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Hauptman Ham, LLP (TSMC)
2318 Mill Road
Suite 1400
Alexandria, VA 22314

EXAMINER	
MAINI, RAHUL	

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte CHEWN-PU JOU and MIN-JER WANG

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Appeal 2024-004096
Application 17/076,088
Technology Center 2800

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Before MARC S. HOFF, ELENI MANTIS MERCADER, and JENNIFER L. MCKEOWN, *Administrative Patent Judges.*

MCKEOWN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–20. *See* Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

[1] "Appellant" refers to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as TAIWAN SEMICONDUCTOR MANUFACTURING CO. Appeal Br. 2.

CLAIMED SUBJECT MATTER

The claims are directed to an integrated circuit testing system and method. Claim 1, reproduced below, illustrates the claimed subject matter:

> 1. A method of testing an integrated circuit, the method comprising:
>
> connecting a conductive line to a ground voltage;
>
> directly physically contacting the conductive line with a first conductive structure without marring the first conductive structure;
>
> contacting the conductive line with a second conductive structure different from the first conductive structure;
>
> supplying a first test voltage to the conductive line through the first conductive structure;
>
> supplying a second test voltage to the conductive line through the second conductive structure; and
>
> generating a report indicating whether the first conductive structure is capable of carrying the first test voltage based on feedback from a first test circuit connected to the first conductive structure.

REFERENCES

The Examiner relies on the following references to reject the claims:

Name	Reference	Date
Fjelstad	US 6,086,386	July 11, 2000
Dishongh	US 6,452,502	Sept. 17, 2002
Spuhler	US 7,501,832 B2	Mar. 10, 2009
Yao	US 9,024,315 B2	May 5, 2015
Wu	US 2014/0266283 A1	Sept. 18, 2014

REJECTIONS

The Examiner maintains the following rejections:

Claims 1–3, 8–10, and 17–20 are rejected under 35 U.S.C. § 103 as being unpatentable over Spuhler, Wu, and Fjelstad. Final Act. 3.

Claims 4 and 11–16 are rejected under 35 U.S.C. § 103 as being unpatentable over Spuhler, Wu, Fjelstad, and Yao. Final Act. 16, 20.

Claims 5–7 are rejected under 35 U.S.C. § 103 as being unpatentable over Spuhler, Wu, Fjelstad, and Dishongh. Final Act. 18.

OPINION

THE OBVIOUSNESS REJECTION BASED ON SPUHLER, WU, AND FJELSTAD
Claims 1–3, 8–10, and 17–20

Appellant asserts that the combination of Spuhler and Fjelstad would render Spuhler unsatisfactory for its intended purpose. Appeal Br. 8. According to Appellant, to satisfy the claim language of "directly physically contacting," Spuhler must be modified to remove the LAND 128, which as shown below in Figure 5, is between the node 154, i.e. conductive line, and solder balls 124, i.e. first conductive structure. *Id.*

