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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ANUBHAV TRIPATHI,
STEPHANIE E. MCCALLA, and JINKEE LEE

Appeal 2018-003031
Application 13/731,338
Technology Center 1600

Before DONALD E. ADAMS, JEFFREY N. FREDMAN, and
JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.

ADAMS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from Examiner's
decision to reject claims 6–15. 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. Appellant identifies the real party in interest as “Brown University” (Appellant’s August 21, 2017 Appeal Brief (Appeal Br.) 2).

STATEMENT OF THE CASE

Appellant's disclosure relates to "a diffusion-limiting reactor having a first element and a closure element, said reactor having at least two interconnected reservoirs said interconnection being by non-impinging microchannel, and at least one said reservoir and said microchannel being magnetic accessible" and "a method of sample separation" (Spec.² 1: 15–19). Claim 12 is representative and reproduced below:

12. A method of sample separation comprising:

providing a diffusion-limiting reactor comprising a non-impinging microchannel connected at a first end to a first reservoir and connected at a second end to a second reservoir,

wherein the microchannel is tapered such that the first end is wider than the second end;

mixing a sample with a plurality of magnetic beads in the first reservoir to affix samples to magnetic beads;

applying a permanent magnet to the first reservoir to attract the sample affixed magnetic beads and form a magnetic complex;

using the permanent magnet to move the magnetic complex from the first reservoir and through the non-impinging microchannel; and

depositing the magnetic complex in the second reservoir, thereby separating the sample.

(Appeal Br. 14.)

² Appellant's February 5, 2013 Specification.

Grounds of rejection before this Panel for review:

Claims 6 and 10–15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Beebe³ and Kelso.⁴

Claims 6–15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Beebe, Kelso, and Vorpahl.⁵

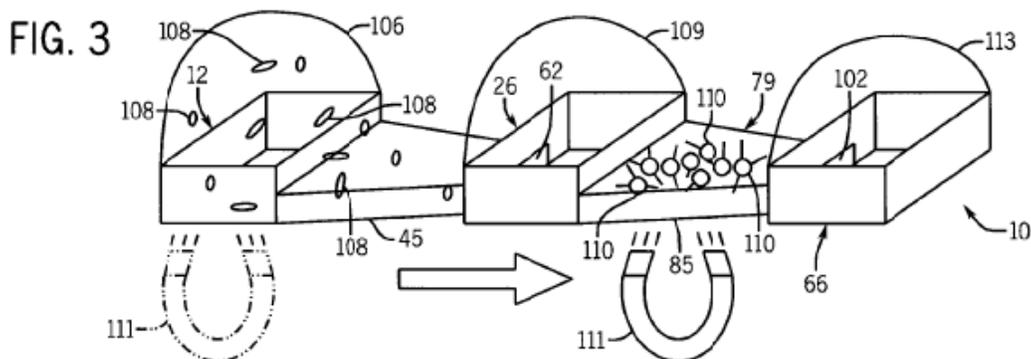
ISSUE

Does the preponderance of evidence relied upon by Examiner support a conclusion of obviousness?

FACTUAL FINDINGS (FF)

FF 1. Beebe relates “to a device for and a method of extracting a fraction from cultured cells, tissue samples and other biological materials” (Beebe ¶ 1; *see generally* Ans.⁶ 2).

FF 2. Beebe’s Figure 3 is reproduced below:



Beebe’s “FIG. 3 is an isometric view of [Beebe’s] device” (Beebe ¶ 18; *see* Ans. 2).

³ Beebe et al, US 2011/0213133 A1, published Sept. 1, 2011.

⁴ Kelso et al., US 2009/0246782 A1, published Oct. 1, 2009.

⁵ Vorpahl, US 5,279,936, issued Jan. 18, 1994.

⁶ Examiner’s October 3, 2017 Answer.

FF 3. Beebe discloses that, in operation, “an appropriate reagent is added to biological sample 106 and mixed such that [a] fraction . . . binds to a solid phase substrate[, such as paramagnetic material that is attracted to a corresponding magnetic field,] in the reagent to form fraction-bound solid phase substrate,” wherein

In order to extract fraction-bound solid phase substrate 110 from biological sample 106, a force to which the solid phase substrate is attracted is positioned adjacent, and preferably below, input well 12. As heretofore described, it is contemplated for the solid phase substrate to be a paramagnetic material attracted to a corresponding magnetic field. As such, in order to generate the magnetic field, magnet 111 is positioned below input well 12 such that fraction-bound solid phase substrate 110 is magnetically attracted thereto. Magnet 111 is sequentially moved: 1) below bottom wall 45 of first channel . . . such that fraction-bound solid phase substrate 110 are drawn into [the] first channel . . . ; 2) below [the] bottom wall . . . of phase-gate well 26 such that fraction-bound solid phase substrate 110 are drawn into phase-gate well 26 through output 62 of first channel . . . ; 3) below bottom wall . . . of second channel 79 such that fraction-bound solid phase substrate 110 are drawn into second channel 79 . . . , FIG. 3; and 4) below [the] bottom wall . . . of output well 66 such that fraction-bound solid phase substrate 110 are drawn into output well 66 through output 102 of second channel 79 It is intended to move magnet 111 from its initial position below input well 12 to a position below output well 66 in less than 10 seconds. However, other time periods are contemplated as being within the scope of the present invention.

