

The opinion in support of the decision being entered today is *not* binding precedent of the Board.

**UNITED STATES PATENT AND TRADEMARK OFFICE**

---

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

---

*Ex parte* TIMOTHY J. LEY, GRAIG L. KVEEN, and BURNS P. DORAN

---

Appeal 2007-2026  
Application 10/131,772  
Technology Center 3700

---

Decided: July 19, 2007

---

Before ERIC GRIMES, LORA M. GREEN, and  
RICHARD M. LEBOVITZ, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

**DECISION ON APPEAL**

This is an appeal under 35 U.S.C. § 134 involving claims to a stent. The Examiner has rejected the claims as anticipated and obvious. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

**BACKGROUND**

“Stents are radially expandable endoprotheses which are typically intravascular implants capable of being implanted transluminally and enlarged radially after being introduced percutaneously. . . . They are used

to reinforce body vessels and to prevent restenosis following angioplasty in the vascular system” (Specification 1).

The Specification discloses stents that are configured to “limit recoil and add resistance to compression . . . and provide[] increased side branch access . . .” (*id.* at 1-2). For example, one embodiment “comprises a metal tube as shown in the Figure 2 end view, such as Nitinol, or stainless steel preferably, which has been etched or more preferably laser cut to [a] configuration . . . made up of a series of generally triangular-like expansion cell elements” (*id.* at 4).

## DISCUSSION

### 1. CLAIMS

Claims 33-41 are pending and on appeal. Claims 33 and 37 are representative and read as follows:

Claim 33. A stent comprised of at least one cell structure selected from the group consisting of I shaped bonate cell structures oriented at an oblique angle relative to the longitudinal axis of the stent, multibonate cell structures oriented at an oblique angle relative to the longitudinal axis of the stent and combinations thereof.

Claim 37. A stent comprising a plurality of bonate cell structures wherein the bonate cell structures are I shaped, abut one another and are disposed at an oblique angle relative to the longitudinal axis of the stent.

Thus, claim 33 is directed to a stent that has at least one cell structure that is an I-shaped bonate structure, a multibonate structure, or a combination of the two. The cells must be oriented at an oblique angle relative to the longitudinal axis of the stent.

The Specification states that “the term ‘bonate’ refers to a structure which has relatively wide end portions joined by a connecting portion which is, at least in part, relatively narrow. A bonate cell structure is illustrated generally at 100 in Fig. 12” (Specification 6).

The Specification states (*id.*) that

The term ‘multibonate’, for the purposes of this disclosure, refers to a structure which has three or more relatively wide end portions each of which is joined to a common portion via a relatively narrow connecting portion. . . . One such multibonate cell structure is shown generally at 120 in Fig. 13.

Claim 37 is directed to a stent that has a plurality of I-shaped bonate cell structures. The I-shaped cells must abut one another and be oriented at an oblique angle relative to the longitudinal axis of the stent.

## 2. PRIOR ART

The Examiner relies on the following references:

Ehr	US 6,033,433	Mar. 7 2000 (filed Apr. 25, 1997)
Fischell	US 5,695,516	Dec. 9, 1997
Fischell	US 5,697,971	Dec. 16, 1997
Savin	US 4,950,227	Aug. 21, 1990

## 3. ANTICIPATION

Claims 37-39 stand rejected under 35 U.S.C. § 102(e) as anticipated by Ehr (Answer 3-4), on the basis that “Ehr discloses a stent consisting entirely of interconnected, I-shaped, bonate cell structures disposed at an oblique angle relative to the longitudinal axis as seen in Fig. 16” (*id.* at 4).

The Examiner reproduced Ehr's Fig. 16 and darkened the cells he interpreted to be "I-shaped, bonate cell structures" (*id.*).

Appellants argue that Figure 23 of the instant Specification provides an example of a stent having I-shaped cells (Br. 5). In contrast, Appellants argue, "the Examiner merely drew an 'I' in the cell structure and declared that this meant that the cell structure is a bonate cell structure that is I-shaped." (Br. 7). Appellants argue that the cells indicated by the Examiner are not I-shaped because they do not have relatively wide end portions that extend from both sides of the relatively narrow portion (*id.*; Reply Br. 3).

