



(51) International Patent Classification:
E06B 3/54 (2006.01)

(21) International Application Number:
PCT/IN2016/050430

(22) International Filing Date:
2 December 2016 (02.12.2016)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
6627/CHE/2015 10 December 2015 (10.12.2015) IN

(71) Applicant: SAINT-GOBAIN GLASS FRANCE
[FR/FR]; 18, Avenue d'Alsace, F-92400 Courbevoie (FR).

(72) Inventor; and

(71) Applicant (for US only): TADEPALLI, Rajappa
[IN/IN]; M131, II Main Road, Thiruvalluvur Nagar,
Thiruvannmiyur, Chennai-600041, Tamilnadu (IN).

(72) Inventors: BALAIAH, Kuppan; No.8, Yadava Street, NS
Puram, Minnal Post, Arakkonam T.k., Vellore district,
Tamil Nadu, Pinocode:632510, Arakkonam (IN). S A,

Rathish; C 20, Mysore Street, Block 26, Neyveli, Tamil
Nadu, Pincode:607803., Neyveli (IN).

(74) Agent: KUMAR, Giriraj; Saint-Gobain Research India
(SGRI) Pvt. Ltd., Intellectual Property Law Department,
No: 1 FA, Phase-II, "C" Block, Kanagam Road, Thara-
mani, Chennai-600113 (IN).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,

[Continued on next page]

(54) Title: METHOD OF INSTALLING GLASS PANEL

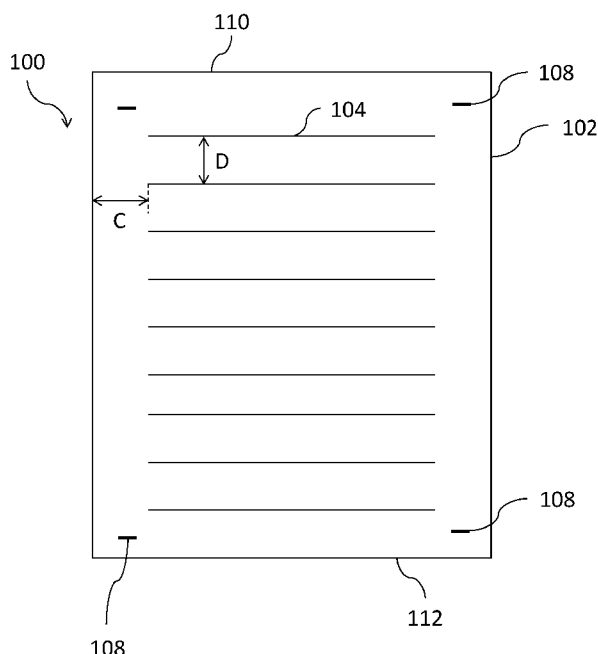


FIG.1

(57) Abstract: A method of installing a glass panel on a sub-
strate is provided. The method includes determining an op-
timum quantity of an adhesive required for the installation.
The method also includes determining a pattern of application
of the adhesive based at least on the type of adhesive. The
method further includes installing the glass panel on the sub-
strate based on the determined optimum quantity and the ap-
plication pattern of the adhesive.



TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

METHOD OF INSTALLING GLASS PANEL

Technical Field

[0001] The present disclosure relates in general to a method of installing a glass panel on a substrate, and more specifically to a method of installing a glass panel using an adhesive.

Background

[0002] Conventionally, glass panels for interior applications are installed using various adhesives. However, some of the adhesives may react with coatings on different types of glass, for example, lacquered glass, colored glass, tinted glass and the like. Further, these adhesives are generally applied in random quantities and patterns which may not provide the required bond strength and/or may result in wastage of the adhesive.

[0003] Installation manuals of glass manufacturers and glass suppliers describe application of adhesive tapes and glue or silicone in vertical strips according to the weight of the glass being installed. However these manuals do not consider other parameters that would influence the installation procedure. Hence, there exists a need to standardize a method for optimized application of adhesive that provides required bonding strength.

Summary of the Disclosure

[0004] In one aspect of the present disclosure, a method of installing a glass panel on a substrate is provided. The method includes determining an optimum quantity of an adhesive required for the installation. The method also includes determining a pattern of application of the adhesive based at least on the type of adhesive. The method further includes installing the glass panel on the substrate based on the determined optimum quantity and application pattern of the adhesive.

[0005] In another aspect of the present disclosure, an installation system is provided. The installation system includes a glass panel and a predetermined quantity of an adhesive for use during installation of the glass panel on a

substrate. The quantity of adhesive and the application pattern of the adhesive are predetermined to provide desired bond strength for the installation.

[0006] In yet another aspect of the present disclosure, a method of installing a glass panel on a substrate using silicone is provided. The method includes determining an optimum quantity of silicone that would provide a desired bond strength for the installation. The method also includes applying the optimum quantity of silicone on one of the substrate or the glass panel in a pattern comprising substantially horizontal lines. The method further includes fixing the glass panel on the substrate.

[0007] In another aspect of the present disclosure, a method of installing a glass panel on a substrate using a tape is provided. The method includes determining an optimum quantity of the tape that would provide a desired bond strength for the installation. The method also includes application of the optimum quantity of the tape on one of the substrate or glass panel in a pattern comprising cross lines. The method further includes fixing the glass panel on the substrate.

[0008] Other features and aspects of this disclosure will be apparent from the following description and the accompanying drawings.

Brief Description of the Drawings

[0009] Embodiments are illustrated by way of example and are not limited in the accompanying figures.

[0010] FIG. 1 illustrates an installation system showing a pattern of application of an adhesive of the installation system, according to an embodiment of the present disclosure;

[0011] FIG. 2 illustrates an installation system showing a pattern of application of an adhesive of the installation system, according to another embodiment of the present disclosure;

[0012] FIG. 3 illustrates an installation system showing a pattern of application of an adhesive of the installation system, according to yet another embodiment of the present disclosure;

[0013] FIG. 4 illustrates an installation system showing a pattern of application of an adhesive of the installation system, according to another embodiment of the present disclosure; and

[0014] FIG. 5 illustrates a flowchart for a method of installing the glass panel on a substrate, according to an embodiment of the present disclosure;

[0015] Skilled artisans appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of embodiments of the invention.

