

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* MARK L. SLOAN and LEONARD J. HEBERT

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Appeal No. 2008-1320  
Application No. 10/454,888  
Technology Center 3700

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Decided: September 17, 2008

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Before WILLIAM F. PATE, III, MURRIEL E. CRAWFORD and DAVID B.  
WALKER, *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 1-30. These are the only claims in the application. We have jurisdiction under 35 U.S.C. §§ 134 and 6(b) (2002).

The claimed subject matter is directed to a flow nozzle for use on a jet engine to reduce jet engine noise and improve fuel economy. The nozzle is in three sections with a convergent portion, a throat portion, and a plurality of

chevrons extending from the throat portion downstream thereof. The chevrons diverge from the throat portion at a predetermined angle between one and ten degrees.

Claim 1, reproduced below, is further illustrative of the claimed subject matter.

1. A flow nozzle for use with a jet engine of an aircraft to reduce jet engine noise, comprising:

a circumferential wall for receiving a flow from said jet engine, said circumferential wall having an axial centerline extending therethrough;

said circumferential wall having a non-undulating, generally circular converging portion that converges toward said axial centerline, relative to a direction of travel of said flow, a non-undulating, generally circular throat portion downstream of said converging portion relative to said direction of travel of said flow, and a plurality of chevrons extending from said throat portion downstream from said throat portion relative to said direction of travel of said flow, said chevrons each further being formed to diverge away from said axial centerline at a predetermined angle and such that said chevrons are non-planar with said converging portion; and

said chevrons providing surfaces against which said flow is able to expand after said flow has passed said throat portion to avoid unstable expansion and resulting downstream shocks in a jet plume formed as said flow exits said throat portion.

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

Ardoin	US 3,215,172	Nov. 2, 1965
Steiner	US 6,082,635	Jul. 4, 2000
Brausch	US 6,360,528 B1	Mar. 26, 2002

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Claims 1-4, 6-10, 12-14, 16-19, 21-25, and 27-30 stand rejected under 35 U.S.C. § 102 as anticipated by Ardoin.

Claims 1, 4, 7, 10, 18, 19, 24, 25, 27 and 28 stand rejected under 35 U.S.C. § 102 as anticipated by Seiner.

Claims 1-3, 6-9, 12, 13, 17, 18, 21-24 and 27-30 stand rejected under 35 U.S.C. § 102 as anticipated by Brausch.

Claims 4, 5, 10, 11, 14, 15, 19, 20, 25, and 26 stand rejected under 35 U.S.C. § 103 as unpatentable over Ardoin or Seiner.

Claims 6, 12, 17, 23, 28 and 30 stand rejected under 35 U.S.C. § 103 as unpatentable over Ardoin or Brausch.

Claims 4, 5, 10, 11, 14, 15, 19, 25 and 26 stand rejected under 35 U.S.C. § 103 as unpatentable over Brausch in view of Ardoin or Seiner.

## OPINION

We have carefully reviewed the rejections on appeal in light of the arguments of the Appellant and the Examiner. As a result of this review, we have determined that the applied prior art references of Ardoin and Seiner establish the lack of novelty of claims 1, 13, 17, and 24, the independent claims separately argued by Appellants. Furthermore, as Appellants have chosen not to argue separately the dependent claims on appeal, (see Appeal Br. 21-22), these claims,

dependent as they are, fall with the independent claims from which they depend.

See 37 C.F.R. § 41.37(c) (7).

Our first matter is one of claim construction. Claim 1 requires that the chevrons diverge away from the axial centerline at a predetermined angle such that the chevrons are “non-planar with said converging portion.” As we understand Appellants’ invention, both the converging portion and the plurality of chevrons are curved and are circular and arcuate, respectively. Thus, there are no planes defined by either the converging portion or the chevrons. Accordingly, we will construe “non-planar” in this instance to mean non-co-arcuate, as this comports with Appellants’ disclosure and arguments in the Appeal Brief.

*Rejection of claims as anticipated by Ardoin*

Ardoin discloses a flow nozzle for a jet engine for the purpose of reducing jet engine noise. The nozzle is comprised of a circumferential wall for receiving flow from the jet engine. The circumferential wall has a first non-undulating, generally circular cross section converging portion 12 that converges toward an axial center line. The converging portion is connected to a non-undulating, generally circular cross section throat portion downstream thereof by way of a flange at 13. The throat portion extends from the flange to the point 18 where the plurality of chevrons extend downstream from the throat portion. Ardoin makes

clear that the throat and chevron are constructed in a manner such that they are slightly larger in diameter at the after end thereof than toward the forward end thereof. See col. 7, ll. 15-21. Thus it is clear that the chevrons diverge from the axial center line of the nozzle at a predetermined angle. Note further that the chevrons are non-planar, as we have construed this term, with the converging portion of the nozzle. In fact, the converging portion of the nozzle tapers down from left to right while the chevrons increase in diameter from left to right as viewed in Figure 2 of Ardoine. Appellants argue on page 16 of the Appeal Brief that the Ardoine reference does not show the use of chevrons that are either non-planar with the converging portion or that diverge away from the converging portion or from the axial center line of the nozzle. We disagree with these arguments. On page 17, the Appellants further states that the element 17 at the downstream edge of the flow nozzle in Ardoine is clearly coplanar with the remainder of the nozzle body. However, as we read the claim, these chevrons only need to be non-coplanar with the converging portion not the throat. That is exactly the case with Ardoine. Converging portion 12 tapers down from left to right and the smallest diameter of the nozzle is at the flange 13. After that, the nozzle tapers slightly outwardly from left to right. Thus the chevrons are not coplanar with the converging portion.

