

W. E. KELLY.
Steam Generators.

No. 141,798.

Patented August 12, 1873.

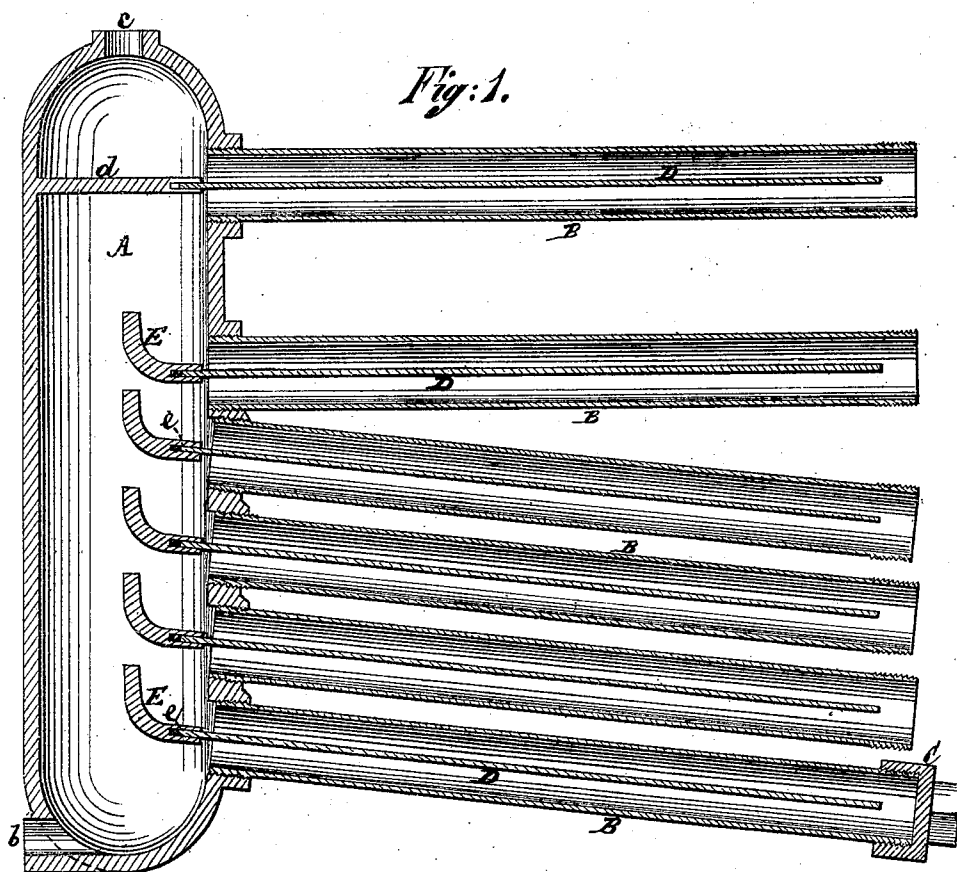
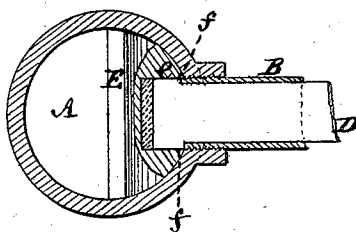


Fig: 2.



Witnesses:

Henry Eichling
Fred Haynes

William E. Kelly
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UNITED STATES PATENT OFFICE.

WILLIAM E. KELLY, OF NEW BRUNSWICK, NEW JERSEY.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **141,798**, dated August 12, 1873; application filed May 2, 1873.

