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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/659,771	07/26/2017	Paul M. Fromm	1776-0693CON	5379

76360 7590 01/23/2018

MAGINOT, MOORE & BECK LLP
One Indiana Square, Suite 2200
INDIANAPOLIS, INDIANA 46204

EXAMINER	
HOHENBRINK JR, LAWRENCE D	

ART UNIT	PAPER NUMBER
1743	

MAIL DATE	DELIVERY MODE
01/23/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 15/659,771	Applicant(s) Fromm et al.	
	Examiner Lawrence D Hohenbrink Jr.	Art Unit 1743	AIA Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 7/26/2017 .

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____ .

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-7 and 11-20 is/are rejected.

8) ☑ Claim(s) 8-10 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 26 July 2017 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 7/26/2017.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Status of the Application

1) This Office Action is the first action on the merits and is a Non-Final Rejection.

2) Claims 1-20 are pending and are examined herein.

Notice of Pre-AIA or AIA Status

3) The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Objections

4) **Claims 8 and 19 are objected to** because of the following informalities:

5) Claim 8 recites "operating a motive force operative connected". This should be operatively connected.

6) Claim 19 recites "operate the operate the". The repeated words should be removed.

7) Appropriate correction is required.

Claim Interpretation

8) "Spontaneously" is interpreted as "without apparent external cause or stimulus" (Oxford Dictionaries Online, https://en.oxforddictionaries.com/definition/us/spontaneously, accessed 2018-01-14). Thus, for the claimed valve means to close spontaneously it must not be controlled by a controller.

Claim Rejections - 35 USC § 112

9) The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10) **Claim 15 is rejected** under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

11) Claim 15 recites "another actuator operatively connected to the wiper, the actuator being configured". It is unclear to which actuator this refers. Does the actuator being configured refer to the actuator recited in Claim 11? Or does the actuator refer to the "another actuator" recited in Claim 15? One of ordinary skill in the art cannot know with certainty, thus the claim is indefinite. For the sake of compact prosecution, the Examiner will examine Claim 15 as if it recited another actuator operatively connected to the wiper, the other actuator being configured.

Claim Rejections - 35 USC § 103

12) In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

13) The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

14) The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15) This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

16) **Claims 1-4 and 7 are rejected** under 35 U.S.C. 103 as being unpatentable over *Neilsen et al.* (US 2004/0262803 A1, hereinafter "***Neilsen***") in view of *Almquist et al.* (US 5,141,680, hereinafter "***Almquist***"), in further view of *Naware* (US 2016/0096326 A1, hereinafter "***Naware***") and *Voris et al.* (US 2016/0067740 A1, hereinafter "***Voris***").

17) As a preliminary matter the Examiner notes that *Naware* and *Voris* qualify as prior art under 35 USC 102(a)(2) because their effectively filed dates are prior to the effective filing date of the instant claims.

18) Regarding Claim 1, *Neilsen* discloses an apparatus and method comprising a solid freeform fabrication additive manufacturing system (3D printer) that involves a liquid-ejecting process, the system comprising bulk-jetting apparatus that generate three-dimensional objects by ejecting a solidifiable build material and a solidifiable support material onto a platform in a layer-by-layer process, where the object is described by electronic data and is automatically built by the system (¶0002 L1-6; ¶0005 L1-3; ¶0006 L1-5; ¶0018 L9-11;). One or more printheads using inkjet drop-on-demand technology, each printhead having a plurality of nozzles to eject drops of material, eject build material and/or support material to form a cross-section of the desired object, the cross-sections successively formed to make the desired object (¶0020; ¶0023; ¶0024 L1-4). Jetted materials may include pre-polymers, polymers, and waxes (¶0023 L11-13). The plurality of ejectors eject drops of material towards the platform opposite the ejectors and horizontally level (Figs. 1, 5). It is the Examiner's position that the Claim 11 recited "digital image data" is inclusive of *Neilsen's* electronic layer-by-layer data. Furthermore, *Neilsen* discloses the process may be controlled via a control panel

and is an automatic process (¶0002; ¶0024 L6-8), thus implying a controller to at least control the plurality of ejectors.

19) *Neilsen* does not disclose operating an actuator with the controller to rotate the platen from a first position that is horizontally level to a second position that is not horizontal; and operating an inductive heater with the controller to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen.

20) In the same field of endeavor, apparatus and methods for forming three-dimensional objects from flowable material (Abstract), *Almquist* discloses after the part has been formed, it can be removed from the platform by heating the platform, thereby melting the thin layer of material bonding the part to the platform, and this material has a lower melting point that the build material and is preferably wax (C5 L28-31; C6 L14-20). Thus, the platen is heated to release the three-dimensional object from the platen.

21) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the *Neilsen* invention of an apparatus for ejecting drops of material onto a platen to manufacture a three-dimensional object, those drops comprising build material and support material, and the support material may comprise wax, as discussed above, with the *Almquist* teaching of heating the platen to melt the wax support material to release the object from the platen. One would be motivated to combine them for the benefit of easy separation of the part from the platen, as taught by *Almquist* [C6 L14-20].

22) The combination *Neilsen* and *Almquist* does not disclose operating an actuator with the controller to rotate the platen from a first position that is horizontally level to a second position that is not horizontal; and operating an inductive heater with the controller to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen.

23) In the same field of endeavor, an additive manufacturing process (Abstract), *Naware* discloses apparatus for printing 3D objects from 3D data, where a platform (10) holds the object being deposited from a print head onto the platform and the material being used may comprise a flowable,

thermally solidifiable material such as wax (¶0004 L1-9; ¶0005 L1-10; ¶0029 L1-3). The platform comprises heating zones that may comprise electromagnetic induction heating (¶0032 L1-9). Each zone comprises a temperature control module (34) comprising a temperature sensor (40), and the modules may be controlled by a controller (50) (¶0032 L17-19; ¶0033 L1-2; Fig. 5). Selective control of the temperature zones may facilitate part removal from the build plate (¶0042 L1-4).

24) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the combination *Neilsen* and *Almquist* invention as discussed above, with the *Naware* teaching of using a controller to perform controlled heating by induction heating of the platen to facilitate part removal. One would be motivated to combine them for the benefit of easy removal of the part from the platen by minimizing the bonding between the part and the platen, as taught by *Naware* [¶0042].

25) The combination *Neilsen* and *Almquist* and *Naware* does not disclose operating an actuator with the controller to rotate the platen from a first position that is horizontally level to a second position that is not horizontal; and operating the inductive heater with the controller to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen

26) In the same field of endeavor, printing three-dimensional objects onto a build plate (Abstract), *Voris* discloses the apparatus (100) comprising a 3D printer (110) with a print controller (130) that has a print control program (134) to control a tilt adjustment mechanism (actuator, 111) for selectively changing the angle of the upper surface of the build plate (112) relative to a first, horizontal position, by tilting or rotating the plate about one axis or about two axes (¶0012 L1-5; ¶0028 L7-9; ¶0031; ¶0034 L1-6; Figs. 4-8), thus rotating the platen to a second position that is not horizontal. The tilting may set a tilt angle of the build plate to a plurality of differing angles in the range of 0-75 degrees or more as measured between a horizontal plane and the upper surface of the plate (¶0014 L6-12). The apparatus may print layers to the object while the platen is angled to create overhanging layers (¶0034 L1-13). *Voris* does not explicitly disclose that an angled position enables gravity to urge the three-dimensional object off of the platen, however one of ordinary skill in the art would recognize that

the natural force of gravity necessarily pulls on the object and if the object was free to move the object would be urged from the platen.

27) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the combination *Neilsen* and *Almquist* and *Naware* invention as discussed above, with the *Voris* teaching of controlling a build plate tilt adjustment mechanism to selectively change the angle of the upper surface of the build plate relative to the horizontal plane. One would be motivated to combine them for the benefit of gaining the capability to print overhanging layers without the need for additional support structure, as taught by *Voris* [¶0034 L1-13]. Furthermore, it is the Examiner's position that because the combination *Neilsen* and *Almquist* and *Naware* and *Voris* discloses electromagnet induction heaters to warm the platen, and melting a base wax layer to ease release of the 3D object, and tilting the platform to print overhanging layer of the 3D object, it would be a matter of ordinary skill and common sense to operate the inductive heater to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen. Thus, a *prima facie* case of obviousness is established.

28) Regarding Claim 2, the limitations of Claim 1 from which Claim 2 depends are disclosed by the combination *Neilsen* and *Almquist* and *Naware* and *Voris* as discussed above. *Voris* further discloses the print controller transmits control signals to the tilt adjustment or print angle-defining mechanism (460) to actuate (set the lengths of) the actuators (466) to orient the upper surface (444) to match the predefined build plate orientation (or tilt angle(s)) (¶0049 L5-11; ¶0051 L13-20), thus the actuator is capable of rotating the platen to the second position that is at an acute angle with reference to the first position.

