United States Court of Appeals for the Federal Circuit

00-1505

DAY INTERNATIONAL, INC.,

Plaintiff-Appellant,

v.

REEVES BROTHERS, INC.,

Defendant-Appellee.

David A. Shough, Kilworth, Gottman, Hagan & Schaeff, L.L.P., of Dayton, Ohio, argued for plaintiff-appellant. With him on the brief was Timothy W. Hagan.

Stanton T. Lawrence II, Pennie & Edmonds LLP, of Washington, DC, argued for defendant-appellee. With him on the brief were Marcia H. Sundeen, Eric J. Fues, and Carl P. Bretscher.

Appealed from: The United States District Court for the District of South Carolina

Magistrate Judge William M. Catoe

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v.

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DECIDED: August 9, 2001

Before CLEVENGER, SCHALL, and GAJARSA, Circuit Judges.

CLEVENGER, Circuit Judge.

Day International, Inc., appeals a summary judgment of noninfringement granted in favor of Reeves Brothers, Inc., by the United States District Court for the District of South Carolina in an order issued by a magistrate judge pursuant to Fed. R. Civ. P. 73. Day Int'l v. Reeves Bros., Inc., No. 6:99?1824-24 (D.S.C. June 19, 2000). Because we conclude that the magistrate judge's construction of the disputed claim language is correct, we affirm.

I

Day International, Inc. ("Day") is the holder of U.S. Patent No. 4,770,928 ("the '928 patent"), entitled "Method of Curing a Compressible Printing Blanket and a Compressible Printing Blanket Produced Thereby," which issued on September 13, 1988. The '928 patent relates to an improved method of manufacturing compressible printing blankets used for printing newspapers, magazines, and other products made using offset lithographic printing methods.

Printing blankets are used in the printing industry to transfer ink from a printing plate to paper. Accurate image reproduction requires that a printing blanket be capable of withstanding a certain amount of compression during the mechanical printing process, yet be sufficiently resilient to return to its original thickness. To achieve this compressible quality, printing blankets are constructed as multi-layered assemblies of which at least one layer is made of an elastomeric

material into which tiny voids have been introduced. The tiny voids enable the elastomeric material to absorb compressive forces such as those commonly experienced in the printing process. The following figure, taken from the '928 patent, reveals a cross-sectional cutout of a multi-layered printing blanket, where the compressible layer (24) is shown containing voids (28):

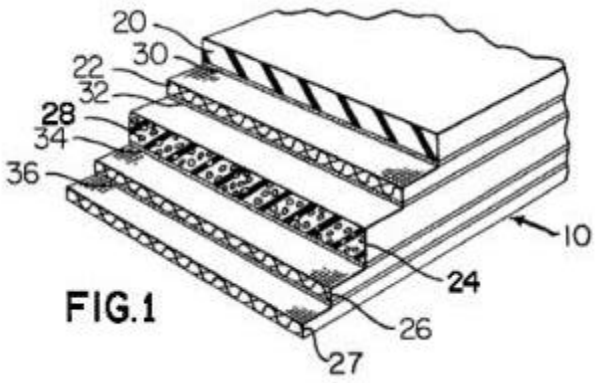

FIG.1

A variety of r reate the voids in the compressible layer of a oids was to mix hollow microcapsules into the nization, of the printing blanket. However, bec ratures high enough to transform the soft, tacky elastomeric material into a strong, temperature-stable substance, the hollow microcapsules would melt before the elastomeric material fully vulcanized, causing agglomeration of voids. The resulting product was a compressible layer with voids which lacked uniform size and distribution, a characteristic which adversely affected printing quality and the durability of the printing blanket itself.

The '928 patent is directed to an improved method[1] in which the compressible layer is cured in a way that avoids the agglomeration problem experienced in prior art processes. Specifically, as described in the '928 patent, after the microcapsules have been evenly mixed into the elastomeric material and laid down to form a compressible layer, the layer is initially cured at temperatures that are below the melting point of the microcapsules but high enough to sufficiently set the structure of the polymeric matrix about them (i.e., 110-170 degrees F). '928 patent, col. 5, ll. 55-63. This initial step is identified as a "low temperature cure"[2] in both the patent and its prosecution history. '928 patent, col. 6, l. 21. It serves to fix the position of the microcapsules in the compressible layer, thereby fixing the positions of the resultant voids as well. '928 patent, col. 6, ll. 5-8, 20-25, 59-63.