Detailed Description

[0016] Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or the like parts. Embodiments disclosed herein are related to an installation system and a method of installing a glass panel on a substrate.

[0017] Referring to FIGS. 1 to 4, various embodiments of an installation system 100 are illustrated. The installation system 100 includes a glass panel 102 having a top edge 110 and a bottom edge 112. In a preferred embodiment, the glass panel 102 may be used for interior applications. The glass panel 102 may include any of a mirror, a lacquered glass, a colored glass, a tinted glass, a tempered glass, a laminated glass, a patterned glass or the like. It may also be contemplated to apply concepts of the present invention to any of the coated glass or a clear glass based on the type of application.

[0018] The glass panel 102 is configured to be installed on a substrate (not shown). In one example, the substrate may be plywood. In other examples, the substrate may be any of fiber cement, drywall or the like. In a preferred embodiment, the substrate may be oriented in a substantially horizontal direction with respect to the glass panel 102. In another preferred embodiment, the substrate may be a vertical wall. In the illustrated embodiment, the glass panel 102 has a rectangular shape. In other embodiments, the glass panel 102 may have

any other shapes such as, but not limited to, polygonal, circular, asymmetrical or the like.

[0019] The installation system 100 also includes an adhesive 104. In an embodiment, the adhesive 104 may be applied on a rear surface of the glass panel 102 for installation on the substrate. In another embodiment, the adhesive 104 may be applied on the substrate. The adhesive 104 may be chemically inert with respect to a coating on the respective glass panel 102. In one embodiment, the adhesive 104 may be silicone. In an example, the silicone may be a neutral alkoxy silicone. In another embodiment, the adhesive 104 may be a tape. The tape may include, for example, a Norton Tape or a DuploColl 918 by Lohmann tapes or the like. Moreover, the adhesive 104 may also be of other types based on various parameters such as, the type of glass panel 102, coating on the glass panel 102, the type of substrate or the like.

[0020] The installation system 100 includes the adhesive 104 in a predetermined quantity. The quantity of the adhesive 104 is determined to be applied in a predetermined pattern on the glass panel 102 to provide desired bond strength. In an embodiment, the predetermined quantity may be an optimum quantity of adhesive 104 required for the installation. The optimum quantity may differ based on the bond strength of the corresponding adhesive 104 and parameters related to the glass panel 102.

[0021] The pattern of application is determined based on the type of adhesive 104 used. In an embodiment, the pattern of application may also depend on the dimensions of the glass panel 102.

[0022] In one embodiment, the optimum quantity may be determined based on the dimensions of the glass panel 102 to achieve a desired bond strength. In another embodiment, the optimum quantity may be determined based on the weight of the glass panel 102. In yet another embodiment, the optimum quantity may be determined as the maximum among the quantities determined based on the weight of the glass panel 102 and, the dimensions of the glass panel 102. Alternatively, the optimum quantity may be determined based on the determined pattern of application.

[0023] The determination of each of the optimum quantity and various parameters related to the pattern of application will be explained hereinafter with reference to FIGS. 1 to 5.

[0024] Referring to FIG. 1, the installation system 100 having a silicone as the adhesive 104 is illustrated, according to an embodiment of the present disclosure. As shown, the pattern of application includes multiple substantially horizontally lines i.e., silicone beads. Moreover, application of the silicone in horizontal lines is found to provide approximately about 9 percent more bonding strength compared to the application of the adhesive 104 in vertical lines. The number of lines, thickness of each of the lines, and an optimum distance 'D' between each of the lines, a clearance 'C' between the pattern and the edges of the glass panel 102 may be determined based on at least one of the optimum quantity of the adhesive 104 and the dimensions of the glass panel 102. Moreover, each of these parameters may be determined to provide a desired bond strength for the installation, as will be described later in the specification.

[0025] In an embodiment, the installation system 100 may also include a spacer element 108 disposed between the glass panel 102 and the substrate. In an example, the spacer element 108 may be a tape of pre-determined thickness. The tape may be disposed without removing the liner so as to provide the required space to achieve the desired thickness of the silicone beads after curing between the glass panel 102 and the substrate. In a preferred embodiment, the spacer element 108 may be disposed adjacent to each of the corners of the glass panel 102, as shown in FIG. 1. As such, a desired thickness of the silicone beads may be achieved when the silicone is cured. In other examples, the spacer element 108 may include other components or suitable mechanisms including foam, robotic arm, vacuum suction or other spacer support means. Accordingly, a position of the spacer element 108 or a spacer mechanism with respect to the glass panel 102 may be determined.

[0026] Referring to FIGS. 2 to 4, a pattern of application of tape as an adhesive 104 is illustrated, according to various embodiments of the present disclosure. The pattern of application of tape may differ based on at least one of the optimum quantity and the dimensions of the glass panel 102. Referring to

FIG. 2, the pattern of application includes cross-lines. Moreover, such a pattern may increase the bond strength between the glass panel 102 and the adhesive 104.

[0027] Referring to FIG. 3, the pattern may have an hour glass shape that includes both cross-lines and horizontal lines disposed adjacent to a top edge 110 and a bottom edge 112 of the glass panel 102. Referring to FIG. 4, the pattern may further include horizontal lines and vertical lines disposed adjacent to the corresponding sides of the glass panel 102. In an embodiment, the pattern may include multiple horizontal lines and/or vertical lines disposed adjacent to each other. In an example, as the thickness of the glass panel 102 increases, the pattern may also include horizontal lines and/or vertical lines along with the cross-lines. Similarly, a pattern of application may be determined for various types of adhesives so as to give desired bonding strength.

