

H. W. LASH.
 PROTECTING SHIELD FOR FURNAOE FLUES.
 APPLICATION FILED SEPT. 27, 1907.

927,557.

Patented July 13, 1909.
 2 SHEETS—SHEET 1.

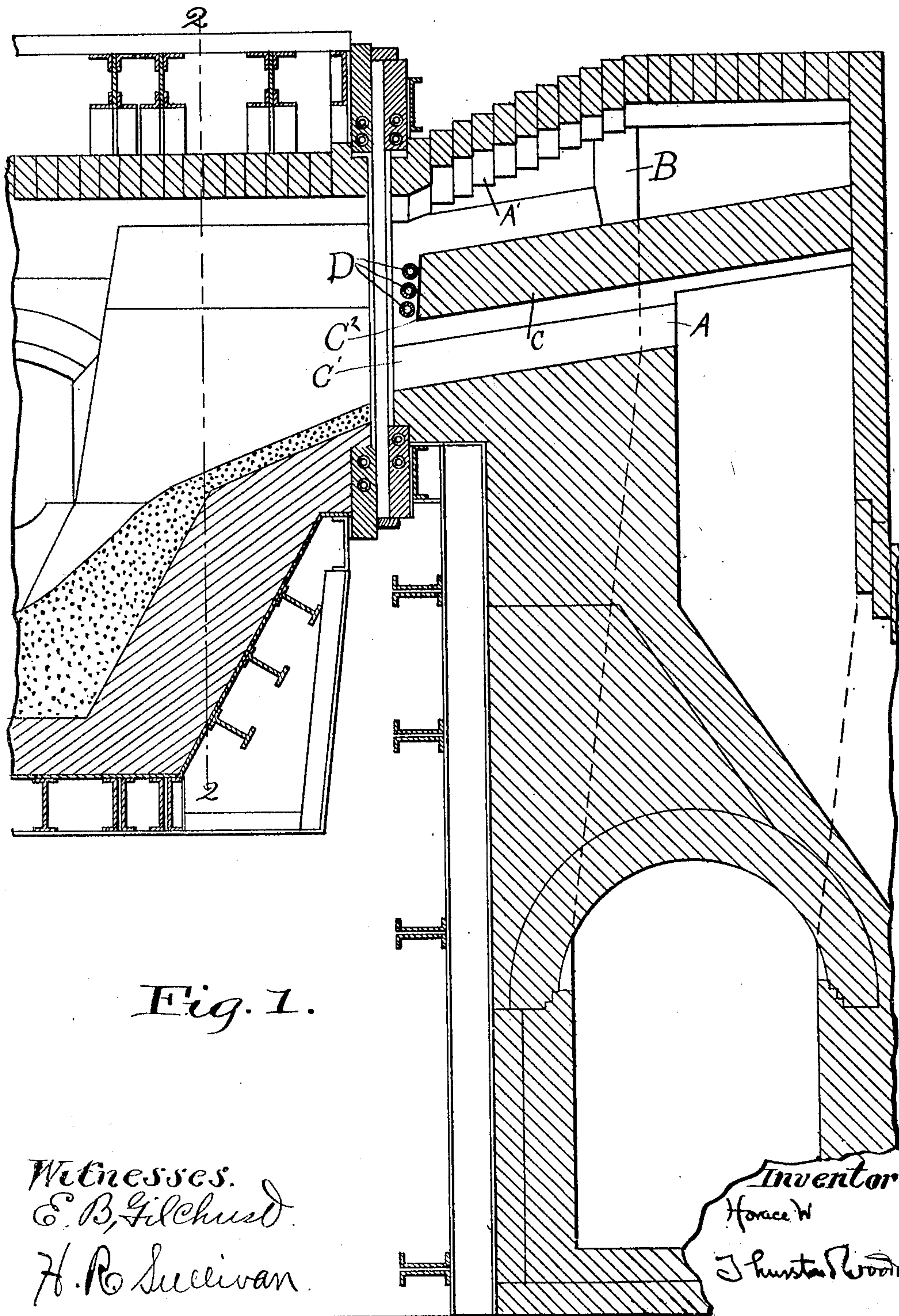


Fig. 1.

Witnesses.
 E. B. Gilchusd.
 H. R. Sullivan.

Inventor
 Horace W.
 Thurston Woodward

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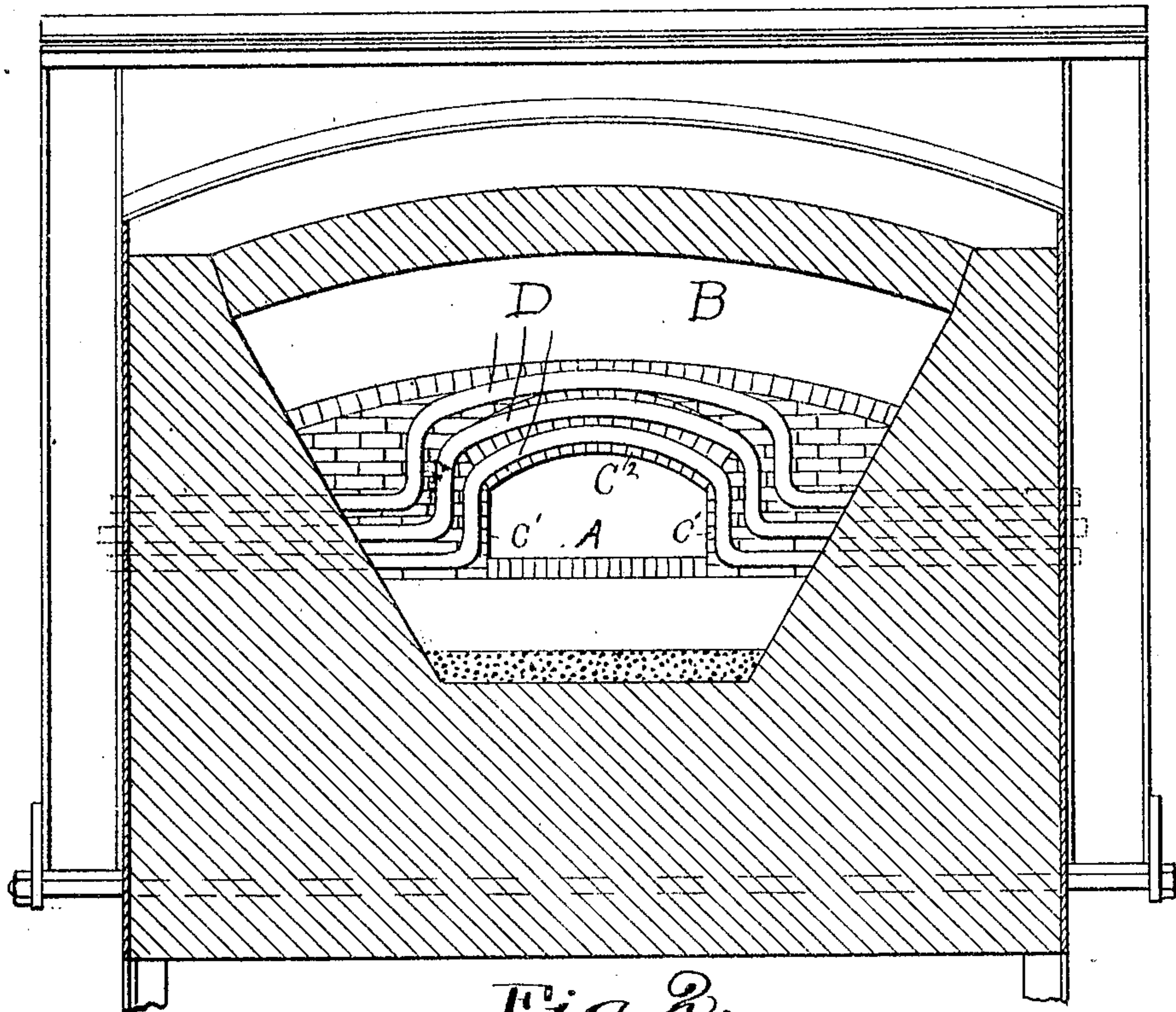


Fig. 2.



