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CA 2206015 C 2003/01/21

(11)(21) 2 206 015

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 1997/05/23

(41) Mise à la disp. pub./Open to Public Insp.: 1997/11/29

(45) Date de délivrance/Issue Date: 2003/01/21

(30) Priorité/Priority: 1996/05/29 (1,003,226) NL

(51) Cl.Int.^{6}/Int.Cl.^{6} A61M 1/00, A61M 25/14

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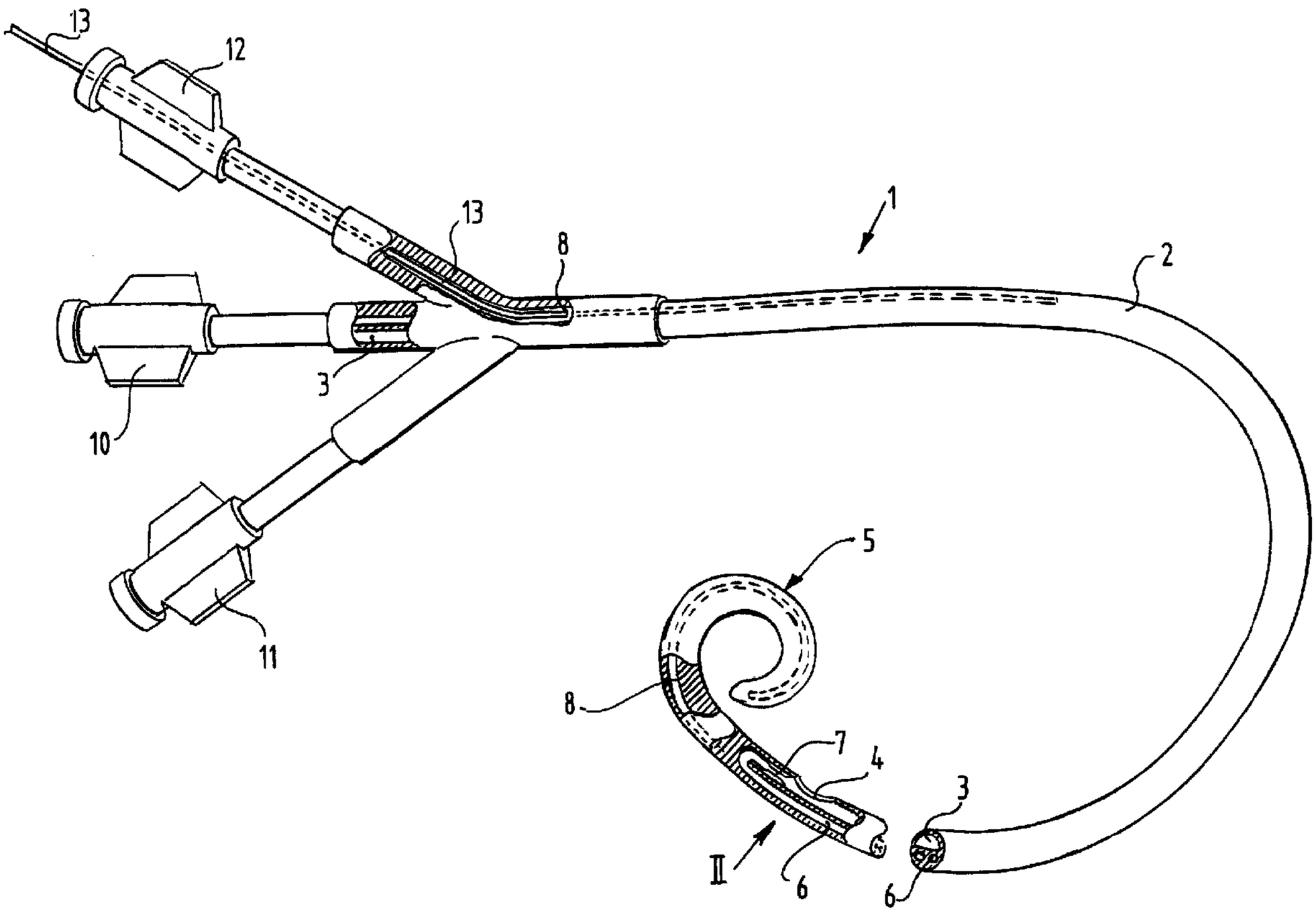
(54) Titre : CATHETER D'ASPIRATION MUNI D'UN EMBOUT PREFORME
(54) Title: SUCTION CATHETER WITH PREFORMED TIP



