

No. 756,246.

PATENTED APR. 5, 1904.

T. A. LEE.
FLUE CONSTRUCTION FOR BOILERS.
APPLICATION FILED NOV. 28, 1903.

NO MODEL.

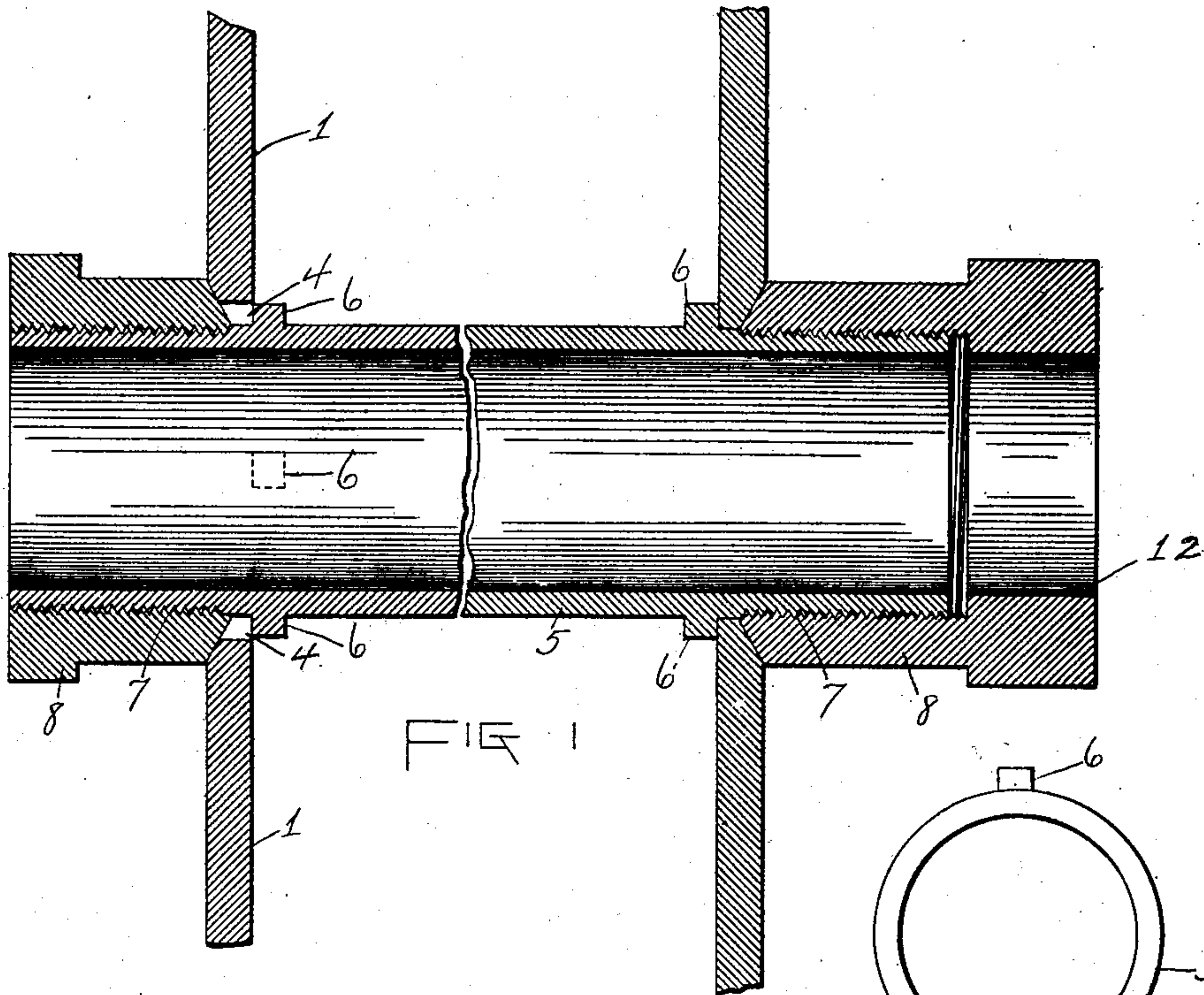


FIG 1

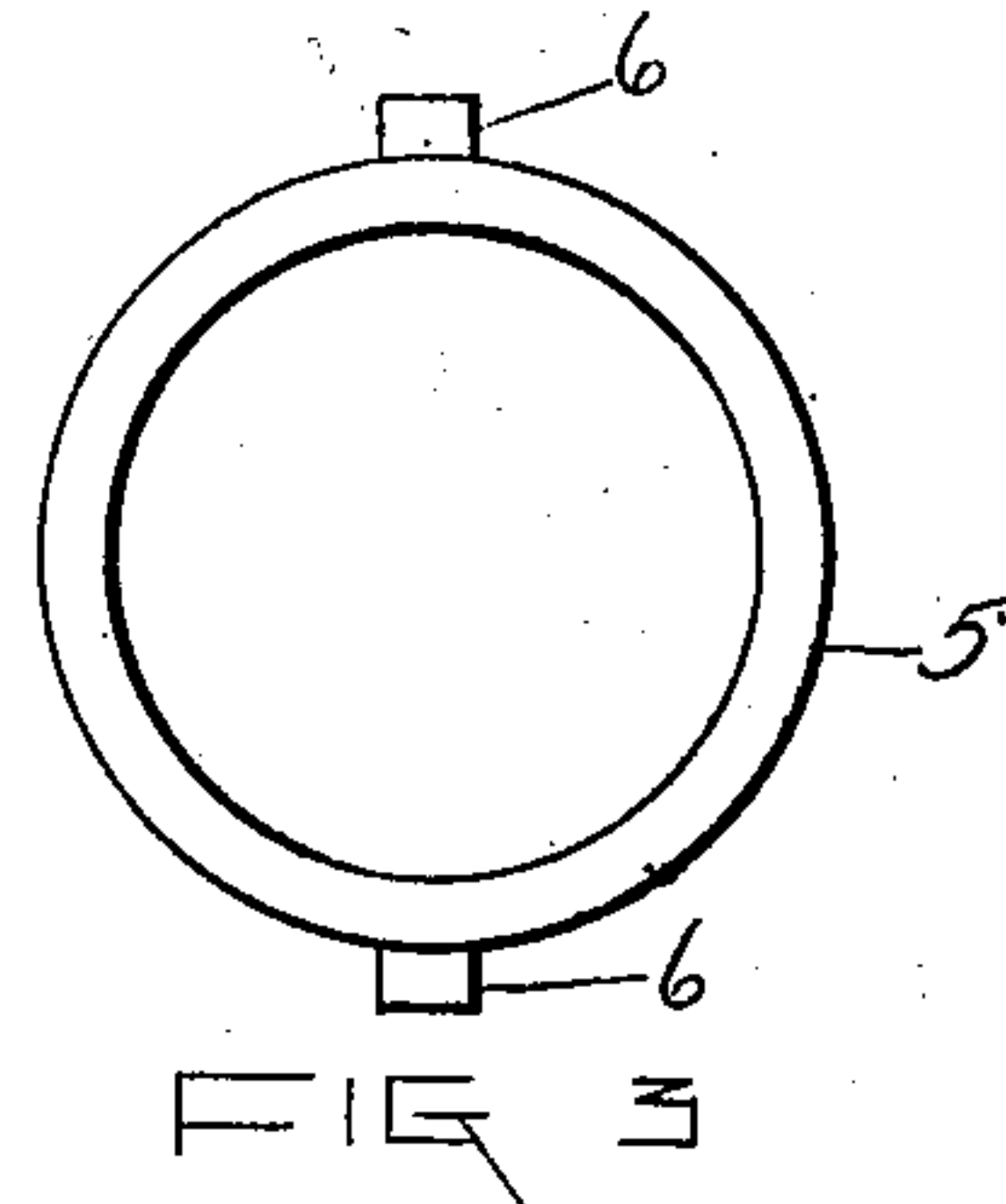


FIG 3

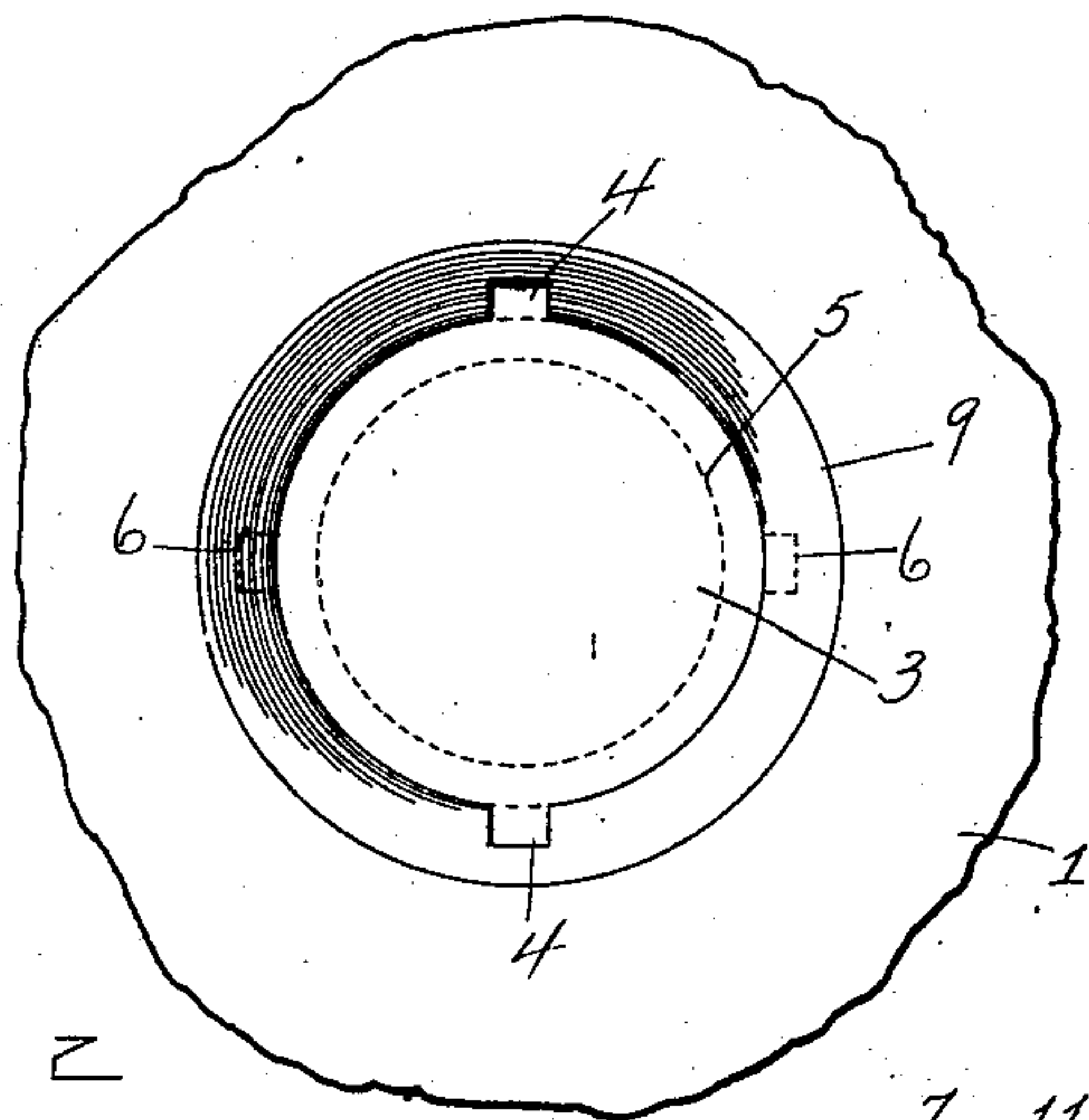


FIG 2

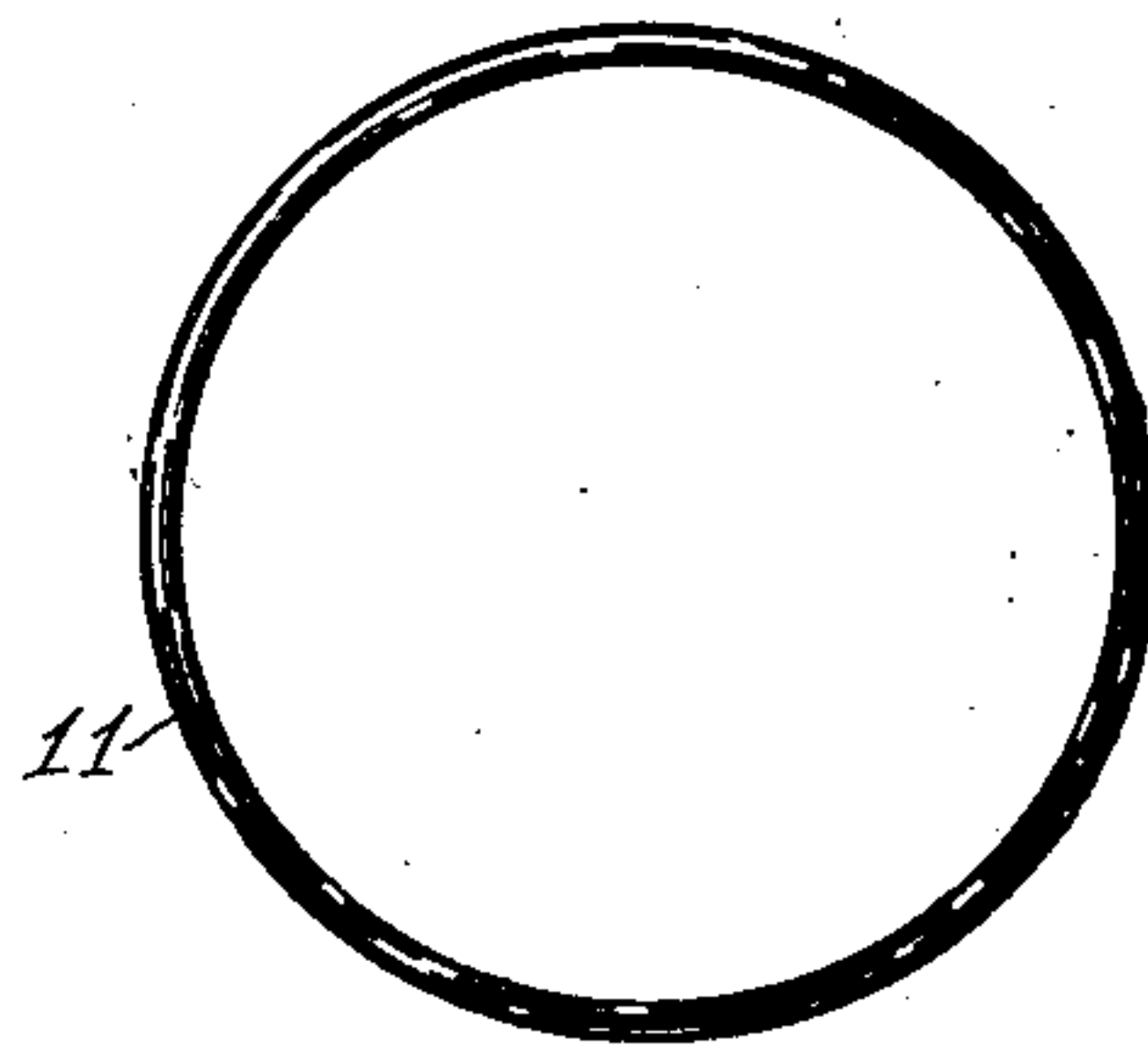


FIG 4

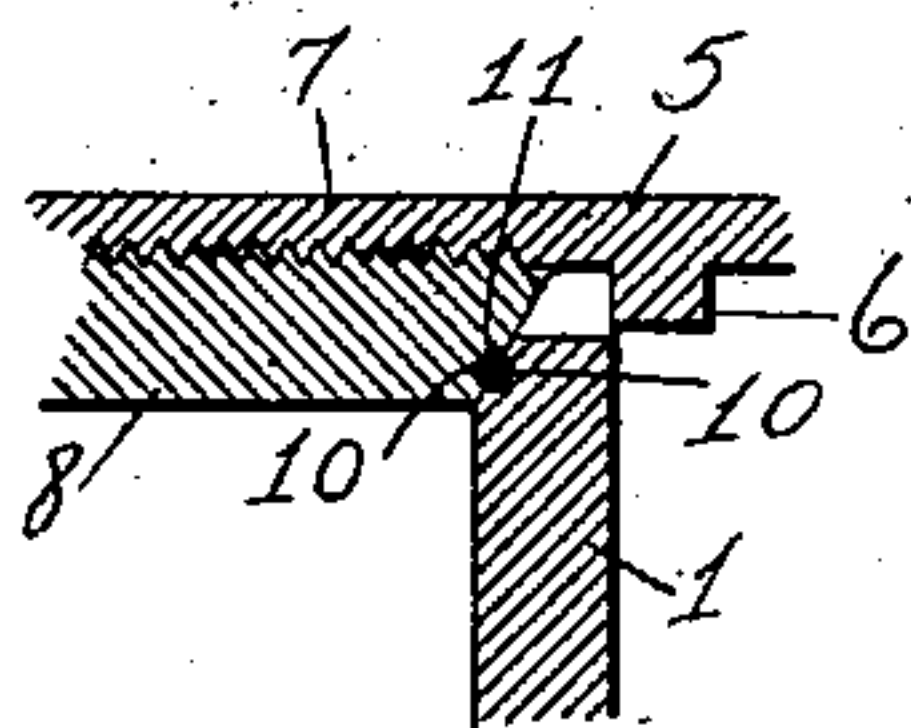


FIG 5

WITNESSES
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THOMAS A. LEE, OF TROY, NEW YORK.

FLUE CONSTRUCTION FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 756,246, dated April 5, 1904.

Application filed November 28, 1903. Serial No. 182,971. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. LEE, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Flue Constructions for Boilers, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

Figure 1 of the drawings is a central vertical longitudinal section of a steam-boiler provided with my improved flue construction, a portion only of the flue-sheets being shown. Fig. 2 is a view in front elevation of a portion of the front flue-sheet. Fig. 3 is an end view of one of the flues. Fig. 4 is a view of a packing-ring adapted to be interposed between the front flue-sheet and the nut on the front end of a flue. Fig. 5 is a vertical cross-sectional view of a portion of the front flue-sheet, nut, flue, and packing-ring.

The principal objects of my invention are to reinforce the flue-sheets of the boiler, to form a tight joint between the flues and flue-sheets, to cover and protect said joints from direct contact with the heated products of combustion, and to cover and protect the ends of the flues adjacent to the fire-box from the wearing action of cinders.

Referring to the drawings, 1 represents the front flue-sheet, and 2 the rear flue-sheet adjacent to the fire-box of a steam-boiler. These flue-sheets are provided with flue-apertures 3, those in the front flue-sheet being, respectively, in line with those in the rear flue-sheet, adapted to receive the respective flues. Certain of the flue-apertures in the front flue-sheet are formed with offset portions 4, forming notches in the flue-aperture wall, as shown in Fig. 2.

The flue 5, which is to be inserted in an aperture in the front flue-sheet provided with

said notches, as well as in the aperture in line therewith in the rear flue-sheet, is provided at a short distance from each end with exteriorly-projecting lugs 6, corresponding in form and location with the notches 4 in the front flue-sheet, and the opposite ends of said flue are formed to extend exteriorly of the respective flue-sheets and are exteriorly screw-threaded, as shown at 7.

The flues are inserted from the front of the boiler, and in inserting a flue provided with lugs as described the rear end of the flue is inserted through a front flue-sheet aperture, the lugs on said rear end being brought into line with the respective notches 4, and the flue is then forced through the boiler until its rear end projects through the proper aperture in the rear flue-sheet, the lugs on the front end of the flue being in like manner brought into line with the notches 4 to permit the full insertion of the flue, which causes the lugs on its front end to occupy a position just inside of the front flue-sheet. A partial rotation of the flue will thus cause the lugs on its front end to be moved out of line with the notches 4 and adapt them to bear against the inner side of the front flue-sheet.

