Feb. 16, 1932. W. R. WOOD 1,845,106

DEVICE FOR SECURING DRY STEAM IN BOILERS

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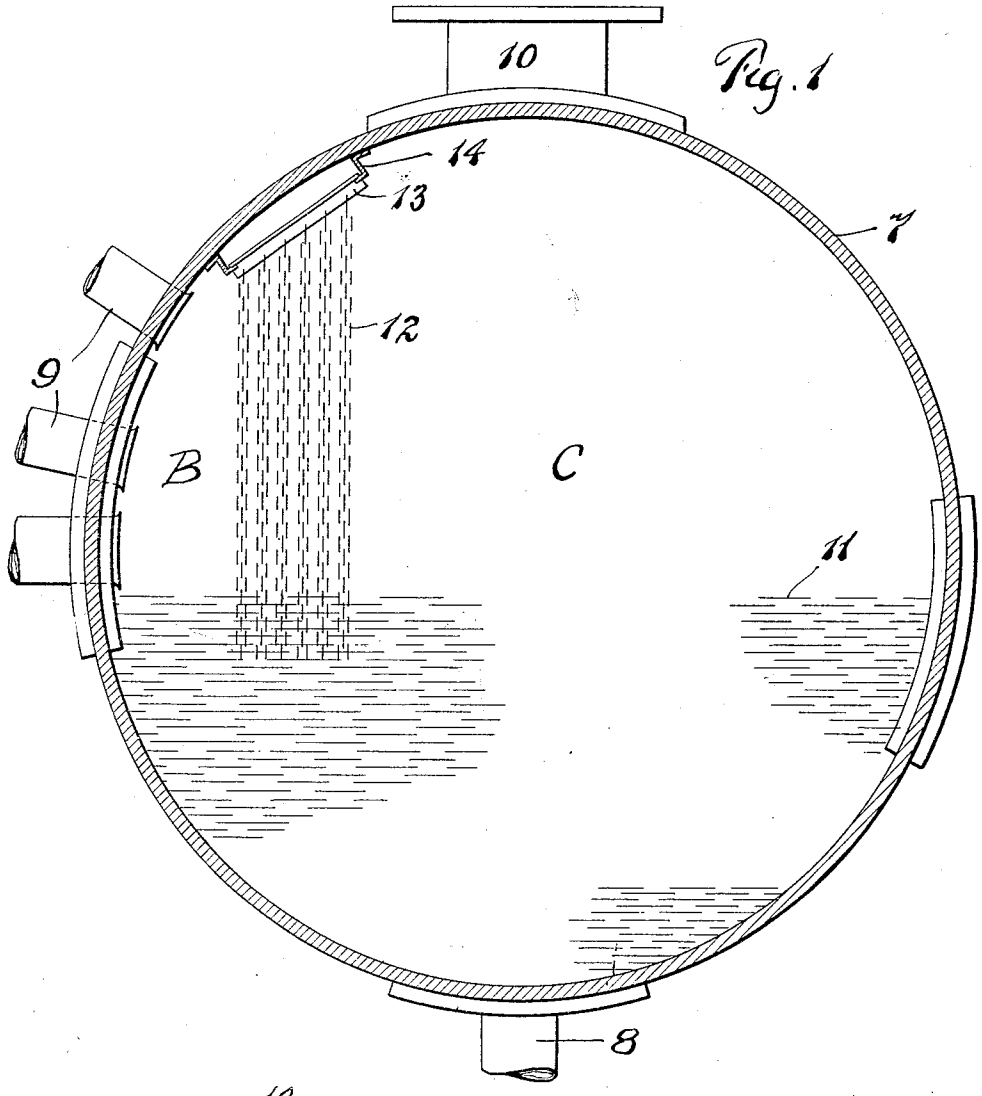


Fig. 1

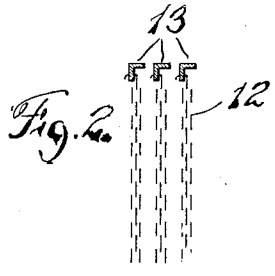


Fig. 2.