(57) Abrégé/Abstract:
The invention relates to a suction catheter comprising a tube-like basic body with a proximal and a distal end inside of which at least a discharge lumen extends, wherein a suction inlet connected to the discharge lumen has been arranged inside the basic body at a distance from the distal end, and a preformed, curved and pliable tip extends from the suction inlet to the distal end. The pliable tip may have been curved in a preformed manner in the direction in which the suction inlet is pointing.

ABSTRACT

The invention relates to a suction catheter comprising a tube-like basic body with a proximal and a distal end inside of which at least a discharge lumen extends, wherein a suction inlet connected to the discharge lumen has been arranged inside the basic body at a distance from the distal end, and a preformed, curved and pliable tip extends from the suction inlet to the distal end. The pliable tip may have been curved in a preformed manner in the direction in which the suction inlet is pointing.

SUCTION CATHETER WITH PREFORMED TIP

The invention relates to a suction catheter comprising a tube-like basic body with a proximal and a distal end inside of which at least a discharge lumen extends. The distal end is connected with a suction inlet of the catheter.

Such a suction catheter is known. It is used for instance to remove blood thrombi from the bloodstream of a patient. When using the known catheter it is sometimes difficult for the physician carrying out the procedure to position the suction inlet at the target position inside the bloodstream of the patient.

In accordance with one aspect of the present invention, there is provided a drainage catheter for selective positioning within the human vasculature, wherein said drainage catheter comprises a flexible, tubular basic catheter body defining first and second catheter lumen respectively comprising a pressure channel and a discharge channel; a connector at a proximal end of said catheter for respectively connecting the pressure channel to a source of liquid under pressure, and the discharge channel to a discharge port; an inlet opening positioned in the side wall of said catheter adjacent the distal end thereof, said discharge channel communicating with said inlet opening, said pressure channel extending from said proximal end to a point distal of said inlet opening and then curving rearwardly to join said discharge channel at said inlet opening, said pressure channel defining a spray nozzle to direct pressurized fluid in the pressure channel across said inlet opening and into said discharge channel to create a suction adjacent said inlet opening, wherein the side wall of said catheter is

substantially imperforate except for the inlet opening; and a first normally-closed valve positioned along the pressure channel, a second normally-closed valve positioned along the discharge channel, and a preformed distal tip portion extending from the distal end of the drainage catheter, said preformed tip portion being formed of a material having the characteristic of retaining a plastic memory and being preformed into a curved spiral configuration for such selective positioning; wherein said pressure channel provides fluid communication only between said inlet opening and said source of liquid under pressure, and said discharge channel provides fluid communication only between said inlet opening and said discharge means.

The preformed, curved and pliable tip facilitates using the suction catheter also when larger blood vessels such as the pulmonary artery are concerned. The preformed curved tip also prevents the distal end of the catheter from entering smaller blood vessels.

In a preferred aspect of the invention, the drainage catheter further comprises a proximal guidewire lumen which extends through the tubular basic catheter body from the proximal end to the distal end thereof, a distal guidewire lumen which extends through at least a portion of the distal tip portion and being in communication with the proximal guidewire lumen within the catheter body, wherein the proximal and distal guidewire lumens are adapted to slidably receive a guidewire, such that when the guidewire is moved to a position so that it extends into the distal tip portion, the curved preformed distal tip portion tends to straighten.

