

Micron Technology, Inc. (Petitioner)
v.
Yangtze Memory Technologies Company, Ltd. (Patent Owner)

IPR2025-00189 (US Patent 11,145,666)

Patent Owner YMTC's Demonstratives

March 12, 2026



Agenda

'666 Patent and Claim 19

Claim Construction

Ground 1 (Kim) Fails

Ground 2 (Nam) Fails

Ground 3 (Lee+Park) Fails



Agenda

'666 Patent and Claim 19

Claim Construction

Ground 1 (Kim) Fails

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Ground 3 (Lee+Park) Fails

'666 Patent And Claim 19

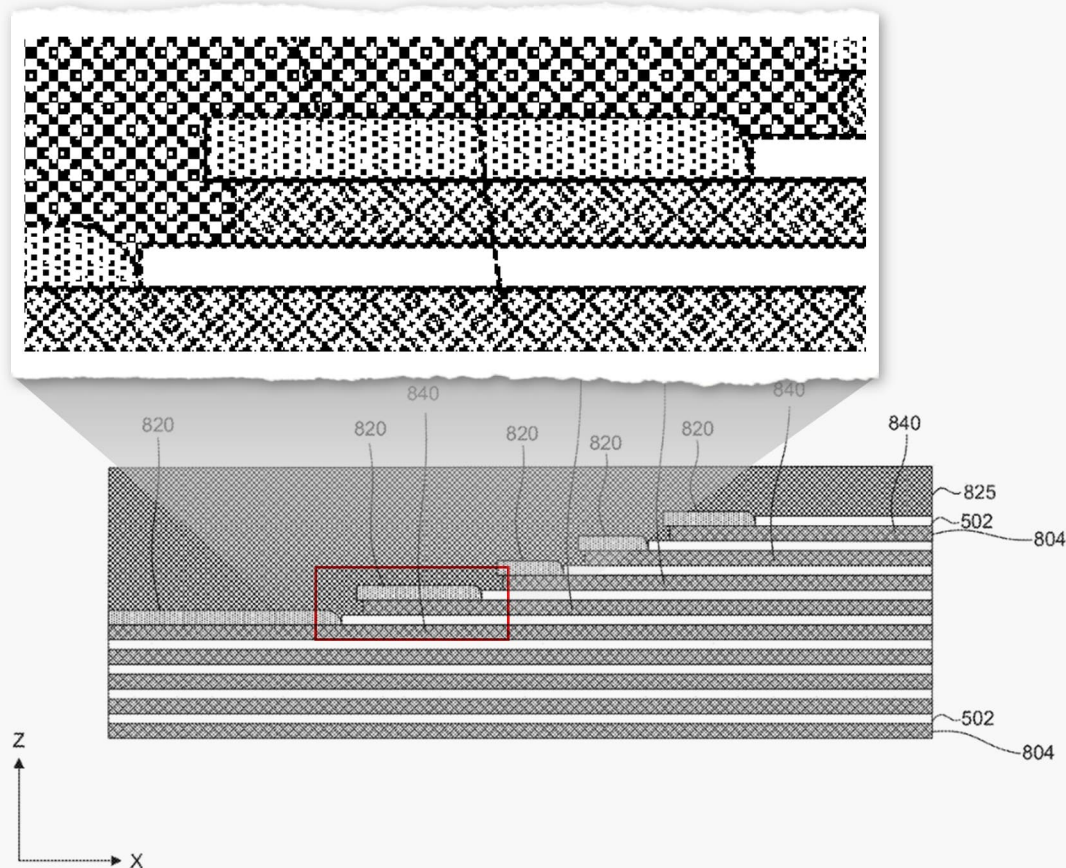
17. A memory device, comprising:

a substrate, wherein the substrate comprises a top surface;
a memory string disposed over the substrate; and
a staircase structure disposed adjacent to the memory string, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising an insulating layer disposed over a first portion of a conductive layer, wherein a second portion of the conductive layer comprises a curved side surface in contact with a side surface of the insulating layer.

Ex. 1001 ('666 Patent), Claim 17

19. The memory device of claim 17, wherein the conductive layer of a layer stack of the plurality of layer stacks is disposed over a first portion of the insulating layer of an adjacent layer stack of the plurality of layer stacks, wherein a second portion of the insulating layer of the adjacent layer stack is laterally displaced from the conductive layer of the layer stack.

Ex. 1001 ('666 Patent), Claim 19



Ex. 1001 ('666 Patent), Fig. 8

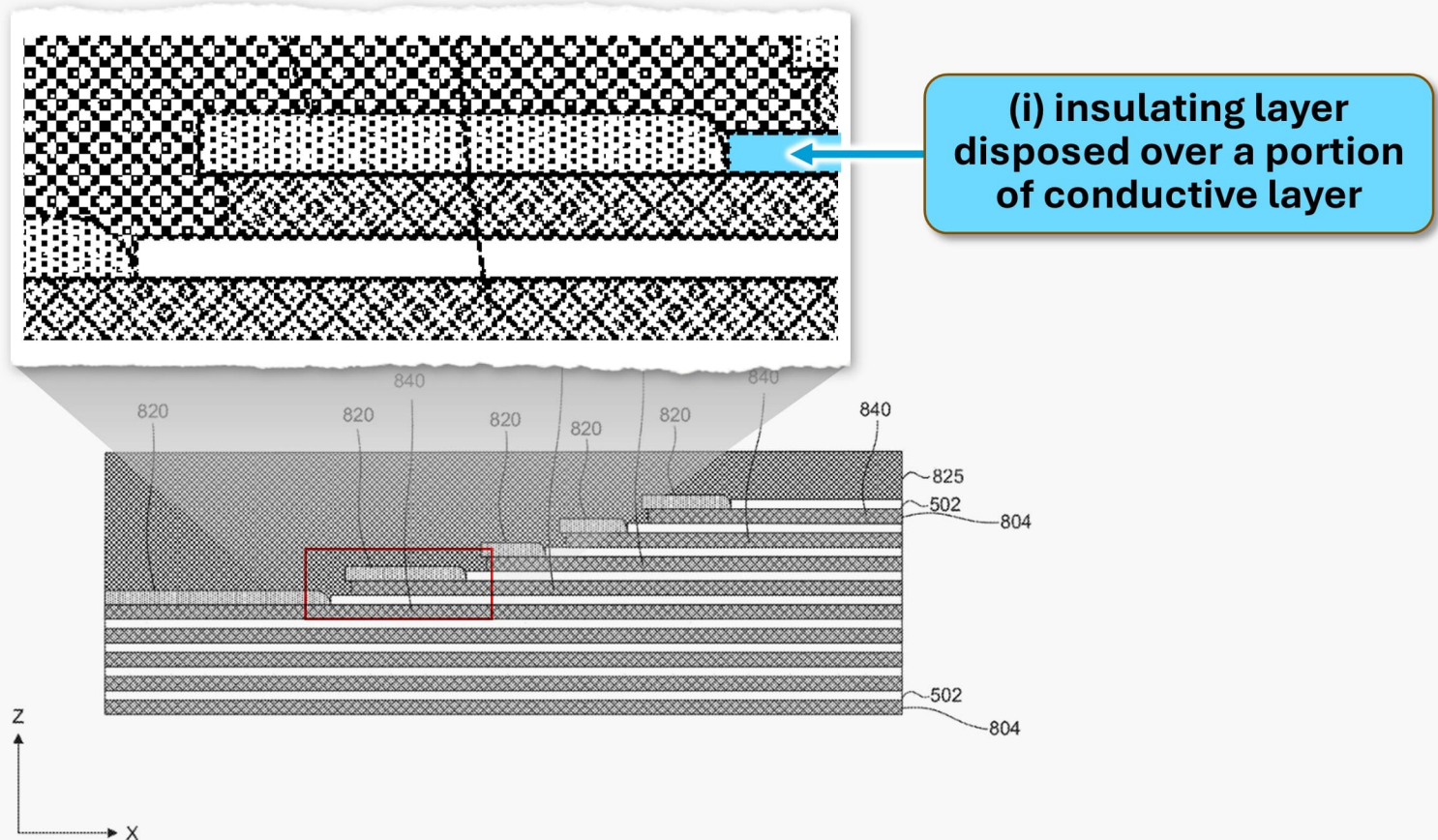
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Ex. 1001 ('666 Patent), Claim 19



Ex. 1001 ('666 Patent), Fig. 8

'666 Patent And Claim 19

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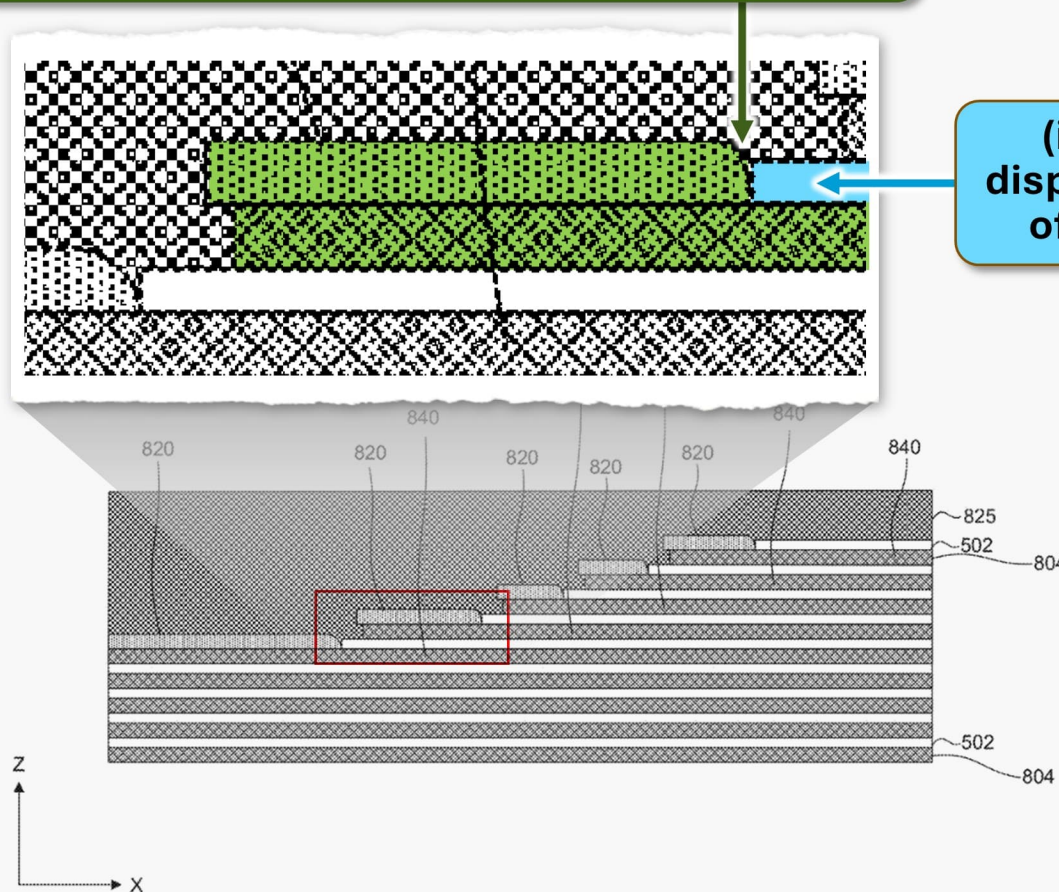
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Ex. 1001 ('666 Patent), Claim 19

(ii) curved side surface of conductive layer in contact with side surface of insulating layer

