

SHENZHEN TUOZHU TECHNOLOGY CO. LTD. (Petitioner)
v.
STRATASYS, INC. (Patent Owner)
PETITIONER'S DEMONSTRATIVES

Case No. IPR2025-00257
U.S. Patent No. 9,592,660
Before LILAN REN, MITCHELL G. WEATHERLY, and CHRISTOPHER M. KAISER
Administrative Patent Judges

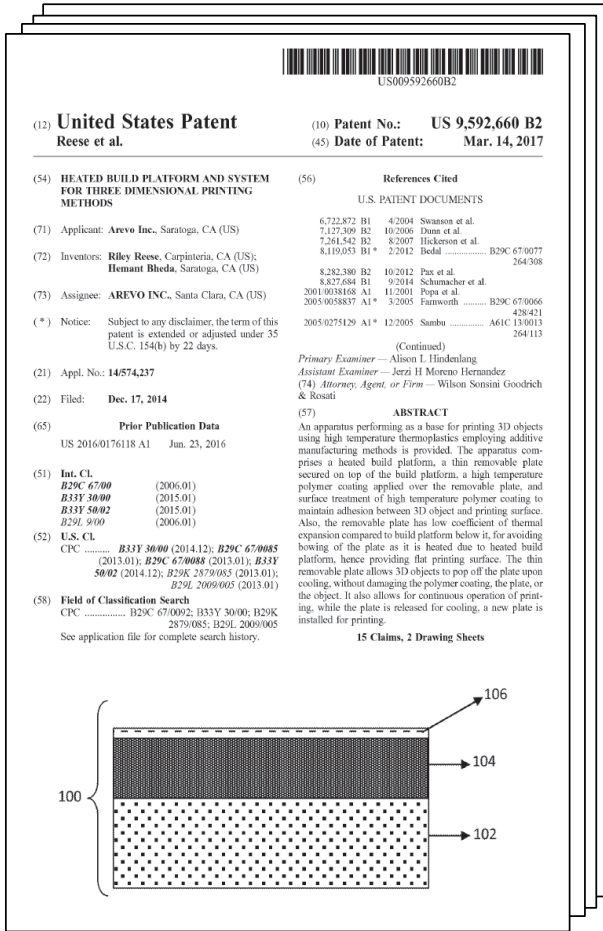


DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Table of Contents

Case Overview	3
Grounds 1A–1B: Claim 1, Element [1.c.ii]—Cable’s Teachings Render Obvious Object Removal Without Damage and Without Chemically or Mechanically Removing the Coating	5
Grounds 1A–1B: Claim 1, Element [1.c.iii]—Cable’s Teachings Render Obvious a Non-Tape Polymer Coating	32
Grounds 2A–2B: Claim 1, Element [1.c.iii]—Comb Alone or With Tummala Provides a Non-Tape Polymer Coating	51
Grounds 2A–2B: Claim 1, Element [1.c.ii]—Comb Alone or With Tummala Renders Obvious Object Removal Without Damage and Without Chemically or Mechanically Removing the Coating	58

Case Overview



- Challenged Claims: 1-15
- Claims 1, 4, 7, and 11 are disputed

Asserted Grounds		
ID	Claims	Prior Art Basis
1A	1–13, 15	§103: Cable (US 2016/0075091), Naware (US 2016/0096326)
1B	1–2, 4, 6–12, 15	§103: Cable, Kritchman (US 2006/0054039)
1C	7–8, 14	§103: Cable, Naware or Kritchman, Comb (US 9,744,730)
2A	1–3, 5–15	§103: Comb, Tummala (US 2013/0310507)
2B	1–15	§103: Comb, Tummala, Kritchman

Case Overview

1. A build apparatus for printing a 3D object of thermoplastics employing additive manufacturing methods, the apparatus comprising:

a build platform with a temperature control unit configured to control heating of the build platform;

a thermally conductive plate disposed adjacent to the build platform;

a polymer coating attached to a surface of the thermally conductive plate which is capable of (i) facilitating adhesion to the 3D object during printing and (ii) permitting removal of the 3D object once the 3D object has been formed and cooled **without chemically or mechanically removing the polymer coating from 3D object and without damaging the polymer coating**, the thermally conductive plate, or the 3D object, wherein the polymer coating is **not a polymer tape**.

***Only the Coating
“Removal”
Capabilities of Claim 1
Are Disputed***

Grounds 1A–1B: Claim 1, Element [1.c.ii]

Cable's Teachings Render Obvious Object
Removal Without Damage and Without Chemically
or Mechanically Removing the Coating

Grounds 1A–1B: Claim 1, Element [1.c.ii]

Pet. 8-10, 23-25

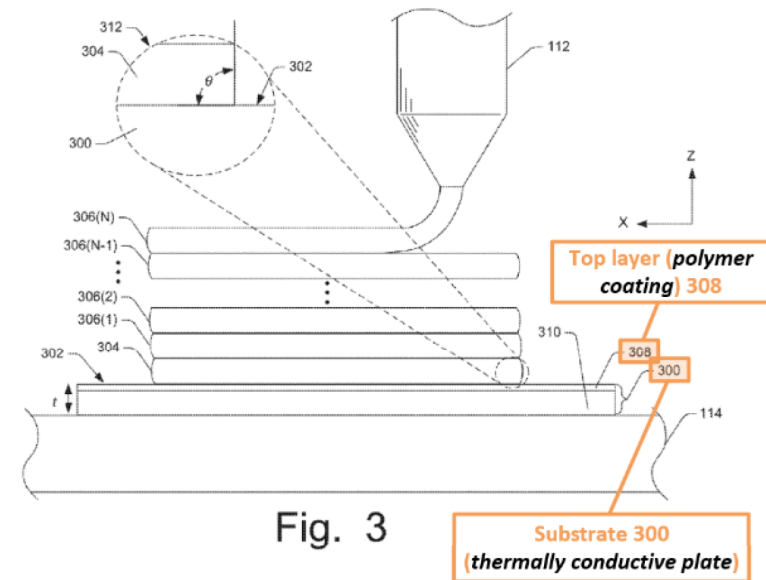
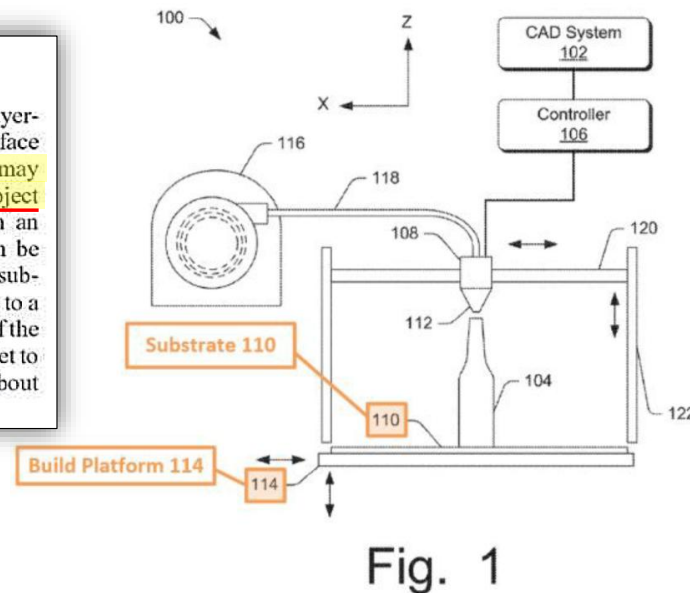
Cable Teaches Removal Without Damage or Chemical/Mechanical Contact

(19) United States
(12) Patent Application Publication (10) Pub. No.: US 2016/0075091 A1
Cable (43) Pub. Date: Mar. 17, 2016

(57) **ABSTRACT**

An object can be produced by depositing a material, layer-by-layer by an additive manufacturing process, onto a surface of a substrate. Removal of the object from the substrate may be accomplished without mechanically contacting the object with a device or chemically contacting the object. In an example, removal of the object from the substrate can be accomplished by flexing or bending the substrate. The substrate can be configured to elastically deform in response to a load applied to the sheet causing a deflection at a center of the sheet in an amount of at least about 12 mm and/or the sheet to have a radius of curvature that is less than or equal to about 305 mm.

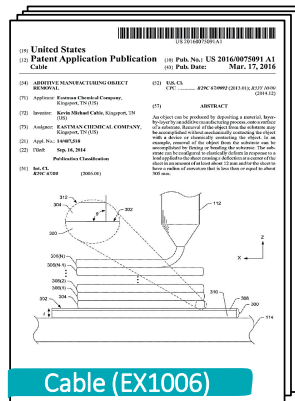
Cable (EX1006)



Grounds 1A–1B: Claim 1, Element [1.c.ii]

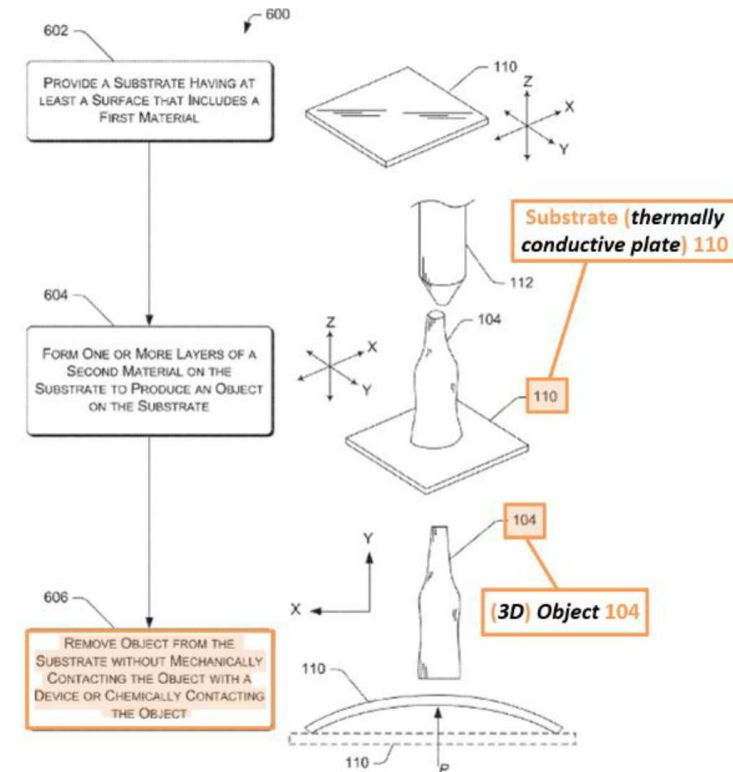
Pet. 8-10, 23-25

Cable Teaches Removal Without Damage or Chemical/Mechanical Contact



[0082] At 606, the object 104 may be removed from the substrate 110 without physically contacting the object with a device (e.g., a chisel, blade, a person's hand, etc.) or chemically contacting the object 104 (e.g., chemically dissolving material at an interface between the object and the substrate).

In an example, the removal of the object 104 at 606 can comprise flexing the substrate 110. The material of the substrate 110 can have a stiffness that allows for resilient (elastic) deformation up to at least a minimum center deflection, d , as shown in FIG. 5. In this manner, the object 104 can be removed from the substrate 110 with minimal, if any, damage to the substrate 110 and/or the object 104 and the substrate 110 can be re-used. Thus, the need for replacement substrates can be minimized or altogether eliminated.



Grounds 1A–1B: Claim 1, Element [1.c.ii]

Pet. 24-25
Reply 1-2

The Petition Relies on Cable's Clear and Express Teachings on Avoiding Chemical/Mechanical Contact

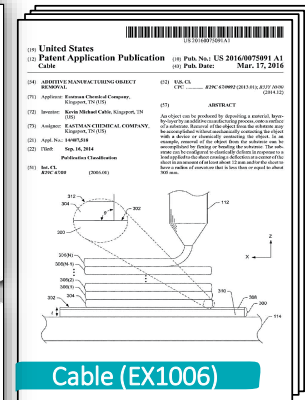
**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 9,592,660 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

Pet. 24

3D object. As Cable explains, its substrate enables the object to be removed “without mechanically contacting the object with a device [or] chemically contacting the object.” EX1006, [0052]; *see also* [0004], [0006], [0020], [0023]. Just like the ’660 patent’s preferred embodiment, Cable teaches that using a flexible polymer-coated substrate allows the part to simply “pop off.” EX1006, [0067]; *see also* [0020], [0023], [0068–0078], [0036], [0061], [0080], Figures 5–6; EX1001, 5:5–31. Thus, “the object can delaminate from the substrate without leaving a residue that is visible to the eye” and “the bottom of the object can have a smooth finish that is aesthetically pleasing.” EX1006, [0067] (reference number omitted). There is no need to chemically or mechanically remove the coating from the 3D object, because the coating remains behind. EX1006, [0052]. This approach results in “no damage to

[0052] Adhesion characteristics between the initial layers of the object 104 and the surface of the substrate 110 can be created such that the object 104 will not move about the substrate 110 during formation of the object 104, yet the object 104 can be easily removed from the substrate 110 without mechanically contacting the object 104 with a device, chemically contacting the object 104, and/or thermal/temperature cycling. As will be discussed in more detail below

strate 110 to flex in a vertical direction. By flexing the substrate 110, the attachment between the object 104 and the substrate 110 can be reduced such that the object 104 can “pop off” or otherwise be removed from the substrate 110. After removal from the substrate 110, the object 104 can be packaged or otherwise processed by downstream systems. By forming the object 104 on the substrate 110 as described with respect to implementations described herein, the object 104 can be removed from the substrate 110 with minimal or no damage to the object 104 and to the substrate 110. Thus, the substrate 110 can be re-used or recycled after removal of the object 104 therefrom such that another object 104 can be formed on the same substrate 110.



