

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

Ex parte WILLIAM CLIFFORD

---

Appeal No. 2003-1379  
Application 09/769,334<sup>1</sup>

---

ON BRIEF

---

Before PAK, OWENS, and TIMM, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 9, which are all of the claims pending in the present application.

---

<sup>1</sup> Application for patent filed January 26, 2001.

Appeal No. 2003-1379  
Application No. 09/769,334

APPEALED SUBJECT MATTER

According to the appellant (Brief, pages 3 and 4):

Claims 1, 8 and 9 are independent claims.... Dependent claims 3, 5 and 7 are separately patentable while the remaining dependent claims stand or fall with parent claim 1.

Therefore, for purposes of this appeal, we limit our discussion to claims 1, 3, 5 and 7 through 9 pursuant to 37 CFR § 1.192(c)(7) (2002). Claims 1, 3, 5 and 7 through 9 are set forth in the Appendix.

PRIOR ART REFERENCES

As evidence of obviousness, the examiner relies on the following prior art references:

Allen	3,782,588	Jan. 1, 1974
Beuck et al (Beuck)	5,542,626	Aug. 6, 1996

REJECTION

Claims 1 through 9 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Beuck and Allen.

OPINION

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the examiner and the appellant in support of their

Appeal No. 2003-1379  
Application No. 09/769,334

respective positions. This review leads us to conclude that the examiner's Section 103 rejection is well founded. Accordingly, we affirm the examiner's decision rejecting claims 1 through 9 under 35 U.S.C. § 103. However, pursuant to 37 CFR § 1.196(b) (2002), we denominate our affirmance as including a new ground of rejection since our rationale for affirming the examiner's Section 103 rejection is materially different from that proffered by the examiner. Our reasons for this determination follow.

We find that Beuck teaches an aircraft having, *inter alia*, a fuselage (2), an energy absorbing structure (5) forming a compartment below the fuselage and fuel tanks (60) adjacent the bottom part of the fuselage inside the compartment. See Figures 4 and 5, together with column 4, lines 40-52, column 6, lines 15-33 and column 9, lines 11-19. We find that Beuck teaches (column 9, lines 12-17) that

these [fuel tanks] are preferably used as ballast or trim tanks in view of safety regulations. Thus, the tanks are empty upon take-off and landing, but fuel is pumped into the tanks during flight to achieve a desired trim. Furthermore, if necessary, the tanks may be provided with **other known safety measures**, such as quick drain valves... (Emphasis added).

The examiner recognizes that Beuck does not teach at least partially filling the fuel tanks with an open cell foam. To

Appeal No. 2003-1379  
Application No. 09/769,334

remedy this deficiency, the examiner relies on the disclosure of Allen. We, like the examiner, find that Allen teaches filling the interior of a fuel tank having a volatile fuel with an open cell polyurethane foam. See column 4, lines 8-64. According to Allen (column 4, lines 32-46):

It [foam] does not substantially increase weight, which is **an important factor in aviation application. The geometry and size of the cells** is [sic., are] important. The reticulated structure keeps flame propagation from reaching the velocity necessary for explosion. It dissipates some of the heat generated at ignition and the foam operates as a heat sink so as to provide a cooling action. The skeletal strands break up the compression wave that precedes a flame front in explosion. Furthermore, the skeletal structure absorbs energy from the initial contained explosion. Therefore, the cellular structure **absorbs, divides and dissipates energy**, whether the energy is thermal or **physical compression**, heat, or explosion. **The structure also provides the foam with an unusual weight-bearing and stress-distributing property.** (Emphasis added).

Given the above safety advantages in employing an open cell polyurethane foam in an aircraft fuel tank, we determine that one of ordinary skill in the art would have been led to at least partially fill the aircraft fuel tanks taught in Beuck with an open cell polyurethane foam having appropriate cell sizes,

motivated by a reasonable expectation of successfully improving the safety of the aircraft during its flight<sup>2</sup>.

The appellant appears to argue that the open cell polyurethane foam taught in Allen is not capable of carrying out the claimed functional limitation relating to controlled deformation as recited in claims 1, 5 and 8.<sup>3</sup> See the Brief, pages 6 and 8. According to the appellant (Id.), "[t]he core [open cell polyurethane foam] is said to have 'an approximate 97 percent void' and thus it appears that the core would be of very limited value as an energy absorbing structure."

We are not persuaded by the appellant's argument. First, we cannot distinguish the open cell polyurethane foam taught by Allen from the claimed open cell foam. Compare claims 1, 5 and 8 with the Allen disclosure mentioned above. The open cell polyurethane structure taught by Allen, like the claimed open cell foam, is said to be useful for absorbing physical energy as

---

<sup>2</sup> As acknowledged by the appellant at page 6 of the Brief, the fuel is pumped into the fuel tanks (60) of Beuck's aircraft during its flight.

