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**Datasheet for the decision
of 4 July 2023**

Case Number: T 1996/20 - 3.2.05

Application Number: 15743241.0

Publication Number: 3099470

IPC: B29C64/245, B33Y40/00,
B33Y30/00

Language of the proceedings: EN

Title of invention:

A device and method for removing 3D print material from build plates of 3D printers

Patent Proprietor:

Stocklyn Venture, LLC

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step (no)

Decisions cited:

T 1014/92, T 1110/03



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Case Number: T 1996/20 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 4 July 2023

Appellant: Stocklyn Venture, LLC
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 9 October 2020
revoking European patent No. 3099470 pursuant to
Article 101(2) EPC**

Composition of the Board:

Chairman P. Lanz
Members: T. Vermeulen
M. Blasi

Summary of Facts and Submissions

- I. The appeal was filed by the patent proprietor against the decision of the opposition division to revoke European patent No. 3 099 470 ("the patent").
- II. In the decision under appeal, the opposition division *inter alia* came to the conclusion that the subject-matter of claims 1 and 8 of the patent as granted did not involve an inventive step over a combination of the following documents:

- D4 "Lexan: The 3D-Printer build platform of the future", dated between 15 June 2013 and 16 March 2016, retrieved from the internet (<http://www.akeric.com/blog/?p=2158>);
- D5 US 2005/0173855 A1;

or over a combination of document D4 with the common general knowledge.

- III. In its statement setting out the grounds of appeal, the appellant (patent proprietor) further referred to the following documents submitted during the proceedings before the opposition division:

- D1 WO 2010/049696 A2;
- D14 "Helpful Tips for the New 3D Printer Owner", by Michael Overstreet, dated 26 December 2012, retrieved from the internet (<https://makezine.com/2012/12/26/helpful-tips-for-the-new-3d-printer-owner/>);

D15 "Part Sticking Issue and Ways to Address the Problem", copyright date of 2016, retrieved from the internet (<https://www.plasticscribbler.com/tutorial/how-to/item/95-top-five-reasons-yourprintsdont-stick-to-the-bed#.WsyT-C-B1E4>);

and filed the following four new documents:

D16 "3D prints keep suffering from warping", dated between February 2017 and July 2019, retrieved from the internet (<https://3dprinting.stackexchange.com/questions/3532/3d-prints-keep-suffering-from-warping>);

D17 "Kapton tape vs. Blue painter's tape", by Andy, dated 2 January 2014, retrieved from the internet (<http://www.3dprinterprices.net/kapton-tape-vs-blue-painters-tape/>) through the Web Archive;

D19 "GiantArm D200 User Manual - Version 1", undated;

D20 "MakerBot Replicator 2 Desktop 3D Printer User Manual - Version 4", dated 22 July 2013.

In addition, the following link to an internet video was submitted:

D18 <https://www.youtube.com/watch?v=sRkpZHg8U84>, posted online on 20 April 2013.

IV. Subsequently, the opponent withdrew its opposition and ceased to be party to the appeal proceedings.

V. With letter dated 27 June 2023 the appellant filed three further documents:

D21 "3D Print Stuck to Bed: What to do?" by Tess Boissonneault, dated 7 November 2022, retrieved

from the internet (<https://www.wevolver.com/article/3d-print-stuck-to-bed-what-to-do>);

D22 "Removing a stuck 3d print from the heated build platform", dated 11 August 2012, retrieved from the internet ([https://reprage.com/posts/2012-08-11-removing-a-stuck-3d-print-from-the-heated-buildplatform/#:~:text=Turn%20the%20heat%20off%20on,without%20any%20effort%20at%20all\);](https://reprage.com/posts/2012-08-11-removing-a-stuck-3d-print-from-the-heated-buildplatform/#:~:text=Turn%20the%20heat%20off%20on,without%20any%20effort%20at%20all);)

D23 "Best way to remove model from print bed", dated from 17 September 2016 until 22 October 2016, retrieved from the internet ([https://forum.prusa3d.com/forum/original-prusa-i3-mk3s-mk3-print-tips-archive/best-way-to-remove-model-from-printbed/#:~:text=So%20I%20use%20the%20dental,bed%20is%20witho ut%20a%20scratch\);](https://forum.prusa3d.com/forum/original-prusa-i3-mk3s-mk3-print-tips-archive/best-way-to-remove-model-from-printbed/#:~:text=So%20I%20use%20the%20dental,bed%20is%20witho ut%20a%20scratch);).

