

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

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 RICHARD S. MUKA, JAMES C. DAVIS Jr.  
and CHRISTOPHER A. HOFMEISTER

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Appeal No. 1998-2722  
Application 08/587,087<sup>1</sup>

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ON BRIEF

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Before STAAB, McQUADE and NASE, Administrative Patent Judges.

McQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Richard S. Muka et al. appeal from the final rejection of claims 1, 3, 6 through 11, 14, 16, 17 and 22 through 25, all of the claims pending in the application. We affirm-in-part.

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<sup>1</sup> Application for patent filed January 16, 1996. According to the appellants, the application is a continuation-in-part of Application 08/549,995, filed October 27, 1995, now U.S. Patent No. 5,647,724, issued July 15, 1997.

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The invention relates to "a substrate processing apparatus and, more particularly, to a substrate transport with substrate holders each capable of transporting more than one substrate at the same time" (specification, page 1). Copies of the appealed claims appear in the appendix to the appellants' main brief (Paper No. 10).<sup>2</sup>

The references relied upon by the examiner to support the rejections on appeal are:

1966	Pflaumer et al. (Pflaumer)	3,272,350	Sep. 13,
1991	Murdoch	5,046,909	Sep. 10,
1992	Ishida et al. (Ishida)	5,151,008	Sep. 29,
1993	Hendrickson	5,180,276	Jan. 19,
2, 1993	Cruz	5,183,370	Feb.
1995	Grunes et al. (Grunes)	5,447,409	Sep. 5,
1997	Davis, Jr. et al. (Davis) <sup>3</sup>	5,647,724	Jul. 15,

The following rejections are before us for review:

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<sup>2</sup> As noted on page 4 in the examiner's answer (Paper No. 11), the dependencies shown in the copies of claims 11 and 14 are inaccurate.

<sup>3</sup> The Davis patent matured from parent Application 08/549,995 (see n.1, supra).

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I) claims 1, 6, 7, 8, 22, 23 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Ishida in view of Pflaumer;

II) claims 1, 6, 7, 9, 22, 23 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Ishida in view of Cruz;

III) claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Ishida in view of Pflaumer or Cruz, and further in view of Hendrickson and Grunes;

IV) claims 10, 11, 14, 22, 23 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Grunes in view of Pflaumer and Murdoch;

V) claims 16, 17, 22, 23 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Grunes in view of Cruz; and

VI) claims 1, 3, 6 through 9, 11, 22, 23 and 25 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 through 19 of the Davis patent in view of Pflaumer and Cruz.<sup>4</sup>

Reference is made to the appellants' main and reply

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<sup>4</sup>The examiner entered this double patenting rejection for the first time in the answer (Paper No. 11) to replace the double patenting rejections set forth in the final rejection (Paper No. 6). In doing so, the examiner erroneously included canceled claims 2, 4 and 5 in the statement of the new rejection.

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briefs (Paper Nos. 10 and 14) and to the examiner's answer (Paper No. 11) for the respective positions of the appellants and the examiner with regard to the merits of these rejections.

Ishida, the primary reference in rejections I-III, discloses "a substrate transfer apparatus for transferring substrates in order to load/unload substrates onto/from a predetermined position in a processing chamber for conducting processing such as etching and the like on substrates in the manufacturing process of semiconductor elements such as integrated circuits" (column 1, lines 7 through 13). The transfer apparatus includes a rotary table 10 turned by a drive motor 11, two pairs of transfer arms 20 and 30, each composed of two sets of parallel link mechanisms 40 and 50 and turned by drive motors 44, and substrate holding members 60a and 60b on the outer tips of the transfer arms. These elements are housed within a central transfer chamber 82 of processing equipment 80 for moving semiconductor substrates/wafers between a preparatory chamber 84 and a plurality of processing chambers 86, 87, and 88 in the manner

described at column 5, line 61 et seq.

