No. 618,357. Patented Jan. 24, 1899.

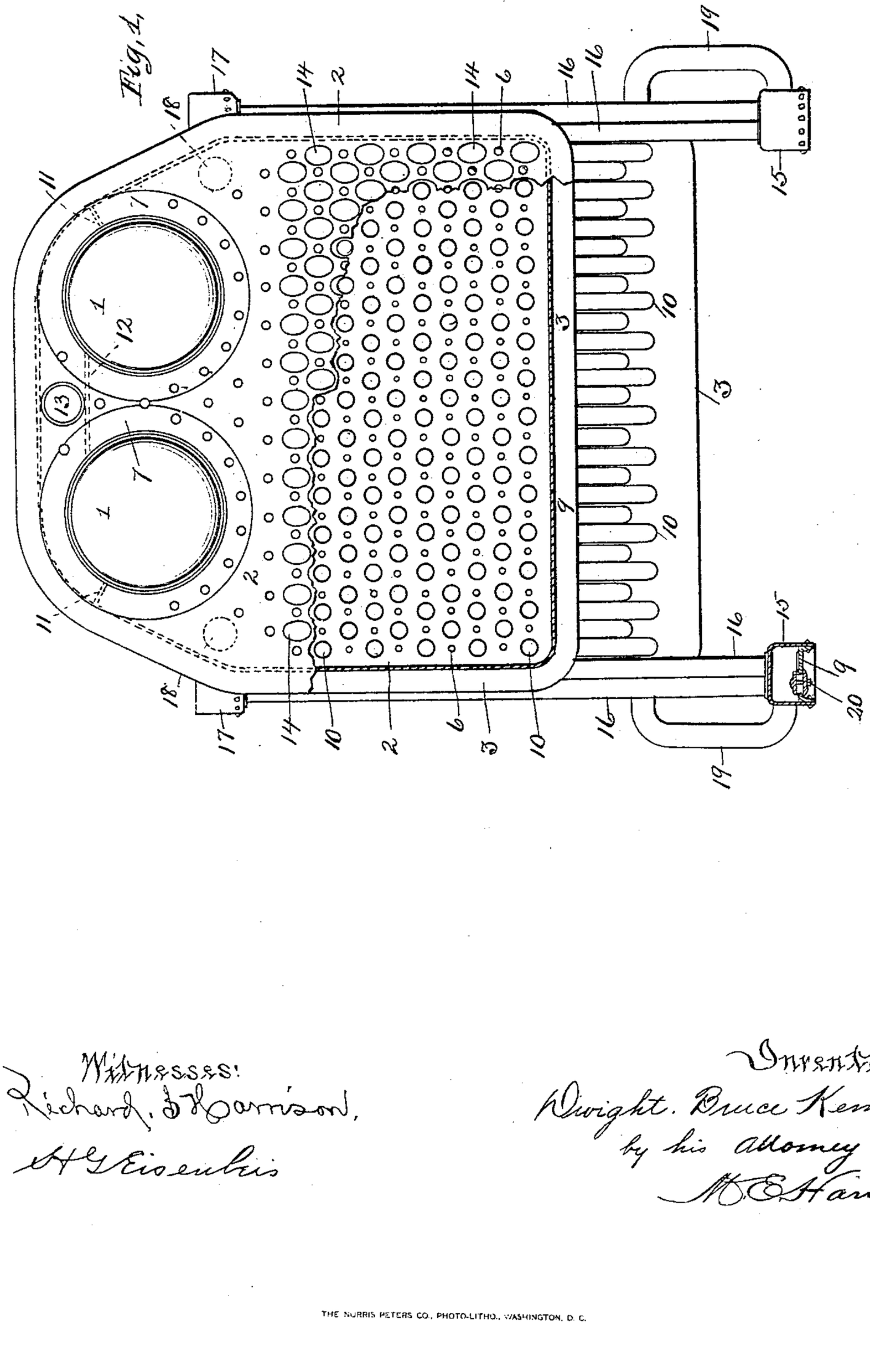
D. B. KENNEDY.

BOILER.

(Application filed Jan. 29, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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H. G. Eisenbis

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M. E. Harrison.

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(No Model.) 4 Sheets—Sheet 2.

