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Paper 46
Entered: March 18, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BERK-TEK, LLC
Petitioner

v.

BELDEN INC.
Patent Owner

Case IPR2013-00057
Patent 6,074,503

Before JAMESON LEE, JOSIAH C. COCKS, and RICHARD E. RICE, *Administrative Patent Judges*.

RICE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

A. Introduction

Petitioner, Nexans, Inc. (“Nexans”), filed a petition on November 19, 2012, for an *inter partes* review of claims 1-6 of U.S. Patent No. 6,074,503 (“the ’503 patent”) pursuant to 35 U.S.C. §§ 311-319. Nexans filed a revised petition on November 28, 2012. Paper 4 (“Pet.”). On April 16, 2013, the Board instituted a trial for claims 1-6, on one or more grounds of unpatentability. Paper 11 (“the Institution Decision” or “Inst. Dec.”). On April 18, 2013, Nexans informed the Board of Nexans’s successor in interest, Berk-Tek, LLC (“Berk-Tek”), which is now the real party in interest for Petitioner. Paper 13.

After institution of trial, Belden Inc. (“Belden”) filed a patent owner response (“PO Resp.”) to the petition. Paper 25. Berk-Tek filed a reply to the patent owner response (Paper 28) and, subsequently, a revised reply to the patent owner response (Paper 30, “Reply to PO Resp.”). Belden later filed a motion to exclude evidence (Paper 36, “Mot. Excl.”), to which Berk-Tek filed a response (Paper 40). Belden then filed a reply to Berk-Tek’s response to the motion to exclude evidence. Paper 44.

An oral hearing was held on November 20, 2013.[1]

The Board has jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Berk-Tek has shown that claims 1-4 are unpatentable.

Berk-Tek has not shown that claims 5 and 6 are unpatentable.

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[1] A transcript of the oral hearing is included in the record as Exhibit 3001.

Belden's motion to exclude is denied.

B. The '503 Patent

The challenged claims are directed to a method of producing a cable. Ex. 1002, 3:3-4. The method includes a step of passing a plurality of transmission media, such as a plurality of twisted pairs of individually-insulated conductors, and a core through a first die that aligns the plurality of transmission media with surface features of the core and prevents twisting motion of the core. *Id.* at 3:4-8, 34-35. The method includes a subsequent step of bunching the aligned plurality of transmission media and core using a second die that forces each of the plurality of transmission media into contact with the surface features of the core, such that the core maintains a spatial relationship between each of the plurality of transmission media. *Id.* at 3:8-13. In the last recited steps of the method, the bunched plurality of transmission media and core are twisted to close the cable, and the closed cable is jacketed. *Id.* at 3:13-15.

An embodiment of the method of producing cable is illustrated in Figure 4 (*id.* at 3:27-29), which is reproduced below:

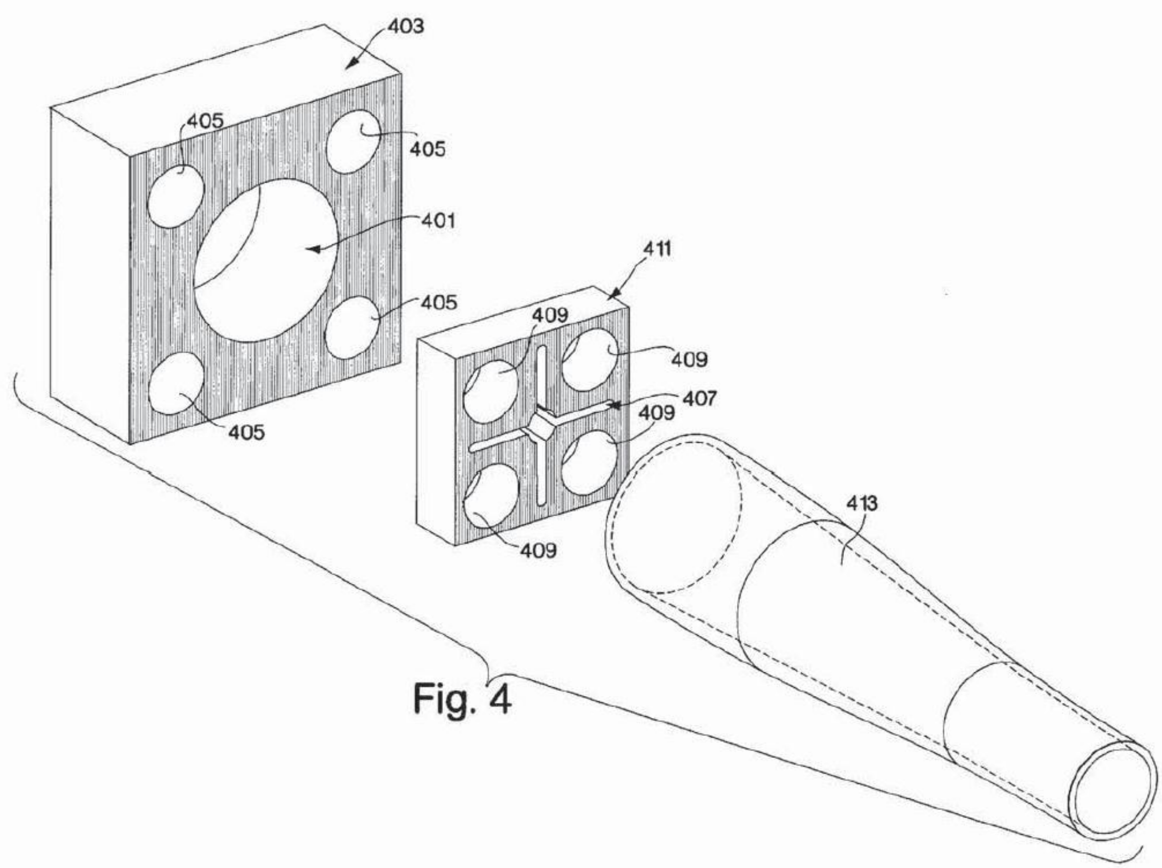

Figure 4 illustrates a die system used to
practice a method of the ’503 patent for making a cable

According to the specification, it was well known in the art that, when plural elements are cabled together, an overall twist is imparted to the assembly in order to improve geometric stability and to help prevent separation. *Id.* at 4:56-58. As described in the specification, the “twisting of the profile of the core along with individual twisted pairs is controlled” in embodiments of the invention, such that the core maintains a physical spacing between the twisted pairs. *Id.* at 4:59-63. It is represented that “the process assists in the achievement of and maintenance of high crosstalk isolation by placing a conductive core in the cable to maintain pair spacing." *Id.* at 4:64-67.

In the embodiment of Figure 4, the plurality of transmission media are four twisted pairs of individually-insulated conductors (*id.* at 3:33-35); the profile of an extruded core has the initial shape of a "+," providing four channels (*id.* at 3:47-49); and each channel carries one twisted pair (*id.* at 3:49-51). That configuration is illustrated in Figure 1 of the '503 patent, reproduced below:

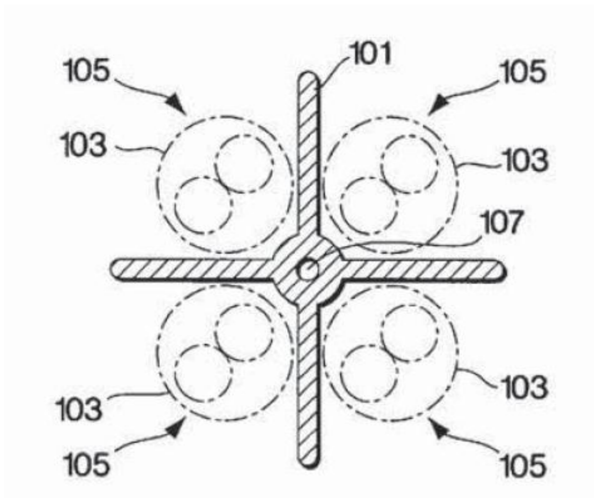

Figure 1 illustrates a cross-sectional view of a cable core
with four twisted pairs, shown in phantom lines, separated thereby

As illustrated in Figures 1 and 4, core 101 (*see* Fig. 1) is brought through opening 407 of die 411 (*see* Fig. 4) and each of four twisted conductor pairs 103 (*see* Fig. 1) is brought through respective openings 409 of die 411 (*see* Fig. 4). *Id.* at 5:8-10. Then, a bunching operation is performed in which the four twisted pairs are pushed into channels 105 of the core (*see* Fig. 1) by die 413 (*see* Fig. 4). *Id.*

at 5:12-14. A final twist is imparted to the cable after the bunching. *Id.* at 5:14-17. According to the specification, "die 411 eliminates back twist, which is inherent in bunching operations, thus allowing . . . die 413 to place the pairs in the channels prior to the twisting" and "[t]he cable twist is imparted to the cable assembly after the second die 411, which locates the twisted pairs relative to the extruded core profile." *Id.* at 5:14-19.

