Sept. 28, 1943. H. J. GALEY 2,330,349

GLASS BENDING APPARATUS

Filed Sept. 6, 1940

Fig. 1

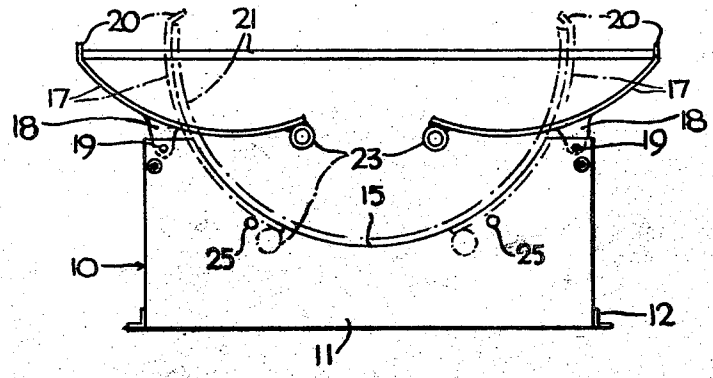


Fig. 2

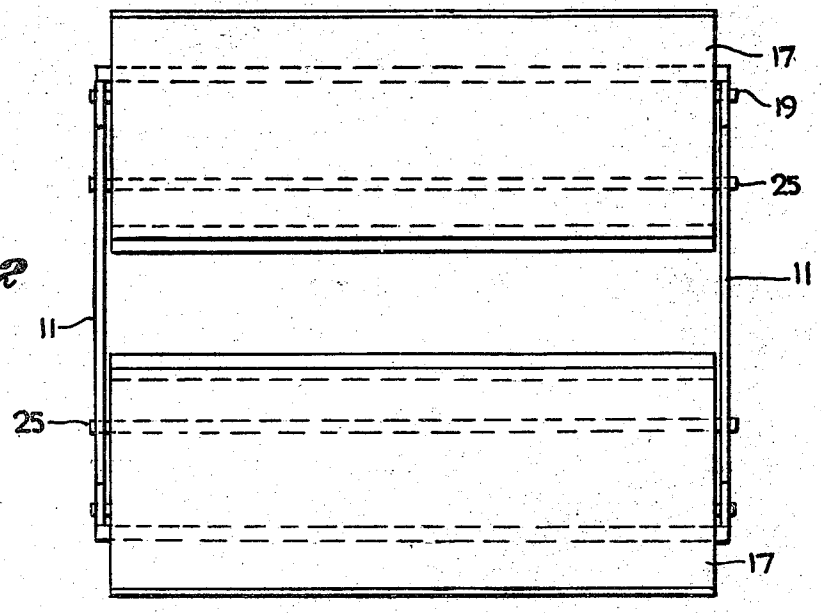
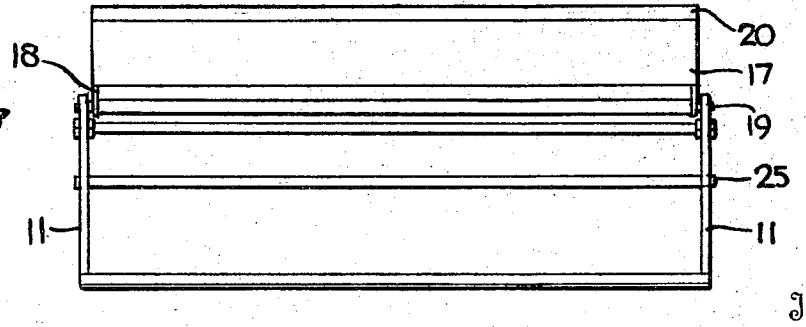


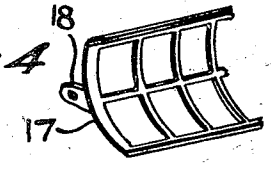
Fig. 3



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Fig. 4



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GLASS BENDING APPARATUS

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Application September 6, 1940, Serial No. 355,614

6 Claims. (Cl. 49—67)

The invention relates to apparatus for bending sheet glass and it has particular relation to frame structure adapted to support and guide sheet glass in connection with glass bending operations.

One object of the invention is to provide an improved frame structure for supporting and facilitating the bending of sheet glass to predetermined curvature.

Another object of the invention is to provide structural elements for use in connection with the bending of sheet glass, wherein progressive control of the sheet glass is effected as the latter is bent to predetermined curvature.

In the drawing:

Fig. 1 is an end elevation of an apparatus for bending glass; Fig. 2 is a plan of the structure shown in Fig. 1; Fig. 3 is a side elevation of the structure shown in Fig. 1; and Fig. 4 is a fragmentary perspective of an alternate form of support for glass.

In practicing the invention, a supporting frame 10 is formed with end sections 11 and side sections 12 connected rigidly to form a structure open at the top and bottom. The side sections 12 can be in the form of bars or rods. The end sections are provided with upwardly facing edges 15 which provide curved seats having their opposite extremities spaced inwardly a short distance from the location of the side sections. Glass supports 17, which can be in the form of curved wings or plates are provided with ears 18 rigidly formed on opposite edges at the end portions thereof. Suitable bearing elements 19 mounted in the end sections receive the ears 18 to support the wings pivotally. The inner curvature of each of these wings, as shown in broken lines of Fig. 1 is concave and conforms to the curvature of the upwardly facing seats 15 of the end sections. The outer edges of these plates extend upwardly and beyond the frame structure and are formed with stops or flanges 20 along their outer edges for positioning one or more flat glass sheets 21 thereon when such plates are pivoted to their outwardly spread positions as shown in full lines of Fig. 1. The curved wings can be in the form of perforated plates or grille work as shown in Fig. 4.