In another preferred aspect of the invention, the spiral configuration of the tip portion extends in a single plane which plane is parallel to the central axis of the catheter body. The distal tip portion may be curved such that the spiral shape extends in a direction away from the side of the catheter body and on the same side of the catheter body as the inlet opening.

The invention will be explained in greater detail below, with reference to the suction catheter according to the invention as illustrated in the figures.

Figure 1 illustrates a partly broken away view of a suction catheter according to an embodiment of the invention.

Figure 2 shows an enlarged detail indicated by arrow II in figure 1.

Figure 3 illustrates a cross-section along the line III-III in figure 2.

Figure 4 illustrates schematically the use of the suction catheter.

The catheter 1 illustrated in figure 1 comprises a basic body 2, in which, at a distance from the distal end, a suction inlet 4 has been formed. This suction inlet 4 is connected with a discharge lumen, which extends from this opening 4 in the proximal direction to the proximal end of the catheter. There the discharge lumen 3 opens into a discharge connection 10. From the suction inlet 4, a preformed, curved and pliable tip 5 extends in the distal direction to the distal end. The curve is of the pigtail-type.

As can be seen in the figure, the tip 5 is curved in the direction in which the suction inlet 4 is pointing.

As a result the suction inlet 4 is at all times kept at a certain distance from the wall of a blood vessel into which the catheter has been introduced.

The catheter shown in figure 1 is a preferred embodiment wherein the suction action at the suction

inlet 4 is effected by means of ejector action. A pressure lumen 6 has been arranged inside the basic body 2 which ends close to the relatively distal end of the suction inlet 4, that is to say on the left-hand side in figure 1, in a jet nozzle 7 which is directed in the opposite, proximal direction along the suction inlet in the discharge lumen 3.

As can be seen in greater detail in figure 2, a fluid jet can be directed along the opening 4 by means of the jet nozzle 7, as a result of which suction will be generated at the suction inlet 4 due to the ejector action. The material sucked in will be passed along by the liquid released from the jet nozzle 7 through the discharge lumen 3 to the discharge connection 10.

At the proximal end the pressure lumen 6 is connected to a pressure connection 11.

For the purpose of introducing the catheter 1, the curved tip 5 can be straightened by using a guide wire 13, which is advanced through a guide-wire-lumen 8 arranged for that purpose inside the basic body 2. At the proximal end this guide- wire-lumen 8 is connected with a guide-wire-connection 12.

It should be noted that the connections 10, 11 and 12 in the figures 1 and 4 have only been illustrated schematically. A catheter used for the purpose described will have been provided at the proximal end with haemostatic devices in order to prevent undesired leaking out of blood via the lumens of the catheter.

As can be seen in figure 4, the catheter 1 with the curved preformed tip 5 can be employed in large blood vessels and even be advanced through the heart 15 into the pulmonary artery. Because of the preformed curve, the suction inlet 4 is positioned in a stable manner as required. The suction inlet 4 cannot attach itself to the wall as it is kept, by means of the curve 5, at a certain distance from the walls of the blood vessel.

Although the guide-wire-lumen in the example of an embodiment shown extends right from the proximal end

to the distal end, the catheter according to the invention can also be given the embodiment of a 'rapid exchange'-type. In that case the guide-wire-lumen extends from an opening in the wall of the basic body 2 positioned at a limited distance from the distal end to the distal end. With such an embodiment the guide-wire-lumen can be formed in the end-section only in a suitable manner. In that case the guide-wire-lumen does not take up any space in the section of the basic body through which the discharge lumen 3 and the pressure lumen 6 extend. These can in that case be given an optimum cross-section for the purpose of ejector action.

