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L. BOUDIN

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GLASS FORMING ROLL

Filed June 25, 1928

Fig. 1.

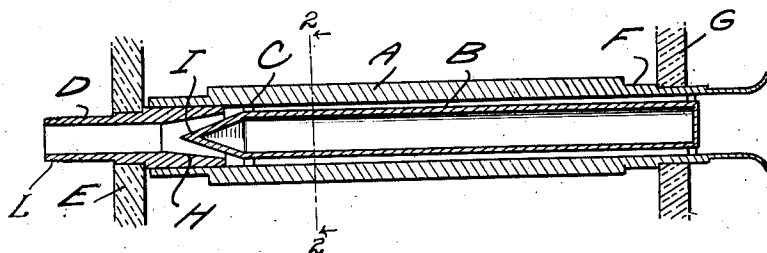


Fig. 3.

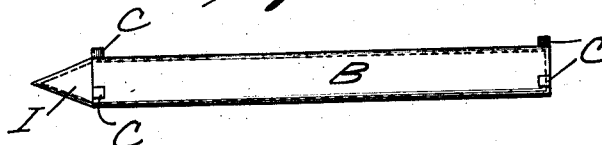


Fig. 4.

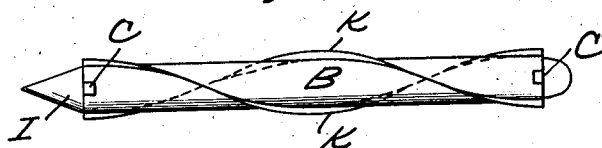
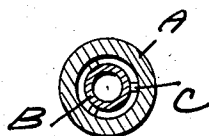


Fig. 2.



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LOUIS BOUDIN, OF ST. GOBAIN, FRANCE, ASSIGNOR TO SOCIETE ANONYME DES MANUFACTURES DES GLACES & PRODUITS CHIMIQUES DE SAINT-GOBAIN, CHAUNY & CIREY, OF PARIS, FRANCE

GLASS FORMING ROLL

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Sheet glass may be formed by the continuous or intermittent process and either by a rolling apparatus in which the sheet glass is formed between two rollers or one roller and a flat rolling table. The uniformity of interval between the rollers on one hand, and the roll and table on the other hand, determines the uniformity of thickness of the sheet formed. It therefore follows that the thickness of the formed sheet will only be uniform when the forming apparatus is of such a construction that heat from the molten glass can not warp the forming mechanism.

Water-cooled rolls heretofore used with a view of absorbing the heat from the glass have suffered from the defect that air pockets tend to form therein adjacent to the inner surface of the rolls, with the result that the surface of the rolls is not maintained at uniform temperature, thus causing a warping of the rolls.

In order to overcome the disadvantages pointed out above, I propose to supply a cooling medium, preferably in the form of water, through a fitting in the bearing of a roll, and by the interior construction of the roll direct the cooling medium to the inner periphery of the roll and thereafter flow the cooling medium in a straight path adjacent the entire forming surface of the roll to be subsequently discharged with the absorbed heat, through the other bearing of the roll, and this is a construction in which no air pockets can form.

Referring now to the drawings,—

Figure 1 is a longitudinal section through a roll embodying my invention.

Figure 2 is a transverse section on line 2—2 of Figure 1.

Figure 3 is an elevation of the shell which is used to define the path of the cooling medium.

Figure 4 is a modified showing of Figure 3. In the drawings, A represents a hollow roll whose outer surface shapes the molten glass, and B a cylindrical shell forming a core within the same, and which, with the inner surfaces of the roll forms the path in which the cooling medium flows. The roll is

mounted on trunnions D and F fitting in bearings E and G. The shell B has on each end thereof spacers C which serve to center the shell into the roll A. The shell B has on its end adjacent the intake, a conical head I, which diverts, with slight resistance, the cooling medium, and causes it to follow the straight path formed by the inner surface of the roll, and the outer surface of the shell. In order to prevent the formation of eddy currents or pockets by reason of abrupt changes in the direction of flow of the cooling medium, the inner diameter of the trunnion D has its interior flared at H. It will be noted that the interior of the trunnion F which serves as the exit for the cooling medium, is as large as the inner diameter of the roll, so that the cooling medium moves in a straight line from its entrance within the roll to the exit therefrom.

If the roll is of large diameter, the outer surface of the shell can be provided as shown in Figure 4 with ribs K which may be either longitudinal or helicoidal, so as to cause all of the stream lines of the cooling medium to come into contact with the interior of the roll A. It is also to be noted, in connection with very large rolls, that the hollow cylindrical shell B will decrease the weight of the roll because of the fact that this shell weighs less than the water which it displaces.

From the above description and drawings, it will be seen that a supply of cooling medium, preferably water, will be connected to the threaded fitting L on the trunnion D of the roll, and thereafter will flow through the trunnion until it meets the conical portion I of the shell B, which will direct the water through the roll in the space formed by the exterior of the shell B and the interior of the roll A. The cooled medium will go through the roll in intimate contact with the interior of the wall thereof throughout its entire forming surface, which means that the cooling medium will be in intimate contact with portions of the roll subjected to the greatest heat.

It is to be noted that the cooling medium, during its entire passage through the roll, travels in a path without abrupt changes

in direction, which means that the greatest amount of cooling medium can, and will pass through the roll in a given time and also that all portions of the cooling medium travel at the same speed. This means also that none of the cooling medium or air contained therein may become entrapped, and that all portions of the forming surface of the roll have the same temperature throughout, which is essential for the formation of good glass sheets.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. The combination in a glass forming roll of a hollow core body having a cylindrical space therein, of a cylindrical shell inserted from one end of said roll and having a conical head adjacent to the opposite end of said roll, with means for introducing cooling fluid at the last named end of the roll.

2. The combination with a roll having trunnions upon the ends thereof and having an interior cavity of substantially uniform diameter from the outer end of one trunnion to adjacent the opposite end of the roll, an induction member having a conical end in the last named end of the roll, and a cylindrical core within the roll having a conical head adjacent to the induction member and spacing members adapted to center the core within the roll.

3. A hollow glass forming roll having means for induction and eduction thereto and therefrom of a cooling medium, the interior of the roll being cylindrical and hollow and of uniform diameter from adjacent to the induction end to the eduction end, said hollow space being divided by a plurality of ribs on a hollow closed core.

In testimony whereof I hereunto affix my signature.

LOUIS BOUDIN.