29) Regarding Claims 3 and 4, the limitations of Claim 2 from which Claims 3 and 4 depend are disclosed by the combination *Neilsen* and *Almquist* and *Naware* and *Voris* as discussed above. *Voris* discloses the tilting may set a tilt angle of the build plate to a plurality of differing angles in the range of 0-75 degrees or more as measured between a horizontal plane and the upper surface of the plate (¶0014 L6-12) as discussed above. Thus the controller may operate the actuator to move the platen to a second position that may be at about at a forty-five degree angle to the horizontal plane (first

position). Furthermore, a position may be at 75 degrees or more. It is the Examiner's position that the recited claim limitation of "up to a one hundred and eighty degree angle" is inclusive of *Voris's* 75 degrees or more. Thus, the claim limitation is *prima facie* obvious.

30) Regarding Claim 7, the limitations of Claim 2 from which Claim 7 depends are disclosed by the combination *Neilsen* and *Almquist* and *Naware* and *Voris* as discussed above. As discussed above, *Neilsen* discloses at least two print heads, each print head comprising a plurality of ejectors, and each print head capable of ejecting materials that may comprise pre-polymers, polymers, and wax, and *Almquist* discloses using wax as a support layer between the platen and the 3D object being built and melting the wax to allow easy 3D object removal. One of ordinary skill in the art would recognize for the wax to melt and release the 3D object, the wax layer must necessarily have a footprint that is larger than a footprint of the 3D object.

31) **Claims 5 and 6 are rejected** under 35 U.S.C. 103 as being unpatentable over *Neilsen et al.* (US 2004/0262803 A1, hereinafter "***Neilsen***") in view of *Almquist et al.* (US 5,141,680, hereinafter "***Almquist***") and *Naware* (US 2016/0096326 A1, hereinafter "***Naware***") and *Voris et al.* (US 2016/0067740 A1, hereinafter "***Voris***"), and further in view of *Perez et al.* (US 2014/0220168 A1, hereinafter "***Perez***").

32) Regarding Claims 5 and 6, the limitations of Claim 2 from which Claims 5 and 6 depend are disclosed by the combination *Neilsen* and *Almquist* and *Naware*, and *Voris* as discussed above. The combination *Neilsen* and *Almquist* and *Naware*, and *Voris* does not disclose operating another actuator with the controller to move a wiper across the platen to remove melted material from the platen while the platen is at the second position; or generating with a sensor a signal indicative of the three-dimensional object being removed from the platen; and operating the actuator with the controller to return the platen to the first position in response to the controller receiving from the sensor the signal indicative of the three- dimensional object being removed from the platen.

33) In the same field of endeavor, three-dimensional printing with automated part removal, *Perez* discloses a generic 3D printer (10) including a printing surface (12) and a printing device (16) (¶0003 L1-5), and a part removal blade (20) which can be moved to release a printed part (22) (¶0032 L1-3).

An onboard host (26) is connected to a Wi-Fi network and uses software stored in the cloud as opposed to a computer tethered to the 3D printer (¶0032). It is the Examiner's position that the Claim 15 and Claim 16 recited controllers are inclusive of the host of *Perez*. The blade is arranged for motion across the print plate using a pneumatic piston (22) to move the plate [sic] under the motive force of compressed air controlled by a solenoid valve (24) (¶0034 L1-5; Fig. 5). It is the Examiner's position that while *Perez* ¶0034 recites that the piston moves the plate, this is likely a misstatement as it is shown in Fig. 5 that the piston moves the blade, not the plate. Fig. 5 depicts the blade scraping across the plate, thus at least some melted material from the plate, if present, would necessarily be at least partially removed. *Perez* further discloses a camera (24) is provided for assessing a part during and after it has been printed (¶0032 L3-4), and to detect successful part removal (Claim 22). *Perez* does not explicitly disclose the controller is configured to operate the actuator to return the platen to the first position in response to the sensor detecting removal of the 3D object, however one of ordinary skill in the art would find it obvious when reaching the end of a build cycle (i.e. part removal) to reset the apparatus to start a new production cycle (i.e. platen to horizontal plane) for the benefit of production efficiency and economy. Moreover, Perez contemplates automatically starting the next print job after the 3D part is automatically removed (¶0005 L1-3).

34) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the combination *Neilsen* and *Almquist* and *Naware* and *Voris* invention as discussed above, with the *Perez* teaching of a wiper to move across the platen thus scraping the platen and automatically removing the 3D object, and a camera to detect removal of the 3D object. One would be motivated to combine them for the benefit of automating 3D object removal from the printing surface so as to eliminate the need for a local operator to remove a part in order to start a next job, as taught by *Perez* [¶0005 L1-3; ¶0043].

