P/00/001
Section 29

AUSTRALIA
Patents Act 1990

636991

PATENT REQUEST : STANDARD PATENT

We being the person identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Applicant:	CRITIKON, INC
Address:	4110 George Road, Tampa, Florida, 33634, United States
Nominated Person:	CRITIKON, INC
Address:	4110 George Road, Tampa, Florida, 33634, United States
Invention Title:	THROUGH THE NEEDLE CATHETER INSERTION DEVICE AND TECHNIQUE
Names of Actual Inventors:	ROBERT H CAMERON and ROBERT DOMAN
Address for Service:	GRIFFITH HACK & CO 71 YORK STREET SYDNEY NSW 2000
Attorney Code:	GH

DIVISIONAL APPLICATION DETAILS

Original Appln No:	43527/89
Person by Whom Made:	Critikon, Inc

DATED this 4th day of July 1991

CRITIKON, INC
By their Patent Attorney

GRIFFITH HACK & CO

P/00/008
Section 29(1)
Regulation 3.1(2)

AUSTRALIA

Patents Act 1990

NOTICE OF ENTITLEMENT

We CRITIKON, INC

of 4110 George Road, Tampa, Florida, 33634, United States

being the applicant in respect of the application, state the following:

The name and address of each actual inventor of the invention is as follows:

Robert H Cameron of 13704 Halliford Drive, Tampa, Florida 33634, United States and Robert Doman, of 15914 Dover Cliffe Drive, Lutz, Florida 33549; respectively

and the applicant is entitled to make this application by virtue of an assignment from the inventors of the invention to the applicant.

DATED this 4th day of July 1991

CRITIKON, INC
By their Patent Attorney

GRIFFITH HACK & CO

GH&CO REF: 17660-AG DJH/KLS

8532A/KLS

AU9180203

(12) PATENT ABRIDGMENT (11) Document No. AU-B-80203/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 636991

(54) Title
THROUGH THE NEEDLE CATHETER INSERTION DEVICE AND TECHNIQUE

International Patent Classification(s)
(51)[5] A61M 025/06 A61M 025/02

(21) Application No. : 80203/91 (22) Application Date : 04.07.91

(30) Priority Data

(31) Number	(32) Date	(33) Country
259649	19.10.88	US UNITED STATES OF AMERICA
260142	20.10.88	US UNITED STATES OF AMERICA

(43) Publication Date : 19.09.91

(44) Publication Date of Accepted Application : 13.05.93

(62) Related to Division(s) : 43527/89

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(56) Prior Art Documents
US 4743265
US 4702735

(57) Claim

1. A through the needle catheter device of the type in which, in a first position the catheter is arranged to be located within a needle having a proximal end and a distal end adapted to enable insertion of the needle and catheter into a blood vessel of a patient, the needle being able to be withdrawn from the blood vessel to a second position leaving the distal end of the catheter emplaced in the blood vessel, the device comprising:

a needle assembly including a housing and means connected to the proximal end of the needle for withdrawing the needle into the housing at the second position;

means for splitting the needle on withdrawal of the needle to enable removal of the catheter from the needle;

a catheter assembly including the catheter and being suitable for releasable connection with the needle assembly when the catheter tube is located within the needle; and

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means cooperating with the catheter assembly for preventing proximal motion of the catheter as the catheter and needle are introduced into the patient.

P/00/011
Regulation 3.2

636991

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT
ORIGINAL

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Invention Title: THROUGH THE NEEDLE CATHETER INSERTION DEVICE AND TECHNIQUE

The following statement is a full description of this invention, including the best method of performing it known to me/us:

GH&CO REF: 17660-AG DJH/KLS

This invention is a divisional application of 43527/89, the contents of which are hereby incorporated by reference and relates to catheter devices for the administration and withdrawal of fluids from a patient and, in particular, to such catheter devices in which a catheter is emplaced by a hollow insertion needle containing the catheter cannula.

Catheters are used in various medical procedures to administer fluids to a patient or to withdraw body fluids from a patient. Since catheters are generally made of a flexible plastic material such as Teflon or various polymers, a needle is used to access a vein or artery in the body in order to introduce the catheter into a blood vessel. Catheters may be categorized as using one of the two widely known insertion techniques. A first technique is the over-the-needle technique, in which the catheter is initially coaxially mounted on the needle. The needle with its surrounding catheter cannula is inserted through the skin until the tip of the needle pierces and enters the blood vessel. Proper location of the needle tip is usually noted by a small flow of blood through the needle and into a flash chamber in the needle hub. With the tip of the needle properly located in the blood vessel, the catheter can then slide into the vessel and the needle is withdrawn from the catheter and disposed of. The emplaced catheter is then usually taped to the skin of the patient and tubing from a fluid source is connected to an attachment hub on the proximal end of the catheter.

The second insertion technique is known as the through-the-needle technique. In this technique the catheter is initially located inside the lumen of the needle. The needle with its enclosed catheter is inserted through the skin and into the blood vessel until the needle

tip is properly located in the vessel. The needle is then withdrawn from the body, leaving the catheter emplaced with the distal end of the catheter cannula located in the vessel. However, the needle cannot be easily removed and disposed of because of the interference of the catheter hub at the proximal end of the catheter. Accordingly, the common solution to this problem with the through-the-needle catheter is to remove the needle from the catheter by splitting it, as is illustrated in US Patents 3,596,658; 3,382,872; 4,100,893, 4,306,652; 4,401,433, 4,449,973, 4,559,043; 4,610,691; and 4,743,265, among others. As these patents illustrate, the needle may be made splittable by forming the needle of two longitudinally aligned halves, or by longitudinally scoring or perforating the body of the needle. A mechanism is attached to the two longitudinal halves of the needle which may be grasped by the user. As the needle is withdrawn the mechanism is manipulated to split the two halves of the needle apart, thereby separating the disposable needle halves from the enclosed catheter.

The present inventors have found that several problems can arise during the use of a through the needle catheter. As the needle and its enclosed catheter penetrate the skin and the blood vessel, the resistance of the tissue being penetrated can oppose the insertion of the catheter. This resistance can cause the distal end of the catheter to retract from the needle tip location.

In a first aspect, the present invention provides a through the needle catheter device of the type in which, in a first position the catheter is arranged to be located within a needle having a proximal end and a distal end adapted to enable insertion of the needle and catheter into a blood vessel of a patient, the needle being able to be withdrawn from the blood vessel to a second position leaving the distal end of the catheter emplaced in the blood vessel, the device comprising:

a needle assembly including a housing and means connected to the proximal end of the needle for withdrawing the needle into the housing at the second position;

'means for splitting the needle on withdrawal of the needle to enable removal of the catheter from the needle;

a catheter assembly including the catheter tube and being suitable for releasable connection with the needle assembly when the catheter tube is located within the needle; and

means cooperating with the catheter assembly for preventing proximal motion of the catheter as the catheter and needle are introduced into the patient.

