

J. LOWERY.

GLASS ANNEALING FURNACE.

No. 188,745.

Patented March 27, 1877.

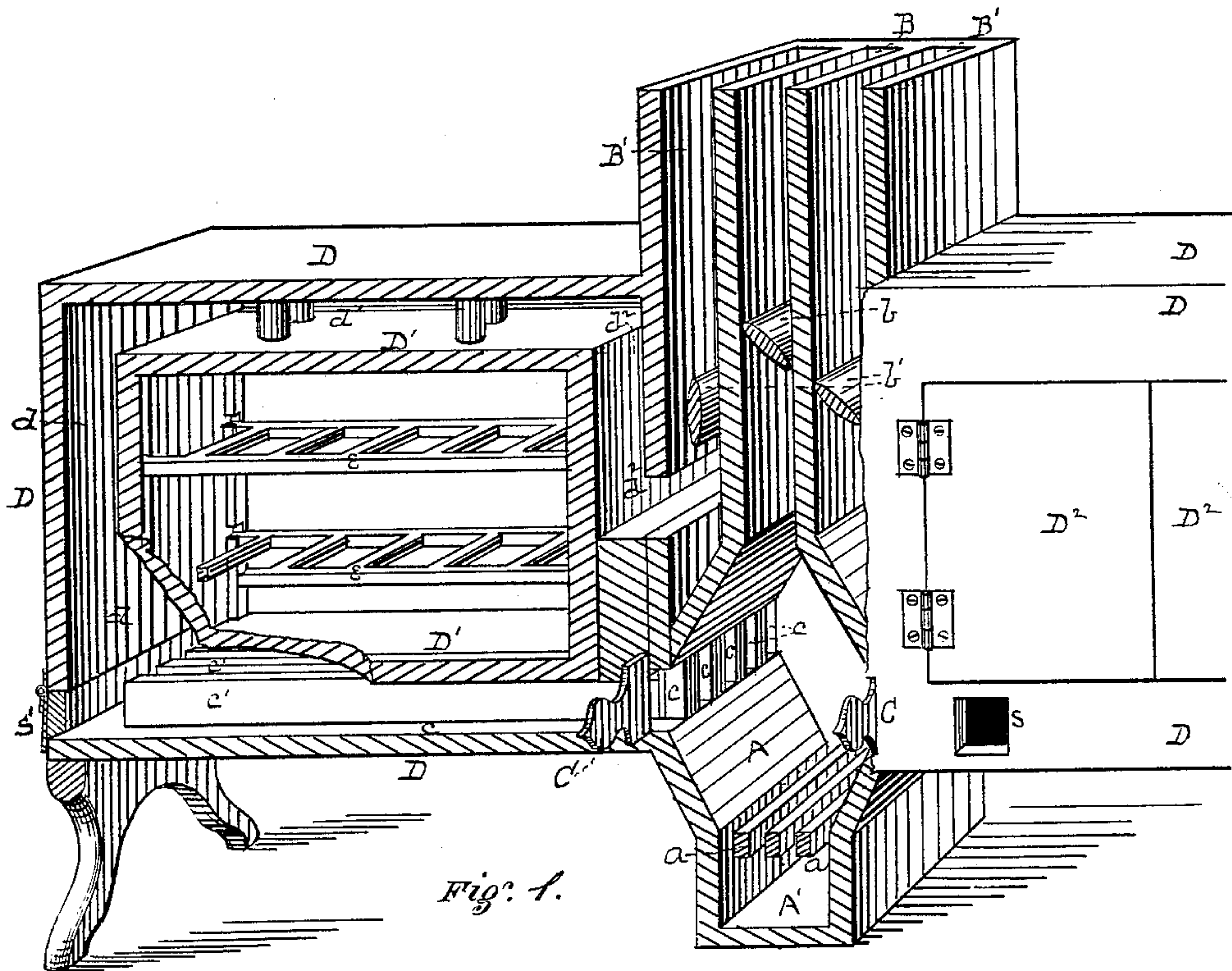


Fig. 1.

