. An aspirator attachment 10 for an electrosurgical pencil 11 having an
20 axis, the pencil with an electrode 12 at a distal end 13 thereof, the aspirator attachment 10 for transmitting vacuum to remove fluid from a patient's operative site comprising:

a semi-rigid hollow body 14 extending predominately parallel to the axis and contoured to fit coextensively against the elongate electrosurgical pencil 11,
25 the semirigid hollow body having a passage 15 therethrough;

an opening 16 at the distal part 17 of the semi-rigid body, the opening 16 generally about the electrode 12 and facing toward the patient, the distal part 17 including a pencil conjugating end 18 aft of the electrode 12 and shaped for generally fluid tight engagement about the distal end 13 of the pencil;

30 a port 21 in the opening 16 between the pencil conjugating end 18 and its opening 16 toward the patient, the port 21 in fluid communication with the passage 15 and the opening 16;

a connector 22 at the end of the semi-rigid body opposite the opening 16, the connector 22 shaped for fluid communication with the passage 15 and vacuum for removal of fluid;

5 a center section on the semi-rigid body located substantially adjacent to and coextensive with the electrosurgical pencil 11, the center section between the port 21 and the connector 22 for joining them and conjugating with the pencil, wherein the pencil includes controls along a side thereof and the semi-rigid body is configured to mate with the pencil on a side opposite the controls in a nested engagement for minimizing the overall bulk and resisting rotation between the pencil
10 and the semi-rigid body;

an offset transition 27 of the semi-rigid body adjacent the pencil conjugating end 18 of the pencil, the offset transition 27 with the passage 15 therethrough for connecting the port 21 and the center section and for alignment therebetween, and

15 the passage 15 having a generally uniform cross sectional area extending therethrough from the opening 16 to the connector 22, so that the flow therethrough is generally constant and so the semi-rigid body resists collapse from vacuum therewithin and during handling and use.

17. A method for using and combining an aspirator attachment 10 and an
20 electrosurgical pencil 11 having an axis, the pencil with an electrode 12 at a distal end 13 thereof, the aspirator attachment 10 for transmitting vacuum to remove fluid through an opening 16 at a patient's operative site and the aspirator attachment 10 having a semi-rigid body with a passage 15 therethrough extending predominately parallel to the axis, including the steps of:

25 placing the electrode 12 coaxially within the opening 16 to extend axially therefrom toward the operative site;

conjugating the aspirator with the end of the pencil opposite the distal
end 13;

30 keeping the conjugated aspirator and pencil together in predominantly parallel relationship to the axis;

carrying the aspirator opposite the pencil controls for permitting undisturbed access to the controls;

locating the opening 16 coaxially about the electrode 12 at the distal part 17 offset and parallel to the aspirator center section;

connecting to the opening 16 with the parallel aspirator through a port 21 in the opening 16 with an offset transition 27 extending the passage 15 therebetween, and

transmitting vacuum from a source through the passage 15, the offset transition 27 and the opening 16 to the environs of the operative site.

18. The method for using and combined an aspirator attachment 10 and an electrosurgical pencil 11 of Claim 17 with the step of keeping the conjugated aspirator and pencil together transversely with the steps of securing the aspirator to the pencil with a pair of clips and preventing the axial movement therebetween with an upstanding rib 24 engaging the pencil at its end opposite the distal end 13.

19. The method for using and combined an aspirator attachment 10 and an electrosurgical pencil 11 of Claim 17 with the step of Assembling the semirigid body with ultrasonic energy into a fluid tight passage 15 from mirror image components of polymeric plastic.