[0028] Referring to FIG. 5, a flowchart for a method 500 of installing a glass panel on a substrate is illustrated. The method 500 will be explained in conjunction with one or more components of the installation system 100. However, it may also be contemplated to implement the concepts of the method 500 with other components without deviating from the scope of the present disclosure.

[0029] At step 502, the method 500 includes determining an optimum quantity of the adhesive 104 required for the installation. In one embodiment, the adhesive 104 may be silicone. In an example, the silicone may be neutral alkoxy silicone. In another embodiment, the adhesive 104 may be tape. The tape may include, for example, an acrylic based foam adhesive. However, it may be contemplated to use other types of suitable adhesives, for the installation. Moreover, in case of a coated glass, the adhesive 104 that is chemically inert to the corresponding coating and having desired bond strength may be used for the installation. The optimum quantity of the adhesive 104 may differ based on the bond strength of the corresponding adhesive 104 and parameters related to the glass panel 102 as will be described below.

[0030] At step 504, the method 500 includes determining a pattern of application of the adhesive 104. The pattern of application is determined based on

a type of the adhesive 104 used. In an embodiment, the pattern of application may also depend on the dimensions of the glass panel 102.

[0031] In one aspect, the adhesive 104 may be silicone. Accordingly, the pattern may include substantially horizontal lines. In such a case, the pattern may also include the spacer element 108 disposed between the glass panel 102 and the substrate.

[0032] In another aspect, the adhesive 104 may be tape. Accordingly, the pattern may include cross-lines as shown in FIG. 2. In an embodiment, the pattern may also include horizontal lines disposed adjacent to the corresponding edges of the glass panel 102 so as to give an hour glass shape to the pattern as shown in FIG. 3. In another embodiment, the pattern may also include one or more vertical lines disposed adjacent to the corresponding edges of the glass panel 102.

[0033] Although, the patterns are illustrated for rectangular shape of the glass panel 102, it may be envisioned to implement one or more steps of the method 500 for various other shapes of the glass panel 102. In an example, for a glass panel 102 having circular shape, a rectangle or a square of highest area that can be fitted within the circular shape of the glass panel 102 may be determined. Further, the dimensions of the rectangle or square having the highest area may be used as the effective dimensions of the glass panel 102.

[0034] In one embodiment, various parameters for the pattern of application may be determined based on desired bond strength and, various properties of the adhesive 104 and the glass panel 102. For example, for silicone as the adhesive 104, the number of lines, the optimum distance 'D' between the adjacent pair of lines and the clearance 'C' from each of the edges of the glass panel 102 may be determined. With such an implementation, other parameters such as the length of each of the line may also be estimated based on determined parameters.

[0035] In an embodiment, the clearance 'C' and the optimum distance 'D' between the adjacent pair of lines may be determined based on experimentation. In an example, the clearance 'C' and the optimum distance 'D' may be determined based on spillage of the adhesive 104. Additionally or optionally, the optimum distance 'D' and the clearance 'C' may be determined based on the

thickness of the silicone beads. Moreover, selection of these parameters may also be determined to enable easy application. Similarly, for use of a tape as the adhesive 104, the parameters related to the pattern of application include, a clearance from the edges of the glass panel 102, number of horizontal and/or vertical lines and the like.

[0036] In an embodiment the optimum quantity of the adhesive 104 may thus be determined based on the pattern of application of the adhesive 104. In an example, the optimum quantity of the adhesive 104 may be determined as a minimum quantity of the adhesive 104 to achieve the determined pattern of application of the adhesive 104.

[0037] In another embodiment, one or more of these parameters may be determined based on the optimum quantity of the adhesive 104. In such a case, the optimum quantity of the adhesive 104 may be determined based on the dimensions of the glass panel 102 and a factor of safety of the glass panel 102. The glass panel 102 may experience various forces such as gravitational force, and other loads upon installation. The optimum quantity may be determined for the adhesive 104 so as to withstand these forces.

[0038] Example 1:

[0039] A shear bond strength test was performed to evaluate bonding strength requirement for the glass panel 102. A minimum shear strength required was evaluated by assuming 5 % area coverage of the adhesive on the glass panel. Based on the gravitational force on the glass panel 102, the minimum shear bond strength required for the adhesive was found to be 3kPa. Further, a force equivalent to a person pulling on the glass panel 102 was added. The pulling force was assumed to be 1000N, in an example. In such a case, the required bond strength was found to be equal to 23kPa. Based on the minimum requirement for the glass panel 102 and the bond strength of the respective adhesive 104, the optimum quantity was evaluated. In an embodiment, the optimum quantity of the adhesive 104 that provided 10 times the factor of safety for the installation was determined. As such, the glass panel 102 may withstand a force of 230kPa with application of the determined optimum quantity of the adhesive 104. Further, a humidity chamber test was also performed to evaluate the bond strength for the

installation. Accordingly, the desired bond strength for the installation was estimated.

[0040] Example 2:

[0041] Three samples of 150mm x 200mm x 4mm dimensions were taken and silicone beads of 10 mm to 12 mm were applied in vertical pattern. Three other samples of 150mm x 200mm x 4mm dimensions were taken and silicone beads of 10 mm to 12 mm were applied in horizontal pattern according to the present invention. All the test specimens were allowed to cure under ambient conditions for seven days. The specimens were then tested using an Universal Testing Machine (UTM) for evaluating the shear bond strength (the glass and the substrate were pulled in opposite direction till adhesive or substrate failure occurs).

[0042] Results of the test procedure are tabulated in Table 1. It is evident from the table that glass specimens with horizontal application of silicone beads had an average load bearing strength of ~1458 N which is greater than that of glass specimens with vertical application of silicone beads (~1299 N). Moreover, application of the silicone in horizontal pattern was found to provide approximately about 9 percent more bonding strength compared to the application of silicone beads in vertical pattern.

