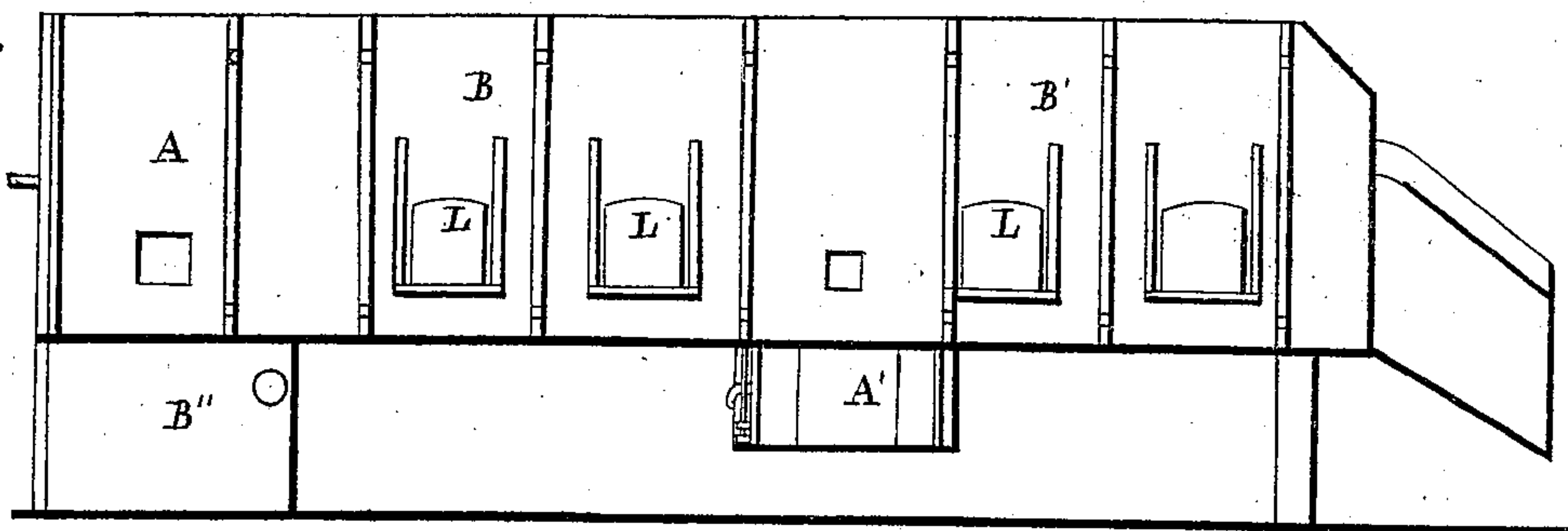


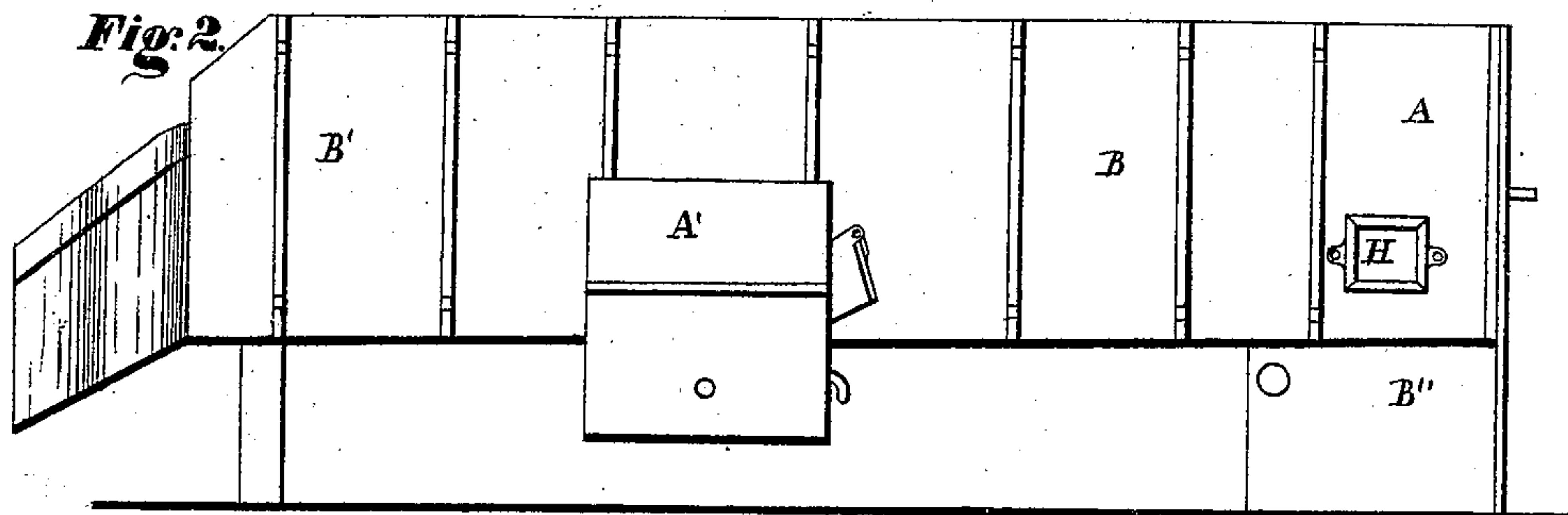
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**H. CHISHOLM.**  
**Furnaces for Reheating Metals, &c.**  
 No. 136,413. Patented March 4, 1873.

