

United States Court of Appeals  
for the Federal Circuit

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STEUBEN FOODS, INC.,  
*Plaintiff-Appellant*

v.

SHIBUYA HOPPMANN CORPORATION, SHIBUYA  
KOGYO CO., LTD., HP HOOD LLC,  
*Defendants-Appellees*

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2023-1790

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Appeal from the United States District Court for the  
District of Delaware in No. 1:19-cv-02181-CFC, Chief  
Judge Colm F. Connolly.

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Decided: January 24, 2025

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COOKALCIATI, Gardella Grace PA, Washington, DC, argued for plaintiff-appellant.

JOHN CHRISTOPHER ROZENDAAL, Sterne Kessler Goldstein & Fox PLLC, Washington, DC, argued for defendants-appellees. Also represented by WILLIAM MILLIKEN, ANNA G. PHILLIPS, BYRON LEROY PICKARD, DEIRDRE M. WELLS.

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Before MOORE, *Chief Judge*, HUGHES and CUNNINGHAM,  
*Circuit Judges.*

MOORE, *Chief Judge*.

Steuben Foods, Inc. (Steuben) appeals the United States District Court for the District of Delaware's entry of judgment as a matter of law (JMOL) of noninfringement for claim 26 of U.S. Patent No. 6,209,591, claims 19 and 22 of U.S. Patent No. 6,536,188, and claims 3 and 7 of U.S. Patent No. 6,702,985. *Steuben Foods, Inc. v. Shibuya Hoppmann Corp.*, 661 F. Supp. 3d 322, 336 (D. Del. 2023) (*Decision*). Steuben also appeals the district court's conditional grant of a new trial on infringement, invalidity, and damages. *Id.* For the following reasons, we reverse the JMOL for the '591 and '188 patents, affirm the JMOL for the '985 patent, reverse the conditional grant of a new trial on noninfringement, and vacate the conditional grant of a new trial on invalidity and damages.

#### BACKGROUND

In 2010, Steuben filed a complaint in the United States District Court for the Western District of New York alleging Shibuya Hoppmann Corp. infringed, *inter alia*, claims of the '591, '188, and '985 patents (the Asserted Patents). In 2012, Shibuya Kogyo Co., Ltd. was added as a defendant. In 2012, Steuben filed a similar complaint, alleging HP Hood LLC infringed, *inter alia*, claims of the Asserted Patents. The cases were consolidated. In 2019, the Western District of New York granted a motion filed by Shibuya Hoppmann Corp., Shibuya Kogyo Co. Ltd., and HP Hood LLC (collectively, Shibuya) to transfer the case to the District of Delaware.

In 2020, the district court issued its claim construction order. In 2021, the district court denied cross-motions for summary judgment of noninfringement, infringement, and invalidity of the Asserted Patents. The district court held a five-day jury trial. *Decision* at 325. At the close of

evidence, Shibuya moved for JMOL under Federal Rule of Civil Procedure 50(a) of noninfringement as to all asserted claims of the Asserted Patents. The district court denied the motions, and the jury returned a verdict that the Asserted Patents are valid and infringed and awarded \$38,322,283.78 in damages.

After the verdict, Shibuya renewed its JMOL of noninfringement under Rule 50(b) as to all asserted claims of the Asserted Patents; moved for JMOL in the first instance as to invalidity of the asserted claims of the Asserted Patents and as to damages; and, in the alternative, moved for a new trial if the district court did not find noninfringement for any of the claims. J.A. 5211–55. The district court granted Shibuya’s motion regarding noninfringement of all the Asserted Patents, found the invalidity arguments waived, and conditionally granted a new trial under Rule of Civil Procedure 50(c)(1). *Decision* at 336. The district court entered a Rule 54(b) judgment, and Steuben appealed. J.A. 31–33. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

## DISCUSSION

### I. Judgments as a Matter of Law

We review a district court’s grant of JMOL under regional circuit law. *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1301 (Fed. Cir. 2011). The Third Circuit reviews a grant of JMOL de novo, applying the same standard as the district court. *Lightning Lube, Inc. v. Witco Corp.*, 4 F.3d 1153, 1166 (3d Cir. 1993). “Such a motion should be granted only if, viewing the evidence in the light most favorable to the nonmovant and giving it the advantage of every fair and reasonable inference, there is insufficient evidence from which a jury reasonably could find liability.” *Id.* Infringement is a question of fact which we review for substantial evidence when tried to a jury. *Wi-Lan, Inc. v. Apple, Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016).