Other layers are subsequently added to the initial vulcanized compressible layer to form a complete printing blanket, and then the entire blanket assembly is cured again, this time, at curing temperatures high enough to melt the microcapsules (i.e., 270-320 degrees F), thus forming voids in the compressible layer. '928 patent, col. 6, ll. 33-45. Since the positions of the microcapsules have already been fixed by the initial low temperature cure, the voids do not agglomerate or interconnect, as they did in prior art processes. The result, according to the '928 patent, is a compressible printing blanket with voids of substantially uniform size and substantially even distribution throughout the compressible layer. '928 patent, col. 3, ll. 23-30.

The asserted independent method claims in the '928 patent are claims 1 and 21. They state as follows:

> 1. A method of making a laminated printing blanket construction comprising the steps of:
>
> providing at least one fabric substrate layer, forming an intermediate compressible layer of an elastomeric material thereon, said intermediate compressible layer having a substantially uniform thickness and having microcapsules incorporated therein, said microcapsules being substantially uniformly distributed throughout said intermediate compressible layer,
>
> maintaining said intermediate compressible layer at a temperature below the melting point of said microcapsules for a time sufficient to cause said elastomeric material to vulcanize to a degree sufficient to substantially fix the positions of said microcapsules within said intermediate compressible layer,
>
> providing a surface layer over said intermediate compressible layer to form said printing blanket construction, and
>
> vulcanizing said construction to cure said layers and provide said intermediate layer with substantially uniformly distributed voids of substantially uniform size.

'928 patent, col. 7, l. 61 – col. 8, l. 15.

> 21. A method of making a compressible layer for use in a laminated printing blanket construction comprising the steps of:
>
> forming said compressible layer of an elastomeric material and mixing microcapsules with said elastomeric material so that said microcapsules are substantially uniformly distributed therein,
>
> maintaining said compressible layer at a temperature below the melting point of said microcapsules for a time sufficient to cause said elastomeric material to vulcanize to a degree sufficient to substantially fix the positions of said

> microcapsules within said compressible layer,
>
> thereby providing a compressible layer having a substantially uniform thickness with said microcapsules being substantially uniformly distributed throughout said compressible layer.

'928 patent, col. 10, ll. 6-22.

The main difference between the two asserted claims is that claim 1 recites the full two-step process for producing an entire printing blanket, whereas claim 21 focuses on the compressible layer itself. For purposes of this appeal, however, the differences between the two claims are irrelevant because the disputed claim terms are identical in both claims.

Reeves Brothers, Inc. ("Reeves") manufactures compressible printing blankets using a method in which the compressible layer is initially cured at conventional vulcanization temperatures. To avoid the agglomeration problem of the prior art processes, Reeves uses high melting point microspheres, [3] or microcapsules, which melt only at temperatures well above conventional vulcanizing temperatures. After the compressible layer is vulcanized at approximately 280 degrees F, one or more layers are added to the compressible layer, and then the final blanket assembly is cured at approximately 285 degrees F. Day Int'l, slip op. at 10-11. It is undisputed that Reeves has never cured the compressible layer in its products at a temperature below 270 degrees F.

On June 8, 1999, Day filed an infringement action against Reeves in the United States District Court for the District of South Carolina, alleging that Reeves' manufacturing process infringed claims 1 and 21 of the '928 patent. Specifically, Day argued that Reeves' use of high melting point microspheres to avoid the agglomeration of voids satisfied the limitation in the '928 patent that the compressible layer be cured "at a temperature below the melting point of [the] microcapsules." Reeves countered by arguing that the scope of the invention should be limited to processes which involve an initial curing step at "low temperatures," namely at 110-170 degrees F, and filed a motion for summary judgment of noninfringement on December 30, 1999. Essentially

agreeing with the position taken by Reeves, the magistrate judge granted summary judgment of noninfringement in favor of Reeves. Day Int'l, slip op. at 17.

II

We review the grant of summary judgment de novo, Conroy v. Reebok Int'l, Ltd., 14 F.3d 1570, 1575, 29 USPQ2d 1373, 1377 (Fed. Cir. 1994), and in doing so, we must keep in mind that summary judgment is appropriate only if there is no genuine issue as to any material fact. See Fed. R. Civ. P. 56(c). We must resolve all reasonable factual inferences against the party whose motion is under consideration. DeMarini Sports, Inc. v. Worth, Inc., 239 F.3d 1314, 1322, 57 USPQ2d 1889, 1892 (Fed. Cir. 2001).

A finding of noninfringement requires a two-step analytical approach. First, the claims of the patent must be construed as a matter of law to determine their proper scope. See Markman v. Westview Instruments, Inc., 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995), aff'd, 517 U.S. 370, 38 USPQ2d 1461 (1996). Second, a factual determination must be made as to whether the properly construed claims read on the accused product. See id. Because questions regarding the construction of the claims are issues of law, we review them without deference. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc).

A

At the center of the parties' dispute is the meaning of the phrase "melting point of said microcapsules" as it appears in the "maintaining" step found in both claims 1 and 21. The language of the "maintaining" step is shown below as it appears in claim 21: [4]

> maintaining said compressible layer at a temperature below the melting point of said microcapsules for a time sufficient to cause said elastomeric material to vulcanize to a degree sufficient to substantially fix the positions of said microcapsules within said compressible layer,

'928 patent, col. 10, ll. 13-18.

In both claims, the phrase "melting point of said microcapsules" appears without any explicit qualifications in terms of specific temperature ranges. Day argues that "melting point of said microcapsules" has a plain and clear meaning to one of ordinary skill in the art, rendering any reference to the written description unnecessary. While it is true that, as a general rule, the words of a patent claim are to be given their plain, ordinary and accustomed meaning to one of ordinary skill in the relevant art, Toro Co. v. White Consol. Indus., Inc., 199 F.3d 1295, 1299, 53 USPQ2d 1065, 1067 (Fed. Cir. 1999), a court must nevertheless examine the remaining intrinsic evidence to determine whether the patentee has set forth an explicit definition of a term contrary to its ordinary meaning, has disclaimed subject matter, or has otherwise limited the scope of the claims. See SciMed Life Sys., Inc. v. Adv. Cardiovascular Sys., Inc., 242 F.3d 1337, 1344, 58 USPQ2d 1059, 1065 (Fed. Cir. 2001); Biodex Corp. v. Loredan Biomedical, Inc., 946 F.2d 850, 862-63, 20 USPQ2d 1252, 1262 (Fed. Cir. 1991).

In this case, the magistrate judge found that arguments made by the patentee during the prosecution of the '928 patent limited the scope of the invention to processes which involve an initial curing at "low temperatures," namely at 110-170 degrees F. Day Int'l, slip op. at 19. The judge identified several passages in the prosecution history which led the court to conclude that the patentee "intentionally specified [a curing step] at a low temperature to differentiate its process from prior art." Id. The relevant passages from the prosecution history relate mainly to two prior art references, U.S. Patent No. 3,700,541 issued to R. H. Shrimpton, et al., on October 24, 1972 ("Shrimpton") and U.S. Patent No. 4,042,743 issued to Charles E. Larson, et al., on August 16, 1977 ("Larson").

Like the '928 patent, Shrimpton discloses a printing blanket containing a compressible layer with voids formed by incorporating hollow thermoplastic microspheres (i.e., microcapsules) into the polymer prior to curing. Shrimpton, col. 1, ll. 38-45. However, unlike the '928 invention,

the curing of the compressible layer in Shrimpton does not take place at "low temperatures," but at a conventional curing temperature, 284 degrees F. Day Int'l, slip op. at 20. In distinguishing Shrimpton, the patentee stated that the invention solved a problem not addressed by Shrimpton (i.e., the agglomeration of voids) by subjecting the compressible layer "to a lower temperature, namely 110 [degrees] F to 170 [degrees] F." (emphasis in original). Furthermore, the patentee argued that Shrimpton disclosed "complete curing or vulcanization, rather than a reduced temperature cure below the melting point of the microcapsules." (emphasis added). In a statement revealing what it regarded as the melting point of the microcapsules, the patentee stated that Shrimpton's conventional curing temperature of 284 degrees F was "well above the melting point of the microcapsules, and therefore completely opposite of the [claimed feature of] claim 1." The above statements indicate that the microcapsules the patentee contemplated were those that would melt at conventional curing temperatures, and that the initial curing step in the '928 invention would take place at temperatures below conventional curing temperatures, namely 110 degrees F to 170 degrees F.