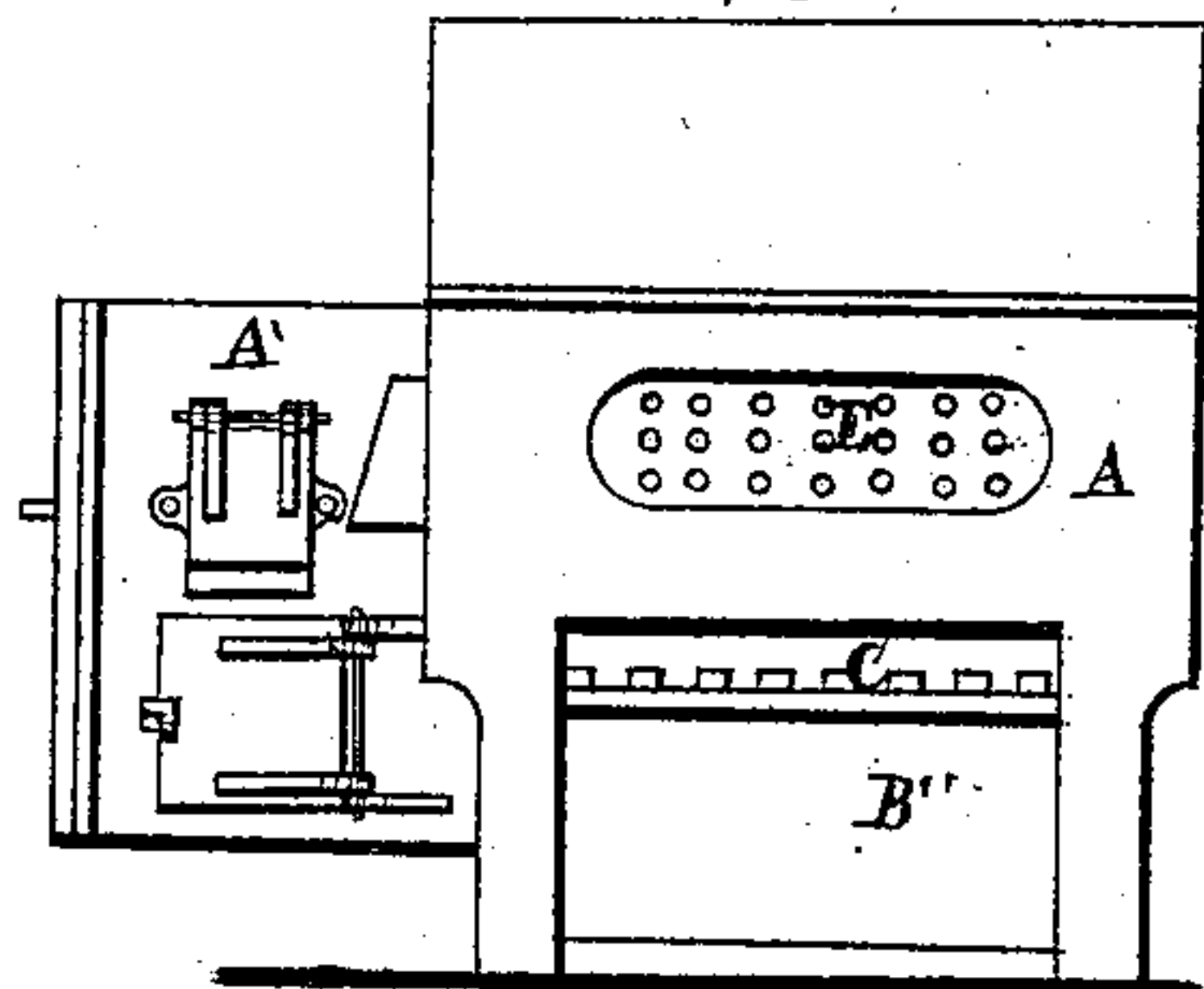
**Fig. 1.**



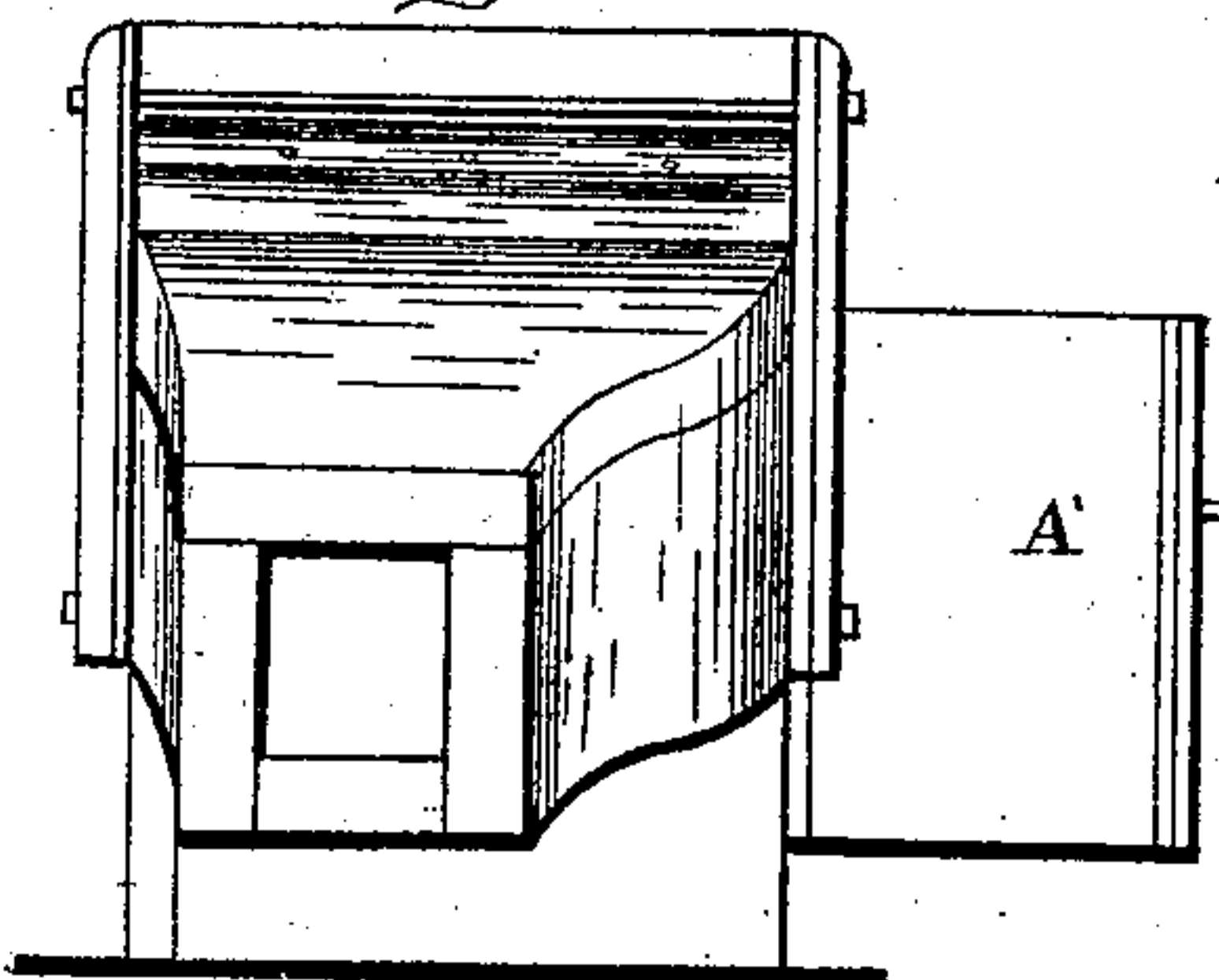