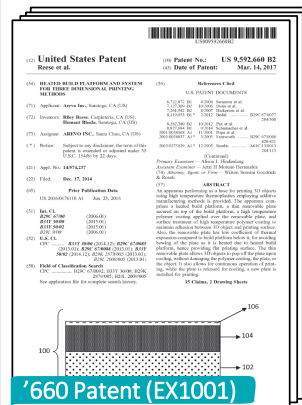
FISH

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.c.ii]

Pet. 24-25
Reply 1-2

Like the '660 Patent, Cable Teaches That the Object Will “Pop Off”



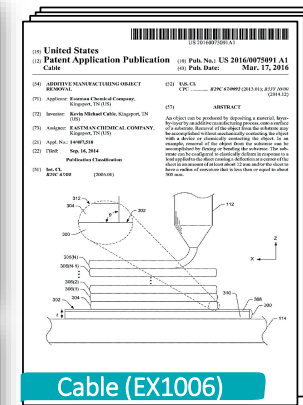
EX1001, 5:5-25

The removable plate **104** also possesses flexibility owing to the type of material it is made of. The flexibility of the plate **104** allows for easier dissociation between the 3D object and the removable plate **104** upon cooling. Further, this flexibility also reduces the possibility of damage to the high temperature polymer coating **106** or the 3D object during object removal since a blade or wedge is no longer needed to pry off the object.

The advantage of having the removable plate 104 secured over the build platform 102 is easy removal of the built object upon completion. This happens, since the removable plate 104 is thin and also there is a significant difference in thermal contraction between the removable plate and the 3D printed polymer object. Therefore once the building of the object is finished, the object will pop off the plate 104 when the plate and part have cooled. This efficiently avoids the general issue in the current art, where the 3D object sticks to the heated build platform, and the object has to be dug out from the platform in order to remove it or having to remove the object from a support raft requiring an additional step to dissolve or mechanically remove the support from the part.

[0052] Adhesion characteristics between the initial layers of the object 104 and the surface of the substrate 110 can be created such that the object 104 will not move about the substrate 110 during formation of the object 104, yet the object 104 can be easily removed from the substrate 110 without mechanically contacting the object 104 with a device, chemically contacting the object 104, and/or thermal/temperature cycling. As will be discussed in more detail below

strate 110 to flex in a vertical direction. By flexing the substrate 110, the attachment between the object 104 and the substrate 110 can be reduced such that the object 104 can "pop off" or otherwise be removed from the substrate 110. After removal from the substrate 110, the object 104 can be packaged or otherwise processed by downstream systems. By forming the object 104 on the substrate 110 as described with respect to implementations described herein, the object 104 can be removed from the substrate 110 with minimal or no damage to the object 104 and to the substrate 110. Thus, the substrate 110 can be re-used or recycled after removal of the object 104 therefrom such that another object 104 can be formed on the same substrate 110.



Cable (EX1006)

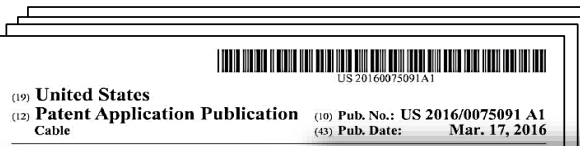
Grounds 1A–1B: Claim 1, Element [1.c.ii]

Pet. 24-25
Reply 1-2

Cable Avoids Mechanical/Chemical Removal Techniques Known to Cause Damage

EX1006, [0024]

achieve. In particular, users of additive manufacturing systems can utilize various techniques to achieve greater adhesion of the object to the substrate, but, damage to the object can result upon removal of the object from the substrate. For example, an object can be adhered to a substrate such that an individual or machine may need to utilize techniques to remove the object from the substrate that can cause damage to the object and/or the substrate. To illustrate, a tool, such as a chisel or knife, or a chemical process may be used to remove an object from the substrate that cause unwanted damage (e.g., removal of portions of the object, removal of portions of the substrate, etc.).



[0004] An object can be produced by depositing a material, layer-by-layer according to a pattern, onto a surface of a substrate. The pattern in which the material is deposited may be based on three-dimensional (3D) model data that is accessed by an additive manufacturing system. Removal of the object from the substrate (dislodging the object) may be accomplished without mechanically contacting the object with a device (e.g., a tool such as a chisel, blade, etc.) or chemically contacting the object (e.g., chemically dissolving material at an interface between the object and the substrate). In an example, removal of the object from the substrate can be accomplished by flexing or bending the substrate, causing the object to dislodge, or "pop-off" of the substrate.

Cable (EX1006)

EX1006, [0004]

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Pet. 24-25
Reply 1-2

**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 9,592,660 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

Pet. 24

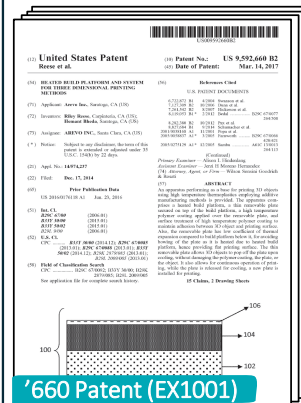
EX1006, [0052]



Grounds 1A–1B: Claim 1, Element [1.c.ii]

Pet. 24-25
Reply 1-2

The '660 Patent Avoids Damage Using the Same Approach Cable Teaches

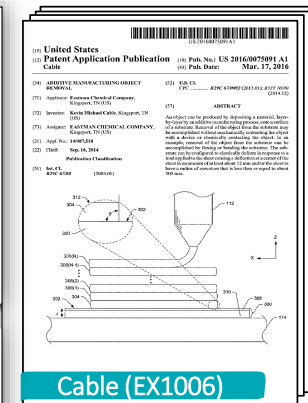


EX1001, 6:19-28

Further advantages include, the polyimide coating 106 can operate at high temperatures up to 300 degrees Celsius suitable for any high temperature thermoplastic. The flexibility of the removable plate 104 also reduces the possibility of damage to the coating 106 or the object during object removal since a blade or wedge is no longer needed to pry off the part. The surface of the polyimide coating 106 can be roughened at the nano-, micro-, or milli-meter scale using sand blasting, bead blasting, and/or metal wire brushing to increase polymer adhesion to the coated surface.

[0052] Adhesion characteristics between the initial layers of the object 104 and the surface of the substrate 110 can be created such that the object 104 will not move about the substrate 110 during formation of the object 104, yet the object 104 can be easily removed from the substrate 110 without mechanically contacting the object 104 with a device, chemically contacting the object 104, and/or thermal/temperature cycling. As will be discussed in more detail below

strate 110 to flex in a vertical direction. By flexing the substrate 110, the attachment between the object 104 and the substrate 110 can be reduced such that the object 104 can “pop off” or otherwise be removed from the substrate 110. After removal from the substrate 110, the object 104 can be packaged or otherwise processed by downstream systems. By forming the object 104 on the substrate 110 as described with respect to implementations described herein, the object 104 can be removed from the substrate 110 with minimal or no damage to the object 104 and to the substrate 110. Thus, the substrate 110 can be re-used or recycled after removal of the object 104 therefrom such that another object 104 can be formed on the same substrate 110.



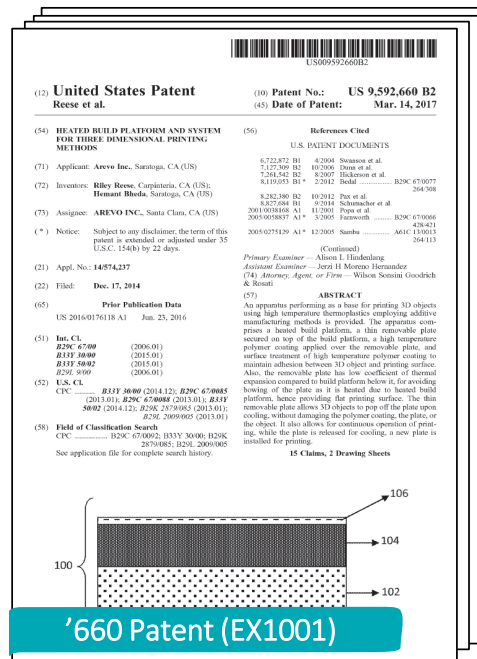
Cable (EX1006)

Grounds 1A–1B: Claim 1, Element [1.c.ii]

Rebuttal
to:

“There is no rationale for narrowing the plain meaning of ‘damage’ or ‘damaging’ to exclude the presence of residue.” Sur-Reply at 3.

No Intrinsic Support for Interpreting “Damage” as the Mere Existence or Presence of Even Minimal Residue



'660 Patent (EX1001)

EX1001, 1:57-64, 4:48-49, 5:9-12

Even if a part is built on an area of polyimide tape without debris or air bubbles, the tape can be easily damaged upon removal of the part. At elevated temperatures, the bottom layer of tape can permanently adhere to the 3D part causing the tape to tear or bubbles to form between the tape and build plate. Even when the part has been fully cooled, the poly-

the high temperature polymer coating 106 is resilient in nature and cannot be easily scratched or punctured. The

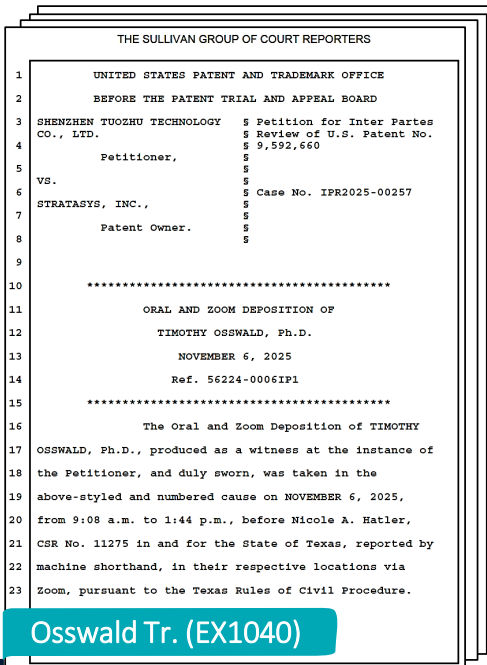
this flexibility also reduces the possibility of damage to the high temperature polymer coating 106 or the 3D object during object removal since a blade or wedge is no longer needed to pry off the object.

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“There is no rationale for narrowing the plain meaning of ‘damage’ or ‘damaging’ to exclude the presence of residue.” Sur-Reply at 3.

Unreliable Expert Testimony Does Not Support Interpreting “Damage” as the Mere “Presence of Residue”



So, I mean, I don't want to go into what size has considered damage. A person of ordinary skill in the art is not -- I mean, is not dumb. I mean, they know what damage means. So damaging the part, damaging the coating, damaging the plate, there are easy ways -- so what's considered damage?

EX1040, 83:23-84:3

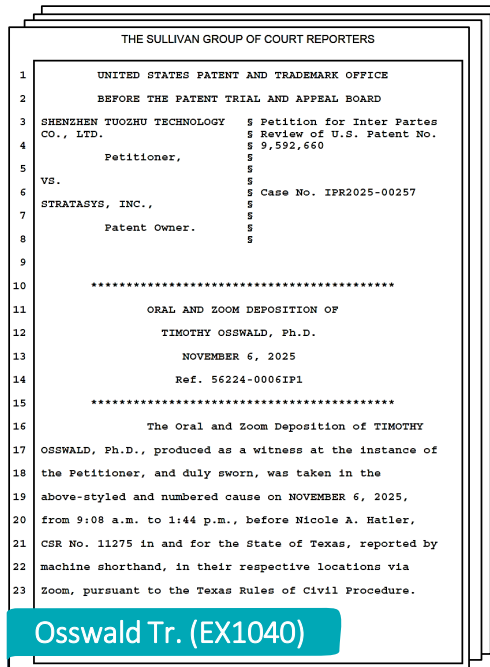
Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“There is no rationale for narrowing the plain meaning of ‘damage’ or ‘damaging’ to exclude the presence of residue.” Sur-Reply at 3.

Unreliable Expert Testimony Does Not Support Interpreting “Damage” as the Mere “Presence of Residue”

EX1040, 84:11-19



Q. BY MR. DARBY: I'm trying to understand, is there an objective measure that you can describe in order to tell if a part is damaged or not damaged?

MR. KAPADIA: Objection. Beyond the scope.

THE WITNESS: I think it's pretty clear. I think damage encompasses a lot, but it's understood -- a person of ordinary skill in the art understands what happened -- what is -- when the part gets damaged during removal.

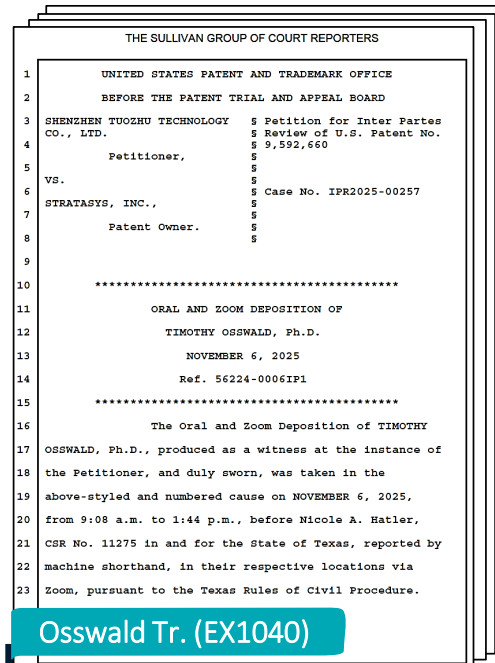
Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“There is no rationale for narrowing the plain meaning of ‘damage’ or ‘damaging’ to exclude the presence of residue.” Sur-Reply at 3.

Unreliable Expert Testimony Does Not Support Interpreting “Damage” as the Mere “Presence of Residue”

EX1040, 86:3-11



Q. BY MR. DARBY: Okay. And in order to make that determination, what factors would a person of ordinary skill in the art consider?

