THE ROBB WATER TUBE BOILER.

A description of a water tube boiler that makes any pretensions to completeness would require much space, and would be uninteresting reading. Many of the details of boilers are common to practically all the makes of the water tube type. For this reason it will be only necessary to point out the difference between the Robb water tube boiler and others and explain the reasons for the improved constructions.



Fig. 1-Section of Robb Water Tube Boiler.

Probably the most distinctive feature of the Robb water tube boiler is the arrangement of parts to give really good circulation. This is accomplished by using two horizontal cross drums and headers, and arranging the connection between the front header and the front drum so that there is an abundantly large passage for the mixture of water and steam as it rises from the tubes just over the hottest part of the fire.



Fig. 2-Showing Construction of Front Drum.

With this construction it is not necessary that the mixture of steam and water pass through a small passage or a single tube for it has the large area provided by the header which extends the entire length of the front drum. By means of a patented throat connection this large passage is obtained without weakening the shell of the drum. The circuit of the water is completed by connecting the two drums with a double row of horizontal tubes at the water line and by joining the rear header to the rear drum by a row of vertical tubes. This row of vertical tubes at the rear has abundant area for the passage of the water for at this point the water only must be provided for, whereas, at the front of the boiler a larger volume, a mixture of steam and water, must be taken care of.

Flexibility is another feature which has received much

attention in the design of this boiler. Flexibility is closely allied to expansion and contraction. In order that such strains may be an absolute minimum in the above type of boiler, all the tube surfaces run in one direction and all the plate surfaces in another, thus avoiding the disastrous results often experienced from unequal expansion and contraction between thin tubes and thick drum plates when both run lengthwise and are connected rigidly.

The boiler is carried on a steel framework entirely independent of the brickwork. The front drum is the only part that is fixed in position. The rear drum is supported by brackets resting on rolls and the rear header is suspended by the long vertical tubes which connect the rear header and the rear drum. It is, therefore, free to swing back and forth and take care of the expansion and contraction of the main bank of tubes.

Dry steam is assured at all times, because the steam is not taken from the same drum in which it is separated from the water. The mixture of water and steam in this type of boiler enters the front drum, the steam separating out

passing through the superheating tubes at the extreme top to the rear drum from which it is taken to the steam mains. The water which separates from the mixture flows to the rear drum through the horizontal tubes and mixes with the cooler entering feed water.

One other point is worthy of notice; that is, the arrangement for cleaning the inside of the tubes. The water



Fig. 3-Showing Throat Connection to Front Drum.

tubes are absolutely straight, as water tubes should always be, and to clean them it is only necessary to remove the front hand-hole plate opposite a tube, insert a scraper and push the sediment back into the rear header from which it drops into the mud chamber at the bottom. The hand-hole plates are oval and there is one opposite each tube. This greatly