**Fig. 2.**



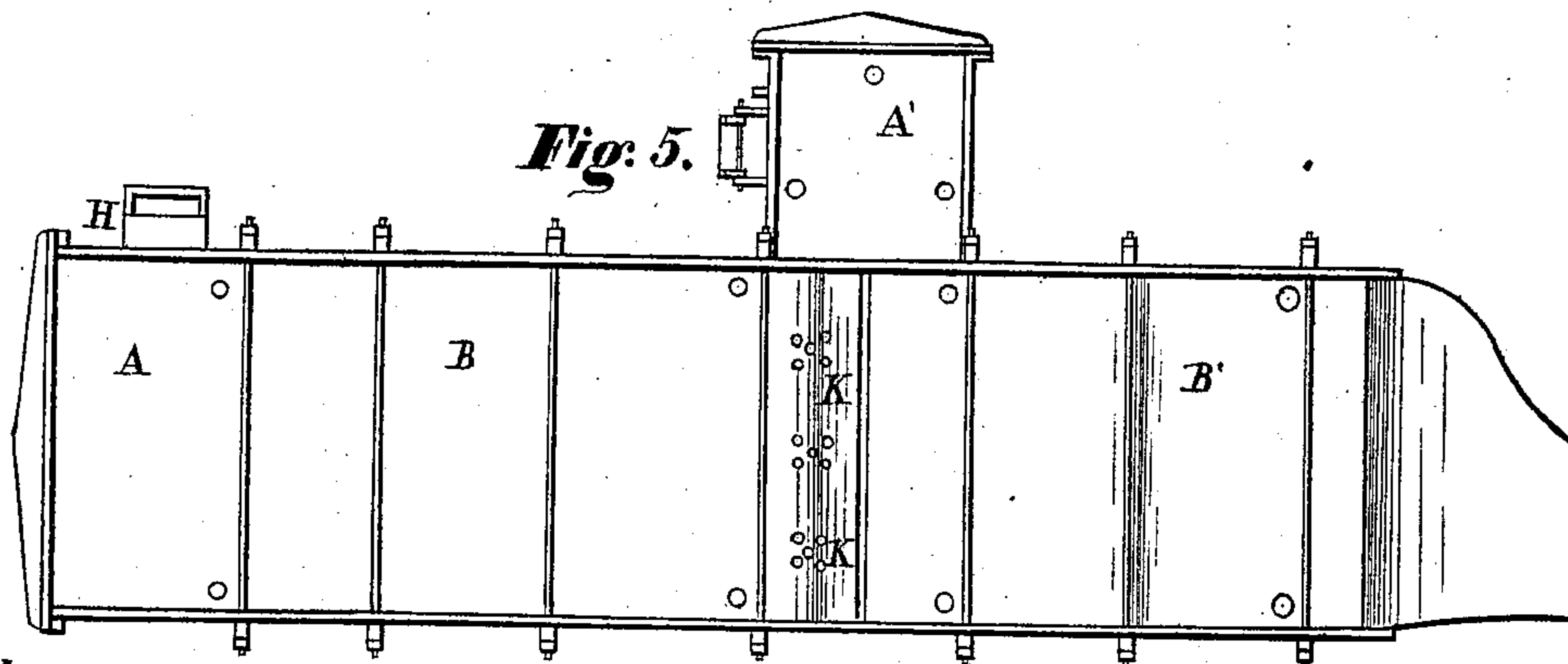
**Fig. 3.