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Biyani

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(54) **VARIABLE HEIGHT VERTEBRAL BODY REPLACEMENT IMPLANT**

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(51) **Int. Cl.**
A61F 2/44 (2006.01)

(52) **U.S. Cl.** **623/17.16**

(58) **Field of Classification Search** 623/17.11–17.16; 606/60, 246–249

See application file for complete search history.

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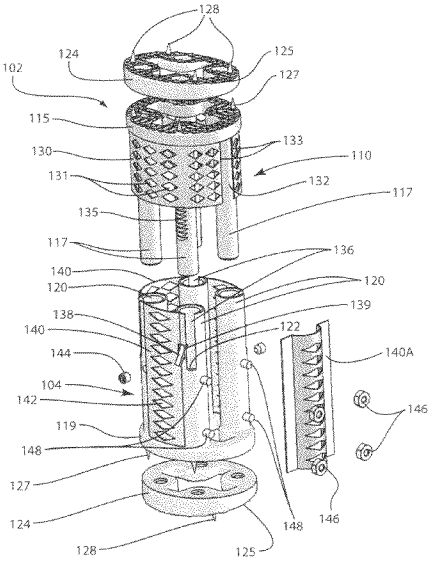
(57) **ABSTRACT**

A variable height vertebral body replacement implant used in corpectomy surgery to provide support in place of a removed or damaged vertebrae, and contain and compact bone graft material.

24 Claims, 11 Drawing Sheets



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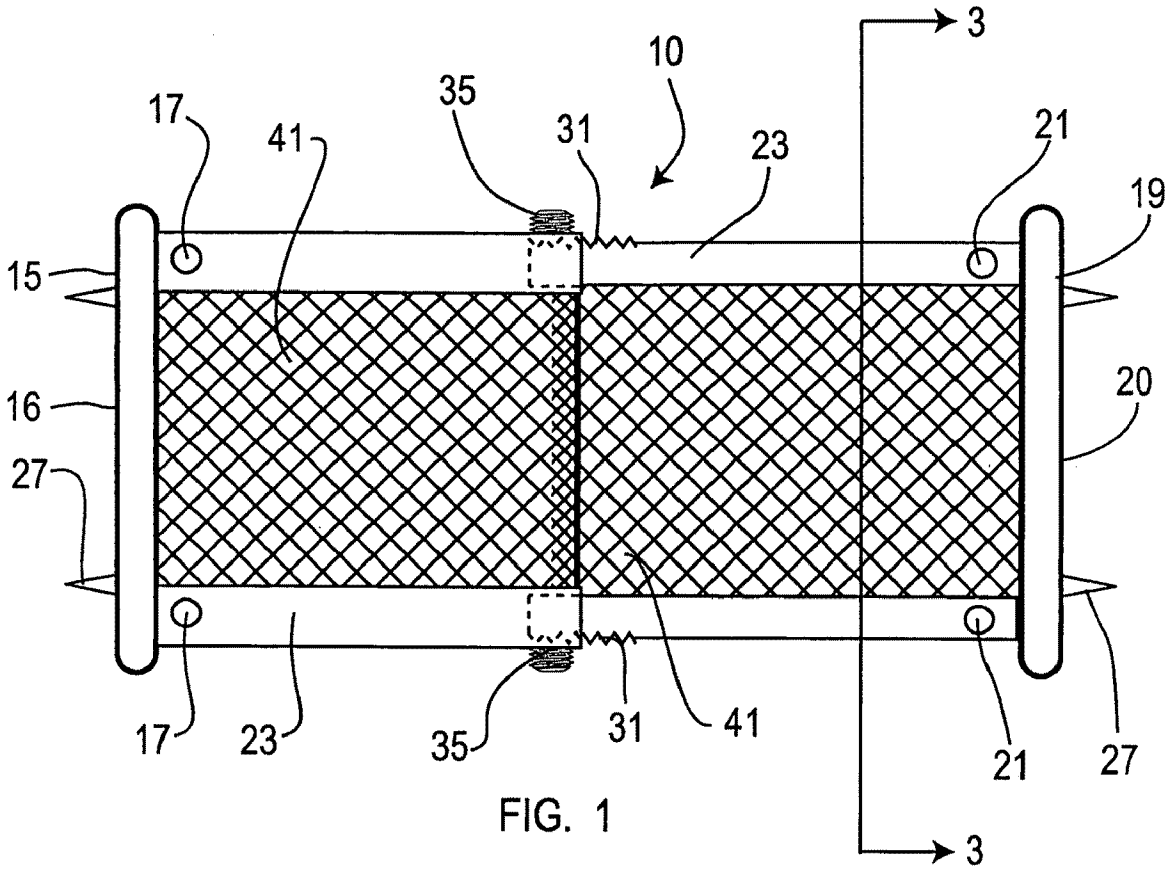
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FIG. 1

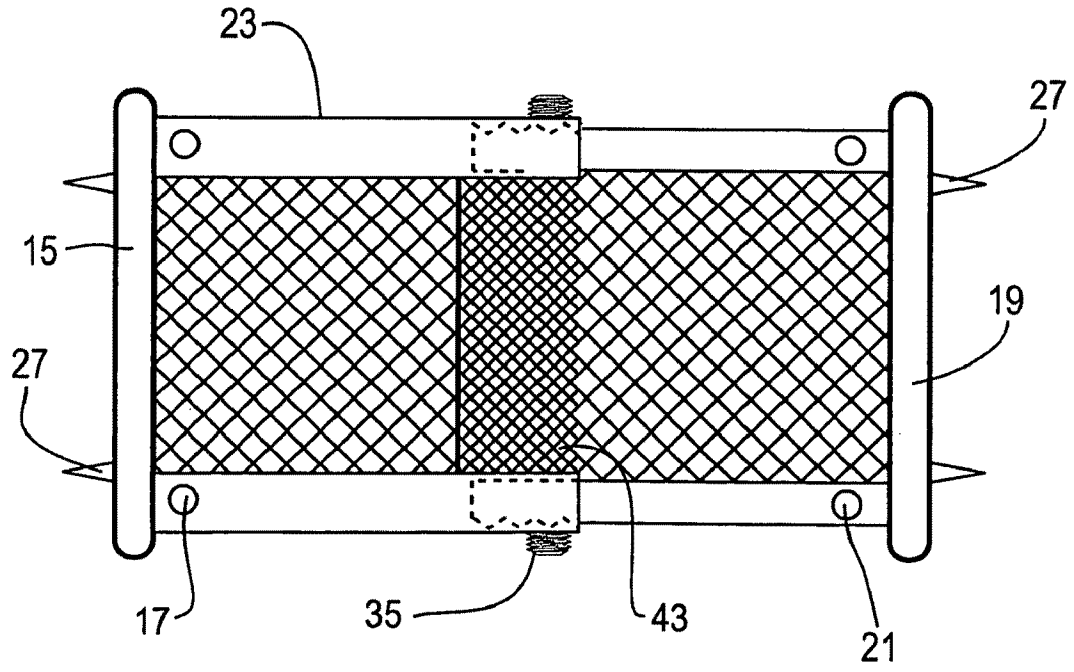
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FIG. 2

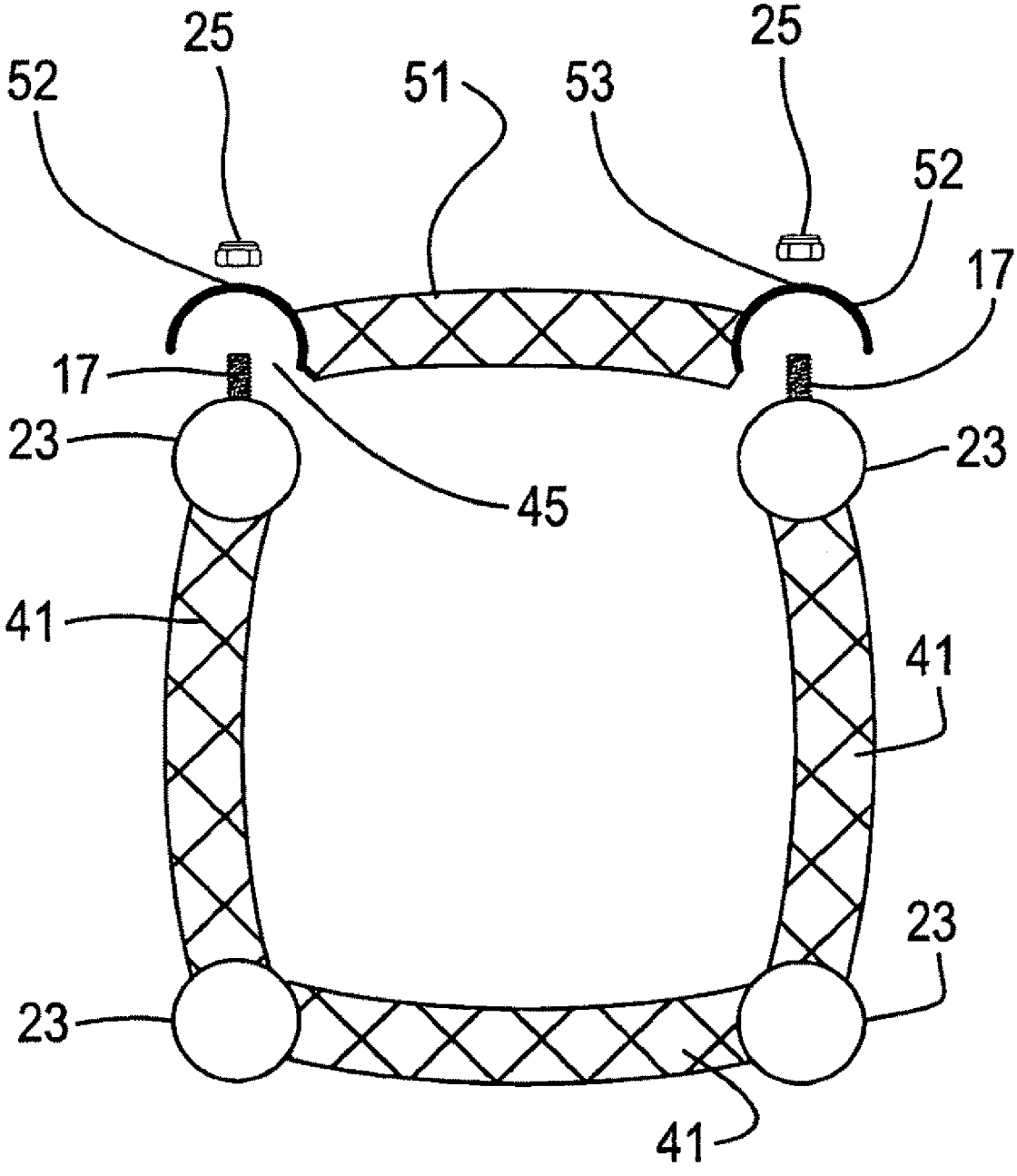

FIG. 3

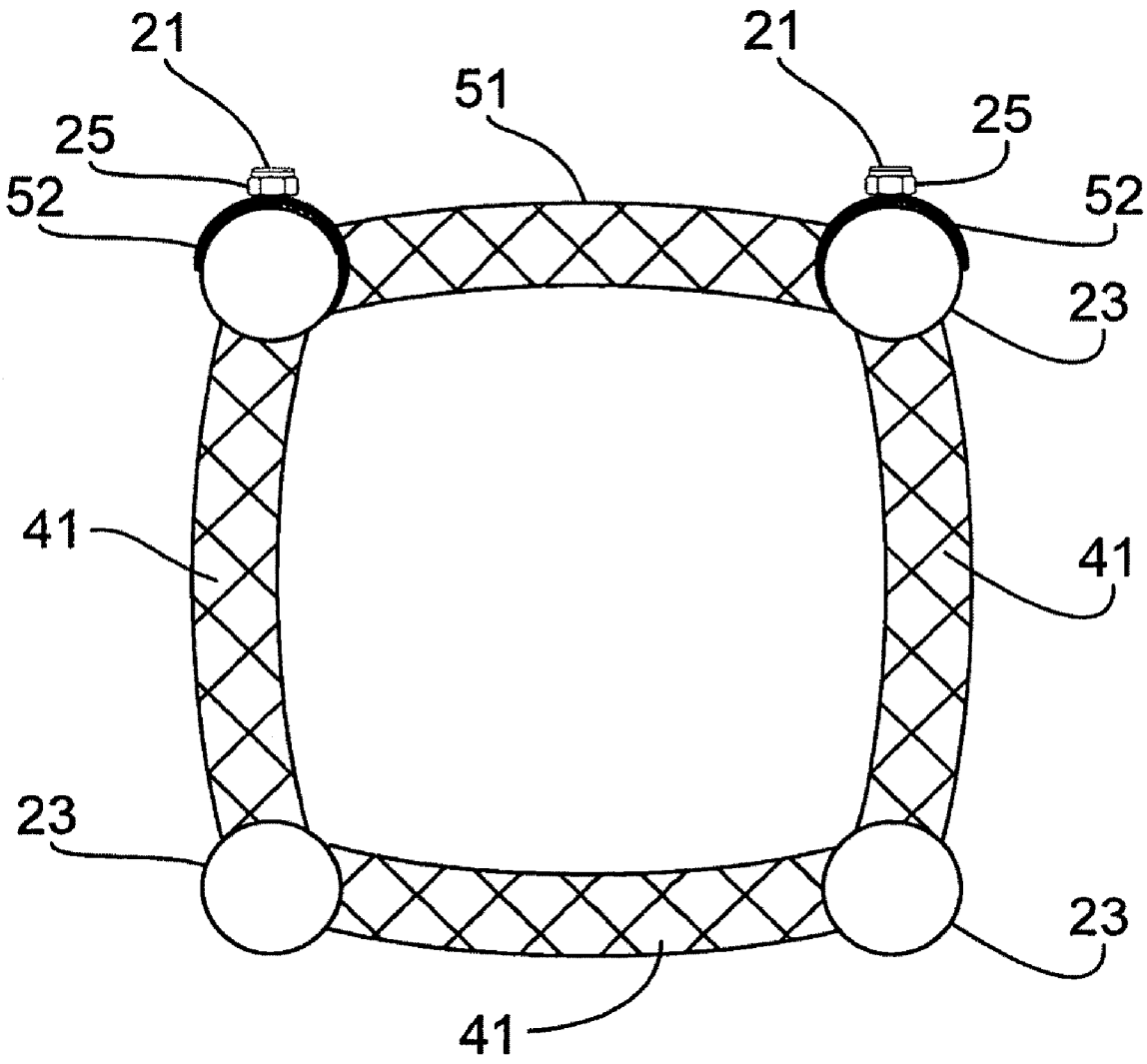

Figure 4

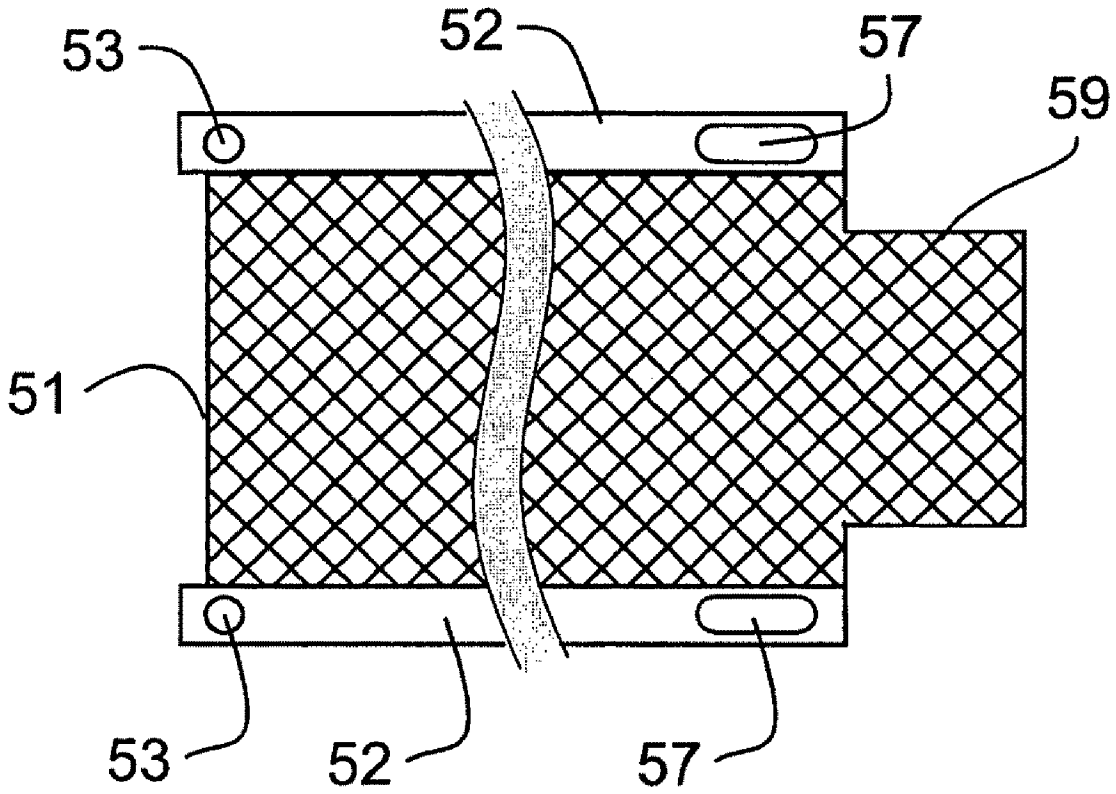

Figure 5

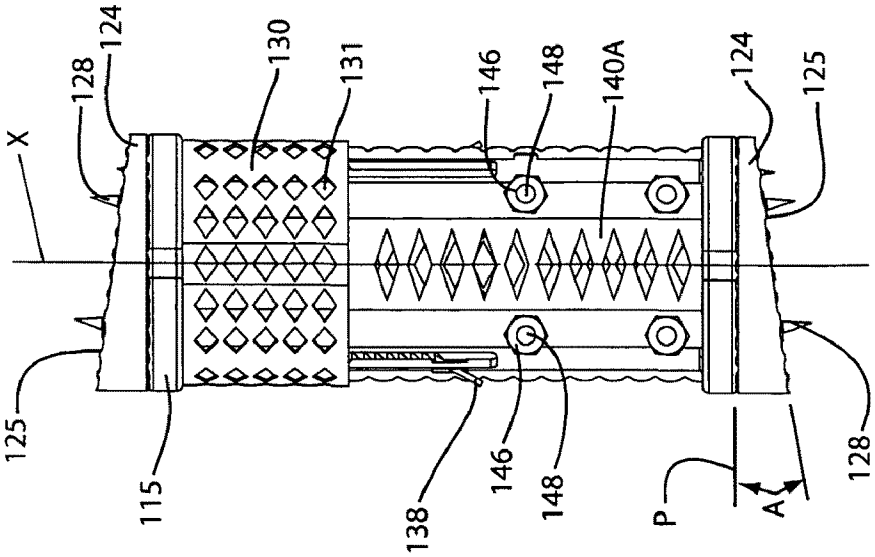

FIG. 8

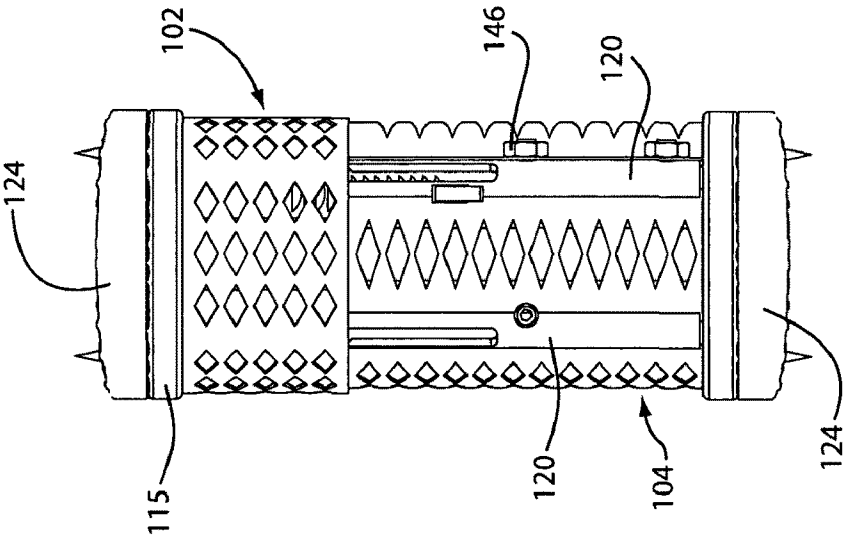

FIG. 7

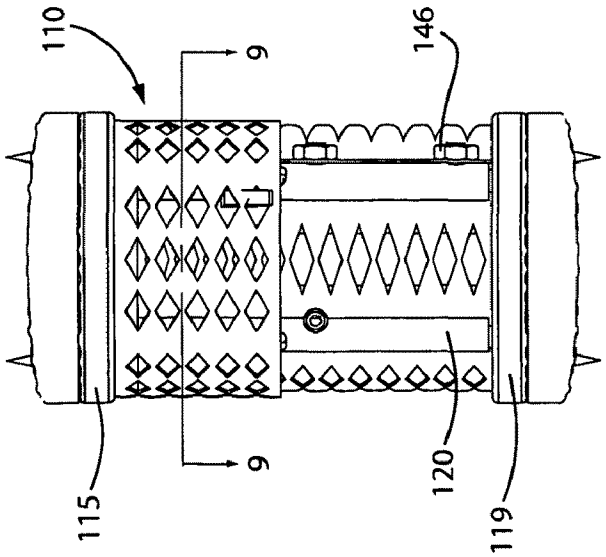

FIG. 6

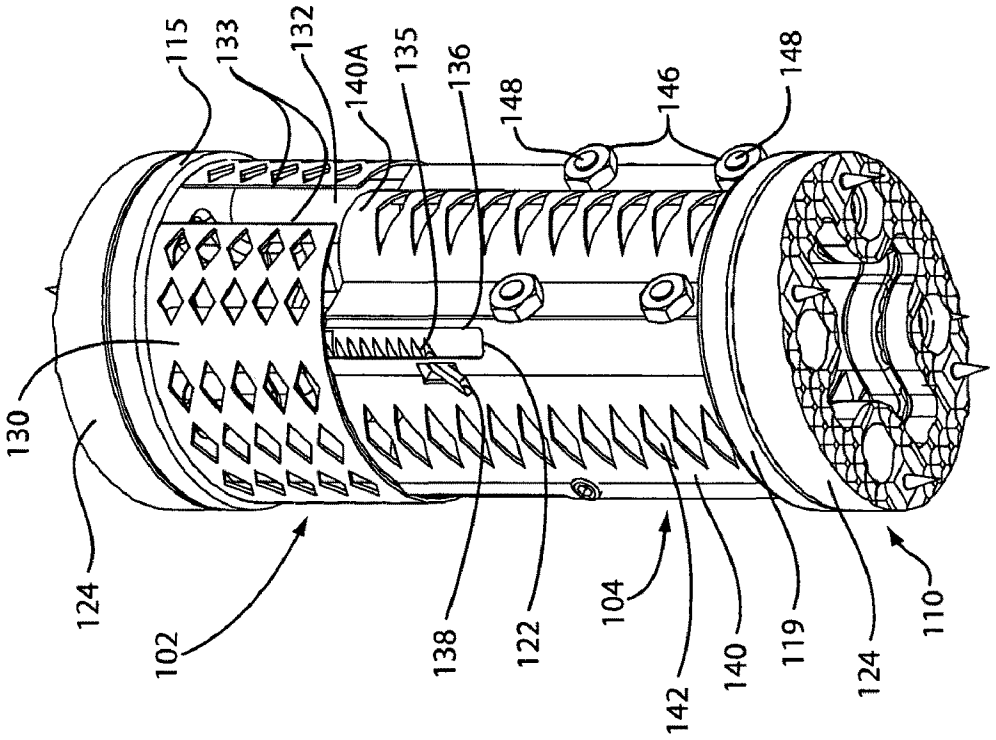
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FIG. 10

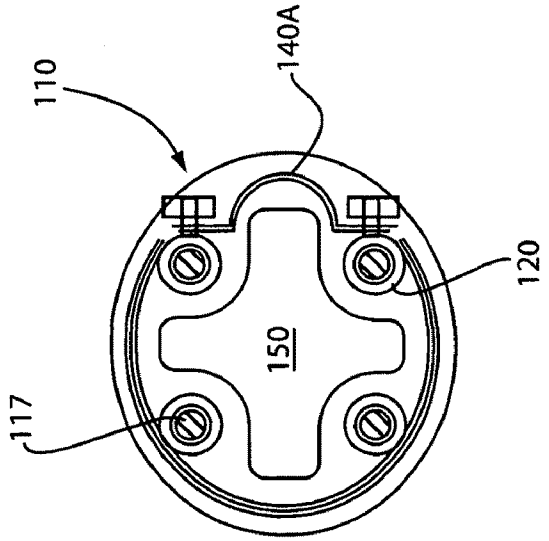
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FIG. 9