Table 1: Results of Shear Bond Strength Test

S.No	Pattern of Application	Maximum Load (N)	Pattern of Application	Maximum Load (N)
Sample 1	Vertical application of Silicone	1261.63	Horizontal application of Silicone	1599.74
Sample 2		1323.2		1497.46
Sample 3		1314.41		1478.92
	Average	1299.75	Average	1458.71

[0043] As such, various parameters related to the pattern of application of the adhesive 104 may be determined further based on the determined optimum quantity of the adhesive 104. For example, for silicone as the adhesive 104, the optimum distance 'D' between the adjacent pair of lines may be determined

based on the dimensions of the glass panel 102, adhesive properties and the like. Further, as described above, the number of lines and the length of each of the lines may be determined based on the determined optimum quantity of the adhesive 104 by providing the optimum distance 'D' between each of the adjacent pair of lines.

[0044] At step 506, the method 500 includes installing the glass panel 102 based on the determined quantity of the adhesive 104 and the pattern of application. The method 500 includes applying the respective adhesive 104 in the determined pattern on the glass panel 102 for the installation. In case of silicone as the adhesive 104, the silicone may be allowed to cure for required amount of time.

[0045] As such, the method 500 of the present disclosure provides a standardized way of installing the glass panel 102. Moreover, the patterns of application as described provide more bonding strength compared to conventional or random application of the adhesive 104. Desired factor of safety and the bond strength are achieved based on the selection of adhesive 104, the pattern of application, and the quantity of adhesive 104. .

[0046] Note that not all of the activities described above in the general description or the examples are required, that a portion of a specific activity may not be required, and that one or more further activities may be performed in addition to those described. Still further, the order in which activities are listed is not necessarily the order in which they are performed.

[0047] Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any feature(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature of any or all the claims.

[0048] The specification and illustrations of the embodiments described herein are intended to provide a general understanding of the structure of the various embodiments. The specification and illustrations are not intended to serve as an exhaustive and comprehensive description of all of the elements and features of apparatus and systems that use the structures or methods described

herein. Certain features, that are for clarity, described herein in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features that are, for brevity, described in the context of a single embodiment, may also be provided separately or in a sub combination. Further, reference to values stated in ranges includes each and every value within that range. Many other embodiments may be apparent to skilled artisans only after reading this specification. Other embodiments may be used and derived from the disclosure, such that a structural substitution, logical substitution, or another change may be made without departing from the scope of the disclosure. Accordingly, the disclosure is to be regarded as illustrative rather than restrictive.

[0049] The description in combination with the figures is provided to assist in understanding the teachings disclosed herein, is provided to assist in describing the teachings, and should not be interpreted as a limitation on the scope or applicability of the teachings. However, other teachings can certainly be used in this application.

[0050] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a method, article, or apparatus that comprises a list of features is not necessarily limited only to those features but may include other features not expressly listed or inherent to such method, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive-or and not to an exclusive-or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0051] Also, the use of "a" or "an" is employed to describe elements and components described herein. This is done merely for convenience and to give a general sense of the scope of the invention. This description should be read to include one or at least one and the singular also includes the plural, or vice versa, unless it is clear that it is meant otherwise. For example, when a single item is described herein, more than one item may be used in place of a single item.

Similarly, where more than one item is described herein, a single item may be substituted for that more than one item.

[0052] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The materials, methods, and examples are illustrative only and not intended to be limiting. To the extent that certain details regarding specific materials and processing acts are not described, such details may include conventional approaches, which may be found in reference books and other sources within the manufacturing arts.

[0053] While aspects of the present disclosure have been particularly shown and described with reference to the embodiments above, it will be understood by those skilled in the art that various additional embodiments may be contemplated by the modification of the disclosed machines, systems and methods without departing from the spirit and scope of what is disclosed. Such embodiments should be understood to fall within the scope of the present disclosure as determined based upon the claims and any equivalents thereof.

List of Elements

TITLE: METHOD OF INSTALLING GLASS PANEL

100	Installation system
102	Glass panel
104	Adhesive
108	Spacer Element
110	Top edge
112	Bottom Edge
500	Method
502	Step
504	Step
506	Step
D	Optimum Distance between Lines
C	Clearance from Edges of Glass panel

Claims

What is claimed is:

1. A method of installing a glass panel on a substrate, the method comprising:
 - determining an optimum quantity of an adhesive required for the installation;
 - determining a pattern of application of the adhesive based at least on a type of the adhesive; and
 - installing the glass panel on the substrate based on the determined optimum quantity and the pattern of application of the adhesive.
2. The method of claim 1, wherein the optimum quantity of the adhesive is determined based on a weight of the glass panel and a factor of safety required for the installation.
3. The method of claim 1, wherein the pattern of application is determined further based on the determined optimum quantity of the adhesive.
4. The method of claim 1, wherein the pattern of application is determined further based on dimensions of the glass panel.
5. The method of claim 4, wherein the optimum quantity is determined based on the pattern of application of the adhesive.
6. The method of claim 1, wherein at least one of the optimum quantity and the pattern of application of the adhesive are determined based on a desired bond strength for the installation.
7. The method of claim 1, wherein the adhesive is one of a silicone or a tape.

8. The method of claim 1, wherein the type of adhesive is a silicone, and wherein the pattern of application comprises a plurality of substantially horizontal lines.
9. The method of claim 8 further comprising disposing a spacer element between the glass panel and the substrate.
10. The method of claim 1, wherein the type of adhesive is a tape, and wherein the pattern of application comprises cross lines.
11. The method of claim 10, wherein the pattern further comprises at least one of horizontal lines and vertical lines disposed adjacent to the corresponding sides of the glass panel.
12. The method of claim 1, wherein the glass panel is one of a mirror, a lacquered glass, a colored glass, a tinted glass, a patterned glass, a laminated glass and a tempered glass.
13. The method of claim 7, wherein the silicone is a neutral alkoxy silicone.
14. An installation system comprising:
 - a glass panel; and
 - a predetermined quantity of an adhesive for use in an installation of the glass panel on a substrate, wherein the quantity of adhesive is determined for application in a predetermined pattern to provide desired bond strength for the installation.
15. The installation system of claim 14, wherein the pattern of application comprises substantially horizontal lines if the adhesive is silicone.
16. The installation system of claim 15 further comprising a spacer element configured to be disposed between the glass panel and the substrate if the adhesive is silicone.

