

(No Model.)

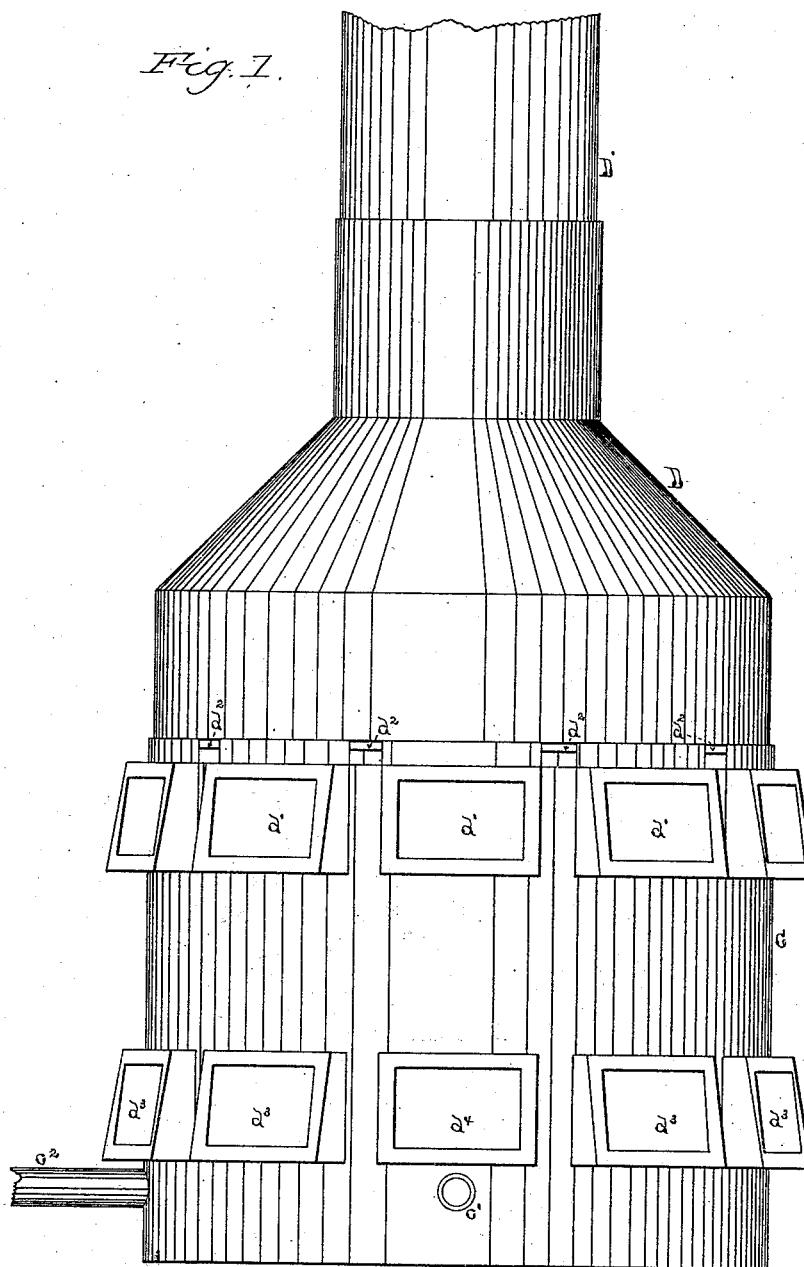
J. FERGUSON.

5 Sheets—Sheet 1.

FURNACE FOR HEATING BLANKS FOR CAR WHEELS.

No. 306,071.

Patented Oct. 7, 1884.



Witnesses

H. B. Brown  
A. P. Ockington.

Inventor  
James Ferguson  
Roy David Wallace  
Atty

(No Model.)

