

## United States Court of Appeals for the Federal Circuit

00-1454

ADVANCED CARDIOVASCULAR SYSTEMS, INC.  
and GUIDANT SALES CORPORATION,

Plaintiffs-Appellants,

v.

SCIMED LIFE SYSTEMS, INC.  
and BOSTON SCIENTIFIC CORPORATION,

Defendants-Appellees.

Richard A. Bardin, Fulwider Patton Lee & Utecht, LLP, of Los Angeles, California, argued for plaintiffs-appellants. With him on the brief were Craig B. Bailey and James Juo. Of counsel on the brief were Harvey Kurzweil, Clark E. Walter, Aldo A. Badini, and Bradford J. Badke, Dewey Ballantine LLP, of New York, New York.

Walter E. Hanely, Jr., Kenyon & Kenyon, of New York, New York, argued for defendants-appellees. With him on the brief were Charles R. Brainard, Douglas E. Ringel, and Reem F. Jishi. Of counsel were Paul H. Heller, of New York, New York; and Mark Michael Supko, of Washington, DC.

Appealed from: U.S. District Court for the Southern District of Indiana

Judge David F. Hamilton

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DECIDED: August 6, 2001

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Before MICHEL, Circuit Judge, ARCHER, Senior Circuit Judge, and SCHALL, Circuit Judge.  
SCHALL, Circuit Judge.

Advanced Cardiovascular Systems, Inc. and Guidant Sales Corp. (collectively, "ACS") appeal the decision of the United States District Court for the Southern District of Indiana granting summary judgment in favor of Scimed Life Systems, Inc. and Boston Scientific Corporation (collectively, "Scimed") in ACS's suit against Scimed for patent infringement. Adv. Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc., No. 98-1108 (S.D. Ind. June 28, 2000) ("Adv. Cardiovascular IV"). The district court ruled that Scimed was entitled to summary judgment that it did not infringe the asserted claims of United States Patent Nos. 5,421,955 (the "'955 patent"), 5,514,154 (the "'154 patent"), 5,603,721 (the "'721 patent"), 5,728,158 (the "'158 patent"), and 5,735,893 (the "'893 patent"). Id. The patents at issue relate to a flexible coronary stent that is adapted to be placed in a patient's blood vessel, expand, and then stay expanded, thereby keeping the involved segment of the vessel open. The asserted claims are directed to the stent, methods for using the stent, and a process for making the stent.

We vacate the district court's grant of summary judgment of non-infringement with respect to claims 11 and 12 of the '955 patent, claims 1-4, 9, and 23 of the '154 patent, claims 1-4 of the '721 patent, and claims 1, 2, 5, 6, 9, and 11-13 of the '158 patent, because the grant of summary judgment was based on an erroneous construction of the term "connecting elements," and the similar terms "interconnected," "connecting members," and "struts for connecting." The court

erred in construing these terms as requiring that the stent's connecting elements be parallel both to each other and to the longitudinal axis of the stent. We also vacate the district court's grant of summary judgment of non-infringement with respect to claims 12-15, 17, 18, and 20 of the '154 patent. We do so because the court erred in construing the phrase "generally parallel connecting elements" to require the connecting elements to be generally parallel to the stent's longitudinal axis, and because it is unclear, from the intrinsic evidence, under what frame of reference the claims require the connecting elements to be generally parallel to each other. We affirm, however, the district court's grant of summary judgment of non-infringement with respect to claims 10 and 21 of the '154 patent, claims 14-16, 19, and 20 of the '158 patent, and claims 1, 2, and 4-13 of the '893 patent. The case is remanded to the district court for further proceedings.

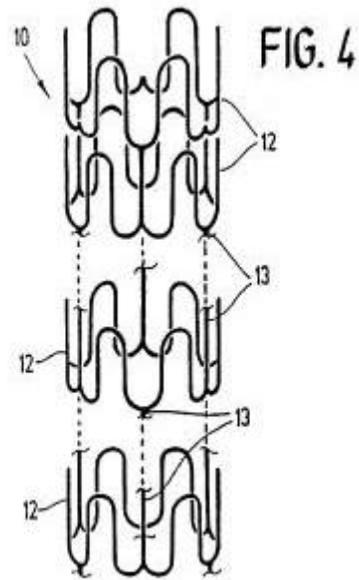
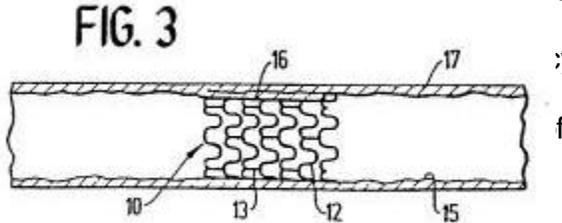
## BACKGROUND

### I.

The '955, '154, '721, '158, and '893 patents all are assigned to ACS. Each patent relates back to two original abandoned applications, Application No. 07/783,558 (the " '558 application"), filed on October 28, 1991, and Application No. 08/164,986 (the " '986 application"), filed on December 9, 1993. Since they all are related to the '558 and '986 applications, the patents have similar specifications and drawings.

The '154 patent's specification and drawings are representative of the specifications and drawings of all of the patents in suit. The '154 patent is directed to "an expandable stent which is relatively flexible along its longitudinal axis to facilitate delivery through [a blood vessel], but which is stiff and stable enough radially in an expanded condition to maintain" free passage through a vessel in which the invention is implanted. '154 patent, col. 1, ll. 53-58. The stent 10 is depicted below in Figures 3 and 4 of the '154 patent.