~~are provided for preventing proximal motion of said~~ catheter as said catheter ~~and needle~~ are introduced into ~~the patient.~~

Once the needle tip and catheter have been properly located in the blood vessel, the needle can be withdrawn from the insertion site. However, the present inventors have found that it is often desirable to extend or "thread" the catheter into the blood vessel before the needle is withdrawn. When the catheter is threaded into the blood vessel, the user is confident that proper catheter placement has been attained before the needle is withdrawn from the body. In accordance with a preferred embodiment of the present invention, means are provided for advancing the catheter to an extended position from the tip of the needle prior to withdrawal of the needle.

The present inventors have found that a further problem can arise as the catheter is threaded or advanced into the blood vessel and as the needle is withdrawn for splitting. As these procedures take place, the body of the catheter is passing through the distal tip of the needle. Since the needle tip is pointed and sharpened about the lumen, the present inventors have recognised the hazard of accidental perforation or shearing of the catheter by the sharp distal end of the needle. In particular, this hazard is most severe should the needle and catheter reverse their relative toward one another. In accordance with a further embodiment of the present invention, this hazard is reduced by preventing relative movement of the needle tip toward the distal end of the catheter as the needle is withdrawn from the body. In accordance with this embodiment the present invention, such relative movement is also retarded during advancement or threading of the catheter prior to withdrawing the needle from the body.

A through-the-needle catheter generally comprises two major assemblies: a needle and needle splitter assembly, and a catheter and tubing attachment assembly. In

accordance with the embodiments of the present invention, the catheter and tubing attachment assembly includes a catheter cannula connected to an extension set. The extension set includes a section of microbore tubing connected to the catheter cannula with a leur connected to the proximal end of the microbore tubing. Proximal the distal end of the microbore tubing is a taping wing, biased in location toward the side of the extension set which is intended to contact the patient when the wing is taped to the patient's body. The taping wing utilizes a flexible, intermediate living hinge, which enables the taping wing to conform to the patient's body. In a preferred embodiment the taping wing is attached to the underside of a catheter hub. When the catheter is threaded into the body up to the catheter hub, which is desired to prevent kinking or "pistoning" of the catheter, the catheter may be affixed in place by taping the wing to the body at the insertion site.

The present inventors have found that numerous ways may be devised to connect the needle assembly to the catheter assembly. However, the present inventors have found that use of a through-the-needle catheter assembly is greatly enhanced by enabling the detachment of the two assemblies by dropping the catheter assembly out from the bottom (patient-contacting side) relative to the needle and splitter assembly. Thus, as the needle is withdrawn from the body and split away from the catheter, the needle assembly can be removed by lifting it upward relative to the body, leaving the catheter assembly in place in its desired position on the body.

In the drawings:

FIGURES 1a-1d illustrate various views of a housing for a catheter constructed in accordance with the present invention;

FIGURES 2a-2c illustrate an extension set assembly for the catheter of the present invention;

FIGURES 3a-3d illustrate a needle assembly for the catheter of the present invention;

FIGURES 4 illustrates a leaf spring for use with the needle assembly of FIGURES 5a-5d;

FIGURES 5a-5d illustrate a needle assembly for the catheter of the present invention utilizing the leaf spring of FIGURE 4;

FIGURE 6 illustrates the needle assembly of FIGURES 5a-5d in engagement with the extension set assembly of FIGURES 2a-2c;

FIGURE 7 illustrates a fully assembled catheter constructed in accordance with the principles of the present invention;

FIGURES 8, 9, and 10 illustrate top, side and bottom views of a through the needle catheter of the present

invention which may be used to perform the inventive insertion technique;

FIGURES 11a and 11b illustrate top and side views of the catheter of FIGURES 8, 9, and 10 after the catheter has been threaded into a blood vessel; and

FIGURES 12a and 12b illustrate top and side views of the catheter of FIGURES 11a and 11b after the needle has been withdrawn.

Referring first to FIGURES 1a-1c, a housing 10 for a through-the-needle catheter is shown. The housing 10 is generally elongated in shape and has a distal end 12 through which the catheter and needle extend and a proximal end 14. The needle and catheter extend through an aperture 16 at the distal end when the catheter device is fully assembled. The housing 10 contains a hollow passageway 18 through which the needle assembly may travel. The needle assembly slides on rails 20 which are formed along the bottom 19 of the housing. The rails 20 extend from the proximal end 14 of the housing to their termination at location 22 near the distal end of the housing. The bottom of the housing 10 is open, thereby allowing the extension set assembly to be released through the bottom of the housing. At the proximal end of the rails are end stops 21, which prevent the needle assembly from sliding out the proximal end of the passageway 18. The open bottom of the housing is widened distal the rail termination points 22 to form an open space 24 where the taping wing of the extension set is located in the assembled catheter device.

At the top of the housing 10 is a push tab 26 which is used to insert the needle and catheter. Also formed on the

top of the housing are a series of teeth 30. These teeth interact with the leaf of the needle assembly to prevent distal motion of the needle as the needle is withdrawn from the patient.

Referring to FIGURES 2a-2c, the extension set assembly of the catheter device is shown
At the distal end of the extension set is the catheter cannula 40. The catheter cannula is connected through a junction 44, molded as a part of taping wing 42, to microbore extension tubing 46. As used herein, microbore tubing refers to tubing with an inside diameter of one-eighth inch or less. Microbore tubing is preferred for the extension set because its small interior diameter can be completely filled with only a very small volume of blood. Thus it is possible to detect the passage of blood through the tubing when the needle tip is properly located in the blood vessel after passage of only a small volume of blood into the extension set.

At the proximal end of the tubing 46 is a female luer 48 having luer lugs 47 at the proximal end. A flashplug 49 is inserted into the open end of the luer 48 to prevent the passage of blood out of the luer as the catheter and needle are being inserted. Once the catheter is properly emplaced and the needle is removed, the flashplug is removed and tubing from a fluid source is attached to the luer to supply fluid to the patient.

A view of the distal end of the extension set is shown in FIGURE 2b. The taping wings 42 extend outwardly from the junction 44 at the bottom (i.e., patient contacting side) of the extension set. The taping wings are located at the proximal end of the catheter cannula 40, enabling the wings to be taped immediately adjacent the insertion side when the

catheter is fully inserted into the body. By taping the wings as close to the insertion site as possible, kinking and pistoning of the catheter cannula is minimized. The taping wings 42 are thinned in the proximity of the junction 44 to form hinges 54 for the wings. The hinged wings can thus bend at the hinges to conform to the shape of the body surface at the insertion site.

The catheter 40 is shown extending from the junction 44. The outer surface 56 of the junction on either side of the catheter and extending proximal the catheter are tapered to form a cam surface. As the needle is withdrawn relative to the catheter by the needle assembly, the needle is split by these cam surfaces 56. It may be appreciated that the cam surfaces could also be formed in the housing 10 at the location of the aperture 16, in which case the surfaces 56 would extend downward from the interior of the housing and be located on either side of the catheter cannula.

The top of the junction 44 is extended to form ridges 52 as shown in FIGURE 2b. These ridges enable the junction 44 and the taping wings to be engaged and held in position by the needle assembly prior to needle splitting, as will be discussed below.