Figure 4 also illustrates use of die 403 to provide initial alignment of the core and the four twisted pairs upstream of die 411. *Id.* at 5:6-11. As illustrated in Figure 4, the core passes through central opening 401, and the four twisted pairs pass through respective openings 405. *Id.* at 5:6-11, Fig. 4.

C. The Alleged Grounds of Unpatentability

The prior art references as applied to claims 1-6 are:

the '582 patent	US 4,393,582	July 19, 1983	Ex. 1003
JP '694	Japanese S52(1977)-76694		
	English Translation	June 28, 1977	Ex. 1007
JP '910	Japanese Sho57(1982)-19910		
	English Translation	Feb. 2, 1982	Ex. 1008
CA '046	Canadian 2,058,046	Aug. 22, 1992	Ex. 1010

Citations to JP '694 and JP '910 refer to their English translations, Ex. 1007 and Ex. 1008, respectively.

The Board instituted trial on the following grounds of unpatentability:

Reference(s)	Basis	Claims Challenged
the ’582 patent	§ 102	1 and 2
JP ’910	§ 103	1 and 4
JP ’910 and either the ’582 patent or JP ’694	§ 103	2 and 3
JP ’910 and CA ’046	§ 103	5 and 6

II. DISCUSSION

A. Introduction

Determining appropriate constructions of the claim terms “a plurality of transmission media,” “twisting motion,” and “surface features” is a first step to the patentability analysis of claims 1-6.

Claim 1, which is the sole independent claim, is reproduced below (emphasis added):

1. A method of producing a cable, comprising steps of:

passing *a plurality of transmission media* and a core through a first die which aligns the plurality of transmission media with *surface features* of the core and prevents *twisting motion* of the core;

bunching the aligned plurality of transmission media and core using a second die which forces each of the plurality of transmission media into contact with the surface features of the core which maintain a spatial relationship between each of the plurality of transmission media;

twisting the bunched plurality of transmission media and core to close the cable; and jacketing the closed cable.

As quoted above, claim 1 requires: passing a plurality of transmission media and a core through a first die; bunching the aligned plurality of transmission media and core using a second die; twisting the bunched plurality of transmission media and core to close the cable; and jacketing the closed cable. Claims 2, 4, and 5 depend from claim 1; claim 3 depends from claim 2; and claim 6 depends from claim 5.

B. Claim Construction

1. Principles of Law

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Claim terms also are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998). Neither Berk-Tek nor Belden contends that the specification of the '503 patent, as filed, coined a new meaning for any term.

The challenge is to interpret claims in view of the specification without unnecessarily importing limitations from the specification into the claims. *See E-Pass Techs., Inc. v. 3Com Corp.*, 343 F.3d 1364, 1369 (Fed. Cir. 2003). If a feature in the disclosure is not necessary to give meaning to what the inventor means by a claim term, it would be "extraneous" and should not be read into the claim. *Renishaw PLC*, 158 F.3d at 1249; *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988). The construction that stays true to the claim language and most naturally aligns with the inventor's description is likely the correct interpretation. *See Renishaw PLC*, 158 F.3d at 1250.

2. "a plurality of transmission media"

The crux of the dispute between the parties is not over the meaning of "a plurality" or "transmission media," but whether the combined term "a plurality of transmission media" as used in claim 1 selectively can be applied to less than all of the transmission media of the cable under production. The Board agrees with Belden (PO Resp. 13) that the term "a plurality of transmission media," recited in claim 1, encompasses "all of the media that are closed into the cable, not merely a subset of that media." That is, the term "a plurality of transmission media" cannot be satisfied by "a subset of the media in the cable, such that it would be sufficient for the core to separate any two of the media." *Id.*

Belden argues that, "[c]onsistent with the core's purpose of reducing crosstalk, every embodiment described in the '503 Patent has a core that individually separates each of the twisted conductor pairs from one another." *Id.* at 10 (citing Clark Decl., Ex. 2003, ¶ 46; Ex. 1002). Belden also argues that construing "a plurality of transmission media" to encompass "just two transmission media" within a larger group of transmission media comprising a cable would be inconsistent with the teaching of the '503 patent to isolate individually each twisted conductor pair, as well as inconsistent with the language of claim 1 that recites "passing a *plurality of transmission media* and a core through a first die," "bunching the aligned *plurality of transmission media* and core using a second die, and then "twisting the *bunched plurality of transmission media* and core to close the cable." *Id.* at 12-13.

Berk-Tek contends that Belden's arguments "are based not only on a misreading of the plain language of the claims, but also on [Belden's] attempts to read limitations from the specification into the claims." Reply to PO Resp. 5. Berk-Tek argues that "the express language of claim 1 <u>does not</u> require that every single transmission media within the jacket needs to be individually separated by a core, but rather claim 1 only includes various steps including passing '<u>**a**</u> plurality' of transmission media and core through a first die and maintaining a spatial relationship between those 'plurality.'" Reply to PO Resp. 6 (emphasis in original). Berk-Tek further argues that nothing in the specification limits the claim language and that, "although the specification of '503 does have an example of a '+' shaped separator that separates every one of the transmission media from each other, this is only a single embodiment of the specification and does not limit the scope of the claims." *Id.* at 6-7 (citing *Golight Inc. v. Wal-Mart Stores Inc.,* 355 F.3d 1327 (Fed. Cir 2004)). Berk-Tek additionally argues that the following language of the specification confirms that the embodiments are not limiting:

> "However, the invention is not limited to the number of pairs or the profile used in this embodiment. The inventive principles can be applied to cables including *greater or fewer numbers of twisted pairs and different core profiles*.["] ([quoting] Ex 1002 '503 patent at col. 3, line 35-38, emphasis added)[.]

Id. at 7 (emphasis in original).

We are persuaded by Belden's arguments, however, that Berk-Tek's proposed claim construction is inconsistent with the context of the surrounding language of claim 1. *See, e.g., ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1088 (Fed. Cir. 2003) ("the context of the surrounding words of the claim also must be considered"). Claim 1 recites "passing a plurality of transmission media and a core through a first die which aligns the plurality of transmission media . . . and prevents twisting of the core," "bunching the aligned plurality of transmission media and core using a second die . . . which maintains a spatial relationship between each of the plurality of transmission media," "twisting the bunched plurality of transmission media and core to close the cable," and "jacketing the closed cable." As Belden argues (PO Resp. 13), these recited steps suggest a process of producing a complete, jacketed cable, not a part or subset of the cable, contrary to Berk-Tek's asserted claim construction.

We also are persuaded that Berk-Tek's proposed claim construction is inconsistent with the specification. The specification states that, "when plural elements are cabled together, an overall twist is imparted to the assembly." Ex. 1002, 4:57-58. The use of "plural elements" in that statement refers to a plurality of transmission media and implies that the referenced plurality is nothing less than all of the elements that are cabled together. The specification *next* states that, "[i]n embodiments of the present invention, twisting of the profile of the core along with the individual twisted pairs is controlled," in order "to maintain a physical spacing between the twisted pairs." *Id.* at 4:59-63. That statement describes the process of the invention that is depicted in Figure 4 and indicates that, in the disclosed method, twisting of *all* of the twisted pairs to be cabled together is controlled, and a physical spacing is maintained between each of those twisted pairs, contrary to Berk-Tek's asserted claim construction.

Berk-Tek's reliance on *Golight, Inc.* is misplaced. In that case, Wal-Mart argued that the specification of the patent at issue required a claim to be construed as limited to horizontal rotation through 360°, even though the claim did not expressly recite the limitation. *Golight, Inc.*, 355 F.3d at 1330-31. Wal-Mart relied on a statement in the specification that "the present invention includes . . . rotating the lamp unit in a horizontal direction through at least 360°." *Id.* at 1331. The Federal Circuit rejected Wal-Mart's argument, finding "no clear definition or disavowal of claim scope in the written description" of the patent that would limit the claim to horizontal rotation through 360°. *Id.*

Golight, Inc. is inapplicable to the present case, because the issue here is not "clear definition or disavowal," but rather the degree to which the competing claim constructions stay true to the claim language and align with the inventor's description. *See Renishaw PLC,* 158 F.3d at 1250. After considering the parties' arguments and evidence, we determine that Belden's asserted construction of "a plurality of transmission media" stays true to the claim language and most naturally aligns with the inventor's description. *See id.*

Berk-Tek does not address Belden's argument that Berk-Tek's asserted claim construction is inconsistent with the claim language. PO Resp. 13. Further, while asserting that Belden's construction unnecessarily imports limitations into the claim from the specification (Reply to PO Resp. 6-7), Berk-Tek fails to refute Belden's argument that, in "*every embodiment*" (PO Resp. 10, emphasis added; *see also id.* at 11-13), not just "a single embodiment" as Berk-Tek argues (Reply to PO Resp. 7), each of the transmission media to be cabled together is separated from all of the others. As Belden contends, every embodiment disclosed in the specification shows an individual space or channel for *each* of the transmission media that are to be cabled together. *See, e.g.*, Ex. 1002, 3:44-56; 4:57-67; Figs. 1-4.

