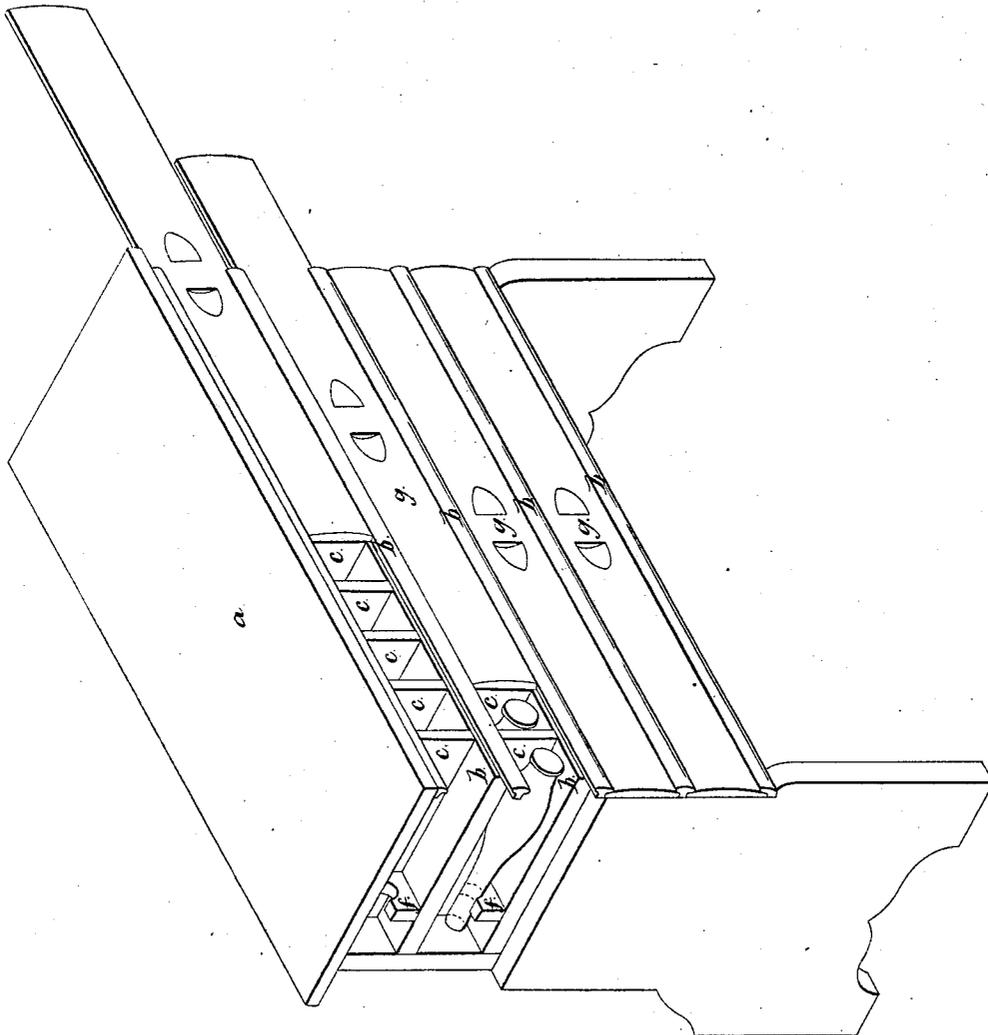


*E. Dithridge,
Glass Furnace.*

N^o 38,930,

Patented June 16, 1863.



Witnesses

A. S. Nicholson

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UNITED STATES PATENT OFFICE.

EDWARD DITHRIDGE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO
EDWARD D. DITHRIDGE.

IMPROVEMENT IN ANNEALING GLASSWARE.

Specification forming part of Letters Patent No. 38,930, dated June 16, 1863.

To all whom it may concern:

Be it known that I, EDWARD DITHRIDGE, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Mode of Annealing Glassware; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, which is a perspective representation of the apparatus which I use.

The object of annealing glassware is to render it less brittle, and it is effected by cooling the articles very gradually. If glassware is allowed to cool by exposure to the air at an ordinary temperature, it becomes so exceeding brittle that it will fly in pieces by the slightest blow or even by a scratch with a sharp instrument, unless the glass is very thin indeed, so that it becomes necessary to anneal most of the articles manufactured of glass.