35) **Claims 11-14 and 17 are rejected** under 35 U.S.C. 103 as being unpatentable over *Neilsen et al.* (US 2004/0262803 A1, hereinafter "***Neilsen***") in view of *Almquist et al.* (US 5,141,680, hereinafter

"***Almquist***"), in further view of *Naware* (US 2016/0096326 A1, hereinafter "***Naware***") and *Voris et al.* (US 2016/0067740 A1, hereinafter "***Voris***").

36) As a preliminary matter the Examiner notes that *Naware* and *Voris* qualify as prior art under 35 USC 102(a)(2) because their effectively filed dates are prior to the effective filing date of the instant claims.

37) Regarding Claim 11, *Neilsen* discloses a solid freeform fabrication additive manufacturing system (3D printer) that involves a liquid-ejecting process, the system comprising bulk-jetting apparatus that generate three-dimensional objects by ejecting a solidifiable build material and a solidifiable support material onto a platform in a layer-by-layer process, where the object is described by electronic data and is automatically built by the system (¶0002 L1-6; ¶0005 L1-3; ¶0006 L1-5; ¶0018 L9-11;). One or more printheads using inkjet drop-on-demand technology, each printhead having a plurality of nozzles to eject drops of material, eject build material and/or support material to form a cross-section of the desired object, the cross-sections successively formed to make the desired object (¶0020; ¶0023; ¶0024 L1-4). Jetted materials may include pre-polymers, polymers, and waxes (¶0023 L11-13). The plurality of ejectors eject drops of material towards the platform opposite the ejectors and horizontally level (Figs. 1, 5). It is the Examiner's position that the Claim 11 recited "digital image data" is inclusive of *Neilsen's* electronic layer-by-layer data. Furthermore, *Neilsen* discloses the process may be controlled via a control panel and is an automatic process (¶0002; ¶0024 L6-8), thus implying a controller to at least control the plurality of ejectors.

38) *Neilsen* does not disclose an actuator operatively connected to the platen, the actuator being configured to rotate the platen from the first position to a second position that is not horizontal; an inductive heater configured to heat the platen; and a controller operatively connected to the inductive heater, and the actuator; the controller being configured to: operate the actuator to rotate the platen from the first position to the second position to enable gravity to urge the three-dimensional object from the platen; and operate the inductive heater to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen.

39) In the same field of endeavor, apparatus and methods for forming three-dimensional objects from flowable material (Abstract), *Almquist* discloses after the part has been formed, it can be removed

from the platform by heating the platform, thereby melting the thin layer of material bonding the part to the platform, and this material has a lower melting point that the build material and is preferably wax (C5 L28-31; C6 L14-20). Thus, the platen is heated to release the three-dimensional object from the platen.

40) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the *Neilsen* invention of an apparatus for ejecting drops of material onto a platen to manufacture a three-dimensional object, those drops comprising build material and support material, and the support material may comprise wax, as discussed above, with the *Almquist* teaching of heating the platen to melt the wax support material to release the object from the platen. One would be motivated to combine them for the benefit of easy separation of the part from the platen, as taught by *Almquist* [C6 L14-20].

41) The combination *Neilsen* and *Almquist* does not disclose an actuator operatively connected to the platen, the actuator being configured to rotate the platen from the first position to a second position that is not horizontal; an inductive heater configured to heat the platen; and a controller operatively connected to the inductive heater, and the actuator; the controller being configured to: operate the actuator to rotate the platen from the first position to the second position to enable gravity to urge the three-dimensional object from the platen; and operate the inductive heater to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen.

42) In the same field of endeavor, an additive manufacturing process (Abstract), *Naware* discloses apparatus for printing 3D objects from 3D data, where a platform (10) holds the object being deposited from a print head onto the platform and the material being used may comprise a flowable, thermally solidifiable material such as wax (¶0004 L1-9; ¶0005 L1-10; ¶0029 L1-3). The platform comprises heating zones that may comprise electromagnetic induction heating (¶0032 L1-9). Each zone comprises a temperature control module (34) comprising a temperature sensor (40), and the modules may be controlled by a controller (50) (¶0032 L17-19; ¶0033 L1-2; Fig. 5). Selective control of the temperature zones may facilitate part removal from the build plate (¶0042 L1-4).

43) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the combination *Neilsen* and *Almquist* invention as discussed above, with the *Naware* teaching of using a controller to perform controlled heating by induction heating of the platen to facilitate part removal. One would be motivated to combine them for the benefit of easy removal of the part from the platen by minimizing the bonding between the part and the platen, as taught by *Naware* [¶0042].

44) The combination *Neilsen* and *Almquist* and *Naware* does not disclose an actuator operatively connected to the platen, the actuator being configured to rotate the platen from the first position to a second position that is not horizontal; and a controller operatively connected to the actuator; the controller being configured to: operate the actuator to rotate the platen from the first position to the second position to enable gravity to urge the three-dimensional object from the platen; and operate the inductive heater to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen.

45) In the same field of endeavor, printing three-dimensional objects onto a build plate (Abstract), *Voris* discloses the apparatus (100) comprising a 3D printer (110) with a print controller (130) that has a print control program (134) to control a tilt adjustment mechanism (actuator, 111) for selectively changing the angle of the upper surface of the build plate (112) relative to a first, horizontal position, by tilting or rotating the plate about one axis or about two axes (¶0012 L1-5; ¶0028 L7-9; ¶0031; ¶0034 L1-6; Figs. 4-8), thus rotating the platen to a second position that is not horizontal. The tilting may set a tilt angle of the build plate to a plurality of differing angles in the range of 0-75 degrees or more as measured between a horizontal plane and the upper surface of the plate (¶0014 L6-12). The apparatus may print layers to the object while the platen is angled to create overhanging layers (¶0034 L1-13). *Voris* does not explicitly disclose that an angled position enables gravity to urge the three-dimensional object off of the platen, however one of ordinary skill in the art would recognize that the natural force of gravity necessarily pulls on the object and if the object was free to move the object would be urged from the platen.

46) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the combination *Neilsen* and *Almquist* and *Naware* invention as discussed above, with the *Voris* teaching of controlling a build plate tilt adjustment mechanism to selectively change the angle of the upper surface of the build plate relative to the horizontal plane. One would be motivated to combine them for the benefit of gaining the capability to print overhanging layers without the need for additional support structure, as taught by *Voris* [¶0034 L1-13]. Furthermore, it is the Examiner's position that because the combination *Neilsen* and *Almquist* and *Naware* and *Voris* discloses electromagnet induction heaters to warm the platen, and melting a base wax layer to ease release of the 3D object, and tilting the platform to print overhanging layer of the 3D object, the structure of the combination is capable of performing the claimed function of operating the inductive heater to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen. Thus, a *prima facie* case of obviousness is established.

47) Regarding Claim 12, the limitations of Claim 11 from which Claim 12 depends are disclosed by the combination *Neilsen* and *Almquist* and *Naware* and *Voris* as discussed above. *Voris* further discloses the print controller transmits control signals to the tilt adjustment or print angle-defining mechanism (460) to actuate (set the lengths of) the actuators (466) to orient the upper surface (444) to match the predefined build plate orientation (or tilt angle(s)) (¶0049 L5-11; ¶0051 L13-20), thus the actuator is capable of rotating the platen to the second position that is at an acute angle with reference to the first position.

48) Regarding Claims 13 and 14, the limitations of Claim 12 from which Claims 13 and 14 depend are disclosed by the combination *Neilsen* and *Almquist* and *Naware* and *Voris* as discussed above. *Voris* discloses the tilting may set a tilt angle of the build plate to a plurality of differing angles in the range of 0-75 degrees or more as measured between a horizontal plane and the upper surface of the plate (¶0014 L6-12) as discussed above. Thus the controller may operate the actuator to move the platen to a second position that may be at about at a forty-five degree angle to the horizontal plane (first position). Furthermore, a position may be at 75 degrees or more. It is the Examiner's position that the

recited claim limitation of "up to a one hundred and eighty degree angle" is inclusive of *Voris's* 75 degrees or more. Thus, the claim limitation is *prima facie* obvious.

49) Regarding Claim 17, the limitations of Claim 12 from which Claim 17 depends are disclosed by the combination *Neilsen* and *Almquist* and *Naware* and *Voris* as discussed above. As discussed above, *Neilsen* discloses at least two print heads, each print head comprising a plurality of ejectors, and each print head capable of ejecting materials that may comprise pre-polymers, polymers, and wax, and *Almquist* discloses using wax as a support layer between the platen and the 3D object being built and melting the wax to allow easy 3D object removal. One of ordinary skill in the art would recognize for the wax to melt and release the 3D object, the wax layer must necessarily have a footprint that is larger than a footprint of the 3D object.

