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(54) **BRANCH GRAFTING DEVICE AND METHOD**

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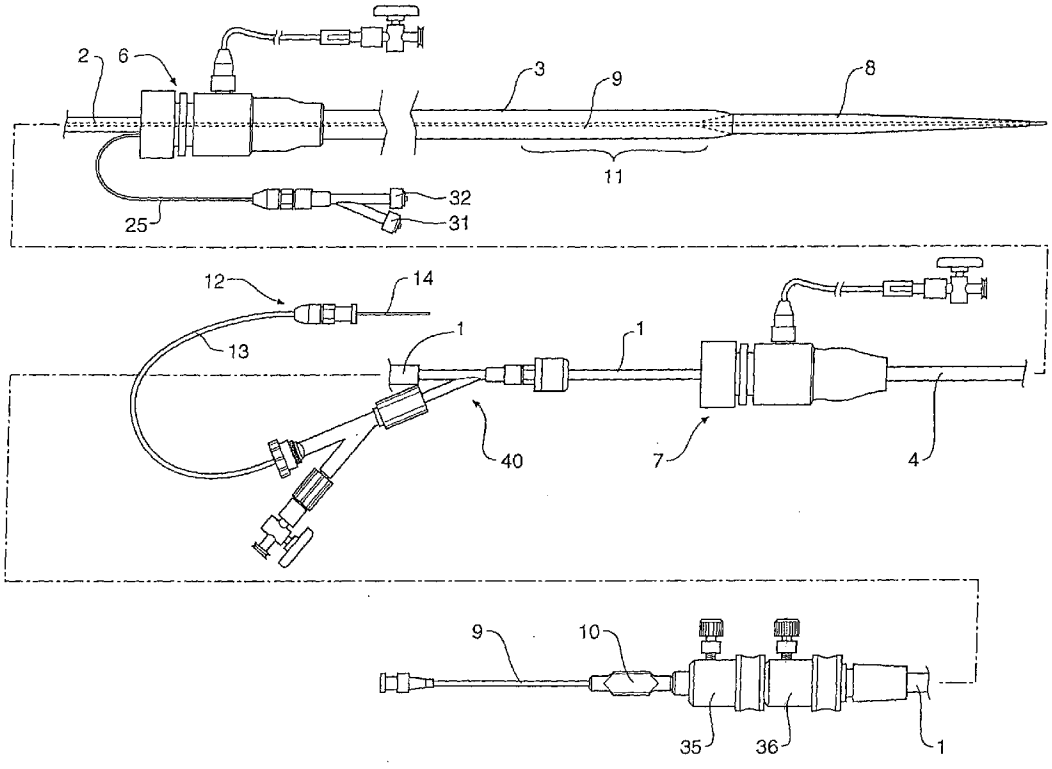
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(57) **ABSTRACT**

An endoluminal stent graft deployment system useful for deployment of a limb of a branched stent graft (**16**) into a blind vessel. The branched stent graft has a main body (**16**) and a limb (**19**) extending from the body. The branched stent graft is mounted on a deployment device which has a separate deflecting guide wire (**14**) extending into the limb. The method of deploying the branched stent graft into a blind vessel in a human or animal body includes the step of releasing the limb from the deployment device, extending the guide wire from the limb into the blind vessel, manipulating the deployment device by withdrawing the deployment device slightly to cause the limb to enter the blind vessel assisted by the guide wire and releasing the stent graft from the deployment device.



