UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte STUART K. DROST

Appeal 2007-2888
Application 11/017,602
Technology Center 3600

Decided: October 26, 2007

Before TONI R. SCHEINER, NANCY J. LINCK, and RICHARD M. LEBOVITZ, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 1-5 and 7-18. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

The claims are directed to a noise reduction system for aircraft cabins. "An acoustic absorption system according to the present invention fills voids between airframe frame members within an airframe section with a close fitting foam portion. The foam portions are each interference or 'force' fit into the voids to completely fill each of the frame voids" (Specification ¶ 8).

Claims 1-5 and 7-18, which are all the pending claims, are appealed (Appeal Br. 1). The following rejections are on appeal:

1) Claims 1, 2, 17, 18 stand rejected under 35 U.S.C. § 102(b) as anticipated by Sloan (U.S. Pat. No. 5,779,193, Jul. 14, 1998) (Answer 3).

2) Claims 3-5 and 7-18[1] stand rejected under 35 U.S.C. § 103(a) as obvious over Sloan in view of Yoerkie (U.S. Pat. No. 6,260,660 B1, Jul. 17, 2001) or Allen (U.S. Pat. No. 4,056,161, Nov. 1, 1977) (Answer 5).

We select the following claims as representative for the purpose of deciding the issues in this appeal:

1. An acoustic absorption system for an airframe section comprising:
a foam portion which provides an interference fit between a multitude of airframe frame members.

7. An airframe section comprising:
an airframe component having a multitude of frame members which define a void; a foam portion which provides an interference fit with said multitude of frame members; and a mass barrier layer mounted to said multitude of frame members.

9. The airframe section as recited in claim 7, wherein said mass barrier layer includes a vinyl which is mass loaded with a barium sulfate powder.

13. The airframe section as recited in claim 7, wherein said mass barrier layer is adhered to said foam portion and said multitude of frame members.

17. The acoustic absorption system as recited in claim 1, wherein said foam portion is sized to be force fit between said multitude of frame members.

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[1] The rejection lists claim 6 as rejected; however, claim 6 was canceled by an amendment dated Jan. 31, 2006, which was entered by the Examiner. *See* Advisory Action dated Jun. 21, 2006.

ANTICIPATION BY SLOAN

Claims 1, 2, 17, 18 stand rejected under 35 U.S.C. § 102(b) as anticipated by Sloan.

Issue on Appeal

The Examiner contends that Sloan describes an airframe section that comprises a foam portion which is inserted between frame members by an "interference fit" as recited in claim 1 and that the foam portion is also "sized to be force fit" between the frame members as recited in claim 17.

Appellant contends that Sloan does not use these terms to describe how the foam portion is fit between the frame members and that such fit would defeat the Sloan's purpose.

The issue in this rejection is whether there is a reasonable basis to believe that Sloan describes foam portions which provide an interference fit and which are sized to be force fit between the airframe frame members.

Claim interpretation

We begin with claim interpretation because only when a claim is properly understood can a determination be made whether the prior art anticipates it.

Claim 1 is directed to an airframe section that comprises a "foam portion" which is inserted between airframe frame members in an "interference fit." As explained in the Specification, the airframe is the outer structure of an aircraft. The airframe is comprised of a multitude of frame members which are typically arranged in a rectilinear pattern (Specification ¶ 19). The frame members support the aircraft's outer skin (*id*.).

Claim 1 recites that the airframe section comprises "a foam portion" which provides "an interference fit between" the airframe frame members. In the Reply Brief, Appellant provides a definition of "interference fit" as "a fastening between two parts which is achieved by friction after the parts are pushed together" (Reply Br. 1). We find this definition consistent with the dictionary definition of "interference,"[2] and therefore we adopt it for the purpose of interpreting the scope of the claim. Thus, we understand an "interference fit" to mean that the foam is held in place between the airframe frame members by friction after the parts are pushed together.

