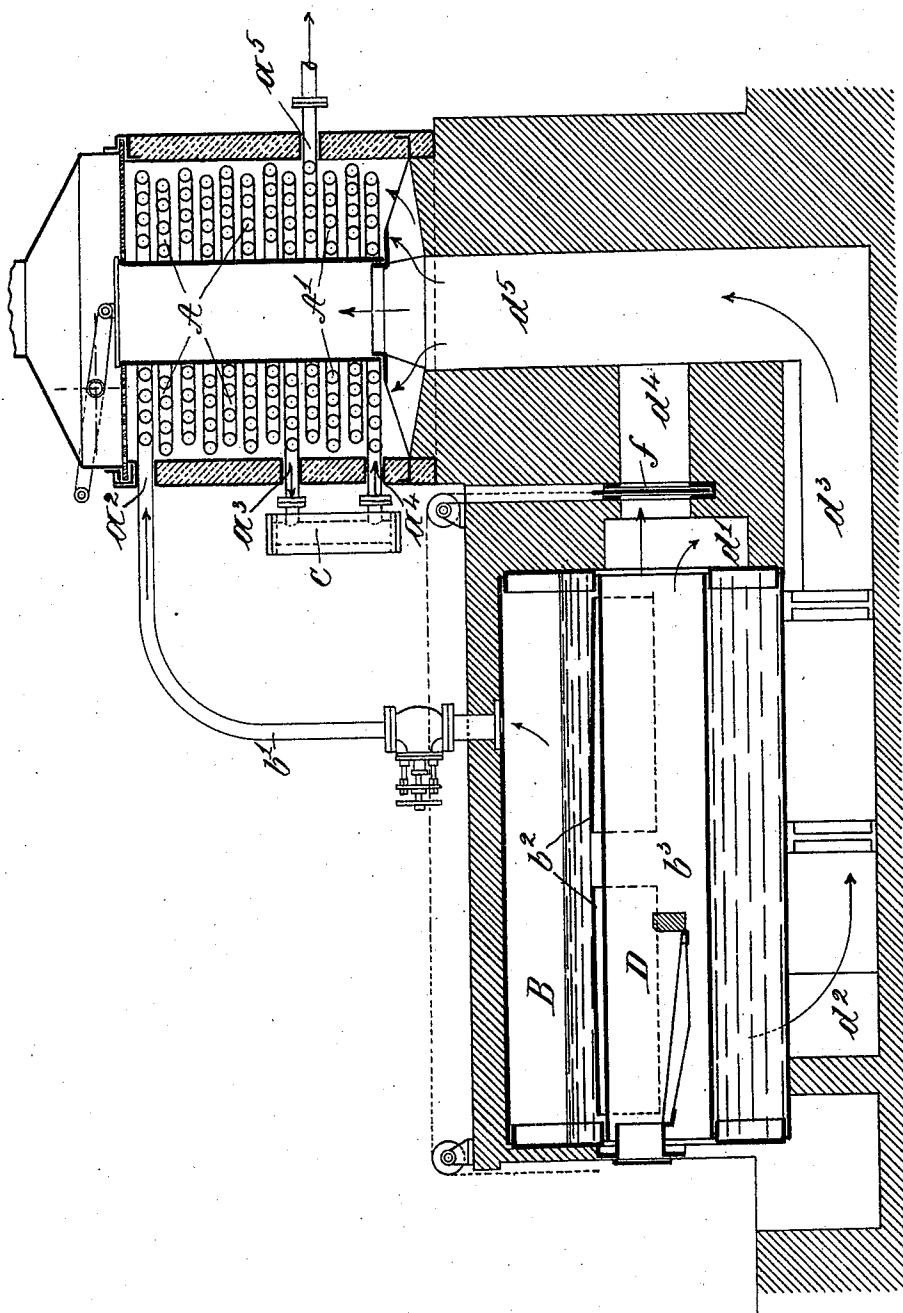


(No Model.)

W. SCHMIDT.
SUPERHEATER.

No. 576,698.

Patented Feb. 9, 1897.



Witnesses.
Emil Kaegser.
Franz Grassnick.

Inventor
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by
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UNITED STATES PATENT OFFICE.

WILHELM SCHMIDT, OF BALLENSTÄDT, GERMANY.

SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 576,698, dated February 9, 1897.

Application filed February 3, 1896. Serial No. 577,960. (No model.)

To all whom it may concern:

Be it known that I, WILHELM SCHMIDT, a subject of the King of Prussia, German Emperor, and a resident of Ballenstädt-on-the Harz, German Empire, have invented a new and useful Apparatus for Highly Superheating Wet Steam, of which the following is an exact specification.

This invention relates to an apparatus for highly superheating wet steam, and is based on the cognizance that a given quantity of heat is more easily taken up by liquors than by gases. The drying of wet steam may therefore be attained even if, first, the difference of temperature between that steam and the furnace-gases is but small, and, second, also but small surfaces of contact are employed. The superheating of dried steam by leading it in a direction equal with that of the furnace-gases is to be preferred to any other method if one succeeds in economically exhausting the heat remaining with the furnace-gases after having effected said superheating of the dried steam. That economical exhaust may fully be attained by using the remaining heat up for the drying of the wet steam.

My invention consists, therefore, in means allowing of leading wet steam first in a direction opposite to the furnace-gases, so as to get dried, and then in an equal direction with said gases, so as to become superheated. The wet steam is acted on by those gases that have already effected the superheating, and is led opposite to the furnace-gases for such length of way that the water contained within the steam is completely evaporated. The dried steam that concerning its temperature possesses only about the comparatively low temperature corresponding to its tension is then suddenly exposed to the hottest gases, or enters those portions of the superheater that are exposed to said hottest gases, respectively. Said portions of the superheater are sufficiently cooled by the steam to be prevented against becoming glowing and letting the steam diffuse.

My improved superheater consists, preferably, of coiled pipes, or of a column of coils or spirals, respectively. One form of construction of such a superheater is represented in the accompanying drawing, that shows the superheater combined with an ordinary flame tube-boiler, both parts being in vertical sec-

tion. The superheater is composed of two superposed columns of coils A A', the upper of which, A, is at its lower end a^3 connected with the lower end a^4 of the lower column A' by the mediation of a piece of tube c. Said end a^4 is in truth the commencement of the column A', whereas a^5 is the end proper of said column. The commencement a^3 of the upper column A is connected with the steam-space of the boiler B by the pipe b' . b^2 are curved shields that are situated above the flame-tube b^3 in a short distance thereof. The purpose of said shields is to make the evolution of the steam violent, so as to obtain steam with a great contents of water.

The wet steam generated within the boiler B passes through the pipe b' and enters at a^3 the superheater A A', or, more precisely, the drying-coils A of the same. Flowing downward in a direction opposite to the furnace-gases the steam is dried when arriving at a^3 , and the dried steam is led through the piece of tube c into the superheating-coils A'. The fire-gases streaming forth from the furnace D may pass into the vertical end conduit d^5 either through the conduits d' , d^2 , and d^3 or directly through the intermediate conduit d^4 . The latter is furnished with any suitable regulating device, for instance with a slide f , the purpose of which is to regulate the temperature of the gases passing away to the coils A A'.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

As a means for highly superheating wet steam, the combination with a steam-generator and with the furnace of the same, of two sets of coils situated in the way of the waste gases of said furnace, and arranged one behind the other with regard to the direction of said gases; the rear end of the rear set being connected with the steam-space of said generator, and the front end of said set being connected with the front end of the front set, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILHELM SCHMIDT.

Witnesses:

FRITZ SPERLING,
W. HAUPT.