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A. '591 Patent

The Asserted Patents generally relate to systems for the aseptic packaging of food products. *E.g.*, '591 patent at 1:9–10. The '591 patent specifically is directed to “an apparatus and method for providing container product filling in an aseptic processing apparatus.” *Id.* at 1:10–13. Asserted claim 26 recites:

26. Apparatus for aseptically filling a series of bottles comprising:

a valve for controlling a flow of low-acid food product into a bottle at a rate of more than 350 bottles per minute in a single production line;

a first sterile region surrounding a region where the product exits the valve;

*a second sterile region positioned proximate said first sterile region;*

a valve activation mechanism for controlling the opening or closing of the valve by extending a portion of the valve from the second sterile region into the first sterile region, such that the valve does not contact the bottle, and by retracting the portion of the valve from the first sterile region back into the second sterile region.

The claimed second sterile region is used to solve a potential contamination problem created when the valve stem actuates the valve between the closed and open position (allowing the sterile food product to flow through the valve). Figures 23 and 24 of the '591 patent depict a filling apparatus without the second sterile region:

Fig. 23

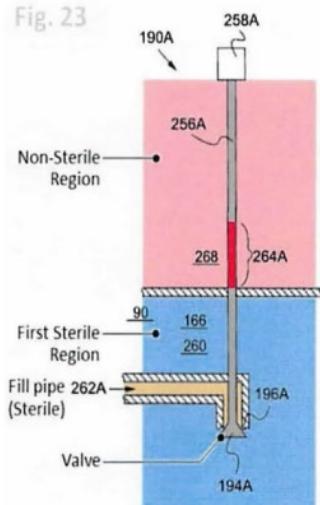
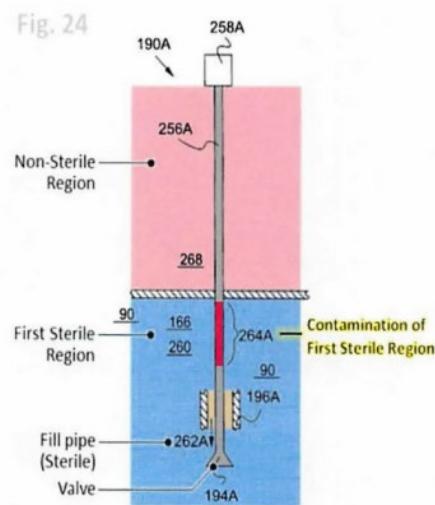


Fig. 24



*Decision* at 331 (annotated). As shown, when actuator 258A displaces valve stem 256A in a downward direction, valve 194A is removed from nozzle 196A, allowing product 262A to flow into a bottle. '591 patent at 14:1–16. When this happens, portion 264A of the valve stem goes from non-sterile region 268 into the first sterile region 260, potentially contaminating the first sterile region. *Id.* at 14:16–23.

The '591 patent's solution to this problem is depicted in Figures 25 and 26:

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Fig. 25

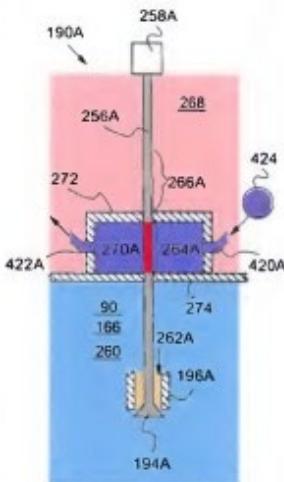
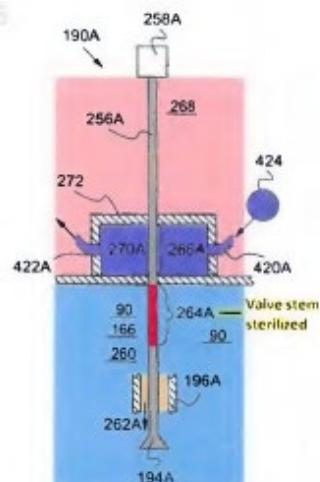
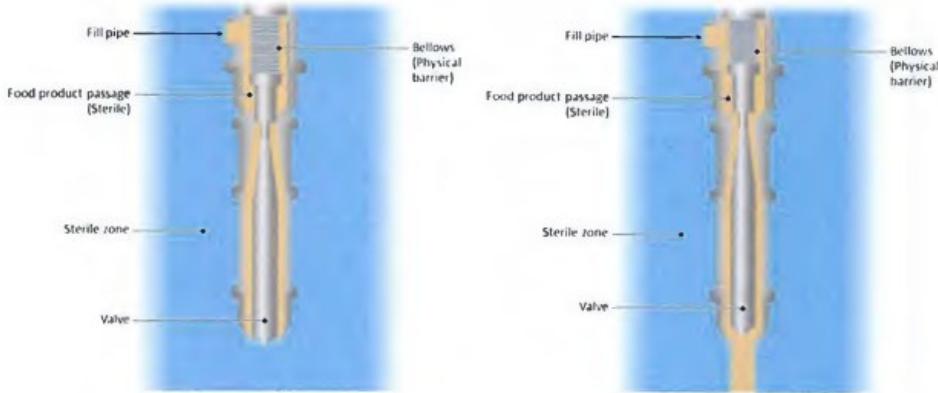