Claim 17, which is dependent on independent claim 1, recites that the "foam portion is sized to be force fit between" the frame members. The Specification states that "[m]ost preferably, each foam portion 34 is shaped to be larger than the particular void [between the frame members], then force fit into the void 32 between the multitude of frame members 26 which surround that void 32" (Specification ¶ 21; *see* Figs. 2-3). While we do not read limitations from the Specification into the claims, we also give claims their broadest reasonable interpretation as the skilled worker would understand them in view of the Specification. Accordingly, we interpret "sized to be force fit" to mean that the foam portion is sized larger than the void. In other words, like the interference fit, the foam is pushed between the frame members and held in place by the resulting frictional force between the foam and frame members.

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[2] *Webster's Third New International Dictionary* (1961) at page 1178 defines "interference", in part, as "contact so close as to produce deformation and stress."

Findings of Fact

The Sloan Patent

1. "The construction universally used for commercial aircraft is that of a skeleton framework comprising a plurality of spaced parallel transverse frames connected by longitudinally extended strings" (Sloan, at col. 1, ll. 21-24 (in "Background of the Invention")). "Each cell between each pair of immediately adjacent frames and immediately adjacent strings is provided with its own insulating element" (Sloan, at col. 1, ll. 26-29).

2. A vapor barrier is provided on the warm side, "usually . . . by enclosing each [insulating] element completely in a bag of a thin flexible moisture impervious plastic material" (Sloan, at col. 1, ll. 31-33).

3. Sloan describes an improved acoustic and thermal insulation system for the passenger cabin of an aircraft that employs thermal insulating elements, each of which comprises "a body of thermally insulating material enclosed in a bag of moisture impervious material" (Sloan, at col. 3, ll. 49-51; *see* also Abstract). The element is labeled "18" in Fig. 2 and "78" in Fig. 8 of Sloan.

4. "A typical aircraft fuselage structure 10, as illustrated by FIGS. 1-3, comprises a plurality of longitudinally spaced circular frames 12 connected together a plurality of circumferentially spaced longitudinally extending stringers 14, the frames and stringers cooperating to form a plurality of approximately rectangular shaped cells 16, each of which received one or more sound, vibration and thermal insulating elements 18" (Sloan, at col. 5, ll. 35-47; Answer 3). The elements are also referred to as "bags."

5. Each bag has at "a lowermost point at which moisture condensed therein will accumulate under gravity[,] an aperture or apertures connecting the bag interior to its exterior" through which condensed liquid which accumulates

in the bag can flow through to a connecting exterior space (Sloan, at col. 3, ll. 52-60; *see* also col. 6, ll. 45-65; Answer 4). The apertures are labeled 46 in Fig. 2.

6. In certain embodiments, the "apertures in the bags are positioned so that with the elements in position in their cells and on their frames they will register vertically with one another," permitting water and air to flow down from one element to another (Sloan, at col. 9, ll. 30-32; at col. 10, ll. 35-57; see Fig. 8).

7. The "elements are [of] rectangular shape and of size so as to fit tightly into the respective cell and fill it as much as possible, thereby minimizing as much as possible any free space in the cells into which moisture laden air from the cabin interior can pass" (Sloan, at col. 5, ll. 52-56; *see* also, at col. 7, ll. 56-57; Answer 4-5).

8. Sloan also describes an embodiment in which the transverse frames 12 are wrapped with insulating elements to form frame insulating elements (Sloan, at col. 6, ll. 8-44; at col. 5, ll. 8-12; Fig. 3).

Application of Sloan to claims

9. Sloan describes an aircraft frame with "frames 12" (Findings of Fact ("FF") 2) which meet the claimed element of "airframe frame members" recited in claims 1 and 17.

10. Sloan describes the elements as "fit tightly into the cells" formed by the frames 12 and longitudinal stringers 14 (FF 4, 7), which satisfies the claimed limitation in claim 1 of "an interference fit" and of claim 17 of a "forced fit" (Answer 5).

Analysis

"A patent is invalid for anticipation if a single prior art reference discloses each and every limitation of the claimed invention." *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1377, 67 USPQ2d 1664, 1667 (Fed. Cir. 2003) (internal citations omitted). A "prior art reference may anticipate without disclosing a feature of the claimed invention if that missing characteristic is necessarily present, or inherent, in the single anticipating reference." *SmithKline Beecham Corp. v. Apotex Corp*., 403 F.3d 1331, 1343 (Fed. Cir. 2005) (citing *Continental Can Co. v. Monsanto Co*., 948 F.2d 1264, 1268 (Fed. Cir. 1991)).

