PUBLISHED
MAY 11, 1943.
BY A. P. C.

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HIGH PRESSURE STEAM GENERATOR
Filed Aug. 2, 1940

Serial No.
349,853

Fig.1

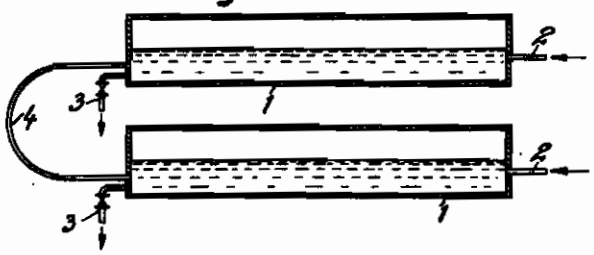


Fig.2

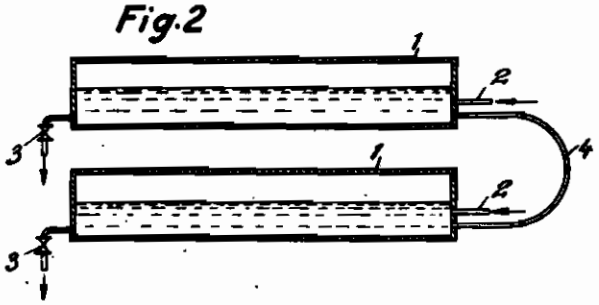


Fig.3

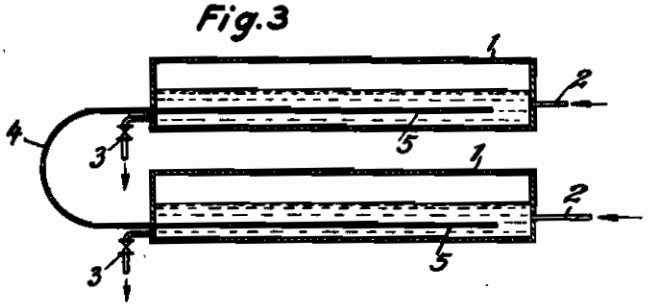
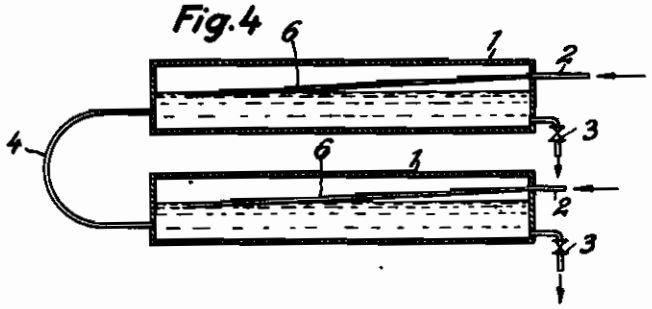


Fig.4



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Published May 11, 1943 Serial No. 349,853

ALIEN PROPERTY CUSTODIAN

HIGH PRESSURE STEAM GENERATOR

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Application filed August 2, 1940

As is well known feed water is evaporated in the drums of Löffler boilers by admitting superheated steam into said drums and distributing this superheated steam, by means of nozzles, as uniformly as possible over the entire water space of the drums. Hereby, the superheating heat of the hot steam is transferred to the water in the drum and generates fresh steam which is withdrawn together with the steam blown in and cooled to the temperature of saturated steam. The water level in the drums is maintained by the admission of fresh feed water. The impurities present in the feed water remain in the boiler drums and gradually enrich more and more in the water of the drum.

If too high an enrichment would occur the steam to be consumed would carry impurities and, therefore, the concentration in the boiler drums must be limited. This is effected by removing a portion of the boiler water containing salts, impurities and so on. To maintain as low as possible the quantity of this water containing the salts, impurities and so on efforts must be made to remove the water from the drums at a point at which enrichment is largest.

