

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2019/082748

International filing date (day/month/year)
27.11.2019

Priority date (day/month/year)
27.11.2018

International Patent Classification (IPC) or both national classification and IPC
INV. B01L3/00

Applicant
STILLA TECHNOLOGIES

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application


2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of
this opinion

see form
PCT/ISA/210

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. IV Lack of unity of invention

1. In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:
- paid additional fees
 - paid additional fees under protest and, where applicable, the protest fee
 - paid additional fees under protest but the applicable protest fee was not paid
 - not paid additional fees
2. This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- complied with
 - not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- all parts.
 - the parts relating to claims Nos. 1-12

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>3-5</u>
	No: Claims	<u>1, 2, 6-12</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-12</u>
Industrial applicability (IA)	Yes: Claims	<u>1-12</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43*bis*.1 and 70.10)
and / or
2. Non-written disclosures (Rules 43*bis*.1 and 70.9)
see form 210

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Reference is made to the following documents:

- D2 US 2016/167053 A1 (GRAY MARK A [US]) 16 June 2016 (2016-06-16)
- D3 US 2005/266582 A1 (MODLIN DOUGLAS N [US] ET AL) 1 December 2005 (2005-12-01)
- D4 US 2012/219947 A1 (YURKOVETSKY YEVGENY [US] ET AL) 30 August 2012 (2012-08-30)

1 **Re Item IV**

Lack of unity of invention

- 1.1 This Authority considers that the application does not meet the requirements of unity of invention.
The reasons, for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:
 - 1.2 There are 2 independent claims: apparatus claim 1 and apparatus claim 2.
 - 1.3 The "same" or "corresponding" technical features linking together all the independent claims 1 and 2 are the following:
 - 1.3.1 A loading well being an open cavity comprising a lateral wall, a bottom wall and a loading opening wherein the bottom wall part comprises at least one sloped bottom section.
 - 1.4 This common matter does not comprise a single general inventive concept, based on same or corresponding special technical features within the meaning of Rule 13.2 PCT, because these features are already anticipated by D2 in paragraphs [0064]-[0066] and in figure 5).
 - 1.5 The common problem to all the claims is therefore to find a loading well that prevents the loss of sample (cf. description p.1, 18-19). This is a commonly known problem and it is solved by D2 in [0064]-[0066]).
 - 1.6 As the claims comprise neither the same, nor corresponding special technical features, the technical relationship between the subject-matter of the claims required by Rule 13.2 PCT is lacking and claims are not so linked as to form a single general inventive concept as required by Rule 13.1 PCT.
Consequently the application does not meet the requirement for unity of invention.
 - 1.7 Thus, the application is split into 2 groups of (alleged) inventions:

- 1.7.1 Group I: Claims 1, 3, 5-7, 9-12. The remaining distinguishing technical feature is an inlet port is located off-center in the bottom wall part. The technical problem that it solves is "to permit to exploit the largest possible surface of the bottom wall part" (cf. description, p.34, I.12-20).
- 1.7.2 Group II: Claims 2, 4 and 8. The remaining distinguishing technical feature is: "the loading well being at least partially filled with oil". The technical problem that it solves is that "*the droplets are suspended in a continuous phase, such as oil, to form an emulsion*" (cf. description, p.10, I.28-30).
- 1.8 It is therefore seen that the remaining technical features and addressed problems of each group are different.
- 1.9 It thus appears possible neither to define the corresponding special technical features within the meaning of Rule 13.2 PCT linking these groups of dependent claims, nor to find a common technical problem underlying these groups of claims which could serve as the single general inventive concept required by Rule 13.1 PCT.
- 1.10 Provided that the additional fees for the second alleged invention (group II) have been paid within the prescribed time limit (Art. 17(3)(a) PCT), the ISA shall establish the International Search Report on those parts of the International Application which relate to the invention first mentioned in the claims and on those parts of the international application which relate to inventions in respect of which the said fees were paid (groups I and II).

