

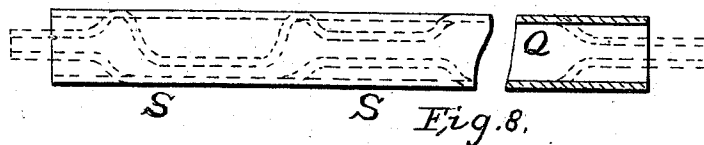
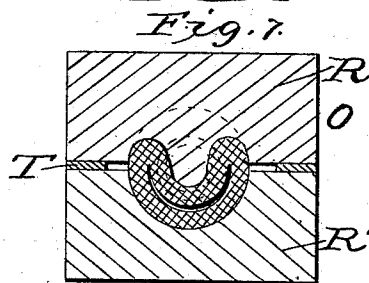
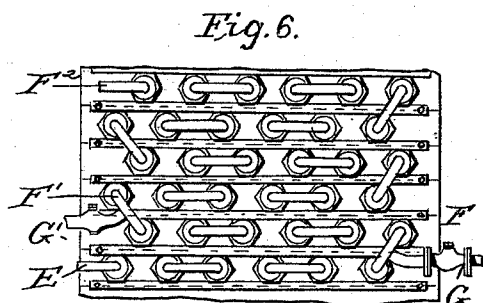
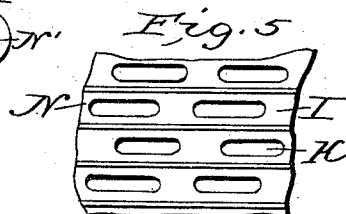
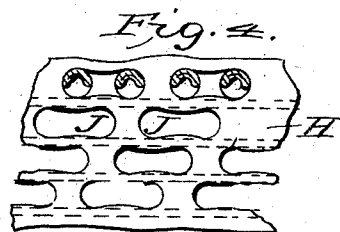
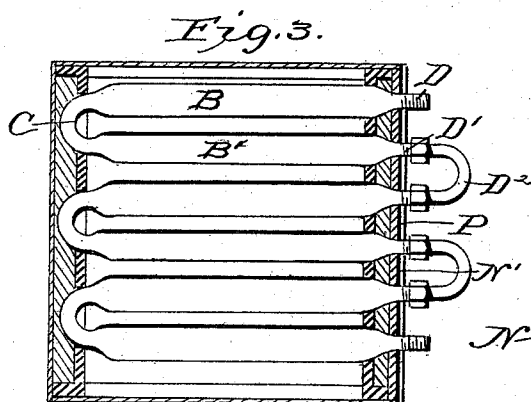
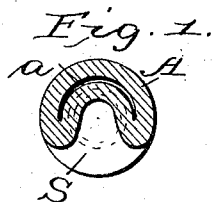
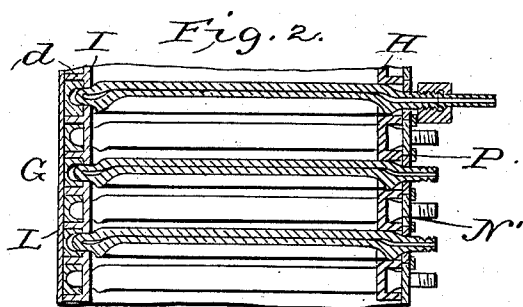
(No Model.)

L. SERPOLLET.

GENERATOR WITH INSTANTANEOUS VAPORIZATION.

No. 535,866.

Patented Mar. 19, 1895.



Attest
Wm. F. Hall
Notary Public

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Attys

UNITED STATES PATENT OFFICE.

LEON SERPOLLET, OF PARIS, FRANCE, ASSIGNOR TO LA SOCIÉTÉ DES GÉNÉRATEURS À VAPORISATION INSTANTANÉE, (SYSTÈME LEON SERPOLLET), OF SAME PLACE.

GENERATOR WITH INSTANTANEOUS VAPORIZATION.

SPECIFICATION forming part of Letters Patent No. 535,866, dated March 19, 1895.

Application filed June 5, 1894. Serial No. 513,540. (No model.) Patented in France May 17, 1892, No. 221,679.

To all whom it may concern:

Be it known that I, LEON SERPOLLET, residing at Paris, France, have invented certain new and useful Improvements in Generators with Instantaneous Vaporization, of which the following is a specification.

The invention has been patented in France May 17, 1892, No. 221,679.

The improvements which constitute the subject matter of the present application have for their object to increase the lightness and the resisting power of the evaporating tubes and also to make their construction more accurate or precise, while the inspection and the replacing of the tubes is rendered easier and their durability greater.

The resistance against all distortions or deformation as well as the lightness of the tubes results principally from the peculiar shape A (Fig. 1) given to the transverse section of the tube which enables me to construct tubular clusters formed of straight tubes without metallic lining, by means of which clusters are formed horizontal rows placed the one upon the other and communicating at their extremities.

In the drawings:—Figure 1, is a section across one of the tubes; Fig. 2, a longitudinal section through the cluster; Fig. 3, a horizontal section showing the tubes in plan view. Figs. 4 and 5 are detail views of the front and back plates. Fig. 6, is a front view of the cluster. Fig. 7, shows a transverse section of one of the tubes and the mold section. Fig. 8, is a view of one of the tubes before being molded showing in dotted lines the tube after being molded.

