

Search history

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Search 24: [SP]: cross-reference to related applications[0001] this application claims the benefit, under 35 u.s.c. 119(e)(1), of provisional patent application ser. no. 62/440,444 titled "method and apparatus for bending thin glass," which was filed on dec. 30, 2016, by the same inventors of this application. the aforementioned provisional application is incorporated herein by reference in its entirety, as if it were disclosed in the present document.field of invention[0002] the present invention relates generally to the field of light weight automotive laminates and, more particularly, to an improved method and apparatus for bending thin glass.background of the invention[0003] in response to the regulatory requirements for increased automotive fuel efficiency as well as the growing public awareness and demand for environmentally friendly products, automotive original equipment manufacturers, around the world, have been working to improve the efficiency of their vehicles.[0004] one of the key elements of the strategy to improve efficiency has been the concept of light weighting. often times, more traditional, less expensive, conventional materials and processes are being replaced by innovative new materials and processes which while sometime being more expensive, still have higher utility than the materials and processes being replaced due to their lower weight and the corresponding increase in fuel efficiency. vehicle glazing has been no exception.[0005] for many years, the standard automotive windshield has had a thickness of 5.4 mm. in more recent years, we have seen the thickness decrease to 4.75 mm. while a reduction of 0.65 mm may not seem significant, at a density of 2600 kg per cubic meter for standard soda lime glass, each millimeter that the thickness is reduced, decreases the weight by 2.6 kg per square meter. the weight of a typical 1.2 square meter windshield going from 5.4 mm to 4.75 mm is reduced by a little over 2 kg. on a vehicle with a total of 6 square meters of glass, a 1 mm reduction on all of the windows translates into a savings of 15.6 kg.[0006] however there are limits as to have thin the glazing can be. stress under wind load has always been a factor. with the trend towards increasing in the size of windshields in particular, wind load is even more of a concern. glass is also becoming a structural element in more and more vehicles. the glazing contributes to the stiffness and strength of the car. fixed glass, once bonded with a relatively soft curing poly-urethane, is being mounted with higher modulus adhesives. as a result, the glass, once isolated by rubber gaskets and soft butyl adhesives, is now much more subject to loading from the bumps in the road and vehicle torsion. [0007] today, windshields with a 2.1 mm outer ply, a 1.6 mm inner ply and a 0.76 mm plastic interlayer totaling just under 4.5 mm in total thickness are becoming common. this may be close to the limit of what can be done with conventional annealed soda lime glass.[0008] annealed glass is glass that has been slowly cooled from the bending temperature through the glass transition range. this is done to relieve stress in the glass. annealed glass breaks into large shards with sharp edges. in a laminate, two sheets of annealed glass are glued together using a sheet of thermo plastic. if the laminated glass should break, the plastic layer holds the shards of glass together, helping to maintain the structural integrity of the glass. the shards of broken glass are held together much like the pieces of a jigsaw puzzle. a vehicle with a broken windshield can still be operated. on impact, the plastic layer also helps to prevent penetration by the occupant or by objects striking the laminate from the exterior.[0009] heat strengthened glass, with a compressive strength in the range of 10,000 psi, can be used in all vehicle positions other than the windshield. heat strengthened (tempered) glass has a layer of high compression on the outside surfaces of the glass, balanced by tension on the inside of the glass. when tempered glass breaks, the tension and compression are no longer in balance and the glass breaks into small beads with dull edges. tempered glass is much stronger than annealed laminated glass. the limits of the typical automotive heat strengthening process are in the 3.2 mm to 3.6 mm range. this is due to the rapid heat transfer that is required. it is not possible to achieve the high surface compression needed with thinner glass using the typical blower type low pressure air quenching systems. fortunately, there are other materials and processes available.[0010] glass can be chemically tempered. in this process, ions in and near the outside surface of the glass are exchanged with ions that are larger. this places the outer

layer of glass in compression. the maximum strength of chemically tempered soda lime glass is limited. however, with some other glass compositions, compressive strengths in excess of 100k psi are possible. the practice of chemically tempering glass is well known to those of ordinary skill in the art and shall not be detailed here.[0011] unlike heat tempered glass, chemically tempered glass breaks into shards rather than beads. this property allows for its use in windshields. however, in standard windshield thicknesses of 2.0 mm or greater, chemically strengthened glass would actually be too strong. in the event of a crash and a head impact, the windshield must break, absorbing the energy of the impact rather than the head of the occupant. therefore, depending upon the tempered strength, thicknesses of 1.1 mm or less must be used.[0012] the majority of the vehicles on the road today have windshields that were made using the gravity bending process. in this process, the plies of glass that form the windshield are placed onto a mold, which supports the glass near the edges, and heated. the glass softens and sags to shape. sometimes, for more complex shapes, gravity is assisted by pneumatic pressure and/or a partial or full surface pressing. as the plies of glass to be laminated are bent in sets, the surfaces, while they may have substantial variation from windshield to windshields, are a near perfect match.[0013] a growing portion of windshields are made by the singlet pressing process. with this process, single sheets of glass are bent using a press to form the glass to shape. the resulting shape is much closer to design and the process can hold tighter tolerances across the surface. but, when the individually pressed sheets are glass are laminated, surface to surface variation can be more of a problem than with gravity bent glass. thin glass is difficult to bend using either of these bending process.[0014] during gravity bending, the edges of the sheets of glass have a tendency to lift off of the mold and form wrinkles. if the plies of glass are of different compositions, with softening points that are too far apart, it may not be possible to gravity bend at all as the glass with the lower softening point will become too soft leading to marking and distortion. in this case, the different glass types must be bent separately.[0015] however, singlet pressing also has problems. the glass is conveyed through the heating section on rolls. the thin glass tends to bend under its own weight resulting in the leading edge hitting the rollers and even falling through. as can be appreciated, a better process is needed.summary of the invention[0016] accordingly, it is an object of the present invention to provide an improved method and apparatus for bending thin glass.[0017] in carrying out the above object, the method of the invention comprises the steps of: stacking one or more sheets of the thin glass onto a full surface bottom mold applying a partial surface top mold to said stack of thin glass, said top mold contacting the glass in at least the periphery area of the glass heating said thin glass to its glass transition point and allowing thin glass to sag under the force of gravity.[0018] furthermore, the apparatus of the invention comprises a bending mold base, a bending mold female ring that receives a bended glass to form a full surface female mold and a male ring mold placed onto the thin glass.description of the drawings[0019] fig. 1 is a view of the female bending mold[0020] fig. 2 is a view of the female bending mold with flat sheet of glass having a higher glass transition point than the thin glass to be bent[0021] fig. 3 is a view of the female bending mold with the higher glass transition point bent to shape[0022] fig. 4 is a view of the female bending mold loaded with thin flat glass[0023] fig. 5 is a detailed view of the female bending mold loaded with thin flat glass[0024] fig. 6 is a detailed view of the mold with male ring in place[0025] fig. 7 is a view of the top plenum in raised position[0026] fig. 8 is a view of the top plenum and mold[0027] fig. 9 is a view of the bottom plenum[0028] fig. 10 is a view of the full surface female mold with vacuum holes.reference numbers2 bending mold base4 bending mold female ring6 thin glass8 male ring mold20 flat sheet of glass used to form full surface female mold22 full surface female mold30 vacuum holes32 top plenum air inlet34 top plenum mold36 bottom plenum back38 bottom plenum vacuum inletdetailed description of the invention[0040] referring now in detail to the illustrative embodiment depicted in the accompanying drawings for (Results 1)

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Search [SP]: field [0001] the invention relates generally to methods and apparatus for forming shaped articles. more specifically, the invention relates to a method and an apparatus for reforming a thin sheet of material into a shaped article. background [0002] molding is a common technique used to make shaped objects. precision molding is suitable for forming shaped glass articles, particularly when the final glass article is required to have a high dimensional accuracy and a high-quality surface finish. in precision molding, a glass preform having an overall geometry similar to that of the final glass article is pressed between a pair of mold surfaces to form the final glass article. the process requires high accuracy in delivery of the glass preform to the molds as well as precision ground and polished mold surfaces and is therefore expensive.[0003] press molding based on pressing a gob of molten glass into a desired shape with a plunger can be used to produce shaped glass articles at a relatively low cost, but generally not to the high tolerance and optical quality achievable with precision molding. where the molten glass has to be spread thinly to make a thin-walled glass article having complex curvatures, the molten glass may become cold, or form a cold skin, before reaching the final desired shape. shaped glass articles formed from press molding a gob of molten glass may exhibit one or more of shear marking, warping, optical distortion due to low surface quality, and overall low dimensional precision. summary [0004] in one aspect, the invention relates to an apparatus for forming shaped articles from a sheet of material which comprises a first mold having a mold surface and a network of gutters formed in the mold surface. the network of gutters has a network gutter profile and defines an array of islands on which an array of bumps is formed. each of the bumps has a surface with a shaped profile. the apparatus further includes a second mold adapted for positioning on the mold surface. the second mold has a network of protuberances defining a plurality of cavities. each of the cavities is sized to overlap one of the bumps of the first mold. the network of protuberances has a network protuberance profile complementary to the network gutter profile.[0005] in another aspect, the invention relates to an apparatus for forming a shaped article from a sheet of material which comprises a first mold having a mold surface and a network of gutters formed in the mold surface. the network of gutters has a network gutter profile and defines an island on which a bump is formed. the bump has a surface with a shaped profile substantially matching a surface profile of the shaped article. the apparatus further includes a second mold adapted for positioning on the mold surface. the second mold has a network of protuberances defining a cavity sized to overlap the bump. the network of protuberances has a network protuberance profile complementary to the network gutter profile.[0006] in another aspect, the invention relates to a method of making a shaped article which comprises positioning a sheet of material on a mold surface of a first mold such that a first portion of the sheet overlies a network of gutters in the mold surface and a second portion of the sheet of material overlies a bump on the mold surface. the network of gutters defines an island on which the bump is formed, and the bump has a surface with a shaped profile. the method further includes positioning a second mold having a network of protuberances defining a cavity on the sheet of material such that the network of protuberances contacts the first portion of the sheet of material and the cavity overlaps the bump. the method further includes pressing the network of protuberances against the sheet of material. the pressing results in thinning out of the sheet of material between the first portion and the second portion of the sheet of material, squeezing of excess sheet of material from the thinning out into the network of gutters, and molding of the second portion of the sheet of material to the bump, thereby forming the shaped article.[0007] other features and advantages of the invention will be apparent from the following description and the appended claims. brief description of drawings [0008] the accompanying drawings, described below, illustrate typical embodiments of the invention and are not to be considered limiting of the scope of the invention, for the invention may admit to other equally effective embodiments. the figures are not necessarily to scale, and certain features and certain views of the figures may be shown exaggerated in scale or in schematic in the interest of clarity and condensation.[0009] fig. 1 is a cross-sectional view of an apparatus for forming a shaped article.[0010] fig. 2 is a top view of the bottom mold of an apparatus for forming a shaped article.[0011] fig. 3 is a bottom view of the top mold of an apparatus for forming a shaped article.[0012] fig. 4 is a top view of a bottom mold of an apparatus for forming a plurality of shaped articles.[0013] fig. 5 is a bottom view of a top mold of an apparatus for forming a plurality of shaped articles.[0014] fig. 6 shows a sheet of material positioned on a bottom mold of an apparatus for forming a shaped article.[0015] fig. 7 shows a top mold suspended over the sheet of material of fig. 6.[0016] fig. 8 shows the top mold of fig. 7 in contact with the sheet of material of fig. 6.[0017] fig. 9 shows a shaped article formed between a top mold and a bottom mold of an apparatus for forming a shaped article. detailed description [0018] the invention will now be described in detail with reference to a few embodiments, as illustrated in the accompanying drawings. in describing the embodiments, numerous specific details are set forth in order to provide a thorough understanding of the invention. however, it will be apparent to one skilled in the art that the invention may be practiced without some or all of these specific details. in other instances, well-known features and/or process steps have not been described in detail so as not to unnecessarily obscure the invention. in addition, like or identical reference numerals are used to identify common or similar elements.[0019] fig. 1 is a cross-sectional view of an apparatus 100 for making a shaped article. in general, a shaped article will be considered herein as having a top surface with a top surface profile and a bottom surface with a bottom surface profile. the terms "top surface" and "bottom surface" are arbitrary. each of the top surface and bottom surface may be the inner or outer surface (front or back surface) of the shaped article.[0020] apparatus 100 includes a bottom mold 102 having a base portion 104, which may be generally planar. base portion 104 has a mold surface 106 in which a network of gutters 108 is formed. the gutters in the network of gutters 108 extend from the mold surface 106 into the base portion 104. the network of gutters 108 defines an island 110 on the mold surface 106. a bump 112 is formed on the island 110. the bump 112 has an outer surface 114 characterized by a shaped profile matching the top surface profile or bottom surface profile of the shaped article to be formed. the network of gutters 108 has a gutter profile, which is more clearly shown in fig. 2. it should be noted that the shaped profile of the bump 112 and the gutter profile of the gutter 108 are not limited to the examples depicted in figs. 1 and 2. for example, the shaped profile of the bump 112 may be convex and smooth, as shown in fig. 1, or may be more complex, e.g., including concave and/or textured portions. in general, the shaped profile of the bump 112 and the gutter profile of the network of gutters 108 will depend on the shape of the shaped article to be formed.[0021] referring to figs. 1 and 2, the network of gutters 108 also defines an island 115 on the mold surface 106. the island 115 encircles the island 110 and is separated from the island 110 by the network of gutters 108. side bumps 116 are formed on the island 115. the side bumps 116 form an arrangement of bumps encircling the bump 112. like the bump 112, the side bumps 116 also have shaped profiles. however, the shaped profiles of the side bumps 116 do not have to match the top surface profile or bottom surface profile of a shaped article to be formed using apparatus 100 because shapes formed by the side bumps 116 would generally be discarded.[0022] referring to fig. 1, apparatus 100 further includes a top mold 118. in one non-limiting example, the top mold 118 includes a base portion 120 and a network of protuberances 122 formed on the base portion 120. the network of protuberances 122 defines a first cavity 124 sized to overlap (fit over) the bump 112. the network of protuberances 122 may further define a plurality of cavities 126, each of which may be sized to overlap (fit over) one of the side bumps 116. in general, the arrangement of the cavities 124, 126 defined by the network of protuberances 122 is complementary with the arrangement of the bumps 112, 116 in the bottom mold 102. this means that when the top mold 118 is aligned with the bottom mold 102 (as indicated by the broken arrows in fig. 1), the cavities 124, 126 are aligned with and in a positio (Results 20)

Search 12 and (curv* w5 glass) and (glass w3 sheet) (Results 94)
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Search (28) AND IPC=(C03) (Results 51)
29:
Search 29 and tac=(method or process) (Results 44)
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Search 30 and (male or female) (Results 11)
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Search 30 and press* (Results 41)
32:
Search 32 and ((thin w5 sheet) or (thin w5 glass)) (Results 32)
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Title: **Method** and apparatus for forming a compound bend in a **glass sheet** on a gas support bed

Abstract: ABSTRACT OF THE DISCLOSURE

Glass sheets having a compound **curvature** composed of **curves** extending both transversely and longitudinally of the **sheet** are formed on an elongated support bed providing a gaseous support for the **glass**. The support bed forms a common surface of changing contour composed of an initial zone of flat configuration, a final zone having **curves** extending both longitudinally and transversely of the path of travel of the **sheet** and a **transition** zone of a configuration changing progressively from a flat surface to a **curvature** transversely of the path of travel of the **sheet** and, finally, to **curvatures** extending both transversely and longitudinally of the path of travel of the **sheet**. The apparatus is provided with means to **heat** the **sheets** to their deformation **temperature** on the support bed, a quenching zone beyond the support bed and means for conveying the **sheets** along the support bed into the quenching zone. This application is a continuation of application Ser. No. 379,108 filed June 30, 1964, now abandoned.