17. The installation system of claim 14, wherein the pattern of application comprises cross lines if the adhesive is tape.
18. The installation system of claim 17, wherein the pattern further comprises at least one of horizontal lines and vertical lines disposed adjacent to the corresponding sides of the glass panel, if the adhesive is tape.
19. The installation system of claim 14, wherein the glass panel is one of a mirror, a lacquered glass, a colored glass, a tinted glass, a patterned glass and a tempered glass.
20. A method of installing a glass panel on a substrate using a silicone, the method comprising:
 - determining an optimum quantity of a silicone that provides a desired bond strength for the installation;
 - applying the optimum quantity of silicone on one of the substrate or the glass panel in a pattern comprising substantially horizontal lines;
 - and
 - fixing the glass panel on the substrate.
21. The method of claim 20, wherein the silicone is a neutral alkoxy silicone.
22. A method of installing a glass panel on a substrate using a tape, the method comprising:
 - determining an optimum quantity of a tape that provides a desired bond strength for the installation;
 - application of the optimum quantity of the tape on one of the substrate or the glass panel in a pattern comprising cross lines; and
 - fixing the glass panel on the substrate.

23. The method of claim 22, wherein the pattern further comprises at least one of horizontal lines and vertical lines disposed adjacent to the corresponding sides of the glass panel.