(i) insulating layer disposed over a portion of conductive layer



Ex. 1001 ('666 Patent), Fig. 8

'666 Patent And Claim 19

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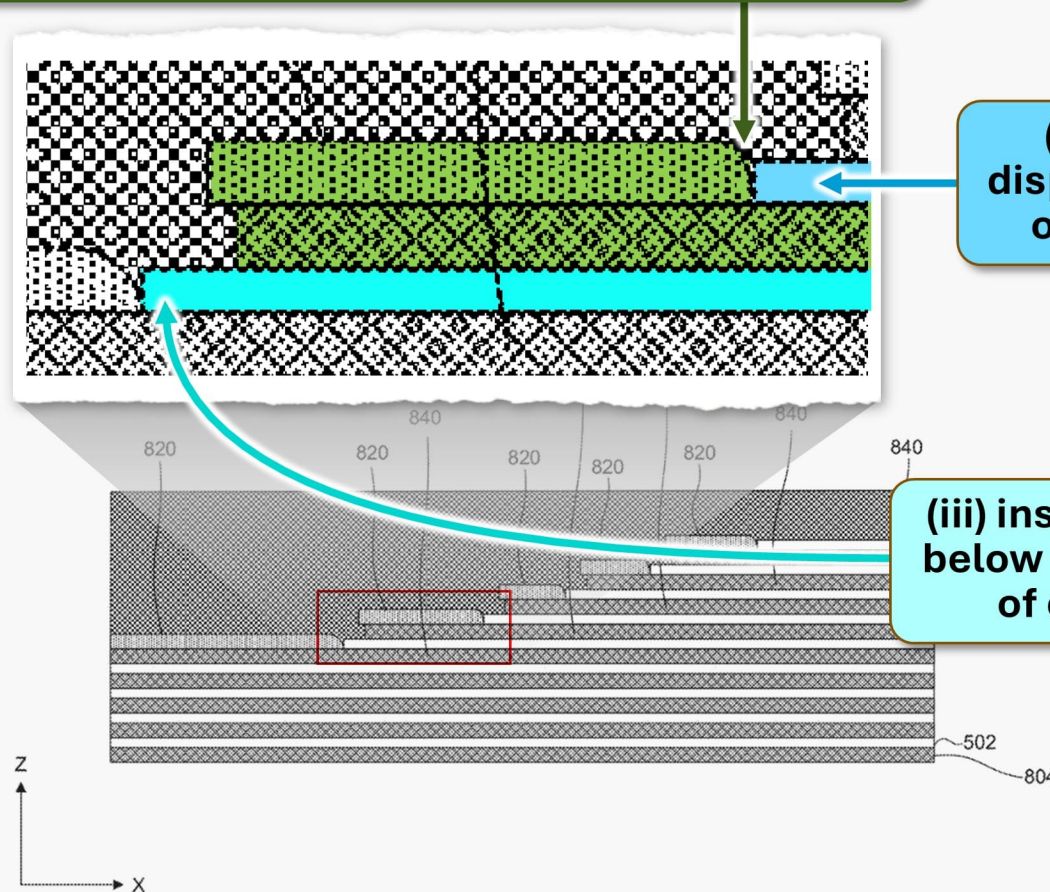
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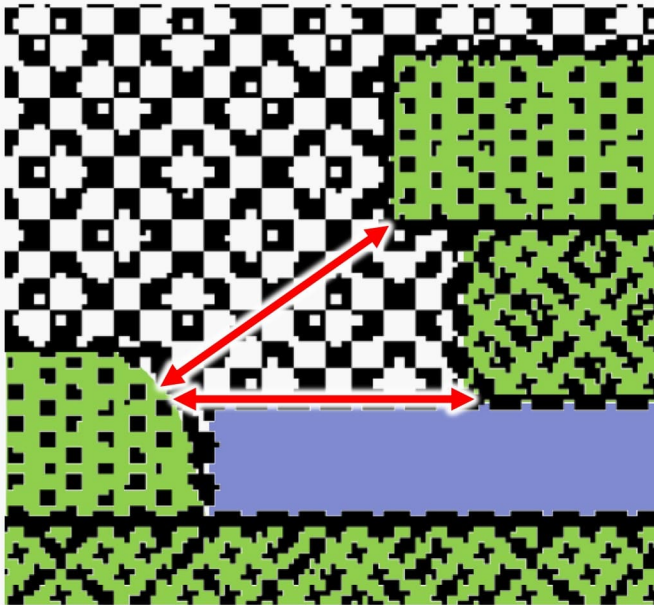
(iii) insulating layer of step below extends beyond end of conductive layer



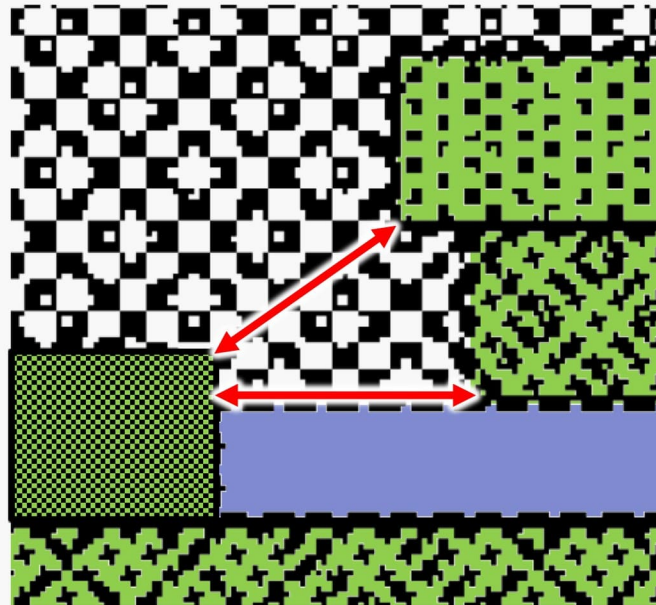
Ex. 1001 ('666 Patent), Fig. 8



'666 Patent And Claim 19



'666 Patent Structure



Other Structures

Ex. 2023 (Giapis Decl.) ¶ 36

Dr. Lee Declaration

420. In my opinion, a POSITA would have recognized that applying Park's teachings and rounding the side of Lee's pad portion PAD would have improved Lee—and limited the risk of short circuit or other adverse electrical effects—by increasing the minimum distance between the pad and the immediately adjacent conductive layer.

Ex. 1003 (Lee Decl.) ¶ 420

Dr. Lee Reply Declaration

62. A POSITA would have recognized that rounded landing pad (with curved side surfaces) operates to increase the distance between the landing pad and adjacent conductive structure.

63. A rounded landing also—because it is further away—increases the thickness of insulation surrounding the landing pad.

Ex. 1027 (Dr. Lee Rpl. Decl.) ¶¶ 62-63



Agenda

'666 Patent and Claim 19

Claim Construction

Ground 1 (Kim) Fails

Ground 2 (Nam) Fails

Ground 3 (Lee+Park) Fails



Construction Of “curved side surface”

A “curved side surface” is a vertical surface curved along a direction (e.g., the z-axis), perpendicular to the top surface of the structure



Claim Language Supports Patent Owner's Construction

17. A memory device, comprising:
a substrate, wherein the substrate comprises a top surface;
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Ex. 1001 ('666 Patent), Claim 19

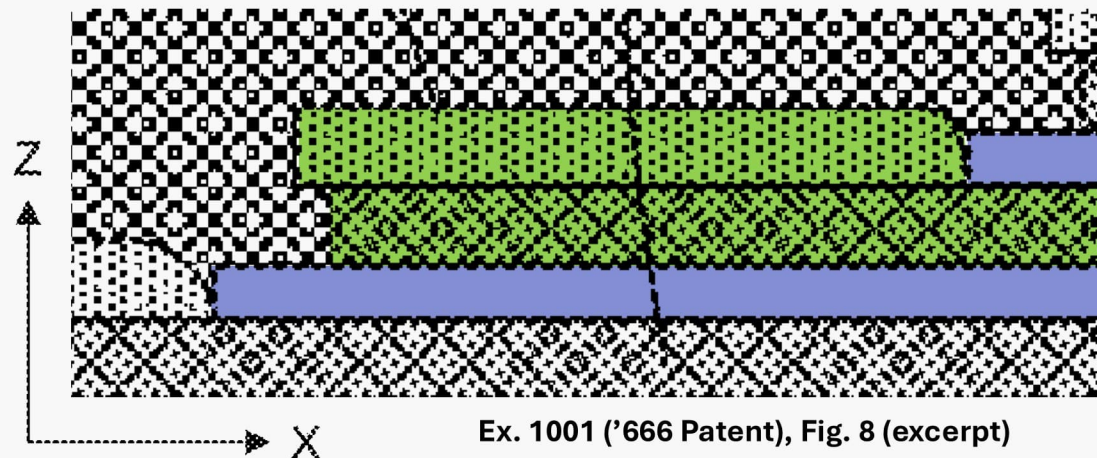
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a substrate, wherein the substrate comprises a **top surface**;
a memory string disposed over the substrate; and
a staircase structure disposed adjacent to the memory string, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising an insulating layer disposed over a first portion of a conductive layer, wherein a second portion of the conductive layer comprises a curved **side surface** in contact with a **side surface** of the insulating layer.

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Ex. 1001 ('666 Patent), Claim 19



Ex. 1001 ('666 Patent), Fig. 8 (excerpt)

Dr. Lee Deposition

Q. So the top surface of the substrate is a horizontal surface; is that fair to say?

A. **The top surface of the substrate is a horizontal surface parallel to the x-axis.**

Ex. 2010 (Jack C. Lee, Ph. D.), 48:1-6

Q. Got it. So when the '666 patent refers to a top surface, it's referring to a horizontal surface; is that fair?

A. **Yes.** The top surface is a horizontal surface parallel to the top surface and the bottom surface of the substrate parallel to the x-y plane.

Ex. 2010 (Jack C. Lee, Ph. D.), 69:3-9



Claim Language Supports Patent Owner's Construction

17. A memory device, comprising:
a substrate, wherein the substrate comprises a **top surface**;
a memory string disposed over the substrate; and
a staircase structure disposed adjacent to the memory string, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising an insulating layer disposed over a first portion of a conductive layer, wherein a second portion of the conductive layer comprises a curved **side surface** in contact with a **side surface** of the insulating layer.

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Ex. 1001 ('666 Patent), Claim 19

1. A semiconductor structure, comprising:
a substrate; and
a staircase structure disposed over the substrate, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising a first material layer and a second material layer, wherein the first material layer is disposed over a first portion of the second material layer; and
a plurality of landing pads respectively disposed on the plurality of layer stacks, wherein each landing pad is disposed over a second portion of the second material layer of a respective layer stack of the plurality of layer stacks, and wherein the each landing pad comprises:
a **bottom surface**; and
a **top surface** opposite to the **bottom surface**, wherein the top surface is above an other **top surface** of the first material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 1

2. The semiconductor structure of claim 1, wherein each of the plurality of landing pads comprises a first **side surface** and a second **side surface**, wherein the first **side surface** is in contact with the first material layer of the respective layer stack, and wherein the second **side surface** is laterally displaced from a third **side surface** of the second portion of the second material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 2

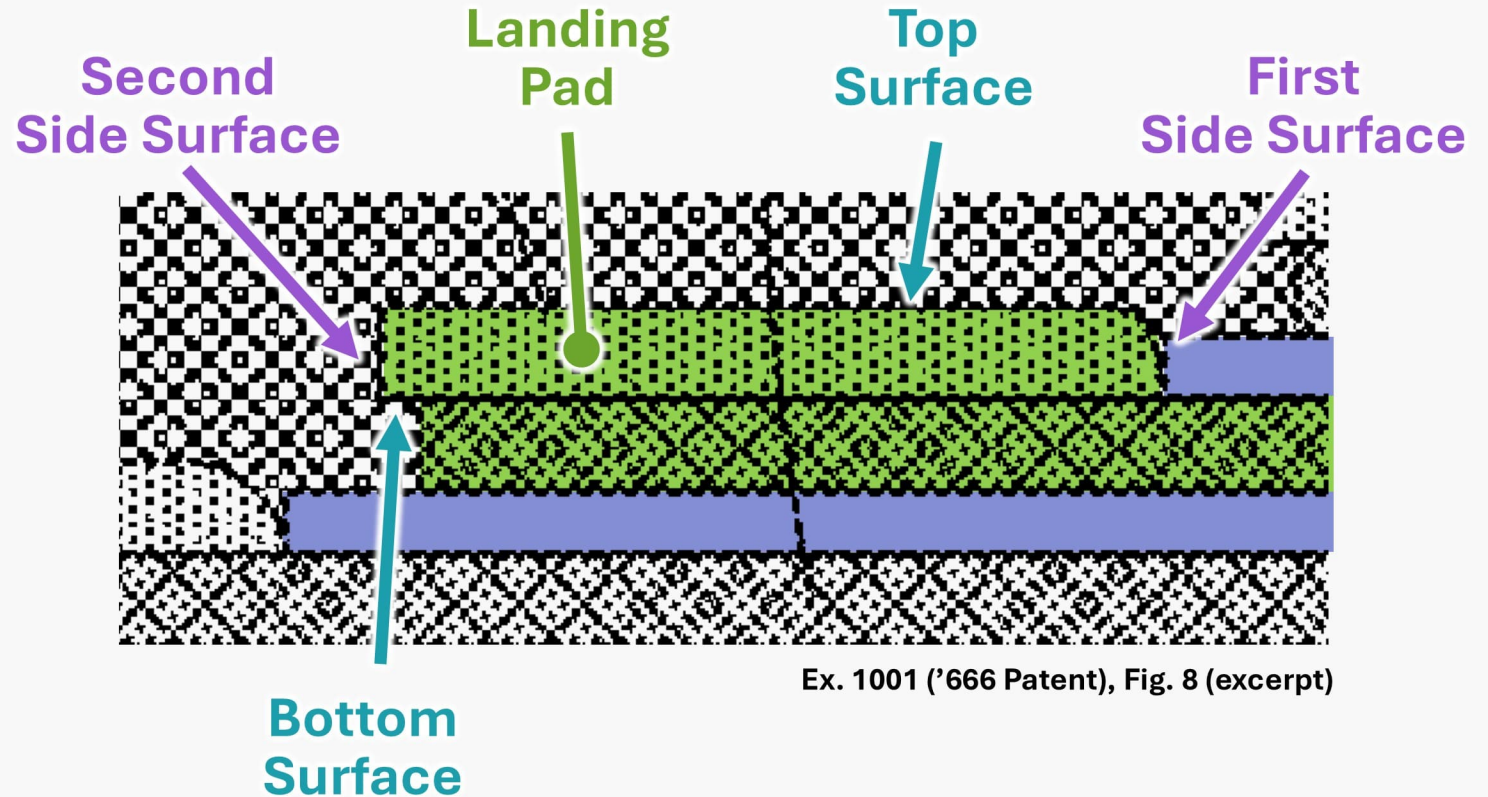
Claim Language Supports Patent Owner's Construction

1. A semiconductor structure, comprising:
a substrate; and
a staircase structure disposed over the substrate, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising a first material layer and a second material layer, wherein the first material layer is disposed over a first portion of the second material layer; and
a plurality of landing pads respectively disposed on the plurality of layer stacks, wherein each landing pad is disposed over a second portion of the second material layer of a respective layer stack of the plurality of layer stacks, and wherein the each landing pad comprises:
a bottom surface; and
a top surface opposite to the bottom surface, wherein the top surface is above an other top surface of the first material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 1

2. The semiconductor structure of claim 1, wherein each of the plurality of landing pads comprises a first side surface and a second side surface, wherein the first side surface is in contact with the first material layer of the respective layer stack, and wherein the second side surface is laterally displaced from a third side surface of the second portion of the second material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 2



Ex. 1001 ('666 Patent), Fig. 8 (excerpt)



Claim Language Supports Patent Owner's Construction

1. A semiconductor structure, comprising:
a substrate; and
a staircase structure disposed over the substrate, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising a first material layer and a second material layer, wherein the first material layer is disposed over a first portion of the second material layer; and
a plurality of landing pads respectively disposed on the plurality of layer stacks, wherein each landing pad is disposed over a second portion of the second material layer of a respective layer stack of the plurality of layer stacks, and wherein the each landing pad comprises:
a bottom surface; and
a top surface opposite to the bottom surface, wherein the top surface is above an other top surface of the first material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 1

2. The semiconductor structure of claim 1, wherein each of the plurality of landing pads comprises a first side surface and a second side surface, wherein the first side surface is in contact with the first material layer of the respective layer stack, and wherein the second side surface is laterally displaced from a third side surface of the second portion of the second material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 2

Dr. Lee Deposition

Q. So by claims 1 and 2 claiming a top and bottom surface, the term "side surface" in claim 1 and 2 excludes top and bottom surfaces, fair?

