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H. E. YARROW

STEAM SUPERHEATER

Filed April 6, 1920

Fig. 1.

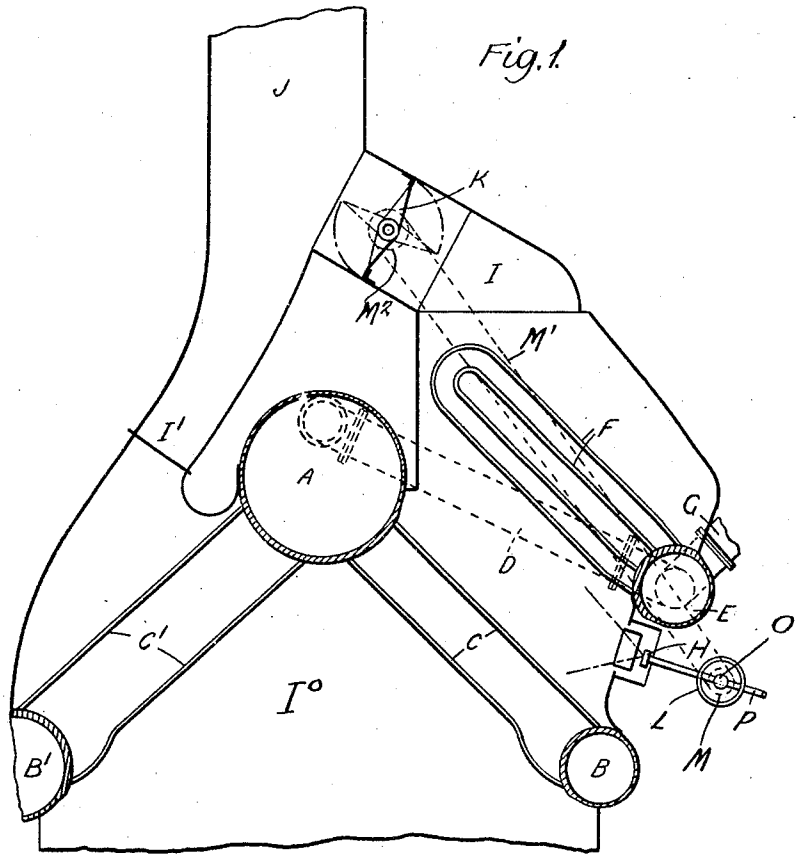
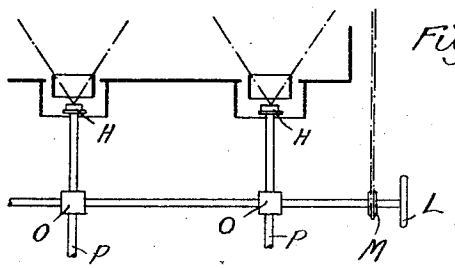


Fig. 2.



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UNITED STATES PATENT OFFICE.

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STEAM SUPERHEATER.

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This invention relates to water tube boilers of the type in which the gases from the furnace normally branch off from the combustion space to the right and left respectively, traversing nests of generating tubes on the two sides of the boiler and also on one side a superheater provided with an auxiliary heating device, usually oil fuel burners, before converging from the uptakes into the funnel.

The present invention has for its primary object to provide means for controlling the amount of superheat without varying the quantity of fuel consumed by the auxiliary burners and with this object a damper is provided in the uptake on the superheater side of the boiler by means of which the passage of the gases on that side of the boiler to the funnel may be completely or partially blocked and the gases deflected, wholly or in part, back through the generating tubes on that side and thence through the generating tubes on the farther side to the uptake on that side and the funnel.

The control of the superheat may alternatively be effected jointly by the damper and the fuel supply to the auxiliary burners, the operation of the damper and the means controlling the fuel supply being in this case made interdependent.

One embodiment of the invention is illustrated in the accompanying drawing in which Fig. 1 shows in transverse section its application to a Yarrow type boiler, and Fig. 2 is a part sectional plan thereof taken through the row of fuel burners. In said drawing A is the steam and water drum, B, B′ the water drums on the two sides of the furnace, C, C′ the nests of generating tubes connecting the steam drums with the two water drums and straddling the main combustion space I°, D the steam pipe conveying the saturated steam from the drum A to the superheater header E from which the superheater tubes F spring and to which they return. G is the outlet pipe for the superheated steam and H is one of the burners of the auxiliary heating device, in this case a horizontal row of oil fuel burners, of which the axes are directed toward the nest C′ of generating tubes and away from the superheater tubes F.

The furnace gases which traverse the nest C′ of generating tubes pass directly through uptake I′ to the funnel J, while the gases which traverse the nest C (preferably of fewer rows than nest C′ as indicated by the smaller distance between the two outer rows shown in the drawing) pass with the gases from the auxiliary burners H between the superheater tubes F and thence through uptake I to the funnel. In the uptake I there is provided a damper K by means of which the uptake can be completely or partially closed, thereby simultaneously reducing the flow of the furnace gases amongst the generating tubes C and superheater tubes F and correspondingly increasing the flow of furnace gases amongst the generating tubes C′. Such closure of the uptake will, without altering the supply of fuel to the burners H, affect the degree of superheat to which the steam is raised by the diversion not only of the furnace gases, but also of the gases from the auxiliary burners H from the superheater side of the boiler to the other side.

Alternatively, the degree of superheat may be controlled by the joint action of the damper and the regulation of fuel supply to burners H. For example, it may be arranged that the complete closure of damper K will by suitable mechanical means, such as a hand wheel L on the spindle of the valves O in the supply pipes P to the burners H and a chain passing over a sprocket wheel M^2 on said spindle of the damper K, reduce the supply of fuel to burners H to half the normal. It is obvious that any other suitable interdependent action of the two mechanisms may be provided for.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

A water tube boiler comprising two upwardly converging sets of steam generating tubes, a main combustion space located between the said sets of generating tubes, two uptakes separated by a partition and located on the farther sides of the respective sets of

generating tubes, a steam superheater located in one of said uptakes, an auxiliary heating device located in said uptake between said superheater and the set of steam generating tubes adjacent thereto, said auxiliary device comprising a plurality of oil fuel burners the axes of which are directed towards the said generating tubes and away from the superheater device, a damper located in the said uptake beyond the said superheater, and means for operating the said damper and for controlling the fuel supply to the oil burners interdependently.

In testimony whereof I have signed my name to this specification.

HAROLD E. YARROW.