MR. KAPADIA: Objection. Beyond the scope.

THE WITNESS: Again, I did not do a full -- as I mentioned earlier, I said I did not do a full analysis of what kind of damage is -- a list of damages of all of those. And I think that -- that the claim is clear.

16

FISH

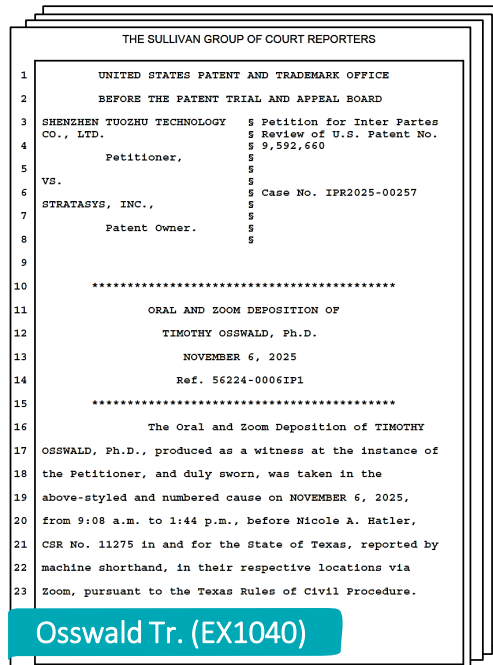
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.c.ii]

Rebuttal
to:

“There is no rationale for narrowing the plain meaning of ‘damage’ or ‘damaging’ to exclude the presence of residue.” Sur-Reply at 3.

Unreliable Expert Testimony Does Not Support Interpreting “Damage” as the Mere “Presence of Residue”



Q. BY MR. DARBY: You mentioned that it would depend on the analysis. What analysis would the person of skill in the art do?

MR. KAPADIA: Objection. Beyond the scope.

THE WITNESS: Optical, seeing if it's mechanical integrity. I mean, they hear it crack when they remove, that's damage. You might not be able to see the crack. So it -- a lot of it -- it's -- it's damage of the part. So is it -- a microscopic, tiny little void, is that damage? I don't know. I mean, it could be part of -- it could be a result of the printing process.

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“[A] POSITA would have understood that Cable fails to teach that the object can be removed without damage, such that there is no visible residue.” POR at 32; see also Sur-Reply at 6-9.

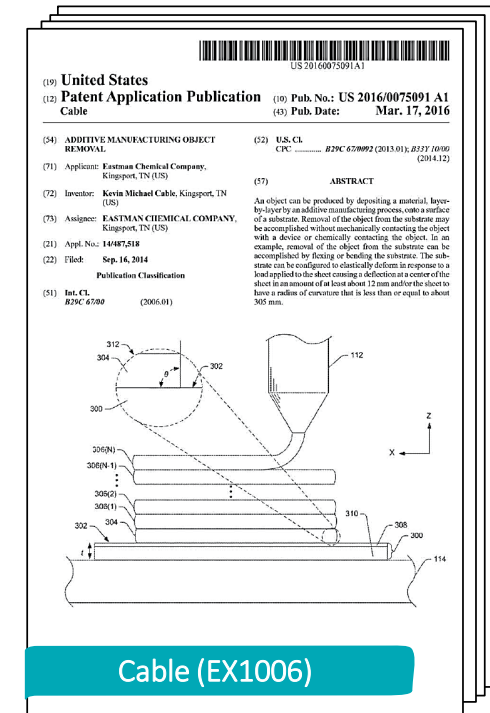
Patent Owner’s “Residue” Argument Artificially Constrains Cable’s Disclosure

substrate 110. With optimal adhesion characteristics, the object 104 can delaminate from the substrate 110 without leaving a residue that is visible to the eye. In addition, the bottom of the object 104 can have a smooth finish that is aesthetically pleasing.

EX1006 [0067]

[0084] The concepts described herein will be further described in the following examples with reference to the following figures, which do not limit the scope of the disclosure described in the claims.

EX1006 [0084]

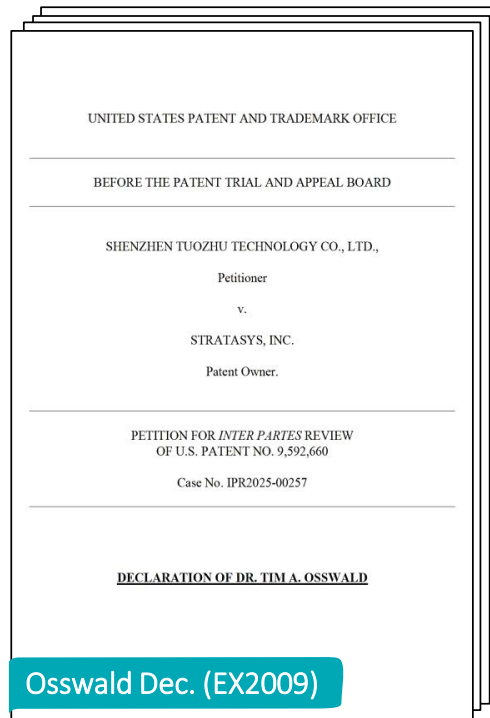


Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“[A] POSITA would have understood that Cable fails to teach that the object can be removed without damage, such that there is no visible residue.” POR at 32; see also Sur-Reply at 6-9.

Patent Owner’s Expert Testimony Directly Contradicts Cable



[0086]. Despite Cable providing an explanation of how to apparently configure its substrate for resilient flexing or bending to remove an object without damage (see EX1006, at ¶¶[0068]–[0078]), when considering Cable’s disclosure as a whole it does not teach removing the object without leaving behind a visible portion of the object as residue on the substrate. In particular, a POSITA would have understood

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“[A] POSITA would have understood that Cable fails to teach that the object can be removed without damage, such that there is no visible residue.” POR at 32; see also Sur-Reply at 6-9.

Patent Owner’s “Residue” Argument Misreads Cable’s Examples

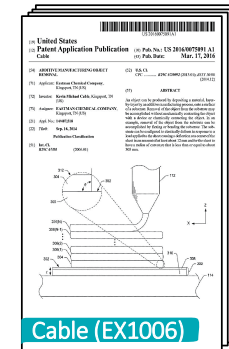
EX1006 [0085], Figure 8

object 700 on the substrate 702, the object 700 was removed from the substrate 702 by an individual flexing two edges of the substrate 702 with their hands. FIG. 8 shows the object 700 after having been removed from the substrate 702. As shown in FIG. 8, the object 700 was not damaged after the removal from the substrate 702 and a minimum amount of residue 800 remained on the substrate 702 after the removal of the object 700.



EX1006 [0086], Figure 9

902. The object 900 was removed from the substrate 902 using a blade (i.e., mechanically contacting the object 900). The substrate 902 was too thick to flex the substrate 902 by hands of an individual to a suitable radius of curvature or center point deflection to cause removal of the object 900 from the substrate 902 without mechanically contacting the object 900.



Patent Owner’s Dr. Osswald:
“A POSITA would have understood that the damage corresponds to the removal of object 900 by using a blade, resulting in scratch marks on the top surface of the substrate.” EX2009 ¶199

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“[A] POSITA would have understood that Cable fails to teach that the object can be removed without damage, such that there is no visible residue.” POR at 32; see also Sur-Reply at 6-9.

Blade Removal Leaves Scratch Marks on Substrate



EX1006 [0085], Figure 9

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Cable’s Teachings Are Presumed Enabling

United States Court of Appeals for the Federal Circuit

AGILENT TECHNOLOGIES, INC.,
Appellant

v.

SYNTHEGO CORP.,
Appellee

at issue, nothing more.”). Prior art disclosures are **pre-
sumed enabling**. *Impax Labs., Inc. v. Aventis Pharms.,
Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008) (reaffirming that

Decided: June 11, 2025

MARK A. LEMLEY, Lex Lumina PLLC, Los Angeles, CA,
argued for appellant. Also represented by DENISE MARIE
DE MORY, AARON HAND, Bunsow De Mory LLP, Redwood
City, CA; REBECCA EMILY WEIRES, Morrison & Foerster
LLP, Los Angeles, CA.

EDWARD R. REINES, Jones Day, Palo Alto, CA, argued
for appellee. Also represented by DEREK C. WALTER, San
Francisco, CA.

Before PROST, LINN, and REYNA, *Circuit Judges*.

Agilent Techs., Inc. v. Synthego Corp.,
139 F.4th 1319, 1327 (Fed. Cir. 2025)

United States Court of Appeals for the Federal Circuit

APPLE INC.,
Appellant

v.

COREPHOTONICS, LTD.,
Appellee

Apple Inc. v. Corephotonics, Ltd.,
861 F. App’x 443, 449-50 (Fed. Cir. 2021)

court litigation, and AIA trial proceedings. Thus, regard-
less of the forum, prior art patents and publications enjoy
a presumption of enablement, and **the patentee/applicant
has the burden to prove nonenablement for such prior art.**
It was error for the Board to suggest otherwise.

DEBRA JANECE MCCOMAS, Haynes & Boone, LLP, Dal-
las, TX, argued for appellant. Also represented by ANDREW
S. EHMKE; ANGELA OLIVER, Washington, DC; MICHAEL
SCOTT PARSONS, Plano, TX.

MARC AARON FENSTER, Russ August & Kabat, Los An-
geles, CA, argued for appellee. Also represented by BRIAN
DAVID LEDAHL, NEIL RUBIN.

Before TARANTO, HUGHES, and STOLL, *Circuit Judges*.

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Patent Owner Fails to Rebut the Enablement Presumption

PATENT OWNER’S RESPONSE

POR 38-39

without damage such that there is no visible residue. *See* EX2009, ¶107. Cable recognizes the unpredictable nature of its teachings, supported by multiple theories (*see, e.g.*, EX1006, [0088]) and that multiple theories may explain why its experiments failed. A POSITA would have recognized that it would have needed to construct a working example according to an identified solution and run experiments. *See* EX2009, ¶107. Notably, Cable’s own experiments show that none of his working examples were able to support object removal without damage such that no visible residue is left behind. *See id.*; EX1006, [0085]-[0088], Figs. 7-

In re Wands

“Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is undue, not experimentation.”

858 F.2d 731, 736-37 (Fed. Cir. 1988)

In re Geisler

“It is **not inventive** to discover the optimum or workable ranges by **routine experimentation.**”

116 F.3d 1465, 1470 (Fed. Cir. 1997)

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Patent Owner Fails to Rebut the Enablement Presumption

PATENT OWNER’S RESPONSE

POR 38-39

without damage such that there is no visible residue. *See* EX2009, ¶107. Cable recognizes the unpredictable nature of its teachings, supported by multiple theories (*see, e.g.*, EX1006, [0088]) and that multiple theories may explain why its experiments failed. A POSITA would have recognized that it would have needed to construct a working example according to an identified solution and run experiments. *See* EX2009, ¶107. Notably, Cable’s own experiments show that none of his working examples were able to support object removal without damage such that no visible residue is left behind. *See id.*; EX1006, [0085]-[0088], Figs. 7-

Apple Inc. v. Gesture Tech. Partners, LLC

“[I]n general, a prior art reference asserted under § 103 does not necessarily have to enable its own disclosure, i.e., be ‘self-enabling,’ to be relevant to the obviousness inquiry.”

129 F.4th 1367, 1379 (Fed. Cir. 2025)

Beckman Instruments, Inc. v. LKB Produkter AB

“Even if a reference discloses an inoperative device, it is prior art for all that it teaches.”

892 F.2d 1547, 1551 (Fed. Cir. 1989)

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Patent Owner Fails to Rebut the Enablement Presumption

41. I understand that to qualify as prior art, a reference must contain an

enabling disclosure that allows one of ordinary skill to practice the claims of the

Challenged Patent without undue experimentation. I understand

STRATASYS, INC.
Patent Owner.

PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 9,592,660

Case No. IPR2025-00257

Osswald Dec. (EX2009)

EX2009, ¶41

Osswald Tr. (EX1040)

2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 SHENZHEN TUOZHU TECHNOLOGY CO., LTD. § Petition for Inter Partes
4 Review of U.S. Patent No. § 9,592,660
5 Petitioner, §
6 VS. §
STRATASYS, INC., § Case No. IPR2025-00257

Q. Let me ask it another way. Is it your

understanding that Cable is disqualified and cannot be
used to determine whether the claims are obvious?

A. Yeah, Cable -- Cable does not -- so when I
read, I understand that to qualify as prior art, a
reference must contain an enabling disclosure that
allows one of ordinary skill to practice the claims of
the challenge patent without undue experimentation. And
Cable doesn't disclose -- contain an enabling
disclosure.

EX1040, 65:24-66:8

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Patent Owner Fails to Rebut the Enablement Presumption

PATENT OWNER’S RESPONSE

POR 38-39

without damage such that there is no visible residue. *See* EX2009, ¶107. Cable recognizes the unpredictable nature of its teachings, supported by multiple theories (*see, e.g.*, EX1006, [0088]) and that multiple theories may explain why its experiments failed. A POSITA would have recognized that it would have needed to construct a working example according to an identified solution and run experiments. *See* EX2009, ¶107. Notably, Cable’s own experiments show that none of his working examples were able to support object removal without damage such that no visible residue is left behind. *See id.*; EX1006, [0085]-[0088], Figs. 7-

United States Court of Appeals for the Federal Circuit

AGILENT TECHNOLOGIES, INC.,
Appellant

v.