FIGURE 2c shows the extension tubing 46 and catheter cannula 40 when positioned in the junction 44. The tubing and cannula are affixed in place to form a leak-free fluid path, as by adhesive or ultrasonic bonding. The cam surfaces 56 are also clearly shown in FIGURE 2c.

Referring to FIGURES 3a-3d, the needle assembly of a catheter device is shown. A splittable needle 60 is attached to the distal end of the needle assembly 70, as by affixing the split ends of the

needle into holes in the needle assembly slide 74. Lower edges 76 of the distal slide 74 enable the slide 74 to engage the junction 44 by overlapping ridges 52 of the extension set junction. When so engaged, the extension set is retained in the catheter device prior to the splitting of the needle. The slide 74 extends through the opening 80 of the proximal needle assembly grip 72. The outer dimensions of the slide 74 are determined so that the slide 74 will engage and slide through the passageway 18 of the housing, held in place by the lower rails 20 of the housing. The body of the housing 10 passes through the opening 80 of the grip 72 as the needle assembly slides relative to the housing.

As shown in the top view of FIGURE 3a and the side view of FIGURE 3b, a leaf or tongue 62 is molded to extend from the distal side of the grip 72. The leaf 62 will engage the teeth 30 on top of the housing as the needle assembly slides in the proximal direction to split the needle. The engagement of the leaf 62 and the teeth 30 prevent inadvertent forward movement of the needle assembly relative to the catheter cannula during needle splitting. The integral leaf 62 is also shown in the front view of the needle assembly of FIGURE 3c and in the rear view of FIGURE 3d.

The grip 72 has an aperture 78 extending from the bottom of the grip. This aperture is for passage of the extension tubing 46 of the assembled catheter device, and enables the extension set assembly to be disengaged through the bottom of the catheter device.

FIGURE 4 illustrates a leaf spring 90 which may be utilized in place of the integral leaf 62. The leaf spring 90 has a proximal upward surface 92, two distal upward

surfaces 94, and a tongue 96. FIGURES 5a-5d illustrate the needle assembly of FIGURES 3a-3d with the leaf spring 90 engaging the grip 72 and functioning in the same manner as the leaf 62.

In FIGURE 6, the extension set assembly is attached to the needle assembly 70 by the engagement of the junction 44 within the needle slide 74. The catheter cannula 40 is then located within the splittable needle 60. The extension tubing 46 extends proximal the junction 44 and through the bottom aperture 78 of the grip 72.

FIGURE 7 shows the fully assembled through-the-needle catheter device. As the needle 60 containing the catheter cannula 40 is inserted into the skin, any rearward movement of the catheter is prevented by the abutment of the rear of the taping wings against the lower edge 22 of the housing at the distal end of the rails 20. When the catheter and needle are properly inserted, as indicated by visible blood in the junction 44 and extension tubing 46, the grip 72 is grasped and the needle assembly is moved to the rear, thereby splitting the needle 60. As the needle assembly 70 moves rearward, the junction 44 disengages from the slide 74 and the extension set is thereafter free to drop from the bottom of the catheter device. The housing and needle assembly are then simply lifted up from the extension set assembly without disturbing the extension set and its emplaced catheter. It may be appreciated that if disengagement of the extension set would have to be done by lifting the extension set upward to remove an underlying housing and needle assembly, the emplaced catheter could readily become dislodged from the blood vessel.

In more conventional over-the-needle catheters, a flash

chamber is located proximal the needle to retain and display blood from a proper needle insertion. In the catheter assembly shown such an arrangement is not possible, for the blood initially flows through the catheter, not the needle. Accordingly, the housing, needle assembly and extension set together cooperate to provide the function of the flash chamber. As blood enters the junction 44, it is visible through the junction, which is preferably made of a transparent or translucent material. Likewise, the overlying needle assembly slide 74 and housing 10 are also made of a transparent or translucent material so that the appearance of blood in the junction 44 may be seen through these components. Most preferably all components with the exception of the catheter and needle are translucent or transparent so that blood flow into the junction 44 and extension tubing 46 can be readily seen through the overlying housing and needle assembly.

A further embodiment is shown in FIGURES 8, 9, and 10. The reference numerals used in these FIGURES are incremented by 100 as compared with reference numerals used in the previous FIGURES to refer to components which perform substantially the same function in the several embodiments.

As shown in FIGURES 8, 9, and 10, the catheter device of these FIGURES has a housing including a distal end 112 which divides into two U-shaped proximal sections 110 and 110' with an opening 111 therebetween. The proximal end of the device is indicated at 114. Riding on the sections 110 and 110' and extending therebetween is a grip 172 of a needle assembly 170. The grip 172 includes two integrally formed leaves or tongues 162, 162' which engage teeth 130 on the bottom of the sections 110, 110'. An extension set

configured as shown in FIGURES 2a-2c is mounted on the bottom of the device, held in place by engagement of the extension set junction 144 with the distal slide 174 of the needle assembly. The distal end of the slide 174 is indicated at 175. A splittable needle 160 extends from the distal end of the slide 174 and through the distal end 112 of the housing. Located distal the needle assembly grip 172 and similarly riding on the sections 110 and 110' and extending therebetween is a needle threading slide 182. The needle threading slide 182 includes a pair of integral leaves or tongues 184, 184', similar to tongues 162, 162', which engage the teeth 186 on the top of the housing as the slide 182 moves forward toward the distal end of the device. The needle threading slide 182 also includes a downward extending catheter advancement arm 188. When the slide 182 is positioned as shown in FIGURES 8 and 9, the arm 188 abuts against the proximal end of the extension set junction 144.

The catheter device of FIGURES 8, 9, and 10 is inserted through the skin of a patient and into a blood vessel as configured in these FIGURES. The present inventors have determined that the needle 160 should extend at least 1/4" from the distal end of the housing of a catheter device intended for adult applications and preferably approximately 5/8" from the distal end of the housing. For pediatric applications the needle should extend at least 3/16" from the distal end of the housing and preferably approximately 1/2" from the distal end of the housing. A suitable needle for adult applications would have an I.D. of 0.036" and an O.D. of 0.042", for example, and a suitable needle for pediatric applications would have an I.D. of 0.022" and an O.D. of 0.028", for example. Once the tip of the needle has been properly located in the vessel, blood will flow through the needle and catheter and be visible as it enters the

junction 144 and extension tubing (not shown in these FIGURES) extending from the rear of the junction 144. This blood flow is visible through the transparent material of the housing. With the needle properly located, the catheter cannula 140 is threaded into the blood vessel by advancing the needle threading slide 182 in the distal direction. Advancement of the slide 182 causes the arm 188 to push the catheter cannula forward by pushing against the proximal end of the junction 144. Inadvertent rearward motion of the catheter cannula relative to the needle, which could cause the sharp needle tip to perforate or shear the cannula, is prevented by the engagement of the leaves 184, 184' with the teeth 186, which do not allow the needle threading slide to travel in the proximal direction. The present inventors have determined that it is desirable to be able to extend the catheter during threading to a position where the distal end of the catheter cannula is advanced at least 1/8" beyond the needle tip of an adult catheter device, and preferably approximately 3/8" beyond the needle tip. For pediatric applications the catheter cannula should advance at least 1/16" beyond the needle tip, and preferably approximately 1/4" beyond the needle tip. A suitable catheter for adult applications would have an I.D. of 0.025" and an O.D. of 0.035", for example, and a suitable catheter for pediatric applications would have an I.D. of 0.014" and an O.D. of 0.020", for example. FIGURES 11a and 11b illustrate the position of the needle threading slide and catheter after the catheter cannula has been advanced beyond the needle tip. As may be seen by the location of the distal end 175 of the needle assembly slide 174, the extension set is still retained in engagement with the housing and needle assembly by the engagement of the needle assembly slide with the extension set junction 144 as previously explained in the discussion of FIGURE 6.

