

No. 740,923.

PATENTED OCT. 6, 1903.

G. H. RHEUTAN.
BOILER TUBE SHEET.
APPLICATION FILED AUG. 3, 1903.

NO MODEL.

Fig. 1.

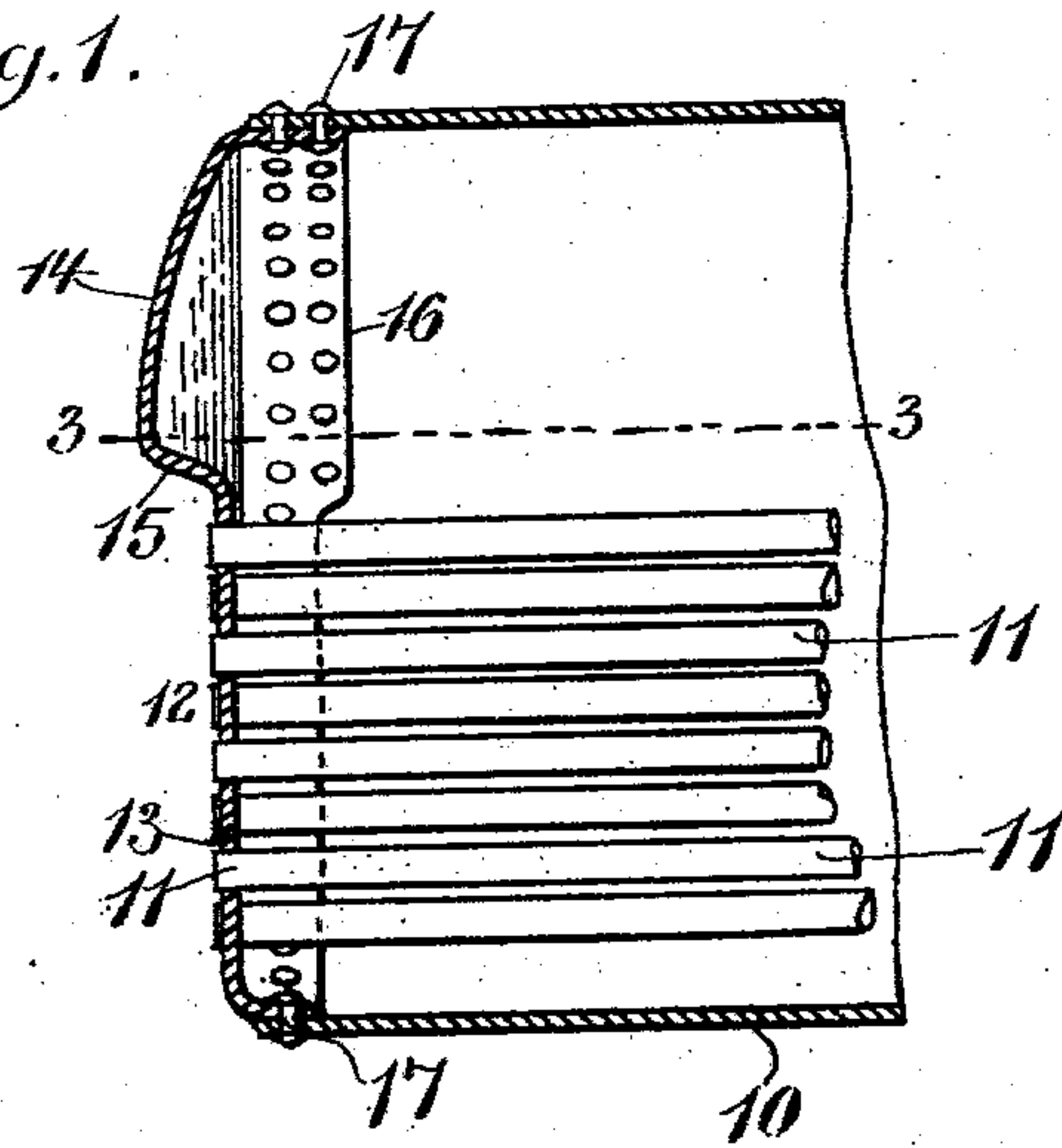


Fig. 2.

