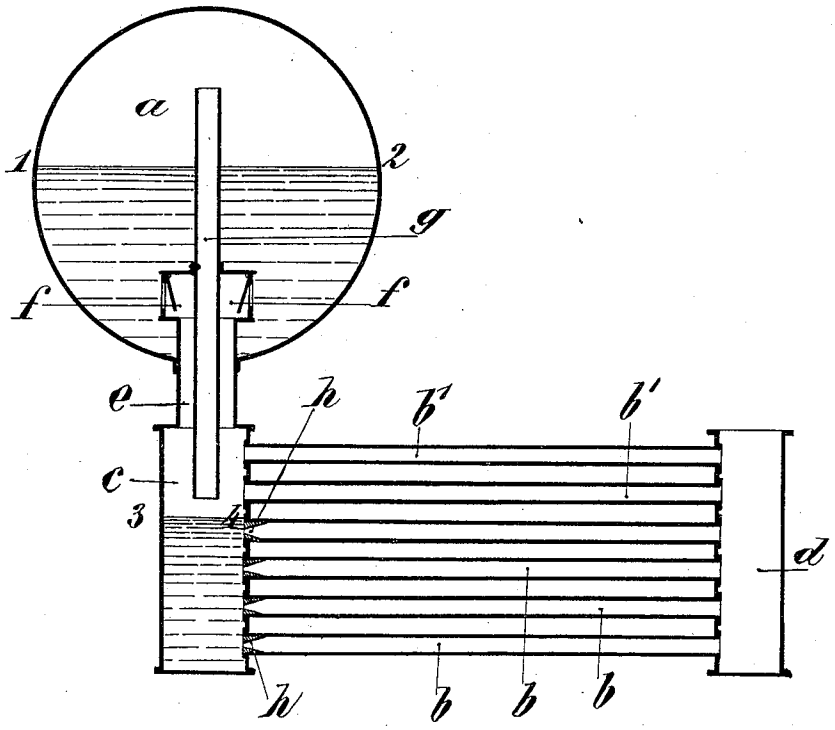
(No Model.)

L. E. SOLIGNAC.

STEAM BOILER.

No. 589,227. Patented Aug. 31, 1897.



Witnesses:
C. M. Wachsschlager
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LOUIS EDMOND SOLIGNAC, OF PARIS, FRANCE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 589,227, dated August 31, 1897.

Application filed January 11, 1897. Serial No. 618,706. (No model.) Patented in France July 7, 1896, No. 257,891.

To all whom it may concern:

Be it known that I, LOUIS EDMOND SOLIGNAC, of the city of Paris, France, have invented Improvements in Steam-Boilers, (for which I have obtained Letters Patent in France for fifteen years, dated July 7, 1896, No. 257,891,) of which the following is a full, clear, and exact description.

This invention relates to an improved steam-generator comprising, first, a nest of tubes whereof the lower ones act as steam-flashing tubes and are supplied through reducing-ferrules with water at a rate proportionate to their vaporizing-power from a water-space in which a constant level is maintained, said tubes being connected with an upper set of tubes which convey the steam to the said water-space; second, a steam and water chamber connected to said water-space through a steam-pipe and valve-controlled water-passage in such manner that the level in the water-space is automatically maintained.

Reference is to be had to the accompanying drawing, forming part of this specification, which represents a vertical section of a boiler constructed in accordance with the invention.

a is a steam and water chamber; *b b'*, a nest of tubes heated by a furnace, and connected to the heads *c d*.

e is a tube rising from the head *c* and terminated within the chamber *a* by a valve-box *f*. A steam-outlet tube *g* dips within the head *c* to the level at which the water is to be constantly maintained, said tube *g* opening to the steam-space of chamber *a*. The lower tubes *b* are of relatively large diameter and are provided with reducing ferrules or nozzles *h* at their point of connection with head *c*, the other set of tubes *b'* being of full bore throughout.

At starting the whole of the apparatus below the water-level 12 is full of water, and when the tubes *b b'* are heated the steam produced in the middle of said tubes will pass into both the heads *c d* and the tube *e*, thus closing the valves *f*. The steam can, therefore, only escape by driving out water through pipe *g*, which continues until the water-level falls in *c* below the mouth of tube *g*—say to the level 34. Thenceforth the water in the boiler will be separated into two masses—viz., that contained in chamber *a* and that contained in tubes *b* and the heads *c d* below the level 34. The water in tubes *b* will become converted into steam, and as, owing to the throttling by the reducing-ferrules *h*, the inlet of water is less than the area of the tubes *b* and than the area of the pipe *g* the tubes *b*, the head *d*, and the upper part of head *c*, tube *e*, and valve-box *f* will be filled with steam. The circulation is then established, the whole of the boiler beyond the reducing-ferrules being free of water and serving only for the passage of the steam.

If for any reason, such as excessive influx of water at the valves or the forcing back of the water from tubes *b* into the heads *c*, &c., the level of the water should rise in *c*, the excess would be expelled through tube *g* by the steam-pressure, which, being unable to escape through *g*, would close the valves *f* during the period of suspension corresponding to the expulsion of the water. It will thus be understood that the water-level in head *c* will be automatically maintained at 34, and so permit the supplying under a constant and regulated pressure of tubes provided with reducing-ferrules for preventing the flooding of the tubes with non-vaporized water. The outlet and inlet tubes *g* and *e* may be separate, while the head *d* may be replaced by any other connection between tubes *b* and *b'*, which may be made ⊃-shaped, for instance, and connected by both ends to head *c*, the lower member acting as the evaporizer and the upper one for conveying the steam away.

I claim—

A steam-generator consisting of a lower set of steam-generating, and an upper set of steam-conveying tubes connected together at one end and both sets connected to the same header or chamber at the other end, the connection of the generating-tubes with the water-space of the header being through constricted orifices while the return steam-tubes are fully open to the steam-space of the

header, a water and steam reservoir at a higher level, connected with the header by ascension and descension pipes or passages, and automatically-operated valves controlling the outlet of said descension-pipes whereby the water may be maintained at a constant level in the header, substantially as described.

The foregoing specification of my improvements in steam-boilers signed by me this 24th day of December, 1896.

LOUIS EDMOND SOLIGNAC.

Witnesses:

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