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The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 10

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* CARL J. HERMACH

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Appeal No. 96-2477  
Application 08/345,292<sup>1</sup>

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ON BRIEF

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Before McCANDLISH, *Senior Administrative Patent Judge*, STAAB and McQUADE, *Administrative Patent Judges*.

STAAB, *Administrative Patent Judge*.

**DECISION ON APPEAL**

This is a decision on an appeal from the examiner's final rejection of claims 1-20, all the claims pending in the application. We *affirm-in-part*.

Appellant's invention pertains to a tandem-engine propulsion module for an aircraft (claims 1-6), a powered dry-wing aircraft

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<sup>1</sup>Application for patent filed November 28, 1994.

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including a tandem-engine propulsion module (claims 7-12), a method of powering a fixed-wing aircraft (claims 13-17), and a method of providing a fixed-wing aircraft with tandem-engine propulsion (claims 18-20). Independent claims 1, 7, 13 and 18 are representative of the appealed subject matter, and copies thereof, as they appear in the appendix to appellant's brief, are appended to this opinion.<sup>2</sup>

The references of record relied upon by the examiner in support of rejections under 35 U.S.C. § 103 are:

Sanders	1,855,652	Apr. 26, 1932
Henrichsen et al. (Henrichsen)	1,874,523	Aug. 30, 1932
Hall	2,619,301	Nov. 25, 1952

Claims 1-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Hall in view of Henrichsen or Sanders.

Hall, the primary reference, pertains to a flight component **A** adapted to be releasably attached to a ground vehicle **B** to permit the ground vehicle to be airborne. The flight component **A**

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<sup>2</sup>We note several instances in the appealed claims of terms which lack a clear antecedent. For example, "the wing means" (claim 2, line 3 and claim 5, line 2); "the engine means" (claim 3, line 2) and "the propellers" (claim 3, line 2) do not have a clear antecedent. While these deficiencies do not obscure the metes and bounds of the claims, in the event of further prosecution before the examiner, corrective action should be taken.

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comprises wings **10** and **11**, a cowled tractor-mounted power plant **20**, a tail boom **25**, and an empennage **30**. The flight component further includes control and instrument panel **53** positioned to be readily accessible to the operator when the flight component is in assembled and operative position with the ground vehicle **B**, and an integral fuel tank **54** positioned behind the power plant. Forward and rearward attachment fittings **60** and **61** are provided for securing the flight component **A** to the ground vehicle **B**.

Henrichsen discloses an aircraft engine cowling having tandem engines **11** and **13** mounted therein, the engine **11** being a tractor mounted engine and the engine **13** being a pusher mounted engine. Sanders discloses an aircraft including six pairs of tandem mounted engines, each pair comprising a tractor mounted engine **4** and a pusher mounted engine **5**. In both Henrichsen and Sanders, the propellers of a tandem mounted engine pair are driven about axes of rotation that are in substantial alignment with one another.

With respect to independent claim 1, Hall's flight component **A** constitutes a "propulsion module" within the broad meaning of the claim terminology. Flight component **A** comprises a housing having an engine **50**, a fuel compartment **54**, and engine

instruments and controls **53**. Further, as is made clear by Figures 3 and 4, flight component **A** is adapted to be installed as the only propulsion means for a fixed-wing aircraft having a fuselage including a cabin for a flight crew, with the engine instruments and controls **53** being accessible to the flight crew. Thus, Hall discloses the subject matter of claim 1 except for the propulsion module being a tandem-engine module with only two engines.

Concerning independent claim 7, Hall discloses a powered dry-wing aircraft comprising fuselage means in the form of component **B**, wing means **10** and **11**, and propulsion module **20** contiguous with and detachably secured to fuselage component **B**. The propeller **51** of the propulsion module is forward of the leading edge of the wing means. Further, as with appellant's aircraft, Hall's wing means is secured to the fuselage in that it is secured to the propulsion module, which is in turn secured to the fuselage. Hall is therefore considered to disclose the subject matter of claim 7 except for the propulsion module being a tandem-engine module with a pusher propeller located aft of the trailing edge of the wing means.

As to independent claim 13, Hall discloses a method of powering a fixed-wing aircraft provided with a fuselage means **B**

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and single-wing means **10** and **11**, comprising the steps of providing a propulsion module **20** detachably secured to the fuselage means proximate to inboard ends of the wing means, and detachably attaching the propulsion module to the upper portion of the fuselage means. Hall is therefore seen as disclosing the subject matter of claim 13 except for the propulsion module being adapted to carry forward and aft engine means.

With respect to independent claim 18, Hall discloses a method of providing a fixed-wing aircraft with engine propulsion, comprising the steps of forming a propulsion module **A** having a housing adapted to be juxtaposed to a dry-wing aircraft fuselage **B**, mounting an aircraft engine **50** having a tractor propeller **51** on the propulsion module, and including an engine fuel compartment **56** within the housing of the propulsion module. Hence, Hall discloses the subject matter of claim 18 except for mounting on the propulsion module **A** an aft engine having a pusher propeller aligned with the tractor propeller **51**.

