No. 629,882. Patented Aug. 1, 1899.

F. WINDHAM.

WATER TUBE STEAM GENERATOR.

(Application filed Feb. 23, 1898.)

(No Model.)

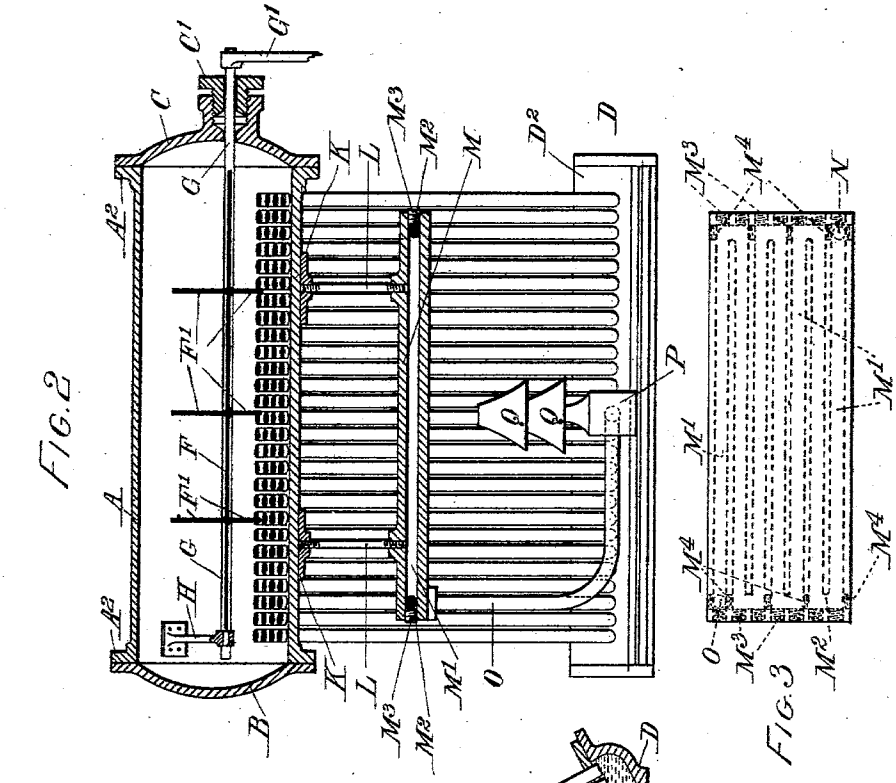


FIG. 2

FIG. 3

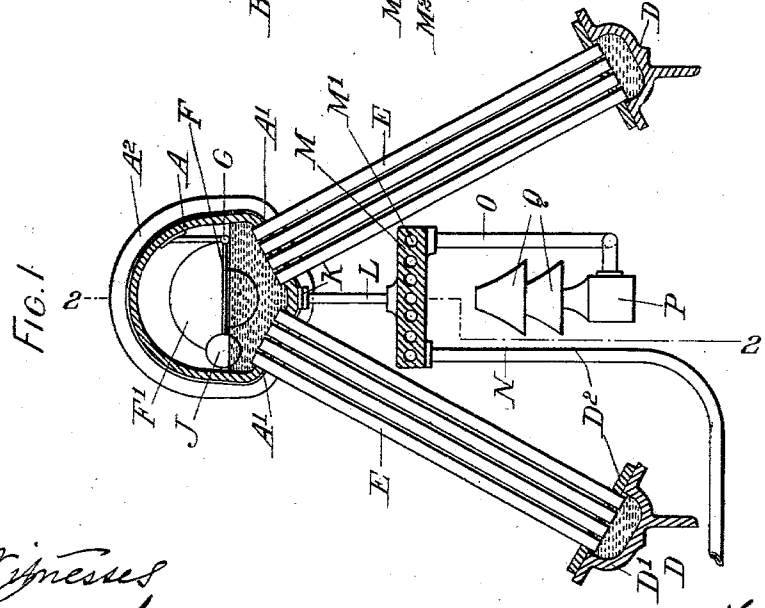


FIG. 1

Witnesses
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UNITED STATES PATENT OFFICE.

FRANCIS WINDHAM, OF LONDON, ENGLAND.

WATER-TUBE STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 629,882, dated August 1, 1899.

Application filed February 23, 1898. Serial No. 671,316. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS WINDHAM, a subject of the Queen of England, residing at London, England, have invented a certain new and useful Improved Water-Tube Steam-Generator, (for which I have made application for Letters Patent in Great Britain, No. 29,972, dated December 18, 1897,) of which the following is a specification.

