

No. 789,919.

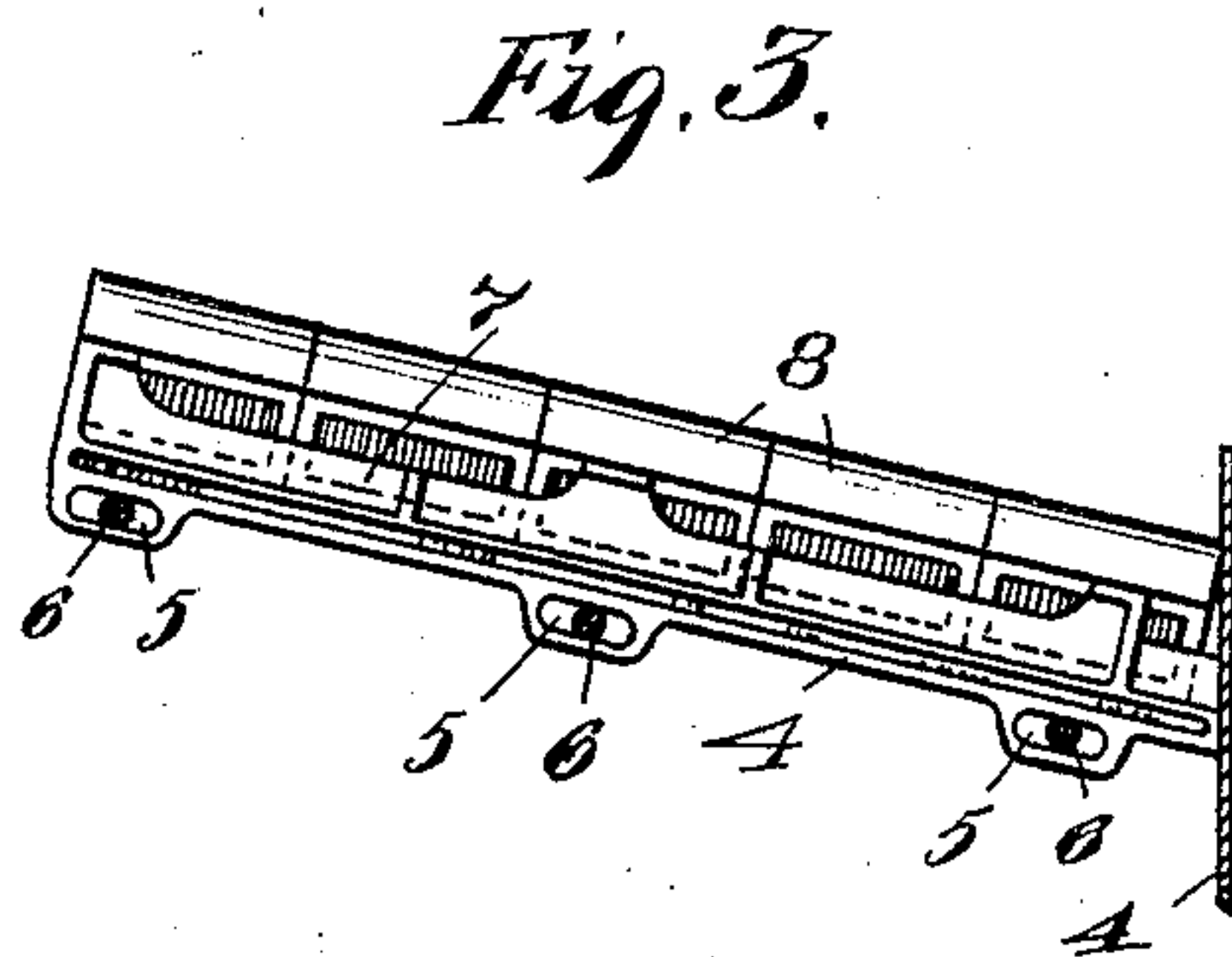
