

No. 773,916.

PATENTED NOV. 1, 1004.

D. BEST.
STEAM BOILER.
APPLICATION FILED APR. 12, 1904.

NO MODEL.

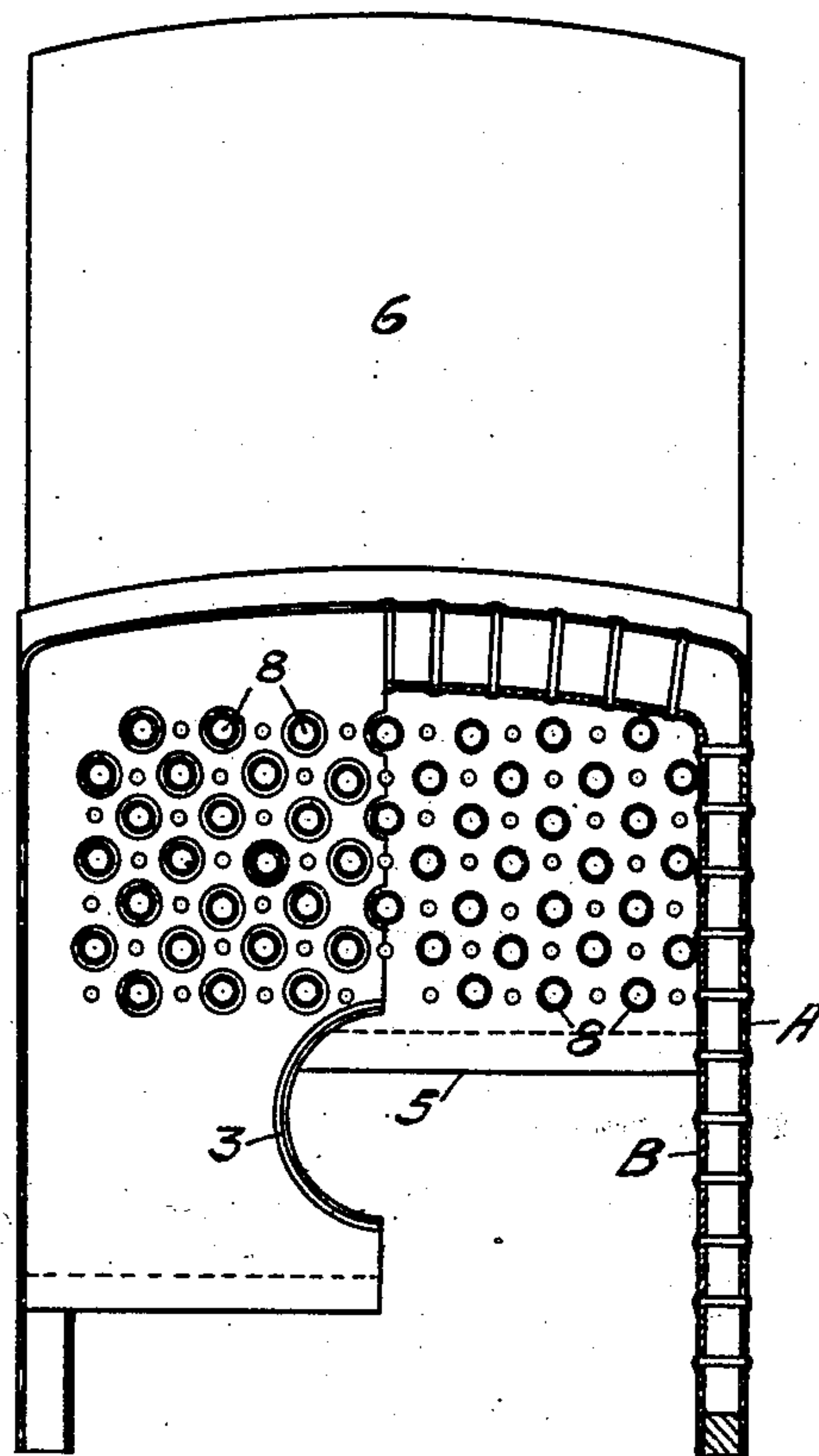


FIG. 1.

