May 22, 1934. B. LONG 1,960,222

MANUFACTURE OF TEMPERED GLASS

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FIG. 1

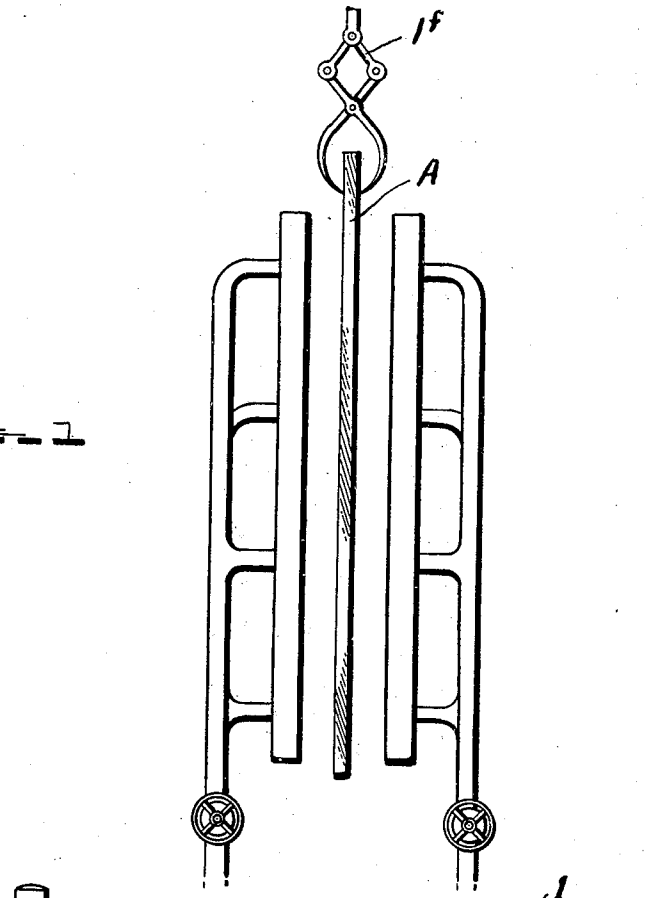
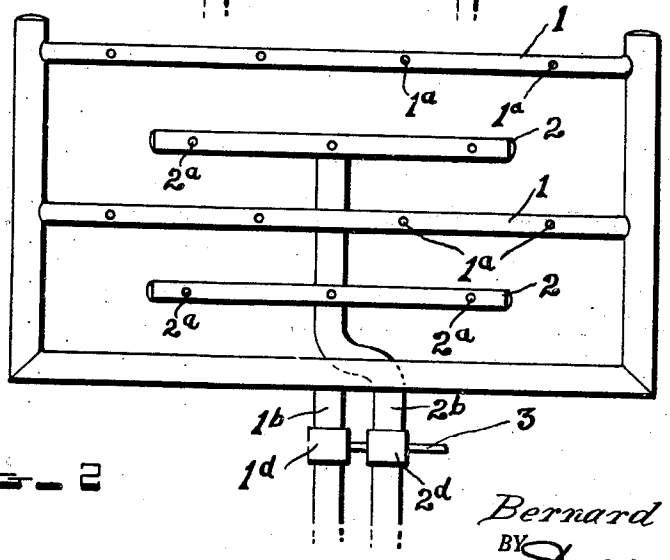


FIG. 2



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MANUFACTURE OF TEMPERED GLASS

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Fig. 3

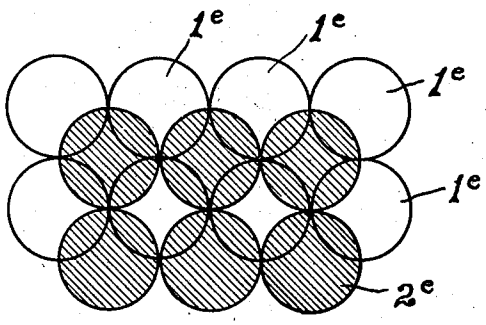


Fig. 4

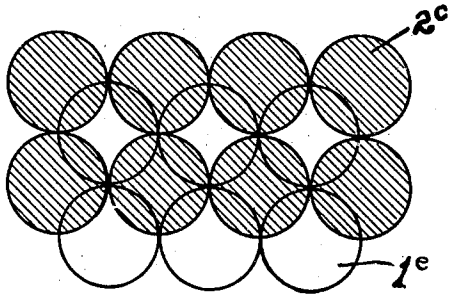
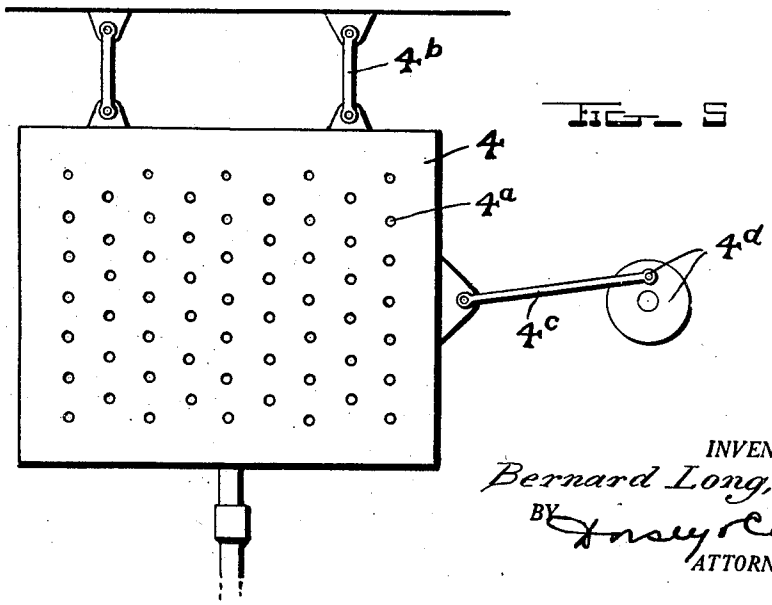


Fig. 5



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Patented May 22, 1934 1,960,222

UNITED STATES PATENT OFFICE

1,960,222

MANUFACTURE OF TEMPERED GLASS

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Application October 6, 1931, Serial No. 567,286
In France October 22, 1930

9 Claims. (Cl. 49—45)

In another application, (Serial No. 434,263), filed by me and Robert Touvay, March 8, 1930, I have disclosed a method of tempering sheet glass by directing on the sheet, while highly heated (in the case of ordinary window glass 550° to 620° C.), jets of air.

Experience has shown that sheets produced by the apparatus described and shown in the aforesaid application are sometimes defective, in that when examined obliquely iridescent spots are visible where the jets stroke the surface of the sheets. The present invention has for its object to prevent the occurrence of such spots, and this I accomplish by causing the air jets to successively impinge on the sheets at different points. This may be accomplished in several different ways. Thus the air nozzles may be divided into two groups, the one group projecting its jets on the sheets intermediate of points on which the other group projects its jets, and causing the air to alternately issue from the jets of the two series, or it may be accomplished by creating a relative movement between the air nozzles by which the jets are projected and the sheet, such motion having a component transverse to the direction in which the jets are projected, and for this purpose my invention consists in the features and steps hereinafter described and claimed.

Referring to the accompanying drawings, in which similar parts are designated by similar marks of reference,—

Figure 1 is a side view of one form of mechanism for carrying out this invention.

Figure 2 is an elevation of the jet projector of Figure 1.

Figures 3 and 4 are diagrammatic representations of the results obtained by using the structures shown in Figures 1 and 2.

Figure 5 shows a form of my invention in which a single series of air nozzles are shifted to distribute the point of impact.

In Figures 1 and 2, 1 represents a grill of pipes having air nozzles 1*a* therein and feeding air under pressure by the pipe 1*b*, provided with a valve 1*d*, while 2 represents another pipe grill, with air nozzles 2*a* fed by the pipe 2*b* having the valve 2*d*. The nozzles 1*a* and 2*a* are staggered, and the valves 1*d* and 2*d* are mounted on a common shaft 3, which may be driven in any suitable manner to open and close the valves in alternation with each other. A represents a heated sheet of glass suspended vertically with a grill 1, and a grill 2 on each side thereof. Under these circumstances, if the valve 1*d* is opened, cooled areas 1*e* will be produced on each side of the plate A, suspended by the tongs 1*f* in Figure 1. When the valve 1*d* is closed and the valve 2*d* is opened, cooling areas as 2*e* will be produced, the one series of areas being interposed between the others. When the valves are repeatedly opened and closed, a uniform chilling of each surface of the plate will be produced, and it will be found that the iridescence produced by prolonged projection of a jet on the same area will not be produced.

In lieu of the double sets of jets above described, a single series of nozzles may be employed, and their action spread over the plate by causing a relative lateral movement between the plate and the nozzles. Figure 5 illustrates how this may be done by moving the nozzles. In the figure, 4 is an air box having on one face thereof, a series of air nozzles 4*a* adapted to project jets of air on the plate. The box is mounted for movement in a plane parallel with its surface by links 4*b*, and may be given a swinging movement in such plane by the connecting rod 4*c*, driven by a wrist pin 4*d*.

Having thus described my invention what I claim is:

1. The hereinbefore described method of tempering a glass sheet by directing jets of cooling air thereon, which comprises shifting the point of impact of such jets on the sheet in such a manner that the jets impinge on the same areas for only limited periods of time, then impinge an area interposed between the first areas, and then impinge on the first named areas.

2. An apparatus for tempering glass sheets comprising nozzles directing air jets against the surface of the sheet, means for creating during the tempering a relative movement having a component at right angles to the direction of the jets between the nozzles and the sheet and means for supplying the nozzles with air cooler than the sheet.

3. In an apparatus for tempering glass sheets, the combination of air nozzles projecting jets of air at a constant angle against the sheet, means for changing, in a regular cycle, the points at which the jets impinge on the sheet and means for supplying the nozzles with air cooler than the sheet.

4. In an apparatus for tempering glass sheets, two series of air nozzles, the nozzles of one series being interposed between those of the other, and means for alternately projecting air jets from the nozzles of the two series.

5. In an apparatus for tempering glass sheets,

the combination with air nozzles, means for supporting a heated sheet of glass opposite the nozzles, and means for causing a cyclic relative motion between the nozzles and the glass sheet in a plane across the direction in which the jets are projected.

6. The hereinbefore described method of tempering a glass sheet which comprises repeatedly subjecting the same surface areas on the sheet to jets of air cooler than the sheet.

7. The hereinbefore described method of tempering a glass sheet which comprises intermittently removing heat from surface areas of the sheet in repeated cycles.

8. The hereinbefore described method of tempering a glass sheet by directing simultaneously on each face of the sheet a plurality of separate jets of cooling air, which comprises so shifting the points of impact of the several jets in respect to the sheet that each air jet impinges successively on different areas of said sheets.

9. The hereinbefore described method of tempering a glass sheet by a plurality of separate jets of cooling air, which comprises creating a relative movement between the said jets and the glass sheet in a direction parallel to the medial plane of said sheet.

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