Figure 3 shows the stent 10 inside an artery 15. It describes stent 10 as having a "plurality of radially expandable cylindrical elements 12 in Figures 3 and 4, that can each "expand and contract" as described in Figures 59-62. "Interconnecting elements or struts" also called 13 in Figure 3. The stent is shown in its contracted state within an artery 15, with an outer wall surface 16 and an inner wall surface 17. Thereafter,



specification identified as at col. 1, ll. 59-62. identified as e increased hereof." Id. member. balloon is

inflated, the stent expands, and the balloon is removed, leaving the stent in its expanded state, against the blood vessel's walls 15, as shown in Figure 3. Id. at col. 4, l. 57 - col. 5, l. 10.

The '154 patent notes that "[p]referably, all of the interconnecting elements of the stent are joined at either the peaks or the valleys of the undulating structure of the cylindrical elements . . . . In this manner there is no shortening of the stent upon expansion." Id. at col. 2, l. 67 - col. 3, l. 4; see also id. at col. 5, ll. 42-51. This configuration is demonstrated in Figures 3 and 4 of the '154 patent, shown above.

Claim 1 of the '154 patent is directed to the stent itself, and is representative of the apparatus claims asserted by ACS. Claim 1 reads:

1. A longitudinally flexible stent for implanting in a body lumen, comprising:
  - a plurality of cylindrical elements which are independently expandable in the radial direction and which are interconnected so as to be generally aligned on a common longitudinal axis;
  - a plurality of connecting elements for interconnecting said cylindrical elements, said connecting elements configured to interconnect only said cylindrical elements that are adjacent to each other; and
  - an outer wall surface on said cylindrical elements, said outer wall surface being smooth prior to expansion of said stent and forming a plurality of outwardly projecting edges which form as said stent is expanded radially outwardly from a first

diameter to a second, enlarged diameter.

Id. at col. 8, ll. 36-52. Independent claim 12 differs from claim 1, describing "a plurality of generally parallel connecting elements . . . ." Id. at col. 9, l. 28 (emphasis added).

The '154 patent is a descendant of the '558 application. The '558 application included claims directed to an expandable, flexible stent, a method of using the stent, a process for making the stent, and a kit that included the stent. Some of the '558 application's claims were rejected as being anticipated by United States Patent No. 5,102,417, which was issued to Julio C. Palmaz (the "Palmaz '417 patent"). The '558 application's claims were amended in response to the rejection, but the examiner maintained his rejection based on the Palmaz '417 patent.

The '986 application was filed as a continuation of the '558 application. Eventually, a preliminary amendment to the '986 application was filed, amending certain claims of the application to recite "a plurality of generally parallel connecting elements for interconnecting said cylindrical elements . . . ." (emphasis added). The inventors argued that the amended claims were patentable over the Palmaz '417 patent. The examiner maintained his rejection, however. The '154 patent then was filed as a continuation-in-part of the '986 application, and the '986 application was abandoned. The '154 patent's claims, directed to an expandable, flexible stent, were allowed. Most of the asserted claims of the '154 patent, such as independent claim 1, simply recite "connecting elements," see '154 patent, col. 8, ll. 36, 52, while other asserted claims, independent claim 12 for example, recite "generally parallel connecting elements," see id. at col. 9, ll. 23-33.

The '955 patent was filed as a continuation of the '558 application, and the '558 application then was abandoned. The '955 patent's claims are directed to a process for making the expandable, flexible stent. [\[1\]](#) Claims 11 and 12 of the '955 patent, the asserted claims, describe the claimed cylindrical elements as being "interconnected," but do not expressly describe the interconnections as being "parallel." '955 patent, col. 8, l. 57 - col. 9, l. 10.

The '721 patent was filed as a divisional of the '154 patent; it claims a method for using the expandable, flexible stent. The asserted claims of the '721 patent describe the stent as having cylindrical elements that are "interconnected." However, like the asserted claims of the '955 patent, they do not state that the interconnections are "parallel." '721 patent, col. 8, l. 33 - col. 10, l. 6.

The '158 patent was filed as a divisional of the '721 patent; its claims are directed to an expandable, flexible stent. Most of the '158 patent claims that ACS asserts against Scimed recite a "longitudinally flexible stent" that has a "plurality of connecting elements." '158 patent, col. 8, l. 47 - col. 10, l. 52. Asserted dependent claim 2, however, recites a stent in claim 1 "wherein said connecting elements are generally parallel to each other," id. at col. 8, ll. 64-65. At the same time, claim 4, which also depends from claim 1 but is not asserted, describes a stent "wherein said connecting elements are generally parallel to the common longitudinal axis of said cylindrical elements," id. at col. 9, ll. 1-3.

The '893 patent was filed as a divisional of the '721 patent; its claims are directed to an expandable, flexible stent. The '893 patent's claims recite "connecting members" or "struts for connecting" that join the stent's cylindrical elements. '893 patent, col. 8, l. 32 - col. 10, l. 19. None of the asserted claims of the '893 patent modify these terms with the phrase "generally parallel." Id.

The accused device that is made by Scimed, the NIR stent, is an expandable, flexible coronary stent. The NIR stent is shown below.



Relevant to the district court's grant of summary judgment of non-infringement, the NIR stent's connecting elements are not straight, such as those seen in Figures 3 and 4 of the '154 patent, but curved vertical loops or U's. These curved connecting elements attach to the peaks or valleys of the horizontal loops that comprise the body of the NIR stent.