Classifications:

International (IPC 8-9): B65G49/06 B65G51/02 B65G51/03 B65H29/24 B65H5/06 B65H5/22 C03B23/02 C03B23/03 C03B23/035 C03B27/008 C03B27/048 C03B29/08 C03B29/12 C03B35/00 C03B35/16 C03B35/18 C03B35/22 C03B35/24 C03C17/00 (Advanced/Invention); C03B23/02 (Advanced/Non-invention); B65G51/00 B65H29/24 C03B23/02 C03B27/00 C03B27/008 C03B29/00 C03B35/00 C03C17/00 (Core/Invention); C03B23/02 (Core/Non-invention)

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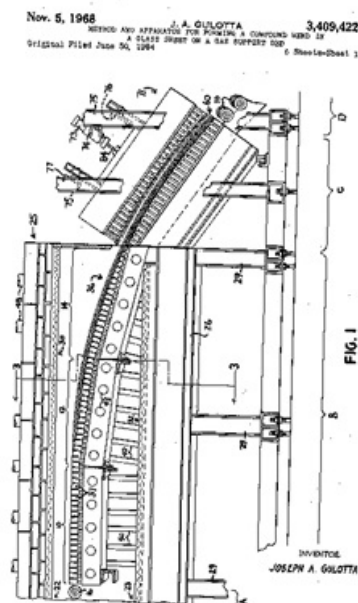
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US: 156/102 226/196.1 242/615.11 264/500 414/159 414/676 65/104 65/106 65/107 65/114 65/115 65/119 65/161 65/182.2 65/194 65/25 65/25.2 65/25.4 65/285 65/287 65/29.15 65/348 65/350 65/351 65/60.52 65/60.53 65/65 65/90

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PatBase - US3409422_R



Family:

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Probable Assignee: PPG INDUSTRIES INC

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ANTHONY GUIOTTA JOSEPH ; PA ; HERSHEL CYPHER JAMES ; JAMES CLAIR FREDLEY ; GULOTTA
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CHARLES R DAVIDSON ; JAMES CLAIR FREDLEY GEORGE ELWOOD SLEIGHTER AND GEORGL WILLIAM
MISS AN ; JAMES CLAIR FREDLEY AND GEORGE ELWOOD SLEIGHTER ; RICHARD DAVIDSON JUN

Title: **Method** and apparatus for conveying and **heat** treating **glass sheets** over a gas support bed

Abstract: An apparatus for **heating** individual **glass sheets** 30 comprises a bed 22 (Fig. 1, not shown) having gas emitting outlets and means, for supplying **heated** gases to the outlets at a sufficient rate to support said **glass sheets** 30 over the outlets, the material for said bed 22 having a **low heat** capacity and **low heat** conductivity, and/or **low** coefficient of thermal expansion and high thermal shock resistance. The material is preferably fused quartz, but in any case should have a **heat** capacity and **heat** conductivity less than half that of steel. Its **heat** conductivity should be 4.0 BTU/hr./ft² DEG F./in. and its coefficient of thermal expansion less than 1 x 10⁻⁶/ DEG C. The bed 22 is composed of a series of blocks aligned longitudinally of the bed and is so designed that the bed is flat for up to about 2/3 of the length of a section 24 of a bending and tempering apparatus. The bed is then caused to change its transverse **curvature** along its upper surface, the rate of change of **curvature** being first **low**, then high, then **low** again until it reaches the final desired **curvature**, the whole following approximately a sine **curve**. The actual chord length x4, x5 (Fig. 6, not shown) across each block for any **curvature** remains the same, only the radius of **curvature** r4, r5 and the height h4, h5 from the longitudinal axis at the highest **point** to the chord changing. The bed is supported upon posts 132, 133 (Fig. 3, not shown) which extend through insulated walls of a furnace structure whereby the furnace enclosure is supported independently of the bed. The bed 22 extends from a loading station 21 through a **heating** and bending zone 24 into a tempering zone 25 between blast heads 23, and is tilted at about 12 degrees to the horizontal.

Classifications:

International (IPC 8-9): B65G49/06 C03B23/035 C03B27/048

C03B29/12 C03B35/00 C03B35/24 (Advanced/Invention);

C03B23/02 C03B27/00 C03B29/00 C03B35/00 (Core/Invention)

International (IPC 1-7): B65G37/02 C03B23/02 C03B23/035

C03B27/04 C03B29/04 C03B35/00 C03B35/24

CPC: C03B23/035 C03B29/12 C03B35/24 C03B35/243 C03B2225/02

C03B27/0404 C03B27/048

European: 45L9J3 C03B23/035 C03B27/048 C03B27/04A

C03B29/12 C03B35/24 C03B35/24B M03B225/02

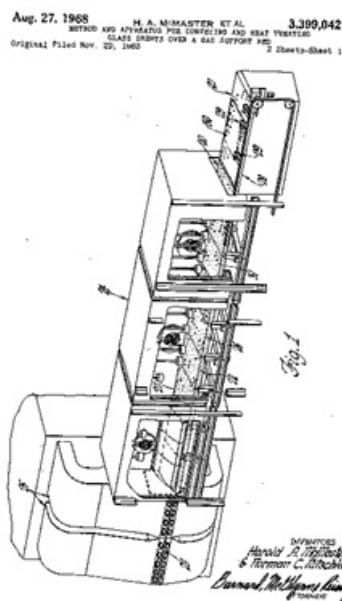
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65/106 65/107 65/114 65/119 65/182.2 65/25 65/25.2 65/25.4

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65/65 65/84

PatBase - US3399042_A



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Priority:

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Inventor(s): HAROLD ASHLEY MCMASTER AND NORMAN CARL NITSCHKE

Title: METHOD AND APPARATUS FOR BENDING GLASS SHEETS

Abstract: A bending fixture for gravity bending a glass sheet or sheets to produce, for example, automobile windshields. The bending fixture has a pair of fixture sections, each having a shaping surface segment with two ends. The fixture sections are hinged to each other at their ends to define a single hinge axis. The hinge axis is immediately adjacent the support surface at the ends of the shaping surface segments and is generally laterally centered in the fixture. The bending fixture supports a flat cold glass sheet or sheets at the hinge area and at points laterally remote from the hinge area. In the closed position after bending, the support segments together form a continuous peripheral support surface for the glass sheet.

Classifications:

International (IPC 8-9): B60J1/00 C03B23/02 C03B23/025 C03B23/027 (Advanced/Invention);

B60J1/00 C03B23/02 (Core/Invention)

International (IPC 1-7): B60J1/00 C03B23/025 C03B23/027

CPC: C03B23/027

European: C03B23/027

US: 65/107 65/291

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JP F-Index: B60J1/00/Z C03B23/025

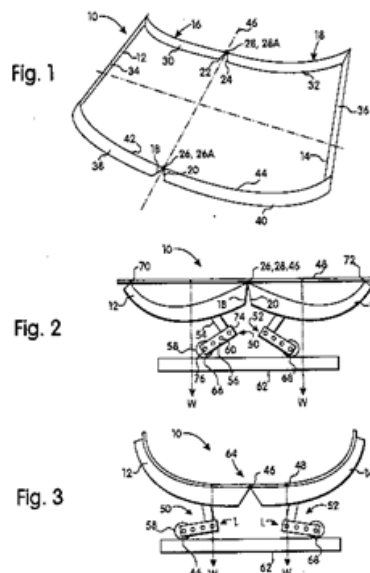
PatBase - US5129934_R

U.S. Patent

July 14, 1992

Sheet 1 of 2

5,129,934



Family:

Publication number	Publication date	Application number	Application date
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Priority:

US19900633741 19901224 CA19912058177 19911220

Probable Assignee: FORD MOTOR CO

Assignee(s): (std): FORD MOTOR CANADA ; FORD MOTOR CO ; FORD WERKE AG ; FORD FRANCE

Assignee(s): FORD FRANCE S A ; FORD WERKE AKTIENGESellschaft ; FORD MOTOR COMPANY LIMITED ; FORD WERKE AG 50735 KOELN DE ; FORD MOTOR COMPANY OF CANADA LIMITED ; KOSS GEORGE A ; FORD MOTOR CO OF CANADA LTD ; FORD MOTOR COMPANY

Inventor(s): (std): JIYOOJI ARETSUKUSU KOSU ; KOSS GEORGE A

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Agent(s): SIM AND MCBURNEY

Designated states: DE ES FR GB IT

Title: **METHOD** AND APPARATUS FOR ION MILLING

Abstract: The present invention relates to **methods** and apparatus for ion milling, and more particularly relates to **methods** and apparatus for smoothing a surface using ion milling.

Classifications:

International (ipc 8-9): B05D5/06 B05D5/12 B23K26/362 B23K26/402 B32B17/06 B32B17/10 B32B7/02 B32B7/14 B60Q1/26 B60R1/02 B60R1/04 B60R1/06 B60R1/07 B60R1/08 B60R1/12 C03C17/36 C09K9/02 C23C14/08 C23C14/18 C23C14/34 C23C14/46 C23C14/58 F16M13/02 G02B1/04 G02B1/10 G02B13/04 G02B27/00 G02B27/14 G02B5/08 G02B5/20 G02B5/26 G02B5/28 G02B7/182 G02F1/00 G02F1/01 G02F1/03 G02F1/061 G02F1/15 G02F1/153 G02F1/155 G02F1/157 G02F1/161 G02F1/163 H05K1/02 H05K3/32 (Advanced/Invention); B60R1/04 B60R1/06 B60R1/08 C23C14/08 C23C14/34 G02F1/1345 G02F1/15 G02F1/155 G02F1/157 G02F1/161 H05K1/03 (Advanced/Non-invention); B05D5/06 B32B7/02 B60R1/06 B60R1/08 B60R1/12 C23C14/46 G02B1/04 G02B27/00 G02B5/08 G02B5/20 G02B5/26 G02B5/28 G02F1/00 G02F1/01 H05K1/02 H05K3/32 (Core/Invention); H05K1/03 (Core/Non-invention); B60R (Subclass/Invention)

International (ipc 1-7): B60R1/08 G02B27/00 G02F1/15 G02F1/153 G02F1/161

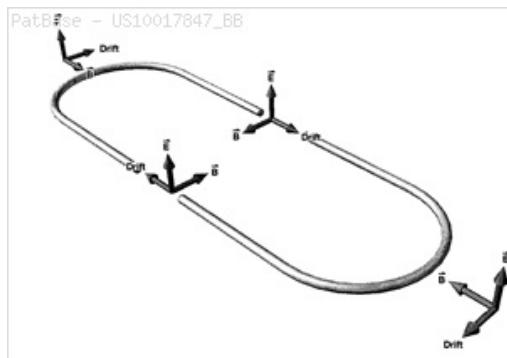
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Designated states:

AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

Title: ARTIFICIAL HUMAN LIMBS AND JOINTS EMPLOYING ACTUATORS, SPRINGS, AND VARIABLE-DAMPER ELEMENTS

Abstract: Biomimetic Hybrid Actuators employed in biologically-inspired musculoskeletal architectures employ an electric motor for supplying positive energy to and storing negative energy from an artificial joint or limb, as well as elastic elements such as springs, and controllable variable damper components, for passively storing and releasing energy and providing adaptive stiffness to accommodate level ground walking as well as movement on stairs and surfaces having different slopes.

Classifications:

International (IPC 8-9): A61B5/103 A61F2/30 A61F2/32 A61F2/48 A61F2/60 A61F2/62 A61F2/64 A61F2/66 A61F2/68 A61F2/70 A61F2/72 A61F2/74 A61F2/76 A61F5/00 A61F5/01 A61F5/052 A61G5/00 A61H A61H1/00 A61H3/00 B25J19/00 B25J19/02 B25J5/00 B25J9/00 B25J9/10 B25J9/16 B25J9/18 B62D51/06 B62D57/032 C03C21/00 F16H25/00 F16H25/20 F16H25/22 F16H55/14 G01L5/00 G01P21/00 G05B19/04 G05B21/00 G06F19/00 H02K41/02 H02K7/06 H04M1/02 H04M1/18 (Advanced/Invention); A61F2/50 A61F2/60 A61F2/64 A61F2/66 A61F2/68 A61F2/70 A61F2/72 A61F2/74 A61F2/76 A61F5/01 A61H3/00 B25J9/00 B25J9/18 F16H25/00 F16H25/20 G01P21/00 H02K41/02 H02K7/06 H02K7/116 (Advanced/Non-invention); A61B5/103 A61F2/48 A61F2/50 A61F2/60 A61H3/00 B25J9/18 B62D51/00 F16H25/00 G05B19/04 H02K41/02 (Core/Invention); A61F2/62 A61F2/68 A61G5/00 F16H25/00 H02K41/02 (Core/Non-invention)

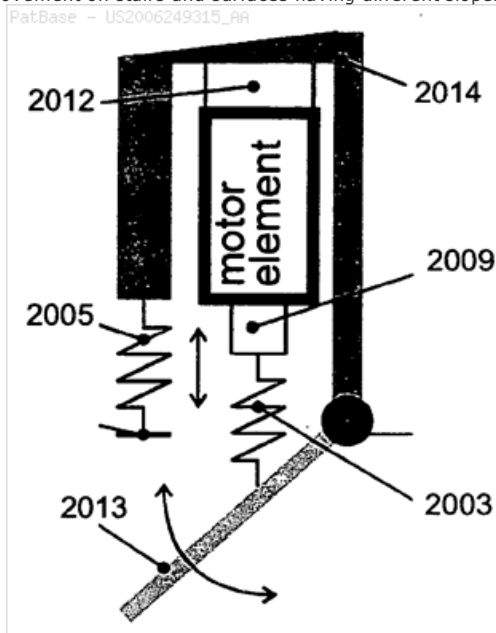
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JP F-Index: A61F2/62 A61F2/64 A61F2/68 B25J11/00/Z A61F2/70 B25J5/00/E B25J5/00/C



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Publication number	Publication date	Application number	Application date
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AU2010208020 AA	20100805	AU20100208020	20100201
CA2736079 AA	20100311	CA20092736079	20090901
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Priority:

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US20160342661 20161103 US20160364311 20161130

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Inventor(s): MAGNUSSON LEE ; PALUSKA DANIEL ; ZADESKY STEPHEN PAUL CUPERTINO ; WEBER DOUGLAS CUPERTINO ; PREST CHRISTOPHER CUPERTINO ; POPOVIC MARKO ; HOFMANN ANDREAS ; HERR HUGH

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: ARRANGEMENT OF STEERING WHEEL AND OPERATOR SEAT ASSEMBLY

Abstract: A control system for a construction vehicle, such as a motor grader, is provided. The control system includes a plurality of joysticks supported by an operator seat assembly of the motor grader.