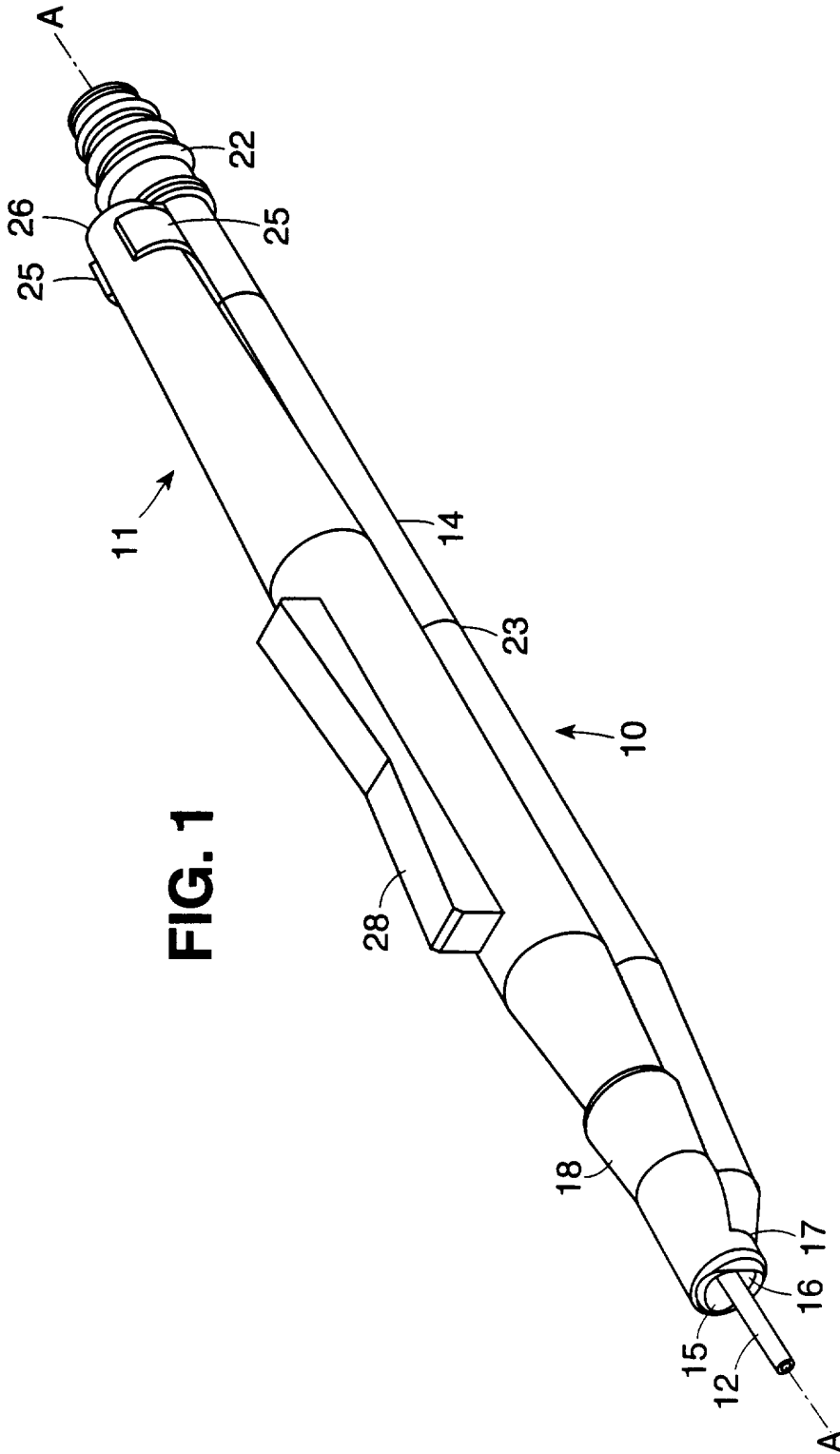


FIG. 1

FIG. 2

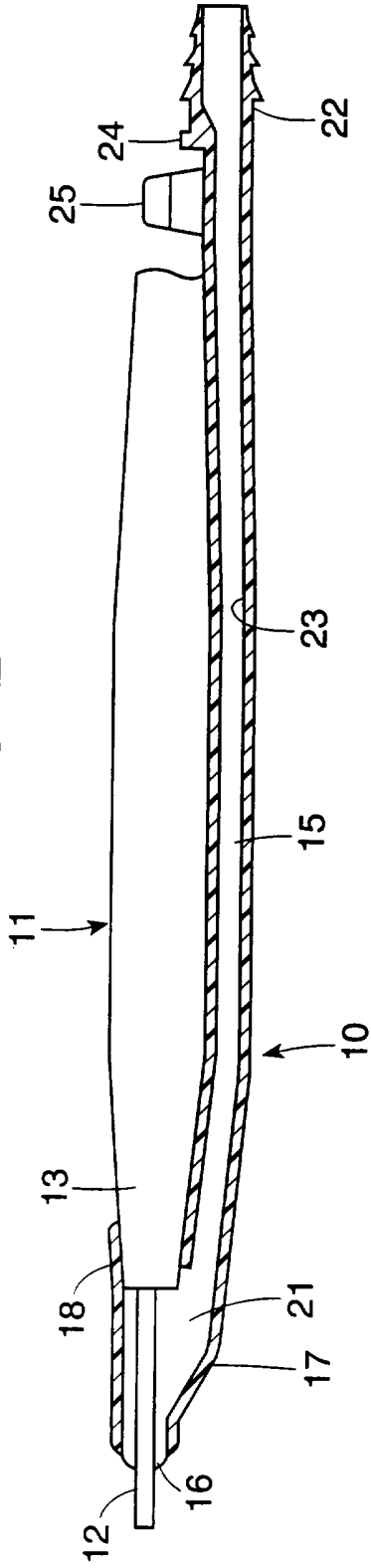


FIG. 3

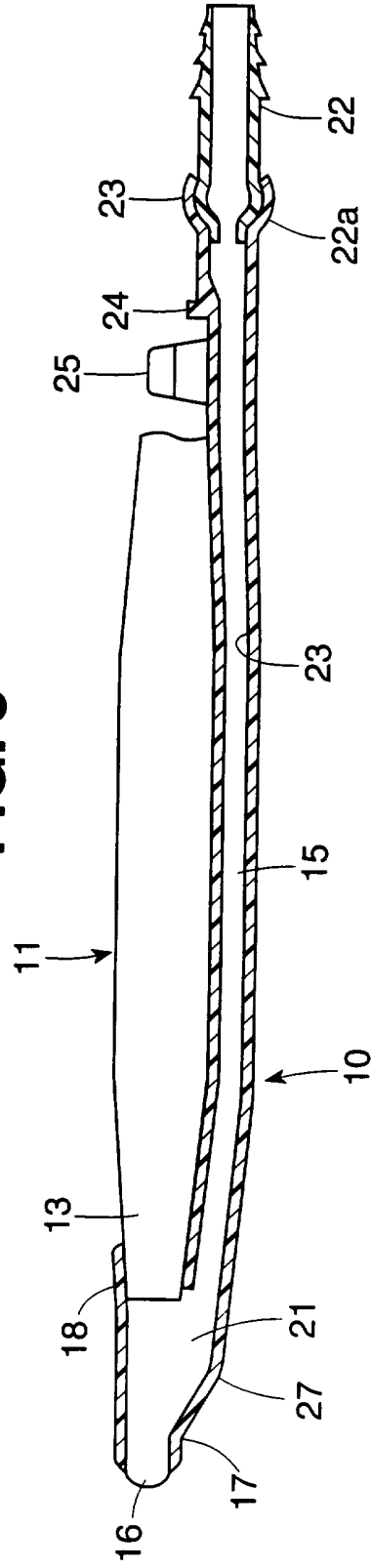


FIG. 4

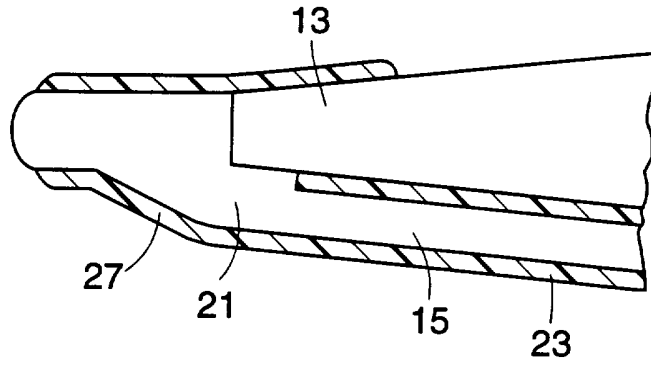


FIG. 5

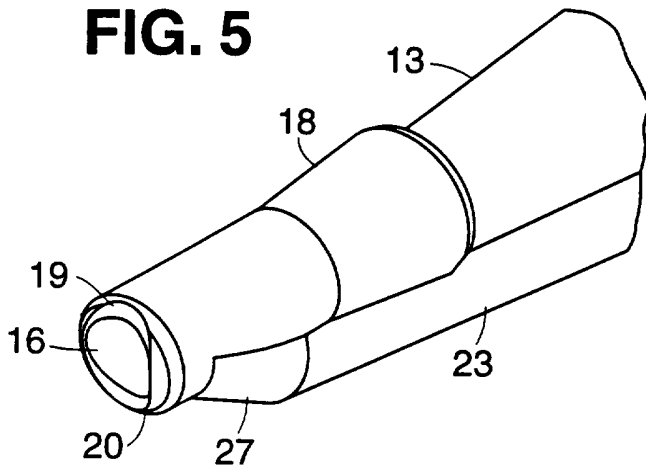
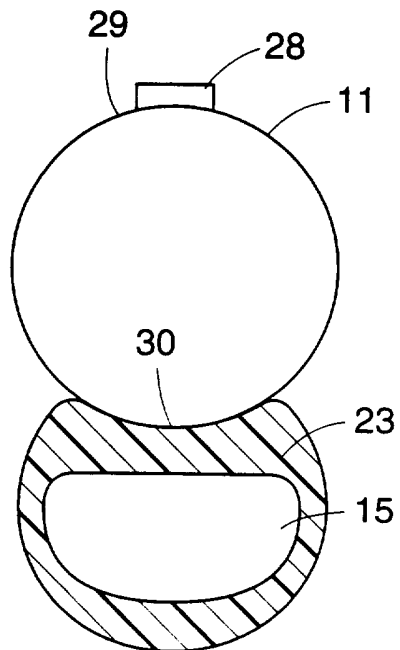


FIG. 6



INTERNATIONAL SEARCH REPORT

Intern. Application No
PCT/IB 96/00003

A. CLASSIFICATION OF SUBJECT MATTER

A 61 B 17/39

According to International Patent Classification (IPC) or to both national classification and IPC ⁶

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A 61 B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5 154 709 (JOHNSON) 13 October 1992 (13.10.92), the whole document.	1-19
Y	US, A, 5 224 944 (ELLIOTT) 06 June 1993 (06.07.93), fig. 1 (cited in the application).	1-19

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search
27 March 1996

Date of mailing of the international search report

17. 04. 96

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ANHANG

zum internationalen Recherchen-
bericht über die internationale
Patentanmeldung Nr.

ANNEX

to the International Search
Report to the International Patent
Application No.

ANNEXE

au rapport de recherche inter-
national relatif à la demande de brevet
international n°

PCT/IB 96/00003 SAE 122767

In diesem Anhang sind die Mitglieder
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US A 5154709	13-10-92	keine - none - rien	
US A 5224944	06-07-93	keine - none - rien	