The tip may be connected to the remaining part of the catheter in any suitable manner, for instance by means of glueing or welding. The specific shape of the curve may be adapted to the required operative position. The tip may have been manufactured in a suitable manner of a plastic material opaque to X-rays, so that the tip can be made properly visible on an X-ray screen.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A drainage catheter for selective positioning within the human vasculature, wherein said drainage catheter comprises:

a flexible, tubular basic catheter body defining first and second catheter lumen respectively comprising a pressure channel and a discharge channel;

a connector at a proximal end of said catheter for respectively connecting the pressure channel to a source of liquid under pressure, and the discharge channel to a discharge port;

an inlet opening positioned in the side wall of said catheter adjacent the distal end thereof, said discharge channel communicating with said inlet opening, said pressure channel extending from said proximal end to a point distal of said inlet opening and then curving rearwardly to join said discharge channel at said inlet opening, said pressure channel defining a spray nozzle to direct pressurized fluid in the pressure channel across said inlet opening and into said discharge channel to create a suction adjacent said inlet opening, wherein the side wall of said catheter is substantially imperforate except for the inlet opening; and

a first normally-closed valve positioned along the pressure channel, a second normally-closed valve positioned along the discharge channel, and

a preformed distal tip portion extending from the distal end of the drainage catheter, said preformed tip portion being formed of a material having the

characteristic of retaining a plastic memory and being preformed into a curved spiral configuration for such selective positioning;

wherein said pressure channel provides fluid communication only between said inlet opening and said source of liquid under pressure, and said discharge channel provides fluid communication only between said inlet opening and said discharge port.

2. A drainage catheter as defined in claim 1, further comprising a proximal guidewire lumen which extends through the tubular basic catheter body from the proximal end to the distal end thereof, a distal guidewire lumen which extends through at least a portion of the distal tip portion and being in communication with the proximal guidewire lumen within the catheter body, wherein the proximal and distal guidewire lumens are adapted to slidably receive a guidewire, such that when the guidewire is moved to a position so that it extends into the distal tip portion, the curved preformed distal tip portion tends to straighten.

3. A drainage catheter as defined in claim 1 or 2, wherein the spiral configuration of the tip portion extends in a single plane which plane is parallel to the central axis of the catheter body.

4. A drainage catheter as defined in claim 3, wherein the distal tip portion is curved such that the spiral shape extends in a direction away from the side of the catheter body and on the same side of the catheter body as the inlet opening.

