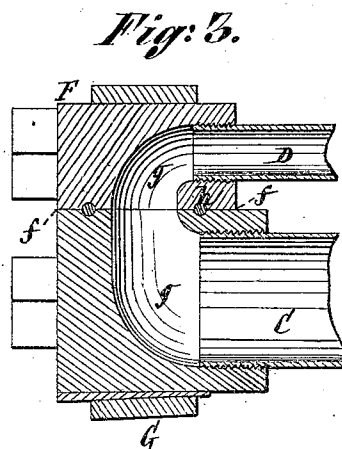
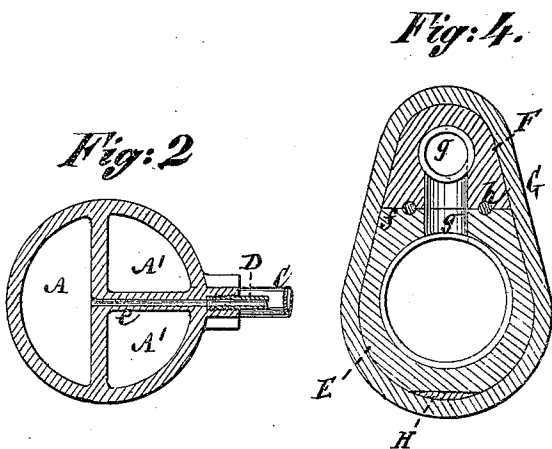
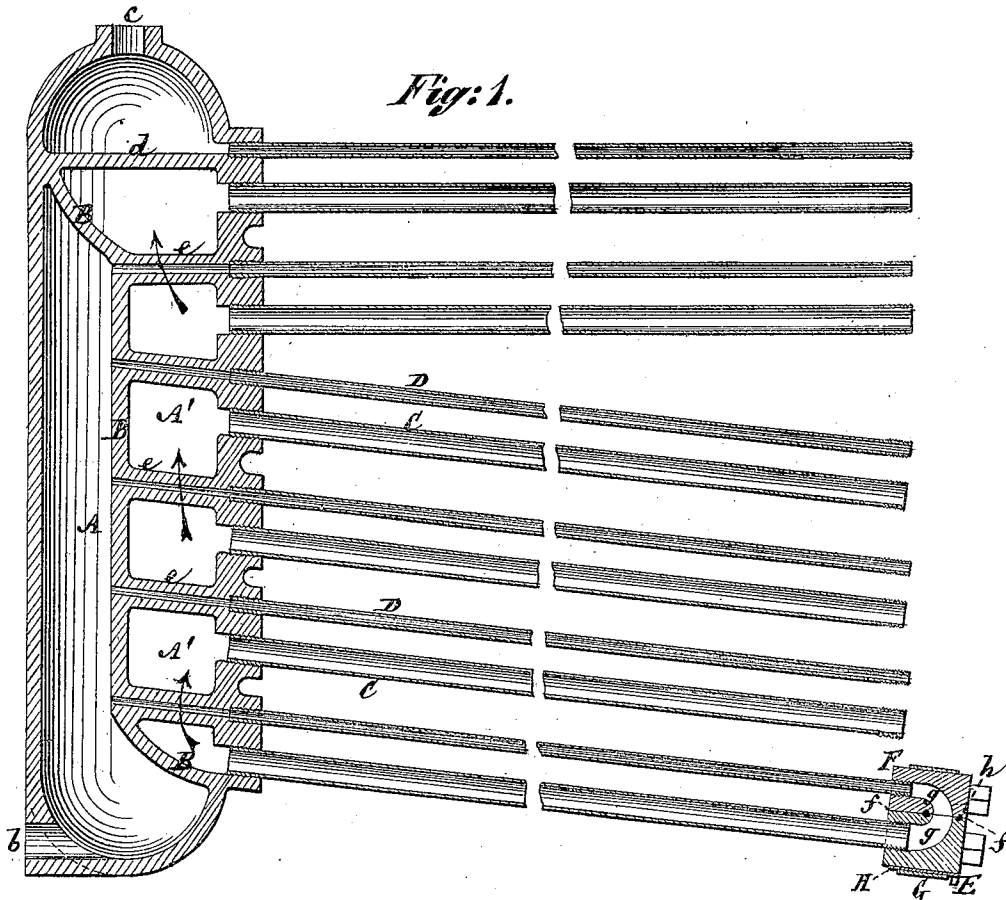


W. E. KELLY.

Sectional Steam Generators.