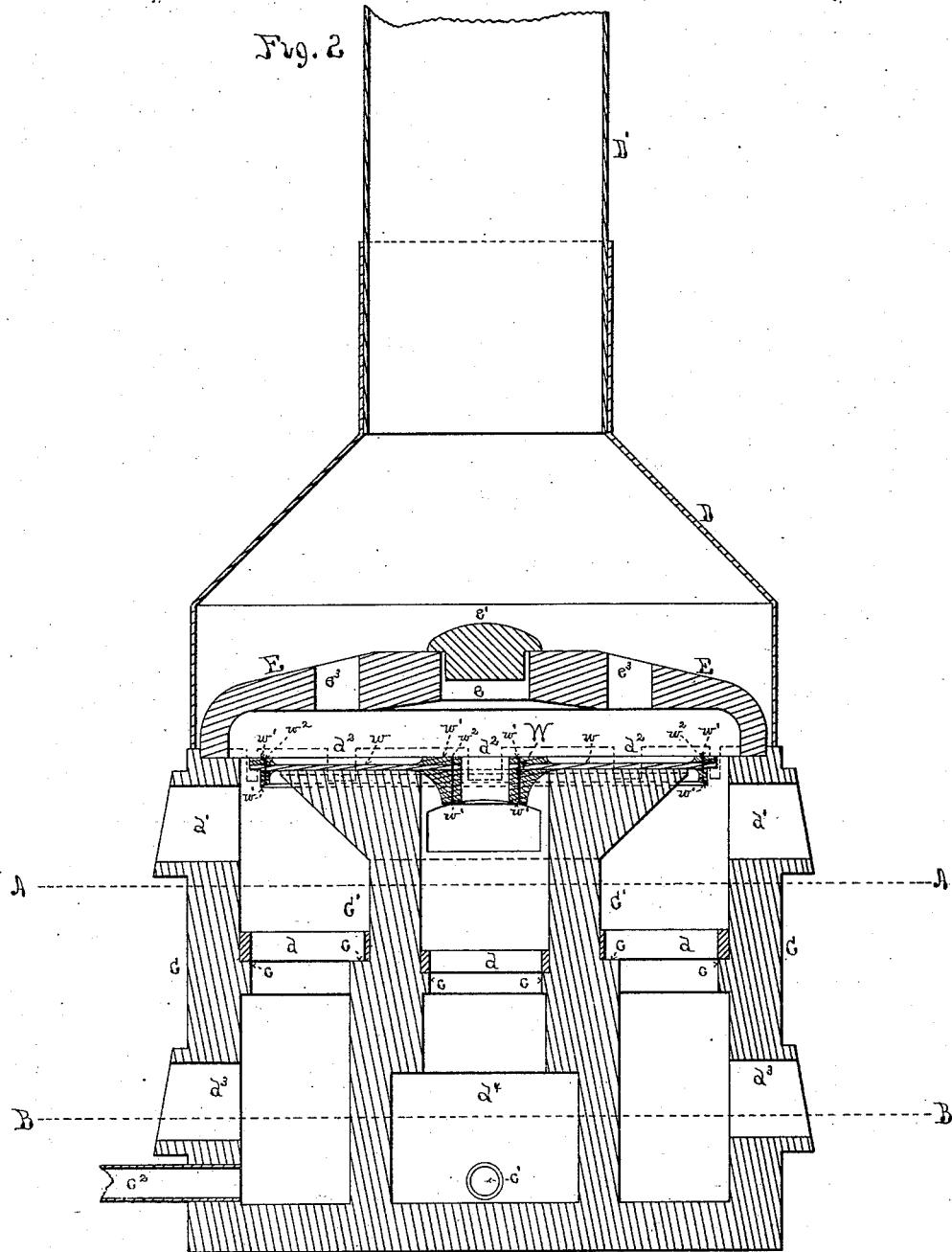
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J. FERGUSON.

FURNACE FOR HEATING BLANKS FOR CAR WHEELS.

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Witnesses

W. S. Brown  
A. P. Ockington

Inventor

James Ferguson.  
By David Haesche  
Atty.

(No Model.)