Classifications:

International (IPC 8-9): A47C7/54 B32B17/00 B32B17/06 B32B17/10 B32B7/02 B60J1/00 B60J1/02 B60K26/00 B60K26/02 B60K37/06 B60N2/38 B60N2/44 B60N2/90 B62D1/02 B62D1/04 B62D1/12 B62D1/24 C03C21/00 C03C27/00 C03C27/12 C03C3/076 C03C3/089 E02F3/76 E02F3/80 E02F3/84 E02F9/20 E06B3/66 G05G13/00 G05G9/047 (Advanced/Invention); C03C3/089 C03C3/091 (Advanced/Non-invention); B60K26/00 B60K37/04 B60N2/24 B62D1/02 B62D1/04 E02F3/76 E02F9/20 G05G13/00 G05G9/00 (Core/Invention)

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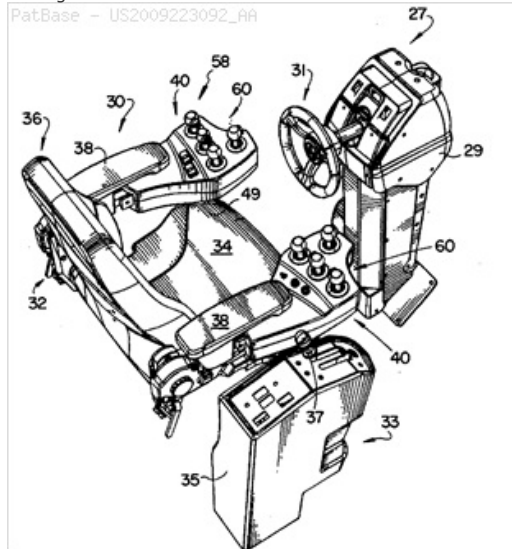
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European: B32B17/10C22 B32B17/10C28 B32B17/10C30B B32B17/10C4 B60N2/46B E02F9/16 E02F9/20A

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JP F-Term: 2E016 2E016/EA05 4F100 4G061 4G061/AA03 4G061/AA11 4G061/BA01 4G061/BA02 4G061/CB03 4G061/CB19 4G061/CD02 4G061/CD18 3D127 4G059 4G059/HB02 4G061/CD03

JP F-Index: B32B17/10 C03C27/12/D C03C27/12/R E06B3/66/Z B60J1/00/H C03C21/00/101

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Publication number	Publication date	Application number	Application date
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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **METHOD** OF MANUFACTURING LARGE DISH REFLECTORS FOR A SOLAR CONCENTRATOR APPARATUS

Abstract: A **method** of manufacturing monolithic **glass** reflectors for concentrating sunlight in a solar energy system is disclosed. The **method** of manufacturing allows large monolithic **glass** reflectors to be made from float **glass** in order to realize significant cost savings on the total system cost for a solar energy system. The **method** of manufacture includes steps of **heating** a **sheet** of float **glass** positioned over a concave **mold** until the **sheet** of **glass** sags and stretches to conform to the shape of the **mold**. The edges of the dish-shaped **glass** are rolled for structural stiffening around the periphery. The dish-shaped **glass** is then silvered to create a dish-shaped mirror that reflects solar radiation to a focus. The surface of the **mold** that contacts the float **glass** preferably has a grooved surface profile comprising a plurality of cusps and concave valleys. This grooved profile minimizes the contact area and marring of the specular **glass** surface, reduces parasitic **heat** transfer into the **mold** and increases **mold** lifetime. The disclosed **method** of manufacture is capable of high production rates sufficiently fast to accommodate the output of a conventional float **glass** production line so that monolithic **glass** reflectors can be produced as quickly as a float **glass** production can make **sheets** of float **glass** to be used in the **process**.

Classifications:

International (IPC 8-9): C03B23/025 C03B23/035 C03C17/00 C03C17/09 C03C17/10 F24J2/08 F24J2/10 F24J2/12 F24J2/38 F24J2/54 G02B5/10 G02B7/182 H01L H01L31/00 H01L31/042 H01L31/044 H01L31/05 H01L31/052 H01L31/054 H02N6/00 H02S40/22 (Advanced/Invention); H01L31/052 (Advanced/Non-invention); C03B23/02 C03C17/00 F24J2/06 F24J2/38 H01L31/042 H01L31/052 (Core/Invention); C03B F24J H01L (Subclass/Invention)

International (IPC 1-7): C03B23/025 H01L31/052

CPC: H01L31/052 C03B23/0352 C03B23/0258 C03B23/035 C03B23/0355 C03B23/0357 Y02E10/42 Y02E10/47 Y02E10/52 C03B23/0256 H01L31/0547 H01L31/054 H02S40/22 F24S23/30 F24S23/82 F24S25/10 F24S25/13 F24S30/452 F24S50/20 F24S2020/16 F24S2030/133 F24S2030/14 F24S2030/145 F24S23/70 F24S23/71

European: C03B23/025C C03B23/035B2 C03B23/035B3 F24J2/08 F24J2/10D F24J2/12 F24J2/38 F24J2/54C2 H01L31/052B R24J2/52A8 R24J2/52A8C R24J2/54P10 R24J2/54P10B R24J2/54P8C Y02E10/42 Y02E10/47 Y02E10/52

US: 126/600 126/601 126/683 126/684 126/685 126/686 126/687 126/688 126/689 126/690 126/691 126/692 126/693 126/694 126/695 126/696 126/697 126/698 126/699 126/700 126/701 126/702 126/703 126/704 126/705 126/706 126/707 126/708 126/709 126/710 126/711 126/712 126/713 126/714 126/715 126/716 126/717 126/718 126/719 126/720 126/721 126/722 126/723 126/724 126/725 126/726 126/727 126/728 126/729 126/730 126/731 126/732 126/733 126/734 126/735 126/736 126/737 126/738 126/739 126/740 126/741 126/742 126/743 126/744 126/745 126/746 126/747 126/748 126/749 126/750 126/751 126/752 126/753 126/754 126/755 126/756 126/757 126/758 126/759 126/760 126/761 126/762 126/763 126/764 126/765 126/766 126/767 126/768 126/769 126/770 126/771 126/772 126/773 126/774 126/775 126/776 126/777 126/778 126/779 126/780 126/781 126/782 126/783 126/784 126/785 126/786 126/787 126/788 126/789 126/790 126/791 126/792 126/793 126/794 126/795 126/796 126/797 126/798 126/799 126/800 126/801 126/802 126/803 126/804 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Priority:

US20080127298	20080512	US20080127298P	20080512	US20090436016	20090505
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Probable Assignee: ARIZONA BOARD OF REGENTS ON BEHALF OF UNIV OF ARIZONA

Assignee(s): (std): DAVISON WARREN B ; ANGEL ROGER P ; ARIZONA BOARD OF REAGENTS ON BEHALF OF UNIV OF ARIZONA ; ARIZONA BOARD OF REAGENTS ON BEHALF OF UNIVERSITY OF ARIZONA ; UNIV ARIZONA STATE ; OLBERT BLAIN H ; ON BEHALF OF THE UNIVERSITY OF ARIZONA ; UNIV ARIZONA ; ON BEHALF OF UNIV OF ARIZONA

Assignee(s): THE ARIZONA BOARD OF REGENTS ON BEHALF OF THE UNIVERSITY OF ARIZONA ; THE ARIZONA BOARD OF REGENTS FOR AND ON BEHALF OF ARIZONA STATE UNIVERSITY ; ARIZONA BOARD OF REAGENTS ON BEHALF OF UNIVERSITY OF ARIZONA ; ARIZONA BOARD OF REGENTS ; ARIZONA BOARD OF REGENTS FOR AND ON BEHALF OF ARIZONA STATE UNIV ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIV ; ENERGY UNITED STATES DEPARTMENT OF ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIV OF ARIZ ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIV OF ARIZONA ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIVERSITY OF ARIZONA ; ARIZONA BOARD OF REGENTS ON BEHALF OF REGENTS ON BEHALF OF THE UNIVERSITY OF ARIZONA ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIVERSITY OF ARIZONA STATE UNIVERSITY ; ARIZONA BOARD OF REGENTS ON BEHALE OF UNIVERSITY OF ARIZONAL ; ARIZONA BOARD OF REGENTS ON BEHALE OF UNIV OF ARIZONAL ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIV OF ARIZONA STATE UNIV ; ARIZONA BOARD OF REGENTS ON BEHALF OF UNIV OF ARIZONA933 NORTH CHERRY STEWARD OBSERVATORY TUCSON AZ 85721 US

Inventor(s): (std): ANGEL ROGER P ; DAVISON WARREN B ; OLBERT BLAIN H

Inventor(s): ROGER P ANGEL ; WARREN B DAVISON ; OLBERT BLAIN ; ANGEL ROGER PUS ; BLAIN H OLBERT ; DAVISON WARREN ; ANGEL ROGER

Agent(s): FB RICE; FB RICE PTY LTD; GOWLING LAFLEUR HENDERSON LLP; VIERING JENTSCHURA AND PARTNER; BOTELLA ANTONIO; WOLFF BREGMAN AND GOLLER; SNELL AND WILMER LLP MAIN; SNELL AND WILMER LLP; SNELL AND WILMER L L P; LEACH SYDNEY M

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: ALKALI-DOPED AND ALKALI-FREE BOROALUMINOSILICATE **GLASS**

Abstract: Alkali-doped boroaluminosilicate **glasses** are provided. The **glasses** include the network formers SiO₂, B₂O₃, and Al₂O₃. The **glass** may, in some embodiments, have a Young's modulus of less than about 65 GPa and/or a coefficient of thermal expansion of less than about 40x10⁻⁷/degrees centigrade. The **glass** may be used as a cover **glass** for electronic devices, a color filter substrate, a **thin** film transistor substrate, or an outer clad layer for a **glass** laminate.

Classifications:

International (IPC 8-9): B32B17/00 B32B17/06 B32B17/10 B32B5/00 B32B7/00 B32B7/02 C03B17/00 C03B17/02 C03B17/06 C03B23/047 C03C1/00 C03C13/04 C03C17/02 C03C17/09 C03C17/22 C03C17/34 C03C17/36 C03C27/06 C03C27/12 C03C3/04 C03C3/062 C03C3/064 C03C3/066 C03C3/076 C03C3/078 C03C3/083 C03C3/085 C03C3/087 C03C3/089 C03C3/091 C03C3/093 C03C3/095 C03C3/097 C03C3/11 C03C3/118 C03C3/12 C03C3/14 C03C3/145 C03C4/00 G02B5/20 G02B5/22 G02F1/133 G06F3/041 G09F9/00 G09F9/30 H01L23/15 H01L29/786 H01L31/00 H01L31/02 H01L31/0203 H01L31/0216 H01L31/0264 H01L31/0272 H01L31/0288 H01L31/0296 H01L31/0352 H01L31/0376 H01L31/0392 H01L31/04 H01L31/042 H01L31/048 H01L31/049 H01L31/06 H01L31/073 H01L31/0749 H01L31/50 H01L51/52 H05B33/02 H05B33/14 (Advanced/Invention); C03C3/04 C03C3/083 C03C3/087 C03C3/091 C03C3/097 H01L31/00 (Advanced/Non-invention); C03C3/076 G02F1/13 H01L31/00 H05B33/14 (Core/Invention); C03C3/091 C03C4/00 (Core/Non-invention)

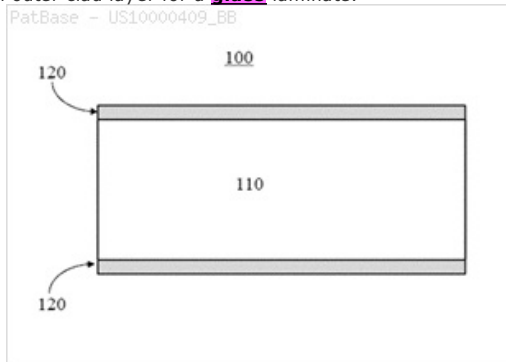
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US: 1/1 136/244 136/252 136/252S 136/258 136/259 136/260 136/261 136/261S 136/262 136/262S 136/264 136/265 428/212 428/217 428/220 428/220S 428/427 501/37 501/41 501/41S 501/49 501/49S 501/52 501/52S 501/63 501/63S 501/64 501/65 501/65S 501/66 501/66S 501/67 501/67S 501/69 501/69S 501/70 501/70S 501/72 501/72S 501/73 501/73S 501/77 501/77S 501/79 501/79S 65/29.19 65/50 65/53 65/90

JP F-Term: 3K107 3K107/AA01 3K107/BB02 3K107/CC42 3K107/CC45 3K107/DD12 3K107/FF03 3K107/FF05 3K107/FF14 3K107/FF15 4G062 4G062/AA01 4G062/BB01 4G062/BB05 4G062/CC10 4G062/DA06 4G062/DB03 4G062/DB04 4G062/DC03 4G062/DC04 4G062/DD01 4G062/DE01 4G062/DF01 4G062/EA01 4G062/EA02 4G062/EA03 4G062/EB01 4G062/EB02 4G062/EB03 4G062/EC01 4G062/EC02 4G062/EC03 4G062/ED01 4G062/ED02 4G062/ED03 4G062/ED04 4G062/EE01 4G062/EE02 4G062/EE03 4G062/EE04 4G062/EF01 4G062/EF02 4G062/EF03 4G062/EF04 4G062/EG01 4G062/EG02 4G062/EG03 4G062/EG04 4G062/FA01 4G062/FA10 4G062/FB01 4G062/FC01 4G062/FD01 4G062/FE01 4G062/FF01 4G062/FG01 4G062/FH01 4G062/FJ01 4G062/FK01 4G062/FL01 4G062/GA01 4G062/GA10 4G062/GB01 4G062/GC01 4G062/GD01 4G062/GE01 4G062/GH01 4G062/HH03 4G062/HH05 4G062/HH07 4G062/HH09 4G062/HH11 4G062/HH13 4G062/HH15 4G062/HH17 4G062/HH20 4G062/JJ01 4G062/JJ03 4G062/JJ05 4G062/JJ07 4G062/JJ10 4G062/KK01 4G062/KK03 4G062/KK05 4G062/KK07 4G062/KK10 4G062/MM27 4G062/NN29 4G061 4G061/AA02 4G061/AA03 4G061/AA04 4G061/AA09 4G061/AA20 4G061/BA01 4G061/BA03 4G061/BA05 4G061/CA02 4G061/CA05 4G061/CB06 4G061/CB12 4G061/CD02 4G061/CD21 4G061/CD24 4G061/DA09 4G061/DA26 4G061/DA32 4G061/DA43 4G062/DE02 4G062/EA10 4G062/FB02 4G062/FC02 4G062/FL02 4G062/MM01 4G062/NN30 4G062/NN31 4G062/NN33 4G062/NN34 5F151 5F151/AA02 5F151/AA03 5F151/JA03 5F151/JA04 5F151/JA05 5F151/JA07 5F151/JA09 4G062/DA07 4G062/DC01 4G062/DC02 4G062/MM23 5F151/AA09 5F151/AA10 5F151/GA03 3K107/FF02 4G059 4G059/AA01 4G059/AC30 4G059/EA13 4G059/EA16 4G059/EB01 4G062/BB06 4G062/FE02 4G062/NN26 5F151/AA04 5F151/AA05 5F151/FA02 5B068 5F151/GA06 4G062/DD00 4G062/DE00 4G062/DF00 4G062/HH02 4G020 4G062/DB02 4G062/DC05 4G062/DD02 4G062/DD03 4G062/DD04 4G062/GE02 4G062/HH12 4G062/JJ04 4G062/JJ06 4G062/MM12 4G015 4G015/BA01 4G015/BB05 4G062/EC04 4G062/MM16 4G061/AA10 4G061/CB16 4G061/CB19 5F151/BA18 5F151/JA27