We are not persuaded by Berk-Tek's reliance on the statement in the specification that the invention is not limited to the preferred embodiment and that the inventive principles can be applied to cables including greater or fewer numbers of twisted pairs and different core profiles than employed in that embodiment. *See* Reply to PO Resp. 7. Nothing in that statement or elsewhere in the specification suggests maintaining a spatial relationship between each of *only a subset* of the transmission media to be cabled together.

For the foregoing reasons, we construe "a plurality of transmission media" in claim 1 to encompass all of the transmission media that are enclosed in the cable under production, not merely a subset of the transmission media.

3. "twisting motion"

Claim 1 recites the step of "passing a plurality of transmission media and a core through a first die which aligns the plurality of transmission media with surface features of the core and prevents *twisting motion* of the core" (emphasis added). Belden implicitly argues that the term "twisting motion," as recited in claim 1, means "back twist." In particular, Belden argues that:

> [A] person of ordinary skill in the art would understand claim 1's requirement that there be a first die that 'aligns the plurality of transmission media with surface features of the core and prevents twisting motion of the core' to mean that the first die prevents *back twist* from propagating beyond the die, towards the core's payoff reel.

PO Resp. 15 (citing Ex. 2003, ¶ 55 (emphasis added; bold and original italics omitted)). For the reasons discussed below, we disagree with Belden's implicit construction of "twisting motion."

The plain meaning of "motion" is "an act, process, or instance of changing place," and the plain meaning of "twisting" is "turning or changing shape under torsion." *See* MERRIAM WEBSTER'S COLLEGIATE DICTIONARY 759, 1277 (10th ed. 1993).[2] The words "motion" and "twisting" must be given these plain meanings unless the plain meanings are inconsistent with the specification. *See In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989).

The specification of the '503 patent appears to use the words "twisting" and "motion" in accordance with their plain meanings in stating that "a first die . . . prevents *twisting motion* of the core." Ex. 1002, 3:8 (emphasis added). The word "motion" does not appear elsewhere in the specification. The word "twisting" additionally appears in two places. The specification states that "*twisting* of the profile of the core along with the individual twisted pairs is controlled." Ex. 1002, 4:60-62 (emphasis added). The specification also states that "[t]he second die 411

[2] The cited pages of MERRIAM WEBSTER'S COLLEGIATE DICTIONARY are included in the record as Exhibit 3002.

eliminates back twist, which is inherent in bunching operations, thus allowing the third die 413 to place the pairs in the channels prior to the *twisting*." *Id.* at 5:14-17 (emphasis added).

Belden argues that, when a cabling operation imparts an overall helical twist to the cable's components, e.g., the transmission media and the core, "that twist can propagate back up the manufacturing line, placing tension on the cable's components and potentially causing them to deform or break," and that "[p]ropagation of the twist back up the manufacturing line is referred to as 'back twist.'" PO Resp. 14 (citing Ex. 2003, ¶ 52). Belden then argues that, because the specification teaches that die 411 in Figure 4 eliminates back twist (*see* Ex. 1002, 5:14), the person of ordinary skill would understand that "aligns the plurality of transmission media with surface features of the core and prevents twisting motion of the core" means "prevents back twist from propagating beyond the die, towards the core's payoff reel." PO Resp. 15 (citing Ex. 2003, ¶ 55).

Belden's argument does not persuade us that the plain meanings of the words "twisting" and "motion" are inconsistent with the specification. Accordingly, we give the claim terms "twisting" and "motion" their plain meanings. *See Zletz*, 893 F.2d at 321.

4. "surface features"

We initially determined that the term "'surface features' is on its face broad and does not require any particular structure, shape or configuration," and that "[a]pplication of the broadest reasonable construction rule also results in the conclusion that any surface feature qualifies, including the plain profile of a flat or curved surface area." Inst. Dec. 12. Neither Berk-Tek nor Belden has raised any issue with respect to our initial construction of the term "surface features." Accordingly, we adhere to our initial construction.

C. Claims 1 and 2 as anticipated by the '582 patent

As noted in section I.C above, Berk-Tek contends that the '582 patent anticipates claims 1 and 2 of the '503 patent. However, we agree with Belden that the '582 patent does not disclose "surface features of the core which maintain a spatial relationship *between each of the plurality of transmission media*" (emphasis added).

1. The '582 patent

The '582 patent is directed to a method of making an internally-shielded, or screened, cable comprising two groups of multi-conductor pair units that are separated from each other by a metallic strip or shield. Ex. 1003, 2:49-56. A typical screened cable is illustrated in Figure 2 (*id.* at 4:17-18), which is reproduced below:

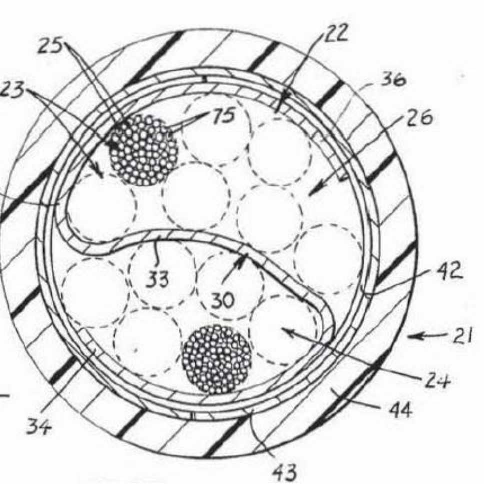

Fig. 2

Figure 2 depicts a cross-sectional end view of a screened cable

Screen cable 21, which is shown in Figure 2, includes a plurality of stranded units 23–23, each of which includes "a plurality of pairs of twisted individually insulated conductors 25–25." *Id.* at 4:17-21. As illustrated in Figure 2, units 23–23 are divided into two groups, 24 and 26, which are separated by S-shaped screen 30. *Id.* at 4:25-27, 33. Group 24 carries signals in one direction, and group 26 carries signals in the other direction. *Id.* at 4:38-40. Screen 30 is a laminate comprising aluminum strip 31 with a plastic coating. *Id.* at 4:28-32. "The plastic coating on the metallic strip **31** acts as a dielectric to keep unwanted currents, which may be emitted from pinholes in the insulation of individual insulated conductors, from reaching the shield [metallic strip 31]." *Id.* at 4:41-45. The S-shaped screen includes a center portion 33 and two arcuately extending end portions or tails 34 and 36. *Id.* at 4:33-35. Units 23–23 of group 24 are enclosed between tail 34 and center portion 33, while units 23–23 of group 26 are enclosed between tail 36 and center portion 33. *Id.* at 4:35-38.

2. Anticipation analysis

To anticipate a patent claim under 35 U.S.C. § 102, "a single prior art reference must expressly or inherently disclose each claim limitation." *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008); *see also In re King*, 801 F.2d 1324, 1326 (Fed. Cir. 1986) ("It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim.").

Belden contends that that the '582 patent discloses "separating *groups* of transmission media within the cable" and "does not teach a core with a cross-sectional profile that creates channels that *individually separate* the transmission media from one another, as required by the plain language of the claim." PO Resp. 11. Belden points out that "many of the transmission media [in the '582 patent] are [actually] adjacent to one another." *Id.* at 13. Belden relies on its asserted claim construction, discussed in section II.B above, that the term "a plurality of transmission media" in claim 1 refers to "all of the media that are closed into the cable, not merely a subset of the media." *Id.*

Berk-Tek does not dispute Belden's assertion that the '582 patent discloses separating *groups* of transmission media enclosed within a cable, or that the '582 patent does not disclose separating individually each of the transmission media enclosed within the cable from one another. *See* Reply to PO Resp. 2, 6-7. Instead, Berk-Tek relies on its asserted claim construction, discussed in section II.B above, that "claim 1 <u>does not</u> require that every single transmission media within the jacket needs to be individually separated by a core." *Id.* at 6. Berk-Tek contends that "the specification and figures of the'582 [patent] teach a core that separates a plurality of transmission media." *Id.* at 2.

As discussed above, the claim term "a plurality of transmission media" in claim 1 encompasses all of the transmission media that are enclosed in the cable under production, not merely a subset of the transmission media. Under that claim construction, the limitation "surface features of the core which maintain a spatial relationship between each of *the plurality of transmission media*" (emphasis added) requires surface features that maintain a spatial relationship between each of *the plural transmission media that are enclosed in the cable under production*. Thus, as Belden contends, merely separating *two groups* of the transmission media that are enclosed in the cable does not meet the claim requirement, because transmission media within either group may not be separated from one another. That is, irrespective of whether the plurality of transmission media in the ’582 patent are considered to be the plurality of individually-insulated conductors, the plurality of pairs of twisted individually-insulated conductors, or the plurality of stranded units, many of the transmission media are adjacent to one another. As such, a spatial relationship is not maintained between each of the plurality of transmission media, as claim 1 requires.