50) **Claims 15 and 16 are rejected** under 35 U.S.C. 103 as being unpatentable over *Neilsen et al.* (US 2004/0262803 A1, hereinafter "***Neilsen***") in view of *Almquist et al.* (US 5,141,680, hereinafter "***Almquist***") and *Naware* (US 2016/0096326 A1, hereinafter "***Naware***") and *Voris et al.* (US 2016/0067740 A1, hereinafter "***Voris***"), and further in view of *Perez et al.* (US 2014/0220168 A1, hereinafter "***Perez***").

51) Regarding Claims 15 and 16, the limitations of Claim 12 from which Claims 15 and 16 depend are disclosed by the combination *Neilsen* and *Almquist* and *Naware*, and *Voris* as discussed above. The combination *Neilsen* and *Almquist* and *Naware*, and *Voris* does not disclose a wiper configured to move across the platen after the platen has been rotated to the second position, another actuator operatively connected to the wiper, the other actuator being configured to move the wiper across the platen, and the controller is further configured to operate the other actuator to move the wiper across the platen and remove melted material from the platen when the platen is in the second position, and a sensor positioned to detect removal of the three-dimensional object from the platen, and the controller is operatively connected to the sensor, the controller further configured to operate the actuator to return the platen to the first position in response to the sensor detecting removal of the three-dimensional object from the platen.

52) In the same field of endeavor, three-dimensional printing with automated part removal, *Perez* discloses a generic 3D printer (10) including a printing surface (12) and a printing device (16) (¶0003 L1-5), and a part removal blade (20) which can be moved to release a printed part (22) (¶0032 L1-3). An onboard host (26) is connected to a Wi-Fi network and uses software stored in the cloud as opposed to a computer tethered to the 3D printer (¶0032). It is the Examiner's position that the Claim 15 and Claim 16 recited controllers are inclusive of the host of *Perez*. The blade is arranged for motion across the print plate using a pneumatic piston (22) to move the plate [sic] under the motive force of compressed air controlled by a solenoid valve (24) (¶0034 L1-5; Fig. 5). It is the Examiner's position that while *Perez* ¶0034 recites that the piston moves the plate, this is likely a misstatement as it is shown in Fig. 5 that the piston moves the blade, not the plate. Fig. 5 depicts the blade scraping across the plate, thus at least some melted material from the plate, if present, would necessarily be at least partially removed. *Perez* further discloses a camera (24) is provided for assessing a part during and after it has been printed (¶0032 L3-4), and to detect successful part removal (Claim 22). *Perez* does not explicitly disclose the controller is configured to operate the actuator to return the platen to the first position in response to the sensor detecting removal of the 3D object, however one of ordinary skill in the art would find it obvious when reaching the end of a build cycle (i.e. part removal) to reset the apparatus to start a new production cycle (i.e. platen to horizontal plane) for the benefit of production efficiency and economy. Moreover, Perez contemplates automatically starting the next print job after the 3D part is automatically removed (¶0005 L1-3).

53) It would have been obvious to one with ordinary skill in the art before the effective filing date of the claimed invention, to modify or combine the combination *Neilsen* and *Almquist* and *Naware* and *Voris* invention as discussed above, with the *Perez* teaching of a wiper to move across the platen thus scraping the platen and automatically removing the 3D object, and a camera to detect removal of the 3D object. One would be motivated to combine them for the benefit of automating 3D object removal from the printing surface so as to eliminate the need for a local operator to remove a part in order to start a next job, as taught by *Perez* [¶0005 L1-3; ¶0043].

Double Patenting

54) The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

55) **Claims 11-20 are rejected** on the ground of nonstatutory double patenting as being unpatentable over claims 2-9 of U.S. Patent No. 9,782,964 B2 (the issued patent of ascendant application 14/677,161). Although the claims at issue are not identical, they are not patentably distinct from each other because the identified claims of U.S. Patent No. 9,782,964 B2 read on instant Claims 11-20.