JP F-Index: C03C3/091 H05B33/02 H05B33/14/A C03C27/06/101/J C03C3/093 H01L31/04/560 C03C3/083 C03C3/085 C03C3/087 H01L31/04/284 H01L31/06/420 H01L31/06/460 C03C17/22/Z G06F3/041/400 G06F3/041/495 C03B17/06 C03C3/118 C03B23/047 C03C27/12/N H01L31/04/562



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Probable Assignee: CORSAM TECHNOLOGIES LLC

Assignee(s): (std): CORNING INC ; CORSAM TECHNOLOGIES LLC ; DICKINSON JAMES EDWARD JR ; DICKINSON JR JAMES EDWARD ; CORSAM TECH LLC ; DICKINSON JAMES E JR ; ELLISON ADAM JAMES ; KICZENSKI TIMOTHY J ; KICZENSKI TIMOTHY JAMES ; KOSIK WILLIAMS CARLO ANTHONY ; MAURO JOHN CHRISTOPHER ; TANDIA ADAMA ; WEBB JAMES ERNEST ; KROL MARK FRANCIS ; AITKEN BRUCE G ; AITKEN BRUCE GARDINER ; CORNING CO LTD ; ELLISON ADAM J

Assignee(s): CORNING INCORPORATEDUS

Inventor(s): (std): WEBB JAMES ERNEST ; TIMOTHY JAMES KICZENSKI ; KICZENSKI TIMOTHY J ; JOHN CHRISTOPHER MAURO ; JAMES EDWARD DICKINSON JR ; ELLISON ADAM JAMES ; BRUCE GARDINER AITKEN ; AITKEN BRUCE GARDINER ; AIKEN BRUCE GARDINER ; ADAMA TANDIA ; ZHOU CHUNFENG ; ZHANG BIN ; VENKATARAMAN NATESAN ; NIKULIN ILIA ANDREYEVICH ; MADAPUSI SHRIRAM PALANTHANDALAM ; KROL MARK F ; KOSIK WILLIAMS CARLO ANTHONY ; JAMES ERNEST WEBB ; HU GUANGLI ; ELLISON ADAM J ; DICKINSON JR JAMES E ; BURDETTE STEVEN ROY ; AMOSOV ALEXEY SERGEYEVICH ; ALLISON ADAM J ; AITKEN BRUCE G ; BRUCE G AITKEN ; DICKINSON JAMES E JR ; DICKINSON JAMES EDWARD ; DICKINSON JAMES EDWARD JR ; DICKINSON JR JAMES EDWARD ; ADAM J ELLISON ; FRACKENPOHL JASON SANGER ; KICZENSKI TIMOTHY JAMES ; NONI JR DOUGLAS MILES ; PIERSON STULL MICHELLE DIANE ; SCHAUT ROBERT ANTHONY ; TANDIA ADAMA ; KROL MARK FRANCIS ; MAURO JOHN CHRISTOPHER

Inventor(s): NONI JR ; TIMOTHY J KICZENSKI

Agent(s): PHILLIPS ORMONDE FITZPATRICK; GOWLING LAFLEUR HENDERSON LLP; OLDROYD RICHARD DUNCAN; SCHEUERMANN ERIK; GREENE SIMON KENNETH; GUNNING JACK PETER; KEVIN M; CORNING INC; TINA N; JASON A; HARNESS DICKEY AND PIERCE PLC; JOHN L; JOHN T; MICHAEL A; THOMPSON TINA N; BARRON JASON A; HOMA JOSEPH M; SANTANDREA ROBERT P

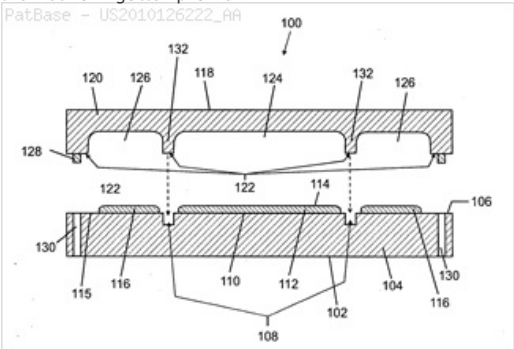
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Title: **METHOD** AND APPARATUS FOR FORMING AND CUTTING A SHAPED ARTICLE FROM A **SHEET** OF MATERIAL

Abstract: An apparatus for forming shaped articles from a **sheet** of material includes a first **mold** having a **mold** surface and a network of gutters formed in the **mold** surface. The network of gutters has a network gutter profile and defines an array of islands on which an array of bumps is formed. Each of the bumps has a surface with a shaped profile. The apparatus also includes a second adapted for positioning on the **mold** surface. The second **mold** has a network of protuberances defining a plurality of cavities. Each of the cavities is sized to overlap one of the bumps of the first **mold**. The network of protuberances has a network protuberance profile complementary to the network gutter profile.

Classifications:

International (IPC 8-9): C03B11/06 C03B21/04 C03B23/02
C03B23/26 (Advanced/Invention);
C03B21/00 C03B23/00 C03B23/02 (Core/Invention);
C03B11/06 (Core/Non-invention)
CPC: C03B21/04 C03B23/02 C03B23/26
European: C03B21/04 C03B23/02 C03B23/26
US: 65/105 65/177



Family:

Publication number	Publication date	Application number	Application date
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Priority:

US20080277550 20081125 WO2009US65403 20091120

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC ; DANNOUX THIERRY LUC ALAIN ; DANNOUX THIERRY L

Assignee(s): CORNING INCORPORATEDUS

Inventor(s): (std): DANNOUX THIERRY L ; DANNOUX THIERRY LUC ALAIN

Agent(s): CORNING INC; SANTANDREA ROBERT P

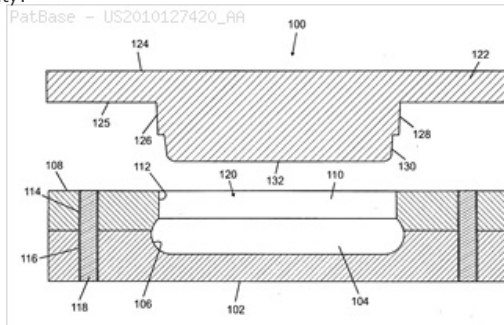
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Title: **METHOD** OF FORMING A SHAPED ARTICLE FROM A **SHEET** OF MATERIAL

Abstract: An apparatus for forming a shaped article having a first surface with a first surface profile and a second surface with a second surface profile is provided. The apparatus includes a first end **mold** having a cavity formed therein, where the cavity is defined by a surface having at least a portion of the first surface profile. The apparatus includes an intermediate **mold** having a hole formed therein. The intermediate **mold** is distinct from the first end **mold** and is configured for **stacking** against the first end **mold** such that the hole is aligned with the cavity. The apparatus includes a second end **mold** having a protuberance formed on a surface thereof. The protuberance is defined by a surface having at least a portion of the second surface profile and is sized for insertion into the hole and cavity.

Classifications:

International (IPC 8-9): B29C43/04 B29C43/42 C03B11/00 C03B11/06 C03B11/08 C03B11/10 C03B23/02 C03B23/03 C03B25/00 (Advanced/Invention); C03B11/10 C03B23/02 C03B23/03 C03B25/00 (Advanced/Non-invention); B29C43/04 B29C43/36 C03B11/06 C03B23/02 (Core/Invention); C03B11/06 (Core/Non-invention)
CPC: C03B40/02 C03B2215/60 C03B11/10 C03B2215/03 C03B2215/50 C03B23/0013 C03B23/0086 C03B23/0258 C03B25/08
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US: 264/232 264/235 264/318 264/322 425/330
JP F-Term: 4G020
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Publication number	Publication date	Application number	Application date
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Priority:

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Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC ; DANNOUX THIERRY L ; DANNOUX THIERRY LUC ALAIN

Assignee(s): CORNING INCORPORATEDUS

Inventor(s): (std): DANNOUX THIERRY L ; DANNOUX THIERRY LUC ALAIN

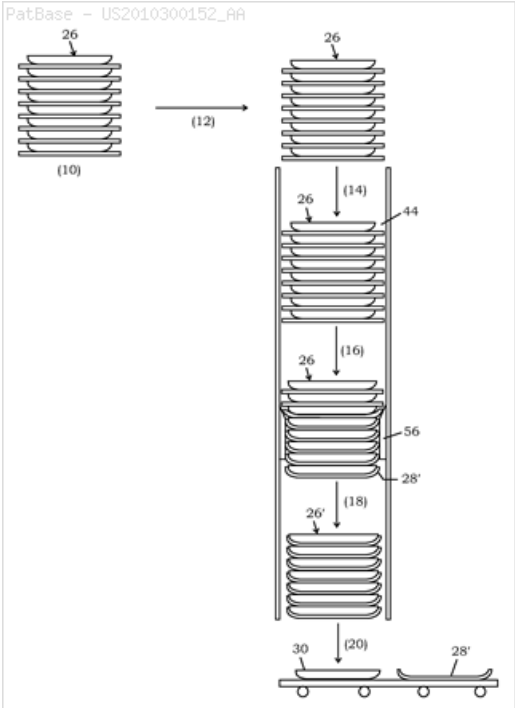
Agent(s): BARTH STEPHAN MANUEL; CORNING INC; SANTANDREA ROBERT P

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **STACK** PROGRESSIVE **PRESSING** FOR MAKING SHAPED ARTICLES

Abstract: A **method** for forming shaped articles (28') includes preparing a **stack** (26) having at least an adjacent set (27) of preformed material (28) and forming **mold** (30), where the preformed material (28) has an edge portion (34) that extends beyond a periphery of the forming **mold** (30), and the forming **mold** (30) has an external surface (32) with a desired surface profile of a shaped article. The **stack** (28) is **heated**. The **stack** (28) is advanced through a constriction (56) that has an internal surface configured to fold the edge portion (34) of the preformed material (28) into contact with the external surface (32) of the forming **mold** (30) as the edge portion (34) passes through the constriction (56), thereby forming a shaped article (28') from the preformed material (28). The shaped article (28') is then separated from the forming **mold** (30).

Classifications:
International (IPC 8-9): C03B11/00 C03B23/023 C03B23/03 C03B29/06 (Advanced/Invention)
CPC: C03B23/0305
European: C03B23/03C
US: 65/102 65/106 65/107 65/181 65/181S 65/66 65/66P



Family:

Publication number	Publication date	Application number	Application date
US2010300152 AA	20101202	US20100774177	20100505
US8281619 BB	20121009	US20100774177	20100505

Priority:

US20090182158P 20090529 US20100774177 20100505

Probable Assignee: CORNING INC
Assignee(s): (std): CORNING INC ; DANNOUX THIERRY LUC ALAIN
Inventor(s): (std): DANNOUX THIERRY LUC ALAIN
Agent(s): CORNING INC; WALTER M

Title: **METHOD** OF FORMING A MIRRORED BENT CUT **GLASS** SHAPE FOR VEHICULAR EXTERIOR REARVIEW MIRROR ASSEMBLY

Abstract: A **method** of forming a mirrored bent cut **glass** shape includes bending a flat **sheet** of **glass** to establish a **curved sheet** of **glass**. A machine vision system determines a surface profile of the **curved sheet** of **glass**, and a computer numerical controlled cutting tool is positioned at the **curved sheet** of **glass** and its cutting wheel is maintained at or close to 90 degrees to the tangential plane of the **curved sheet** of **glass**. At least one of (a) the cutting wheel and (b) the **curved sheet** of **glass** is controlled in three dimensions to cut a bent cut **glass** shape from the **curved sheet** of **glass**, and such controlling is, at least in part, responsive to the surface profile of the **curved sheet** of **glass**. A mirror reflector is established at a surface of the bent cut **glass** shape to form a mirrored bent cut **glass** shape.

