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[54] **BRANCH CONNECTOR FOR SPINAL FIXATION SYSTEMS**

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**Related U.S. Application Data**

[63] Continuation of Ser. No. 169,609, Dec. 17, 1993, abandoned, which is a continuation-in-part of Ser. No. 26,518, Mar. 4, 1993, Pat. No. 5,330,473.

[51] **Int. Cl.<sup>6</sup>** ..... **A61B 17/70**

[52] **U.S. Cl.** ..... **606/61; 606/73**

[58] **Field of Search** ..... **606/59, 60, 61, 606/69, 72, 73**

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

5,030,220 7/1991 Howland ..... 606/61  
5,092,893 3/1992 Smith ..... 606/60

**FOREIGN PATENT DOCUMENTS**

2612070 9/1988 France .  
90/04948 5/1990 WIPO ..... 606/61

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[57] **ABSTRACT**

A connector for cross bracing a first spine rod and a second spine rod. The connector comprises a cross brace, upper saddles and connectors for connecting the upper saddles and cross brace to the first and second spine rods to thereby cross brace the first and second spine rods. Lower saddles are integrally formed at opposite ends of the cross brace to mate with the upper saddles in gripping the spine rods.

**6 Claims, 12 Drawing Sheets**