VI. With a further letter dated 28 June 2023 the appellant filed the following document:

D24 "[Help] My print won't come off the bed", dated 2015 ("8 yr. ago"), retrieved from the internet (https://www.reddit.com/r/Reprap/comments/30zk5o/help_my_print_wont_come_off_the_bed/).

VII. The appellant as sole party to the appeal proceedings requested that the decision under appeal be set aside and that the patent be maintained as granted.

VIII. Claim 1 of the patent as granted has the following wording (feature numbering added by the board in square brackets is identical to the decision under appeal):

"1. [1.1] A 3D printer comprising a removable build plate (101) [1.2] consisting of a substantially flat

sheet of flexible material of sufficient size to receive and hold deposits of print material from the 3D printer, [1.3] said sheet being sized to be substantially larger than the desired 3D print to allow the sheet to receive the print and to allow the sheet to be flexed sufficiently to remove the 3D print upon completion [1.4] wherein the sheet of flexible material can accommodate repeated flexing without fracturing and without loss of the substantially flat disposition, [1.5] and wherein the sheet of flexible material can be removably placed in the 3D printer prior to the printing process; [1.6] and a means for preventing movement of the sheet while in the 3D printer and during the printing process, [1.7] and where the top surface of the flexible sheet is textured for temporary bonding of the first layer of a 3D print [1.8] to prevent the 3D print from moving on the sheet during the printing process, [1.9] where the build plate is reusable."

IX. The appellant's submissions may be summarised as follows:

Document D4 was to be regarded as the closest prior art. The difference with claim 1 was that document D4 lacked feature 1.7. The textured surface allowed the 3D print to stick just enough so that it was possible to remove it afterwards. Therefore, paragraph [0017] of the patent had to be understood in the sense that a balance had to be struck between sufficient bonding and assistance in removing the 3D print. The objective technical problem was to improve the precision of the printing process by avoiding a relative movement between the printed material and the plate.

The opposition division's reasoning was based on an unallowable *ex post facto* analysis. The skilled person would not have combined document D4 with the teaching of document D5 for several reasons.

First of all, the solutions were not compatible because document D4 stated that a razor blade was necessary for detaching the 3D prints. Paragraph [0045] of document D5 acknowledged that a razor blade would easily damage and contaminate a structured surface. The suggestion in document D4 that a razor blade was not required for larger prints was merely speculative since the user in document D4 was new to using Lexan as a build plate. Moreover, documents D21 to D24 highlighted the risks of using razor blades to detach 3D prints. Even if some of these documents were published after the priority date of the patent, they could be used to ascertain facts prior to the priority date, as set out in decision T 1110/03 (Reasons 2.3).

Furthermore, placing the thick ribbed build tray of document D5 on top of the heated build plate (HBP) of document D4 would result in air pockets and, consequently, in extremely poor heat conduction. The thickness of the build tray of document D5 was further not compatible with the adjustment of the Z-axis of the extruder disclosed by document D4.

A further reason that would have discouraged the skilled person to opt for the solution of document D5 was that the dominant thinking around the priority date of the patent was to provide an extra thin and disposable adhesive layer on top of the build plate for each 3D print. This followed not only from documents D1 and D4, also documents D14, D15, D16 and D17 contained various passages indicating that Kapton tape, blue

painter's tape or hairspray were common solutions for the skilled person who was struggling - as the entire 3D printing community at the time - with the problem of how to get a 3D print to stick to the printing bed. The video link D18 and the manuals D19 and D20 showed that the major manufacturers of 3D printers solved the issue during the years 2010 to 2013 by delivering their machines with blue painter's tape. Hence, around the priority date there was a prejudice in the field for this solution. In fact, the skilled person was stuck in the tape/glue paradigm and would not have combined document D4 with a document D5 dated 2005. Overcoming the dominant thinking at the time clearly involved inventive activity. Because of decision T 1110/03, it was not crucial that some of the documents filed by the appellant in support of its arguments were published only after the priority date of the patent.