## II.

In the district court, ACS alleged that Scimed infringed claims 11 and 12 of the '955 patent, claims 1-4, 9, 10, 12-15, 17, 18, 20, 21, and 23 of the '154 patent, claims 1-4 of the '721 patent, claims 1, 2, 5, 6, 9, 11-16, 19, and 20 of the '158 patent, and claims 1, 2, and 4-13 of the '893 patent by manufacturing and selling its NIR stent. The parties first asked the court to construe certain terms in the asserted claims. In response, the court construed the asserted claims, adopting ACS's proposed construction of "connecting element," construing the term to mean "an element of the stent that connects adjacent cylindrical elements." Adv. Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc., No. 98-1108, slip op. at 16-17 (S.D. Ind. Oct. 15, 1999) ("Adv. Cardiovascular I"). The court construed the phrase "generally parallel connecting elements" in independent claim 12 of the '154 patent to mean that the connecting elements must be parallel both to each other and to the stent's longitudinal axis. Id. at 25-27. In addition, the court determined that dependent claim 2 of the '158 patent explicitly required the connecting elements to be generally parallel to each other. Id. at 26-27. Finally, the court construed the phrase "[a] plurality of outwardly projecting edges" in claims 1 and 23 of the '154 patent, and similar phrases in claim 1 of the '721 patent and claims 1 and 14 of the '158 patent, to mean "a number of U-, W-, and Y-shaped members of the cylindrical elements."<sup>[2]</sup> Id. at 23-24.

Scimed then moved for a supplemental claim construction, asking, in part, that the district court limit the term "connecting element" in the asserted claims to a "connector that is generally parallel to the longitudinal axis of the stent." Adv. Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc., No. 98-1108, slip op. at 1-2 (S.D. Ind. Feb. 9, 2000) ("Adv. Cardiovascular II"). The district court

granted the request and adopted Scimed's proposed construction, focusing on statements by the inventors during prosecution relating to the Palmaz '417 patent. Id. at 4-5. The court also noted that "if the connecting elements claimed in the [asserted patents] must all be generally parallel to the longitudinal axis, they should all be generally parallel to each other." Id. at 5 n.2. We interpret this footnote to mean that the district court construed the term "connecting element" to require the connecting elements to be generally parallel both to each other and to the longitudinal axis of the stent.

Scimed then moved for summary judgment of non-infringement with respect to the asserted claims. In due course, the district court granted summary judgment of non-infringement, either literal or by equivalents, of claims 12-15, 17, 18, and 20 of the '154 patent on the ground that the NIR stent did not have connecting elements that were "generally parallel," as required by the claims. Adv. Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc., No. 98-1108, slip op. at 7-12 (S.D. Ind. Feb. 9, 2000) ("Adv. Cardiovascular III"). The court noted that the connecting elements of the NIR stent were not generally parallel to each other, because, when the curved or U shaped connecting elements on opposite sides of the NIR stent were compared, they were "not aligned in the same manner." Id. at 8. Rather, they were seen to "run in opposite directions, like, as defendants put it, a smile and a frown." Id. The court also noted that the NIR stent's connecting elements were not generally parallel to the stent's longitudinal axis because they were curved and therefore could not be parallel to that axis. Id. at 9-10. The court stated that ACS had failed to present any evidence explaining how the NIR stent's connecting elements, which were non-parallel, were equivalent to the claimed "generally parallel connecting elements." Id. at 10-12. Concluding, based on the NIR stent's lack of substantially U-shaped members, that the NIR stent also did not fall within the scope of the '893 patent's claims, the court granted summary judgment of no literal infringement, or infringement under the doctrine of equivalents, of claims 1, 2, and 4-13 of the '893 patent in favor of Scimed.<sup>[3]</sup> Id. at 16-17. The court also granted summary judgment of non-infringement of claims 10 and 21 of the '154 patent, which require the stent to be

formed of a single piece of tubing, and claims 14-16, 19, and 20 of the '158 patent, which require the stent's cylindrical elements to have "a width," id. at 17, because, as the district court noted, ACS represented to the court that it would not assert infringement of those claim limitations, id. at 3.[\[4\]](#)

ACS then asked the district court to reconsider its construction of "connecting elements," while Scimed requested that the court, based upon its construction of "connecting elements," grant summary judgment of non-infringement of all of the claims asserted by ACS. The district court denied ACS's motion for reconsideration, reaffirming its construction of "connecting elements." Adv. Cardiovascular IV, slip op. at 7-8. In so doing, the court pointed to the fact that the only embodiment in the asserted patents depicts the connecting elements as generally parallel to the stent's longitudinal axis. Id. The district court also based its construction on statements made by the inventors regarding the Palmaz '417 patent during the prosecution of the '986 application, concluding that the inventors described their invention, not just the claims of the '986 application, as superior to the Palmaz '417 patent because it had connecting elements that were generally parallel to the stent's longitudinal axis. Id. at 8-10. The court applied its construction of connecting elements to the term "interconnected" in the '955 and '721 patents, and to the terms "connecting members" and "struts for connecting" in the '893 patent because all of those terms refer to the means for connecting the described stent's cylindrical elements. Id. at 10-11.

Based on its construction of the term "connecting elements," the district court granted Scimed's motion for summary judgment, finding that the NIR stent did not infringe, either literally or under the doctrine of equivalents, any of the asserted claims because the stent's connecting elements are not generally parallel both to each other and the stent's longitudinal axis. Id. at 11-12. The court therefore entered judgment in favor of Scimed. ACS now appeals. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1) (1994).

## DISCUSSION

### I.

Summary judgment "shall be rendered forthwith if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(c); see also Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc., 200 F.3d 795, 806-07, 53 USPQ2d 1289, 1297 (Fed. Cir. 1999); Wolf v. Northwest Ind. Symphony Soc'y, 250 F.3d 1136, 1141 (7th Cir. 2001). We review a grant of summary judgment without deference. Conroy v. Reebok, Int'l, Ltd., 14 F.3d 1570, 1575, 29 USPQ2d 1373, 1377 (Fed. Cir. 1994). In addition, we must, as the district court was required to do, draw all reasonable factual inferences in favor of the nonmovant. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 255 (1986); Semiconductor Energy Lab. Co. v. Samsung Elecs. Co., 204 F.3d 1368, 1378, 54 USPQ2d 1001, 1008 (Fed. Cir. 2000).

Determination of a claim of infringement involves a two step inquiry. First, the claims are construed, a question of law in which the scope of the asserted claims is defined. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1454-56, 46 USPQ2d 1169, 1172-74 (Fed. Cir. 1998) (en banc). Second, the claims, as construed, are compared to the accused device. Id. This is a question of fact. WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1346, 51 USPQ2d 1385, 1389 (Fed. Cir. 1999). To prevail, the plaintiff must establish by a preponderance of the evidence that the accused device infringes one or more claims of the patent either literally or under the doctrine of equivalents. Id.

### II.

We address first the parties' contentions with respect to the remaining asserted claims that do not have any reference to a parallel relationship as far as the "connecting elements" are

concerned. Those claims are claims 11 and 12 of the '955 patent, claims 1-4, 9, and 23 of the '154 patent, claims 1-4 of the '721 patent, and claims 1, 2, 5, 6, 9, and 11-13 of the '158 patent. [\[5\]](#) As seen above, the district court construed the term "connecting elements" in the '154 and '158 patents to require the connecting elements to be generally parallel both to each other and to the longitudinal axis of the stent. Adv. Cardiovascular III, slip op. at 5-6. The court applied this construction to the term "interconnected" in the asserted claims of the '955 and '721 patents and to the terms "connecting members" and "struts for connecting" in the '893 patent. [\[6\]](#) Adv. Cardiovascular IV, slip op. at 8-9. Based on this construction, the district court concluded that the NIR stent did not infringe any of the asserted claims because the NIR stent's connecting elements were not parallel both to each other and to the stent's longitudinal axis. Id. at 11-12.

ACS argues that the district court erred in its claim construction. It asserts that none of the asserted patents ascribe any significance to the orientation of the claimed connecting elements in relation to each other or to the stent's longitudinal axis. ACS notes that the phrase "generally parallel" appears nowhere in the specification, and only appears in some of the asserted claims, specifically independent claim 12, and dependent claims 13-15, 17, 18, and 20 of the '154 patent and dependent claim 2 of the '158 patent. ACS points out that only the drawings of the asserted patents show the connecting elements generally parallel both to each other and the stent's longitudinal axis, and it contends that such a limitation, that only appears in the drawings, should not be read into the claims. ACS also contends that the district court gave too much weight to statements made during the prosecution of the '986 application because the '986 application specifically claimed "generally parallel connecting elements."

Scimed responds that the district court's claim construction was proper. Scimed argues that the only embodiments disclosed in the asserted patents depict the connecting elements in parallel alignment both with each other and with the stent's longitudinal axis. Scimed also argues that the asserted patents emphasize the longitudinal orientation of the connecting elements and

the fact that this orientation prevents shortening and deformation of the stent upon expansion. In light of these teachings in the specification, Scimed asserts, the district court properly limited the described connecting elements to connecting elements that are generally parallel both to each other and to the stent's longitudinal axis. Scimed also argues that the inventors expressly disclaimed non-parallel connecting elements during prosecution by indicating that the "invention," not just the claims in the '986 application, was distinguishable from the Palmaz '417 patent because the Palmaz '417 patent disclosed connectors that were not parallel to the stent's longitudinal axis and therefore deformed upon expansion.

We agree with ACS that the district court erred in construing "connecting elements" and the similar terms "interconnected," "connecting members," and "struts for connecting" by requiring the stent's connecting elements to be generally parallel both to each other and to the stent's longitudinal axis. We reach this conclusion based on the intrinsic evidence of record—the claims, the specification, and the prosecution history, Vitronics Corp. v. Conceptor, Inc., 90 F.3d 1576, 1582, 39 USPQ2d 1573, 1576 (Fed. Cir. 1996).

We begin our analysis with the claim language. Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999) ("The starting point for any claim construction must be the claims themselves."). In that regard, none of the claims presently under discussion require the recited "connecting elements," "interconnected" members, "connecting members," or "struts for connecting," to be "generally parallel" both to each other and to the stent's longitudinal axis. For example, independent claim 1 of the '154 patent simply recites "a plurality of connecting elements." '154 patent, col. 8, l. 43. The claim continues, indicating that the connecting elements are "configured to interconnect only said cylindrical elements that are adjacent to each other . . . ." Id., col. 8, ll. 44-46. The claim has no other express structural limitations on the claimed connecting elements. In contrast, independent claim 12 of the '154 patent, which is discussed in Part III below, recites "a plurality of generally parallel connecting

elements . . . ." Id., col. 9, l. 28 (emphasis added). Claim 12's language includes an express limitation on the described connecting elements, that they be generally parallel. Based on the claim language alone, the term "connecting elements," and the terms "interconnected," "connecting members," and "struts for connecting," are not limited to those connectors that parallel each other and the stent's longitudinal axis.

