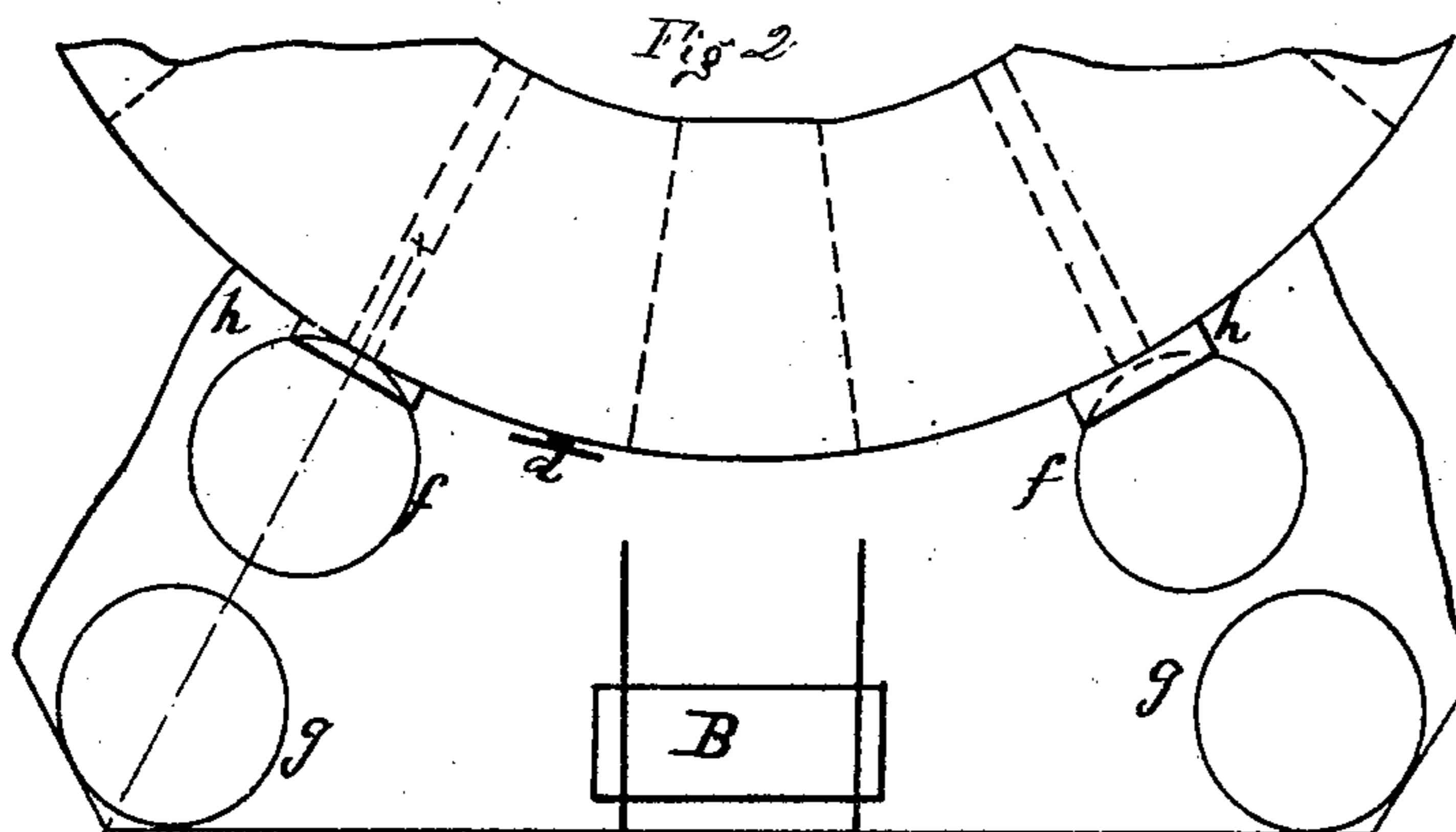