The PTO does not have the ability "to manufacture products or to obtain and compare prior art products." *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977). Thus, once "the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In this case, we agree with the Examiner's findings that Sloan meets all the elements of claims 1 and 17 (FF 9-10). Although Sloan does not explicitly state that the insulating elements are fit between the frame members by an "interference fit" or a "forced fit" as recited in claim 1 and 17, respectively, we agree with the Examiner's reasoning that such limitation is inherent met by Sloan because Sloan describes the elements as "fit tightly" between the frame members to "fill [the space]. . . as much as possible" (FF 7, 10).

Thus, in our opinion, the Examiner has properly shifted the burden to Appellant to prove that Sloan's insulating elements, when fit between the

aircraft frame members, are not fitted by an "interference fit" or a "forced fit. See *Spada*, 911 F.2d at 708, 15 USPQ2d at 1658.

An interference fit, as we have interpreted it, means that the foam is held in place between the frame members by friction after the parts are pushed together. To "fit tightly" – as Sloan characterizes its insulating elements when held in place between the frame members (FF 7) – is a snug fit, "a close drawing together of all parts . . . or a squeezing together."[3] "Tight" also means "so close in structure as not to permit passage of a liquid or gas" and to "fix firmly."[4] *See* FF 7 referring to a tight fit as minimizing the passage of moisture laden air. Thus, an interference or forced fit is consistent with Sloan's tight fit.

Sloan does not explicitly state how the insulating elements are held between the frame members. But Sloan describes the elements as fitting tightly between the frame members (FF 7). In our opinion, this could only mean that that insulating elements are held between the frame members by the tight fit – a frictional force that occurs between the contact surfaces of the frame member and foam. There is no other attachment described in Sloan or shown in its drawings. We do not see any other way in which the foam would be held in place other than by having it pushed against the frame members by a frictional force – as would be the case for an interference or a forced fit. In our opinion, this is sound basis (*see Spada*, 911 F.2d at 708, 15 USPQ2d at 1658) for believing that Sloan's insulation system meets all limitations of claims 1 and 17, shifting the burden to Appellant to provide rebuttal arguments or evidence.

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[3] *Webster's Third New International Dictionary* 2392 (1964).
[4] *Id*.

Appellant asserts that "Sloan simply cannot be an interference fit otherwise such an interference fit would prevent moisture condensing within the bag 36 [an insulating element] from communicating out of the bag through the outlet aperture 44" (Reply Br. 2; *see* also Appeal Br. 7-8).

We do not find this argument persuasive. Sloan describes "apertures" connected to flow ducts that lead to the exterior space (FF 5-6). As shown in Fig. 8 of Sloan (FF 6), the elements are arranged in a vertical series with each connected to another. Fluid flows vertically through the bag, through the aperture, and into the next bag (FF 5-6). The interference fit between the lateral frame members would not obstruct the water because the water flows through the bag and out the aperture at its bottom (as shown in the embodiment of Fig. 8).

For the foregoing reasons, we affirm the rejection of claims 1 and 17. Claims 2 and 18 were not separately argued; consequently, they fall with claims 1 and 17. *See* C.F.R. 41.37(c)(1)(vii).

OBVIOUSNESS

Claims 3-5 and 7-16 stand rejected under 35 U.S.C. § 103(a) as obvious over Sloan in view of Yoerkie or Allen.

Issues on Appeal

The issues in this rejection are whether the skilled person would have had reason to have further provided the foam portion with a) a mass barrier, b) a mass barrier with a barium sulfate, and c) to have attached the mass barrier to the foam and to the frame members.

Findings of Fact

The Yoerkie patent

11. According to Yoerkie, one "of the major passenger complaints with aircraft travel is noise within the cabin section" (Yoerkie, at col. 1, ll. 12-13; Answer 5).

12. To address this problem, Yoerkie describes an improved sound absorbing blanket for reducing noise (Yoerkie, at col. 2, ll. 61-63; Answer 5).

