

(No Model.)

2 Sheets—Sheet 1.

J. MARSHALL.  
FURNACE.

No. 475,984.

Patented May 31, 1892.

FIG. 1.

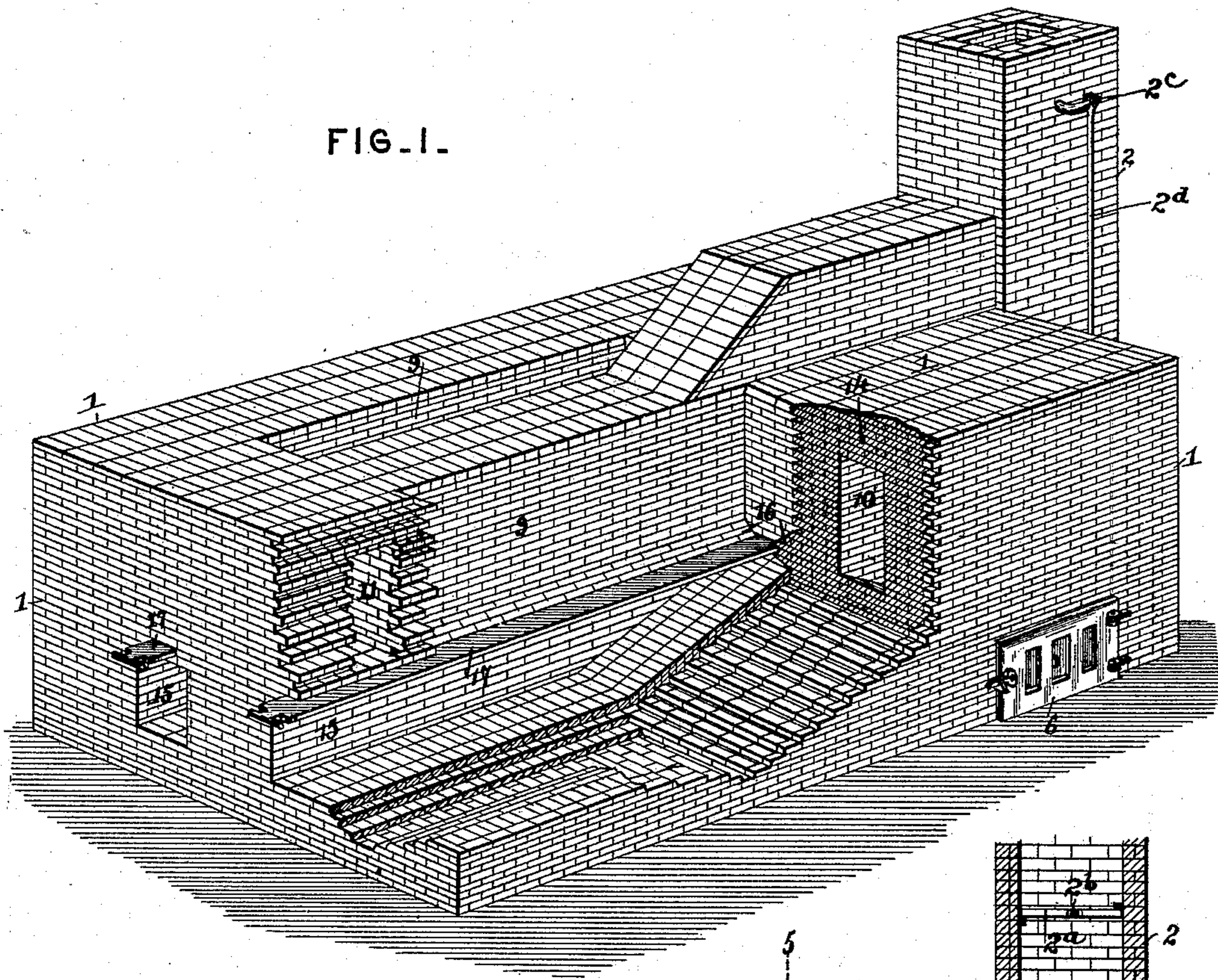
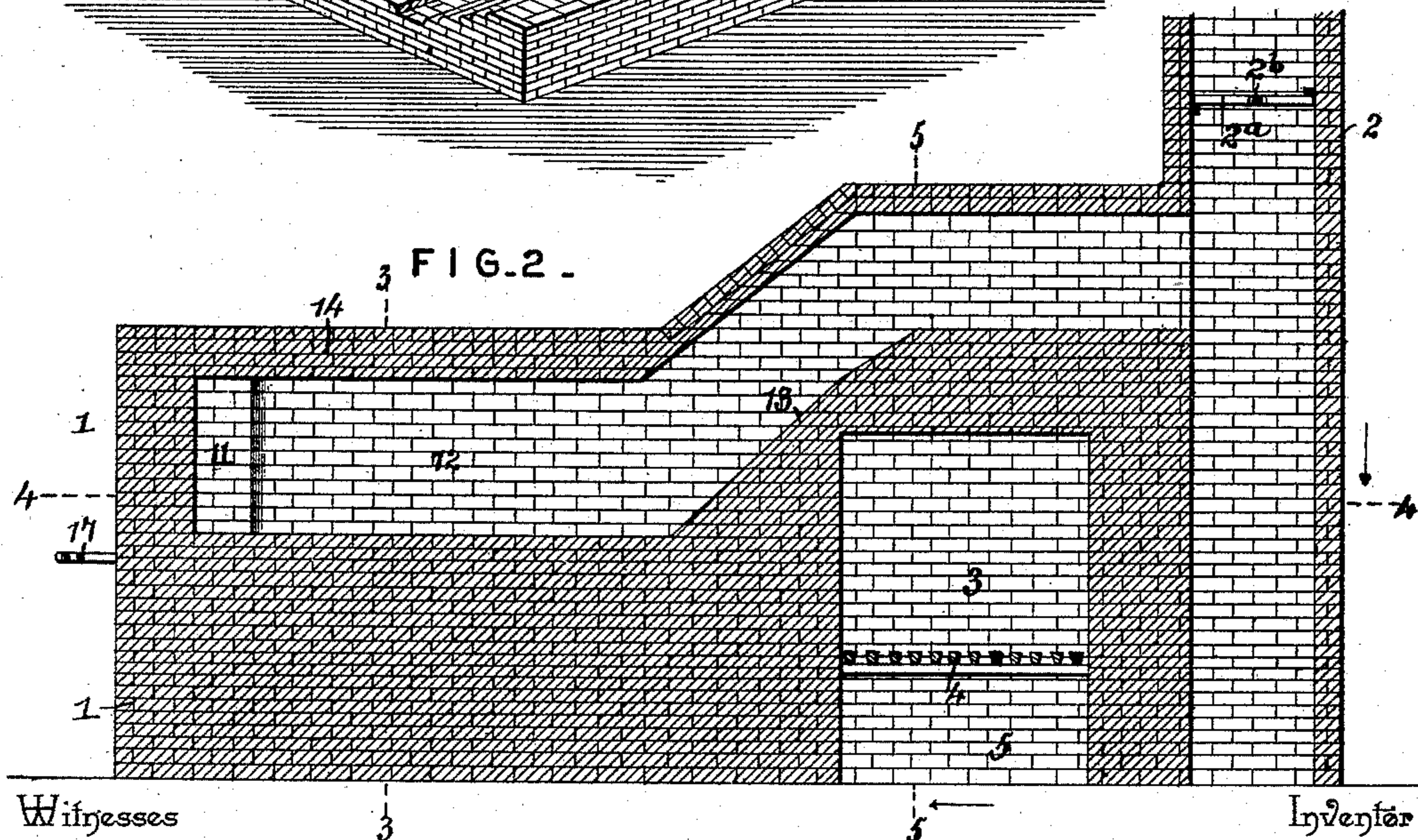