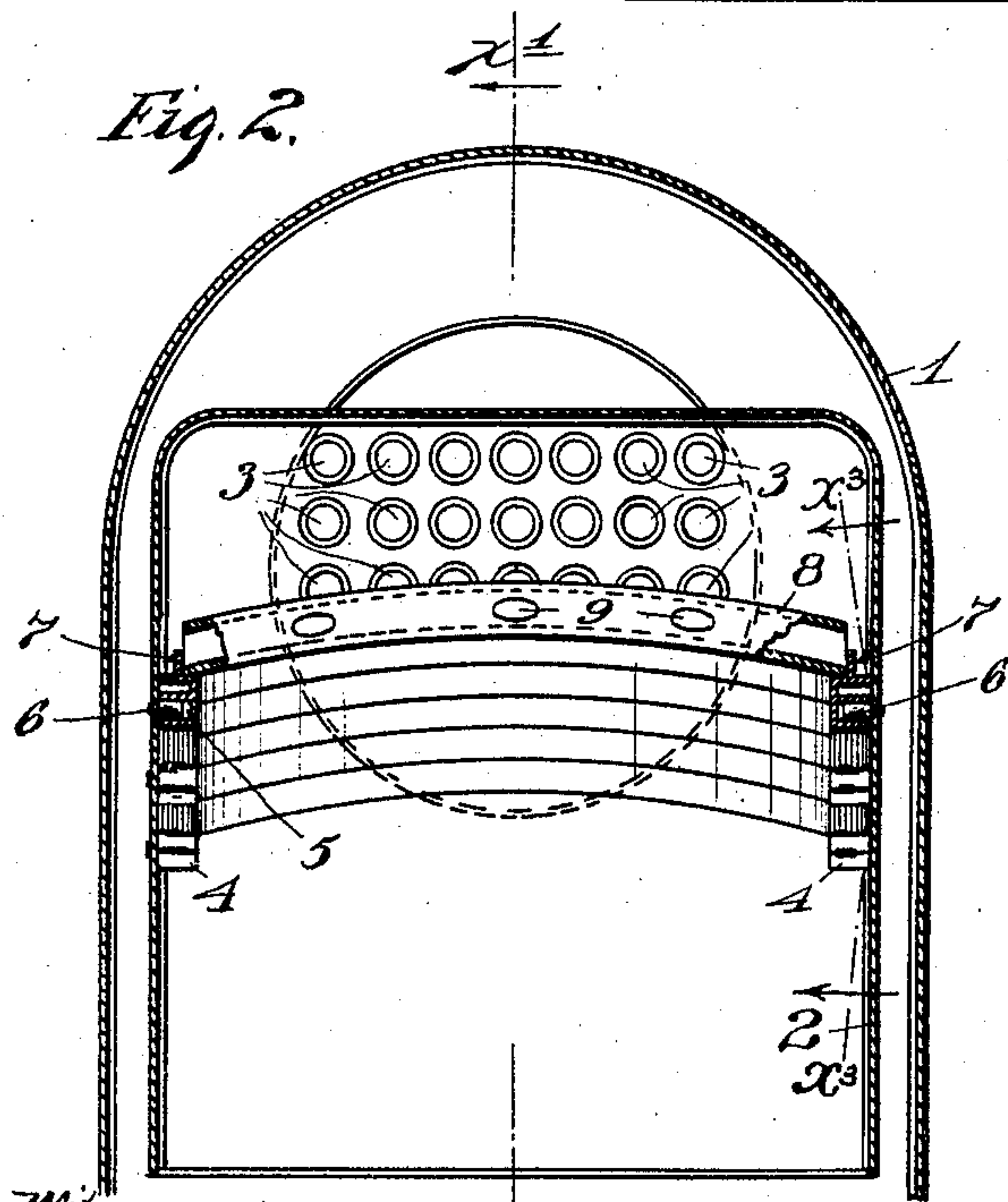