13. "The blanket includes a mass barrier portion" (Yoerkie, at col. 2, l. 67 to col. 3, l. 1). "The mass barrier portion 12 preferably includes a plurality of overlapping vinyl layers 16. Each layer is preferably made from . . . vinyl which is mass loaded with barium sulfate powder" (Yoerkie, at col. 4, ll. 26-29; Answer 6).

14. The blanket "is intended to be attached to or disposed between the frames, beams and skins of the helicopter and the cabin interior trim panels" (Yoerkie, at col. 4, ll. 20-24; Answer 6).

15. "In one embodiment of the invention, the foam portion [of the blanket] is attached to the mass barrier portion with an adhesive. In a second embodiment of the invention the foam portion is mounted to the aircraft separate from the mass barrier portion" (Yoerkie, at col. 3, ll. 20-24).

The Allen patent

16. Allen describes a sound barrier comprising filler materials, such as barium sulfate (Allen, at col. 4, ll. 60 to col. 5, l. 3; Answer 6-7).

Analysis

In making an obviousness determination over a combination of prior art references, it is important to identify a reason why persons of ordinary skill in the art would have attempted to make the claimed subject matter. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007). Here, the Examiner finds that cabin noise is a major problem in aircrafts (FF 11). The Examiner also finds that the prior art teaches mass barriers to address this problem (FF 12, 13). Thus, the Examiner finds that person of ordinary skills in the art would have had reason to have provided the insulating elements of Sloan with a mass barrier to improve cabin noise levels to produce the invention of claim 7 (Answer 7).

Appellant contends that the

> Examiner's proposed combination, however, fails to take account of how the purported sound attenuation material as taught by Allen or Yoerkie would be attached to the insulated walls of Sloan. Contrary to the Examiner's proposed combination, there are no exposed frame members in Sloan to which the noise reducing blanket of Yoerkie can be attached as taught therein (see Figure 7 of Yoerkie) since the foam of Sloan is completely encased within the bag 36 prior to fitting between the metal skin 20 and the trim panel 22 (see Figure 3 . . .). Thus, even if one was to combine Yoerkie with Sloan as purported by the Examiner, the combination would still not disclose, teach, or suggest a mass barrier layer mounted to a multitude of frame members.

(Appeal Br. 9.)

We are not convinced. Fig. 3, referenced by Appellant, shows a frame member 12 (FF 8) wrapped with the insulating material (FF 8). However, not all embodiments are described in Sloan to have frame insulating elements (FF 8; *see also* Sloan, at col. 3, ll. 43-48, which describes an

embodiment with only wall elements; compare to col. 4, ll. 44-53, which describes an embodiment further comprising the frame insulating elements). Thus, contrary to Appellant's argument, the mass barrier could be attached to Sloan's frame members in the manner described by Yoerkie because Sloan does not describe insulated frame members in all its embodiments. Consequently, we do not agree that the purpose of Sloan would be ruined by combining it with Yoerkie as asserted by Appellant (Appeal Br. 10).

Appellant also asserts: "Attempting to attach a relatively *heavy* noise attenuating blanket of Yoerkie . . . will certainly not be supported by the 'thin moisture impervious flexible material of bag 36.' Bag 36 would thus tear or be otherwise damaged by the weight of the noise attenuating blanket" (Appeal Br. 10) (emphasis added).

Appellant has mischaracterized Yoerkie. Yoerkie specifically states that an "object of the invention is to provide an improved sound absorbing blanket for reducing noise in an aircraft cabin which is *lightweight*" (emphasis added) (Yoerkie, at col. 2, ll. 60-63). Thus, the facts do not support Appellant's characterization of the blanket as "heavy." Moreover, Appellant has not provided evidence to support their hypothesis that Yoerkie's blanket, when attached to Sloan's insulating element, would rip the plastic. Arguments of counsel cannot take the place of evidence lacking in the record. *Estee Lauder Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595, 44 USPQ2d 1610, 1615 (Fed. Cir. 1997).

Appellant also argues that Allen "is not directed to a sound attenuating blanket but rather to a solid panel structure" which would make its combination with Sloan improper (Appeal Br. 10). However, Allen is relied upon by the Examiner for its teaching of a sound barrier comprising

barium sulfate (FF 16) – the limitation recited in claim 3. This teaching is cumulative to that of Yoerkie who also describes barium sulfate as a sound barrier (FF 13), but specifically for an aircraft – that same context in which the claimed structure occurs.

