

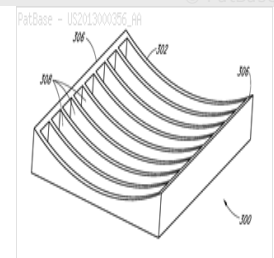
1) Family number: 52660776 (US2013000356 AA)

GLASS BENDING METHOD AND APPARATUS

Abstract: Source: US2013000356 AA A sag-bending glass mold for creating a partial parabolic-curved glass sheet is disclosed. The glass mold comprises a glass-support surface having a cross-sectional profile of varying height. The cross-sectional profile has a first portion with profile of a non-parabolic, linear-square root composite shape. A method for forming a partial parabolic glass sheet is also disclosed. The method comprises positioning a planar glass sheet on a sag-bending mold having a linear-square root composite shape and deforming the glass sheet to follow the linear-square root composite shape of the sag-bending mold.

Probable Assignee: SUNPOWER CORP

Earliest Publication Date: 20130103



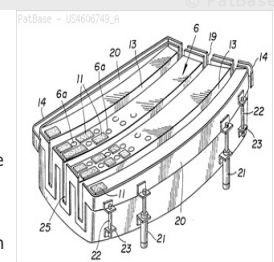
2) Family number: 2045181 (US4606749 A)

APPARATUS FOR AND METHOD OF BENDING GLASS SHEETS

Abstract: Source: US4606749 A A glass sheet bending apparatus has a lower mold and conveyor rolls for conveying a heated glass sheet horizontally to a position over the lower mold, the lower mold having slots for receiving the conveyor rolls when the lower mold is lifted. The glass sheet bending apparatus has a main ring mold disposed around the outer peripheral surface of the lower mold which has a first shaping surface for shaping the central area of the glass sheet, the main ring mold having a second shaping surface for shaping the peripheral edge of the glass sheet. The glass sheet bending apparatus also has an auxiliary ring mold disposed between the main ring mold and the lower mold and having a substantially horizontal, flat support surface for supporting the glass sheet between the central area and peripheral edge of the glass sheet. The auxiliary ring mold is lifted prior to the upward movement of the lower mold and the main ring mold for raising the glass support off the conveyor rolls with its support surface. There is also disclosed a method of bending a glass sheet.

Probable Assignee: NIPPON SHEET GLASS CO LTD

Earliest Publication Date: 19860327



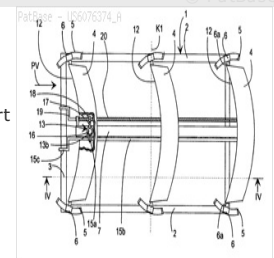
3) Family number: 20695373 (US6076374 A)

BENDING MOLD FOR BENDING GLASS SHEETS

Abstract: Source: US6076374 A PCT No. PCT/FI96/00439 Sec. 371 Date Apr. 17, 1998 Sec. 102(e) Date Apr. 17, 1998 PCT Filed Aug. 14, 1996 PCT Pub. No. WO97/08109 PCT Pub. Date Mar. 6, 1997A bending mold for bending glass sheets is provided. The mold comprises a frame having longitudinally parallel side walls and a bottom. Support devices having support surfaces are connected between the side walls. An elongated member is provided on the bottom of the frame and is movable in relation to the frame. Support arms are connected by joints between the support device and the elongated member. Movement of the elongated member twists the support devices about a horizontal twisting center.

Probable Assignee: TAMBEST OY

Earliest Publication Date: 19960930



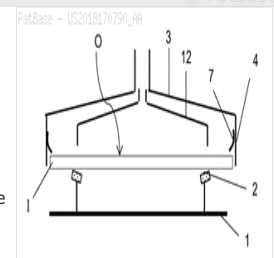
4) Family number: 65835951 (US2018170790 AA)

OVERPRESSURE-ASSISTED GRAVITY BENDING METHOD AND DEVICE SUITABLE THEREFOR

Abstract: Source: US2018170790 AA A device and method for bending a glass pane. The device includes a gravity bending mould with a supporting surface, which is suitable for arranging a glass pane thereon; and an upper shaping tool arranged opposite the supporting surface. The upper shaping tool is suitable for producing an overpressure on the top surface of the glass pane arranged on the supporting surface. The top surface faces away from the supporting surface. The shaping tool has a cover that forms a hollow space open in the direction of the gravity bending mould and is equipped with means for introducing a gas into the hollow space in order to produce the overpressure. The hollow space is divided by a separating wall into two subspaces such that a different pressure can be produced in two regions of the surface. The shaping tool is equipped with a common gas feed line, and the separating wall extends to the common gas feed line.