**



**Fig. 4.**



**Fig. 5.**



**Witnesses.**

*A. Hornell.*  
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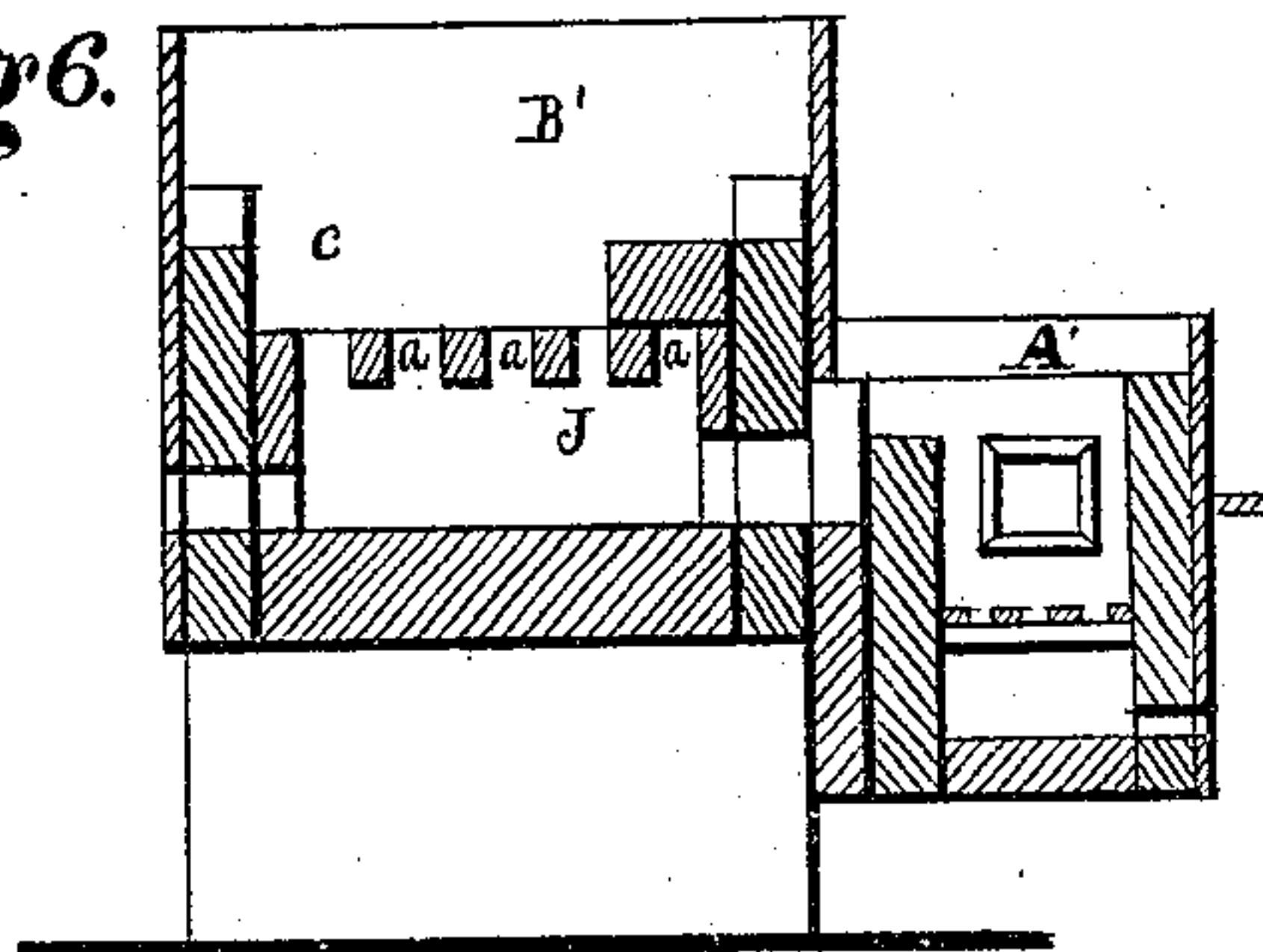
H. CHISHOLM.