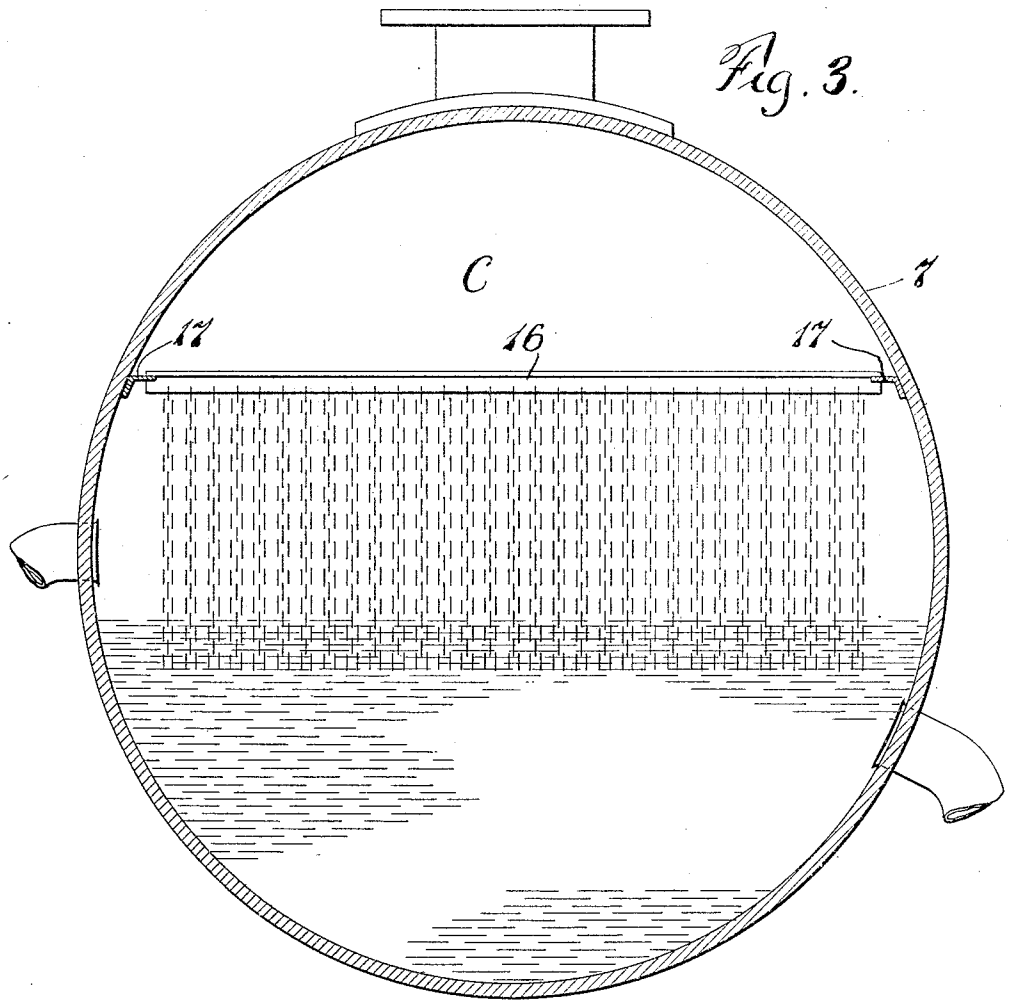
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Fig. 3.



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UNITED STATES PATENT OFFICE

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DEVICE FOR SECURING DRY STEAM IN BOILERS

Application filed July 7, 1930. Serial No. 466,132.

This invention relates to apparatus for securing dry steam in boilers.

One of the primary objects of the invention is to provide a simple, economical and effective means for separating water from steam, which may be installed in existing or in new boilers with facility.

Another object of the invention is to make it possible to simplify boilers of the Stirling type whereby it is possible to provide a three drum boiler and take substantially dry steam from a drum into which active tubes deliver.

