

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ACE BED CO., LTD.,
Petitioner,

v.

SEALY TECHNOLOGY LLC,
Patent Owner.

Case IPR2014-01119
Patent 7,404,223 B2

Before PHILLIP J. KAUFFMAN, GLENN J. PERRY, and
CARL M. DeFRANCO, *Administrative Patent Judges*.

PERRY, *Administrative Patent Judge*.

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

INTRODUCTION

Petitioner Ace Bed Co., Ltd. (“Ace”) filed a Corrected Petition (“Pet.”)¹ on July 25, 2014, requesting an *inter partes* review of claims 1–3, 5–8, and 10–17 of U.S. Patent No. 7,404,223 B2 (“the ’223 patent,” Ex. 1001). Paper 4. Patent Owner Sealy Technology LLC (“Sealy”) did not file a Preliminary Response. On January 20, 2015, we instituted an *inter partes* review of claims 1–3, 5–8, and 10–17 on the following grounds of unpatentability:

- A. Claims 1–3, 5–8, 10–13, and 17 under 35 U.S.C. § 102 as anticipated by Ahn;²
- B. Claims 1–3, 5–8, 10–13, and 17 under 35 U.S.C. § 103 as unpatentable over Ahn and Flesher;³ and
- C. Claims 14–16 under 35 U.S.C. § 103 as unpatentable over Ahn, Flesher, and Oakhill.⁴

Paper 9 (“Dec.”), 21–22.

After institution of trial, Sealy did not file a response, which was due on April 21, 2015. Paper 10. Counsel for Ace and Sealy conferred. In an email dated June 26, 2015, Counsel for Sealy indicated that Sealy was “not going to oppose the validity challenge.” Paper 11, 2. On July 7, 2015, Counsel for the parties and the panel held a conference during which

¹ A Petition (Paper 1) was filed on July 3, 2014. However, references to the Petition refer to the Corrected Petition (Pet.) filed July 25, 2014.

² U.S. Patent 7,677,541 B2, issued March 16, 2010 – Ahn (“Ahn”), Exhibit 1006.

³ U.S. Patent 4,726,572, issued February 23, 1988 – Flesher, et al. (“Flesher”), Exhibit 1007 (an expired patent owned by Sealy).

⁴ U.S. Patent Publication 2005/0223496 A1, published October 13, 2005 – Oakhill, et al. (“Oakhill”), Exhibit 1008.

Counsel for Sealy confirmed that Sealy would not oppose Ace's challenge.

We have 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.

Ace has shown, by a preponderance of the evidence, that claims 1–3, 5–8, and 10–17 of the '223 patent are unpatentable.

Related Matters

Sealy indicates that there are no related district court cases. Paper 7, 2.

THE '223 PATENT (EX. 1001)

Described Invention

The '223 patent describes helical coils for use in an innerspring of a mattress. It explains that when designing helical coil springs, there are design tradeoffs between height and stiffness in order to achieve a desired compression force for a particular mattress thickness. Ex. 1001, 2:7–29. The '223 patent describes forming a generally helical coil spring so as to have one or more non-helical segments, each referred to as a “step,” to increase the stiffness of the spring without substantially adding to its height. *Id.* at 2:65–3:10. According to Ace, the enhanced stiffness results from the generally vertical orientation of the spring. Pet. 5. A step may be linear or non-linear, and parallel to or angularly disposed with respect to a longitudinal axis of the coil body. Ex. 1001, [57]. When located proximate to a coil end, the step extends out of the plane in which the coil end lies. *Id.* Alternatively, one or more steps may be formed intermediate to helical turns of the helical coil body. *Id.* An embodiment of the “step” is shown in Figure 1A of the '223 patent, reproduced below.

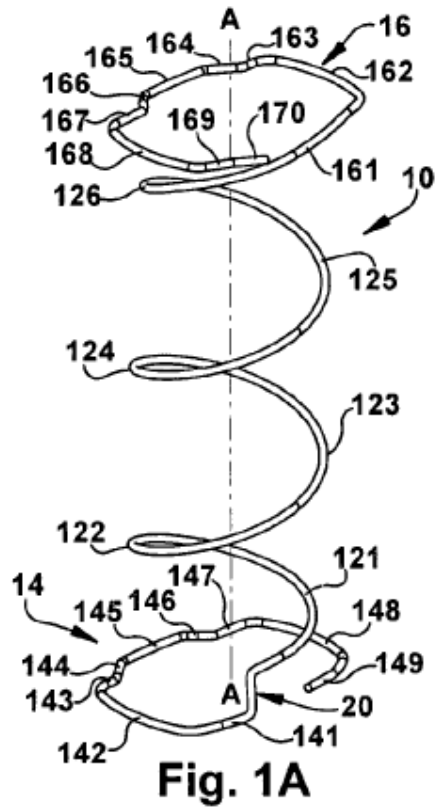


Figure 1A is a view of a one-step coil. *Id.* at 4:20. Note step 20 near the bottom of coil 10, which does not follow the curve of the helical portions of the coil. Figure 5 of the '223 patent is reproduced below.

