

(No Model.)

W. W. WILE & G. L. CALKIN.
HOLLOW GRATE BAR.

No. 593,287.

Patented Nov. 9, 1897.

Fig. 1.

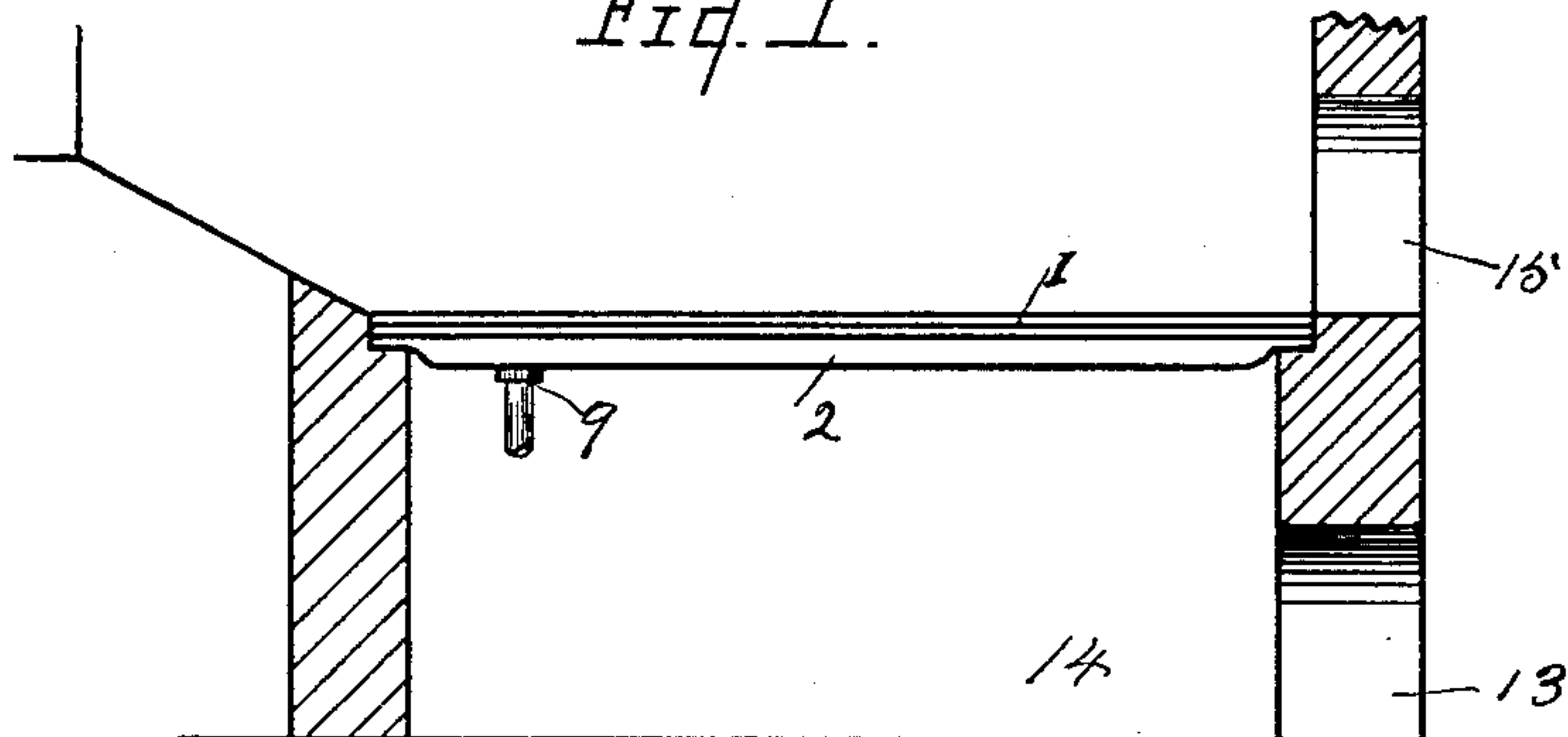


Fig. 2.

