Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASAZUMI AMAGAI, KAZUYOSHI EBE
and HIDEO SENOO

Appeal No. 1997-3306
Application No. 08/234,073

ON BRIEF

Before URYNOWICZ, DIXON, and BARRY, Administrative Patent Judges.

URYNOWICZ, Administrative Patent Judge.

Decision on Appeal

This appeal is from the final rejection of claims 5-17.

The invention pertains to a process for preparing a semiconductor wafer for dicing. Claim 5 is illustrative and reads as follows:

5. A process for preparing a semiconductor wafer for subsequent dicing into a plurality of semiconductor chips, said process comprising:
forming a radiation curable adhesive layer on a substrate film to provide a composite adhesive sheet, wherein the radiation curable adhesive layer includes

an acrylic adhesive material made of a copolymer of an acrylic ester and an OH group-containing polymerizable monomer existing in a quantity of 100 parts by weight, and

a radiation polymerizable compound having two or more unsaturated bonds in a quantity of 50-200 parts by weight;

securing the composite adhesive sheet to the back surface of a semiconductor wafer having respective circuits formed on the front surface thereof by pressing the radiation curable adhesive layer of the composite adhesive sheet onto the back surface of the semiconductor wafer;

dicing the semiconductor wafer into a plurality of semiconductor chips each containing a circuit on the front side thereof while retaining the plurality of semiconductor chips on the composite adhesive sheet;

irradiating the radiation curable adhesive layer of the composite adhesive sheet with radiation to cure the radiation curable adhesive layer such that the radiation polymerizable compound has an elastic modulus of not less than 1×10^9 dyne/cm^2 after curing;

removing the plurality of semiconductor chips from the composite adhesive sheet after the adhesive layer thereof has been cured by irradiation;

mounting the individual semiconductor chips on a lead frame; and

packaging the individual chips with the back surfaces thereof in at least partial contact with a molding resin.

The references relied upon by the examiner are:

Gotman	4,296,542	Oct. 27, 1981
Ebe et al. (Ebe)	5,187,007	Feb. 16, 1993
Ishiwata et al. (Ishiwata)	5,281,473	Jan. 25, 1994

The admitted prior art at page 2 of appellants' specification.

Claims 5-9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ishiwata in view of appellants' admitted prior art and Gotman.

Claims 10-17 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ishiwata, appellants' admitted prior art and Gotman, further in view of Ebe.

The respective positions of the examiner and the appellants with regard to the propriety of these rejections are set forth in the final rejection and the examiner's answer (Paper Nos. 8 and 12, respectively) and the appellants' brief (Paper No. 11).

Appellants' Invention

A summary of the invention is provided by appellants at pages 3-7 of the brief.

Opinion

After consideration of the positions and arguments presented by both the examiner and the appellants, we have concluded that the rejection of sole independent claim 5 should not be sustained.

At pages 3 and 4 of the final rejection, the examiner states that "Ishiwata does not teach as a specific embodiment the particular combination or concentration of compounds." He asserts the reference teaches a process for combining compounds to form a radiation curable tape and that the process is "not limited by any of the details of the description, unless otherwise specified, but rather be

construed broadly within its spirit and scope as set out in the accompanying claims" (col. 23, lines 45-49). Note is made of the fact that at page 31, lines 17-19, applicants explicitly teach that the instant invention "is in no way limited" to the specific examples. In view of the above, the conclusion is drawn that the specific combination and concentration of compounds would have been obvious through routine experimentation and optimization.

We do not agree with the examiner that the specific combination and concentration of compounds would have been obvious through routine experimentation and optimization.

Although choosing a compound or concentration of a compound by itself can involve routine experimentation when attempting to optimize a specific characteristic or property of an invention, the examiner has not indicated specifically what characteristic or property of Ishiwata's invention it is that the routineer would have found it obvious to optimize by experimentation and why he would have done so, and how such experimentation would have resulted in the "specific combination and concentration of compounds" to which he makes reference at page 4, line 8, of the final rejection. Contrary to the examiner's statement at page 4, lines 10-13, of the final rejection,

there is no disclosure in Ishiwata reporting that the patentees recognized that a residue of adhesive adhering to a chip upon its removal from a radiation cured adhesive layer was a problem which subsequently caused defects such as separation between chips and molding resin in packaged chips. Accordingly, one of ordinary skill in the art would not have experimented to obtain adhesive-free wafer chips, which experimentation purportedly would have been expected to yield the claimed "combination and concentration of compounds."

Whereas Ishiwata does not recognize the problems caused by adhesive residue adhering to a wafer when it is removed from a radiation cured adhesive layer as the examiner contends, we do not agree with his position at page 4, lines 9-15, of the final rejection that a modulus of elasticity of not less than $1x10^9$ dyne/cm^2 is an inherent property of the adhesive made by the process of Ishiwata. It is clear from appellants' disclosure at pages 27-29 that the lower limit for the modulus of elasticity of the radiation polymerizable compound is set to assure that diced wafer chips A1-A3 do not fall off the adhesive sheet 1, yet can be removed from the sheet without any residual adhesive contamination.

Whereas we will not sustain the rejection of sole independent claim 5, we will not sustain the rejection of dependent claims 6-9 over Ishiwata in view of appellants' admitted prior art and Gotman, nor will we sustain the rejection of dependent claims 10-17 over Ishiwata in view of appellants' admitted prior art, Gotman and Ebe.

REVERSED

STANLEY M. URYNOWICZ, JR. Administrative Patent Judge	)	
JOSEPH L. DIXON Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)	

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