The examiner relies on Pflaumer in rejection I and Cruz in rejection II to cure the failure of Ishida to meet the limitations in independent claim 1 requiring a first substrate holder suitably sized and shaped to simultaneously hold at least two spaced substrates thereon and the limitations in independent claim 22 requiring first and second substrate holders suitably sized and shaped to respectively hold a first and a different second maximum number of substrates.

Pflaumer discloses a semiconductor wafer carrier/holder for simultaneously transporting a plurality of wafers between work stations (see column 1, lines 50 through 66). The carrier/holder is a generally flat rigid member having a plurality of recesses for receiving and retaining a like plurality of wafers (see column 1, line 67, through column 2, line 13). As shown by the embodiments illustrated in Figures 2 and 3A, the carrier/holder may be sized and shaped to accommodate different numbers of wafers. In the examiner's view, it would have been obvious at the time the invention was

made to a person having ordinary skill in the art "to substitute holders as claimed for one or both holders in Ishida in view of the teaching in Pflaumer" (answer, page 5).

Cruz discloses a semiconductor wafer gripping means 50 for simultaneously transporting one or more wafers (see column 1, lines 53 through 57). The gripping means 50 includes a plurality of vertically spaced tracks 2 for gripping and holding vertically spaced wafers. The examiner considers that it would have been obvious at the time the invention was made to a person having ordinary skill in the art "to substitute holders as claimed for holder 60a in Ishida in view of a teaching in Cruz" (answer, page 6).

While not disputing the general combination of Ishida and Pflaumer, the appellants argue that the resulting device would not meet the limitation in claim 1 requiring the two substrate holders to be always located on a same side of the movable arm assembly or the above mentioned limitations in claim 22 requiring the substrate holders to be suitably sized and shaped to hold different maximum numbers of substrates (see

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pages 4 through 6 in the main brief). The appellants' position here is not persuasive.

Although the examiner's rationale that "the holders in Ishida can be held . . . on the same side [of the movable arm assembly] by not moving them through the center" (answer, page 5) is somewhat suspect given the disclosed operation of the Ishida device, Ishida's holders clearly are always located on the upper "side" of the arm assembly and therefore meet the rather broad recitation at issue in claim 1. Furthermore, the examiner's conclusion (see page 8 in the answer) that it would have been obvious to suitably size and shape the holders to hold different maximum numbers of substrates as recited in claim 22 to allow each arm to move different numbers of substrates is reasonable as a simple matter of common sense. A conclusion of obviousness may be based on common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference. In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

The corresponding arguments advanced by the appellants

(see pages 7 through 9 in the main brief) with respect to the proposed combination of Ishida and Cruz are similarly unpersuasive. The additional argument "the two systems in Ishida et al. and Cruz appear to be so different, it is not understood how their teachings could be combined" (main brief, page 8) is also unconvincing. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). In the present case, Cruz's disclosure of a holding means for simultaneously transporting one or more vertically spaced wafers/substrates would have provided the artisan with ample suggestion or motivation to furnish the Ishida device with like holders to improve its efficiency.

In light of the foregoing, we shall sustain the standing

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35 U.S.C. § 103(a) rejections of independent claims 1 and 22 as being unpatentable over Ishida in view of Pflaumer and as being unpatentable over Ishida in view of Cruz. We also shall sustain the standing 35 U.S.C. § 103(a) rejections of dependent claims 6, 7, 8, 23 and 25 as being unpatentable over Ishida in view of Pflaumer and of dependent claims 6, 7, 9, 23 and 25 as being unpatentable over Ishida in view of Cruz since the appellants have not challenged such with any reasonable specificity, thereby allowing these claims to stand or fall with parent claims 1 and 22 (see In re Nielson, 816 F.2d 1567, 1572, 2 USPQ2d 1525, 1528 (Fed. Cir. 1987)).

Since the thrust of our affirmances of the 35 U.S.C. § 103(a) rejections of claim 1 and dependent claims 6 through 9 as being unpatentable over Ishida in view of Pflaumer or Cruz differs somewhat from the reasoning offered by the examiner, we hereby designate the affirmances as new grounds of rejection under 37 CFR § 1.196(b) in order to provide the appellants with a fair opportunity to react thereto.

