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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ALLEN J. BARTLETT, MICHAEL A. DRISCOLL, MICHAEL J. EACOBACCI JR., WILLIAM L. JOHNSON, ROBERT P. SULLIVAN, SERGEI SYSSOEV, MARK A. STIRA, and JOHN J. CASELLO

Appeal 2019-001638
Application 12/008,985
Technology Center 3700

Before ANNETTE R. REIMERS, BRANDON J. WARNER, and LEE L. STEPINA, *Administrative Patent Judges*.

STEPINA, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1, 4, 14, 60–62, 64, 65, and 67.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Brooks Automation, Inc. Appeal Br. 3.

[2] Claims 2, 3, 5–13, 15–59, 66, and 68–70 are cancelled. Appeal Br. 18–20 (Claims App.).

CLAIMED SUBJECT MATTER

The claims are directed to a cryopump including a housing with a drain hole covered by a baffle that directs gases traversing through the drain hole away from non-primary second stage condensing surfaces. Spec. 4:11–24.

Claim 14, reproduced below, is illustrative of the claimed subject matter.

> 14. A cryopump comprising:
> a vacuum vessel;
> a refrigerator having at least a first stage and a second stage;
> a radiation shield mounted within the vacuum vessel and enclosing second stage cryopumping surfaces, the radiation shield and the second stage cryopumping surfaces configured to be cooled by the refrigerator of the cryopump, the radiation shield comprising:
> a housing including a primary opening, an end opposite the primary opening, and a lateral side wall connected to the end, a frontal array being across the primary opening and the housing having an inner surface facing the second stage cryopumping surfaces and having an interior volume sufficient to hold the second stage cryopumping surfaces, the second stage cryopumping surfaces including primary second stage condensing surfaces and non-primary second stage condensing surfaces;
> a drain hole located in a center region of the end of the housing to permit cryogenic liquid and gas to traverse therethrough during a regeneration operation, the drain hole providing for fluid communication between the interior volume of the housing and an annular space between the vacuum vessel and the radiation shield; and
> a baffle: (a) directly connected to the inner surface of the end of the radiation shield housing to extend across the drain hole and to cover the drain hole, wherein the

> baffle and the inner surface of the end of the radiation shield housing define a channel having two ends, the drain hole being in fluid communication with the channel at a location between the two ends and (b) configured to direct gases traversing through the drain hole away from the non-primary second stage condensing surfaces.

Appeal Br. 18–19 (Claims App.).

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Bergquist	US 4,785,666	Nov. 22, 1988
Bartlett	US 5,156,007	Oct. 20, 1992
Schlenga	US 2007/0022761 A1	Feb. 1, 2007

REJECTIONS

I. Claims 1, 4, 14, 60–62, 64, 65, and 67 are rejected under 35 U.S.C. § 103(a) as unpatentable over Bartlett and Schlenga.

II. Claims 1, 4, 14, 60, 62, 64, and 65[3] are rejected under 35 U.S.C. § 103(a) as unpatentable over Bartlett and Bergquist.

[3] The heading for this rejection lists claim 66, but not claim 65, as included in the rejection. Final Act. 8. As claim 66 has been cancelled, and the body of the rejection addresses the elements recited in claim 65, we understand this to be a typographical error and that the rejection includes claim 65.

OPINION

Rejection I–Bartlett and Schlenga

The Examiner finds that Bartlett discloses many of the elements recited in claim 14, but does not disclose a baffle that meets the location and functional requirements recited in the last clause of the claim. Final Act. 3–4. Addressing this deficiency, the Examiner finds that Schlenga teaches a baffle (splash protection surface 33) directly connected to an inner surface of a cryogenic housing and extending across a hole (entry of refrigerator space 4). *Id.* at 4; *see also* Schlenga, Fig. 3. The Examiner reasons that modifying the cryopump of Bartlett to include the baffle disclosed by Schlenga, in the location recited in claim 14, would (i) provide improved radiation shielding of the inside of the cryopump and (ii) provide control of a flow of gas therethrough. *Id.* (citing Schlenga ¶ 22).