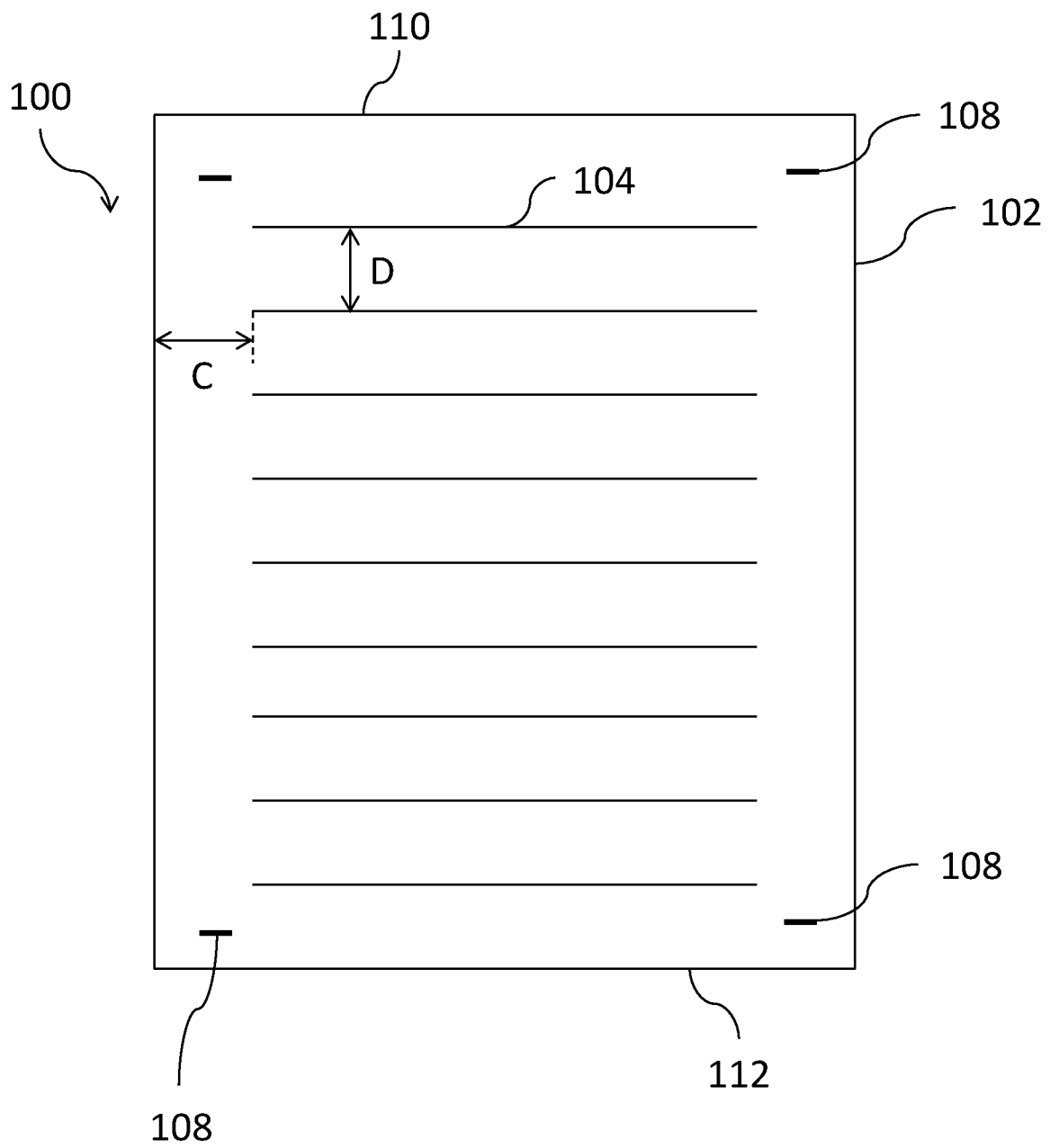


FIG.1

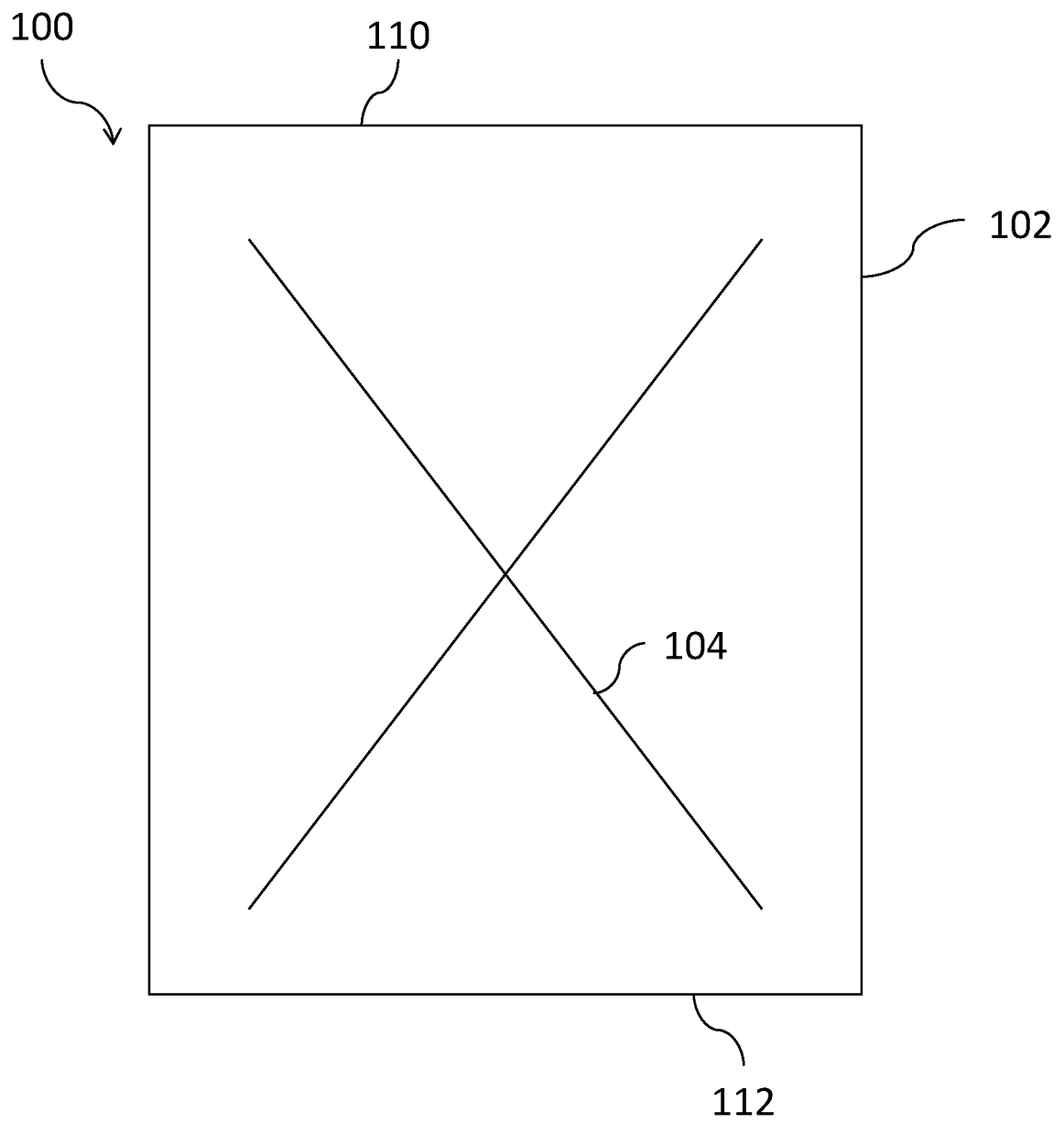


FIG.2

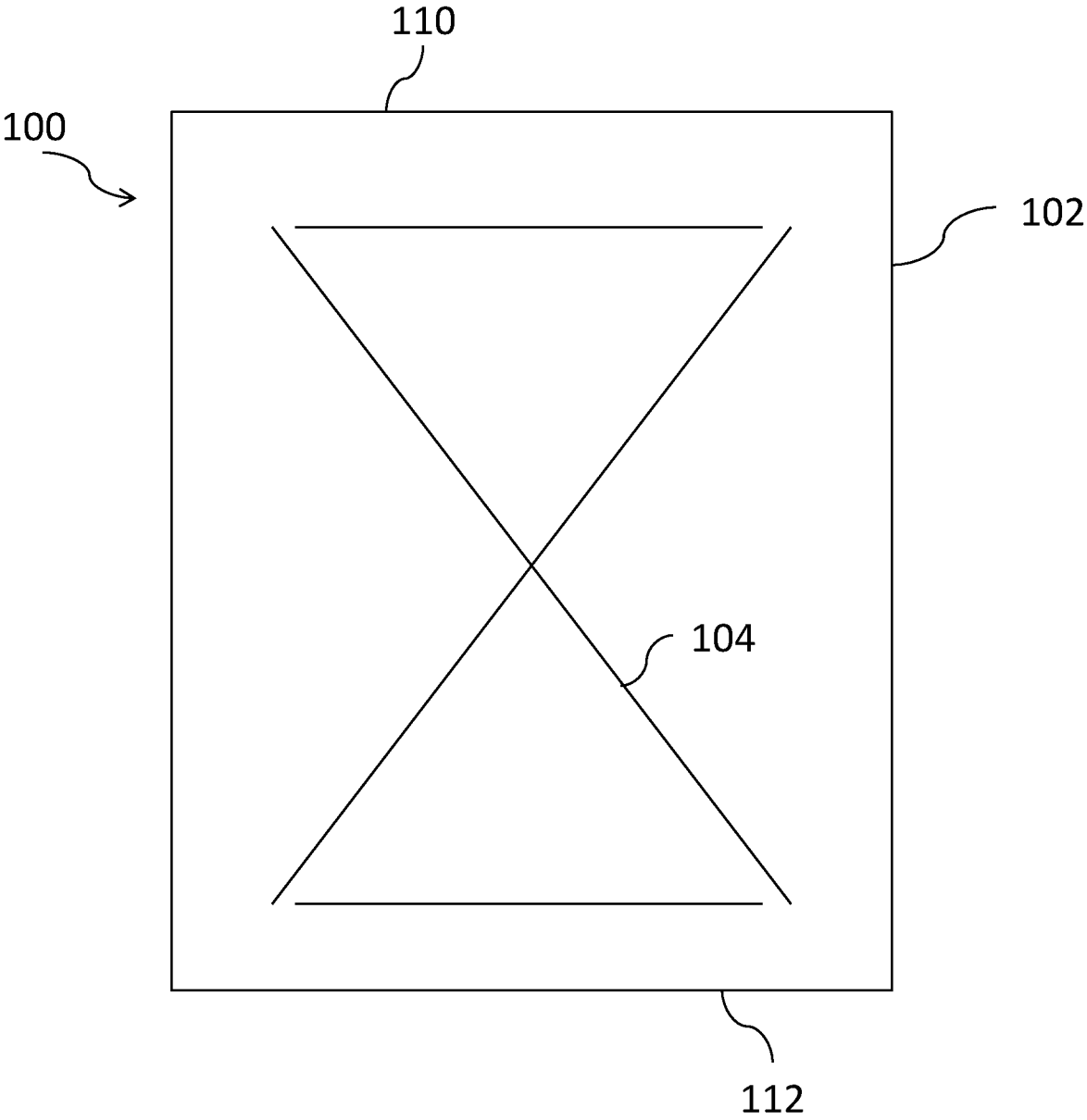


FIG.3

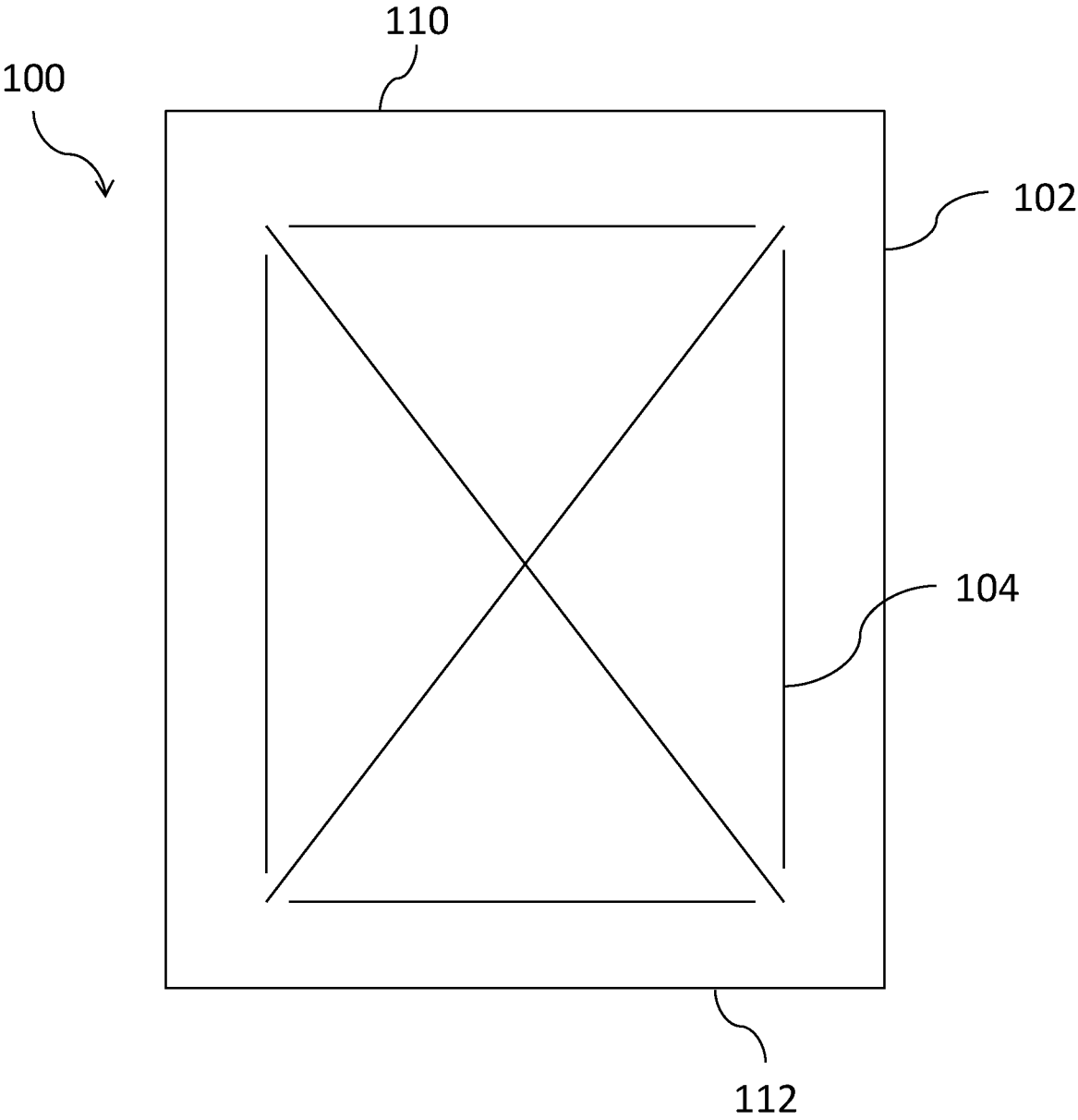


FIG.4

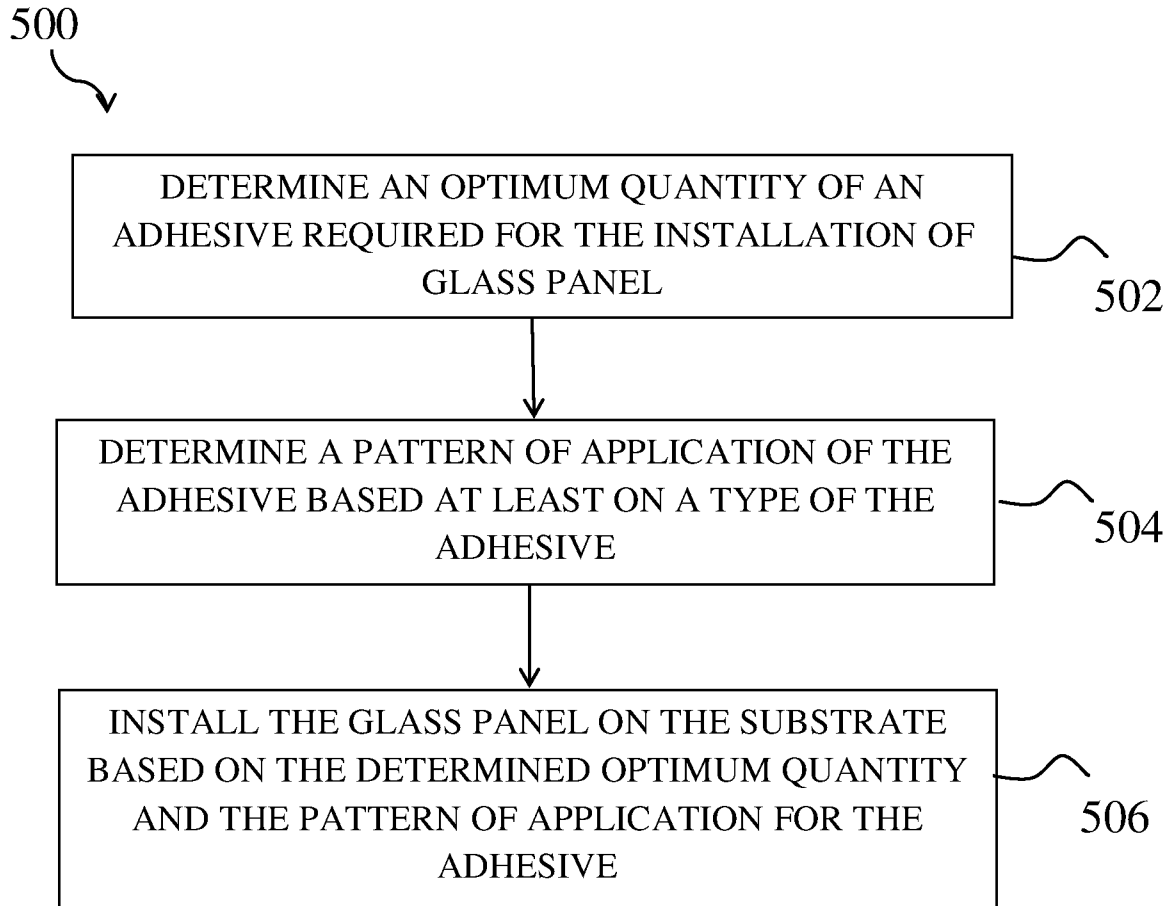


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2016/050430

A. CLASSIFICATION OF SUBJECT MATTER
E06B3/54 Version=2017.01

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)

E06B3/54

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

Patseer, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US2009233020A1 (CARDINAL LG COMPANY) (PUBLICATION DATE 17 SEPTEMBER 2009) Page 2 para 21 line 3-11	1-23
Y	US2015135627A1 (SAINT GOBAIN GLASS CORP) (PUBLICATION DATE 21 MAY 2015) Page 1 para 3 line 1-5 ,20-24; para 11 line 3-6	1-23