FIGURES 12a and 12b illustrate the catheter device after the needle has been retracted from the insertion site. As the needle assembly is moved rearward by sliding the grip 172, the leaves 162, 162' of the grip engage the teeth 130 on the bottom of the housing. This engagement prevents any inadvertent forward motion ofthe needle relative to the catheter which could perforate or shear the catheter cannula. After the needle 160 is fully withdrawn and split, it is located inside the housing as shown in FIGURE 12b. The rearward travel of the needle assembly also causes the needle assembly slide 174 to release the junction 144 of the extension set, thereby permitting the extension set to drop from the bottom of the device and remain in its emplacement in the patient.

It may be appreciated that modification of the embodiment of FIGURES 8-12b will be apparent to those skilled in the art. For example, it may be desirable to locate the teeth 130, 130' on the sides or top of the housing in order to present a smooth bottom of the device. The tongues 162, 162' would also likewise be repositioned on the grip 172. With the device of these FIGURES modified to extend the range of travel of the slide 182 and the extension set, it is further possible to withdraw the catheter inside the needle or even completely inside the housing prior to needle insertion. Once the needle has been inserted, the catheter may then be threaded through the inserted needle and into the blood vessel. In the illustrated embodiments the distal tip of the catheter is normally located just inside the needle tip during insertion.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A through the needle catheter device of the type in which, in a first position the catheter is arranged to be located within a needle having a proximal end and a distal end adapted to enable insertion of the needle and catheter into a blood vessel of a patient, the needle being able to be withdrawn from the blood vessel to a second position leaving the distal end of the catheter emplaced in the blood vessel, the device comprising:

a needle assembly including a housing and means connected to the proximal end of the needle for withdrawing the needle into the housing at the second position;

means for splitting the needle on withdrawal of the needle to enable removal of the catheter from the needle;

a catheter assembly including the catheter and being suitable for releasable connection with the needle assembly when the catheter tube is located within the needle; and

means cooperating with the catheter assembly for preventing proximal motion of the catheter as the catheter and needle are introduced into the patient.

2. A through the needle catheter device as claimed in claim 1, wherein the catheter assembly comprises an extension tube having a first end to which the proximal end of the catheter is connected and a second end to which a luer is connected.

3. A through the needle catheter device as claimed in claim 2, wherein the catheter assembly further comprises a taping wing located at or adjacent the proximal end of the catheter.

4. A through the needle catheter device as claimed in any one of claims 1 to 3 wherein the means connected to the needle proximal end is slidingly mounted to the

housing such that the sliding thereof to the second position causes the needle to be withdrawn from the catheter, and wherein in the first position the proximal end of the needle is arranged to be located within the housing with the remainder of the needle extending outside the housing.

5. A through the needle catheter device as claimed in any one of claims 1 to 4, wherein the means for splitting the needle is located on the catheter assembly and is arranged to engage the needle to cause splitting of the needle on movement of the needle assembly from the first to the second position.

6. A through the needle catheter device as claimed in any one of claims 1 to 5, wherein the housing incorporates a cut out portion incorporating a wall surface against which the catheter assembly is arranged to abut in the first position to provide the means for preventing proximal motion of the catheter as the catheter and needle are introduced into the patient.

7. A through the needle catheter device as claimed in any one of claims 1 to 6 further comprising means for preventing relative motion of the needle and the distal end of the catheter towards one another as the needle is withdrawn.

8. A through the needle catheter device as claimed in claim 7, wherein the needle assembly further comprises locating means secured to the body portion and wherein the means for preventing relative motion of the needle and the distal end of the catheter towards one another as the needle is withdrawn comprises interengaging means operable between the locating means and the housing.

9. A through the needle catheter device as claimed in claim 7, wherein the needle assembly further comprises

locating means secured to the body portion and wherein the means for preventing the proximal motion of the catheter as the catheter and needle are introduced into the patient comprise mounting means arranged to mount the catheter assembly to the housing in the first position, the mounting means being further arranged to enable the catheter assembly to be movable in a direction towards the distal end of the needle thereby enabling the catheter to be threaded through the needle, the catheter device being further arranged such that the means for preventing the relative motion of the needle and the distal end of the catheter towards one another as the needle is withdrawn comprises interengaging means operable between the locating means and the housing.

10. A through the needle catheter device as claimed in claim 9, wherein the mounting means comprises a ratchet assembly operable between the catheter assembly and the housing.

11. A through the needle catheter device as claimed in any one of claims 8 to 10, wherein the interengaging means comprises a ratchet.

12. A through the needle catheter device as claimed in any one of claims 1 to 11, wherein on movement of the needle assembly to the second position, the catheter assembly is able to disengage both the housing and the needle assembly on the patient side of the catheter device.

13. A through the needle catheter device as claimed in any one of claims 1 to 12 further comprising means for [illegible] blood flowing into the catheter assembly.

14. A through the needle catheter device as claimed in claim 1 and substantially as herein described with reference to the accompanying drawings.

Dated this 2nd day of February 1993

CRITIKON, INC.
By their Patent Attorneys
GRIFFITH HACK & CO.

ABSTRACT

A through the needle catheter device is disclosed which is arranged to resist proximal motion of the catheter as the catheter and needle are introduced into a patient.