Nuts 8 are applied to the respective projecting screw-threaded ends of the flue and screwed tightly against the outer sides of the respective flue-sheets to make a tight joint therewith, the thrust of the nuts being resisted by the engagement of the lugs 5 with the inner surface of the respective flue-sheets.

The flue-sheet is preferably provided with a countersink 9 surrounding the flue-aperture and the nut with a beveled end adapted to fit closely in said countersink.

The width of the countersink in the front flue-sheet and thickness of the inner end of the nut adapted to fit said countersink are materially greater than the depth of the notches 4, affording a continuous annular bearing-surface on the flue-sheet for engagement with the inner end of the nut outside of said notches.

If desired, the front flue-sheet and the inner end of the nut on the front end of the flue may be provided with annular grooved seats 10, adapted to receive a packing-ring 11, of cop-

per or other suitable material adapted to form a tight joint therebetween, as shown in Figs. 4 and 5.

The outer end of the nut on the rear end of the flue is formed with an interiorly-projecting flange 12, reducing the aperture in said nut to the size of the interior of the flue and presenting to the cinders and gaseous products of combustion coming from the fire-box a comparatively thick heavy body of metal well adapted to withstand the excessive heat and the wearing action of the cinders and to protect therefrom the rear end of the flue. It will thus be seen that the joints formed between the flue and flue-sheets are effectually covered and protected by the nuts, which can be screwed up tightly into engagement with the flue-sheets without strain thereupon due to the reinforcement afforded by the lugs 6.

The invention greatly facilitates the insertion and removal of the flues, as well as prevents the loosening of the joints between the flues and flue-sheets by reason of the expansion and contraction of the parts under varying temperatures and serves to reinforce and support the flue-sheets when the boiler is relieved of internal pressure.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-boiler, the combination with a flue-sheet provided with a flue-aperture; of a flue having a screw-threaded end projected through said aperture and having offsets abutting upon the inner side of the flue-sheet; and a nut screwed upon the projecting end of the flue into engagement with the flue-sheet around said aperture.

2. In a steam-boiler, the combination with a flue-sheet provided with a flue-aperture and with notches offset from said aperture; of a flue having a screw-threaded end projecting through said aperture and exteriorly-projecting lugs adapted to pass through said notches respectively, and by partial rotation of the flue to be brought into position to abut upon the inner side of the flue-sheet; and a nut

screwed upon the projecting end of the flue into engagement with the outer side of the flue-sheet.

3. In a steam-boiler, the combination with the front flue-sheet provided with a flue-aperture and with notches offset therefrom; and the rear flue-sheet provided with a flue-aperture in line with the flue-aperture in the front flue-sheet; of a flue having its opposite ends screw-threaded and extended through the respective flue-apertures in the front and rear flue-sheets, and having near each end exteriorly-projecting lugs adapted to be passed through the notches in the front flue-sheet, said lugs on the rear end of the flue being adapted to abut upon the inner side of the rear flue-sheet, and the lugs on the front end being adapted by partial rotation of the flue to abut upon the inner side of the front flue-sheet, and nuts screwed upon the respective ends of the flue into engagement with the outer sides of the respective flue-sheets.

4. In a steam-boiler, the combination with a flue-sheet provided with a flue-aperture, and a countersink surrounding said aperture; of a flue having a screw-threaded end projected through said aperture and having offsets abutting upon the inner side of the flue-sheet; and a nut screwed upon the projecting end of the flue having a beveled inner end adapted to fit said countersink.

5. In a steam-boiler, the combination with a flue-sheet provided with a flue-aperture, and a flue having a screw-threaded end projected through said aperture; of a nut screwed upon said projecting end of the flue into engagement with the outer side of the flue-sheet, said nut having an interiorly-projecting flange whereby its aperture is reduced to approximately the size of the interior of the flue.

In testimony whereof I have hereunto set my hand this 27th day of November, 1903.

THOMAS A. LEE.

Witnesses:

FRANK C. CURTIS,
E. M. O'REILLY.