Y	US6612091B1 (FIELD STEPHEN, GLOVER MICHAEL) (PUBLICATION DATE 02 SEPTEMBER 2003) Description, Claims	1-23
Y	KR101524507B1 (SAINT-GOBAIN PERFORMANCE PLASTICS CORPORATION) (PUBLICATION DATE 01 JUNE 2015) Description, Claims	1-23
Y	CN104884248A (SAINT GOBAIN SA) (PUBLICATION DATE 02 SEPTEMBER 2015) Description, Claims	1-23

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search

30-03-2017

Date of mailing of the international search report

30-03-2017

Name and mailing address of the ISA/

Indian Patent Office
Plot No.32, Sector 14, Dwarka, New Delhi-110075
Facsimile No.

Authorized officer

Dev Narayan Jatwa

Telephone No. +91-1125300200

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2016/050430

Citation	Pub.Date	Family	Pub.Date
US 2009233020 A1	17-09-2009	WO 2009039240 A2	26-03-2009
		WO 2009039240 A3	07-05-2009
US 2015135627 A1	21-05-2015	US 9410357 B2	09-08-2016
		CN 104583522 A	29-04-2015
		KR 20150016539 A	12-02-2015
		JP 2015524029 A	20-08-2015
		EP 2855814 A1	08-04-2015
		WO 2013182760 A1	12-12-2013
		FR 2991370 A1	06-12-2013
		FR 2991370 B1	16-05-2014
US 6612091 B1	02-09-2003	WO 2000036260 A1	22-06-2000
		EP 1144790 A1	17-10-2001
		CA 2355107 A1	22-06-2000
KR 101524507 B1	01-06-2015	WO 2012088538 A3	10-01-2013
		EP 2655534 A2	30-10-2013
		US 20120159880 A1	28-06-2012
		WO 2012088538 A2	28-06-2012
		KR 20130143103 A	30-12-2013
		EP 2655534 A4	27-01-2016
		WO 2012088541 A3	06-12-2012
		WO 2012088541 A2	28-06-2012
		US 8826611 B2	09-09-2014
		US 20140345782 A1	27-11-2014
		US 9272499 B2	01-03-2016
CN 104884248 A	02-09-2015	FR 3015926 A1	03-07-2015
		US 20160325528 A1	10-11-2016
		EP 3089871 A1	09-11-2016
		WO 2015101745 A1	09-07-2015
		CA 2931234 A1	09-07-2015