To all whom it may concern:

Be it known that I, WILLIAM E. KELLY, of New Brunswick, in the county of Middlesex and State of New Jersey, have invented certain Improvements in Steam-Generators, of which the following is a specification:

This invention relates to steam generators or boilers in which a series of horizontal or inclined tubes is used, arranged to connect at their one or forward end with a chamber common to each, and in which the tubes are longitudinally divided to promote circulation, the fire or gaseous products of combustion acting upon the outside of the tubes. Said boiler may be composed of any number of such sectional constructions, arranged side by side; and the invention consists in a longitudinal partition or dividing plate within each tube, arranged to separate the latter into upper and lower sections, in communication at the back end of the tube, in combination with pockets leading upward within the chamber at the front end of the tubes, whereby a most perfect circulation is obtained, and water carried by the steam is returned for recirculation through the tubes, and a rapid and most perfect generation of steam produced. The invention also consists in a novel and advantageous means of securing the partition-plates in the tubes in connection with the pockets thereof, whereby said plates are held securely in position in every direction, with provision for their expansion and contraction, as well as providing for their ready attachment or detachment and secure hold, in proper relation with each other, of the tubes, partition-plates, and pockets.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a vertical section of one row of tubes, with partition-plates, pockets, and upright chambers, with which the tubes connect at their forward ends, there being any number of such rows of tubes with attachments, as described, arranged side by side to make up a complete boiler. Fig. 2 is a horizontal or approximately horizontal section, in part, through the main chamber in front and one of the tubes.

Similar letters of reference indicate corresponding parts.

A is the upright or main chamber in front of one row of tubes, B, arranged one above the other, and screwing, at their forward ends, into nozzles projecting from the back side of the chamber A, and being closed at their rear ends by screw-caps C. The water may be admitted to the boiler by an inlet, *b*, at or near the bottom of the chamber A, and the steam, as generated, passed off by an outlet, *c*, at the top of said chamber, above a diaphragm, *d*, within which the front end of the partition-plate of the upper tube fits, as hereinafter described, for the connection of the partition-plates D of the other or lower tubes with independent pockets E, arranged within the chamber A in front of the tubes. These pockets E extend across the back part of the chamber A, and are shaped to curve or project upward at their forward portions. They may be cast in common with or as attachments to the chamber A, and are arranged so that their back edges lie across the central portion of the inner ends of the nozzles into which the tubes screw, in order that the forward ends of the partition-plates D may enter within slots *e* in the back edges of the pockets, which slots should be provided with packing of any suitable kind for the front ends of the partitions to form a close joint with. The partition-plates D are of a length, so as to stop short of the back ends of the tubes, in order that communication may be established at the back ends of the latter between the upper and lower spaces formed by the partition-plates within the tube. Said plates D intercept the tubes centrally in direction of their length, and are generally of a width corresponding with the interior diameter of the tubes, so that they form a close fit at their edges with the latter without interfering with the turning of the tubes when screwing or unscrewing them to or from their places. The forward ends of these partition-plates, which enter within the slots or recesses *e* in the back edges of the pockets E, extend beyond the front ends of the tubes, and such extended portions are formed with a shoulder or shoulders, *f*, to overlap the front ends of the tubes, whereby the plates are retained securely in position both laterally and in all other directions, with every provis-

ion for expansion and contraction, and for the ready attachment and detachment of them and the tubes.

In the use of the boiler, the upper spaces of the longitudinally-divided tubes being cooler than the lower spaces thereof, the water, including that caught by or deposited from the steam in the pockets E, is caused to circulate down or backward over the tops of the partition-plates D to take the place of the steam generated in the hotter or lower spaces of the longitudinally-divided tubes, and made to pass upward or forward again along the under surface of the partition-plates. This produces a thorough circulation, as well as rapid and perfect generation, of the steam.

I will explain that the pockets E E differ, both in construction and function, from the flanges which, when attached to diaphragms or partition-plates in tubes, form the subject-matter of Letters Patent No. 82,146, for these pockets, extending all across the chamber A, and having their upper surfaces entirely concave, serve to collect and conduct back into

the upper parts of the tubes, above the partition-plates D, water, which is carried into the chamber A by the steam entering therein from the parts of the tubes below said plates; whereas the flanges in the said patent, being convex transversely and not extending across the chamber, have no such collecting effect, and do not act as pockets, but are specified in the patent as for a different purpose.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the pockets E extending across the chamber A, the partition-plates D, and the tubes B, substantially as shown and described.

2. The partition-plates D, constructed with shoulders *f* at their forward ends, in front of the tubes B, within which said plates fit, in combination with the recesses *e* in the back edges of the pockets, essentially as specified.

WILLIAM E. KELLY.

Witnesses:

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