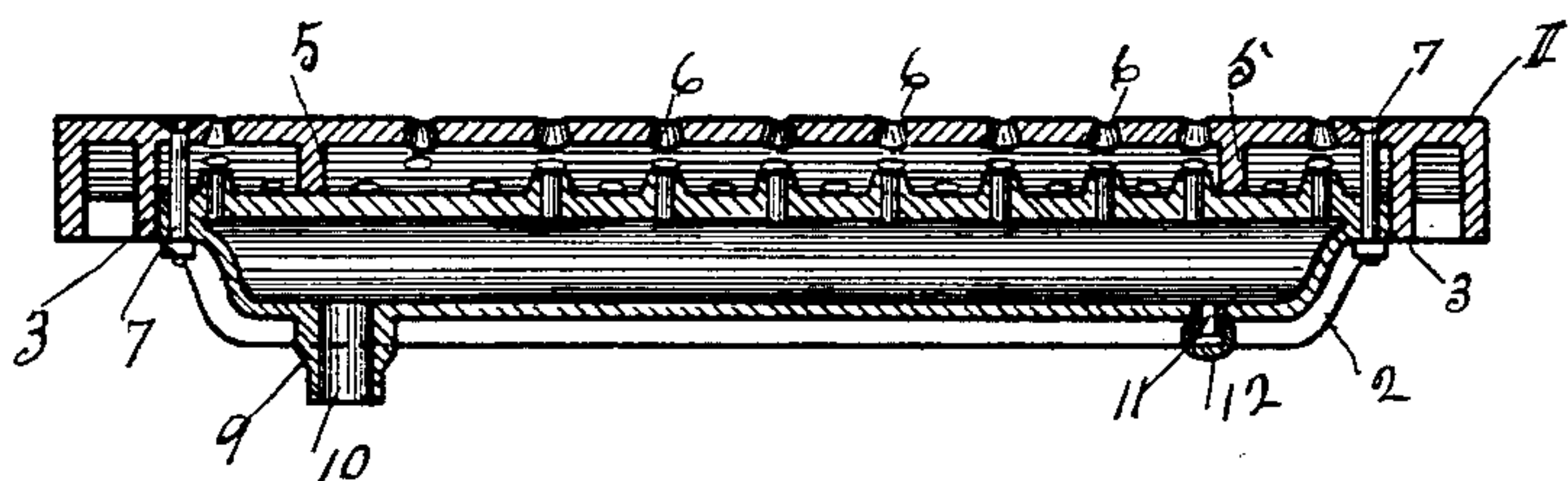


Fig. 3.