SYNTHIGO CORP.,
Appellee

AFFIRMED

*Agilent Techs., Inc.
v. Synthego Corp.*,
139 F.4th 1319,
1327-29 (Fed. Cir.
2025)

30. The Board also found that “while it appears that Examples 4 and 5 in Pioneer Hi-Bred are prophetic, as opposed to working[] examples, that fact alone does not undermine the presumption that Pioneer Hi-Bred is enabled.” J.A. 31. And it also rejected Agilent’s argument that “the nascent state of the art demonstrates that undue experimentation would be required.” J.A. 32. It found that

MARK A. LEMLEY, Lex Lumina PLLC, Los Angeles, CA.

[W]hile the art was somewhat unpredictable in December 2014, it was far from a blank slate with a

EDWARD R. REINES, Jones Day, Palo Alto, CA, argued
Appellee’s Motion, supported by Denise G. Wallace, San

J.A. 32. Considering these findings, the Board concluded that “undue experimentation would not have been required

DEBORAH I. RUST, JAMES R. RUST, AND KATHA, CLEVELAND, OHIO.

26

FISH.

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Patent Owner Fails to Rebut the Enablement Presumption

PATENT OWNER’S RESPONSE

POR 38-39

without damage such that there is no visible residue. *See* EX2009, ¶107. Cable

recognizes the unpredictable nature of its teachings, supported by multiple theories

(*see, e.g.*, EX1006, [0088]) and that multiple theories may explain why its

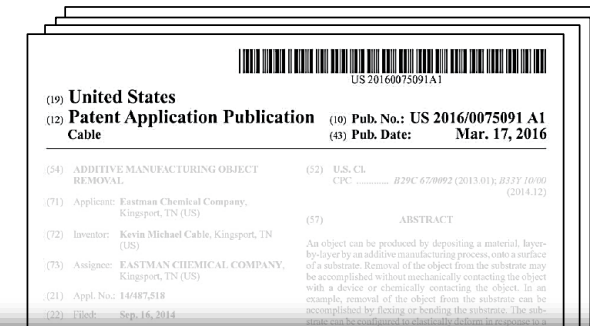
experiments failed. A POSITA would have recognized that it would have needed

to construct a working example according to an identified solution and run

experiments. *See* EX2009, ¶107. Notably, Cable’s own experiments show that

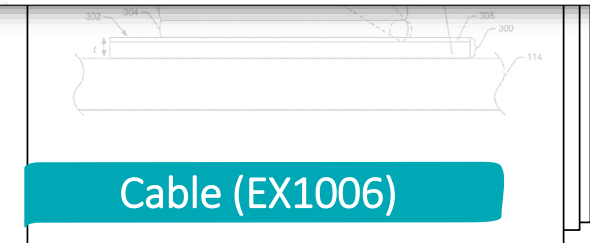
none of his working examples were able to support object removal without damage

such that no visible residue is left behind. *See id.*; EX1006, [0085]-[0088], Figs. 7-



EX1006 [0088]

Without being tied to any particular theory, the differences between the physical characteristics of the substrate and the material of the object in addition to the lack of heating of the 3D printer platform may have prevented sufficient bonding to take place between the substrate and the material of the object. Thus, the object was prevented from being completely formed.



Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

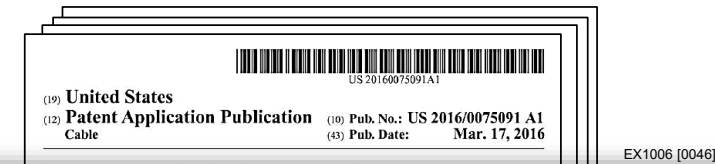
“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Patent Owner Fails to Rebut the Enablement Presumption

PATENT OWNER’S RESPONSE

POR 38-39

without damage such that there is no visible residue. *See* EX2009, ¶107. Cable recognizes the unpredictable nature of its teachings, supported by multiple theories (*see, e.g.*, EX1006, [0088]) and that multiple theories may explain why its experiments failed. A POSITA would have recognized that it would have needed to construct a working example according to an identified solution and run experiments. *See* EX2009, ¶107. Notably, Cable’s own experiments show that none of his working examples were able to support object removal without damage such that no visible residue is left behind. *See id.*; EX1006, [0085]-[0088], Figs. 7-



[0046] As will be described in more detail below with reference to the following figures, the material of the substrate 110 is generally immiscible with the build material used to form the object 104, yet a relationship between the material properties of the build material and the material of the substrate can be selected in order to promote optimal adhesion characteristics between the substrate 110 and the build material deposited thereon. The term “immiscible,” as used herein,

substrate 110. With optimal adhesion characteristics, the object 104 can delaminate from the substrate 110 without leaving a residue that is visible to the eye. In addition, the bottom of the object 104 can have a smooth finish that is aesthetically pleasing.

Cable (EX1006)

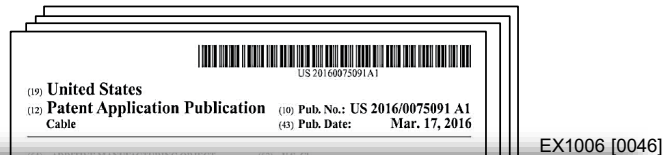
EX1006 [0067]

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Cable’s Teachings Provide Sufficient Direction and Guidance



[0046] As will be described in more detail below with reference to the following figures, the material of the substrate 110 is generally immiscible with the build material used to form the object 104, yet a relationship between the material properties of the build material and the material of the substrate can be selected in order to promote optimal adhesion characteristics between the substrate 110 and the build material deposited thereon. The term “immiscible,” as used herein,

substrate 110. With optimal adhesion characteristics, the object 104 can delaminate from the substrate 110 without leaving a residue that is visible to the eye. In addition, the bottom of the object 104 can have a smooth finish that is aesthetically pleasing.

Cable (EX1006)

EX1006 [0067]

Specific, Narrow Ranges of Known, Measurable Parameters Support Cable’s Routine Optimization

1. **Adhesion During Printing:** A percent difference of “within about 10%” between the “surface energy” of the substrate surface and the build material of the object, respectively;
2. **Release After Printing:** A percent difference of “at least about 5%” between the “Hildebrand solubility parameter” of the substrate surface and the build material of the object, respectively;

Reply at 8-9 (citing EX1006, [0063]-[0064])

FISH

Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

Cable’s Teachings Provide Sufficient Direction and Guidance

Q. And how would a person of skill in the art determine the surface energy of a polymer material?

A. They could measure it. There is a way to measure the -- the wetting parameter and measuring the -- the surface -- to measure the surface energy by using angles and the wetting of one material to the other one.

EX1040, 22:17-23

Q. BY MR. DARBY: How would you determine the Hildebrand solubility parameter of a polymer material?

A. There are different ways of -- of measuring it using solvents and other techniques. I mean, this -- there's a method that goes back to 1949, when Hildebrand published this paper. I have read about it. I have -- in my book, "Material Science of Polymers For Engineers," I have a whole section of solubility of polymers with a whole table of solubility of solvents and a whole table of solubility of polymers for people

EX1040, 24:16-25

Osswald Tr. (EX1040)

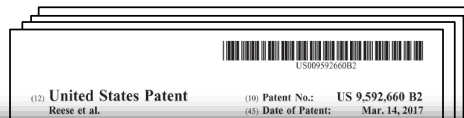
Grounds 1A–1B: Claim 1, Element [1.c.ii]

**Rebuttal
to:**

“Cable fails to provide an enabling disclosure to support removal without damage such that there is no residue that is visible to the eye.” POR at 38; see also Sur-Reply at 9-13.

The '660 Patent's Sparse Implementation Details Confirm the Skilled Artisan's Ability to Make and Use

32 F.3d 1559, 1568 (Fed. Cir. 1994)



EX1001, 2:59-62, 4:35-38

or without these specific details. In other instances well known methods, procedures and components have not been described in detail so as to not unnecessarily obscure aspects of the embodiments of the invention.

the plate 104. It may be obvious to a person skilled in the art that there exists a variety of coating methods and types of high temperature polymer coatings that can be used to create a coated layer 106 over the plate 104. Further, the thickness

In re Epstein

“[T]he Board’s observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board’s finding that one skilled in the art would have known how to implement the features of the references and would have concluded that the reference disclosures would have been enabling.”

FISH.

'660 Patent (EX1001)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

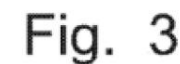
Grounds 1A–1B: Claim 1, Element [1.c.iii]

Cable's Teachings Render Obvious a Non-Tape
Polymer Coating

Pet. 8-10, 21-23, 25-26

	
US 2016/0075091 A1	
(19) United States	
(12) Patent Application Publication	(10) Pub. No.: US 2016/0075091 A1
Table	(43) Pub. Date: Mar. 17, 2016
(54) ADDITIVE MANUFACTURING OBJECT REMOVAL	(52) U.S. CL. CPC: B23C 6/0092 (2013.01), B23F 10/00

Technical drawing of a cable cross-section (EX1006). The drawing shows a central core (300) surrounded by a jacket (302). A dashed line (310) indicates a specific internal structure or measurement. Other labels include 304, 306, 308, and 114. A dimension line indicates a length of 1.5.



Grounds 1A–1B: Claim 1, Element [1.c.iii]

When Skilled Artisans Talked About Tape, They Used the Word “Tape,” Not “Coating”

EX1012, p.7



Tape

EX1018, p.1



Coating

37. The term “tape,” as understood by a POSITA in the 3D printing community (and even more colloquially), refers to a thin, flexible piece of material with a pre-applied adhesive that is sticky at room temperature to allow the tape to adhere to another surface; it often comes packaged in rolls. Adhesive sheets, painter’s tape, and DuPont™ Kapton® tape were common in the 3D printing community. See EX1011, p.10 (“These materials include Kapton or polyimide tape,

38. “Tapes” are distinct from “coatings,” which I will discuss in detail below in Section VI.B.3. Tapes are classified, marketed, and sold as “tape” or “adhesive sheets,” not as coatings. Again, tapes and adhesive sheets all share the common structure of a material sheet with pre-applied adhesive. A “coating” is a distinct designation that does not connote this material with pre-applied adhesive. It was understood by the 3D printing community, and by extension a POSITA, that a coating does not encompass tape, and vice versa.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Riley Reese et al.
U.S. Patent No.: 9,592,660 Attorney Docket No.: 56224-0006IP1
Issue Date: March 14, 2017
Appl. Serial No.: 14/574,237
Filing Date: December 17, 2014
Title: HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS

DECLARATION OF DR. MICHAEL HICKNER

Hickner Dec. (EX1003)

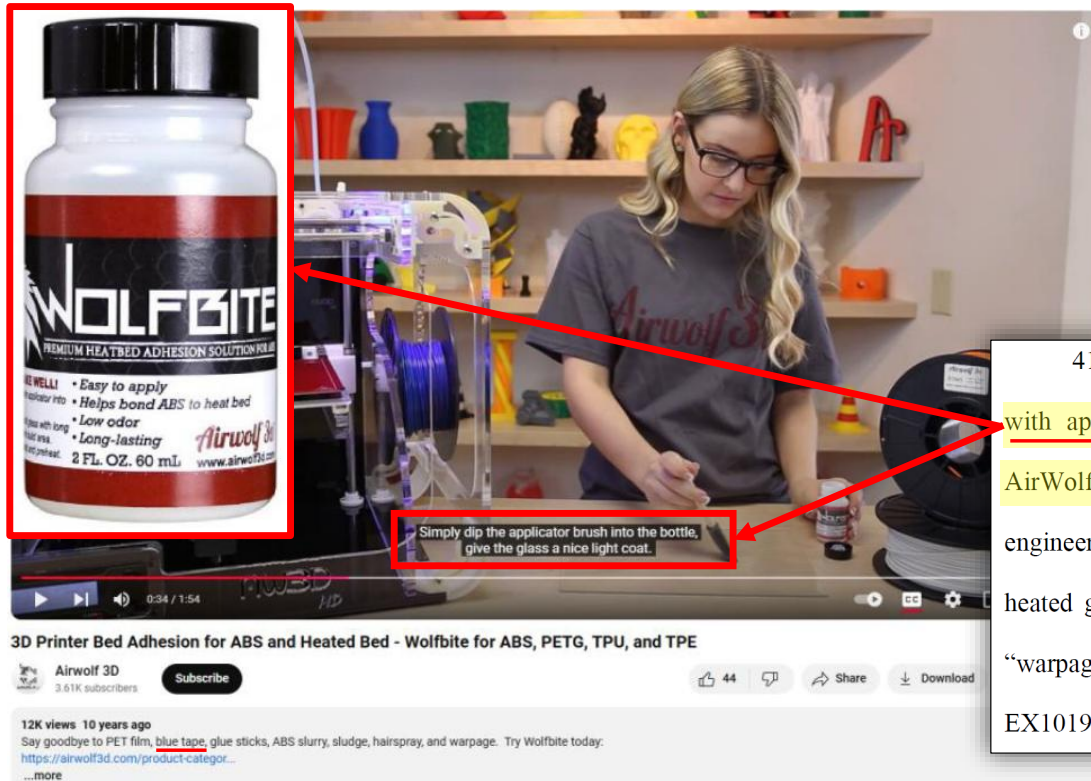
FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Skilled Artisans Knew the Difference Between “Coatings” and “Tapes”

EX1018 p.1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Riley Reese et al.
U.S. Patent No.: 9,592,660 Attorney Docket No.: 56224-0006IP1
Issue Date: March 14, 2017
Appl. Serial No.: 14/574,237
Filing Date: December 17, 2014
Title: HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS

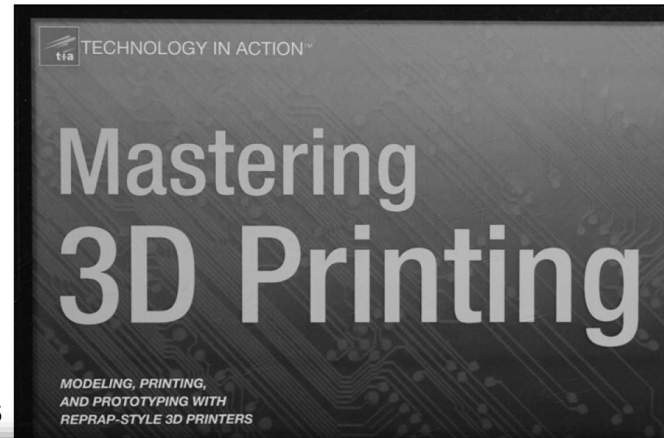
DECLARATION OF DR. MICHAEL HICKNER

Hickner Dec. (EX1003)

41. By 2014, the desire for polymer coatings as a cure to user frustration with applying tapes led to commercial products like Wolfbite, marketed by AirWolf3D. Wolfbite, a commercially available polymer coating, was “specially engineered to bond Acrylonitrile Butadiene Styrene (ABS) plastic parts directly to a heated glass 3D printing surface without lifting—also known in the industry as “warpage,”—and to enable smooth release of objects after printing.” EX1018, p.2; EX1019, p.2 (“Proprietary aqueous solution of selected polymers.”).