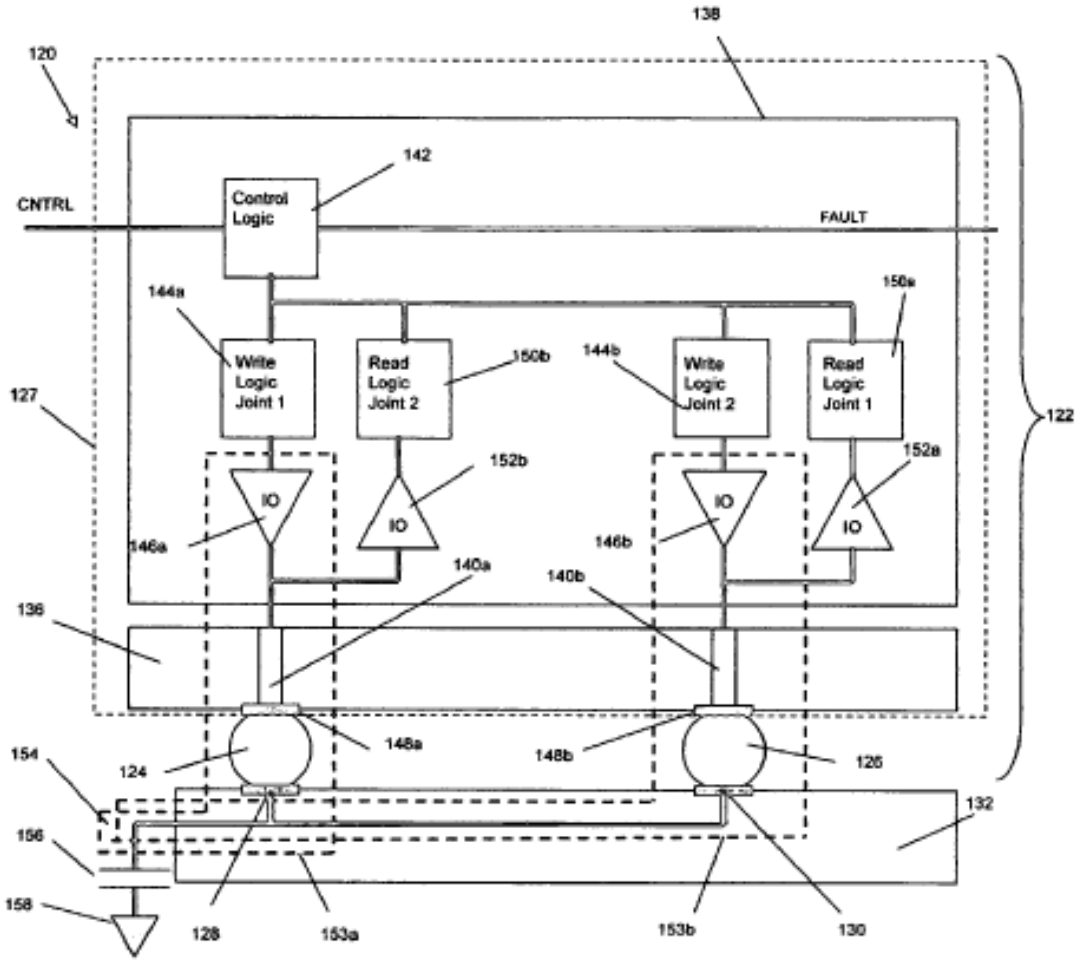

Fig. 5

Spuhler's Figure 5 Depicting An Exemplary Embodiment With LANDS Contacting Solder Balls

Appellant maintains that removal of the LAND 128 would reduce the effectiveness of Spuhler and render Spuhler unsatisfactory for its intended purpose "of accurately evaluating the condition of solder joints in the electronic package." Appeal Br. 8; Reply Br. 4.

More particularly, Appellant argues that removal of LAND 128 would remove Spuhler's ability to detect failures in the printed wired board (PWB) LAND interface. Appeal Br. 9. Appellant explains that Spuhler's stated purpose is to detect failures at multiple locations and that

> One of ordinary skill in the art would understand that whether a failure occurs at a first location or at a second location, the overall result is that the entire device fails. Sampling at just a single location, instead of the multiple locations of Spuhler, reduces the likelihood of precisely identifying whether "any such failure will result in a defective electronic package." The modification asserted by the Examiner reduces the number of testing locations by half. This reduction in testing locations will increase the risk of producing a defective device, which Spuhler is explicitly described as seeking to avoid. One of ordinary skill in the art would understand that removing the ability to detect failure at the PWB/LAND interface would inhibit Spuhler from helping to ensure high overall device yield.

Appeal Br. 9–10. *See also, e.g.*, Reply Br. 4 (citing Spuhler's background to show that the PWB LAND and solder ball interface is a location typical for failures and asserting that performing a test that excludes a typical location of failures "will inherently reduce the effectiveness of a determining the presence of defects by failing to test a location where defects typically occur" and the further the test "result would be degraded to the point of being usable.").

