

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PAOLO GRAZIOSI,
KEVIN KIRTLEY, and
RAMANI MANI

Appeal 2007-1434
Application 10/610,718
Technology Center 3600

Decided: April 30, 2007

Before WILLIAM F. PATE, III, JENNIFER D. BAHR, and ROBERT E. NAPPI,
Administrative Patent Judges.

PATE, III, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal from the Final Rejection of claims 1-25. These are the only claims in the application. We have jurisdiction under 35 U.S.C. § 134.

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The claimed invention is a system for reducing jet engine noise including the synergistic operation of fluidic vortex generators (fluidic chevrons) and a configurable thermal acoustic shield to reduce the exhaust jet noise. Claims 1 and 13, reproduced below, are further illustrative of the claimed subject matter.

1. A system for jet engine noise control of a jet engine having a main jet stream exiting a nozzle exit and flowing along a jet axis, the system comprising:

a thermal acoustic shield directed at a non-zero angle relative to the jet axis.

13. A system for jet engine noise control of a jet engine having a main jet stream exiting a nozzle exit and flowing along a jet axis, the system comprising:

a fluidic chevron injected at a location relative to the nozzle exit for creating a non-circular jet stream; and

a thermal acoustic shield directed at a non-zero angle to the jet axis for selective noise reduction.

The references of record relied upon by the Examiner as evidence of anticipation are:

Hoch US 3,721,314 Mar. 20, 1973

Braga Da Costa Campos US 6,705,547 B2 Mar. 16, 2004

Claims 1-25 stand rejected under 35 U.S.C. § 102 as anticipated by Costa Campos.

Claims 1-25 stand rejected under 35 U.S.C. § 102 as anticipated by Hoch.

Appellants group the claims on appeal into two groups (Br. 6). Claims 1-12 stand or fall with claim 1 and claims 13-25 stand or fall with claim 13.

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ISSUES

The sole issue submitted for our decision in this appeal is whether claims 1-25 lack novelty over the applied prior art.

In addition, pursuant to our authority under 37 C.F.R. § 41.50(b) we enter new rejections under the first and second paragraphs of 35 U.S.C. § 112.

FINDINGS OF FACT

It is our finding that Appellants claims are directed to a fluidic chevron and a thermal acoustic shield. The term “fluidic chevron” has been adopted by Appellants to analogize to prior art mechanical chevrons the fluidic injectors that generate vortices by directing flow at an angle into a jet stream. We further find that Appellants in the Specification define the claimed subject matter of a thermal acoustic shield as “a thin layer of flow that partially surrounds the main jet 32 and is characterized by a proper combination of velocity and speed of sound.” Specification, ¶ 0024.

Turning to the references of record, Hoch discloses a system and method for reducing aircraft engine noise by using mechanical extractors to extract exhaust streams to create fractional jets. In contrast to Appellants’ claimed subject matter, the extractors disclosed in Hoch appear to be completely mechanical and do not operate on the principles of fluidics.

Campos is also concerned with a system and method for reducing aircraft noise. In Figures 9 and 11, Campos discloses techniques for causing a portion of the exhaust nozzles wall to move. Campos utilizes corrugated or undulating

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nozzles, and one of ordinary skill can choose to have the nozzles permanently installed or have them move in an oscillatory manner driven by actuators. As such these are not fluidic chevrons as recited by Appellants. It does appear that Campos forms several regions of thin layers of flow around the base of his exhaust stream. However, we are unable to determine whether these areas of flow are of the appropriate velocity, speed of sound, or temperature that will characterize these areas as a thermal acoustic shield. We note that the Examiner at page 4 of the Answer has some typical values for bypass flow. We presume this is speculation on the part of the Examiner, for it is certainly not based on any disclosure in the Campos reference. In the absence of any disclosure in the prior art that these assertion by the Examiner are applicable to the disclosure of Campos, we must conclude that the Examiner has not fulfilled his burden of establishing the lack of novelty based on the Campos reference by a preponderance of the evidence. In short, we do not find the specific values in the Campos reference that convince us that these areas denoted in Figures 9 and 11 have appropriate properties of velocity and speed of sound.