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Skilled Artisans Knew the Difference Between “Coatings” and “Tapes”



EX1045, pp. 1, 5

Beyond heating, the surface of the platform needs to be a material that is compatible with the print material. At the moment figuring out what sticks to what is fairly empirical. Blue painter's tape (3M seems to work best) and high-temperature Kapton tape (transparent gold-colored tape) are common printer bed materials. Glass, often with glue or some other adhesive coating, is becoming a more popular printing surface. Follow your manufacturer's directions, but generally the following rules of thumb hold:

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Coatings, Unlike Tapes, Are Typically Applied to Substrates as Liquids, Gels, or Slurries

Materials Processing

A Unified Approach to Processing of Metals,
Ceramics and Polymers

Lorraine F. Francis
University of Minnesota

With contributions from

Bethanie J. H. Stadler
University of Minnesota

Christine C. Roberts
Sandia National Labs



AMSTERDAM • BOSTON • NEW YORK • OXFORD • SAN FRANCISCO • SINGAPORE
Academic Press is an imprint of Elsevier

6.4 COATING AND TAPE CASTING

6.4.1 Process Overview

Thin, flat sheets of polymer, ceramic, or metal particles are produced from coating dispersions, solutions, and liquid monomers. Tape casting is a special type of coating process in which a dispersion containing ceramic particles with polymer binder is coated onto a substrate. In all cases, a liquid dispersion is deposited, spread onto a substrate, and subsequently solidified. In

EX1020 p.62

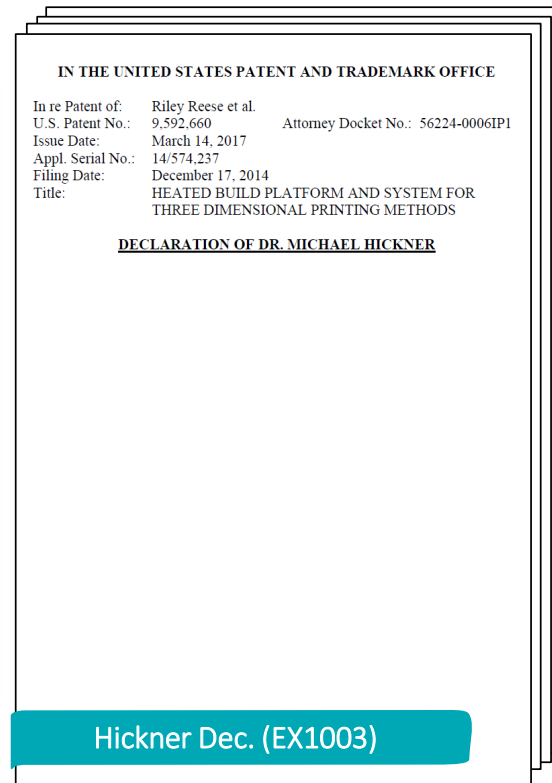
FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Coatings, Unlike Tapes, Are Typically Applied to Substrates as Liquids, Gels, or Slurries

44. Finally, as I discussed above, by “coating,” a POSITA means something other than tape. “Coating” is a distinct designation that does not connote the common rolls of tape or adhesive sheets that are widely available. Coatings are traditionally sprayed or painted on as a liquid, slurry, or gel, while tape is prepared with adhesive physically applied by the user in strips and sheets to the build plate. It is understood by the engineering community, and by extension a POSITA, that coating thus does not connote tape or adhesive sheets.



Grounds 1A–1B: Claim 1, Element [1.c.iii]

Liquid Polymer Coatings Were Common in Manufacturing Production Processes

EX1020 p.65

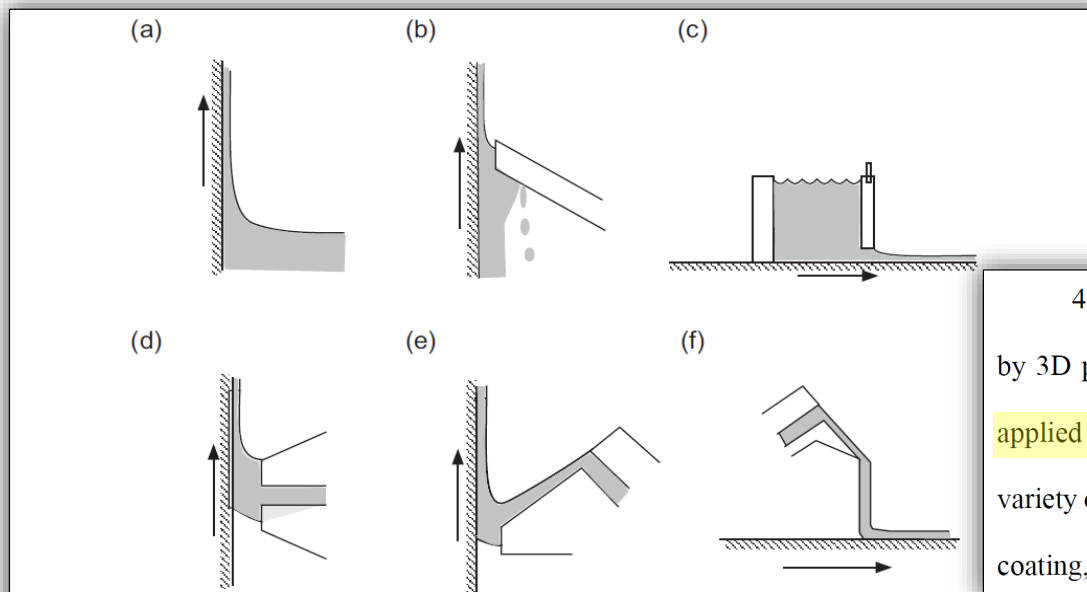


FIGURE 6.27 Different methods for applying liquid coatings onto moving substrates: (a) dip coating, (b) knife coating, (c) adjustable gap blade coating (doctor blade coating), (d) slot coating, (e) slide coating, and (f) curtain coating. In (a) and (b) the liquid is pulled from a vat or container; in (c) a liquid reservoir is kept full during coating and in (d)–(f) the liquid is pumped into the coating die. *Courtesy of M.S. Carvalho, Pontifical Catholic University of Rio de Janeiro.*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of:	Riley Reese et al.	Attorney Docket No.:	56224-0006IP1
U.S. Patent No.:	9,592,660	Issue Date:	March 14, 2017
Appl. Serial No.:	14/574,237	Filing Date:	December 17, 2014
Title:	HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS		

DECLARATION OF DR. MICHAEL HICKNER

42. Although polymer coatings were commonly applied on an ad hoc basis by 3D printing users, it was well known by 2014 that polymer coatings could be applied to substrate surfaces as part of a manufacturing production process in a variety of different manners, including dip coating, spray coating, spin coating, knife coating, slot coating, powder coating, etc. See EX1020, p.64 (“Several coating

Hickner Dec. (EX1003)

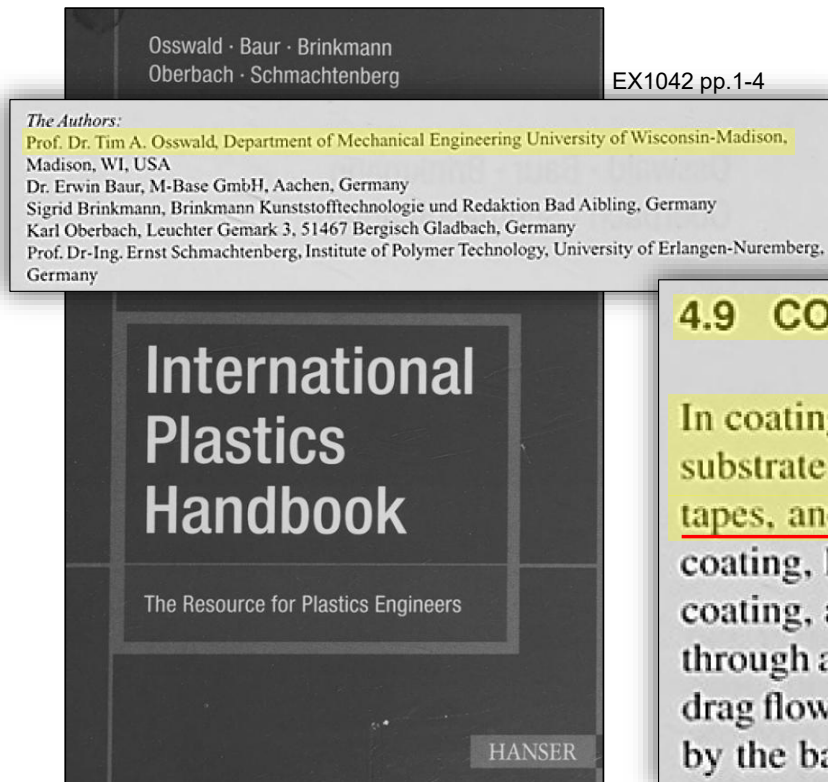
Grounds 1A–1B: Claim 1, Element [1.c.iii]

**Rebuttal
to:**

“[A] POSITA would have understood that a coating can commonly refer to a tape that is used in the process of making a coated surface.” POR at 41; see also Sur-Reply at 13.

Dr. Osswald’s Handbook Undercuts His Testimony

Although “[c]oating is done on...adhesive tape[],” the tape itself is not a coating



4.9 COATING

In coating a liquid film is continuously deposited on a moving, flexible or rigid substrate. Coating is done on metal, paper, photographic films, audio and video tapes, and adhesive tapes. Typical coating processes include wire coating, dip coating, knife coating, roll coating, slide coating, and curtain coating. In wire coating, a wire is continuously coated with a polymer melt by pulling the wire through an extrusion die. The polymer resin is deposited onto the wire using the drag flow generated by the moving wire and sometimes a pressure flow generated by the back pressure of the extruder. The process is schematically depicted in

Grounds 1A–1B: Claim 1, Element [1.c.iii]

**Rebuttal
to:**

“[A] POSITA would have understood that a coating can commonly refer to a tape that is used in the process of making a coated surface.” POR at 41; see also Sur-Reply at 13.

Patent Owner’s Prior Patent Filings Distinguish Coatings From Tapes

(12) United States Patent Comb	(10) Patent No.: US 9,744,730 B2 (45) Date of Patent: Aug. 29, 2017
(54) MAGNETIC PLATEN ASSEMBLY FOR ADDITIVE MANUFACTURING SYSTEM	5,152,012 A * 10/09/2007 Chou 0007,700(1)
(71) Applicant: Stratasys, Inc., Eden Prairie, MN (US)	5,152,111 A 5/10/04 Hachikawa et al.
(72) Inventor: James W. Comb, Hamel, MN (US)	5,148,413 A 5/10/04 Chung
(73) Assignee: Stratasys, Inc., Eden Prairie, MN (US)	5,152,128 A 5/10/04 Chung et al.
	5,178,817 A 5/10/04 Dierker et al.
	5,154,411 A 5/10/04 Hachikawa 0205,413(1)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(a) by 774 days.	5,166,078 A 5/10/04 Hachikawa et al.
(21) Appl. No. 14/987,098	5,166,217 A 5/10/04 Dierker et al.
(22) Filed: Nov. 22, 2013	5,166,008 A 5/10/04 Chung et al.
(65) Prior Publication Data	5,168,714 A 5/10/04 Hachikawa et al.
	5,164,118 A 5/10/04 Hachikawa et al.
	5,152,217 A 5/10/04 Chung et al.
	5,154,071 A 5/10/04 Chung et al.
	5,157,105 A 5/10/04 Hachikawa et al.
	5,178,217 A 5/10/04 Chung et al.
	5,155,075 A 5/10/04 Chung et al.
	5,154,411 A 5/10/04 Hachikawa 0205,413(1)

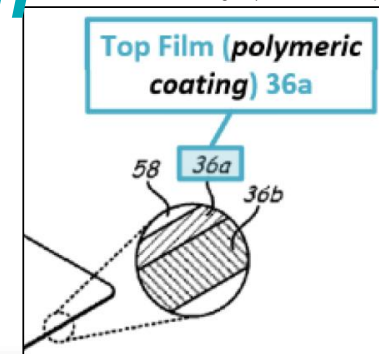
- (54) **MAGNETIC PLATEN ASSEMBLY FOR
ADDITIVE MANUFACTURING SYSTEM**
- (71) Applicant: **Stratasys, Inc., Eden Prairie, MN (US)**
- (72) Inventor: **James W. Comb, Hamel, MN (US)**
- (73) Assignee: **Stratasys, Inc., Eden Prairie, MN (US)**

Comb (EX1004)

**“Coatings” and “Tapes”
Referenced Separately**

Top film 36a may be derived from one or more polymeric coatings, tapes, or other lamina, which may be adhered to base sheet 36b. For example, a polycarbonate top film 36a may be adhered with a high-temperature adhesive to a steel base sheet 36b, which is advantageous for use with ABS and polycarbonate part materials due to their similar glass transition temperatures.

