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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* LOUIS CHIAPPETTA JR., PARMESH VERMA,  
and THOMAS D. RADCLIFF

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Appeal 2019-006104  
Application 14/003,559  
Technology Center 3700

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Before HUBERT C. LORIN, NINA L. MEDLOCK, and  
MATTHEW S. MEYERS, *Administrative Patent Judges*.

MEDLOCK, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1–14 and 17–21, which are all the pending claims in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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<sup>1</sup> We use the term “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Our decision references Appellant's Appeal Brief (“Appeal Br.,” filed February 11, 2019) and Reply Brief (“Reply Br.,” filed August 12, 2019), and the Examiner's Answer (“Ans.,” mailed June 11, 2019), and Final Office Action (“Final Act.,” mailed September 6, 2018). Appellant identifies Carrier Corporation as the real party in interest (Appeal Br. 2).

## CLAIMED INVENTION

Appellant’s claimed invention “relates to refrigeration” and, more particularly, to “ejector refrigeration systems” (Spec. ¶ 3).

Claims 1, 11, 12, and 14 are the independent claims on appeal.<sup>2</sup>

Claim 1, reproduced below with bracketed notations and emphasis added, is representative of the subject matter on appeal:

1. An ejector (300) comprising:
  - a primary inlet (40) for admitting a liquid or supercritical or two-phase motive flow;
  - a secondary inlet (42);
  - an outlet (44);
  - a primary flowpath from the primary inlet;
  - a secondary flowpath from the secondary inlet;
  - a mixer convergent section (114) downstream of the secondary inlet; and
  - a motive nozzle (100) surrounding the primary flowpath upstream of a junction with the secondary flowpath and having an exit (110),
    - wherein the ejector further comprises:
      - means (340) for introducing swirl* to the motive flow prior to mixing with a saturated or superheated vapor or two-phase secondary flow from the secondary flowpath; and

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<sup>2</sup> Claim 11 recites “[a] vapor compression system comprising: [. . .] the ejector of claim 1.” The Examiner ostensibly characterizes claim 11 as a dependent claim; yet, the claim appears to have been drafted in a “shorthand” format to avoid rewriting the particulars of the apparatus of claim 1, and not to further define the claimed apparatus recited in claim 1 — an indication that claim 11 is an independent claim. *See Ex parte Porter*, 25 USPQ2d 1144, 1145 (BPAI 1992). Claim 12 recites “[a] method for operating the system of claim 11” — a similar indication that claim 12 is an independent, rather than dependent, claim. This does not, however, affect our analysis here.

a control needle, wherein the means is selected from the group consisting of:

[(option A)] *the means mounted on the needle to move therewith; and*

[(option B)] *the means through which the control needle slides.*

(Appeal Br. 17 (Claims Appendix)).

### REJECTIONS

Claims 1–8, 11, 12, 14, 17, 18, and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over Applicant Admitted Prior Art (“AAPA”) and Wittrisch (US 6,210,123 B1, issued Apr. 3, 2001).

Claims 9, 10, 19, and 20 are rejected under 35 U.S.C. § 103(a) as unpatentable over AAPA, Wittrisch, and Alansary (US 2010/0276517 A1, published Nov. 4, 2010).

Claim 13 is rejected under 35 U.S.C. § 103(a) as unpatentable over AAPA, Wittrisch, and Takeuchi et al. (US 2001/0025499 A1, published Oct. 4, 2001) (“Takeuchi”).

### ANALYSIS

#### *Independent Claims 1 and 11 and Dependent Claims 2–8 and 21*

We are persuaded, as detailed below, that the Examiner erred in rejecting independent claims 1 and 11 under 35 U.S.C. § 103(a) (Appeal Br. 8–13; Reply Br. 1–5).

Claim 1 is directed to an ejector comprising, *inter alia*, “means (340) for introducing swirl to the motive flow” and “a control needle,” and recites that “the means [for introducing swirl to the motive flow] is selected from the group consisting of: [(option A)] the means mounted on the [control]

needle to move therewith; and [(option B)] the means through which the control needle slides.” Claim 11 recites a vapor compression system comprising, *inter alia*, “the ejector of claim 1,” and, thus, includes language identical to that of claim 1.

In rejecting claims 1 and 11 under 35 U.S.C. § 103(a), the Examiner cites AAPA as disclosing substantially all the claim elements. But, the Examiner acknowledges that AAPA fails to disclose a “means for introducing swirl to the motive flow” (Final Act. 5). The Examiner cites Wittrisch to cure the deficiency of AAPA (*id.* at 5–6). And the Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time of Appellant’s invention to modify the ejector of AAPA “to add means for introducing swirl to the motive flow . . . wherein the means is selected from a group consisting of the means through which the control needle slides, as taught by Wittrisch, in order to rotate the motive fluid within the nozzle and[,] thus[,] improve the efficiency of the pump” (*id.*).

Wittrisch is directed to a jet pumping device comprising an injection nozzle for injecting a working fluid, and discloses, with reference to Figures 3a and 3b, “a variant wherein the nozzle comprises[,] internally[,] . . . means for rotating the working fluid stream” (Wittrisch at 3:35–38). Wittrisch discloses that the rotation means can be achieved in multiple ways; thus, for example, in Figure 3b, blades 22 are inclined in relation to longitudinal axis 20 and fastened to a central core 23 so as to form a stationary turbine that will force the working fluid to rotate around the longitudinal axis (*id.* at 3:43–56). Figure 5b similarly shows a variant in which the nozzle is internally equipped with a stationary turbine 22 and outer blades 24 (*id.* at 5:35–38).

The Examiner opines, with respect to option A, that the “means for introducing swirl to the motive flow” of Wittrisch, i.e., Wittrisch’s stationary turbine 22, “when combined with AAPA, would be placed on the [control] needle (132)” of AAPA because:

based on the location of the needle in AAPA (prior to the mixing area downstream of 110, FIG. 1), said means would have to be placed at a location in the system prior to the mixing of the motive and gaseous flow in order to provide the rotation to the motive flow, which improves the efficiency of the pump

(Final Act. 6). And the Examiner concludes, with respect to option B, that because:

the turbine (22, FIG. 5B) of Wittrisch is stationary (col 2, lines 13–14), one of ordinary skill in the art would find it obvious to slide the needle of AAPA through the turbine of Wittrisch, to allow the vanes to be mounted prior to placing the system (22 and 23) into the annular space 3 (FIG. 3B) resulting in the rotation of the motive fluid

(*id.* at 5–6).

The Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (quoted with approval in *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007)).

The Examiner posits here that modifying AAPA to include a means for introducing swirl to the motive flow would “improve the efficiency of the pump” (Final Act. 5). Yet, the Examiner does not adequately explain why or in what way the efficiency of the pump is improved. Nor does the

Examiner adequately explain why a person of ordinary skill in the art would have had an apparent reason to modify the ejector of AAPA to include Wittrisch's stationary turbine 22 in either of the claimed configuration options, absent impermissible hindsight.

As to option A, the Examiner's articulated reason, as described above, for mounting Wittrisch's stationary turbine 22 on the control needle 132 of AAPA is that "said means would have to be placed at a location in the system prior to the mixing of the motive and gaseous flow in order to provide the rotation to the motive flow" (Final Act. 6). It, however, is not readily apparent why placing the turbine "prior to the mixing of the motive and gaseous flow" would necessarily involve mounting the turbine on the control needle to move therewith, as opposed to some other configuration.

As to option B, the Examiner's articulated reason for modifying the ejector of AAPA to include Wittrisch's stationary turbine 22 such that AAPA's control needle 132 slides through the turbine is "to allow the vanes to be mounted prior to placing the system (22 and 23) into the annular space 3" (Final Act. 6). But, we do not see why, and the Examiner does not adequately explain why, allowing the vanes to be mounted prior to placing the system into the annular space would necessarily involve the control needle sliding through the turbine, as opposed to some other configuration.

Responding to Appellant's arguments, the Examiner takes the further position in the Answer that:

Wittrisch teaches means (turbine 22, FIG. 5B) through which the control needle slides (central core 23, FIG. 3B) in order to force the working fluid to rotate around the longitudinal axis (col 3, lines 52–57). The central core is clearly interpreted as the needle as it provides the necessary mounting surface, centrally located, upon which the turbine is mounted (FIG. 3B).