We are not persuaded of error in the Examiner's rejection and adopt the Examiner's findings and conclusions as our own. *See, e.g.*, Final Act. 2–7; Ans. 3–7. As the Examiner points out (Ans. 6), "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . . Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). The Examiner, here, relies on the teachings of the reference as a whole to arrive at the claimed limitation. *See, e.g.*, Ans. 6. Moreover, we understand Spuhler's LAND 128 to be a contact of the node 154, i.e.

conductive line. Given the broad disclosure of conductive line in the Specification, a skilled artisan would understand Spuhler's LAND is part of Spuhler's conductive line. *See* Spec. ¶ 25 (noting that "[i]n some embodiments, conductive line 113 is a conductive plane.").

Nevertheless, even if the Examiner's combination did require LAND 128 removal, Appellant fails to identify persuasive support for the alleged intended purpose of Spuhler nor does Appellant persuasively explain how the proposed combination would render Spuhler unsatisfactory for that alleged purpose. As the Examiner explains, the cited portions of Spuhler identify that failures may occur at the PWB LAND and solder ball interface, but not that the interface is "specifically being used to determine whether failures are likely to occur within the electronic package." Ans. 4. For example, Spuhler, at cited column 3, lines 5–42, describes different failure types, such as intermittent and hard failures, different failure evaluation mechanisms, such as temperature operation and storage tests, and different methods of analyzing solder joints, such as with or without opening the package. *See also* Ans. 4–5. As noted by the Examiner, we find no support in the cited disclosures for Appellant's assertion that Spuhler uses the solder ball and LAND interface to determine "whether failures are likely to occur within the electronic package resulting in defects." Appeal Br 8.

Moreover, Appellant does not demonstrate that removal of Spuhler's LAND would reduce the overall effectiveness of Spuhler's testing. As the Examiner explains,

> Because the internal solder-joint connections are tested directly, a test of the solder-joint/LAND interface is not required to determine the connectivity of the internal solder-joint connections. In other words, the internal solder-joint connections are tested even in the absence of LAND 128. Therefore, the

> ability to detect failure does not reduce the number of testing locations by half, does not increase the risk of producing a defective device and does not inhibit Spuhler from ensuring high overall yield.

Ans. 7. As such, based on the record before us, we are not persuaded in the Examiner's determination.

Finally, contrary to Appellant's assertion (Reply Br. 5–7), we do not understand the Examiner to modify the rejection to rely on internal connections of Spuhler instead of the cited node 154 and solder ball 128. Rather, the Examiner, in responding to Appellant's unsatisfactory for intended use argument, explains that Spuhler is directed to testing a variety of locations, such as testing the internal connection, such that removing one or more interfaces does not render the entire testing device unusable or less effective. Ans. 4–5, 7.

Accordingly, we affirm the rejection of claims 1–3, 8–10, and 17–20 under 35 U.S.C. § 103 as unpatentable over Spuhler, Wu, and Fjelstad.

THE REMAINING OBVIOUSNESS REJECTIONS
Claims 4–7 and 11–16

Appellant does not present separate arguments of patentability for claims 4–7 and 11–16, but instead rely on the arguments presented for claim 1. *See, e.g.*, Appeal Br. 11–12. As discussed above, we are not persuaded of error in the Examiner's rejection of claim 1. Similarly, for the same reasons, we are also not persuaded of error in the Examiner's rejections of 4–7 and 11–16 and affirm the rejections of these claims.

CONCLUSION

The Examiner's rejections are AFFIRMED.

DECISION SUMMARY

The following table summarizes our decision:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1–3, 8–10, 17–20	103	Spuhler, Wu, Fjelstad	1–3, 8–10, 17–20	
4	103	Spuhler, Wu, Fjelstad, Yao	4	
5–7	103	Spuhler, Wu, Fjelstad, Dishongh	5–7	
11–16	103	Spuhler, Wu, Fjelstad, Yao	11–16	
Overall Outcome			1–20	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED