

(No Model.)

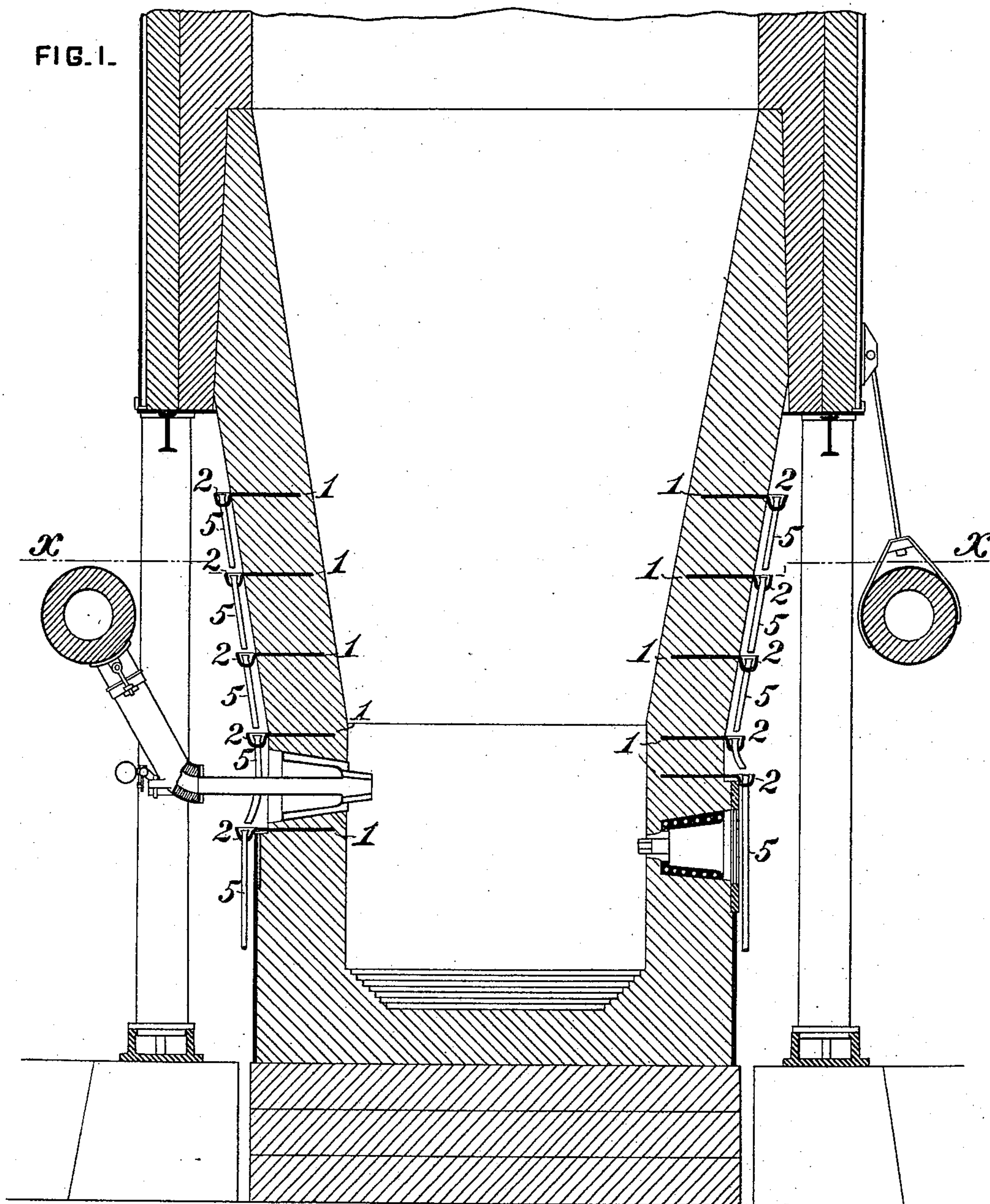
3 Sheets—Sheet 1.

J. KENNEDY.  
BLAST FURNACE.

No. 486,110.

Patented Nov. 15, 1892.

FIG. 1.



WITNESSES:

*Darius S. Wolcott*  
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*by George H. Christy*  
Att'y.