Furnaces for Reheating Metals, &c.

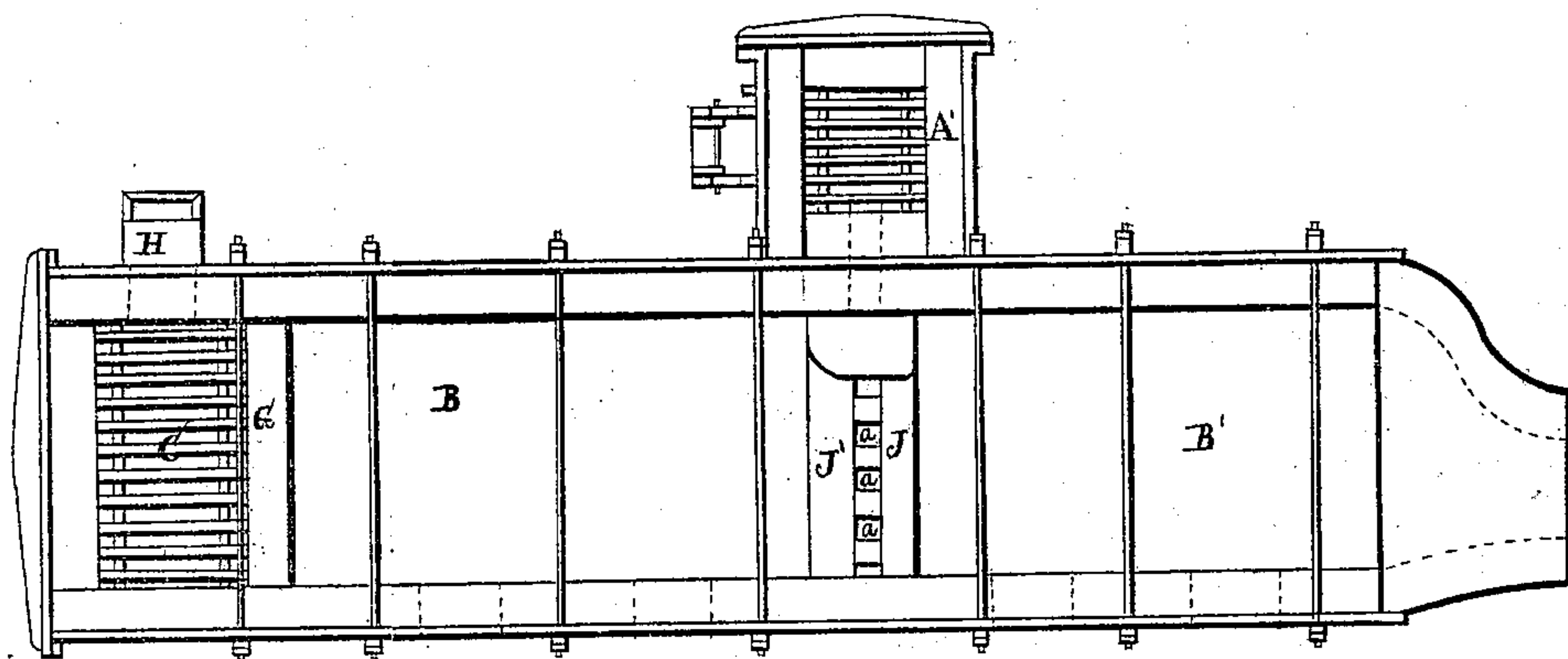
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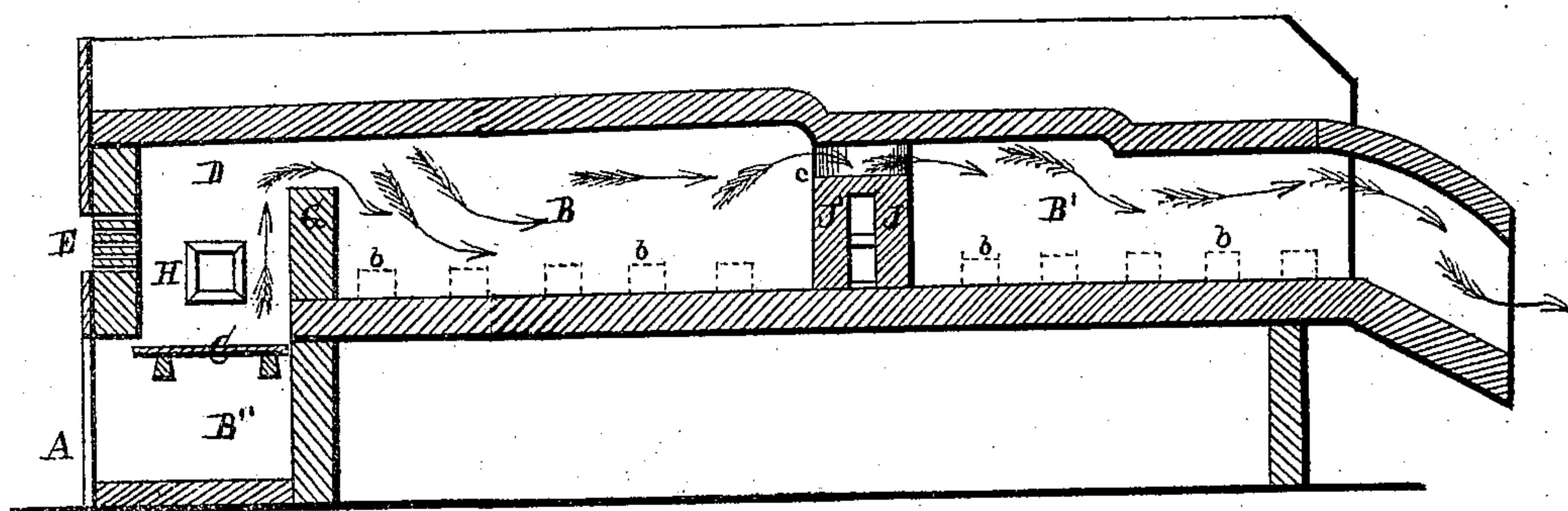
**Fig 6.**