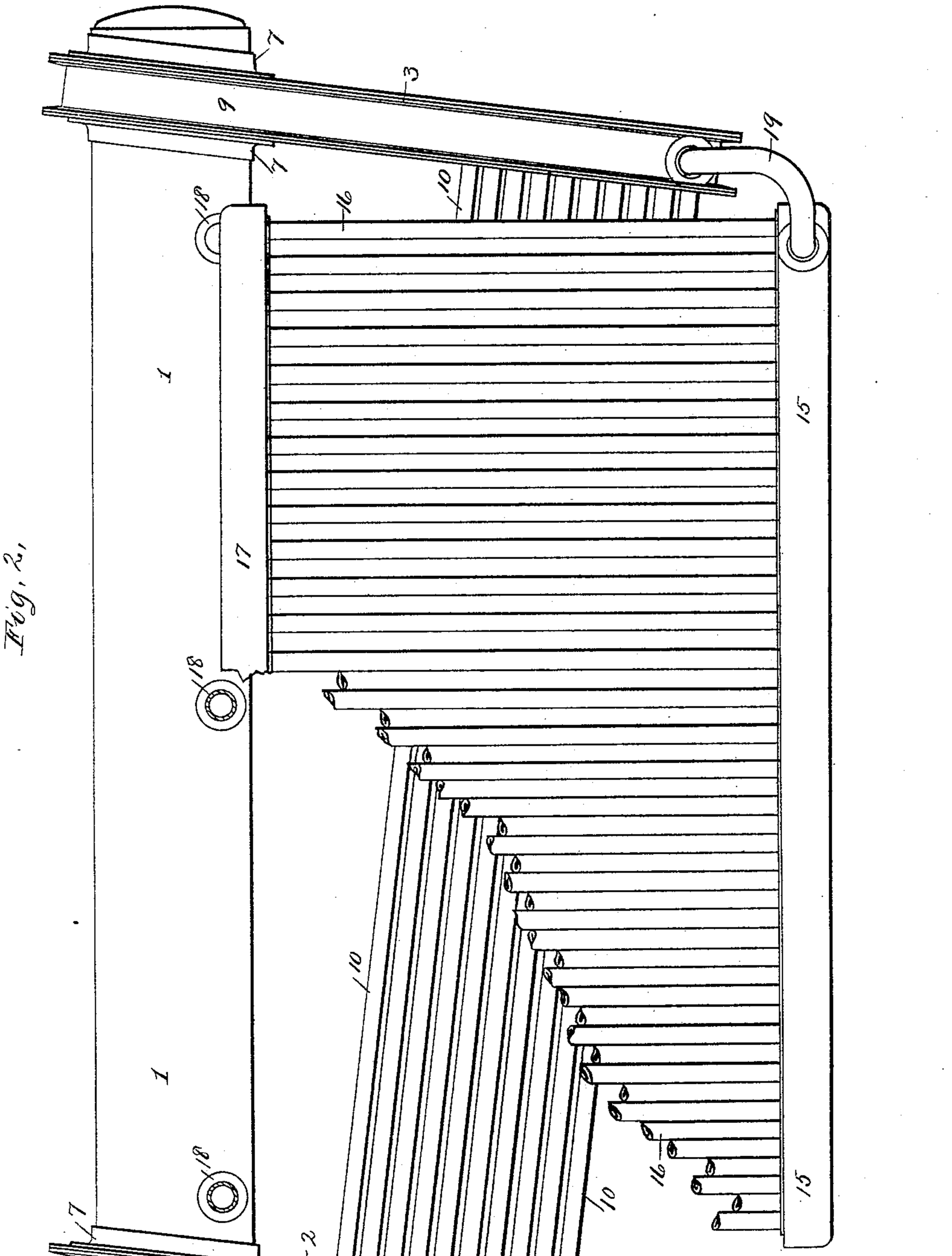

Fig. 2.