FIG-1a

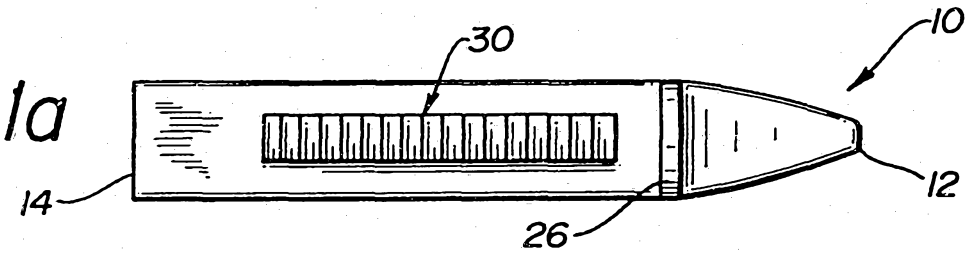


FIG-1d

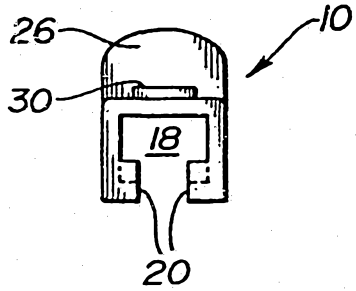


FIG-1b

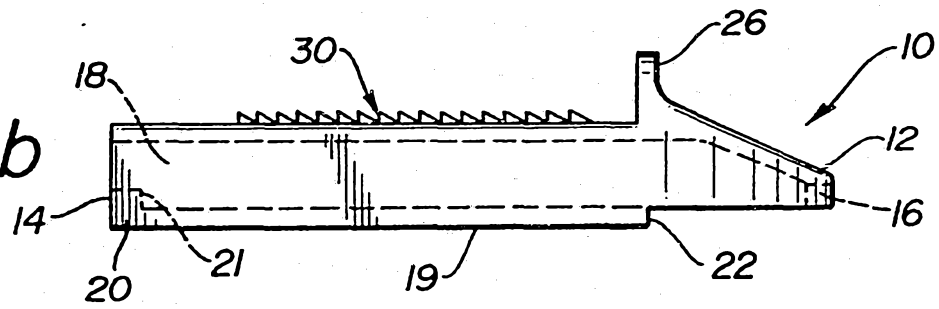


FIG-1c

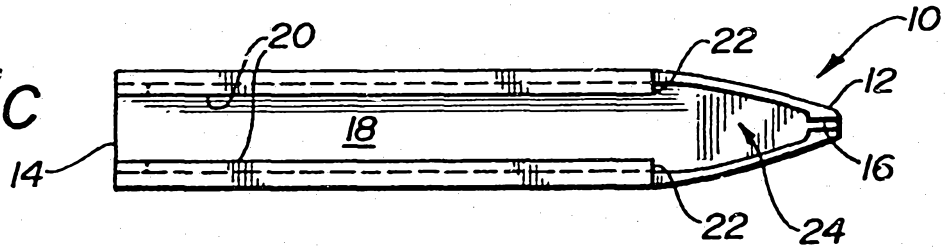
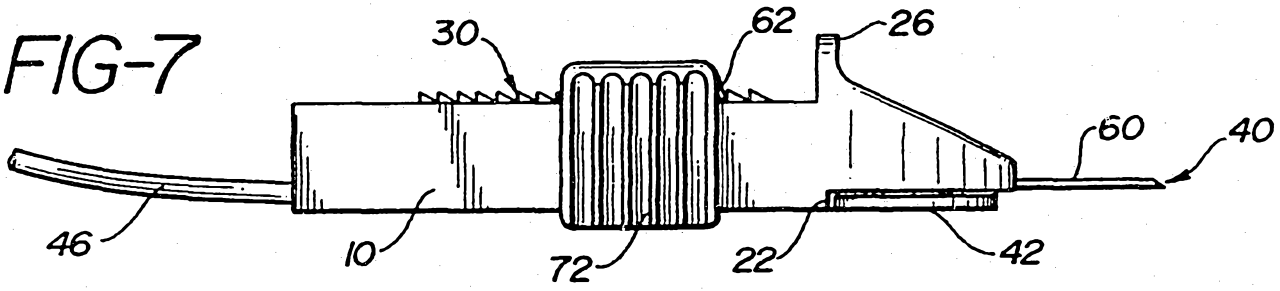