Fig. 26



*Decision at 331 (annotated).* The specification details “[i]n the present invention, the first portion 264A of the valve stem 256A has not introduced contaminants into the first sterile region 260 because the first portion 264A of the valve stem 256A was pre-sterilized in the second sterile region 270A before entering the first sterile region 260.” ’591 patent at 14:49–53. In other words, the second sterile region prevents contamination of the first sterile region by pre-sterilizing the portion of the valve stem highlighted in red, which would otherwise move from non-sterile region 268 into the first sterile region 260, and potentially introduce contaminants.

Steuben alleged Shibuya’s P7 aseptic bottling line infringed claim 26 of the ’591 patent and moved for summary judgment of infringement. J.A. 5155. Specifically, Steuben argued the accused product contained a sterile zone surrounding the fill pipe, identified by Steuben as a first sterile region, and a sterile food product passage, identified as the “second sterile region,” as depicted below. *Decision at 332.*



*Id.* (annotated).

At summary judgment, Shibuya argued the accused product did not infringe because it did not meet the “second sterile region” limitation and, separately, there existed genuine material facts in dispute regarding noninfringement under the reverse doctrine of equivalents (RDOE). J.A. 5156. The district court found that the accused product’s product pipe was “a second sterile region positioned proximate [to] said first sterile region,” and thus literally infringed claim 26. J.A. 5159. However, the district court denied summary judgment of infringement because there was a genuine issue of material fact about whether RDOE precluded a finding of infringement. J.A. 5163.

We have previously described RDOE as an “anachronistic exception, long mentioned but rarely applied.” *Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1368 (Fed. Cir. 2002). RDOE is, as it sounds, the reverse of the doctrine of equivalents. An alleged infringer may avoid a judgment of infringement by showing the accused “product has been so far changed in principle [from the asserted claims] that it performs the same or similar function in a substantially different way.” *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107,

1124 (Fed. Cir. 1985). A patentee alleging infringement bears the initial burden of proving infringement. *Id.* at 1123. If the patentee establishes literal infringement, then an accused infringer claiming noninfringement under RDOE bears the burden of establishing a prima facie case of noninfringement under RDOE. *Id.* at 1123–24. If the accused infringer meets this burden, then the burden shifts back to the patentee to rebut the prima facie case. *Id.* at 1124.

The jury found claim 26 of the '591 patent not invalid and infringed. J.A. 5204–08. The district court granted JMOL of noninfringement, holding that no reasonable juror could have found infringement. *Decision* at 335. The district court found that Shibuya satisfied its prima facie case of RDOE through Dr. Glancey's testimony and Dr. Sharon's rebuttal testimony was wrong as a matter of law and entitled to no weight. *Id.* at 334.

Steuben makes two primary arguments on appeal: (1) the district court erred in relying on RDOE to overturn the jury's verdict of infringement of claim 26 of the '591 patent, and (2) RDOE is not a viable defense to infringement. Shibuya argues the district court correctly granted JMOL under RDOE. In the alternative, Shibuya argues that the district court erred in its claim construction of “second sterile region” and under the proper construction, JMOL of noninfringement is warranted.

RDOE can be traced back to at least the 1800s. In *Boyden Power-Brake Co. v. Westinghouse*, the Supreme Court stated:

We have repeatedly held that a charge of infringement is sometimes made out, though the letter of the claims be avoided. The converse is equally true. The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to

represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent.