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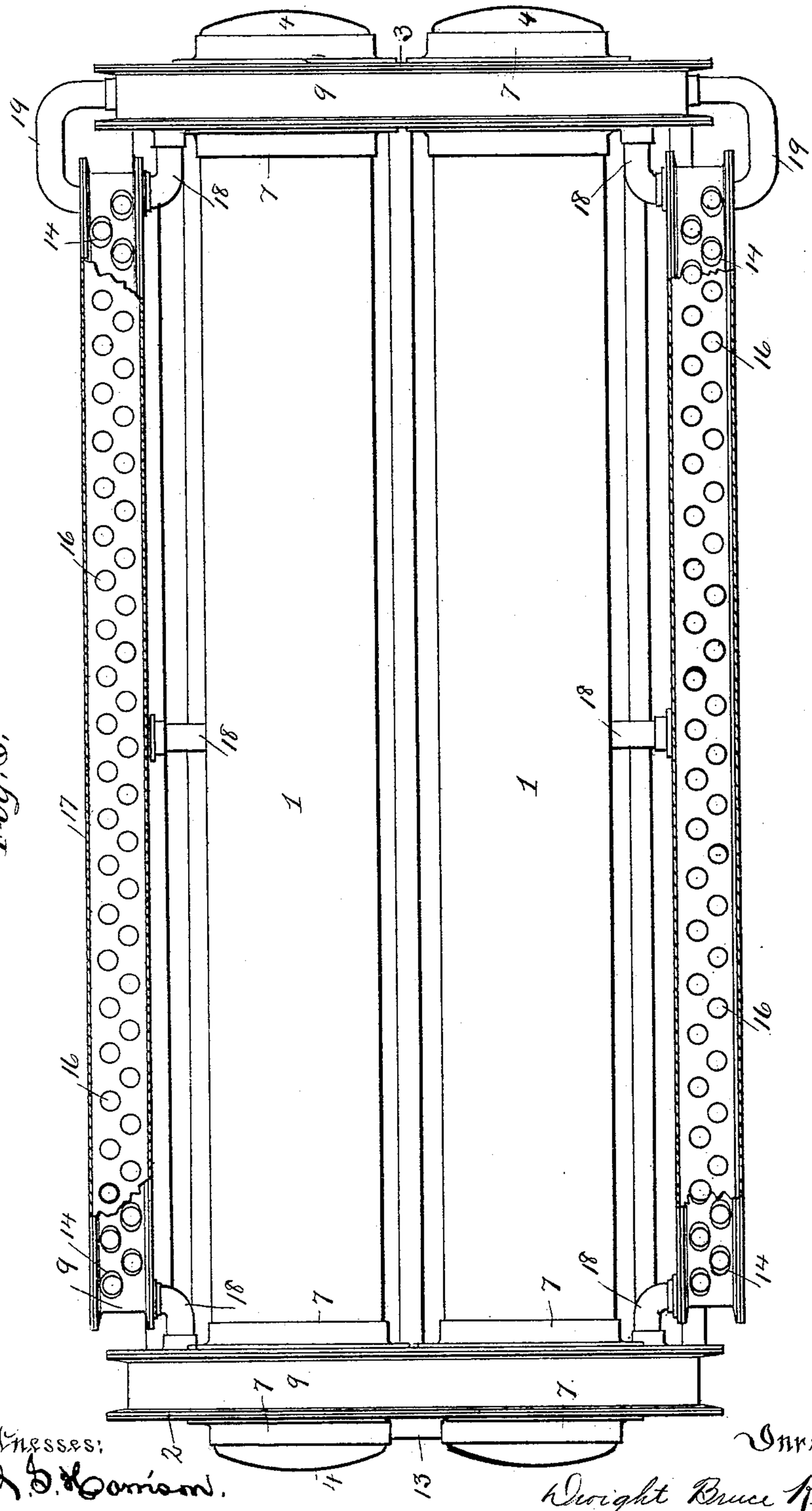
(No Model.) 4 Sheets—Sheet 3.

Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

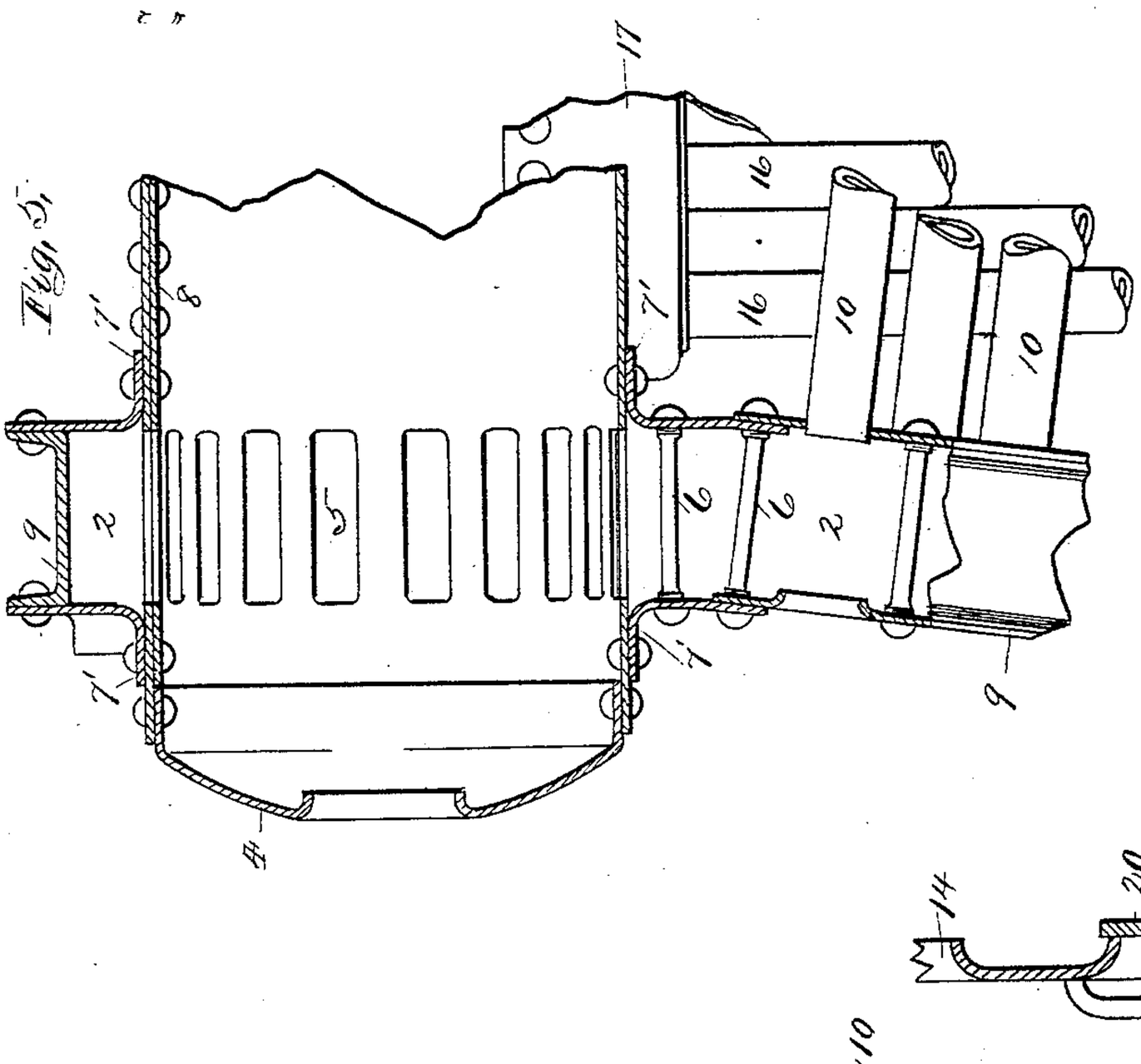


Fig. 8.

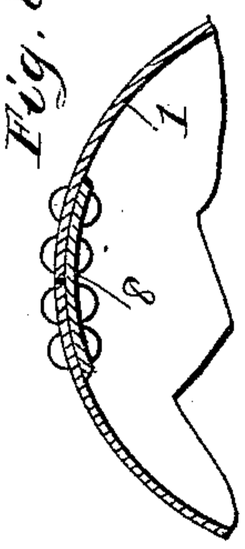


Fig. 7.

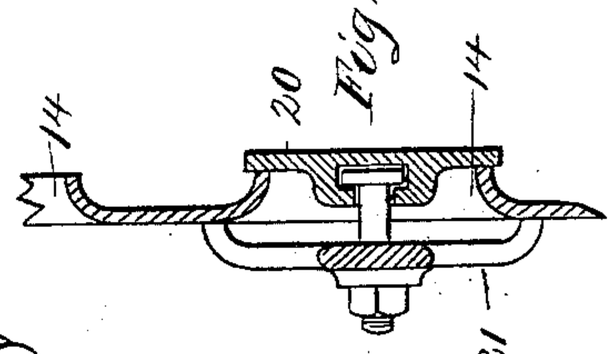


Fig. 4.

