

(No Model.)

J. ALVES.
STEAM BOILER.

No. 292,613.

Patented Jan. 29, 1884.

Fig. 1.

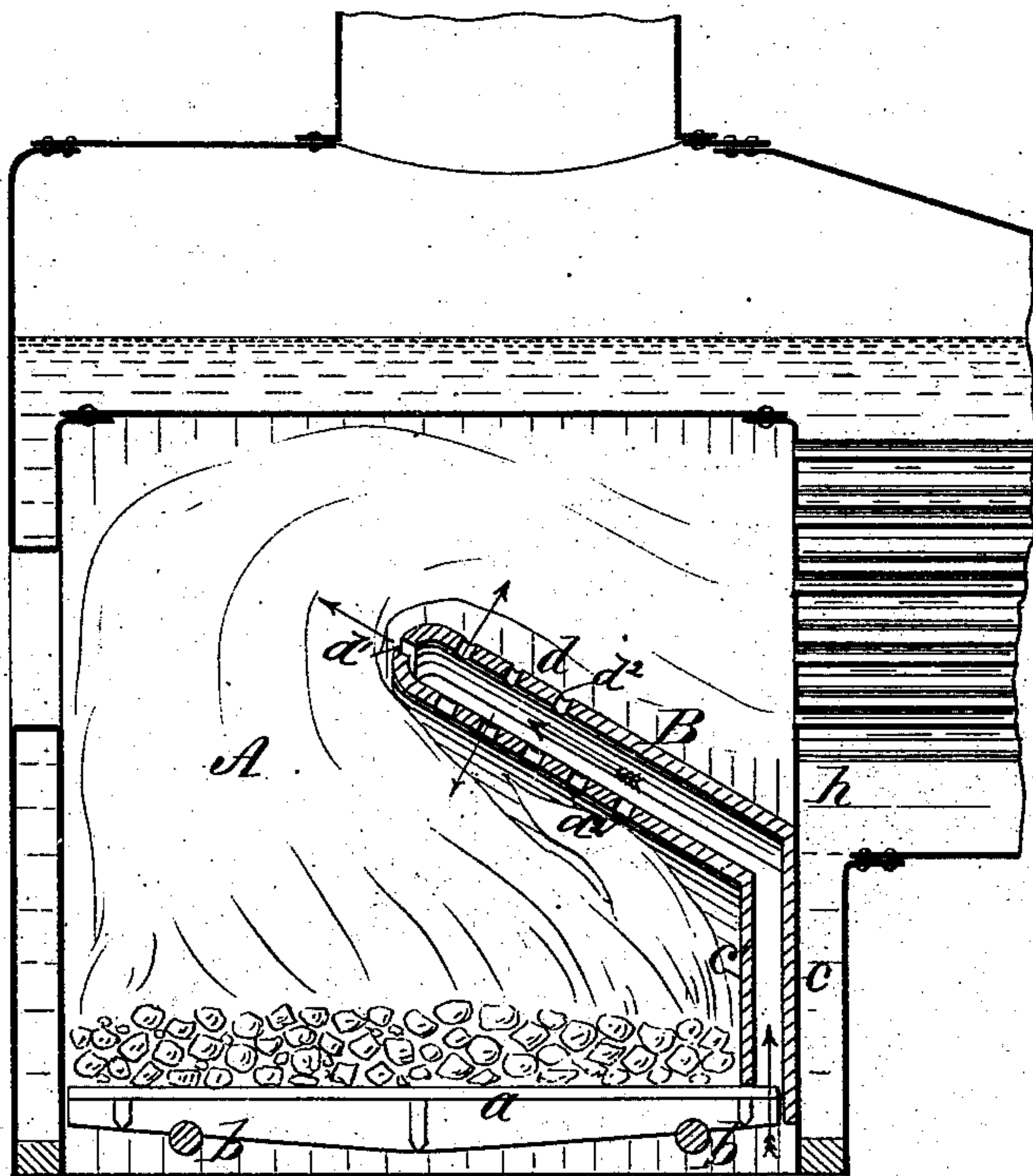
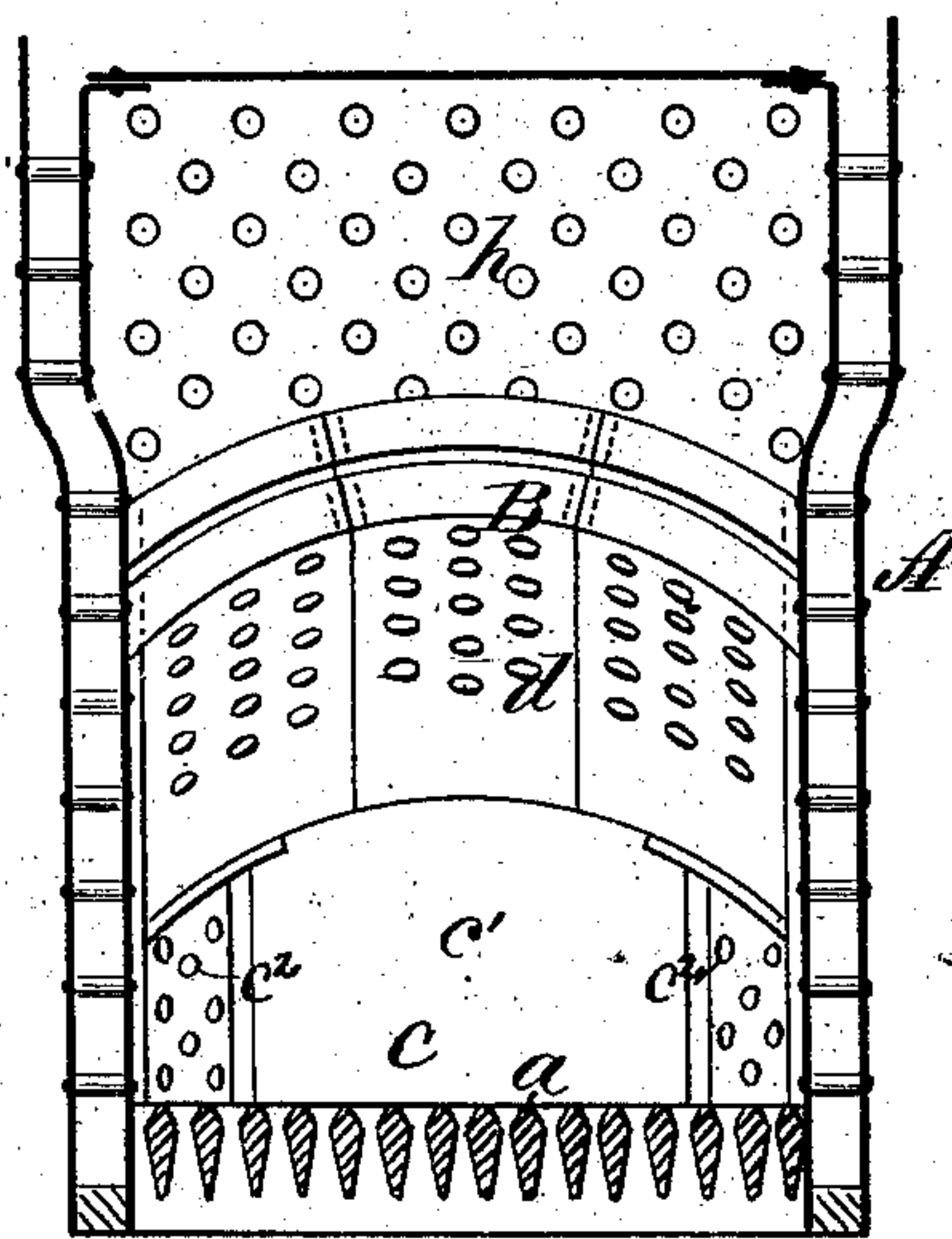


Fig. 2.