Claim 3, which depends from independent claim 1, recites a coaxial drive shaft assembly connected to the movable arm assembly. The examiner's reliance on Hendrickson and Grunes to cure the failure of Ishida, Pflaumer and Cruz to teach or suggest an apparatus having such a drive shaft assembly is not well taken. Although Grunes does disclose a substrate transport apparatus having a coaxial drive shaft assembly connected to a movable arm assembly (see column 3, lines 28 through 39), there is nothing in this disclosure, or in Hendrickson's disclosure of a non-coaxial drive shaft assembly, which justifies the examiner's conclusion (see page 6 in the answer) that it would have been obvious to employ a coaxial drive shaft assembly in the Ishida apparatus.

Therefore, we shall not sustain the standing 35 U.S.C. § 103(a) rejection of claim 3 as being unpatentable over Ishida in view of either Pflaumer or Cruz, and further in view of Hendrickson and Grunes.

Grunes, applied as the primary reference in rejections IV and V, discloses "a robot assembly for the simultaneous

manipulation of multiple objects, for example semiconductor wafers" (column 1, lines 14 through 16). As described in the reference, the robot assembly 2

includ[es] a central hub [4] having two arms [6 and 8]. Each arm is arranged for rotation relative to the hub. Two carriers [10 and 12], spaced apart from each other, are provided for handling various objects, such as semiconductor wafers [13]. Each carrier is coupled to an end of each of the arms [via struts 24/25, 36/37]. A drive [40] is provided for rotating the arms in opposite directions from each other to extend one or the other of the carriers radially from the central hub, and for rotating both arms in the same direction to effect rotation of the carriers about the hub. In the preferred embodiment, one drive is used for rotation of one arm and a second drive is used for rotation of the other arm. By synchronizing drive operation the arms can be rotated in the same or opposite directions [column 2, lines 16 through 30].

Grunes teaches that in functioning to process semiconductor wafers

the robot arm fetches a wafer from a stack of wafers and places the wafer in a reaction chamber. The robot arm then fetches a second wafer while the first wafer remains in the reaction chamber. After sufficient processing time has elapsed, the first wafer is withdrawn from the reaction chamber and the robot arm now carries two wafers, one processed and one fresh. The carriers, when positioned as shown in FIG. 3a, are then rotated, such that a fresh wafer on one carrier is placed into the reaction

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chamber, while a processed wafer on the other carrier is returned to the stack of wafers. The robot arm then loads another fresh wafer from the stack of wafers and returns to the reaction chamber. The process just described is repeated as required [column 4, line 63, through column 5, line 9].

In rejection IV, the examiner relies on Pflaumer and Murdoch to cure the failure of Grunes to meet the limitations in independent claim 10 requiring a substrate processing module sized and shaped to simultaneously receive two substrates and a first substrate holder including two separate side-by-side holding areas and a one-piece, generally planar frame member having three point mounts extending from its top surface at each of the side-by-side holding areas, and the limitations in independent claim 22 requiring first and second substrate holders suitably sized and shaped to respectively hold a first and a different second maximum number of substrates. According to the examiner, it would have been obvious at the time the invention was made to a person having ordinary skill in the art "to substitute holders as claimed by applicants for one or both of the holders in Grunes in view of the teaching in Pflaumer" (answer, page 6). The examiner also submits that "whether one used recesses 115 in Pflaumer or

point mounts as taught by Murdoch (elements 84) would be an obvious matter of design and/or choice" (answer, pages 6 and 7). Murdoch discloses a semiconductor wafer transport module in the form of an arm mechanism 76 which includes a holder in the form of a pair of fingers 78 having friction pads 84 thereon formed from soft plastic material for engaging the underside of a wafer to prevent slippage without damaging the surface of the wafer (see Figure 5 and column 4, lines 63 through 68).