FIG-7



80203/91

FIG-2a

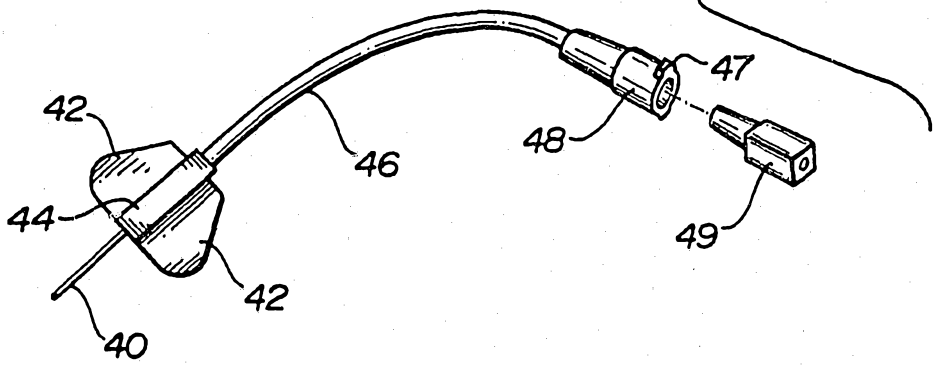


FIG-2b

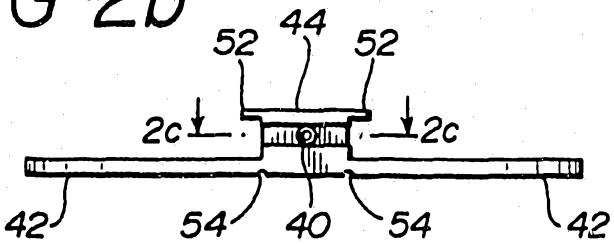


FIG-2c

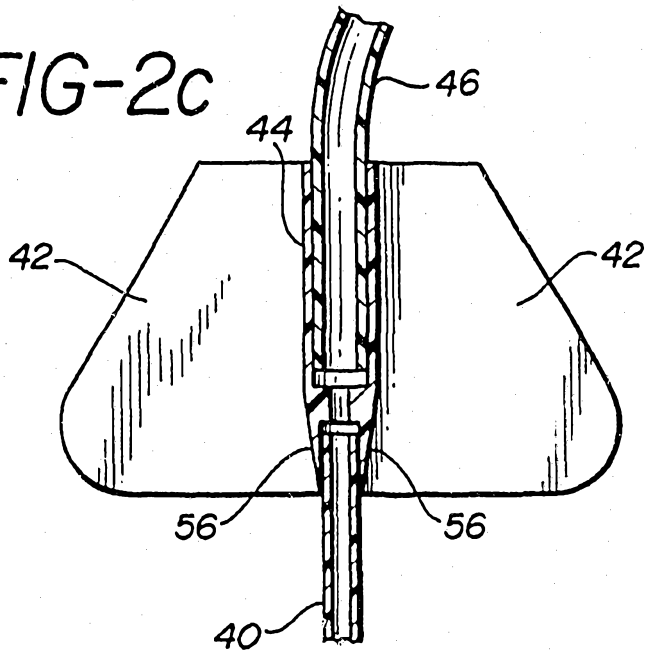


FIG-3a

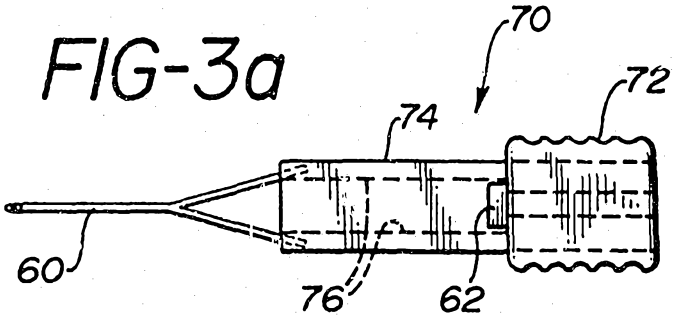


FIG-3b

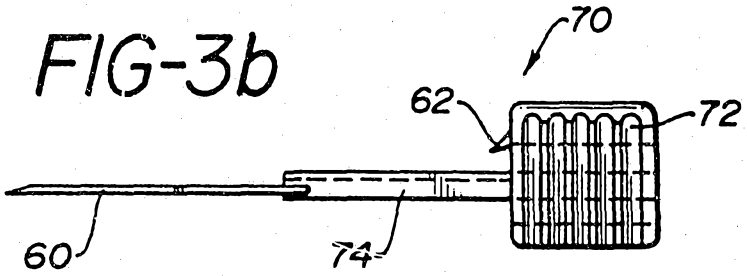


FIG-3c

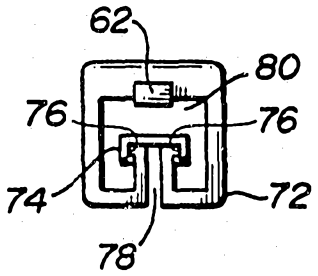


FIG-3d

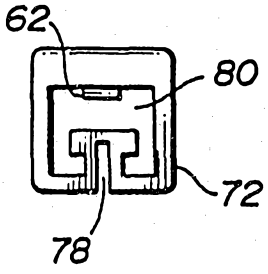


