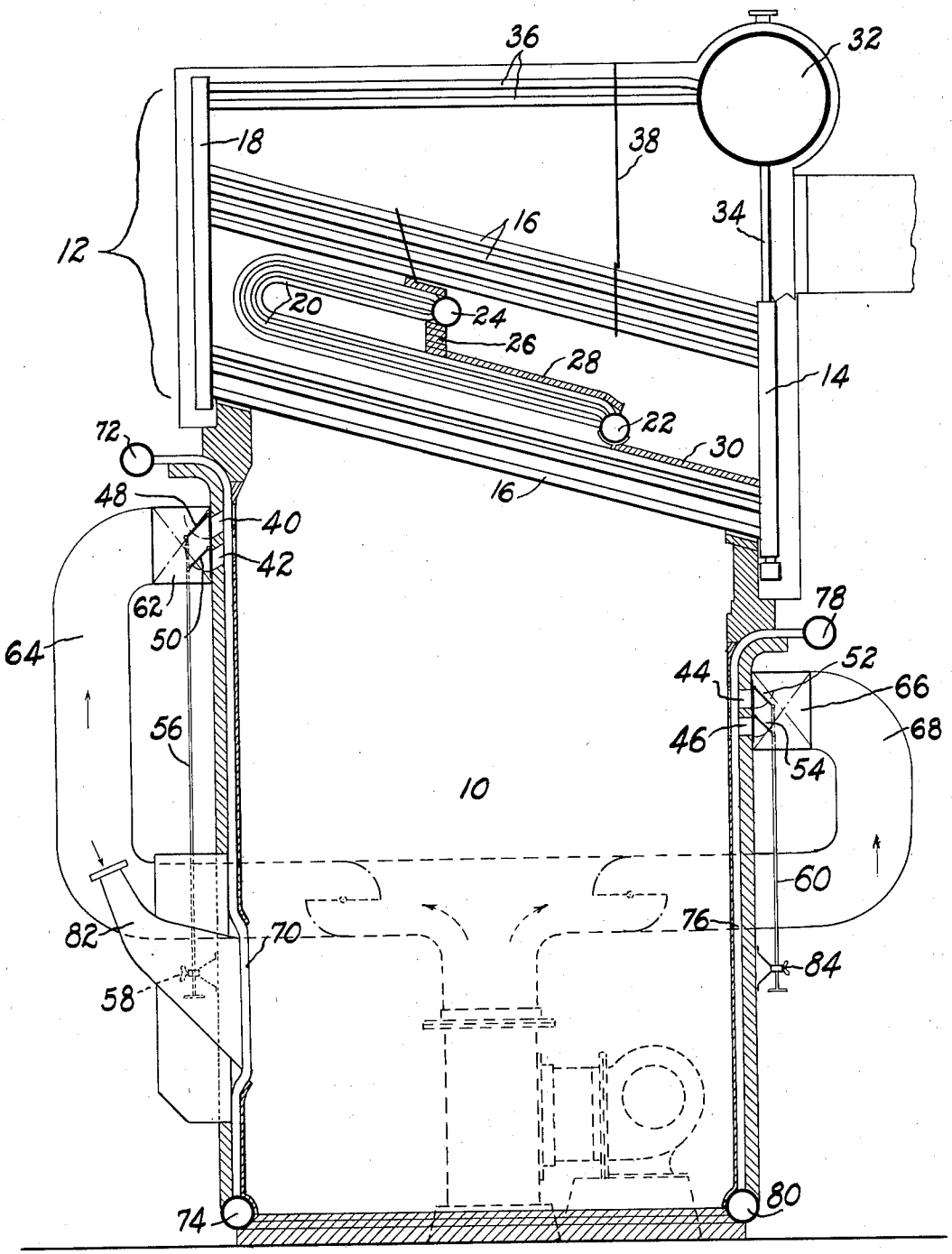
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SUPERHEATER BOILER AND METHOD OF OPERATING THE SAME

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SUPERHEATER BOILER AND METHOD OF OPERATING THE SAME

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2 Claims. (Cl. 122—478)

This invention is concerned with a protector operating during abnormal conditions arising in the use of steam generators of the high heat release type.

