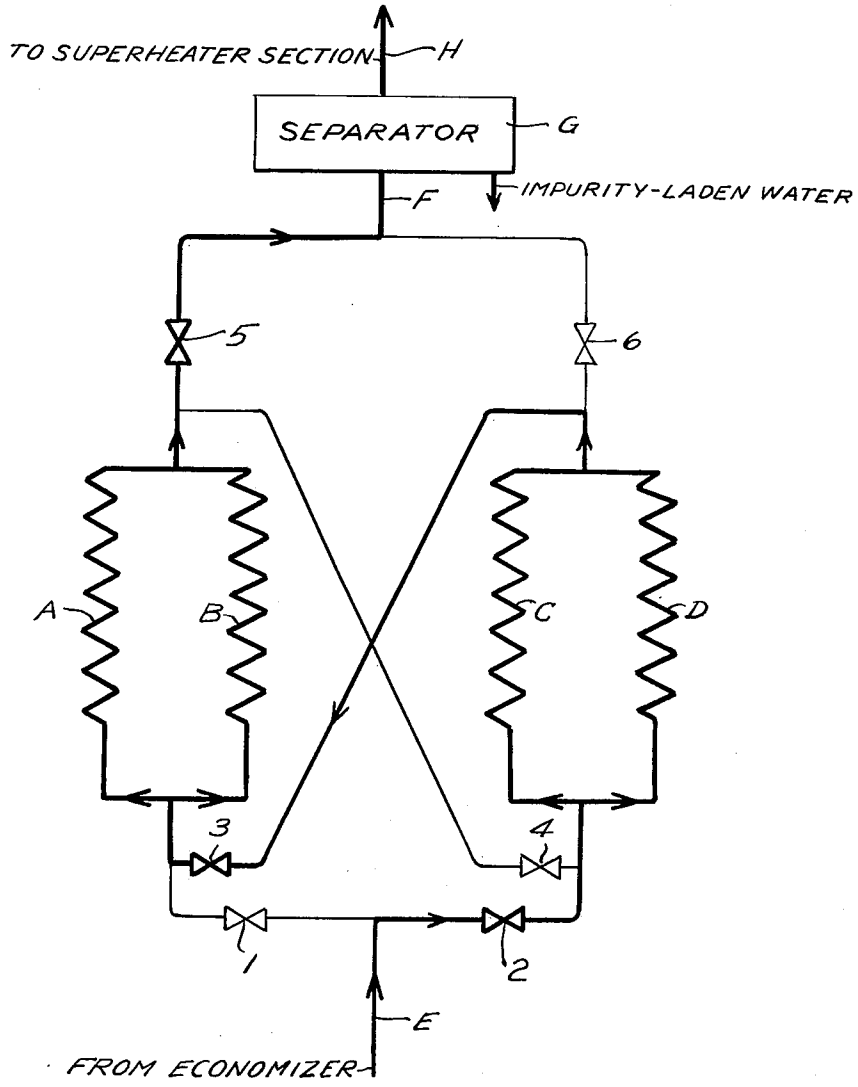
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WASHING OUT TUBESIDE DEPOSITS

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WASHING OUT TUBESIDE DEPOSITS

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This invention relates to evaporator systems for once-through boilers and more particularly for evaporator systems arranged for washing out tubeside deposits in once-through boilers.

In such boilers a serious problem arises if, as is frequently the case, the water contains a relatively high proportion of solid impurities soluble in water but insoluble in steam which tend to separate out in the evaporating section and to deposit on the tube walls.

To avoid such separation involves so controlling the rate of evaporation that at no point in the evaporating section is the water content of the steam and water mixture produced therein so low that it becomes over-saturated with the objectionable solid impurities. This is so difficult to ensure that it becomes out of the question. Alternatively, it involves producing at the outlet from the evaporating section steam which is so wet as seriously to impair the operation or the efficiency of the superheating section.

The invention solves the problem by providing in the evaporating section two circuits connected in series and control valves enabling the water to be flowed through the circuits in opposite sequence from time to time while maintaining the flow through each circuit always in the same direction. In this way, if the objectionable impurities have started to deposit in one circuit (that in which the water content of the steam and water mixture is the lower), these will be re-absorbed on reversal of the flow because that circuit will then receive a wetter mixture, the water content of which will be well below impurity saturation.