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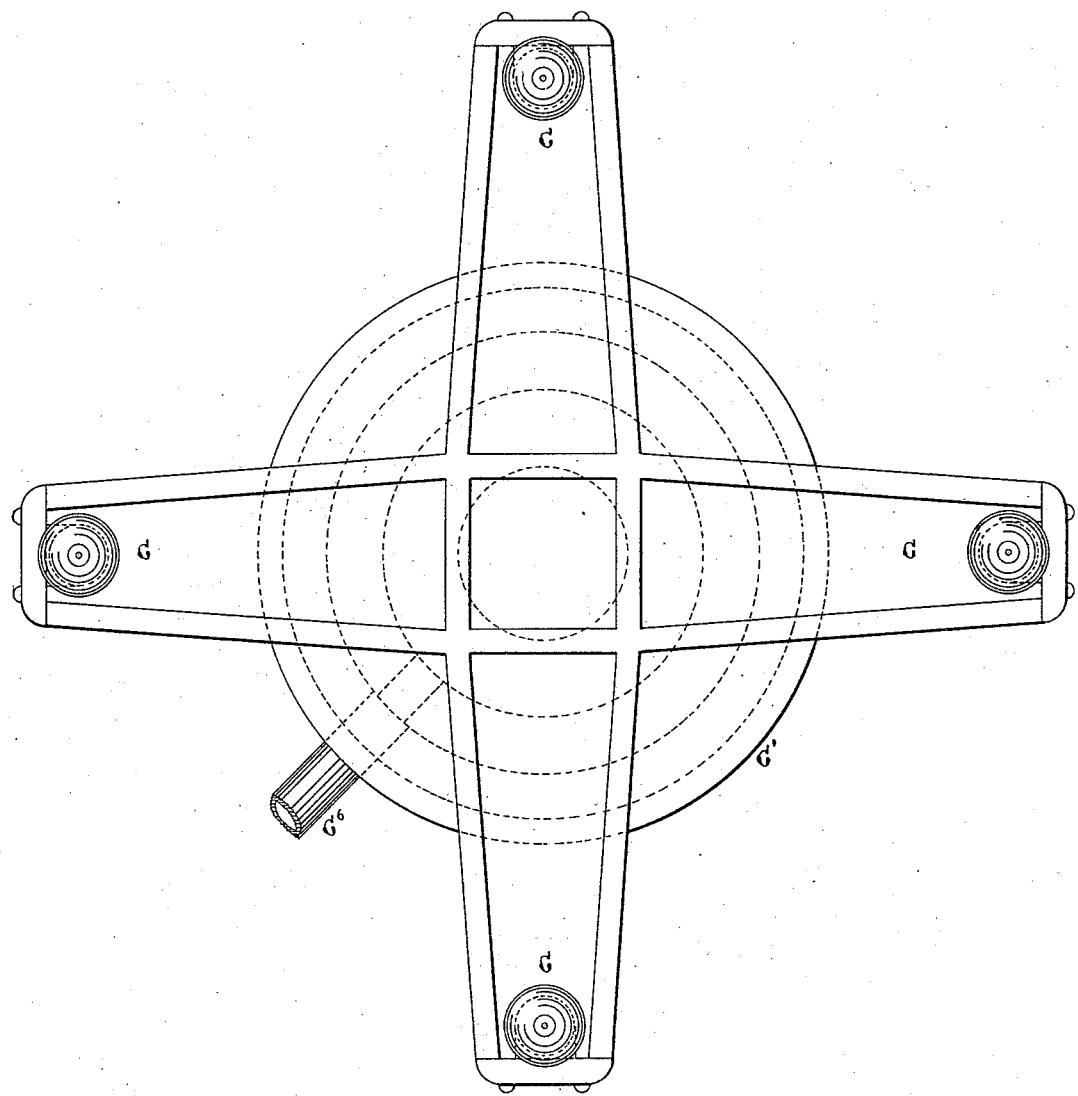
J. FERGUSON.

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Fig. 3



Witnesses

W. S. Brown  
A. P. Ockington.

Inventor

James Ferguson  
by David Haeselice  
atty

(No Model.)