A. I said that the applicants knew how to craft a claim that exclude the top and bottom surfaces of a layer from the scope of the term "side surface," in claim 1 and 2, but not in claim 17. Okay? That exclusion only applied to claim 1 and 2. But the applicant deliberately chose not to do so in claim 17.

Ex. 2024 (Jack C. Lee, Ph. D.), 65:7-73:8



Petitioner Misapplies Claim Construction Law

1. A semiconductor structure, comprising:
a substrate; and
a staircase structure disposed over the substrate, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising a first material layer and a second material layer, wherein the first material layer is disposed over a first portion of the second material layer; and
a plurality of landing pads respectively disposed on the plurality of layer stacks, wherein each landing pad is disposed over a second portion of the second material layer of a respective layer stack of the plurality of layer stacks, and wherein the each landing pad comprises:
a bottom surface; and
a top surface opposite to the bottom surface, wherein the top surface is above an other top surface of the first material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 1

2. The semiconductor structure of claim 1, wherein each of the plurality of landing pads comprises a first side surface and a second side surface, wherein the first side surface is in contact with the first material layer of the respective layer stack, and wherein the second side surface is laterally displaced from a third side surface of the second portion of the second material layer of the respective layer stack.

Ex. 1001 ('666 Patent), Claim 2

Dr. Lee Reply Declaration

19. Dr. Giapis also references the limitations in claim 1 and 2 specifying that the “landing pad” of those claims includes a “bottom surface,” “a top surface,” a “first side surface,” and a “second side surface.” This, in my opinion, also does not redefine or change the meaning of the term. *Id.*, ¶ 43. Instead, it once again merely shows that the applicant knew how to craft a claim that excludes the top and bottom surfaces of a layer from the scope of the term “side surface” (this is accomplished by specifying that the layer has a “top,” “bottom,” and “side” in the same claim). The applicant chose not to do so in claim 17, referencing only a “side surface.” It follows that the term “side surface” must include not only the lateral surfaces, but also the top and bottom surfaces of a layer.

Ex. 1027 (Dr. Lee Rpl. Decl.) ¶ 19

Petitioner Misapplies Claim Construction Law

- The same claim term should be construed consistently



In re Varma

“[T]he principle that the same phrase in different claims of the same patent should have the same meaning is a strong one, overcome only if ‘it is clear’ that the same phrase has different meanings in different claims.”

In re Varma, 816 F.3d 1352, 1363 (Fed. Cir. 2016) (internal citations omitted)



Phillips v. AWH

“Because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims.”

Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005) (internal citations omitted)



Specification Supports Patent Owner's Construction

17. A memory device, comprising:
a substrate, wherein the substrate comprises a **top surface**;
a memory string disposed over the substrate; and
a staircase structure disposed adjacent to the memory string, wherein the staircase structure comprises:
a plurality of layer stacks, each layer stack comprising an insulating layer disposed over a first portion of a conductive layer, wherein a second portion of the conductive layer comprises a curved **side surface** in contact with a **side surface** of the insulating layer.

Ex. 1001 ('666 Patent), Claim 17

19. The memory device of claim 17, wherein the conductive layer of a layer stack of the plurality of layer stacks is disposed over a first portion of the insulating layer of an adjacent layer stack of the plurality of layer stacks, wherein a second portion of the insulating layer of the adjacent layer stack is laterally displaced from the conductive layer of the layer stack.

Ex. 1001 ('666 Patent), Claim 19

In the present disclosure, a staircase structure refers to a set of surfaces that include at least two horizontal surfaces (e.g., along an x-y plane) and at least two vertical surfaces (e.g., along a z-axis). Each horizontal surface is adjoined to a first vertical surface that extends upward from a first edge of the horizontal surface, and is also adjoined to a second vertical surface that extends downward from a second edge of the horizontal surface. Each of the horizontal surfaces is referred as a “step” or “stair” of the staircase structure. A horizontal direction can refer to a direction (e.g., the x-axis or the y-axis) parallel with a top surface of the substrate (e.g., the substrate that provides the fabrication platform for formation of structures over it). A vertical direction can refer to a direction (e.g., the z-axis) perpendicular to the top surface of the structure.

Ex. 1001 ('666 Patent), 5:44-58

A “curved side surface” is a vertical surface curved along a direction (e.g., the z-axis), perpendicular to the top surface of the structure



Specification Supports Patent Owner's Construction

Professor Giapis Declaration

44. The specification supports my opinion as well. In particular, the patent references a “top surface” 33 times. Every reference to a “top” surface would have been understood to refer to a horizontal surface. Meanwhile, the ’666 patent refers to a “side” surface (without the modifier “top” or “bottom”) 53 times, each time referring to a vertical surface. This is detailed in my discussion below and reflects consistent usage throughout the specification of any “side surface” being a vertical surface.

Ex. 2023 ¶ 44



Specification Supports Patent Owner's Construction

As used herein, the term “substrate” refers to a material onto which subsequent material layers are added. The substrate includes a top surface and a bottom surface. The top surface of the substrate is where a semiconductor device is formed, and therefore the semiconductor device is formed at a top side of the substrate. The bottom surface is opposite to the top surface and therefore a bottom side of the substrate is opposite to the top side of the substrate. The substrate itself can be patterned. Materials added on top of the substrate can be patterned or can remain unpatterned. Furthermore, the substrate can include a wide array of semiconductor materials, such as silicon, germanium, gallium arsenide, indium phosphide, etc. Alternatively, the substrate can be made from an electrically non-conductive material, such as a glass, a plastic, or a sapphire water.

As used herein, the term “layer” refers to a material portion including a region with a thickness. A layer has a top side and a bottom side where the bottom side of the layer is relatively close to the substrate and the top side is relatively away from the substrate. A layer can extend over the entirety

Ex. 1001 ('666 Patent), 4:21-40



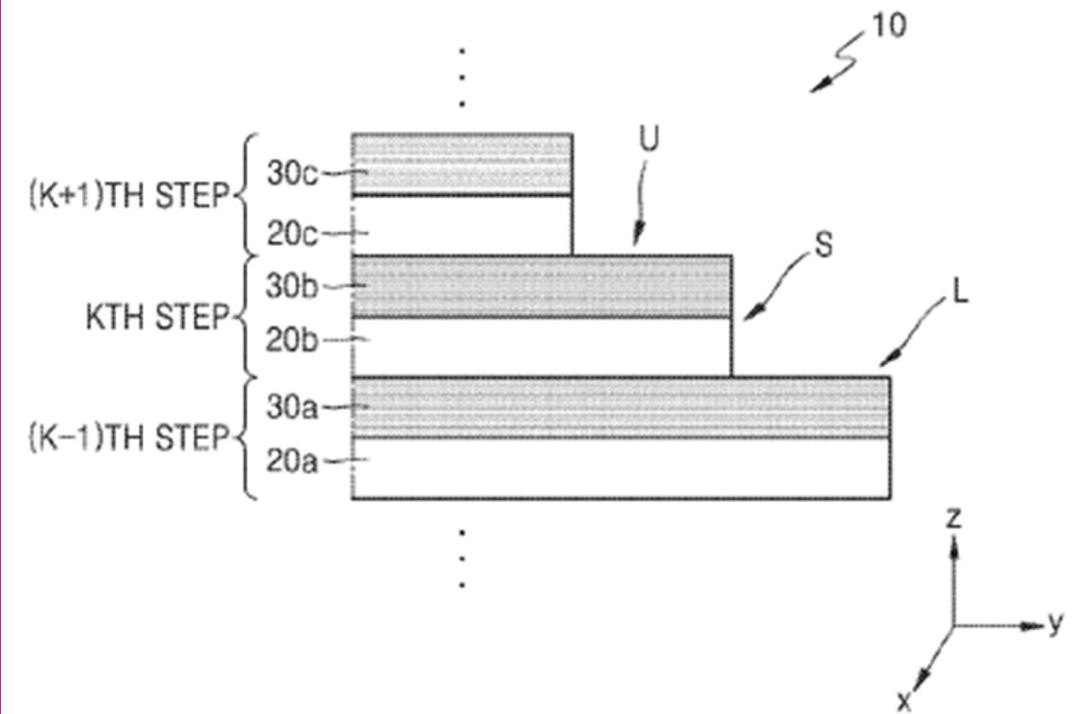
File History Supports Patent Owner's Construction

Patent Owner's Response

Id. Fig. 6A. Thus, the cited prior art, like the '666 patent, describes “side surfaces” as being vertical surfaces, as opposed to horizontal surfaces, which are described as either “top”/“bottom”/“upper”/“lower” “surfaces.” See, e.g., *Id.* [0103], Fig. 6A; '666 patent 7:1-7, 7:63-8:2, 8:11-60, cls. 1-3, 6, 9-11, 15-18, 20. **POR 26-27**

Patent Owner's Response

FIG. 6A



POR 26

Dr. Lee Knows What A “side surface” Is

Dr. Lee Deposition

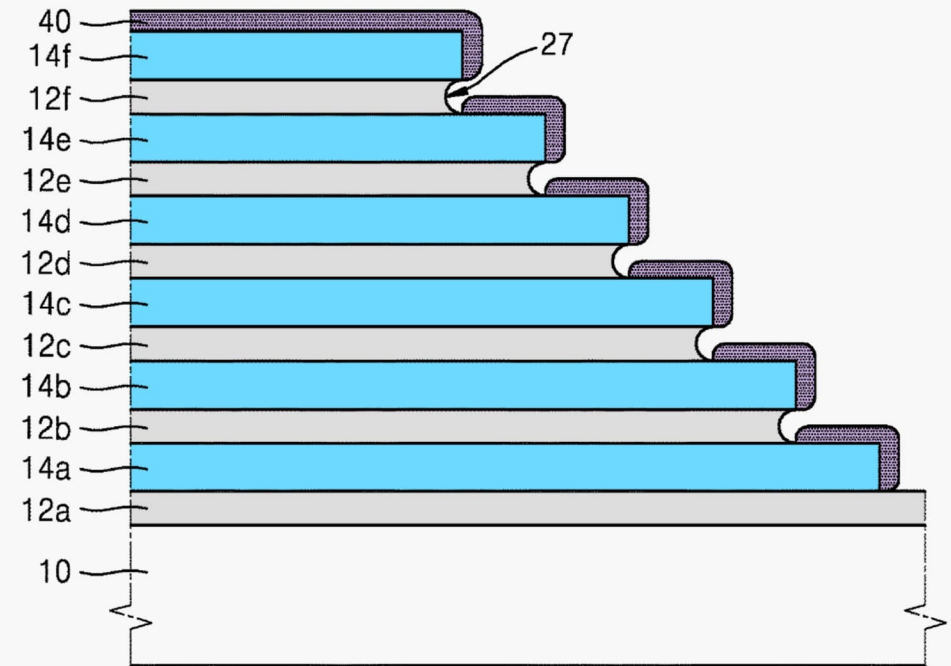
Q. Okay. Can you point to me where the oxidant is added in Park Figure 7 to form the rounded pads?

A. Well, it's due to the oxidation step as shown in Figure 6C. Figure 6C is -- the additional insulating layer 40 is formed by oxidizing the surface and the side surface of the step sacrificial layer patterns 14a through 14f that are externally exposed.

Q. So the oxidant is introduced into the corners that are externally exposed, correct?

A. I don't know how you said the corner is -- the oxidizing -- by oxidizing the surface and the side surfaces of the step sacrificial layers, layer patterns 14a through 14f that are externally exposed.

Ex. 2010 (Jack C. Lee, Ph. D.), 136:14-137:7



Ex. 1008 (Park), Fig. 6C



Petitioner Ignores The Intrinsic Evidence

Petitioner's Reply

1. *Patent Owner's Construction Is Contrary to the Claims*

Claim construction begins with the claim language. And “[t]he words of a claim are generally given their ordinary and customary meaning...” *Thorner v. Sony Comput. Entm’t Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).

Reply 3



Petitioner Ignores The Intrinsic Evidence

Petitioner's Reply

1. *Patent Owner's Construction Is Contrary to the Claims*

Claim construction begins with the claim language. And “[t]he words of a claim are generally given their ordinary and customary meaning **as understood by a person of ordinary skill in the art when read in the context of the specification and prosecution history.**” *Thorner v. Sony Comput. Entm’t Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).

