F. SHUMAN.

METHOD OF AND MEANS FOR ANNEALING GLASS.

APPLICATION FILED MAY 20, 1905.

957,477. Patented May 10, 1910.

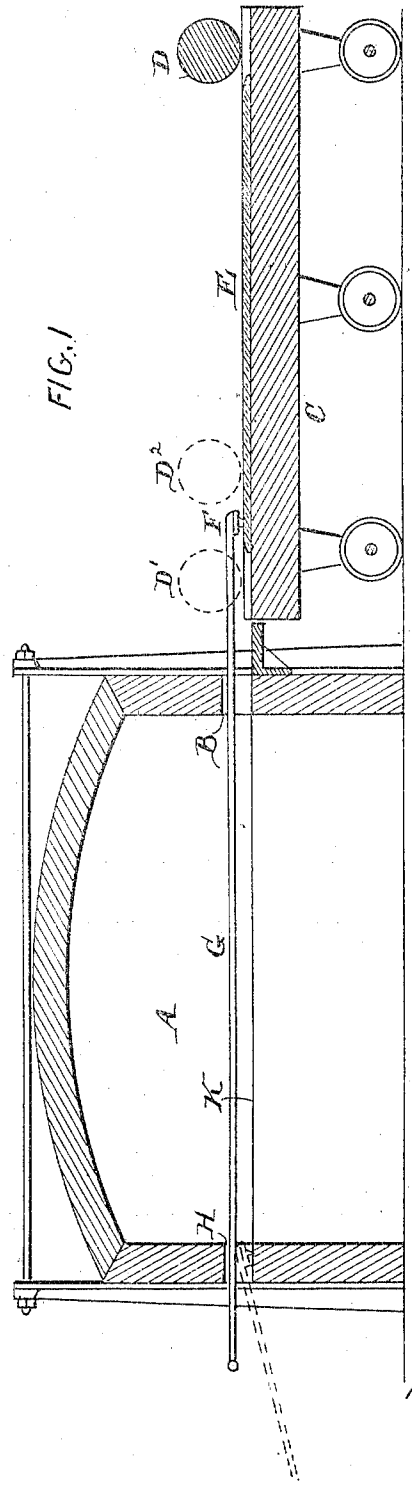

FIG. 1

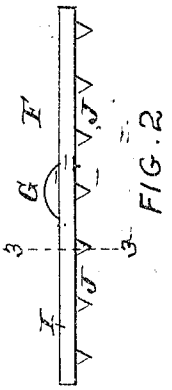

FIG. 2

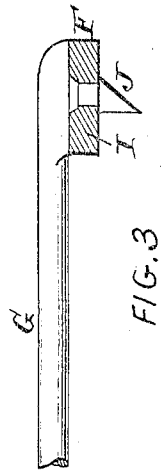

FIG. 3

Attest
R. M. Kelly
M. J. Eyre

Inventor
Frank Shuman
By his atty
J. R. Johnston

UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE CONTINUOUS GLASS PRESS COMPANY, A CORPORATION OF NEW JERSEY.

METHOD OF AND MEANS FOR ANNEALING GLASS.

957,477. Specification of Letters Patent. Patented May 10, 1910.

Application filed May 20, 1905. Serial No. 261,384.

To all whom it may concern:

Be it known that I, FRANK SHUMAN, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Methods of and Means for Annealing Glass, of which the following is a specification.

My invention has reference to methods and means of annealing glass and consists of certain improvements which are fully set forth in the following specification taken in connection with the accompanying drawings which form a part thereof.

Heretofore, it has been customary to roll the sheet of glass, then push the sheet from the rolling table into the leer where it is annealed. This method is slow because the end of the sheet last rolled must be allowed to set sufficiently to permit pressure from the pushing rods without changing its shape. Because of the delay in transferring the sheet of glass into the leer the glass is liable to be more or less defective and inferior in quality due to internal strains owing to uneven annealing. The sheet is liable to buckle under the compressive strains and this is more especially the case with large thin sheets.

The object of my invention is to overcome the above objections in the present mode of handling sheets of glass in transference thereof into the annealing furnace or leer. I have found by practical application of my invention that the most advantageous results may be secured by pulling the glass sheet from the rolling table into the leer instead of pushing it. By using this method I have been enabled to reduce the breakage in annealing very considerably, have reduced the time required in transferring the glass from the table to the leer, have improved the quality of the glass because the sooner it is gotten into the leer the less internal strains are caused by uneven annealing, and less damage is caused from buckling or distortion of the sheet of glass.

In carrying my improved method into operation, I roll the glass sheet upon the table with the roller moving away from the leer. The moment the first portion of the sheet of glass is formed a pronged tool is embedded in the glass before it is cold and after the sheet is fully rolled the sheet is instantly pulled into the leer by the pronged tool. Preferably the tool is formed like a rake and thrust through the leer for attachment to the glass. By this method the glass may be pulled directly into the leer some seconds before it would be cold enough to permit pushing as in the old method. By pulling the glass from the coolest end the sheet is caused to pass easily and quickly into the leer and irrespective of its softness is kept flat and free from buckling.

It will be understood that owing to the quick transfer of the glass after being rolled into the leer the annealing is more quickly and perfectly accomplished.

My invention also comprehends means by which the above recited method may be carried into effect and said means being fully described hereinafter and defined in the claims.

My invention will be better understood by reference to the accompanying drawings showing suitable means for putting my improved method into practice, in which:

Figure 1 is a cross section through the leer and glass rolling machine. Fig. 2 is an end view of the tool for pulling the glass into the leer; and Fig. 3 is a section of same on line 3—3.

A is the leer or more particularly the first heating compartment thereof and B is the front door through which the glass sheets are introduced into the leer. The particular construction of the leer is immaterial.

K is the level of the leer bottom or support for the glass and is on a level rolling table C. This rolling table C is on rollers and is moved up to the front door B of the leer as shown. The roller D is first brought to the position indicated in dotted lines at D′ and after the ball of molten glass is laid upon the table it is moved to the position indicated in dotted lines at D^2. This action produces a small portion of the rolled sheet between the leer and roller. The teeth J of the drawing in tool F is then forced down into the glass before it is set. While this is being done the rolling of the glass is being completed and the roller moved off the glass to the position shown at D. The glass is then drawn into the leer from the table by the tool F which is provided with the long iron handle G which extends through the leer and protrudes from the rear through a passage H. The transference of the glass is made into the leer from the table the instant the rolling thereof has been completed. This tool F consists

of a transverse iron bar I having a series of sharp teeth J secured therein, and the bar I is connected with the rod G. When not being used for drawing in a sheet of glass the tool is moved to the position indicated in dotted lines in which the part F is kept in a reasonably hot condition but not overheated. This improved method of transferring the sheet of glass into the leer is equally applicable for all kinds of rolled plate glass, whether skylight, wire glass, or large plate glass.

An important feature of my invention is the applying the power for moving the glass plate to that portion of the sheet that is first rolled and set and reducing the strain upon the glass from the end first rolled to the end last rolled during its transference into the leer.

The essential feature of my invention is in moving the sheet of glass while it is under tension instead of compression as was heretofore done.

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

1. The method of making and annealing flat sheets of glass which consists, in rolling molten glass into a sheet upon a horizontal flat surface, and while still hot and pliable transferring the sheet of glass into a leer for annealing it by applying power to the end of the sheet across its width next to the leer and thereby pulling it bodily over the flat surface into the leer as distinguished from pushing it and whereby the sheet is held in a flat condition by gravity and the flat surface during the operation.

2. The art of making sheets of rolled glass which consists of rolling a ball of glass into a sheet upon a flat surface and during the rolling operation while the glass is plastic applying a drawing-in tool to the end of the glass first rolled, and as soon as the roller has left the glass drawing or pulling the sheet of glass from the rolling table into the leer over the supporting surface as distinguished from pushing it.

3. The art of making sheets of rolled glass which consists of rolling a ball of glass into a sheet, embedding in the end of the glass first rolled a drawing-in tool and at the same time completing the rolling of the sheet, and then at once drawing into the leer the sheet of glass by pulling upon the drawing-in tool whereby the glass is drawn or pulled into the leer as distinguished from pushing it.

4. A leer having an entrance door for the glass and a tool aperture in its opposite wall, combined with a table upon which the glass sheet is rolled arranged adjacent to and upon the level of the entrance door of the leer, and a drawing in tool extending entirely through the furnace and the tool aperture and door thereof and provided with means for attachment to the glass sheet adjacent to the leer.

5. A leer having an entrance door for the glass and a tool aperture in its wall, combined with a table upon which the glass sheet is rolled arranged adjacent to and upon the level of the entrance door of the leer, and a drawing in tool extending entirely through the furnace and the tool aperture and door thereof and provided with prongs for attachment into the glass sheet adjacent to the leer.

6. The combination of a leer having an entrance door, combined with table upon which the glass is rolled, a roll for rolling the glass movable over the table to and from the leer, and a tool for drawing the glass from the table into the leer through the entrance door having means for attachment to the glass at its end adjacent to the leer and the leer end of the table.

In testimony of which invention, I hereunto set my hand.

FRANK SHUMAN.

Witnesses:
R. M. Kelly,
M. J. Eyre.