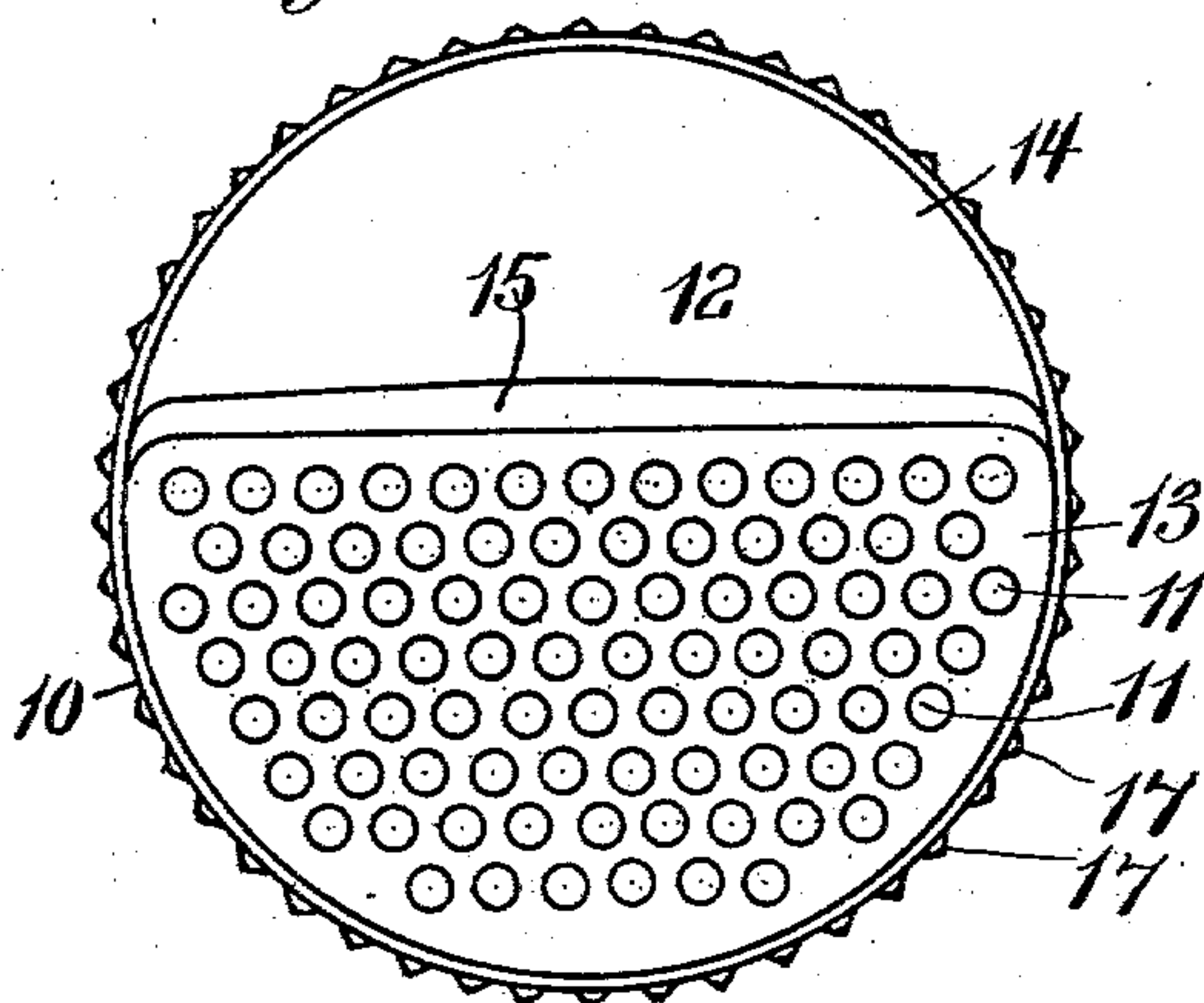


Fig. 3.