(No Model.)

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FIG.2.

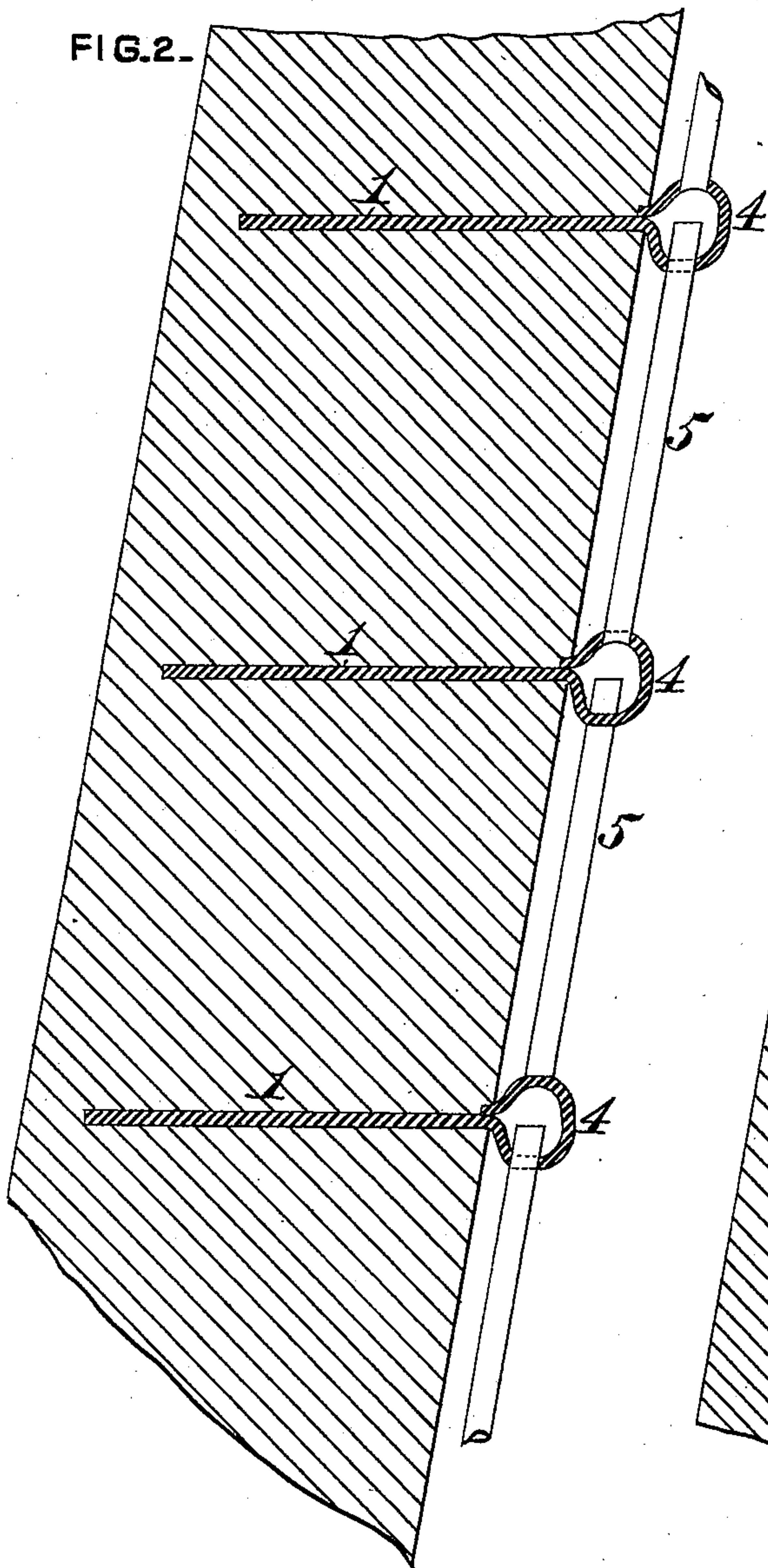
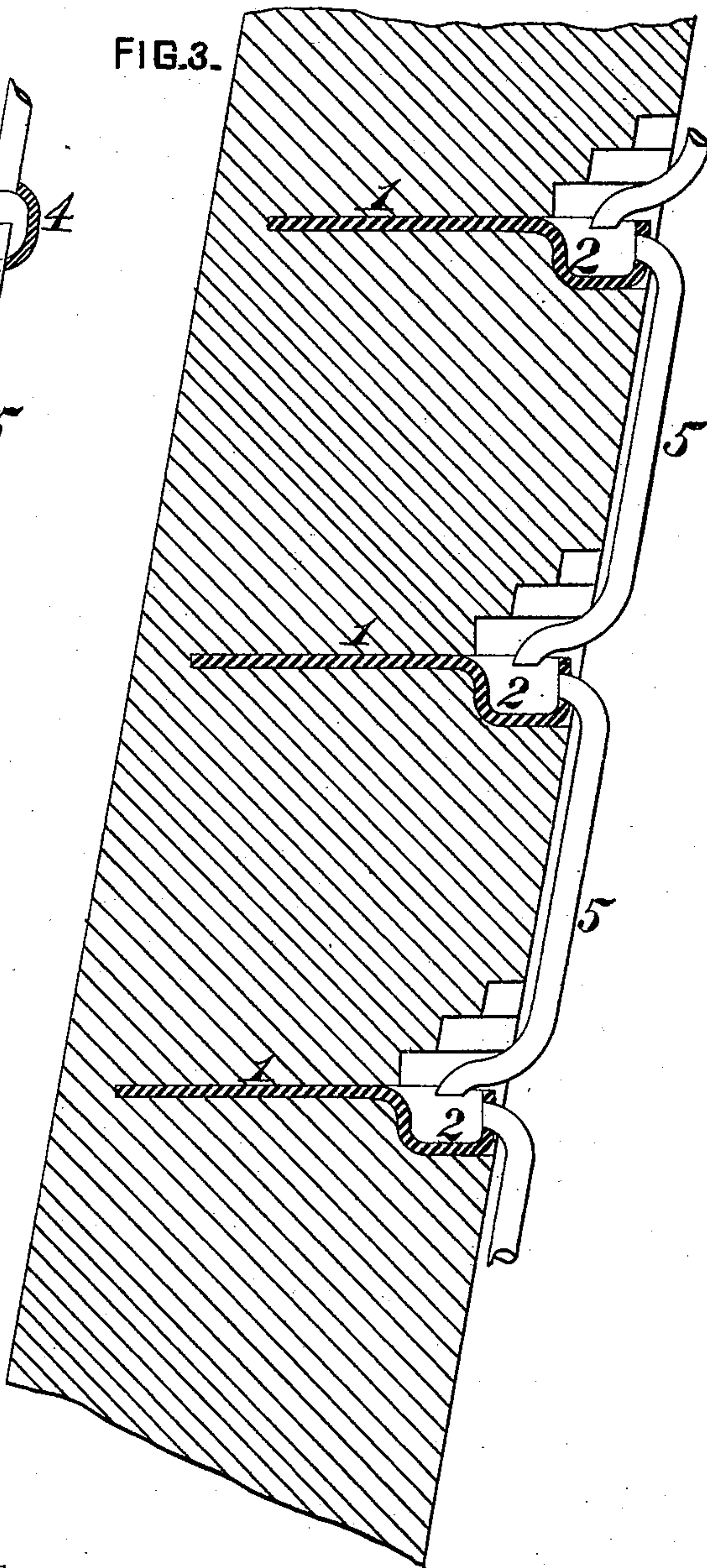


