

(No Model.)

J. DALZELL.  
GLASS FURNACE.

No. 297,114.

Patented Apr. 22, 1884.

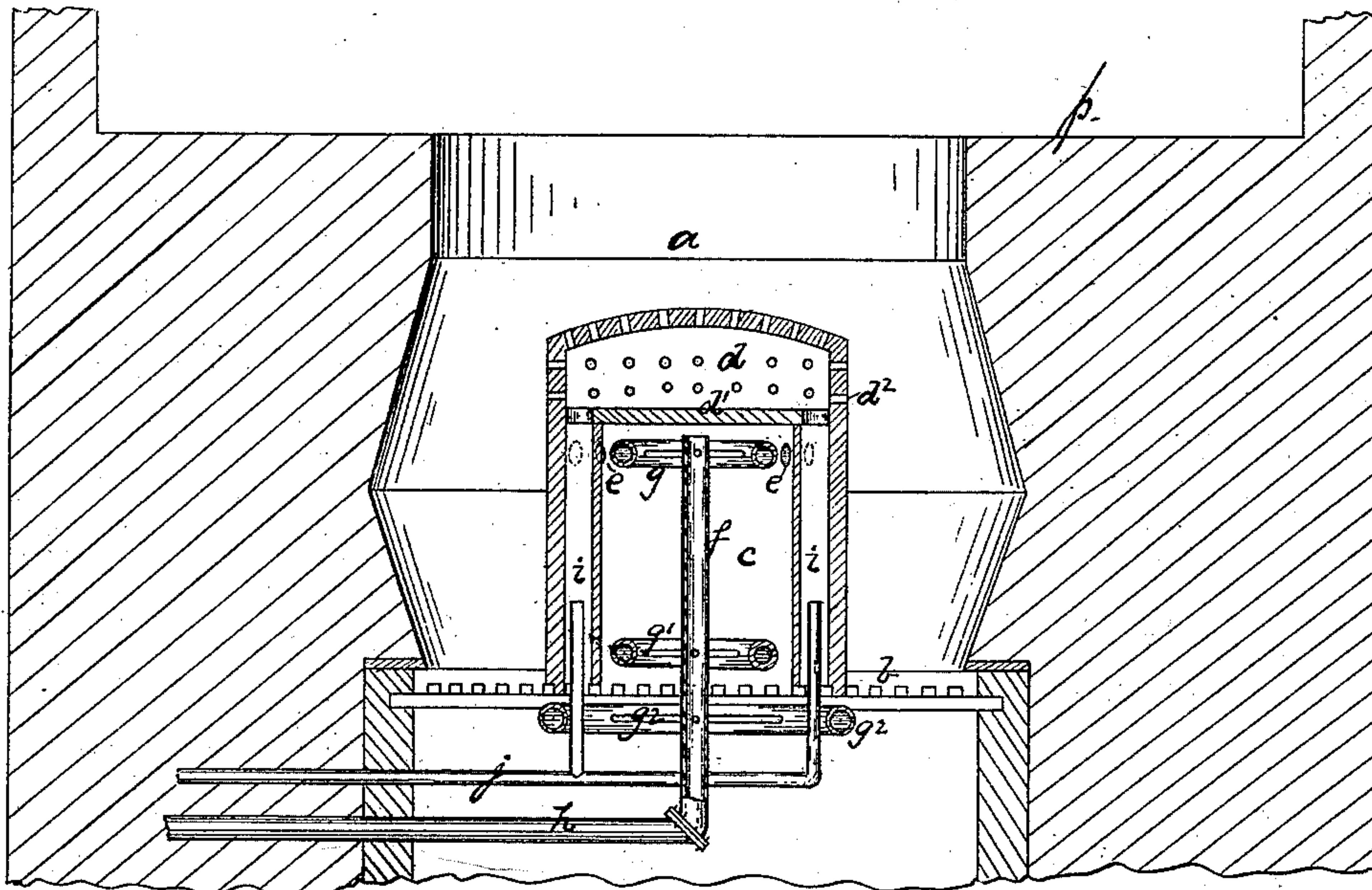


Fig. 1.

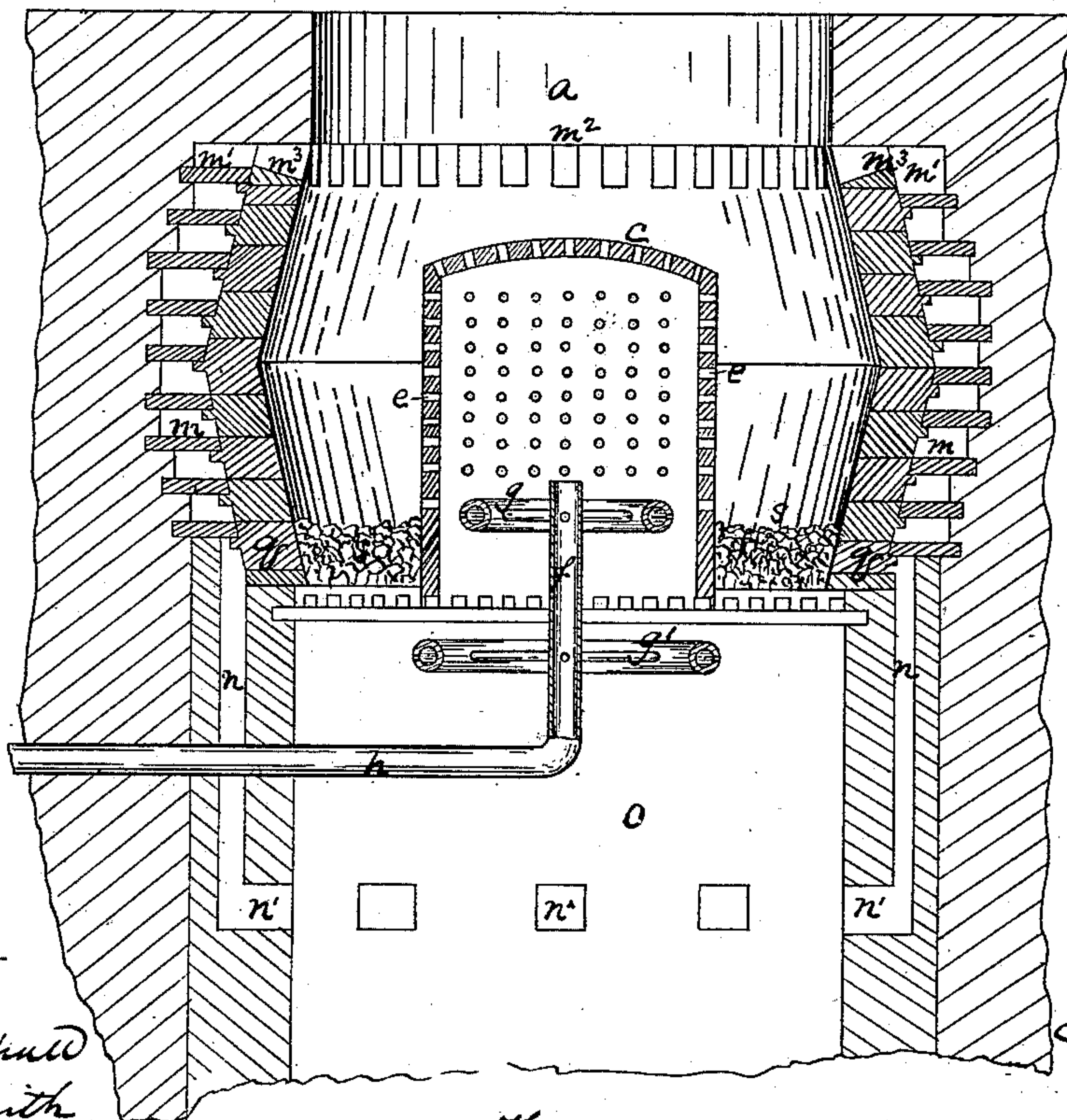


Fig. 2.

Witnesses.

R. C. Winick  
Jno K. Smith

Inventor

James Dalzell  
by his attys  
Bakewell & Kern



# UNITED STATES PATENT OFFICE.

JAMES DALZELL, OF PITTSBURG, PENNSYLVANIA.

## GLASS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 297,114, dated April 22, 1884.

Application filed October 22, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES DALZELL, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Glass-Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a vertical sectional view through the eye of a glass-furnace, showing my improvement; and Fig. 2 is a like view of a modification thereof.

15 Like letters of reference indicate like parts wherever they occur.

In the drawings, *a* represents the eye of the furnace, and *b* the grate-bars at the bottom thereof.

20 In the center of the eye *a*, rising from the grate-bars or foundation, as desired, is a cylindrical or other shaped burner, *c*, having one or more annular rows of perforations or holes, *e*, extending through the sides near the top.

25 In the upper part or crown of the burner *c* is an air-chamber, *d*, the bottom of which is formed by the close partition *d'*. In the top and sides of this air-chamber are holes or perforations *d''*. The bottom of the burner *c* is open, or partly closed, as desired, and extending through the same to a point near the partition *d'* is a gas-supply pipe, *f*, which is provided at this point with the hollow perforated ring *g*. Similar rings, *g' g''*, may also be used inside of the burner, just above the grate-bars, 35 or below the grate-bars, as shown in the drawings. The lower end of the pipe *f* is connected with the main gas-pipe *h*.

40 In the sides of the burner *c* are vertical passages or air-flues *i*, preferably two or more in number, leading from the bottom of the burner or from the grate-bars into the air-chamber *d*. These air-passages are preferably built of brick, and communicate at their lower ends with the air-supply pipe *j*, or with the external atmosphere, or with both, as shown in Fig. 1.

45 Around the wall of the fire-chamber I form a spiral or otherwise arranged air flue or flues, *m*, to which the air finds access through flues *n* and ports *n'*, made in the walls of the cave *o*. 50 These spiral flues *m* all terminate in an annu-

lar flue or opening, *m'*, from which a number of ports, *m''*, open into the eye of the furnace at determined intervals in the circumference. Providing the supply of gas fails, these flues are adapted for heating air in a coal burning 55 furnace.

To prevent the drip from the pots entering the ports *m''*, I extend the bench *p* a short distance over them and make the bottom tile, forming the lower sides of the ports *m''*, inclined 60 inward, as shown at *m'''*, Fig. 2. By this arrangement I obtain in the furnace a supply of air which is heated by contact with the hot side walls of the eye of the furnace, and is caused to enter at the sides of and above the 65 point where the gas is discharged, so as to become thoroughly mingled therewith, producing the complete combustion of the same.

The operation is as follows: The natural gas passes from the gas-well or supply-tank 70 through the pipes *h* and *f* into the rings *g g' g''*, and is discharged through the perforations into the burner *c*, where it mingles with the air which enters through the open lower end, and, together with the same, passes through the per- 75 forations *e* into the eye of the furnace. Here it meets hot air from the chamber *d* and flues *m*, and uniting therewith is completely consumed. The heat rises through the eye and acts on the pots on the bench in the usual way. 80

In Fig. 2 I show a modification in which the air-chamber *d* is dispensed with, and that por- 85 tion of the burner *c* above the ring *g* is perforated, so as to permit the free and general escape of the gas and air into the fire-chamber.

In order to retard the air which enters the grate-bars around the burner, the space be- 90 tween the burner and the side walls, *q*, may be filled with broken stone or brick, as shown at *s*, or this may be done in any other desired way.

While I have not shown the surrounding flues *m* in Fig. 1, yet I intend to use them in both constructions.

The advantages of my improvement are as follows: The placing of the burner in the cen- 95 ter of the furnace prevents the molten glass from the bench falling upon and destroying the pipes, such glass falling into the open space between the burner and the side walls, *q*. Moreover, the arranging of the gas-pipes be- 100



low the burner-cap or cage *c* protects them from the reverberation of the heat from the top or crown of the furnace, which would have a tendency to burn out the pipes, and also from the drip or fall of glass from the bench, as in case of the breaking of the pots. Thus the pots are protected not only from the drip of the glass, but also from the effect of the reverberated heat from the melting-chamber above.

10 I do not limit myself to the number or arrangement of the rings *g*, but only to placing the burner-pipes of a centrally-placed burner under the cover of a cap or shield, which will protect them, as stated.

15 I do not desire to claim, broadly, the burning of natural gas in a glass-melting furnace; but What I do claim is—

1. The construction and arrangement of the devices herein described, consisting of a perforated burner situated in the eye of a glass-furnace, below the bench, having an air-supply orifice, and a gas-supply pipe arranged to admit natural gas within the burner, substantially as and for the purpose specified.

25 2. The construction and arrangement of the devices herein described, consisting of a perforated burner situated in the eye of a glass-fur-

nace, below the level of the bench, having an air-supply orifice, and a gas-supply pipe arranged to admit natural gas within the burner, and a perforated air-chamber arranged above the burner and having an air-supply pipe leading thereto, substantially as and for the purpose specified.

3. The combination, in a glass-melting furnace, of a gas-burner arranged in the central part of the fire-chamber or eye, and having a space between the same and the walls of the eye, so that the drip of the pots shall fall in the space, and not on the burner, substantially as and for the purposes specified.

4. The combination, in a glass-melting furnace, of a gas-burner arranged within the central part of the eye, and having a cap or casing interposed between the gas-pipes and the crown of the furnace, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 17th day of October, A. D. 1883.

JAMES DALZELL.

Witnesses:

T. B. KERR;  
W. B. CORWIN.