May 1, 1928. 1,667,758

G. WELTER

ELECTRIC BOILER APPARATUS

Filed June 28, 1926

Fig. 1.

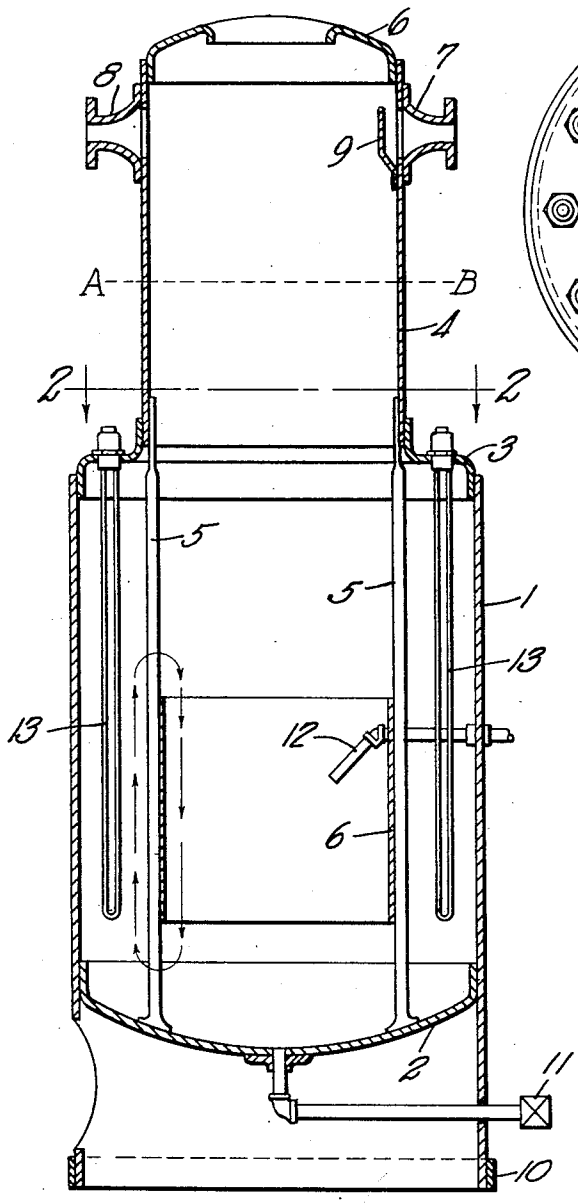
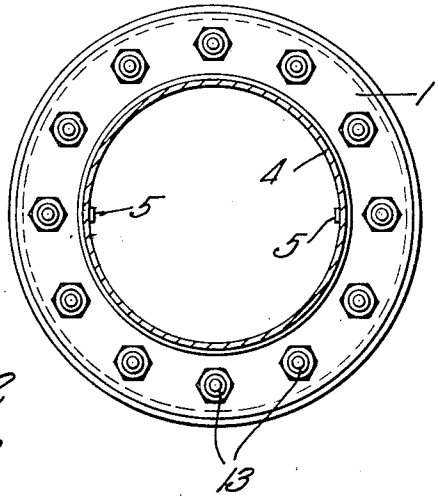


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRIC BOILER APPARATUS.

Application filed June 28, 1926. Serial No. 119,047.

This invention relates to an improved electrically heated boiler construction. Many companies are required to contract to take more electric current than is needed because their plants must have enough to provide for their peak loads. In such plants it frequently occurs that a substantial difference exists between the current used and the current paid for. The improved electric boiler of this invention is particularly designed as an economical means of using the surplus electric energy which must be paid for in any event and which a manufacturer can put to good use by this invention. Of course the invention is not limited to this particular field but such field offers definite economies with relation to which this boiler is particularly designed as a useful unit. In this sense the boiler is designed for use as an accessory rather than a primary equipment.

The invention will be understood from the accompanying drawings and specific description.

Fig. 1 shows a vertical section of the boiler.

Fig. 2 shows a cross section on the line 2—2 of Fig. 1.

The boiler includes a simple tank construction, preferably cylindrical, with the lower part 1 of greater width than the upper part 4, and with an annular horizontal wall 3 joining the lower edge of the latter with the upper edge of the former tank parts. The steam outlet is indicated at 7 with a baffle 9 spaced over the entrance. The connection 8 is for a safety valve nozzle. The valve 11 with a pipe connection through the lower header member 2 is for blowing off the boiler. The water feed enters through the pipe 12, particularly arranged for a purpose to be described.