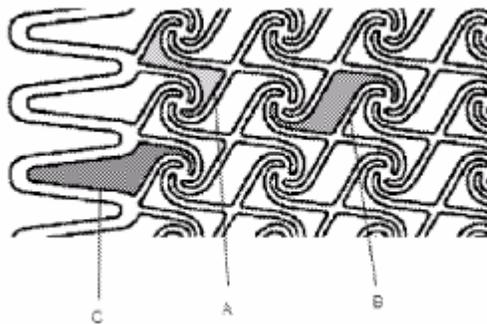
The Examiner argues that it is reasonable to interpret the term "I shaped" as encompassing structures "generally shaped like an I" because the I-shaped structures in Appellants' Figures 17, 21a, and 23 are not perfectly I-shaped, having instead "thickness, curvature and a gradual tapering thickness where the sections meet. [The] Examiner asserts that since this broad interpretation has been applied to the instant invention, so to can it be applied to the prior art" (Answer 7-8). The Examiner argues that the Specification provides "no reference . . . to give guidance as to how to interpret 'I'-shaped" (*id.* at 8).

It is well settled that "claims in an application are to be given their broadest reasonable interpretation consistent with the specification and that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Sneed*, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983) (citation omitted).

In the instant case, as pointed out by the Examiner (Answer 8), the Specification does not define the term "I shaped." As also pointed out by

the Examiner (*id.*), the structures in Figure 23 are not perfect “I” shapes because they have curvature and gradual tapering that join the wider ends to the narrow middle. We therefore agree with the Examiner that it is reasonable to interpret “I shaped” to encompass any structure that is generally shaped like an “I.”

Appellants’ annotated version of Ehr’s Figure 16 is reproduced below:



The annotated figure shows an enlarged section of Ehr’s cell structure, with three cells shaded and labeled “A”, “B”, and “C”. The figure shows that the wider end portions of cell “A” extend away from both sides of the narrower portion of the cell that connects the two ends. Moreover, cell “A” has the general appearance of a capital letter “I.” Thus, Appellants’ arguments to the contrary notwithstanding, we agree with the Examiner that at least cell “A” has the general shape of an “I.”

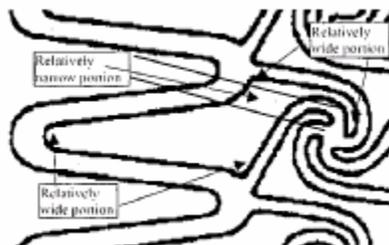
“Absent claim language carrying a narrow meaning, the PTO should only limit the claim based on the specification or prosecution history when those sources expressly disclaim the broader definition.” *In re Bigio*, 381 F.3d 1320, 1325, 72 USPQ2d 1209, 1211 (Fed Cir. 2004). Thus, we also agree with the Examiner that it would be improper to limit claim 37 only to

stents having a structure that closely resemble those shown in Appellants' Figure 23.

Because we agree that the Examiner's interpretation of claim 37 is reasonable, and because claim 37 does not have any language that distinguishes the term "I shaped" from Ehr, we agree with the Examiner that claim 37 encompasses the stent shown in Ehr's Figure 16. Also, because the corners of cell "A" all touch each other, all of those cells "abut one another," as recited in claim 37.

Appellants also argue that Ehr does not anticipate claim 39. Appellants refer to their annotated version of Ehr's Figure 16 (reproduced above), and argue that structure "C" is not a bonate structure because it does not have "a relatively wide end portion joined by a connection portion which is, at least in part, relatively narrow" (Br. 8). Appellants argue that because cell "C" is neither bonate nor I-shaped, Ehr does not anticipate claim 39 (*id.*).

To demonstrate that cell "C" has relatively wide portions joined by a connecting portion that is at least in part relatively narrow, the Examiner provides an annotated version of Ehr's Figure 16 (Answer 9), reproduced below:



The figure shows an enlargement of the cell labeled “C” by Appellants, with the Examiner’s notation of relatively wide and relatively narrow portions.

We agree with the Examiner that cell “C” is bonate. According to the Specification a cell is bonate if it “has relatively wide end portions joined by a connecting portion which is, at least in part, relatively narrow” (Specification 6). As demonstrated by the Examiner’s annotated drawing above, cell “C” meets this definition.

To summarize, we agree with the Examiner that at least cell “A” of Ehr’s stent has the general shape of an “I” and is oriented at an oblique angle to the longitudinal axis of the stent. Because every cell “A” contacts every other cell “A,” we agree with the Examiner that every cell “A” abuts every other cell “A.” We therefore agree with the Examiner that Ehr’s stent anticipates claim 37. Moreover, because all of the cells of Ehr’s stent are bonate and interconnected, we also agree with the Examiner that Ehr’s stent anticipates claims 38 and 39. We therefore affirm the Examiner’s anticipation rejection of claims 37-39.