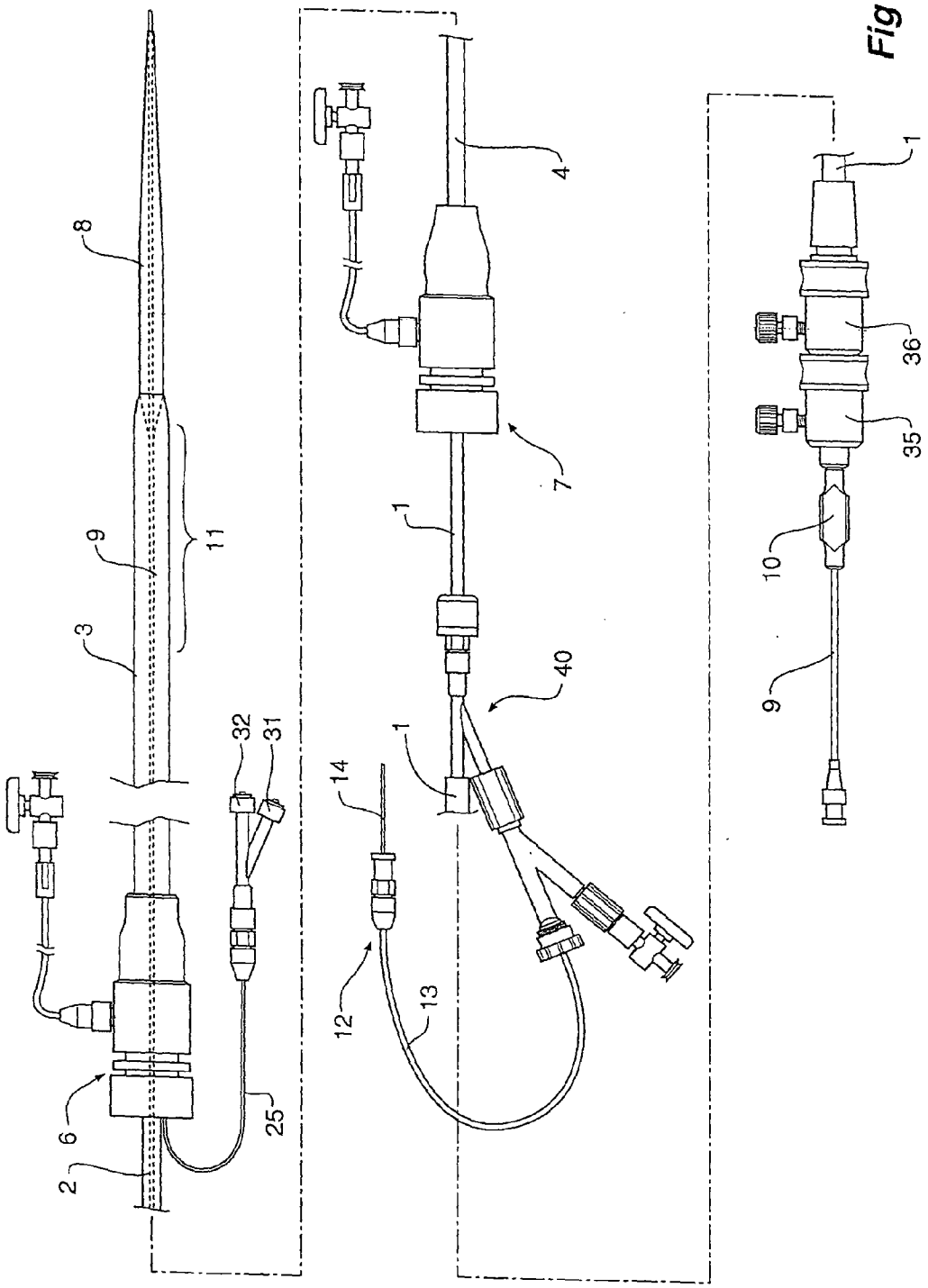


Fig 1

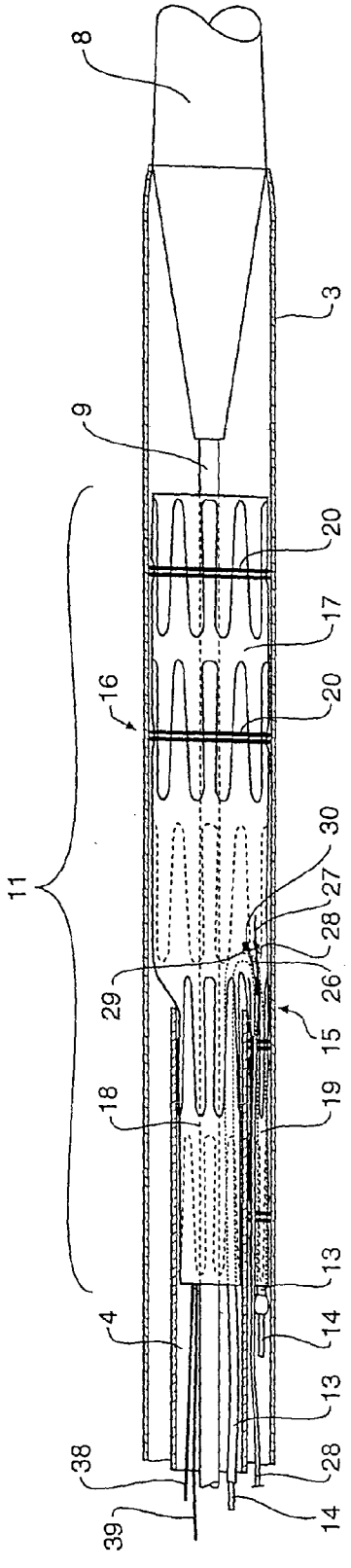

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Fig 2A

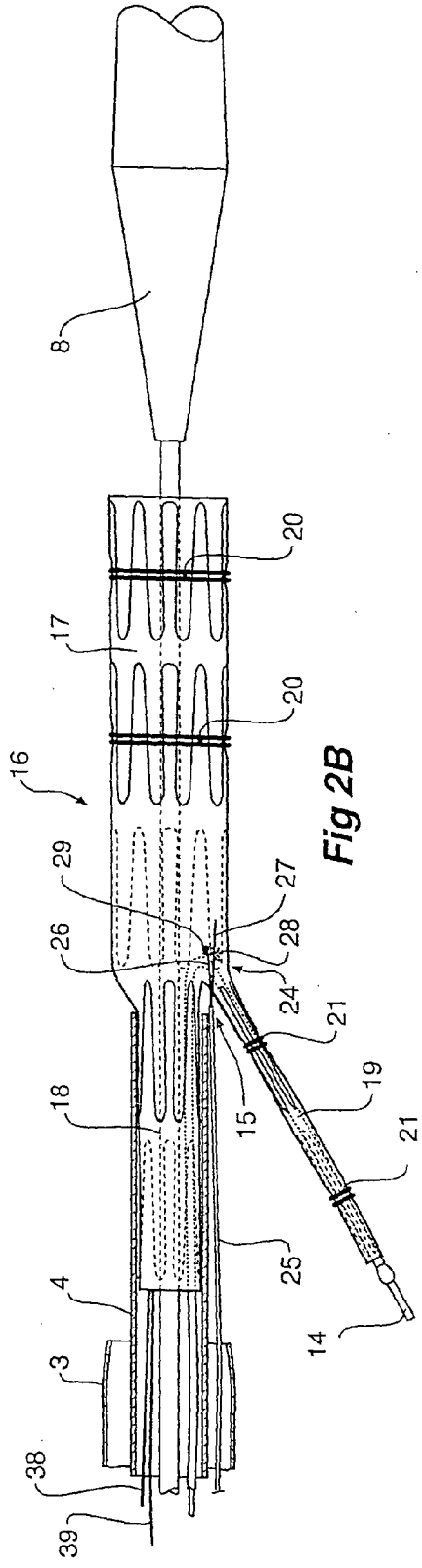

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Fig 2B

