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Steffee

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[54] **METHOD FOR USING SPINAL INPLANTS**

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[73] Assignee: **AcroMed Corporation**, Cleveland, Ohio

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[51] **Int. Cl.**[6] **A61F 2/44**
[52] **U.S. Cl.** **623/17**; 128/898
[58] **Field of Search** 623/16–21, 623/66; 606/60–64; 128/898

[56] **References Cited**

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1107854	8/1984	U.S.S.R.	623/17

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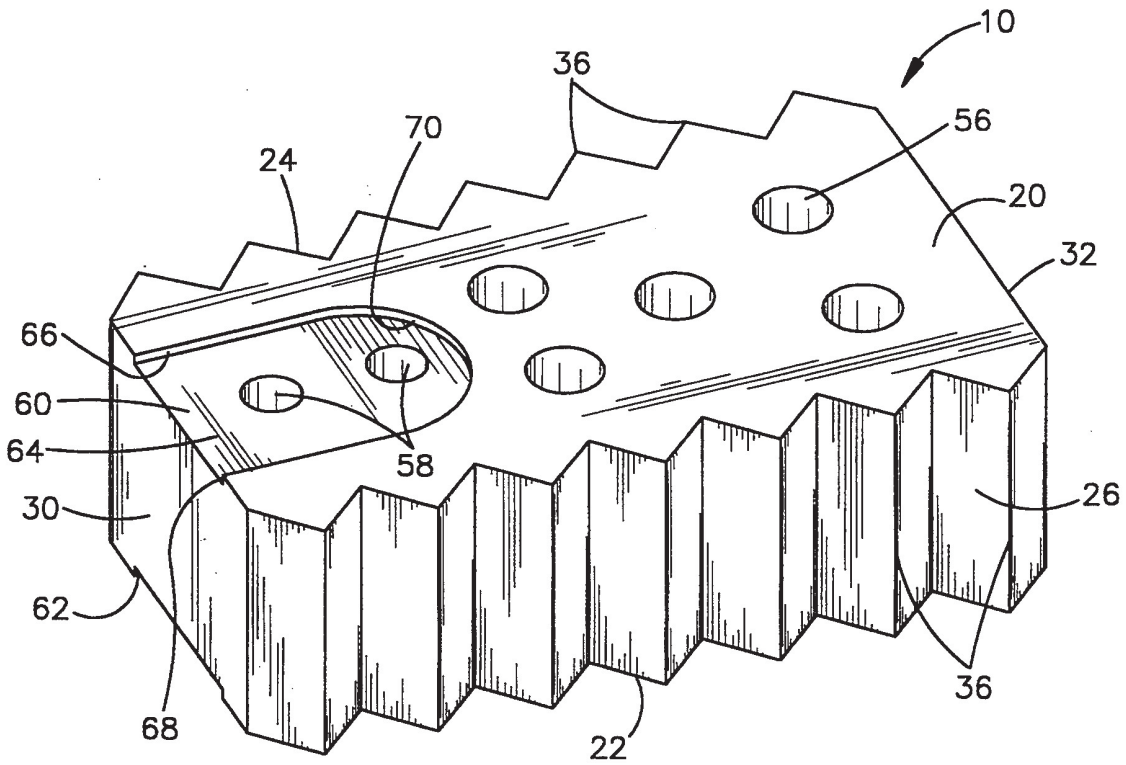
Assistant Examiner—Rob Clarke
Attorney, Agent, or Firm—Tarolli, Sundheim & Covell

[57] **ABSTRACT**

A method of fusing together the adjacent vertebrae using the spinal implant includes removing at least a portion of the spinal disc between the adjacent vertebrae. The spinal implant is inserted between the adjacent vertebrae with the first and second parallel side surfaces facing the adjacent vertebrae. The spinal implant is rotated into a position in which the parallel side surfaces extend from one of the adjacent vertebrae to the other adjacent vertebrae and the upper and lower surfaces engage the adjacent vertebrae.