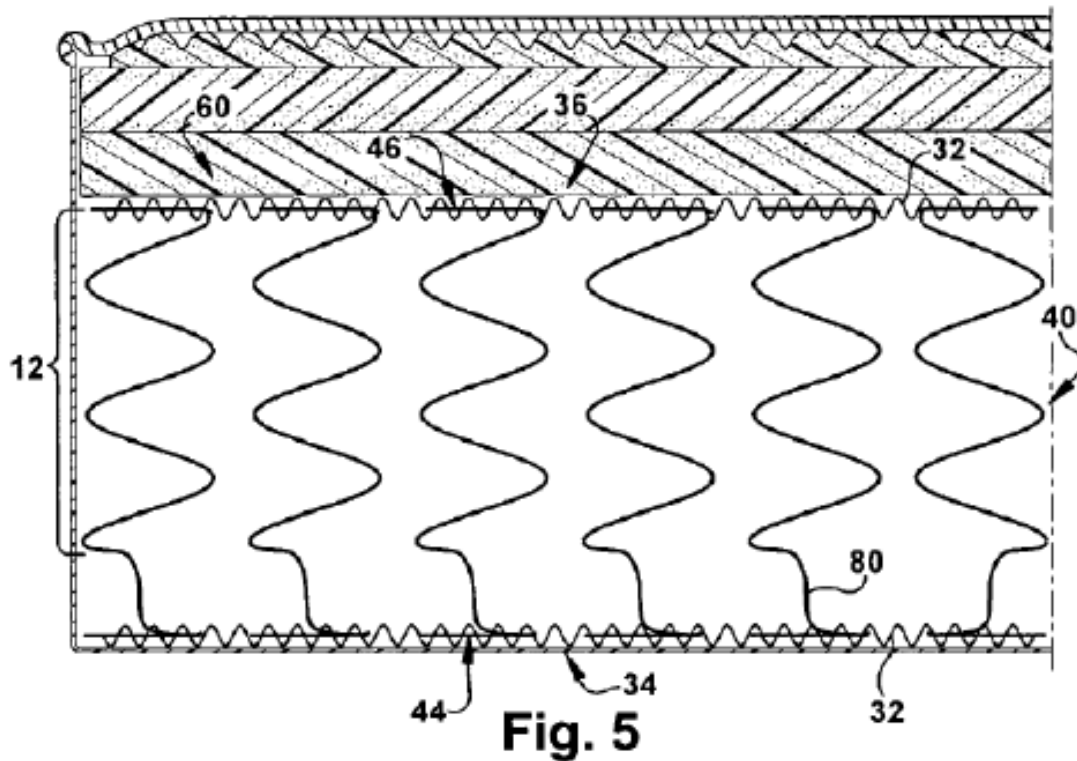


Figure 5 is an elevation of an innerspring that includes a plurality of one-step coils of an alternative embodiment, showing individual one-step coils 40 laced together using lacing wire 32 to form an innerspring assembly 60. *Id.* at 4:27–28.

Illustrative Claim

Claims 1, 7, and 17 are independent. Claim 1 is illustrative and is reproduced below:

1. An innerspring having a plurality of wire coils interconnected in an array, each of the wire coils having a generally cylindrical body with two or more helical turns of wire which form a helical path about a longitudinal axis of the coil, the coil body terminating at opposed axial ends,

a coil end at each axial end of the coil body, each coil end oriented in a plane which is generally perpendicular to the longitudinal axis of the coil, and

a step which extends between one of the coil ends and the coil body and which does not follow the helical path of the coil body;

wherein the each of the coil ends have at least one linear segment, and further comprising

a lacing wire which extends between coils and is engaged with linear segments of the coil ends.

Ex. 1001, 14:54–67 (emphasis added).