#### 4. OBVIOUSNESS -- CLAIMS 37-41

Claims 37-41 stand rejected under 35 U.S.C. § 103 as being obvious over Fischell ‘516 and Savin (Answer 4-5).

The Examiner asserts that “Fischell [‘516] discloses a stent consisting entirely of interconnected, I-shaped, bonate cell structures[, but] does not disclose that the bonate structures are disposed at an oblique angle” (*id.* at 5). To meet this deficiency the Examiner cites Savin as disclosing a stent that can be deployed using a tapered balloon, in a stepped fashion, or by opening only one end, leaving the other end to act as a filter (*id.*)

The Examiner reasons that “[b]y using a tapered balloon to deliver the stent of Fischell, the cell structures will be disposed at an oblique angle relative to the longitudinal axis. The cell structures will converge longitudinally toward the distal (or proximal) end of the stent, as well as converge radially inward toward the longitudinal axis” (*id.*). The Examiner concludes that one of ordinary skill would have considered it obvious to deliver the stent of Fischell ‘516 using Savin’s tapered balloon since “Savin states that . . . using a tapered balloon to deliver a stent provides numerous advantages because it can be used in various areas of the body and can also fulfill several functions (i.e. a stent or a filter)” (*id.*).

Appellants argue that the references teach away from their combination “because the stent delivery system of Savin uses a stent that maintains or decreases its length upon expansion whereas the stent of Fischell [‘516] increases its length upon expansion” (Br. 9). Appellants argue that the deployment method of Savin, in which retaining sleeves are pulled away from the ends of the stent as it is expanded by an inflating balloon, demonstrates the desirability of using a stent that maintains or decreases its length, rather than a stent that increases in length, like the one disclosed in Fischell ‘516 (*id.* at 9-10; Reply Br. 4-6).

We are not persuaded by this argument. Recently addressing the issue of obviousness, the United States Supreme Court noted that the analysis under 35 U.S.C. § 103 “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art

would employ.” *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007).

Moreover, it is well settled that, “in a section 103 inquiry, ‘the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.’” *Merck & Co. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989) (quoting *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).) Thus, “[a]ll the disclosures in a reference must be evaluated, including nonpreferred embodiments, and a reference is not limited to the disclosure of specific working examples.” *In re Mills*, 470 F.2d 649, 651, 176 USPQ 196, 198 (CCPA 1972) (citations omitted).

We note that Savin discloses that “[i]n preferred embodiments . . . the stent is formed of knitted material and the length of the stent does not significantly change when the stent is expanded . . .” (Savin, col. 2, ll. 20-27). Rather than limiting its disclosure to stents that lengthen on deployment, however, Fischell ‘516 actually states that “[a]t the nominal fully-deployed diameter, *the deployed stent is exactly the same length as the non-deployed length*. This characteristic provides better assurance of completely covering a dilated stenosis as compared to a stent that shortens in length when deployed . . .” (Fischell ‘516, col. 1, ll. 30-35, emphasis added).

Therefore, rather than teaching away from using the stents of Fischell ‘516, Savin’s preference for non-lengthening stents suggests that the tapered balloon deployment method would be useful with the non-lengthening stent embodiments of Fischell ‘516.

We also note that Savin discloses that a stent that decreases in length upon expansion “enhances its release from [the delivery] system” (Savin col. 5, ll. 48-49). However, Savin qualifies this preference in the next sentence, stating that “[a]ny kind of stent may be delivered by this system, including plastically deformable *or elastically deformable stents*” (*id.* at col. 5, ll. 49-51, emphasis added). Therefore, because Savin’s disclosure is not limited to stents that shorten upon deployment, we do not agree that Savin teaches away from delivering the stents disclosed in Fischell ‘516 with the tapered balloon delivery system.

Appellants argue that the stent of Fischell ‘516 has hour-glass shaped cells, rather than the I-shaped cells required by claim 37 (Reply Br. 4).