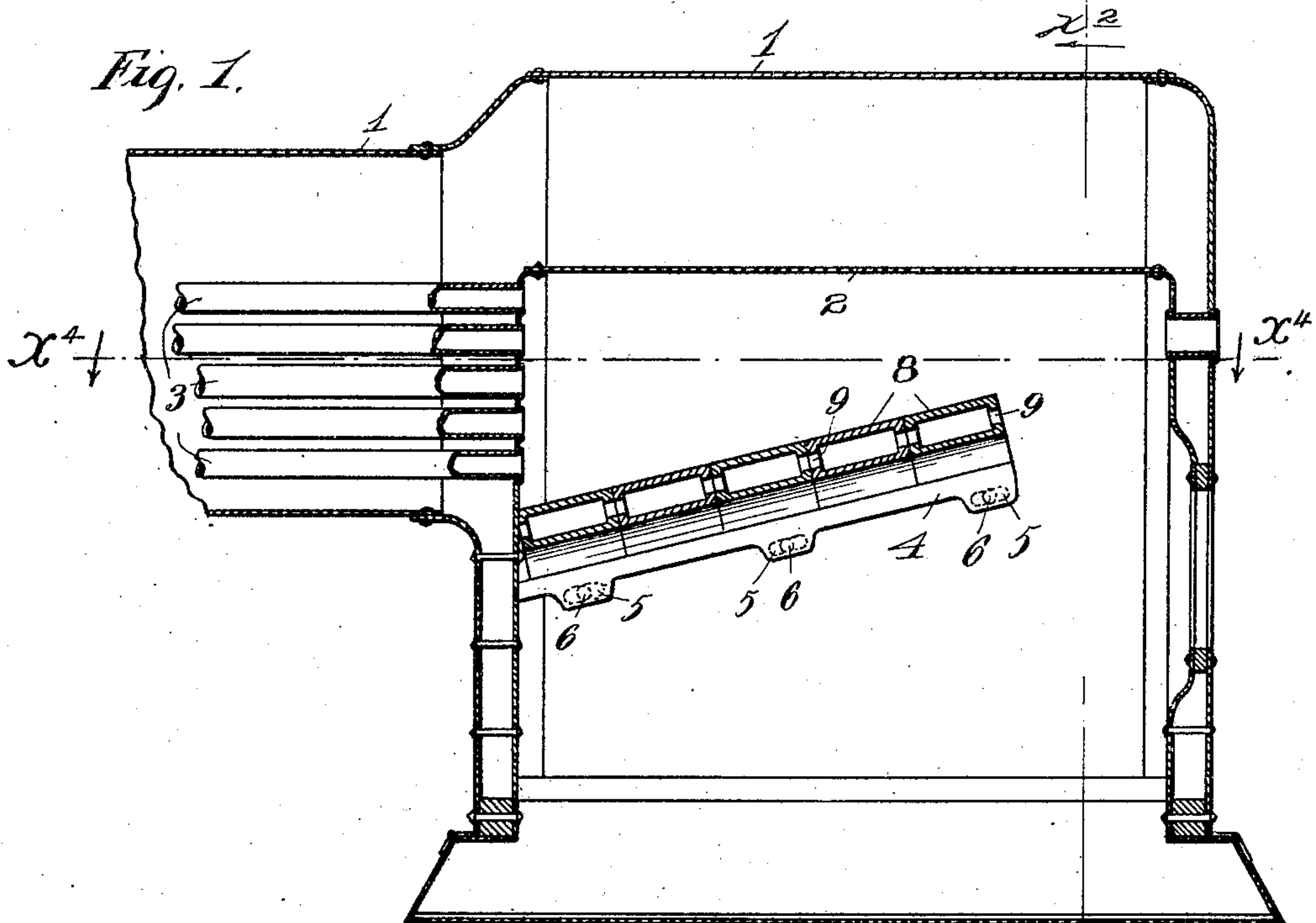
PATENTED MAY 16, 1905.

G. KIRKLAND & M. J. ALLAN.

STEAM BOILER FIRE BOX.

APPLICATION FILED JULY 18, 1904.

2 SHEETS—SHEET 1.



Witnesses,
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Fig. 4.

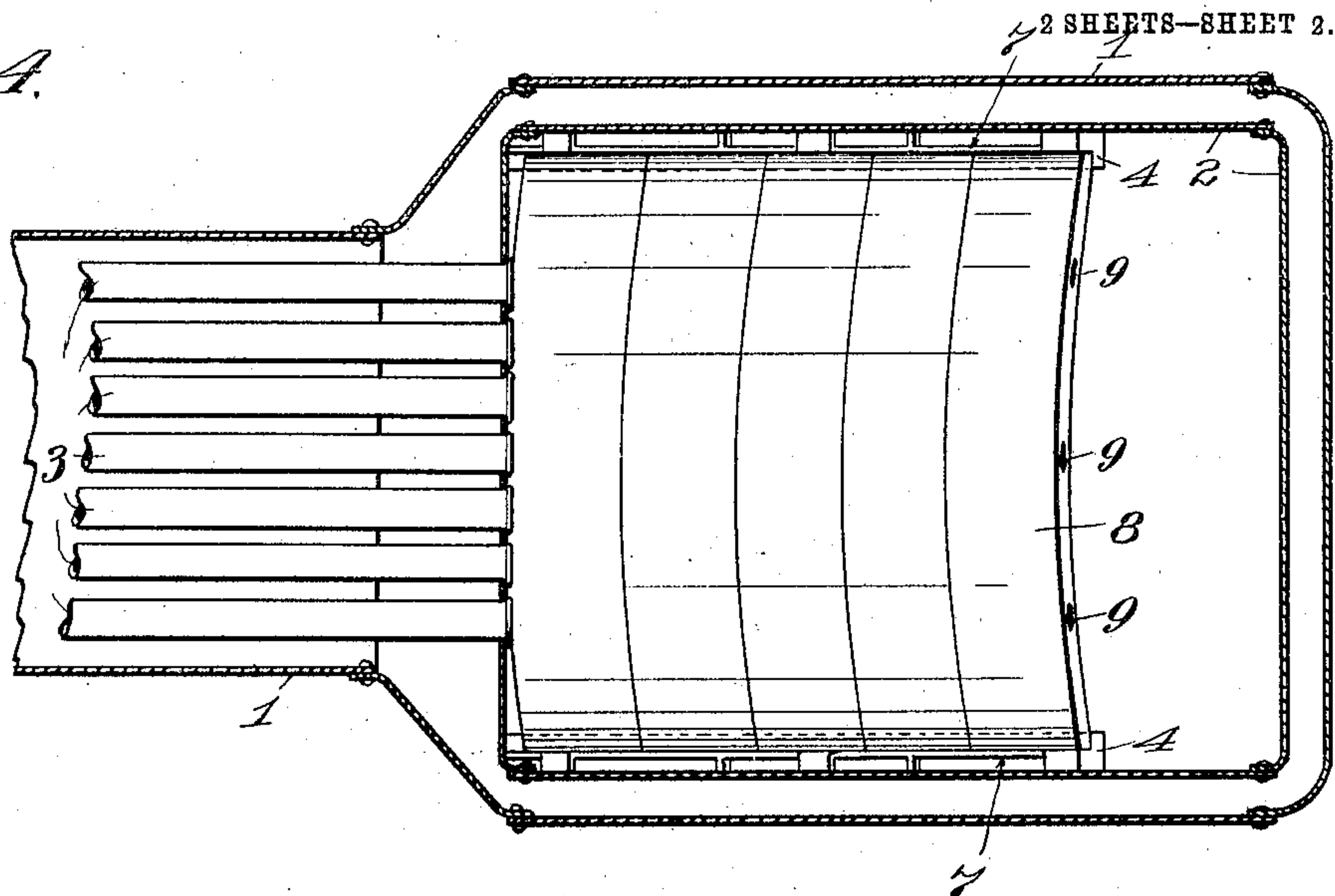
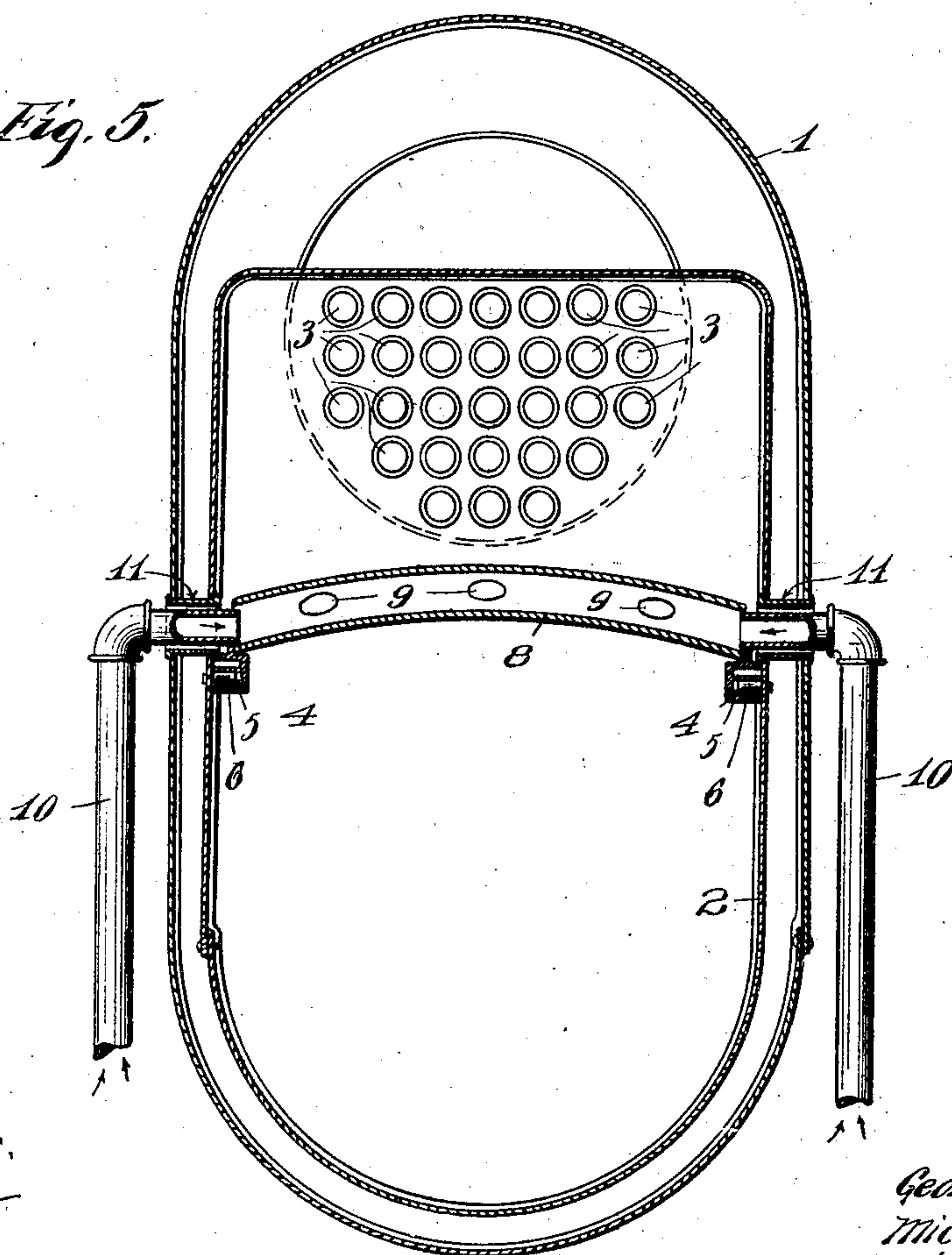