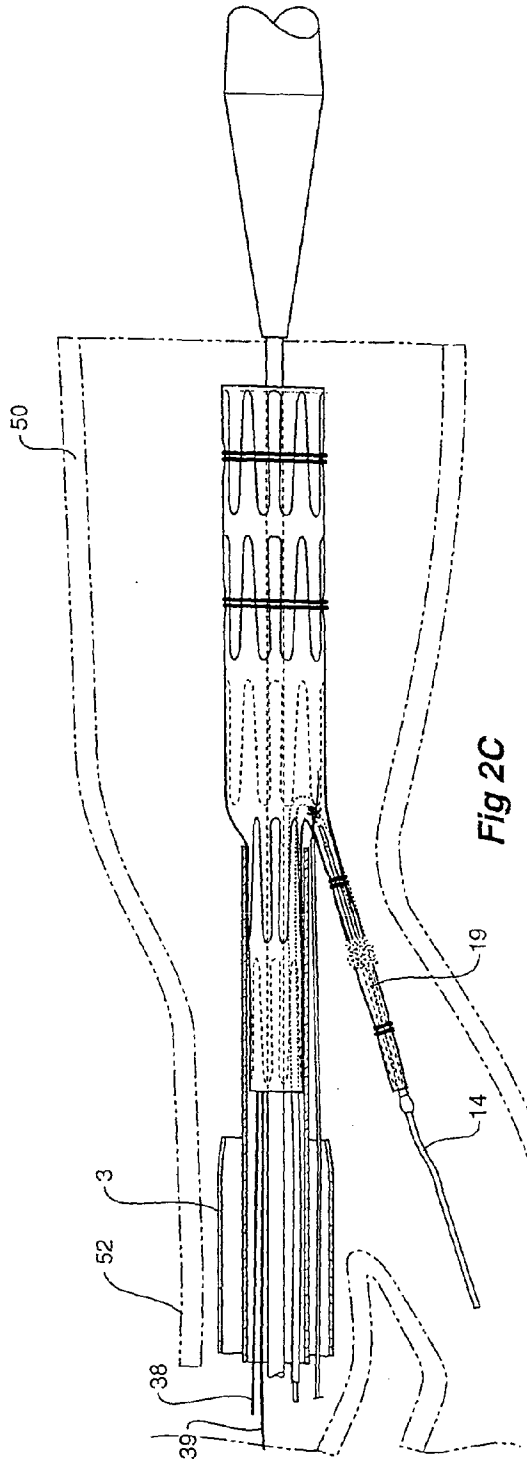


Fig 2C

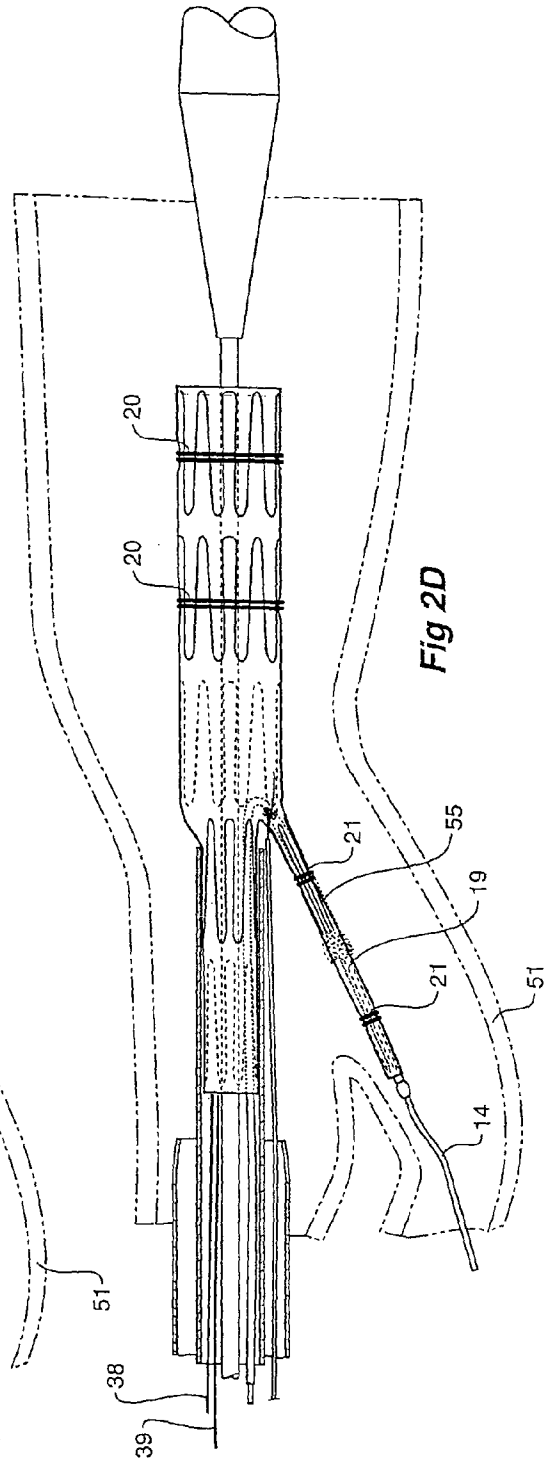


Fig 2D

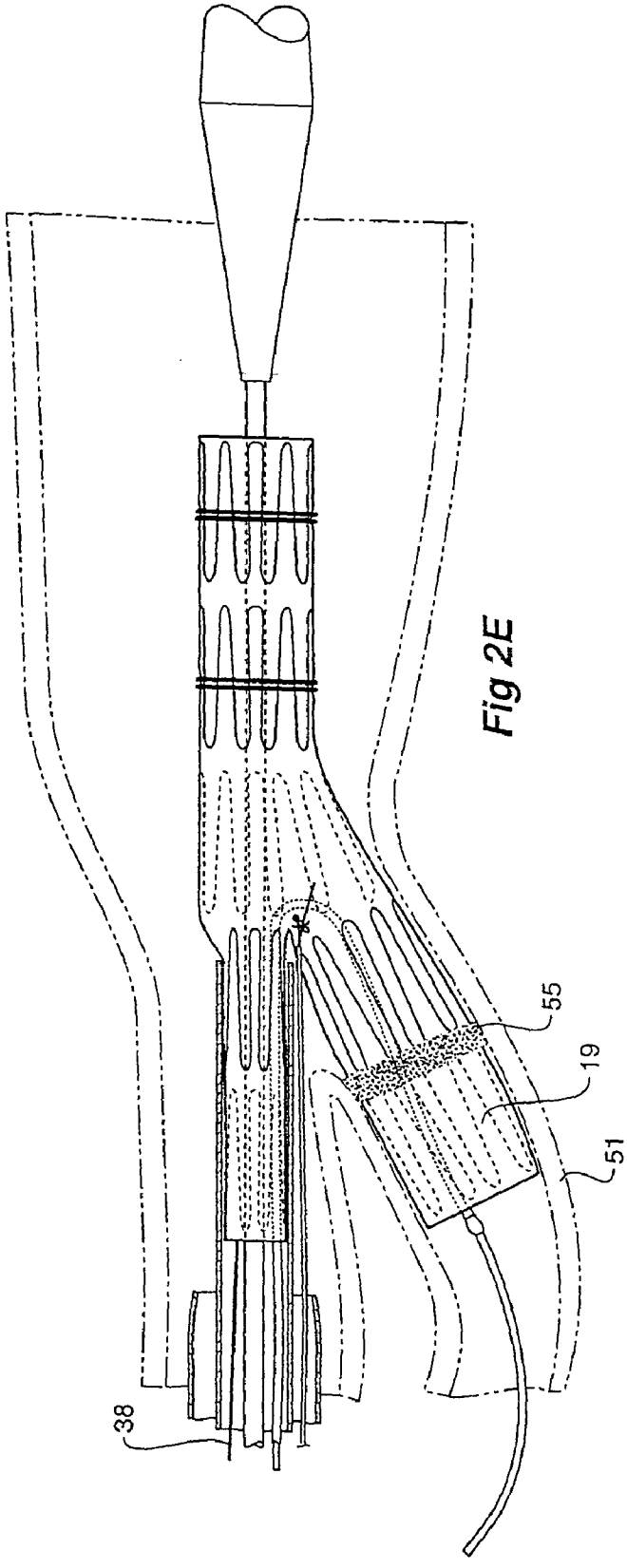


Fig 2E

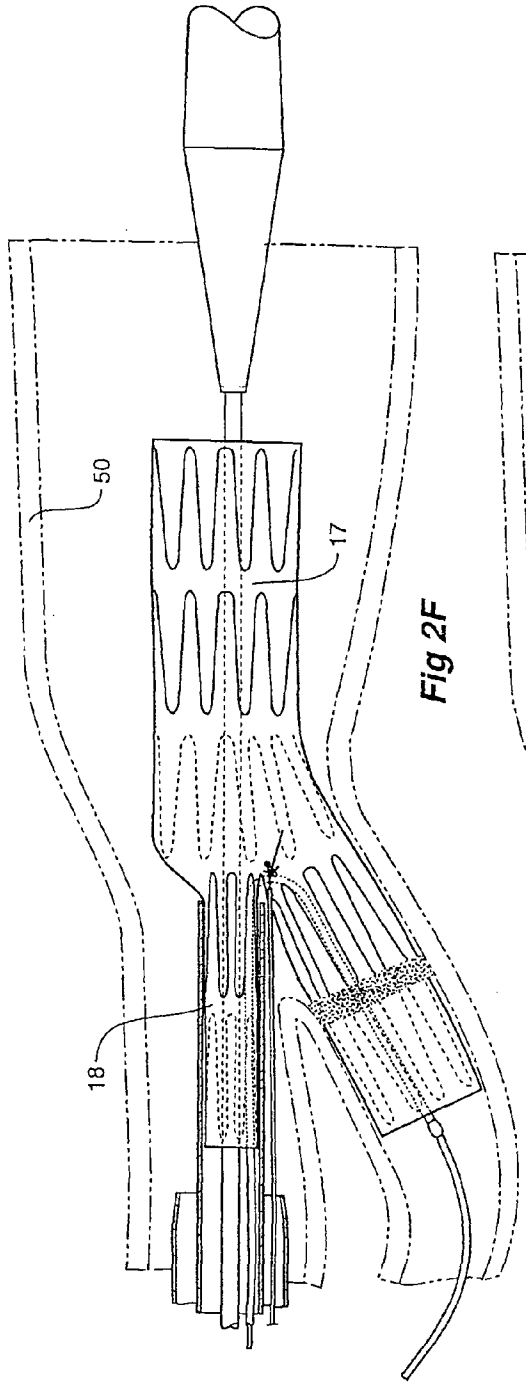


Fig 2F

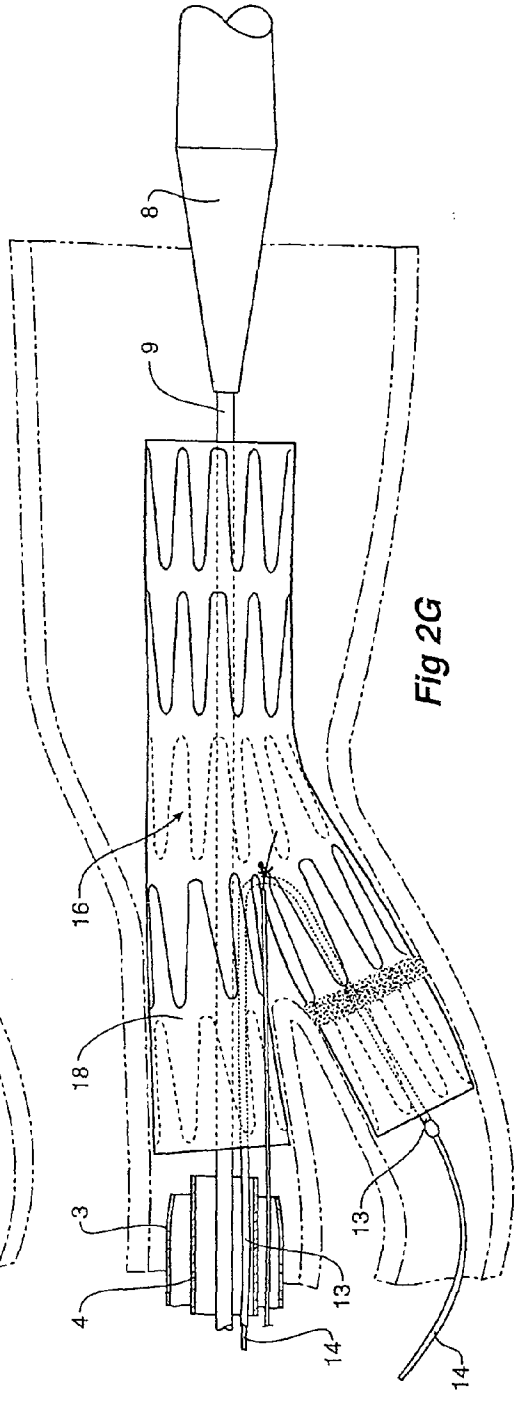


Fig 2G