Probable Assignee: SAINT GOBAIN SA

Earliest Publication Date: 20170601



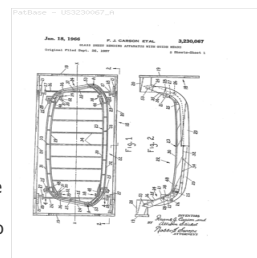
5) Family number: 22954521 (US3230067 A)

GLASS SHEET BENDING APPARATUS WITH GUIDE MEANS

Abstract: Source: US3230067 A (Claim 1) 1. In apparatus for blending flat glass sheets, a bending mold having a plurality of mold sections disposed end to end along the longitudinal axis of the mold and including oppositely disposed movable end sections and an intermediate section pivotally joined together at their adjacent ends, a plurality of substantially U-shaped support elements mounted on opposite sides of said intermediate section and each having upwardly directed leg portions disposed in a vertical plane extending perpendicular to said longitudinal axis, means pivotally mounting each of said support elements disposed at one side of said intermediate section on said intermediate section to turn in said plane about a second axis parallel to said longitudinal axis, a support surface provided at the upper end of one of said legs to engage the underside of a glass sheet disposed on said mold, a substantially vertical locating surface formed on the other of said legs to engage the longitudinal edge of the sheet, said support elements at said one side of the intermediate section being urged to rotate about said second axis in response to the weight of said sheet resting on said support surface to move said locating surface inwardly to exert an inwardly directed force against the edge of said sheet, and a lifting means mounted on the outer ends of said movable end sections and operable to exert a single lifting force against the outer ends of the sheets acting at all times along a line extending normal to the sheet.

Probable Assignee: LIBBEY OWENS FORD GLASS CO

Earliest Publication Date: 19660118



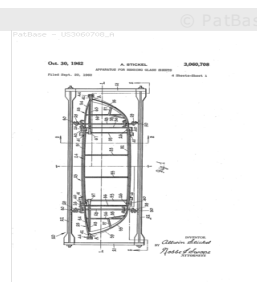
6) Family number: 22863575 (US3060708 A)

APPARATUS FOR BENDING GLASS SHEETS

Abstract: Source: US3060708 A (Claim 1) 1. In apparatus for bending glass sheets, a mold comprising an intermediate section and a movable end section rotatably joined for movement between opened and closed positions, a substantially flat sheet supporting plate fixed to said end section and extending outwardly therefrom, an upwardly facing support surface formed on said plate and being located in the plane of the upper surface of the adjacent portion of said end section, a substantially elongated locating member extending parallel to and transversely across said support surface, a movably mounted member secured to said locating member and pivotally mounted on said end section beneath said support plate to rock about an axis substantially parallel to said support surface, and an actuating member connected to said movably mounted member and to said intermediate section and operable to rock said movably mounted member about said axis thereby to move said locating member back and forth along said plate as said end section moves between said open and said closed positions.

Probable Assignee: LIBBEY OWENS FORD GLASS CO

Earliest Publication Date: 19621030



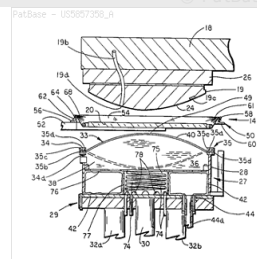
7) Family number: 15734601 (US5857358 A)

METHOD AND APPARATUS FOR BENDING GLASS

Abstract: Source: US5857358 A A method of and apparatus for bending a sheet of material heated to a formable, state such as glass, resinous polymeric material, viscoelastic material, and thermoplastic material, provides an improved pressing member for pressing the heated sheet against a first rigid mold which reduces the size of the buckles in the bent sheet, eliminates the need for a second rigid mold, reduces the process control steps, reduces the risk of damaging the rigid mold, increases the tolerances for the positioning of the sheet in the apparatus, and increases the range of application. The pressing member includes a flexible diaphragm which rolls the heated sheet against a rigid mold by first applying a pressure to a portion of the heated sheet and then radiating the pressure from that portion to the remaining surface area of the heated sheet in a rolling action. The bending apparatus includes a rigid mold and a flexible diaphragm pressurized into a convex shape for initially pressing on a portion of the heated sheet. A control system moves the pressing member toward the rigid mold and maintains the pressure on the flexible diaphragm so that as the pressing member is moved toward the rigid mold, the flexible member generally conforms to the shape of the rigid mold and rolls the heated sheet onto the rigid mold. To further reduce the size of any buckles, a holder for supporting the heated sheet between the rigid mold and the flexible diaphragm is provided. The holder includes a support surface for supporting the heated sheet generally planar before bending.

Probable Assignee: DONNELLY CORP

Earliest Publication Date: 19980429



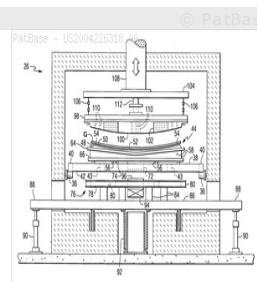
8) Family number: 30609100 (US2004226318 AA)

APPARATUS AND METHOD FOR BENDING GLASS SHEETS

Abstract: Source: US2004226318 AA An apparatus for shaping heat softened glass sheets includes an upper mold having a full surface press face with a shaping surface generally contoured to the desired curvature of the sheets; a support device to support the sheets below the upper mold; a shaping rail having an upper sheet supporting surface that supports selected peripheral portions of the sheets, the sheet supporting surface having a profile corresponding to desired elevational contours of the selected peripheral portions of the sheets and complementing corresponding portions of the upper mold shaping surface; a chamber positioned below the sheets; a moving device for moving the upper mold and the shaping rail relative to each other so as to press at least a periphery of the sheets against the upper mold shaping surface, and a connector to direct pressurized gas into the chamber to urge the sheets towards the upper mold press face.