Adding a textured surface to the build plate of document D4 was just one of many feasible solutions to the objective technical problem. Alternatively, the skilled person could have modified the chemical bonding between the 3D print and the build plate. Document D4 actually mentioned that polylactic acid (PLA) stuck "super good" to the Lexan plate. This would have inspired the skilled person to work in a different direction and to modify the chemistry of the build plate or the printing material to make them attach even better to each other. In addition, there were many other types of solutions that did not involve modifying the build plate. Some were mentioned in documents D15 and D16, namely controlling the temperature, using rafts to change the shape of the 3D print or switching to different types of printing materials.

According to document D17, it was a nightmare to use Kapton tape to obtain adhesiveness. The only alternative at the time was the blue painter's tape delivered by the main manufacturers with their machines. Also documents D14, D15 and D16 showed that, at the priority date, there was a long-felt need in the field to improve the bonding of the print material to the build plate. This was another indication of inventive step.

For the above reasons, the subject-matter of claim 1 involved an inventive step.

Reasons for the Decision

1. The present decision only deals with the issue of inventive step of the subject-matter of claim 1 as granted.
2. In the decision under appeal the opposition decision *inter alia* found that the 3D printer of claim 1 was obvious to a person skilled in the art having regard to a combination of documents D4 and D5 (cf. point 9.1 of the reasons).

Document D4

3. Document D4 is a disclosure made available on the internet in the form of a blog entry published at a certain date followed by a series of user comments posted at a later point in time. In the present case, the board has no doubt that the content of the blog entry dated 15 June 2013 ("2013 06/15") as well as the first three comments on page 6/7 of 16 June 2013 and 10 October 2013 were made available to the public

before the priority date of the patent in suit, i.e. before 29 January 2014. With the exclusion of the last five comments of pages 6/7 and 7/7, posted between 3 December 2014 and 16 March 2016, document D4 therefore constitutes prior art under Article 54(2) EPC.

4. The appellant did not contest the selection of document D4 as a starting point for the inventive step assessment, nor did it challenge the opposition division's finding that features 1.1 to 1.6 and 1.9 were known in combination from document D4. The board has no reason to doubt these findings. Indeed, the author of the internet disclosure recounts their experience with a sheet of flexible "Lexan" material as build surface on a 3D printer. A textured top surface is not disclosed by document D4. Since the purpose clause of feature 1.8 is linked to the textured top surface of feature 1.7, both features 1.7 and 1.8 must be regarded as distinguishing features with respect to document D4.

The objective technical problem

5. In point 9.1.2 of the decision under appeal, the objective technical problem was formulated as "to improve the precision of the printing process by avoiding a relative movement between the printed material and the plate". However, the flexible build plate of document D4 already achieves a strong bond with the print material (cf. page 4/7: "The final print results are great: PLA sticks to the Lexan *super good*"). Consequently, a more accurate formulation of the objective technical problem is to further improve the bonding of the print material to the build plate.

This was not challenged by the appellant at the oral proceedings held before the board.

Document D5

6. Document D5 is concerned with 3D printers. In paragraph [0004] various prior art solutions are disclosed for depositing print material on a substrate removably affixed to a modelling platform. One of these solutions uses a flexible sheet substrate (cf. paragraph [0011]). The importance of a strong adherence of the print material to the substrate is repeatedly acknowledged in paragraph [0006] of the section 'Background of the invention'. In paragraph [0014] a solution is then offered for removably mounting and locking a substrate onto the modelling platform.
7. Despite of being characterised as "substantially rigid" (cf. paragraphs [0015] and [0032], claim 1), the substrate of the preferred embodiment of document D5 comprises a tray 50 which, according to paragraph [0032], "can be flexed slightly so as to assist in releasing a completed model from the substrate 16". This particular property of the substrate is reiterated towards the end of the detailed description where it is used to "release models from the substrate, either as the sole release technique or in combination with use of the cleaning tank" (cf. paragraph [0046]).
8. The board is therefore satisfied that the teaching of document D5 is sufficiently close to the disclosure of document D4 so that the skilled person would have been prompted to at least consider its teaching when looking for a solution to the objective technical problem.