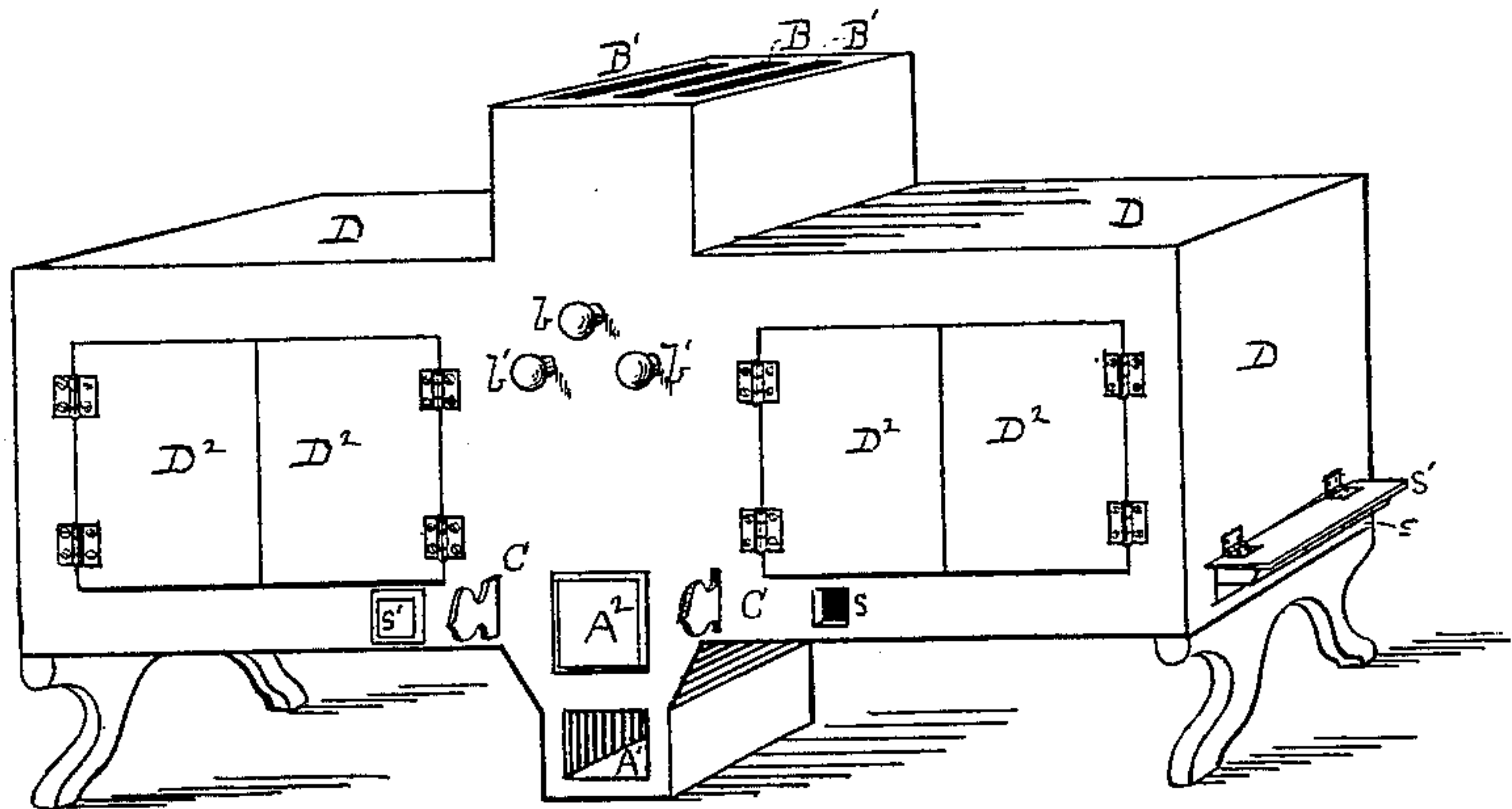


Fig. 2.

Witnesses

Francis L. Clark
Claudius L. Parker

Inventor John Lowery

By Attorney George H. Christy

UNITED STATES PATENT OFFICE.

JOHN LOWERY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO EXCELSIOR FLINT GLASS COMPANY, OF SAME PLACE.

IMPROVEMENT IN GLASS-ANNEALING FURNACES.

Specification forming part of Letters Patent No. 188,745, dated March 27, 1877; application filed March 1, 1877.

To all whom it may concern:

Be it known that I, JOHN LOWERY, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Glass-Annealing Ovens; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a sectional perspective of my improved annealing-oven, and Fig. 2 is an outside perspective.