EX1004, Fig. 5 (annotated excerpt)



EX1004, 8:27-33

41

Grounds 1A–1B: Claim 1, Element [1.c.iii]

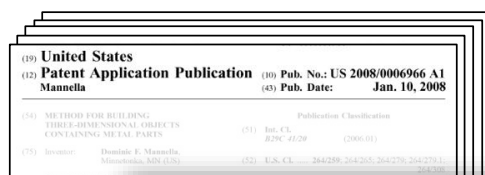
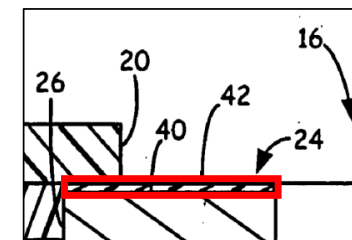
**Rebuttal
to:**

“[A] POSITA would have understood that a coating can commonly refer to a tape that is used in the process of making a coated surface.” POR at 41; see also Sur-Reply at 13.

Patent Owner’s Prior Patent Filings Distinguish Coatings From Tapes

**Identifying Various Coating Techniques
With No Mention of Tape**

EX1043, Fig. 2 (annotated excerpt)



(54) **METHOD FOR BUILDING
THREE-DIMENSIONAL OBJECTS
CONTAINING METAL PARTS**

(75) Inventor: **Dominic F. Mannella,**
Minnetonka, MN (US)

Correspondence Address:
KINNEY & LANGE, P.A.
THE KINNEY & LANGE BUILDING, 312
SOUTH THIRD STREET
MINNEAPOLIS, MN 55415-1002

(73) Assignee: **Stratasys, Inc., Eden Prairie, MN**
(US)

[0043] Top surface **24** (i.e., a polymer-coated surface) may be formed by coating the adhesion-promoting polymeric material onto metal surface 40, and drying the adhesion-promoting polymeric material to form polymer film **42**. The adhesion-promoting polymeric material may be coated onto metal surface **40** in a variety of manners, such as with spray coating, knife coating, extrusion coating, and combinations thereof.

EX1043

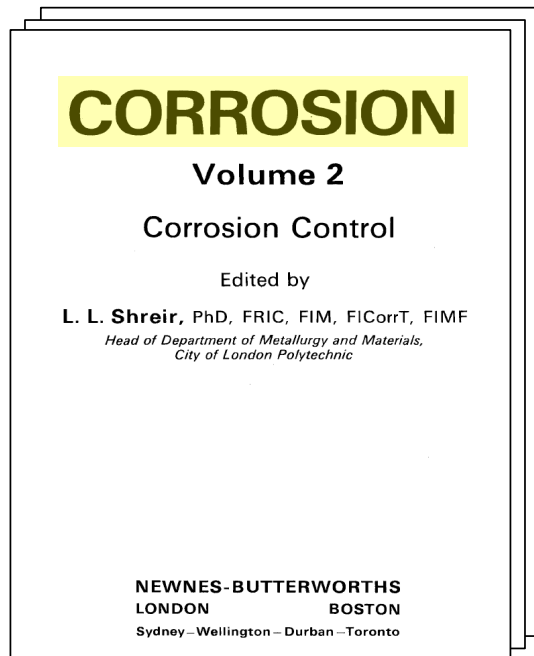
FISH.

Grounds 1A–1B: Claim 1, Element [1.c.iii]

**Rebuttal
to:**

“[A] POSITA would have understood that a coating can commonly refer to a tape that is used in the process of making a coated surface.” POR at 41; see also Sur-Reply at 13.

Patent Owner’s Old Underground Pipe Coating Reference Is Irrelevant



EX2017 pp.1-2

First published by George Newnes Ltd., 1963

Second impression 1965

Second edition published 1976 by Newnes-Butterworths

© The several contributors listed on pages xiii–xvi of Volume 1

Properties Required of Buried Coatings

The aim in applying a coating to a buried metal such as a pipeline is to prevent electrical contact with an electrolyte such as soil and/or water. The characteristics required are as follows:

EX2017 p.14

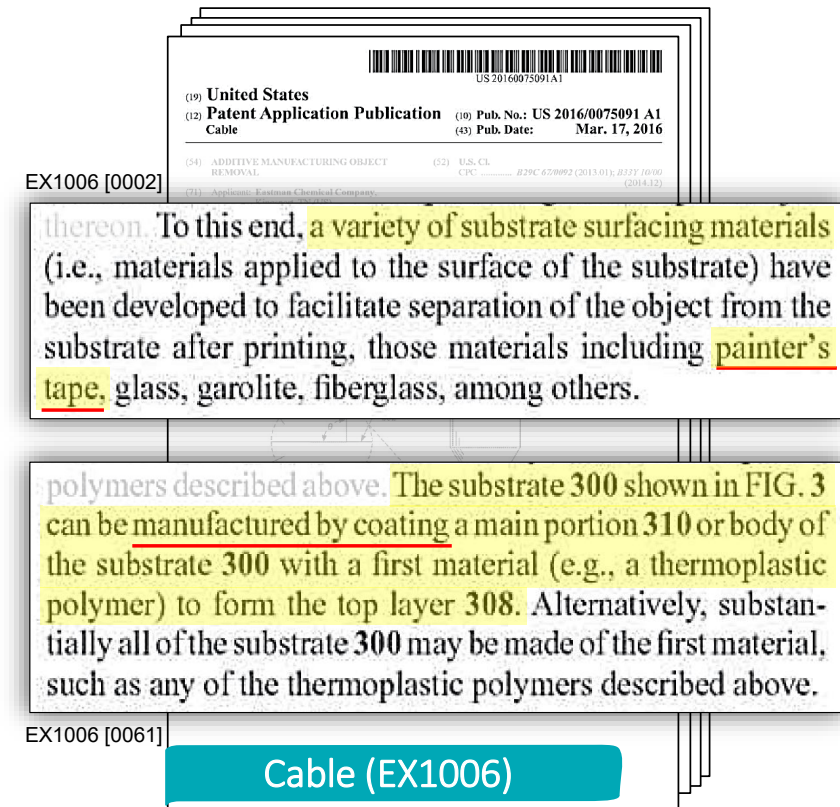
Grounds 1A–1B: Claim 1, Element [1.c.iii]

Cable Distinguishes a “Coating” Applied During Manufacturing From “Painter’s Tape”

PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT NO. 9,592,660 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

EX1003, ¶¶93–95, ¶¶37–39, ¶44. Simply put, when skilled artisans talked about tape, they used the word “tape,” not “coating.” *Id.* Cable never mentions tapes while discussing his embodiments and expressly distinguishes his embodiments from other known solutions like “painter’s tape.” EX1006, [0002].

Pet. 25-26



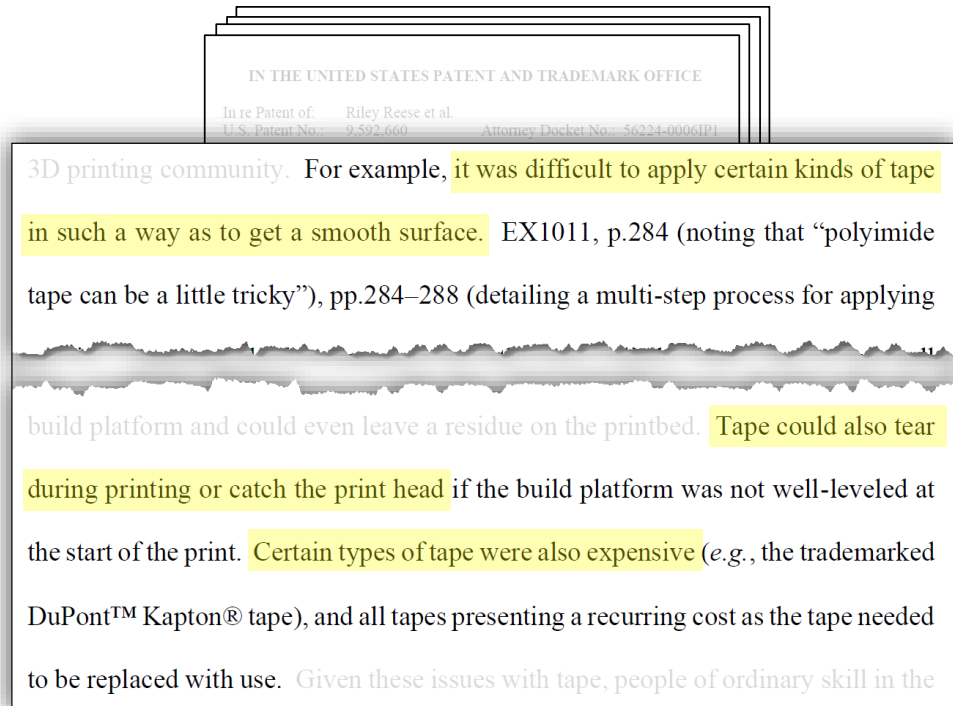
Grounds 1A–1B: Claim 1, Element [1.c.iii]

Alternatively, It Would Have Been Obvious to Apply Cable's Polymer Coating Without Using Tape

**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 9,592,660 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

Pet. 26

As an additional basis for addressing Element [1.c.iii], it would have been obvious to pursue a non-tape solution for implementing Cable's polymer coating. First, as the '660 patent concedes, the difficulties/drawbacks of polymer tapes like Kapton tape were well documented, which would have prompted a POSITA to choose any one of the "variety" of admittedly known alternatives. EX1001, 1:31–64, 4:35–38; EX1003, ¶¶96, ¶¶40–43 (discussing known coating techniques).

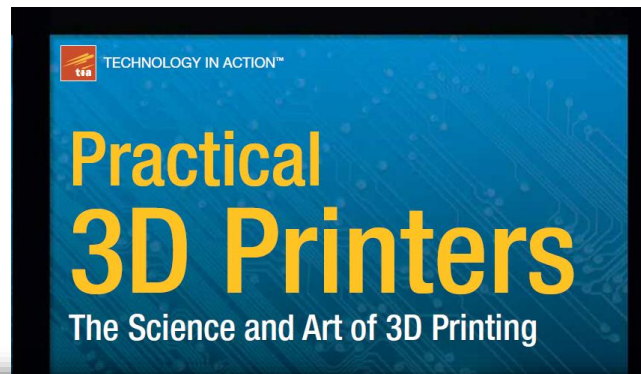


EX1003 ¶39

Hickner Dec. (EX1003)

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Difficulties Associated With Tape Motivated Skilled Artisans to Explore Non-Tape Solutions



Printbed Surfacing

If you are printing straight onto a bare glass or aluminum print surface, then all you need to do is properly clean the surface with acetone every day or so to continue printing. Most people use a print surface such as blue painter's tape or polyimide tape (Kapton) to print with a wider variety of materials. If this is the case, then about every week or two, or if the first layer of your prints stops sticking, it's a good time to change the tape on your printbed. This is fairly easy to do with blue painter's tape, but polyimide tape can be a little tricky. Rather than avoid using polyimide, I have a nifty way to easily replace the tape on your print surface using a technique very similar to applying tinting film on windows.

It might take a little practice to get this down, but a clean and smooth print surface that gives you great prints is always worth a little extra work.

*Multi-Step Process
to Apply "Tricky"
Polyimide Tape* →



Figure A-8. Cleaning new tape with acetone



Figure A-5. Applying polyimide tape to soapy surface



Figure A-7. Trimming polyimide tape with a hobby knife



Figure A-3. Cleaning the printed surface



Figure A-6. Removing soap and water from underneath the tape



Figure A-4. Wetting the surface with soapy water

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Non-Tape Coatings Were Well-Known Alternatives to Tape Coverings

On top of whatever sheet material you may choose to use, you can use different toppings as well. But for many plastics, you don't have to. Many users print directly onto clean, and this is important, absolutely clean glass, many plastics will directly stick to that. Then there's Kapton and PET tape, which are nice for ABS and other higher-temp materials. And there is the glue section of glue stick, diluted PVA glue and hairspray, each of those having their own unique properties, and, as always what might work for everybody else might just not work for you. So there's definitely some trial and error involved, but there's always some way that works out. Most of the surface choices lose their stickiness when they cool down, so prints are going to be much easier to remove or pop right off if you wait for the bed to cool down after a print has finished.

EX1012, p.6

Manufacturers and users of FDM style 3-D printers often require or recommend covering the print bed surface with heat resistant polyimide film or paper masking tape (typically used by painters), and/or pre-treating the surface with hairspray, special water-soluble glue or other liquid treatment solutions. These applications are intended to hold the 3-D printed object to the surface while it is printing and to preserve the longevity of the original print bed. These print bed covering materials are intended to provide a removable and replaceable surface on which to print, and in some cases take the wear and tear that would otherwise be inflicted upon the print bed.

EX1032, 1:50-61



EX1018, p.1



40. Polymer coatings were well known for promoting the adhesion of printed objects to the printbed during the additive manufacturing process of a 3D printer. Notably, polymers are virtually the only material known to promote such adhesion, whereas materials such as ceramics and metal generally do not have the same effect. In many instances, coatings used commonly by 3D printing users were hairspray (copolymers of polyvinylpyrrolidone (PVP) and polyvinyl acetate (PVAc)), glue sticks (polyvinyl acetate), or a custom mixture of a polymer and solvent (e.g. ABS solution or slurry).