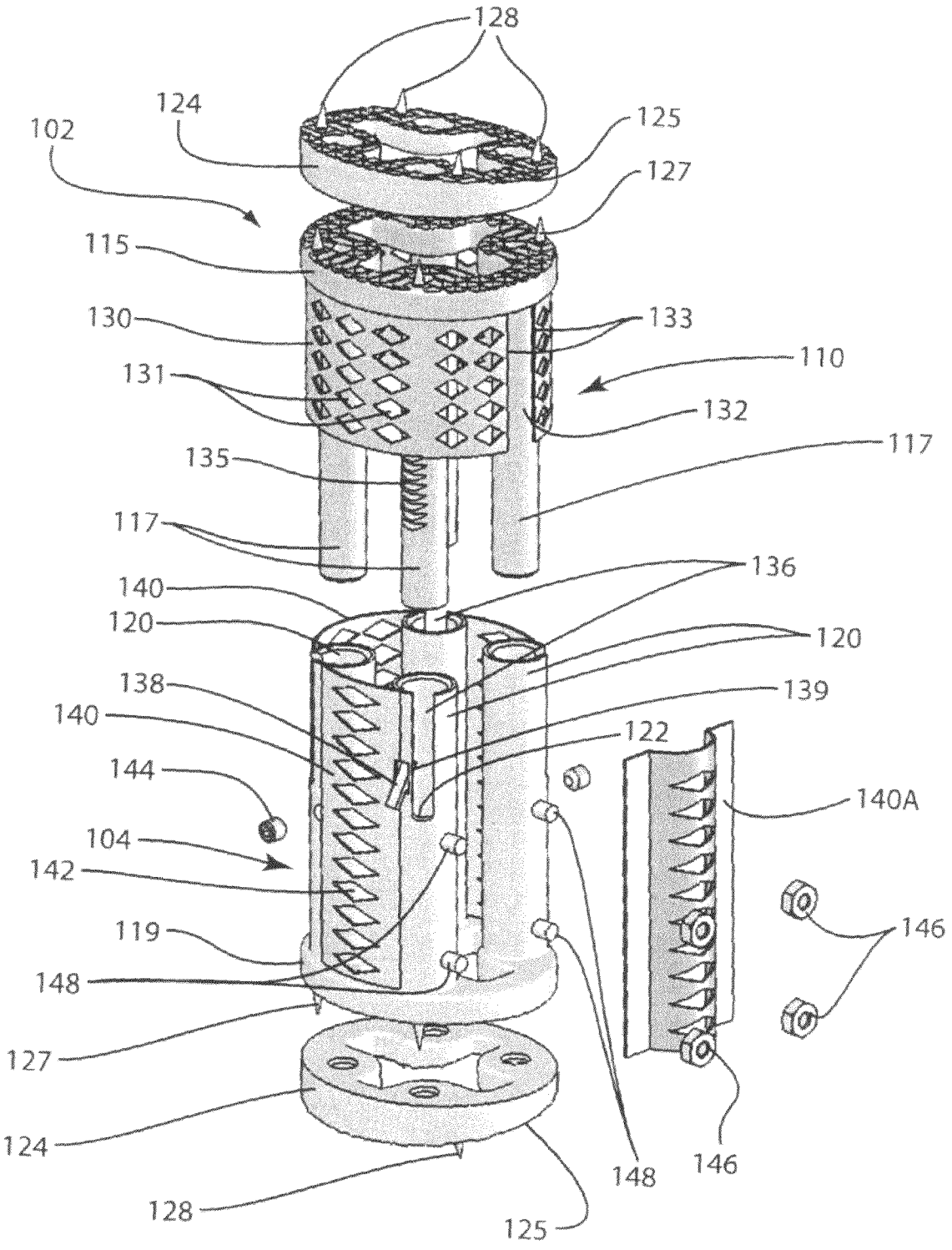
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FIG. 11

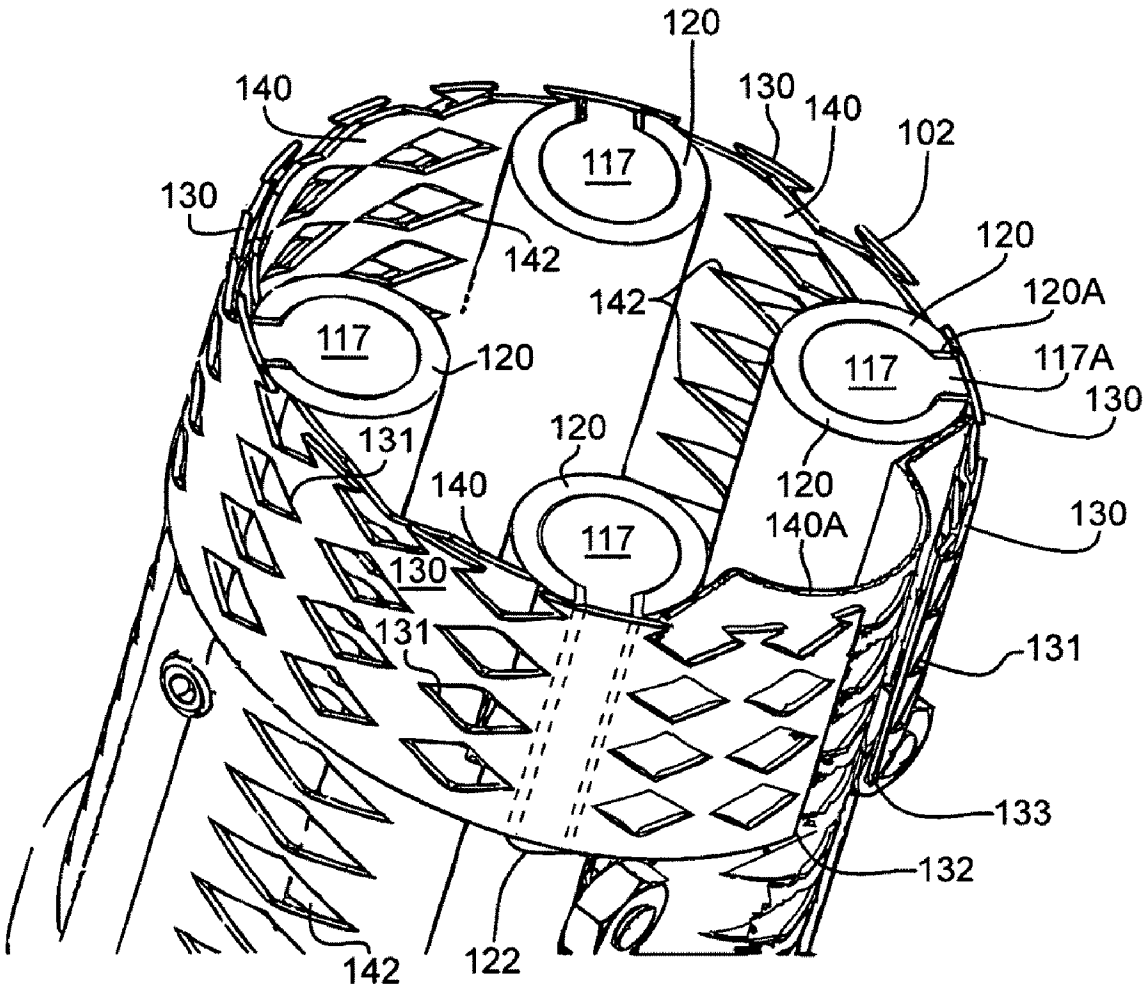
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FIG. 12

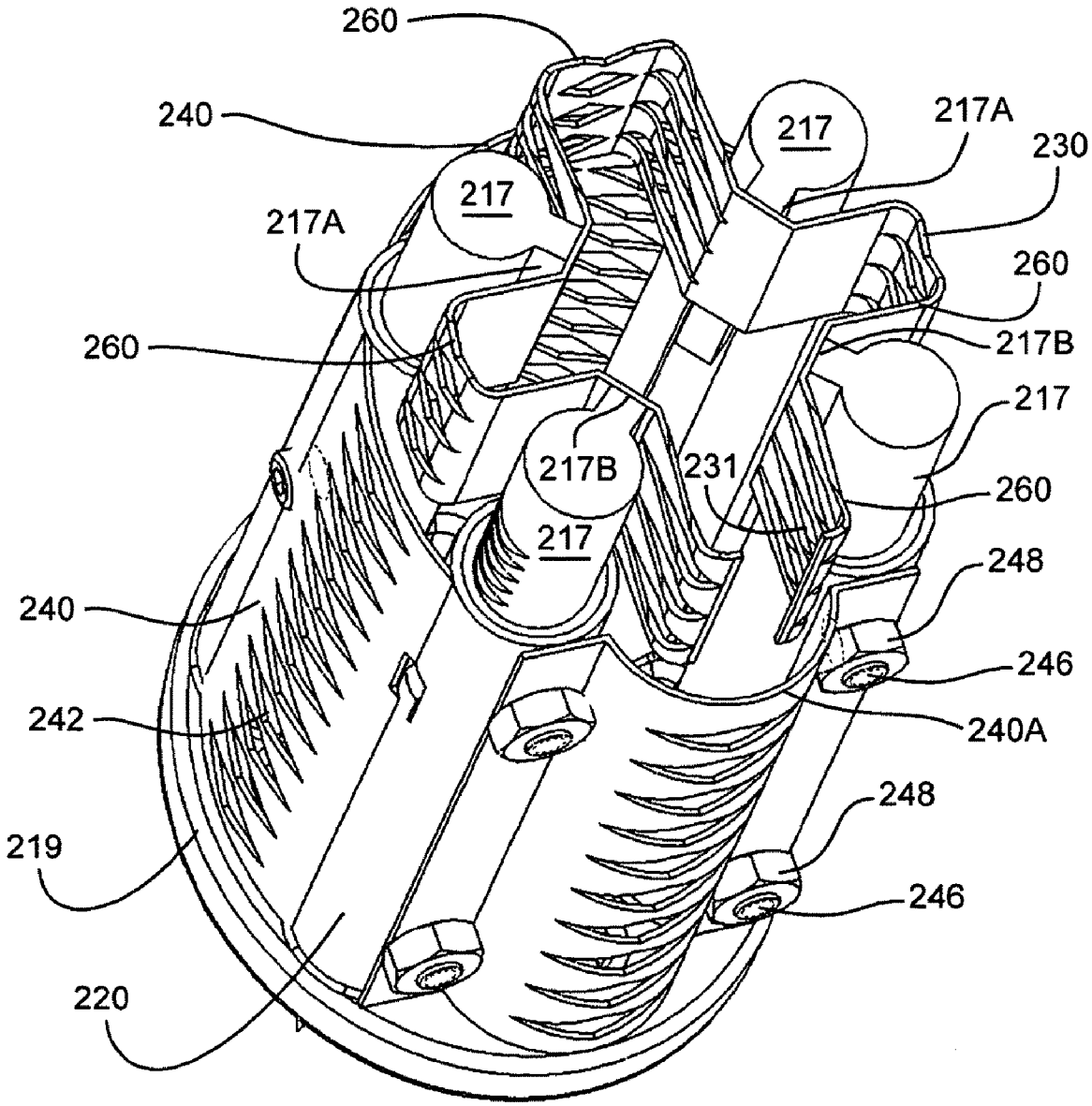
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FIG. 13