In view of the above noted teachings of Henrichsen and Sanders, the examiner's conclusion that it would have been obvious to one of ordinary skill in the art to provide the flight component **A** of Hall with an aft mounted pusher engine, as called for in the claims, is well taken. In this regard, in applying

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the teachings of Henrichsen or Sanders in Hall, we believe that the ordinarily skilled artisan would have aligned the tractor and pusher propeller along a common axis, as taught by Henrichsen and Sanders, for the self evident advantages such an arrangement provides, such as, the redundant safety of dual engines with reduced off-axial mass and thrust.

Regarding the requirement of claim 1 that the housing of the propulsion module comprises a housing with only two engines and that said module is adapted to be installed as the only propulsion means of the aircraft, the provision of only two propulsion engines in Hall's flight component **A** is considered to be an obvious matter of engineering choice to one of ordinary skill in the art dependent upon design factors such as the amount of thrust desired. As to the requirement of claim 7 that the tractor propeller and pusher propeller be located respectively forward and aft of the leading and trailing edges of the wing means, it is our view that the ordinarily skill artisan would have recognized this arrangement as being the most straightforward design approach in applying the aligned tandem-engine teachings of Henrichsen and Sanders in Hall. In any event, Sanders discloses such an arrangement.

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Appellant argues that Hall's single-engine design is incompatible with the tandem-engine arrangements of Henrichsen and Sanders because Hall lacks accommodation for Henrichsen's struts and close-coupled engines or Sander's relatively large winglet 2 and stays 3. This argument is not well taken. In order to justify combining reference teachings in support of a rejection under 35 U.S.C. § 103, it is not necessary that a device shown in one reference can be physically inserted into the device shown in the other. *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Moreover, the artisan is not compelled to blindly follow the teachings of one prior art reference over the other without the exercise of independent judgement. *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889, 221 USPQ 1025, 1032 (Fed. Cir. 1984).

Appellant's arguments directed to the individual deficiencies of the applied references, such as Hall being directed to a single-engine propulsion module, and the failure of Henrichsen and Sanders to disclose a fuel compartment in the portions thereof that might be termed the propulsion module, are noted. However, nonobviousness cannot be established by attacking the references individually when, as here, the rejection is predicated upon a combination of prior art

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disclosures. *In re Merck & Co. Inc.*, 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986).

In light of the foregoing, we will sustain the standing § 103 rejection of independent claims 1, 7, 13 and 18 as being unpatentable over Hall in view of Henrichsen or Sanders.

Dependent claims 9, 10, 14 and 19, in one form or another, call for the propulsion module to be detachably secured to the wing means. While we do not necessarily concur with the rationale advanced by the examiner in rejecting these claims,<sup>3</sup> we nevertheless agree with the examiner's bottom line position that the subject matter of these claims would have been obvious to one of ordinary skill in the art at the time of appellant's invention. In our view, the ordinarily skilled artisan would have readily appreciated the advantages and disadvantages unitary wing construction and detachable wing construction provide.<sup>4</sup>

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<sup>3</sup>On page 5 of the answer, the examiner states that the wings of Hall are detachable "in that they were assembled to the module and if damaged they will be removed."

<sup>4</sup>In this regard, an artisan must be presumed to know something about the art apart from what the references disclose (*In re Jacoby*, 309 F.2d 513, 516, 135 USPQ 317, 319 (CCPA 1962)), and a conclusion of obviousness may be made from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference (*In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969)).

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Specifically, it is apparent that a detachable wing design would greatly facilitate the replacement of a damaged wing component, as well as provide the capability of removing the wings for easier storage and transport. Based on these considerations, we conclude that it would have been obvious to one of ordinary skill in the art to provide the flight component **A** of Hall with detachable wings in order to take advantage of the self evident benefits such construction provides. *Compare In re Heinrich*, 268 F.2d 753, 756, 122 USPQ 388, 390 (CCPA 1959) (substitution of one type of spring construction for another considered to be matter of choice or engineering design where advantages and disadvantages of each are apparent). Accordingly, we will sustain the examiner's rejection of claims 9, 10, 14 and 19.

We will also sustain the standing § 103 rejection of dependent claims 2, 6, 8, 11, 15, 16 and 20 since Hall discloses (1) flight component **A** detachably secured to the fuselage, as called for in claims 2 and 8, (2) a control and instrument panel **53** on the flight component **A** accessible through opening **64** when the components **A** and **B** are properly assembled (column 9, lines 45-50), as called for in claims 6, 15 and 20, (3) an undercarriage landing gear means in the form of wheels **6** and **8** partially recessed in the fuselage, as called for in claim 11,

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and (4) an engine fuel compartment **54** in the propulsion module or flight component **A**, as called for in claim 16.