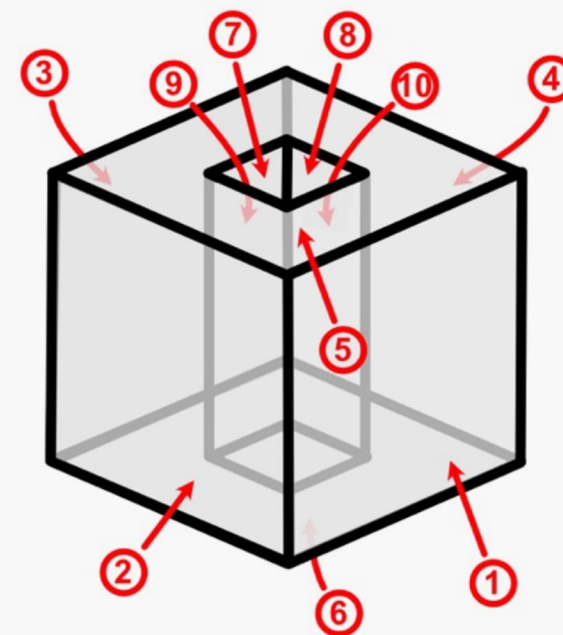
Reply 3 (blue text added)

Petitioner Ignores The Intrinsic Evidence

Petitioner's Reply

Next, a “side” of a three-dimensional object is any “outer surface of [the] object.” Ex. 1024, 483. This is exactly how claim 19 uses the term “side”: to refer to any of the various surfaces making up the claimed “second portion of the conductive layer” (or landing pad) and “insulating layer.” This “side” can be the top, bottom, left, right, front, or back of a “layer.” It can be a vertical or horizontal

Reply 4



Ex. 1027 (Dr. Lee Rpl. Decl.) ¶ 12

Petitioner Reads Out Claim Language

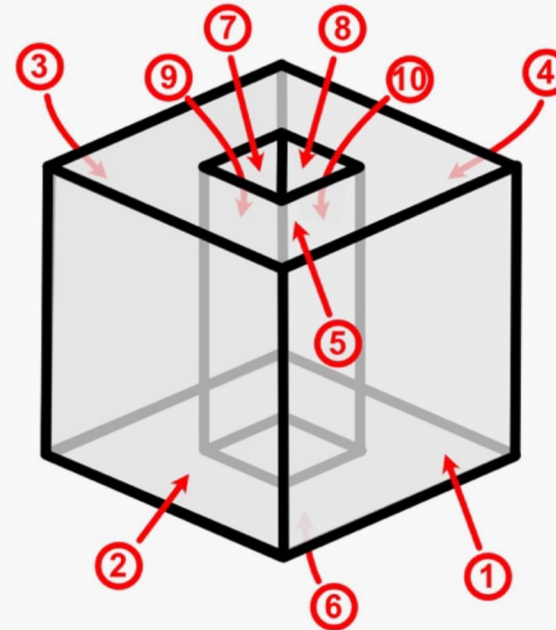
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Ex. 1001 ('666 Patent), Claim 19

- Petitioner argues that "side" "can be the top, bottom, left, right, front, or back of a 'layer'"; can be internal, can be external



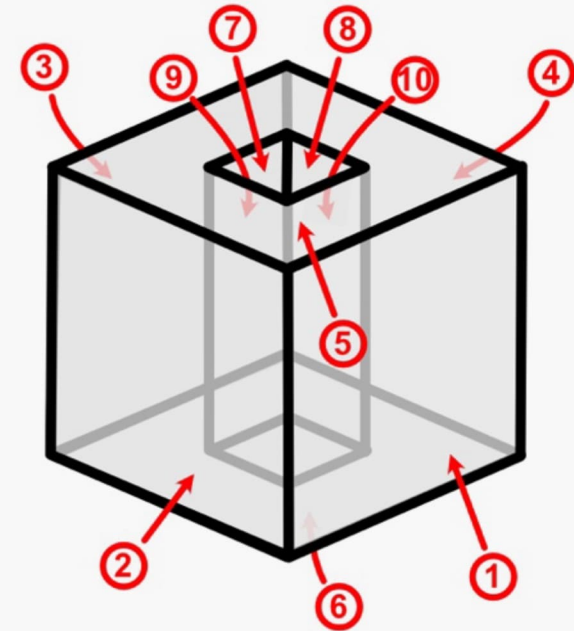
Ex. 1027 (Dr. Lee Rpl. Decl.) ¶ 12

Petitioner's Conflicting Extrinsic Evidence

Definition Of "side"

side \ˈsīd\ *n* **1** : the right or left part of the trunk of a body **2** : a place away from a central point or line **3** : a border of an object; *esp* : one of the longer borders as contrasted with an end **4** : an outer surface of an object **5** : a position regarded as opposite to another **6** : a body of contestants — **side** *adj*

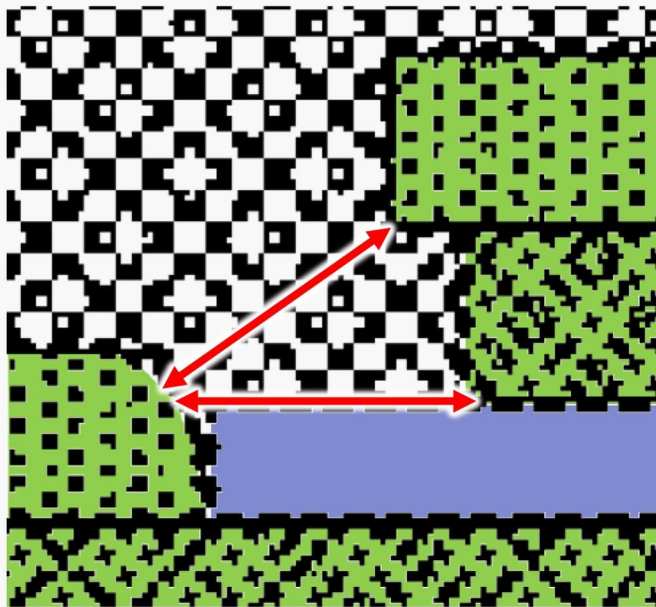
Ex. 1024 (The Merriam-Webster Dictionary: 1998), 3



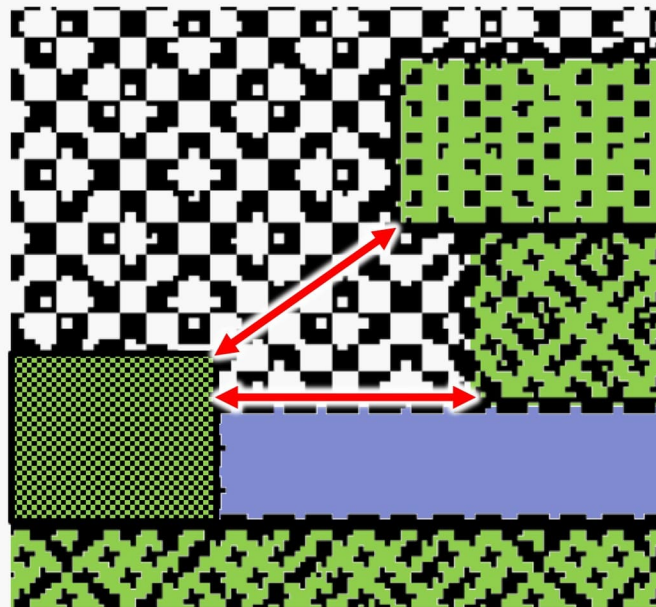
Ex. 1027 (Dr. Lee Rpl. Decl.) ¶ 12



Petitioner Ignores The Intrinsic Evidence



'666 Patent Structure



Other Structures

Ex. 2023 (Giapis Decl.) ¶ 36

Dr. Lee Declaration

420. In my opinion, a POSITA would have recognized that applying Park's teachings and rounding the side of Lee's pad portion PAD would have improved Lee—and limited the risk of short circuit or other adverse electrical effects—by increasing the minimum distance between the pad and the immediately adjacent conductive layer.

Ex. 1003 (Lee Decl.) ¶ 420

Dr. Lee Reply Declaration

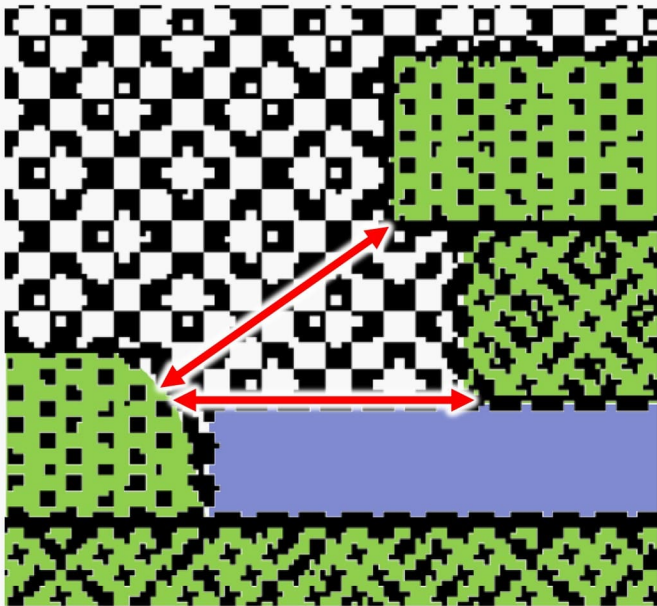
62. A POSITA would have recognized that rounded landing pad (with curved side surfaces) operates to increase the distance between the landing pad and adjacent conductive structure.

63. A rounded landing also—because it is further away—increases the thickness of insulation surrounding the landing pad.

Ex. 1027 (Dr. Lee Rpl. Decl.) ¶¶ 62-63



No Dispute That Depicted Curve Is Curved Along Vertical Direction



'666 Patent Structure

Ex. 2023 (Giapis Decl.) ¶ 36

Dr. Lee Deposition

Q. Okay. But I don't think that answered my question. I'm just asking, are there any processes described in the '666 patent that would form a curved side surface curved along the X-Y direction?

A. Well, the deposition techniques such as LPCVD and ALD by themselves would not produce vertically curved landing pad side surface like those shown in the '666 patent. And these techniques can, however, produce landing pad that a curve in x-y plane, as I describe in paragraph 29.