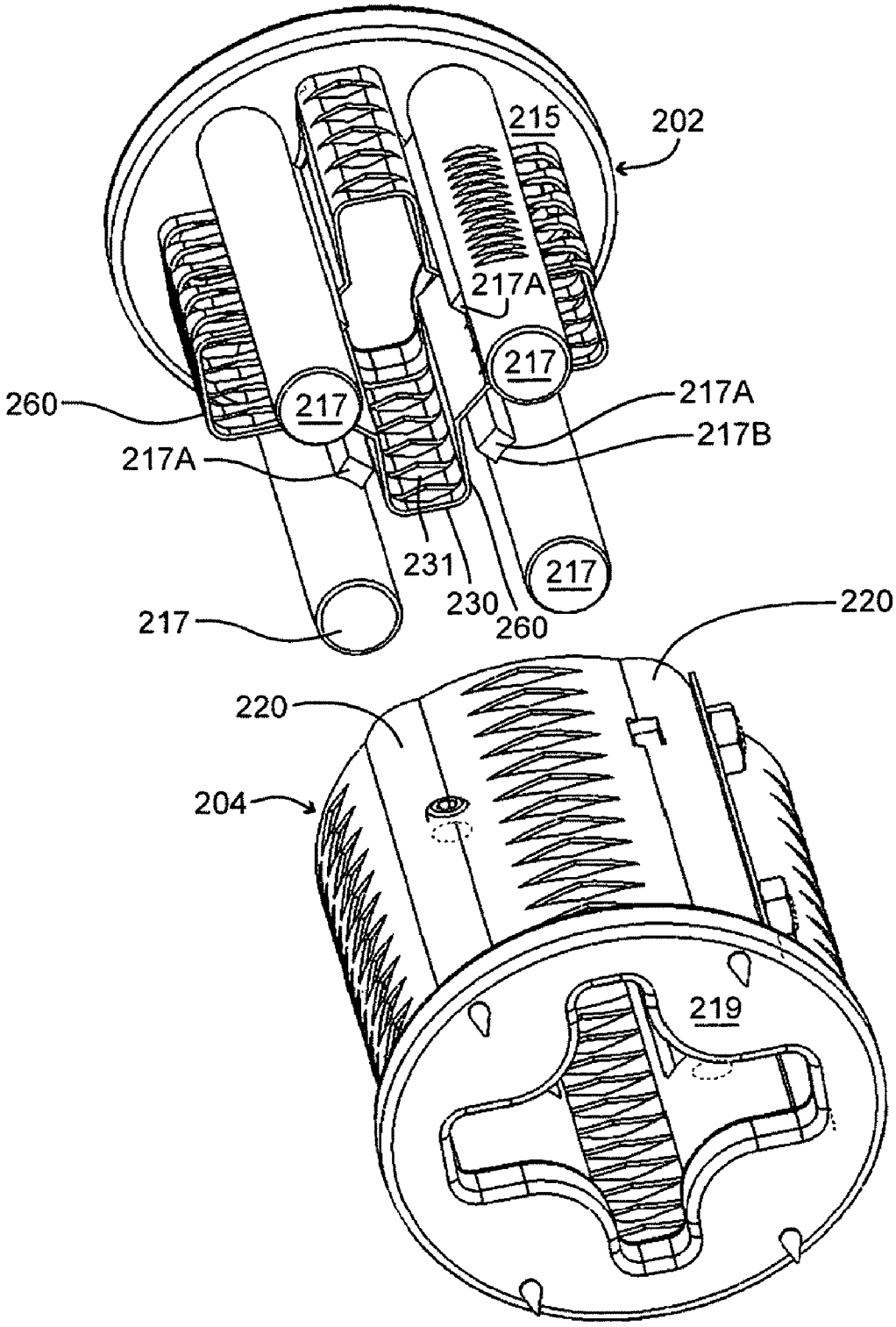
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FIG. 14

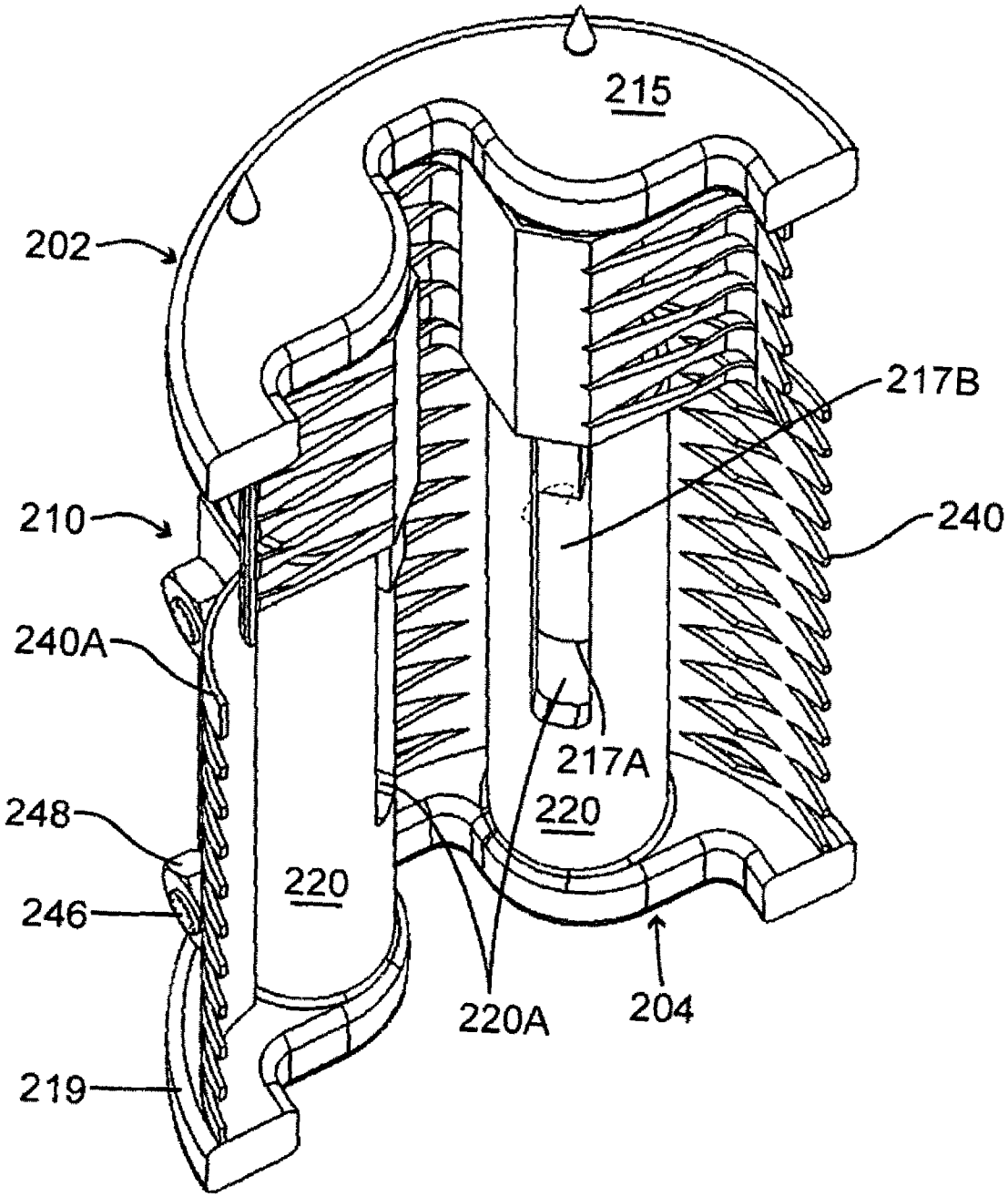

FIG. 15

VARIABLE HEIGHT VERTEBRAL BODY REPLACEMENT IMPLANT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of International Application No. PCT/US 2007/019921 filed 13, Sep. 2007, which is based upon and claims the benefit of U.S. provisional application No. 60/844,887 filed Sep. 14, 2006.

