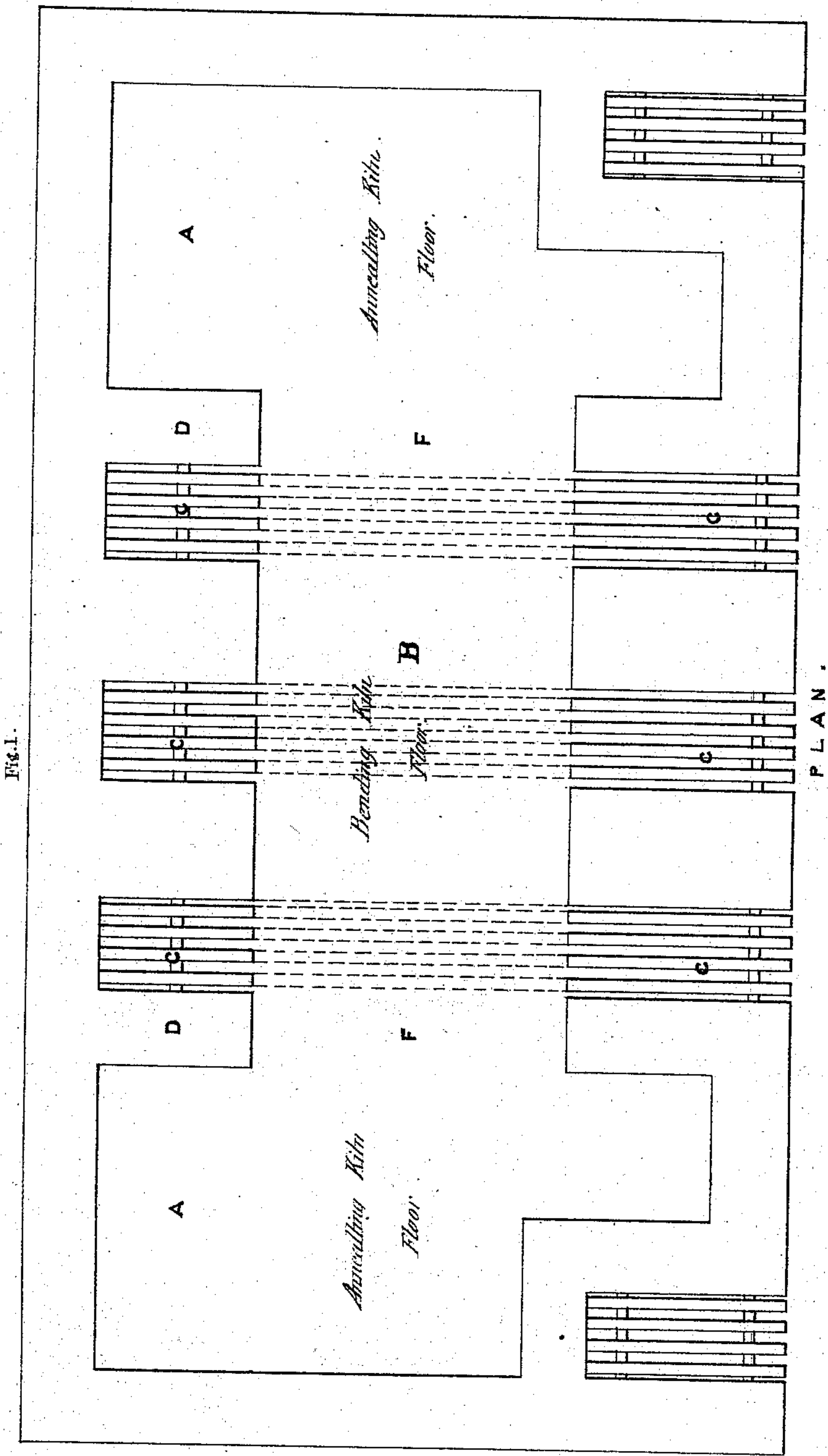


**J. R. DENMAN.**  
**Glass-Furnaces.**

No. 156,776.

Patented Nov. 10, 1874.



Witnesses:  
Geo W Francis  
Geo H Wilson.