As usual the fresh feed water is supplied at the one side or the one end of the drums. While flowing through the drums in the longitudinal direction of same the feed water is progressively evaporated and the impurities are correspondingly enriched more and more in the direction of flow until the highest concentration is reached at the end of the drums opposite to that at which feed water is supplied. To limit this concentration the water containing the salts, impurities etc. is withdrawn at this piont.

If a Löffler boiler is provided with two or more boiler drums, care is to be taken that the water level is of equal height in all the drums even if the feed water supply and the evaporation are not exactly identical in all drums. Therefore, the drums are connected with water compensating pipes by means of which the surplus water not evaporated may flow over from one drum into the other drum or drums. This results in a water sided connection of the Löffler boiler drums as shown in Fig. 1 of the drawing. The arrangement of the boiler drums shown in this figure corresponds to known constructions. The feed water is admitted into the evaporator drums 1 and 2, flows through these drums in the longitudinal direction of same and is enriched more and more with salts, impurities etc. The highest concentration is reached at the other end of the drum. The removal of salts, impurities etc. is effected at this end of the drums by the valves 3. Furthermore, the surplus water of one drum is transferred at this point by way of the compensating pipe 4 to the other drum.

In connection with boilers of this construction certain impurities have permanently been ascertained in the steam for the presence of which no explanation could be obtained from the concentration of the boiler water ascertained in the water containing the salts, impurities etc. An increase of the quantity of the water containing the salts, impurities etc. withdrawn from the boiler drums resulted in a reduction of the concentration in the water containing the salts, impurities etc. but impurities still were present in the steam.

A remedy was obtained by the present invention which is based on the following knowledge:

If in a boiler having a plurality of drums the supply of feed water into the individual drums or the steam generation in said drums is not exactly identical, boiler water flows by way of compensating pipes from one drum into the other. Therefore, water to be evaporated is admitted at both ends into the drum into which water is supplied from the other drum, i. e on the one hand by way of the feed water pipe and on the other hand by way of the compensating pipe. The result of this is that a zone of stagnating water is formed within the drum and that at this point, due to the evaporation, the impurities are enriched to an unlimited and uncontrollable degree. By way of the pipe removing salts, impurities etc. substantially only the water flowing over from the other drum is removed and not the water having the highest concentration. An increase of the amount of the water containing the salts, impurities etc. results in some displacement of the critical zone within the drum only, but removal of the water of the highest concentration is not obtained.

This knowledge is utilized according to the present invention by the fact that not the surplus water of one drum, already enriched with impurities during evaporation, is transferred by way of compensating pipes to the other drum, but that the compensating pipes only transfer fresh feed water from one drum to the other. This substantially is obtained by arranging the mouths of the compensating pipes at the same side or end of the drum as the mouths of the feed water pipes. Due to this arrangement fresh feed water only flows into all drums at one end thereof and the water positively flows through the drums in the longitudinal direction thereof,

At the end of the flow highest concentration is obtained in each drum and at this point removal of the salts, impurities etc. is effected.

An example of the arrangement according to the invention is shown in Fig. 2. The feed water is admitted at 2 into the drums 1 and the valves 3 removing the salts, impurities etc. are provided at the other end of the drums. To compensate the water level compensating pipes 4 are arranged at the side or end of the drums at which feed water is admitted so that by way of these pipes fresh feed water only may flow over from one drum into the other.

If for constructional or other reasons the arrangement of the compensating pipes 4 at the side of feed water supply 2 offers difficulties, the arrangement may be as shown in Fig. 3. According to this modification the compensating pipes 4 are provided at the opposite end of the drums and are extended within the drums 1 by special pipes 5 as far as to the neighborhood of the end of feed water admission.

With an arrangement of the feed water supply 2 and the valves 3 removing the salts, impurities etc. at one end of the drums and the compensating pipes 4 at the other end as shown in Fig. 4, the feed water is conducted by way of pipes or channels 6 through the drums to the end of the compensating pipes 4 before being admitted to the boiler water.

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