We do not find this argument persuasive of nonobviousness. As discussed above, we agree with the Examiner that, when given its broadest reasonable interpretation in light of the Specification, the term “I shaped” encompasses any structure that is generally shaped like an “I.” We note that the cells of the stent of Fischell ‘516 could be characterized as hour glass-shaped. However, because the cells have two wider end portions which extend from both sides of a narrower connecting portion that extends along a central axis (*see* Fischell ‘516, Figure 1), we agree with the Examiner that the cells are also generally shaped like an “I.” We therefore also agree that claim 37 encompasses the cells of the Fischell ‘516 stent.

To summarize, Appellants’ arguments do not persuade us that the Examiner erred by concluding that claims 37-41 are obvious over the cited references. We therefore affirm the Examiner’s obviousness rejections of claims 37-41.

#### 4. OBVIOUSNESS -- CLAIMS 33-36

Claims 33-36 stand rejected under 35 U.S.C. § 103 as being obvious over Fischell '971 and Savin (Answer 6-7).

The Examiner asserts that “Fischell discloses [a] stent with a plurality of I-shaped bonate cell structure[s] and multibonate cell structures wherein the cell structures are interlocking,” but that “Fischell does not disclose that the structures are oriented at an oblique angle” (*id.* at 6). Citing Savin to meet this deficiency, the Examiner again reasons that “[b]y using a tapered balloon to deliver the stent of Fischell, the cell structures will be disposed at an oblique angle relative to the longitudinal axis. The cell structures will converge longitudinally toward the distal (or proximal) end of the stent, as well as converge radially inward toward the longitudinal axis” (*id.* at 6-7). The Examiner concludes that it would have been obvious to use Savin’s tapered balloon to deploy the Fischell '971 stent because Savin discloses that its delivery system is advantageous “because it can be used in various areas of the body and can also fulfill several functions (i.e. a stent or a filter)” (*id.* at 7).

Appellants argue that expanding only one end of the Fischell '971 stent to form a filter “would render the stent of Fischell ['971] unsatisfactory for its intended purpose, namely, to provide support to a main branch vessel on either side of a bifurcation and to provide an opening to the side branch vessel of the bifurcation” (Br. 13). Appellants argue that if only one end of the Fischell '971 stent were expanded, the stent would not provide support to the wall of the main branch vessel, because the special expandable cells require positioning adjacent to the side branch ostium of a bifurcation (*id.*).

Because forming a filter would render the Fischell '971 unsatisfactory for its intended purpose, Appellants argue, "there is no suggestion or motivation to make the proposed modification and the combination of Fischell ['971] and Savin does not teach or suggest instant independent claim 33" (*id.*).

Appellants also argue that "there would have been no need to look to Savin in order to use the stent of Fischell ['971] in other vessels in the human body" because Fischell '971 had already disclosed that the stent was amenable to deployment in other types of vessels (*id.* at 13-14).

The Examiner responds that "by combining the stent of Fischell '971 with the tapered delivery balloon of Savin, one could enhance the use of the Fischell '971 stent by providing numerous advantages such as delivering the stent to various areas of the body and also fulfilling several functions (i.e. a stent or a filter)" (Answer 12). The Examiner argues that using the stent as a filter "is just one reason for combination. The focus of the combination is using a tapered or stepped balloon to deliver the stent to locations not contemplated by a straight stent" (*id.* at 13).

We agree with the Examiner that one of ordinary skill would have considered it obvious to use Savin's delivery system to deploy the Fischell '971 stent. Fischell '971 discloses a stent having two types of cells, allowing the stent to be deployed in a main artery that connects with a branching artery (Fischell '971, col. 1, ll. 29-40). One of the cells is configured such that, once the stent is placed in the main artery, the cells can be "expanded at the ostium of a side branch artery to a comparatively large diameter without breaking any of the struts of the stent cell. By this technique unobstructed blood flow of the side branch can be provided" (*id.*

at col. 1, ll. 35-40). Fischell '971 discloses that while the focus of the disclosure is on placing the stent into arteries, the stent "could also be applied to other types of vessels of the human body such as bronchial tubes in the lung or the bile duct in the liver" (*id.* at col. 4, ll. 32-36).

Savin discloses a stent delivery method in which the "[b]alloon catheter . . . may be either non-tapered in the stent-engaging region . . . , or tapered or stepped, as desired. This system may be used to deliver stents to, for example, coronary arteries, peripheral arteries (e.g., popliteal artery) and visceral arteries, veins, and to the biliary tree, the urinary tract, and the gastro-intestinal tract" (Savin, col. 6, ll. 27-34). As discussed above, Savin states that "[a]ny kind of stent may be delivered by this system, including plastically deformable or elastically deformable stents" (*id.* at col. 5, ll. 49-51).