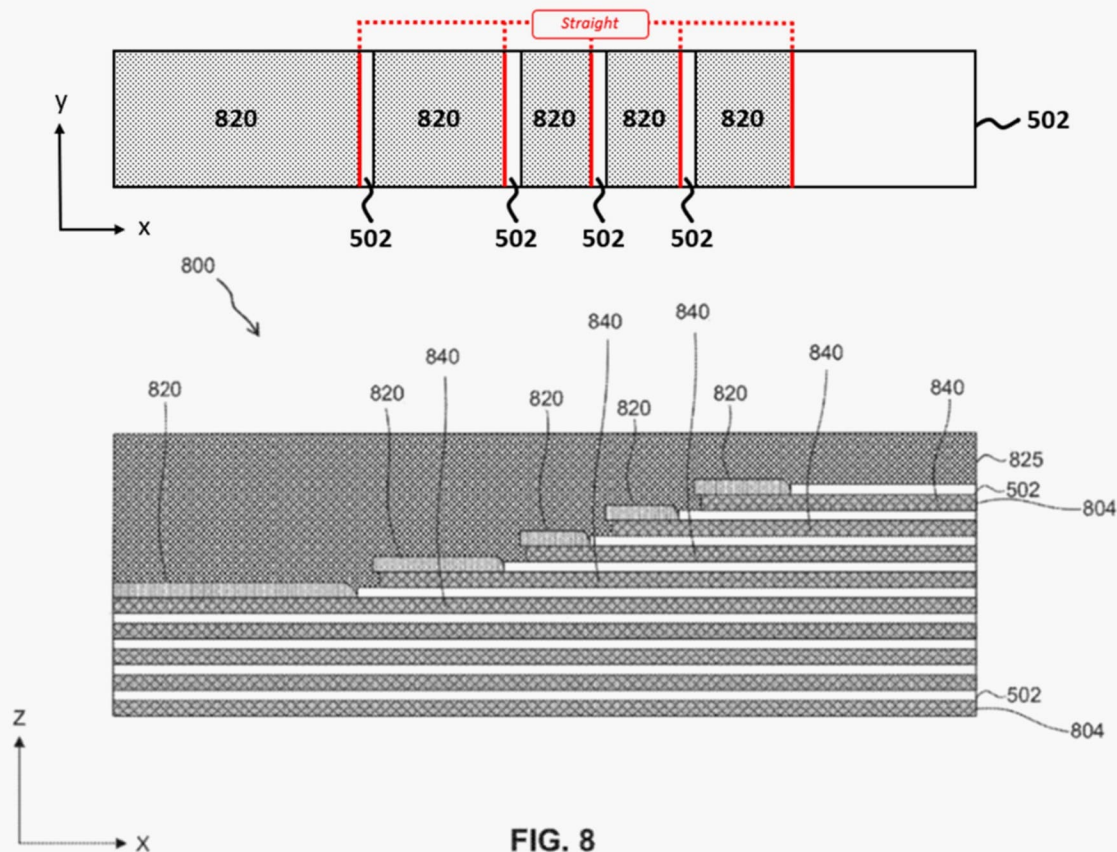
Ex. 2024 (Jack C. Lee, Ph. D.), 94:4-15



Petitioner Ignores The Intrinsic Evidence

'666 Patent

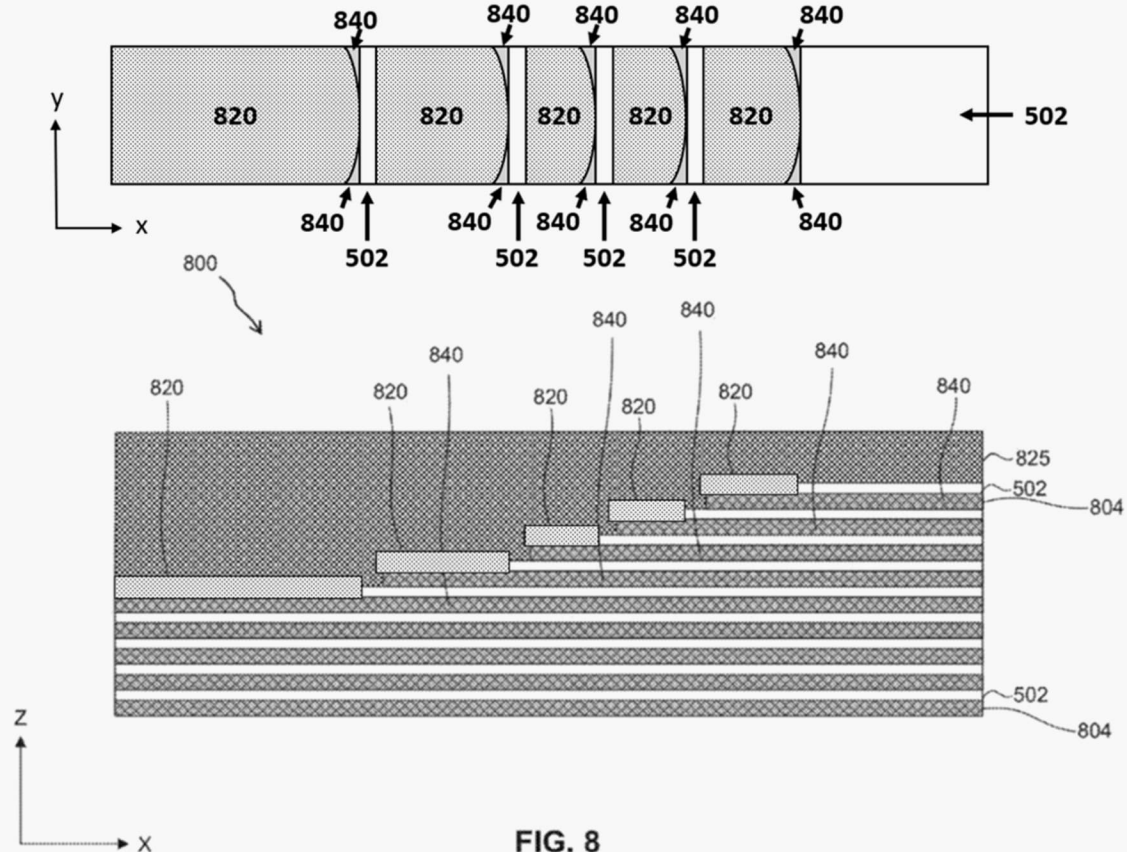
Top View of Fig. 8



POR 20; Ex. 2023 ¶ 57

NOT '666 Patent

Top and Side View of Fig. 8 if Curved in X-Y Plane and Not X-Z Plane



POR 24; Ex. 2023 ¶ 60

Petitioner Ignores The Intrinsic Evidence

■ Petitioner incorrectly argues that PO's construction limits to one embodiment

Petitioner's Reply

2004). Rather than limiting itself to just what is shown in Figure 8, the '666 patent explains that this is simply an “embodiment[.]” ’666 patent, 1:37-41, 13:10-40.

Further, the patent notes that there is only “contact” between an insulating layer and landing pad in “some” (but not necessarily all) “embodiments” of the purported invention. *E.g.*, 2:46-57. The specification also concludes by explaining that its embodiments are simply examples that are meant to be “readily modified.” *Id.*, 13:10-40. So, the particular type of curved side shown in the figures is an optional—not a required—feature. The specification also says nothing about how “curved” pad sides are to be formed. It does not mention use of a method with “directional and isotropic flux components” like that discussed in Patent Owner’s response (*see* Response, 19). Instead, the patent is expressly open to the use of “any suitable deposition techniques” when forming its layers. ’666 patent, 2:39-45, 8:65-9:7; Ex. 1028, 34:3-35:8 (CVD can produce good step coverage); Ex. 1027, ¶¶ 23-30.

Reply 8

17. A memory device, comprising:

a substrate, wherein the substrate comprises a top surface;
a memory string disposed over the substrate; and
a staircase structure disposed adjacent to the memory string, wherein the staircase structure comprises:

a plurality of layer stacks, each layer stack comprising an insulating layer disposed over a first portion of a conductive layer, wherein a second portion of the conductive layer comprises a curved side surface in contact with a side surface of the insulating layer.

Ex. 1001 ('666 Patent), Claim 17

19. The memory device of claim 17, wherein the conductive layer of a layer stack of the plurality of layer stacks is disposed over a first portion of the insulating layer of an adjacent layer stack of the plurality of layer stacks, wherein a second portion of the insulating layer of the adjacent layer stack is laterally displaced from the conductive layer of the layer stack.

Ex. 1001 ('666 Patent), Claim 19

Petitioner Ignores The Intrinsic Evidence

■ Petitioner incorrectly argues that PO's construction limits to one embodiment

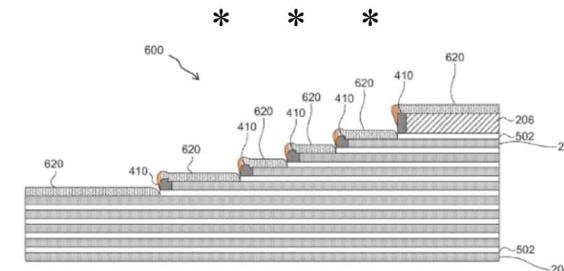
Petitioner's Reply

2004). Rather than limiting itself to just what is shown in Figure 8, the '666 patent explains that this is simply an “embodiment[.]” '666 patent, 1:37-41, 13:10-40. Further, the patent notes that there is only “contact” between an insulating layer and landing pad in “some” (but not necessarily all) “embodiments” of the purported invention. *E.g.*, 2:46-57. The specification also concludes by explaining that its embodiments are simply examples that are meant to be “readily modified.” *Id.*, 13:10-40. So, the particular type of curved side shown in the figures is an optional—not a required—feature. The specification also says nothing about how “curved” pad sides are to be formed. It does not mention use of a method with “directional and isotropic flux components” like that discussed in Patent Owner's response (*see* Response, 19). Instead, the patent is expressly open to the use of “any suitable deposition techniques” when forming its layers. '666 patent, 2:39-45, 8:65-9:7; Ex. 1028, 34:3-35:8 (CVD can produce good step coverage); Ex. 1027, ¶¶ 23-30.

Reply 8

Giapis Declaration

sacrificial layer underneath. '666 patent at 8:29-40, 12:24-31, Fig. 5. A dielectric material is then deposited onto the staircase structure so that the ensuing “layer 620 has poor step coverage on staircase structure 500.” '666 patent at 8:51-52. A POSITA would have understood what the '666 patent meant by “poor step coverage.” *See, e.g.*, Ex. 2008 (Plummer) at 509-510. The term



'666 patent at Fig. 6 (annotated).

33. The overhang reduces (shadows) further the delivery of additional depositing molecules to the bottom corner of each step from the space above the structure. As the overhang grows out, progressively less-and-less material is deposited directly below it, resulting in a layer (620) with a surface that curves into the corner by the step sidewall, precisely where layer 620 meets the insulating layer 502 of the respective layer stack. '666 patent at 8:41-9:7, 12:32-44, Fig. 6.

Ex. 2023 (Giapis Decl.) ¶¶ 32-33



Petitioner Ignores The Intrinsic Evidence

■ Petitioner incorrectly argues that PO's construction limits to one embodiment

Petitioner's Reply

2004). Rather than limiting itself to just what is shown in Figure 8, the '666 patent explains that this is simply an "embodiment[]." '666 patent, 1:37-41, 13:10-40. Further, the patent notes that there is only "contact" between an insulating layer and landing pad in "some" (but not necessarily all) "embodiments" of the purported invention. *E.g.*, 2:46-57. The specification also concludes by explaining that its embodiments are simply examples that are meant to be "readily modified." *Id.*, 13:10-40. So, the particular type of curved side shown in the figures is an optional—not a required—feature. The specification also says nothing about how "curved" pad sides are to be formed. It does not mention use of a method with "directional and isotropic flux components" like that discussed in Patent Owner's response (*see* Response, 19). Instead, the patent is expressly open to the use of "any suitable deposition techniques" when forming its layers. '666 patent, 2:39-45, 8:65-9:7; Ex. 1028, 34:3-35:8 (CVD can produce good step coverage); Ex. 1027, ¶¶ 23-30.

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Dr. Lee Deposition

Q. In column 8, lines 51 through 52 of the '666 patent, it says "In some embodiments, dielectric layer 620 has poor step-coverage on staircase structure 500," correct?

A. That's what it says in that -- in column 8, line 51 to 52.

Q. What is "poor step-coverage"?

A. Well, a step-coverage -- right? --

Q. Uh-huh.

A. -- and I -- let me go to my declaration. Sorry. (Pause in testimony.)

A. We don't talk about that. I'm trying to see.

Ex. 2010 (Jack C. Lee, Ph. D.), 81:5-20



A POSITA Understands Relationship Between Process And Structure

Dr. Lee Deposition

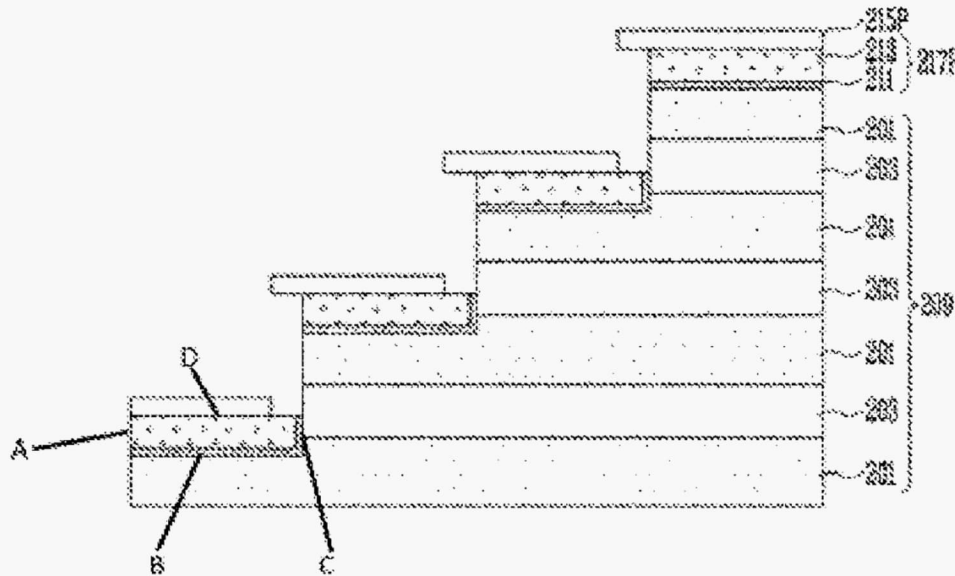
Q. Is the structure of a landing pad determined by the manufacturing process used to create it?

A. Of course.

Ex. 2024 (Jack C. Lee, Ph. D.), 142:13-16

File History Supports Patent Owner's Construction

FIG. 2E



Ex. 1014, 288

File History for Patent No. 10,680,003

1. (Currently Amended) A semiconductor structure, comprising:
 - a substrate; and
 - a staircase structure disposed over the substrate, wherein the staircase structure comprises:
 - a plurality of layer stacks, each layer stack comprising a first material layer and a second material layer, wherein the first material layer is disposed over a first portion of the second material layer; and
 - a plurality of landing pads respectively disposed on the plurality of layer stacks, each landing pad disposed over a second portion of the second material layer of a respective layer stack of the plurality of layer stacks, wherein the each landing pad comprises a bottom surface, a first side surface, and a second side surface, wherein the second side surface is vertically below and laterally displaced from the first side surface, wherein the bottom surface is substantially coplanar with another bottom surface of the first material layer of the respective layer stack.

Ex. 1014, 283



Patent Owner's Construction Follows Federal Circuit Precedent



Phillips

“Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.”

Phillips v. AWH Corp., 415 F.3d 1303, 1316 (Fed. Cir. 2005) (internal citation omitted)



Agenda

'666 Patent and Claim 19

Claim Construction

Ground 1 (Kim) Fails

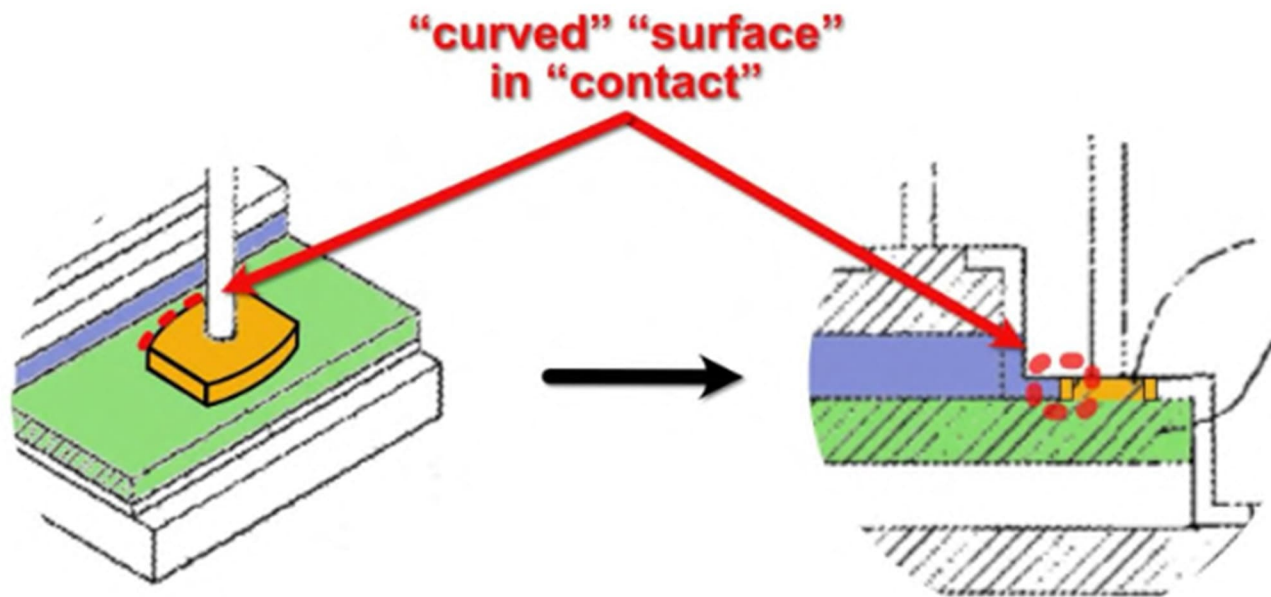
Ground 2 (Nam) Fails

Ground 3 (Lee+Park) Fails

Kim's Cylindrical Pads Are Not A “curved side surface”

Petitioner's Reply

Generally cylindrical pad:



Reply 11



Kim's Cylindrical Pads Are Not A “curved side surface”

Dr. Lee Declaration

[17.C.2] “wherein a second portion of the conductive layer comprises a curved side surface in contact with a side surface of the insulating layer.”