9. In paragraph [0031] of document D5, the tray 50 illustrated in Figures 3 to 6 is described as follows:

"The tray 50 has an upward-facing, substantially flat modeling surface 52, which has a texture selected for desired adherence and release characteristics according to the particular modeling process parameters and modeling material used to build models on the substrate 20. The texture may range from smooth (rms roughness less than about 0.001 in.) to rough (rms roughness greater than about 0.001 in.). [...] The modeling surface 52 optionally includes a grid 58, defined by grooves in the modeling surface. The grid 58 facilitates accuracy in the positioning of models on the substrate 16."

Further references to a textured modelling surface of the substrate are included in dependent claims 5 to 8, 21 to 23, 38, 41 and 42 of document D5.

10. In the board's view, the skilled person would not have ignored this clear and unambiguous teaching in document D5. This explicit solution to the objective technical problem would have prompted the skilled person to modify the substrate, i.e. the flexible Lexan sheet, of document D4 by texturing its top surface. In so doing, the skilled person would have arrived at the subject-matter of claim 1 of the patent as granted. Hence, the claimed subject-matter is obvious.

Razor blade argument

11. In a first line of argument, the appellant maintained that documents D4 and D5 were incompatible in view of the fact that the razor blade scraper mentioned in

document D4 would damage a textured surface. This argument is not found convincing. The corresponding statement on page 4/7 of document D4 only concerns smaller items printed on a Lexan sheet. The same passage suggests that larger 3D prints 'pop off' by bending the flexible sheet. Even if this suggestion leaves some room for speculation (see the author's remark in the passage: "(yet to print anything 'big')"), it at least shows that razor blade scrapers may not be indispensable for removing a 3D print in the context of document D4.

12. Moreover, paragraph [0017] of the patent in suit indicates that a textured surface actually facilitates the removal of items from a flat sheet of flexible material ("does not bond permanently to the surface 104 of the sheet 102 for ease in removing the 3D print 103 from the surface 104 of the sheet 102"). This points away from the idea that a razor blade would be indispensable to remove the 3D print off a flexible sheet with a textured surface.

13. The same applies to the internet disclosures D21 to D24 filed by the appellant in support of its argument that documents D4 and D5 were not compatible. While highlighting the risks of using a sharp object such as a blade or razor to detach 3D prints, document D21 actually provides a list of alternative solutions to razor blade scrapers (see pages 4/12 to 6/12: applying heat or cold, or using dental floss or solvents). Document D21 even contains a suggestion to use flexible plates as a way of easily removing the 3D print (page 7/12: "they are designed to be [...] flexed so that the 3D print simply pops off"). Also document D24 proposes a flexible printing surface as an alternative to scraping (cf. page 3/6: "That's when I discovered

NinjaPlates [...] It's basically a flexible printing surface, print the part, let it cool, and give it a good twist"). Documents D22 and D23, in turn, recommend to cool down the heated build platform and to apply dental floss, respectively, in order to remove the 3D print. Hence, none of these documents establishes an absolute requirement for using razor blades in order to scrape off a 3D print from a build plate, let alone an incompatibility between the disclosure of document D4 and the textured surface of document D5.

Documents D15, D16, D21, D23 and D24

14. Documents D21, D23 and D24, as well as further documents D15, D16 relied on by the appellant, have been made available on the internet only after the priority date of the patent. Hence, these documents cannot be regarded as prior art under Article 54(2) EPC.
15. The appellant argued with reference to decision T 1110/03 (OJ EPO 2005, 302) that documents D15, D16, D21, D23 and D24 could nevertheless be used to ascertain facts prior to the priority date.
16. In decision T 1110/03, it was held that a document which is not itself part of the state of the art can provide a basis for an inference about, e.g. the state of the art, common general knowledge in the art, issues of interpretation or technical prejudice etc - an inference which is subject to challenge as to its plausibility (cf. Reasons 2.1). By way of example, decision T 1110/03 mentions a dictionary as an account of the meaning of words and a technical review article as an account of the common general knowledge (cf. Reasons 2.3).