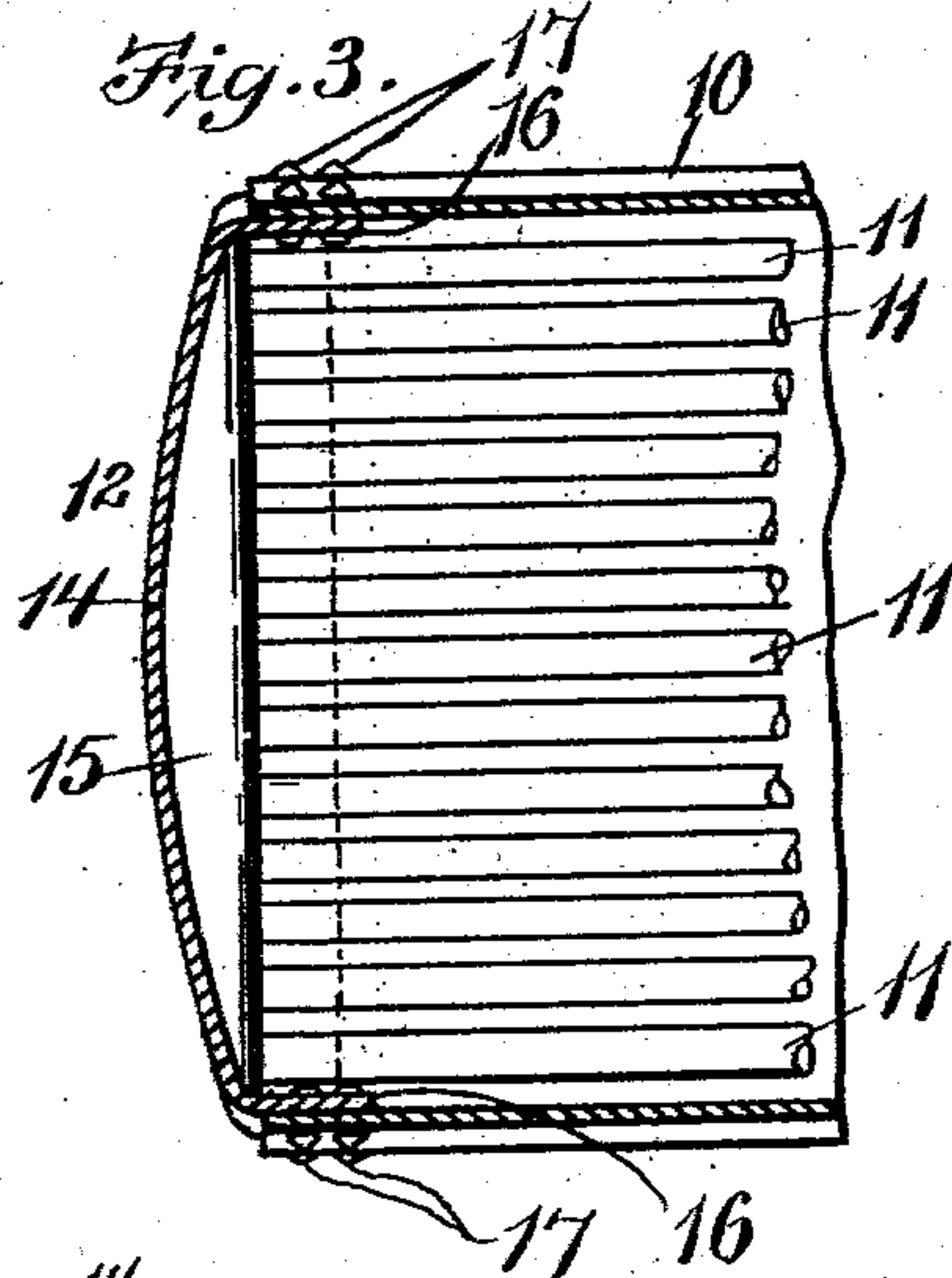
