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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ISAO TSUKAGOSHI, YUTAKA YAMAGUCHI, ATSUO NAKAJIMA and YASUSHI GOTO

Appeal No. 1998-0786
Application No. 08/464,118

HEARD: January 12, 2000

Before KIMLIN, GARRIS, and PAK, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's refusal to allow claims 2, 5 and 7, as amended subsequent to the final Office action dated September 3, 1996, Paper No. 8. These claims are all of the claims pending in the present application since claims 4 and 6 were canceled subsequent to the final Office action.

Claim 2 is representative of the subject matter on appeal and reads as follows:

2. A process for connecting circuits comprising the steps of:

(a) forming a filmy adhesive layer on the surfaces of projecting electrodes of a semiconductor wafer formed with a plurality of integrated circuit elements having the pressure-deformable electrodes projecting from the main face, said adhesive comprising a liquid epoxy resin, a solid resin having a functional group and a micro-capsule type curing agent;

(b) cutting said wafer along with the adhesive layer to form chips, and positioning the projecting electrodes of said chips with opposing circuits on a wiring substrate through the medium of the adhesive layer to set the chips in place correctly, and

(c) substantially curing the adhesive after the projecting electrodes have been contacted with the opposing circuits by heating and pressing said chips and wiring substrate together; the projecting electrodes being contacted with the opposing circuits by heating to a temperature of 40 to 250°C while applying a pressure in the range of from 1 to 100 kgf/cm^2.

As evidence of obviousness, the examiner relies on the following prior art:

Bentov et al. (Bentov)	3,167,602	Jan. 26, 1965
Breen	3,600,246	Aug. 17, 1971
Fujiwara et al. (Fujiwara)	3,741,858	Jun. 26, 1973
Celling	3,811,183	May 21, 1974

Pallie et al. (Pallie)	4,617,357	Oct. 14, 1986
Hatada	4,749,120	Jun. 7, 1988

Claims 1 and 7 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Hatada, Breen, Fujiwara, Pallie and Bentov. Claim 5 stands rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Hatada, Breen, Fujiwara, Pallie, Bentov and Ceiling.

We reverse each of the foregoing rejections. Our reasons for this determination follow.

The claimed subject matter is directed to a process for connecting circuits. The process involves, ***inter alia***, forming a specific adhesive film on the surface of pressure deformable projecting electrodes of a semiconductor wafer, cutting the wafer along with the adhesive film to form chips and substantially curing the adhesive film after contacting the pressure deformable electrodes with opposing circuits under specific heating and pressing conditions. According to page 12 of the specification, the pressure deformable electrode is defined as follows:

> Various methods, such as mentioned below, are available for affording pressure-deformability to the projecting electrodes 2; and extendable material (for example, the materials having an elongation of 40% or more, shown in METAL DATA BOOK, p, 155, 1984, compiled by Japan Metallurgical Society and pub. by Maruzen Co., Ltd.) such as gold, solder, copper, aluminum, silver, lead, titanium or the like is used as the electrode material; fine unevenness is formed at the end of the convex electrode as shown in FIGS. 3 and 4 to reduce the portion to be pressed (deformed portion; the grain boundary structure at the time of plating is enlarged. It is preferred to use the above-described techniques in combination. Also, the electrodes may be formed with a pressure-deformable material such as a thermoplastic material and their surfaces coated with a metal.

The use of the pressure deformable electrodes allows the improvement in connection between the electrodes and the opposing circuits, without causing mechanical break of electronic parts, substrates and/or circuits. See specification, pages 11, 12 and 13. Moreover, the application of the specific adhesive film on the wafer prior to cutting prevents scattering of chips during the cutting operation. See specification, pages 17 and 19. The properties of the specific adhesive film appear to play an important role in avoiding contamination associated with using the adhesive film prior to cutting. See specification, page 17.

As evidence of obviousness of the claimed subject matter under 35 U.S.C. § 103, the examiner relies on the combined disclosures of Hatada, Breen, Fujiwara, Pallie, Bentov and Celling. See Answer in its entirety. According to the examiner, Hatada essentially shows the claimed process except for the claimed adhesive composition and its application on a wafer prior to cutting it into chips. ***Id.*** The examiner then relies on the disclosures of Fujiwara, Pallie, Bentov and Celling to establish obviousness of using the claimed adhesive composition and the disclosure of Breen to establish obviousness of applying the claimed adhesive composition on the wafer prior to cutting it into chips. See Answer, pages 6-9. In addition, the examiner takes the position that "these metal projections/bumps of [Hatada] are held/seen to correspond/be essentially identical to the "deformable projecting electrodes" recited/envisioned for use by appellants..." See Answer, page 8.

Under 35 U.S.C. § 103, "the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a ***prima facie*** case of unpatentability." ***In re***

Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). In other words, the burden of producing a factual basis to support a Section 103 rejection rests on the examiner. ***In re Warner***, 379 F.2d 1011, 1017, 154 USPQ 173, 177-78 (CCPA 1967). However, on this record, we find that the examiner has not met his burden of proof.

Contrary to the examiner's factual finding, for example, Breen does not teach applying an adhesive film on the pressure deformable projecting electrodes of a wafer prior to its cutting. Rather, Breen teaches forming a non-adhesive film 18 on the non-electrode surface of a wafer, prior to cutting or cracking it into chips. See Breen, column 3, lines 20--31 and Figures 2 and 3, element 18. Moreover, although the examiner alleges that the metal projections/bumps of Hatada are either identical to or essentially identical to the claimed "pressure deformable projecting electrodes", the examiner does not refer to any evidence to support such an allegation. Thus, on this record, we agree with appellants that the examiner has not established a ***prima facie*** case of obviousness regarding the claimed pressure deformable projecting electrodes and the

claimed adhesive film forming sequence. Accordingly, we reverse the examiner's § 103 rejections of all of the appealed claims.

The decision of the examiner is reversed.

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

REVERSED

EDWARD C. KIMLIN Administrative Patent Judge	)
BRADLEY R. GARRIS Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
CHUNG K. PAK Administrative Patent Judge	)

CKP:lp

Appeal No. 1998-0786
Application No. 08/464,118

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Appeal No. 1998-0786
Application No. 08/464,118

APJ PAK

APJ KIMLIN

APJ GARRIS

DECISION: REVERSED
Send Reference(s): Yes No
or Translation (s)
Panel Change: Yes No
Index Sheet-2901 Rejection(s):
Prepared: October 27, 2000

Draft Final

3 MEM. CONF. Y N

OB/HD GAU

PALM / ACTS 2 / BOOK
DISK (FOIA) / REPORT