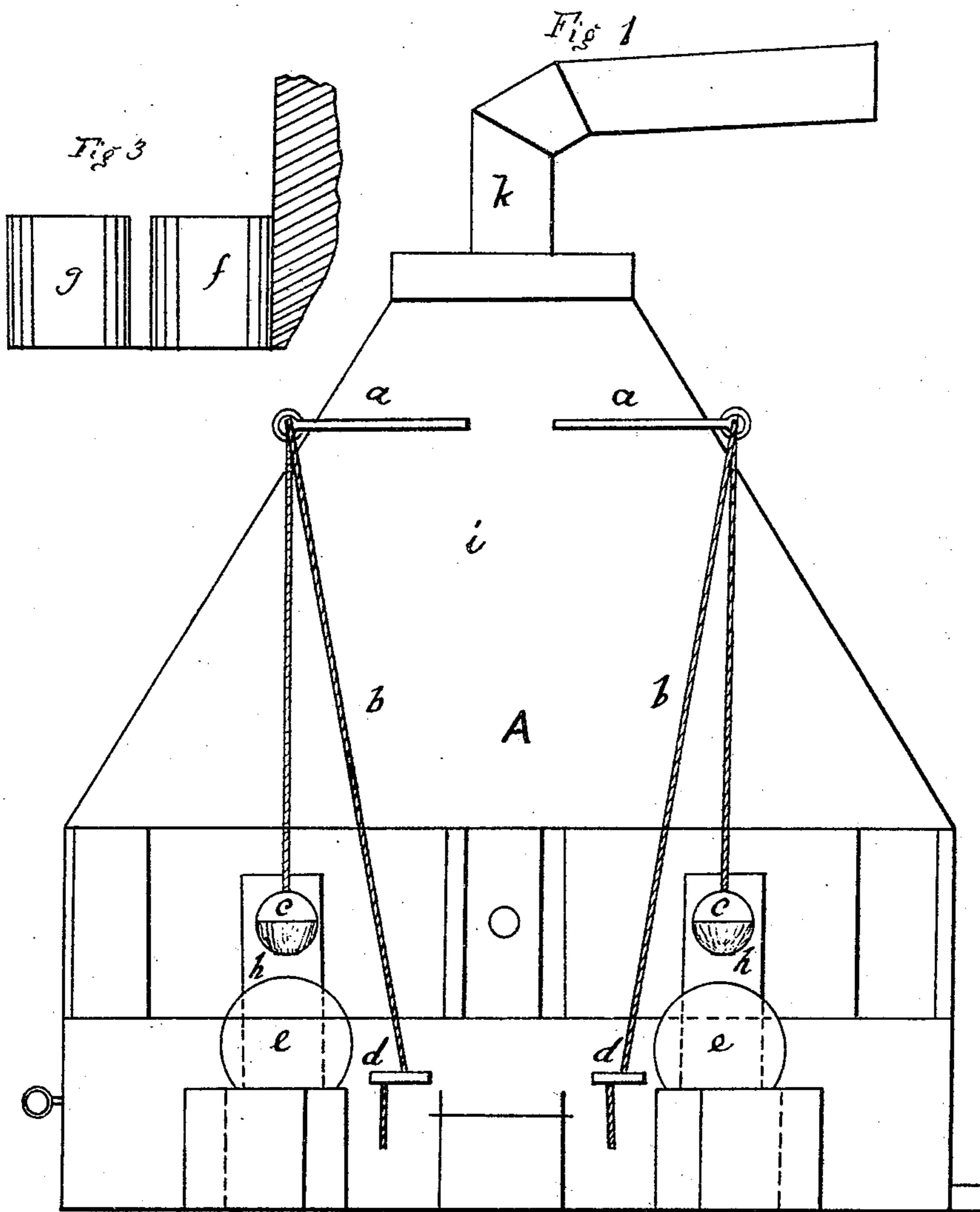