BACKGROUND OF THE INVENTION

This invention relates to the field of orthopedic surgery and more particularly to the area of spinal surgery. The present invention is a variable height vertebral body replacement implant and is designed to reconstruct the spinal column after part or all of a vertebral body has been removed. It consists of an open design, which is initially distracted and placed in the vertebral defect. Bone graft material is then placed in the cage like enclosure. Bone graft can be compacted within the cage as its open portion is completed.

SUMMARY OF THE INVENTION

The present invention is a variable height vertebral body replacement implant consisting of a top and bottom ring joined by telescoping rods. The variable length telescoping rods include a ratcheting mechanism for allowing the cage to be secured and released once implanted. Between the rings is a expandable mesh material that forms a three sided tubular cage. The mesh material has an opening on one side that allows for complete packing of the cage with bone graft material. After the bone graft is packed into the cage, a fourth lateral mesh wall is attached to the open side of the cage to form a completely contained cage structure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows the implant in its extended position.

FIG. **2** shows the implant in its retracted position.

FIG. **3** is a sectional view taken through line **3-3** of FIG. **1** showing the removable cage wall.

FIG. **4** is a view similar to FIG. **3** with the mesh insert in the installed position.

FIG. **5** is an expanded plan view of the mesh insert.

FIG. **6** is an elevational view of a modified implant in its retracted position.

FIG. **7** is a view similar to FIG. **6** showing the implant in its extended position.

FIG. **8** is a view similar to FIG. **7** showing the implant rotated 90° about it longitude and axis.

FIG. **9** is a sectional view taken through line **9-9** of FIG. **6**.

FIG. **10** is a perspective view of the implant as viewed from the lower end of FIG. **7**.

FIG. **11** is an exploded view of the modified implant.

FIG. **12** is a fragmentary perspective view taken through line **9-9** of FIG. **6**.

FIG. **13** is a perspective view of a portion of further modification.

FIG. **14** is an exploded view, in perspective, of the further modification of FIG. **13**.

FIG. **15** is a sectional view taken through the longitudinal axis of the assembled further modification.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

FIGS. **1-5** show the variable height vertebral body replacement implant of the present invention. The implant **10** has a

first end ring **15** and a second end ring **19**. A plurality of telescopically variable length rods **23** extend between the first end ring **15** and the second end ring **19**. The telescoping rods **23** maintain the first and second end rings in generally parallel, spaced apart relationship. The first and second end rings are generally ovoid or rectangular in shape and are designed to engage the end plates of adjacent vertebrae. The first end ring **15** has a first engagement side **16** and the second end ring **19** has a second engagement side **20** wherein the first and second engagement sides are disposed to engage the adjacent vertebrae. A plurality of serrations or projections **27** can be positioned on the engagement sides of the first and second end rings to assist with securing the first and second end rings in the desired position with respect to the adjacent vertebrae. The end rings **15** and **19** as well as the telescoping rods **23** are made of titanium although other materials may be used for these components.

Four telescoping rods **23** maintain the first and second end rings in spaced apart relationship. As the first and second end rings are substantially rectangular in shape a telescoping rod **23** can be positioned at generally each corner of the first and second end rings. It should be understood that other shapes can be utilized for the first and second end rings. Shapes such as ovoid, trapezoid and other generally four sided shapes can be utilized for the end rings. The telescoping rods **23** are positioned on the end rings in a manner that allows the telescoping rods **23** to provide the necessary support for the end rings. This position for the telescoping rods will maintain the first end ring **15** and second end ring **19** in an aligned spaced apart relationship. A ratchet mechanism **31** is included on at least one of the telescoping rods **23** to allow the telescoping rod to be varied in length in finite increments and to maintain the telescoping rod in the desired position whereby the first and second end ring provide the desired spacing between adjacent vertebrae in the spine. It is desirable to include a ratchet mechanism **31** on at least two of the telescoping rods **23** to assist in maintaining the desired length of the implant or cage and to keep first and second end rings in an appropriate position. If two ratchet mechanisms **31** are utilized, it is preferable to place the ratchet mechanisms on telescoping rods **23** that are in diagonally opposed relationship in the implant **10**. However, it should be understood that the number of ratchet mechanisms utilized in the implant **10** can be varied as long as the proper orientation for the first end ring **15** and second end ring **19** can be achieved and maintained to provide the proper spacing between the adjacent vertebrae in the spine. The ratchet mechanism **31** has a release feature to allow the telescoping rods **23** to be adjusted until just the proper length is achieved for providing the desired spacing between the adjacent vertebrae in the spine. A set screw **35** is provided on each telescoping rod **23** and the set screw **35** is utilized to releasably lock the telescoping rod **23** in the desired position once the appropriate spacing has been achieved between the adjacent vertebrae.

The telescoping rods **23** can be straight or have a slight curvature depending on the configuration of the area of the spine that is being repaired. The objective is to have the implant generally conform with the shape of the spine in the area that is being repaired and to maintain the adjacent vertebrae in a position that is consistent with the normal location of the adjacent vertebrae in the spine before the injury. The telescoping rods **23** usually have a range of expansion up to 20 mm. If more expansion is needed, an implant with longer telescoping rods should be utilized.

An expandable mesh wall **41** is positioned to extend between the first end ring **15** and the second end ring **19**. The mesh is usually made of titanium similar to the telescopic

rods. The expandable mesh wall **41** defines an opening **45** for providing access to the interior of the implant **10**. The mesh wall is interconnected with the four telescoping rods **23** to structurally support and assist in locating the mesh wall **41**. To provide for expansion for the mesh wall, it may be desirable to secure one portion of the mesh wall to the first end ring **15** and to secure a second portion of the mesh wall **41** to the second end ring **19**. The first and second portions of the mesh wall will extend to be in an overlapping relationship generally in the center of the implant **10**. The overlap **43** (FIG. **2**) for the first and second portions of the mesh wall is sufficient to allow for any expansion of the implant due to the extension of the telescoping rods **23**. Usually, the mesh wall **41** extends substantially around three sides of the generally rectangular first and second end rings. The opening **45** defined by the mesh wall **41** is, therefore, usually one side wall that extends between the first end ring **15** and the second end ring **19**.

A mesh insert **51** is releasably secured to the two telescoping rods **23** on opposite sides of the opening **45** to cover the opening **45**. The mesh insert **51** is made of the same general material as the mesh wall **41**. The mesh insert **51** has a channel **52** positioned on each side of the insert. The channels provide strength to the mesh insert and the channels are designed to fit over and engage the telescoping rods **23**. The mesh insert **51** has two holes **53** positioned at one end of the mesh insert and two slots **57** positioned in the opposite end of the mesh insert **51**. The holes **53** and slots **57** are preferably located in the channels **52** located on each side of the mesh insert. A threaded projection **17** is positioned on each of the two telescoping rods **23** on opposite sides of the opening **45** adjacent the first end ring **15** so that the threaded projections extend in a direction that is substantially perpendicular to the telescoping rods **23**. A threaded projection **21** is positioned on each of the two telescoping rods **23** on opposite sides of the opening near the second end ring **19** so that the threaded projections **21** extend in a direction that is substantially perpendicular to the telescoping rods **23**. The threaded projections **17** are disposed to be in alignment with and engage the holes **53** in the mesh insert **51**. The threaded projections **21** on rods **23** adjacent the second end ring **19** are disposed to be in alignment with and engage the slots **57** in the opposite end of the mesh insert **51**. Nuts **25** can be threadingly positioned on the threaded projections **17** and the threaded projections **21** to releasably secure the mesh insert **51** over the opening **45** in the mesh wall **41**. The slots **57** in one end of the mesh insert **51** allow the mesh insert to accommodate expansion and contraction of the implant due to changes in the length of the telescoping rods **23**. The lengths of the slots **57** are at least as long as the anticipated range of movement for the telescoping rods **23** and preferably are a little bit longer than the range of motion for the telescoping rods **23**. The end of the mesh insert **51** that contains the slots **57** has section **59** that extends into the second end ring **19** a distance that is also sufficient to accommodate the range of motion for the telescoping rods **23**. In this manner the mesh insert will be able to accommodate the expansion and contraction anticipated for the implant **10**. It is also anticipated that slots could be positioned on each end of the mesh insert **51** to allow the mesh insert to accommodate variations in length of the implant **10** on either end of the mesh insert.

If desired, the mesh insert **51** could be connected to the first and second end rings **15** and **19** rather than to the telescoping rods **23**.

