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Felix L. Fischer-The Boeing Company C/O Felix L. Fischer, Attorney at Law 4525 Holman St. Golden, CO 80403			PAGHADAL, PARESH H	
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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* JONATHAN B. VANCE

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Appeal 2019-004086  
Application 14/938,444  
Technology Center 2800

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Before BEVERLY A. FRANKLIN, MICHAEL P. COLAIANNI, and  
JULIA HEANEY, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the Examiner's decision to reject claims 1–6, 8, and 10–14. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as The Boeing Company. Appeal Br. 3.

Appellant's invention is directed to electronic circuits including deposited dielectric and conductive materials in combination with microwire conductors (Spec. ¶ 2; Claim 1).

Claim 1 is representative of the subject matter on appeal:

1. A microwire circuit comprising:
  - a first dielectric layer printed as a first stripe shape on a substrate using a first printing engine;
  - a drawn microwire trace positioned on the first dielectric layer by a microwire spooling machine connected to track the first printing engine and incorporating a tension guide to position the microwire trace onto the first dielectric layer while still tacky from printing to provide an adhesive effect in constraining the microwire trace; and,
  - a second dielectric layer printed as a plurality of second stripe portions using a second printing engine connected to track the microwire spooling machine to interruptibly deposit the second dielectric layer over the drawn microwire trace.

Appellant appeals the following rejections:

1. Claims 1–3, 6, 8, and 11–14 are rejected under 35 U.S.C. § 103(a) as unpatentable over Casey '693 (US 2005/0156693 A1, published July 21, 2005) in view of Casey '841 (US 2004/0258841 A1, published Dec. 23, 2004), Tanaka (US 2001/0040490 A1, published Nov. 15, 2001), Chen (US 8,236,154 B2, issued Aug. 7, 2012), and Erika (US 2008/0099759 A1, published May 1, 2008).
2. Claim 4 is rejected under 35 U.S.C. § 103(a) as unpatentable over Casey '693, in view of Casey '841, Tanaka, Chen, Erika and Conlon (US 5,035,939 July 30, 1991).
3. Claims 5 and 10 are rejected under 35 U.S.C. § 103(a) as

unpatentable over Casey ‘693, in view of Casey ‘841, Tanaka, Chen, Erika, and Deckelmann (US 4,689,270, issued Aug. 25, 1987).

## FINDINGS OF FACT & ANALYSIS

### Rejections (1)

Claim 1 recites in relevant part “a drawn microwire trace positioned on the first dielectric layer by a microwire spooling machine. . . .”

The Examiner finds that Casey ‘693 teaches the subject matter of claim 1 including a drawn microwire trace referring to reference numbers 204 and 206 (Final Act. 2). The Examiner determines that no patentable weight should be given to, *inter alia*, the use of a first printing engine or microwire spooling machine (Final Act. 3). The Examiner determines that the process limitations do not patentably distinguish the resulting product from the product taught or suggested by the applied prior art (Final Act. 3). The Examiner finds that the combined teachings of Casey ‘693, Casey ‘841, Tanaka, Chen, and Erika would have suggested a microwire circuit having the same structure as required by claim 1 (Final Act. 3-4; Ans. 5). The Examiner determines that claim 1 does not recite specific structure and material(s) (Ans. 6). The Examiner finds that a structure such as “a microwire trace positioned on the first dielectric layer” can be made by different, well-known processes such as screen printing, stencil printing, coating, spraying, deposition of conductor, or track etc. (Ans. 7).

Appellant argues that none of the applied prior art teaches a drawn microwire trace or the ability to create a functional circuit with a drawn microwire trace by any process (Appeal Br. 7). Appellant contends that the

drawn microwire trace has a specific structural connotation wherein the drawn microwire is adhesively constrained in the dielectric layers (Appeal Br. 8). Appellant argues that the structural limitation would not be possible without the specific process limitations of the claims where the microwire is positioned on the dielectric layer while the dielectric layer is still tacky from printing (Appeal Br. 8). We agree.

Product-by-process claims are generally not limited by the process used to make the product. *In re Thorpe*, 777 F.2d 695, 698 (Fed. Cir. 1985). However, the structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. *See, e.g., In re Garnero*, 412 F.2d 276, 279 (CCPA 1969).

Claim 1 requires a “drawn microwire trace positioned on the first dielectric layer by a microwire spooling machine . . . .” Appellant describes the microwire as including a copper wire (Spec. ¶ 13). The copper wire, as shown in Appellant’s Figures 1 and 3, is a metal wire 18 on a spool that is applied to the tacky dielectric layer 12 (Spec. ¶ 15). Appellant contrasts the resistance properties of a copper metal wire with a printed on silver layer (Spec. ¶ 13). Appellant states that the printed on silver layer has a much higher resistance (1kOhm) as compared to the copper wire (i.e., 2 Ohms) (Spec. ¶ 13). The recitation in claim 1 that a spooling machine is used to apply the microwire implies that a solid microwire is wound around the spool and applied to the dielectric layer. We construe claim 1 as requiring a structure where the microwire trace is a solid metal microwire.

In light of our construction, the Examiner has not established that structure taught or suggested by the combined teachings of Casey ‘693, Casey ‘841, Tanaka, Chen, and Erika would have included a solid metal microwire. Casey ‘693 teaches that the conductors 204 and 206 are formed of conductive paste (¶ 24). Casey ‘841 discloses that the conductor may be formed as disclosed in another application of Casey (i.e., US 2004/0256350 A1) (¶ 22). Casey ‘350 discloses using a paste (e.g., DuPont QG150 as taught by Casey ‘693 in paragraph 24) to form the conductors (¶¶ 14, 17). Although the Examiner finds that Tanaka’s electrode 22c is a drawn microwire trace, Tanaka is silent about how the strip line electrodes are formed (Final Act. 5, Tanaka *generally*). The Examiner has not established that Tanaka teaches or would have suggested a circuit that includes a drawn microwire as recited in claim 1. Chen teaches an electrode formed by coating, which the Examiner does not explain why that should be considered a drawn microwire made of metal, such as copper (Final Act. 5; Chen col. 4, ll. 64–67, col. 5, ll. 52–56). The Examiner does not rely on Erika to teach a drawn microwire (Final Act. 6).

Each of the applied references either teaches using a paste to form the electrodes or is silent as to how the electrodes are formed. In light of our claim construction above, we find that the Examiner has not established that the applied prior art would have suggested a microwire circuit having a drawn, solid metal microwire as required by claim 1. The structure in the applied prior art has not been shown to be the same as that required by claim 1. On this record, we reverse the Examiner’s § 103(a) rejection over Casey ‘693 in view of Casey ‘841, Tanaka, Chen, and Erika. For the same reasons, we reverse the § 103 rejections of dependent claims 4, 5, and 10 over the

combined teachings of Casey ‘693, Casey ‘841, Tanaka, Chen, and Erika and further in view of either Conlon or Deckelmann.

CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/ Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1–3, 6, 8, 11–14	103	Casey ‘693, Casey ‘841, Tanaka, Chen, Erika		1–3, 6, 8, 11–14
4	103	Casey ‘693, Casey ‘841, Tanaka, Chen, Erika, Conlon		4
5, 10	103	Casey ‘693, Casey ‘841, Tanaka, Chen, Erika, Deckelmann		5, 10
<b>Overall Outcome</b>				1–6, 8, 10–14

REVERSED