CLAIM CONSTRUCTION

During a review before the Board, we construe claims in an unexpired patent in accordance with the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see In re Cuozzo Speed Techs., LLC*, 778 F.3d 1271, 1278–82 (Fed. Cir. 2015) (“Congress implicitly adopted the broadest reasonable interpretation standard in enacting the AIA,” and “the standard was properly adopted by PTO regulation.”); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Under the broadest reasonable interpretation standard, claim terms 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). An inventor may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read

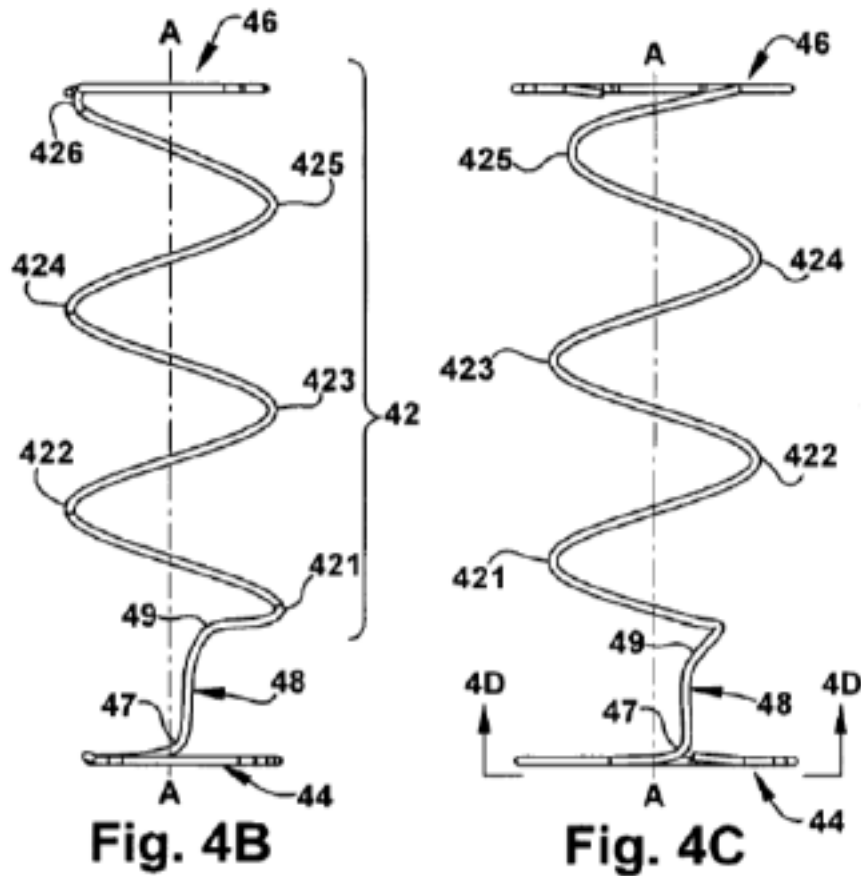
from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

“step”

“Step” appears in the body of independent claims 1, 7, and 17. Ace proposes a construction of “step” based on an explicit definition in the specification — “non-helical shaped segments of the described coils.” Ex. 1001, 3:8–10. Pet. 12. We adopt this construction.

“transition segment”

Claim 6 depends from independent claim 1 and recites, “wherein the coils further comprise a transition segment between the coil end and the step.” Ex. 1001, 15:12–14. Ace proposes that “transition segment” be construed to be a segment of wire where the path of a coil transitions to the path of the “step.” Pet. 12–13. Transition segments (reference numeral 47) are shown in Figures 4B and 4C of the ’223 patent, reproduced below.



Figures 4B and 4C are various views of alternative embodiments of a one-step coil. Ex. 1001, 4:25–26. According to the '223 patent,

[b]y extending from the transition segment **47** which may be formed substantially within the plane of the coil end **44**, a lower end of the step **48** is closely contiguous with coil end **44** which forms the base or bottom of an innerspring **40**. As further shown in the Figures, a distal end of the transition segment **47** generally rises above the plane in which the coil end **44** resides. The transition segment **47** can be considered part of the coil end **44**, or as a separate segment between the coil end **44** and the step **48**.

Ex. 1001, 8:4–39. We adopt Ace's proposed construction.

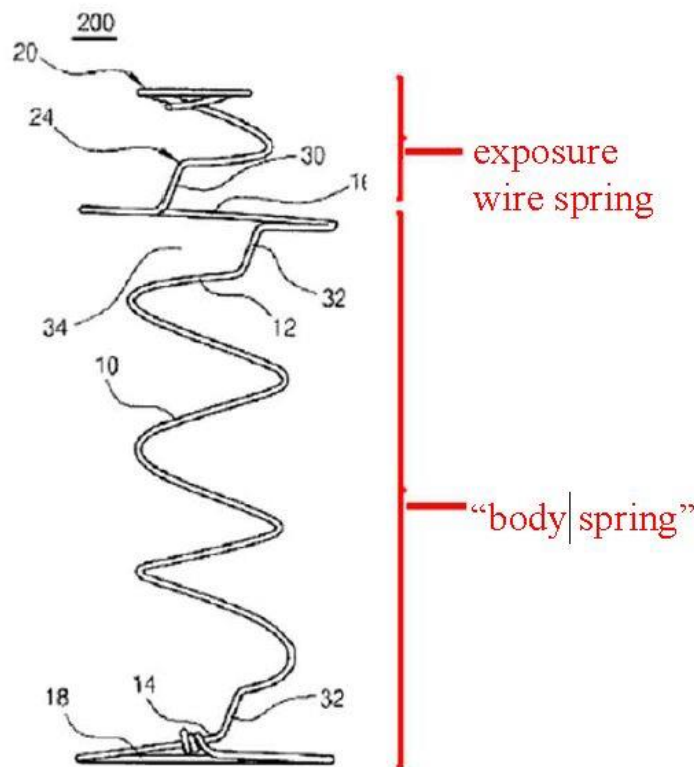
CHALLENGES RELYING ON AHN (EX. 1006)

Ace argues that claims 1–3, 5–8, 10–13, and 17 are anticipated by Ahn, providing a detailed read of Ahn on these claims at Petition 15–36.

We note that Sealy did not submit a response, and for that reason we consider material facts of the Petition to be admitted. *See* 37 C.F.R. § 42.23(a); *see also* 37 C.F.R. § 42.120(a) (a patent owner response is an opposition).

Ahn Generally

Ahn describes a spring structure for a mattress. Ex. 1006, Title. Ahn Figure 4d, as annotated by Ace (Pet. 16) is reproduced below.

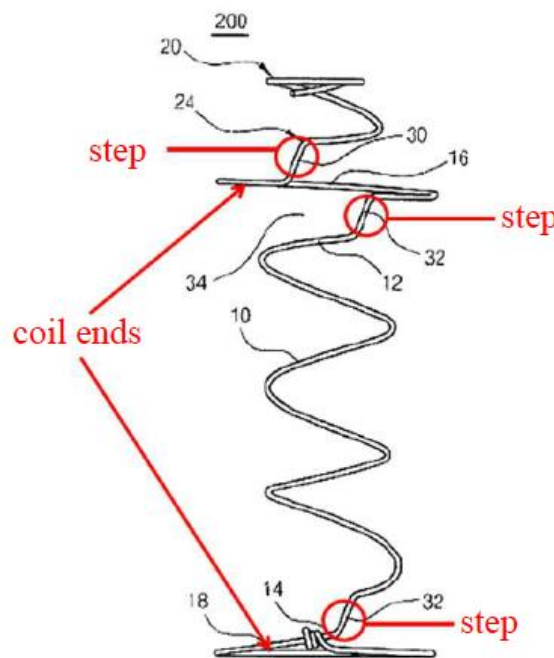


Ex. 1006, Figure 4d, a side view of a spring structure, as annotated by Ace (Pet. 16). The Ahn spring assembly 200 includes a “body spring” (10) and

an “exposure wire spring” (20). Ex. 1006, 6:57–67. Ace asks that we consider the “body spring” of Ahn, independent of the “exposure wire spring” as corresponding to the claimed “coil” of the ’223 patent. We adopt Ace’s point of view, noting that Ahn treats the “body spring” as an element separate and distinct from the “exposure wire spring.” Ex. 1006, 7:5–6.

Independent Claim 1

The Petition provides a detailed reading of Ahn on claim 1. Pet. 18–24. Ahn Fig. 4d, reproduced below with Ace’s annotations, shows a “spring assembly” including a “body spring” and “exposure wire spring.”



Ahn Figure 4d as annotated by Ace (Pet. 22), is a side view of a spring structure. Ex. 1006, 6:5–7.

Ace identifies two regions as corresponding to the claimed “step.” Pet. 22. Ahn describes these portions as “contact-preventing ends” (reference numerals 30 and 32) formed in coils intended for use as mattress

springs. Ex. 1006, 8:18. The “contact-preventing ends” are said to “prevent the contact between the springs and a resulting noise.” Ex. 1006, 9:54–56. They are also said to “reinforce the resilient strength of the body spring **10**.” *Id.* at 8:31–32. Ace specifically alleges where each element of claim 1 is found in the prior art with citations by exhibit number to the specific portion of the evidence that supports the challenge. Pet. 18–24.

Ahn’s “contact-preventing ends” appear to be substantially coaxial with the longitudinal axis of the coil bodies that terminate at opposed axial ends which are generally perpendicular to the longitudinal axis of the coil. Linear segments (*see* base of coil 100 shown in Ahn Fig. 1a) of the coil spring accommodate interconnections by lacing wire (shown in Ahn Fig. 2a and 2b). *Id.* Transition segments (visible in Ahn Fig. 4d) connect coil ends with the “contact-preventing ends.” Pet. 14. Given these disclosures, we find that Ahn anticipates claim 1.

Claims 2, 3, 5 and 6

Ace specifically alleges where each element of dependent claims 2, 3, 5, and 6 is found in the prior art with citations by exhibit number to the specific portion of the evidence that supports the challenge. Pet. 24–25. The claim 2 requirement that the step is located proximate to a base coil end of the coils which form a base of the innerspring appears to be shown in Ahn Figure 4d, above. *Id.*

The claim 3 requirement that the step is located proximate to a radial edge of the coil body appears to be shown in Ahn Figure 8 as well as Figures 4b, 4d, 6a, and 6b. Pet. 25.

Regarding the claim 5 requirement that the claimed step has a length is in the range of 10 mm to 40 mm, Ahn describes the “contact-preventing

ends” may have a height of 5 to 40 mm. Pet. 26 (citing to Ex. 1006, 5:45–46).

Claim 6 requires that the coils further include a “transition segment” between the coil end and the “step” and that the step have a length of 10 mm to 40 mm. Ahn describes the “contact-preventing ends” may have a height of 5 to 40 mm. Ace compares Exhibit 1001 Figure 4a showing an embodiment of the claimed “transition segment” with a corresponding portion of Ahn shown in Exhibit 1006, Figure 4d. Pet. 27–28.

For the above reasons, we find that Ahn anticipates claims 2, 3, 5, and 6.

Independent Claim 7

The Petition provides at pages 28–31 a detailed reading of claim 7 on Ahn. Claim 7 is reproduced below (with emphases added):

7. A wire coil for use in an innerspring, the coil having a plurality of helical turns which form a helical coil body about a longitudinal axis of the coil;

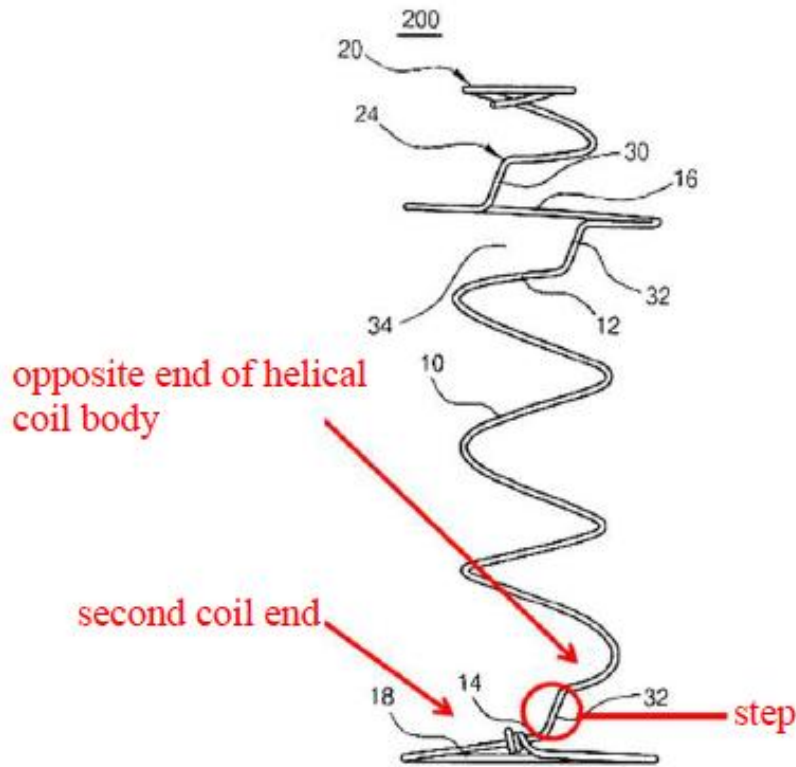
a first coil end which extends from one end of the helical coil body, the first coil end located in a plane which is generally perpendicular to the longitudinal axis of the coil;