(Beebe ¶¶ 28 and 30 (emphasis removed); *see* Ans. 2.)

FF 4. Beebe discloses that “the cross-sectional area of [the] input . . . to [the] first channel . . . is greater than the cross-sectional area of output 62 of [the] first channel” (Beebe ¶ 29; *see* Ans. 2).

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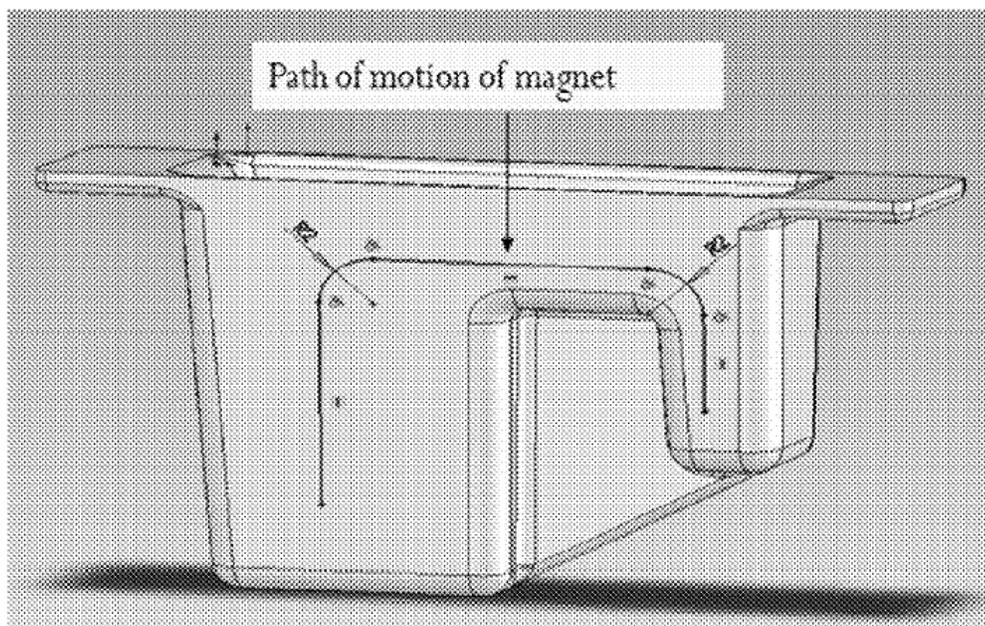
FF 5. Kelso “relates to systems, devices, and methods for performing biological reactions. In particular, the present invention relates to the use of hydrophobic, water-immiscible, or lipophilic barriers in sample separation, purification, modification, and analysis processes” (Kelso ¶ 3; *see generally* Ans. 3).

FF 6. Examiner relies on Kelso “as evidence that analyte separation using two reservoirs was known in the art” (Ans. 10).

FF 7. Kelso discloses that its “invention is not limited by the manner in which the chamber[s] are configured or separated from one another. The chambers may each be the same size and shape as one another or may be different sizes or shapes. A wide variety of configurations may be used” and channels may be used to separate reaction chambers (Kelso ¶ 11; *see* Ans. 3).

FF 8. Kelso’s Figure 13 is reproduced below:

FIGURE 13



Kelso's "FIG. 13 shows a schematic of a two-chamber cuvette used in some embodiments of [Kelso's] . . . invention" (Kelso ¶ 29; *see* Ans. 3).

FF 9. Kelso discloses experiments "performed in a two-chamber cuvette . . . designed to facilitate moving particles [associated with paramagnetic particles,] from the lysis buffer [in the left chamber] to the elution buffer" in the right chamber, wherein

[w]hen a magnet is placed on the side wall of the lysis chamber, particles are drawn to the wall forming a pellet. As shown in FIG. 13, the magnet is then moved up dragging the pellet along the wall through the lysis buffer The magnet is then moved laterally dragging the particles . . . until the pellet is above the elution chamber. Finally, the magnet is moved down dragging the particles . . . into the elution buffer.

(Kelso ¶ 241; *see id.* ¶ 97 (generally describing the use of paramagnetic particles); *see generally* Ans. 3.)

FF 10. Examiner finds that "Beebe and Kelso are silent regarding the viscosity relative to water . . ., viscosity enhancers . . ., and the rate of magnetic particle movement" and relies on Vorpahl to make up for these deficiencies in Beebe and Kelso (Ans. 5).

ANALYSIS

The combination of Beebe and Kelso:

Examiner finds that Appellant's "claims do not limit the structure, shape, size, dimensions or components of the first or second reservoir" (Ans. 7). Stated differently, the method of Appellant's claim 12 *comprises, inter alia*, two reservoirs connected by a microchannel that is tapered such that the first end is wider than the second end (*see* Appeal Br. 14). Appellant's use of the open transitional term "comprising," allows for the inclusion of additional elements and method steps (*see id.*).