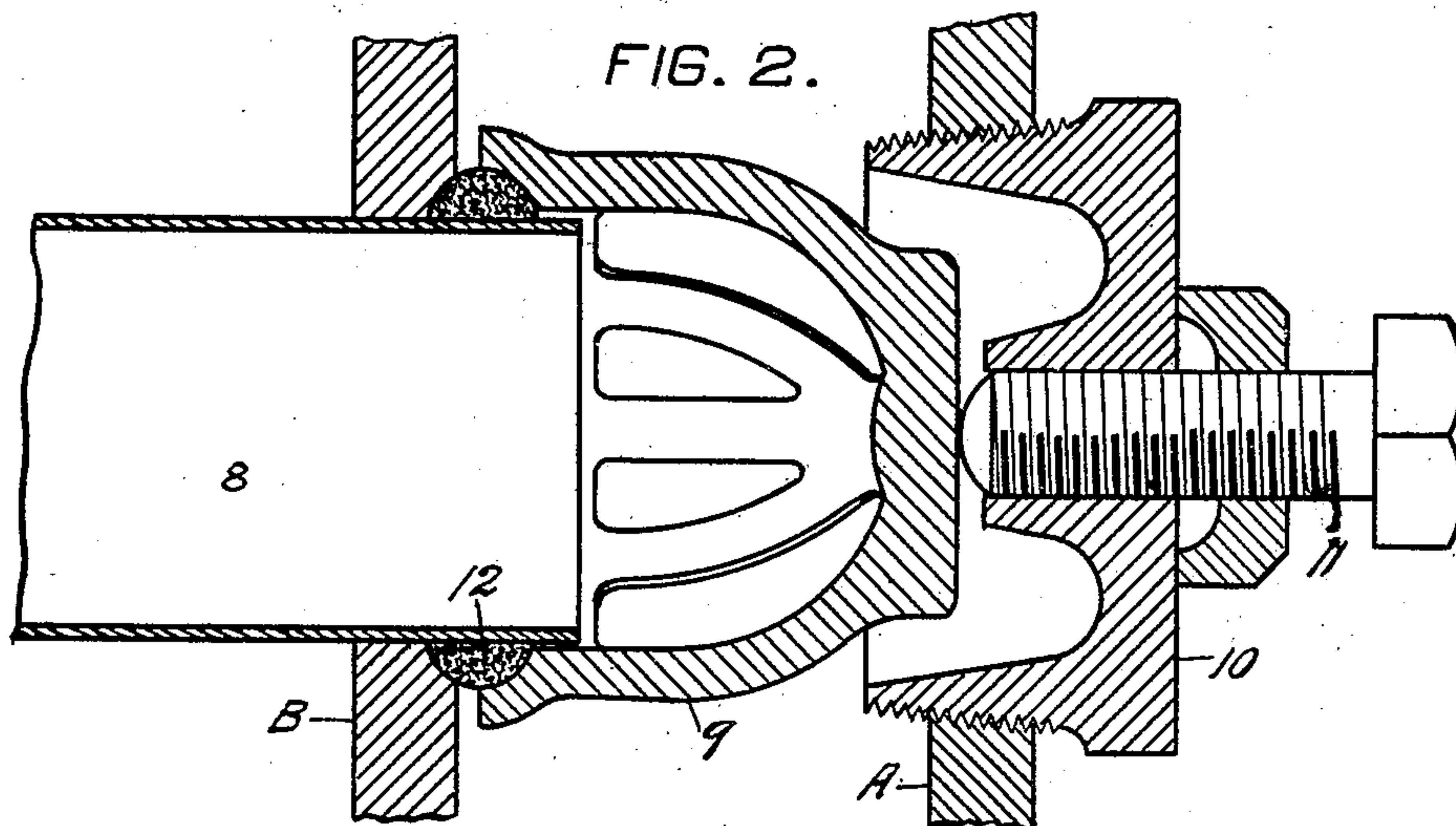


FIG. 2.

WITNESSES,
Chas. E. Chapin.
[Signature]

INVENTOR,
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UNITED STATES PATENT OFFICE.