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE KIRKLAND AND MICHAEL JOHN ALLAN, OF HAMILTON,
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STEAM-BOILER FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 789,919, dated May 16, 1905.

Application filed July 18, 1904. Serial No. 216,955.

To all whom it may concern:

Be it known that we, GEORGE KIRKLAND and MICHAEL JOHN ALLAN, citizens of the Dominion of Canada, residing at Hamilton, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Steam-Boiler Fire-Boxes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to steam-boilers, and has for its particular object to provide an improved deflecting arch or plate for horizontal boilers of the locomotive type.

To the above ends our invention consists of the novel devices and combinations of devices and the construction of parts herein-after described, and defined in the claims.

As is well known, the so-called "deflecting" arches or plates are located in the fire-boxes of the boilers in position to cause the flames to take a circuitous line of travel on their way to the flues of the boiler and are therefore subjected to very intense heat. For a good many reasons metal is a very desirable material from which to construct these deflecting arches or plates; but the great difficulty hitherto encountered in the use of metal for this purpose has been found in the fact that the metallic parts would be heated to such a high degree of temperature that they would either melt or become so soft that they would sag under their own weight, and thus lose their shape and in time drop from position.

In accordance with our invention we preferably form the deflecting arch or plate of hollow metallic portions having air-passages arranged to permit a circulation of air there-through, so as to prevent them from becoming overheated.

Our invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a vertical section taken longitudinally of a boiler on the line $x' x'$ of Fig.

2, the said boiler having within its fire-box a deflecting arch or plate designed in accordance with our invention. Fig. 2 is a transverse vertical section taken on the line $x^2 x^2$ of Fig. 1. Fig. 3 is a vertical longitudinal section taken on the line $x^3 x^3$ of Fig. 2. Fig. 4 is a horizontal section taken approximately on the line $x^4 x^4$ of Fig. 1; and Fig. 5 is a view corresponding to Fig. 2, but illustrating a modified construction.

Of the parts of the boiler shown in the drawings the numeral 1 indicates the shell of a boiler, the numeral 2 the fire-box, and the numeral 3 the flues. The grates of the fire-box are not shown in the drawings.

The sections of our improved deflecting arch or plate are supported by a pair of inclined rails 4, which rails are formed with elongated seats or slots 5, that engage detachably with studs 6, rigidly secured to the inner surfaces of the sides of the fire-box 2. These supporting-rails 4 are flanged and cored out to make them comparatively light, and they are formed with shouldered ledges 7, that are adapted to receive the open ends of the sections 8 of the said deflecting arch or plate. The sections 8 are hollow and are preferably rectangular in cross-section and are slightly bowed upward at their intermediate portions. As already stated, these sections 8 are open at their ends, and by reference to Fig. 2 it will be noted that these open ends are spaced apart from the sides of the fire-box by the shouldered ledges 7 of the supporting-rails 4. The sections 8 hold the rails 4 in working position. The several hollow sections 8 are placed edge to edge, so as to afford a continuous arch or plate extending from the fluesheet of the fire-box rearward and upward to a proper point to leave only the desired passage between the same and the rear and upper plates of the fire-box. The side walls of the several sections 8 are formed with air-passages 9, so located that the air-passages of the abutting walls register and afford communication between the interiors of the several sections.

With the construction described the hot air

within the hollow sections finds a ready escape upward and outward through the air-passages 9, and the cooler air from the sides of the fire-box rushes into the interior of said sections, through the open ends thereof, and passes from one section to the other upward through the coincident passages 9. In this way the sections of the deflecting arch or plate are kept from becoming overheated—that is, from being heated to the melting point or to a point at which they will not have sufficient rigidity to sustain their own weight. Any section of the deflecting arch or plate which may in the course of time become burned out or damaged by the continued heat may be easily replaced by a new section. By making the sections arch-shaped and providing them with end portions having bases of reaction against the sides of the fire-box their self-sustaining strength when under a high temperature is also greatly increased.

In Fig. 5 is illustrated a construction in which cold outside air from outside of the fire-box may be introduced into the hollow sections of the deflecting-arch through pipes 10, the inturned ends of which are shown as passed through thimbles 11, extended between the side plates of the boiler and fire-box.

From what has been said it will of course be understood that our invention above described is capable of modification in many respects, all within the scope of our invention, as herein set forth and claimed.

What we claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a fire-box for boilers a deflecting-plate made up of a plurality of hollow sections that are spaced, at their ends from the sides of the fire-box and are open for the inlet of air, said sections having in their abutting side walls aligned communicating passages substantially as described.

2. The combination with a horizontal boiler having supporting-strips located within and supported from the sides of its fire-box a deflecting-plate supported by said strips, and made up of a plurality of hollow arched sections 8, which sections are opened at their ends and spaced apart from the sides of the fire-box to afford air-inlet passages, and are formed in their abutting side walls with communicating air-passages 9, and which arched sections at their ends react against the sides of the fire-box to resist straightening of said sections, substantially as described.

In testimony whereof we, the said inventors, have affixed our signatures each in the presence of two witnesses.

GEORGE KIRKLAND.
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Witnesses as to Kirkland:

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