FIG.3.



WITNESSES:

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(No Model.)

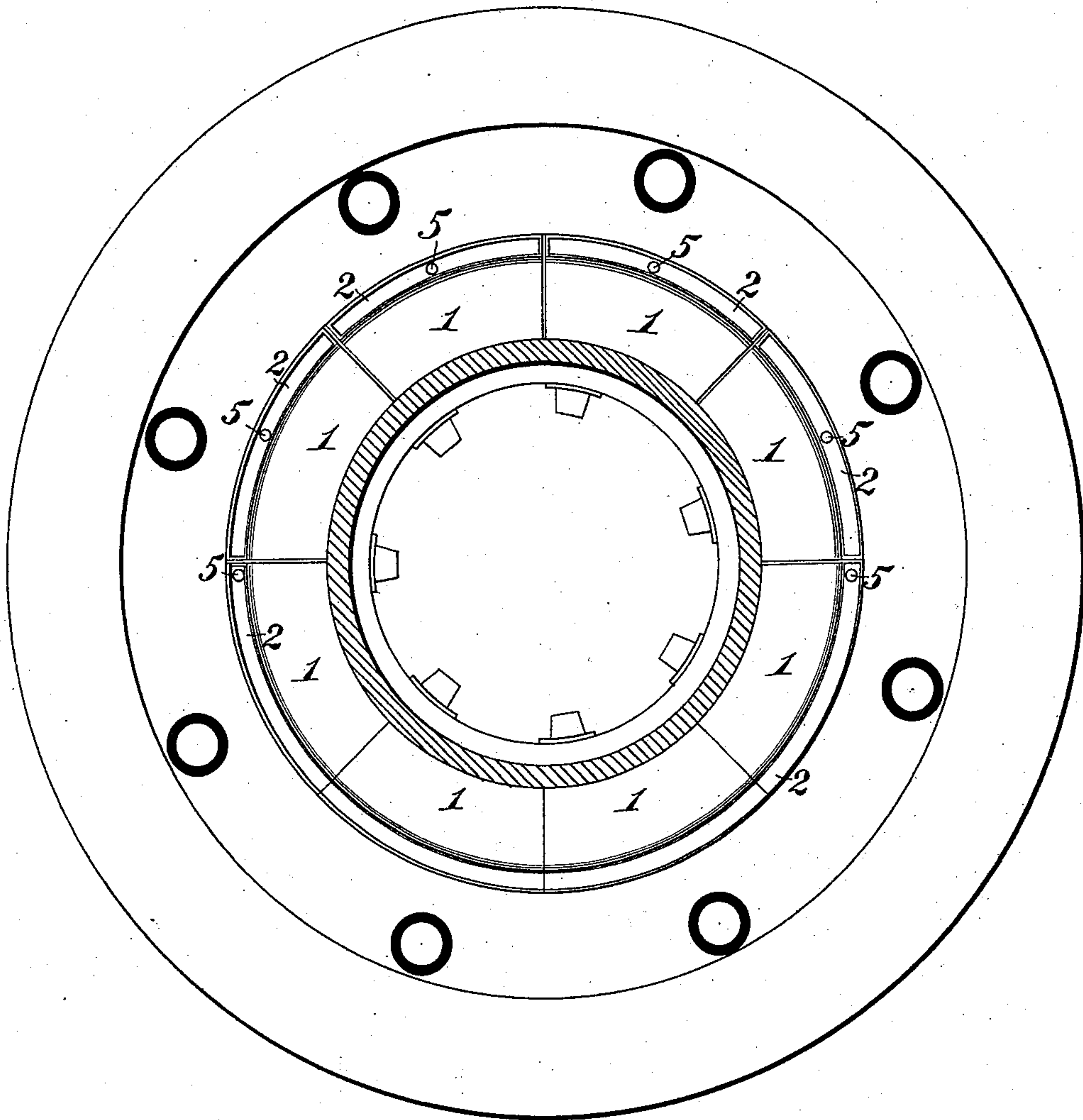
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FIG. 4.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF PITTSBURG, PENNSYLVANIA.

## BLAST-FURNACE.

SPECIFICATION forming part of Letters Patent No. 486,110, dated November 15, 1892.

Application filed August 1, 1891. Serial No. 401,351. (No model.)

*To all whom it may concern:*

Be it known that I, JULIAN KENNEDY, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Blast-Furnaces, of which improvements the following is a specification.

The invention described herein relates to certain improvements in blast-furnaces, whereby the inner walls thereof are protected against burning and cutting away. Numerous devices have heretofore been employed for this purpose, such as tanks or basins arranged against or partially embedded in the outer wall of the bosh of the furnace and hollow plates entirely embedded within the wall of the bosh, being preferably located near the inner face thereof. As the walls of the bosh are quite thick—i. e., thirty inches, more or less—the outside tanks or basins are inefficient, being located too far from the surface most affected, and the embedded hollow plates are objectionable, as they are liable to become choked up, so that the water cannot pass through, thereby permitting the burning and cutting away of the inner face of the wall until the plates are exposed.