EX1003 ¶40

Hickner Dec. (EX1003)

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Non-Tape Coatings Were Well-Known Alternatives to Tape Coverings

Why Wolfbite?

No More 3D Printed Part Warping

Wolfbite is a new premium solution specially engineered to bond Acrylonitrile Butadiene Styrene (ABS) plastic parts directly to a heated glass 3D printing surface without lifting—also known in the industry as “warping,”—and to enable smooth release of objects after printing. This unique solution was co-developed with Professor Miodrag “Mickey” Micic, Sc.D., Ph.D., M.T.M (https://web.archive.org/web/20141206025011/http://scholar.google.com/citations?user=Ij_TB0AAAAJ&hl=en&oi=ao), who is a department chair and professor at Cerritos College and is a well known surface and polymer chemist. ABS is a preferred material for 3D printing because of its durable nature and options for post processing. However, ABS must be printed on a prepared surface for correct adhesion. A common surface treatment includes applying polyethylene terephthalate (PET) film or Kapton tape to a glass plate and treating the surface with a slurry of dissolved ABS and acetone. After several uses, the film may become damaged, which results in the parts becoming difficult to remove, or lifting off the film.

Wolfbite Stops 3D Printed Parts From Warping

Wolfbite is applied with an applicator brush straight onto the glass, eliminating the need for PET film or Kapton tape. One light coat of Wolfbite can be used for several prints. After applying Wolfbite, the glass is heated and ABS parts stick firmly to the glass without warpage. Airwolf 3D specially formulated the proprietary solution to not only promote excellent adhesion but also to make part removal easy. Once the 3D printed parts have cooled, they will dismount from the printing surface with minimal effort, leaving a clean and smooth bottom surface. Wolfbite is packaged in a two fluid ounce container and comes with a foam brush applicator. It is currently available for presale at an introductory price of \$19.99.

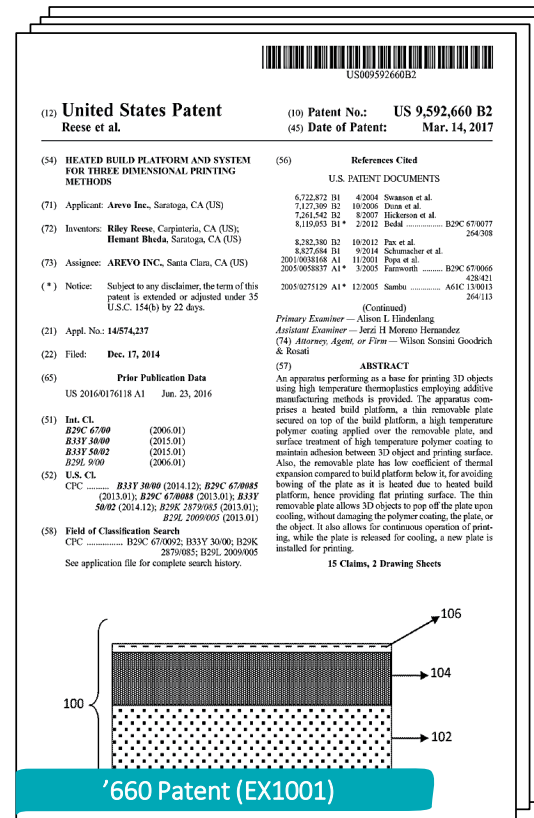
FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

EX1018, pp. 1-3

Grounds 1A–1B: Claim 1, Element [1.c.iii]

The '660 Patent Concedes That Problems With Tape Coverings Were Known and That Coatings Were “Obvious”



'660 Patent (EX1001)

Polyimide tape has been applied to heated build plates for its tactility and performance under high temperatures. Applying polyimide tape is a difficult process inevitably allowing for tiny debris or air to be trapped between the tape and metal surface. Once the metal surface is heated, the air gaps expand creating an uneven printing surface. Further, the adhesive for the polyimide tape can burn off under high temperatures releasing fumes and damaging the coating.

Even if a part is built on an area of polyimide tape without debris or air bubbles, the tape can be easily damaged upon removal of the part. At elevated temperatures, the bottom layer of tape can permanently adhere to the 3D part causing the tape to tear or bubbles to form between the tape and build plate. Even when the part has been fully cooled, the polyimide tape can still adhere to the bottom layer resulting in damage or tearing of the tape upon part removal.

EX1001, 1:31-64

the plate 104. It may be obvious to a person skilled in the art that there exists a variety of coating methods and types of high temperature polymer coatings that can be used to create a coated layer 106 over the plate 104. Further, the thickness

EX1001, 4:35-38

Grounds 1A–1B: Claim 1, Element [1.c.iii]

Using a Non-Tape Coating Was a Known and Predictable Alternative to Tape Coverings

United States Court of Appeals
for the Federal Circuit

INTEL CORPORATION,
Appellant

v.

PACT XPP SCHWEIZ AG,
Appellee

It's enough for Intel to show that there was a known problem of cache coherency in the art, that Bauman's secondary cache helped address that issue, and that combining the teachings of Kabemoto and Bauman wasn't beyond the skill of an ordinary artisan. Nothing more is required to show a motivation to combine under *KSR*, so we reverse the Board's finding to the contrary.

geles, CA; MARK YEH-KAI TUNG, Redwood Shores, CA.
Before NEWMAN, PROST, and HUGHES, Circuit Judges.

Intel Corp. v. PACT XPP Schweiz AG,
61 F.4th 1373, 1381 (Fed. Cir. 2023)

United States Court of Appeals
for the Federal Circuit

UBER TECHNOLOGIES, INC.,
Appellant

v.

X ONE, INC.,
Appellee

Uber Techs., Inc. v. X One, Inc.,
957 F.3d 1334, 1340 (Fed. Cir. 2020)

A person of ordinary skill would therefore have two predictable choices for when to perform plotting, providing them with a simple design choice as to whether to plot server-side or terminal-side. *Id.* Because a person of ordinary skill “has good reasons to pursue the known options within his or her technical grasp,” § 103 bars the patentability of such obvious variations. *KSR*, 550 U.S. at 417, 421; *see also*

gued for appellee. Also represented by JEFFREY CURTISS
TOTTEN; KEVIN D. RODREY, Atlanta, GA; JACOB ADAM
SCHROEDER, Palo Alto, CA.

Grounds 2A–2B: Claim 1, Element [1.c.iii]

Comb Alone or With Tummala Provides a
Non-Tape Polymer Coating

Grounds 2A–2B: Claim 1, Element [1.c.iii]

Reply 22

Comb Alone Renders the “Polymer Coating” Obvious

PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 9,592,660 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

**Comb mapping is substantively un rebutted
on all elements except “not a polymer tape”**

[1.c]	a polymer coating attached to a surface of the thermally conductive plate
[1.c.i]	[a polymer coating...] which is capable of (i) facilitating adhesion to the 3D object during printing and
[1.c.ii]	[a polymer coating...which is capable of...] (ii) permitting removal of the 3D object once the 3D object has been formed and cooled without chemically or mechanically removing the polymer coating from 3D object and without damaging the polymer coating, the thermally conductive plate, or the 3D object,
[1.c.iii]	wherein the polymer coating is not a polymer tape.

build sheet 36 includes “a top film 36a.” EX1004, 8:17–26. According to Comb, the top film 36a “may be derived from one or more *polymeric coatings*, tapes, or

Pet. 60

The Combination renders obvious Element [1.c.i]. EX1003, ¶191. Per Comb,

its polymer *coating is capable of facilitating* “good *adhesion to the part*...used in

Pet. 61

Element [1.c.ii]. As detailed below, Comb teaches a removal process that tracks both the ’660 patent’s embodiment and Patent Owner’s infringement allegations.

Pet. 62-64

coating...). That Comb identifies *polymeric coatings* in a disjunctive list of alternatives including “tapes” makes clear to the POSITA coatings and tapes are distinct alternatives—i.e., *the polymer coating is not a polymer tape* (and vice

Pet. 68-69

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.iii]

Pet. 46-47, 60-61, 68-69

A Skilled Artisan Would Have Understood That Comb's "Coating" Disclosure Teaches a Non-Tape Polymer

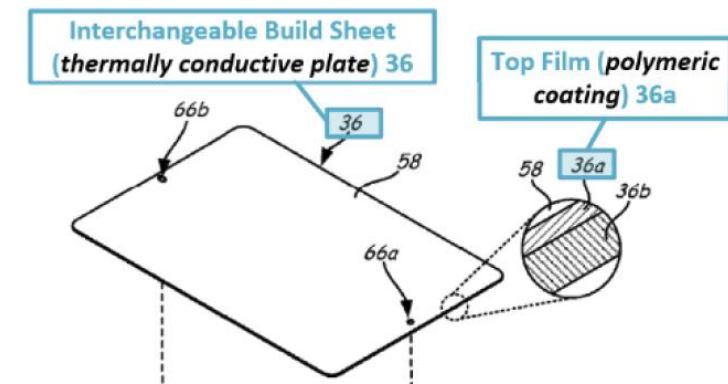
(12) United States Patent Comb	(10) Patent No.: US 9,744,730 B2 (45) Date of Patent: Aug. 29, 2017
(54) MAGNETIC PLATES ASSEMBLY FOR ADDITIVE MANUFACTURING SYSTEM	5,210,012 A * 10/1991 Chida 395/93
(71) Applicant: Stratasys, Inc., Eden Prairie, MN (US)	5,905,141 A 4/1994 Handchler et al.
(72) Inventor: James W. Comb, Hamel, MN (US)	5,312,224 A 5/1994 Handchler et al.
(73) Assignee: Stratasys, Inc., Eden Prairie, MN (US)	5,364,431 A 9/1994 Chung
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. (154(b)) by 774 days.	5,905,785 A 4/1996 Chung et al.
(21) Appl. No. 14/087,596	5,384,817 A 4/1996 Doolittle et al.
	5,944,221 A * 6/1999 Handchler 329C/41/35 156/244/12
	5,980,078 A 5/1999 Handchler et al.
	5,998,227 A 5/1999 Doolittle et al.
	5,979,009 A 6/1999 Comb et al.
	5,984,641 A 10/1999 Handchler et al.
	5,984,124 A 12/1999 Stevenson et al.
	5,922,227 A 2/2000 Doolittle et al.
	5,999,227 A 4/2000 Comb et al.
	5,999,227 A 4/2000 Doolittle et al.

Comb References "Coatings" and "Tapes" Separately Within a Disjunctive List

Top film 36a may be derived from one or more polymeric coatings, tapes, or other lamina, which may be adhered to base sheet 36b. For example, a polycarbonate top film 36a may be adhered with a high-temperature adhesive to a steel base sheet 36b, which is advantageous for use with ABS and polycarbonate part materials due to their similar glass transition temperatures.

Comb (EX1004)

EX1004, 8:27-33



Schumer v. Lab. Comput. Sys.

"We have consistently interpreted the word 'or' to mean that the items in the sequence are alternatives to each other."

308 F.3d 1304, 1311 (Fed. Cir. 2002)

FISH.

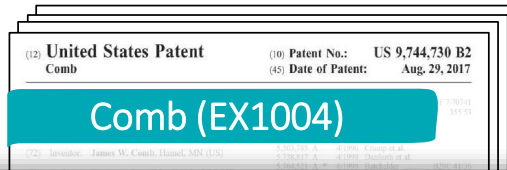
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.iii]

Pet. 46-47, 60-61, 68-69
Reply 21

**Rebuttal
to:**

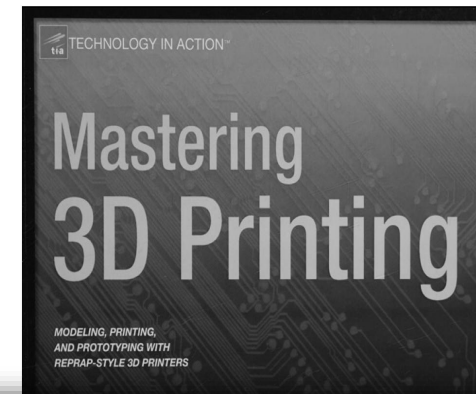
“The only teaching in Comb of a coating for higher-temperature part materials, which would be used with a heated build platform, is polyimide tape.” POR at 63; see also Sur-Reply at 19-20.



Patent Owner Is Wrong: Comb's Disclosure Isn't Limited to Polyimide Tape for Heated Build Platforms

Accordingly, build sheets 36 may be individually customized for use with particular part and support materials to improve adhesion and/or peeling characteristics. For example, a first build sheet 36 may have a polycarbonate-coating top film 36a for use with ABS and polycarbonate part materials, and a second build sheet 36 may have a polyimide-tape top film 36a for use with polyetherimide part materials.

**Polycarbonate
“coating” for printing
polycarbonate and ABS
parts on a heated bed**



For many materials (like ABS and polycarbonate), the platform has to be kept warm so that the print sticks to it. Some 3D printers have heated platforms; ones that do not probably cannot print in these materials. Materials that need a heated bed will warp while printing if the bed is not adequately heated. As the lower layers cool, they will shrink and pull up from the bed at the corners. The hot layers on top will be a bit bigger, and as they cool the part will warp more and more as the upper layers also contract.