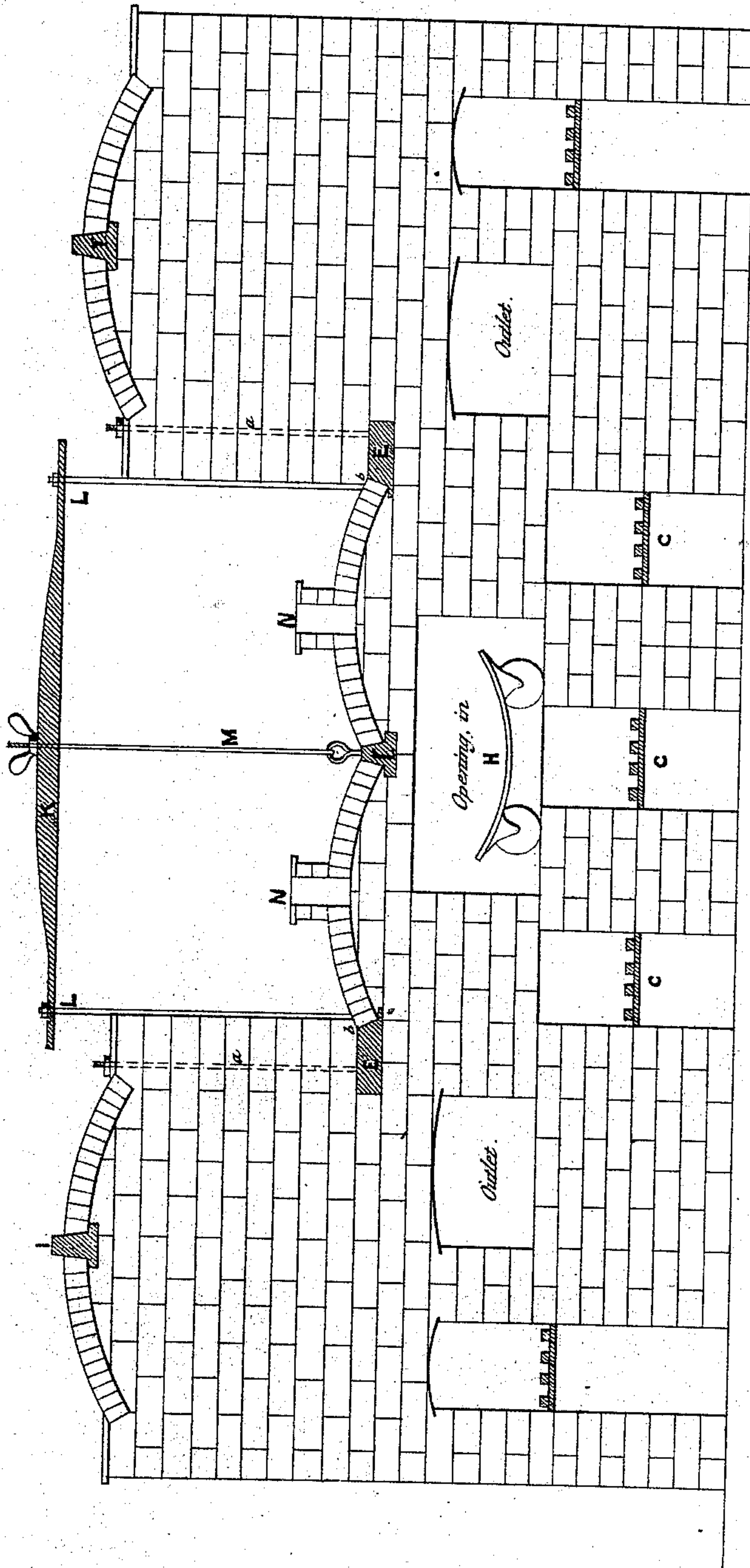
Inventor.  
Julius R. Denman.

J. R. DENMAN.  
Glass-Furnaces.

No. 156,776.

Patented Nov. 10, 1874.

Fig. 2.