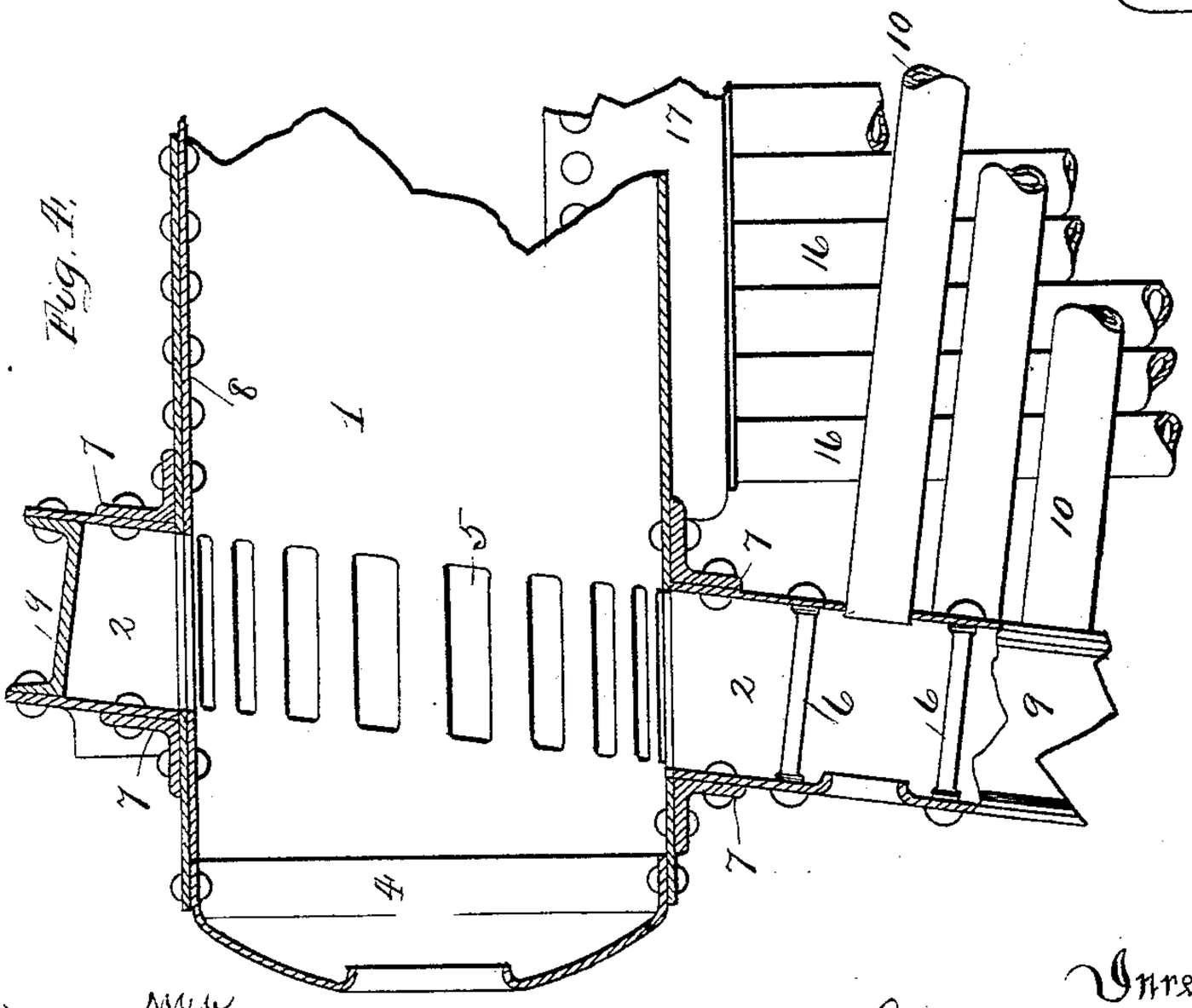
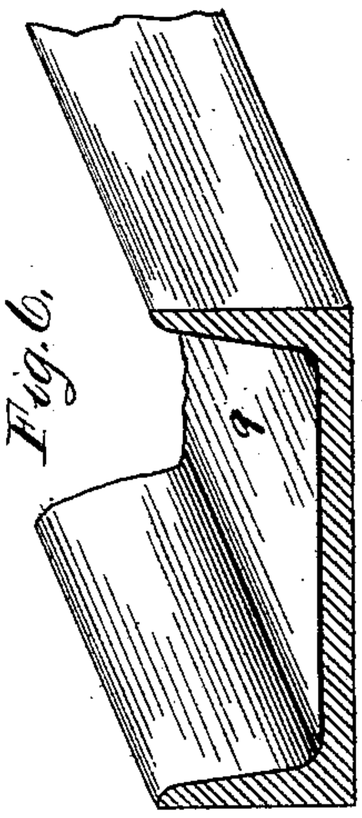


