May 9, 1939. A. JOLLIE 2,157,759

PROCESS FOR DRAWING GLASS STRIP

Original Filed Jan. 22, 1937

FIG. 1.

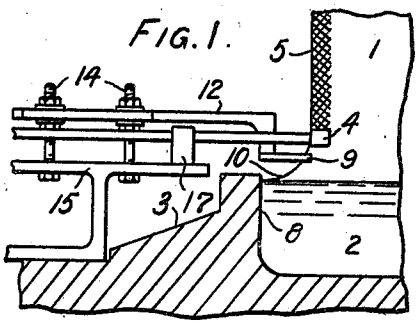


FIG. 2.

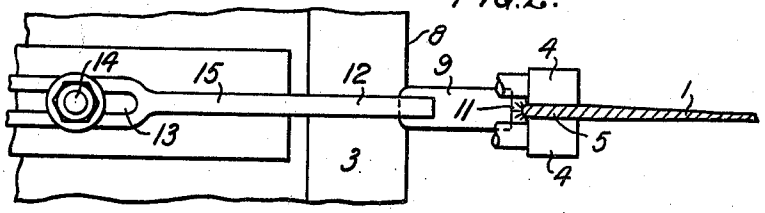


FIG. 4.

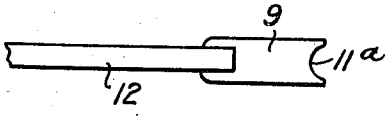
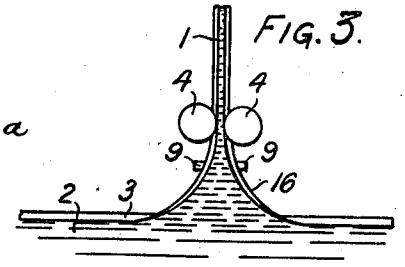


FIG. 3.



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PROCESS FOR DRAWING GLASS STRIP

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3 Claims. (Cl. 49—83.1)

This invention relates to the drawing of continuous glass sheets from a bath of molten glass by apparatus employing the edge-maintaining device of rotating the edge rolls. Its object is an improved method and apparatus whereby the strip can be drawn, and annealed in an annealing tower of ordinary type.

When a sheet of glass is drawn and its width maintained by edge rolls, these are spaced so that the band rolled by them is thicker than the main body of the sheet. The thickness of the glass, however, does not decrease gradually from that of the rolled band to that of the main body of the sheet, but has wide and often abrupt variations. Such a sheet cannot ordinarily be produced with sufficiently small or gradual variations to be annealed with certainty in an annealing tower of ordinary type, such as is commonly used in connection with the Fourcault drawing process, without breaking.

According to the invention the thickness of the portion of the sheet immediately adjoining the rolled band is controlled by varying the distance from the side of the bath at which the edge of the sheet rises. This distance is varied by adjusting the position, in the direction of the plane of the sheet, of a member engaging the extreme edge of the rising glass.

In the accompanying drawing:

Figure 1 is a section showing a sheet drawn according to the invention;

Figure 2 is a part plan view thereof on an enlarged scale, with the sheet in section;

Figure 3 is a vertical section through Figure 1, seen from the right, and

Figure 4 is a plan view of the preferred form of member.

Referring to Figures 1 to 4, Figure 1 shows an apparatus according to the invention, the sheet 1 being drawn so that its edge 5 is at a greater distance from the side wall 8 of the bath than has been the case with edge holding rolls as commonly used in the art heretofore. This is made possible by a member 9 which engages the extreme edge of the sheet at a level between the rolls 4 and the surface of the molten glass 2.

By reason of the edge of the sheet being at a greater distance from the side wall 8, the zone of glass from which the glass going to form the edge portion is drawn, is greater than has heretofore been the case and therefore the flow is less rapid and the temperature is lower and more nearly equal to the glass going to form the main body of the sheet. The rolls can then be maintained at a higher temperature, as by air cooling, and they do not unduly chill the glass in the edge portion adjoining the rolled band.

By suitably adjusting the position of the member 9 in the direction of the plane of the sheet, so as to adjust the position of the edge of the sheet from the side wall 8 to the bath, the edge portion of the sheet formed may be brought to the form shown in Figure 2, where the thickness decreases gradually from that of the rolled band 5 to that of the main body of the sheet, at 1.

The thickness of the rolled band is determined by the distance separating the rollers 4, and, by means of the invention, the thickness of the portion of the sheet immediately adjoining the rolled band is controlled so as to avoid any abrupt or large variations in thickness between the rolled band and the main body of the sheet.

The invention has the further advantage that the temperature gradient from the edge to the main body of the sheet is more uniform, and consequently the cooled sheet is more free from strains.

The member 9 consists of a bar or narrow plate, and the edge 11 engaging the glass may be straight as shown in Figure 2. Preferably, however, it has a notch, such as the semi-circular notch 11a shown in Figure 4 for the purpose of locating the edge of the rising glass in a direction perpendicular to the edge of the sheet.

The member 9, however, engages only the extreme edge of the rising glass, as it is an essential feature of the invention that the meniscus of glass 16 (Figure 3) rising to form the side surfaces of the sheet be entirely free, its form therefore being determined solely by the temperature of the glass and the speed of draw. Thereby, and by means of the invention, any abrupt variations in the temperature gradient of the glass from the rolled band to the main body of the sheet may be avoided.

The member 9 is made adjustable in position in the direction of the plane of the sheet, and also preferably in height. For this purpose it is attached to a bar 12, slotted at 13 and held by screw-threaded rods 14 fixed to the support 15.

The form of edge shown in Figure 2, with gradual decrease in thickness from the band 5 to the normal thickness of the sheet, is the best, but sheets departing from this form can be annealed provided that there are no abrupt or large variations in thickness.

Small adjustments of the member 9 may be made without alteration in the position of the

rolls 4, but for larger adjustments simultaneous adjustment of the member and the rolls is advisable. The shafts of such rolls are adjustable longitudinally through bearing blocks 17 (Fig. 1) mounted on the support 15 and suitably driven by means (not shown) which are well known in the art.

Having described my invention, I declare that what I claim and desire to secure by Letters Patent is:

1. Process of drawing a continuous glass sheet from a bath, consisting in rolling edge bands by rolls, forming at each edge portion of the sheet a meniscus of glass from the bath to the level of the rolls which is free with respect to its sides, and controlling the thickness of the portion of the sheet adjoining the rolled band by adjusting the distance of the edge of the sheet just below the rolls and above the bath from the side walls of the bath.

2. Process of drawing a continuous sheet of glass from a bath, consisting in rolling edge bands by rolls, forming at each edge portion of the sheet a meniscus of glass from the bath to the level of the rolls which is free with respect to its sides, and controlling the thickness of the portion of the sheet adjoining the rolled band by adjusting the distance from the side walls of the bath of a member lying entirely above the bath engaging the extreme edge only of the glass rising to the rolls.

3. Process of drawing a continuous sheet of glass from a bath, consisting in rolling edge bands by rolls, forming at each edge portion of the sheet a meniscus of glass from the bath to the level of the rolls which is free with respect to its sides, and controlling the thickness of the portion of the sheet adjoining the rolled band by adjusting simultaneously the distance from the side walls of the bath of a member lying entirely above the bath engaging the extreme edge only of the glass rising to the rolls and of the rolls themselves.

ANDREW JOLLIE.