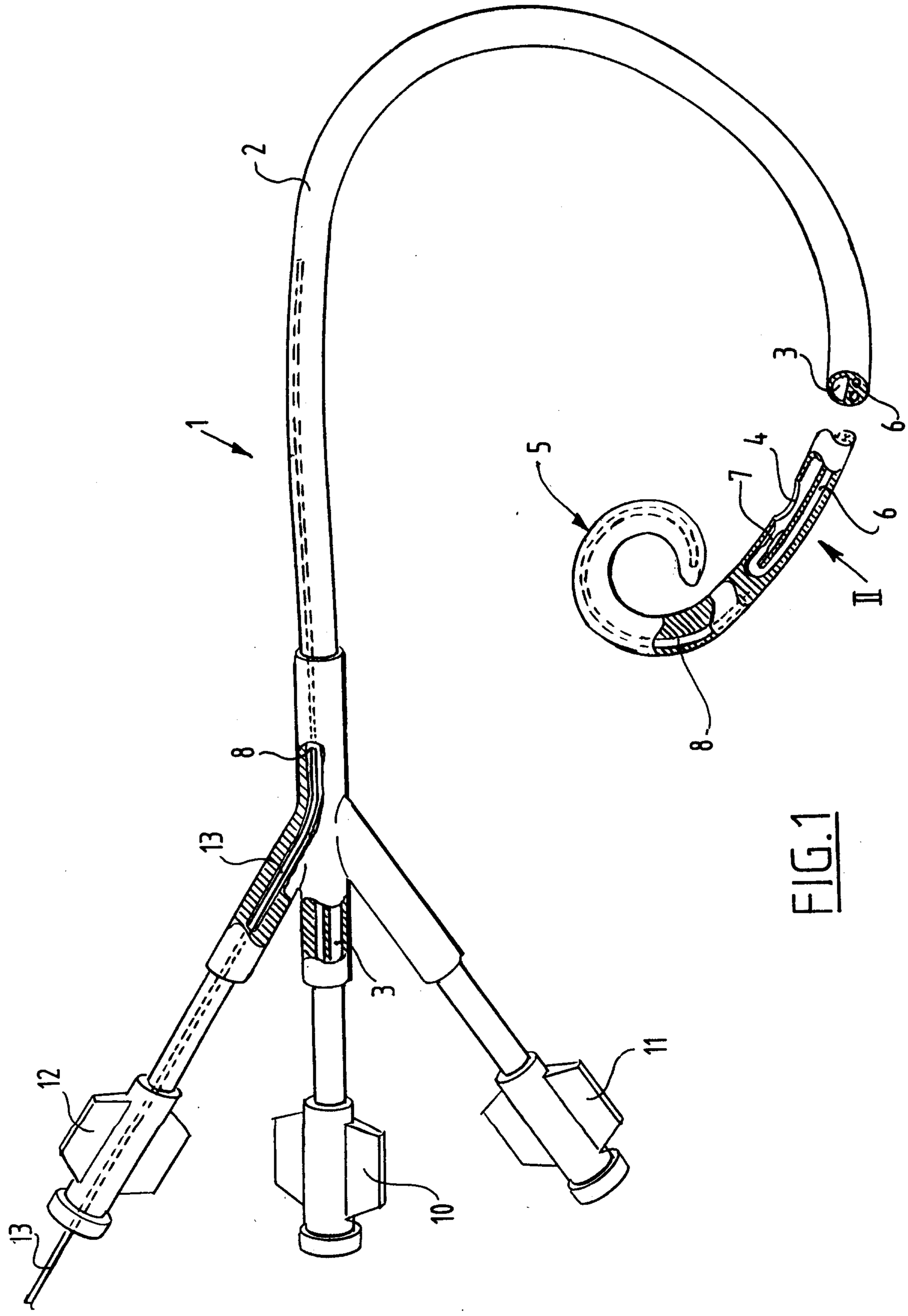


FIG.1

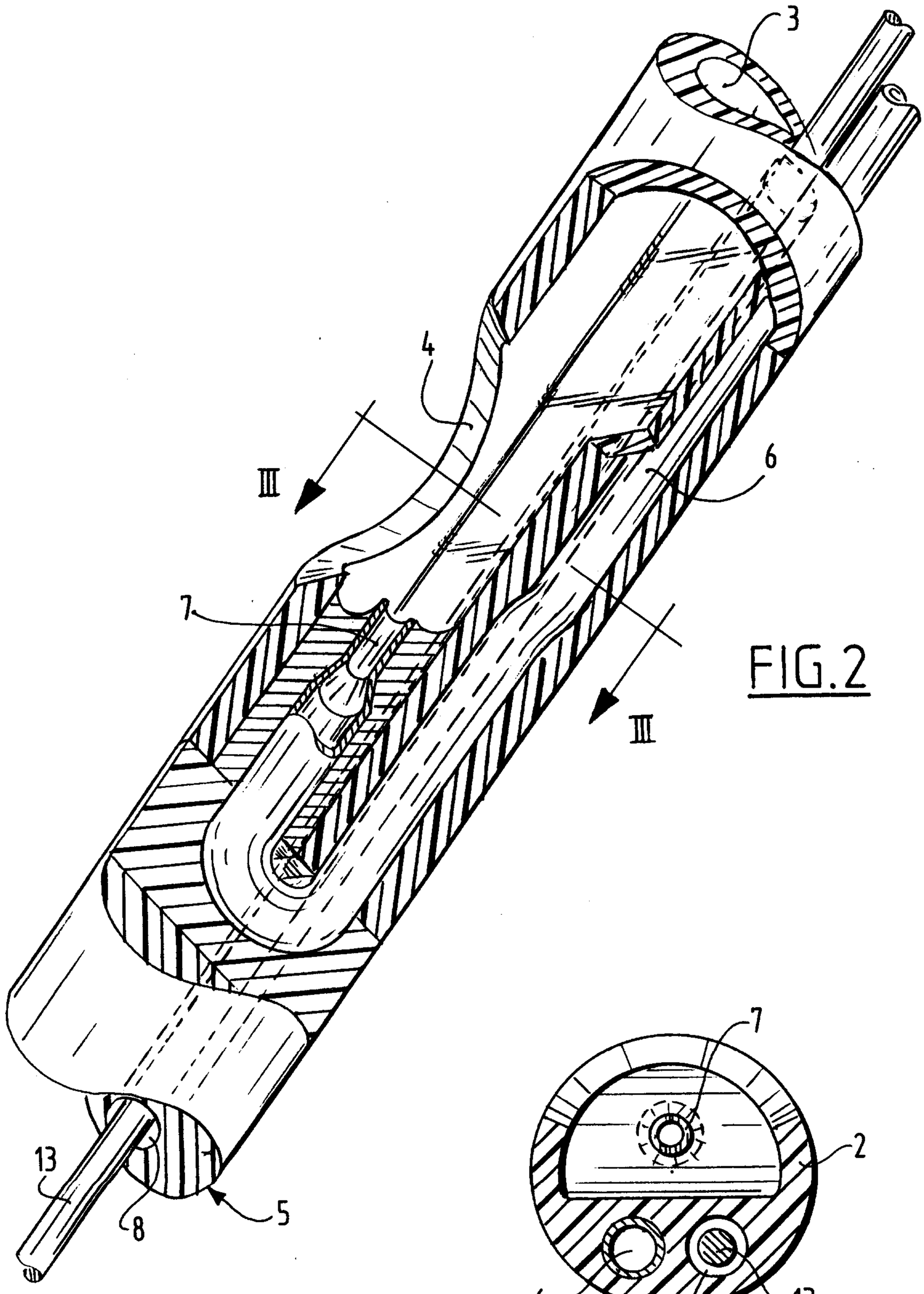