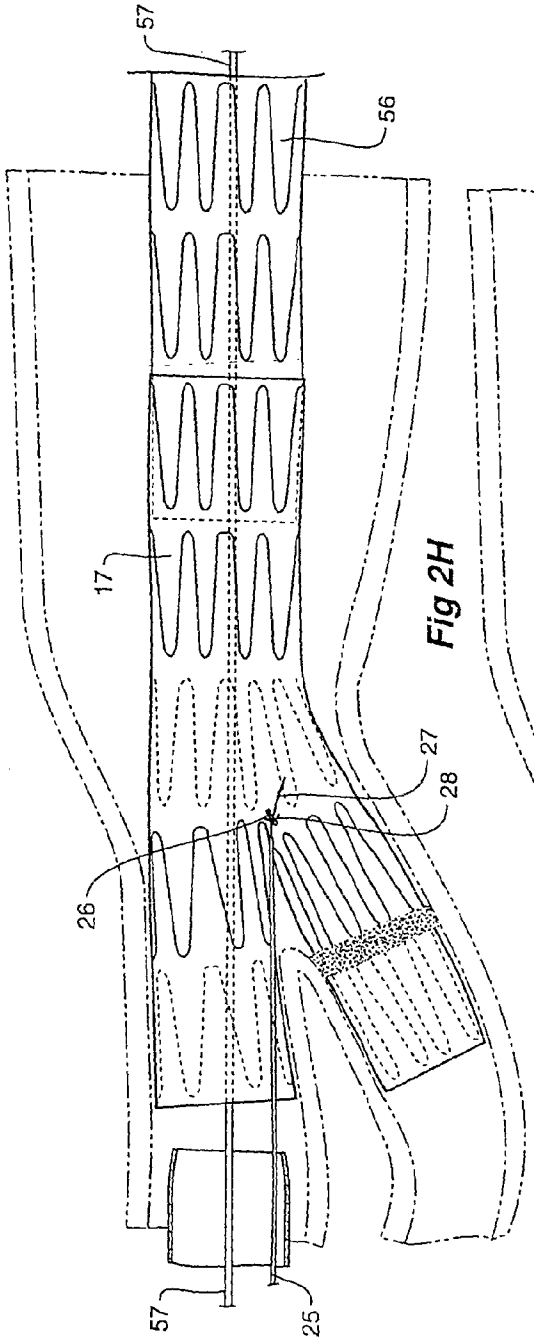


Fig 2H

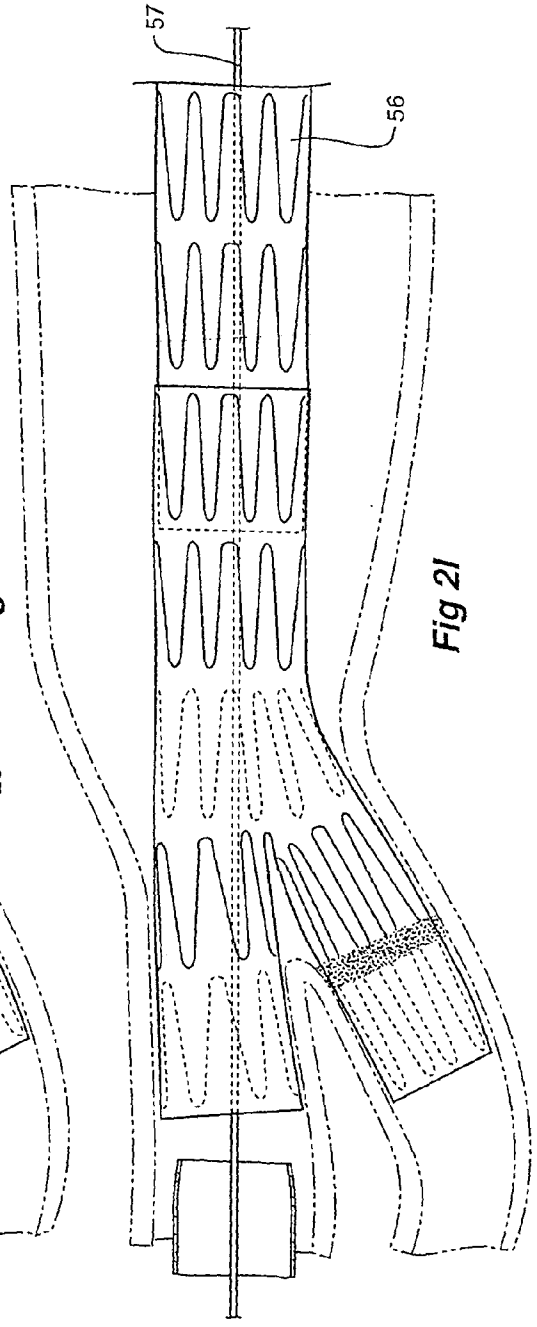


Fig 2I

BRANCH GRAFTING DEVICE AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Australian Provisional Patent Application No. 2002951147, filed Sep. 2, 2002.