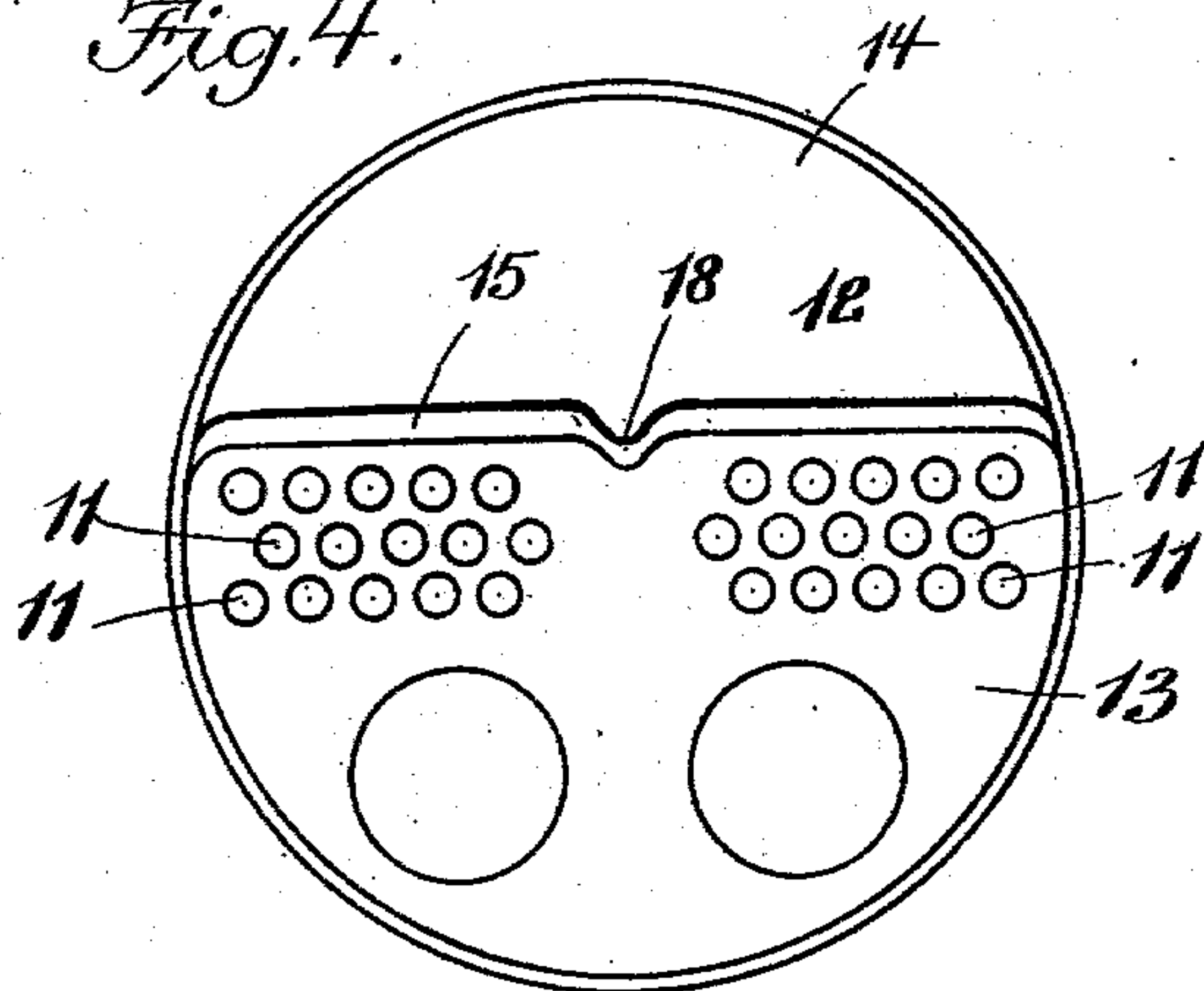