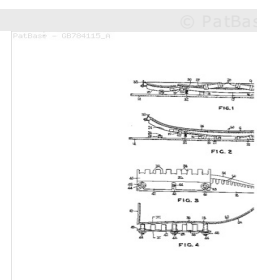
Probable Assignee: PPG IND OHIO INC

Earliest Publication Date: 20040603



9) Family number: 20504589 (GB784115 A)

APPARATUS FOR BENDING GLASS



Abstract: Source: GB784115 A 784,115. Bending glass sheets. PITTSBURGH PLATE GLASS CO. Jan. 11, 1956 [Jan. 28, 1955], No. 962/56. Class 56. A glass bending mould comprises an upper shaping surface adapted to conform in elevation and curvature to the shape of a bent glass sheet and a plurality of closely spaced, rigid, smoothly surfaced supporting elements located beyond the area embraced by the shaping surface, for supporting an extremity of a flat glass sheet mounted for bending on the mould. The mould 10 comprises a central element 12, fixed to the frame 14 by cross-rods 16, and wing elements 18 rotatable about hinges 19 from the open position shown to a closed position in continuation of the central element 12, providing a substantially continuous upper surface 34 of required shape, apertures 50 being provided to allow escape of air. The wing elements 18 are urged to the closed position by counterweights 20 on arms 22. In the open position ledges 24 abut adjustable screws 26 to ensure correct positioning of the mould to receive the flat glass, G. On each element 18, a plate 35 slit to provide alternate tabs 36, 38 extending in a plane tangential to the element 18 and at an angle to such plane respectively, is adjustably mounted. The plate 35 may be welded to a slotted reinforcement plate 42 or provided with slots through which bolts 44, welded to elements 18, are clamped by nuts 48. The glass sheet G rests in the flat condition on the tabs 36 and is positioned by the tabs 38. Each tab 36, 38 preferably is less than 1/16 inch in thickness and ? inch in width. For glass with pointed or rounded edges, the location of the tabs may be varied and curved plates may be used to form the tabs.

Probable Assignee: PITTSBURGH PLATE GLASS CO

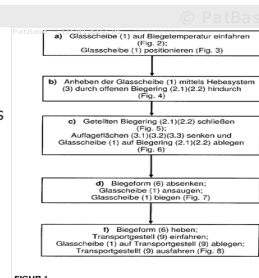
10) Family number: 50538006 (EP2412682 A1)

METHOD FOR BENDING GLASS PANES

Abstract: Source: EP2412682 A1 The method involves positioning (a) a glass pane at a temperature ranging from 550 degree Celsius to 680 degree Celsius in a bending station. The glass pane is lifted (b) through opened segments of a bending ring, which is separated into two folds, by a lifting device with a support surface. The separated bending ring is closed (c), and the lifting device is lowered. The glass pane is supported by the bending ring. A bending mold is lowered (d), and the glass pane is lifted (f) by suction at the mold and/or pressing the mold against the bending ring. Independent claims are also included for the following: (1) a bending ring comprising displaceable segments (2) a device for bending a glass pane.

Probable Assignee: SAINT GOBAIN SA

Earliest Publication Date: 20120201



11) Family number: 80253724 (CN211170439 U)

A GLASS COVER PLATE BENDING MOLDING GRAPHITE MOLD (MACHINE TRANSLATION)

Abstract: Source: CN211170439 U The utility model discloses a glass cover plate bending molding graphite mold, including the upper mold and the lower mold and the upper mold are engaged, the lower mold is provided with a support surface used for supporting the glass of the first plane and the first boss and the boss is provided with an outer heat suction assembly is connected to the curved glass cover for the suction of the first recess, the upper mold is provided with a second recess and a second recess is provided with an outer heat suction assembly is connected to the curved surface of the glass cover plate at the suction of the third cavity and the second cavity is formed for molding a first boss with curved glass cover plate bending mold cavity. The utility model is a graphite mold in the molding surface of the glass cover plate, can be heated by a suction assembly respectively, Rewan curved glass cover cavity under suction and the suction port, the curved glass cover completely adsorbed on graphite mold thermal bend type cavity, to ensure that after forming the curved glass cover plate morphology consistent with drawings, better, reducing the degree of contour surface after molding surface of the glass cover plate is imprinted.

Probable Assignee: SHENZHEN ORIENTAL CARBON CO LTD

Earliest Publication Date: 20200804

