

No. 737,517.

PATENTED AUG. 25, 1903.

F. E. STANLEY.
BOILER.

APPLICATION FILED JUNE 21, 1901.

NO MODEL.

Fig. 1.

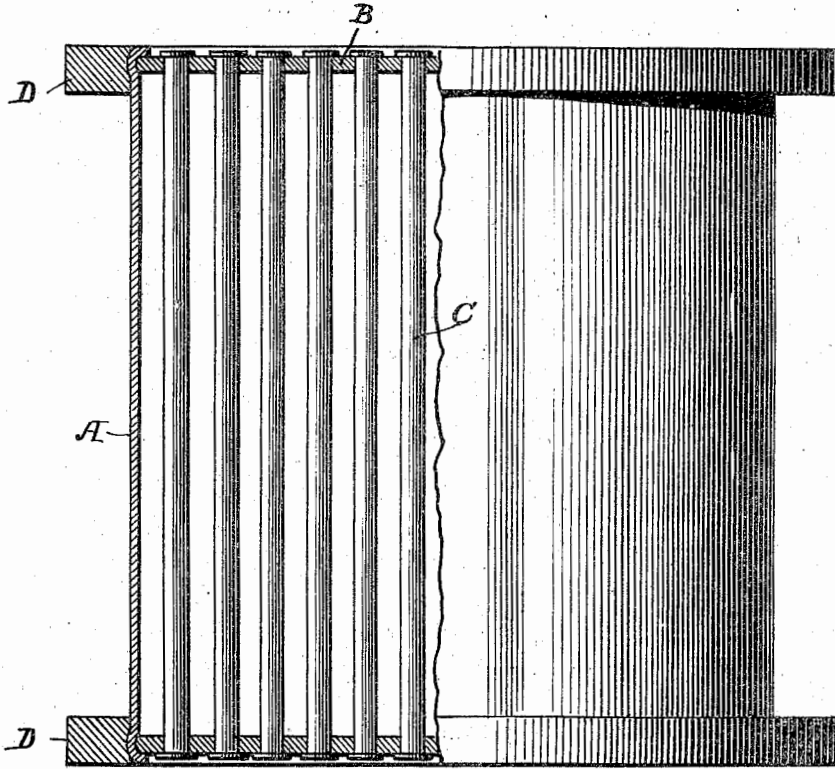


Fig. 2.

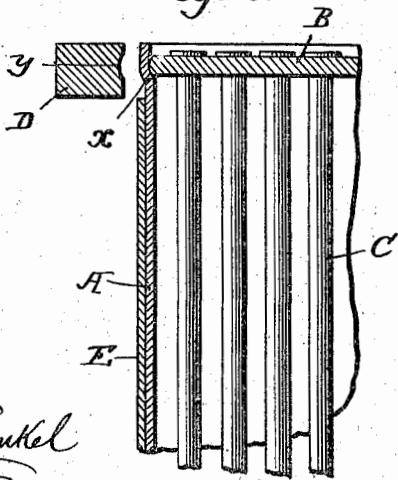
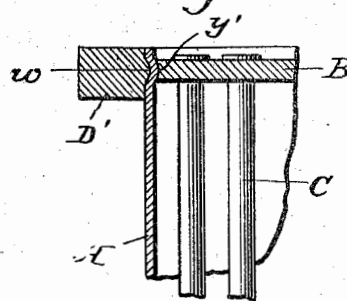


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANCIS E. STANLEY, OF NEWTON, MASSACHUSETTS, ASSIGNOR OF ONE HALF TO FREELAN O. STANLEY, OF NEWTON, MASSACHUSETTS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 737,517, dated August 25, 1903.

Application filed June 21, 1901. Serial No. 65,474. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS E. STANLEY, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

My invention relates to steam-generators, and has for its objects to secure a tight joint between the head or heads and shell of the boiler without the use of rivets and to properly strengthen the body of the boiler when it is made of soft metal, and to these ends I construct the parts as set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of a tubular steam-generator embodying my invention; Fig. 2, a section showing the parts in the positions which they occupy before being bound together to form a tight joint between the shell and head and with a reinforcing shell or sleeve, and Fig. 3 a section illustrating a modification.