H. O'NEILL.

PROCESS OF TEMPERING GLASS.

No. 178,797.

Patented June 13, 1876.



Attest  
Thomas L. Linnell  
for the Patent Office

Hugh O'Neill

# UNITED STATES PATENT OFFICE

HUGH O'NEILL, OF JERSEY CITY, N. J., ASSIGNOR OF ONE-THIRD HIS RIGHT  
TO SAMUEL T. WILLIAMS, OF PRINCE GEORGE'S COUNTY, MD.

## IMPROVEMENT IN PROCESSES OF TEMPERING GLASS.

Specification forming part of Letters Patent No. 178,797, dated June 13, 1876; application filed  
February 16, 1876.

*To all whom it may concern:*

Be it known that I, HUGH O'NEILL, of Jersey City, in the State of New Jersey, have invented an Improved Process of Tempering Glass, of which the following is a specification:

This invention relates to the construction of apparatus and to improvements in that class of processes which have their analogies in the well-known modes of tempering steel by immersing it, in a white-hot or red-hot condition, in oil or fat, and transferring it thence to cold water, whereby it is condensed in all its parts; and it consists, chiefly, in immersing the red or cherry-red glass, as soon as formed in the ultimate shapes desired, into baths, as herein described.

In the accompanying drawing, which makes part of this specification, Figure 1 is an external elevation of the glory-hole. Fig. 2 is a bird's-eye view of a segment of said glory-hole, with the first and second bath-tanks in position, the operator's chair, and the gas-escape flues; and Fig. 3 is a sectional view of the bath-tanks and a broken section of the glory-hole.

The glory-hole A requires no special description, as it is like others in general use. Springing out from it, for each pair of tanks, is an arm, *a*, that may otherwise form part of a crane. Pendent from this arm is a cord or chain, *b*, for the elevation and depression of a basket, *c*, of reticulated metal, or of woven wire, one end of the cord or chain being detained at *d*, near the operator's hand, or convenient to an attendant. A flap-cover, *e*, is designed to be let down upon the removal of the basket from the first tank, or at other times, to prevent the escape of gas, heat, or vapor from the tank *f*; but when the cover *e* is closed, such gas, heat, or vapor ascends in the flue *h* to the dome *i* of the glory-hole, and thence passes out with the products of combustion through the smoke-stack *k*. The tank *f* is for the first immersion in the process, and the tank *g* is for the second, as shall be fully explained. The chair B is of ordinary construction, but is advantageously arranged, so as to afford working room for the operator and enable him to control all the operations in progress. The surrounding tanks,

forming the inner circle in Figs. 1 and 2, may be made of boiler-iron. Beneath them are constant fires, to keep in a molten condition a sufficient quantity of caoutchouc, gutta-percha, lead, or other metal or alloy of metals, for the first immersion of the perfectly-formed object of glass manufacture. As soon as this is formed, and while yet red, it should be immersed in the molten material in one of the tanks *f*. After remaining there five seconds or five minutes, at the option of the operator, the articles of glass should be removed in the basket *c*, previously sunk in tank *f* for this purpose, and promptly immersed in a cold bath of "dead-oil" (or carbolic acid) in tank *g*, and after from two to five minutes it should be transferred to a vessel of cool or warm water holding soap, or soda, or salt (chloride of sodium) in solution. In this it may be washed and prepared for transportation or for storage.

The use of oils, grease, wax, resin, bitumen, or any substance liable to combustion, or to the rapid escape of heat, or to free vaporization, is incompatible with this process, which requires substances that melt only at a comparatively high temperature, and which press closely upon the glass, protecting it from sudden chilling while yielding to such pressure. The whole body of the glass, instead of merely the surface, as in other processes, is thus solidified, and hence a superficial cut or scratch cannot occasion a separation of the whole plate or body, as in glass not condensed in all its parts.

With respect to the degree of heat to which the caoutchouc, gutta-percha, or metal shall be raised for the first immersion, common experience will prove a sufficient guide to those skilled in the art, who never remelt the glass in this operation. From this maximum down to a temperature that will barely melt the most yielding of these substances, is the range of discretion in the premises.

The proper arrangement of the immersion-tanks is: the first bath nearest to the glory-hole, and the second without, in such manner that a line radial from the axis of the glory-hole shall pass through the pillars of the same, and through the axes of the first and second tanks exterior thereto.

What I claim is—

1. The arrangement of the first immersion-tanks in relation to the glory-hole, substantially as described.

2. The arrangement of the first and second tanks in relation to the glory-hole, substantially as described.

3. The arrangement of the operator's chairs in relation to the glory-hole and the first series of immersion-tanks, substantially as described.

4. The arrangement of the suspended basket

in relation to the furnace and surrounding tanks, substantially as described.

5. The arrangement of the covers in relation to the glory-hole and surrounding tanks, substantially as described.

6. Immersing in a bath of carbolic acid glass that has been first immersed in a heated bath.

HUGH O'NEILL.

Witnesses:

THOMAS C. CONNOLLY,  
JAMES REYNOLDS.