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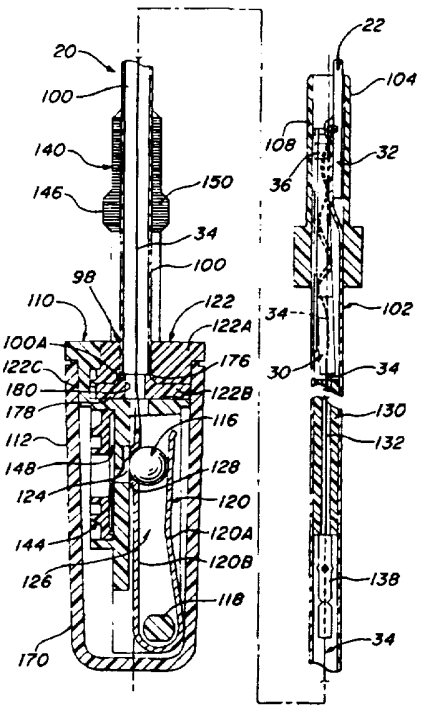
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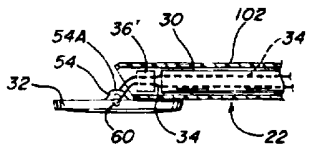
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(54) Title: HEMOSTATIC VESSEL PUNCTURE CLOSURE SYSTEM AND METHOD OF USE

(57) Abstract

A system, a closure (22), and method for sealing a percutaneous puncture (24) in a blood vessel (26). The puncture includes a tract (24A) leading to it from the skin of the being. The system includes an introducer sheath (28), a positioning device (200), a hemostatic puncture closure (22), and a deployment instrument (20). The positioning device positions the introducer sheath (28) at a desired position within the vessel (26). The deployment instrument includes a tubular carrier (100) having a distal end (102) storing the closure. The carrier is extended via an introducer sheath (28) through the tract (24A) and puncture (24) into the blood vessel (26). The closure comprises a rigid anchor (32), a spacer member (36), a compressed collagen plug (30), and a thin filament (34) connecting them in a pulley-like arrangement. The anchor has a centrally located domed projection (54). The carrier (100) ejects the anchor through the introducer (28) and puncture (24) and then draws it against the free end (28C) of the introducer (28). The instrument (100) and introducer (28) are then withdrawn together to pull the anchor (32) against the tissue contiguous with the puncture (24) inside the artery (26) and so that the domed portion (54) of the anchor (32) extends through the puncture (24). Further withdrawal draws the plug (30) and spacer (36) out of the carrier (100) into the puncture tract (24A), whereupon the spacer (36) engages the domed portion (54) of the anchor (32) to prevent the plug (30) from entering the puncture (24). A tensioning device (136) limits the force applied to the filament (34). The carrier also includes a tamper (130) which is used to mechanically deform the plug (30) within the tract (24A). Hemostasis occurs rapidly and the plug seals the tract.





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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 A61B17/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 A61B

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.
A	US,A,5 021 059 (KENSEY ET AL.) 4 June 1991 cited in the application see claim 1; figures 5-7	1,28,51
A	US,A,5 053 046 (JANESE) 1 October 1991 see column 5, line 1 - line 36; figure 9	1,28,51
A	US,A,3 874 388 (KING ET AL.) 1 April 1975 see column 9, line 66 - column 10, line 1; figures 9G,H	1,28,51

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US-A-5021059	04-06-91	AU-B-	651595	28-07-94
		AU-A-	7899791	27-11-91
		EP-A-	0527923	24-02-93
		WO-A-	9116858	14-11-91
US-A-5053046	01-10-91	NONE		
US-A-3874388	01-04-75	NONE		