170 U.S. 537, 568 (1898) (internal citations omitted). Half a century later, in *Graver Tank & Mfg. Co., Inc. v. Linde Air Products Co.*, the Supreme Court commented:

[The doctrine of equivalents] is not always applied in favor of a patentee but is sometimes used against him. Thus, where a device is so far changed in principle from a patented article that it performs the same or a similar function in a substantially different way, but nevertheless falls within the literal words of the claim, the doctrine of equivalents may be used to restrict the claim and defeat the patentee's action for infringement.

339 U.S. 605, 608–09 (1950).

Steuben argues this common law doctrine, RDOE, was eliminated by the 1952 Patent Act. Specifically, Steuben argues RDOE conflicts with 35 U.S.C. § 271(a) and was subsumed in 35 U.S.C. § 112 when Congress enacted the 1952 Patent Act. Whether the doctrine survived enactment of the 1952 Patent Act is a question of first impression. Steuben argues the plain language of 35 U.S.C. § 271(a), “[e]xcept as otherwise provided in this title,” requires that exceptions to infringement must be expressly identified in Title 35. Opening Br. 39. Because RDOE is not codified in Title 35, Steuben argues it is no longer a defense to infringement. While RDOE may have been appropriate prior to 1952, Congress wrote out any RDOE exception to infringement when defining infringement in the 1952 Patent Act.

Steuben argues this elimination was intentional because RDOE was subsumed by 35 U.S.C. § 112.

Specifically, Steuben argues that if a device literally falls within the scope of a claim, but the accused infringer believes the claim is too broad and its device should not infringe, the appropriate recourse is a § 112 challenge, not a claim of noninfringement under RDOE. We have noted, without deciding, “when Congress enacted 35 U.S.C. § 112, after the decision in *Graver Tank*, it imposed requirements for the written description, enablement, definiteness, and means-plus-function claims that are co-extensive with the broadest possible reach of the reverse doctrine of equivalents.” *Tate*, 279 F.3d at 1368; *see also Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1042 (Fed. Cir. 1993) (noting § 112 ¶ 6 “operates more like the reverse doctrine of equivalents than the doctrine of equivalents because it restricts the coverage of literal claim language”).

Shibuya argues RDOE survived the 1952 Patent Act. Shibuya argues the Supreme Court held the 1952 Patent Act “left intact the entire body of case law on direct infringement” in *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 342 (1961), which Shibuya interprets to include defenses to direct infringement such as RDOE. Shibuya also argues the Supreme Court rejected Steuben’s § 112 argument in *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.* when it observed “[t]he 1952 Patent Act is not materially different from the 1870 Act with regard to claiming,” and declined to overrule *Graver Tank*. 520 U.S. 17, 26 (1997).

We find Steuben’s arguments compelling, but need not decide whether RDOE survived the 1952 Patent Act. We have never “affirmed a decision finding noninfringement based on the reverse doctrine of equivalents.” *Tate*, 279 F.3d at 1368; *see also, e.g., U.S. Steel Corp. v. Phillips Petroleum Co.*, 865 F.2d 1247, 1253 (Fed. Cir. 1989); *Intel Corp. v. U.S. Int’l Trade Comm’n*, 946 F.2d 821, 842 (Fed. Cir. 1991); *Odetics, Inc. v. Storage Tech. Corp.*, 116 F.3d 1497 (Fed. Cir. 1997); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1351 (Fed. Cir. 2003); *Roche Palo*

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*Alto LLC v. Apotex, Inc.*, 531 F.3d 1372, 1378 (Fed. Cir. 2008); *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1339 (Fed. Cir. 2009). And this case does not cause a change of course. If Shibuya made a prima facie case that the principle of operation of the accused product was so far removed from that of claim 26 of the '591 patent, the jury's verdict should not have been overturned under RDOE because Dr. Sharon provided rebuttal testimony that the jury was entitled to credit. JMOL of noninfringement was therefore improper.

The district court faulted Dr. Sharon's explanation of the '591 patent's principle of operation as contrary to the specification, and therefore, did not consider any of Dr. Sharon's testimony. *Decision* at 334. With respect to the '591 patent, Dr. Sharon testified the principle of operation is "basically filling more than 350 bottles per minute aseptically and doing that with, by having these two sterile regions that the valve is sort of constrained to so that as it opens and closes, it only stays within those two regions and it does not go into any non-sterile region and therefore risk the possibility of bringing in contaminants, pathogens, into the food." J.A. 3089 at 355:7–13. The district court concluded this was wrong as a matter of law because it is inconsistent with the specification where "the whole purpose of the second sterile region in the patented invention is to sterilize the portion of the valve stem that is *exposed to a non-sterile region*." *Decision* at 334 (emphasis added by the district court).

