

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference SP18-406	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2019/060815	International filing date (<i>day/month/year</i>) 12 November 2019	(Earliest) Priority Date (<i>day/month/year</i>) 26 November 2018
Applicant CORNING INCORPORATED		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out 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)).

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (see Box No. II).

3. **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 15

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b. none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/060815

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
See extra sheet(s).

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-22

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/060815

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - G02B 26/00; H01L 21/027; H01L 21/00; H01L 27/00 (2020.01)
 CPC - G02B 26/005; G02B 26/00; G09G 3/348; H01L 21/00; H01L 21/027; H01L 27/00 (2020.02)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 USPC - 438/71; 438/149; 438/164 (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2015/0228552 A1 (STATS CHIPAC, LTD.) 13 August 2015 (13.08.2015) entire document	1-22
A	US 2009/0294989 A1 (DELIGIANNI et al) 03 December 2009 (03.12.2009) entire document	1-22
A	US 2007/0047095 A1 (JUNG et al) 01 March 2007 (01.03.2007) entire document	1-22

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 February 2020

Date of mailing of the international search report

27 FEB 2020

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/060815

Continued from Box No. III Observations where unity of invention is lacking

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-22, are drawn to a method for forming a patterned insulating layer on a conductive layer, the method comprising: removing an annular region of an insulating layer overlying a perimeter of an opening in a mask by laser ablation.

Group II, claims 23-29, are drawn to an electrowetting device comprising: a first window, a second window, and a cavity disposed between the first window and the second window.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: removing an annular region of an insulating layer overlying a perimeter of an opening in a mask by laser ablation, an inner portion of the annular region of the insulating layer disposed on a central region of the conductive layer corresponding to the opening in the mask, and an outer portion of the annular region of the insulating layer disposed on the mask, whereby an annular portion of the central region of the conductive layer is uncovered by each of the mask and the insulating layer; and removing the mask from the conductive layer to remove an excess portion of the insulating layer disposed on the mask, whereby a remaining portion of the insulating layer defines the patterned insulating layer disposed on the central region of the conductive layer, and a surrounding region of the conductive layer surrounding the central region of the conductive layer is uncovered by the patterned insulating layer as claimed therein is not present in the invention of Group II. The special technical feature of the Group II invention: a first window, a second window, and a cavity disposed between the first window and the second window; a first liquid and a second liquid disposed within the cavity, the first liquid and the second liquid substantially immiscible with each other, whereby a liquid interface is formed between the first liquid and the second liquid; a driving electrode disposed on a sidewall of the cavity; and an insulating layer disposed within the cavity to insulate the driving electrode from the first liquid and the second liquid; wherein the insulating layer is substantially free of flaps and stringers as claimed therein is not present in the invention of Group I.

Groups I and II lack unity of invention because even though the inventions of these groups require the technical feature of an insulating layer, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2007/0047095 to Jung et al. teaches an insulating layer (Para. [0032]).

Since none of the special technical features of the Group I or II inventions are found in more than one of the inventions, unity of invention is lacking.