FIG. 2.



Witnesses

3

5

Inventor

Jas. H. McLathian

Wm. Baggett

By his Attorneys,

James Marshall

C. A. Snow & Co.

(No Model.)

2 Sheets—Sheet 2.

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FIG. 4.

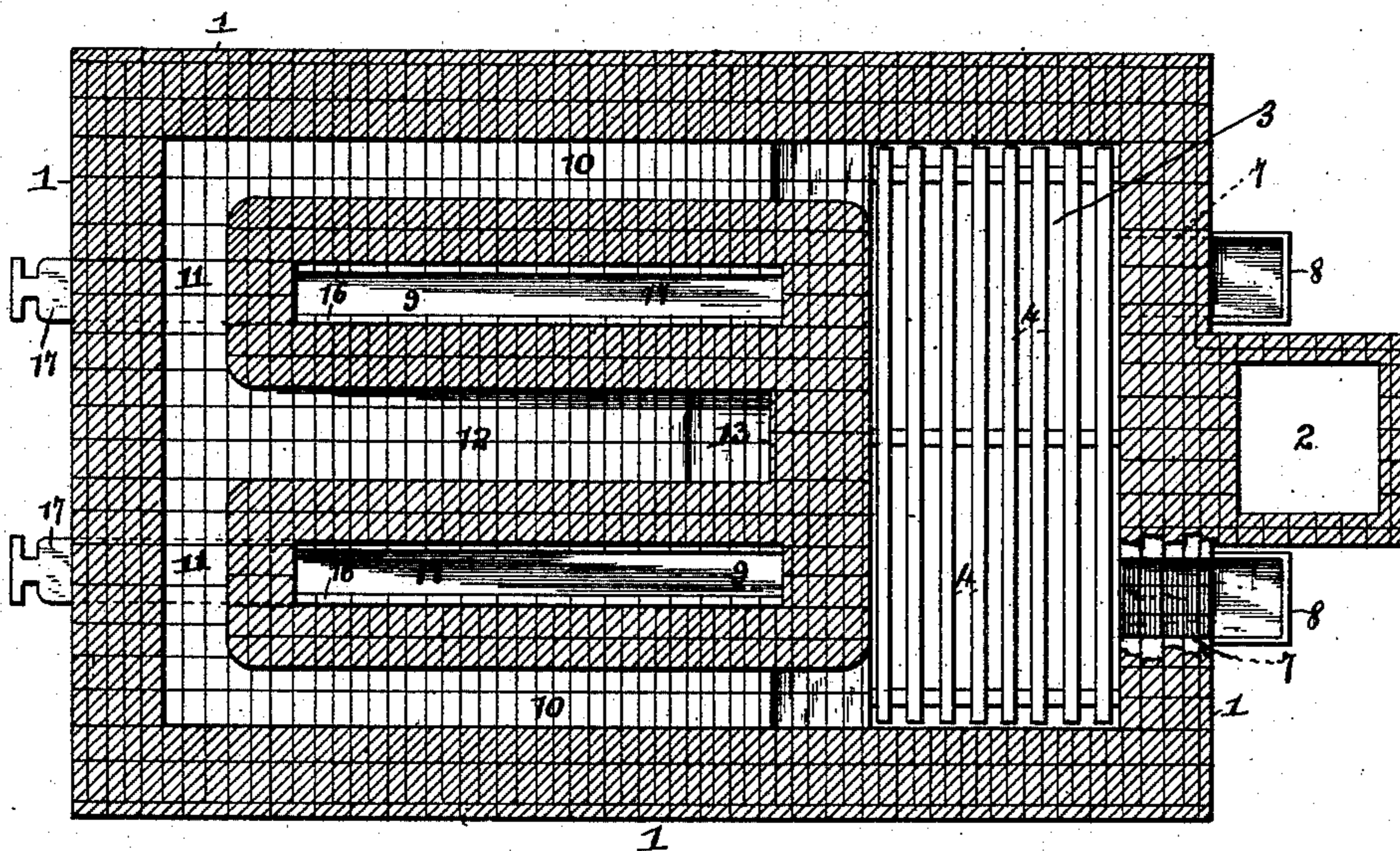
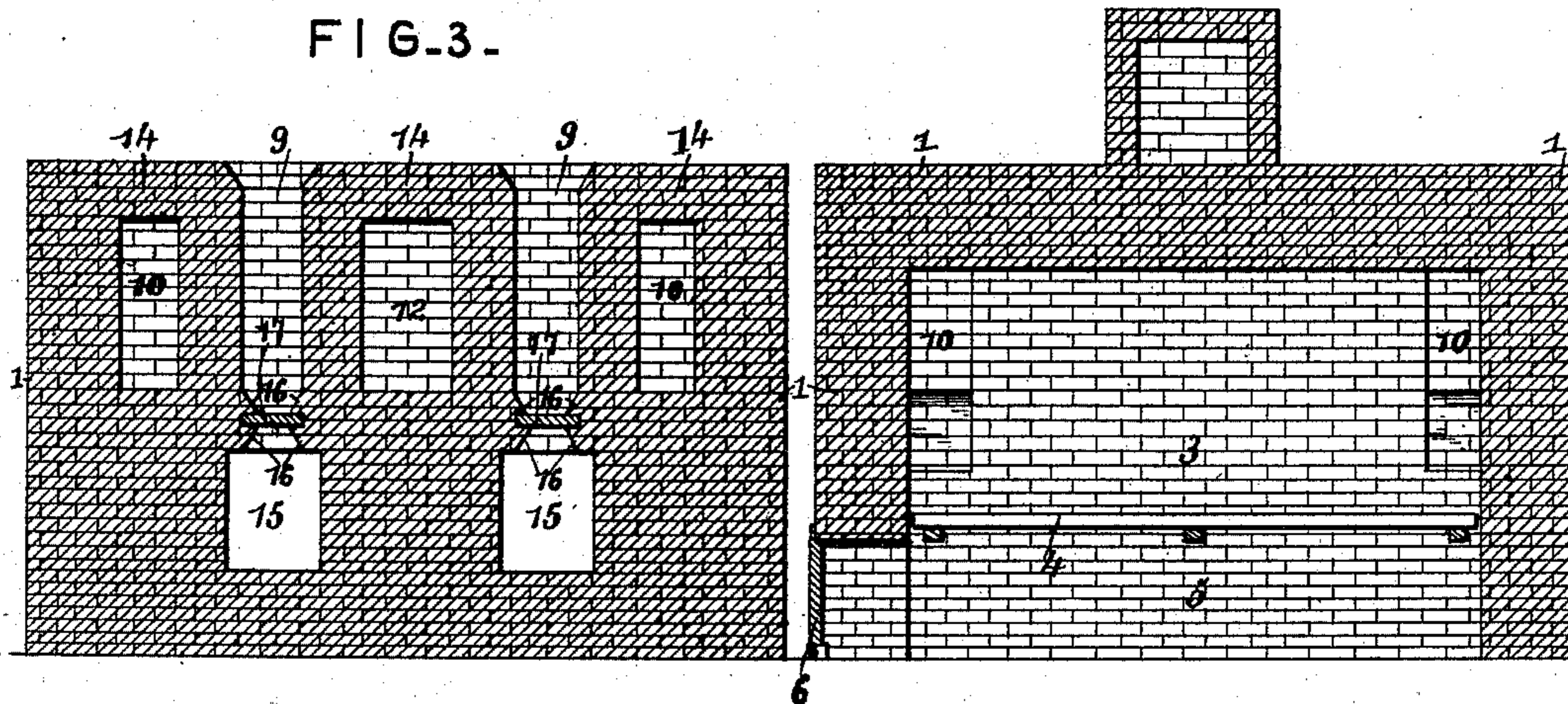