Appellants' next argument, regarding how the chevrons extend collinearly with the nozzle wall, does not reflect structure that is found in claims 1 or 7. In claims such as claim 29, which does not specifically call for a throat section, the claim does not preclude such a section, and the fact that the chevrons are coarcuate with the throat section does not mean that the chevrons are coplanar with the converging portion 12.

Thus it can be seen that Ardoин establishes the lack of novelty of independent claims 1, 7, 13, 18, 24, 29 and 30. Inasmuch as Appellants have not argued dependent claims 2-4, 6, 8-10, 12, 14, 16, 19, 21-23, 25, 27 or 28, we hold that these claims fall with their respective independent claim.

*Rejection of claims as anticipated by Seiner*

Seiner discloses a flow nozzle for use with a jet engine of an aircraft to reduce jet noise. The nozzle consists of the circumferential wall for receiving the flow from the jet engine. The simplest example is shown in Seiner Figure 3. The (Specification, col. 9, ll. 12-24) makes clear that this is an axisymmetrical, convergent-divergent baseline round nozzle. Thus, the nozzle has a non-undulating, generally circular cross section converging portion at the front end thereof which converges down to a throat portion that slightly diverges toward a plurality of chevrons downstream from the throat portion. Thus, the chevrons

diverge from the axial centerline of the nozzle X at a predetermined slight angle.

Furthermore, these chevrons are clearly non-planar with the converging portion of the nozzle which ends at the beginning of the throat section, i.e., the narrowest section of the entire nozzle. Accordingly, Seiner anticipates independent claims 1, 7, 18, and 24 and claims 4, 10, 19, 25, 27 and 28 which depend therefrom.

*Rejection of Claims as Anticipated by Brausch*

We do not affirm the § 102 rejection of claims 1-3, 6-9, 12, 13, 17, 18, 21-24 and 27-30 as rejected under § 102 as anticipated by Brausch for the reason that it is unclear whether the nozzle of Brausch includes a converging portion or, in the alternative, a throat portion. With reference to Figure 1 it is difficult to demarcate on this figure both a converging portion and a throat portion before the chevrons. Likewise with respect to Figure 4, it is unclear where a converging portion and a throat portion and chevrons could be rationally demarcated on this figure. Accordingly, we do not affirm the § 102 rejection of the above-noted claims.

*35 U.S.C. § 103 rejection of claims 4, 5, 10, 11, 14, 15, 19, 20, 25, and 26 under § 103 as unpatentable over Ardoin or Seiner.*

Inasmuch as Appellants have declined to argue these claims separately or with any specificity, we hold that these dependent claims fall with the independent claims they depend from.

*Rejection of claims 6,12, 17, 23, 28 and 30 under 35 U.S.C. § 103 as unpatentable over Ardoin or Brausch.*

We affirm the rejection of claims 6, 12, 17, 23, 28 and 30 under 35 U.S.C. § 103 as unpatentable over Ardoin. Inasmuch as Appellants have declined to argue these claims separately, we hold that these dependent claims fall with the independent claims they depend from at least with the respect to the rejection based on the disclosure of Ardoin.

*Rejection of claims 4, 5, 10, 11, 14, 15, 19, 20, 25 and 26 as unpatentable over Brausch in view of either Ardoin or Seiner*

The rejection of claims 4, 5, 10, 11, 14, 15, 19, 20, 25 and 26 as unpatentable over Brausch inview of either Ardoin or Seiner is reversed, inasmuch as we have not found a converging portion, a throat portion, and chevrons disclosed in the primary reference to Brausch. Consequently, the rejection of these claims on this ground is not sustained.

## CONCLUSION

The rejection of claims 1-4, 6-10, 12-14, 16-19, 21-25 and 27-30 under 35 U.S.C. § 102 as anticipated Ardoin is affirmed.

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The rejection of claims 1, 4, 7, 10, 18, 19, 24, 25, 27 and 28 under 35 U.S.C. § 102 as anticipated Seiner is affirmed.

The rejection of claims 1-3, 6-9, 12, 13, 17, 18, 21-24 and 27-30 under 35 U.S.C. § 102 as anticipated by Brausch is reversed.

The rejection of claims 4, 5, 10, 11, 14, 15, 19, 20, 25 and 26 under 35 U.S.C. § 103 as unpatentable over Ardoin and Seiner is affirmed.

The rejection of claims 6, 12, 17, 23, 28, and 30 under 35 U.S.C. § 103 as unpatentable over Ardoin and Brausch is affirmed to the extent that it is based on the Ardoin reference and reversed inasmuch as it is based on the Brausch reference.

The rejection of claims 4, 5, 10, 11, 14, 15, 19, 25, and 26 under 35 U.S.C. § 103 as unpatentable over Brausch in view of Ardoin and Seiner is reversed.

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

AFFIRMED

JRG

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