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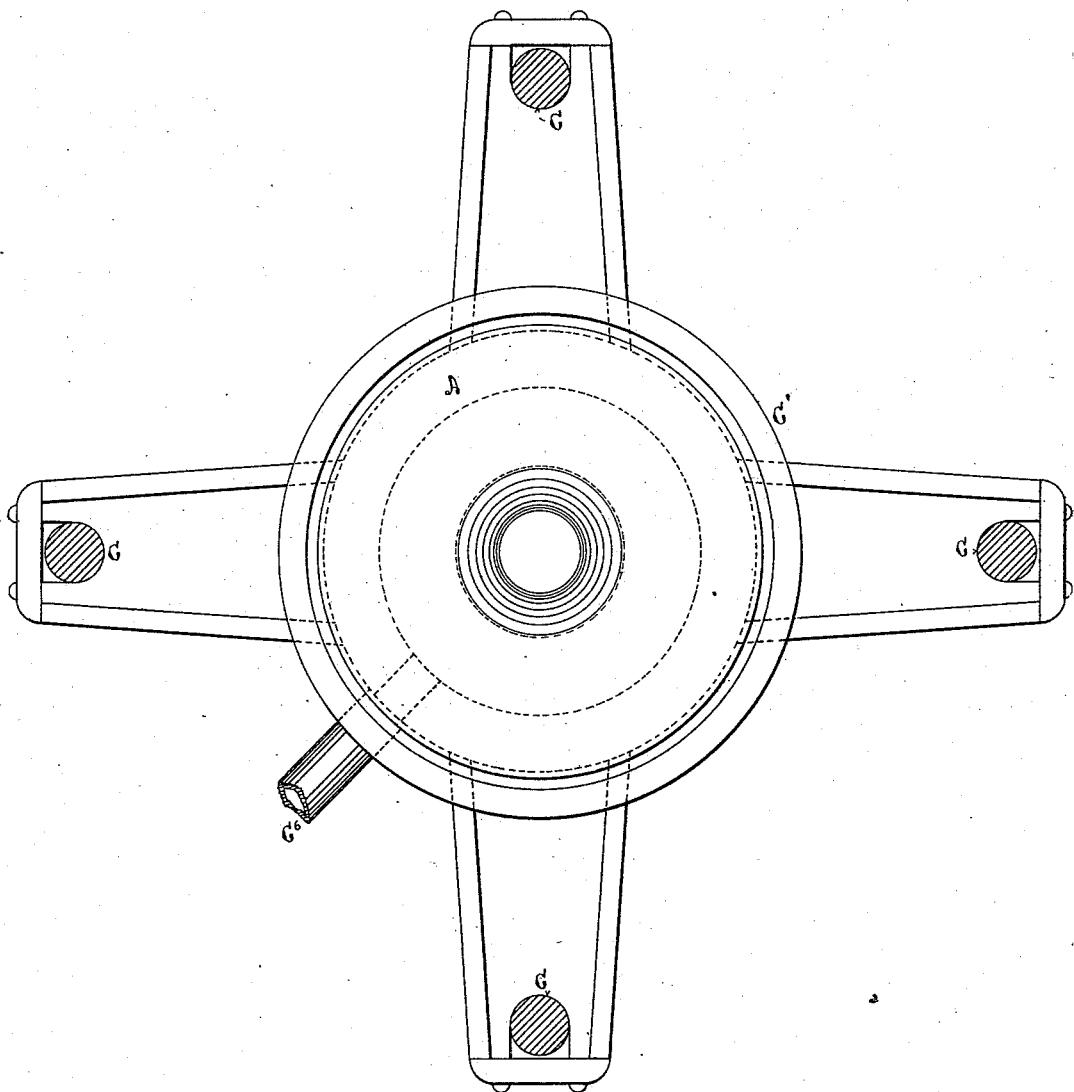
J. FERGUSON.

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Fig. 4



Witnesses

J. S. Brown  
H. P. Ockington.

Inventor

James Ferguson  
By David Hale Rice  
Atty

(No Model.)

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J. FERGUSON.

FURNACE FOR HEATING BLANKS FOR CAR WHEELS.

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Fig. 5.

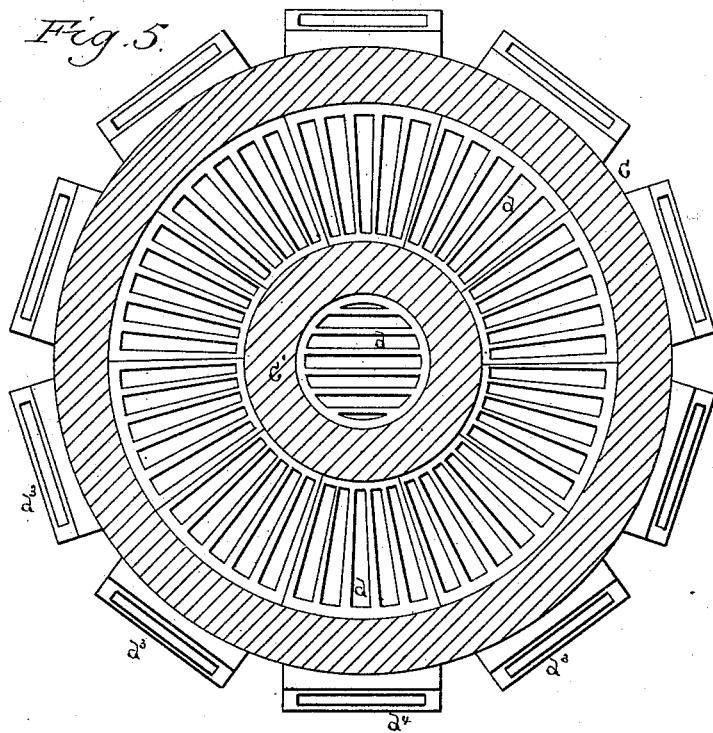
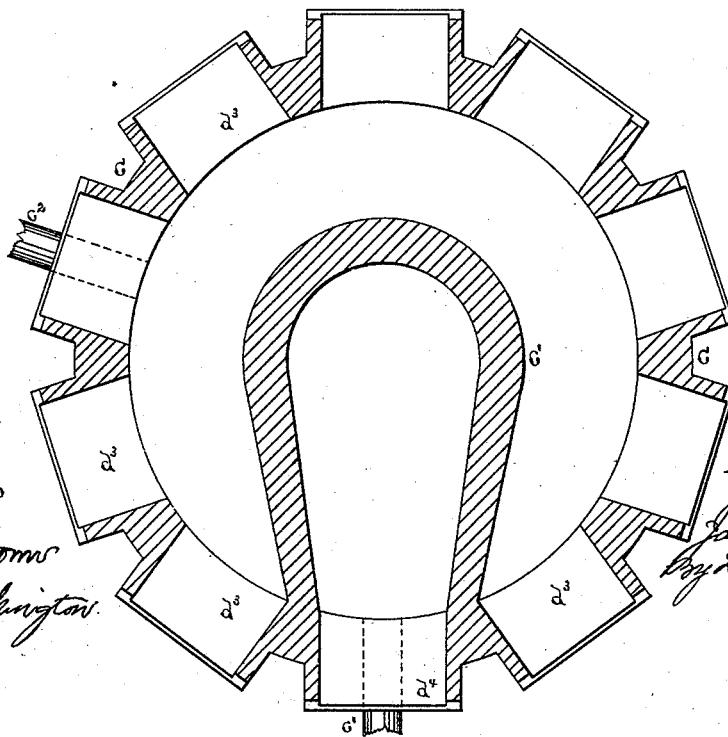