FIG-4

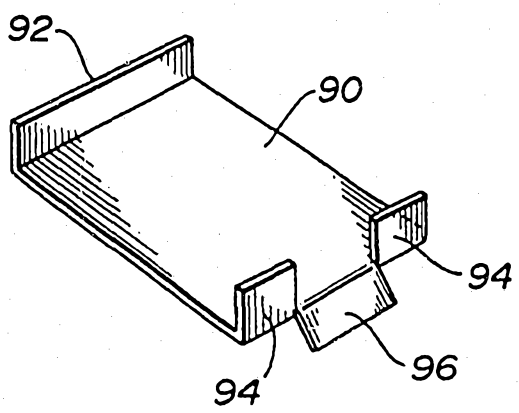


FIG-5a

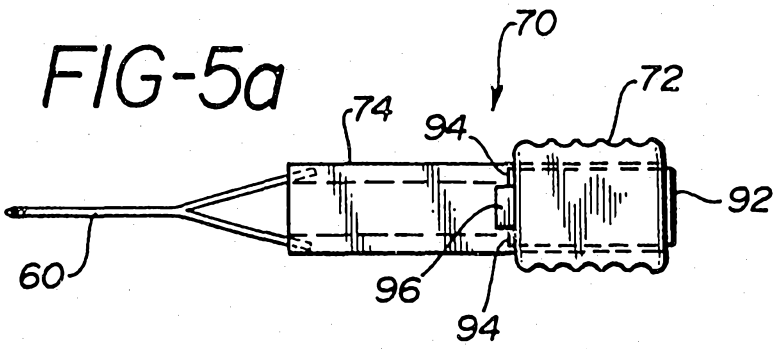


FIG-5b

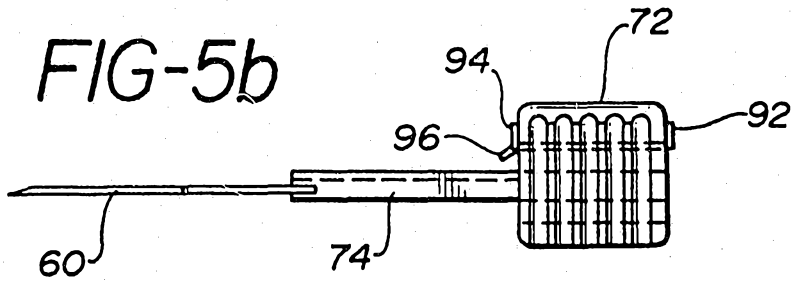


FIG-5c

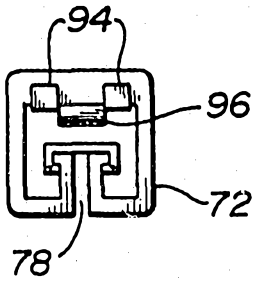


FIG-5d

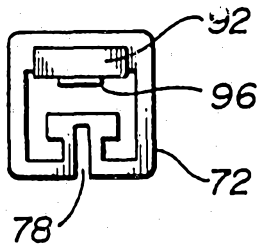


FIG-6

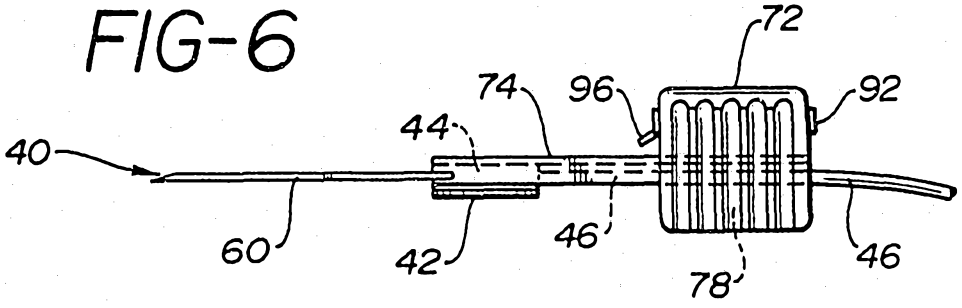


FIG-8

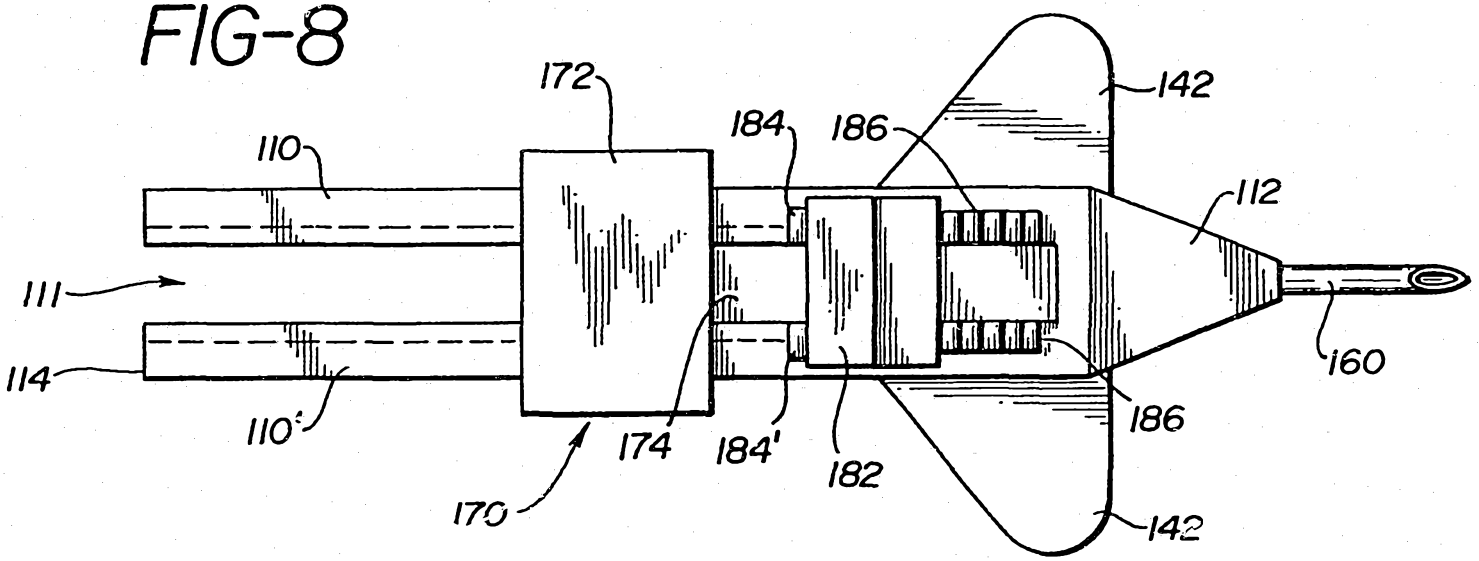

172
142
184
186
110
112