In operation the implant **10** is positioned in the body of a patient to provide the desired spacing when one or more vertebrae have been removed from the spine of the patient. The first end ring **15** and the second end ring **19** are positioned in a not completely extended orientation to allow the implant **10** to be more readily inserted into the proper location in the spine of the patient. Once the implant **10** is positioned between the adjacent vertebrae, the telescoping rods **23** can be advanced to engage the adjacent vertebrae and to position the adjacent vertebrae in the desired spatial relationship. The ratchet mechanism **31** is utilized to advance the telescoping rods **23** in small increments until the desired spacing between the adjacent vertebrae is achieved. Once the desired positioned for the first ring **15** and second ring **19** has been achieved, the set screws **35** on each telescoping rod **23** can be engaged to lock the telescoping rods in the desired position. Bone or bone graft material can then be positioned in the implant **10** through the opening **45** in the mesh wall **41**. The bone or bone graft material normally completely fills the interior of the implant **10**. Once the appropriate amount of bone or bone graft material is positioned in the implant **10**, the mesh insert **51** is positioned on the threaded projections **17** and **21** and secured in position with nuts **25** to close the opening **45** in the mesh wall **41**. The mesh insert **51** presses against the bone or bone graft material and acts to compact the bone or bone graft material in the interior of the implant **10**. Compaction of the bone or bone graft material assist in the fusing of the bone or bone graft material with the adjacent vertebrae to complete the surgical repair of the spine.

Referring now to FIGS. **6-11**, there is shown a modified implant which will hereinafter be referred to as expandable corpectomy cage **110**. The corpectomy cage **110** includes two slidably engageable assembly members, namely, a first assembly member **102** having a first end ring **115** and a second assembly member **104** having a second end ring **119**. As best seen in FIGS. **11** and **12**, extending from the first end ring **115** are four insertion rod sections **117** spaced apart from one another and extending parallel to one another and to an axis X (see FIG. **8**) centered between said insertion rod sections **117**. Each of the insertion rod sections **117** has an outwardly extending rib **117**A extending axially from a point near the first end ring **115** to a point approximately midway of their respective lengths. Extending from the second end ring **119** are four hollow cylindrical members **120** which, when the second end ring **119** is properly aligned with the first end ring **115**, will result in the hollow members **120** extending from end ring **119** being axially aligned with the insertion members **117** extending from the first end ring **115**. The hollow members **120** are sized to receive therein the respective insertion sections **117** extending from the first end ring **115**. The hollow members **120** are each provided with a slot **136** extending from their distal ends opposite the second end ring to a slot end **122**. The slot **136** is sized breadthwise and lengthwise to completely receive therein the outwardly extending rib **117**A when the corpectomy cage is at its shortest length as shown in FIG. **6**.

The first end ring **115** and the second end ring **119** may have a circular, oval or other cross sectional shape depending on the anatomy of the patient. Similarly, the insertion rod sections **117** and the hollow members **120** may be arranged such that an arcuate line drawn through their respective axes may define a similar circular, oval or other shape although somewhat smaller.

As was the case with the embodiment of FIGS. **1-5**, each of the first end ring **115** and second end ring **119** has extending therefrom a plurality of serrations or projections **127** to assist in securing the first and second end rings **115**, **119** in the desired position with respect to the adjacent vertebrae of the patient.

Depending upon the anatomy of the patient, it maybe desirable to also provide a wedge-shaped end cap **124** on one or

both of the end rings **115**, **119**. The respective end caps **124** each has a distal end surface **125** disposed at an angle A (see FIG. **8**) in the range of 2° to 10° with respect to a plane P perpendicular to the axis X centered between the joined insertion rod sections **117** and hollow members **120**. The end caps **124** can be fastened to the respective end rings **115**, **119** by any desired fastening means. Each of the end caps **124** has a plurality of serrations or projections **128** extending from its distal end surface **125**.

Substantially encircling the insertion rod sections **117** extending from the first end ring **115** is a perforated sleeve **130** which extends axially from the first end ring **115** toward the second end ring **119** overlying approximately one-half the length of the respective insertion rod sections. The perforated sleeve **130** has a plurality of perforations **131** which, preferably, are aligned in rows parallel the axis X and aligned in rows extending therearound in a plane perpendicular to the axis X. The perforated sleeve **130** extends around the axis to define an arc on the order of 350° to 355° such that there is a gap **132** between the opposing ends **133** of the perforated sleeve **130**. As can be seen most clearly in FIG. **12**, the ribs **117**A extend outwardly beyond the outer surface **120**A of the hollow members **120** and are welded or otherwise joined to the inner surface of the perforated sleeve **130**.

At least one and preferably more of the insertion rod sections **117** includes a series of teeth **135** forming part of a ratchet mechanism to assist in maintaining the desired length of the corpectomy cage **110**. As previously mentioned, the hollow members **120** extending from the second end ring **119** are provided with axially extending slots **136** extending from their receiving ends approximately half the distance toward the second end ring **119**. Positioned adjacent the slots **136** in an area spaced from the receiving end of the hollow sections **120** is an engagement member **138** of the ratchet mechanism, which engagement member **138** includes an inwardly extending projection **139** for engaging the teeth **135** of the aligned insertion rod section **117** extending from the first end ring **115**.

Positioned between adjacent ones of the respective hollow members **120** and extending from the second end ring **119** toward the first end ring **115** are a plurality of arcuate sections **140**, each of which has a series of spaced apart perforations **142** aligned in rows extending axially from a position adjacent the second end ring **119** to the opposing end of each arcuate section and aligned in rows perpendicular to the axis X. Each arcuate section **140** may be affixed to one or both of the adjacent hollow members **120** by a fastening member **144** such as a screw and/or screw and nut arrangement by welding or by other fastening means. Three of the arcuate sections **140** are attached to the second end ring **119** and to the respective hollow members **120** extending therefrom. As may be seen most clearly in FIGS. **8**, **11** and **12**, the fourth arcuate section **140**A is separate from the rest of the corpectomy cage **110** as delivered to the operating room. The arcuate section **140**A is similar in size to the other arcuate sections **140** and may be attached to the adjacent hollow members **120** by means of nuts **146** engaged to threaded studs **148** secured to and extending outwardly from two adjacent hollow members **120** as seen most clearly in FIGS. **8** and **11**.

As maybe seen from FIG. **11**, the first assembly member **102** maybe joined to the second assembly member **104** by aligning the four insertion rod sections **117** with the respective hollow members **110** and moving the first assembly member **102** toward the second assembly member **104** to slide the insertion rod sections **117** into the respective aligned hollow members **120**. When the insertion sections **117** are inserted to their maximum extent, the corpectomy cage **110** will be at its shortest length as shown in FIG. **6**. When the first assembly member **102** is positioned relative to the second assembly member **104** as shown in FIG. **6**, the perforated sleeve **130** of such first assembly member **102** will encircle the hollow sections **120** and the arcuate sections **140** and **140**A secured thereto.

In order to have the insertion sections **117** moved into the hollow sections **120** to the maximum extension as shown in FIG. **6**, it will be necessary to pivot the engagement member **138** to retract the projection **139** to a position to avoid engaging the teeth **135** of the insertion rod sections **117** during that time. When the first assembly member **102** is moved away from the second end ring **119**, and moved to the desired extended position suitable to the anatomy of the patient, the engagement member **138**, which is preferably spring loaded, will move to a position at which the projection **139** engages the teeth **135** of the insertion sections **117** to retain the corpectomy cage **110** in its expanded position as shown in FIG. **7**. With corpectomy cage **110** locked in such expanded position, bone chips, bone splints and/or other bone graphs or fusion of materials may be positioned in the cavity **150** (see FIG. **9**) defined by the assembled structure following which, the removable fourth arcuate section **140**A maybe engaged to the studs **148** of the hollow members **120** and affixed thereto by the threaded nuts **146**.

Referring to FIGS. **13-15**, there is shown a further modification of the corpectomy cage **210**, a section of which is shown in FIG. **15** in which the first assembly member **202** is joined to the second assembly member **204** to form the assembled further modified corpectomy cage **210**. The major difference between the embodiment of FIGS. **13-15** is that the insertion rod sections **217** have ribs **217**A which, extend inwardly toward the longitudinal axis of the assembled cage **210** rather than the outwardly extending ribs **117**A of the embodiment of FIGS. **6-12**.

Thus, the corpectomy cage **210** first assembly member **202** has four insertion rod sections **217** extending from a first end ring **215**. Welded or otherwise secured to the innermost surface **217**B of the inwardly extending ribs **217** is a perforated sleeve **230** having a series of perforations **231**. The perforated sleeve **230** defines a closed loop which maybe defined as having four legs **260**, with each leg **260** extending away from the longitudinal axis and positioned between adjacent ones of the insertion rod sections **217**. (See FIGS. **13** and **14**).

The second assembly member **204** has four hollow cylindrical members **220** extending upwardly from a second end ring **219**. Each hollow member **220** has a slot **220**A facing inwardly toward the longitudinal axis and sized to receive therein the rib **217**A of the insertion rod sections **217**.