Classifications:

International (IPC 8-9): B05D5/12 B26D7/14 B32B17/10 B60R1/08 C03B23/023 C09K9/02 G02B5/08 G02B7/182 G02F1/15

G02F1/153 (Advanced/Invention);

G02F1/155 (Advanced/Non-invention)

CPC: B32B17/10036 B32B17/06 B32B17/10697 B60Q1/2665

B60R1/088 B60R1/1207 C09K9/02 C09K2211/1007 C09K2211/1011

C09K2211/1014 C09K2211/1029 C09K2211/1033 C09K2211/1037

G02F1/15 G02F1/1521 G02F1/155 G02F2001/1502 G02F2001/151

G02F2001/1512 G02F2001/1515 G02F2201/58 G02F2202/022

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Y10T428/31649 Y10T428/31678 Y10T428/31935

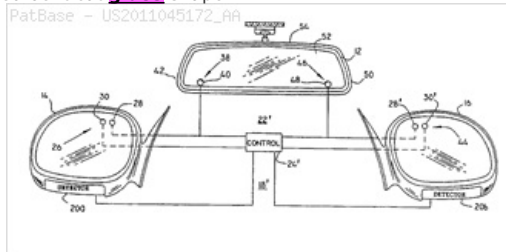
European: B32B17/06 B32B17/10C4 B32B17/10G14 B60Q1/26J2

B60R1/08G5 B60R1/12A C09K9/02 G02F1/15 M09K211/10B2 M09K211/10B4 M09K211/10B6 M09K211/10D4B

M09K211/10D4B2 M09K211/10D4B4 S02F1/15 S02F1/15B S02F1/15F S02F1/15M S02F1/15N S02F1/15V S02F201/58

S02F202/02B

US: 359/267 359/844 359/872 427/108 427/108P 65/106 83/17 83/17S



Family:

Publication number	Publication date	Application number	Application date
US2011045172 AA	20110224	US20100910479	20101022
US8164817 BB	20120424	US20100910479	20101022

Priority:

US19940238521 19940505	US19950429643 19950427	US19970824501 19970326
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US20000381856 20000127	US20010954285 20010918	US20020197679 20020716
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Probable Assignee: DONNELLY CORP

Assignee(s): (std): AGRAWAL ANOOP ; ALLEMAND PIERR MARC ; DONNELLY CORP ; DORNAN CRAIG A ; LYNAM NIAL R ; VARAPRASAD DESARAJU V ; ZHAO MINGTANG

Inventor(s): (std): AGRAWAL ANOOP ; ALLEMAND PIERR MARC ; DORNAN CRAIG A ; DORNAN CRAIG ALLEN ; LYNAM NIAL R ; VARAPRASAD DESARAJU V ; ZHAO MINGTANG

Agent(s): VAN DYKE GARDNER LINN AND BURKHART LLP; GARDNER LINN BURKHART AND FLORY LLP

Title: EDGE ILLUMINATION OF AN ION-EXCHANGED GLASS SHEET

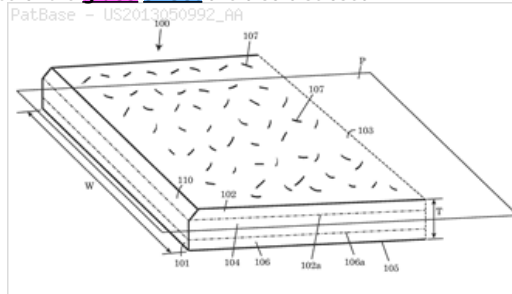
Abstract: A planar ion-exchanged glass sheet for out-of-plane light beam coupling includes a first surface, a ion-exchanged first glass region adjacent and parallel to the first surface, a core glass region adjacent and parallel to the first glass region, a ion-exchanged second glass region adjacent and parallel to the core glass region, and a second surface adjacent and parallel to the second glass region. One edge of the glass sheet has an angled end face that is inclined to the plane extends across a thickness of at least one of the glass regions. Methods of making the planar ion-exchanged glass sheet, coupling an out-of-plane light beam into a plane using the planar ion-exchanged glass sheet, and scattering the coupled light to illuminate at least select regions of an exposed surface of the glass sheet are also disclosed.

Classifications:

International (IPC 8-9): B44F1/06 C03C21/00 F21S2/00 F21S8/00 F21V13/08 F21V7/00 F21V7/04 F21V8/00 F21W121/00 F21Y115/10 F25D23/02 F25D27/00 F25D29/00 G01N21/00 G02B5/02 G09F13/18 (Advanced/Invention); F21W121/00 F21Y101/02 F21Y115/10 (Advanced/Non-invention)
CPC: F21W121/00 G02B6/0031 G02B6/0041 G02B6/0043 G09F13/18 G02B5/0284 F21V13/08 F25D23/028 F25D27/00 F25D29/008 F25D2327/001 F25D2400/18 F21Y2115/10
US: 349/65 359/599 362/100 362/217.02 362/296.01 362/330 362/627 362/629 362/97.1

JP F-Term: 3K244 3K244/AA04 3K244/AA05 3K244/BA48 3K244/BA50 3K244/CA02 3K244/CA03 3K244/DA01 3K244/DA02 3K244/DA05 3K244/EA01 3K244/EA16 3K244/EA31 3K244/EA34 3K244/EC01 4G059 4G059/AA11 4G059/AC09 4G059/AC16 4G059/HB00

JP F-Index: C03C21/00/B C03C21/00/101 F21S2/00/432

**Family:**

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CN103764587 A	20140430	CN201280042056	20120824
CN103764587 B	20160817	CN201280042056	20120824
DE602012039325 D1	20171214	DE201260039325T	20120824
EP2751043 A1	20140709	EP20120828017	20120824
EP2751043 A4	20150415	EP20120828017	20120824
EP2751043 B1	20171101	EP20120828017	20120824
EP3296276 A1	20180321	EP20170196148	20120824
JP2014529869 A2	20141113	JP20140528474	20120824
JP2014529869 T2	20141113	JP20140528474T	20120824
JP5793623 B2	20151014	JP20140528474T	20120824
US2013050992 AA	20130228	US20110285616	20111031
US2014321124 AA	20141030	US20140328238	20140710
US8789998 BB	20140729	US20110285616	20111031
US8974105 BB	20150310	US20140328238	20140710
WO13032890 A1	20130307	WO2012US52221	20120824

Priority:

US20110529573P 20110831 US20110285616 20111031 EP20120828017 20120824
WO2012US52221 20120824 US20140328238 20140710

Probable Assignee: CORNING INC

Assignee(s): (std): SCHNEIDER VITOR M ; SCHNEIDER VITOR MARINO ; WHITTIER ALANA M ; WHITTIER ALANA MARIE ; CORNING CO LTD ; CORNING INC

Assignee(s): CORNING INC CORNING

Inventor(s): (std): SCHNEIDER VITOR M ; SCHNEIDER VITOR MARINO ; WHITTIER ALANA M ; WHITTIER ALANA MARIE

Inventor(s): WHITTIER ALANA MARIE PAINTED POST ; SCHNEIDER VITOR MARINO PAINTED POST

Agent(s): EPPING HERMANN FISCHER PATENTANWALTSGESELLSCHAFT MBH; GREENE SIMON KENNETH; EPPING HERMANN FISCHER; RYAN T; WATSON BRUCE P

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: OPTICAL COMPONENT PRODUCTION **METHOD**, OPTICAL COMPONENT, AND OPTICAL PANEL PRODUCTION **METHOD**

Abstract: A **method** of producing an optical component includes a transfer step of sandwiching a **molding** material layer of a **molding** material between a **thin glass** plate and a **mold** and transferring an indented pattern on the **mold** to the **molding** material layer to form a patterned indented layer on the **thin glass** plate, and a separation step of separating the **mold** from the patterned indented layer. During the transfer step, a reinforcing plate is removably attached to the **thin glass** plate.

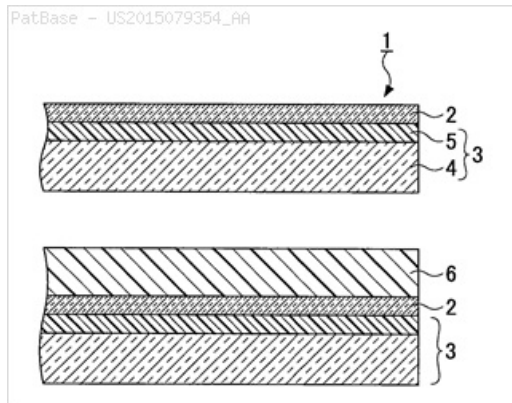
Classifications:

International (IPC 8-9): B05D3/12 B05D5/06 B29C59/02 B29C59/04 B29L11/00 B32B17/06 C03C17/28 G02B1/04 G02B1/10 G02B1/11 G02B1/118 G02B3/00 G02B5/02 G02B5/30 G02F1/1335 H01L21/027 H01L51/50 H05B33/02 (Advanced/Invention); B29L11/00 G02B1/11 G02B3/00 G02B5/30 (Advanced/Non-invention)
CPC: G02B3/0031 G02B5/3058 B29C59/046 G02B1/04 B05D3/12 B05D5/06 B29C59/026 Y10T428/24612 G02B1/118

US: 427/165 428/172

JP F-Term: 2H042 2H042/BA04 2H042/BA12 2H042/BA15 2H042/BA20 2H149 2H149/AA02 2H149/AA18 2H149/AB23 2H149/BA23 2H149/BB28 2H149/FA42 2H149/FB01 2H149/FD47 3K107 3K107/AA01 3K107/BB01 3K107/CC43 3K107/CC45 3K107/EE21 3K107/EE26 3K107/EE29 3K107/FF15 3K107/GG09 4F209 4F209/AD04 4F209/AD08 4F209/AD20 4F209/AF01 4F209/AG01 4F209/AG03 4F209/AG05 4F209/AH73 4F209/PA02 4F209/PB01 4F209/PG05 4F209/PH30 4F209/PN06 4F209/PQ09 4F209/PQ11

JP F-Index: B29C59/02/Z B29L11/00 B29L9/00 G02B5/02/C G02B5/30 H05B33/02 H05B33/14/A



Family:

Publication number	Publication date	Application number	Application date
CN104334333 A	20150204	CN201380026773	20130521
CN104334333 B	20170301	CN201380026773	20130521
JP2013176146 A1	20160114	JP20140516815T	20130521
JP6112109 B1	20170412	JP20140516815T	20130521
KR20150020282 A	20150225	KR20147032742	20130521
TW201402315 A	20140116	TW20130118231	20130523
TWI588017 B	20170621	TW20130118231	20130523
US2015079354 AA	20150319	US20140551679	20141124
WO13176146 A1	20131128	WO2013JP64118	20130521

Priority:

JP20120118514 20120524 JP20140516815 20130521 WO2013JP64118 20130521

Probable Assignee: ASAHI GLASS CO LTD

Assignee(s): (std): ASAHI GLASS CO LTD

Inventor(s): (std): KAIDA YURIKO ; KAKUTA JUNICHI ; SAKAMOTO HIROSHI ; TAKAYAMA KOSUKE ; TAKAYAMA KOSUKE

Agent(s): ITOH TADAHIKO ; ITOH TADASHIGE ; ITOH TADASHIGE ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: LAMINATED GLASS STRUCTURES HAVING HIGH GLASS TO POLYMER INTERLAYER ADHESION

Abstract: A thin glass laminate is provided including at least one or two thin glass sheets with at least one polymer interlayer laminated therebetween. The laminate has a high level of adhesion between the two glass sheets and the interlayer, such that the laminate has a pummel value of at least 7, at least 8, or at least 9. The laminate also has a high penetration resistance of at least 20 feet mean break height. The polymer interlayers have a thickness ranging from about 0.5 mm to about 2.5 mm and are formed of an ionomer, poly vinyl butyral, or polycarbonate. At least one or both of the two glass sheets are chemically strengthened.

Classifications:

International (IPC 8-9): B32B17/10 B32B37/18 B60J1/00 C03C27/12 E04F11/18 H01L31/048 (Advanced/Invention);

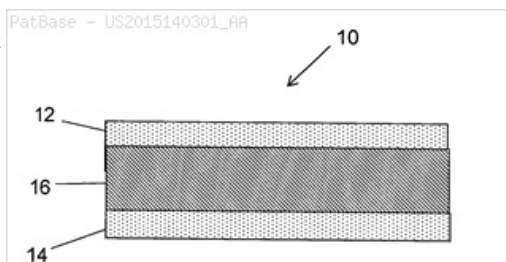
H01L31/048 (Advanced/Non-invention)

CPC: B32B17/10743 B32B37/182 B32B17/10036 B32B17/10137 B32B17/10688 B32B17/10761 Y10T428/24967

US: 156/99 428/215

JP F-Term: 2E101 2E301 2E301/GG06 2E301/HH15 2E301/HH18 2E301/NN01 2E301/NN31 3D127 4G061 4G061/AA02 4G061/AA03 4G061/AA04 4G061/AA06 4G061/AA11 4G061/AA27 4G061/AA28 4G061/BA01 4G061/BA02 4G061/CA02 4G061/CB03 4G061/CB17 4G061/CB19 4G061/CD02 4G061/CD03 4G061/CD18 4G061/DA10 4G061/DA23 4G061/DA32 4G061/DA38 4G061/DA46

JP F-Index: B60J1/00/H C03C27/12/C C03C27/12/E C03C27/12/R E04F11/18



Family:

Publication number	Publication date	Application number	Application date
CN104684861 A	20150603	CN201380030135	20130606
CN104684861 B	20180223	CN201380030135	20130606
EP2858821 A1	20150415	EP20130729886	20130606
JP2015527280 T2	20150917	JP20150516201T	20130606
JP6328619 B2	20180523	JP20150516201T	20130606
KR20150022989 A	20150304	KR20157000382	20130606
US2015140301 AA	20150521	US20130405647	20130606
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Priority:

US20120657182P 20120608

US20130405647 20130606

WO2013US44483 20130606

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC ; FISHER WILLIAM KEITH ; FRISKE MARK STEPHEN

Inventor(s): (std): FISHER WILLIAM KEITH ; FRISKE MARK STEPHEN

Agent(s): GUNNING JACK PETER; HARDEE RYAN T

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **METHOD** AND DEVICE FOR THE LASER-BASED MACHINING OF **SHEET**-LIKE SUBSTRATES

Abstract: A **method** for the laser-based machining of a **sheet**-like substrate, in order to separate the substrate into multiple portions, in which the laser beam of a laser for machining the substrate is directed onto the latter, is characterized in that, with an optical arrangement positioned in the path of rays of the laser, an extended laser beam focal line, seen along the direction of the beam, is formed on the beam output side of the optical arrangement from the laser beam directed onto the latter, the substrate being positioned in relation to the laser beam focal line such that an induced absorption is produced in the material of the substrate in the interior of the substrate along an extended portion, seen in the direction of the beam, of the laser beam focal line, such that a material modification takes place in the material of the substrate along this extended portion.