An open ended cylinder 6 is mounted centrally of the tank part 1 and is about the diameter of the tank part 4. This cylinder 6 is supported by vertical rods 5 which extend from the header member 2 vertically up to and are joined to the tank part 4. Only 2 of these members 5 are indicated, but enough are used to properly support the cylinder 6 and to aid in the alignment of the tank part 4 with the tank part 1.

The cross wall 3 is joined to the tank parts 1 and 4 according to the usual boiler practice as by riveting and this wall provides special means for mounting the heating units. The top header 6 for the tank part 4 is shown with an opening suitable for receiving a manhole closure not shown.

With the tank structure arranged as described, I will now point out the particular means for heating the boiler. I arrange a series of electric heating units 13 of the immersion type in spaced relation around the cross wall, as indicated in Fig. 2. Each of these heating units is preferably of a commercially well-known form such, for example, as fully shown and described in the patent to Abbott No. 1,522,992, granted January 13, 1925. The heating units 13 extend vertically from points on the wall 3 and are arranged around the annular space below the cross wall 3 within the tank part 1. The lower ends of the heating units are preferably close to the bottom of the tank. This arrangement of mounting the heating units from the cross wall 3 at about the middle or waist line of the tank makes a most useful construction for inspection purposes and for repair purposes, and also provides a useful construction to assist in the efficient heating of the boiler.

The annular space below cross wall 3 is all heated electrically. The desired circulation for the boiler is aided by the cylinder 6 and the particular location of the water feed pipe 12. The feed water enters the tank part 1 at about its center. The cylinder 6 forms a wall between the colder part of the boiler at the center and the hotter part around the annular space below cross wall 3, so as to induce a desired water circulation. As indicated by the arrows in Fig. 1, the heating of the water causes a circulation so that the colder water is fed to the bottom of the annular heating space and in rising the water continually brushes across in a most efficient manner all of the electric heating units 13. When heated sufficiently, the hot water rises to the upper boiler part 4. The steam is gathered in the latter part above the normal water level A—B.

By the construction described, it will be seen that a boiler is provided which may be constructed at low cost because of extremely simple design and yet the boiler is arranged to operate efficiently with very little care. Whatever attention is needed can be most conveniently given by reason of the construction because all the heating units are ar-

ranged in the horizontal cross wall at about the waist line of the boiler where they can be reached for inspection purposes and for replacement if burnt out.

With this construction it is a simple matter for a manufacturer with low equipment cost to translate any excess electric energy into steam. His equipment requires so little attention that he can connect it up as a useful accessory, by which he can avoid peak loads in his consumption of electrical energy. Apart from this special object, it is apparent that the construction serves as a particularly useful boiler for making steam by electricity.

I claim as my invention:

1. An electrically heated boiler comprising a vertically arranged tank, the upper portion of which serves as a steam drum and is of less diameter than the lower portion, a horizontally arranged wall joining the lower and upper parts of the tank, a series of electric heating units of the immersion type passing through the horizontal wall and supported to hang vertically around the sides of the lower tank part to points near the bottom.

2. An electrically heated boiler comprising a tank with its lower part of greater diameter than its upper part and having a horizontal wall joining said parts, a series of spaced electric heating units of the immersion type mounted to hang vertically below said horizontal wall to points near the bottom of the tank, and provide heating means adjacent the outer walls of the lower tank part.

3. An electrically heated boiler comprising a tank having its lower part of greater width than its upper part with a cross wall joining said parts, a series of electric heating units vertically hung in the lower part of the tank below said cross wall and extending to points near the bottom of the tank.

4. An electrically heated boiler comprising a tank having its lower part of greater width than its upper part with a cross wall joining said parts, a series of electric heating units of the immersion type, extending vertically around the tank and hung in the lower part of the tank below said cross wall, means to introduce the feed water at about the center of the lower tank part.

5. An electrically heated boiler comprising a cylindrical tank having its lower part of greater width than its upper part, and a horizontal wall joining such parts, a series of electric heating units of the immersion type mounted in the horizontal wall in spaced relation around the tank, said units being hung vertically to points close to the bottom of the tank, and open ended cylinder inside and adjacent the circle of the heating units arranged to direct the circulation in the tank, and means to supply feed water at about the center of the open ended cylinder.

In testimony whereof I have affixed my signature.

GUSTAVE WELTER.

DISCLAIMER.

1,667,758.—*Gustave Welter*, New Haven, Conn. ELECTRIC BOILER APPARATUS. Patent dated May 1, 1928. Disclaimer filed June 10, 1929, by the assignee, *The Bigelow Company*, the patentee, said *Gustave Welter*, concurring.

Therefore, disclaims the subject matter of claims 1 to 3, inclusive, in so far as they purport to cover a construction in which the heating units are not vertical.

[*Official Gazette July 2, 1929.*]