The usual mode of annealing glass is to place the articles, as soon as made and while yet quite hot, in a leer, which is a kind of long oven, heated considerably at one end, but which, being open at both ends, gradually diminishes in temperature toward the rear end, where there is no fire. The glassware, placed on trays or trucks at the hot end of the leer, is slowly drawn toward, the cold end, and is thus cooled very gradually, so that in cooling, the glass contracts equally all through and does not, by cooling first at the surface, become hide-bound. These leers require to be of considerable length, occupy a great deal of space, and are expensive and troublesome. My improved mode of annealing dispenses entirely with the use of leers and of any heat other than that emitted by the glass when cooling.

I anneal glassware by cooling it gradually, but do so by confining the articles in small compartments made nearly air-tight, so that the air confined in the annealing-compartments becomes heated by the glassware placed therein, and these compartments, being constructed of some material which is a bad conductor of heat, the temperature of the air confined therein is so slowly diminished as that the annealing or gradual cooling of the articles placed therein is successfully accomplished.

My invention therefore consists in annealing glassware by placing the articles, while hot, in small, close compartments, not otherwise heated than by the hot glass, and confining them therein until they are sufficiently cooled.

To enable others skilled in the art to use my invention, I will proceed to describe the apparatus which I employ.

The drawing represents a small apparatus designed for annealing glass chimneys. It is constructed of wood, that being a good non-conductor of heat, and chimneys being so thin that their heat is not sufficient to burn or char it.

a is a chest or box, divided by horizontal shelves *b* and upright partitions *c* into a number of small, deep compartments, large enough to receive each one glass chimney. A small support, *f*, is placed at the rear end of each compartment on which the small end of the chimney is rested, (as seen in the drawing in which a piece of the end of the box is represented as removed to exhibit more clearly the interior.) Each row of compartments is furnished with a sliding door, *g*, which fits up close to the outer edge or face of the horizontal shelves *b* and upright pieces *c*, so as to exclude the external air from the compartments, when the door is closed, as much as possible. The horizontal doors *g* will slide out at either end of the frame so that all the compartments may be easily reached.

The mode of using this apparatus is as follows: The door of one of the horizontal series of compartments is slid out at one end so as to expose all the compartments. A chimney is then placed in the first compartment. As soon as it is finished, and while yet very hot, the door is then slid along far enough to inclose the chimney, and so on, as fast as the compartments are filled the door *g* is pushed forward to cover them. When the whole of the divisions are full, the chimneys first placed in the annealing-chest will be sufficiently cold to be removed, which is done as a new lot of chimneys is inserted to take their places.

As chimneys are made very thin they cool more rapidly and are sooner annealed than larger or thicker articles. The length of time necessary to leave the articles in the annealing-compartments will be easily ascertained.

In annealing articles which are larger or made of thicker glass than chimneys, and which consequently retain a much greater amount of heat, when ready for the annealing chest, it will be necessary to make the annealing apparatus in whole or in part of some other substance less inflammable than wood—as fire-clay, brick, &c.—or to place some inflammable substance in the compartments for the glass articles to rest upon. I do not, therefore, desire to confine myself to the use of annealing apparatus made of wood, as any substance which is a good non-conductor of heat may be used, or the chest may be made of iron or other metal lined with wood or other suitable substances calculated to prevent the too rapid dissipation of the heat from the articles of glassware placed therein.

In the drawing I have represented the annealing-compartments as being small in size and adapted especially to use for lamp-chimneys, but as in glassworks which make a variety of articles it would be inconvenient to have annealing-chests made with compartments especially suited to each particular size and shape of article, the compartments may be made larger, so as to receive several small articles or a single one of larger size at the same time. Care should be taken, however, to put a sufficient amount of heated glassware into such compartment to raise the

temperature of the air therein sufficiently to prevent the chilling or too rapid cooling of the glass.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The annealing of glassware by inclosing it immediately after it is made, and while yet hot, in close compartments or boxes of such size as that the air confined therein will be readily heated by the glass article or articles placed therein, and keeping the glassware thus confined and excluded from the external air until it becomes cold, or nearly so, thereby securing the gradual cooling of glassware without the use of leers or the application of artificial heat other than that which is contained in the articles themselves when placed in the annealing-boxes.

2. The use of annealing apparatus for glassware, consisting of a series of compartments capable of being readily closed as the glass articles are placed therein, and constructed of wood, fire-brick, or other suitable substance, substantially in the manner and for the purposes hereinbefore set forth.

In testimony whereof the said EDWARD DITHRIDGE has hereunto set his hand.

EDWD. DITHRIDGE.

Witnesses:

W. BAKEWELL,
A. S. NICHOLSON.