EX1004, 13:36-43

EX1045, pp. 1, 5



54

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.iii]

Pet. 48-53, 68-69

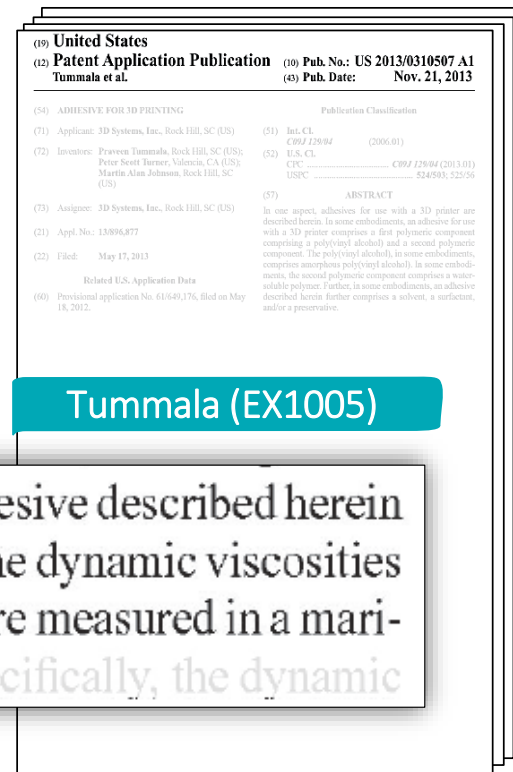
Alternatively, a POSITA Would Have Been Motivated to Apply Comb's Polymer as a Non-Tape Gel, as Tummala Teaches

PETITION FOR INTER PARTES REVIEW OF UNITED STATES PATENT NO. 9,592,660 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

EX1001, 4:35-38. Recognizing that many of the materials identified by Comb are the same materials identified by Tummala or have similar properties as Tummala's materials, and that Tummala advocates applying the material as a gel, a POSITA would have alternatively also found it obvious to apply Comb's polymer as a gel. Compare, e.g., EX1004, 8:26 (polyimide, polylactic acid) and EX1005, [0028], [0031], [0034] (polyimide, polylactic acid).

Pet. 48

[0053] In some embodiments, an adhesive described herein is a viscous gel at room temperature. The dynamic viscosities of some adhesives described herein were measured in a manner consistent with ASTM D2983. Specifically, the dynamic



Tummala (EX1005)

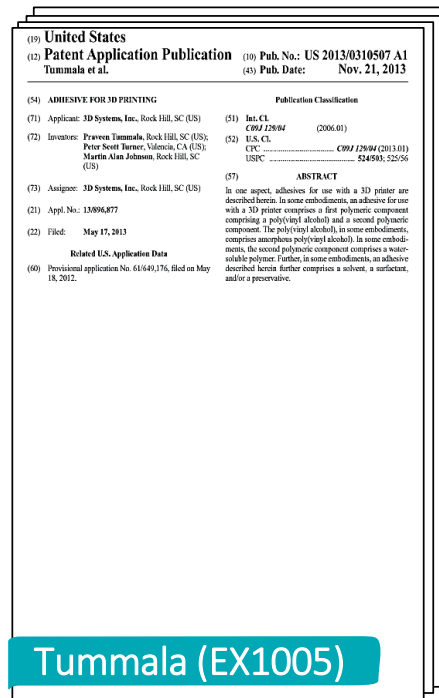
Grounds 2A–2B: Claim 1, Element [1.c.iii]

Reply 21-22

Rebuttal
to:

“Comb’s polymer would not be applied as a gel because a POSITA would have recognized that making a gel at room temperature out of polyimide (Comb’s polymer) would be difficult and impractical.” POR at 63 (citing EX2009 at ¶170); see also Sur-Reply at 20-21.

Dr. Osswald’s Conclusory Testimony Does Not Override Tummala’s Express Teachings



[0053] In some embodiments, an adhesive described herein is a viscous gel at room temperature. The dynamic viscosities of some adhesives described herein were measured in a manner consistent with ASTM D2983.

Tummala teaches a
“polyimide” coating
applied as a “viscous gel”

[0034] Further, in some embodiments, an adhesive described herein comprises only one polymeric component. Such a single polymeric component, in some embodiments, can comprise, consist, or consist essentially of any of the polymeric species described herein for a first or second polymeric component of an adhesive. For example, in some embodiments, a single polymeric component comprises, consists, or consists essentially of a methyl vinyl ether/maleic polyhydroxybutyrate co-hydroxyalkanoate, polyimide, polyesteramide, an aliphatic copolyester, aromatic copolyester, or PVOH.

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.iii]

Pet. 53
Reply 21-22

Rebuttal
to:

“Comb’s polymer would not be applied as a gel because a POSITA would have recognized that making a gel at room temperature out of polyimide (Comb’s polymer) would be difficult and impractical.” POR at 63 (citing EX2009 at ¶170); see also Sur-Reply at 20-21.

Polymer Gel Coatings Were Known, Including for 3D Printer Build Plates

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Riley Reese et al.
U.S. Patent No.: 9,592,660 Attorney Docket No.: 56224-0006IP1
Issue Date: March 14, 2017
Appl. Serial No.: 14/574,237
Filing Date: December 17, 2014
Title: HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS

DECLARATION OF DR. MICHAEL HICKNER

the common rolls of tape or adhesive sheets that are widely available. Coatings are traditionally sprayed or painted on as a liquid, slurry, or gel, while tape is prepared with adhesive physically applied by the user in strips and sheets to the build plate.

Hickner Dec. (EX1003)

EX1003 ¶44; see also *id.*
¶175 (citing EX1018 p.2;
EX1019; p.2)

SECTION 9, PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Translucent to pink gel.

EX1019 p.4



EX1018 p.2

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.ii]

Comb Alone or With Tummala Renders Obvious
Object Removal Without Damage and Without
Chemically or Mechanically Removing the Coating

Grounds 2A–2B: Claim 1, Element [1.c.ii]

Pet. 62-68

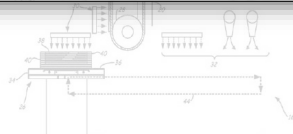
Comb's Part Removal Teachings Parallel the '660 Patent's Preferred Embodiment

(12) United States Patent Comb	(10) Patent No.: (45) Date of Patent:	US 9,744,730 B2 Aug. 29, 2017
(54) MAGNETIC PLATEN ASSEMBLY FOR ADDITIVE MANUFACTURING SYSTEM	5,253,012 A *	10/089 Ciba Q107 7/97(4) 395/51
(71) Applicant: Stratasys, Inc., Eden Prairie, MN (US)	5,305,141 A	4/1994 Biedeker et al.
(72) Inventor: James W. Condit, Hamel, MN (US)	5,312,234 A	9/1994 Biedeker et al.
(73) Assignee: Stratasys, Inc., Eden Prairie, MN (US)	5,340,433 A	10/1994 Condit
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(a) by 774 days.	5,352,785 A	4/1995 Condit et al.
	5,382,817 A	4/1995 Biedeker et al.
	5,384,221 A *	6/1995 Biedeker B20C 41/30 156/344.21
	5,406,078 A	2/1995 Biedeker et al.
	5,408,237 A	9/1995 Biedeker et al.
	5,439,008 A	9/1995 Condit et al.
	5,458,751 A	10/1995 Biedeker et al.
	5,464,124 A	12/1995 Biedeker et al.
	5,622,257 A	9/2000 Biedeker et al.
(2017) Appl. No. 14/087,208	5,622,257 A	9/2000 Biedeker et al.

**Removal without chemically or
mechanically removing the polymer
coating from the 3D object**

After removal from platen plate 52, the thin, flexible nature of build sheet 36 allows 3D part 38 and support structure 40 to be removed by flexing build sheet 36. This flexing of build sheet 36 amplifies the stresses induced at the bending line of action, causing delamination of 3D part 38 and support structure 40 from its base part, or delamination of the base part from build sheet 36.

Comb (EX1004)



EX1004, 12:49-55

(12) United States Patent Reese et al.	(10) Patent No.: (45) Date of Patent:	US 9,592,660 B2 Mar. 14, 2017
(54) HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS	(56) References Cited U.S. PATENT DOCUMENTS	
(71) Applicant: Arreva Inc., Sausalito, CA (US)	6,722,672 B1	4/2004 Stearns et al.
(72) Inventors: Riley Reese, Cupertino, CA (US); Brenton Blodde, Sausalito, CA (US)	7,127,399 B2	12/2004 Blodde et al.
(73) Assignee: AREVO INC., Sausalito, CA (US)	7,261,542 B2	9/2007 Biedeker et al.
	8,193,053 B1 *	2/2012 Biedeker B20C 47/0077 368/308
	8,242,080 B2	10/2012 Day et al.
	8,257,044 B1	9/2014 Biedeker et al.
	2011/0181018 A1	12/2014 Page et al.
	2015/0108857 A1 *	7/2015 Biedeker B20C 47/0006 426/421
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(a) by 774 days.	2015/0108857 A1 *	7/2015 Biedeker B20C 47/0006 426/421

to the type of material it is made of. The flexibility of the plate 104 allows for easier dissociation between the 3D object and the removable plate 104 upon cooling. Further, this flexibility also reduces the possibility of damage to the high temperature polymer coating 106 or the 3D object during object removal since a blade or wedge is no longer needed to pry off the object.



'660 Patent (EX1001)

EX1001, 5:6-12

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.ii]

Pet. 62-68

Comb's Part Removal Teachings Parallel the '660 Patent's Preferred Embodiment

(12) United States Patent
Comb
(10) Patent No.: US 9,744,730 B2
(45) Date of Patent: Aug. 29, 2017

EX1004, 4:8-16

In particular, the flexing of the build substrate amplifies the stresses induced at the bending line of action, causing delamination of the 3D part from its base layers, or delamination of the base layers from the build substrate. Earlier systems incorporated thick inflexible build platens, making removal of thick stiff 3D parts with large base areas very difficult. In fact, the only effective solution of removal in this case involved prying the 3D part off with crow bar-like device or chisel, which could damage the 3D part or platen.

Alternatively, if the previous 3D part 38 and support structure 40 cleanly are removed from the previous build sheet 36, and the previous build sheet 36 retains its integrity, the same previous build sheet 36 may be reused. In some

Comb (EX1004)

EX1004, 13:6-9

**Removal without
damaging the polymer
coating, the thermally
conductive plate, or the
3D object**

(12) United States Patent
Reese et al.
(10) Patent No.: US 9,592,660 B2
(45) Date of Patent: Mar. 14, 2017

(54) HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS

(71) Applicant: Aerevo Inc., Sunnyvale, CA (US)

(72) Inventors: Riley Reese, Cupertino, CA (US); Benamit Rhoda, Sunnyvale, CA (US)

(73) Assignee: AEREVO INC., Sunnyvale, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 22 days.

(21) Appl. No. 14/874,237

(22) Filed: Dec. 17, 2014

(65) Prior Publication Data
US 2016/0176118 A1 Jun. 23, 2016

(51) Int. Cl.

(56) References Cited
U.S. PATENT DOCUMENTS

6,722,472 B1 4/2004 Swanson et al.

7,127,399 B2 8/2004 Tsao et al.

7,261,542 B2 8/2007 Richardson et al.

8,119,075 B1 * 2/2012 Jeldt B2C 679,077 246,394

8,282,180 B2 10/2012 Pao et al.

8,277,044 B1 8/2014 Schneider et al.

2003/0034148 A1 1/2003 Papp et al.

2005/0088017 A1 * 3/2005 Farnsworth B2C 677,046 426,821

2005/0274126 A1 * 12/2005 Smith A1C 139,013 344,113

(Continued)

Primary Examiner—Alison L. Underberg
Assistant Examiner—Jeri H. Moreno Hernandez
(74) Attorney, Agent or Firm—Wilson Sonnet Goodrich & Root

(57) ABSTRACT

An apparatus performing as a base for printing 3D objects using high temperature thermoplastic employing additive manufacturing methods is provided. The apparatus comprises a heated build platform, a thin removable plate secured to one of the build platform's high temperature

to the type of material it is made of. The flexibility of the plate 104 allows for easier dissociation between the 3D object and the removable plate 104 upon cooling. Further, this flexibility also reduces the possibility of damage to the high temperature polymer coating 106 or the 3D object during object removal since a blade or wedge is no longer needed to pry off the object.

EX1001, 5:6-12

'660 Patent (EX1001)

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds 2A–2B: Claim 1, Element [1.c.ii]

Pet. 62-68

Comb's Teaching That the Object Is Removed "Cleanly" Suggests No Damage or Chemical/Mechanical Intervention

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Riley Reese et al.
U.S. Patent No.: 9,592,660 Attorney Docket No.: 56224-0006IP1
Issue Date: March 14, 2017
Appl. Serial No.: 14/574,237
Filing Date: December 17, 2014
Title: HEATED BUILD PLATFORM AND SYSTEM FOR THREE DIMENSIONAL PRINTING METHODS

DECLARATION OF DR. MICHAEL HICKNER

196. Comb teaches that the 3D part 38 is removed "cleanly," such that the build sheet 36 "retains its integrity" and "may be reused." EX1004, 13:6–9. That the build sheet 36 remains in condition for re-use would have indicated to a POSITA that the *removal* process is conducted *without damaging* the build sheet's constituent components, including the base sheet 36b (*thermally conductive plate*, per Element [1.b]) and the top film 36a (*polymer coating*, per Element [1.c]).

Hickner Dec. (EX1003)

197. Furthermore, that the 3D part in Comb is removed "cleanly" and the build sheet 36 "retains its integrity" indicates that the 3D part was removed *without damaging* the 3D part (*3D object*) and the polymer coating is also not adhered to the 3D part. Thus, there is no need to remove the polymer coating from the 3D part, *chemically, mechanically* or otherwise. For example, if the removal process were to leave some polymer coating on the 3D part, particularly if it were adhered so strongly that it required chemical or mechanical removal, the build sheet 36 would not have "retain[ed] its integrity." Comb's purpose was to avoid older "solution[s] of removal...[that] could damage the 3D part or platen." EX1004, 4:9–19. If intervention were required to remove the polymer coating from the 3D object, the user would risk deforming the 3D object through contact with a tool for mechanical

FISH.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE