Dec. 15, 1936. J. R. KRUSE 2,064,123

WELDED BOILER CONSTRUCTION

Filed Jan. 4, 1934

Fig. 1.

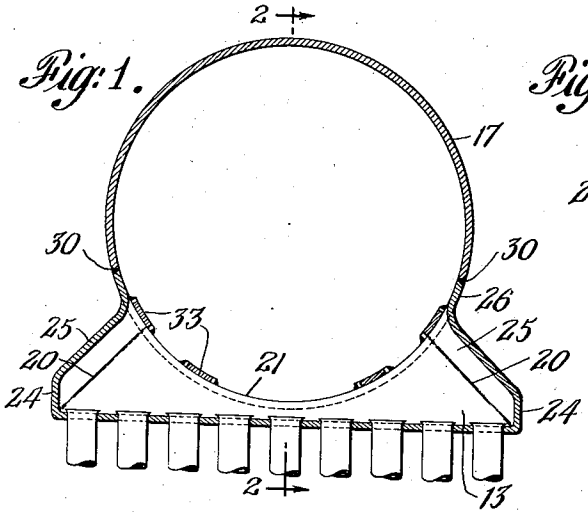


Fig. 2.

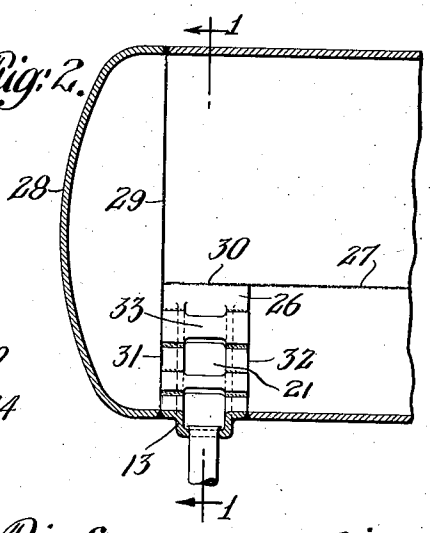


Fig. 3.

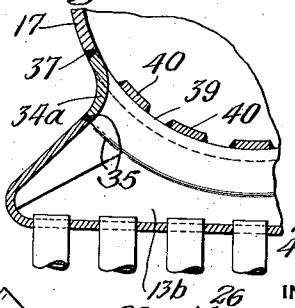


Fig. 4.

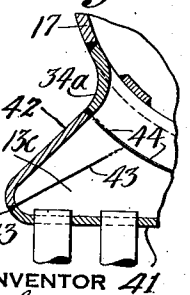
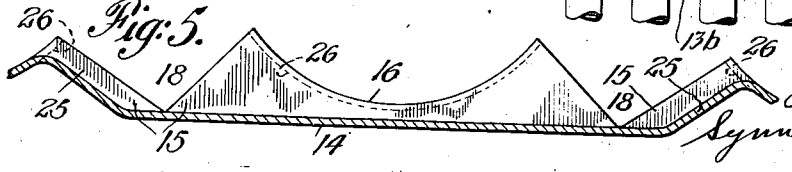


Fig. 5.



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WELDED BOILER CONSTRUCTION

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Application January 4, 1934, Serial No. 705,255

3 Claims. (Cl. 122—365)

The invention relates to welded boiler constructions and more particularly to the construction of boiler parts such as cross boxes, headers, and the like.

It is among the objects of the invention to provide welded constructions in which the welds or welded seams are located so that accurate examination thereof may be made by means of X-ray to definitely determine the quality of the weld.

Another object of the invention resides in the provision of boiler parts of the above character which may be manufactured without the use of elaborate dies and methods such as were necessary heretofore in constructing the parts of forgings.

Other objects relate to improved features of construction hereinafter more specifically appearing.

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 drawing, wherein—

Fig. 1 is a cross section through a boiler drum showing a cross box constructed in accordance with my invention, the section being taken on the line 1—1 of Figure 2;

Fig. 2 is a fragmentary longitudinal section taken on the line 2—2 of Fig. 1;

Figs. 3 and 4 are fragmentary cross sections illustrating modifications of the invention; and

Fig. 5 is a sectional developed view of the cross box illustrated in Figs. 1 and 2.