Ex. 1003 (Lee Decl.), 53

Dr. Lee Deposition

Q. Kim alone does not expressly or inherently disclose limitation 17.C.2, correct?

A. I think I answered that, that Kim alone does not expressly or inherently disclose every element of that limitation 17.C.2 --

Q. Okay.

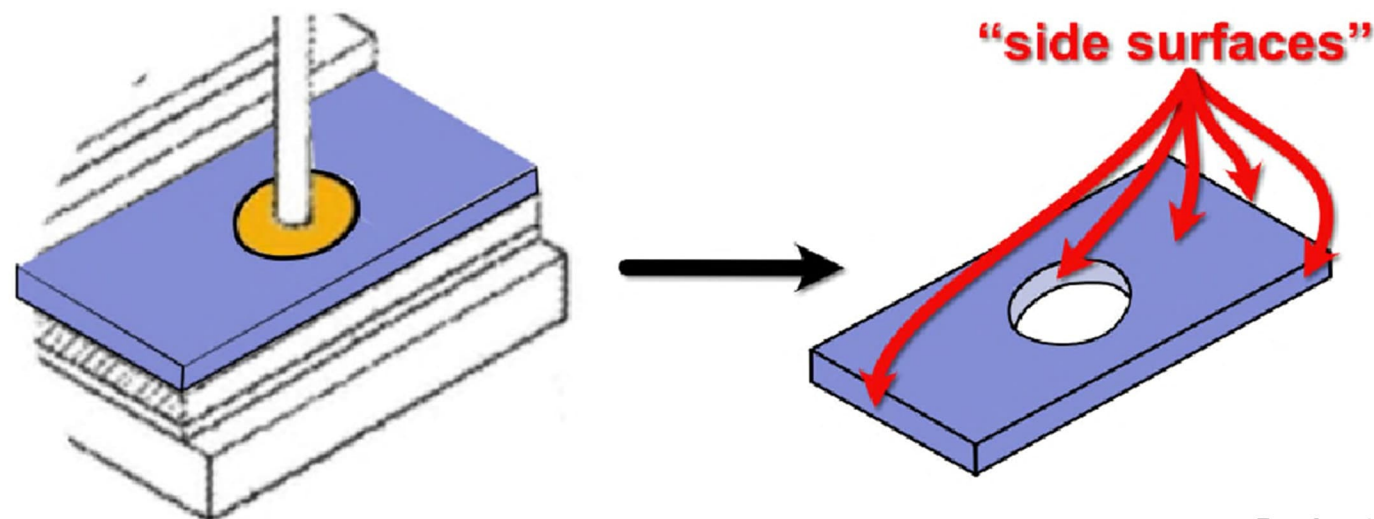
A. -- exactly as claimed.

Ex. 2010 (Jack C. Lee, Ph. D.), 130:8-133:3 (objections omitted)



Kim's Cylindrical Pads Do Not Contact A “side surface” Of The Insulating Layer

Petitioner's Reply



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side \ˈsīd\ *n* **1** : the right or left part of the trunk of a body **2** : a place away from a central point or line **3** : a border of an object; *esp* : one of the longer borders as contrasted with an end **4** : an outer surface of an object **5** : a position regarded as opposite to another **6** : a body of contestants — *side adj*

Ex. 1024, 3



Ground 1 Is Kim Alone

Petition

Petitioner challenges claims 17, 19, and 20 on the following grounds:

Ground 1: Claims 17, 19, and 20 are obvious over Kim;

Ground 2: Claims 17, 19, and 20 are obvious over Nam; and

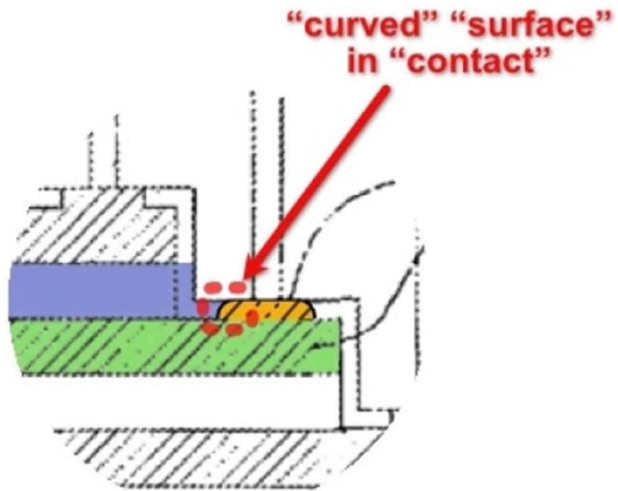
Ground 3: Claims 17, 19, and 20 are obvious over Lee and Park.



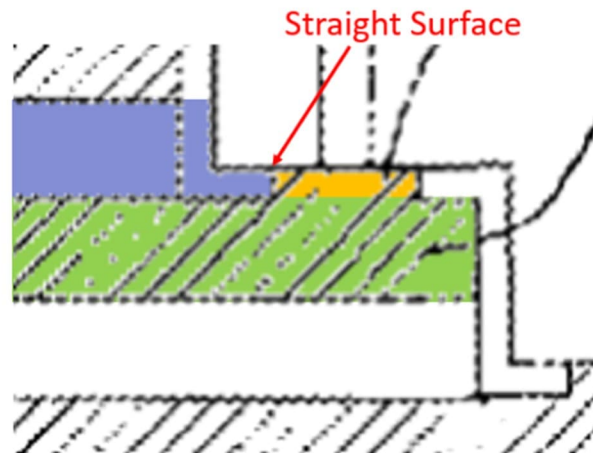
Kim Does Not Teach A “curved side surface”

Patent Owner's Response

Petitioner's Modified Figure (Pet. 46)



Actual Figure from Kim



POR 29

Dr. Lee Deposition

Q. Kim alone does not expressly or inherently disclose limitation 17.C.2, correct?

A. I think I answered that, that Kim alone does not expressly or inherently disclose every element of that limitation 17.C.2 --

Q. Okay.

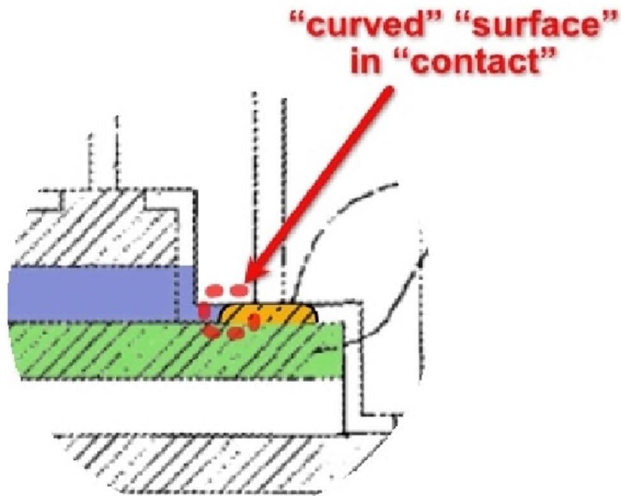
A. -- exactly as claimed.

Ex. 2010 (Jack C. Lee, Ph. D.), 130:8-133:3
(objections omitted)

Dr. Lee's *Ipse Dixit* Is Insufficient

Petition

For example, a POSITA would have understood that when Kim references a “curved surface based on a virtual rectangular parallel[] shape,” PAD_P would obviously be shaped in the manner shown in the demonstrative below:



Ex. 1003, ¶¶ 200-203 (annotated, modified). As can be seen, just as Kim teaches,

Pet. 45-46

Dr. Lee Declaration

202. In my opinion, a POSITA would have understood that this teaches a variety of different protrusion pad PAD_P shapes, many of which have the type of “*curved*” side surface Claim 17 requires. This includes, for instance, pads with curved sides when viewed in cross-section or pads with curved sides when viewed above.

203. More particularly, a POSITA would have understood that when Kim references a “curved surface based on a virtual rectangular parallel[] shape,” PAD_P would obviously be shaped in the manner shown in the demonstrative below. This demonstrative was created using an expanded version of Figure 4B. The rectangular pad shown by that figure has been replaced with a pad with curved sides following Kim’s teachings:

Ex. 1003 (Lee Decl.) ¶¶ 202-203



Ground 1 Is Kim Alone – But Petitioner Relies On Combinations

Petitioner's Reply

Patent Owner's arguments regarding the second type of “curved” landing pad referenced in Kim also lack merit. To begin, Patent Owner **wrongly characterizes the Petition as trying to substitute various prior art pad designs into Kim.** *E.g.*, Response, 29, 42. This, however, is something a POSITA would have understood that **Kim already teaches.** Kim references not only “cylindrical” pads but also pads that “includ[e] a curved surface based on a **virtual rectangular parallele shape.**” Kim, 8:29-35. A POSITA would have considered this to be an **obvious reference to the types of vertically curved pads routinely disclosed in and used by the prior art.** Petition, 45-49 (Exs. 1006, 1008, and 1018 examples of “curved” pads). *Patent*

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Ground 1 Is Kim Alone – But Petitioner Relies On Combinations

Petitioner's Reply

Patent Owner improperly assumes that Kim is limited to just one pad manufacturing method. It is not. Instead, Kim repeatedly makes clear that the process it discusses is merely an example. Kim, 12:12-15 (“some embodiments” employ the discussed method); 12:38-42 (explaining that while “one process[]” for forming layers is discussed, Kim “is not limited thereto”); 12:61-13:4 (“[a]n ion injection process may be performed”) (all emphasis added). In other words, Kim is open to the use of any method capable of producing the types of contact pads it discusses. Park (Ex. 1008), Nam (Ex. 1006), and Yun (Ex. 1018) not only provide examples of contact pads with “curved side surfaces,” but explain how such pads can be manufactured. Petition, 50-51. Any of these methods—when applied to Kim—produce a pad with a “curved side surface.” Ex. 1003, ¶¶ 203-222, 226-238.

Next, even if a POSITA did attempt to maintain as much of Kim’s existing manufacturing process as possible, a rounded contact pad would still have been readily achievable. To form its contact pads, Kim forms a “photosensitive resin

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Ground 1 Is Kim Alone – But Petitioner Relies On Combinations

Petitioner's Reply

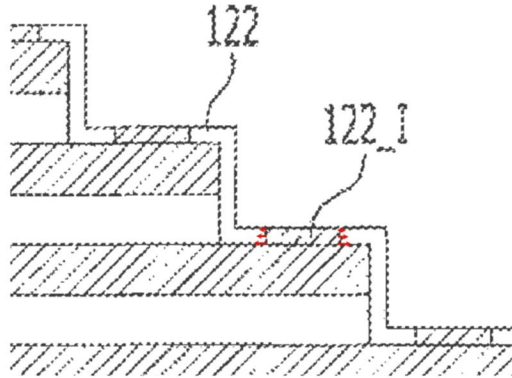
Patent Owner improperly assumes that Kim is limited to just one pad manufacturing method. It is not. Instead, Kim repeatedly makes clear that the process it discusses is merely an example. Kim, 12:12-15 (“some embodiments” employ the discussed method); 12:38-42 (explaining that while “one process[]” for forming layers is discussed, Kim “is not limited thereto”); 12:61-13:4 (“[a]n ion injection process may be performed”) (all emphasis added). In other words, Kim is open to the use of any method capable of producing the types of contact pads it discusses. Park (Ex. 1008), Nam (Ex. 1006), and Yun (Ex. 1018) not only provide examples of contact pads with “curved side surfaces,” but explain how such pads can be manufactured. Petition, 50-51. Any of these methods—when applied to Kim—produce a pad with a “curved side surface.” Ex. 1003, ¶¶ 203-222, 226-238.