The annealing-ovens or "leers" heretofore in most common use for annealing glassware have consisted of a long trunk or chamber, with a furnace at one end for the supply of the requisite heat, and a stack at a point more or less distant from the other end to carry off the unabsorbed and waste heat. An objection to this oven is, that it is difficult to regulate the temperature at the hot end, so that the manufactured ware introduced at that end shall be raised to the proper temperature, and no more, the proper temperature being but little short of that at which the glass would become plastic, or so much so as no longer to retain its shape; also, from the furnace end to the stack the temperature is too nearly uniform, and from the stack on it is reduced too rapidly or abruptly to give the best results. In my improved oven I have the temperature at all times under such perfect control that it may with safety and accuracy be brought up to the maximum, and then reduced as rapidly or slowly, and in either case as uniformly, as may be desired.

In the drawing, A represents a fire-chamber, of any suitable construction, with grate-bars *a*, ash-pit *A*¹, and door *A*². A flue, B, opened and closed by a damper, *b*, leads directly therefrom to the stack. On each side of this fire-chamber I make an oven, which consists of an outer case, D, preferably of brick-work, and an inner case or box, D¹, preferably of heavy sheet or boiler-plate iron, though other material may be used, if preferred. The box D¹ rests on two or more

bearings or supports, *c*', and between these a series of flues, *c*, extend from the fire-chamber A along under the box D¹, and at their outer ends they open into the uptake-flue *d*, which connects with the top flue *d*¹, and the latter with a diving-flue, *d*², which latter opens into a flue, B', leading to the stack, such flue being opened and closed by a damper, *b*'. The box D¹ is constructed to receive a series of trays or racks, *e*, and on these I place the pans containing the articles of glassware to be annealed. The bottom flues *c* are opened and closed by sliding registers C, or equivalent dampers. The box D¹ is so built in its case D that the doors D² will close it up air-tight, or practically so.

For the purpose of admitting external cold air, when desired, into the flues *c d d*¹ *d*², and in regulated quantities, I make holes or openings *s*, closed by stoppers, slides, or doors *s*', at any desired points in front and rear, or at the ends, or both. The number, size, and arrangement of these may be varied at pleasure. A thermometer or pyrometer, or both, are to be connected with the interior of the box D¹, to guide the operator in regulating the temperature.

The boxes D¹ are to be air-tight, (when closed,) or practically so, in order that the glass may not be injuriously affected by any deleterious gases, dust, or ashes carried over from the fire-chamber, nor by the chilling effect of external or cold air; and, also, that greater uniformity of temperature may be preserved throughout the box.

In practical use I intend that (in order to secure the best results) each box D¹ shall have a capacity to contain and anneal the product of one "turn," or, generally speaking, of one set of hands doing what counts with them for one day's work. The fire-chamber having been heated up, one box, D¹, is filled, the doors are closed, and luted if need be; the cold-air passages are closed, also the damper *b*; the proper register C is opened, as also the damper *b*' on that side.

The hot air, gases, and flame, playing along the flues *c d d*¹ *d*², raise the temperature of the box D¹ as high as may be desired in the glass-

annealing operation—say from 500° to 600° Fahrenheit, more or less. When this is done, which will require, say, from two to three hours, more or less, the damper *b* is opened, *C* is closed, and the oven is left to cool down by radiation; or one or more of the cold-air ports or openings *s* are opened, and the draft of cold air along the flues *c d d' d''* is regulated by the damper *b'*. In this way the operation of cooling may be carried on with comparative rapidity, or slowly, as may be preferred; and while this operation is going on the work of the next turn may be charged into the other oven, and the ovens be thus used alternately. Two or more ovens may be used for each single turn, if so preferred, especially in works of large manufacturing capacity.

I claim herein as my invention—

1. The close box *D*¹, with surrounding flues, in combination with a fire-chamber and ports, doors, dampers, or registers suitably arranged for applying either hot air and gases alone,

or cold air alone, to the exterior of the box, the combination being substantially as set forth.

2. A glass-annealing oven, consisting of a close box, *D*¹, outer case *D*, interposed flues *c d d' d''*, and one or more cold-air ports, *s*, in combination with fire-chamber *A*, flues *B B'*, dampers *b b'*, and register *C*, substantially as set forth.

3. A fire-chamber, *A*, having an independent smoke-flue, *B*, and damper *b*, in combination with a glass-annealing oven on each side of the same, and an independent system of flues or passages, regulated by registers leading from the fire-chamber around each annealing-box, whereby the effective heat of the fire-chamber can be directed onto either box, or cut off from both, at pleasure, the combination being substantially as set forth.

In testimony whereof I have hereunto set my hand.

Witnesses:

JOHN LOWERY.

J. J. McCORMICK,

CLAUDIUS L. PARKER.