2 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

2.1 **Group I**

- 2.1.1 The subject-matter of the independent apparatus claim 1 is not considered to be novel over D2 in the sense of Art. 33(2) PCT because all its technical features are disclosed in the paragraphs [0064]-[0066] and in figure 5, wherein D2 discloses: a loading well (503) configured to receive a drop of sample, wherein the loading well is an open cavity comprising a wall and a loading opening (cf. D2, fig.5: open upper side of loading well (503)), wherein the wall comprises a bottom wall part globally extending according to a bottom plan (wbp) parallel to the base plan (x/y) (wherein the note 1 (see above) applies, mutatis mutandis, to D2) and a lateral wall part extending along a well lateral direction (wld) disposed according to an angle $0^\circ < \alpha < 180^\circ$ relatively to the bottom plan (wbp) (unambiguously disclosed in fig. 5 of D2), wherein the loading opening is

defined by a free end of the lateral wall part opposite to the bottom plan (wbp) (cf. D2, fig.5), and wherein:

- the bottom wall part comprises at least one sloped bottom section (cf. D2, [0064] and fig. 5),
- an inlet port is located off-center in the bottom wall part (cf. D2, fig.5, wherein several ports (509) located off-centered in the bottom wall part are disclosed).

2.1.2 Furthermore, D3 also discloses the subject-matter of claim 1 in the embodiment anticipated in the figures 37 and 41 and in the paragraphs [0180]-[0184] and in the figures 37 and 41 wherein it is disclosed: a loading well comprised by the conical well (642) and the access port (643) (see in fig. 37 the references named), comprising a wall and a loading opening (cf. D3, fig.41, opening of the the bottom wall of (482)), wherein the bottom wall part comprises at least one sloped bottom section (cf. D3, fig. 41), an inlet port is located off-center in the bottom wall part (cf. D3, fig. 41). The further technical features of claim 1 not specified are unambiguously anticipated by the previous passages and figures cited.

Therefore, the subject-matter of the independent claim 1 is not considered to be novel over D2 and D3 in the sense of Art. 33(2) PCT.

2.1.3 Moreover D2 discloses also the further technical features of claim 7 in the paragraphs [0071]-[0074] and in figures 14-16.

2.1.4 Furthermore, claims 6, 9 and 11, in view of the clarity objections described below, do not seem to comprise further technical features differing from the subject-matter of the independent claim 1.

Therefore, claims 6, 7, 9 and 11 are not considered to be novel over D2 under Art. 33(2) PCT.

2.1.5 Moreover, the further technical features of claims 3 and 5 are considered to be mere design features of the loading well disclosed in claim 1 that the person skilled in the art would apply to D2 (cf. D2, fig.5), depending on the circumstances, and reach the subject-matter of claims 3 and 5, without involving an inventive step under Art.33(3) PCT.

2.1.6 The subject-matter of the independent method claim 10 (see clarity objections) is anticipated by D3 in the passages cited against the novelty of claim 1 and in the paragraph [0310], wherein the technical feature of "placing a drop of sample in the loading well is anticipated" (cf. D3, [0310], "*injection and/or or removal of a continuous series of very small fluid droplets into or out of the inlet and output access ports, respectively*"). Similar objection applies, mutatis mutandis to the

independent claim 12.

Therefore, claims 10 and 12 are not considered to be novel over D3 under Art. 33(2) PCT

2.2 **Group II**

2.2.1 The subject-matter of the independent apparatus claim 2 is not considered to be novel over D2 in the sense of Art. 33(2) PCT because all its technical features are disclosed by D2 in [0064]-[0066] and in figure 5, wherein D2 discloses: A loading well (503) configured to receive a drop of sample, wherein the loading well is an open cavity comprising a wall and a loading opening (cf. D2, fig.5: open upper side of loading well (503)), wherein the wall comprises a bottom wall part globally extending according to a bottom plan (wbp) parallel to the base plan (x/y) (wherein the note 1 (see above) applies, mutatis mutandis, to D2) and a lateral wall part extending along a well lateral direction (wld) disposed according to an angle $0^\circ < a < 180^\circ$ relatively to the bottom plan (wbp) (unambiguously disclosed in fig. 5 of D2) and wherein the loading well is at least partially filled with oil (cf. D2, [0066] and [0009], wherein the organic fluid is defined to be oil), wherein the loading opening is defined by a free end of the lateral wall part opposite to the bottom plan (wbp), and wherein the bottom wall part comprises at least one sloped bottom section (cf. D2, fig.5).

2.2.2 D4 also discloses all the technical features of claim 2 in the paragraphs [0028]-[0030] and in the figure 1b, wherein a loading well (102) comprising a sloped bottom wall portion (cf. D4, fig. 1B, bottom side of (102)), a side well portion, a free end (cf. D4, fig. 1B, top side of (102)) and wherein the loading well (102) is at least partially filled with oil (cf. D4, [0027]-[0030]) is disclosed.

