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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte FABRICE CASSET
and ARNAUD MILLET

Appeal 2019-001424
Application 15/046,803
Technology Center 1700

Before JAMES C. HOUSEL, GEORGE C. BEST, and
SHELDON M. McGEE, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–15, 17, and 18 of Application 15/046,803. Final Act. (August 29, 2017). We have jurisdiction under 35 U.S.C. § 6(b).

For the reasons set forth below, we *reverse*.

¹ We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Commissariat a L’Energie Atomique et aux Energies Alternatives as the real party in interest. Appeal Br. 1.

BACKGROUND

The '803 Application describes a device for manipulating biological cells using a vibrating support and to a device for sorting biological cells. Spec. 1. In particular, the Specification describes apparatus and methods for sorting biological cells from the heterogeneous mixture without marking the cells prior to sorting. *Id.* According to the Specification, prior art techniques that allow sorting without prior marking do not have sufficient resolution. *Id.* at 1–2.

The apparatus described in the '803 Application sorts cells according to their adherence with respect to a surface. *Id.* at 2–3. Techniques using this sorting principal are known, but recovery of the cells that adhere to the surface may pose a problem. *Id.* at 2. The '803 Application's Specification describes a device having a support to which the cells adhere. *Id.* at 3. The apparatus also includes means to make the support vibrate at least one frequency—e.g., a piezoelectric actuator—so to apply an inertial force to the cells which have adhered to the support. *Id.* The inertial force is sufficient to release the cells from the support surface. *Id.*

Claim 1 is representative of the '803 Application's claims and is reproduced below from the Claim Appendix of the Appeal Brief

1. Device for manipulating biological cells distinguished by their adherence properties, comprising:

at least one support including a reception surface enabling the adherence of a plurality of cells having different adherence properties with respect to said reception surface, the support being a suspended membrane,

at least one actuator contacting said suspended membrane and configured to make said surface vibrate at [] least one natural frequency of the membrane, and

a controller configured to control said actuator such that the surface vibrates at a predetermined frequency correlated to adherence properties of at least one type of biological cells among said plurality of cells such that the predetermined frequency causing detachment of the at least one type of biological cells while not causing detachment of others of said plurality of cells.

Appeal Br. 8.

REJECTIONS

On appeal, the Examiner maintains² the following rejections:

1. Claims 1–13, 17, and 18 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Martin,³ Singh,⁴ and Fukui.⁵ Final Act. 4–8.
2. Claims 14 and 15 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Martin, Singh, Fukui, and Toner.⁶ Final Act. 8–9.
3. Claims 1–13, 17, and 18 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Fukui, Martin, and Singh. Final Act. 10–14.

² The Examiner has withdrawn the rejection of claims 6 and 17 under 35 U.S.C. § 112(b) as indefinite and the rejection of claim 18 under 35 U.S.C. § 112(d) as being of improper dependent form. Answer 3.

³ US 2009/0298153 A1, published December 3, 2009.

⁴ US 2014/0357506 A1, published December 4, 2014.

⁵ US 2012/0003709 A1, published January 5, 2012.

⁶ US 6,759,245 B1, issued July 6, 2004.

4. Claims 14 and 15 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Fukui, Martin, Singh, and Toner. Final Act. 14–15.

DISCUSSION

Rejection 1. The Examiner rejected claims 1–13, 17, and 18 as unpatentable over the combination of Martin, Singh, and Fukui. Final Act. 4–8.

Appellant provides a single argument for reversal of this rejection with respect to the group of claims at issue. We, therefore, select claim 1 as representative of the claims subject to this ground of rejection. 37 C.F.R. § 41.37(c)(1)(iv).

In rejecting claim 1, the Examiner found—in relevant part—Martin describes at least one actuator capable of making the surface vibrate at essentially any frequency, including at least one natural frequency of the membrane. Final Act. 4 (citing Martin ¶¶ 44–52; Figure 3). The Examiner further found that Martin does not expressly state that the controller controls the actuator to produce a vibration that selectively causes the detachment of only one type of biological cell. *Id.* The Examiner also found that Singh discloses a device for manipulating biological cells distinguished by their adherence properties. *Id.* at 5. In particular, the Examiner found that Singh describes an actuator that is configured to produce a force of predetermined magnitude to selectively detach a desired population of target cells based on their relative attachment strength to a substrate. *Id.* (citing Singh ¶¶ 8–11).

