Paper No. 44

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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*Ex parte* ALEC MIAN,
STEPHEN G. KIEFFER-HIGGINS, and
GEORGE D. COREY

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Appeal No. 2004-0615
Application No. 08/761,063

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ON BRIEF

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Before KIMLIN, OWENS, and PAWLIKOWSKI, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

*DECISION ON APPEAL*

This appeal is from the final rejection of claims 1-56, 64-70, 78-81 and 84. Claims 57-63, 71-77, 82 and 83, which are all of the other claims in the application, stand withdrawn from consideration by the examiner as being directed toward a nonelected invention.

*THE INVENTION*

The appellants claim an apparatus comprising a rotatable platform having a first flat surface with microchannels enclosed therein through which a sample can flow due to centripetal forces, and having opposite thereto a second flat surface which is encoded with electromagnetically-readable instructions for controlling the operation of the apparatus. Claim 1 is illustrative:

> 1. A centripetally-motivated fluid micromanipulation apparatus that is a combination of
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> a microsystem platform, comprising a substrate having a first flat, planar surface and a second flat, planar surface opposite thereto, wherein the first surface comprises a multiplicity of channels enclosed within the first surface and a sample input means, wherein each said channel is a microchannel, wherein the sample input means and the microchannels are connected and in fluidic contact, and wherein the second flat, planar surface opposite to the first flat planar surface of the platform is encoded with an electromagnetically-readable instruction set for controlling rotational speed, duration, or direction of the platform, and further comprising analytical, diagnostic or quality control instructions for performing an assay, the instruction set is capable of being read by a CD-ROM reader, and
>
> a micromanipulation device, comprising a base, a rotating means, a power supply and user interface and operations controlling means, wherein the rotating means is operatively linked to the microsystem platform and in rotational contact therewith, and wherein the operations controlling means is directed by the instructions comprising the instruction set on the second planar surface of the platform;

wherein a volume of a fluid within the microchannels of the platform is moved through said microchannels by centripetal force arising from rotational motion of the platform for a time and a rotational velocity sufficient to move the fluid through the microchannels.

*THE REFERENCES*

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| Cottingham | 5,639,428 | Jun. 17, 1997 (filed Jul. 19, 1994) |
| Zaffaroni et al. (Zaffaroni) | 6,121,048 | Sep. 19, 2000 (filed Oct. 18, 1994) |
| Takase et al. (Takase) (European patent application) | 0 417 305 A1 | Mar. 20, 1991 |

*THE REJECTIONS*

Claims 1-56, 64-70, 78-81 and 84 stand rejected under 35 U.S.C. § 103 as being unpatentable over Takase in view of Cottingham and Zaffaroni.

*OPINION*

We affirm the aforementioned rejection.

The appellants state that all of the claims stand or fall with claims 1-3 (brief, page 5). The appellants, however, do not argue the separate patentability of claims 1-3. Consequently, the claims stand or fall together and we limit our discussion to one claim, i.e., claim 1. *See In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(7)(1997).

Takase discloses a centripetally-motivated fluid analyzer comprising a disk (101) having a first flat, planar surface and a second flat, planar surface opposite thereto (figure 1), wherein the first surface comprises a multiplicity of flow paths (102) which can be narrow, shallow grooves (col. 5, lines 38-42 and 52-56). A sample input nozzle (7) is in fluidic contact with the flow paths (col. 7, lines 25-28). The second surface is encoded with an optically-readable instruction set for controlling disk rotational speed (col. 12, lines 4-13 and 29-30) and for performing an assay (col. 13, lines 38-49). A disk rotating device (6) is connected to the disk and comprises a servomotor (4) and a drive control circuit (5), the drive control circuit being directed by instructions on the disk's second surface (col. 7, lines 12-18; col. 12, lines 4-30); figure 1). A volume of fluid within the flow channels of the platform can be moved through the flow channels by centripetal force arising from rotational motion of the disk (col. 5, lines 43-49; col. 9, lines 28-32).

Takase does not disclose that the flow paths are enclosed within the first surface. Cottingham's apparatus is a centripetally-motivated fluid analyzer having channels which can be microchannels, the channels and reagent chambers being covered

with a thin, flexible film to seal them from the surrounding environment (col. 3, lines 34-37 and 51-57; col. 7, lines 41-45 and 63-65; col. 8, lines 25-30; col. 8, line 67 - col. 9, line 8; col. 18, lines 51-56; col. 19, lines 2-5). Cottingham teaches that contamination of the laboratory by samples is a problem (col. 1, lines 31-38; col. 2, lines 32-35) and that the fluid flow channels in his apparatus are effectively sealed with respect to contamination (col. 18, lines 51-56). Cottingham, therefore, would have fairly suggested, to one of ordinary skill in the art, covering Takase's flow channels and reagent chambers with a thin, flexible film to seal them with respect to contamination.

Takase does not state that the instruction set is capable of being read by a CD-ROM reader. However, Takase discloses that 1) the format on the bottom side of the disk can be bits, i.e., unevenness, formed during molding, 2) the position accuracy of the formats can be the same as that of an optical disk, which is very high, and 3) the formats are not limited to the disclosed embodiment (col. 13, lines 1-19 and 50-52; col. 14, lines 10-11). Hence, Zaffaroni's teachings that 1) compact disks (like the substrate on which Takase's formats are formed) have very small pits cut into their surface (col. 14, lines 38-41), 2) compact

disks are optical disks (which can provide the same position accuracy as Takase's formats) (col. 14, lines 32-57), and 3) CD-ROMs are effective for providing information to a processor which controls a centripetally-motivated fluid analyzer (col. 21, lines 36-37; col. 22, lines 5-25), would have fairly suggested, to one of ordinary skill in the art, using, as an alternative disk having formats in Takase's apparatus, an optical disk which is readable by a CD-ROM reader.

