

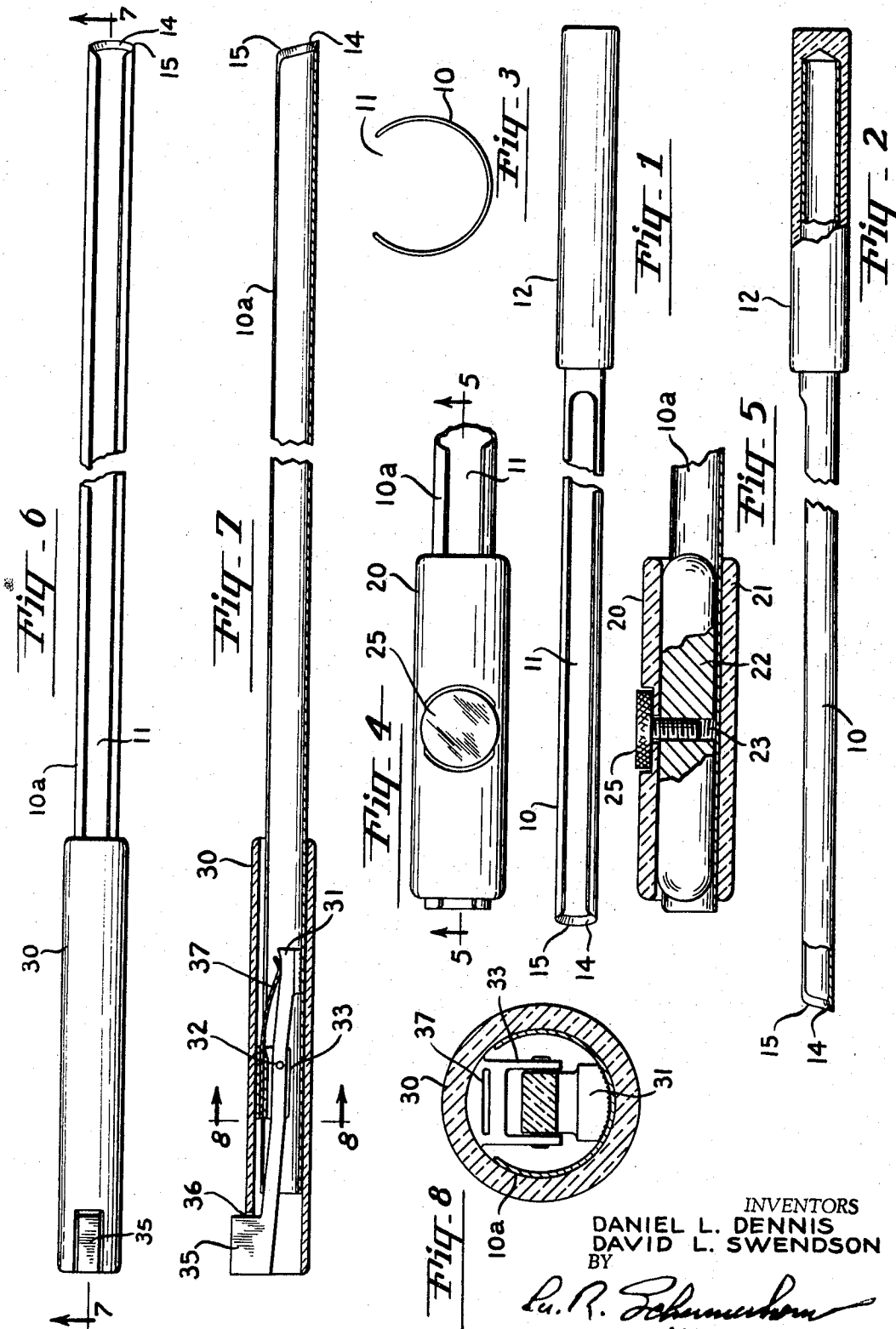
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ENDARTERECTOMY INSTRUMENT

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ENDARTERECTOMY INSTRUMENT

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5 Claims

ABSTRACT OF THE DISCLOSURE

An instrument used in vascular surgery for re-sectioning the thickened intima at major arterial bifurcations to eliminate stenosis, i.e., for cleaning the arterial walls to increase blood flow. The instrument comprises, essentially, a piece of resilient plastic tubing having a slot extending lengthwise along one side thereof. The distal end is angled and internally beveled to provide an efficient scraping and stripping edge. The proximal end is equipped with a handle which may be an integral part of the tube or may be adjustable along the tube for varying the length of the distal end of the instrument. The slot allows the tube to collapse to the extent necessary to conform to the lumen of an artery of smaller diameter than the tube.

BACKGROUND OF THE INVENTION

Previous instruments for this purpose have been made in the form of a long wire with a small metal loop or ring at the distal end. Such instruments are not as effective as may be described for separating the plaque from the artery wall and have been particularly deficient in their ability to remove the plaque. Also, since the scraping and stripping element is rigid, it does not conform itself to the lumen of an artery which varies in diameter over the length to be treated.

SUMMARY OF THE INVENTION

Objects of the invention are, therefore, to provide an improved endarterectomy instrument, to provide an instrument which is more effective in separating plaque from an artery wall, to provide an instrument which is more effective in removing plaque from the artery, and to provide an instrument having a resilient scraping and stripping element that adjusts itself to the lumen of an artery of varying diameter.