Fig. 6.



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UNITED STATES PATENT OFFICE.

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BOILER.

SPECIFICATION forming part of Letters Patent No. 618,357, dated January 24, 1899.

Application filed January 29, 1897. Serial No. 621,162. (No model.)

To all whom it may concern:

Be it known that I, DWIGHT BRUCE KENNEDY, a citizen of the United States, residing at Oakmont, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Boilers; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to an improvement in boilers or steam-generators; and it consists in the certain details of construction and combination of parts, as will be fully described hereinafter.

This invention relates to that class or type of boilers known in the art as "water-tube" boilers; and the particular features of the invention are, first, in projecting the steam drum or drums through the water-legs, thereby greatly adding to the strength of the construction and avoiding the use of stay bolts or braces and establishing a communication between the said drums and water-legs by perforating the former at the proper points; second, to cheapen and strengthen the construction of the water-legs by means of a peripheral rolled section or shape, and, third, to construct and arrange the hand-openings opposite the water-tubes in the form of an oval or ellipse having an inwardly-projecting flange, against which the covers will find a bearing, and also to so arrange baffle-plates with reference to the steam-outlet that will insure the best results, together with other advantages that will be particularly referred to in the following description and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation of my improved boiler or steam-generator which is constructed and arranged in accordance with my invention, a part of the said view being shown in section the better to show the arrangement of the water-tubes and stay-bolts. Fig. 2 is a side elevation of the same, a part of the side water-tubes being broken away at the front. Fig. 3 is a plan view of my improved steam-generator, showing the side boxes or drums in section. Fig. 4 is an enlarged detailed side sectional elevation of the front portion of the boiler, showing the manner in which the drum is projected through the water-leg. Fig. 5 is a modified form of the connection between the drum and water-leg. Fig. 6 is an enlarged sectional perspective view of the rolled section used in the construction of the water-legs. Fig. 7 is a sectional side elevation of one of the hand-openings formed in the water-legs, showing the cover and inner flange of the same. Fig. 8 is an end sectional elevation of a portion of the drum, showing the manner of riveting the same together in order that a perfect circle may be formed.

To construct a boiler or steam-generator in accordance with my invention, I form from sheet metal one or more drums consisting of a cylindrical shell 1, closed at each end by suitable flanged heads 4, the parts or sheets of the said shell being joined together at the top by means of a plate 8, securely riveted in the manner shown at Fig. 8 on the drawings. This manner of forming the drum 1 will give a complete circle in cross-section without the usual lap and permit the same to be passed through openings formed in the front and rear water-legs, thereby forming a steam-space in the said legs 2 3 above the top of the drums 1. The preferred method of attaching or connecting these drums 1 with the front and rear water-legs 2 3 is made by means of angle or flanged rings 7, (see Fig. 4,) arranged about the drums at the front and rear at the points of intersection of the water-legs and the parts securely riveted. To establish a communication between the drum 1 and the water-legs 2 3, a series of perforations or openings 5 are formed through that portion of the said drum inclosed within the water-legs. The preferred form of the water-legs 2 3 will be best seen at Figs. 1, 2, and 4 of the drawings, which show the front and rear plates formed from single pieces of metal, each having a smooth uninterrupted surface without bend and inclined at an angle to the drums. Each of these water-legs 2 3 consists

