



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/785,915	10/21/2015	Lyutsia DAUTOVA	62082US02-U173-012157	7141
12208	7590	09/11/2020	EXAMINER	
Kinney & Lange, P.A. 312 South Third Street Minneapolis, MN 55415			KIM, YUNJU	
			ART UNIT	PAPER NUMBER
			1742	
			NOTIFICATION DATE	DELIVERY MODE
			09/11/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPatDocket@kinney.com
amkoenck@kinney.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LYUTSIA DAUTOVA, SERGEY MIRONETS,
AGNES KLUCHA, and WENDELL V. TWELVES

Appeal 2019-006412
Application 14/785,915
Technology Center 1700

Before JEFFREY B. ROBERTSON, N. WHITNEY WILSON, and
JANE E. INGLESE, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner’s July 6, 2018 decision to finally reject claims 1–19 (“Final Act.”). We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as United Technologies Corporation (Appeal Br. 2).

CLAIMED SUBJECT MATTER

Appellant's disclosure is directed to an additive manufacturing system which comprises a build chamber, a powder bed additive manufacturing device disposed in the build chamber, and a powder contamination detection system (Abstract). The powder contamination detection system is in communication with an atmosphere in the build chamber (*id.*). An analyzer/controller evaluates the resulting powder contamination signals to identify constituent components of gases, including those indicative of powder contamination (Spec. 3). Details of the claimed system are set forth in independent claim 1, which is reproduced below from the Claims Appendix of the Appeal Brief:

1. An additive manufacturing system comprising:
 - a build chamber;
 - a powder bed additive manufacturing device disposed in the build chamber, the device comprising:
 - a raw material storage chamber;
 - a working surface for receiving individual layers of raw material powder from the storage chamber;
 - and
 - an energy source for consolidating the individual layers of raw material powder into a freeform object in the build chamber, the consolidated raw material powder generating a first gas byproduct corresponding to a composition of the raw material powder and a second gas byproduct corresponding to at least one contaminant in the raw material powder; and
 - a real-time powder contamination detection system in communication with an atmosphere in the build chamber and a sample port, the detection system configured to detect the second gas byproduct and differentiate the second gas byproduct from the first gas byproduct to identify at least one

aspect of contamination of the raw material powder in the build chamber.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Syassen	EP 2 730 353 A1	May 14, 2014
Powell et al.	US 2006/0203239 A1	September 14, 2006

REJECTION

Claims 1–19 are rejected under 35 U.S.C. § 103 as unpatentable over Syassen in view of Powell.

OPINION

Appellant argues only independent claims 1 and 12 (see Appeal Br. Brief filed January 7, 2019, hereinafter “Appeal Br.,” 7–8). Accordingly, we select claim 1 as representative and decide this appeal based on its rejection over Syassen in view of Powell.

The Examiner finds that Syassen discloses an additive manufacturing system comprising each of the claimed limitations, except for the following: (a) the consolidated raw material powder generates a gas byproduct corresponding to a contaminant in the raw material powder, (b) the detection system is configured to detect the second gas byproduct and differentiate the second gas byproduct from the first gas byproduct to identify at least one aspect of contamination of the raw material powder in the build chamber; (c) the powder contamination detection system is a real-time powder contamination detection system, and the real-time powder contamination detection system in communication with an atmosphere in the build chamber

and (d) a sample port (Final Act. 6–7, citing Syassen FIG. 1, and ¶¶ 1, 13, 45–47, and 51). The Examiner then determines that:

[I]n the same field of endeavor, real-time gas sampling and spectral analysis, Powell et al. teach that semiconductor manufacturing has adopted various telemetry techniques utilizing mass spectrometry or spectrographic analysis to improve the cleaning, conditioning or operation of reaction chambers . . . , and Reaction chambers that operate at pressures significantly below atmospheric pressure can be monitored for contamination with ambient or atmospheric gases.

Therefore, one of ordinary skill in the art would consider that the system would necessitate the detection of the raw powder material contamination, and it would be obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Syassen with the teachings of Powell et al. so that the skilled artisan would configure the gas detection system of Syassen to detect and analyze a second gas byproduct corresponding to at least one contaminant in the raw material powder in order to improve the cleaning, conditioning or operation of reaction chambers. One would appreciate that the system of the combination is capable of differentiating the second gas byproduct from the first gas byproduct to identify at least one aspect of contamination of the raw material powder in the build chamber from analyzing the gas byproducts.

As to (c), it would be obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to consider that the apparatus of Syassen is capable of detecting/controlling the gas atmosphere in the build chamber since Syassen teaches that the control is practiced at least during each of the laser or particle beam irradiation steps, so that the skilled artisan would operate the powder contamination detection system in real-time for the purpose of detecting/controlling the gas atmosphere in real time in order to reduce the defect of the object.

As to (d), it would be obvious to one of ordinary skill in the art before the effective filing date of the invention to modify the system of Syassen so that the skilled artisan would make the

detector outside the build chamber connected by a sample port to the build chamber in order to take a sample gas from the build chamber and detect the gas composition, also it would be obvious since it has been held that the change in form or shape, without any new or unexpected results, is an obvious engineering design.

(*id.* at 8–9, citations omitted).

Appellant argues that Syassen does not provide an indication of how contamination of the raw material affects the process, and that Syassen does not suggest any way to recognize or remediate localized contamination of the raw material powder from the storage chamber (Appeal Br. 7).

Appellant further argues that Syassen is concerned with how the atmosphere in the build chamber might affect the object being built, but not possible contamination in the raw material powder (*id.*).

This argument is not persuasive, essentially for the reasons articulated by the Examiner at pages 3–4 of the Answer. In particular, while Syassen might specifically be measuring the composition of the atmosphere in the build chamber, the rejection is premised on a combination of the teachings of Syassen and Powell, as set forth in the rejection. That is, a person of skill in the art would have configured the gas detection system of Syassen as suggested by Powell to detect and analyze a second gas byproduct corresponding to at least one contaminant in the raw material powder in order to improve the cleaning, conditioning or operation of reaction chambers. Powell explicitly states that the gas that it samples and measures “may be representative of material supplied to the reaction chamber” (i.e. the raw material powder) (Powell, ¶ 18).

Appellant further argues that neither Syassen nor Powell disclose “the location or extent of raw material contamination” (Appeal Br. 8). However, as noted above, Powell specifically notes that the material gas may be representative of raw material contamination, and thus would necessarily disclose the extent of raw material contamination. Thus, contrary to Appellant’s argument, Powell specifically indicates that its analysis can be used to measure raw material contamination.

Accordingly, we determine that Appellant has not demonstrated reversible error in the rejection.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–19	103	Syassen, Powell	1–19	

TIME PERIOD FOR RESPONSE

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).

AFFIRMED