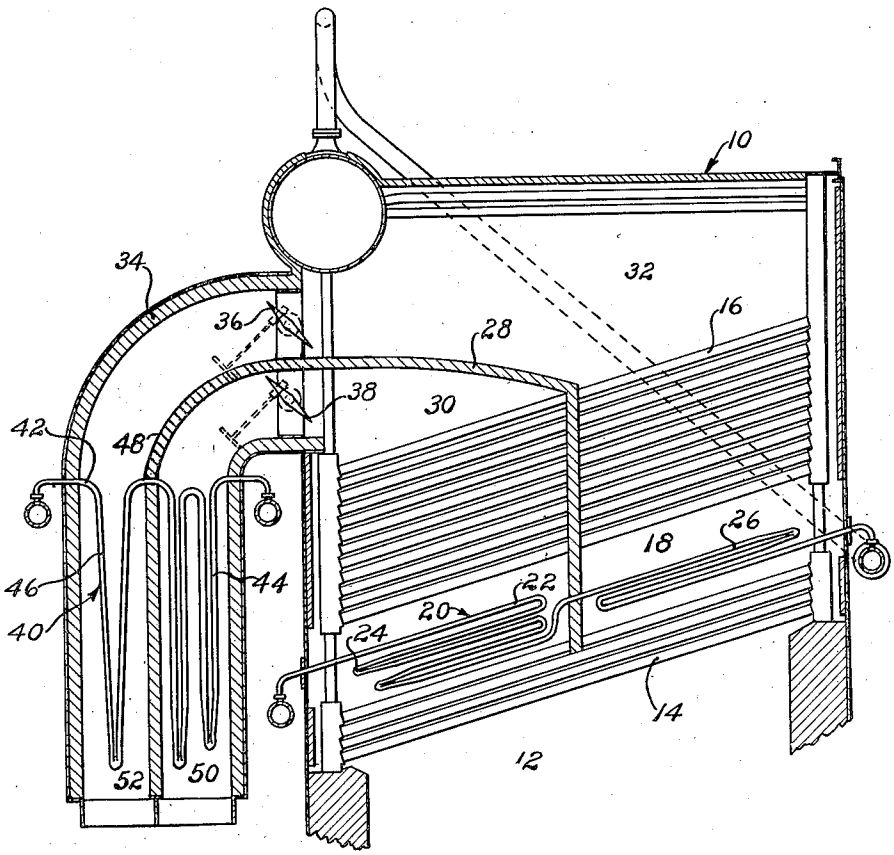
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COMPENSATING REHEATER AND SUPERHEATER

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COMPENSATING REHEATER AND SUPERHEATER

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2 Claims. (Cl. 122—480)

My invention relates to superheating steam and aims to provide an arrangement whereby the temperature of the steam may be readily and accurately controlled.

Superheated steam is used in practically all steam turbines, but in most turbine installations the steam is reheated between certain expansion stages so that a reheater is employed as well as a superheater. In such installations, there is a natural tendency for the temperature of the superheated steam of the reheated steam to vary with the load. For best efficiency of the turbine, however, such temperatures should be maintained constant at or near the prescribed maximum.

It is an object of my invention to provide an arrangement whereby such variations are minimized.

In accordance with my invention, the superheating surface and the reheating surface is divided into two unequal sections, each one arranged in a different gas path, and the percentage flow of gases in the different gas paths is regulated to maintain the superheat and/or reheat temperature as nearly at the desired constant temperature as may be.

In order that my invention, together with its objects and advantages, may be fully and readily understood, I will now describe in detail a boiler having a superheater and a reheater, an exemplification of my invention which is illustrated in the accompanying drawing and which has been selected by way of example from a number of possible embodiments thereof. In the drawing,

The figure is a vertical sectional view of an installation in accordance with the invention.

In the arrangement illustrated, 10 is a boiler of a conventional type having a furnace chamber 12, a slag screen bank 14 immediately above said furnace chamber, and a main bank of generating tubes 16 above and spaced from said bank 14. The chamber 18 lies between banks 14 and 16 and the superheater 20 preferably is placed in such chamber. The gas touched surface of the superheater 20 is composed of a number of units one of which appears at 22, and each such unit is divided into two sections 24 and 26 in such manner that the heating surface of one section is very considerably greater than that of the other. Furthermore, baffling means 28 is provided forming two gas paths 30 and 32 so arranged that section 24 lies in one path 30 and section 26 lies in the other path 32, the baffle 28 extending between the two sections. In the arrangement illustrated, the baffling 28 extends continuously from the upper edge of the slag screen bank 14 vertically upward through the bank 16 and laterally to one edge of the boiler setting, where the gas is discharged into a flue 34. At the inlet of the flue 34, two independently hand controlled dampers 36 and 38 are placed so that the percentage flow of gases in the paths 30 and 32 can be regulated at will within wide limits. However, it is obvious that dampers 36 and 38 can be automatically controlled if so desired. By throwing more of the gases over the larger section 24, the temperature of the steam delivered by superheater 20 can be increased beyond that normally expected at a given load and this fact is taken advantage of to maintain the steam temperature delivered by the boiler to an operation at as nearly the prescribed maximum as possible. Also, in the arrangement illustrated, a reheater 40 is placed in the flue 34. Reheater 40 is composed of a number of units one of which is illustrated at 42. The gas touched surface of each of units 42 is divided into two sections 44, 46, one having materially more active surface than the other and a baffle wall 48 joining with baffle wall 28 extends between the sections 44 and 46 so as to divide the flue 34 into two gas paths 50 and 52 which extend longitudinally of flue 34 at least as far as the units 46.

Furthermore, a different division may be made of the heating surface in the superheater 20 as compared to that in reheater 40. This is indicated in the drawing by the fact that in heater 20 there are two and a half loops per unit in path 30 to one and a half loops per unit in path 32, a ratio of 1.6 while in heater 40 there are two loops per unit in path 50 to one loop per unit in path 52, a ratio of two. Each of the two heaters is thereby enabled to approach the optimum steam temperature under varying loads.

What I claim is:

1. The combination of a boiler having a reheater and superheater and having two entirely separate gas paths in which said superheater and reheater lie, said superheater and reheater each having sections in both paths but each having its surface unequally divided between said paths and having its larger section in a given path, and means whereby the percentage flow of gases through said paths may be varied to regulate the final temperature of steam from said superheater and reheater.

2. The combination as set forth in claim 1 and in which the ratio of the superheater surface in a given gas path to that in the other gas path is different from the ratio of the reheater surface in said given path to that in said other path.

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