a second coil end located proximate to an opposite end of the helical coil body, the second coil end located in a plane which is generally perpendicular to the longitudinal axis of the coil;

and a *step* which extends between the opposite end of the coil body and the second coil end, the step *extending out of the plane in which the second coil end is located* and not aligned with the helical turn at the opposite end of the coil body;

wherein the first end and second end of the coil body each have *at least one linear segment*.

The step limitation of claim 7 differs from the step limitation of claim 1 in that claim 7 requires the step to extend out of the plane in which the second coil end is located and that it not be aligned with the helical turn at the opposite end of the coil body. Ahn Figure 4d, as annotated by Ace, is reproduced below.



Ahn Figure 4d, as annotated by Ace (Pet. 31), is a side view of a spring structure. Ex. 1006, 6:5–7. As shown in Ahn Figure 4d, Ahn discloses a step that is positioned between an end of the coil body and the second coil end. The step extends out of the plane of the second coil end and is not aligned with the helical turn.

For the above reasons, we find that Ahn anticipates claim 7.

Claims 8, 10, 11, 12, and 13

The limitation of claim 8 is substantially the same as that in claim 3. For the reasons stated with respect to claim 3, we find that Ace has demonstrated, by a preponderance of the evidence, that Ahn discloses this limitation.

Claim 10 requires that the step be substantially perpendicular to support surfaces of the innerspring. Ace points to Ahn Figure 4b as demonstrating the claimed relationship. Pet. 32–33.

Claim 11 requires that the step be coaxial with the longitudinal axis of the coil. Ace points to Ahn Figure 4b as demonstrating the claimed relationship. Pet. 33.

The limitations of claims 12 and 13 are substantially the same as their respective corresponding limitations of claims 6 and 5. For the reasons stated with respect to those claims, we find that Ace has demonstrated, by a preponderance of the evidence, that Ahn discloses these limitations. Pet. 34.

Independent Claim 17

The Petition provides a detailed reading of claim 1 on Ahn at pages 34–36. Independent claim 17 is reproduced below.

17. A combination of wire coils for use as an innerspring, each of the coils of the combination of wire coils having a plurality of helical turns which form a helical coil body about a longitudinal axis of the coil, and

a first coil end which extends from one end of the helical coil body, the first coil end located in a plane which is generally perpendicular to the longitudinal axis of the coil, and

a second coil end located proximate to an opposite end of the helical coil body, the second coil end located in a plane which is generally perpendicular to the longitudinal axis of the coil, and

a step which extends between the opposite end of the coil body and the second coil end, the step extending out of the plane in which the second coil end is located and not aligned with the helical turn at the opposite end of the coil body;

the combination of wire coils arranged in an array and interconnected by lacing wires which engage the first and second ends of the coils, wherein the step in each of the coils is located proximate to the second end of the coils which form a bottom of the innerspring.

The limitations of claim 17 do not differ substantially from those of claim 7. For reasons stated above, we find that Ace has established by a preponderance of the evidence that the limitations of claim 17 are disclosed by Ahn.

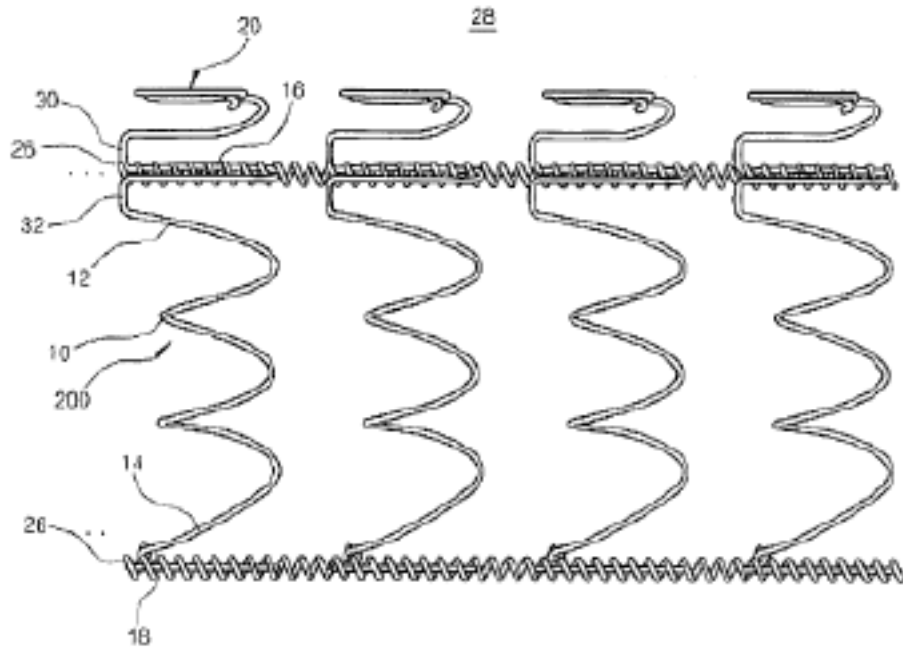
In sum, we determine that Ace has shown, by a preponderance of the evidence, that claims 1–3, 5–8, 10–13, and 17 are anticipated by Ahn.