A specific object of the invention is the protection of superheaters under abnormal conditions which are contrasted with conditions under which such superheaters protect themselves.

A further object of the invention is to provide such protection by mixing cool gases with the hot furnace gases of a high heat release type installation at times when needed and stopping the supply of cool gases when the boiler is operating normally.

Other objects of the invention will appear as the accompanying description proceeds.

In the accompanying drawing there is shown a figure illustrating steam generating equipment mainly in vertical section.

The illustrative apparatus comprises a boiler furnace 10 and a boiler section 12, the latter having downtake headers 14 connected by means of water tubes 16 to uptake headers 18. The water tubes are shown arranged in two banks between which are superheater tubes 20. The superheater shown is an interdeck superheater having a lower header 22 and an upper header 24, arranged with reference to the baffles 26, 28 and 30 as illustrated.

The downtake headers 14 are connected to the steam drum 32 by nipples 34, and the boiler circulation is completed by circulating tubes 36 connecting the headers 18 to the steam drum 32. A vertical baffle 38 separates the second and third passes of the boiler.

The superheater shown is in the first gas pass and is therefore subject to the concentration of heat from the hot furnace gases. Under normal operation the flow of steam through the superheater tubes causes such heat abstraction from them that the superheater metal is protected against overheating and the detrimental effects of such overheating. Under abnormal conditions, as when the boiler is starting up, circulation will start in the water tubes and they will be thereby protected. Until steam is discharged from the boiler there is no flow through the superheater tubes 20. For this conditon they are disclosed as protected by a mixture of cold gases with the hot furnace gases. These cold gases enter the combustion chamber 10 through ports 40 and 42 at one side of the combustion chamber and through ports 44 and 46 at the other side.

Because of the fact that the mixture of the large excess of cold gas with the hot furnace gases makes it impossible to efficiently make steam, or to superheat steam to the desired high temperature, this mixture cannot be used during normal boiler operation. Control of the mixture is effected in the illustrative apparatus by means of regulators 48 and 50 associated respectively with the ports 40 and 42, and other regulators 52 and 54 on the other side of the furnace associated respectively with the ports 44 and 46.

The regulators herein shown are pivoted gates, the gates 48 and 50 being conveniently operable by means of a rod 56 held in any desired positon by securing means 58. On the other side of the furnace the gates 52 and 54 are operated by a similar rod 60 held by securing means 84.

The gates 48 and 50 are preferably located in the distributing header 62 receiving its cold gas supply through a conduit 64. On the other side of the furnace a similar distributing header 66 and conduit 68 are provided.

Inclination of the ports upwardly and inwardly promotes the development of a desirable mixture of gases. Such an arrangement is indicated in the disclosure of the wall forming the ports 40 and 42.

The combustion chamber illustrated is formed by water walls in which the tubes 70 are connected to upper and lower headers 72 and 74 respectively on one side of the furnace. On the other side of the furnace the water wall tubes 76 are connected to upper and lower headers 78 and 80, respectively.

A fuel burner 82 is shown applied to one side of the furnace.

While the invention has been described with reference to the particular apparatus disclosed it is not limited thereto but is of a scope commensurate with the scope of the subjoined claims.

What I claim as new, and desire to secure by Letters Patent, is:

1. In a boiler having a furnace, means for burning fuel in suspension in said furnace, a steam generating section in the path of the heating gases leaving said furnace, and a superheater associated with said steam generating section and in an initial portion of the flow path of the heating gases leaving said furnace, the method of protecting the superheater during starting-up periods which comprises introducing and intimately mixing a quantity of low temperature air with said heating gases subsequent to a point where the fuel combustion has been substantially completed and before said heating gases contact with the superheater.

2. In a boiler having a furnace, means for burning fuel in suspension in said furnace and steam superheating tubes in the initial portion of a convection heated zone of said boiler above said furnace, the method of preventing overheating of the superheater tubes during starting-up periods of said boiler which comprises tempering the heating gases leaving said furnace with low temperature cooling air at a point beyond the main combustion zone and below but adjacent to said superheater tubes.

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