Referring to Figs. 1, 2, and 5, the cross box 13 is constructed from a metal plate bent to be substantially of channel form in cross section with a web 14 and side flanges 15. The upper edges of the flanges are configured as shown in Fig. 5, the middle portion 16 being concave to correspond to the curvature of the boiler drum 17 and the remaining portions being configured as shown at 18. The end portions 25 are bent inwardly toward the middle portion 16 until the flanges meet to form seams 20 as illustrated in Fig. 1.

The flanges of the middle and end portions together form the side walls of the box, the web of the middle portion forms the bottom, and the webs of the end portions form the end walls while the top of the box is open for communication with the interior of the drum through a suitable opening 21. The seams 20 are welded and are located in the side walls of the box and extend inwardly at an angle from the lower corners of the box and are the only seams located in the box proper.

It will thus be seen that a welded cross box is provided in which the welds are located in regions outside zones where the metal is relatively highly stressed such as is the case at corners for example. Also these welds are readily accessible for examination by X-ray the location thereof being such that it is possible to get only the weld between the X-ray bulb and the film which enables the taking of a very accurate X-ray. I am enabled, therefore, to definitely determine whether or not there are any gas pockets or inclusions within the weld without cutting through the weld. Furthermore such examination will also show whether the weld metal has made a firm bond with the parent metal and whether any cracks develop within the weld due to shrinkage in cooling.

The ends of the box may extend vertically upward as indicated at 24 before inclining inwardly toward the drum. The development illustrated in Figure 5 shows the box before the end portions 25 are inwardly bent to meet the middle portion.

An integral flange 26 may be provided peripherally of the open top of the box for welding it into the drum sheet so that no riveting is required.

Fig. 2 illustrates a preferred location for the box when applied to a welded drum having shell sections secured together by longitudinal welds 27 and heads 28 secured in place by circumferential welds 29. The box is so located that the end welds 30 for securing it in place fall in line with the longitudinal welds 27 and one side weld 31 falls in line with the circumferential weld 29 so that only one additional weld or seam 32 extending part way around the circumference of the drum is required to secure the box in place. A plurality of spaced reinforcement bars 33 extending across the throat opening of the box and welded in place may be employed.

The cross box 13*b* illustrated in Fig. 3 is of similar construction to that above described. However, a forged throat 34*a* is welded to the cross box proper at the periphery of the open top, the weld being indicated at 35. The assembled cross box and throat may then be secured to the boiler drum 17 by means of welding as indicated at 37. The drum 17 may have slots 39 formed directly therein affording communication with the interior of the header, or these slots may be provided by spaced reinforcement bars 40 extending across the throat opening and welded in place.

It is to be noted that the welded joints of the box are not located in highly stressed zones such as corners and that their location is such as will permit accurate X-ray examination of them.

In Fig. 4 I have shown a modification in which

the cross box 13c is made up of a middle section 41 and two end sections 42 secured together by welds 43 and to the throat 34a by means of the weld 44. This assembly may be welded to the drum 17 as shown. It should be observed that the corner is rounded on a substantial radius which in this construction reduces stress in the metal constituting the corner, to a negligible value.

What I claim is:—

1. In combination, a boiler drum, and a cross box formed with welded butt seams located so as to be accessible for accurate X-ray examination of the welds, the shell of said drum having an opening for receiving said cross box, said cross box having an upper flanged portion struck on the same radius as the drum shell, said flanged portion being of a size to fit said opening in the shell with the peripheral edge thereof in butt seam relation to the edge of the opening, and said seam being welded and accessible for accurate X-ray examination.

2. In combination, a boiler drum, and a plate metal cross box constructed of portions bent in butt seam relation to form the box, the meeting edges of the portions being welded and forming welded butt seams located so as to be accessible for accurate X-ray examination of the welds, the shell of said drum having an opening for receiving said cross box, said cross box having an upper outwardly flanged portion struck on the same radius as the drum shell, said flanged portion being of a size to fit said opening in the shell with the peripheral edge thereof in butt seam relation to the edge of the opening, and said seam being welded and accessible for accurate X-ray examination.

3. In combination, a boiler drum, a cross box having an open top and a throat butt welded to the upper peripheral edge of said box, the shell of said drum having an opening for receiving said throat, said throat having an upper outwardly flared portion struck on the same radius as the drum shell, said flared portion being of a size to fit said opening in the shell with the peripheral edge thereof in butt seam relation to the edge of the opening, and said seam being welded.

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