Secured between adjacent ones of the hollow members **220** are three arcuate sections **240** each of which is provided with a series of perforations **242**. A fourth arcuate section **240**A, which is removable, maybe attached between adjacent hollow sections **220** by means of studs **246** and threaded nuts **248**.

As maybe clearly seen from FIGS. **13-15**, under this embodiment, the arcuate sections **240** and **240**A encircle the perforated member **260** attached to the inner surfaces **217**B of the ribs **217**A. This is in contrast to the embodiment of FIGS. **6-12** in which the perforated sleeve **130** attached to the outer surfaces of the ribs **117**A of the insertion member **117** encircled the arcuate members **140** attached to adjacent hollow members **120**.

The above detailed description of the present invention is given for explanatory purposes. It will be apparent to those skilled in the art that numerous changes and modifications other than those cited can be made without departing from the

scope of the invention. For example, the first assembly **102**, **202** could be provided with hollow cylindrical members rather than the insertion rod sections **117** in which case, the second assembly **104**, **204** would be provided with insertion rod sections **117**, **217** rather than the hollow member **120**, **220** as shown. Additionally, the first assembly **102**, **202** and the second assembly could each have two insertion rod sections and two hollow members. Accordingly, the whole of the foregoing description is to be construed in an illustrative and not a limitative sense, the scope of the invention being defined solely by the appended claims.

I claim:

1. A variable height vertebral implant comprising:

a first end ring and a second end ring positioned in spaced apart relationship, the first and second end rings being disposed to engage adjacent spaced apart vertebrae;

a plurality of telescopically variable length rods extending between the first and second end rings, the plurality of rods being adjustable in length to provide the desired spacing between the first and second rings to engage the adjacent spaced apart vertebrae, at least one of the telescopically variable length rods including a ratchet mechanism for releasably securing the at least one telescopically variable length rod in a fixed position;

an expandable mesh wall extending between the first and second rings, the mesh wall defining an opening between adjacent ones of said variable length rods for providing access to the interior of the vertebral implant; and

a mesh insert that is releasably secured to each of said adjacent ones of said variable length rods or the first and second rings whereby the mesh insert covers the opening in the mesh wall between said adjacent ones of said variable length rods.

2. The implant of claim **1** wherein bone material is positioned through the opening in the mesh wall into an interior chamber defined by the wall of the implant whereby the bone material extends between the spaced apart adjacent vertebrae.

3. The implant of claim **2** wherein the mesh insert is secured to the variable length rods or the first and second rings after the bone material is positioned in the interior chamber of the implant, the mesh insert being disposed to engage the bone material and to compact the bone material.

4. The implant of claim **1** further including projections extending from said first and second rings for engagement with said spaced apart vertebrae.

5. A variable height vertebral implant comprising:

a first end ring and a second end ring positioned in spaced apart relationship, the first and second end rings being disposed to engage adjacent spaced apart vertebrae;

a plurality of telescopically variable length rods extending between the first and second end rings, the plurality of rods being adjustable in length to provide the desired spacing between the first and second rings to engage the adjacent spaced apart vertebrae, at least one of the telescopically variable length rods including a ratchet mechanism for releasably securing the at least one telescopically variable length rod in a fixed position;

an expandable mesh wall extending between the first and second rings, the mesh wall defining an opening for providing access to the interior of the vertebral implant; and

a mesh insert that is releasably secured to the variable length rods or the first and second rings whereby the mesh insert covers the opening in the mesh wall,

said mesh insert being releasably secured to the variable length rods by means comprising (a) projections extending outwardly from said rods and (b) openings in said mesh insert positioned to receive said projections, at least two of said openings defining elongated slots to accommodate movement of said variable length rods.

6. A corpectomy cage for use in spine surgery comprising:

a first assembly having a first end member, a plurality of spaced apart elongated hollow members or insertion rod sections extending from said first end member, a sleeve joined to said spaced apart hollow members or insertion rod sections; and

a second assembly having a second end member, a plurality of spaced apart elongated hollow members or insertion rod sections extending from said second end member, each of said second end member hollow members and insertion rod sections being engageable with one of said first end member insertion rod sections or hollow members, longitudinally extending perforated members connected to adjacent ones of said second end member hollow members or insertion rod sections, one of said longitudinally extending perforated members being attachable to adjacent ones of said second end member hollow members or insertion rod sections following engagement of said first assembly to said second assembly and means to retain said first assembly in one of a plurality of fixed positions relative to said second assembly.

7. The corpectomy cage according to claim **6** wherein said means to retain comprises:

a plurality of teeth on one or more of said insertion rod sections and a latch on one or more of said hollow members engageable with said teeth.

8. The corpectomy cage according to claim **7** wherein a slot is provided in hollow members and further including a latch adjacent said slot, said latch being engageable with said teeth.

9. The corpectomy cage according to claim **6** further including a wedge shaped end cap attached to one or both first and second end rings, said end cap having a first surface in contact with said first or second end ring and a tapered surface disposed at an angle in the range of 2° to 10° relative to a plane defined by said first surface.

10. The corpectomy cage according to claim **6** wherein said sleeve substantially encircles said spaced apart hollow members or insertion rod members and partially overlies said longitudinally extending perforated members when said first assembly is engaged to said second assembly.

11. The corpectomy cage accordingly to claim **6** wherein said perforated members, in cross section perpendicular to the longitudinal axis of said first assembly, define an arcuate path.

12. The corpectomy cage according to claim **6** wherein said first and second end members, in cross section perpendicular to the longitudinal axis of said assembled corpectomy cage, defines a circle or an oval.

13. The corpectomy cage according to claim **6** wherein one or more insertion rod sections has a rib extending radially outwardly and extending longitudinally substantially parallel to the longitudinal axis of said rod sections and at least one said elongated hollow member has a slot sized and positioned to receive said rib upon insertion of said rod sections into said hollow members.

14. The corpectomy cage according to claim **6** wherein one or more insertion rod sections has a rib extending radially from the surface of said rod section in a direction toward the longitudinal axis of said corpectomy cage and extending longitudinally substantially parallel to the longitudinal axis of said rod sections and said elongated hollow members have a slot sized and positioned to receive said rib upon insertion of said rod sections into said hollow members.

15. A corpectomy cage for use in spine surgery comprising:

a first assembly having a first end member, a plurality of spaced apart elongated hollow members or insertion rod sections extending from said first end member, each said hollow member or insertion rod section having a longitudinal axis parallel to each of the other of said longitudinal axes and cooperating to define a central axis parallel to each of said longitudinal axes and a sleeve connected to said spaced apart hollow members or rod sections; and

a second assembly having a second end member, a plurality of spaced apart elongated hollow members or insertion rod sections extending from said second end member, each of said second end member hollow members and insertion rod sections being engageable with one of said first end member insertion rod sections or hollow members, longitudinal perforated members extending substantially parallel to said central axis connected to adjacent ones of said second end member hollow members or insertion rod sections, one of said longitudinal perforated members being attachable to adjacent ones of said second end member hollow members or insertion rod sections following engagement of said first assembly to said second assembly and means to retain said first assembly in one of a plurality of fixed positions relative to said second assembly.

16. The corpectomy cage accordingly to claim **15** wherein said perforated members, in cross section perpendicular said central axis, define an arcuate path.

17. The corpectomy cage according to claim **15** wherein one or more of said insertion rod sections has a rib extending outwardly in a direction away from said central axis and longitudinally in a direction parallel to said central axis and said hollow member have a slot sized and positioned to receive said rib upon insertion of said rod sections into said hollow members.

18. The corpectomy cage according to claim **17** wherein said sleeve at least partially encircles the group of hollow members and insertion rod sections extending from said first end member.

19. The corpectomy cage according to claim **18** wherein said sleeve at least partially encircles the group of hollow members and insertion rod sections extending from said second end member and at least some of said longitudinal perforated members upon engagement of said first assembly to said second assembly.

20. The corpectomy cage according to claim **15** wherein one or more of said insertion rod sections has a rib extending inwardly in a direction toward said central axis and longitudinally in a direction parallel to said central axis and said hollow members have a slot sized and positioned to receive said rib upon insertion of said rod sections into said hollow member.

21. The corpectomy cage accordingly to claim **20** wherein said sleeve is attached to said inwardly extending rib.

22. The corpectomy cage according to claim **15** wherein said means to retain comprises:

a plurality of teeth on one or more of said insertion rod sections and a latch on one or more of said hollow members engageable with said teeth.

23. The corpectomy cage according to claim **15** further including a wedge shaped end cap attached to one or both first and second end rings, said end cap having a first surface in contact with said first or second end ring and a tapered surface disposed at an angle in the range of 2° to 10° relative to a plane defined by said first surface.

24. The corpectomy cage according to claim **15** wherein at least one of said first and second end members, in cross section perpendicular to the longitudinal axis of said assembled corpectomy cage, defines a circle or an oval.

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