FRONT ELEVATION

Witnesses:  
Geo W Francis  
Geo H Wilson

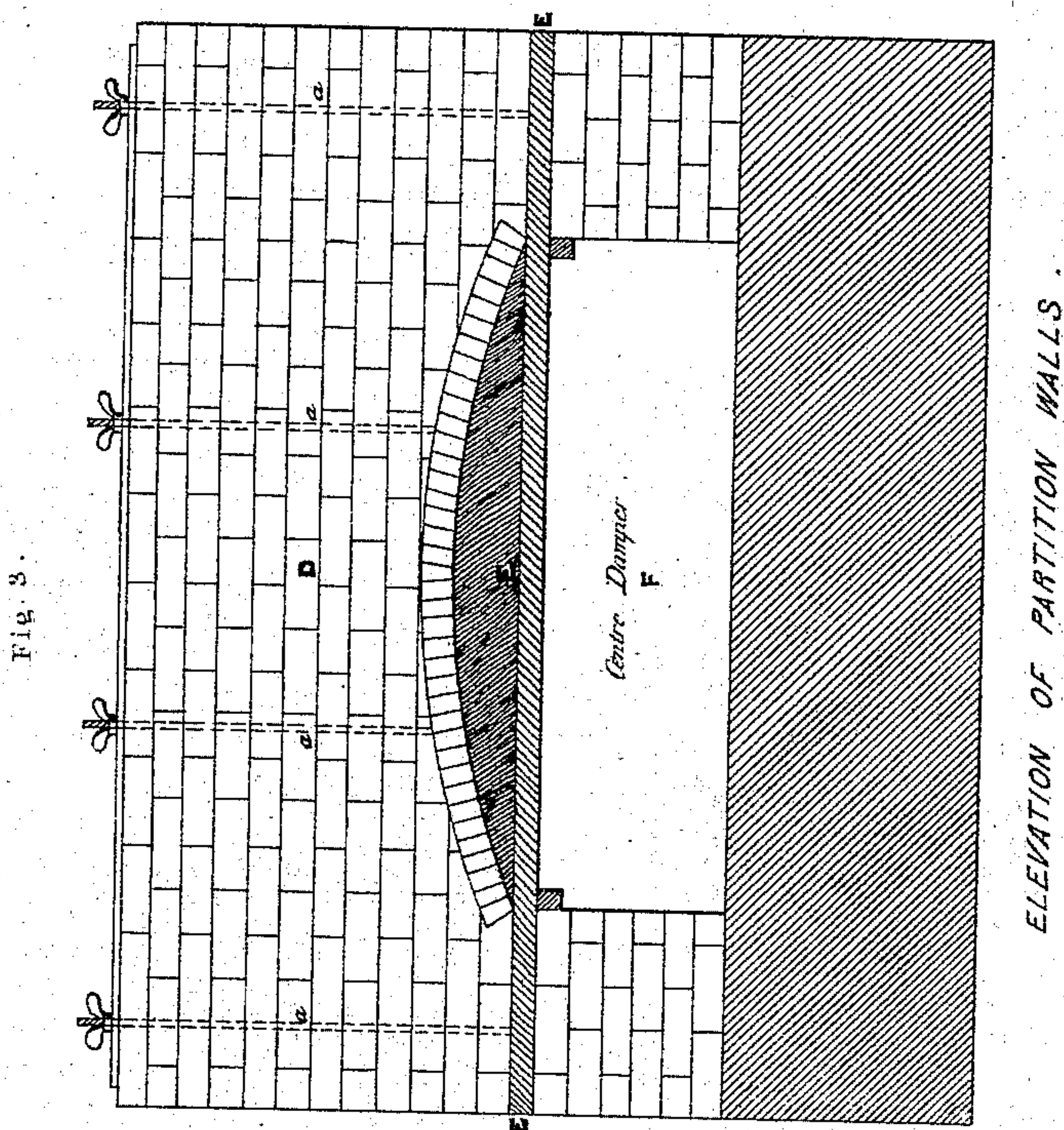
Inventor  
Julius R. Denman

**J. R. DENMAN.**  
**Glass-Furnaces.**

3 Sheets--Sheet 3.

No. 156,776.

Patented Nov. 10, 1874.



Witnesses:  
*Geo. W. Francis*  
*Geo. H. Wilson*

*Julius R. Denman*  
Inventor.



# UNITED STATES PATENT OFFICE.

JULIUS R. DENMAN, OF NEWARK, NEW JERSEY.

## IMPROVEMENT IN GLASS-FURNACES.

Specification forming part of Letters Patent No. **156,776**, dated November 10, 1874; application filed July 24, 1874.

*To all whom it may concern:*

Be it known that I, JULIUS R. DENMAN, of the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Furnaces or Kilns for Bending and Annealing Glass; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in the manner of constructing and building glass-furnaces; and it consists in the devices by which the tops of the kilns are supported, as will be more fully described hereafter.

The accompanying drawings represent my invention.

A represents annealing-kilns, connected through passages F with the bending-kiln B, all on a level with each other. C are furnaces extending entirely through from one side to the other. The walls D form a partition between the annealing and bending kilns. The metallic plates E rest upon or are embedded in the said partition-walls, which are supported and strengthened by vertical rods *a*, which

rods pass entirely through the plates E and walls D, and are keyed or secured firmly upon a plate laid upon the top of said wall D, as shown in Fig. 3. The arches and crowns of the furnaces are also supported by plates E, which form a skew-back, *b*, against which the ends of the arches abut, and also by the keys I, which pass through the center of the arches over the annealing-kilns, upon each side and between the two central arches, and which keys also serve as girders as they pass through the entire length of the arches, as shown in Fig. 2. The two central arches are further supported by cross-beam K upon two upright posts, L, and by rods M, which connect with the central girder or key I, and are firmly attached to the cross-beam K.

Having thus fully described my invention, I claim—

The combination of metallic plates E, flanged girder and keys I, rods M, upright posts L, and cross-beam K, constructed and arranged substantially as described.

In testimony that I claim the foregoing as my own invention I affix hereto my signature in presence of two witnesses.

JULIUS R. DENMAN.

Witnesses:

GEO. H. WILSON,  
L. MICKENS.