For the foregoing reasons, we determine that the ’582 patent does not anticipate claim 1 of the ’503 patent. Because dependent claim 2 incorporates by reference the method of claim 1, it follows that the ’582 patent does not anticipate claim 2 for the same reasons as claim 1.

D. Claims 1 and 4 as unpatentable over JP ’910

As noted in section I.C above, Berk-Tek contends that claims 1 and 4 of the ’503 patent are unpatentable as obvious over JP ’910. For the reasons that follow, we agree.

1. JP ’910

According to JP ’910, in the conventional method of manufacturing cable, it is first necessary to produce single communication wires by jacketing them with plastic insulation by extrusion, then to strand two or four of the insulated wires into a pair or quad, and finally to bind a number of pairs or quads. Ex. 1008, ¶ 3:2-4. JP ’910 teaches that such a conventional manufacturing method has certain disadvantages:

> Above all, great care must be taken when stranding 4 single communication wires into a quad in the process. That is, when the

> conductor of each single cable is not placed at each of the vertex [sic] of a square on the cross-section of the quad stranded wire, cross talk occurs by electromagnetic coupling and capacitive coupling.

Id. at ¶ 3:4-6. JP ’910 discloses that, before single communication wires are stranded into a quad, it is sometimes necessary for those reasons to add a preparatory process called “back-stranding,” or to wind a securing thread or tape around the quad-stranded wire to retain the arrangement of the quad-stranded wire. *Id.* at ¶ 3:7-8.

The purpose of the invention of JP ’910 “is to provide a method of manufacturing plastic insulated communication cable that advantageously eliminates the shortcomings described above.” *Id.* at ¶ 3:10-11. Figure 1 of JP ’910 shows a side view of an embodiment and is reproduced below:

Figure 1

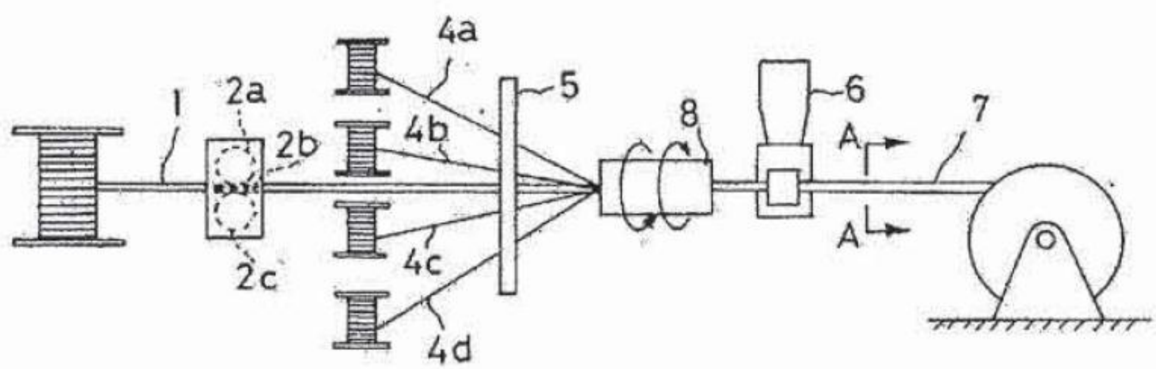

Figure 1 illustrates an assembly for carrying
out the method of forming a cable disclosed in JP ’910

As illustrated in Figure 1, “an electrically insulating thread-like object 1” (core 1) made of a material that is easily deformable by heat, such as rubber or plastic, is extruded to heating rolls 2a, 2b, 2c, and 2d, which form corresponding longitudinal grooves 3a, 3b, 3c, and 3d thereon; the grooves are placed "so that their bottom portions align to the *vertices of a square*." *Id.* at ¶ 3:13-18; Figs. 1 & 2 (emphasis added). Then, core 1 and communication cable conductors 4a, 4b, 4c, and 4d "are guided to a wire-splitting board 5, and each of them [is] placed in a *correct location*." *Id.* at ¶ 3:19-20 (emphasis added). JP '910 further discloses:

> That is, there is a hole through which thread-like object 1 passes at the center of wire-splitting board 5, and 4 holes are placed on the board *at intervals of 90 degrees*, through which the communication cable conductors pass, *thereby* each of the 4 communication cable conductors is inserted into each of the grooves on the thread-like object 1 at the location where the communication cable conductors converge (the entrance of the left-right alternating stranding device described below).

Id. at ¶ 3:20-24 (emphasis added).

A person of ordinary skill would have understood from this disclosure that the four conductors are passed through the board at intervals of 90 degrees such that they are aligned with the four grooves, which are placed on core 1 at intervals of 90 degrees, and in which the conductors respectively will be inserted at the entrance of the stranding device. *See* Ex. 1012, ¶ 121. JP '910 refers to this alignment as the "correct location" and discloses that "thereby" each of the conductors is inserted into the appropriate groove at the next step in the manufacturing process. The patent claim of JP '910 is consistent with this understanding and recites "guiding the thread-like object with the grooves with 4 cable conductors 4a, 4b, 4c, and 4d to a wire-splitting board 5 thereby inserting each communication cable conductor into each groove on the thread-like object followed by stranding them alternately (left and right)." *Id.* at ¶ 2:3-5.

After wire-splitting board 5, the core and the four conductors "are stranded into SZ with a left-right alternating stranding device 8." *Id.* at ¶ 3:25-26. Finally, cable jacket 7 is formed over the cables and core 1 by extruder 6. *Id.* at ¶ 3:26; *see also* Fig. 4. Figure 4 is reproduced below:

Figure 4

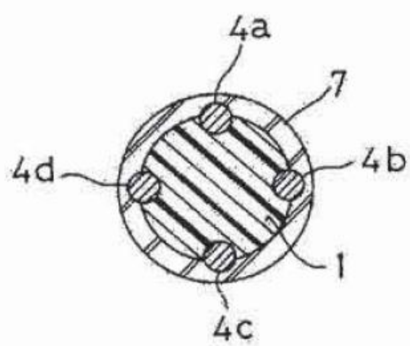

Figure 4 shows a cross-section of the finished cable

2. Obviousness analysis

A patent claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). "[H]owever, the analysis 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*, 550 U.S. at 418; *see also In re Preda*, 401 F.2d 825, 826 (CCPA 1968) ("[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom."). The level of ordinary skill in the art usually is evidenced by the references themselves. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

Belden argues that claim 1 of the '503 patent is not unpatentable for obviousness over JP '910 because that reference does not suggest any reason, and there would have been no reason, to use the first die to prevent twisting motion of the core, as claim 1 requires. PO Resp. 24-28. It is not disputed that JP '910 discloses "passing a plurality of transmission media and a core through a first die which aligns the plurality of transmission media with surface features of the core," as recited in claim 1. *Id.* It also is not disputed that JP '910 discloses the additionally recited, bunching, twisting, and jacketing steps of claim 1. *Id.*

As discussed above, JP '910 teaches aligning, at board 5, the four grooves on core 1 with the four conductors. This requires orienting each of the grooves on core 1, as it passes through the center hole in board 5, to face in the direction of one of the four holes (placed on board 5 at intervals of 90 degrees) through which a corresponding conductor passes. A person with ordinary skill in the art would have recognized that such alignment of the grooves on core 1 with the fixed positions of the conductors on board 5 cannot be maintained if core 1 twists in relation to board 5. *See* Ex. 1012, ¶ 121.

Therefore, by teaching alignment of the grooves and the conductors at board 5, JP ’910 suggests using board 5 to prevent twisting motion of core 1. That is, a person of ordinary skill in the art would have recognized that preventing twisting motion of core 1 in relation to board 5 would maintain alignment between grooves 3a, 3b, 3c, 3d and conductors 4a, 4b, 4c, 4d, in accordance with the teaching of JP ’910. Further, as Berk-Tek argues, “since one of the most important concerns, as stated in the reference[,] is to avoid any misplacement of the conductors in relation to the core, it would [have been] prudent to prevent any twisting of the core relative to the conductors at the first possible instance during the manufacturing.” Pet. 35-36.

That board 5 could have been used to prevent twisting of core 1 as it passes through board 5 need not be stated explicitly in JP ’910. *See KSR*, 550 U.S. at 418. We are persuaded that board 5 could have been used to prevent twisting of core 1 by one with ordinary skill in the art exercising ordinary creativity. *See id.* at 421; Reply to PO Resp. 11-14; Ex. 1012, ¶¶ 118-131. For example, as explained by Berk-Tek’s expert, Mr. Baxter, a person skilled in the art would have recognized that a material, such as a heat recoverable polymer that changes shape by extrusion, could have been used as a core to separate the conductors of the quad disclosed in JP ’910. Ex. 1012, ¶¶ 124-126. Such a material, according to Mr. Baxter’s testimony, “solidifies into a new form that would engage the die so as to prevent the back twisting motion of the core.” *Id.* at ¶ 126.