Therefore, it is an object of this invention to provide an evaporator section system for washing out tubeside deposits in a once-through boiler.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing in which is shown diagrammatically one embodiment of the invention.

Referring to the drawing, there is shown two circuits AB and CD, each formed of a number of tubes connected in parallel and forming the evaporating section of a once-through boiler. These circuits are connected so that they can receive water from an economiser section through a pipe E and so that they can deliver wet steam to a separator G through a pipe F.

The lines leading to and from them and interconnecting them are provided with valves **1** through **6**.

It will be seen that if valves **1**, **4** and **6** are closed, the flow will be as shown in heavy lines in the drawing, viz: pipe E, upwards through circuit CD, upwards through circuit AB, pipe F.

If on the other hand valves **2**, **3** and **5** are closed and valves **1**, **4** and **6** are opened, the flow will be as shown in thin lines, viz: pipe E, upwards through circuit AB, upwards through circuit CD, pipe F. Thus, the sequence in which the water flows through the two circuits AB and CD is altered but the direction of flow through them remains unaltered.

If the sequence is alternated as described above periodically, the timing being dictated by the quality of the water and the characteristics of the boiler, it can be contrived that substantially all the objectable impurities are carried over in the water content of the wet steam carried over

from the evaporating section. This wet steam is passed through the separator G in which the impurity-laden water is separated out and blown down out of the system and dry saturated steam is passed from the separator through a pipe H to the superheating section.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangements of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A once-through boiler evaporator system arranged for washing out tubeside deposits, comprising:

two separate evaporator circuits for evaporating liquid flowing therethrough,

a first flow path for connecting said circuits in series with each circuit having a predetermined direction of flow,

a second flow path for connecting said circuits in series but in reverse order and with each circuit having the same predetermined direction of flow as with said first flow path, and

means for opening one flow path and closing the other flow path.

2. A once-through boiler evaporator system according to claim **1** wherein said means for opening one flow path and closing the other flow path includes valves.

3. A once-through boiler evaporator system arranged for washing out tubeside deposits, comprising:

a first circuit for evaporating liquid flowing therethrough,

a second circuit for evaporating liquid flowing therethrough,

a first flow path for supplying fluid through said first circuit in a first predetermined direction and then through said second circuit in a second predetermined direction so that a higher proportion of steam exists in said second circuit than in said first circuit,

a second flow path for supplying fluid through said second circuit in said second predetermined direction and then through said first circuit in said first predetermined direction, so that a higher proportion of steam exists in said first circuit than in said second circuit, and

valves located in said first and second flow paths to permit selection of one flow path and then the other whereby the solid impurities insoluble in steam but soluble in water are removed from both circuits.

4. A once-through boiler evaporator system arranged for washing out tubeside deposits, comprising:

a first evaporator circuit for heating fluid flowing therethrough, said first evaporator circuit having an inlet end and an outlet end,

a second evaporator circuit for heating fluid flowing therethrough, said second evaporator circuit having an inlet end and an outlet end,

a first inlet conduit connected to said inlet end of said first circuit for supplying fluid into said first circuit,

a first inlet valve located in said first inlet conduit for opening and closing said first inlet conduit,

a first intermediate conduit connecting said discharge end of said first circuit with said inlet end of said second circuit for conveying said fluid from said first circuit into said second circuit,

a first intermediate valve located within said first intermediate conduit for opening and closing said first intermediate conduit,

a second outlet conduit connected to the outlet end of

said second circuit for discharging said fluid therefrom,

a second outlet valve located in said second outlet conduit for opening and closing said second outlet,

a second inlet conduit connected to said second circuit for supplying fluid into said second circuit,

a second inlet valve located in said second inlet conduit for opening and closing said second inlet conduit,

a second intermediate conduit connecting said discharge end of said second circuit with said inlet end of said first circuit for conveying said fluid from said second circuit into said first circuit,

a second intermediate valve located within said second intermediate conduit for opening and closing said second intermediate conduit,

a first outlet conduit connected to said discharge end of said first circuit for discharging said fluid from said first circuit, and

an outlet valve located in said first outlet conduit for opening and closing said first outlet conduit.

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