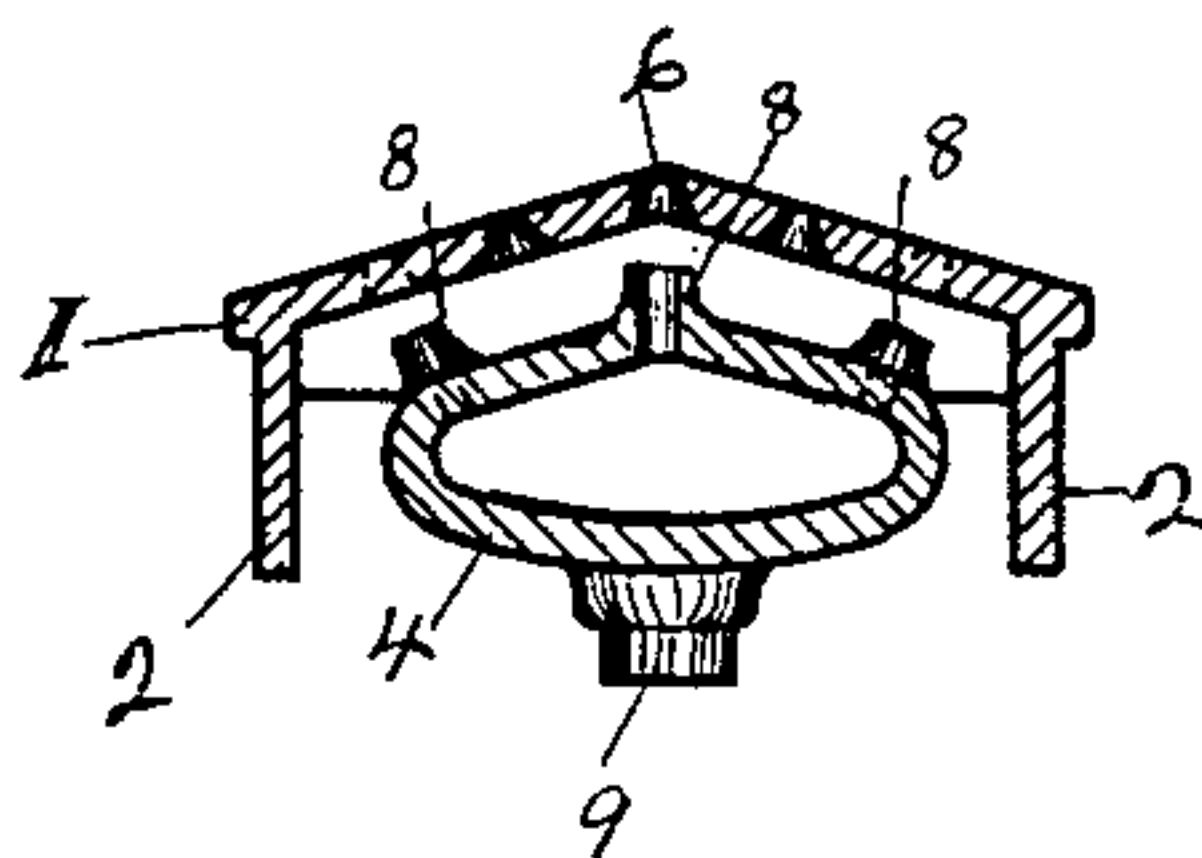
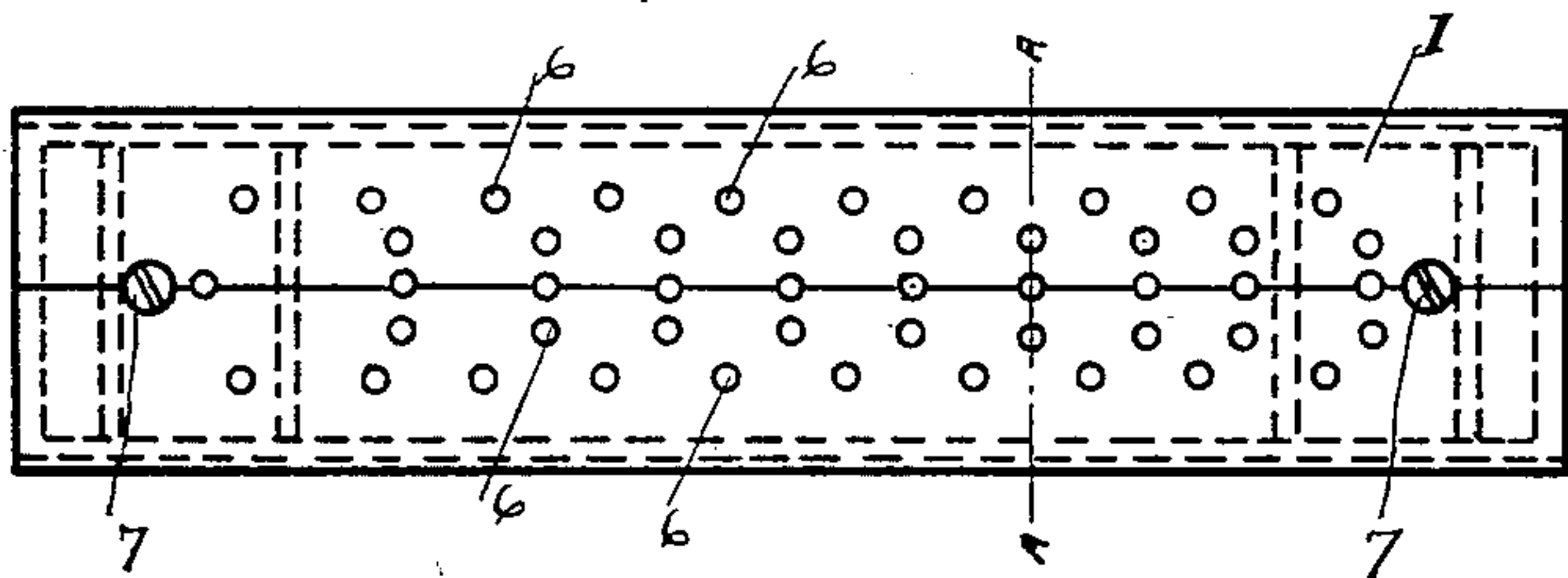


