Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte ZIN-CHEIN WEI

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Appeal No. 2000-2093
Application No. 08/730,385

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ON BRIEF

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Before ABRAMS, FRANKFORT and NASE, Administrative Patent Judges.

ABRAMS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 5, 9 and 13-16, which are all of the claims pending in this application.

We AFFIRM-IN-PART.

BACKGROUND

The appellant's invention relates to a method and machine for chemical-mechanical polishing a silicon wafer. An understanding of the invention can be derived from a reading of exemplary claims 5 and 13, which appear in the appendix to the appellant's Brief.

The prior art reference of record relied upon by the examiner in rejecting the appealed claims is:

Shendon	5,899,800	May 4, 1999

Claims 5, 9 and 13-16 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

Claim 13 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Shendon.

Claims 5, 9 and 14-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shendon.[1]

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[1]In the final rejection (Paper No. 17) claim 9 was not included in this rejection, and claim 13 was not listed as being rejected under Section 102 although such was the case in the preceding office action (Paper No. 10). Since the appellant has not disputed the rejections as set forth in the Answer and has provided arguments directed to them, we shall act in accordance with that listing of the claims.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the Answer (Paper No. 22) and the final rejection (Paper No. 17) for the examiner's complete reasoning in support of the rejections, and to the Brief (Paper No. 21) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art reference, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

The appellant’s invention is directed to a method and apparatus for polishing a silicon wafer. In the course of the invention, three motions act on the wafer, which is held on a wafer holder. The first motion is provided by a platen that has a polishing pad on its surface and which rotates with respect to the wafer as polishing slurry is deposited on the pad. The second motion is provided by rotating the wafer holder while pressing the wafer mounted thereon against the pad on the rotating platen. The third motion results from mounting the rotatable wafer holder on a crank and then rotating the crank to cause the wafer holder to orbit with respect to the rotating platen.

The Rejection Under Section 112, First Paragraph

Independent claims 5 and 13 each contain the limitation that in addition to rotating the platen and orbiting the wafer holder, the wafer is "independently" rotated. It is the examiner's view that the specification and drawings fail to describe a structure for accomplishing this independent rotation of the wafer, and therefore do not represent that the appellant had possession of this feature of the invention at the time the application was filed.

On page 7 of the specification it is stated that "independent rotational means 32 may be provided so as to cause its [the platen's] rotation to be fully independent." Element 32 is shown in the drawings schematically as being disposed about the axis of rotation of the wafer holder with an arrow indicating that it rotates. In our opinion, one of ordinary skill in the art would have recognized that, at the very least, this was intended to indicate an electric motor or equivalent means for rotating the wafer holder about its axis. This conclusion is supported by the fact that the appellant indicates it was known in the prior art to utilize an electric motor or the like for just such a task, for he describes the wafer rotation means in the prior art system shown in Figure 1 as "rotation causing means 3 (such as an in-situ motor), held in position by support arm 17, [which] causes wafer holder 2 to rotate in the direction symbolized by arrow 19" (specification, page 3). Thus, while the appellant did not repeat such a detailed description of the like structure when describing his invention, it

is our view that he had possession of this feature, that is, a manner of rotating the wafer holder, at the time the application was filed.

In view of the above, it is our conclusion that the examiner's position is not well taken, and we will not sustain this rejection.

The Rejection Under Section 102(e)

Independent claim 13 stands rejected as being anticipated by Shendon. Anticipation is established only when a single prior art reference discloses, either expressly or under the principles of inherency, each and every element of the claimed invention. See In re Paulsen, 30 F.3d 1475, 1480-1481, 31 USPQ2d 1671, 1675 (Fed. Cir. 1994). Anticipation by a prior art reference does not require either the inventive concept of the claimed subject matter or recognition of inherent properties that may be possessed by the reference. See Verdegaal Brothers Inc. v. Union Oil Co. of California, 814 F.2d 628, 633, 2 USPQ2d 1051, 1054 (Fed. Cir. 1987). Nor does it require that the reference teach what the applicant is claiming, but only that the claim on appeal "read on" something disclosed in the reference, i.e., all limitations of the claim are found in the reference. See Kalman v. Kimberly-Clark Corp, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983).

The only argument raised by the appellant with regard to this rejection is that Shendon fails to disclose or teach "independently" rotating the wafer holder, as is required

by the claim. According to the appellant, Shendon provides a rotational compensation assembly which is intended to stop rotation of the wafer during the polishing process, thus limiting the movements to rotation of the platen and orbiting of the wafer. We do not agree with the appellant on this point.

Using Figure 2 as an illustration, Shendon discloses a polishing pad 22 mounted on a rotatable platen 16. Mounted on the bottom of a rotatable shaft 56 positioned above the platen is a cross arm 60 from which extends a drive shaft 64 upon the end of which the substrate (wafer) carrier 24 is mounted. Rotation of shaft 56 by a first drive belt 52 causes carrier 24 to orbit about shaft 56. Also attached to drive shaft 64 is a pinion gear 74 that has teeth on its outer periphery that mesh with teeth on the inside of the outer hub 59 of transfer case housing 58. Outer hub 59 is rotated by a second drive belt 90. Shendon teaches that "[t]he carrier may be controlled to orbit the substrate without rotation or to rotate the substrate at a desired velocity as it is orbited" (column 3, lines 19-21). To accomplish this, as is explained in column 7, beginning at line 49, the orbiting substrate

> may be rotated, or may orbit without rotation, by selectively rotating the housing 58 with the motor 90. By rotating the orbiting substrate 12 at the same speed as the polishing pad 22, the cumulative motion between the polishing pad 22 and every point on the substrate 12 may be uniformly maintained. Therefore, over-polishing attributable to differential cumulative motions on different areas of the substrate is eliminate [sic]. Additionally, the rotational speed of the substrate may be varied from the rotational speed of the polishing pad 22 to increase the relative motion between the edge of the substrate and the polishing pad 22, as compared to the center of the

> substrate. The substrate 12 may even be moved in a rotational direction opposite to the direction of the polishing pad 22 if desired.

From this recitation it is clear that Shendon utilizes the rotational compensation assembly not only to insure that the substrate doesn't rotate with respect to the polishing pad when such is desired, but also to cause such relative rotation to occur, when that is action deemed necessary. It also is clear that this rotation of the substrate meets the claim requirement of being independent, in that it is caused to occur by a mechanism that is controllable independently of the rotation of the polishing pad and the orbiting mechanism. This conclusion appears to be supported by the appellant's statement on page 7 of the Brief that in the Shendon system "the wafer could, perhaps unintentionally, be given some independent rotational motion" (emphasis added). The appellant's argument that, with regard to the rotational motion of the wafer produced by Shendon, "it is reasonable to assume that it is very limited (i.e. not fully independent) since its principal purpose is to prevent rotation in the first place" is not persuasive since the language of claim 13 does not preclude "limited" rotation and does not recite the rotation as being "fully independent," whatever that might mean as compared to "independent."

It is our conclusion that all of the subject matter recited in claim 13 is disclosed or taught by Shendon, and therefore we will sustain the rejection.

The Rejection Under Section 103

Method claims 5 and 9 and apparatus claims 14-16 stand rejected as being unpatentable over Shendon.

The test for obviousness is what the combined teachings of the prior art would have suggested to one of ordinary skill in the art. See, for example, In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). In establishing a prima facie case of obviousness, it is incumbent upon the examiner to provide a reason why one of ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. See Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Int. 1985). To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from the appellant's disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988).

While we concluded above with regard to apparatus claim 13 that all of the subject matter therein recited is disclosed or taught by Shendon, there is no evidence upon which to base a conclusion that the same is true with regard to the method of claim 5, or that this method would have been obvious in view of Shendon. Claim 5 recites a number of operating parameters which the examiner apparently has concluded are not disclosed or taught by Shendon, for he has taken the position that they are merely matters of design

choice for one of ordinary skill in the art. We do not agree. The claimed values for platen rotation, independent rotation of the wafer, and speed of the wafer along a closed path of rotation were set forth in the appellant's original disclosure. They all are recited together in claim 5, with the appellant arguing that they thus produce desirable results (Brief, pages 7 and 8). We note that Shendon teaches setting the speed of the orbiting substrate and the rotating platen so that the nominal speed at the surface of the substrate is 1800-4800 centimeters per second, and that the speed of the rotating platen is less than 10 rpm. However, not only does this platen speed fall outside of the range claimed by the appellant, but there appears to be no information which would suggest to the artisan the ranges recited in the claim.

It is our conclusion that Shendon fails to establish a prima facie case of obviousness with regard to the subject matter recited in independent method claim 5, and we therefore will not sustain the rejection of claim 5 or of claim 9, which depends from claim 5.

Apparatus claims 14-16 depend from claim 13. We determined above that the subject matter recited in claim 13 was anticipated by Shendon. Anticipation being the epitome of obviousness (see In re Fracalossi, 681 F.2d 792, 215 USPQ 569 (CCPA 1982)), considering claim 13 in the light of Section 103 does not change this conclusion. In the absence of argument by the appellant of the separate patentability of claims 14-16,

and appellant's grouping of the claims (Brief, page 3) we shall, sustain this rejection. In this regard, to the extent that the intent of the appellant's argument on pages 7 and 8 of the Brief regarding operating parameters is intended to apply to dependent claim 15, the appellant has pointed out to us no reason from which to conclude that Shendon's apparatus is not capable of causing the wafer to complete "between 10 and 30 rotations for each revolution of the handle about the shaft."

SUMMARY

The rejection of claims 5, 9 and 13-16 under 35 U.S.C. § 112, first paragraph, is not sustained.

The rejection of claim 13 under 35 U.S.C. § 102(e) as being anticipated by Shendon is sustained.

The rejection of claims 5 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Shendon is not sustained.

The rejection of claims 14-16 under 35 U.S.C. § 103(a) as being unpatentable over Shendon is sustained.

The decision of the examiner is affirmed-in-part.

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

AFFIRMED-IN-PART

NEAL E. ABRAMS Administrative Patent Judge	)
CHARLES E. FRANKFORT Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
JEFFREY V. NASE Administrative Patent Judge	)

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