Classifications:

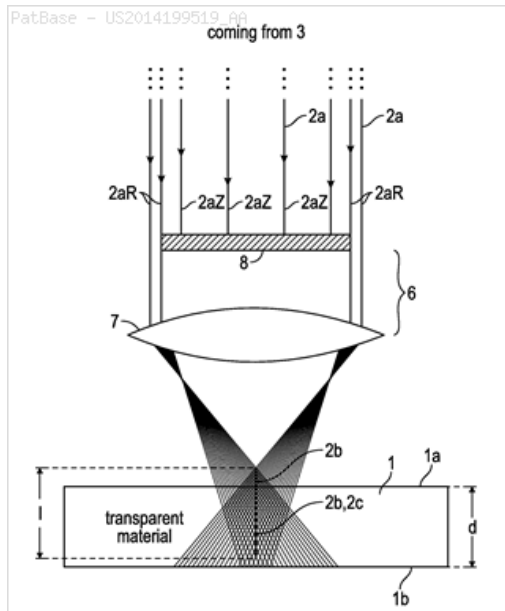
International (IPC 8-9): B23K101/40 B23K26/00 B23K26/04 B23K26/06 B23K26/0622 B23K26/064 B23K26/067 B23K26/073 B23K26/08 B23K26/14 B23K26/18 B23K26/359 B23K26/38 B23K26/382 B23K26/386 B23K26/40 B23K26/402 B23K26/50 B23K26/53 B23K26/55 B23K26/57 B28D5/00 C03B17/04 C03B23/02 C03B23/023 C03B23/025 C03B23/03 C03B23/035 C03B33/02 C03B33/023 C03B33/033 C03B33/04 C03B33/06 C03B33/08 C03B33/09 C03B33/095 C03B33/10 C03B9/12 C03C15/00 C03C23/00 H01L21/301 H01L21/304 (Advanced/Invention); B23K101/40 B23K103/00 B23K103/16 C03B33/023 C03B33/04 C03B33/095 (Advanced/Non-invention)

CPC: B23K26/0648 Y10T428/24471 C03B33/082 C03B23/02 C03B23/0252 B23K26/382 Y10T428/24355 B23K26/0738 B23K26/38 B23K26/04 B23K26/55 B23K26/57 B23K2203/56 C03B33/091 C03B33/102 B23K26/0063 B23K26/359 B23K26/386 C03B23/0357 B23K26/0057 B23K26/0087 B23K26/0622 B23K26/0884 B23K26/402 B23K26/53 B23K2203/172 B65G2249/04 C03B23/023 C03B23/025 C03B33/023 C03B33/033 C03B33/04 B23K2203/54 C03B9/12 C03B33/095 B23K26/389 C03B33/06 C03B33/0955 Y10T428/15 Y10T428/24777 B23K26/0006 B23K26/006 B23K26/0613 B23K26/0624 B23K26/0676 B23K26/40 B23K2203/50 C03B33/0222 Y02P40/57

US: 219/121.66 219/121.75 219/121.78 428/131 428/141 428/155 428/192 428/43 65/105 65/111 65/112 65/187 65/269 65/355

JP F-Term: 3C069 3C069/AA03 3C069/BA08 3C069/BB01 3C069/BC01 3C069/CA05 3C069/CA11 3C069/EA01 3C069/EA02 3C069/EA04 3C069/EA05 4E068 4E168 4E168/AE01 4E168/CB03 4E168/CB04 4E168/CB07 4E168/CB11 4E168/CB18 4E168/DA02 4E168/DA23 4E168/DA24 4E168/DA32 4E168/DA36 4E168/DA40 4E168/DA45 4E168/DA46 4E168/EA13 4E168/EA14 4E168/EA15 4E168/EA19 4E168/JA11 4E168/JA13 4E168/JA14 4E168/KA06 4E168/KA08 4G015 4G015/FA06 4G015/FB02 4G015/FC14 3C069/AA01 3C069/BC03 3C069/BC04 3C069/CB04 4E168/CB17 4G015/FB01 4G015/FC02 5F063 5F063/AA05 5F063/BA43 5F063/BA47 5F063/BA48 5F063/CA06 5F063/DD26 5F063/DD32 4E168/AD12 4E168/AD14 4E168/AE02 4E168/CB15 4E168/DA03 4E168/DA04 4E168/DA37 4E168/DA39 4E168/DA47 4G015/AA03 4G015/AA04 4G015/AA08 4G015/AA13 4G015/AB02 4G015/FA01 4G015/FA07 4G015/FA09 4G015/FC10 3C069/AA02 4E168/EA23 4E168/JA27 4E168/JB03 4E168/AD11 4E168/AE00 4G015/FB03

JP F-Index: B23K26/073 B23K26/53 B28D5/00/Z C03B33/09 B23K26/04 B23K26/064/A B23K26/064/Z H01L21/78/B B23K26/382 C03B23/025 C03B23/03 C03B23/035 C03B33/08 B23K26/06 C03B33/02 B23K26/50 C03B33/095



Family:

Publication number	Publication date	Application number	Application date
CA2898256 AA	20150715	CA20142898256	20140114
CA2898371 AA	20150715	CA20142898371	20140114
CN105209218 A	20151230	CN201480009759	20140114
CN105209218 B	20180706	CN201480009759	20140114
CN106102980 A	20161109	CN201480075632	20141215
CN106170365 A	20161130	CN201480008674	20140114
CN107074611 A	20170818	CN201580047994	20150710
CN107241904 A	20171010	CN201480075620	20141217
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EP2945770 A1	20151125	EP20140705210	20140114
EP3083514 A2	20161026	EP20140824690	20141217
EP3083515 A2	20161026	EP20140825015	20141215
EP3166894 A1	20170517	EP20150744789	20150710
JP2016509540 T2	20160331	JP20150553188T	20140114
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KR20160010396 A	20160127	KR20157022064	20140114
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Priority:

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Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC ; CORNING LASER TECH GMBH ; CORNING LASER TECHNOLOGIES GMBH

Assignee(s): INNOLAS SYSTEMS GMBH ; SCHILLINGER HELMUT ; GRUNDMULLER RICHARD

Inventor(s): (std): ALBERT ROTH NIEBER ; BOOKBINDER DANA CRAIG ; GRUNDMUELLER RICHARD ; GRUNDMULLER RICHARD ; HELMUT SCHILLINGER ; KLINGENSMITH LEWIS KIRK ; LEWIS KIRK KLINGENSMITH ; LOGUNOV STEPHAN LVOVICH ; MARJANOVIC SASHA ; NIEBER ALBERT ROTH ; PIECH GARRETT ANDREW ; PUSHKAR TANDON ; SCHILLINGER HELMUT ; SCHILLINGER HELMUT DR ; SERGIO TSUDA ; STEPHAN LVOVICH LOGUNOV ; TANDON PUSHKAR ; TSUDA SERGIO ; WAGNER ROBERT STEPHEN

Agent(s): GOWLING LAFLEUR HENDERSON LLP; PFENNING MEINIG AND PARTNER MBB PATENTANWAELTE; PFENNING MEINIG AND PARTNER GBR; PFENNING MEINIG AND PARTNER MBB; GREENE SIMON KENNETH; SCHEUERMANN ERIK; SVETLANA Z; MICHAEL G; KEVIN L; BRAY KEVIN L; SHORT SVETLANA Z

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: LAMINATED GLASS STRUCTURES HAVING HIGH GLASS TO POLYMER INTERLAYER ADHESION

Abstract: A thin glass laminate is provided that includes at least one or two outer thin (not exceeding 2 mm or not exceeding 1.5 mm) glass sheets with at least one polymer interlayer laminated between the two outer thin glass sheets. The laminate has a high level of adhesion between the two glass sheets and the interlayer, such that the laminate has a pummel value of at least 7, at least 8, or at least 9. The laminate may also have a high penetration resistance of at least 20 feet mean break height. The polymer interlayers may have a thickness ranging from about 0.5 mm to about 2.5 mm and may be formed of an ionomer, polyvinyl butyral, or polycarbonate. At least one or both of the two glass sheets may be chemically strengthened.

Classifications:

International (IPC 8-9): B32B17/10 B32B27/30 B32B37/06

B32B37/14 B60J1/00 C03C21/00 C03C27/12

H01L31/048 (Advanced/Invention)

CPC: B32B17/10743 B32B17/10119 B32B17/10752 B32B37/06

B32B37/14 B32B17/10036 B32B17/10137 B32B17/10761 C03C27/10

US: 156/99 428/215

JP F-Term: 3D127 4F100 4F100/AG00 4F100/AK23 4F100/AK45

4F100/BA03 4F100/BA06 4F100/GB07 4F100/GB31 4F100/JK10

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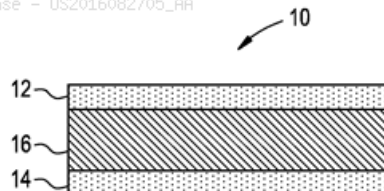
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4G061/CB19 4G061/CD18

JP F-Index: B32B17/10 B32B27/30/102 B60J1/00/J C03C21/00/101

C03C27/12/D C03C27/12/F C03C27/12/R

PatBase - US2016082705_AA



Family:

Publication number	Publication date	Application number	Application date
CN105408109 A	20160316	CN201480022969	20140414
EP2988931 A1	20160302	EP20140722511	20140414
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KR20160003704 A	20160111	KR20157032486	20140414
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WO14176059 A1	20141030	WO2014US33970	20140414

Priority:

US20130814569P 20130422 US20140785757 20140414 WO2014US33970 20140414

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC

Inventor(s): (std): FISHER WILLIAM KEITH ; FRISKE MARK STEPHEN

Agent(s): SCHEUERMANN ERIK; HARDEE RYAN T

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: **METHOD** AND APPARATUS FOR PERFORMING LASER **CURVED** FILAMENTATION WITHIN TRANSPARENT MATERIALS

Abstract: Systems and **methods** are described for forming continuous **curved** laser filaments in transparent materials. The filaments are preferably **curved** and C-shaped. Filaments may employ other **curved** profiles (shapes). A burst of ultrafast laser pulses is focused such that a beam waist is formed external to the material being **processed** without forming an external plasma channel, while a sufficient energy density is formed within an extended region within the material to support the formation of a continuous filament, without causing optical breakdown within the material. Filaments formed according to this **method** may exhibit lengths in the range of 100 micro m-10 mm. An aberrated optical focusing element is employed to produce an external beam waist while producing distributed focusing of the incident beam within the material. Optical monitoring of the filaments may be employed to provide feedback to facilitate active control of the **process**.

Classifications:

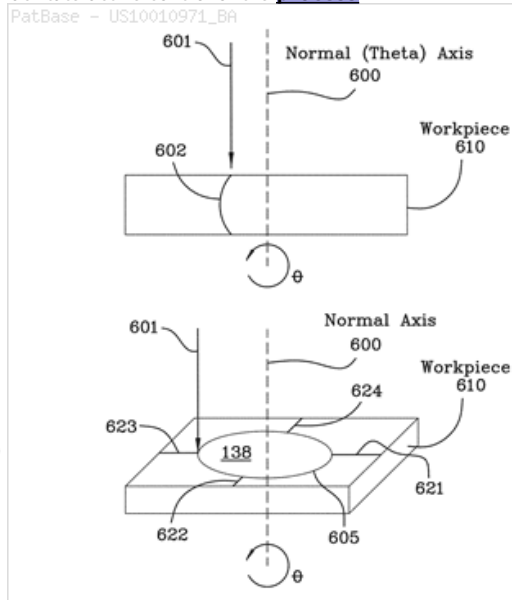
International (IPC 8-9): B23K26/00 B23K26/02 B23K26/035 B23K26/04 B23K26/046 B23K26/06 B23K26/062 B23K26/0622 B23K26/064 B23K26/067 B23K26/08 B23K26/082 B23K26/30 B23K26/36 B23K26/362 B23K26/38 B23K26/40 B23K26/50 B23K26/53 B23K26/55 B28D5/00 C03B33/02 C03B33/033 C03B33/04 C03B33/07 C03B33/09 C03C14/00 C03C23/00 H01J9/00 H01L H01L21/02 H01L21/301 H01L21/78 (Advanced/Invention); B23K103/00 B23K103/16 (Advanced/Non-invention); B23K C03B (Subclass/Invention)

CPC: C03C14/002 C03C2214/02 B23K26/0626 C03B33/09 C03B33/033 C03B33/04 B23K26/0006 B23K26/0057 H01L21/78 B23K26/083 B23K2203/00 B23K26/04 B23K26/064 B23K26/0624 B23K26/0648 B23K26/082 B23K2203/16 B23K2203/166 B23K2203/42 B23K2203/50 B23K2203/52 B23K2203/54 B23K2203/56 C03B33/0222 C03B33/07 B23K26/38

US: 1/1 219/121.61 219/121.72 219/121.73 219/121.75 438/463 501/32 65/112 65/355

JP F-Term: 4E068 4E168 4E168/AE01 4E168/CA06 4E168/CB07 4E168/CB11 4E168/DA02 4E168/DA03 4E168/DA04 4E168/DA05 4E168/DA23 4E168/DA28 4E168/DA32 4E168/DA46 4E168/DA47 4E168/DA60 4E168/JA12 4E168/JA13 4E168/JA14 4E168/JB03 3C069 3C069/AA01 3C069/AA03 3C069/BA08 3C069/BB01 3C069/CA02 3C069/CA03 3C069/CA05 3C069/CA11 3C069/EA01 3C069/EA05 4E168/AA00 4E168/AD18 4E168/AE05 4E168/CA02 4E168/CA05 4E168/CB01 4E168/CB04 4E168/CB15 4E168/CB17 4E168/CB22 4E168/CB23 4E168/CB24 4E168/DA00 4E168/DA13 4E168/DA37 4E168/DA54 4E168/EA03 4E168/EA06 4E168/EA13 4E168/EA15 4E168/EA23 4E168/JA01 4E168/JA11 4E168/JA15 4E168/JA17 4E168/JA27 4E168/JA28 4E168/JB05 4E168/KA04 4G015 4G015/FA06 4G015/FB01 4G015/FC02 4G015/FC14 5F063 5F063/AA44 5F063/BA33 5F063/BA45 5F063/BA47 5F063/BA48 5F063/CB07 5F063/DD27 5F063/DD32 5F063/DE33 4E168/AD02 4E168/AD11 4E168/AE04 4E168/DA42 4E168/EA02 5F063/AA04 5F063/AA15 5F063/AA43 5F063/BA11 5F063/BA42 5F063/BA43 5F063/CA01 5F063/CA02 5F063/CA06 5F063/CB02 5F063/CB06 5F063/CB23 5F063/CB26 5F063/DD26 5F063/DE01 5F063/EE21 4E168/CA13 4E168/CB03 4E168/CB18 4E168/DA11 4E168/EA11 4E168/GA01 4E168/GA02 4E168/JA16 4G059 4G059/AA01 4G059/AB13 4G059/AC01 4G059/AC30

JP F-Index: B23K26/00/N B23K26/064/A B23K26/53 B23K26/00/P B23K26/067 B23K26/36 B28D5/00/Z C03B33/09 H01L21/78/B B23K26/064/Z B23K26/55 B23K26/062 C03C23/00/D



Family:

Publication number	Publication date	Application number	Application date
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CA2857820 AA	20150202	CA20142857820	20140725
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TW201521931 A	20150616	TW20140126070	20140730
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Priority:

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Probable Assignee: ROFIN SINAR TECHNOLOGIES LLC

Assignee(s): (std): ROFIN SINAR TECHNOLOGIES INC ; ROFIN SINAR TECH INC ; ROFIN SINAR TECH LLC

Assignee(s): ROFIN SINAR TECHNOLOGIES LLC ; ROFIN SINAR TECHNOLOGIES INC PLYMOUTH ; NA JUNG UN ; KINESTRAL TECHNOLOGIES INC ; ALBELO GILBERT ; BARCLAYS BANK PLC COLLATERAL AGENT AS ; HOSSEINI S ABBAS

Inventor(s): (std): NA JUNG UN ; S ABBAS HOSSEINI ; S ABBAS HOSSEINI SA ; JUNG UN NA ; ALBELO GILBERT ; HOSSEINI S ABBAS ; GILBERT ALBELO

Inventor(s): HOSSEINI ABBAS S ; HOSSEINI S ABBAS RICHMOND HILL ; HOSSEINI SABBAS

Agent(s): BENNETT JONES LLP; VASS WILLIAM B; PUSCHMANN BORCHERT BARDEHLE PATENTANWAELTE PARTNERSCHAFT MBB; PUSCHMANN BORCHERT BARDEHLE PATENTANWAELTE PARTNERSCHAFT MBB; RODYK AND DAVIDSON LLP; WOODLING KROST AND RUST; WOOLING KROST AND RUST

Designated states: AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

Title: DAMAGE RESISTANT **GLASS** ARTICLE

Abstract: A strengthened **glass sheet** product along with a **process** and an apparatus for strengthening a **glass sheet** are provided. The **process** comprises cooling the **glass sheet** by non-contact thermal conduction for sufficiently long to fix a surface compression and central tension of the **sheet**. The **process** results in thermally strengthened **glass sheets** having improved breakage properties.