The appellants argue that Cottingham does not disclose the function of flexible top film 72 and, therefore, fails to suggest using it to cover Takase's flow paths 102 (brief, page 10). Cottingham's teachings that 1) top film 72 seals the reagent chambers from the surrounding environment, leaving sample port 74 as the sole means of fluid communication with the exterior of the test unit (col. 8, line 67 - col. 9, line 8), 2) flap 92, adhesively bonded to top film 72, closes off sample port 74 so as to seal the test unit with respect to the outside environment (col. 8, lines 25-30), and 3) contamination of the environment caused by exposure to the fluid in the test unit is undesirable (col. 1, lines 31-38; col. 2, lines 32-35), would have indicated, to one of ordinary skill in the art, that Cottingham's top film 72 functions to help seal the surrounding environment from

the fluid in the test unit and would have fairly suggested, to one of ordinary skill in the art, using Cottingham's top film 72 in Takase's test unit to perform that function.

The appellants argue that Takase discloses grooves or troughs and does not disclose microchannels (brief, page 12). As indicated by the dictionary definitions of record, a groove is a channel. The appellants' "[m]icrochannel sizes can range from 0.1 m [sic, 0.1 mm] to a value close to the 1mm thickness of the disk", and preferably "the cross-sectional dimension of the the [sic] microchannels across the thickness dimention [sic] of the platform is less than 500μm [0.5 mm]" (specification, page 12, lines 6-7 and 8-11). Cottingham's microchannels, which are of the type disclosed in U.S. patent application no. 08/213,304, issued as patent no. 5,783,148 (Cottingham, col. 19, lines 3-6), are about 0.006 inches [0.152 mm] high ('148 patent, col. 4, lines 15-16). Takase's exemplified flow paths are 1-10 mm wide, 50-100 mm long and 0.1-2 mm deep, and Takase teaches that the width and length are not limited (col. 5, lines 52-56). Because the depth of Takase's flow paths can be the same as those of the appellants' and Cottingham's microchannels, and the lowest exemplified width of Takase's flow paths is comparable to the appellants' preferred microchannel

width and is not limited, it reasonably appears that Takase discloses, or would have fairly suggested, to one of ordinary skill in the art, microchannels as Takase's flow paths.

The appellants argue that Takase's maximum disclosed disk rotation speed is approximately 3,000 rpm (col. 7, lines 17-18) and that at the high speeds required to drive fluid through microchannels, Takase's fluid would be displaced from Takase's open flow paths (brief, pages 13-14). This argument is not well taken because, first, the appellants disclose that fluid can be driven through microchannels using a disk rotation speed as low as 1 rpm (specification, page 5, lines 10-11). Second, the fluid displacement problem suggested by the appellants clearly would not exist when Cottingham's top film 72 is applied over Takase's flow paths.

The appellants argue that placing Cottingham's top film over Takase's flow paths may interfere with the supply means (brief, page 14). Like Cottingham (col. 8, lines 26-28), one of ordinary skill in the art would leave a hole in the top film for a sample port.

The appellants argue that Cottingham's top film may interfere with Takase's measuring head 11 (brief, page 14), but do not provide any support for this argument. Takase's measuring

head 11 is an optical device (col. 8, lines 2-28). Cottingham's measuring device also is an optical device and is disclosed as being suitable for use with the top film (col. 7, lines 7-45). Hence, Cottingham would have indicated to one of ordinary skill that Cottingham's top film would not interfere with Takase's measuring head.

The appellants argue that "unlike the instantly-claimed invention, the Takase platform uses an instruction set contained in the CPU of the rotation device, and not on the platform itself" (brief, page 15). Takase discloses an instruction set on the platform itself (col. 12, lines 4-34).

The appellants argue that the appellants' claims require that the microchannels are enclosed within the first surface of the platform, which means that the microchannels are surrounded on all sides by the platform, whereas Takase's flow paths having Cottingham's top film over them would be covered rather than enclosed (reply brief, pages 2-3). The appellants do not point out, and we do not find, support in the appellants' original disclosure for their claim interpretation. The only relevant portion of the disclosure appears to be figure 17K which states that "[o]nce the disk configuration has been burnt by a writable CD player, the surface of the disk maybe [sic] sealed with a

clear, partially porous membrane to allow for the controlled movement of fluids on the disk without the need for specific vents." This disclosure indicates that the appellants' term "enclosed within" includes covering by a film.

The appellants argue that in their specification and claims they consistently have described the microchannels as being enclosed within the platform surface (reply brief, pages 3-4). The appellants do not point out, and we do not find, the term "enclosed within" in the appellants' original specification including the claims. The appellants originally disclosed that the microchannels, as well as the reaction chamber and reagent reservoir, are embedded in the first surface of the platform (specification, page 12, lines 8-9 and 11-13; claim 3).

For the above reasons we conclude that the appellants' claimed apparatus would have been obvious to one of ordinary skill in the art over the applied references.

*DECISION*

The rejection of claims 1-56, 64-70, 78-81 and 84 under 35 U.S.C. § 103 over Takase in view of Cottingham and Zaffaroni is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

*AFFIRMED*

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| Edward C. Kimlin<br>Administrative Patent Judge | ) | |
| Terry J. Owens<br>Administrative Patent Judge | ) | BOARD OF PATENT APPEALS AND INTERFERENCES |
| Beverly A. Pawlikowski<br>Administrative Patent Judge | ) | |

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