7 Claims, 3 Drawing Sheets



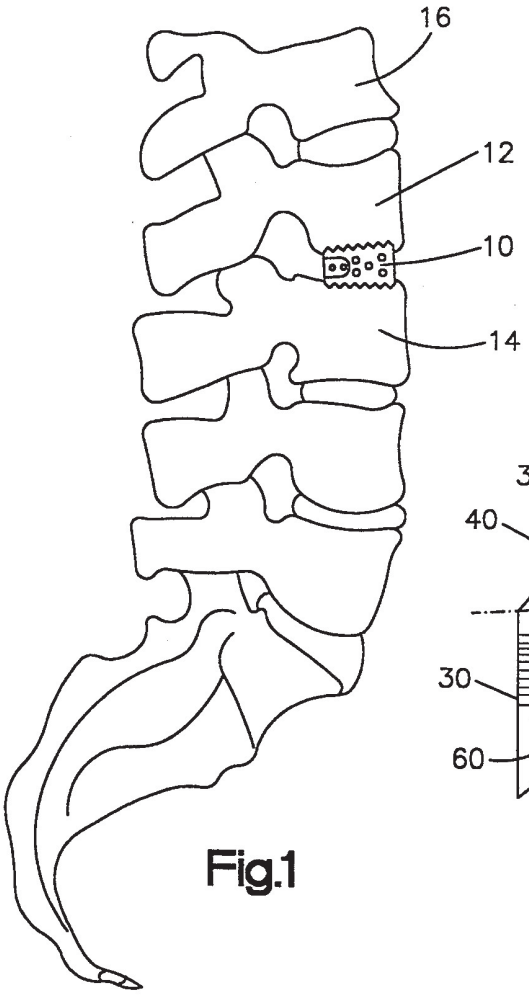


Fig.1

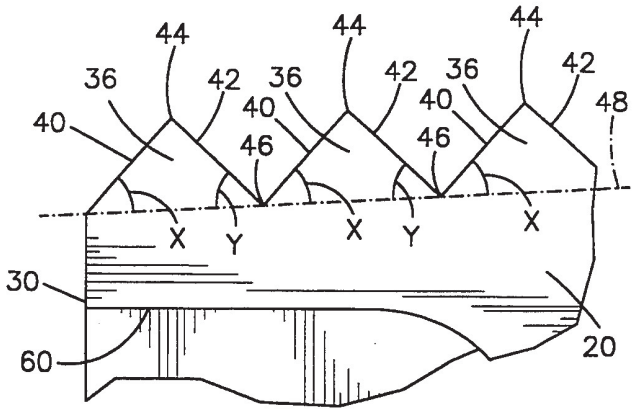


Fig.3

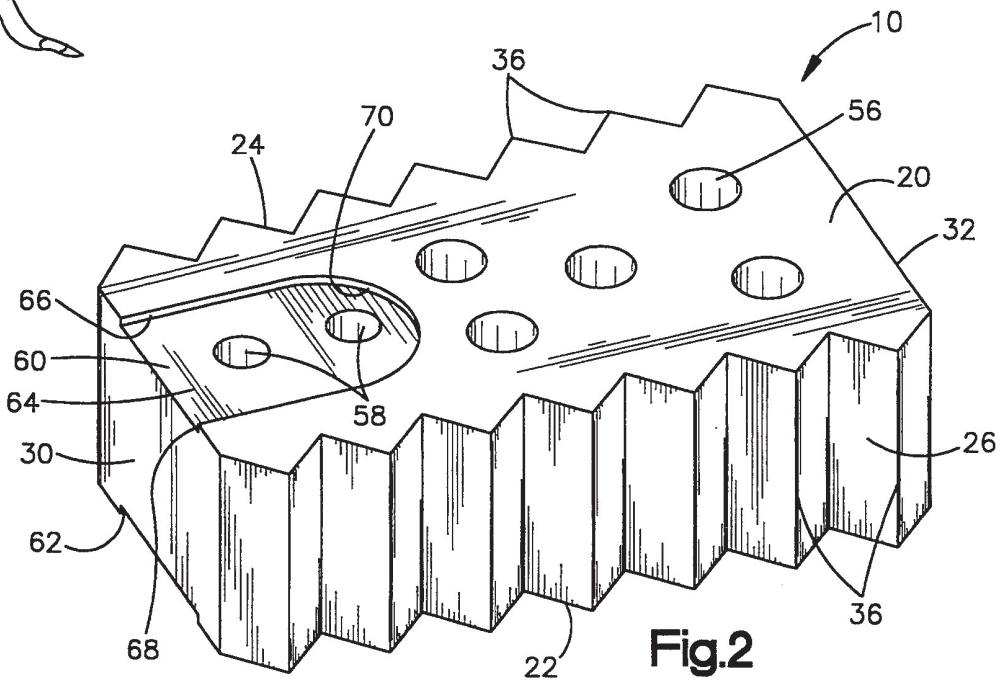


Fig.2

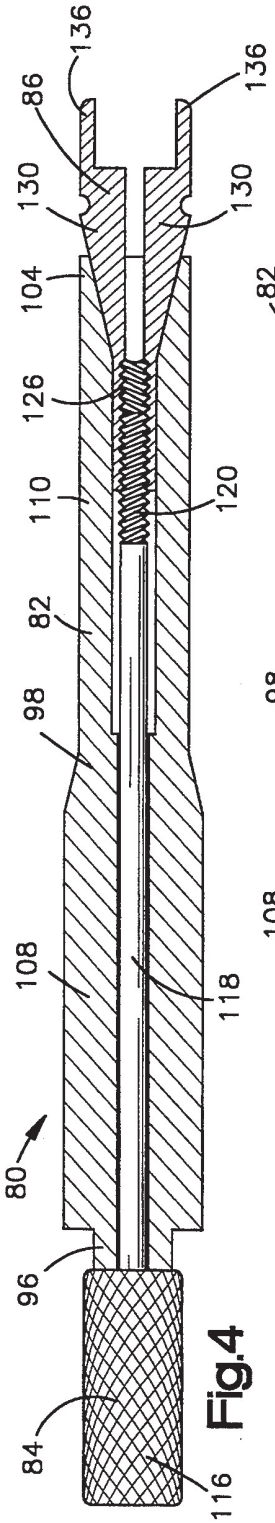


Fig.4

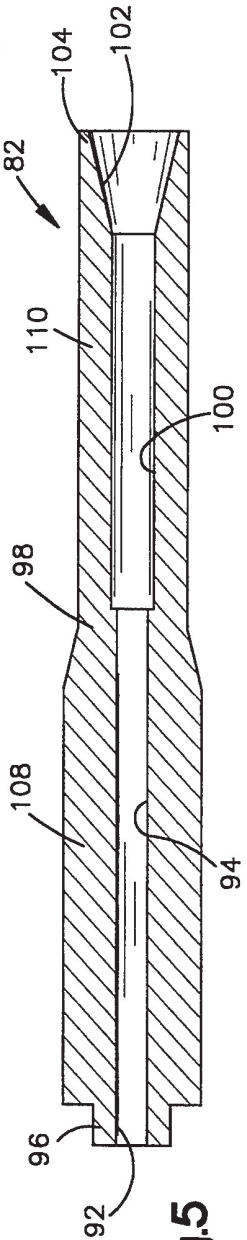


Fig.5

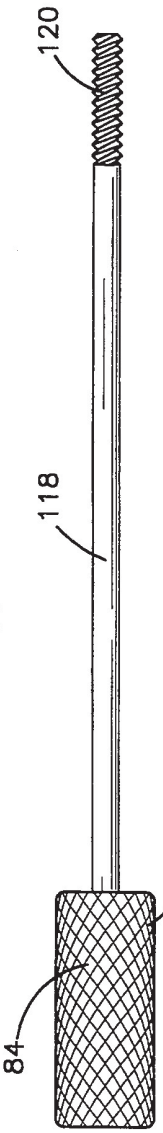


Fig.6

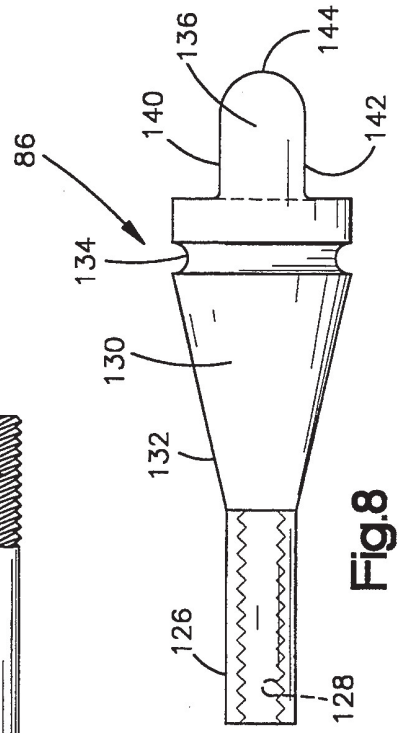


Fig.8

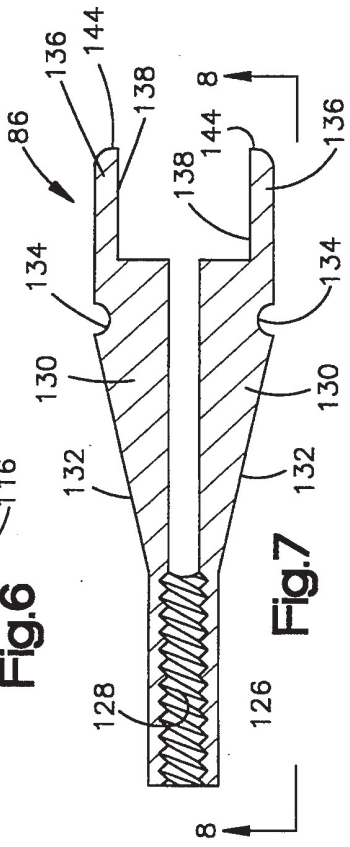


Fig.7

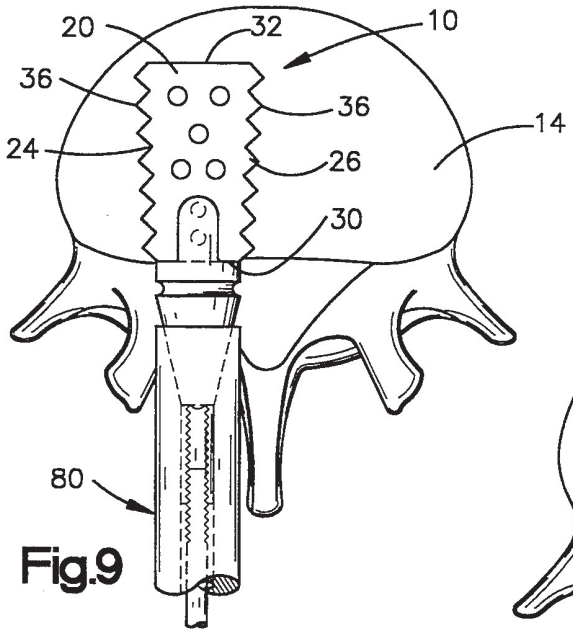


Fig.9