This invention relates to an improved water-tube steam-generator, its object being to construct a neat and efficient form of generator the parts of which may readily be renewed, the generator being also provided with an automatic water-regulating device, an oil-vaporizer, and vapor-burner.

In the accompanying drawings, Figure 1 is an end elevation, partly in section, of the complete generator. Fig. 2 is a longitudinal vertical section on the line 2 2 of Fig. 1. Fig. 3 is a plan of the vaporizer.

Like letters indicate like parts throughout the drawings.

The generator comprises a tubular top member or steam-drum A, having two flattened parts A′ running throughout its length on the under side. The ends of this tubular member are provided with flanges A^2, to which may be bolted the covers B and C. Two bottom members or mud-drums D are provided, each consisting of a curved portion D′ and a flat side conveniently formed by a plate D^2. The water-tubes E are all straight and of equal length, their ends being connected, respectively, to the flattened parts A′ of the steam-drum A and to the flat plates D^2 of the bottom members D. With this arrangement it is only necessary to have tubes of a standard length at hand in order to replace any of them which may be damaged. A float-plate F of approximately the same length as the steam-drum A is attached at one edge to a rod G and arranged within the steam-drum so that the rod G lies longitudinally along one side of the drum, with one end carried in a stirrup H, so as to turn freely, while the other end projects through a stuffing-box C′ in one of the covers or end plates of the steam-drum. Along the edge of the plate F opposite to that at which it is attached to the rod G is arranged a float J, the plate being also provided with vanes or baffles F′, projecting approximately at right angles from its upper and lower faces. The end of the rod G which projects through the stuffing-box C′ carries a lever which is connected through a rod G′ with a valve or cock controlling the feed-water supply. The plate F is arranged within the steam-drum so that it is maintained in an approximately horizontal position by the float J as long as the water-level is at its normal height, the plate in this position lying close to the surface of the water. When the water-level falls, the plate also falls, causing the rod G to turn, this movement opening the feed-supply cock and admitting the water necessary to bring the latter up to its proper level, when the supply is automatically turned off by the plate F being raised to its normal position.

To the under side of the steam-drum A are riveted or otherwise secured bosses or lugs K, into which are screwed or otherwise attached rods L. The latter are attached at their lower ends to a combined vaporizer and baffle M, which may consist of a metal plate traversed by a series of longitudinal holes M′, which are connected to each other by cross-passages M^2, so as to form a zigzag passage throughout the whole plate. This plate may conveniently be formed by casting it with the longitudinal passages and afterward boring transverse passages near the ends of the plate. The ends of the longitudinal holes are now stopped with screw-plugs, as at M^3, the transverse passages being also plugged between the alternate longitudinal passages, as at M^4. Liquid fuel is led into the vaporizer M by a pipe N, the resulting vapor being conducted by a pipe O to the burner P, the latter comprising a nozzle which projects into one, two, or more concentrically-arranged cones Q. The vapor issuing from the nozzle P draws in the air necessary for its complete combustion through the spaces between the cones Q and being ignited at the point R burns with a powerful heating-flame. From the situation of the several parts this flame strikes against the vaporizer M, which acts as a baffle and deflects it laterally against the water-tubes E.

If desired, where other means are employed for heating the boiler the perforated plate M may serve as a feed-water heater. If desired, the movement of the hinged plate F, in addi-

tion to controlling the feed-water supply, may at the same time serve to regulate the supply of fuel to the vaporizer.

The hinged plate F within the steam-drum by reason of its position is very effective in preventing priming, while the baffles F′ prevent the excessive movement of the water within the generator when the latter is subjected to movement—as, for example, on board ship.

I claim—

1. In a tubular steam-boiler, the combination with a steam-generator, two series of water-tubes communicating with the generator and inclined downwardly and outwardly therefrom in opposite directions, mud-drums with which the lower ends of the tubes communicate, a vaporizer located beneath the generator and intermediate the two series of water-tubes, and a vapor-burner beneath and connected to the vaporizer, substantially as described.

2. In a tubular steam-boiler, the combination with a steam-generator, two series of water-tubes communicating with the generator and inclined downwardly and outwardly therefrom in opposite directions, mud-drums with which the lower ends of the tubes communicate, a combined vaporizer and baffle located beneath the generator and intermediate the two series of water-tubes, and a vapor-burner beneath and connected to the vaporizer, substantially as described.

3. In a tubular steam-boiler, the combination with a generating-chamber, of a pivoted float-plate within the chamber and baffle-plates carried upon the float-plates, substantially as described.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

FRANCIS WINDHAM.

Witnesses:
W. M. HARRIS,
A. P. HOAG.