of a front and rear plate attached the one with the other, side by side and parallel, by means of a rolled section U-shaped in cross-section arranged inside the periphery of the said plates, the said section being in the form of a "channel-bar" bent to the contour of the water-leg and securely riveted about its flanges to the plates forming the water-leg. To strengthen and brace the plates of the water-legs, a number of stay-bolts 6 are arranged in regular order between the same. Formed in the front sheet of the water-leg 2 and in the rear sheet of the leg 3 are a series of oval or elliptical openings 14 to form hand-holes, one of which is located opposite to each extremity of the inclined water-tubes 10. These openings 14 are each formed with an inner flange, against which a cover 20 is placed and the said cover held in position by a bolt and arch-piece 21. These openings thus formed will permit the oval or elliptical cover 20 to be easily passed through the said openings and be secured against the inner flange to form a steam-tight connection and resist the outward pressure of the steam within the water-legs. Connecting the front 2 and rear water-legs 3, the one with the other, are a series of water-tubes 10, arranged at a right angle with the said legs and in parallel rows.

At the top of the front water-leg 2, between the drums, is a steam-outlet 13, which is located at a point above the water-line and is protected by baffle-plates, (see Fig. 1,) one of which, 12, is located between the two drums 1 and the other plates 11 at each outer side thereof. These plates 11 12 are perforated to permit the steam to ascend and form a barrier to prevent the water rising to the steam-opening above.

At each side of the boiler are placed boxes or supplemental drums 15 17, each of which is formed from sheet metal bent in the form of the letter U in cross-section, the open outer side of which is fitted with a rolled section 9, securely riveted thereto, in a manner that will form a box. These boxes 15 17 are arranged in pairs, the one above the other, and connected by water-tubes 16, preferably in double rows placed as close together as possible, practically forming side walls for the boiler-setting. Each of these boxes 15 17 is provided with oval hand-openings 14 opposite the extremity of each tube and the top boxes 17, having connections 18 with the drums 1, while the lower boxes 15 are provided with connections 19 with the rear water-leg. These connections 18 19 will insure the proper circulation between the several parts of the boiler.

The rear water-leg 3 is similar in every respect to the front, except that the same is made somewhat longer, the reason of which is obvious.

Each of the side boxes 15 17 is provided with the oval hand-openings 14, formed with the inner flange in the same manner as those above described and arranged opposite to all the vertical water-tubes 16.

At Fig. 5 on the drawings I have shown a modified form of connection for connecting the drums to the water-legs, which consists in flanging the openings through which the drums are passed both at the front and rear and riveting the said flanges 7′ to the drums. It will be noticed that the front and rear plates forming the water-leg are in two pieces, riveted in horizontal seams, and to simplify the forming of the flanges 7′ and to give the water-tubes 10 the proper angle of inclination a slight bend is made at or near the connection of the sheets. The same rolled section 9 and arrangement of the other parts of the boiler are the same in this modification as that of the preferred form above described.

It is obvious that other modifications may be made without departing from the spirit of my invention. Therefore I do not confine myself to the exact construction shown and described.

Having thus described my invention, I claim—

1. In a boiler, the combination of inclined water-legs, a horizontal drum projecting through said legs and secured thereto by flanges and rivets whereby said legs are strengthened and supported, and a series of inclined water-tubes secured to said legs beneath the drum; said drum being perforated at its parts surrounded by the legs, substantially as set forth.

2. In a water-tube boiler such as described, the drums of which project through the water-legs, a central baffle-plate resting upon the said drums, in combination with side baffle-plates at each side of the same, said plates arranged within the legs above the water-line, whereby a barrier is formed between the steam-outlet opening above and the water beneath, as and for the purpose set forth.

3. A boiler comprising water-legs, the drums projecting through the water-legs below the upper ends thereof to provide steam-spaces connected with the drums, the longitudinal water-tubes connecting the legs, the supplemental side drums each consisting of upper and lower V-shaped portions fitted with rolled sections and vertical, closely-arranged, water-tubes 16 connecting said portions, and the connection between the water-legs and the side drums; substantially as described.

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

DWIGHT BRUCE KENNEDY.

Witnesses:
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H. G. EISENBEIS.