Fig. 6



Witnesses

H. D. Brown

J. P. Ockington

Inventor

James Ferguson  
by David Wallace  
Atty

# UNITED STATES PATENT OFFICE.

JAMES FERGUSON, OF BRIDGEWATER, MASSACHUSETTS.

## FURNACE FOR HEATING BLANKS FOR CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 306,071, dated October 7, 1884.

Application filed August 8, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES FERGUSON, of Bridgewater, in the county of Plymouth and State of Massachusetts, have invented a new and useful Improvement in Furnaces for Heating Blanks to Form Wrought-Iron Car-Wheels, of which the following is a specification.

My improvement relates to furnaces for heating blanks to form wrought-iron car-wheels; and it consists in the novel form of construction of such furnaces, substantially as herein-after described.

In the drawings, Figure 1 is an elevation of my improved furnace. Fig. 2 is a vertical section of the same. Fig. 3 is a top view of the furnace proper with the cover in place. Fig. 4 is view of the same with the cover removed. Fig. 5 is a horizontal section on line A A of Fig. 2. Fig. 6 is a horizontal section on line B B of Fig. 2.

C is the outer wall of the furnace, made of suitable material. On top of this wall rests a sheet-iron hood, D, at its lower edge, which 25 conducts the flame and smoke to the flue or smoke-stack D'. This flue is made cylindrical, and the upper end of hood D fits it closely, but so as to slide freely up and down on D', the hood being provided with a sleeve fitting 30 the outside of the smoke-flue for the purpose. The hood D may be raised by a pulley and chain attached to it, or in any other well-known manner.

Within the outer wall, C, of the furnace I 35 build another wall, C', concentric with the outer wall, and provide it, as well as the outer wall, with ledges e e to support grate-bars d d, both in the annular space between the walls C and C', and also in the cylindrical inclosure 40 within wall C'. At the upper end the wall C' broadens outward, so as to narrow the annular space between it and the outer wall to bring the heat to bear upon the part of the wheel-blank required, as well as to afford a broad 45 annular shelf on top of the inner wall, on which the part of the wheel-blank not required to be heated rests, and is protected from injury by the heat. The top of inner wall, C', is substantially of the same height as that of outer 50 wall, C.

Above the grate-bars d, I make doors d' d'

in the outer wall, C, through which fuel may be introduced into the furnace, and above these doors I make small holes d<sup>2</sup> d<sup>2</sup> through the wall opposite the edge of the blank for the purpose 55 of observing when the wheel-blank is raised to the proper heat, as hereinafter described. These holes are intended to be filled with fire-brick when not used for that purpose.