<sup>3</sup> Claim 9, the broadest independent claim in the application, does not recite the functional limitation in question.

indicated supra. Thus, it can be inferred from the Allen disclosure that its open cell polyurethane foam provides some resistance to deformation as required by the claims on appeal.<sup>4</sup>

Second, we find that the open cell foam taught by Allen appears to be either identical or substantially identical to those embraced by the claims on appeal. We find that the open cell foam taught by Allen, like the claimed open cell foam, is made with polyurethane and is useful for absorbing, inter alia, physical energy as indicated above. Thus, the burden is on the appellant to prove that the open cell polyurethane foam taught by Allen is not capable of performing the claimed function. In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997); In re Best, 562 F.2d 1252, 1255-56, 195 USPQ 430, 433-34 (CCPA 1977); In re Swinehart, 439 F.2d 210, 212, 169 USPQ 226, 228 (CCPA 1971). However, the appellant on this record has

---

<sup>4</sup> Our review of claims 1, 5 and 8 on appeal indicates that they do not recite any specific degree of resistance to deformation, thus inclusive of any degree of resistance to and/or control of deformation. See In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997) (During prosecution of a patent application, we give words in the claims their broadest reasonable meaning in their ordinary usage, taking into account the written description found in the specification.).

proffered no evidence to demonstrate that the open cell polyurethane foam taught by Allen cannot perform the claimed function.

The appellant argues that Allen does not teach or suggest that "cells of the foam material not occupied with fluid and residual volume of the [fuel] tank are filled with a gas" as required by claim 3. See the Brief, page 8 together with claim 3. We do not agree. We find that Allen teaches employing its open cell foam in a fuel tank filled with a volatile fuel (gas). See column 4, lines 21-24 and column 5, lines 14-18. It can be inferred from this teaching that the foam cells and the fuel tank volume not occupied by fluid in the tank are filled with a gas.

The appellant argues that the applied prior art references do not teach or suggest having a landing gear structure providing high primary energy absorption and a fuel tank providing high secondary energy absorption as required by claim 7. See the Brief, page 8 and the Reply Brief, page 2. We do not agree. As indicated supra, the foam material included in the fuel tank absorbs physical energy. Moreover, the landing gear structure of the aircraft taught in Beuck, of necessity, provides high primary

Appeal No. 2003-1379  
Application No. 09/769,334

energy absorption since it must be able to absorb energy produced by the weight of the aircraft during the landing (physical compression caused by the landing). This is especially true since the appellant acknowledges at page 1 of the specification that such landing gear structure is well known.

In view of the foregoing, we affirm the examiner's decision rejecting the claims on appeal under 35 U.S.C. § 103. However, since our rationale for affirming this rejection is materially different from that supplied by the examiner, we denominate our affirmance as including a new ground of rejection pursuant to 37 CFR § 1.196(b) (2002).

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of

Appeal No. 2003-1379  
Application No. 09/769,334

rejection to avoid termination of proceedings (§ 1.197(c)) as to  
the rejected claims:

(1) Submit an appropriate amendment of the claims  
so rejected or a showing of facts relating to the  
claims so rejected, or both, and have the matter  
reconsidered by the examiner, in which event the  
application will be remanded to the examiner. . . .

(2) Request that the application be reheard under  
§ 1.197(b) by the Board of Patent Appeals and  
Interferences upon the same record. . . .

No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
§ 1.136(a).

AFFIRMED  
37 CFR § 1.196(b)

CHUNG K. PAK	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
TERRY J. OWENS	)	APPEALS AND
Administrative Patent Judge	)	INTERFERENCES
	)	
	)	
	)	
CATHERINE TIMM	)	
Administrative Patent Judge	)	

CKP/dal

Appeal No. 2003-1379  
Application No. 09/769,334

LARSON & TAYLOR, PLC  
1199 NORTH FAIRFAX STREET  
SUITE 900  
ALEXANDRIA VA 22314

APPENDIX

1. An aircraft including a fuselage having a lower fuselage part and a fluid tank located adjacent the lower fuselage part, the fluid tank being at least partially filled with fluid and an open cell foam material so that in the event of impact on the lower fuselage part, fluid is constrained to flow through the foam to provide controlled deformation of the lower fuselage part.

3. An aircraft according to claim 1 wherein cells of the foam material not occupied with fluid and residual volume of the tank are filled with a gas.

5. An aircraft according to claim 1 wherein the foam material is an open cell polyurethane foam having an average cell size within the foam arranged to provide a predetermined degree of resistance to deformation of the lower fuselage part.

7. An aircraft according to claim 1 which includes a landing gear structure which is arranged to provide primary high energy absorption in the event of impact, the fluid tank providing secondary high energy absorption in the event of landing gear structural collapse.

8. A method of controlling deformation of a lower fuselage part of an aircraft in the event of impact, the method including providing a fluid tank located adjacent the lower fuselage part, the fluid tank being at least partially filled with fluid and an open cell foam material so that in the event of impact on the lower fuselage part, fluid is constrained to flow through the foam to provide controlled deformation of the lower fuselage part.

9. A fluid tank for use in an aircraft including a fuselage having a lower fuselage part, the fluid tank being at least partially filled with fluid and an open cell foam material and being adapted to be located adjacent the lower fuselage part.