Fig. 3.

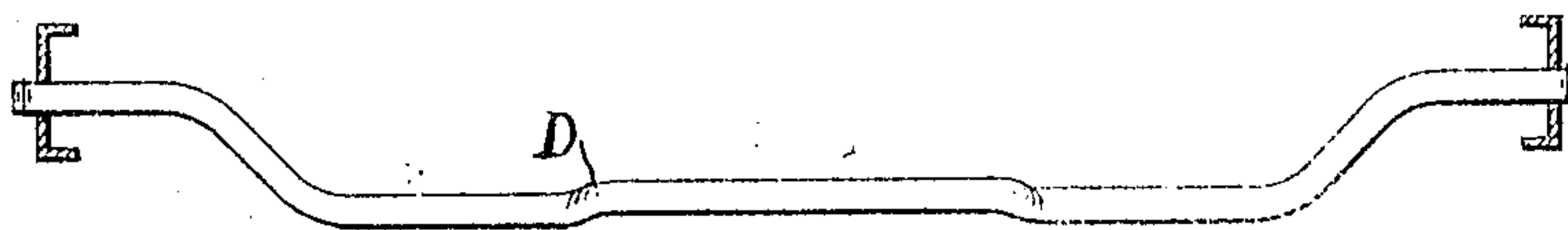


Fig. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

HORACE W. LASH, OF CLEVELAND, OHIO, ASSIGNOR TO THE GARRETT-CROMWELL
ENGINEERING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PROTECTING-SHIELD FOR FURNACE-FLUES.

No. 927,557.

Specification of Letters Patent.

Patented July 13, 1909.

Application filed September 27, 1907. Serial No. 394,932.

To all whom it may concern:

Be it known that I, HORACE W. LASH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Protecting-Shields for Furnace-Flues, of which the following is a full, clear, and exact description.

The present invention relates to the shielding of jambs and arches of the ports of the flues leading from furnaces to the regenerators, against the action of the hot out-flowing currents of burned gas.

The invention is more particularly to be characterized as relating to a structure whereby the burned gases are prevented from striking the faces of the aforesaid arches and their supporting jambs at a high temperature, and thus preserving the structure from disintegration as distinguished from those prior devices known in the art, including means for artificially cooling the interior or rear portion of the arch, while the burned gases, at high temperature, play freely on the face thereof.

I am, of course, aware, as are all persons familiar with iron smelting, that this practice last referred to, namely, the simple practice of backing up the brick work or inserting therein artificial cooling means, such as water pipes, is old and commonly used wherever the engineer thinks the cost and risk are compensated by the wear saved. I do not, therefore, desire to be understood as regarding this idea broadly, of artificially cooling the arches, as patentable, since not only is this within the obvious province of every engineer, but also because I do not use an arrangement which can, in truth, be said to artificially cool the arches, as the novel arrangement which I have provided does not operate in this manner but, instead, serves as a protecting shield in front of the arch, protecting it from the impingement of the burned gases and cooling the gas current in immediate proximity to the face of the arch, below the temperature at which the brick work becomes friable or fusible under the influence of such gases, the jambs or supports of the arch being similarly protected.

In order that my invention may be better understood, reference is had to the following specification, and the accompanying drawings, in which—

Figure 1 is a cross section of a furnace

showing the ports of the gas and air flues leading to and from the regenerators at one end. Fig. 2 is an enlarged section on the line 2—2 of Fig. 1. Fig. 3 is a detail showing the water pipes forming the shield for the ports. Fig. 4 is a top plan of the water pipe shown in Fig. 3.