FIG. 5.



Witnesses

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# UNITED STATES PATENT OFFICE.

JAMES MARSHALL, OF PLAINS, ASSIGNOR OF ONE-HALF TO WOLCOTT J. PARMELEE, OF WILKES-BARRÉ, PENNSYLVANIA.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 475,984, dated May 31, 1892.

Application filed May 5, 1891. Serial No. 391,686. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES MARSHALL, a citizen of the United States, residing at Plains, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Furnace, of which the following is a specification.

This invention relates to furnaces for case-hardening the spindles of vehicle-axles; and it has for its object to provide a furnace of this class which shall be simple in construction and efficient in operation and in which the operation may proceed continuously without interrupting the fires.

The invention consists in the improved construction of the said furnace, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of my improved furnace, the parts of the same broken away for the purpose of showing the interior construction. Fig. 2 is a central longitudinal sectional view of the same. Fig. 3 is a vertical transverse sectional view taken on the line 3 3 in Fig. 2. Fig. 4 is a horizontal sectional view taken on the line 4 4 in Fig. 2. Fig. 5 is a vertical transverse sectional view taken on the line 5 5 in Fig. 2.

Like numerals of reference indicate like parts in all the figures.

The outer furnace wall or casing, which is designated by 1, is preferably rectangular in shape, and at the front end of the same is constructed the flue or smoke-stack 2, the upper part of which is provided with an ordinary damper 2<sup>a</sup>, mounted upon a rock-shaft 2<sup>b</sup>, having a crank-arm 2<sup>c</sup>, extending without the smoke-stack and connected with an operating-rod 2<sup>d</sup>, as illustrated.

The fire-box 3 is constructed transversely at the front end of the furnace-casing, and it has the grate 4, under which the ash-pit 5 is located, said ash-pit being provided at one end with a door 6, through which the ashes may be drawn. The front wall of the furnace-casing has the feed-openings 7, communicating with the fire-box, and is provided with the hoppers 8, through which fuel may be supplied.

Suitably constructed longitudinally within the furnace-casing in rear of the fire-box are

the boxes or receptacles 9. Flues 10 extend from the ends of the fire-box between the side walls of the furnace and the outer side walls of the receptacles 9, and the rear ends of said flues 10 are connected by passages 11 between the rear furnace-wall and the rear walls of the receptacles 9, with the rear end of a forwardly-extending flue 12 between the inner side walls of the receptacles 9. The front end of the center flue 12 is inclined upwardly, as shown at 13, and extended above the top of the fire-box to the flue or smoke-stack 2, with which it is connected. The top of the furnace-casing, which is designated by 14, is built over the several flues, which are thus closed, while the upper ends of the receptacles 9 are left open.

Suitably constructed in the furnace-casing below the receptacles 9 are the pits 15, having inclined front ends. Grooved cleats 16 are arranged horizontally between the upper ends of the pits 15 and the lower ends of the receptacles 9, and in these grooved cleats are mounted the slides 17, having handles 18, which project through the rear wall of the furnace-casing. The slides 17 may be withdrawn when desired, so as to permit the contents of the receptacles 9 to drop into the pits 15, and the latter are open at their rear ends, so as to enable the contents of said pits to be drawn out.

In operation the chambers or receptacles 9 are packed with animal charcoal and the spindles of the axles are inserted therein. The products of combustion pass from the furnace through the flues 10, 11, and 12 to the chimney or smoke-stack, and it will be observed that the receptacles 9 are inclosed on three sides by the said flues, while the fourth side is formed by the back wall of the furnace. The said chambers or receptacles, with their contents, are thus constantly kept in a highly-heated condition, thus causing the spindles which are being operated upon to be hardened evenly and rapidly. The contents of the receptacles 9 may, whenever desired, be dumped into the pit 15 by simply withdrawing the slides 17, thus enabling said casing or receptacles to be repacked without interrupting the fires.

It will be seen that by this invention the

operation of case-hardening the spindles may be carried out in a rapid, efficient, and economical manner and without necessity for letting the furnace-fires go down at any time.

5 Having thus described my invention, what I claim is—

1. In a furnace of the class described, the combination of the furnace-casing, the fire-box constructed transversely at the front end  
10 of the same, the chambers or receptacles open at top and bottom for charging and discharging the same and being constructed longitudinally in the furnace-casing, removable bottom plates closing the bottom openings in  
15 said receptacles, the flues extending from the ends of the fire-box between the side walls of the furnace-casing and the outer sides of the longitudinal receptacles, the intermediate flue extending between the inner side walls of  
20 said receptacles and connected at its rear end with the outer flues, and the chimney or smoke-stack arranged at the front end of the furnace-casing and connected with the upwardly-inclined front end of the intermediate  
25 flue, substantially as set forth.

2. In a furnace, the combination of the furnace-casing, the fire-box at one end of the same,

the chambers 9, open at the top, the sliding bottoms 17 for the chambers, the flues 10, 11, and 12, leading from the fire-box and envelop-  
30 ing the sides of the chambers, and the smoke-stack communicating with the flue 12 and also located at the front end of the furnace, substantially as set forth.

3. In a furnace of the class described, the  
35 combination of the furnace-casing having the fire-box and the chimney located at the front end thereof, the longitudinally-disposed receptacles open at their upper ends, and the  
40 flues connecting the ends of the fire-box with the chimney and enveloping said receptacles, the pits constructed below said receptacles, and the slides separating said receptacles  
45 from said pits, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of witnesses.

JAMES MARSHALL.

Witnesses:

FRANK W. PARMELEE,  
D. L. O'NIELL,  
J. EDWARD WATTS.