Appellant argues that the Examiner's reasoning is not supported by rational underpinnings because Bartlett merely discloses an uncovered hole in the bottom of its radiation shield, and a person of ordinary skill in the art would not have had any reason to implement Schlenga's splash protection surface as a cover for this hole. *See* Appeal Br. 11–12. Appellant contends that there is no reason to provide additional radiation shielding to Bartlett's existing radiation shield (which includes the hole the Examiner proposes to cover with a baffle). In this regard, Appellant notes that there is no indication that the hole in Bartlett's radiation shield poses a problem, and, in fact, Schlenga leaves openings in various parts of its own radiation shields. *Id.* at 12 (citing Schlenga, Figs. 1, 3). As to the Examiner's second rationale for the proposed modification, the control of gas flow, Appellant asserts this comes only "from inventors' discovery that the prior art drain hole

contributed to gas condensation on undesirable surfaces of the secondary array," and, therefore, is based on impermissible hindsight. *Id.*

In response, the Examiner finds the systems in Bartlett and Schlenga are similar, stating:

> The context of Schlenga is directly applicable because the problem of preventing thermal heat leak through an opening in a cryogenic container and also of redirecting of straight through flows through the opening is extremely similar thermally and mechanically to the context of Bartlett where there is an opening in a cryogenic enclosure structure that permits thermal radiation from a warmer exterior into a colder interior and has occasional undesired flows therethrough.

Ans. 10. The Examiner further states, "[t]here is no evidence to the support the implication of the Appellant that there would be no benefit from blocking thermal radiation through the drain hole with a baffle." *Id.* at 11. As to Appellant's argument regarding the existence of holes in Schlenga's radiation shield, the Examiner finds that Schlenga also teaches "blocking thermal radiation from warm exteriors into cold enclosures is highly desirable by teaching explicitly that even small holes are prevented from 'seeing' warmer exterior regions directly." *Id.* at 12. Thus, according to the Examiner, the holes in Schlenga's radiation shield are blocked with respect to radiation.[4]

In reply, Appellant reiterates that there does not appear to be any need in Bartlett to provide a radiation shield over the unmarked hole at the bottom of radiation shield 9. Reply Br. 9–10. In this regard, Appellant states,

[4] Aside from splash protection, one purpose of Schlenga's splash protection surface 33 is to insulate the cryogenic fluid tank from the refrigerator unit. Schlenga ¶¶ 6–9, 17, 22.

"Bartlett teaches absolutely nothing about the drain hole, and does not even mention the entry of any gases therethrough." *Id.* at 15.

Appellant also notes that Schlenga's system is designed to protect a cryogenic fluid from heat flow into the fluid in the instance of a failure of the refrigerator. Reply Br. 9–10. According to Appellant, "[e]ven in this critical context, most of Schlenga's radiation shields have holes in them—just as there is an uncovered hole in the radiation shield of the primary Bartlett reference." *Id.* at 10.

Appellant has the better position. Contrary to the Examiner's finding that Schlenga discloses that "even small holes are prevented from 'seeing' warmer exterior regions directly" (Ans. 12), Figure 3 of Schlenga depicts open space (between pins 35), which appears to directly expose the interior of cryogenic tank 2, and its associated cryogenic fluid, to refrigerator space 4. Schlenga ¶ 48. Thus, some radiation may pass between the two areas intended to be kept isolated by splash protection shield 33. Figure 1 of Schlenga shows a similar arrangement in which radiation shield 5 includes openings 11, directly exposing the cryogenic fluid to refrigeration space 4 as well as refrigerator 6. In other words, Schlenga allows for the presence of openings between spaces intended to be isolated. Thus, we agree with Appellant that there is insufficient evidence to support the Examiner's finding that, based on the teachings of Schlenga, a person of ordinary skill in the art would have been motivated to cover the hole in the bottom of radiation shield 9 of Bartlett.

Bartlett discloses a hole in the bottom of radiation shield 9, but, as Appellant points out, Bartlett does not discuss the function of this hole. Indeed, Bartlett does not provide a reference number to identify the hole

relied upon by the Examiner. The Examiner does not identify any portion of Bartlett that supports a finding that, during operation, gas flows through the hole in the bottom of radiation shield 9. *See* Final Act. 3–4. The only indication that gas flows through this hole and presents a problem is in Appellant's Specification. *See* Spec. 10:18–11:3. Thus, the Examiner's reasoning that a person of ordinary skill in the art would have found it obvious to implement splash protection surface 33 of Schlenga as a baffle in the system of Bartlett *to direct gas flow* appears to be based on Appellant's disclosure. Accordingly, we agree with Appellant that this portion of the Examiner's rejection relies on impermissible hindsight, and, therefore, we do not sustain the rejection of claim 14, and claims 1, 4, 60–62, 64, 65, and 67 depending therefrom, as unpatentable over Bartlett and Schlenga.