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM W. WILE AND GORGE L. CALKIN, OF AUBURN, INDIANA.

HOLLOW GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 593,287, dated November 9, 1897.

Application filed February 20, 1897. Serial No. 624,377. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM W. WILE and GORGE L. CALKIN, citizens of the United States, residing at Auburn, in the county of DeKalb, in the State of Indiana, have invented certain new and useful Improvements in Hollow Grate-Bars; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to improvements in hollow grate-bars.

The object of our invention is to provide a hollow grate-bar of simple and economical construction so arranged that the natural draft is employed either with or without the solid blast, thereby forming a combined natural-draft and hollow-blast grate-bar adapted to give a more even heat, prevent the usual warping and distortion of the grate-bar sections incident to those grate-bars having each alternate bar arranged for an open draft, particularly when the alternate hollow-blast bars become overlaid with fuel and thereby clog up the blast-openings, and having the hollow-blast bar separate from the adjacent sides of the containing grate-bar body by an intervening open air-chamber, whereby the natural draft has free access to all the blast-openings of the grate-bar surface.

Our invention consists of a two-part combined open-draft and hollow-blast grate-bar, the grate-bar body consisting of an open casing or shell whose upper surface has a series of blast-openings and a hollow-blast bar-section rigidly but detachably mounted in said grate-bar body and provided upon its upper surface with a series of twyer-openings in register with said body blast-openings, but separated therefrom by an air-space in free communication with the open draft.

In the accompanying drawings similar reference-numerals indicate like parts.

Figure 1 is a side view of our improvement in position upon the supporting furnace-walls shown in section. Fig. 2 is a longitudinal central section of our invention, showing its internal construction and relative

arrangement. Fig. 3 is a cross-section of the same on the line A A of Fig. 4, showing the elliptical contour of the hollow-blast bar. Fig. 4 is a plan view of Fig. 2, showing the blast-openings.

All parts of our improvement are made of suitable metal.

The grate-bar body or casing 1 has its upper surface or top oppositely inclined from a longitudinal line midway its sides to better protect the blast-openings from the clogging effects of ashes and sediment of the furnace. The opposite integral sides 2 of said body 1 are sufficiently pendent to induce a proper open draft about the sides and top of the hollow-blast bar or section hereinafter described. Near the ends of the said body 1 are arranged the transverse vertical webs 3, Fig. 2, against which the respective ends of the hollow bar 4 abut and impinge, and thus serve to brace said body 1 against warping. The inner face of said body is also provided with the vertical cross-webs 5, of a less height than the said webs 3, having a concave lower surface to fit the convex upper surface of the said bar 4. The upper surface of the said body 1 is provided with a series of vertical blast-openings 6, whose outline resembles that of the frustum of a cone, all of which openings communicate freely at all times with the natural draft. The hollow-blast bar or section 4, preferably elliptical in cross-section, is of a sufficient length to snugly fit between the said cross-webs 3 and is supported rigidly in such position and firmly held against the said webs 5 by the vertical holding-bolts 7, which pass through the ends thereof and have their heads countersunk in suitable perforations in the top of said body. The upper convex face of said bar 4 is provided with a series of vertical bosses 8, centrally apertured, as shown, and so arranged as to leave a short intervening space between the said bosses and the perforated top of said body 1, the central apertures of said bosses being arranged directly opposite and in close proximity to corresponding blast-openings 3 in the top of said body 1. The lower surface of the forward end of said bar 4 has a pendent boss 9, having a twyer-opening which is properly connected with a suitable blast, and the other end of said bar has