TECHNICAL FIELD

[0002] This invention relates to a bifurcated or branched stent graft and to a deployment device for deploying a branched stent graft and a method of deploying such a device as well as to a temporary stent graft anchoring system.

BACKGROUND OF THE INVENTION

[0003] The invention will be generally discussed with reference to deploying a branched stent graft into an internal iliac artery from the common iliac but is not so limited and may be used with deployment into any branched vessel but is particularly applicable where the vessel into which the device is deployed is a blind vessel, that is, access is not available from an end of the vessel remote from the bifurcation from a main vessel.

[0004] Throughout this specification the term 'distal' with respect to a portion of the vasculature of a patient, a deployment device or a prosthesis is the end of the vasculature, deployment device or prosthesis furthest away in the direction of blood flow from the heart and the term 'proximal' means the portion of the vasculature, deployment device or end of the prosthesis nearer to the heart. For other lumens within the human or animal body the terms caudal and cranial respectively should be understood.

SUMMARY OF THE INVENTION

[0005] In one form therefore the invention is said to reside in an endoluminal stent graft deployment system adapted for deployment of a limb of a branched stent graft into a blind vessel, the deployment system including, a deployment device having a distal end and a proximal end and including the branched stent graft releasably retained thereon at the proximal end thereof, an inner sheath slidably and coaxially mounted on the deployment device, the branched stent graft having a main body and a limb extending therefrom, the limb extending distally from a bifurcation in the main body, the branched stent graft being mounted on the deployment device with the deployment catheter passing through the main body, the inner sheath enclosing the main body up to distally of the bifurcation, and a separate deflecting wire guide extending into the limb from the distal end of the deployment device.

[0006] Preferably the endoluminal stent graft deployment device further includes an outer sheath slidably and coaxially mounted on the inner sheath and adapted to enclose the entire stent graft.

[0007] Preferably the endoluminal stent graft deployment system further includes an anchor wire arrangement extending between the inner and outer sheaths and extending to and fastened to the main body of the stent graft adjacent to the bifurcation.

[0008] The anchor wire arrangement may include an anchor wire and an anchor release wire and the anchor release wire extending to an anchor wire release arrangement at the distal end of the deployment device and adapted to remain outside the patient during deployment.

[0009] The separate deflecting wire guide may include a guide wire arrangement extending through the limb and extending distally therefrom to assist with directing the limb into the blind vessel.

[0010] Preferably the separate deflecting wire guide extending to the limb includes a guide wire and a guide wire sheath, the guide wire being movable within the guide wire sheath from outside the patient during deployment.

[0011] The deployment device may include a guide wire catheter mounted coaxially and movably within a deployment catheter, the guide wire catheter extending to a nose cone and the branched stent graft releasably retained distally of the nose cone.

[0012] Preferably the endoluminal stent graft deployment system further includes a diameter reducing arrangement on at least part of the main body of the stent graft and a diameter reducing arrangement on the limb of the stent graft.

[0013] The diameter reducing arrangements may each include ties around the main body or limb to reduce the diameter of the main body or limb from a deployed diameter to a compressed diameter and a trigger wire arrangement to release the ties to allow the main body or limb to expand to the deployed diameter. Generally it is intended that the released ties remain associated with the stent graft.

[0014] The trigger wire arrangement may include a trigger wire release arrangement at the distal end of the deployment device that is adapted to remain outside the patient during deployment.

[0015] In one form the branched stent graft comprises a tubular body and self expanding stents at, at least the proximal and distal ends of the main body and at the distal end of the limb. Further self expand stents may be provided on the main body and limb. The stents may be zig-zag Z stents made from Nitinol or stainless steel.

[0016] Preferably the limb includes on an outer surface thereof fibres extending therefrom to improve adhesion to the vessel wall.

[0017] The anchor wire arrangement may include an anchor wire and an anchor wire release wire and the anchor wire release wire extending to an anchor wire release arrangement at the distal end of the deployment device and adapted to remain outside the patient during deployment. The anchor wire and anchor wire release wire extend through an anchor wire catheter which is positioned between the inner and outer sheaths.

[0018] In an alternative form the invention resides in a method of deploying a limb of a branched stent graft into a blind vessel in a human or animal body, the branched stent graft being mounted on a deployment device, the branched stent graft having a main body and a limb extending therefrom, the limb extending distally from a bifurcation in the main body, the method including the steps of:

[0019] deploying the deployment device into a vessel from which the blind vessel extends;

[0020] releasing a limb of the main body of the branched stent graft from the deployment device such that the limb extends laterally and distally adjacent the blind vessel;

[0021] extending a guide wire from the limb into the blind vessel;

[0022] manipulating the deployment device by withdrawing the deployment device slightly to cause the limb to enter the blind vessel assisted by the guide wire, and

[0023] releasing the branched stent graft from the deployment device.

[0024] The step of manipulating by withdrawing the deployment device slightly may include the step of retaining the main body of the branched stent graft on the deployment device by means of an anchor wire and the step of releasing the branched stent graft may include the step of releasing the anchor wire.

[0025] The step of releasing the branched stent graft may include the step of releasing diameter reducing ties on the limb and main body of the branched stent graft using a trigger wire system.

[0026] The step of deploying the deployment device may include the step of releasably retaining the branched stent graft on the deployment device by means of an inner and outer coaxial sheath, the outer sheath retaining the whole of the branched stent graft and the inner sheath retaining a portion of the main body of the branched stent graft distal of the bifurcation.

[0027] In an alternative form the invention is said to reside in an endoluminal stent graft deployment system adapted for deployment of a limb of a branched stent graft into a blind vessel, the deployment system including, a deployment device having a distal end and a proximal end and including the branched stent graft releasably retained thereto at the proximal end thereof; an inner sheath slidably and coaxially mounted on the deployment device, an outer sheath slidably and coaxially mounted on the inner sheath, the branched stent graft having a main body and a limb extending therefrom, the limb extending distally from a bifurcation in the main body, the branched stent graft being mounted on the deployment device in an annular recess thereon with the deployment catheter passing through the main body, the inner sheath enclosing the main body up to distally of the bifurcation, the outer sheath enclosing the entire stent graft and extending proximally of the annular recess, and an anchor wire arrangement extending between the inner and outer sheaths and extending to and fastened to the main body adjacent to the bifurcation.

[0028] Preferably the endoluminal stent graft deployment system further includes a guide wire arrangement extending through the limb and extending distally therefrom to assist with directing the limb into the blind vessel.

[0029] The deployment device may include a guide wire catheter mounted coaxially within a deployment catheter, the guide wire catheter extending to a nose cone and the annular recess being between the nose cone and the deployment catheter.