Based upon these findings, the Examiner explained that it would have been obvious to configure the Martin controller to produce a vibrational frequency/magnitude known to

selectively detach a first type of cells from the membrane. Singh teaches that it is known in the art to exploit differences in the relative adhesive strengths of different cell populations to sort and isolate desired cell types. Martin already teaches that the actuator may be operated in multiple frequencies and magnitudes over time, and one of ordinary skill would have understood that different vibrations could be produced at these values to specifically dislodge certain cells of interest. In other words, it would have been obvious to apply the teachings of Singh to the Martin system in order to detach different cells at different times instead of all at once in order to separate them and collect them.

Id. at 5–6.

Appellant argues that the Examiner erred by finding that Singh describes or suggests the use of Martin’s system to selectively detach one type of cell from the membrane having a plurality of cell types attached to it. Appeal Br. 5–7.

We agree with Appellant that the Examiner has not sufficiently explained why a person having ordinary skill in the art would have combined Singh and Martin in the manner set forth in the rejection. In particular, the Examiner found that Singh’s paragraph 117 states that the detachment force may be essentially any mechanical, hydrodynamic, centrifugal, or magnetic force. Final Act. 5. We determine that the Examiner—perhaps prompted by hindsight—has read too much into Singh’s disclosure. Singh’s paragraph 117 states, in relevant part, that cells may be detach by a force “applied by any suitable method including, without limitation, hydrodynamic force, centrifugal force and/or magnetic force.” Singh ¶ 117. Although this statement seems broad, it must be understood in the context provided by the rest of Singh’s disclosure. As Appellant points

out, Singh actually describes the use of laminar fluid flow to provide shear force that selectively detach cells from a device surface. Appeal Br. 5.

The Examiner has not provided an adequate explanation of why a person having ordinary skill in the art, considering the entirety of Singh's disclosure, would have combined Singh with Martin when Singh does not discuss the use of vibration to detach, either selectively or nonselectively, cells from a surface. In the absence of such an explanation, we reverse the rejection of claim 1. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[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.”).

Rejection 2. The Examiner rejected claims 14 and 15 as unpatentable over the combination of Martin, Singh, Fukui, and Toner. Final Act. 8–9.

Appellant's Appeal Brief does not address this rejection. *See* Appeal Br. 3–7. Claims 14 and 15 ultimately depend from claim 1. As discussed above, we have reversed the rejection of claim 1 as unpatentable over the combination of Martin, Singh, and Fukui. In rejecting claims 14 and 15, the Examiner does not make any findings or offer any rationale that cures the defect in the rejection of claim 1. We, therefore, also reverse the rejection of claims 14 and 15.

Rejection 3. The Examiner rejected claims 1–13, 17, and 18 as unpatentable over the combination of Fukui, Martin, and Singh. Final Act. 10–14.

Appellant's arguments for reversal of this rejection do not differentiate between the rejected claims. We, therefore, select claim 1 as representative of the group of claims subject to this ground of rejection. 37 C.F.R. § 41.37(c)(1)(iv).

In rejecting claim 1 as unpatentable over the combination of Fukui, Martin, and Singh, the Examiner relies upon Singh in the same manner that we have discussed in connection with Rejection 1. We, therefore, reverse the rejection of claim 1 as unpatentable over the combination of Fukui, Martin, and Singh for the reasons we discussed in Rejection 1.

Rejection 4. The Examiner rejected claims 14 and 15 as unpatentable over the combination of Fukui, Martin, Singh, and Toner. Final Act. 14–15.

Appellant's Appeal Brief does not address this rejection. *See* Appeal Br. 3–7. Claims 14 and 15 ultimately depend from claim 1. As discussed above, we have reversed the rejection of claim 1 as unpatentable over the combination of Fukui, Martin, and Singh. In rejecting claims 14 and 15, the Examiner does not make any findings or offer any rationale that cures the defect in the rejection of claim 1. We, therefore, also reverse the rejection of claims 14 and 15.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1–13, 17, 18	§ 103 Martin, Singh, Fukui		1–13, 17, 18
14, 15	§ 103 Martin, Singh, Fukui, Toner		14, 15

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Claims Rejected	Basis	Affirmed	Reversed
1–13, 17, 18	§ 103 Fukui, Martin, Singh		1–13, 17, 18
14, 15	§ 103 Fukui, Martin, Singh, Toner		14, 15
Overall Outcome			1–15, 17, 18

REVERSED