Classifications:

International (IPC 8-9): B32B17/10 C03B27/012 C03B27/016 C03B27/04 C03B27/044 C03B27/048 C03B27/052 C03B29/12 C03B29/16 C03B35/14 C03B35/24 C03C21/00 C03C23/00 C03C3/11 E04C2/54 E06B3/54 E06B3/66 E06B3/663 E06B3/67 G06F3/01 G06F3/041 (Advanced/Invention)

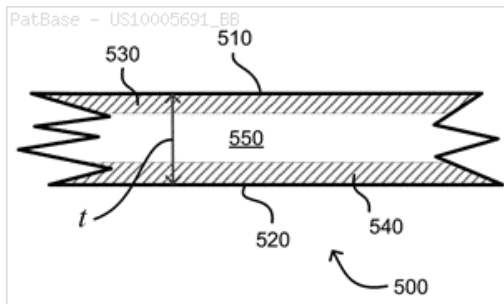
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CPC: C03B27/0413 C03B27/048 C03B27/044 C03B27/04 C03C21/002 C03B27/052 C03B29/12 C03B29/16 C03B35/24 C03C3/11 C03B27/012 C03B27/0404 C03B27/016 C03B27/0526 Y10T428/315 C03C23/007 E06B3/6715 G06F3/041 C03B27/0445 C03B27/0447 C03B35/147 B32B17/06 B32B17/10055 B32B17/10137 B32B17/10743 B32B17/10761 B32B17/1077 B32B17/10788 Y02P40/57 E06B3/66304 G06F3/016 B32B17/10302 E04C2/54 E06B3/6612 E06B3/66309 B32B17/10036 B32B17/10091 B32B17/101 B32B17/10752 C03C21/00 B32B2315/08 B32B2605/00 C03C3/078 C03C3/083 C03C3/085 C03C3/087 C03C3/095 E06B3/5409 E06B3/5436

US: 1/1 428/141 428/156 428/220 428/410 428/426 65/114 65/115 65/157 65/32.1 65/348 65/349

JP F-Term: 4G015 4G015/CA04 4G015/CB01 4G015/CC01

JP F-Index: C03B27/044



Family:

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Priority:

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Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC

Assignee(s): LEZZI PETER JOSEPH ; MASCHMEYER RICHARD ORR ; WASSON KEVIN LEE ; THOMAS JOHN CHRISTOPHER

Inventor(s): (std): JOHN CHRISTOPHER THOMAS ; KEVIN LEE WASSON ; PETER JOSEPH LEZZI ; RICHARD ORR MASCHMEYER ; WASSON KEVIN LEE ; THOMAS JOHN CHRISTOPHER ; MASCHMEYER RICHARD ORR ; LEZZI PETER JOSEPH

Agent(s): PHILLIPS ORMONDE FITZPATRICK; GOWLING WLG CANADA LLP; SCOTT MARK ANDREW; GREGORY V; BEAN GREGORY V; MAGAZINER RUSSELL S; WEGMANN ZACHARY J ET AL; WEGMANN ZACHARY J; PATEL PAYAL A

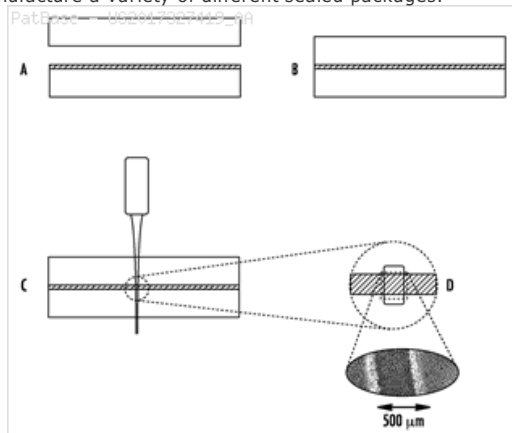
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: LASER WELDED GLASS PACKAGES AND METHODS OF MAKING

Abstract: A method of forming a sealed device comprising providing a first substrate having a first surface, providing a second substrate adjacent the first substrate, and forming a weld between an interface of the first substrate and the adjacent second substrate, wherein the weld is characterized by $((S_{\text{tensile stress location}})/(S_{\text{interface laser weld}})) < 1$ or < 1 and $S_{\text{interface laser weld}} > 10 \text{ MPa}$ or $> 1 \text{ MPa}$ where $S_{\text{tensile stress location}}$ is the stress present in the first substrate and $S_{\text{interface laser weld}}$ is the stress present at the interface. This method may be used to manufacture a variety of different sealed packages.

Classifications:

International (IPC 8-9): B23K26/18 B23K26/20 B23K26/32 B23K26/324 C01G19/02 C03B23/203 C03B23/24 C03C15/00 C03C17/02 C03C17/06 C03C17/22 C03C17/23 C03C23/00 C03C27/00 C03C27/02 C03C27/04 C03C27/06 C03C27/10 C03C3/14 C03C3/16 C03C3/23 C03C3/247 E06B3/66 E06B3/67 E06B3/677 H01L51/52 (Advanced/Invention); C03C17/06 C03C17/23 H01L51/52 (Advanced/Non-invention)
CPC: C03C17/02 C03C27/06 E06B3/6715 C03C15/00 C03C3/16 C01G19/02 C03C3/23 C03C23/0025 C03C3/14 C03C3/247 C03C17/06 C03C17/23 C03C27/044 C03C27/10 H01L51/5246 C03B23/203 C03B23/245 C03C27/00 C03C27/02 C03C2217/211 C03C2217/228 C03C2217/23 C03C2217/285 C03C17/22
JP F-Term: 2E016 2E016/BA01 2E016/CA01 2E016/CB01 2E016/CC02 2E016/EA01 4E168 4E168/BA02 4E168/BA90 4E168/CA06 4E168/CA11 4E168/DA04 4E168/DA32 4E168/DA45 4E168/FD01 4E168/JB03 4G061 4G061/AA25 4G061/BA01 4G061/BA03 4G061/CB12 4G061/CD02 4G061/CD24 4G061/DA35
JP F-Index: B23K26/18 B23K26/324 C03C27/06/101/D C03C27/10/A E06B3/677



Family:

Publication number	Publication date	Application number	Application date
CN107406292 A	20171128	CN201580071732	20151029
EP3212589 A1	20170906	EP20150797204	20151029
JP2018501175 T2	20180118	JP20170523432T	20151029
KR20170076774 A	20170704	KR20177014788	20151029
TW201623166 A	20160701	TW20150135817	20151030
US2017327419 AA	20171116	US20150522198	20151029
WO16069822 A1	20160506	WO2015US57924	20151029

Priority:

US20140073550P 20141031 US20150522198 20151029 WO2015US57924 20151029

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC

Inventor(s): (std): DABICH II LEONARD CHARLES ; STRELTSOV ALEXANDER MIKHAILOVICH ; STRELTSOV ALEXANDER MIKHAILOV ; QUESADA MARK ALEJANDRO ; LOGUNOV STEPHAN LVOVICH ; KOVAL SHARI ELIZABETH ; KOVAL SHARI ; KIM JIN SU ; DENEKA DAVID ALAN ; DABICH LEONARD CHARLES II ; DABICH II LEONARD ; BOEK HEATHER DEBRA

Agent(s): SCOTT MARK ANDREW; HARDEE RYAN T

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: CHEMICALLY STRENGTHENED GLASS

Abstract: A chemically strengthened glass includes a first main surface, a second main surface opposite to the first main surface, and an end surface connecting the first main surface and the second main surface. A compressive stress layer is provided in the first main surface and the second main surface. An average sheet thickness t is from 0.06 to 0.25 mm. When a bending test method is performed, a crack originating in at least one main surface of the first main surface and the second main surface is not formed.

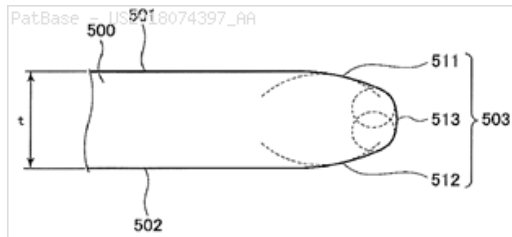
Classifications:

International (IPC 8-9): B82Y5/00 C03C19/00 C03C21/00 C03C3/083 C03C3/085 C03C3/087 C03C4/00 C03C4/18 G01N3/20 G03F1/60 (Advanced/Invention)

CPC: G03F1/60 C03C3/087 C03C4/18 C03C21/002 G01N2203/0003 C03C2204/00 G01N2203/0023 G01N2203/0064 G01N3/20

JP F-Term: 2H195 2H195/BC26 2H195/BC27 2H195/BC28 4G059 4G059/AA01 4G059/AB03 4G059/AB11 4G059/AC16 4G059/HB03 4G059/HB14 4G059/HB23 4G062 4G062/AA01 4G062/BB01 4G062/CC10 4G062/DA06 4G062/DA07 4G062/DB02 4G062/DB03 4G062/DB04 4G062/DC01 4G062/DD01 4G062/DE01 4G062/DF01 4G062/EA01 4G062/EA02 4G062/EA03 4G062/EA10 4G062/EB01 4G062/EB02 4G062/EB03 4G062/EB04 4G062/EC01 4G062/EC02 4G062/EC03 4G062/EC04 4G062/ED01 4G062/ED02 4G062/ED03 4G062/ED04 4G062/EE01 4G062/EE02 4G062/EE03 4G062/EF01 4G062/EF02 4G062/EF03 4G062/EG01 4G062/EG02 4G062/EG03 4G062/FA01 4G062/FA10 4G062/FB01 4G062/FB02 4G062/FC01 4G062/FC02 4G062/FC03 4G062/FD01 4G062/FE01 4G062/FF01 4G062/FG01 4G062/FH01 4G062/FJ01 4G062/FK01 4G062/FL01 4G062/GA01 4G062/GA10 4G062/GB01 4G062/GB02 4G062/GC01 4G062/GD01 4G062/GE01 4G062/HH01 4G062/HH03 4G062/HH05 4G062/HH07 4G062/HH09 4G062/HH11 4G062/HH12 4G062/HH13 4G062/HH15 4G062/HH17 4G062/HH20 4G062/JJ01 4G062/JJ03 4G062/JJ05 4G062/JJ07 4G062/JJ10 4G062/KK01 4G062/KK03 4G062/KK05 4G062/KK07 4G062/KK10 4G062/MM27 4G062/NN33

JP F-Index: C03C19/00/Z C03C21/00/101 C03C3/083 C03C3/085 C03C3/087 G03F1/60



Family:

Publication number	Publication date	Application number	Application date
CN107614454 A	20180119	CN201680031038	20160526
JP2016194785 A1	20180405	JP20170521889T	20160526
TW201704174 A	20170201	TW20160116761	20160527
US2018074397 AA	20180315	US20170822314	20171127
WO16194785 A1	20161208	WO2016JP65647	20160526

Priority:

JP20150110899 20150529 WO2016JP65647 20160526

Probable Assignee: ASAHI GLASS CO LTD

Assignee(s): (std): ASAHI GLASS CO LTD

Inventor(s): (std): ISHIMOTO HARUHIKO ; IWASAKI TATSUYA ; KAKUTA JUNICHI ; KOIKE AKIO

Agent(s): EIKOH PATENT FIRM PC

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: COLD FORMED LAMINATES

Abstract: The principles and embodiments of the present disclosure relate generally to complexly **curved** laminates made from a complexly **curved** substrate and a flat substrate, such as automotive window glazings, and **methods** of cold forming complexly-**curved glass** products from a **curved** substrate and a flat substrate. In one or more embodiments, the laminate includes first complexly-**curved glass** substrate with a first surface and a second surface opposite the first surface, a second complexly-**curved glass** substrate with a third surface and a fourth surface opposite the third surface with a thickness therebetween; and a polymer interlayer affixed to the second convex surface and third surface, wherein the third surface and fourth surface have compressive stress values respectively that differ such that the fourth surface has as compressive stress value that is greater than the compressive stress value of the third surface.

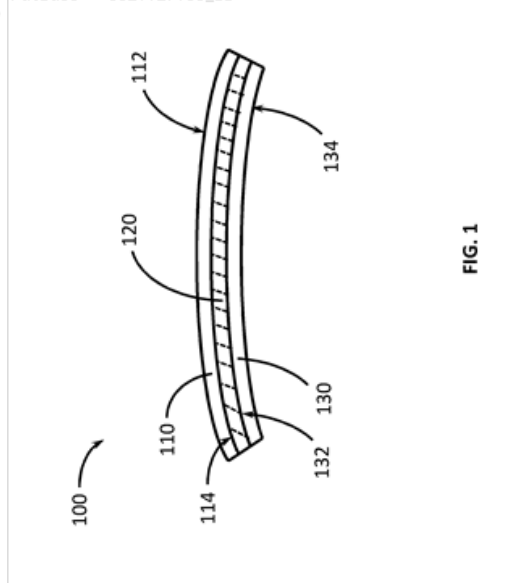
Classifications:

International (IPC 8-9): B32B17/10 B60J1/00 B61D25/00 B63B19/00 B64C1/14 C03B23/035 C03C27/10 (Advanced/Invention)

CPC: B60J1/004 C03B23/0357 B32B17/10761 B32B2605/006 B32B17/10889 B32B17/10036 B32B17/10137 B32B17/10816 B32B17/1088 B32B17/1077 B32B17/10788

US: 296/146.16

PatBase - US10017033_BB



Family:

Publication number	Publication date	Application number	Application date
CN107848265 A	20180327	CN201680040779	20160707
CN206385033 U	20170808	CN201621010957U	20160711
EP3319795 A1	20180516	EP20160741471	20160707
IN201817000927 A	20180330	IN201817000927	20180109
KR20180030097 A	20180321	KR20187003921	20160707
US10017033 BB	20180710	US20160204452	20160707
US2017008377 AA	20170112	US20160204452	20160707
WO17011270 A1	20170119	WO2016US41365	20160707

Priority:

US20150190828P 20150710 US20160281301P 20160121 US20160339145P 20160520
US20160204452 20160707 WO2016US41365 20160707

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING CO LTD ; CORNING INC

Inventor(s): (std): FISHER WILLIAM KEITH ; FRISKE MARK STEPHEN ; MARK STEPHEN FRISKE ; MOYER STEVEN LUTHER ; PAUL GEORGE RICKERI ; PAUL GEORGE RICKERL ; RICKERL PAUL GEORGE ; STEVEN LUTHER MOYER ; WILLIAM KEITH FISHER

Agent(s): EPPING HERMANN FISCHER; F BROCK; PATEL PAYAL A

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: GLASS STRUCTURE HAVING 3D SHAPE AND UNIFORM THICKNESS

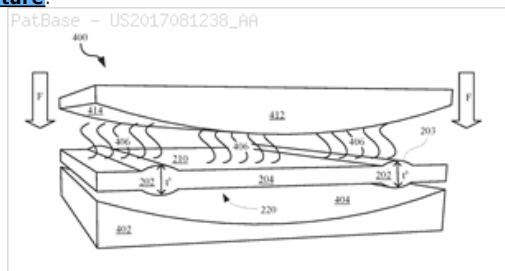
Abstract: A **method** of modifying a substrate formed of non-deformable material is disclosed. In some embodiments, techniques are disclosed for identifying a region of a planar substrate that is susceptible to stretching during a subsequent shaping operation. In some embodiments, techniques are disclosed for adding an amount of non-deformable material to the planar substrate at an identified location and in a single operation, acting on the substrate until the substrate has a shape corresponding to a uniform thickness and a three-dimensional **curvature**.