CHALLENGES RELYING ON AHN AND FLESHER (EX. 1007)

Ace argues that claims 1–3, 5–8, 10–13, and 17 would have been obvious based on Ahn and Flesher, providing a detailed read of Ahn and Flesher on these claims at Petition 36–51.

This ground assumes that the “body spring” of Ahn is not independent of the “exposure wire spring,” and the combined body and exposure wire springs are treated as a single combined spring corresponding to the claimed spring. Pet. 36. Under this assumption, Ahn itself would not anticipate the claim feature of connecting the coils of the innerspring at both of their ends.

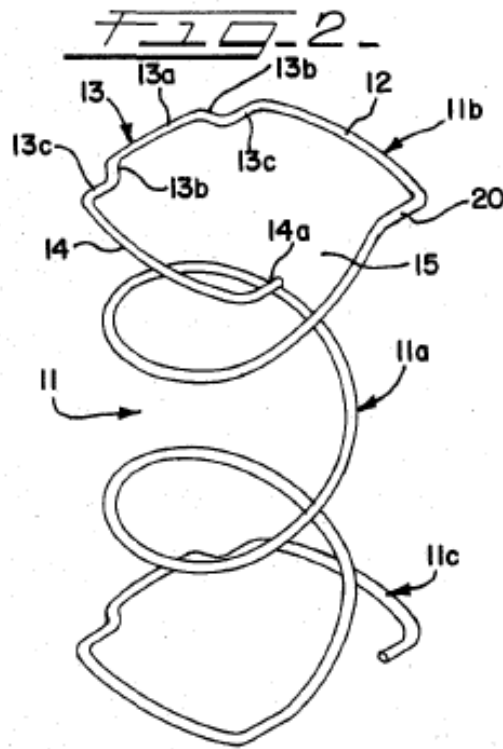
Ahn Figure 5d is reproduced below.



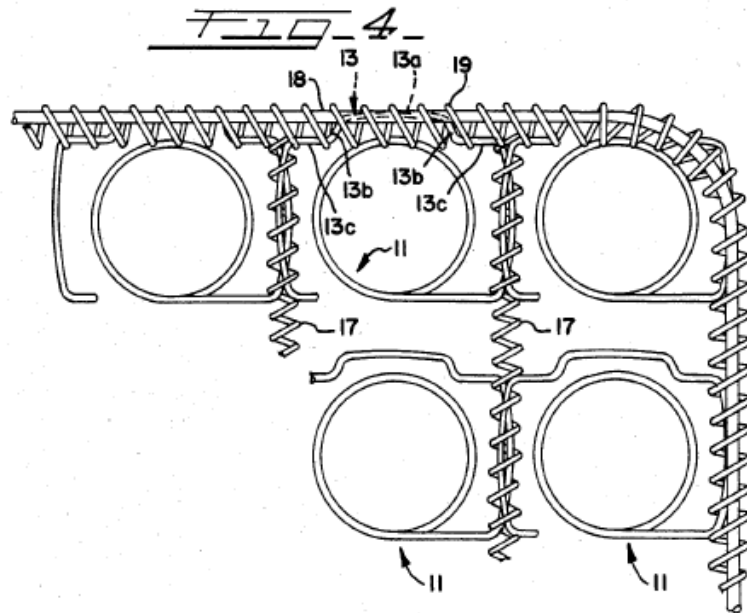
As shown in Ahn Figure 5d, the coils are laced together at the point where the “body coil” and “exposure wire spring” join. Ace argues that claims 1–3, 5–8, 10–13, and 17 would have been obvious based on Ahn and Flesher. Pet. 36–51.