Rejection II–Bartlett and Bergquist

In Rejection II, the Examiner again relies on Bartlett to teach many of the elements of claim 14, but relies on Bergquist to teach "a baffle (46) directly connected to a cryogenic housing (44) to extend across a hole (42) and to cover the hole (42)." Final Act. 6. The Examiner articulates the same rationales for modifying the system of Bartlett as set forth in Rejection I, namely, (i) improved radiation shielding, and (ii) control of the direction of gas flow. *See id.* at 7.

Appellant argues that Bergquist does not teach using baffle 46 to block radiation, and a person of ordinary skill in the art would have had no reason to add such a baffle to the system of Bartlett to do so. Appeal Br. 15.

In response, the Examiner finds that baffle 46 would function as a radiation shield, stating, "the mere location of the baffle of Bergquist does

provide the operation of blocking thermal radiation inherently." Ans. 13. The Examiner states:

> The rationale of the rejection is noting that those of ordinary skill in the art would recognize that radiation shielding is a literal and actual function of a baffle as explicitly shown by Schlenga and would recognize that there is a thermal benefit to blocking thermal radiation from warmer areas outside a radiation shield enclosure through an opening into the enclosure.

Id. at 14. The Examiner does not identify, and we do not find, any explicit disclosure in Bergquist regarding any radiation blocking function of baffle 46. Thus, the Examiner relies on the inherent radiation-blocking ability of baffle 46 as providing rational underpinnings for the reason to modify the system of Bartlett.

Appellant has the better position because, as discussed above, the Examiner does not provide any evidence that the unlabeled hole in the bottom of radiation shield 9 of Bartlett would benefit from additional radiation shielding. Nor does Bergquist provide any reason for adding additional radiation shielding via baffle 46, which is provided by Bergquist for directing gas flow, not for blocking radiation. Consequently, neither reference would appear to support the Examiner's rationale based on radiation blocking.

As to the Examiner's second rationale, Appellant argues that "Applicant, not Bergquist, provides the motivation to place a baffle over the drain hole in Bartlett—namely, the recognition that there can be undesirable accumulation of condensate on the underside of the array—on non-primary condensing surfaces." Appeal Br. 15.

In response, the Examiner states, "Bergquist explicitly teaches that providing baffle covering an opening in a radiation shield of a cryopump does provide the ability to redirect gases that flow through the opening. There is nothing from the application that is relied upon in making the combination of the obviousness rejection." Ans. 14.

In reply, Appellant argues that "Bartlett teaches absolutely nothing about the drain hole, and does not even mention the entry of any gases therethrough. The Examiner's entire analysis is contaminated with hindsight bias and should be rejected." Reply Br. 15.

We agree with the Examiner that Bergquist teaches redirecting gas flow via baffle 46. *See* Bergquist 7:44–61. However, absent any indication that the hole in the bottom of radiation shield 9 of Bartlett receives a flow of gas, Bergquist's disclosure of redirecting gas flow does not provide an adequate basis for the Examiner's proposed rejection. In other words, the Examiner has not established that the gas redirection function of baffle 46 of Bergquist would have any effect on gas flow, much less a beneficial one, when placed over the unlabeled and undescribed hole in the bottom of Bartlett's radiation shield 9. For the reasons discussed above, we do not sustain the rejection of claim 14, and claims 1, 4, 60, 62, 64, and 65 depending therefrom, as unpatentable over Bartlett and Bergquist.

CONCLUSION

The Examiner's rejections are reversed.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 4, 14, 60–62, 64, 65, 67	103(a)	Bartlett, Schlenga		1, 4, 14, 60–62, 64, 65, 67
1, 4, 14, 60, 62, 64, 65	103(a)	Bartlett, Bergquist		1, 4, 14, 60, 62, 64, 65
Overall Outcome				1, 4, 14, 60–62, 64, 65, 67

REVERSED