[0030] Preferably the endoluminal stent graft deployment system further includes a diameter reducing arrangement on at least part of the main body of the stent graft.

[0031] Preferably the endoluminal stent graft deployment system further includes a diameter reducing arrangement on the limb of the stent graft.

[0032] The diameter reducing arrangement may include ties around the stent graft to reduce the diameter of the stent graft from a deployed diameter to a compressed diameter and a trigger wire arrangement to release the ties to allow the stent graft to expand to the deployed diameter.

[0033] The trigger wire arrangement may include a trigger wire release arrangement at the distal end of the deployment device and adapted to remain outside the patient during deployment.

[0034] Preferably the branched stent graft comprises a tubular body and self expanding stents at at least the proximal and distal ends of the main body and at the distal end of the limb.

[0035] The guide wire arrangement extending to the limb may include a guide wire and a guide wire catheter extending to the distal end of the deployment device, the guide wire being movable within the guide wire catheter from outside the patient during deployment.

[0036] The anchor wire arrangement may include an anchor wire and an anchor release wire and the anchor release wire extending to an anchor wire release arrangement at the distal end of the deployment device and adapted to remain outside the patient during deployment.

[0037] In an alternative form the invention is said to reside in an endoluminal stent graft deployment system adapted for endoluminal deployment of a stent graft, the deployment system including a deployment device having a distal end and a proximal end and including the stent graft releasably retained thereon at the proximal end thereof, characterized by an anchor wire arrangement extending from the distal end of the deployment device and engaging the stent graft to thereby anchor the stent graft during manipulation of the deployment device or other deployment devices through the stent graft.

[0038] Preferably the anchor wire arrangement includes an anchor wire and an anchor release wire and the anchor release wire extending to an anchor wire release arrangement at the distal end of the deployment device and adapted to remain outside the patient during deployment.

[0039] The deployment device may include an inner sheath and an outer sheath and the anchor wire and an anchor release wire extend between the inner and outer sheaths in an anchor wire catheter.

BRIEF DESCRIPTION OF THE DRAWING

[0040] This generally describes the invention but to assist with understanding the invention will now be exemplified with the assistance of the accompanying drawings.

[0041] In the drawings:

[0042] **FIG. 1** shows a deployment device according to one embodiment of the invention; and

[0043] **FIG. 2A** to **2I** show various stages of deployment using the device shown in **FIG. 1**.

DETAILED DESCRIPTION

[0044] U.S. Pat. No. 5,387,235 entitled "Endovascular Transluminal Prosthesis For Repair Of Aneurysms" dis-

closes apparatus and methods of retaining grafts onto deployment devices. These features and other features disclosed in U.S. Pat. No. 5,387,235 could be used with the present invention and the disclosure of U.S. Pat. No. 5,387,235 is herewith incorporated in its entirety into this specification.

[0045] U.S. Pat. No. 5,720,776 entitled "Stent Barb" discloses improved barbs with various forms of mechanical attachment to a stent. These features and other features disclosed in U.S. Pat. No. 5,720,776 could be used with the present invention and the disclosure of U.S. Pat. No. 5,720,776 is herewith incorporated in its entirety into this specification.

[0046] U.S. Pat. No. 6,206,931 entitled "Graft Prosthesis Materials" discloses graft prosthesis materials and a method for implanting, transplanting replacing and repairing a part of a patient and particularly the manufacture and use of a purified, collagen based matrix structure removed from a submucosa tissue source. These features and other features disclosed in U.S. Pat. No. 6,206,931 could be used with the present invention and the disclosure of U.S. Pat. No. 6,206,931 is herewith incorporated in its entirety into this specification.

[0047] PCT Patent Publication Number No. WO98/53761 entitled "A Prosthesis and a Method of Deploying a Prosthesis" discloses an introducer for a prosthesis which retains the prosthesis so that each end can be moved independently. These features and other features disclosed in PCT Patent Publication No. WO98/53761 could be used with the present invention and the disclosure of PCT Patent Publication No. WO98/53761 is herewith incorporated in its entirety into this specification.

[0048] PCT Patent Publication No. WO99/29262 entitled "Endoluminal Aortic Stents" discloses a fenestrated prosthesis for placement where there are intersecting arteries. This feature and other features disclosed in PCT Patent Publication No. WO99/29262 could be used with the present invention and the disclosure of PCT Patent Publication No. WO99/29262 is herewith incorporated in its entirety into this specification.

[0049] PCT Patent Publication No. WO03/034948 entitled "Prostheses for Curved Lumens" discloses prostheses with arrangements for bending the prosthesis for placement into curved lumens. This feature and other features disclosed in PCT Patent Publication No. WO03/034948 could be used with the present invention and the disclosure of PCT Patent Publication No. WO03/034948 is herewith incorporated in its entirety into this specification.

[0050] Australian Provisional Patent Serial No. 60/392,682 entitled "Trigger Wires" discloses release wire systems for the release of stent grafts retained on introducer devices. This feature and other features disclosed in Australian Provisional Patent Serial No. 60/392,682 could be used with the present invention and the disclosure of Australian Provisional Patent Serial No. 60/392,682 is herewith incorporated in its entirety into this specification.

[0051] Australian Provisional Patent Serial No. 10/609,846 entitled "Thoracic Deployment Device" discloses introducer devices adapted for deployment of stent grafts particularly in the thoracic arch. This feature and other features disclosed in Australian Provisional Patent Serial No. 10/609,846 could be used with the present invention and the disclosure of Australian Provisional Patent Serial No. 10/609,846 is herewith incorporated in its entirety into this specification.

[0052] Australian Provisional Patent Serial No. 60/391,737 entitled "A Stent-Graft Fastening Arrangement" discloses arrangements for fastening stents onto grafts particularly for exposed stents. This feature and other features disclosed in Australian Provisional Patent Serial No. 60/391,737 could be used with the present invention and the disclosure of Australian Provisional Patent Serial No. 60/391,737 is herewith incorporated in its entirety into this specification.

[0053] PCT Patent Publication No. WO03/053287 entitled "Improving Graft Adhesion" discloses arrangements on stent grafts for enhancing the adhesion of such stent grafts into walls of vessels in which they are deployed. This feature and other features disclosed in PCT Patent Publication No. WO03/053287 could be used with the present invention and the disclosure of PCT Patent Publication No. WO03/053287 is herewith incorporated in its entirety into this specification.

[0054] Australian Provisional Patent Application No. 2002950950 entitled "Composite Prostheses" discloses prostheses or stent grafts suitable for endoluminal deployment. These prostheses and other features disclosed in Australian Provisional Patent Application No. 2002950950 could be used with the present invention and the disclosure of Australian Provisional Patent Application No. 2002950950 is herewith incorporated in its entirety into this specification.

[0055] Now looking more closely at the drawings and more particularly the embodiment shown in **FIG. 1** and parts of this embodiment shown in **FIGS. 2A and 2B** it will be seen that the deployment device comprises a deployment catheter **1** having slidably mounted over it an outer sheath **3** and an inner sheath **4**. The outer sheath **3** is manipulated from an outer sheath manipulator generally shown as **6** and the inner sheath is manipulated from an inner sheath manipulator **7**. Extending from a nose cone **8** throughout the deployment catheter is a guide wire catheter **9**. The guide wire catheter **9** is fixed for movement with respect to the deployment catheter **1** by means of a pin vice **10**. Release of the pin vice allows movement of the nose cone with respect to the deployment catheter **1**.