Fig. 4.



Witnesses.
H. Brown
A. C. Ratigan

Inventor.
G. H. Rheutan.
by Wright, Brown & Company
Attys.

UNITED STATES PATENT OFFICE.

GARRETT H. RHEUTAN, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ROBERT B. LINCOLN, OF WALTHAM, MASSACHUSETTS.

BOILER TUBE-SHEET.

SPECIFICATION forming part of Letters Patent No. 740,923, dated October 6, 1903.

Application filed August 3, 1903. Serial No. 167,980. (No model.)

To all whom it may concern:

Be it known that I, GARRETT H. RHEUTAN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Boiler Tube-Sheets, of which the following is a specification.

This invention relates to fire-tube boilers, and particularly those of the return tubular fire-tube type.

The invention resides in the construction of the tube-sheet or head and its relation to the boiler; and among its objects are to simplify the construction of the boiler and produce a head or tube-sheet of adequate strength which shall require no bracing or a minimum of bracing by stays and like structure; to obtain increased strength by shaping the head along the natural lines of resistance which the plate would assume under pressure if free to adjust itself thereto; to produce a boiler with a minimum of parts and to attain uniform expansion and contraction, and to obtain an unincumbered interior of the boiler above the fire-tubes, wherein scaling, cleaning, and inspection can be carried on under improved conditions.

Of the accompanying drawings, Figure 1 represents a longitudinal vertical section of one end of a return tubular boiler provided with my improved tube-sheet. Fig. 2 represents an end elevation. Fig. 3 represents a section on line 3 3 of Fig. 1. Fig. 4 represents an end elevation showing a variation in form.

The same reference characters indicate the same parts in all the figures.

In the drawings, 10 represents the shell of a return tubular boiler, and 11 represents the fire-tubes, having the usual location in the lower part of said shell, their ends being fixed in the perforations of the tube-sheet or head 12. Said head is constructed with a substantially flat perforated lower portion 13, whose holes receive the tube ends, an outwardly-bulged convex portion 14 above the flat portion 12 and occupying substantially the whole width of the tube-sheet, and a horizontal connecting-shelf 15, integral with the metal or substance of the portions 13 14—in other words, continuous with the web of the sheet and extending transversely across said sheet. The convex portion 14 has the natural shape

of greatest resistance which it would assume if free to adjust itself to the pressure of the boiler, and the shelf or ledge 15 forms a transverse truss presented edgewise to the general plane of the tube-sheet and to the direction of pressure from within the boiler. The effect of such construction is to so stiffen and strengthen the tube-sheet that the necessity for staying its upper portion is eliminated or reduced to a minimum, thereby attaining the advantages above mentioned.

The head or tube-sheet 12 has a cylindrical flange 16 for securing it to the shell 10 with rivets 17.

Various modifications may be made in the actual configuration of the sheet without departing from the principles involved. For example, in Fig. 4 I have shown a tube-sheet for large boilers, such as those of the marine type. In this case the ledge or truss 15 is formed with a downwardly-extending cusp 18, coinciding with the middle portion of the flat part 13, where tubes 11 are omitted.

I claim—

1. A tube-sheet for fire-tube boilers having included in its structure a truss crossing the sheet transversely and presented edgewise to the general plane of the sheet.

2. A tube-sheet for fire-tube boilers constructed with a substantially flat portion perforated for the reception of the tube ends, a convexed portion offset therefrom, and a connecting-shelf integral with the substance of said portions and forming a truss extending transversely of the sheet and lying edgewise to the general plane thereof.

3. In a fire-tube boiler, a boiler-shell, a head or tube-sheet in the end thereof constructed with a substantially flat perforated portion, an outwardly-bulged convex portion adjoining the same, and a connecting-shelf forming a truss extended transversely of the tube-sheet and lying edgewise to its general plane, and fire-tubes within said shell having ends fixed in the perforations of said tube-sheet.

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

GARRETT H. RHEUTAN.

Witnesses:

R. M. PIERSON,
A. C. RATIGAN.