The specification further supports not requiring the connecting elements described in the asserted claims to be generally parallel both to each other and to the stent's longitudinal axis. "Claims must be read in view of the specification, of which they are a part." Markman v. Westview Instruments, Inc., 52 F.3d 967, 979, 34 USPQ2d 1321, 1329 (Fed. Cir. 1995), aff'd, 517 U.S. 370, 38 USPQ2d 1461 (1996). However, "[w]hile it is true that claims are to be interpreted in light of the specification and with a view to ascertaining the invention, it does not follow that limitations from the specification may be read into the claims . . . ." Sjolund v. Musland, 847 F.2d 1573, 1581, 6 USPQ2d 2020, 2027 (Fed. Cir. 1988). Here, the specification does not require the connecting elements be parallel to each other and to the stent's longitudinal axis. Scimed admits that the phrase "generally parallel" only appears in the patents in suit when it is used in a particular claim. At the same time, the specifications of the asserted patents do not discuss the orientation of the connecting elements in relation to each other or to the longitudinal axis of the described stent. Looking at the '154 patent for example, the specification's only discussion of the connecting elements' orientation states that the connecting elements are "disposed between adjacent cylindrical elements," '154 patent, col. 4, ll. 25-26, and that this adjacent placement "prevents shortening of the stent during the expansion thereof," id. at col. 5, ll. 50-51. See also id. at col. 3, ll. 1-4 (noting that the connecting elements should be joined at "either the peaks or the valleys of the undulating structure of the cylindrical elements . . . . In this manner there is no shortening of the stent upon expansion."). The specification's only other discussion of the connecting elements' orientation indicates that it is preferred to place them "on one side of the cylindrical element 12 . . . to achieve maximum flexibility for a stent." Id. at col. 5, ll. 34-37.

Contrary to Scimed's assertions, none of the specifications of the asserted patents teach that the connecting elements must be parallel both to each other and to the stent's longitudinal axis in order to prevent the shortening of the stent when the stent is expanded. As noted above, the specifications teach that it is the attachment of the connecting elements to either the peaks or the valleys of the cylindrical elements, as demonstrated in Figures 3 and 4 of the '154 patent, not the parallel placement of the connecting elements, that prevents shortening upon the stent's expansion.

Scimed correctly notes that all of the drawings in the asserted patents depict the connecting elements in parallel alignment both with each other and the stent's longitudinal axis. However, this fact, by itself, does not support adding such a limitation to the claims. See Johnson Worldwide Assoc., Inc. v. Zebco Corp., 175 F.3d 985, 992, 50 USPQ2d 1607, 1612 (Fed. Cir. 1999) (noting that "mere inferences drawn from the description of an embodiment of the invention cannot limit claim terms"). Without a "generally parallel" limitation in the claim or a discussion in the specification about the claimed connecting elements being generally parallel both to each other and to the stent's longitudinal axis, the drawings' depiction of the connecting elements in parallel relationship both with each other and the stent's longitudinal axis can not support the conclusion that such a limitation exists. Since nothing in the specification assigns significance to the fact that the drawings align the connecting elements parallel both to each other and to the stent's longitudinal axis, we will not allow this aspect of the drawings to be imported into the claims as a limitation. See, e.g., Kraft Foods, Inc. v. Int'l Trading Co., 203 F.3d 1362, 1367-69, 53 USPQ2d 1814, 1818-19 (Fed. Cir. 2000) (indicating that the claim term "protecting back panel" was limited to a "relatively stiff" panel because, in addition to other intrinsic evidence, the specification's text described the back panel in the patent's drawings as being "constructed of a relatively stiff material"); Toro Co. v. White Consol. Indus., Inc., 199 F.3d 1295, 1300-02, 53 USPQ2d 1065, 1069-70 (Fed. Cir. 1999) (construing the claim term "including" to mean "part of" and "permanently attached" because, in addition to the patent's drawings, the specification's text

stressed that the claimed vacuum/blower's flow restriction ring was part of and attached to the invention's air inlet cover); Wang Labs., Inc. v. Am. Online, Inc., 197 F.3d 1377, 1382-83, 53 USPQ2d 1161, 1164-65 (Fed. Cir. 1999) (noting that the claims were limited to a character-based protocol because of the express teachings of such a protocol in both the patent's specification and the drawings). In this case, the specifications only discuss the orientation of the connecting elements in relation to the cylindrical elements, not to other connecting elements or the stent's longitudinal axis. Therefore, although the drawings show the connecting elements parallel both to each other and to the stent's longitudinal axis, the drawings do not require limiting the claimed connecting elements to a configuration in which they are in parallel alignment both with each other and with the stent's longitudinal axis.

Finally, we note that the prosecution history supports a claim construction that does not require that the recited "connecting elements" be generally parallel both to each other and to the stent's longitudinal axis. The prosecution history "is often of critical significance in determining the meaning of the claims," Vitronics, 90 F.3d at 1582-83, 39 USPQ2d at 1577, since it may be used to determine the scope and meaning of the claims, Alpex Computer Corp. v. Nintendo Co., 102 F.3d 1214, 1220, 40 USPQ2d 1667, 1671 (Fed. Cir. 1996).

The prosecution history does not support the district court's claim construction. In prosecuting the '986 application, the inventors argued that, in contrast to the Palmaz '417 patent's non-parallel connecting members, "the independent claims of the present invention recite a plurality of generally parallel connecting elements." However, when making this argument, the inventors were referring to the specific language in the '986 application's claims, language that recited "a plurality of generally parallel connecting elements," to distinguish the '986 application from the Palmaz '417 patent. As discussed below in Part III, this language appears in other asserted claims of the '154 patent, specifically claims 12-15, 17, 18, and 20. The inventors explicitly limited their arguments to the '986 application's claims that recite "generally parallel connecting

elements," not to claims that only recite "connecting elements." Therefore, the arguments do not apply to the invention's connecting elements in general, but only to connecting elements that are described, in the claims, as "generally parallel."