In Fig. 2, a vertical section is shown longitudinal through the tubes which are, as will be seen placed the one above the other in order to form a tubular cluster and in Fig. 3 a plan view of a row of tubes is shown which in this case are double or consisting of two branches B B' yet which could also be single or have more than two branches.

An elbow C forged upon the tube unites the two branches B B' at the rear. At the front each of them ends in a straight tubular nipple D or D' which also forms one body with the mass of the tube and which is screw

threaded at its extremity. A tube D² serves to join and to connect two neighboring tubes so as to form a horizontal row.

Fig. 6 shows in front view a fragment of the cluster of tubes seen from the end and in elevated horizontal rows the one above the other over the fire box. As can be judged from Figs. 2, 3 and 6 that multitubular cluster is arranged in the peculiar manner herein-after described in order to prevent the destruction or deformation of the lower tubes which are the most exposed to the action of the fire. The water, driven back by the feeding apparatus arrives into the first lower row through the tube E. It runs through all the arms of said lower row, by means of the elbows C and the flushings D². From that first row, and by means of the two way flushing F, provided with a cock G the water can either pass into the second row, or return wholly or partly into the feeding cistern. In the same way, if the whole water driven back passes in the second row it can, in the same manner pass into the upper rows or return to the feeding cistern through the two way flushing F', provided with the cock G'. These means enable the attendant to produce in the boiler only the quantity of steam required by the motor and if desired not to produce any at all if the motor is stopped while maintaining the lower tubes cool enough, at the same time so that they keep their resisting power and that they protect the upper tubes as screens would do.

The elbows C, the extremities D D', the flushings D² are sheltered from the flames and from the combusive gases, and at the same time the replacing of the evaporating elements is facilitated, by means of the constructions indicated in Figs. 2, 3, 4, 5, and 6, which show the cast iron plate H, that supports in front the extremities D D' of the tubes; a front view of the cast iron plate I that supports at the back the elbows C of the same tube and finally a front view of the cluster provided with its movable plates N', and of its stop or check bars P.

The plate H is perforated with oblong openings J through which each of the evaporating tubes can pass. The rear plate is also per-

forated with oblong openings K supporting the elbows C which can easily be removed from them. It is reinforced by ribs N. The object of these arrangements is to render
 5 easy the removal or the replacing of one tube or of a row of those tubes without hurting the working of the rest of the boiler.

The back plate I (Fig. 5) is reinforced by ribs N that form between them and with the
 10 outside plate L chambers which can be filled with cotton or silicious mineral fibers. The front plate H is also reinforced by ribs U which form between them and with each of the movable and distinct plates N' chambers
 15 which are filled with an anticaloric material. Each of the plates N' which are maintained by the cross bars P is removed when one of the evaporating tubes must be removed, and then put in its place again.

20 Fig. 7, shows the two parts of a matrix between which can be seen the transverse section of the tube and in dotted lines their shape at their junction with the part C and the extremities D D'. Fig. 8, shows the longitudinal form of that tube. These two figures illustrate the process by which the evaporating
 25 tubes are obtained in a precise manner.

It is from the metallic cylindrical tube Q, shown in Fig. 8, and which is supposed to have
 30 been chosen of the required dimensions that the evaporating tube B B' is produced. The central part which must form the elbow C is hollowed by hammer. The extremities which must form the tubular parts D D' which must
 35 be screw threaded before the tube has been elbowed, are also burnished. After this the tube, while hot, is carried between the two parts R and R' of the matrix O.

The cylindrical body part of the tube Q, except at the points S S' is deformed by pressure and brought into the transverse shape A and to the longitudinal shape A' illustrated in Figs. 1 and 8 having inside a capillary space
 40 α in the shape of a crescent. That space is made slightly and progressively larger according as the evaporating tube belongs to a more or less elevated row and that it reaches near
 45 the exit (Fig. 6). The object thereof is to furnish to the steam a passage in proportion to

its volume. To effect this wedges T and T' 50 are inserted between the parts R R' of the matrix O, the thickness of which is more or less according to the fact that evaporating tubes must be constructed destined for the higher rows. 55

I claim—

1. In a generator the evaporation tubes having crescent shaped body portions with crescent shaped openings therein and cylindrical non-deformed bearing portions, substantially 60 as described.

2. In a generator the evaporation tubes comprising the crescent shaped body portions united at their extremities and having cylindrical bearing portions, said tubes being arranged in clusters and having crescent shaped 65 passages increasing in height about the center, substantially as described.

3. In combination, the evaporation tubes, arranged in a cluster one above the other, the 70 connections D² between the tubes, the connections E and F² at the ends of the cluster of tubes, and the two way flushings F G and F' G' provided with cocks and adapted to control the supply of water in the lower rows of 75 tubes, substantially as described.

4. In combination the cluster of evaporation tubes, the front and back supporting plates H I, having openings therein, the ribs extending adjacent to the said openings, and the 80 covering plates extending over said ribs and forming therewith chambers and a suitable filling therein, substantially as described.

5. In combination, the cluster of tubes, the front and back plates having openings, the 85 ribs arranged adjacent to the openings, the cover plate L, at the rear, the series of cover plates N' at the front, the series of cross pieces P for holding the plates N' in place and the filling in the chambers between by 90 the flanges and the plates, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

LEON SERPOLLET.

Witnesses:

DAVID T. S. FULLER,
 CHARLES CASALONGA.