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Reply 14

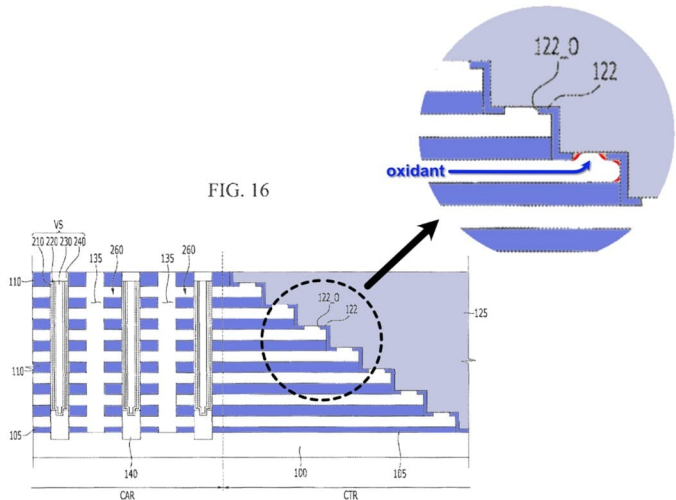


Ground 1 Is Kim Alone – But Petitioner Relies On Combinations



Kim, Fig. 13 (excerpted and annotated).

Ex. 1027 (Dr. Lee Rpl. Decl.) ¶ 52



Ex. 1027 (Dr. Lee Rpl. Decl.) ¶ 48

Dr. Lee Reply Declaration

50. Alternatively, a POSITA would have considered it obvious to employ

Nam's process to obtain landing pads with curved side surfaces in Kim.

Ex. 1027 (Lee Reply Decl.), ¶ 50

Dr. Lee Deposition

Q. And it's your opinion that when a person of ordinary skill in the art applies Park's oxidation method to Kim, they would arrive at the claimed invention in the '666 patent, correct?

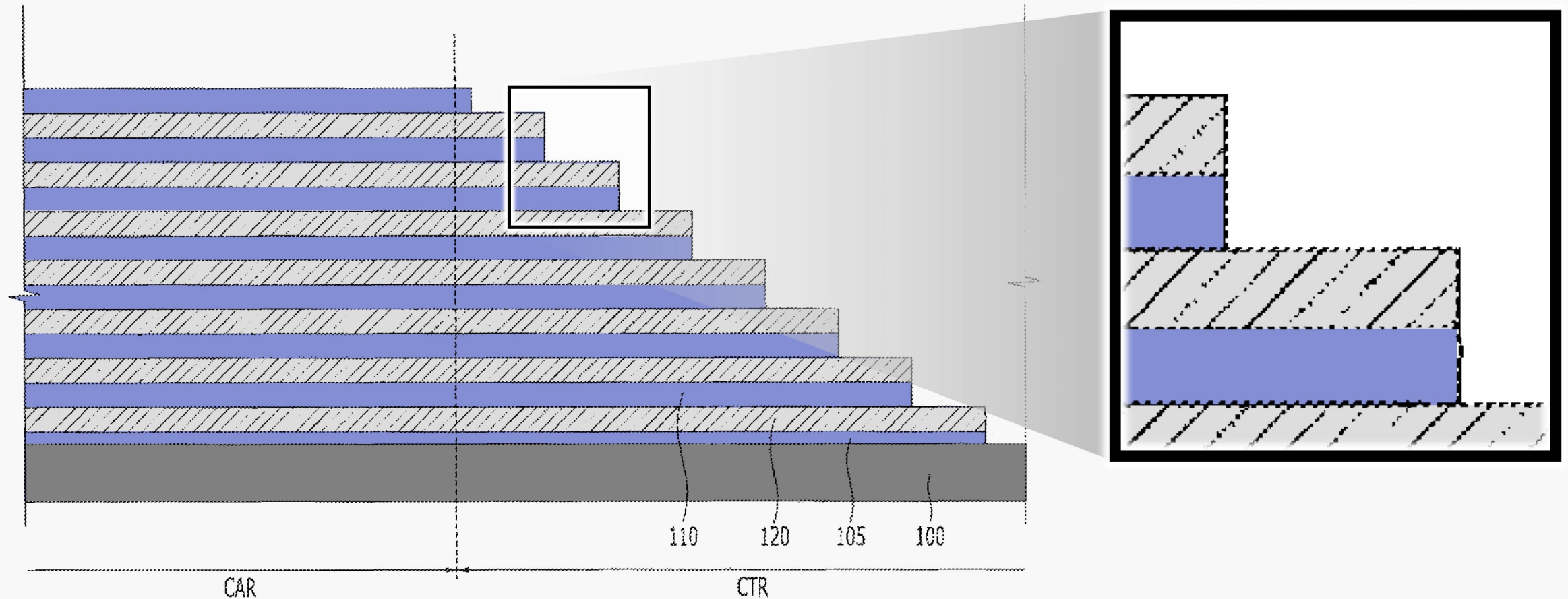
A. Yeah, it's a combination between -- a combination of Kim techniques and Park's technique.

Ex. 2024 (Jack C. Lee, Ph. D.), 127:20-128:6; 155:13-17; 135:5-14



Kim's Process Does Not Form Vertical Curved Side Surfaces

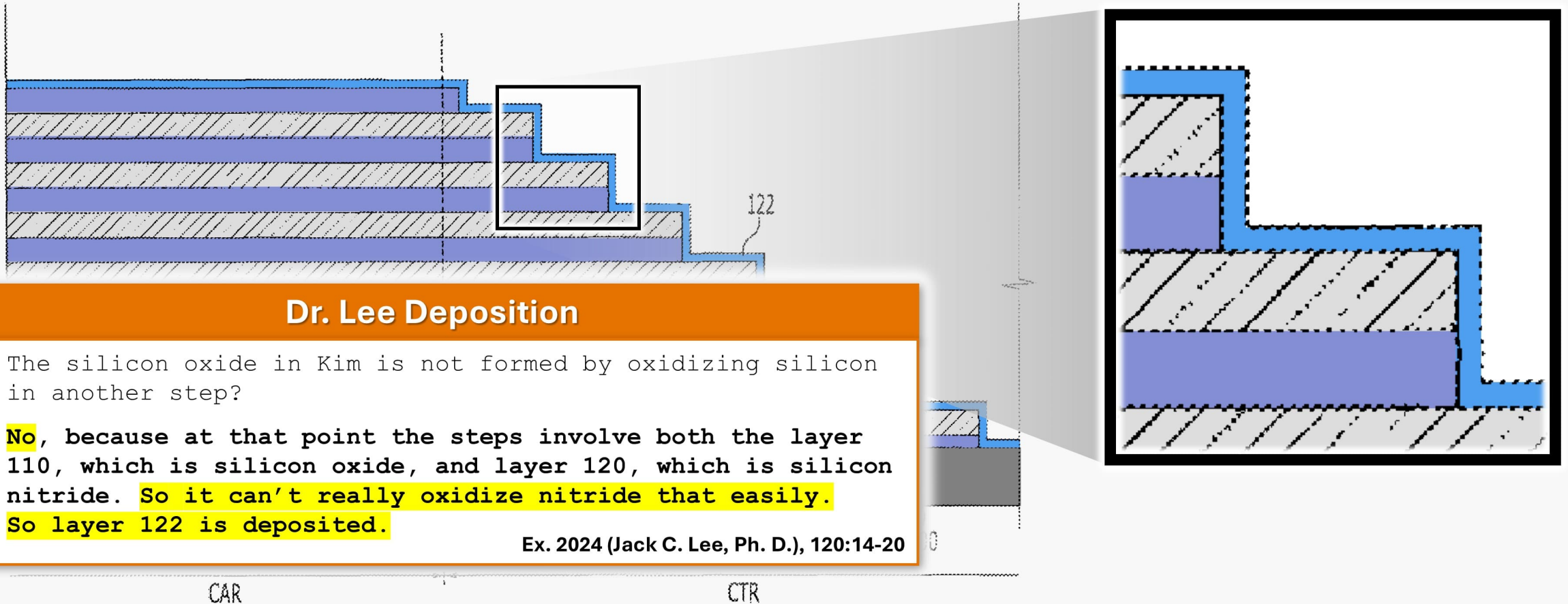
FIG. 11



Ex. 1005 (Kim), Fig. 11 (modified)