Scimed, however, points to statements that the inventors made that allegedly applied to their invention in general and that, therefore, were not exclusive to the '986 application's claim language. In distinguishing the Palmaz '417 patent, the inventors stated:

Moreover, Applicants' invention is superior to the stent disclosed in the Palmaz patent from a functional standpoint. As is clearly shown in Figs. 7 and 10 of the '417 Palmaz patent, due to its construction, upon expansion, the stent will substantially shorten as the slotted members of the stent body expand. Further, connecting members 100 and 102 deform upon expansion, as depicted in Figure 10, which adds to the shortening of the stent. . . .

The problem of stent shortening as taught by Palmaz has been solved by Applicants' invention due to its novel structure. The connecting elements of Applicants' invention are configured to "interconnect only said cylindrical elements that are adjacent to each other." Accordingly, as Applicants' stent is expanded from its first configuration to a larger configuration, the stent will not appreciably shorten . . .

We reject Scimed's argument. Even if these statements could apply to the claims that are now at issue, the inventors argued that their invention's structure was superior to the Palmaz '417 patent because the Palmaz '417 patent allowed substantial shortening upon expansion while "[t]he connecting elements of [the inventors'] invention are configured to 'interconnect only said cylindrical elements that are adjacent to each other.' Accordingly, as [the inventors'] stent is expanded from its first configuration to a larger configuration, the stent will not appreciably shorten." The inventors thus argued that their invention was superior to the Palmaz '417 patent because it configured the connecting elements to join adjacent cylindrical elements. The inventors did not argue that their invention was superior because its connecting elements were parallel to the stent's longitudinal axis. Finally, even if parts of the '986 application's prosecution history could be viewed as applying to asserted claims that do not explicitly describe "generally

parallel connecting elements," the prosecution history does not support the district court's claim construction. As discussed below in Part III, nowhere in the prosecution history did the inventors indicate that their invention, in general, required that the connecting elements be parallel to each other and to the stent's longitudinal axis.

The district court erred in construing the claim terms "connecting elements," "interconnected," "connecting members," and "struts for connecting" as requiring connecting members to run parallel both to each other and to the longitudinal axis of the stent. The court's grant of summary judgment of no literal infringement or infringement under the doctrine of equivalents with respect to claims 11 and 12 of the '955 patent, claims 1-4, 9, and 23 of the '154 patent, claims 1-4 of the '721 patent, and claims 1, 2, 5, 6, 9, and 11-13 of the '158 patent was based on this incorrect construction, Adv. Cardiovascular IV, slip op. at 11-12. We therefore vacate the district court's grant of summary judgment with regard to those claims, and remand for further proceedings.

### III.

In contrast to the asserted claims just discussed that only recite "connecting elements," independent claim 12 and dependent claims 13-15, 17, 18, and 20 of the '154 patent specifically claim "a plurality of generally parallel connecting elements." '154 patent, col. 9, l. 25 - col. 10, l. 17. The court construed the phrase "generally parallel connecting elements" to require the described connecting elements to run generally parallel both to each other and to the stent's longitudinal axis. Adv. Cardiovascular I, slip op. at 25-27. Based on this construction, the court granted summary judgment of no literal infringement of claims 12-15, 17, 18, and 20 of the '154 patent because it found that the connecting elements on the opposite sides of the NIR stent are not generally parallel to each other because they curve in opposite directions. Adv. Cardiovascular III, slip op. at 8. The court also noted that the connecting elements of the NIR stent are not parallel to the stent's longitudinal axis because, while the longitudinal axis is straight, the connecting elements are curved. Id. at 9. The court also granted summary judgment of no

infringement under the doctrine of equivalents, finding that ACS had failed to present any evidence to support its contention that non-parallel connecting elements are insubstantially different from the claimed generally parallel connecting elements. Id. 10-12.

ACS argues that claims 12-15, 17, 18, and 20 of the '154 patent only require the connecting elements to be generally parallel to each other, not to the stent's longitudinal axis. ACS asserts that, under this construction, the NIR stent's connecting elements meet the "generally parallel" limitation because, while curved, they are still parallel to each other. Scimed responds by arguing that the district court properly construed "generally parallel connecting elements" to require the connecting elements be parallel both to each other and to the stent's longitudinal axis. Relying upon this construction, Scimed asserts that the NIR stent cannot infringe because its connecting elements are curved, making them non-parallel to each other and to the stent's longitudinal axis.

We conclude that the district court erred in construing claims 12-15, 17, 18, and 20 of the '154 patent as requiring connecting elements that run parallel to the longitudinal axis of the stent. These claims simply recite "generally parallel connecting elements." See, e.g., id. at col. 9, l. 28. The claims contain no language explicitly requiring the connecting elements to be parallel to the longitudinal axis of the stent. In addition, as noted above in Part II, there is no support for such a construction in the '154 patent's specification or drawings.

Scimed, however, points to the prosecution history. It argues that the inventors distinguished their invention over the disclosure of the Palmaz '417 patent on the ground that the Palmaz '417 patent disclosed connecting members that were not parallel to the longitudinal axis of the stent. The prosecution history does not support this argument.

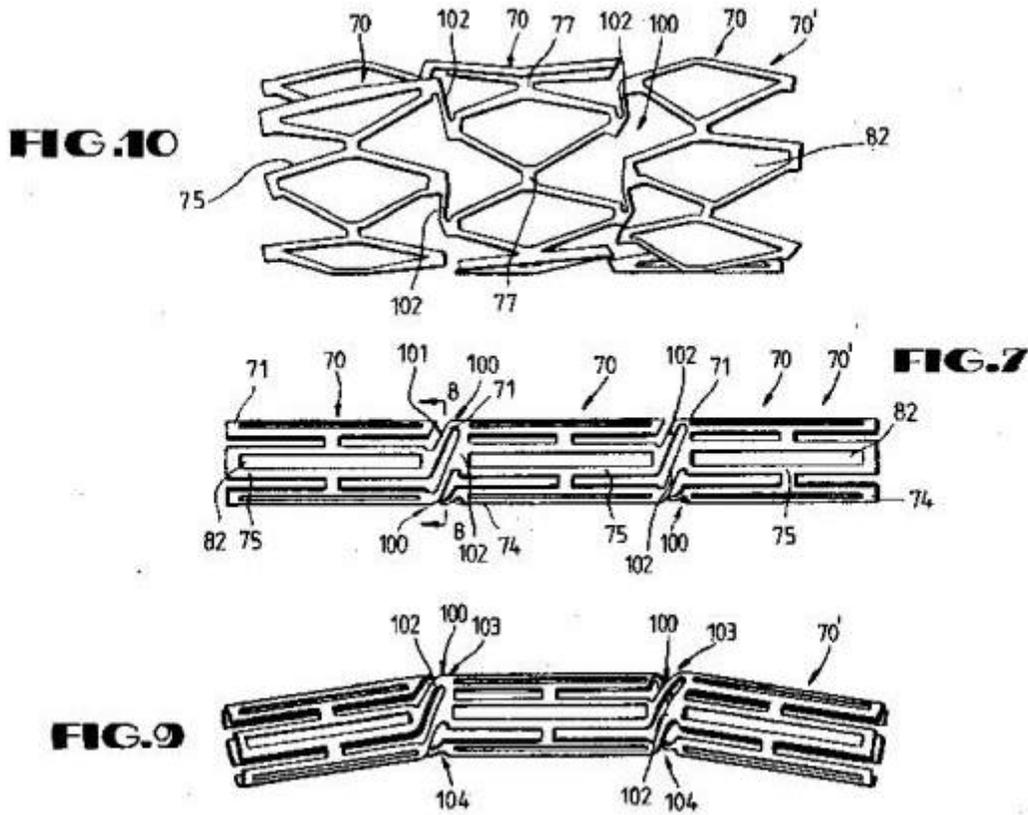
It is important to recognize exactly what the inventors stated with respect to the Palmaz '417 patent and their invention, as disclosed in the '986 application:

The '417 Palmaz patent discloses connector members 100 which are preferably disposed in a "non-parallel" relationship with respect to the longitudinal axis of adjacent grafts or prosthesis 70. . . . As seen in Figures 7-10 of Palmaz, each of the connector members 100 and 102 are disposed in a non-parallel relationship with respect to the longitudinal axis of the adjacent prosthesis 70.

\* \* \*

[T]he independent claims of the present invention recite "a plurality of generally parallel connecting elements" which clearly distinguish over the preferred "non-parallel" connecting members 100 of the '417 Palmaz patent.

Figures 7, 9, and 10 from the Palmaz '417 patent are as follows:



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stent in which the connecting members were in parallel alignment with the longitudinal axis of the stent. [7]

As already seen, the district court based its grant of summary judgment of non-infringement on

two aspects of the NIR stent: that the stent's connecting elements are not parallel to each other and are not parallel to the stent's longitudinal axis. While claims 12-15, 17, 18, and 20 of the '154 patent do not contain the latter limitation, neither party disputes that the claims require the former limitation—that the connecting elements be parallel to each other. When determining whether this limitation had been infringed, the district court noted that, "[w]hen the elements of the stent have been cut from [a] flat sheet, the 'connecting elements' in any particular row would be parallel to one another," but "[w]hen the sheet is rolled to form the finished stent, however, the NIR stent's 'connecting elements' are not aligned in the same manner [because] '[c]onnecting elements' on opposite sides of the cylinder run in opposite directions . . . ." Adv. Cardiovascular III, slip op. at 8. The court thus concluded that, for purposes of infringement, it was required to look at the finished stent, and that in the finished NIR stent, the connecting elements are not generally parallel to each other. Id.

ACS does not dispute the district court's description of the NIR stent's connecting elements. Nor, as just noted, does ACS dispute the district court's construction that the claims require the connecting elements to be generally parallel to each other. Instead, ACS argues that the district court's analysis as to whether the connecting elements are actually parallel to each other uses the wrong frame of reference. ACS asserts that the correct frame of reference for comparing the connecting elements is not a linear plane cutting through opposite sides of the stent, but a cylindrical plane following the surface of the stent. ACS argues that along the cylindrical plane of the stent, the connecting elements are parallel to each other. ACS notes that, during prosecution, the examiner considered the Palmaz '417 patent's connecting elements, which are slanted, to be parallel, further supporting its argument that the NIR stent's connecting elements, which are also not straight, are parallel. Scimed responds that the connecting elements on the opposite sides of the NIR stent are not parallel to each other because, when looking through the stent, they curve in opposite directions. Therefore, Scimed contends, the NIR stent cannot infringe.