Regardless, Dr. Sharon provided other testimony that the jury was entitled to consider. Dr. Sharon testified the principle of operation of the second sterile region in the accused product is "that it provides a sterile region for the valve tip to go up into when it's being opened so that it doesn't, you know, go into a non-sterile region and then bring contaminants into food." J.A. 3090 at 360:20–361:3; J.A. 8472–73. Dr. Glancey, Shibuya's expert, testified the principle of operation of claim 26 of the '591 patent is "[t]he

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second sterile region uses a sterilizing media or sterilant that provides that second sterile region,” and “the valve stem is sterilized in that second sterile region, removing any contaminant.” J.A. 3227–28 at 907:8–908:1. He further testified that Shibuya’s valve’s principle of operation is substantially different because it uses a “flexible barrier we called a bellows. That’s basically a barrier preventing contaminants, blocking contaminants by the physical barrier. So the contaminants can never move into the food passage in the Shibuya valve.” J.A. 3228 at 908:6–10. The jury heard conflicting testimony from experts regarding the principle of operation of claim 26 of the ’591 patent. Dr. Sharon’s testimony constitutes substantial evidence for the jury’s rejection of RDOE. “We presume the jury resolved all underlying factual disputes in favor of the verdict.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1040 (Fed. Cir. 2016) (en banc).

JMOL “should be granted only if, viewing the evidence in the light most favorable to the nonmovant and giving it the advantage of every fair and reasonable inference, there is insufficient evidence from which a jury reasonably could find liability.” *Lightning Lube*, 4 F.3d at 1166. Here, viewing the evidence in the light most favorable to Steuben, the non-movant, a reasonable jury could have found the principles of operation of the accused product and claim 26 of the ’591 patent were not “so far changed,” as to support a theory of noninfringement under RDOE. *SRI*, 775 F.2d at 1124. Because there was substantial evidence to rebut any *prima facie* case of RDOE, we need not address whether a *prima facie* case was met.

Shibuya argues in the alternative that the district court erred when it did not adopt Shibuya’s proposed construction of “second sterile region,” and that under the correct construction there is no infringement. Response Br. 60. Shibuya’s proposed construction of “second sterile region” is “a region that is sterile and proximate to the first sterile region through which food does not flow.” Response

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Br. 61. The district court declined to adopt Shibuya's proposed construction of "second sterile region." J.A. 5074. The district court noted Shibuya did not point to any lexicography or disclaimer in the patent that would require the negative limitation. J.A. 6122. Here too, Shibuya does not tether the carveout of second sterile regions through which food could flow to language in the specification. The patent is silent as to whether food can flow through the second sterile region. We see no error in the district court's construction.

For the foregoing reasons, we reverse the JMOL of non-infringement with respect to the asserted claim of the '591 patent and reinstate the jury's verdict of infringement.

#### B. '188 Patent

The '188 patent is directed to an aseptic bottle sterilization filling line. See '188 patent at 2:1–6. Steuben alleged Shibuya infringed claims 19 and 22:

19. A device for aseptically bottling aseptically sterilized foodstuffs having at least about a 12 log reduction in Clostridium botulinum comprising:

*means for providing a plurality of bottles;*

*means for aseptically disinfecting the plurality of bottles;*

*means for aseptically filling the aseptically disinfected plurality of bottles with the aseptically sterilized foodstuffs; and*

*means for filling the aseptically disinfected plurality of bottles at a rate greater than 100 bottles per minute.*

22. The device for aseptically bottling aseptically sterilized foodstuffs having at least about a 12 log reduction in Clostridium botulinum of claim 21, wherein the interior of the plurality of filled bottles

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does not have a residual level of hydrogen peroxide of about 0.5 ppm or more.

*Id.* at claims 19 and 22 (emphases added).

Under pre-America Invents Act 35 U.S.C. § 112 ¶ 6, a claim limitation can be written in terms of a function achieved, rather than a definite structure that achieves the function. *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1266 (Fed. Cir. 1999). The limitation must be construed “to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” *Id.* at 1266–67 (quoting 35 U.S.C. § 112 ¶ 6). To show infringement of a means plus function limitation, the patent owner must show the relevant structure in the accused product “perform[s] the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification.” *Id.* at 1267. To show an accused structure is equivalent, the structure must “perform the identical function, in substantially the same way, with substantially the same result.” *Kemco Sales, Inc. v. Control Papers, Inc.*, 208 F.3d 1352, 1364 (Fed. Cir. 2000). Identifying the claimed function and the corresponding structures disclosed in the written description are issues of claim construction. *Id.* at 1360. Whether an accused product has an equivalent structure is a question of fact. *Odetics*, 185 F.3d at 1268–69.

The district court construed the term “means for filling the aseptically disinfected plurality of bottles at a rate greater than 100 bottles per minute” as a means plus function limitation. *Decision* at 328. The district court identified the function as “[aseptically] filling the aseptically disinfected plurality of bottles at a rate greater than 100 bottles per minute,” and the structure as “filling valves (Items 194A, 194B) and filling nozzles (Items 190A, 190B); a control system (Item 550); a conveyer plate (Item 94); conveyor (Item 106); and equivalents.” J.A. 5073–74. The jury returned a verdict of infringement of claims 19 and 22 of

the '188 patent. J.A. 5205. The district court granted JMOL of noninfringement because no reasonable juror could find “the way the accused machines’ rotary wheels and neck grippers operate is substantially the same as the way a conveyor and conveyor plate operate.” *Decision* at 329.

Steuben argues Dr. Sharon provided substantial evidence for the jury to find the accused structures perform the claimed function in an equivalent way. Steuben argues that the district court failed to consider infringement in the context of the claimed function and erred by importing unclaimed functions into its analysis. We agree with Steuben and reverse the district court’s grant of JMOL of noninfringement.

Steuben presented substantial evidence by which the jury could find infringement. For the identified structure of conveyor 106, Dr. Sharon testified the way conveyor 106 performs its role in the overall function of the claim limitation is by moving the bottles via rotating around a pulley system, causing the bottles to move along the machine. J.A. 3102 at 408:18–25. Dr. Sharon testified the accused product’s rotary wheels<sup>1</sup> operate in substantially the same way by “rotat[ing] to bring the bottles from . . . one station to the next.” *Id.* at 410:1–11. In Dr. Sharon’s opinion, these two structures are equivalents. *Id.* at 409:1–6. Steuben also played the jury a video of the rotary wheels moving within the accused machine during the testimony of Dr. Sharon. *Id.* at 409:7–22.

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<sup>1</sup> Dr. Sharon refers to “dials” and “transfer wheels” in his testimony, Dr. Glancey refers to “rotating turrets,” whereas the district court and the parties use the term “rotary wheels.” Compare J.A. 3102 at 409:5–6, with J.A. 3214 at 854:25, and *Decision* at 329. To avoid confusion, we use the term “rotary wheels.”

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For conveyor plate 94, Dr. Sharon testified the way the conveyor plate performs its portion of the claimed function is by holding the bottles as they are brought “to the filler so they can then be filled.” J.A. 3101 at 404:16–406:25. He testified the accused product’s neck grippers are equivalent to the ’188 patent’s conveyor plate because they hold the bottles as they move. *Id.* at 405:7–406:25. Dr. Sharon showed the jury the neck grippers and the way they hold a bottle. *Id.* at 405:18, 406:17–21. Dr. Sharon also pointed out the neck grippers in a video of the accused product played for the jury. J.A. 3102 at 409:12–20. Dr. Sharon did note the two structures differ in that the accused product’s neck grippers hold the bottles from the neck, rather than the bottom as the conveyor plate does, on the way to be filled, but testified this difference is insubstantial in the context of the claimed function of filling bottles at a rate greater than 100 bottles per minute. J.A. 3101 at 406:1–25. This is substantial evidence by which the jury could find infringement.

Shibuya argues Steuben reads out the structural identity requirement of the equivalence test and only recites functional equivalence. Specifically, Shibuya contends Steuben did not adduce sufficient evidence that the way the accused structures operate is substantially equivalent. We find there is substantial evidence with which the jury could have concluded otherwise.

Shibuya fails to tether its “substantially the same way” comparison to the claimed function. While Dr. Glancey testified to several differences in rotary wheels versus the conveyor, J.A. 3214 at 855:1–22, and in the neck grippers versus the conveyor plate, J.A. 3214 at 853:3–854:14, these differences must be evaluated in the context of the claimed function. “The individual components, if any, of an overall structure that corresponds to the claimed function are not claim limitations. Rather, the claim limitation is the overall structure corresponding to the claimed function.” *Odetics*, 185 F.3d at 1268. Dr. Sharon testified that the way the

conveyor and conveyor plate help perform the claimed function is by holding and moving bottles from one location to the other. J.A. 3102 at 408:18–25; J.A. 3101 at 404:16–406:25. He testified the accused product uses equivalent structures of rotary wheels and neck grippers in substantially the same way, “in the context of filling bottles at a rate greater than 100 per minute.” J.A. 3101 at 406:2–25; J.A. 3102 at 410:1–11. Dr. Sharon’s testimony went directly to the “way” the structures operate in the context of the claimed function, and provided the jury substantial evidence with which to find infringement. We reverse the grant of JMOL of noninfringement with respect to the asserted claims of the ’188 patent and reinstate the jury’s verdict of infringement.