FIG.2

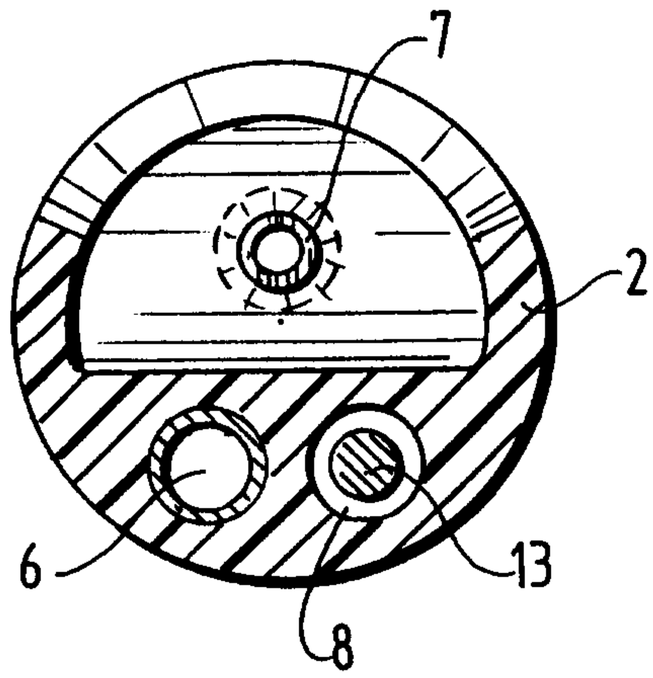


FIG.3

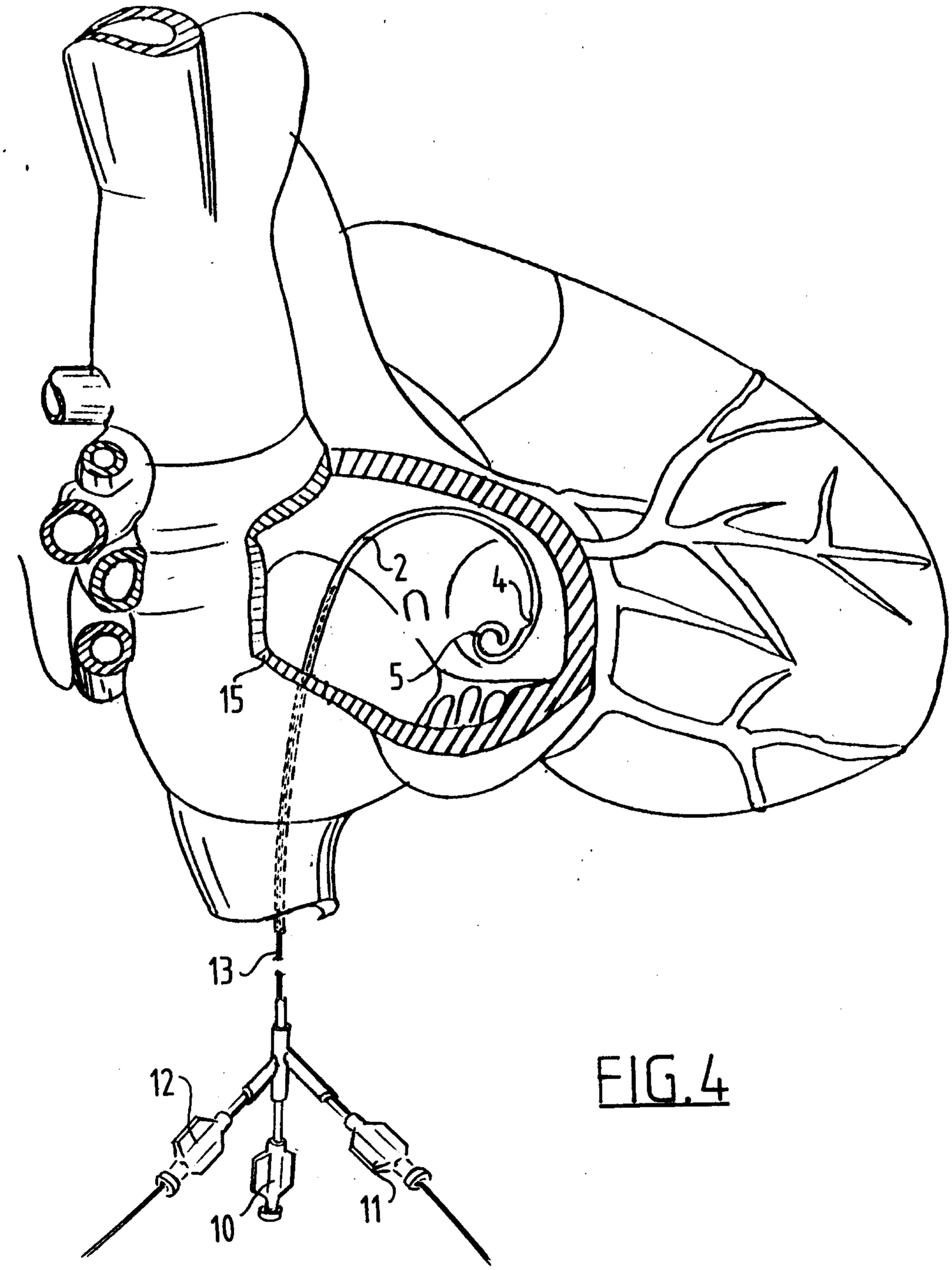
