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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARCEL BROEKAART,
IONUT RADU, and CHRYSTELLE LAGAHE BLANCHARD

Appeal 2018-004732
Application 14/903,961
Technology Center 2800

Before GEORGE C. BEST, MONTÉ T. SQUIRE, and
SHELDON M. McGEE, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

The Examiner finally rejected claims 1–18 of Application 14/903,961 under 35 U.S.C. § 103 as obvious. Final Act. (June 9, 2017). Appellant¹ seeks reversal of these rejections pursuant to 35 U.S.C. § 134(a). We have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we *affirm*.

¹ Soitec, a French corporation, is identified as the Applicant and real party in interest. Appeal Br. 2.

BACKGROUND

The '961 Application describes a process that can be used in the manufacture of integrated circuits or other micro-devices including microelectronic, optoelectronic, and photovoltaic devices. Appeal Br. 4.

As the Specification explains, it is known in the prior art to transfer a useful layer from a donor substrate to a carrier substrate. For ease of reference, we reproduce Figure 1A of the '961 Application below:

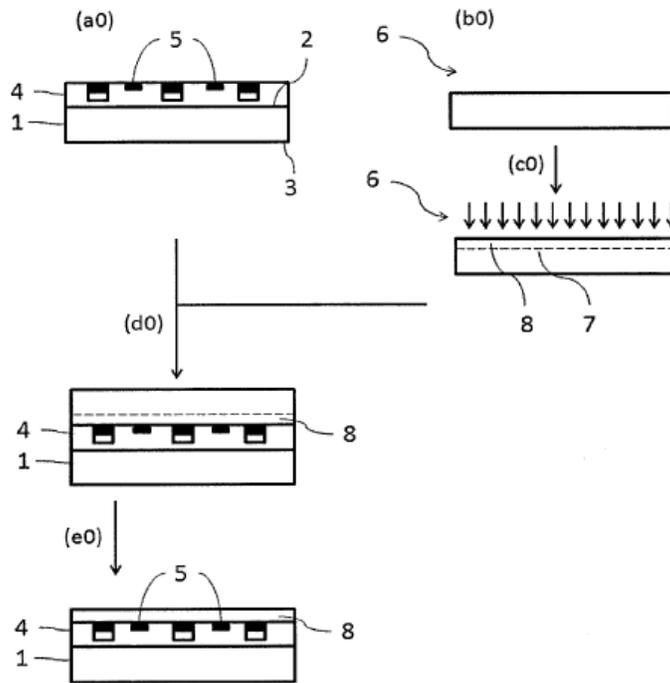


Figure 1A shows an admitted prior art process for transferring a useful layer from a donor substrate to a carrier substrate. Spec. ¶¶ 3–17.

As shown in Figure 1A, carrier substrate **1** may comprise device layer **4** which has alignment marks **5**. Spec. ¶¶ 3–17; Figure 1A. Useful layer **8** may be transferred from donor substrate **6** to carrier substrate **1**. *Id.* This process involves formation of weak zone **7** in donor substrate **6**. *Id.* Useful layer **8** is brought into contact with device layer **4**; then, donor substrate **6** is fractured in weak zone **7** to transfer useful layer **8** to device layer **4**. *Id.* A

drawback of this process is that alignment marks **5** are covered by useful layer **8**. *Id.* While alignment marks **5** may be exposed—e.g., photolithography followed by etching—because alignment marks **5** are not visible, the apertures that must be created to reveal alignment marks **5** are larger than is desirable. *Id.*

The process described in the '961 Application's Specification is said to overcome this drawback. Claim 1 is representative of the '961 Application's claims and is reproduced below from the Claims Appendix of the Appeal Brief.

1. A process for locating devices after transfer of a useful layer, the process comprising the following steps:
 - a) providing a carrier substrate comprising:
 - a device layer comprising a free surface and cavities having an aperture flush with the free surface; and
 - alignment marks placed in the cavities of the device layer, away from the aperture;
 - b) providing a donor substrate;
 - c) forming a weak zone in the donor substrate, the weak zone delimiting a useful layer;
 - d) assembling the donor substrate to the free surface of the device layer of the carrier substrate, the presence of the cavities in the device layer generating unbonded zones between the donor substrate and the carrier substrate; and
 - e) fracturing the donor substrate in the weak zone so as to transfer the useful layer to the device layer and to form through holes in the useful layer in positional correspondence with the cavities to expose the alignment marks.

Appeal Br. Claims App. 3.

REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 1, 15, and 16² are rejected under 35 U.S.C. § 103 as unpatentable over the combination of Applicant's Admitted Prior Art ("AAPA") and Ho.³ Final Act. 2.
2. Claim 2 is rejected under 35 U.S.C. § 103 as unpatentable over the combination of AAPA, Ho, and Nicolas.⁴ Final Act. 4.
3. Claims 3–7 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of AAPA, Ho, Nicolas, and Yoshimura.⁵ Final Act. 5.
4. Claims 3–6, 8–12, 17, and 18 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of AAPA, Ho, Nicolas, and Or-Bach.⁶ Final Act. 6.
5. Claims 13 and 14 are rejected under 35 U.S.C. § 103 as unpatentable over the combination of AAPA, Ho, and Yoshimura. Final Act. 8.

² Claims 15 and 16 are not mentioned in the Examiner's summary statement of the rejection but are discussed in the detailed explanation of the rejection. Claims 2 and 3, on the other hand, appear to be improperly included in the summary statement because they are not substantively discussed in the rejection. *See* Final Act. 2–4.

³ US 2013/0037958 A1, published February 14, 2013.