**Fig 7.**



**Fig 8.**



**Witnesses.**

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# UNITED STATES PATENT OFFICE.

HENRY CHISHOLM, OF CLEVELAND, OHIO.

## IMPROVEMENT IN FURNACES FOR REHEATING METALS, &c.

Specification forming part of Letters Patent No. 136,413, dated March 4, 1873.

*To all whom it may concern:*

Be it known that I, HENRY CHISHOLM, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Reheating-Furnaces; and I do hereby declare that the following is a full, clear, and complete description thereof, reference being had to the accompanying drawing making part of the same.

Figures 1 and 2 are side elevations of the furnace. Figs. 3 and 4 are end elevations. Fig. 5 is a plan view. Fig. 6 is a transverse section. Fig. 7 is a top view of the inside. Fig. 8 is a longitudinal vertical section.

Like letters of reference refer to like parts in the several views.

In the process of manufacturing Bessemer steel it is poured into molds from the converter, making what are known as ingots. These steel ingots are reheated in a furnace for further manipulation. The nature of this invention relates to a furnace for heating said steel ingots, &c., and the object of the same is to heat the whole cast of ingots at once in one furnace, instead of employing two or more furnaces for that purpose, as heretofore practiced, whereby much time, labor, and expense in the construction and heating the furnace are saved.

