*The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN F. RABOLT and MEI-WEI TSAO

Appeal 2007-0619
Application 10/178,008
Technology Center 1700

Decided: March 29, 2007

Before CHUNG K. PAK, PETER KRATZ, AND
CATHERINE Q. TIMM, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1 through 4, all of the claims pending in the above-identified application. We have jurisdiction pursuant to 35 U.S.C. § 6.

I. APPEALED SUBJECT MATTER

The subject matter on appeal is directed to a method of forming an elastomeric printing stamp using injection-molded plastic stamp masters. This method is said to be useful for printing high resolution structures in many modern devices, including electronic circuits. (*See* the Specification 4-5). Details of the appealed subject matter are recited in representative claim 1, which is reproduced below:

> 1. A method to form an elastomeric printing stamp comprising:
> (a) providing an injection-molding plastic stamp master, wherein the stamp master has a pattern and said pattern has at least one feature below 100 [μ]m in size;
> (b) casting an elastomeric printing stamp using the stamp master by contacting an elastomer to the stamp master; and
> (c) curing the elastomeric printing stamp.

II. PRIOR ART

As evidence of unpatentability of the claimed subject matter, the Examiner has relied upon the following references:

Kumar	US 5,512,131	Apr. 30, 1996
Hawker	US 6,413,587 B1	Jul. 2, 2002
Shepard	US 6,586,327 B2	Jul. 1, 2003

III. REJECTIONS

The Examiner has rejected the claims on appeal as follows:

1) Claims 1 and 2 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Kumar and Shepard; and

2) Claims 3 and 4 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Kumar, Shepard, and Hawker.

IV. ISSUE

Is there some teaching or suggestion to employ the injection molded plastic stamp master (mold or mold surface) taught by Shepard as the stamp master (mold or mold surface) in the method described in Kumar within the meaning of 35 U.S.C. § 103(a)?

V. RELEVANT FACTUAL FINDINGS

1. The Appellants have not disputed the Examiner's findings at page 3 of the Answer that:

> Kumar et al. disclose or suggest the basic claimed method of forming an elastomeric printing stamp including (1) providing a plastic stamp master, wherein the stamp master has a pattern and the pattern has at least one feature below 100 microns in size (column 4, line 60), (2) casting an elastomeric printing stamp using the stamp master or mold by contacting an elastomer to the stamp master or mold (column 8, lines 30-49), and (3) curing, hardening or crosslinking the elastomeric printing stamp. (See Br. 3-6 and Reply Br. 1-5).

2. The Appellants have not challenged the Examiner's findings at pages 3 and 4 of the Answer that:

> The [E]xaminer takes Official Notice that it is known to check dimensions of products, as in claim 2, in order to ensure that product quality standards are met…..
> Hawker et al., at column 1, lines 15-36, note that it is known to use an elastomeric printing stamp to transfer a pattern using soft lithography and further note at column 7, lines 30-37 that Kumar et al., among others, practice such a soft lithography technique…The [E]xaminer takes Official Notice that it is known to assess quality of a transferred pattern, as in claim 4, in order to determine if a product is meeting desired specifications. (See Br. 3-6 and Reply Br. 1-5).

3. Kumar describes that its stamp master (mold surface) may be prepared by various known techniques. Specifically, Kumar teaches (col. 9, ll. 47-54) that:

> In its broadest sense, mold surface **42** may comprise any surface having morphological features that may desirably serve as a template for the formation of a stamp, hence the patterning of a molecular species on a surface. For example, a microelectronic device such as a chip may serve as a template, as may any other corrugated or indented surface. **Mold surface 42 may be formed according to a variety of ways**. [Emphasis added.]

Kumar then goes on to exemplify two techniques, i.e., micromachining and lithography (col. 9, l. 54 to col. 10, l. 13).

4. Shepard, like Kumar, is directed to fabricating microelectronic devices having feature sizes ranging from hundreds of nanometers to microns (col. 1, ll. 14-39 and col. 4, ll. 21-22). Shepard teaches fabricating microelectronic devices via a molding process that employs*, inter alia*, an injection molded stamp master (master copy) (col. 3, l. 55 to col. 4, l. 12). Specifically, Shepard teaches (col. 3, l. 56 to col. 4, l. 26) that:

> Devices in accordance with the invention may be fabricated using a molding process, which obviates the need to etch a recessed pattern into each substrate. Such a process is illustrated in FIG. 1. With reference to FIG. 1, a "master" substrate is etched with the recessed pattern …Variations on the electroforming of the master copy could include depositing on that master copy material intended to appear in the face of the mold, following which the mold is chemically or physically separated from the master following deposition.

> … In one embodiment, injection molding is used to produce new substrates having the same recessed pattern as the master. The new substrate is typically formed out of plastic or glass although other moldable materials…are suitable. Finally, a series of layers is applied to the new substrate (step **150**). These layers provide the desired electrical properties of the microelectronic device.
>
> FIG. 2A is a top view of a portion of a substrate **200** having a microscopic recessed pattern constructed in accordance with the present invention. Typically, feature sizes will range from hundreds of nanometers to microns, but larger and smaller features are possible….Substrate **200** can be formed from the master by injection molding or itself could be the master used to create the form…

5. Shepard teaches that its injection molding technique is taught to be more economical than a lithography technique for patterning, such as that employed in preparing the mold surface (stamp master) exemplified in Kumar (col. 1, ll. 15-40).

VI. PRINCIPLES OF LAW

Under 35 U.S.C. §103, the obviousness of an invention cannot be established by combining the teachings of the prior art references absent some teaching, suggestion or incentive supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). This does not mean that the cited prior art references must specifically suggest making the combination. *B.F. Goodrich Co. v. Aircraft Braking Systems Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996); *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988). Rather, the test for

obviousness is what the combined teachings of the prior art references would have suggested to those of ordinary skill in the art. *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). In evaluating the prior art references for a suggestion, it is proper to take into account not only the specific teachings of the references, but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 827, 159 USPQ 342, 344 (CCPA 1968).