Suitable weights 23 are mounted upon inner and lower edge portions of the wings 17 and they always exert force under the influence of gravity tending to move these wings to the position indicated in broken lines of Fig. 1, or to maintain the wings in such position. In the latter position, the wings 17 are stopped by means of pins or rods 25, or other suitable elements mounted rigidly in and extending from one of the end sections to the other. Thus the curvature of the inner surfaces of the wings 17 is substantially coincident along considerable extent thereof with the like curvature of the upwardly facing seats 15.

In mounting a sheet of glass 21 upon the frame, the wings 17 are tilted back and the glass is positioned thereon as shown in the drawing. Then the frame with the glass thereon is placed in a furnace, or otherwise subjected to heat of sufficient intensity to reduce the glass to softening temperature. One example of this type of heating is shown in my prior U. S. Patent No. 2,021,180 of November 19, 1935. The weights 23 exert force sufficient to assist in the bending action to which the glass is subjected and when softened a predetermined degree, the glass is bent to the curvature defined by the substantially continuous surfaces of the wings 17 and seats 15 of the end sections.

Since the glass is urged in its bending action by the weighted wings 17 and the latter are curved according to the degree of bending desired, such bending is uniform and is stopped when the plates strike the elements 25. The glass conforms closely to the curvature of the wings 17 and seats 15 and likewise the glass is prevented from prematurely reaching its finally bent configuration. Very accurate and expeditious bending operations are thus accomplished in connection with smaller plates of glass as well as with larger plates.

It should be understood that the pivotal supports 19 and guide flanges 20 are so arranged with reference to the curvatures of the seats 15 and wings 17 that the edges of the glass sheet 21 remain in contact with the guide flanges 20 during substantially the entire bending operation and, hence, aid materially in exerting force to bend the glass as desired. This phase of continuously urging the opposite edges in directions generally toward each other during the bending operation is of particular importance where small sections of glass are to be bent somewhat sharply and more or less local or concentrated forces are required to secure the proper bending.

Although only one form of the invention has been shown and described in detail, it will be apparent to those skilled in the art that the invention is not so limited but that various changes can be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In a glass bending apparatus, a pair of spaced molding members including permanently concave portions and relatively movable to define together in one position a common path of curvature along which sheet glass is to be bent and also relatively movable to an outwardly spread position to support opposite edges of a flat glass sheet preparatory to bending it, said members being provided with means for holding the opposite edges of the sheet glass in position on the molding members in their outwardly spread position, and supporting means carrying the molding members in their movable relation.

2. In a glass bending apparatus, a pair of spaced molding members including permanently concave portions and relatively movable to define together in one position a common path of curvature along which sheet glass is to be bent and also relatively movable to an outwardly spread position to support opposite edges of a flat glass sheet preparatory to bending it, said members being provided with means for holding the opposite edges of the sheet glass in position on the molding members in their outwardly spread position, and supporting means carrying the molding members in their movable relation, said members being provided with means constantly urging them to the position in which they lie with their concave portions in the common path of curvature.

3. In a glass bending apparatus, a pair of spaced molding members including permanently concave portions and relatively movable to define together in one position a common path of curvature along which sheet glass is to be bent and also relatively movable to an outwardly spread position to support opposite edges of a flat glass sheet preparatory to bending it, said members being provided with means for holding the opposite edges of the sheet glass in position on the molding members in their outwardly spread position, supporting means carrying the molding members in their movable relation, said members being provided with means constantly urging them to the position in which they lie with their concave portions in the common path of curvature, and stop means on said supporting means against which the molding members are moved upon reaching their position defining said common path of curvature.

4. An apparatus for bending sheet glass comprising a frame, a pair of members having outer marginal portions extending upwardly to support and press against opposite edges of a glass sheet, said members having permanently concave molding areas of like contour and coacting to define a mold form against which the glass is adapted to be bent, means pivotally supporting said members on opposite sides of the frame to provide for the swinging of the outer marginal portions away from each other into position to receive the opposite edges of the glass sheet therebetween, said members being provided with means urging the upper marginal portions toward each other to exert force tending to bend the glass upon heating the latter to softening temperature.

5. In a glass bending apparatus, a support provided with a fixed concave glass molding portion to determine at least part of the curvature of sheet glass to be bent thereon, a pair of wings movably mounted upon the support and provided with permanently concave molding portions the radius of curvature thereof corresponding to the radius of curvature of said fixed concave portion and movable to such position as to dispose all of the concave portions in a common path of curvature, said wings including glass supporting outer margins to carry a glass plate above said concave portions preparatory to the bending of the glass to the contour of said curved portions, said wings including means inherently urging said wings to bring their concave portions into the common path of curvature with the fixed concave portion.

6. A glass bending apparatus comprising a pair of spaced parallel mold members, a support provided with horizontal pivotal connections supporting said members upon parallel horizontal axes arranged in substantially the same horizontal plane, said members having outer glass-supporting margins, said members including permanently concave molding faces movable in conjunction with the pivotal action of the members to form an upwardly opening concave mold form into which the glass is adapted to drop by gravity when heated to softening temperature, said members being provided with means for urging the outer glass supporting margins against the opposite edges of the glass sheet.

HENRY J. GALEY.