PRINCIPLES OF LAW

The prior art may anticipate a claimed invention, and thereby render it non-novel, either expressly or inherently. *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349, 64 USPQ2d 1202, 1206 (Fed. Cir. 2002), cert. denied, 538 U.S. 907 (2003). Express anticipation occurs when the prior art expressly discloses each limitation (i.e., each element) of a claim. *Id.* In addition, [i]t is well settled that a

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prior art reference may anticipate when the claim limitations not expressly found in that reference are nonetheless inherent in it. *Id.*

“The enablement provision of the Patent Act requires that the patentee provide a written description of the invention ‘in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.’ 35 U.S.C. § 112, & 1 (2000). The purpose of this requirement is to ensure that ‘the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims.’ *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1195-96, 49 USPQ2d 1671, 1675 (Fed. Cir. 1999)(citation deleted). Accordingly, we have held that the specification must provide sufficient teaching such that one skilled in the art could make and use the full scope of the invention without undue experimentation. *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1338, 68 USPQ2d 1940, 1944(Fed. Cir. 2003); *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 42 USPQ2d 1001, 1004(Fed. Cir. 1997); *In re Wands*, 858 F.2d 731, 736-37, 8 USPQ2d 1400, 1404(Fed. Cir. 1988). The key word is ‘undue,’ not experimentation. *Wands*, 858 F.2d at 737, 8 USPQ2d at 1404. That is, the specification need only teach those aspects of the invention that one skilled in the art could not figure out without undue experimentation. See, e.g., *Nat'l Recovery Techs.*, 166 F.3d at 1196, 49 USPQ2d at 1675 (“The scope of enablement . . . is that which is disclosed in the specification plus the scope of what would be known to one of ordinary skill in the art without undue experimentation.”); *Wands*, 858 F.2d at 736-37, 8 USPQ2d at 1404 (“Enablement

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is not precluded by the necessity for some experimentation such as routine screening.”).” *Warner-Lambert Company v Teva Pharmaceuticals USA, Inc.*, 418 F.3d 1326, 1337, 75 USPQ2d 1865, 1872 (Fed. Cir. 2005).

With regard to the second paragraph requirement for “particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention,” it has been stated that the “essence of that requirement is that the language of the claims must make it clear what subject matter they encompass.” *In re Hammack*, 427 F.2d 1378, 1382, 166 USPQ 204, 208 (CCPA 1970). This has been frequently stated in a shortened form as a requirement that the claims set forth the "metes and bounds" of their coverage. *See, merely for example, In re Venezia*, 530 F.2d 956, 958, 189 USPQ 149, 151 (CCPA 1976); *In re Goffe*, 526 F.2d 1393, 1397, 188 USPQ 131, 135 (CCPA 1975); *In re Watson*, 517 F.2d 465, 477, 186 USPQ 11, 20 (CCPA 1975); *In re Knowlton*, 481 F.2d 1357, 1366, 178 USPQ 486, 492 (CCPA 1973). This requirement has usually been viewed from the perspective of a potential infringer, “so that they may more readily and accurately determine the boundaries of protection involved and evaluate the possibility of infringement and dominance.” *Hammack*, 427 F.2d at 1382, 166 USPQ at 208.

ANALYSIS

As our findings of fact show, we are unable to credit the Examiner with establishing the lack of novelty of the claims on appeal to a preponderance of the evidence. Therefore, the anticipation rejections are reversed.

Pursuant to our authority under 37 C.F.R. § 41.50(b) we enter the following new grounds of rejection. Claims 1-25 are rejected under 35 U.S.C. § 112, first paragraph, for failing to enable a person skilled in the art to make or use the invention without undue experimentation. Specifically, Appellants have not enabled one of ordinary skill to make or use the claim limitation of “a thermal acoustic shield.” Appellants define a thermal acoustic shield as “a thin layer of flow that partially surrounds the main jet 32 and is characterized by a proper combination of velocity and speed of sound.” Specification, ¶ 0024.