How the foregoing, together with such other objects and advantages as may hereinafter appear or are incident to my invention, are realized, is illustrated in preferred form in the accompanying drawings wherein:

Fig. 1 is a cross section of a cross drum boiler embodying my improvements, and

Fig. 2 is a fragmentary view illustrating details of the invention, and

Fig. 3 is a cross section through one of the drums of a bent tube type of boiler illustrating the application thereto of my invention.

Referring now to Fig. 1, reference numeral 7 indicates the drum of the cross drum boiler which has the usual down-coming tubes 8 to the headers of the main bank of tubes (not shown), and the usual delivery tubes 9. The steam offtake is indicated at 10. The line 11 indicates the normal water level in the boiler, although it is to be understood that this may vary somewhat depending upon operating conditions.

The separator indicated as a whole by the reference character A is composed of a plurality of chains 12, arranged in what may be termed a mass, extending for approximately the length of the drum. These chains may be of any preferred type and character, but cheap wire chain of the types now available on the market may be used. A number of such chains are carried in a row on a small angle 13. The angle and its chains constitute a unit, the number of units depending upon the size of the installation. The angles are threaded into place in the clips 14, which may be light Z bars secured to the inner periphery of the drum, and located so that the chains will depend across the line of delivery from the delivery tubes 9, the chains being preferably of such length that the lower ends will always be immersed, even at normal low water levels. The angles being small, the rows of chains will be close together, forming as before stated, a mass of chain work.

Since the lower ends of the chains are immersed in the water in the drum, a compartment B is provided into which the delivery from the tubes 9 takes place. The steam and steam and water delivered into this compartment strikes against the mass of chains, is broken up, and works its way through the wall of chains into the compartment C. The chains present a very large area for the deposition of the water and the steam, and since the velocity of the steam is not increased appreciably, the water which collects upon the chains is not swept off or picked up, but runs down the chains into the body of water in the drum. Thus dry steam is insured.

The mass of chains in a sense may be described as a thick but highly porous wall, permitting the steam to pass therethrough without any increase in velocity, such as would defeat the purposes of the chains.

At times, gobs of water are discharged from the tubes 9 along with the steam, but the wall of chains acts as a barrier which breaks up such discharge, causing precipitation of the water and at the same time preventing ebullition and boiling or agitation in the space C, from which the steam is withdrawn from the drum.

It will be seen that the separator is very inexpensive, can be readily installed in existing or new boilers, and that when it is necessary for workmen or inspectors to enter the drum, they can push the chains aside to examine or work on the tubes, or readily remove the chains or as much of the chains as may be necessary. Ordinarily, it will be unnecessary to remove any of the chains.

In the arrangement of Fig. 3, substantially the same wall of chains is used, but in this case the wall is horizontally disposed and extends lengthwise of the drum with the lower ends of the chains immersed as before, but preferably located above the upper ends of

the delivery tubes. The screens will function as before described, and will maintain a quiet condition within the drop of the drum so that dry steam may be withdrawn from compartment C formed by the wall of chains.

In this case the rows of chains are suspended from horizontally disposed angle 16 resting on angles 17, extending longitudinally of the drum at a suitable level above the water line.

I claim:

1. In combination in a boiler, a drum, boiler tubes connected therewith, a steam offtake, and a plurality of reticulated members dividing the interior of the drum and through which the steam delivered by the tubes must pass to reach the offtake, said members being in the form of chains suspended from their upper ends and having their lower ends free.

2. In combination in a boiler, a drum, boiler tubes connected therewith, a steam offtake, and a flexible relatively thick wall, freely depending from an upper part of the drum, dividing the interior and disposed between the delivery end of the tubes and the steam offtake and being sufficiently foraminous to permit of steam to flow therethrough at velocities such that the wall acts as a separator.

3. In combination in a boiler, a steam-and-water drum, boiler tubes connected therewith, a steam offtake, and a separator in the drum through which steam from the tubes must pass before reaching the offtake comprising a flexible foraminous wall suspended from an upper part of said drum and having its lower end submerged in the water in said drum with freedom to swing therein.

In testimony whereof, I have hereunto signed my name.

WILFRED R. WOOD.