The object of this invention is to provide for the cooling down, or rather the conducting, of the heat away from the inner portions of the walls of the bosh by means of a series of plates of high conductivity extending into the wall of the bosh to within three or four inches (more or less) of the inner face thereof, their outer ends being subjected to the action of a suitable cooling medium.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional elevation of a portion of a blast-furnace embodying my invention. Figs. 2 and 3 are similar views showing modified forms of cooling-plates; and Fig. 4 is a horizontal section, the plane of section being indicated by the line *xx*, Fig. 1.

In the practice of my invention the blast-furnace is constructed in the usual or any suitable manner, except as regards the features hereinafter described. In constructing the walls of the bosh a series of plates 1, formed of a material of high conductivity, preferably of rolled copper, are so placed in

the walls that their inner edges will lie near the inner face of said wall, while their outer edges project beyond the walls, as shown. The portions of the plates projecting beyond the wall are shaped to form gutters 2 for the reception of water or other cooling medium. These plates are made in the form of segments of a flat ring and are preferably constructed so that their adjacent ends will abut against each other or be closely contiguous. The ends of the gutter in each plate or segment are closed by walls brazed or riveted in position so as to form tight joints; or, if preferred, the ends of the gutters of adjacent plates or segments may be brazed or otherwise united, thereby forming a continuous gutter around the furnace. In lieu of the gutter the outer edges of the plates or segments may be bent into the form of a tube 4, as shown in Fig. 2, and any suitable cooling fluid, as air, gas, or water, caused to circulate through it. If preferred, the gutter or tubular portion of the plate or segment may be arranged in suitable recesses in the face of the wall of the bosh, as shown in Fig. 3. While each gutter or tube may be provided with suitable supply and discharge pipes, so that each gutter or series thereof may be filled and emptied independently of the others, it is preferred that the cooling fluid should flow from the upper gutters or series thereof down into the next lower gutter or series thereof, and so on, to the lowest gutters or series, which are provided with an outlet-pipe for conducting the fluid to any suitable point of discharge. To this end, a pipe 5 or series thereof is arranged between the upper gutters and those below, the upper end of the pipe projecting up through the bottom of the upper gutter for a distance equal to the depth of water it is desired to be maintained in the gutter, while its lower end is arranged to discharge the water into the next gutter below, as shown in Fig. 1. These plates, being formed of a material having high conductivity, will rapidly transmit the heat received at their inner edges to the cooling medium at their outer edges, thereby preventing any excessive heating of the portions of the walls adjacent thereto. In case of the inner face of the wall being so cut away as to expose the inner edges of the plates or segments to the action of the heat or molten



metal within the furnace the plates will only be melted back to a point where the action of the cooling medium at the outer edges of the plates will overbalance the heat applied to the inner edges of the plates, when the destruction of the plates will stop and the plates will operate as before.

In the use of my solid cooling-plates there is not any liability of any water entering the furnace, as is always the case when the hollow cooling-plates are employed, nor does the partial destruction of my plates render them inoperative.

I am aware that it is not new to employ an annular plate provided near its outer edge with a cooling-chamber for the purpose of supporting the upper portion of the wall of a reverberatory chamber; but no claim for any such construction is made, as if an annular plate were embedded in a wall and subjected to different degrees of heat at different points it would so buckle as to injure the wall.

I claim herein as my invention—

1. A blast-furnace having, in combination

therewith, a series of solid plates of high conductivity embedded in the walls of the furnace and means for cooling the outer edges of the plates, substantially as set forth.

2. A blast-furnace having, in combination therewith, a series of solid plates of high conductivity embedded in the walls of the furnace, the outer edges of the plates being provided with gutters or tubes for the circulation of a cooling fluid, substantially as set forth.

3. A solid metal plate for cooling the boshes of blast-furnaces, having a length less than the circumference of the wall of the furnace to which it is to be applied and provided along its outer edge with a tube or gutter for the reception of a cooling medium, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JULIAN KENNEDY.

Witnesses:

DARWIN S. WOLCOTT,  
R. H. WHITTLESEY.