The shell A of the steam-generator may be of any suitable metal or composition, but is preferably of copper, which may when necessary be strengthened by an exterior wire winding or in any other suitable manner, and each head B supports tubes C, expanded or connected in any suitable manner. Instead of flanging the body and riveting the flange thereof to the head, as usual, I connect these two parts by forming an annular recess in one and a corresponding annular rib or projection upon the other, and then by means of a metallic ring D, having an inner face corresponding with the shell opposite the edge of the head, I maintain the parts in contact. In order that these parts may be held in contact under the necessary pressure to secure a tight joint and to avoid leakage resulting from any expansion of the parts, the ring D is a continuous ring, the opening in which is smaller in diameter than the diameter of the parts to which it is applied, and this ring is then heated to a red heat and is thereby expanded to such an extent that it can be slipped over the exterior of the body or shell of the boiler to a position opposite the edge of the head, and the ring is then

cooled or allowed to cool, when it will contract and will exert thereby sufficient pressure upon the shell to force it into contact with the edge of the head and secure and maintain the desired tight joint. The heating of the boiler will not result in any undue expansion of the ring D, inasmuch as the latter is in any case subjected to very much less heat than the other parts.

In the construction shown in Fig. 1 the head B, preferably of steel, is slightly rounded at the edge, and in the process of manufacture the shell is expanded near the end to form a slight shoulder or offset α , upon which the head is placed. With a shell made of copper properly annealed the shoulder may be readily formed. The ring D, preferably of steel and having an internal diameter less than that of the outside shell, is provided with an annular groove γ in its inner face and may readily be expanded by heat to a diameter permitting it to be slipped into place outside of the shell, and when it cools will contract and force the copper shell up against the steel head, pinching it between its inner face and the edge of the head and making a perfectly-tight steam-joint.

In the construction shown in Fig. 3 the position of the parts is reversed, the ring D' having an annular rib w on the inner face and the head B having an annular recess or inwardly-curved edge y' .

If any leaks should appear when pressure is put upon the generator, the edge of the shell projecting beyond the head of the boiler may be hammered, so as to upset and close the leak. As the shell and head of the boiler are subjected to a greater heat and acquire a higher temperature than the outside ring, the joint will be tightest when the steam-pressure is greatest.

It will be seen that for the purpose of upsetting the edge of the shell to tighten the joint when necessary it is desirable that the shell should be of soft metal. In such case it may be too soft of itself to stand the desired internal pressure, and as one means of reinforcing the shell where it is not desirable to make use of a wire winding I provide a reinforcing-shell E, of steel of proper thickness and somewhat less in internal diameter than

the shell A, and expand this shell E by heat and slip it over the shell A before forming the shoulder upon the latter. On shrinking, the shell E contracts and binds tightly against the shell A and affords the desired reinforcement.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. The combination in a steam-generator, of a shell, a head, and a ring engaging the outer portion of the shell with its inner face at a point opposite the edge of the head and holding the shell and head in contact to form a tight joint, substantially as set forth.

2. The combination in a steam-generator, of a shell and a head, one with an annular recess to receive an annular projection on the other, and a shrunken ring having an inner face adapted to the outer face of the shell opposite the edge of the head, holding the parts

together under the pressure secured by shrinking, substantially as set forth.

3. A boiler in which the shell is held in tight contact with the edge of the head by an external ring under pressure, substantially as set forth.

4. The combination in a steam-generator, of a shell of soft metal, a head the edge of which fits an internal annular recess in the shell, and a metallic ring recessed to fit the exterior of the shell opposite the edge of the head and maintained thereon under the pressure secured by shrinking, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS E. STANLEY.

Witnesses:

J. W. BACON,
J. H. GILKEY: