

# UNITED STATES PATENT OFFICE.

GEORGE E. ROGERS, OF CHELSEA, MASSACHUSETTS.

## IMPROVEMENT IN PROCESSES FOR ANNEALING GLASS.

Specification forming part of Letters Patent No. **176,066**, dated April 11, 1876; application filed January 27, 1876.

*To all whom it may concern :*

Be it known that I, GEORGE EDWIN ROGERS, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Processes for Annealing Glass and other Materials, of which the following is a specification:

This invention relates to that class of processes employed for annealing articles of glass; and it consists in subjecting the articles to be annealed to the action of superheated steam in a suitable receiver or chest, the articles being thus raised quickly to a high temperature, which is afterward gradually reduced by gradually reducing the temperature of the steam.

In carrying out my invention, I employ a receiver or chest of suitable strength, in which I place the articles to be annealed. I then admit superheated steam into the receiver, which quickly raises the temperature of the articles to the desired point, after which the temperature of the steam is gradually reduced. The essential features to successful annealing are thus obtained, viz: rapidly raising the temperature to a high point and gradually reducing it afterward. The superheated steam possesses the quality of raising fusible articles to a higher point of temperature without melting than ordinary furnace-heat; and it is well known that in annealing the higher the temperature to which the material is raised the greater is the subsequent shrinkage or condensation, and therefore the increase of strength in the material treated.

Among the advantages of my improved process may be named its cheapness and practicability, entire absence of liability of injuring the articles or discoloring them, as well as the high degree of heat attainable without melting, as above mentioned.

The process requires no unusually expensive machinery, and no handling or moving of the articles while they are being annealed.

By superheated steam I mean steam at a temperature above 212° Fahrenheit, whether the heat is obtained by pressure or by superheating apparatus.

Heated compressed air may be substituted for superheated steam, either medium being adapted to produce a good annealing effect, the heated compressed air having nearly as good an effect as the steam, an important advantage resulting from the use of either medium being the exclusion of drafts of air at varying temperatures from the material undergoing the annealing process.

I do not confine myself to the process of heating rapidly and cooling slowly, as the process may be reversed for producing other results upon the material.

For giving a hard surface to the glass and rendering it proof against breakage by concussion I suddenly reduce the temperature from near the melting-point of the glass to about 400° Fahrenheit.

By compressed hot air I mean either air heated in a strong air tight chamber, and compressed by its effort to expand, or air which is compressed by other means.

I am aware that glass has been annealed by immersing it while hot in a bath of hot liquid at a temperature lower than that of the glass as in the several patents of Le Bastie; and I therefore disclaim any process in which the articles are so treated.

I claim—

The process herein described for annealing glass, consisting in subjecting the articles to be annealed to the action of superheated steam in a close receiver.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE EDWIN ROGERS.

Witnesses:

LIZZIE H. BROWN,  
C. F. BROWN.