The construction and mode of operation of the aforesaid furnace are as follows:

The drawing, Figs. 1 and 2, represents side views of the furnace. Said furnace consists of four sections, viz., two fire-places or furnaces, A A', and two heating chambers or ovens, B B', (which may be varied in number,) arranged in connection therewith. The first of the fire-places referred to is situated at the end at A, Fig. 1, a front view of which is shown in Fig. 3. Of said fire-place or furnace, B'' is the ash-pit; C, the fire-grates; D, the fire-space above the grates. E are air-holes for the admission of air from the outside to the surface of the fire. G is a wall dividing the fire-place from the heating-chamber B, back of the fire-place. H, Figs. 2 and 5, is the door through which the furnace A is fed. Said furnace is so constructed as to be of a reverberatory character, having anterior thereto a heating chamber or oven, B, referred to. Arranged in connection with the above-described furnace and heating-chamber is an auxiliary blast-furnace or fire-

place, A', referred to. Said fire-place A' is built at one side of the stack and outside thereto, as shown in the drawing. Its position in relation to the two heating-chambers is such as to be at the rear end of chamber B and at the front end of chamber B', thus dividing the two chambers, with its flue or bridge-walls J extending therefrom, as shown in Fig. 8. The auxiliary furnace or fire-place A' is constructed in a similar manner as the fire-place A, differing, however, in size, it being smaller, and having used in connection therewith a blast, making it a blast-furnace. The flue referred to consists of two walls, J J', between which the heat and flame of the fire-place A' are conducted into the chamber B'. Openings *a* are made in the side of the walls to facilitate the passage of the flames into the chamber, and also to divide it, so as to be diffused through the chamber equally. The flame also passes over the top of the walls, there being a space, *c*, left between them and the roof of the chamber for that purpose, as will be seen in Figs. 6 and 8. In the roof, immediately over the flue J, are air-holes K, Fig. 5, for the admission of air to the flames from the furnace to further the combustion of the smoke and inflammable gases generated.

Having described the construction of the furnace, the practical operation of the same is as follows: The ingots of steel are laid in the two chambers B B', which have a holding capacity of an entire cast of ingots. L are the doors whereby access is had to the chambers for introducing them. The ingots *b* in the first chamber B are heated by the fire from the furnace or fire-place A. The flames pass therefrom over the top of the wall G, and are deflected down upon the ingots, as indicated by the arrows in Fig. 8, thereby heating them; then the flames pass through the chamber back into the second chamber B', which also contains a charge of ingots, indicated by the dotted line *b*. The chamber B', in part, is heated by the flames and heat from the first chamber, the intensity of which is augmented by that from the auxiliary furnace or fire-place A', with which it mingles on passing over the top of the flue J into the chamber B'. This mingling of the caloric from the large furnace A and that of the small re-enforcing furnace A' readily heats the chamber and the ingots



therein to the required degree for the hammer or other manipulation.

By this arrangement of the two furnaces or fire-places and heating-chambers, I am enabled to heat the entire cast of ingots in much less time and with much less expense than it can be done with two separate furnaces, consisting of one fire-place and one heating chamber, as is usually practiced, the auxiliary fire-place or furnace being so situated that the heat and flames therefrom mingle with that from the primary fire-place, thus intensifying its heat and consuming all the inflammable gases and matter that may pass over with the flames; hence the second chamber is heated, in part, by the waste heat from the primary furnace, re-enforced by that from the secondary one, A', as aforesaid.

In connection with the auxiliary furnace is used a blast, in order to increase its intensity and force the flame into the chamber, as aforesaid.

This system of furnaces may be so arranged

as to increase their capacity in size and number, having the same correlation to each other, as hereinbefore described, and may be applied to other uses analogous to that previously set forth.

*Claim.*

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

1. In combination with the heating-chamber B, the auxiliary furnace A', flue J, and furnace-chamber B', substantially as and for the purpose set forth.

2. In reheating-furnace, one or more heating chambers or ovens, B, in combination with one or more auxiliary heating-chambers, B', and one or more furnaces, A', provided with a blast, substantially as and for the purpose set forth.

HENRY CHISHOLM.

Witnesses:

J. H. BURRIDGE,  
A. F. CORNELL.