In sum, we find that the Examiner has met the burden of establishing prima facie obvious for claim 7. Claims 4, 5, 8, 10, 11, 12, 14, 16, and 18 fall with claim 7 because separate arguments for their patentability were not presented. *See* 37 C.F.R. 41.37(c)(1)(vii).

Claims 3 and 9

Claims 3 and 9 recite that the "mass barrier layer includes a vinyl which is mass loaded with a barium sulfate powder."

The Examiner finds that the Yoerkie and Allen teach "that the addition of a mass barrier of vinyl and barium sulfate optimize the sound reduction of a foam sound insulation" (Answer 7; *see* FF 11-13). The Examiner concludes that it would have been obvious to persons of ordinary skill in the art "to further provide the insulated walls of Sloan" with a mass barrier comprising barium sulfate as taught by Yoerkie and Allen because it would have been known to enhance the walls' "sound deafening" properties (Answer 7).

Appellant contends that none "of the cited references . . . disclose or suggest a vinyl which is mass loaded with a barium sulfate power as a mass barrier layer and is mounted to a multitude of frame members" (Appeal Br. 12).

We do not agree. Yoerkie very specifically describes a blanket that includes a mass barrier "made from . . . vinyl which is mass loaded with

barium sulfate powder" (FF 13; Answer 6). The blanket is disclosed by Yoerkie as being attached to the aircraft frames (FF 14). Thus, we see no error in the Examiner's findings. Accordingly, we affirm the rejection of claim 3 and 9.

Claims 13 and 15

Claims 13 and 15 further limit the claimed mass barrier layer by requiring that the "mass barrier layer is adhered to said foam and said multitude of frame members."

Appellant contends that "it is not possible to adhere anything to the foam layer of Sloan as the foam layer is completely enclosed within the tightly fitting bag 36 of the thin moisture impervious flexible material. That is, there can be no direct adherence in the proposed combination as claimed" (Appeal Br. 12-13).

We do not find this argument persuasive. Yoerkie describes an embodiment in which the "the foam portion [of the blanket] is attached to the mass barrier portion with an adhesive" (FF 15) – the same configuration which is recited in claims 13 and 15. In Yoerkie, the foam portions are not described as being interference or force fit between the frame members. But Sloan teaches that such a tight fit is desirable to minimize free space in the cells (FF 7), thus giving the skilled person reason to have force fit the foam of Yoerkie's sound reducing blanket between the frame members. Furthermore, while Sloan describes encasing the foam insulating elements in plastic, Sloan also acknowledges in its background section that the elements are "usually" and therefore not always enclosed by plastic (FF 2). Consequently, Yoerkie's description of adhering the mass barrier to the

foam insulating element would have been compatible with prior art foam insulating elements (as described in Sloan) which lack plastic casing. While such arrangement might not make use of Sloan's improved insulating element, "a finding that the prior art as a whole suggests the desirability of a particular combination need not be supported by a finding that the prior art suggests that the combination claimed by the patent applicant is the preferred, or most desirable, combination." *In re Fulton*, 391 F.3d 1195, 1200, 73 USPQ2d 1141, 1145 (Fed. Cir. 2004).

For the foregoing reasons, we affirm the rejections of claims 13 and 15.

OTHER ISSUES

If prosecution in this application is continued, we suggest additional findings be made about the conventionality of interference and forced fits in the context of installing insulation. In this regard, we note the following:

Fink (U.S. Pat. No. 3,095,671, Jul. 17, 1956) teaches assembling insulating elements by friction force fit (Fink, at col. 3, ll. 63-65).

Nelson (U.S. Pat. No. 4,985,106, Jan. 15, 1991) teaches that insulation for reducing appliance noise has a "snug fit" for optimal acoustical and vibrational dampening (Nelson, col. 12, l. 54 to col. 13, l. 4). Nelson also describes adjusting the dimensions of the insulation when utilizing a force interference fit (Nelson, col. 13, ll. 13-18).

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED.

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