1. Appellants have not disclosed how to create or generate the thermal acoustic shield. The Specification contains the following language: the thermal shield 42 is “created” adjacent the jet engine nozzle. *Id.* In paragraph 0025, it is “actuated” along a partial section of the jet nozzle. Also in paragraph 0025, it is “deployed” and it is also “accomplished fluidically”. Just the use of these terms raises in our minds the issue that the Specification does not contain a clear and specific description of how these thermal acoustic zones are created and maintained.

2. Appellants disclosure does not advance any apparatus or structure that is useful in creating these thermal acoustic shields. No structure is described in the written Specification, and certainly no structure is illustrated in Appellants’ drawn Figures.

3. The lack of enabling disclosure as to the thermal acoustic shield is further illustrated in that the thermal acoustic shield must have a proper combination of velocity and speed of sound. There is simply no disclosure of how

such velocity and speed of sound can be generated in a jet engine. One of ordinary skill is left to speculate as to whether fluid is injected or fluid is extracted. Is this bypass gas? Is it makeup gas? Is it bleed gas? There is simply no disclosure of how flows of this specific range of velocity and speed of sound are generated vis-à-vis flows of velocity and speed of sound outside the desired range.

4. There is no working example. While Appellants' Specification seems to indicate that tests have been performed so that noise reduction potential could be established as shown in the Graphs in Appellants' Figures, the working examples have not be shared in the Specification.

With respect to the so-called *Wands* factors, we note that the amount of direction and guidance presented in the Specification is practically nil. There is an absence of working examples. The state of the prior art is such that, at least as to the prior art cited fluidic controls of sound abatement they are not well known. The claims are broad. While the so-called *Wands* factors are merely illustrative and not mandatory, we notice that all these factors point to a conclusion that the amount of experimentation required of one of ordinary skill to make and use the invention of a thermal acoustic shield would be undue.

Claims 1-25 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite. According to Appellants, a thermal acoustic shield is a "thin layer of flow that partially surrounds the main jet 32 and is characterized by a proper combination of velocity and speed of sound." Specification 0024. Following this definition in the Specification ranges are given. The ranges are quite broad. Our concern with the claims on appeal and this definition of thermal acoustic shield is

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that we are of the view that one of ordinary skill operating as a potential infringer could not determine the metes and bounds of the claimed subject matter and could not ascertain whether his jet engine noise abatement system would come under the claims on appeal. In this regard there is little guidance or direction presented about whether flows around an existing jet engine come under the claimed subject matter. Since a potential infringer could not determine what subject matter was covered by the claims and what subject matter was outside the scope of the claims, the claims are indefinite.

Claims 13-25 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Appellants, in the Brief at page 6, last line, define a fluidic chevron as a vortex generator that operates by injecting fluid. The Specification concurs with this definition in paragraph 0019 wherein a fluidic chevron is defined as a vortex generator. On the other hand, the Specification in paragraph 0021 discusses steady or pulsed vortex generator jets and introduces an acronym PVGJ. The jets 10 are injected around an aircraft engine exhaust nozzle for mixing enhancement in the exhaust flow and creating vortexes therein. Therefore it seems clear that a jet of fluid is injected in the main flow to generate a vortex. Additionally, to maintain the analogy between mechanical chevrons and fluidic ones, it would appear that fluidic chevrons should be understood to be vortex generators that operate on the principles of fluidics.

Turning to claim 13, note that the claims states that a fluidic chevron is “injected.” As noted above, the fluidic chevron is a vortex generator and what is injected into the main jet stream is actually a jet of fluid. In our view, Appellants

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have used the term fluidic chevron to mean several different things in the Specification and claims. This has inured confusion. Thus we find that claims 13-25 are indefinite under § 112, second paragraph. We further note that claim 15 includes the term fluid chevrons which we presume should read fluidic chevron.

CONCLUSIONS AND ORDER

For the reason given above we reverse the rejections of claims 1-25 based on prior art. Additionally, pursuant to our authority under 37 C.F.R. § 41.50(b) we enter rejections of claims 1-25 under § 112 first and second paragraphs.

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b) (effective September 13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)). 37 C.F.R. § 41.50(b) provides “[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review.”

37 C.F.R. § 41.50(b) also provides that Appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the Examiner, in which event the proceeding will be remanded to the Examiner. . . .

(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

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

REVERSED
37 C.F.R. § 41.50(b)

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