Thus, Fischell '971 discloses that the two-cell-type stent can be suitably deployed to different vessels in the body, and Savin discloses that its delivery system can be used to deploy stents to a wide variety of vessels. Given the broad applicability of Savin's delivery system to "any kind of stent" (Savin, col. 5, ll. 49-51), we agree with the Examiner that one of ordinary skill would have reasonably concluded that Savin's delivery methods were suitable for deploying the Fischell '971 stent. Therefore, even assuming for argument's sake that one of ordinary skill would have considered the Fischell '971 stent unsuitable for use as a filter, one of ordinary skill would still have considered it obvious to use Savin's tapered balloon delivery methods to deploy the Fischell '971 stent into a tapered vessel.

Appellants argue that “the allegedly I shaped bonate cell in Fischell [‘971] consists of two triangles connected by a plus sign (+). This shape is more similar to a bow-tie shape than an I shape” (Reply Br. 7). Appellants argue that a comparison of Figure 2 of Fischell ‘971 with Figure 23 of the instant Specification supports this argument (*id.*).

We do not find this argument persuasive. As discussed above, we agree with the Examiner that the term “I shaped” can reasonably be interpreted to encompass any structure that is generally shaped like an “I.” It is true that the cells of the Fischell ‘971 stent can be characterized as having a shape somewhat like a bow tie. However, because the cells have two wider end portions which extend from both sides of a narrower connecting portion that extends along a central axis we agree with the Examiner that the cells are also generally shaped like an “I.”

Moreover, “[a]bsent claim language carrying a narrow meaning, the PTO should only limit the claim based on the specification or prosecution history when those sources expressly disclaim the broader definition.” *In re Bigio*, 381 F.3d 1320, 1325, 72 USPQ2d 1209, 1211 (Fed Cir. 2004). Claim 33 does not contain any limitations on the structure of the I-shaped cells, beyond the requirement that the cells be generally shaped like an “I.” The Examiner therefore correctly interpreted claim 33 to encompass the Fischell ‘971 stent, rather than limiting claim 33 only to structures that closely resemble the cells shown in Appellants’ Figure 23.

Appellants argue that neither Fischell ‘971 nor Savin discloses using their stents at tapered or narrowing vessels and “there is no reasonable expectation of success that the Fischell [‘971] stent can be used at a taper”

(Reply Br. 7-8). Appellants argue that because the geometry of the Fischell ‘971 stent is consistent from end to end, deploying it in a tapered fashion will result in one end of the stent covering a greater amount of vessel wall than the other end (*id.* at 8). Thus, Appellants argue, “[i]t is not obvious that it is desirable to cover a greater amount of the vessel wall or to have this difference in vessel wall coverage. In addition it is not obvious that the difference in vessel wall coverage would result in a successful outcome” (*id.*).

We do not find this argument persuasive. As discussed *supra*, Fischell ‘971 discloses that in addition to being useful when placed into arteries, the stent “could also be applied to other types of vessels of the human body such as bronchial tubes in the lung or the bile duct in the liver” (Fischell ‘971, col. 4, ll. 32-36). Savin disclose that their stent delivery system “may be used to deliver stents to, for example, coronary arteries, peripheral arteries (e.g., popliteal artery) and visceral arteries, veins, and to the biliary tree, the urinary tract, and the gastro-intestinal tract” (Savin, col. 6, ll. 27-34).

Given the variety of suitable locations and broad applicability for both the Fischell ‘971 stent and the Savin delivery system, we agree with the Examiner that one of ordinary skill would have reasonably expected that the delivery system of Savin would be useful in deploying the Fischell ‘971 stent in a tapered configuration, resulting in a stent having I shaped bonate cells oriented obliquely, relative to the longitudinal axis of the stent. We therefore affirm the Examiner’s rejection of claims 33-36 over Fischell ‘971 and Savin.

SUMMARY

We affirm the Examiner's rejection of claims 37-39 as anticipated by Ehr.

We affirm the Examiner's obviousness rejection of claims 37-41 over Fischell '516 and Savin.

We also affirm the Examiner's obviousness rejection of claims 33-36 over Fischell '971 and Savin.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Ssc

VIDAS, ARRETT & STEINKRAUS, P.A.  
SUITE 400  
6640 SHADY OAK ROAD  
EDEN PRAIRIE, MN 55344