### C. ’985 Patent

The ’985 patent relates to “[a]n apparatus and method for providing container interior sterilization in an aseptic processing apparatus.” ’985 patent at Abstract. Steuben asserted claims 3 and 7, which both depend from claim 1:

1. Apparatus for sterilizing a container comprising:
  - a first supply source of sterile air;
  - a supply source of sterilant;
  - an atomizing system producing an atomized sterilant from the mixing of the sterile air from the first supply source of sterile air with the sterilant;
  - a second supply source providing a non-intermittent supply of hot sterile air to a conduit wherein said conduit is operationally coupled between said atomizing system and a container, and wherein said *atomized sterilant is intermittently added* to said conduit;

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a mechanism for applying the atomized sterilant and the second supply source of hot sterile air on to the container; and

a third supply source of a hot sterile drying air for activating and drying the sterilant in the interior of the container, wherein the container is upright.

3. The apparatus of claim 1, wherein the container is a bottle.

7. The apparatus of claim 1, wherein after drying the container interior surface retains a concentration of hydrogen peroxide less than 0.5 PPM.

The asserted claims require the atomized sterilant to be added to the conduit “intermittently.” ’985 patent at claim 1. Steuben and Shibuya stipulated to a construction of “intermittently added” as “[a]dded in a non-continuous matter.” *Decision* at 325; J.A. 5075. It is undisputed the accused machines add sterilant continuously. *Decision* at 325. The jury found claims 3 and 7 of the ’985 patent infringed under DOE. *Decision*, at 326. The district court granted Shibuya’s motion for JMOL of noninfringement. *Id.* at 328. The district court determined the “intermittently added” limitation cannot be met under the doctrine of equivalents by a continuous addition of sterilant,” because “intermittently” and “continuously” are antonyms of each other, not equivalents, and doing something in a non-continuous manner cannot be achieved by doing it continuously. *Id.* at 327.

Steuben argues the district court erred in granting JMOL of noninfringement of the asserted claims of the ’985 patent. Specifically, Steuben argues substantial evidence supports the jury’s verdict of infringement because under DOE, the accused product’s continuous sterilization is equivalent to claim 1’s “intermittently added” limitation. find there is not substantial evidence to support the jury’s verdict.

When at least one claim element is missing from an accused product, infringement can still be found under DOE if the accused product contains “an equivalent device or instrumentality.” *Warner-Jenkinson*, 520 U.S. at 40. Something is equivalent if the differences between it and the claim limitation are “insubstantial,” or it matches the “function, way, and result of the claimed element.” *Id.* DOE may not apply where “the accused device contain[s] the antithesis of the claimed structure,” such that the claim limitation would be vitiated. *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1356 (Fed. Cir. 2012).

Steuben’s expert, Dr. Sharon, testified Shibuya’s product’s continuous sterilization was equivalent to claim 1’s “intermittently added” limitation under the “function, way, result” test. J.A. 3107–08 at 430:20–434:17. Dr. Sharon testified the ’985 patent uses a spoon dipper to add the sterilant intermittently and the “function is to ensure the right amount of sterilant gets to the bottle.” J.A. 3108 at 431:3, 12–13. He testified the “way” is the spoon dipper, and the “result” is a properly sterilized bottle. *Id.* at 431:17–432:4. Dr. Sharon testified the accused product’s equivalent is “continuously using flow sensors and metering pumps to achieve the same function because in the end, the point is to get the right amount of sterilant into the bottle.” J.A. 3107 at 429:9–13. He testified the function of the Shibuya’s product’s continuous sterilization is to “ensure that the correct amount of sterilant gets to the bottles,” the “way” is “with metering pumps and flow meters,” and the result is “that the bottles are properly sterilized.” J.A. 3108 at 433:1–434:13.