Belden’s first argument, which we discuss below, focuses on our Institution Decision. In our Institution Decision, we stated that Nexans [Berk-Tek’s predecessor in interest] had presented logical reasoning with rational underpinnings as to why it would have been obvious to one with ordinary skill in the art to configure wire-splitting board 5 such that it would prevent twisting of the core where the core passes through the board. Inst. Dec. 30. As an example, we noted that Nexans had indicated in its petition that JP ’910 states:

> Above all, great care must be taken when stranding 4 single communication wires into a quad in the process. That is, when the conductor of each single cable is not placed at each of the vertex [sic] of a square on the cross-section of the quad stranded wire, cross talk occurs by electromagnetic coupling and capacitive coupling.

Id. (quoting Ex. 1008, ¶ 3:4-6 and citing Pet. 35). We reasoned that:

> Given that JP ’910 articulates a special need to have the wires aligned at precise locations on the core during stranding after passing through wire-splitting board 5, one with ordinary skill in the art would have known that the passage of core 1 through wire-splitting board 5 preferably should be made such that twisting of the core causing misalignment of the wires would be prevented. One with ordinary skill is presumed to be skilled and would have known that twisting of the core at the wire-splitting board would cause misalignment of the wires on the core for subsequent stranding at stranding and twisting die 8.

Id. at 31.

Belden contends that the Board, in granting an *inter partes* review, misinterpreted the statement in JP ’910 quoted above. PO Resp. 25-26. More specifically, Belden contends that the Board misinterpreted the statement as showing that “JP ’910 articulates a special need to have the wires aligned at precise locations on the core during stranding after passing through wire-splitting board 5” and that the Board, based on such misinterpretation, adopted Nexans’s argument that it would have been obvious to prevent the core from twisting at wire-splitting board 5. *Id.* at 25 (citing Inst. Dec. 31). Belden's position is that "[t]he passage cited by the Board does not support the idea that it would have been obvious to prevent the core from twisting at wire-splitting board 5 because JP '910 states that the cited problem was ***solved*** by his use of the thread-like object, without any mention of twisting." *Id.* at 26.

We are not persuaded by Belden's first argument. Viewed as a whole, JP '910 does teach the importance of avoiding any misplacement of the conductors in relation to the core, as Berk-Tek contends. *See* Pet. 35-36. The purpose of forming the grooves on core 1 and aligning the grooves with the conductors at board 5 is to avoid problems of misplacement, such as cross talk. *See, e.g.*, Ex. 1008, ¶ 3:4-6, 10-32.

JP '910 states that the "*purpose*" of the invention is to eliminate the shortcomings of a conventional manufacturing method. *Id.* at ¶ 3:10-11 (emphasis added). However, JP '910 does not state that the invention necessarily eliminates all potential for misplacement of the conductors, and certainly does not state that it eliminates problems due to twisting motion of *core 1*, which was not used in the conventional manufacturing method. Berk-Tek's argument that it would have been prudent, in order to avoid any misplacement of the conductors in relation to the core, to prevent any twisting of the core relative to the conductors at board 5, is not inconsistent with the teachings of JP '910 regarding problems solved. *See* Pet. 35-36.

Further, it is not disputed that JP '910 discloses "a first die which aligns the plurality of transmission media with surface features of the core," as recited in claim 1. By teaching alignment of the grooves and the conductors at board 5, JP ’910 suggests using board 5 to prevent twisting motion of core 1, as discussed above. In arguing that JP ’910 does not provide any motivation or suggestion of a first die that “prevents twisting motion of the core,” Belden overlooks the significance of the teaching of JP ’910 with respect to alignment. *See* PO Resp. 24-28; Ex. 1012, ¶ 121. Moreover, an express motivation or suggestion is not required to support a conclusion of obviousness. *See KSR*, 550 U.S. at 418 (“[T]he [obviousness] analysis 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.”).

Belden next argues that “there would be no reason to control twist at wire-splitting board 5” (*id.* at 26), and raises a number of factual or technical issues in that regard (*id.* at 26-28).

Belden argues, relying on the declaration of its expert, Mr. Clark, who is an inventor of the patent at issue, that “[o]ne of ordinary skill in the art would recognize that the grooves [shown in figures 2-4 of JP ’910] are not deep enough to control twisting of the thread-like object using a first die with a corresponding core profile,” particularly “because JP ’910 teaches that the ‘threadlike object 1 [is] composed of a material easily deformable by heat such as rubber or plastic.’” *Id.* at 26-27 (citing Ex. 2003, ¶ 73). Belden also argues that “[o]ne of ordinary skill in the art would know that a first die as taught in the ’503 Patent would not be able to get enough grip on the thread-like object to prevent twisting during JP ’910’s high-speed manufacturing operation.” *Id.* at 27 (citing Ex. 2003, ¶ 73; Ex. 1008, p. 52 (¶ 3:13-14)). “And, if the die was constructed in a way that would prevent backtwist, it would create forces that would deform the soft core." *Id.* (citing Ex. 2003, ¶ 73). Belden additionally argues that:

> one of ordinary skill in the art would recognize that it would be desirable that the hole in wire-splitting board 5 through which the thread-like object passes create *no friction whatsoever*, in order to minimize any residual heat in the thread-like object from JP '910's groove cutting step before the thread-like object reaching [sic] the stranding operation (8).

Id. (citing Ex. 2003, ¶ 74).

In responding to these factual/technical issues, Berk-Tek relies on the reply declaration of its expert, Mr. Baxter. Reply to PO Resp. 11-14. Berk-Tek argues that "Clark's contention that it is not possible to prevent the twisting of the JP '910 thread-like object (core) because it is small, is speculative" and "[t]he size and shape of the thread-like object in JP '910 has significant enough mass and dimensions to be gripped by a die and to withstand the prevention of twisting." Reply to PO Resp. at 13 (citing Ex. 1012, ¶¶ 126-131). Berk-Tek also argues that "[i]f the walls surrounding the grooves are strong enough to keep the wires within their intended grooves during the twisting operation, then they would likewise be strong enough to hold a grip against a die." *Id.* at 13-14 (citing Ex. 1012, ¶ 128). Berk-Tek further argues that "Clark's proposition that the JP '910 thread-like object (core) is too deformable because of extrusion and thus would not be able to withstand a die that prevents its rotation is incorrect" because "[w]hen making a cable component such as a separator, a polymer or other material would be selected that can withstand the stresses of the cable manufacturing process." *Id.* at 14 (citing Ex. 1012, ¶¶ 123-124).

Belden raises an additional factual/technical issue with respect to S-Z stranding. Belden argues that "a person of skill in the art would recognize that there would be no reason to control twisting using wire-splitting board 5, because JP '910's quad wire is S-Z stranded, meaning any tension placed on the thread-like object would be relieved when the stranding process is reversed throughout the method." PO Resp. 27-28 (citing Ex. 2003, ¶ 75).

With respect to Belden's S-Z stranding argument, Berk-Tek replies that "back-twisting of the thread-like object (core) along its own longitudinal axis . . . propagates back up the JP '910 manufacturing line as a result of S-Z strander (8)" and that, "[a]ccording to JP '910 it is extremely important for each conductor to fall in its corresponding groove, thus it would be imperative to prevent backtwisting of the thread-like object (core)." Reply to PO Resp. 13 (citing Ex. 1012, ¶¶ 117-120). "The fact that the stranding in JP '910 is S-Z instead of uni-directional helical is immaterial." *Id.* (citing Ex. 1012, ¶¶ 118-119).

As discussed above, we are persuaded by Berk-Tek and its expert, Mr. Baxter, that board 5 could have been used by one with ordinary skill in the art exercising ordinary creativity to prevent twisting of core 1 as it passes through board 5. Further, we find Mr. Baxter's testimony with respect to S-Z stranding more credible than Mr. Clark's testimony. *Compare* Ex. 1012, ¶¶ 119-120 *with* Ex. 2003, ¶ 75. For example, we credit Mr. Baxter's testimony that the relevant technical issue "is not the 'tension' on the cable components," as Mr. Clark surmises, but rather "holding the core still enough so that the conductors (4a-4d) can be placed in the grooves." Ex. 1012, ¶ 119. We additionally note that misalignment from "twisting motion" (*see* section II.B above) potentially may stem from any source and need not be caused exclusively by back twist, contrary to Belden's contentions. For the foregoing reasons, we do not agree with Belden's argument.

Accordingly, we determine that claim 1 is unpatentable as obvious over JP '910.

Berk-Tek contends that claim 4 also is unpatentable as obvious over JP '910. Claim 4 recites "[t]he method of claim 1, wherein the step of passing [a plurality of transmission media and a core through a first die] further comprises[] extruding the core so that the surface features thereof align with the plurality of transmission media." JP '910 discloses using a heating die or heating rolls 2a, 2b, 2c, and 2d, to form grooves 3a, 3b, 3c, and 3d, in core 1, so that the bottoms of the grooves "align to the vertexes of a square." *See* Ex. 1008, ¶ 3:13-18, Figs. 1-3. Petitioner argues that JP '910 "uses an extrusion/deformation process directly inline and before assembly." Pet. 43-44 (chart) (citing Ex. 1008, p. 52, ll. 4-9 [¶ 3:13-18], Figs. 1-3).