a vertical opening 11 for the removal of sediment and which is closed by a proper cap 12. The number of blast-openings 6 can of course be varied to suit the constructor, though we prefer an additional row of draft-openings upon each side of the registering blast-openings, whereby the operation of the natural draft will at all times be unaffected through said draft-openings by the force of the blast through the said blast-openings.

The forward portion of the upper surface of the blast-bar 4 above the opening 10 is preferably left blank to more evenly distribute the blast to the said registering openings.

The operation of our improved grate-bar thus described is obvious, and, briefly stated, is as follows: When the blast is supplied to the opening 10, it will fill the hollow bar 4 and evenly distribute itself to the fuel through the opening in the bosses 8 and the respective coincident blast-openings 6. At the same time the natural or open draft has a free circulation through the said additional or draft-openings and also has at all times a free circulation around about the said bar 4, which tends to prevent undue heating and warping of the same. The manner in which the bar 4 abuts the said cross-webs 3 and 5 is an efficient aid in preventing the warping of said body 1. When the blast is not employed, it is obvious that the natural draft has a free and abundant access to the furnace-fuel through all of the said blast-openings 6, whereby our improvement constitutes a combined natural-draft and hollow-blast grate-bar of simple, substantial, and economical construction, adapted to effectively remedy the common defect of being overheated and warped by use, particularly when the blast is stopped.

The ashes and other debris of the furnace which falls through the blast-openings will drop upon the convex upper surface of the said bar 4, from whence it will fall by gravity to the ash-pit 14 below, and such debris as still remains in the furnace can readily be removed through the furnace-opening 15.

It is obvious that the blast-bar 4 can read-

ily be detached from its position in said body 1 by removing the said bolts 7.

Having thus described our invention and the manner of employing the same, what we desire to secure by Letters Patent is—

1. A grate-body 1 provided with opposite pendent draft-inducing sides 2, and having in its top or fuel-surface a series of natural-draft and blast openings; in combination with a hollow-blast bar 4 elliptical in cross-section and rigidly fixed in said body 1, adapted to brace the said grate-bar against warping as described, the said bar having upon its upper surface a series of blast-openings coincident with and in close proximity to a corresponding number of blast-openings in said body 1, the said bar 4 having its upper and lateral faces separated from the adjacent faces of the body 1 by an intervening air-space, for the purpose specified; and means for rigidly but detachably mounting said blast-bar 4 in said body 1, all substantially as described.

2. The combination of a grate-bar body 1 having the pendent draft-inducing sides 2, the cross-webs 3 and 5, and having its top provided with a series of draft-openings 6; and the hollow-blast bar 4 elliptical in cross-section, and rigidly fixed in said body 1 by holding-bolts as shown, and adapted to brace the said body against warping, as described, the said bar having its upper surface provided with blast-openings coincident with and in close proximity to corresponding blast-openings 6 in said body 1, the said bar 4 having its upper and lateral faces separated from the adjacent faces of the body 1 by an intervening air-space, whereby said openings 6 are adapted for both the natural draft and the solid blast, all substantially as described.

Signed by us at Auburn, De Kalb county, in the State of Indiana, this 16th day of February, A. D. 1897.

WILLIAM W. WILE.
GORGE L. CALKIN.

Witnesses:

JOSIAH WILE,
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