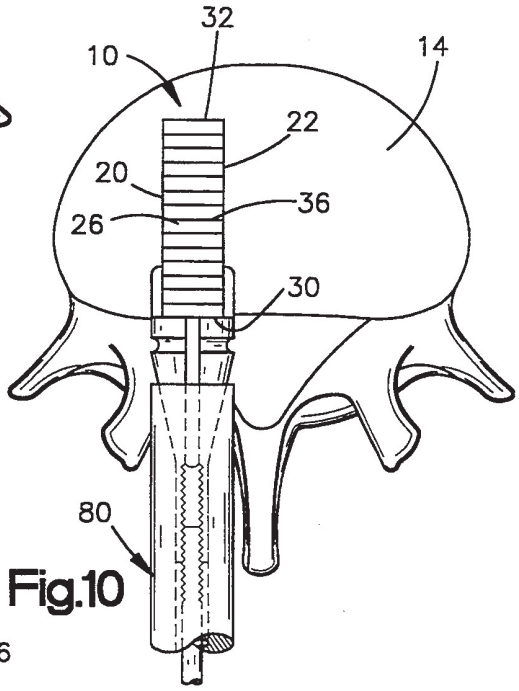


Fig.10

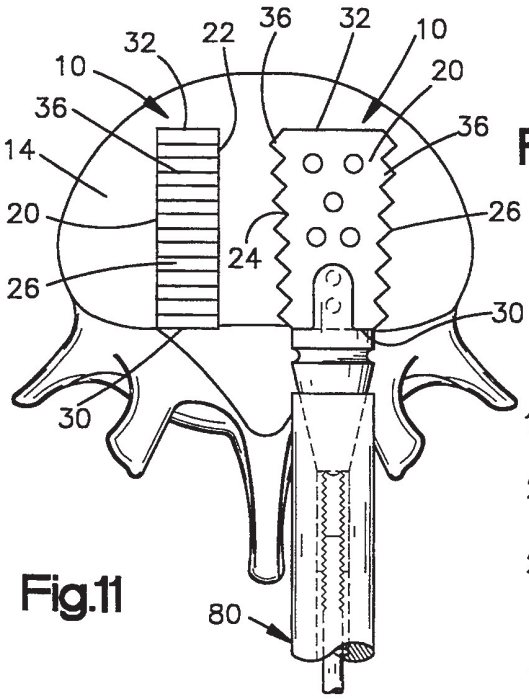


Fig.11

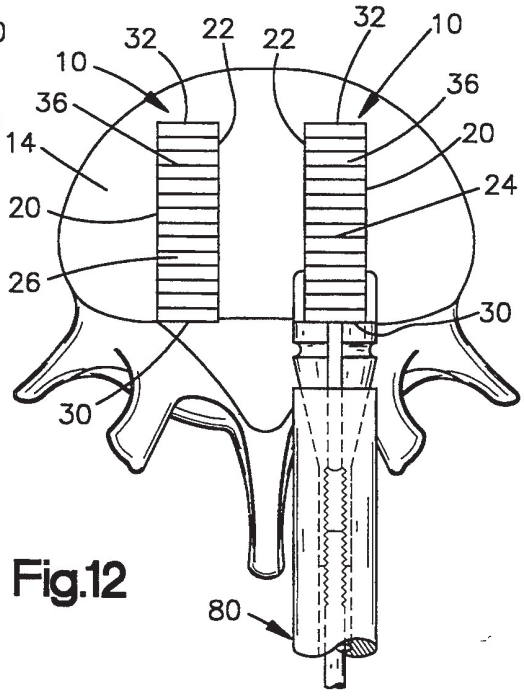


Fig.12

METHOD FOR USING SPINAL INPLANTS

BACKGROUND OF THE INVENTION

The present invention relates to a spinal implant, and to a method of using the spinal implant to fuse together adjacent vertebrae of a spinal column.

A known spinal implant has a rectangular shape and a tapered front end. The spinal implant includes nubs to grip adjacent vertebrae. The nubs have inclined front faces that accommodate forward sliding movement of the spinal implant into channels cut in the adjacent vertebrae. This known spinal implant is described in U.S. Pat. No. 4,834,757. By cutting channels into the vertebrae for receiving the spinal implant nerve roots are put at risk.

SUMMARY OF THE INVENTION

The present invention provides a new and improved spinal implant and method of using the spinal implant to fuse together adjacent vertebrae of a spinal column. The spinal implant of the present invention includes first and second side surfaces extending substantially parallel to each other. Upper and lower surface means for engaging the adjacent vertebrae extend between the first and second side surfaces and extend from a first end portion to a second end portion of the spinal implant. Recesses in the first and second side surfaces receive an instrument for rotating the spinal implant when the implant is located between the adjacent vertebrae.