In the present instrument, an efficient scraping and stripping edge is formed by angling and internally beveling the end of a plastic tube which is insertable in the artery. The tube is made of a resilient material and is slotted lengthwise to allow it to contract as the diameter of the artery diminishes along the portion to be treated. The tube is inserted through an incision in the artery above the area that needs treatment, the tube being pushed into the artery by means of a handle on the proximal end of the tube. As the tube is pushed forward, its sharpened distal end scrapes the plaque from the artery wall and collects the plaque in the lumen of the tube. This material is then removed when the instrument is withdrawn from the artery.

Additional objects and advantages will become apparent and the invention will be better understood from the following detailed description of certain preferred embodiments illustrated in the accompanying drawing. Various changes may be made in the details of construction and arrangement of parts and all such modifications within the scope of the appended claims are included in the invention.

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BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a plan view, with parts broken away, showing an instrument with a fixed handle embodying the principles of the invention;

FIGURE 2 is a side elevation view of the instrument in FIGURE 1, with parts broken away;

FIGURE 3 is an enlarged end elevation view of the distal end of the instrument in FIGURES 1 and 2;

FIGURE 4 is a fragmentary top plan view of a modification having an adjustable handle;

FIGURE 5 is a sectional view on the line 5—5 of FIGURE 4;

FIGURE 6 is a top plan view, with parts broken away, showing a different form of adjustable handle;

FIGURE 7 is a sectional view on the line 7—7 in FIGURE 6; and

FIGURE 8 is an enlarged cross sectional view on the line 8—8 in FIGURE 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGURES 1 and 2 show an instrument having a fixed handle. The instrument comprises a cylindrical tube 10 which is longitudinally slotted at 11. The slot gap is preferably equal to approximately one-fourth the circumference of the tube. The tube may be an extruded polypropylene or Delrin plastic. The proximal end of the tube is unslotted and fixedly secured in a plastic handle 12. However, the tube and handle may be injection molded in one piece, if desired.

The tube 10 must be resilient and have good memory characteristics. The slot allows the diameter to contract when it is inserted into an artery of diminishing diameter but after removal from the artery the tube must return to its original size. The distal end of the tube is internally chamfered to form a surface at 14 at an angle of approximately 20° with the longitudinal axis of the tube to provide a scraping and stripping edge 15. The edge 15 is beveled so that it lies in a plane which slopes at about 75° to the longitudinal axis of the tube.

Preparatory to using the instrument, an incision is made in the artery above the region that needs treatment. When the instrument is inserted through the incision into the artery, the beveled edge 15 scrapes the plaque or thickened intima from the artery wall, such material being collected in the lumen of the instrument. The wall of tube 10 is sufficiently flexible to allow the tube to freely contract in diameter as it progresses into a portion of the artery which is of reduced diameter. Thus, the tube 10 accommodates itself to the lumen of the artery while the resilience of the plastic material holds the beveled edge in scraping engagement with the artery wall. The outer surface of tube 10 is smooth and reasonably slick so as to slide freely in the artery. Although flexible, the tube must be stiff enough to possess the column strength necessary for pushing it into the artery. When the instrument is withdrawn from the artery, it brings with it the stripped material which is collected in the lumen of the tube.

In FIGURES 4 and 5 the tube 10a is the same as the tube 10 except that slot 11 extends to the proximal end of the tube and an adjustable handle 20 is provided. The handle 20 comprises an outer cylindrical sleeve 21 and an inner cylindrical mandrel 22. Mandrel 22 contains a tapped hole 23 to receive a clamp screw 25.

Sleeve 21 is of a size to receive the tube 10a and mandrel 22 is of a size to fit within the tube. Thus, the proximal end of the tube is slidably received between the sleeve and mandrel with the shank of screw 25 extending through slot 11. The handle is adjusted along the tube to a desired position according to the depth to which the tube is to be inserted into the artery and clamped in such position.

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Tightening the screw 25 clamps the wall of the tube on opposite sides of slot 11 between the mandrel and the sleeve.

FIGURES 6, 7 and 8 show a different form of adjustable handle for the tube 10a. In this embodiment the handle comprises a sleeve 30 slidable on the outside of the tube. A clamping dog 31 is pivotally mounted at 32 on a bracket 33 on the inside of sleeve 30. The clamping dog comprises a lever arm having a push button 35 on its proximal end projecting through a slot 36 in the sleeve. A leaf spring 37 on the bracket 33 presses the clamp dog 31 against the inside wall of the sleeve.

Tube 10a is inserted in handle sleeve 30 with bracket 33 disposed in the tube slot 11. By depressing the push button 35, the clamp dog 31 is raised to allow the handle to be located at any desired distance from beveled edge 15. When push button 35 is released, the clamp dog 31 will hold the handle securely in adjusted position.

It will be observed that both handles 20 and 30 are removable from the tube 10a for cleaning and sterilizing the parts.

Having now described our invention and in what manner the same may be used, what we claim as new and desire to protect by Letters Patent is:

1. An endarterectomy instrument comprising a cylindrical tube of resilient plastic material having a handle on its proximal end and a beveled and chamfered scraping and stripping edge on its distal end, said tube having a longitudinal slot therein and being sufficiently flexible to

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conform itself to the lumen of an artery of smaller diameter than the tube when the tube is inserted therein.

2. An instrument as defined in claim 1, said handle being adjustable along said tube, and means for clamping the handle to the tube in adjusted positions.

3. An instrument as defined in claim 2, said handle comprising a sleeve slidable on said tube and said clamping means extending through said slot and engaging the inside of said tube.

4. An instrument as defined in claim 3, said clamping means comprising a mandrel in said tube and a screw in said mandrel extending through said slot and sleeve for clamping a portion of said tube between said sleeve and mandrel.

5. An instrument as defined in claim 3, said clamping means comprising a spring actuated clamp dog on said sleeve and means on said sleeve for releasing said dog.

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