DANIEL BEST, OF SAN LEANDRO, CALIFORNIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 773,916, dated November 1, 1904.

Application filed April 12, 1904. Serial No. 202,798. (No model.)

To all whom it may concern:

Be it known that I, DANIEL BEST, a citizen of the United States, residing at San Leandro, in the county of Alameda and State of California, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to improvements in steam-boilers.

It consists in the combination and arrangement of parts whereby tight and adjustable joints are formed between the shell of the boiler and the water-tubes and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a partial vertical transverse section taken through the rear end of the boiler. Fig. 2 is a central section of the joint.

In the construction of multitubular water-tube boilers the joints between the tubes and the tube-sheets are commonly formed either by expanding the tubes within the tube-sheets, with thimbles fitted thereto; or by other similar means. In many places where the water is of such character that the tubes and the portions especially at these joints become rapidly corroded it is almost impossible to maintain these joints in a tight condition and to prevent leakage.

It is the object of my invention to maintain such joints, to make them readily adjustable, and to easily remove and replace the tubes.

As shown in the drawings, the boiler comprises outer and inner shells A and B, suitably connected by stay-bolts and extending upon both sides, the top, and ends of the boiler.

The tubes 8 are made of any suitable or desired size and extend through the inner wall B at the ends of said walls, and these tubes open into the space between the inner and outer walls, so that water circulating freely through the space between the double walls will also pass through the tubes, so that returning between the shells to the lower end and back through the tubes a very complete circulation is provided. In order to form my improved joint, I have shown the ends of the tubes where they pass through the inner shell

B as fitting into a chamber formed in the inner end of a cap 9, which chamber has its sides open for the free circulation of water from the tube through these openings or from the space exterior to the cap through the openings into the tube, dependent upon the end of the boiler with which the tubes are connected. The outer end of the cap 9 fits into a plug or equivalent handhold-plate 10, and this plate screws or is otherwise fixed into the outer shell A substantially in line with the cap 9. A screw 11 passes through the plug 10, and the inner end of the screw abuts against the outer end of the cap 9. The inner end of the cap 9 is counterbored or has an annular channel or depression formed so as to surround the tube where it enters the cap. This channel is designed to receive an asbestos or equivalent packing, which packing may be made half-round, square, or other suitable form. In the present case this packing 12 is shown as being segmental in transverse section and fitting the corresponding segmental counterbore or channel in the inner end of the cap. The sheet B may have a corresponding counterbore or depression formed around the hole through which the tube passes, so that when the segmental packing is inserted it fits the contiguous grooves in the cap and the tube-sheet B and surrounds the tube at the point where it enters the cap. By forcing the cap down upon this packing by means of the screw 11 an absolutely-tight joint will be made, and the asbestos or equivalent packing not being acted upon by the corrosive substances in the water will maintain this joint in the proper condition. It is so located that the internal pressure from within the tube will have no action tending to blow the gasket out or to make a leak. It will be understood that if a rectangular gasket be employed at this point it will not be necessary to make any depression or chamber in the sheet B, the gasket being compressed firmly against the surface of the sheet and held in place within the channel in the cap 9, which channel would be made of a form proper to receive such a gasket.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. Means for forming tight joints at the junction of a water-tube and inner tube-sheet through which it passes, said means consisting of an open-sided cap chambered to receive
5 the projecting ends of the tubes, a gasket surrounding the end of the tube said tube-sheet and chambered end of the cap counterbored to receive each a portion of the gasket, a plug fixed in the outer shell of the boiler in line
10 with the flue, and a screw passing through the plug and bearing against the closed end of the cap.

2. The combination of a tube-sheet, a tube, a cap in line with the tube, having one end
15 closed and the opposite end open to receive

the end of the tube, said tube-sheet and the adjacent end of the cap counterbored, a gasket segmental in cross-section and surrounding said tube and fitting the counterbores in the cap and tube-sheet, and means for com- 20 pressing the gasket to form a tight joint at the junction of the tube and tube-sheet.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DANIEL BEST

Witnesses:

CHAS. H. HALE,
A. B. THOMAS.