Dependent claim 3 calls for the engines of the propulsion unit to be adapted to drive the propellers about rotation axes in substantial alignment with one another. In that, as explained above in our discussion of claims 1, 7, 13 and 18, we believe the artisan would have readily appreciated that tandem engines aligned along a common axis, as taught by Henrichsen and Sanders, have certain advantages, such as, the redundant safety provided by dual engines with reduced off-axial mass and thrust, we will sustain the § 103 rejection of claim 3.

We reach an opposite conclusion with respect to claims 4, 5 and 17. Dependent claim 4 calls for the fuel compartment to be centered fore-and-aft in the propulsion module. Dependent claim 17 sets forth the step of centering the fuel compartment fore-and-aft relative to the wing means of the propulsion unit. In rejecting these claims, the examiner states that "Hall specifically has a fuel compartment in the module in the centerline thereof" (answer, page 5). However, the fuel compartment **54** of Hall is located forward of the attachment fitting **60** (Figure 4), which attachment fitting **60** is located at the forward edge of the wings (Figure 6). Thus, the fuel

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compartment **54** of Hall is located *forward* of the wings in the *forward* portion of the flight component. It is not apparent to us, and the examiner has not explained, how Hall's fuel compartment location forward of the wings discloses or suggests the centered fore-and-aft fuel compartment locations called for in claims 4 and 17. In addition, Henrichsen and Sanders are not relevant to claims 4 and 17 in that they are silent as to the location of any fuel compartment. In light of the above, we cannot sustain the examiner's § 103 rejection of claims 4 and 17, or claim 5 which depends from claim 4.

We also will not sustain the examiner's rejection of claim 12, which depends from claim 7 and further requires that the fuselage is boat like and that outboard stabilization means depend from the wing means and flanks of the fuselage. In rejecting this claim, the examiner has taken the position that it is known in the art to provide wing pontoons to adapt an aircraft to water landing, and that, accordingly, it would have been obvious to provide Hall with pontoons. Even if it is assumed that it is known generally to provide wing pontoons on an aircraft to adapt it to water landing, the issue here is whether it would have been obvious to provide *Hall's* components **A** and **B** with stabilization means for water operation. Here, Hall's

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device is not merely an airplane. Rather, Hall is directed to a land component, an automobile, that may be mated to a flight component in order to convert the land component into an airplane. The modifications to Hall's components, and in particular automobile component **B**, that would be required in order to adapt it for water operation would appear to be significant and would certainly go beyond merely providing pontoons of the wings of flight component **A**. Precisely why one of ordinary skill in the art would have been motivated to modify Hall's land vehicle, given that it is known generally to provide pontoons on an aircraft to adapt it to water landing, and how this is to be accomplished, have not been adequately explained by the examiner and, in our opinion, would not have been obvious based on the applied reference teachings.

In summary, the rejection of claims 1-20 as being unpatentable over Hall in view of Henrichsen or Sanders is affirmed with respect to claims 1-3, 6-11, 13-16 and 18-20 but is reversed with respect to claims 4, 5, 12 and 17.

The decision of the examiner is affirmed-in-part.

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

**AFFIRMED-IN-PART**

HARRISON E. McCANDLISH	)	
Senior	)	
Administrative Patent Judge)	)	
	)	
	)	
LAWRENCE J. STAAB	)	BOARD OF PATENT
Administrative Patent Judge)	)	APPEALS AND
	)	INTERFERENCES
	)	
	)	
JOHN P. McQUADE	)	
Administrative Patent Judge)	)	

**APPENDIX**

1. Tandem-engine propulsion module, comprising

a housing with only two engines, respectively fore-and-aft in the housing, a fuel compartment in the housing, and engine instruments and controls;

adapted to be installed as the only propulsion means for a fixed-wing aircraft having fuselage means extending fore-and-aft, including a forward cabin portion for a flight crew, with the engine instruments and controls accessible to the flight crew.

7. Powered dry-wing aircraft, comprising in combination fuselage means extending fore and aft along and about a substantially horizontal centerline;

wing means extending substantially horizontally and laterally outboard relative to the fuselage means, and secured thereto; and

a tandem-engine propulsion module in part contiguous with and detachably secured to at least one of the foregoing means,

the propulsion module being adapted to rotate a tractor propeller and a pusher propeller located respectively forward and aft of the leading and trailing edges of the wing means.

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13. Method of powering a fixed-wing aircraft provided with enclosed fuselage means extending fore-and-aft including a crew cabin and having single-wing means extending outboard therefrom in opposite lateral directions, comprising the steps of

providing a propulsion module detachably attachable to the fuselage means proximate to inboard portions of the wing means and adapted to carry forward and aft engine means, and

detachably attaching the propulsion module in substantial contiguity to an upper portion of the fuselage means.

18. Method of providing a fixed-wing aircraft with tandem-engine propulsion, comprising the steps of

forming a propulsion module having a housing adapted to be juxtaposed to a dry-wing aircraft fuselage and detachably attached thereto in substantial contiguity therewith; and

mounting, fore and aft on the the propulsion module housing, aircraft engines with respective tractor and pusher propellers with their respective rotational axes substantially mutually aligned; and

including an engine fuel compartment within the housing and adapted to connect to the respective engines.

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