17. Neither of these examples applies in the present case. Although documents D14, D17 and D22 confirm that some aspects, such as the use of Kapton tape, blue painter's tape and hairspray, mentioned in the internet disclosures D15, D16, D21, D23 and D24 were known before the priority date of the patent in suit, the board is not convinced that the entire content of the post-dated blog entries, online forum discussions and question-and-answer sessions, which are not on a par with dictionaries or technical review articles, can be considered indirect evidence for the common general knowledge of the person skilled in the art in the field of 3D printing.

Heated build plate argument

18. A further argument put forward by the appellant against a combination of documents D4 and D5 is that the first document concerns a 3D printer with a heated build plate (HBP) and the second document does not. The board is not persuaded by this argument, since the skilled person would have implemented only the features from document D5 that solve the objective technical problem. In the present case, the question of obviousness is not so much whether the skilled person would have substituted the substrate of document D5 for the Lexan sheet of document D4. Rather, it boils down to the assessment of what document D5 would have taught the skilled person in terms of how the bonding of the print material to the build plate can be improved. And the teaching in document D5 pointed in the direction of texturing the build surface. The fact that the tray 50 shown in Figures 3 to 6 of document D5 has a certain thickness and a matrix of ribs 60 at its lower surface would not have discouraged the skilled person from

following the teaching of document D5 and providing texture on the build surface of the 3D printer according to document D4.

Dominant thinking, prejudice

19. The appellant's submissions concerning the "dominant thinking" and the "prejudice" at the time of filing seem to miss the point that document D4, the starting point for the inventive step assessment, already discloses an alternative to the Kapton tape, the blue painter's tape and the hairspray, namely a build plate consisting of a flat sheet of flexible material (cf. page 1/7: "Furthermore, if you print in ABS, there's a good chance you'll somehow mangle the Kapton tape [...] or printing with PLA, rip up your blue painters tape" and page 4/7: "Plus I can cut back on my blue-tape usage"). Even if the solution of document D4 had not been widely known to all users in the 3D printing community, this does not mean that there was an unsolved "tape/glue paradigm" at the priority date of the patent in suit. The fact that some other internet sources D14, D17 or D18 selected by the appellant focused on solutions applying thin disposable layers anew on the build plate for each 3D print does not prevent a finding of lack of inventive step over a combination of document D4 with the teaching of document D5, which was publically available already in 2005.

One of many feasible solutions

20. It may very well be that the textured top surface is just one of several different feasible solutions to the objective technical problem. But it is the only solution to the problem offered by document D5. Neither

the chemistry of the build plate nor a change in printing material is in focus in document D5. The appellant has thus not convincingly shown that the teaching of document D5 would have prompted the skilled person to work in a different direction than modifying the surface structure. Regarding the teaching of documents D15 and D16, they do not form part of the state of the art pursuant to Article 54(2) EPC (cf. point 14. above), nor can they be regarded as indirect evidence of the common general knowledge at the priority date of the patent in suit (cf. point 17. above). But even if they were, the content of these documents would not change the inventive step assessment in view of the combination of documents D4 and D5.

Long-felt need

21. The board does not dispute the appellant's argument that producers of 3D printers at the time the application for the patent in suit was filed relied on Kapton foil, blue painter's tape or hairspray. Documents D14 and D17 are proof thereof. However, this does not imply a long-felt need that was overcome by the claimed invention and that is therefore indicative of an inventive step. By providing a flexible sheet as build plate on top of the 3D printer platform, document D4 already proposed before the priority date of the patent in suit a measure to satisfy any need there may have been in the field. In fact, so did document D5 in 2005, at least in the context of the prior art discussed in paragraph [0011] ("The Stratasys® modeling machines have also used a flexible sheet substrate held down on a platform by vacuum forces, as is disclosed in the Comb et al. '008 patent"). Moreover, the board agrees with decision T 1014/92 (Reasons 4.7) that, in

absence of a long-felt need, a finding of obviousness based on an objective evaluation of the state of the art cannot be affected by the fact alone that two documents had not been combined by skilled person for a considerable period of time.

Conclusion

22. In sum, the board shares the opposition division's view that the subject-matter of claim 1 as granted does not involve an inventive step so that the ground for opposition under Article 100(a) EPC in combination with Article 56 EPC prejudices the maintenance of the patent as granted. The appeal must therefore be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



N. Schneider

P. Lanz

Decision electronically authenticated