(Ans. 11). Yet, to the extent the Examiner relies on Wittrisch as disclosing or suggesting the sliding configuration of claim 1 (i.e., option B), we agree with Appellant (Reply Br. 2) that Wittrisch does not disclose that central core 23, which the Examiner equates to the control needle, slides through stationary turbine 22. *See* Wittrisch at 3:52–56 (describing blades 22 “fastened to a central core 23 so as to form a *stationary* turbine”) (emphasis added).

In view of the foregoing, we do not sustain the Examiner’s rejection of independent claims 1 and 11 under 35 U.S.C. § 103(a). For the same reasons, we also do not sustain the Examiner’s rejection of dependent claims 2–8 and 21. *Cf. In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (“dependent claims are nonobvious if the independent claims from which they depend are nonobvious”).

#### *Independent Claim 12*

Independent claim 12 recites “[a] method for operating the system of claim 11” comprising four distinct method steps. The entire basis of the Examiner’s rejection of claim 12 is that “it is rejected based on the rejection of [the] apparatus as explained in the rejection of claim 11 above[,] and the associated method steps, which follow directly from the use of the apparatus, are rejected accordingly” (Final Act. 8).

We find that the Examiner has not established a *prima facie* case of obviousness. Critically, the Examiner does not make any finding that the prior art discloses the method steps recited in claim 12, which include, *inter alia*, “passing said saturated or superheated vapor or two-phase secondary flow of the refrigerant through the secondary inlet to merge with the motive flow.” Nor does the Examiner articulate any reasoning with rational



underpinning for modifying AAPA to arrive at the method recited in claim 12. Specifically, the Examiner does not provide any explanation as to why the claimed method steps “follow directly from the use of the apparatus.”

Therefore, constrained by the record before us, we do not sustain the Examiner’s rejection of claim 12 under 35 U.S.C. § 103(a).

*Independent Claim 14 and Dependent Claims 17 and 18*

Independent method claim 14 recites “[a] method for operating an ejector” including “passing the motive flow over redirecting surfaces . . . the redirecting surfaces are formed along vanes (242) selected from the group consisting of: [(option A)] vanes (242) mounted to the control needle; and [(option B)] vanes extending from a centerbody within which centerbody the control needle slides.”

Claim 14 stands rejected based on substantially the same rationale (regarding AAPA and Wittrisch) applied with respect to claim 1 (Final Act. 8–9). In particular, the Examiner finds that Wittrisch’s turbine blades 22 are equivalent to the claimed vanes, and the Examiner determines that “one of ordinary skill in the art would find it obvious to slide the needle of AAPA through the turbine of Wittrisch, to allow the vanes to spin resulting in the rotation of the motive fluid” and “in order to rotate the motive fluid within the nozzle and thus improve the efficiency of the pump” (*id.* at 9).

It is not apparent why allowing the vanes to spin would necessarily involve sliding the control needle through the stationary turbine. The Examiner’s reasoning also does not take into account that Wittrisch’s

stationary turbine 22 already forces the working fluid to rotate, i.e., without apparent rotation of the turbine’s blades. *See* Wittrisch at 3:52–56.

In view of the foregoing, we do not sustain the Examiner’s rejection of independent claim 14 and dependent claims 17 and 18.

*Dependent Claims 9, 10, 13, 19, and 20*

Each of claims 9, 10, 13, 19, and 20 depends, directly or indirectly, from one of independent claims 1, 12, and 14. The rejections of these dependent claims do not cure the deficiencies in the corresponding rejections of independent claims 1, 12, and 14. Therefore, we do not sustain the rejections under 35 U.S.C. § 103(a) of dependent claims 9, 10, 13, 19, and 20 for the same reasons set forth above with respect to the corresponding independent claims.

CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1–8, 11, 12, 14, 17, 18, 21	103(a)	AAPA, Wittrisch		1–8, 11, 12, 14, 17, 18, 21
9, 10, 19, 20	103(a)	AAPA, Wittrisch, Alansary		9, 10, 19, 20
13	103(a)	AAPA, Wittrisch, Takeuchi		13
<b>Overall Outcome</b>				1–14, 17–21

REVERSED