Kim's Process Does Not Form Vertical Curved Side Surfaces

FIG. 11

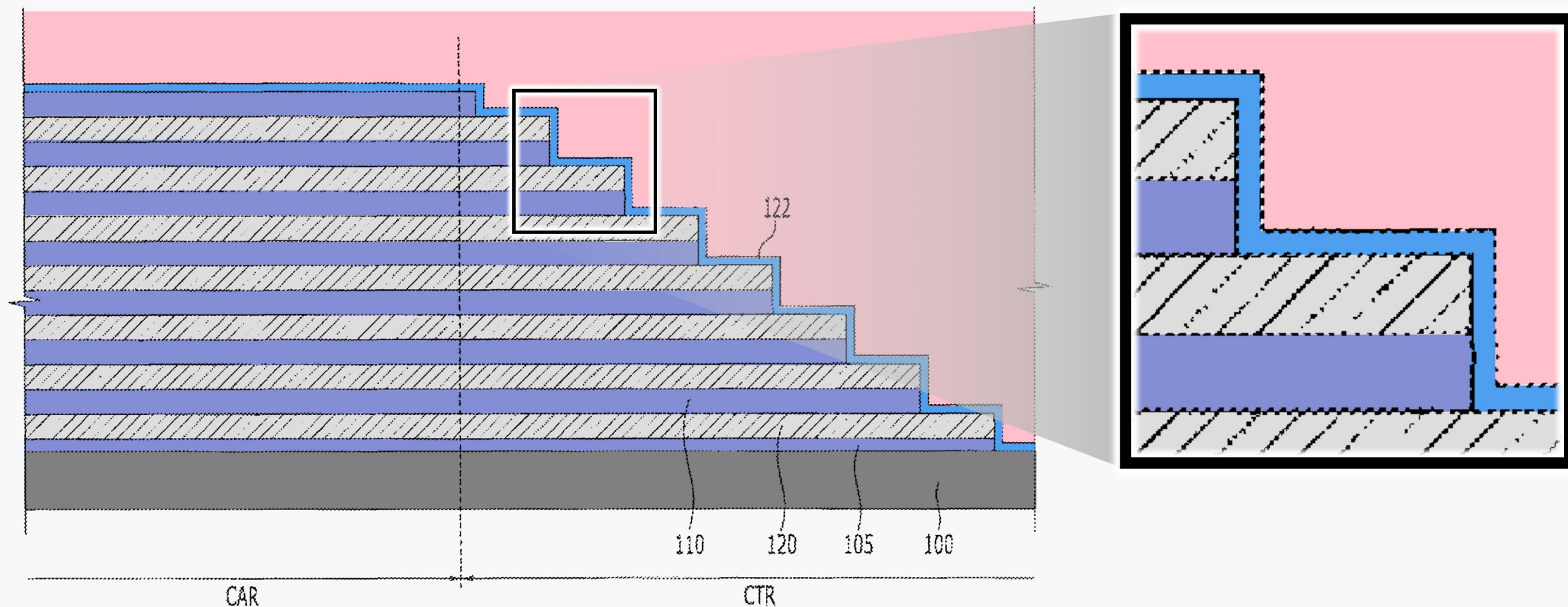


Ex. 1005 (Kim), Fig. 11



Kim's Process Does Not Form Vertical Curved Side Surfaces

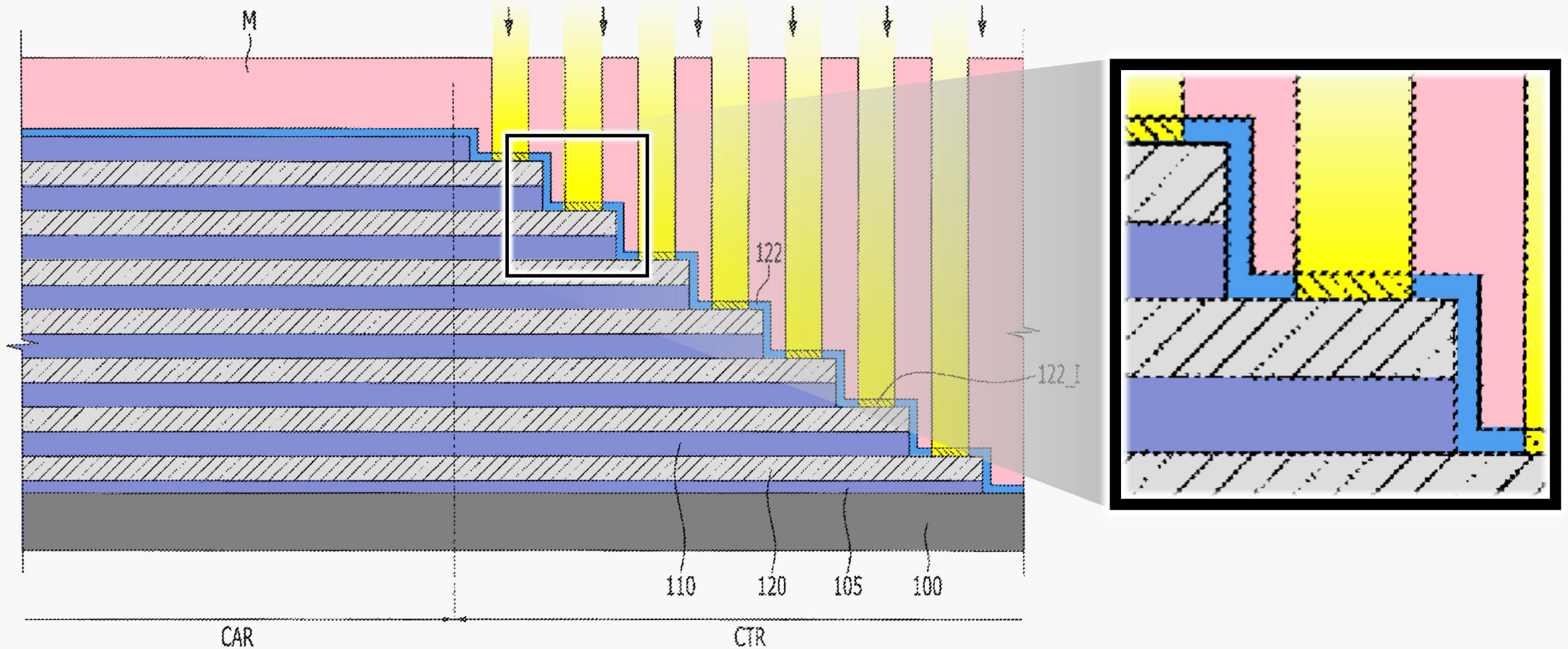
FIG. 11



Ex. 1005 (Kim), Fig. 11

Kim's Process Does Not Form Vertical Curved Side Surfaces

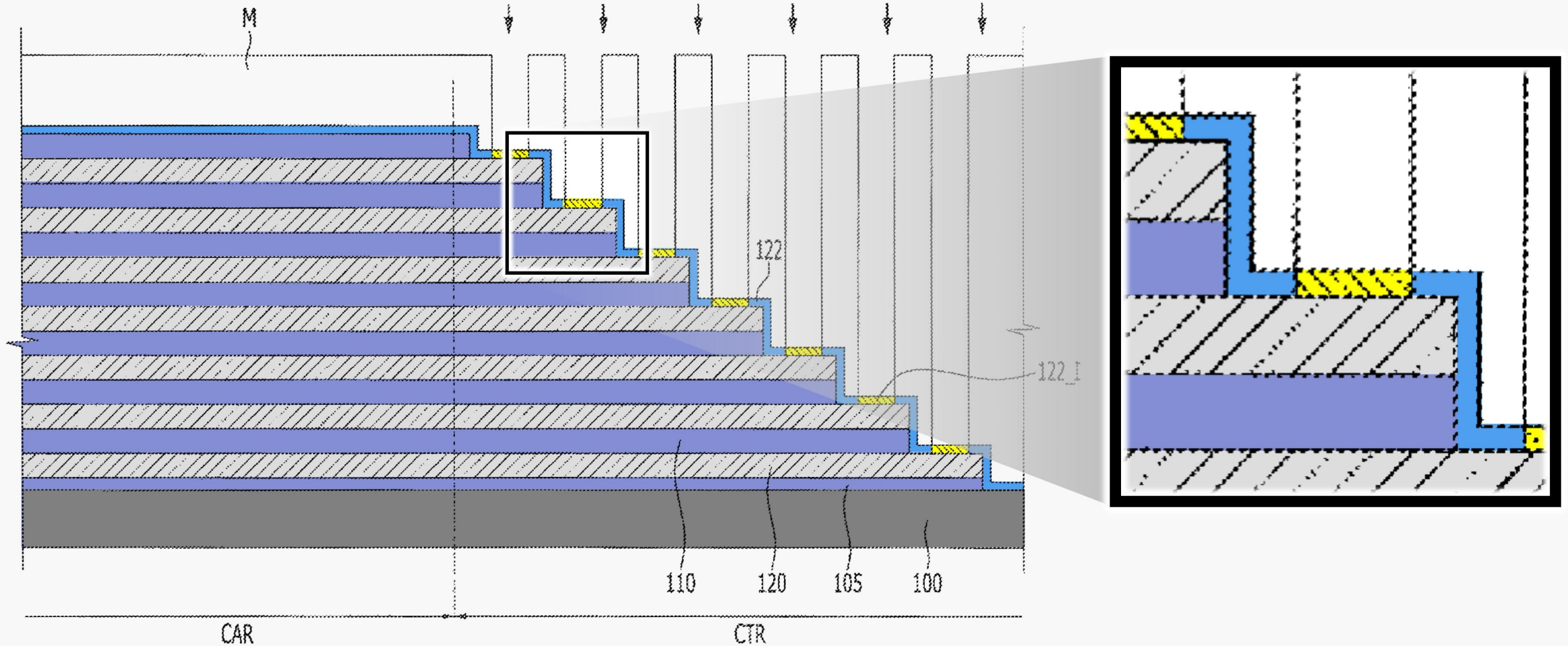
FIG. 12



Ex. 1005 (Kim), Fig. 12

Kim's Process Does Not Form Vertical Curved Side Surfaces

FIG. 12

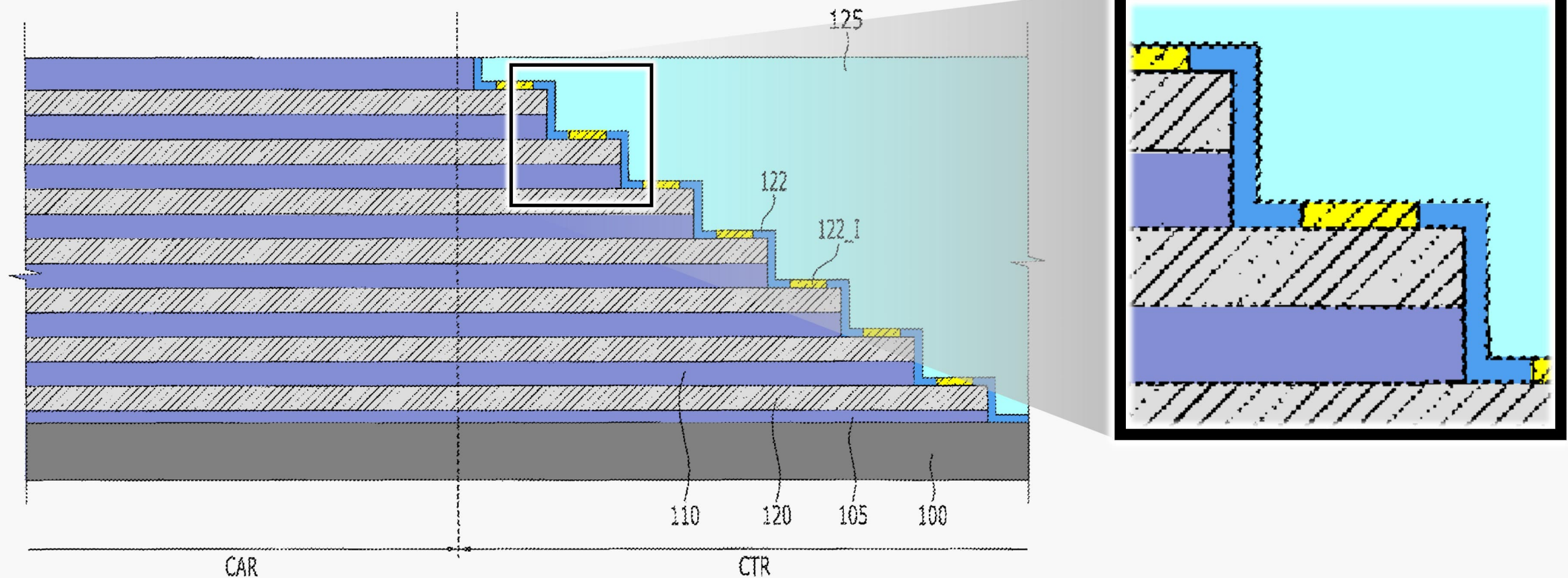


Ex. 1005 (Kim), Fig. 12



Kim's Process Does Not Form Vertical Curved Side Surfaces

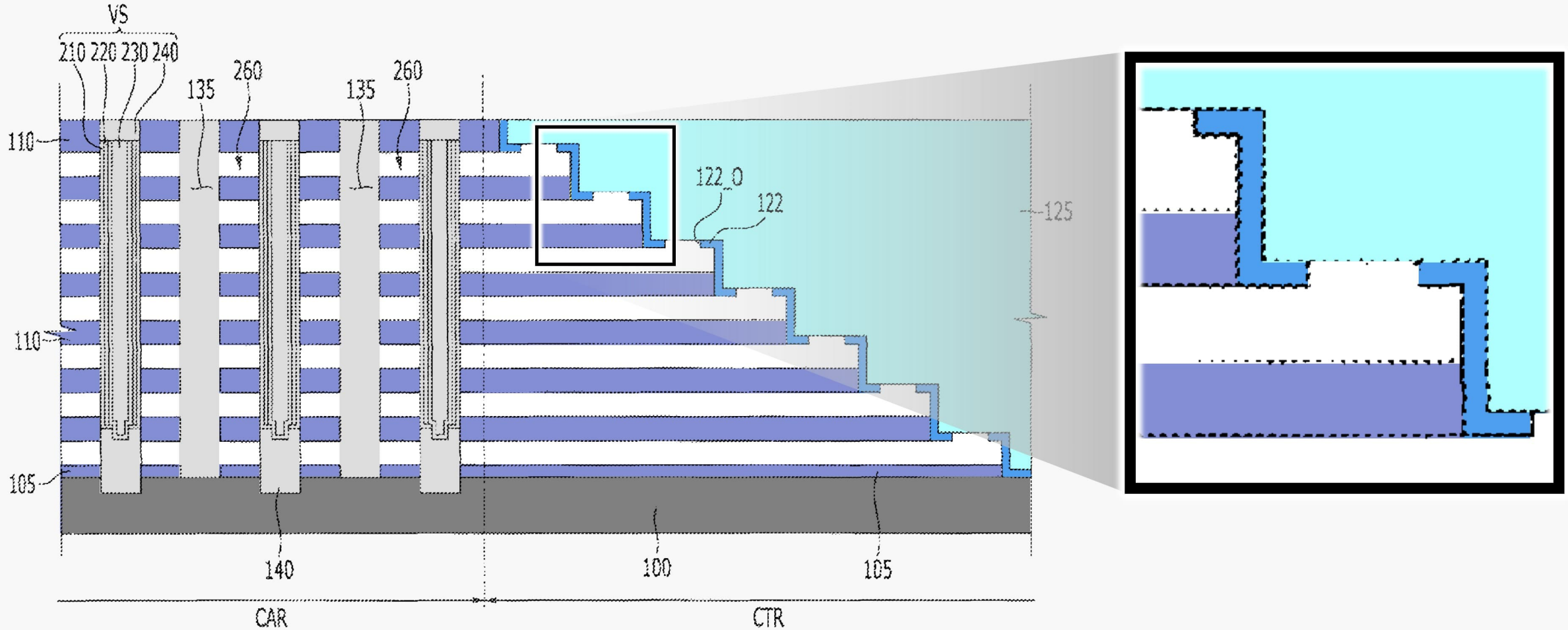
FIG. 13



Ex. 1005 (Kim), Fig. 13

Kim's Process Does Not Form Vertical Curved Side Surfaces

FIG. 16

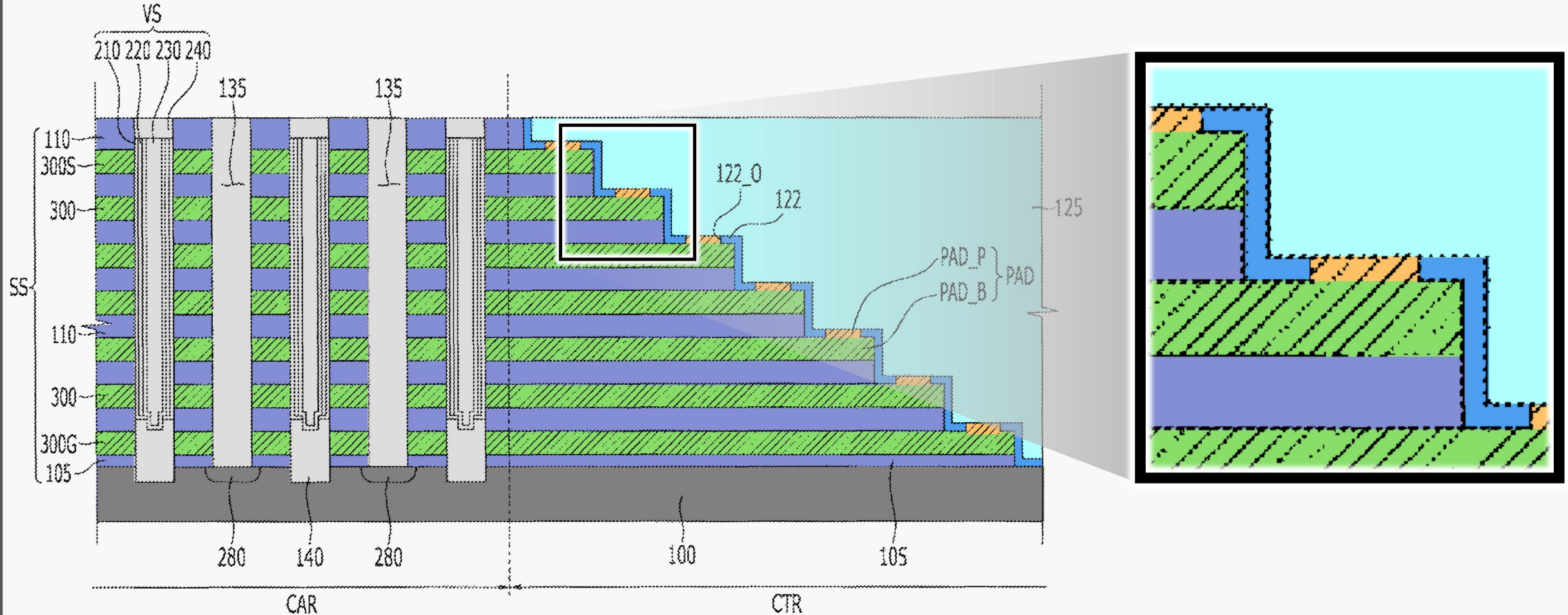


Ex. 1005 (Kim), Fig. 16



Kim's Process Does Not Form Vertical Curved Side Surfaces

FIG. 17



Ex. 1005 (Kim), Fig. 17