111
114
160
110'
186
174
184'
182
170
142

FIG-9

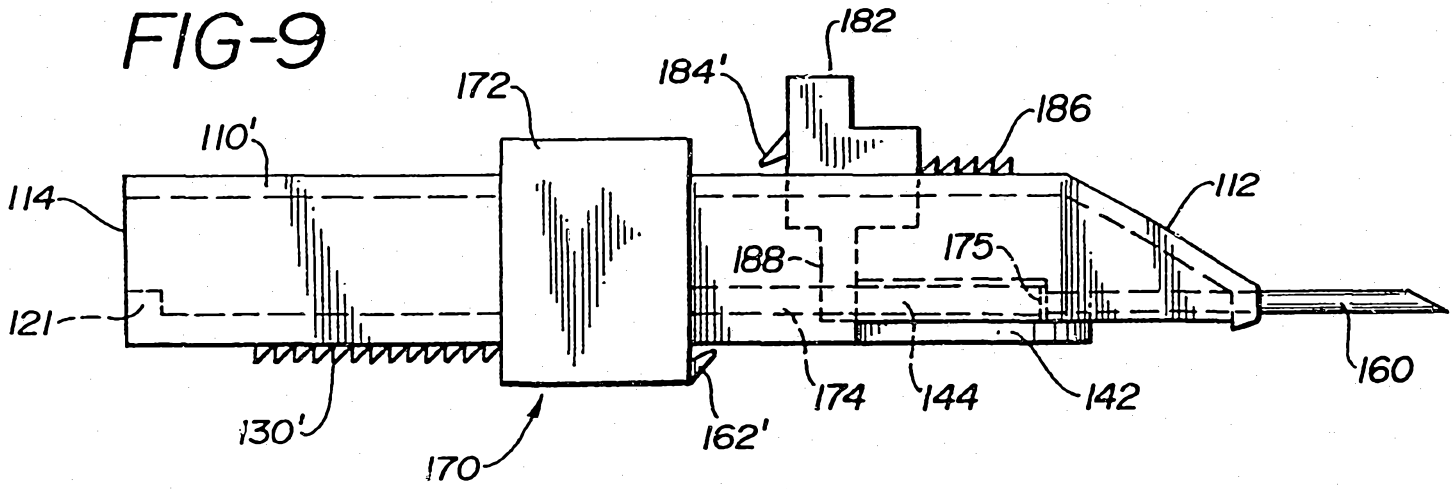

182
184'
172
186
110'
112
114
188
175
121
160
174
144
142
130'
162'
170

FIG-10

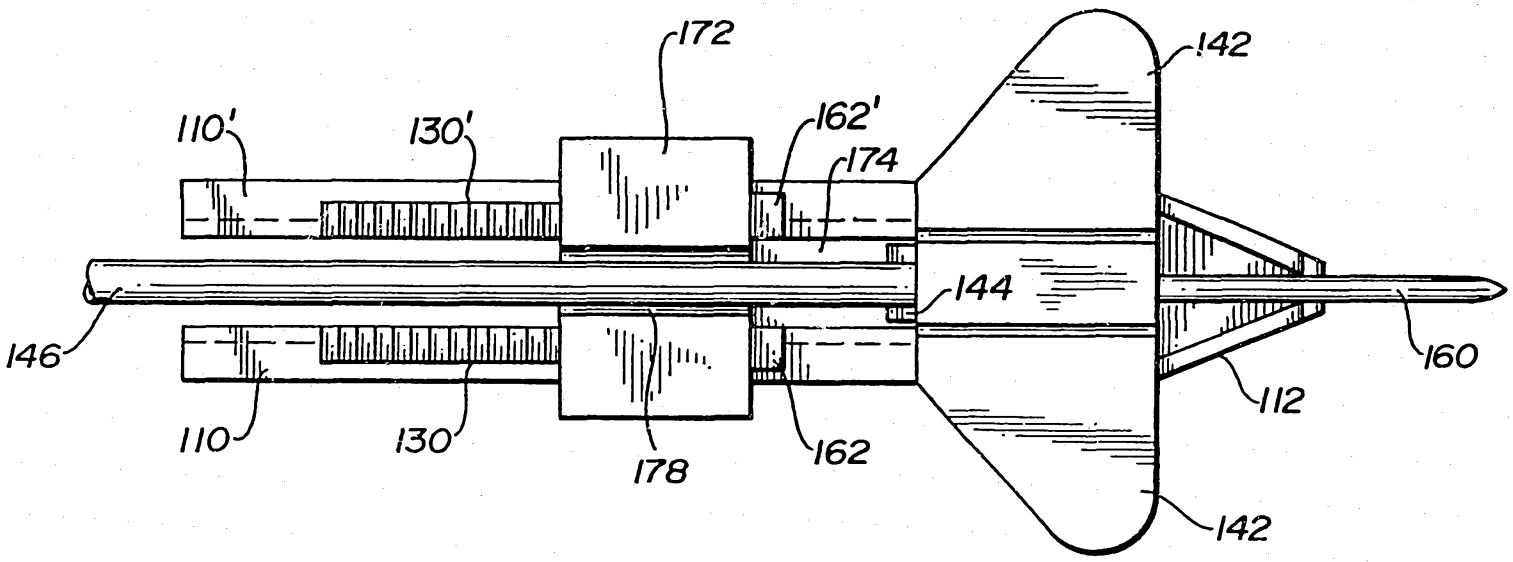


FIG-11a

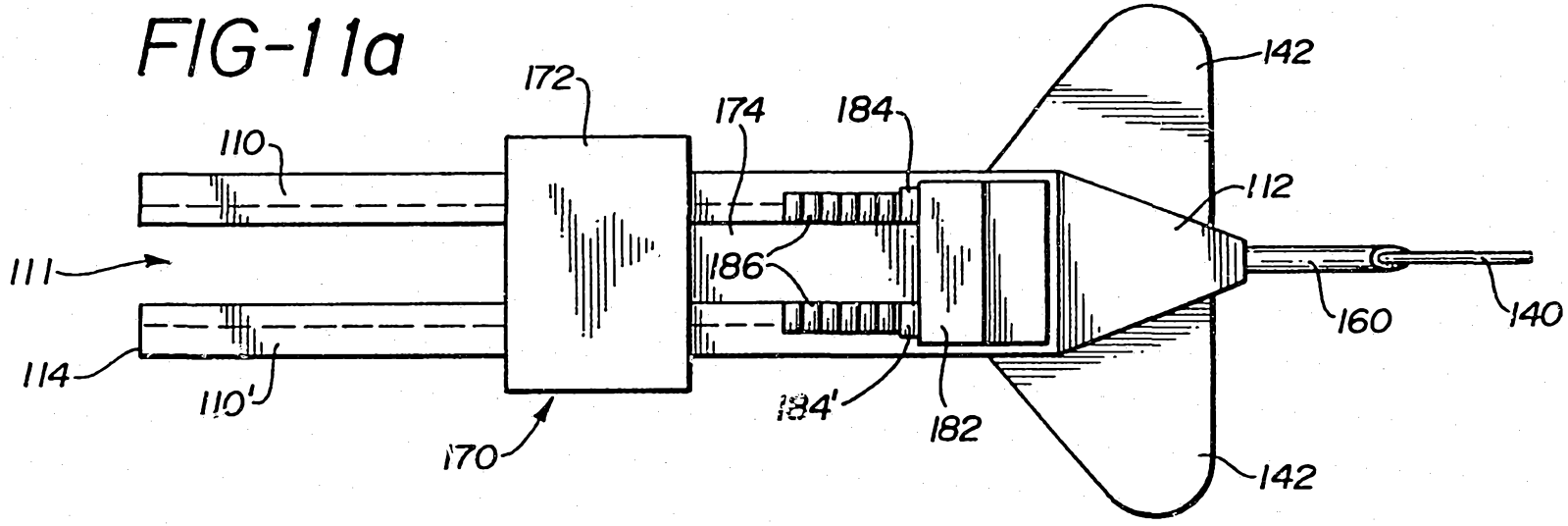


FIG-11b

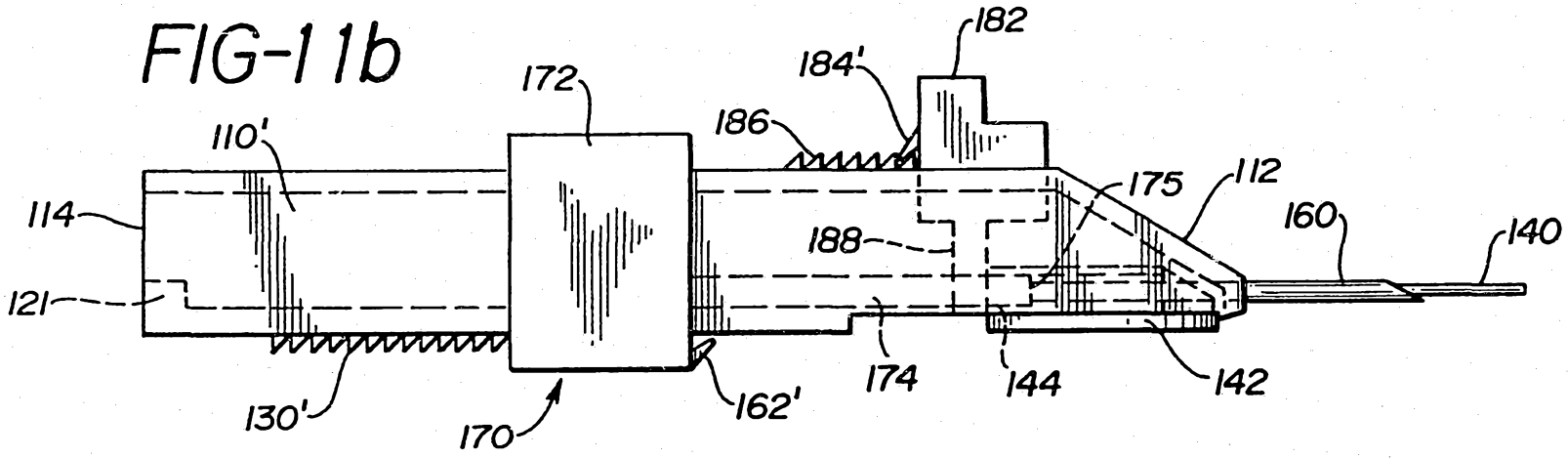


FIG-12a

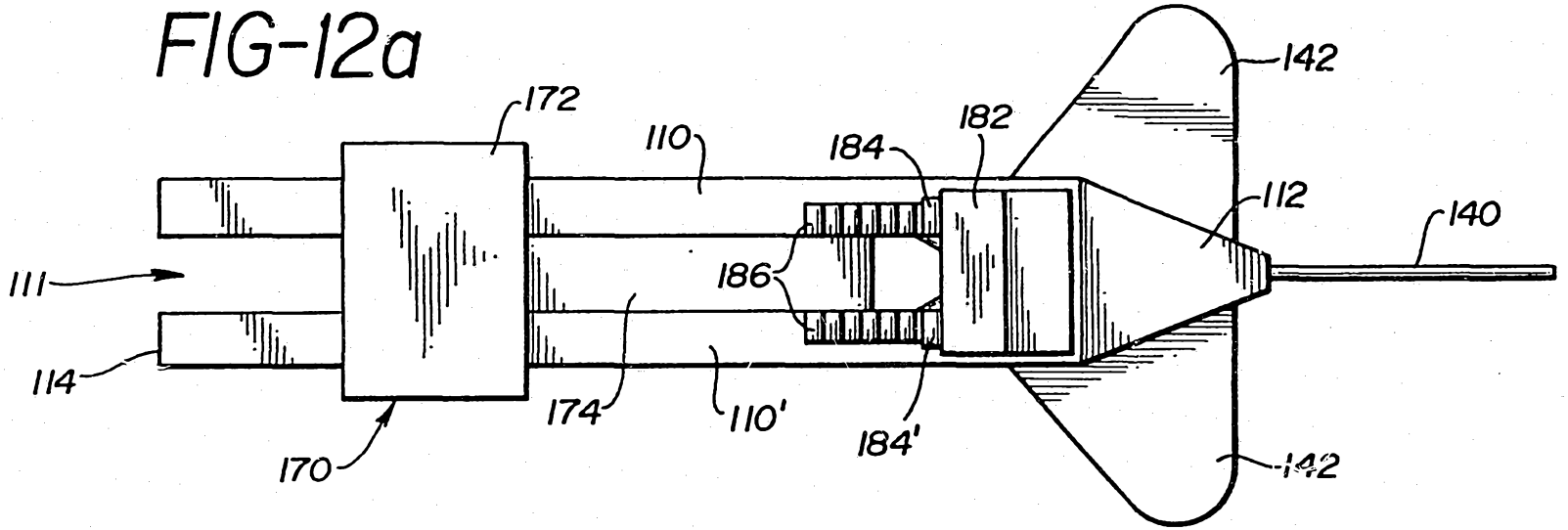


FIG-12b