Beebe discloses a three reservoir apparatus, wherein each reservoir is connected through a microchannel that is tapered such that a first end is wider than a second end (*see* FF 1–4). Thus, as discussed above, Beebe discloses an apparatus *comprising* two reservoirs (*see* Ans. 7 (Examiner finds that “Beebe clearly illustrates two reservoirs . . . connected by a non-impinging/tapered channel”)).

Beebe further discloses a method, wherein a first reservoir comprises sample mixed with a plurality of magnetic beads to affix the sample to the magnetic beads, a magnet is applied to the first reservoir to attract the sample affixed magnetic beads and form a magnetic complex, the magnet then used to move the magnetic complex from the first reservoir, through a non-impinging microchannel, thereby depositing the sample, magnetic complex, in a second reservoir (*see* FF 1–4).

In addition, Kelso, suggests a two reservoir apparatus, wherein a magnet is used to move sample affixed to magnetic beads from one reservoir to a second reservoir of the apparatus (FF 7–9). Thus, we agree with Examiner’s finding “that analyte separation using two reservoirs was known in the art” (FF 6).

For the foregoing reasons, we find no error in Examiner’s conclusion, based on the combination of Beebe and Kelso, that, at the time Appellant’s invention was made, it would have been *prima facie* obvious to use Beebe’s apparatus in a method of sample separation, as suggested by Beebe and Kelso (*see* Ans. 3; *see* FF 1–8).

For the foregoing reasons, we are not persuaded by Appellant’s contention that Beebe’s channels should be considered as part of Beebe’s reservoirs (Appeal Br. 6–7).

Beebe and Kelso both disclose an apparatus used to move sample affixed to magnetic beads from one chamber to another (*see* FF 1–5 and 7–9). Although Beebe discussed Kelso, and provided an alternative to Kelso, we are not persuaded by Appellant’s contention that Beebe teaches away from Kelso’s broad teaching that it was known in the art at the time of Appellant’s claimed invention to utilize a device *comprising* a first and second reservoir connected through a channel to magnetically move sample affixed to magnetic beads from a first reservoir to a second reservoir of the apparatus (*see* Appeal Br. 7–8; *cf.* FF 1–9).

As discussed above, Examiner found that Appellant’s “claims do not limit the structure, shape, size, dimensions or components of the first or second reservoir” (Ans. 7). In this regard, we note that Appellant’s claimed invention does not require that its two reservoirs are on the same plane (*see* Appeal Br. 14). Kelso discloses that its “invention is not limited by the manner in which the chamber[s] are configured or separated from one another” (FF 7). Beebe discloses one such alternative configuration, wherein chambers or reservoirs are connected by a channel on the same plane (FF 1–4). Therefore, we are not persuaded by Appellant’s contentions relating to Kelso’s disclosure of the “use of a two-axis system,” as illustrated in Kelso’s Figure 13 (Appeal Br. 8; *see generally* FF 8; *cf.* FF 2).

Because Appellant’s claimed invention is open to include more than one reservoir connected through a channel, we are not persuaded by Appellant’s contentions regarding Examiner’s alternative rationale relating to removing one of Beebe’s three reservoirs and channels to arrive at a two reservoir device connected by a single channel (*see* Appeal Br. 9–11; *cf.* Ans. 10 (“The position . . . that removing the phase gate would simplify the device of Beebe was merely an additional argument to support Examiner’s

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opinion that the instantly claimed method would have been obvious in view of Beebe and Kelso”)).

The combination of Beebe, Kelso, and Vorpahl:

Based on the combination of Beebe, Kelso, and Vorpahl, Examiner concludes that, at the time Appellant’s invention was made, it would have been prima facie obvious “to use fluids having different viscosities as taught by Vorpahl in the methods of Beebe and/or Kelso” and “use[] routine experimentation to adjust the magnetic field based on the geometry of device being used to thereby provide a rate of transport that optimized sample separation” (Ans. 6; *see* FF 1–10).

Appellant does not specifically address this rejection or the combination of Vorpahl with Beebe and Kelso. Therefore, having found no error in Examiner’s combination of Beebe and Kelso, as it relates to Appellant’s independent claim 12, we find no error in Examiner’s rejection of claim 12 over the combination of Beebe, Kelso, and Vorpahl.

CONCLUSION

The preponderance of evidence relied upon by Examiner supports a conclusion of obviousness.

The rejection of claim 12 under 35 U.S.C. § 103(a) as unpatentable over the combination of Beebe and Kelso is affirmed. Claims 6, 10, 11, and 13–15 are not separately argued and fall with claim 12.

The rejection of claim 12 under 35 U.S.C. § 103(a) as unpatentable over the combination of Beebe, Kelso, and Vorpahl is affirmed. Claims 6–11 and 13–15 are not separately argued and fall with claim 12.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
6, 10–15	103	Beebe, Kelso	6, 10–15	
6–15	103	Beebe, Kelso, Vorpahl	6–15	
Overall Outcome			6–15	

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).

AFFIRMED