WITNESSES:

Donn Twitchell.
L. Sedgwick

INVENTOR:

BY

J. Alves
Munn & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN ALVES, OF DUNEDIN, NEW ZEALAND, ASSIGNOR OF ONE-HALF TO
CAROLINE NAEF, OF NEW YORK, N. Y.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 292,613, dated January 29, 1884.

Application filed June 30, 1883. (No model.) Patented in New Zealand April 6, 1882, No. 615.

To all whom it may concern:

Be it known that I, JOHN ALVES, of Dunedin, New Zealand, have invented a new and Improved Furnace for Steam-Boilers, of which
5 the following is a full, clear, and exact description.

My invention relates to furnaces of locomotive and other boilers, with the object to obtain more perfect combustion of the gases in
10 the fire-box and before they pass to the boiler-tubes.

The present invention is an improvement upon the furnace shown in Letters Patent granted to me March 8, 1881, No. 238,546.

15 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical longitudinal section
20 of a boiler-furnace with my improved hollow arch. Fig. 2 is a vertical transverse section of the same.

A is the furnace provided with grate-bars
25 *a*, that are supported on bearers *b b*. B is the hollow bridge-wall at the back of the fire-box, consisting of a vertical portion, *c*, that rests on the rear ends of the grate-bars and against the tube-sheet *h*, and of an upper portion, *d*,
30 that inclines forward, and forms an arch or bridge in the fire-box in front of the flue-tubes. The bridge-wall B is preferably formed of cast-iron, though it may be of fire-brick,
hollow throughout. The vertical portion *c* of
35 the bridge-wall B has its central portion, *c'*, imperforated and its sides *c''* perforated, as shown in Fig. 2, and the upper inclined portion, *d*, thereof has its forward end, *d'*, open,
and is provided with the perforations *d''* on
40 both its upper and lower sides, as shown in Fig. 1. By this construction the hollow bridge-wall receives air from the ash-pit space below the grate-bars, and the air is discharged into the fire-box at the sides of the lower part of the bridge-wall, and on both sides, and at the
45 end of the inclined portion of the same, so that it shall mingle thoroughly with the heated gases and uniformly throughout the fire-space. The hot air thus supplied insures perfect combustion of the gases before they pass

to the boiler-tubes; consequently a more intense heat is obtained and a saving of fuel. 50
Further, there will be less deposit of soot in the boiler-tubes and a more uniform heat, so that wear and tear from the expansion and contraction due to sudden changes of temperature is saved. 55

The fire-bridge may be applied to locomotive, stationary, and marine engines, and insures the double purpose of an ordinary bridge and a smoke-consumer. 60

I am aware that a hollow perforated bridge-wall arranged at the back of the fire-box, and having a portion projecting forward into the same, has heretofore been used for drawing in air from the outside of the furnace and discharging it into the fire-box, and I therefore
65 do not claim such invention; but in my invention, by making the central portion of the lower part of the bridge-wall imperforate and the sides thereof perforated, the air is discharged into the fire-box from the sides only,
70 thereby forcing the products of combustion toward the central portion of the fire-box and concentrating the same, thus insuring more perfect combustion, the imperforate portion assisting the concentration of the products of combustion by preventing admission of air at the rear. 75

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is— 80

1. The hollow bridge-wall B, having its vertical portion *c* provided with the perforated sides *c''* and the imperforated central portion, *c'*, substantially as herein shown and described. 85
2. The hollow bridge-wall B for furnaces, consisting of the vertical portion *c*, having the perforated sides *c''* and the imperforated central portion, *c'*, and the inclined arched portion *d*, provided with the perforations *d''* on its upper and lower sides and at its end, substantially as herein shown and described. 90

JOHN ALVES.

Witnesses:

HENRY HOWORTH,
Solicitor, Dunedin, N. Z.
ALFRED E. MEALYARD,
Law-Clerk, Dunedin.