In the several figures of the drawing a structure of furnace is illustrated in which the gas flue A and air flue B are shown disposed in their usual relation to each other, the air flue being above the gas flue with a separating wall or arch C therebetween. The upper wall A' of the air flue is inclined downward toward the outlet so as to direct the incoming flow of the air, and consequently the mixture of air and gas, properly on to the hearth of the furnace and also to prevent the flame, created by the burning mixture, from striking against the furnace roof and fusing it away. There are two sets of these gas flues used with regenerative furnaces, as is well known, one set serving as the outlet, while the other serves as the inlet for the flow of the various gases, the direction of flow being reversed from time to time.

There is no wear upon the transverse partition wall or arch C separating the gas and air flues, or of the jambs C' supporting this partition, due to the flowing of the unburned gas and air thereby into the furnace, but the gaseous products of combustion passing out of the furnace at a high temperature fuse and wear away the nose C² of this partition and necessitate the renewal thereof from time to time in order to avoid an undesirable change in the direction of the inflowing current when the same ports are used as inlets instead of outlets.

I am aware that it has been proposed to follow the usual expedient of iron and steel engineering practice and artificially cool the partitions against which the outgoing gases play. This, of course, retards the wearing action to considerable extent, but is based upon the wrong principle, as it is remedial or counteractive in its theory rather than preventive.

It is not thoroughly effective to, more or less remotely, back up the nose with cooling means when the burned gases are permitted to play upon the outside of the same at a high temperature, since the face of the bricks will be found to eventually rise to the high

temperature and will gradually fuse or crumble away, according to the nature of the brick employed, and the nose will thus gradually wear back or down toward the artificial cooling means.

For the reasons above noted, I do not employ the method of artificially cooling the arch or partition for the purpose of preserving the same, but I place in front of the face of the arch, against which the hot gases play, a protecting shield, preferably made up of water cooled pipes D, though it is obvious that this shield may have other construction within the limits of economy. I prefer to extend the shield to practically the upper and lower edges of the arch, and also to protect jamb C' supporting the arch or partition in like manner, as it is found that the said edges are worn away under the action of the highly heated products of combustion impinging thereon. By the employment of this shield, the faces of the arch and its supporting walls are protected against the impingement of the outflowing gases, and the gaseous products of combustion in immediate proximity to the faces are cooled below the temperature at which they fuse the bricks or cause them to crumble; and thus the arch wears so well and so long that it is unnecessary to employ any additional supporting means therefor in order to sustain it against the disintegrating effect of the outflowing currents. The advantage of this arrangement will be obvious to those familiar with the effect of highly heated products of combustion upon brick work, even where the latter is backed up by artificial cooling means of some sort, since in my structure the face of the bricks at the portion of the arch where the wear takes place is protected against the impingement of the burned gases and does not readily reach the crumbling or fusing temperature, and is, therefore, maintained in better condition than could be had otherwise.

Obviously certain modifications could be made in the shield which I employ, but the general features of the arrangement may be said broadly to require that the protecting shield be placed so as to prevent the out-

flowing products of combustion from impinging against the face of the arch, at such a temperature as to destroy the arch.

Having thus described my invention, I claim:

1. In a furnace of the class described having gas and air flue ports with a transverse partition therebetween, means located in front of the said partition and between the gas and air ports to cool the outflowing products of combustion before the latter strike against the face of the said partition.

2. In a furnace of the class described having gas and air flue ports with a transverse partition therebetween, means to cool the outflowing products of combustion before the latter strike against the face of said partition, and means for cooling the products of combustion before the latter strike against the face of the jamb supporting said partition.

3. In a furnace of the class described having gas and air flue ports with a transverse partition therebetween, a gas cooling shield located between the gas and air flue ports and in front of said partition and extended substantially to the edges of said partition.

4. In a furnace of the class described having gas and air flue ports one above the other with a separating partition or arch therebetween, a water cooled shield located between the gas and air flue ports and in front of said arch, protecting the face of the latter from the impingement of outflow products of combustion.

5. In a furnace of the class described having gas and air flue ports one above the other with a separating partition or arch therebetween, separate water cooled pipes in front of said arch and the walls supporting said arch, protecting the faces of said arch and walls from the impingement of the outflowing products of combustion.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

HORACE W. LASH.

Witnesses:

H. R. SULLIVAN,
E. B. GILCHRIST.