Flesher Generally

Flesher Figure 2 is reproduced below.



Flesher Figure 2 shows a mattress coil 11 having “linear segments” at its top (12) and bottom (no reference numeral). Flesher Figure 4 is reproduced below.



Flesher Figure 4 shows lacing wire attaching respective linear segments of coils. Ex. 1007, 4:4–6.

Claim 1

Flesher discloses, inter alia, innersprings made up of combinations of wire coils arranged in an array and interconnected by lacing wires which engage the first and second ends of the coils. Flesher also discloses spring coils with linear segments that serve as attachment points for the lacing wires. Pet. 14–15. Flesher connects the coils at their respective ends to form an innerspring. *Id.* at 37.

We agree with Ace that it would have been obvious to a person of ordinary skill in the art to include a linear segment in the upper end of the coil disclosed in Ahn to facilitate a connection with lacing wire at the upper end of the coil – either in addition to, or in place of the linear segments already present in the Ahn coil. Pet. 43. Coils connected by lacing wires in that location were taught by Flesher to be both stable and “a common practice.” Ex. 1007, 1:13–26. A person of ordinary skill would have been motivated to connect the coils disclosed in Ahn at their ends to improve stability and form a matrix of interconnected coils in accordance with standard practice in the art. Coils so connected are nothing more than a predictable variation of the coils disclosed in Ahn. Accordingly, this limitation would have been obvious in view of Ahn alone, and/or in combination with Flesher.

The preponderance of evidence establishes that claim 1 is unpatentable under 35 U.S.C. § 103(a) over Ahn and Flesher.

Claims 2–3, 5–8, 10–13, and 17

Aside from the claim feature discussed above with respect to claim 1, our analysis finding that Ahn discloses the limitations of claims 2, 3, 5–8, 10–13, and 17, as discussed above, applies equally to the rest of the claims challenged based on Ahn and Flesher. Accordingly, for claims 1–3, 5–8, 10–13, and 17, we determine that Ace has shown, by a preponderance of the evidence, that these claims would have been obvious over Ahn and Flesher.

CHALLENGES RELYING ON AHN, FLESHER,
AND OAKHILL (EX. 1008)

Ace challenges claims 14–16 based on Ahn, Flesher, and Oakhill, providing a detailed read of Ahn, Flesher and Oakhill on these claims at Petition 51–56.

Oakhill Generally

Oakhill describes a “Low-profile Mattress” having an innerspring core. Oakhill, Abstract. It describes spring sizes in a range of 4.5 to 5⁵ inches in length and 2 to 7⁶ inches in length. Pet. 15 (citing Ex. 1008 ¶ 21).

Claims 14–16

Dependent claim 14 states a range of spring height of 140 mm to 190 mm. Thus, the Oakhill range falls within the claimed range.

Claim 15 depends from claim 14 and further requires that the “step” is substantially coaxial with the longitudinal axis of the coil body. As with claim 11, Ace has shown that this limitation is met by Ahn.

⁵ 1 inch = 25.4 mm. Thus, this range corresponds to 104.3 to 127 mm.

⁶ 1 inch = 25.4 mm. Thus, this range corresponds to 50.8 to 177.8 mm.

Claim 16 depends from and further limits claim 14 by requiring the innerspring to be in a “one-sided” mattress. The ’223 patent describes both one and two-sided mattresses. It describes one-sided mattresses as having only one weight-bearing side. Ex. 1001, 1:57–58. Ace has established that Ahn discloses coils for use in one-sided mattress. Pet. 56 (citing Ex. 1006, Figs. 3a, 6a). Accordingly, for claims 14–16, we determine that Ace has shown, by a preponderance of the evidence, that these claims would have been obvious over Ahn, Flesher, and Oakhill.

CONCLUSIONS

For the foregoing reasons, we are persuaded that the information presented in the Petition and accompanying exhibits establishes by a preponderance of the evidence that claims 1–3, 5–8, and 10–17 would not have been patentable.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–3, 5–8, and 10–17 of the ’223 patent have been shown, by a preponderance of the evidence, to be unpatentable; and

FURTHER ORDERED that because this is a final written decision of the Board under 35 U.S.C. § 318(a), 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.

IPR2014-01119
Patent 7,404,223 B2

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