Belden does not argue the separate patentability of claim 4, but rather relies for patentability on the dependency of claim 4 from claim 1. PO Resp. 24-28.

In light of the need to insert transmission media 4a, 4b, 4c, and 4d into the grooves created by heating rolls 2a, 2b, 2c, and 2d, it would have been obvious to one with ordinary skill in the art to extrude core 1 in an in-line manner such that the grooves thereon are aligned axially and radially with the transmission media to facilitate insertion of the transmission media into the corresponding grooves. We note that one with ordinary skill in the art possesses ordinary creativity. *See KSR*, 550 U.S. at 421.

Accordingly, we determine that claim 4 is unpatentable as obvious over JP ’910.

E. Claims 2 and 3 as unpatentable over JP ’910 and either the ’582 patent or JP ’694

Claim 2 of the ’503 patent depends from claim 1 and additionally recites the step of: “before passing the transmission media and the core through the first die, passing the transmission media and the core through a third die which generally centers the core relative to the plurality of transmission media.” Claim 3 of the ’503 patent depends from claim 2 and additionally recites that “the step of passing the transmission media and the core th[ro]ugh the third die further comprises[] extruding the core at a center position relative to the plurality of transmission media.”

As noted in section I.C above, Berk-Tek contends that claims 2 and 3 are unpatentable as obvious over JP ’910 and either the ’582 patent or JP ’694. For the reasons that follow, we determine that claims 2 and 3 are obvious over both of the asserted combinations: (i) JP ’910 and the ’582 patent; and (ii) JP ’910 and JP ’694.

With respect to claim 2, the specification of JP ’910 does not disclose a third die placed upstream of the wire-splitting board 5, through which both the transmission media and the core pass and by which the core generally is centered relative to the plurality of transmission media. However, as Berk-Tek indicates (*see* Pet. 43), die 71 in the ’582 patent and die 31 in JP ’694 each suggests passing the transmission media and the core through a third die that generally centers the core relative to the plurality of transmission media. Ex. 1003, Figs. 1, 3; Ex. 1007, Figs. 1, 2. Berk-Tek's position, as set forth in the revised petition, is that it would have been obvious to add one of those dies prior to die 5 of JP '910 "to further align the components as a matter of obvious design choice." Pet. 43. We agree.

Belden does not dispute that the '582 patent and JP '694 disclose the use of a third die as recited in claim 2; rather, Belden contends that Berk-Tek has failed to articulate an apparent reason to add the die prior to die 5 of JP '910. *See* PO Resp. 30.

Belden argues that "there is no suggestion in JP '910 of using a third die upstream of wire-splitting board 5." PO Resp. 29. Belden also argues that the petition "provides no testimony of a person of ordinary skill in the art, or any other evidence, showing why it would have been obvious to add a third die to JP '910." PO Resp. 30. First, these arguments are not persuasive, because they fail to address or rebut Berk-Tek's rationale that the third die would have been added to align further the cable components. *See* Pet 43. Second, neither JP '910 nor any other evidence needs to have provided an express suggestion of using a third die, because an express teaching, suggestion or motivation to combine is not required to support a conclusion of obviousness based on a combination of references. *See KSR*, 550 U.S. at 418.

Relying on Mr. Clark's declaration, Belden further argues that "a person of ordinary skill in the art would ***not*** recognize any problem in JP '910 that [] placing a third die upstream of wire-splitting board 5 would solve," and "that without an articulable reason to add a third die as recited in claim 2 of the '503 Patent, the combination of JP '910 with the '582 Patent or JP '694 is not an appropriate basis for invalidity under § 103." PO Resp. 30-31 (citing Ex. 2003, ¶ 78; case citations omitted). Belden also argues, based on Mr. Clark's declaration, that "one of ordinary skill in the art would recognize in JP '910's manufacturing method a need to reduce drag on the threadlike object in order to minimize friction and heat that could cause the thread-like object to deform or stretch" and, "[t]herefore, a person of ordinary skill in the art would not be motivated to add a third die to JP '910, because doing so would serve only to generate additional undesirable stress caused by friction of the thread-like object against the opening of the third die, without any apparent benefit." *Id.* at 31 (citing Ex. 2003, ¶ 79).

In reply, Berk-Tek incorporates its arguments with respect to claim 1, summarized above, and argues, based on Mr. Baxter's declaration, that "using extra dies to align and alleviate stresses in a cabling arrangement is simply routine." Reply to PO Resp. 14 (citing Ex. 1012, ¶ 133-135).

We are persuaded by Berk-Tek and its expert, Mr. Baxter, that a person of ordinary skill in the art would have added a third die, as recited in claim 2, in order to align further the cable components. The issue of obviousness does not depend on whether JP '910 expressly discloses a problem that placing a third die upstream of wire-splitting board 5 would solve. *See KSR*, 550 U.S. at 418. We credit Mr. Baxter's testimony that:

> Placing a third die upstream from the wire-splitting board would solve the same problem it does in any other cable line production arrangement, namely more accurately aligning the input wires with the rest of the machine with less or lessened tensions and with better angles, allowing the supply reels to be located farther from the wire-splitting board, etc . . . .

Ex. 1012, ¶ 133. Further, we agree with Berk-Tek that the ’582 patent and JP ’694 each teaches the benefit of a third die. *See* Pet. 43; Ex. 1012, ¶ 135. We also credit Mr. Baxter’s testimony that:

> [S]peculation about the inherent fragility of the thread-like object is completely unfounded based on anything in the JP ’910 document. Furthermore, as you go upstream towards the supply reels, the dies get progressive[ly] looser fitting.

Ex. 1012, ¶ 134; see *also id.* ¶¶ 123-124.

In *KSR*, the Supreme Court stated:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

550 U.S. at 417. The operative question is “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.* The Court further stated that the obviousness analysis “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*, 550 U.S. at 418.

Here, inserting an additional die upstream of wire-splitting board 5 of the assembly of JP ’910 involves merely a predictable use of a prior art element disclosed in each of the ’582 patent and JP ’694, to perform the same function it was known to perform and to yield no more than one of ordinary skill would expect from such use.

Accordingly, we determine that claim 2 is unpatentable as obvious over both of the asserted combinations: (i) JP ’910 and the ’582 patent; and (ii) JP ’910 and JP ’694.

Claim 3 recites “[t]he method of claim 2 wherein the step of passing the transmission media and the core th[ro]ugh the third die further comprises[] extruding the core at a center position relative to the plurality of transmission media.” JP ’910 discloses that core 1 “is extruded to a heating die or 4 heating rolls 2a, 2b, 2c, and 2d,” which form grooves 3a, 3b, 3c, and 3d in core 1. *See* Ex. 1008, ¶ 3:13-18, Figs. 1-3. Thus, JP ’910 discloses extruding core 1 at a center position relative to the positions (i.e., grooves 3a, 3b, 3c, and 3d) where the plurality of transmission media will be inserted. Petitioner argues that JP ’910 “uses an extrusion/deformation process directly inline and before assembly.” Pet. 43 (chart) (citing Ex. 1008, p. 52, ll. 4-9 [¶ 3:13-18], Figs. 1-3).

Belden does not argue the separate patentability of claim 3, but rather relies for patentability on the dependency of claim 3 from claim 2. PO Resp. 28-31.

In light of the need to place transmission media 4a, 4b, 4c, and 4d into the grooves created by heating rolls 2a, 2b, 2c, and 2d, it would have been obvious to one with ordinary skill in the art to extrude core 1 in an in-line manner such that the core is at a center position relative to the plurality of transmission media. We again note that one with ordinary skill in the art possesses ordinary creativity. *KSR*, 550 U.S. at 421.

Accordingly, we determine that claim 3, like claim 2, is unpatentable as obvious over both of the asserted combinations: (i) JP ’910 and the ’582 patent; and (ii) JP ’910 and JP ’694.

F. Claims 5 and 6 as unpatentable over JP ’910 and CA ’046

Claim 5 of the ’503 patent depends from claim 1 and additionally recites: “providing as the plurality of transmission media, a plurality of twisted pairs of insulated conductors.” Claim 6 of the ’503 patent depends from claim 5 and additionally recites “providing as the plurality of transmission media, four twisted pairs of insulated conductors.”

Berk-Tek contends that claims 5 and 6 are unpatentable as obvious over JP ’910 and CA ’046. However, for the reasons explained below, we agree with Belden that a person of ordinary skill in the art would *not* have had sufficient reason to apply the method of producing an insulated cable as disclosed in JP ’910 to make the helically-twisted cable of CA ’046 comprising twisted pairs of individually-insulated conductors. *See* PO Resp. 32-35.