The method of using the spinal implant to fuse together the adjacent vertebrae of a spinal column includes removing at least a portion of the spinal disc between the adjacent vertebrae. The spinal implant is inserted between the adjacent vertebrae with the first and second substantially parallel side surfaces facing the adjacent vertebrae. The spinal implant is rotated into a position in which the parallel side surfaces extend from one of the adjacent vertebrae to the other of the adjacent vertebrae and the upper and lower surface means engage the adjacent vertebrae. There are no channels cut in the adjacent vertebrae. Thus, the operation takes less time and lessens the risks to the patient.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features of the present invention will become more apparent to one skilled in the art upon reading the following description of the present invention with reference to the accompanying drawings, wherein:

FIG. **1** is an elevation view of a human spinal column having a spinal implant in accordance with that of the present invention placed therein;

FIG. **2** is a perspective view of the spinal implant of FIG. **1**;

FIG. **3** is an enlarged plan view looking at a portion of the spinal implant of FIG. **2** from the side;

FIG. **4** is a sectional view of an instrument for holding the spinal implant of FIG. **2** to facilitate inserting the spinal implant between adjacent vertebrae and rotating the spinal implant;

FIG. **5** is a sectional view of an intermediate portion of the instrument of FIG. **4**;

FIG. **6** is a plan view of a handle of the instrument of FIG. **4**;

FIG. **7** is a sectional view of a clamp portion of the instrument of FIG. **4**;

FIG. **8** is a plan view of the clamp portion of FIG. **7** taken along the line **8**—**8** of FIG. **7**;

FIG. **9** is a view showing a method of inserting spinal implants in a side-by-side relationship between adjacent vertebrae;

FIG. **10** is a view similar to FIG. **9** further showing the method of inserting the spinal implants between the adjacent vertebrae;

FIG. **11** is a view similar to FIG. **10** further showing the method of inserting the spinal implants between the adjacent vertebrae; and

FIG. **12** is a view similar to FIG. **11** further showing the method of inserting the spinal implants between adjacent vertebrae.

DESCRIPTION OF A PREFERRED EMBODIMENT

One or a pair of substantially rigid spinal implants **10** (one of which is shown in FIG. **1**) are placed between adjacent vertebrae **12** and **14** of a spinal column **16** in a side-by-side relationship to fuse together the adjacent vertebrae. Preferably, the spinal implants **10** are made by injection molding a chopped carbon fiber reinforced polymer. However, the spinal implants **10** can be made of other suitable implantable materials such as stainless steel or titanium. Also, preferably, the ultimate tensile strength of the material used to make the spinal implants **10** is higher than 10,000 psi so that the spinal implants will prevent relative movement between the adjacent vertebrae **12** and **14** and will support the compressive load of the spinal column.

Each of the spinal implants **10** (FIG. **2**) has parallel side surfaces **20** and **22**. An upper surface **24** and a lower surface **26** for engaging the adjacent vertebrae **12** and **14** extend between the side surfaces **20** and **22**. The upper and lower surfaces **24** and **26** adjacent a first end portion **30** of the spinal implant **10** are spaced apart by a first distance. The upper and lower surfaces **24** and **26** adjacent a second end portion **32** of the spinal implant **10** are spaced apart a second distance. The second distance is preferably greater than the first distance to give the spinal implant a wedge shape for use in portions of the spine with a lordotic curve.

The upper and lower surfaces **24** and **26** include a plurality of triangular-shaped teeth **36** that extend from the side surface **20** to the side surface **22** for engaging the vertebrae **12** and **14**. Each tooth **36** (FIG. **3**) includes a surface **40** facing toward the end portion **30**. A surface **42** of the tooth **36** faces the end portion **32** of the spinal implant **10**. The surfaces **40** and **42** of the tooth **36** intersect each other to form an edge **44**. The surfaces **40** and **42** of adjacent teeth **36** intersect to form edges **46**. The edges **46** are parallel to each other and lie in a plane **48**.

The surface **40** of the tooth **36** extends at an acute angle x to the plane **48**. The surface **42** of the tooth **36** extends at an acute angle y to the plane **48**. Preferably, the angles x and y are equal and have a value of 45° so that surfaces **40** and **42** extend perpendicular to each other. Therefore, the teeth **36** are not preferential. The teeth **36** prevent the spinal implant **10** from moving toward the anterior portion of the spinal column **16** as much as they prevent the spinal implant from moving toward the posterior portion of the spinal column **16**.

A plurality of openings **56** and **58** extend from the side surface **20** to the side surface **22** to provide for blood flow and bone growth from one side of the implant **10** to the other side of the implant. The openings **58** are located near the end portion **30** of the implant.

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