Therefore, the subject-matter of the independent claim 2 is not considered to be novel over D2 and D4 in the sense of Art. 33(2) PCT.

2.2.3 Furthermore, all the technical features of claims 4 and 8 are also anticipated by D2 and/or D4 in the paragraphs cited: claim 4: (cf. D4, [0029], wherein the oil is fluorocarbon oil, it is common knowledge that the density of the fluorocarbon oil is up to twice the density of water); claim 8: (cf. D2, [0071]-[0074] and figs. 14-16), wherein a microfluidic chip (1601) comprising loading well (503) (it is unambiguously derivable from paragraphs [0071]-[0074] that the technical features of the well (503) are applicable to each of the wells of fig. 16), a droplet generator (cf. D2, [0042], wherein the formation of droplets applicable to the embodiment disclosed in fig.5 is disclosed) and a droplet chamber (503) is

anticipated.

Therefore, the subject-matter of the claims 4 and 8 is not considered to be novel over D2 and/or D4 in the sense of Art. 33(2) PCT.

- 2.2.4 Moreover, the further technical features of claim 4, wherein the relative density of the oil is claimed, are considered to be mere design technical features which do not seem to provide a surprising technical effect over D2, that the person skilled in the art would apply to D2, depending on the circumstances, without involving an inventive step and arrive to the subject-matter of claim 4. Therefore, the subject-matter of claim 4 is not considered to involve an inventive step over D2 under Art. 33(3) PCT.

3 **Re Item VIII**

Certain observations on the international application

The application does not meet the requirements of Article 6 PCT, because the subject-matter of claims 6, 9-12 is not clear.

- 3.1 In regards to claims 5 and 6: the technical feature "a curved section of the lateral wall part" is claimed to be as an "or feature". Therefore, the further technical features of claim 6 "*wherein the curved section of the lateral wall has a curvature radius*" do not seem to limit the subject-matter of the claim because such feature is considered to be "optional" and claim 6 do not seem to include further technical features from the claim 5, from which is dependent and it is therefore not considered to be clear under Art. 6 PCT.
- 3.2 Claims 9 and 11 do not meet the requirements of Article 6 PCT because the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved (cf. claim 9: "*wherein the system is configured to locate the drop of sample at a distance in the base plan (x/y) ranging from 0 to 1 diameter of the drop of sample*") and (cf. claim 11, "*wherein the system is configured to allow the drop of sample to be trapped and/or moved in a defined location of the loading well*"), which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. For the scope of the search, the broadest meaning of this wording has been understood.
- 3.3 In regards to the independent claim 10: It is clear from the description on page 3, lines 1-2, that feature "wherein the inlet port is located at a distance in the base plan (x/y) ranging from about 1 mm to about 5 mm from the bottom wall part's deepest depth relatively to the loading opening" is essential to the definition of the invention.

Since independent claim 10 does not contain this feature it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

- 3.4 Furthermore, it is not clear from the wording of the independent method claim 12 which are the further technical features that make the drop to be trapped and/or moved in a defined position. It is furthermore not clear which are the technical features of such "defined position". Furthermore, in view of this objection, it is not clear which are of the further technical features of claim 12 that differ from the independent method claim 10. Therefore, the independent claim 12 is also not considered to be clear under Art. 6 PCT and the wording from the two last lines of this claim do not seem to limit the subject-matter of the claim. Similar objection applies, mutatis mutandis, to the wording of the two last lines of claim 10.

4 Final remarks

The following remarks will become relevant on entry into the examination phase:

- 4.1 The attention of the applicant is drawn to the fact that the application may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Article 19(2) PCT).
- 4.2 In order to facilitate the examination of the conformity of the amended application with the requirements of Article 19(2) PCT, the applicant should clearly identify the amendments made, irrespective of whether they concern amendments by addition, replacement or deletion, and indicate the passages of the application as filed on which these amendments are based.
- 4.3 The independent claims should, whenever appropriate be drafted in the two-part form (Rule 6 PCT).
- 4.4 To meet the requirements of Rule 5.1 PCT, the documents cited in the Search Opinion should be identified in the description and the relevant background art disclosed therein should be briefly discussed. The applicant should ensure that it is clear from the description which features of the subject-matter of independent claims are known from said documents.