Below the grate-bars d, I make doors d<sup>3</sup> in 60 the outer wall of the furnace opening into the annular space between walls C and C', for the purpose of removing slag and ashes and cleaning out the furnace. At this height the inner wall, C', is also carried out to the outer 65 wall, as shown in Fig. 6, on one side, and a door, d<sup>4</sup>, is provided for giving access to the inner cylindrical compartment of the furnace for cleaning, &c., this extension of wall C' being arched or covered over from the outer 70 wall above door d<sup>4</sup> to the circular part of the inner wall, which extends in such circular form upward from the level of the top of door d<sup>4</sup> all around. Opposite to and below door d<sup>4</sup> the inner wall is of the form shown in Fig. 6. 75 Thus the inner tubular part of the furnace is completely separated from the outer annular chamber between walls C and C'. An air-blast pipe, c', leads into the inner cylindrical part of the furnace, and another, c'', leads into the 80 outer annular part, thus enabling the heat to be controlled and graduated independently in the two compartments.

On top of the outer annular wall, C, rests the top E of the furnace, by removing which 85 access is gained to the heating-chamber, of which it forms the top part. When this top is so removed, fuel can be supplied to the inner cylindrical fire-chamber of the furnace by pouring it into the top of said chamber. 90 Through the center of this top is an aperture, e, covered by a removable lid, e', for enabling the center of the wheel-blank to be inspected to ascertain whether it is at a proper welding heat without removing the whole top of the 95 furnace.

Through the furnace top E are made flues e' e' to allow the smoke and gases to escape into the hood D and pass off.

W is the wheel-blank, for the construction 100 of which this furnace is specially adapted, and from which I manufacture the wrought-iron

car-wheel which I have invented, and which is the subject of a separate patent applied for simultaneously with the present one. This wheel-blank is formed of a plate,  $w$ , of wrought-iron or steel of equal thickness in all its parts made circular and of proper size, and with a hole through its center for the hub of the wheel. On this plate are placed on each side wrought-iron or steel rings  $w'$ , forged of proper shape to make the hub and flange of the blank and the surfaces of the plate  $w$ , and these rings  $w'$  being properly prepared where they abut upon each other for welding. The whole are held together temporarily by light rivets  $w^2$  to prevent their being displaced during the welding process. The whole is then introduced into the furnace, as shown in Fig. 2, the top  $E$  is put on, the hood  $D$  lowered to place, and the heat applied. The part of the plate  $w$  which is between the hub and rim of the blank  $W$  rests upon, and is protected by, the wall  $C'$ , while the heat only comes directly upon the hub and rim parts which are to be welded. When these parts are raised to the proper welding heat, the top  $E$  is removed, the blank taken out and placed in a hydraulic press between dies of proper form, and the welding accomplished by a single process, as well as the heating, as above described. The entire draft of the central cylindrical chamber of the furnace passes through the hole in the blank which receives the axle of the completed wheel, and the entire blank is thus formed at one heating without injury to its thinner part in preparing the other parts for welding.

I make no claim in this application for the described process of forming the blank, as that is claimed in the other application above mentioned.

What I claim as new, and of my invention, is—

1. In a heating-furnace, the outer annular

fire-chamber, and an inner fire-chamber, separated from each other, substantially as described.

2. In combination with the outer annular fire-chamber and the independent inner fire-chamber, the air-blast tubes  $c' c^2$ , substantially as described.

3. In combination with the outer fire-chamber and the central fire-chamber of the furnace, the removable top  $E$ , substantially as described.

4. In a furnace, the combination of the outer fire-chamber, the inner central fire-chamber, and the dividing-wall  $C'$ , made broader and adapted to abut against and protect the blank between its inner and its outer edge, substantially as described.

5. In a furnace, in combination with the central fire-chamber and the heating-chamber above it, the furnace-top provided with the central aperture,  $e$ , placed in the top of the heating-chamber, substantially as described.

6. In a heating-furnace, the combination of the outer fire-chamber, having an annular heat-passage into the heating-chamber, with the latter, and the central fire-chamber connected with the heating-chamber by a separate outlet, substantially as described.

7. In a heating-furnace, the outer surrounding fire-chamber, the central fire-chamber, and the door-passages  $d^3 d^4$ , connecting with the same respectively, substantially as described.

8. In a furnace, the combination of the outer surrounding fire-chamber, the heating-chamber above, and the escape-flues  $e^3$ , placed directly over the dividing-wall  $C'$ , between said outer and inner fire-chambers, substantially as described.

JAMES FERGUSON.

Witnesses:

DAVID HALL RICE,  
N. P. OCKINGTON.