Instant Application 15/659,771	U.S. Patent 9,782,964 B2
11. A printer for manufacturing a three-dimensional object comprising: a plurality of ejectors configured to eject drops of material; a platen positioned opposite the plurality of ejectors, the platen being oriented at a first position that is horizontally level; an actuator operatively connected to the platen, the actuator being configured to rotate the platen from the first position to a second position that is not horizontal; an inductive heater configured to heat the platen; and a controller operatively connected to the inductive heater, the actuator, and the plurality of ejectors, the controller being configured to: operate the plurality of ejectors with reference to digital image data of the three-dimensional object to eject the drops of material towards the platen while the platen is at the first position to form layers of material on the platen and produce the three-dimensional object on the platen; operate the actuator to rotate the platen from the first position to the second position to enable gravity to urge the three-dimensional object from the platen; and operate the inductive heater to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen. 12. The printer of claim 11, the controller being further configured to: operate the actuator to rotate the platen to the	1. A printer for manufacturing a three-dimensional object comprising: a plurality of ejectors configured to eject drops of material; a track; a platen positioned opposite the plurality of ejectors, the platen being oriented at a first position that is horizontally level and the platen being operatively connected to a motive force that is configured to move the platen along the track; an inductive heater positioned to heat the platen; and a controller operatively connected to the platen, inductive heater and the plurality of ejectors, the controller being configured to: operate the plurality of ejectors to eject the drops of material towards the platen and form layers of material with reference to digital image data of the three-dimensional object to produce the three-dimensional object on the platen; rotate the platen to a second position that enables gravity to urge the three-dimensional object off of the platen; operate the inductive heater to heat the platen and release the three-dimensional object from the platen; and operate the motive force to move the platen along the track at an angle with respect to the first position so the operation of the inductive heater enables the three-dimensional object to fall from the platen. 2. The printer of claim 1 further comprising: an actuator operatively connected to the platen; and the controller being operatively connected to the platen through the actuator, the controller being further configured to operate the actuator to rotate the platen to a position that is at an angle to the first

second position that is at an acute angle with reference to the first position. 18. The printer of claim 11 further comprising: a track; the platen being operatively connected to a motive force that is configured to move the platen along the track; the controller being further configured to operate the motive force to move the platen along the track while the platen is at the second position and to operate the inductive heater to heat the platen while the platen is moving along the track at the second position to enable the three-dimensional object to fall from the platen.	position to enable gravity to urge the three-dimensional object towards an edge of the platen.
13. The printer of claim 12, the controller being configured to: operate the actuator to rotate the platen to the second position that is at an angle of about forty-five degrees with reference to the first position.	3. The printer of claim 2, the controller being further configured to: operate the actuator to rotate the platen to the second position that is at about at a forty-five degree angle to the first position.
14. The printer of claim 13, the controller being further configured to: continue to operate the actuator to rotate the platen to another position that is at an angle that is up to one hundred and eighty degrees with reference to the first position.	4. The printer of claim 2, the controller being further configured to: operate the actuator to rotate the platen to the second position that is up to a one hundred and eighty degree angle to the first position.
15. The printer of claim 11 further comprising: a wiper configured to move across the platen after the platen has been rotated to the second position; another actuator operatively connected to the wiper, the actuator being configured to move the wiper across the platen while the platen is at the second position; and the controller is further configured to operate the other actuator to move the wiper across the platen and remove melted material from the platen while the platen is at the second position.	5. The printer of claim 2 further comprising: a wiper configured to move across the platen after the platen has been rotated to the second position; another actuator operatively connected to the wiper, the actuator being configured to move the wiper across the platen; and the controller is further configured to operate the other actuator to move the wiper across the platen and remove melted material from the platen when the platen is in the second position.
16. The printer of claim 11 further comprising: a sensor configured to generate a signal indicative of the three-dimensional object being removed from the platen; and the controller is operatively connected to the sensor, the controller further configured to operate the actuator to return the platen to the first position in response to the controller receiving from	6. The printer of claim 2 further comprising: a sensor positioned to detect removal of the three-dimensional object from the platen; and the controller is operatively connected to the sensor, the controller further configured to operate the actuator to return the platen to the first position in response to

the sensor the signal indicative of the three-dimensional object being removed from the platen.	the sensor detecting removal of the three-dimensional object from the platen.
17. The printer of claim 12, the controller being further configured to: operate a first group of ejectors in the plurality of ejectors to eject wax onto the platen to form a wax base on the platen; and operate a second group of ejectors in the plurality of ejectors to eject the drops of material that form the layers of the three-dimensional object on the wax base, the wax base having a footprint that is larger than a footprint of the three-dimensional object.	7. The printer of claim 2, the controller being further configured to: operate a first group of ejectors in the plurality of ejectors to eject wax onto the platen to form a wax base on the platen; and operate a second group of ejectors in the plurality of ejectors to eject material onto the wax base to form the three-dimensional object, the wax base having a footprint that is larger than a footprint of the three-dimensional object.
20. The printer of claim 19 further comprising: a wiper that extends across the track; and the controller is further configured to operate the motive force to move the platen on the track past the wiper after the platen has been rotated the one hundred and eighty degrees to enable the wiper to remove debris from the platen.	8. The printer of claim 1 further comprising: a wiper that extends across the track; and the controller is further configured to move the platen on the track past the wiper to clean the platen as the platen passes the wiper.
19. The printer of claim 18, the track being further configured to rotate the platen one hundred eighty degrees; and the controller is further configured to operate the operate the motive force to move the platen along the track and rotate the platen one hundred and eighty degrees with reference to the first position.	9. The printer of claim 8, the track being further configured to rotate the platen one hundred eighty degrees to enable the platen to support a building of another object; and the controller is further configured to move the platen along the track to rotate the platen through the one hundred and eighty degrees.

Allowable Subject Matter

56) **Claims 8-10 are objected to** as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

57) **Claims 18-20 are objected to** as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, double patenting rejections notwithstanding.

58) The following is an examiner's statement of reasons for allowance:

59) Dependent Claim 8 is indicated as having allowable subject matter because the recited limitations for operating a motive force operative connected to the platen with the controller to move the platen along a track while the platen is at the second position and while the controller is operating the inductive heater to heat the platen to enable the three-dimensional object to fall from the platen, when taken with the claim as a whole, is novel and nonobvious over the prior art of record. Dependent Claims 9-10 are indicated as having allowable subject matter as depending from an indicated allowable base claim.

60) Dependent Claim 18 is indicated as having allowable subject matter because the recited limitation for the controller being further configured to operate the motive force to move the platen along the track while the platen is at the second position, when taken with the claim as a whole, is novel and nonobvious over the prior art of record. Dependent Claims 19 and 20 are indicated as allowable as depending from an indicated allowable base claim.

61) A close prior art reference of record *Neilsen* discloses a solid freeform fabrication additive manufacturing system that involves a liquid-ejecting process, the system comprising bulk-jetting apparatus that generate three-dimensional objects by ejecting a solidifiable build material and a solidifiable support material onto a platform in a layer-by-layer process, where the object is described by electronic data and is automatically built by the system. One or more printheads using inkjet drop-on-demand technology, each printhead having a plurality of nozzles to eject drops of material, eject build material and/or support material to form a cross-section of the desired object, the cross-sections successively formed to make the desired object. The plurality of ejectors eject drops of material towards the platform opposite the ejectors and horizontally level. Furthermore, *Neilsen* discloses the process may be controlled via a control panel and is an automatic process. *Neilson* does not disclose operating an inductive heater with the controller to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen, or the controller being further configured to operate a motive force to move the platen along a track while the platen is at the second position.

62) A close prior art reference of record *Naware* discloses apparatus for printing 3D objects from 3D data, where a platform holds the object being deposited from a print head onto the platform and the

material being used may comprise a flowable, thermally solidifiable material such as wax. The platform comprises heating zones that may comprise electromagnetic induction heating. Each zone comprises a temperature control module comprising a temperature sensor, and the modules may be controlled by a controller. Selective control of the temperature zones may facilitate part removal from the build plate. *Naware* does not disclose operating an inductive heater with the controller to heat the platen while the platen is at the second position to release the three-dimensional object from the platen and enable gravity to remove the three-dimensional object from the non-horizontal platen, or the controller being further configured to operate a motive force to move the platen along a track while the platen is at the second position.

63) A close prior art, *Spence* (US 2014/0125749 A1, made here of record), discloses apparatus and methods for servicing a substrate media printing system, particularly for cleaning elements of a printing station and rail track comprising parallel rails used to covey the substrate media. A cart frame is moveable along a rail track for passing through a printing station and other stations, the cart frame may comprise a platen, and the rail track path may be linear, arched, or curved. *Spence* further discloses a non-contact motor drive such as a magnetic propulsion drive, thus a motive force, with a central rail provided to house elements of the drive. *Spence* does not disclose operating the motive force to move the platen along the track to move the platen at angle with respect to the first position.

64) A search of the relevant prior art failed to turn up any other prior art references which anticipated or could be used individually or in combination to set forth a *prima facie* case of obviousness, and upon which to base a prior art rejection for claims reciting these limitations.

65) Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence D. Hohenbrink Jr. whose telephone number is 571-270-5549. The examiner can normally be reached Monday - Friday, 7:00 am to 3:00 pm Eastern Time U.S.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph S. Del Sole can be reached on 571-272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LAWRENCE D. HOHENBRINK, JR./
Examiner, Art Unit 1743

/SEYED MASOUD MALEKZADEH/
Primary Examiner, Art Unit 1743