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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK RAY and MARK SHERWOOD MILLER

Appeal 2020-000472
Application 15/176,644
Technology Center 3600

Before JOHN C. KERINS, KEVIN F. TURNER, and
LEE L. STEPINA, *Administrative Patent Judges*.

KERINS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–20, the only claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

[1] The term "Appellant" is used herein to refer to "applicant" as defined in 37 C.F.R. § 1.42. Rosemount Aerospace Inc. is the applicant of record. Bib. Data Sheet. Appellant identifies the real party in interest as United Technologies Corporation, and states that United Technologies directly or indirectly owns the entire equity in Rosemount Aerospace. Appeal Br. 2.

THE CLAIMED SUBJECT MATTER

Appellant's invention relates to an ice detection system and method for determining the condition of a cloud. Claim 1 is illustrative, and is reproduced below:

> 1. An aircraft ice detection system configured to determine a condition of a cloud, the aircraft ice detection system comprising:
>
> a radar transmitter configured to produce quasi-optical radiation at a wavelength selected to detect supercooled large droplets by reflection from supercooled large droplets in the cloud;
>
> optics configured to direct the quasi-optical radiation from the radar transmitter to the cloud and receive reflected quasi-optical radiation from the cloud;
>
> a radar receiver configured to receive the reflected quasi-optical radiation from the optics; and
>
> a splitter configured to direct the reflected quasi-optical radiation from the optics to the radar receiver.

THE REJECTIONS

The Examiner rejects:

(i) claims 1, 2, 4–6, 9–11, 13–15, and 18–20 under 35 U.S.C. § 103 as being unpatentable over Ray (US 2010/0110431 A1, published May 6, 2010) in view of Volkov (US 6,777,684 B1, issued Aug. 17, 2004);

(ii) claims 3 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Ray in view of Volkov and Huguenin (US 5,202,692, issued Apr. 13, 1993);

(iii) claims 7 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Ray in view of Volkov and Khammouni (US 6,166,699, issued Dec. 26, 2000); and

(iv) claims 8 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Ray in view of Volkov and Thomson (US 3,921,173, issued Nov. 18, 1975).

ANALYSIS

Claim 1, 2, 4–6, 9–11, 13–15, and 18–20--§ 103--Ray/Volkov

The Examiner finds that Ray discloses all limitations of the ice detection system recited in claim 1, with the exception that Ray does not disclose that its transmitter employs quasi-optical radiation[2] to detect supercooled large droplets, and instead employs radiation in the optical range. Final Act. 4. The Examiner cites to Volkov as disclosing a system that involves transmitting quasi-optical radiation used to detect ice. *Id.*, citing Volkov, col. 74, ll. 50–51. The Examiner notes that Volkov's quasi-optical radiation "is capable of detecting supercooled large droplets. *Id.*, citing Volkov, Fig. 2 and col. 4, ll. 45–47. The Examiner concludes that it would have been obvious to use the quasi-optical band disclosed in Volkov in the Ray ice detection system, in order to gain the benefit of improved propagation in weather. *Id.*, citing Volkov, col. 1, ll. 18–21.

Appellant counters that Volkov is directed to a wide variety of applications for imaging, many or all of which involve the ability to penetrate solid substances like clothes, rocks, fog, dust and light rain.

[2] Appellant describes quasi-optical radiation as lying in "the millimeter and sub-millimeter range of infrared wavelengths that lie just outside the 'optical' spectrum but may still be reflected and focused using the same optics as are used for radiation in the optical spectrum." Spec. ¶ 8. Elsewhere in the Specification, Appellant notes that wavelengths in the IEEE G-Band (1 mm to 2.7 mm wavelength) and those lying close to and encompassing the G-Band (0.1 mm to 3 mm wavelength) are considered to be quasi-optical. Spec. ¶ 10.

Appeal Br. 6, citing Volkov, col. 74, ll. 16–22. Appellant points out that Volkov discloses that its use of millimeter and sub-millimeter wavelengths provide superior propagation in poor weather conditions, including in rain and fog. *Id.* Appellant argues that, notwithstanding a single reference in Volkov to the possibility that an example of its systems might be used to detect ice, a person of ordinary skill in the art would not view Volkov as teaching or suggesting using the radiation wavelengths disclosed as being suitable for creating reflection from supercooled large droplets in a cloud. *Id.* Instead, according to Appellant, the focus in Volkov is on penetrating or seeing through targets. *Id.* at 7. Appellant thus assigns error to the proposed combination of Ray and Volkov. *Id.*

Appellant has the better position here. Although we agree with the Examiner that, were the Ray system modified to use quasi-optical radiation as disclosed in Volkov, the modified system would have the capability of detecting supercooled large droplets, the teachings of Volkov that involve imaging in adverse weather conditions such as fog are, in the main, seeking to "see" or image objects other than the fog itself. *See, e.g.*, Volkov, col. 74, ll. 48–49 (inland waterway navigation in fog). Thus, even though the radiation contemplated for use by Volkov is or includes quasi-optical wavelength radiation (col. 3, l. 66 "wavelength between about 0.1 and about 10 mm"), Volkov's focus on penetrating substances or objects which obstruct visual observation, such as clouds in the case of Ray, appears to have resulted in Volkov's lack of recognition that certain of those wavelengths, particularly at the lower end of the disclosed range, might not be especially effective at penetrating completely through certain vision-obstructing objects, and would instead be absorbed or reflected. As such,

neither Volkov nor Ray appears to provide sufficient indication to a person of ordinary skill in the art that wavelengths in the quasi-optical range would potentially be useful, for example, in a cloud characterization system as disclosed in Ray. In addition, although Volkov evidences the common knowledge that different objects irradiated by radiation of a particular wavelength will have different reflection and attenuation characteristics, Volkov does not, for example, provide any particular examples or general conditions that might lead a person of ordinary skill in the art to consider using subsets of the overall range of wavelengths for purposes other than penetrating obstructive media and instead analyzing that media in some manner.

Accordingly, we do not sustain the rejection of claim 1 as being unpatentable over Ray and Volkov. Independent claim 1 involves a method essentially performed by the system set forth in claim 1, and the rejection is not sustained as to that claim, either. Claims 2, 4–6, 9, 11, 13–15, and 18–20 depend either directly or indirectly from one of claims 1 and 10, and the rejection is not sustained as to those claims as well.

Claims 3 and 12--§ 103--Ray/Volkov/Huguenin

The Examiner does not rely on Huguenin in any manner that cures the deficiency in the proposed combination of Ray and Volkov. The rejection of claims 3 and 12 is not sustained.

Claims 7 and 16--§ 103--Ray/Volkov/Khammouni

The Examiner does not rely on Khammouni in any manner that cures the deficiency in the proposed combination of Ray and Volkov. The rejection of claims 7 and 16 is not sustained.

Claims 8 and 17--§ 103--Ray/Volkov/Thomson

The Examiner does not rely on Thomson in any manner that cures the deficiency in the proposed combination of Roy and Volkov. The rejection of claims 8 and 17 is not sustained.

DECISION

The rejections of claims 1–20 under 35 U.S.C. § 103 are reversed.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2, 4–6, 9–11, 13–15, 18–20	103	Ray, Volkov		1, 2, 4–6, 9–11, 13–15, 18–20
3, 12	103	Ray, Volkov, Huguenin		3, 12
7, 16	103	Ray, Volkov, Khammouni		7, 16
8, 17	103	Ray, Volkov, Thomson		8, 17
Overall Outcome				1–20

REVERSED