"Eliminating the cost ….would have been sufficient motivation for doing so." *In re Thompson*, 549 F.2d 1290, 1294, 192 USPQ 275, 277 (CCPA 1976)

"Economics alone would motivate a person of ordinary skill in the art…." *In re Clinton*, 527 F.2d 1226, 1229 188 USPQ 365, 367 (CCPA 1976).

VII. ANALYSIS

The Appellants have not disputed the Examiner's findings at page 3 of the Answer that:

> Kumar et al. disclose or suggest the basic claimed method of forming an elastomeric printing stamp including (1) providing a plastic stamp master, wherein the stamp master has a pattern and the pattern has at least one feature below 100 microns in size (column 4, line 60), (2) casting an elastomeric printing stamp using the stamp master or mold by contacting an elastomer to the stamp master or mold (column 8, lines 30-49), and (3) curing, hardening or crosslinking the elastomeric printing stamp. (See Br. 3-6 and Reply Br. 1-5).

Nor have the Appellants challenged the Examiner's findings at pages 3 and 4 of the Answer that:

> The [E]xaminer takes Official Notice that it is known to check dimensions of products, as in claim 2, in order to ensure that product quality standards are met…..
> Hawker et al., at column 1, lines 15-36, note that it is known to use an elastomeric printing stamp to transfer a pattern using soft lithography and further note at column 7, lines 30-37 that Kumar et al., among others, practice such a soft lithography technique…The [E]xaminer takes Official Notice that it is known to assess quality of a transferred pattern, as in claim 4, in order to determine if a product is meeting desired specifications. (See Br. 3-6 and Reply Br. 1-5).

The Appellants only contend that Kumar and Shepard do not suggest using an injection molded stamp master (mold or mold surface) in Kumar's method (Br. 3-6 and Reply Br. 1-5). The Examiner disagrees with this contention (Answer 4-6).

Thus, the dispositive question is whether Kumar and Shepard as a whole would have provided some teaching or suggestion to employ an injection molded plastic stamp master (mold or mold surface) in the method described in Kumar within the meaning of 35 U.S.C. § 103(a). On this record, we answer this question in the affirmative.

At column 9, line 47 to column 10, line 13 of Kumar referred to by the Appellants (Br. 4), Kumar teaches that its stamp master (mold surface) may be prepared by various known techniques. Specifically, Kumar states (col. 9, ll. 47-54) that:

> In its broadest sense, mold surface **42** may comprise any surface having morphological features that may desirably serve as a template for the formation of a stamp, hence the patterning of a molecular species on a surface. For example, a microelectronic device such as a chip may serve as a template, as may any other corrugated or indented surface. **Mold surface**

> **42 may be formed according to a variety ways**. [Emphasis added.]

Kumar then goes on to exemplify two techniques, i.e., micromachining and lithography (col. 9, l.54 to col. 10, l. 13).

Shepard, like Kumar, is directed to fabricating microelectronic devices having feature sizes ranging from hundreds of nanometers to microns (col. 1, ll. 14-39 and col. 4, ll.21-22). Shepard teaches fabricating microelectronic devices via a molding process that employs, *inter alia*, an injection molded stamp master (master copy) (col. 3, l. 55 to col. 4, l. 12). Specifically, Shepard teaches (col. 3, l. 56 to col. 4, l. 26) that:

> Devices in accordance with the invention may be fabricated using a molding process, which obviates the need to etch a recessed pattern into each substrate. Such a process is illustrated in FIG. 1. With reference to FIG. 1, a "master" substrate is etched with the recessed pattern…Variations on the electroforming of the master copy could include depositing on that master copy material intended to appear in the face of the mold, following which the mold is chemically or physically separated from the master following deposition.
> … In one embodiment, injection molding is used to produce new substrates having the same recessed pattern as the master. The new substrate is typically formed out of plastic or glass although other moldable materials…are suitable. Finally, a series of layers is applied to the new substrate (step **150**). These layers provide the desired electrical properties of the microelectronic device.
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> FIG. 2A is a top view of a portion of a substrate **200** having a microscopic recessed pattern constructed in accordance with the present invention. Typically, feature sizes will range from hundreds of nanometers to microns, but larger and smaller features are possible….Substrate **200** can be formed from the master by injection molding or itself could be the master used to create the form…

Given the above teachings, we concur with the Examiner that Kumar and Shepard as a whole would have suggested to one of ordinary skill in the art to employ master stamps formed by various known techniques, including those formed by injection molding, in Kumar's method with a reasonable expectation of successfully providing nanometer to micron features in microelectronic devices. *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981); *In re Preda*, 401 F.2d 825, 827, 159 USPQ 342, 344 (CCPA 1968). This is especially true in this case since the injection molding technique is taught to be more economical than the lithography technique for forming a pattern, such as the lithography technique for forming the mold surface exemplified in Kumar (see Shepard, col. 1, ll. 15-40). *In re Thompson*, 549 F.2d 1290, 1294, 192 USPQ 275, 277 (CCPA 1976); *In re Clinton*, 527 F.2d 1226, 1229, 188 USPQ 365, 367 (CCPA 1976).

Accordingly, for the fact findings set forth in the Answer and above, we determine that the evidence of obviousness relied upon by the Examiner, on balance, outweighs the evidence of unobviousness proffered by the Appellants. Hence, we affirm the Examiner's decision rejecting the claims on appeal under 35 U.S.C. § 103(a).

VIII. ORDER

The decision of the Examiner is affirmed.

IX. *TIME PERIOD*

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

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