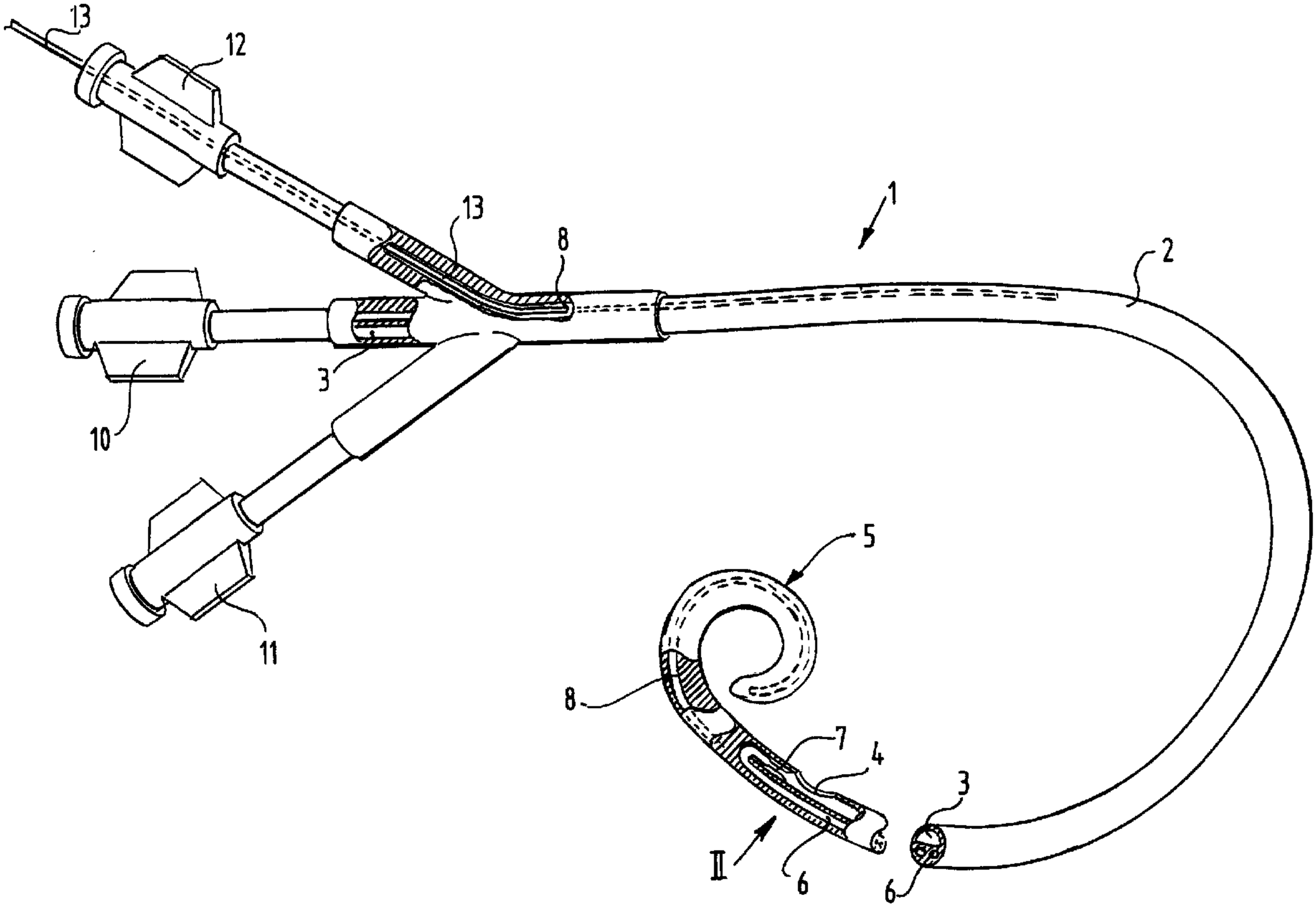


FIG.4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II
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