1. CA ’046

CA ’046 discloses an electrical telecommunications cable comprising a plurality of pairs of individually-insulated conductors, the insulated conductors in each pair being twisted together, and a spacer means such as a central core member that separates the pairs of insulated conductors from one another. Ex. 1010, 2:1-20.

Figures 2 and 3 of CA ’046, as reproduced at page 37 of Berk-Tek’s revised petition, are reproduced below.

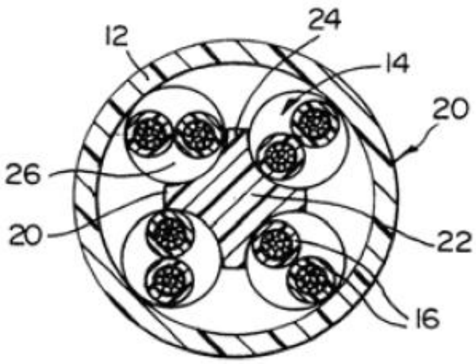

FIG. 2

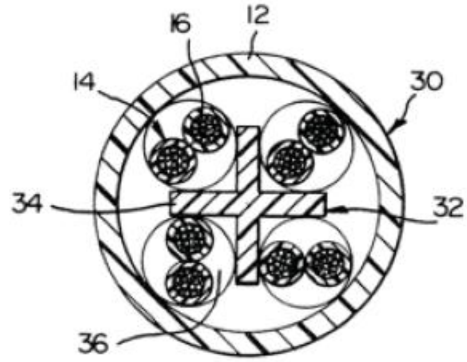

FIG. 3

Figures 2 and 3 are cross-sectional views of embodiments of cables

In cable 20, illustrated in Figure 2, jacket 12 surrounds four pairs 14 of insulated conductors 16 and central core member 20 (both the cable and the central core member are labeled “20” in Figure 2). *Id.* at 3:36-4:4. The central core member “extends axially along the cable and is formed from a tensile dielectric material.” *Id.* at 4:4-5. The central core member includes central core mass 22 and four tapered projections 24, with concave sides, that are angularly placed equally around the axis of the central core member and define recesses 26 between them; an individual pair of the conductors lies in each of the four recesses between the projections. *Id.* at 4:5-14. “The projections 24 and thus the recesses 26 extend *in helical fashion* along the core member 20 to allow the pairs 14 to lie within the recesses in stranded fashion.” *Id.* at 4:14-17 (emphasis added).

In the embodiment of Figure 3, jacket 12 of cable 30 surrounds four circumferentially spaced pairs 14 of conductors 16. *Id.* at 4:22-25. The structure is similar to the embodiment of Figure 2 except that body 32 is "+"-shaped. *Id.* at 4:25-31; Fig. 3. That is, "body 32 [is] formed by four *helically extending* spokes 34 which lie, in cross-section, at right angles to one another in cruciform fashion." *Id.* at 4:28-31 (emphasis added).

2. Obviousness analysis

With respect to claims 5 and 6, Belden argues that there would be no reason for a person of ordinary skill in the art to alter the quad cable described in JP '910 to have twisted conductor pairs, with individually insulated conductors, *and* a separator with a plus-shaped cross sectional profile. *See* PO Resp. at 33 (citing Ex. 2003, ¶ 82). Belden further argues that "the method described in JP '910 is intended to be an ***alternative*** to jacketing and twisting wires into a pair or quad" and teaches away from a method of producing a cable comprising a plurality of twisted pairs of individually-insulated conductors. *Id.* at 34 (emphasis in original). Belden points out that "JP '910 teaches placing ***bare*** wires (4a-4d) in grooves of [the] thread-like object, and then applying a jacket to insulate the entire structure." *Id.* (referencing Ex. 1008, Fig. 4). Belden contends that JP '910 teaches away from the use of individually-insulated conductors where it states:

> [I]n a "***conventional method of manufacturing plastic insulated communication cables***, it is necessary to include a process of a cable core by ***producing single communication wires by jacketing them with plastic insulator by extrusion, stranding two wires or 4 wires into a pair or a quad, then binding a number of pairs or quads*.**"

Id. at 33-34 (quoting Ex. 1008, ¶ 3:2-4). Belden relies on its expert and inventor, Mr. Clark, in further arguing that "[o]ne of ordinary skill in the art would understand [] JP ’910 to teach away from using insulated conductors; otherwise, the jacketing step would be redundant.” *Id.* at 34 (citing Ex. 2003, ¶ 83). Belden also argues that one skilled in the art “would not be motivated to modify the cable shown in JP ’910 to include twisted pairs, which would destroy the circular shape of JP ’910’s ‘quad’ wire.” *Id.* at 34-35 (citing Ex. 2003, ¶ 83).

In turn, Berk-Tek argues that one of ordinary skill in the art would have been motivated to combine the teachings of JP ’910 and CA ’046 and to substitute twisted pairs for the single conductors of JP ’910. Reply to PO Resp. 14. Berk-Tek contends that Belden misunderstands the scope of the claims of the ’503 patent and the nature of an obviousness analysis. *Id.* at 15 (citing Ex. 1012, ¶¶ 136-141). Berk-Tek argues that dependent claims 5 and 6 are method claims that “simply substitute twisted pairs for transmission media (claim 5) or specifically four twisted pairs (claim 6)” in the method steps of claim 1. *Id.* at 15. Berk-Tek further argues that:

> [A] person skilled in the art who intended to implement a method to twist a cable that has a separator, such that at a die location the transmission media is aligned with the surface of the separator, would make sure that the die would prevent back-twisting of the separator as taught by JP’910.

Id. at 15 (citing Ex. 1012, ¶¶ 139-140). The implicit assumption of Berk-Tek’s argument is that a skilled person would have understood the method of JP ’910 as being applicable to *any twisted cable that has a separator*.

Based on Belden’s opposition to the petition, including the declaration of Mr. Clark, and other evidence of record, we are persuaded that a skilled person would *not* have understood the method of JP ’910 as being applicable to *any twisted cable that has a separator*, contrary to Berk-Tek’s position.

JP ’910 is directed to a method of producing an insulated cable comprising the sequential steps of: (1) aligning four *bare metal conductors* with, and then inserting them in, the corresponding grooves of an insulating core, (2) *S-Z stranding* the core and the conductors with a left-right alternating stranding device, and (3) *jacketing* the stranded core and conductors using an extruder. *See* Ex. 1008, ¶ 3:13-32; Figs. 1-4. A purpose of the method is to manufacture plastic insulated communication cable more efficiently. *See* PO Resp. 33-35; Ex. 1008, ¶ 3:2-11. In this regard, JP ’910 teaches that conventional cable includes individually-insulated conductors, and that each insulated conductor must be jacketed individually by extrusion so as to place it in the center of a plastic insulator. Ex. 1008, ¶ 3:3, 8-9. Further, JP ’910 teaches that conventional cable requires stranding two or four wires into a pair or a quad and then binding a number of pairs or quads. *Id.* ¶ 3:3-4. For the purpose of eliminating these “shortcomings” of conventional cables and the methods of making them, JP ’910 teaches a method of making a new type of cable that does not include individually-insulated conductors, much less twisted pairs of individually-insulated conductors. *Id.* at ¶ 3:10-32; Figs. 1-4; *see also* Ex. 1012, ¶ 113 (“the ‘910 reference teaches a new arrangement where only conductors are placed in their corresponding grooves”).

As such, contrary to Berk-Tek’s argument, the method of making the new cable of JP ’910 cannot be understood reasonably as teaching or suggesting a method of manufacturing all types of twisted cables having a separator. In particular, JP ’910 does *not* teach or suggest a method of making a *conventional* twisted cable, such as a helically-twisted cable having a separator that includes twisted pairs of individually-insulated conductors. It follows, therefore, that one of ordinary skill, tasked to produce the conventional twisted cable of CA ’046, would *not* have been motivated by the teachings of JP ’910 simply to substitute twisted pairs of insulated conductors for the bare metal conductors in the method of JP ’910, contrary to Petitioner’s argument. That is, combining the teachings of JP ’910 with the teachings of CA ’046 would have “involve[d] more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement.” *KSR*, 550 U.S. at 417.

We are persuaded that Berk-Tek has not provided an apparent reason to combine the known elements of JP ’910 and CA ’046. See *KSR*, 550 U.S. at 418. In particular, Berk-Tek has not explained (*see* Reply to PO Resp. 14-15) *why* a skilled person predictably would have substituted twisted pairs of individually-insulated conductors as taught by CA ’046 for the bare-metal single conductors in the method of JP ’910. *See KSR*, 550 U.S. at 418 (“Often, it will be necessary . . . to look to interrelated teachings of multiple patents . . . and the background knowledge possessed by a person having ordinary skill in the art, . . . in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.”).