[0056] A stent graft **16** (**FIG. 2A**) is retained in the region **11** of the deployment device immediately distally of the nose cone **8** as can be particularly seen in **FIG. 2A**. The stent graft **16** includes a proximal body portion **17** enclosed and retained in a constrained state by the outer sheath **3** and a distal body portion **18** enclosed and retained in a constrained state by the inner sheath **4**. Extending between the proximal **16** and distal **18** body portions from a bifurcation **15** is a limb **19**. The proximal body portion **17** is retained in a compressed state by diameter reducing ties **20** and the limb **19** is retained in a compressed state by diameter reducing ties **21**. The method of releasing these diameter reducing ties will be discussed later.

[0057] A deflecting wire guide arrangement generally shown as **12** on the deployment device in **FIG. 1** has a guide wire catheter **13** with a guide wire **14** within it.

[0058] The separate deflecting guide wire catheter **13** extends from the deployment catheter **1** at a Y-piece generally shown as **40**.

[0059] The deflecting guide wire catheter **13** extends from the part of the deployment device which in use remains outside of the patient through the inner sheath **3** and is bent and extends into the limb **19**. When the limb **19** is released as discussed below the deflecting wire guide assists in causing the limb to deflect laterally from the main body of the stent graft.

[0060] An anchor wire arrangement is mounted at **24** to the main body of the stent graft **16** adjacent the bifurcation **15**. The anchor wire arrangement includes an anchor wire catheter **25**, an anchor wire **26** which passes through the anchor wire catheter **25** and an anchor wire release wire **27** which also passes through the anchor wire catheter **25**. The anchor wire **26** includes a bead **29** at its proximal end so that a suture **30** can be fastened through the stent graft body adjacent to the bifurcation **15** and then around the anchor wire **26** and retained by a knot **28** which is locked by the anchor wire release wire **27**. The anchor wire catheter **25** passes between the outer sheath **3** and the inner sheath **4** and extends out of the rear of the outer sheath manipulator **6**. The cap **32** can be removed to enable release of the anchor wire release wire **27** and pull it through the anchor wire catheter **25** and the cap **31** can be released to pull the actual anchor wire **26** back. When the anchor wire release wire **27** is withdrawn the knot **28** is unlocked and the suture **30** is released and the anchor wire **26** is released from the stent graft body **16**.

[0061] The diameter reducing ties **21** on the limb **19** are activated by the release of the trigger wire mechanism **35** on the deployment catheter **1**. The diameter reducing ties **20** on the proximal body portion **17** are released by means of the trigger wire release mechanism **36**. Trigger wire **38** extends from the diameter reducing ties **20** to the release **36** and trigger wire **39** extends from the diameter reducing ties **21** to the release **35**.

[0062] This then generally describes the deployment apparatus but to assist with understanding reference will now be made to **FIGS. 2A** to **21** which show various stages of deployment of a stent graft using the deployment device discussed in relation to **FIG. 1**.

[0063] In **FIG. 2A** it will be seen that the stent graft **16** is retained within the outer sheath **3** and inner sheath **4** in the manner discussed above. It will be noted that the limb **19** is outside the inner sheath **4** but inside the outer sheath **3**.

[0064] In **FIG. 2B** the outer sheath has been withdrawn to allow the limb **19** to deflect laterally.

[0065] For clarity the portion of the iliac bifurcation into which the device is deployed according to this invention is not illustrated in **FIGS. 2A and 2B** but is shown in dotted lines in later illustrations.

[0066] As can be seen in **FIG. 2**C, the deployment device is deployed in an iliac artery which has a common iliac artery **50** branching into an internal iliac artery **51** and the external iliac artery **52**. The deployment device has been deployed through the external iliac artery **52**. The common iliac artery **50** is deformed into an aneurysmal sac and to provide a good place for deployment of a leg of an endoluminal device to bridge the aneurysm the device of the present invention is deployed.

[0067] As can be seen in **FIG. 2**C, the outer sheath **3** has been withdrawn to a position in which where the limb **19** can escape from being retained by the outer sheath **3** and the guide wire **14** has been advanced so that it can extend into the internal iliac artery **51**. It will be understood by those skilled in the field that radiological techniques can be used to ensure proper alignment before advancement of the guide wire **14** into the internal iliac artery **51**. Suitable radiopaque markers may be place as needed on the main body and limb to assist with placement and contrast fluids may be provided through the deployment device to assist with visualization of the arterial structure.

[0068] As can be seen in **FIG. 2**D, once the guide wire **14** has been deployed into the internal iliac artery **51**, the entire device can be manipulated from outside the patient by being withdrawn slightly so that the limb **19** extends into the internal iliac artery **51** while being guided by the already placed guide wire **14**.

[0069] Once a sufficient amount of the limb has been deployed into the internal iliac artery **51**, which can be observed by suitable radiological techniques, the diameter reducing ties **21** on the limb **19** are released by removal of the trigger wire release **35** and the limb **19** expands under the effect of self expanding stents to engage with the walls of the internal iliac **51** as particularly can be seen in **FIG. 2E**. It will be noted that fibres **55** are included on the limb **19** to improve adhesion onto the wall of the internal iliac artery **51** by encouraging ingrowth.

[0070] As can be seen in **FIG. 2**F, the diameter reducing ties **20** on the proximal body portion **19** have been released by removal of the trigger wire release mechanism **36** so that the proximal body portion expands under the effect of self expanding stents to its full size. At this stage, however, the proximal body portion does not necessarily engage with the walls of the common iliac artery **50** because of the aneurysmal sac within the vessel **50**.

[0071] In the next stage, as shown in **FIG. 2**G, the inner sheath **4** is withdrawn to release the distal body portion **18** which expands under the effect of self expanding stents to engage against the walls of the external iliac artery. At this stage the deployment of the iliac branched stent graft is essentially completed and the nose cone **8**, guide wire catheter **9** and internal sheath **4** along with the separate guide wire catheter **13** and guide wire **14** can be withdrawn leaving the outer sheath **3** in place for deployment of other devices through the iliac branched stent graft **16** as required. At this stage, however, the anchor wire arrangement may still be maintained in place to hold the branched stent graft in place while further deployment occurs through the device.

[0072] Deployment of subsequent devices can be carried out over guide wire **57** which remains in place after removal of the iliac branched stent graft deployment device.

[0073] **FIG. 2H** for instance shows the leg **56** of a further stent graft deployed within the proximal end of the proximal body portion **17**.

[0074] After deployment of further stent grafts as required, the anchor wire arrangement can be withdrawn by withdrawal of the anchor wire release wire **27** which

releases the knot **28** so that the anchor wire **26** and the anchor wire catheter **25** can be then be withdrawn to leave the situation shown in **FIG. 2I**.

[**0075**] It will be seen generally by this invention that a stent graft can be deployed into a blind vessel such as an internal iliac and then that stent graft anchored while further stent grafting is occurring.

[**0076**] The use of an anchoring system using an anchor wire catheter, an anchor wire and an anchor wire release is not restricted to this application but may be used in other situations where a temporary anchoring of a stent graft is desirable.