In rejection V, the examiner relies on Cruz to cure the failure of Grunes to meet the limitations in independent 16 requiring two substrate holders each having more than one separate substrate holding area located one above the other in parallel planes, and the limitations in claim 22 requiring first and second substrate holders suitably sized and shaped to respectively hold a first and a different second maximum number of substrates. Here, the examiner has concluded that it would have been obvious at the time the invention was made to a person having ordinary skill in the art "to substitute

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holders as claimed for one or both the holders in Grunes in view of the teaching in Cruz" (answer, page 7).

The appellants' arguments (see pages 10 through 14 in the main brief) relating to the proposed combination of Grunes and either Pflaumer or Cruz mirror those presented with regard to the proposed combination of Ishida and either Pflaumer or Cruz and are unpersuasive for the reasons expressed above. The additional arguments regarding the examiner's application of Murdoch in response to the point mount limitations in claim 10 are also unconvincing. Murdoch's disclosure of the advantages of friction pads 84, which constitute point mounts to the extent broadly recited in claim 10, would have provided the artisan with ample suggestion or motivation to replace Pflaumer's recesses with a suitable number and arrangement of such pads.

Accordingly, we shall sustain the standing 35 U.S.C. § 103(a) rejections of independent claims 10 and 22 as being unpatentable over Grunes in view of Pflaumer and Murdoch and of independent claims 16 and 22 as being unpatentable over Grunes in view of Cruz. We also shall sustain the standing 35

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U.S.C. § 103(a) rejections of dependent claims 11, 14, 23 and 24 as being unpatentable over Grunes in view of Pflaumer and Murdoch and of dependent claims 17, 23 and 24 as being unpatentable over Grunes in view of Cruz since the appellants have not challenged such with any reasonable specificity, thereby allowing these dependent claims to stand or fall with parent claims 10, 16 and 22 (see In re Nielson, supra).

Finally, we shall not sustain standing rejection of claims 1, 3, 6 through 9, 11, 22, 23 and 25 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 through 19 of the Davis patent in view of Pflaumer and Cruz. In short, the analysis advanced by the examiner (see pages 7 and 8 in the answer) fails to account for a

multitude of differences between each of the rejected claims and the claims in the Davis patent.

In summary and for the above reasons, the decision of the examiner:

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a) to reject claims 1, 6, 7, 8, 22, 23 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Ishida in view of Pflaumer is affirmed, with the affirmance being designated as a new ground of rejection pursuant to 37 CFR § 1.196(b) with respect to claims 1, 6, 7 and 8;

b) to reject claims 1, 6, 7, 9, 22, 23 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Ishida in view of Cruz is affirmed, with the affirmance being designated as a new ground of rejection pursuant to 37 CFR § 1.196(b) with respect to claims 1, 6, 7 and 9;

c) to reject claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Ishida in view of Pflaumer or Cruz, and further in view of Hendrickson and Grunes is reversed;

d) to reject claims 10, 11, 14, 22, 23 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Grunes in view of Pflaumer and Murdoch is affirmed;

e) to reject claims 16, 17, 22, 23 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Grunes in view of Cruz is

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affirmed; and

f) to reject claims 1, 3, 6 through 9, 11, 22, 23 and 25 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 through 19 of the Davis patent in view of Pflaumer and Cruz is reversed.

In addition to affirming the examiner's rejections of one or more claims, this decision contains new grounds of rejection pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63,122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides, "A new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

(b) Appellant may file a single request for rehearing within two months from the date of the original decision . . . .

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37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejections, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejections are overcome.

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If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of

Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for reconsideration thereof.

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; 37 CFR § 1.196(b)

LAWRENCE J. STAAB )  
Administrative Patent Judge )  
)  
)  
) BOARD OF PATENT  
JOHN P. McQUADE )  
Administrative Patent Judge ) APPEALS AND

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)  
) INTERFERENCES  
)  
JEFFREY V. NASE )  
Administrative Patent Judge )

JPM/PGG  
Mark F. Harrington  
Perman and Green  
425 Post Road  
Fairfield, CT 06430