Further, even assuming that Berk-Tek’s argument sufficiently articulates a reason to use the die of JP ’910 to align the twisted pairs of individually-insulated conductors and the separator of CA ’046 and to prevent twisting of the separator, Berk-Tek has not explained why a person of ordinary skill in the art would have had sufficient reason to use the S-Z stranding step of JP ’910 to manufacture the helically-twisted cable of CA ’046. It is undisputed that the left-right S-Z stranding device of JP ’910 twists the cable components “periodically in one direction and then in the other direction,” which is different from “a uni-directional stranding operation.” Ex. 1012, ¶ 120. It also is undisputed that CA ’046 discloses “a helically twisted cable.” *See* Pet. 37; Ex. 1012, ¶ 138. As such, the S-Z stranding step of JP ’910 is inconsistent with production of a helically-twisted cable, such as disclosed in CA ’046.

Berk-Tek also has not explained why a person of ordinary skill in the art would have had sufficient reason to use the final jacketing/extrusion step of JP ’910, which serves to insulate electrically the bare-metal conductors of JP ’910, to manufacture a cable comprising twisted pairs of individually-insulated conductors that do not require additional electrical insulation. In this regard, Berk-Tek has not replied to Belden’s argument that “the jacketing step [of JP ’910] would be redundant,” if insulated conductors were substituted for the bare-metal conductors in the method of JP ’910. *See* PO Resp. 34 (citing Ex. 2003, ¶ 83). Nor has Berk-Tek responded to Belden’s argument that modifying the cable of JP ’910 to include twisted pairs would “destroy the circular shape of JP ’910’s ‘quad’ wire.” *Id.* at 34-35 (citing Ex. 2003, ¶ 83). On the present record, Belden’s arguments are unopposed.

For the foregoing reasons, we determine that claim 5 of the ’503 patent is not unpatentable as obvious over JP ’910 and CA ’046. Because dependent claim 6 incorporates by reference the method of claim 5, it follows that claim 6 in not unpatentable as obvious over JP ’910 and CA ’046 for the same reasons as claim 5.

G. Belden's motion to exclude.

Belden filed a motion (Paper 36, "Mot. Excl.") seeking to exclude the declaration of Berk-Tek's expert, Mr. Baxter (Ex. 1012), the appendices to Mr. Baxter's declaration ("Exs. 1012A-1012S"), and Mr. Baxter's curriculum vitae ("CV") (Ex. 1013). Mot. Excl. 1. In addition to raising evidentiary issues, Belden's motion seeks to exclude Berk-Tek's reply evidence for "belatedly identifying new arguments and evidence necessary to establish its *prima facie* case for unpatentability." *Id.* at 2.

Prior to filing its motion to exclude, Belden initiated a telephone conference to object to Berk-Tek's reply and supporting evidence. During the telephone conference, the Board explained that it did not need special briefing on whether Berk-Tek's reply is improper for including information it should have submitted in its petition, and that the Board would consider the matter when rendering its final written decision. The Board issued an Order (Paper 29) authorizing Berk-Tek to file a revised reply that "relies on less of the reply declaration currently of record." The Board did not require Berk-Tek to excise any portions of the reply declaration on which it chose not to rely in its revised reply. Pursuant to the Board's Order, Berk-Tek filed a revised reply (Paper 30) along with a supplemental declaration of Mr. Baxter (Paper 31).

After Belden filed its motion to exclude, Berk-Tek initiated a telephone conference to object to Belden's motion. During the telephone conference, the Board explained that Belden should have sought prior authorization before providing briefing on whether Berk-Tek's revised reply or supporting evidence exceeded its appropriate scope. However, noting that Berk-Tek had indicated in the telephone conference a readiness to respond to Belden's briefing in an opposition to the motion, the Board, nevertheless, issued an Order (Paper 39) retroactively authorizing Belden to include in its motion to exclude a discussion of why Berk-Tek's revised reply to Belden's patent owner response is improper for including arguments and evidence that should have been presented in Berk-Tek's initial petition.

Berk-Tek filed a response (Paper 40, "Resp. Mot. Excl.") to the motion to exclude. Belden then filed a reply (Paper 44, "Reply Mot. Excl") in support of its motion.

Upon consideration of the parties' arguments, we deny Belden's motion to exclude. We provide our reasons below.

First, Belden seeks to exclude the entirety of Mr. Baxter's declaration, all of its appendices, and Mr. Baxter's CV on the ground that, in paragraphs 37-47 of his declaration, Mr. Baxter offers various opinions about the '503 prosecution history that are not responsive to anything contained in the declaration of Belden's expert, Mr. Clark. Mot. Excl. (Paper 36) 3-4. However, Belden admits that Berk-Tek's revised reply does not cite to these paragraphs. *Id.* at 3. As such, Berk-Tek does not rely on the challenged paragraphs, and we have not considered them in reaching our final decision. Therefore, we consider the issue to be moot.

Second, Belden seeks to exclude the entirety of Mr. Baxter's declaration, all of its appendices, and Mr. Baxter's CV on the ground that "Mr. Baxter's assertion" —in paragraph 63 of his declaration relating to asserted anticipation of claims 1 and 2 by the '582 patent—"that claim 1 of the '503 Patent does not require separation of all the cable's transmission media represents a newly articulated claim construction position that should have been in the Petition." *Id.* at 5; *see also id.* at 4 (citing Ex. 1012 ¶ 63). Belden's argument is moot and need not be reached, because even without excluding Mr. Baxter's declaration, we have determined that the '582 patent does not anticipate claims 1 and 2 of the '503 patent.

Third, Belden seeks to exclude the entirety of Mr. Baxter's declaration, all of its appendices, and Mr. Baxter's CV on the ground that, in paragraph 138 of his declaration (not identified by paragraph number in Belden's motion), Mr. Baxter belatedly presents evidence in support of the unpatentability of claims 5 and 6 over JP '910 and CA '046. *Id.* at 6. However, Belden's expert, Mr. Clark, testified, in paragraphs 82 and 83 of his declaration (Ex. 2003), that a person of ordinary skill would not have been motivated to combine the teachings of JP '910 and CA '046. We determine that the cited testimony of Mr. Baxter fairly responds to Mr. Clark's declaration.

Fourth, Belden seeks to exclude Mr. Baxter's declaration and his CV on the general ground that "[i]t is improper for [Berk-Tek] to attempt to establish its prima facie case through its reply declaration." Mot. Excl. 7. Belden similarly seeks to exclude all of the appendices to Mr. Baxter's declaration and Mr. Baxter's CV on the general ground that Berk-Tek relies on them to support new arguments that should have been identified in Berk-Tek's revised petition. *Id.* at 7-15. Belden raises a similar issue with respect to Exhibit 1012F specifically; in particular, Belden argues that Berk-Tek relies on Exhibit 1012F to support new arguments relating to the '582 patent that should have been identified in Berk-

Tek's petition. *Id.* at 9. Belden has not persuaded us that Mr. Baxter's testimony was necessary for Berk-Tek to establish a prima facie case. Further, we are satisfied that Mr. Baxter's declaration, including the appendices and his CV, generally are in fair reply to Mr. Clark's declaration and/or Belden's response to the revised petition. *See, e.g.*, our discussion of the parties' competing positions relating to JP '910 in section II.D *supra*. Belden's argument with respect to Exhibit 1012F is moot and need not be reached because, even without excluding Exhibit 1012F, we have determined that the '582 patent does not anticipate claims 1 and 2 of the '503 patent.

Belden next argues that Berk-Tek's revised reply improperly relies on Exhibits 1012A-1012S and Mr. Baxter's CV. *Id.* at 7.

Belden has not identified where Berk-Tek's revised reply cites or relies on Exhibits 1012C-1012E, Exhibits 1012H-1012S, or Mr. Baxter's CV. Accordingly, Belden has not persuaded us that Berk-Tek has improperly relied on those exhibits. *See* Reply Mot. Excl. 1 (stating that Berk-Tek did not rely on those particular exhibits in its revised reply).

Exhibits 1012A and 1012B are transcripts of Mr. Clark's testimony under oath at a deposition and a trial, respectively. The exhibits are admissible under Fed. R. Evid. 801(d)(2)(C), 806.

Exhibit 1012F and 1012G are U.S. patents and admissible. *See* 37 C.F.R. § 42.61(b).

For the foregoing reasons, Belden's motion to exclude is denied.

CONCLUSION

Berk-Tek has shown, by a preponderance of the evidence, that: (1) claims 1 and 4 of the ’503 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over JP ’910; and (2) claims 2 and 3 of the ’503 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over (i) JP ’910 and the ’582 patent and (ii) JP ’910 and JP ’694.

Berk-Tek has not shown, by a preponderance of the evidence, that claims 1 and 2 of the ’503 patent are unpatentable under 35 U.S.C. § 102 as anticipated by the ’582 patent or that claims 5 and 6 of the ’503 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over JP ’910 and CA ’046.

ORDER

In consideration of the foregoing, it is

ORDERED that claims 1, 2, 3, and 4 of the ’503 patent are unpatentable;

FURTHER ORDERED that claims 5 and 6 of the ’503 patent have <u>not</u> been shown to be unpatentable; and

FURTHER ORDERED that Belden’s motion to exclude is DENIED.

This is a final decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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