[**0077**] Throughout this specification various indications have been given as to the scope of the invention but the invention is not limited to only one of these but may reside in two or more of these combined together. The examples are given for illustration only and not for limitation.

What is claimed is:

1. An endoluminal stent graft deployment system adapted for deployment of a limb of a branched stent graft into a blind vessel, the deployment system comprising a deployment device having a distal end and a proximal end and including the branched stent graft releasably retained thereon at the proximal end thereof; an inner sheath slidably and coaxially mounted on the deployment device, the branched stent graft having a main body and a limb extending therefrom, the limb extending distally from a bifurcation in the main body, the branched stent graft being mounted on the deployment device with a deployment catheter passing through the main body, the inner sheath enclosing the main body up to distally of the bifurcation, and a separate deflecting wire guide extending into the limb from the distal end.

2. An endoluminal stent graft deployment system as in claim 1 further including an outer sheath slidably and coaxially mounted on the inner sheath and enclosing the entire stent graft.

3. An endoluminal stent graft deployment system as in claim 2 further including an anchor wire arrangement extending between the inner and outer sheaths and extending to and fastened to the main body of the stent graft adjacent to the bifurcation.

4. An endoluminal stent graft deployment system as in claim 1 wherein the separate deflecting wire guide includes a guide wire arrangement extending through the limb and extending distally therefrom to assist with directing the limb into the blind vessel.

5. An endoluminal stent graft deployment system as in claim 1 wherein the deployment device includes a guide wire catheter mounted coaxially and movably within a deployment catheter, the guide wire catheter extending to a nose cone and the branched stent graft releasably retained distally of the nose cone.

6. An endoluminal stent graft deployment system as in claim 1 further including a diameter reducing arrangement on at least part of the main body of the stent graft.

7. An endoluminal stent graft deployment system as in claim 1 further including a diameter reducing arrangement on the limb of the stent graft.

8. An endoluminal stent graft deployment system as in claim 6 or **7** wherein the diameter reducing arrangement includes ties around the main body or limb of the stent graft to reduce the diameter of the stent graft or limb from a deployed diameter to a compressed diameter and a trigger wire arrangement to release the ties to allow the main body or limb of the stent graft to expand to the deployed diameter.

9. An endoluminal stent graft deployment system as in claim 8 wherein the trigger wire arrangement includes a trigger wire release arrangement at the distal end of the deployment device and adapted to remain outside the patient during deployment.

10. An endoluminal stent graft deployment system as in claim 1 wherein the branched stent graft comprises a tubular body and self expanding stents at at least the proximal and distal ends of the main body and at the distal end of the limb.

11. An endoluminal stent graft deployment system as in claim 1 wherein the separate deflecting guide wire catheter extending to the limb includes a guide wire and a guide wire sheath, the guide wire being movable within the guide wire sheath from outside the patient during deployment.

12. An endoluminal stent graft deployment system as in claim 1 wherein the limb includes on an outer surface thereof fibres extending therefrom to improve adhesion to the vessel wall.

13. An endoluminal stent graft deployment system as in claim 3 wherein the anchor wire arrangement includes an anchor wire and an anchor release wire and the anchor release wire extending to an anchor wire release arrangement at the distal end of the deployment device that is adapted to remain outside the patient during deployment.

14. A method of deploying a limb of a branched stent graft into a blind vessel in a human or animal body, the branched stent graft being mounted on a deployment device, the branched stent graft having a main body and a limb extending therefrom, the limb extending distally from a bifurcation in the main body, the method including the steps of:

deploying the deployment device into a vessel from which the blind vessel extends;

releasing a limb of the main body of the branched stent graft from the deployment device such that the limb extends laterally and distally;

extending a guide wire from the limb into the blind vessel;

manipulating the deployment device by withdrawing the deployment device slightly to cause the limb to enter the blind vessel assisted by the guide wire, and

releasing the branched stent graft from the deployment device.

15. An endoluminal stent graft deployment system adapted for deployment of a limb of a branched stent graft into a blind vessel, the deployment system comprising a deployment device having a distal end and a proximal end and including the branched stent graft releasably retained thereto at the proximal end thereof; an inner sheath slidably and coaxially mounted on the deployment device, an outer sheath slidably and coaxially mounted on the inner sheath, the branched stent graft having a main body and a limb extending therefrom, the limb extending distally from a bifurcation in the main body, the branched stent graft being mounted on the deployment device in an annular recess thereon, with a deployment catheter passing through the main body, the inner sheath enclosing the main body up to distally of the bifurcation, the outer sheath enclosing the entire stent graft and extending proximally of the annular recess, and an anchor wire arrangement extending between

the inner and outer sheaths and extending to and fastened to the main body adjacent to the bifurcation.

16. An endoluminal stent graft deployment system as in claim 15 further including a guide wire arrangement extending through the limb and extending distally therefrom to assist with directing the limb into the blind vessel.

17. An endoluminal stent graft deployment system as in claim 15 wherein the deployment device includes a guide wire catheter mounted coaxially within a deployment catheter, the guide wire catheter extending to a nose cone and the annular recess being between the nose cone and the deployment catheter.

18. An endoluminal stent graft deployment system as in claim 15 further including a diameter reducing arrangement on at least part of the main body of the stent graft.

19. An endoluminal stent graft deployment system as in claim 15 further including a diameter reducing arrangement on the limb of the stent graft.

20. An endoluminal stent graft deployment system as in claim 18 wherein the diameter reducing arrangement includes ties around the stent graft to reduce the diameter of the stent graft from a deployed diameter to a compressed diameter and a trigger wire arrangement to release the ties to allow the stent graft to expand to the deployed diameter.

21. An endoluminal stent graft deployment system as in claim 20 wherein the trigger wire arrangement includes a trigger wire release arrangement at the distal end of the deployment device that is adapted to remain outside the patient during deployment.

22. An endoluminal stent graft deployment system as in claim 15 wherein the branched stent graft comprises a tubular body and self expanding stents at at least the proximal and distal ends of the main body and at the distal end of the limb.

23. An endoluminal stent graft deployment system as in claim 16 wherein the guide wire arrangement extending to the limb includes a guide wire and a guide wire catheter, the guide wire being movable within the guide wire catheter from outside the patient during deployment.

24. An endoluminal stent graft deployment system as in claim 15 wherein the branched stent graft comprises a tubular body and self expanding stents at at least the proximal and distal ends of the main body and at the distal end of the limb.

25. An endoluminal stent graft deployment system as in claim 16 wherein the guide wire arrangement extending to the limb includes a guide wire and a guide wire catheter, the guide wire being movable within the guide wire catheter from outside the patient during deployment.

26. An endoluminal stent graft deployment system as in claim 15 wherein the anchor wire arrangement includes an anchor wire and an anchor release wire and the anchor release wire extending to an anchor wire release arrangement at the distal end of the deployment device that is adapted to remain outside the patient during deployment.

27. An endoluminal stent graft deployment system adapted for endoluminal deployment of a stent graft, the deployment system including a deployment device having a distal end and a proximal end and including the stent graft releasably retained thereon at the proximal end thereof, characterized by a releasable anchor wire arrangement extending from the distal end of the deployment device and engaging the stent graft to thereby anchor the stent graft during manipulation of the deployment device or another deployment device through the stent graft.

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