No. 141,799.

Patented August 12, 1873.



Witnesses:

Henry Eichling
J. C. Hargreaves

William E. Kelly
by his Attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. 141,799, 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 Sectional Steam-Generators, applicable also to the fire-boxes of steam-boilers, of which the following is a specification:

This invention, which may either be used as an improvement in tubular boilers of sectional construction, or as an improvement in fire-box sides or surfaces of boilers, relates to those water-heating or steam-generating combinations in which a series of horizontal or inclined tubes are used, connecting at their one end with a chamber common to each, and in which supplementary pipes or tubes are used to promote circulation. The invention consists in a certain combination of tubes in couplets, one outside of the other, and arranged so as to be unequally exposed to the action of the fire, with a divided front end chamber to the several tubes, and independent back connections for each couplet of tubes, whereby a near perfect circulation is kept up. The invention also consists in a novel and advantageous construction of the back connections to each couplet of tubes.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a vertical section of one row or section of tubes, with end chamber attachment, constructed in accordance with my invention, and which will here be described as a single row or section of a tubular boiler, made up of any desired number of such rows arranged side by side. The same combination of parts, however, might be used in the construction of the sides of fire-boxes of steam-boilers. Fig. 2 is a horizontal or approximately horizontal section of the same, in part, through the main or end chamber, with which the tubes connect at their one or forward end. Fig. 3 is a vertical longitudinal section, upon a larger scale, of one of the back connections to each couplet of tubes; and Fig. 4, a transverse vertical section thereof.

Similar letters of reference indicate corresponding parts.

A A' represent the front or main end chamber, with which the tubes connect at their forward ends. This chamber, to which the feed-

water is admitted by an inlet, *b*, below, and from which the steam is passed by an outlet, *c*, above, is divided vertically, or throughout the greater portion of its length, by a partition, B, into front and back sections A A', and preferably also by a cross-partition, *d*, into an upper section or steam-space, which is in connection by the upper couplet of tubes with the back section A' of the main chamber. C and D represent couplets of tubes arranged to screw at their forward ends into the main chamber, and so that the one tube, C, of each couplet connects with the back section A' of the main chamber, while the other tube, D, of the several couplets, except the upper one, connects, through a socket or tubular connection, *e*, with the front section A of the main chamber. These tubes C and D are arranged outside of each other, the tube D, which may be smaller than the tube C, being under cover, as it were, of the latter tube, and farthest removed from the action of the fire, so that the tubes D, which connect with the tubes C in the rear, being cooler, serve to keep up a circulation of the water backward through them to the hotter or steam-generating tubes C. In this way a rapid and perfect generation of the steam is established, and a thorough circulation of the water obtained. The arrangement shown in the drawing is such that the water-circulating tubes D lie above the tubes C, which arrangement is adapted to the application of the invention to the boiler itself, the fire playing from underneath the tubes. When, however, the invention is applied to the fire-box of a boiler, then the tubes D may be arranged alongside the tubes C—that is, between the latter and the wall. The couplets of tubes C and D are in communication at their rear ends by independent connections, each of which is composed of half or partial boxes E F, arranged to screw, respectively, onto the back ends of said tubes, and formed with flat or meeting faces *f*, through which passages *g*, bent so as to project forwardly to establish connection between the tubes, are made, a packing, *h*, being introduced within the faces around the meeting ends of the passages *g* to prevent leakage. The connection of these half boxes E F is made, and their faces brought together, by first screwing the one half box onto

its pipe, leaving its face in proper meeting position with the face of the other half box after the latter has been screwed onto its pipe. A band, G, is then slipped or driven onto or over and around the two half boxes and the whole secured together, and the faces of the two half boxes brought in close contact by driving one or more wedges, H, in between the band and the boxes. This forms a simple and very efficient clamp or means of connecting the tubes at their back ends, together with great facility for attaching and detaching the same.

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

1. The chamber A A', constructed with partitions B *d* and tubular connections *ee*, in combination with the tubes C D, substantially as and for the purpose herein specified.

2. The independent back connections to the several couplets of tubes, composed of half or partial boxes E F, provided with passages *g*, and secured at their meeting faces by an outside clamp, essentially as described.

WILLIAM E. KELLY.

Witnesses:

MICHAEL RYAN,
FRED. HAYNES.