The parties' arguments present a question of claim construction. Neither party disputes the shape of the NIR stent's connecting elements or that claims 12-15, 17, 18, and 20 of the '154 patent require the connecting elements be generally parallel to each other. What the parties do dispute is the manner in which the connecting elements are required to be parallel. ACS argues that the connecting elements only need to be parallel to each other as they are compared when looking around the cylindrical surface of the stent, while Scimed and the district court compare connecting elements by looking through the side of the stent. Nothing in the intrinsic evidence of record suggests that one method of determining parallelism is correct over the other. The claims simply recite "a plurality of generally parallel connecting elements," providing no indication of the frame of reference in which the connecting elements should be parallel to each other. As noted in Part II, supra, the specification does not mention the connecting elements being parallel. The drawings show parallel connecting elements, but the connecting elements in the drawings are straight lines, which are parallel to each other in both a cylindrical plane and a linear plane. ACS correctly notes that the prosecution history contains statements by the examiner that the Palmaz '417 patent's connecting elements, which would not be parallel under Scimed's construction, are generally parallel to each other, but these statements alone do not support ACS's construction. There are no statements by the inventors, or the examiner, that indicate the specific manner in which the connecting elements are required to be generally parallel to each other.

When "intrinsic evidence is insufficient to enable the court to determine the meaning of the asserted claims," resort may be had to extrinsic evidence. Vitronics, 90 F.3d at 1584, 39 USPQ2d at 1578. Extrinsic evidence will be particularly helpful in this case when construing the claims and properly determining what it means to someone skilled in the art to require the connecting elements to be "generally parallel" to each other. Pitney-Bowes, 182 F.3d at 1308-09, 51 USPQ2d at 1168.

For the foregoing reasons, we vacate the district court's grant of summary judgment of

non-infringement of claims 12-15, 17, 18, and 20 of the '154 patent. On remand, the district court may consider extrinsic evidence, "such as expert testimony, inventor testimony, dictionaries, and technical treatises and articles," Vitronics, 90 F.3d at 1584, 39 USPQ2d at 1578, in order to determine in what manner the connecting elements should be "generally parallel" to each other.

## CONCLUSION

The district court erred in construing the claim terms "connecting elements," "interconnected," "connecting members," and "struts for connecting" by improperly requiring the connecting elements to be both generally parallel to each other and to the stent's longitudinal axis. We therefore vacate the court's grant of summary judgment of no literal infringement or infringement by equivalents of claims 11 and 12 of the '955 patent, claims 1-4, 9, and 23 of the '154 patent, claims 1-4 of the '721 patent, and claims 1, 2, 5, 6, 9, and 11-13 of the '158 patent, which was based solely on this erroneous construction. We additionally hold that the district court erred in construing the phrase "generally parallel connecting elements" in claims 12-15, 17, 18, and 20 of the '154 patent to require the connecting elements to be generally parallel to the stent's longitudinal axis. We vacate the court's grant of summary judgment of non-infringement of these claims because the particular way in which the claims require the connecting elements to be generally parallel to each other is unclear, based solely on the intrinsic evidence of record. We affirm the district court's grant of summary judgment of non-infringement of claims 10 and 21 of the '154 patent, claims 14-16, 19, and 20 of the '158 patent, and claims 1, 2, and 4-13 of the '893 patent. The case is remanded to the district court for further proceedings consistent with this opinion.

AFFIRMED-IN-PART, VACATED-IN-PART, and REMANDED.

## COSTS

Each party shall bear its own costs.

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[1] The '955 patent was subject to a reexamination, but the two claims asserted by ACS in this case, claims 11 and 12, were allowed, unamended, at the conclusion of the reexamination.

[2] ACS argues that the district court's construction of "projecting edges" is erroneous. However, the construction of this term did not form the basis for any judgment of non-infringement by the district court. Since this claim construction is irrelevant to the judgment that is on appeal, we will not address whether the construction was correct. See Phonometrics, Inc. v. N. Telecom Inc., 133 F.3d 1459, 1464, 45 USPQ2d 1421, 1425 (Fed. Cir. 1998) (noting that any construction, by a district court or this court, of a claim term that is not at issue is "merely dictum, and therefore has no issue preclusive effect").

[3] ACS does not appeal the grant of summary judgment relating to the '893 patent. Accordingly, the district court's judgment of non-infringement of claims 1, 2, and 4-13 of the '893 patent, the asserted claims of that patent, is left undisturbed.

[4] ACS does not appeal this finding. Accordingly, the district court's judgment of non-infringement of claims 10 and 21 of the '154 patent and claims 14-16, 19, and 20 of the '158 patent also is left undisturbed.

[5] We note that claim 2 of the '158 patent specifically requires the connecting elements be "generally parallel to each other." '158 patent, col. 8, ll. 64-65. However, the district court granted summary judgment of non-infringement of this claim based on its construction of the term "connecting elements" alone. Adv. Cardiovascular IV, slip op. at 11-12. Therefore, we will handle summary judgment of non-infringement of claim 2 of the '158 patent in this part of the opinion, which discusses the construction of "connecting elements" and the grant of summary judgment based on the construction of that term.

[6] As noted above, ACS does not appeal the grant of summary judgment of non-infringement relating to the '893 patent.

[7] After the statements cited above were made, the examiner responded that "there is no limitation of the claim which requires the connector members to be parallel to the longitudinal axis of the stent; only that the connector members are 'generally parallel.'" This response by the examiner further supports our conclusion that the inventors were not defining "generally parallel connecting elements" to mean connecting elements that are parallel to the stent's longitudinal axis.