Like Shrimpton, the Larson reference also discloses a printing blanket in which the compressible layer is vulcanized at conventional vulcanization temperatures, rather than at lower temperatures. Day Int'l, slip op. at 20. More importantly, Larson also teaches the importance of using microballoons (i.e., microcapsules) that do not soften or melt during vulcanization. Larson, col. 4, ll. 7-12. In light of these two specific teachings, the patentee's explicit statements that Larson does not relate "to a low temperature vulcanization step" indicates that the initial curing contemplated by the '928 invention uses temperatures lower than those used in conventional vulcanization procedures.

In addition to the above, the patentee's representations to the patent examiner that it had "discovered that the standard curing temperatures used in prior art procedures such as those practiced by Shrimpton and Larson caused the microcapsules to melt," and its numerous

references to a "low temperature cure" or "low temperature vulcanization" throughout the prosecution of the '928 patent all support the finding that the patentee had disavowed curing done at the higher conventional curing temperatures. Therefore, we conclude that the magistrate judge did not err, in light of the prosecution history, when it construed the "maintaining" step in claims 1 and 21 to require microcapsules that melted at conventional curing temperatures and when it concluded that the claims require an initial curing step that took place at temperatures below conventional curing temperatures.

B

Given the claim construction above, the second step of the infringement analysis is quite simple. To prove infringement, Day must show that every limitation in claim 1 or in claim 21 is met by Reeves' product either literally or under the doctrine of equivalents. See Am. Permahedge, Inc. v. Barcana, Inc., 105 F.3d 1441, 1443, 41 USPQ2d 1614, 1616 (Fed. Cir. 1997). There is no dispute that Reeves uses Expancel 091 microcapsules which have copolymer shells that melt at approximately 330 degrees F, which is, according to both parties, "'well above the 270 [degrees] F – 280 [degrees] F vulcanization temperatures' used to cure the compressible layer." There is also no dispute that Reeves has never cured the compressible layer in its printing blankets at a temperature below 270 degrees F. Hence, Reeves' processes do not practice the "maintaining" step in the '928 patent because Reeves uses microcapsules that do not melt at conventional curing temperatures, and additionally, vulcanizes the compressible layer in its printing blankets at conventional curing temperatures. As such, no literal infringement can exist and the magistrate judge's finding on this point is affirmed.

With respect to the magistrate judge's grant of summary judgment of noninfringement under the doctrine of equivalents, we conclude that Day's disavowal of the prior art temperatures

during the prosecution of the '928 patent constitutes prosecution history estoppel, and hence, it should not be allowed to recapture subject matter that it has previously surrendered. Hilgraeve Corp. v. McAfee Assocs. Inc., 224 F.3d 1349, 1355, 55 USPQ2d 1656, 1661 (Fed. Cir. 2000) ("[P]rosecution history estoppel bars recapture of subject matter surrendered during prosecution."). Therefore, the magistrate judge's finding that Reeves' processes do not infringe claims 1 and 21 of the '928 patent under the doctrine of equivalents is also affirmed.

AFFIRMED

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[1] Although the '928 patent also includes claims directed at the compressible printing blankets themselves, those claims were not asserted at trial and thus are not relevant to this appeal.

[2] This step is also referred to as a "low temperature vulcanization" or "low temperature vulcanizing step" in the '928 patent, and will be treated as synonymous to a "low temperature cure." See, e.g., '928 patent, col. 6, ll. 5-6, 10.

[3] Reeves uses microspheres, with the trade name "Expancel 091," which have copolymer shells that melt at approximately 330 degrees F. Day Int'l, slip op. at 11 n.4.

[4] The "maintaining" step in claims 1 and 21 are identical, but for one exception. The "compressible layer" in claim 21 is referred to as an "intermediate compressible layer" in claim 1. This difference, however, is irrelevant for purposes of the claim construction in this dispute.