In this case, where the parties stipulated to a claim construction of “intermittently added” as “[a]dded in a non-continuous matter,” with which we see no error, a finding of infringement under DOE would vitiate the claim limitation. Something that is done non-continuously cannot be the equivalent of something done continuously. Steuben points to different cases where this court has held

“continuous” and “intermittent” can be equivalents. See *Epos Techs., Ltd. v. Pegasus Techs. Ltd.*, 766 F.3d 1338, 1347 (Fed. Cir. 2014). But in *Epos*, as the district court noted, the parties had not stipulated to a claim construction of “intermittent” that necessarily precludes a continuous device. *Decision* at 328. A reasonable juror could not find, under this construction, that Shibuya’s continuously added sterilant is equivalent to the claims’ “intermittently added.” We therefore affirm the district court’s grant of JMOL of noninfringement with respect to the asserted claims of the ’985 patent.

## II. New Trials

We review a district court’s grant of a motion for a new trial under regional circuit law. *Uniloc*, 632 F.3d at 1309. The Third Circuit reviews a grant of a new trial for abuse of discretion. *Lightning Lube*, 4 F.3d at 1167.

### A. Infringement

Shibuya moved for a new trial on infringement in the alternative to JMOL. J.A. 5252. The district court conditionally granted a new trial with respect to infringement under Rule 50(c)(1). *Decision* at 336. Rule 50(c)(1) states “[i]f the court grants a renewed motion for judgment as a matter of law, it must also conditionally rule on any motion for a new trial by determining whether a new trial should be granted if the judgment is later vacated or reversed. The court must state the grounds for conditionally granting or denying the motion for a new trial.” The district court’s sole ground for conditionally granting a new trial on infringement was “as explained above, the jury’s verdicts with respect to infringement of the asserted claims of the [Asserted Patents] are contrary to the evidence.” *Decision* at 336. Because the district court did not provide any basis for granting a new trial that is not subsumed by our analysis regarding the JMOLs, we reverse the conditional grant of a new trial on infringement.

### B. Validity

After the jury verdict, Shibuya moved for JMOL of invalidity of the Asserted Patents under Federal Rule of Civil Procedure 50(b) or, in the alternative, a new trial. *Decision* at 335. The district court found Shibuya never moved under Rule 50(a) at trial. *Id.* at 335–36. “A motion under Rule 50(b) is not allowed unless the movant sought relief on similar grounds under Rule 50(a) before the case was submitted to the jury.” *Exxon Shipping Co. v. Baker*, 554 U.S. 471, 486 n.5 (2008). The district court determined Shibuya could not bring a Rule 50(b) motion and denied the motion. *Decision* at 336. The district court did, however, “conditionally grant Shibuya’s motion for a new trial under Federal Rule of Civil Procedure 50(c)(1).” *Id.*

On appeal, Steuben argues the district court erred in not extending the waiver analysis to Shibuya’s request for a new trial on invalidity. Shibuya argues a new trial on validity is required because it is not possible to parse the infringement and invalidity issues post-trial. And, even if Shibuya waived its JMOL on invalidity, it was still entitled to a new trial because the verdict went against the great weight of the evidence. Response Br. 69–70.

The district court did not provide any reasoning for conditionally granting a new trial specific to validity for us to review. *Decision* at 336. We therefore cannot assess whether the district court abused its discretion in the conditional grant. We vacate the conditional grant of a new trial on invalidity and remand for further proceedings.

### C. Damages

After the jury verdict, Shibuya moved for JMOL on damages or, in the alternative, a new trial. J.A. 5248–54. The district court did not address the JMOL on damages because it granted JMOLs of noninfringement for all asserted claims of the Asserted Patents, obviating any need

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for a damages verdict. *Decision* at 336. The district court conditionally granted a new trial under Rule 50(c)(1). *Id.*

On appeal, Steuben argues no new trial on damages is necessary because Shibuya necessarily infringed any one of the asserted claims each time it ran the accused machines. Opening Br. 66–67. In Steuben’s view, if we reinstate the jury verdict of infringement on any one or more of the claims of the Asserted Patents, we should also reinstate the full damages award. Shibuya argues a new trial on damages is required if we reinstate any of the jury’s verdict. Response Br. 71.

Because the district court provided no rationale for its grant of a new trial on damages, we vacate and remand.

CONCLUSION

We have considered Steuben’s remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm-in-part, reverse-in-part, and vacate-in-part. We remand for further proceedings.

**AFFIRMED-IN-PART, REVERSED-IN-PART,  
VACATED-IN-PART, AND REMANDED**

COSTS

No costs.