⁴ US 2014/0342487 A1, published November 20, 2014.

⁵ KR 2002-0077936, published October 14, 2002. We rely upon and cite the machine translation that is part of the '961 Application's prosecution history.

⁶ US 8,058,137 B1, issued November 15, 2011.

DISCUSSION

Rejection 1. Appellant argues for reversal of this rejection on the basis of limitations in claim 1. *See* Appeal Br. 16–22. We, therefore, select claim 1 as representative of the claims subject to this ground of rejection. 37 C.F.R. § 41.37(c)(1)(iv). The dependent claims will stand or fall with claim 1.

In rejecting claim 1, the Examiner found that AAPA describes or suggests each limitation recited in claim 1 except for alignment marks placed in cavities formed in a device layer, wherein the cavities have an aperture flush with the device layer’s free surface. Final Act. 2–3. The Examiner further found that Ho’s Figure 6 depicts a device layer comprising a free surface that includes a cavity. *Id.* at 3. Alignment marks are located to the bottom of the cavity away from the cavity’s aperture, which is flush with the free surface. *Id.*

As the Examiner found, *see* Answer 6–7, Ho further states that these alignment marks may be used in the subsequent formation of structures on the surface of the device layer. Ho ¶ 22. According to the Examiner, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate Ho’s alignment marks located at the bottom of a cavity as a substitute for AAPA’s alignment marks for use in subsequent processing because Ho’s alignment marks will be visible without further processing after fracturing of the donor substrate. Answer 7. The Examiner further found that, at the time of the invention, a person having ordinary skill in the art would have had a reasonable expectation that this substitution could be made successfully. *Id.*

Appellant argues that this rejection should be reversed because there is no objective reason to combine AAPA and Ho in any way that would

arrive at a method recited in claim 1. Appeal Br. 16; *see also* Reply Br. 4 (reiterating the argument set forth in the Appeal Brief). We are not persuaded by this argument.

As discussed above, the Examiner identified a reason to combine Ho's alignment marks for AAPA's alignment marks. *See* Answer 7. Moreover, the Examiner's reasoning is consistent with Ho's discussion of the use of the alignment marks in the subsequent formation of the colored filters and lenses on Ho's backside illumination chip. *See* Ho ¶ 22 ("In the formation of the color filters and lenses, SPM 40' may be used as an alignment mark."). The Examiner, therefore, has provided sufficient reasoning to support the obviousness rejection.

Appellant's remaining arguments center around the alleged impossibility of attaching a donor layer to Ho's backside illumination chip. *See* Appeal Br. 20–22. These arguments, however, are based upon the bodily incorporation of the backside illumination chip depicted in Ho's Figure 6 in the AAPA process. *Id.* Obviousness, however, does not require bodily incorporation of the features of a secondary reference into the primary reference. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("To justify combining reference teachings in support of a rejection it is not necessary that a device shown in one reference can be physically inserted into the device shown in the other.").

In view of the foregoing, we affirm the rejection of claim 1 as unpatentable over the combination of AAPA and Ho. Because claim 1 is representative of the claimed subject to this ground of rejection, we also affirm the rejection of claims 15 and 16.

Rejection 2. The Examiner rejected claim 2 as unpatentable over the combination of AAPA, Ho, and Nicolas. Final Act. 4–5. Appellant argues

that this rejection should be reversed because Nicolas does not remedy the alleged deficiencies in the combination of AAPA and Ho. Appeal Br. 22–23. As discussed above, we have determined that Appellant has not persuaded us of the existence of reversible error in the rejection of claim 1. Accordingly, Appellant’s arguments with respect to this rejection also are unpersuasive. We, therefore, affirm.

Rejection 3. The Examiner rejected claims 3–7 as unpatentable over the combination of AAPA, Ho, Nicolas, and Yoshimura. Final Act. 5–6. Appellant argues that claims 3–7 are allowable by virtue of their dependence from independent claim 1 and the alleged failure of Nicolas and Yoshimura to cure the defects in the rejection of claim 1. Appeal Br. 23–24. Because we have affirmed the rejection of claim 1, we also affirm the rejection of claims 3–7.

Rejection 4. The Examiner rejected claims 3–6, 8–12, 17, and 18 as unpatentable over the combination of AAPA, Ho, Nicolas, and Or-Bach. Final Act. 6–8. Appellant argues that claims 3–6, 8–12, 17, and 18 are allowable by virtue of their dependence from independent claim 1 and the alleged failure of Nicolas and Or-Bach to cure the defects in the rejection of claim 1. Appeal Br. 25–26. Because we have affirmed the rejection of claim 1, we also affirm the rejection of claims 3–6, 8–12, 17, and 18.

Rejection 5. The Examiner rejected claims 13 and 14 as unpatentable over the combination of AAPA, Ho, and Yoshimura. Final Act. 8. Appellant argues that claims 13 and 14 are allowable by virtue of their dependence from independent claim 1 and the alleged failure of Ho and Yoshimura to cure the defects in the rejection of claim 1. Appeal Br. 26–27. Because we have affirmed the rejection of claim 1, we also affirm the rejection of claims 13 and 14.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
115, and 16	§ 103 AAPA and Ho	115, and 16	
2	§ 103 AAPA, Ho, and Nicolas	2	
3–7	§ 103 AAPA, Ho, Nicolas, and Yoshimura	3–7	
3–6, 8–12, 17, and 18	§ 103 AAPA, Ho, Nicolas, and Or-Bach	3–6, 8–12, 17, and 18	
13 and 14	§ 103 AAPA, Ho, and Yoshimura	13 and 14	
Overall Outcome		1–18	

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