Classifications:

International (IPC 8-9): C03B23/03 (Advanced/Invention)

CPC: C03B23/0302 C03B23/0235 C03B23/0258 C03B23/0307
C03B32/02

US: 65/29.14



Family:

Publication number	Publication date	Application number	Application date
US2017081238 AA	20170323	US20160269838	20160919

Priority:

US20150221255P 20150921 US20160269838 20160919

Probable Assignee: APPLE INC

Assignee(s): (std): APPLE INC

Inventor(s): (std): JONES CHRISTOPHER D ; MEMERING DALE N ; PREST CHRISTOPHER D

Title: GLASS-RESIN COMPOSITE AND METHOD FOR PRODUCING SAME

Abstract: Provided is a glass-resin composite including a glass plate and a resin film, wherein the glass-resin composite is characterized in that: the resin film is provided on the entire surface of at least one main surface of the glass plate; the glass plate is chemically strengthened glass having a compressive-stress layer on all surface layers of the main surfaces and end surfaces; the plate thickness t_1 of the glass plate is 0.05-0.25 mm; and the plate thickness t_1 , the thickness t_2 of the resin film, and the yield stress P of the resin film satisfy the relationship $\{t_1(\text{mm}) \times 4(\text{N/mm}^2) < t_2(\text{mm}) \times P(\text{N/mm}^2)\}$.

Classifications:

International (IPC 8-9): B32B17/06 B32B17/10 C03C17/32

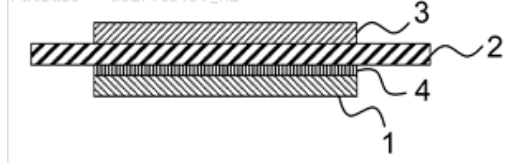
C03C17/34 C03C21/00 C03C3/087 G03F1/50

G03F1/60 (Advanced/Invention)

CPC: B32B17/06 C03C3/087 C03C17/32 C03C17/34 C03C21/00

G03F1/50 G03F1/60

PatBase - WO17069090_A1



Family:

Publication number	Publication date	Application number	Application date
DE112016004796 T5	20180719	DE201611004796T	20161017
TW201730002 A	20170901	TW20160133853	20161020
WO17069090 A1	20170427	WO2016JP80725	20161017

Priority:

JP20150206528 20151020 WO2016JP80725 20161017

Probable Assignee: ASAHI GLASS CO LTD

Assignee(s): (std): ASAHI GLASS CO LTD

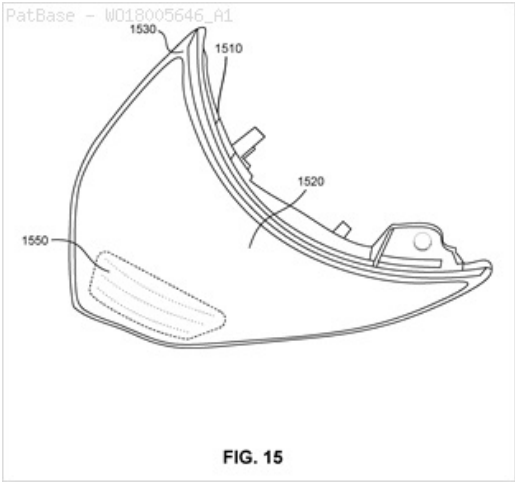
Inventor(s): (std): HAYASHI HIDEAKI ; KAKUTA JUNICHI ; KOIKE AKIO

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: LAMINATING THIN STRENGTHENED GLASS TO CURVED MOLDED PLASTIC SURFACE FOR DECORATIVE AND DISPLAY COVER APPLICATION

Abstract: A process comprises cold-forming a flat glass substrate into a non-planar shape using a die. The cold-formed glass substrate is bonded to a non-planar rigid support structure at a plurality of non-planar points using the die. Bonding methods include injection molding the non-planar rigid support structure, and direct bonding. An article is also provided, comprising a cold-formed glass substrate having opposing major surfaces and a curved shape, the opposing major surfaces comprising a surface stress that differ from one another. The cold-formed glass substrate is attached to a rigid support structure having the curved shape. The cold-formed glass substrate includes an open region not in direct contact with the non-planar rigid support structure, and the open region has a curved shape maintained by the non-planar rigid support structure.

Classifications:
International (IPC 8-9): B29C45/14 B32B17/06 B32B17/10 B60R13/02 C03B23/023 C03B23/03 C03C17/00 C03C25/10 E06B3/66 (Advanced/Invention)
CPC: C03C17/002 B32B17/10889 C03B23/023 C03C2217/73 B29C45/1418 B29C45/14778 B60R13/02 B32B17/10036 B32B17/10743 B32B17/10761 B32B17/1077 B32B17/10788



Family:

Publication number	Publication date	Application number	Application date
TW201808836 A	20180316	TW20170121551	20170628
WO18005646 A1	20180104	WO2017US39752	20170628

Priority:

US20160355542P 20160628 US20170444470P 20170110

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING INC

Inventor(s): (std): BRENNAN MICHAEL TIMOTHY ; SUN YAWEI

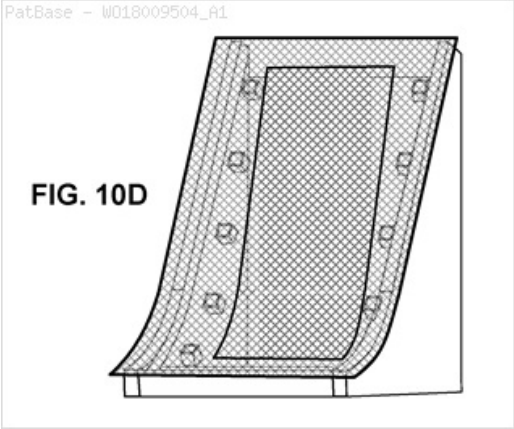
Agent(s): PATEL PAYAL A

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: COLD-FORMED GLASS ARTICLE AND ASSEMBLY PROCESS THEREOF

Abstract: Embodiments of an article comprising a cold-formed glass substrate in a curved shape, a plurality of separate mechanical retainers, and a frame are disclosed. The cold-formed glass substrate has a first major surface, and a second major surface opposing the first major surface. In one more embodiments, the plurality of separate mechanical retainers are attached to the second major surface of the cold-formed glass substrate. The mechanical retainers may be attached to the frame to define a position for each of the plurality of mechanical retainers, such that the mechanical retainers define the curved shape. Embodiments of processes to form such articles are also provided. Such processes can include attaching a plurality of separate mechanical retainers to a flexible glass substrate such that the glass substrate maintains its flexibility, and attaching the mechanical retainers to a frame, such that the mechanical retainers attached to the frame define a cold-formed curved shape for the flexible glass substrate.

Classifications:
International (IPC 8-9): C03C17/00 E04D3/28 E06B3/54 G02F1/1333 (Advanced/Invention)
CPC: C03C3/091 C03C3/085 C03B23/023



Family:

Publication number	Publication date	Application number	Application date
TW201815719 A	20180501	TW20170122491	20170705
WO18009504 A1	20180111	WO2017US40661	20170705

Priority:

US20160358278P 20160705 US20170458692P 20170214

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING INC

Inventor(s): (std): KUMAR ATUL ; LI CHENG CHUNG ; SEIDERMAN WILLIAM MICHAEL ; SUN YAWEI

Agent(s): PATEL PAYAL A

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: METODO PARA EL DOBLADO, **CURVADO** Y LAMINADO DE VIDRIO DELGADO CON UNA PRENSA DE PLACA **Method** for bending, **curved** and **thin glass** laminate with a plate **press** (Machine translation)

Classifications:

International (IPC 8-9): B32B1/00 B32B17/00 C03B13/00 C03B23/00 C03B23/023 C03B23/03 (Advanced/Invention)

Family:

Publication number	Publication date	Application number	Application date
CO20170009263 A1	20180131	CO20170009263	20170913

Priority:

US20170528129P 20170702

Probable Assignee: AGP AMERICA SA

Assignee(s): AGP AMERICA SA

Inventor(s): CHARLES STEPHEN VOELTZEL ; MARIO ARTURO MANNHEIM ASTETE ; MAURICIO FERNANDO CORNEJO POL

Agent(s): CARLOS REINALDO OLARTE GARCIA

Title: METODO PARA EL DOBLADO Y LAMINADO DEL VIDRIO DELGADO CON PLACA DE CUBIERTA **Method** for bending and rolling OF THE **THIN GLASS** WITH COVER PLATE (Machine translation)

Classifications:

International (IPC 8-9): B32B1/00 B32B17/00 C03B13/00 C03B23/00 C03B23/02 C03B23/023 C03B23/03 (Advanced/Invention)

Family:

Publication number	Publication date	Application number	Application date
CO20170009264 A1	20180131	CO20170009264	20170913

Priority:

US20170528131P 20170702

Probable Assignee: AGP AMERICA SA

Assignee(s): AGP AMERICA SA

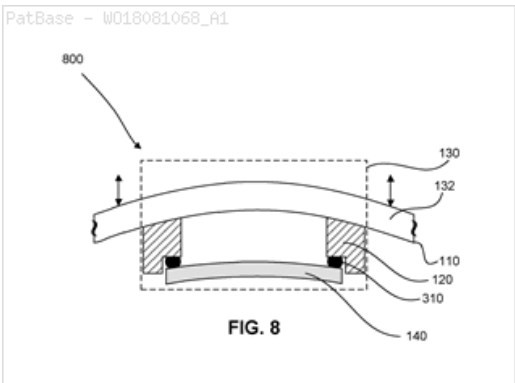
Inventor(s): CHARLES STEPHEN VOELTZEL ; MARIO ARTURO MANNHEIM ASTETE ; MAURICIO FERNANDO CORNEJO POL

Agent(s): CARLOS REINALDO OLARTE GARCIA

Title: COLD-FORM GLASS LAMINATION TO A DISPLAY

Abstract: In some embodiments, a process comprises fixing a first portion of a flexible glass substrate into a first fixed shape with a first rigid support structure and attaching a first display to the first portion of the flexible glass substrate or to the first rigid support structure. After fixing the first portion and attaching the first display, and while maintaining the first fixed shape of the first portion of the flexible glass substrate and the attached first display, cold-forming a second portion of the flexible glass substrate to a second fixed shape and fixing the second portion of the flexible glass substrate into the second fixed shape with a second rigid support structure.

Classifications:
International (IPC 8-9): B32B17/06 C03B23/023 C03C27/00 G06F1/16 (Advanced/Invention)
CPC: C03C27/00 B32B17/06 C03B23/023 G06F1/1601



Family:

Publication number	Publication date	Application number	Application date
WO18081068 A1	20180503	WO2017US58010	20171024

Priority:

US20160412542P 20161025

Probable Assignee: CORNING INC

Assignee(s): (std): CORNING INC

Inventor(s): (std): BRENNAN MICHAEL TIMOTHY ; KUMAR ATUL ; MCFARLAND MICHAEL JAMES ; SUN YAWEI

Agent(s): PATEL PAYAL A

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: FUSION-FORMABLE AUTOMOTIVE GLASS COMPOSITIONS, ARTICLES, AND LAMINATES

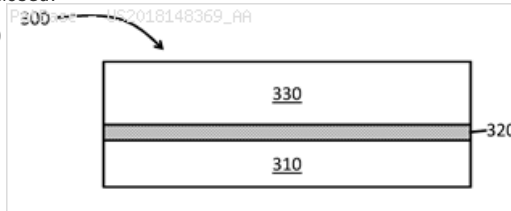
Abstract: Embodiments of glass articles exhibiting a sag temperature in a range from about 600 degrees centigrade to about 700 degrees centigrade are disclosed. In one or more embodiments, the glass article includes a glass composition including SiO₂ in an amount in a range from about 66 mol percent to about 80 mol percent, Al₂O₃ in an amount in a range from about 2 mol percent to about 15 mol percent, B₂O₃ in an amount in a range from about 0.9 mol percent to about 15 mol percent, P₂O₅ in a non-zero amount up to and including 7.5 mol percent, Li₂O in an amount from about 0.5 mol percent to about 12 mol percent, and Na₂O in an amount from about 6 mol percent to about 15 mol percent. Laminates including the glass articles and methods for forming such laminates are also disclosed.

Classifications:

International (IPC 8-9): B32B17/00 B32B17/06 B60J1/00 C03C21/00 C03C3/097 C03C4/18 (Advanced/Invention)

CPC: C03C4/18 B60J1/001 B32B2605/006 C03C2204/00

B32B2309/105 B32B17/06 B32B17/00 C03C21/002 C03C3/097



Family:

Publication number	Publication date	Application number	Application date
US2018148369 AA	20180531	US20170817958	20171120
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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

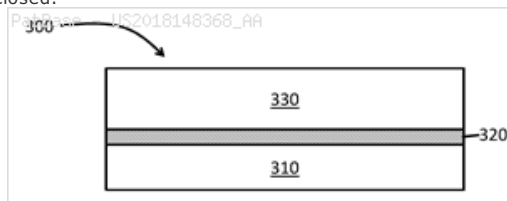
Title: AUTOMOTIVE GLASS COMPOSITIONS, ARTICLES AND LAMINATES

Abstract: Embodiments of glass articles exhibiting a sag temperature in a range from about 600 degrees centigrade to about 710 degrees centigrade are disclosed. In one or more embodiments, the glass article includes a glass composition including SiO₂ in an amount in the range from about 67 mol percent to about 80 mol percent, Al₂O₃ in an amount in the range from about 5 mol percent to about 11 mol percent, an amount of alkali metal oxides (R₂O) in a range from about 5 mol percent to about 27 mol percent, wherein the amount of R₂O comprises Li₂O in an amount in range from about 0.25 mol percent to about 4 mol percent and K₂O in an amount equal to or less than 3 mol percent, a non-zero amount of MgO, and a non-zero amount of ZnO. In some instances, the glass composition is substantially free of Li₂O. Laminates including the glass articles and methods for forming such laminates are also disclosed.

Classifications:

International (IPC 8-9): B32B17/10 B60J1/00 C03C21/00 C03C27/10 C03C3/085 C03C3/087 C03C3/091 C03C3/093 C03C3/097 C03C4/18 (Advanced/Invention)

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW