

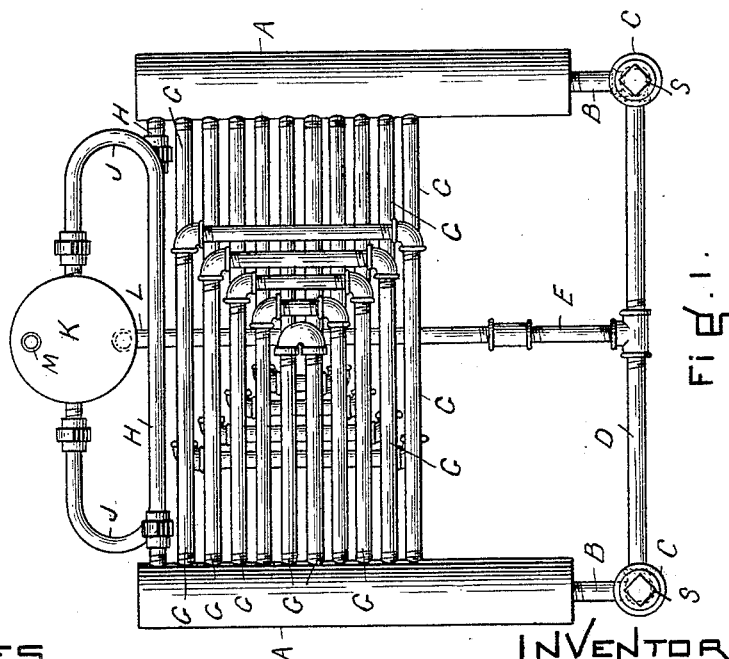
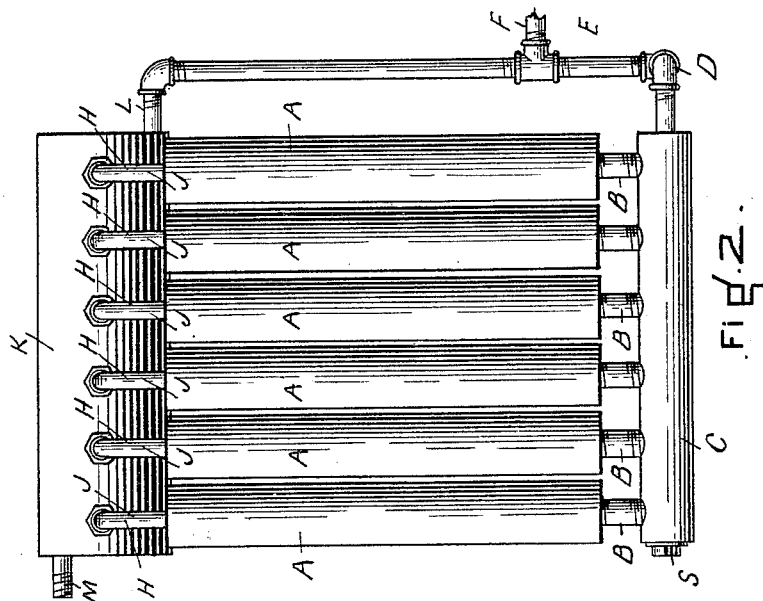
(No Model.)

3 Sheets—Sheet 1.

A. T. TREGURTHA.
SECTIONAL STEAM BOILER.

No. 458,923.

Patented Sept. 1, 1891.



WITNESSES

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(No Model.)

3 Sheets—Sheet 2.

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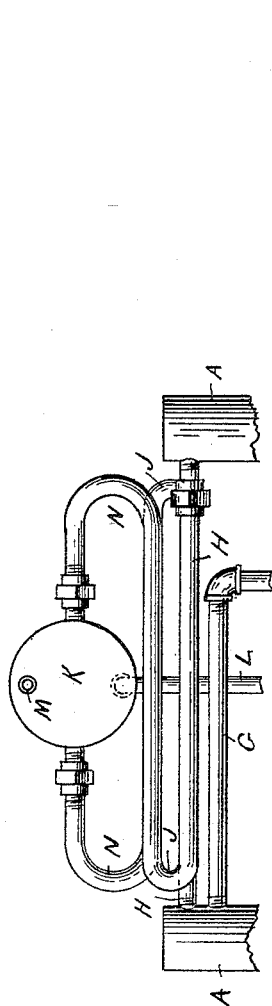


FIG. 6.

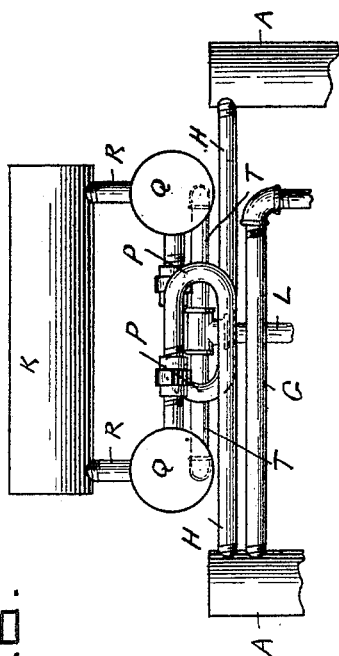


FIG. 7.

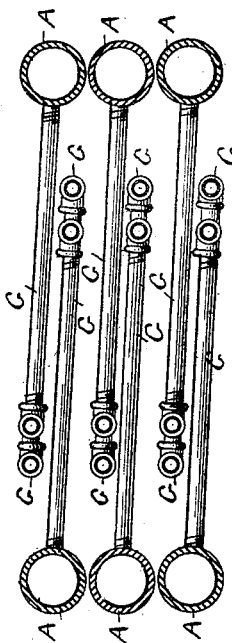


FIG. 8.

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(No Model.)

3 Sheets—Sheet 3.

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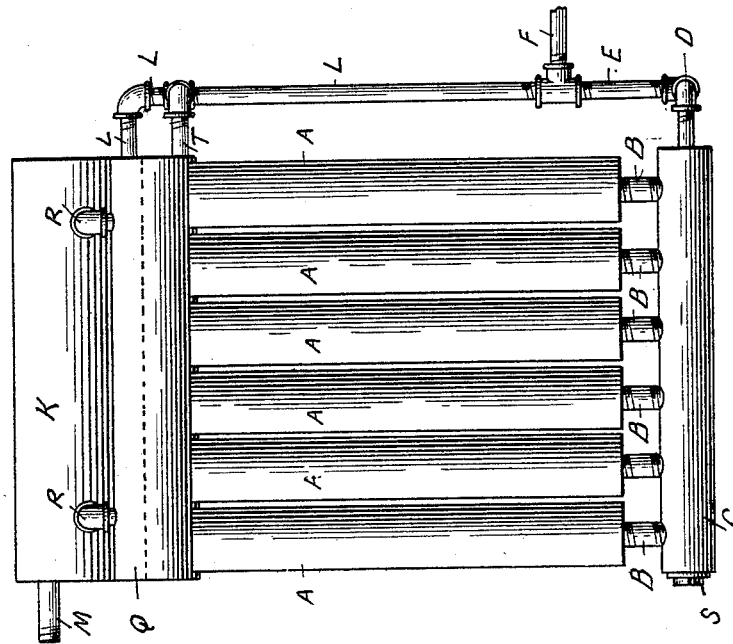


FIG. 5.

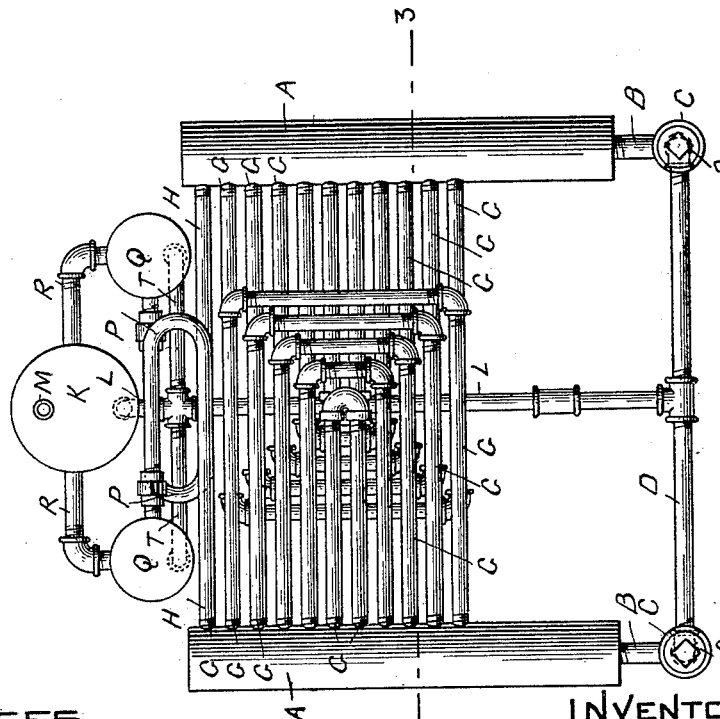


FIG. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

ALFRED T. TREGURTHA, OF EVERETT, MASSACHUSETTS.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 458,923, dated September 1, 1891.

Application filed February 12, 1891. Serial No. 381,225. (No model.)

To all whom it may concern:

Be it known that I, ALFRED T. TREGURTHA, of Everett, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Sectional Steam-Boilers, of which the following is a full, clear, and exact description.

This invention relates to sectional steam-boilers, and the object of the invention is to
10 so arrange and combine the water pipes or tubes or drums of a sectional steam-boiler in relation to the fire-grate and to the steam-drum that steam only will pass from the
15 pipes or tubes to the steam-drum, and also that the steam will be superheated and dried before or as it reaches the steam-drum; and the invention consists of a sectional steam-boiler constructed and arranged for opera-
20 tion, all substantially as hereinafter fully described, reference being had to the accompanying sheets of drawings, in which is illustrated a sectional steam-boiler constructed in accordance with this invention without its casing or shell, of which—

25 Figure 1 is a front elevation. Fig. 2 is a side elevation. Fig. 3 is a horizontal section on line 3 3, Fig. 1. Fig. 4 is a front elevation similar to Fig. 1, showing additional parts in connection therewith. Fig. 5 is a side elevation of Fig. 4. Fig. 6 is a detail view of additional parts, and Fig. 7 is a detail view of a
30 modification.

In the drawings, A A represent vertical drums or tubes in two series, one on each
35 side of the fire-grate, each of which at its lower end communicates by a pipe B with a horizontal sediment-tube C, one sediment-tube being below each series of drums A and extending from the front to the rear. The
40 two sediment-tubes are connected together at their rear ends by a horizontal pipe D, connected to a vertical pipe E, having a feed-pipe F.

Between the two series of vertical drums at
45 their lower ends, extending from one to the other, is located the usual fire-grate, but which is not shown in the drawings.

Each vertical drum A has a series of U-shaped pipes or tubes G, both ends of which
50 pipes communicate with its respective drum, the series from each drum being in the same vertical plane and disposed one within the

other, or each shorter pipe being within the fold or bend of its next longer pipe, the longest pipe in each case extending nearly to the
55 opposite vertical drum on the other side of the grate, as shown in Figs. 1, 3, and 4 more particularly, and each series of bent tubes of one vertical drum overlapping laterally the corresponding series of bent tubes extending
60 from the opposite vertical drum, as shown more particularly in cross section in Fig. 3.

Near the top of each vertical drum A and with which it communicates is a horizontal
65 pipe H, which extends toward the opposite vertical drum, and by a return-bend J its other end is connected to and communicates with the steam-drum K, which is the usual
70 steam-drum of sectional steam-boilers and which extends from the front to the rear and is located just above the series of U-shaped pipes between the two series of vertical drums and preferably over the center of the grate. A pipe L is connected to the rear end of the
75 steam-drum, communicating therewith and extending downward therefrom to and forming one pipe with the pipe E, as shown more particularly in Fig. 2.

M is the usual supply-pipe from the steam-drum to the engine or other apparatus to be
80 supplied with steam.

In Fig. 6 is shown the bent pipe H as having a double bend or a bend N in addition to the bend J, and in this view it extends from the vertical drum with which it is connected
85 and communicates nearly to the opposite vertical drum, then by its return-bend J back again nearly to its vertical drum, and thence by its return-bend N to and communicating with the steam-drum K, as shown in this fig-
90 ure. The series of bent tubes H extending from one set of vertical drums overlaps laterally the series of bent tubes H extending from the series of opposite vertical drums in a similar manner to the overlapping of the
95 U-shaped pipes or tubes. Having the bent horizontal tubes or pipes H located just above the U-shaped tubes and communicating with the steam-drum and between the fire-grate and the steam-drum it insures their becoming
100 thoroughly heated by the fire, so that if any water should happen to pass into these horizontal pipes from the vertical drums it would be so thoroughly heated as to be surely con-

verted into steam, for the steam only to pass to the steam-drum; also, that the steam in passing through these pipes will be more or less superheated and dried when it reaches the steam-drum, an advantage which is of great benefit in the use of the boiler.

To doubly insure the passage of steam only to the steam-drum and the superheating of the same, the pipes H can be doubled, as shown in Fig. 6, and one or more return-bends be added, as desired; also, to the more fully carry out the object of this invention intermediate horizontal steam-drums can be placed above the U-shaped pipes, with which the bent pipes H will communicate, and communication then be had from each intermediate steam-drum by pipes with the steam-drum A. Such an arrangement is shown in detail in Figs. 4, 5, and 7. In these views the pipes H extend horizontally toward the opposite vertical drum, and by a return-bend P its other end is connected to and communicates with a horizontal intermediate "steam-drum" or "superheater" Q, as it might be called, extending from the front to the rear, one on each side, as shown in Fig. 4 more particularly, and from the upper side of each intermediate or superheater-drum Q, near each end is a tube or pipe R, which is connected to the side and communicates with the steam-drum A, as shown more particularly in Fig. 5. With the intermediate steam drums or superheaters combined with the return-bend pipes H the passage of water to the steam-drum is surely prevented and the superheating of the steam doubly insured.

In Fig. 7 is shown a modification of the method of connecting the steam-drum with the two intermediate steam-drums or superheaters, and that is by pipes R connected to the under side of the steam-drum, one at each end, to the upper side of the superheater-drums, through which communication is had from the superheater-drums to the steam-drum.

In lieu of having the pipes of U shape, as shown, they can be of other outline or form; but it is essential that both ends of each pipe should communicate with its respective vertical drum and that the two series should overlap each other; also, it is preferable that these pipes extend from their respective vertical drums nearly to the opposite drums.

In lieu of making the pipes H with a return-bend they can lead directly from the superheater-drum to a vertical drum, but having a return-bend gives a longer pipe for the steam to pass through between the vertical drum and the superheater-drums, thus doubly insuring the passage of steam only to the steam-drums.

The several pipes and tubes can be connected together and to the drums by unions and joints, as desired, the invention not being limited to the manner herein particularly shown.

The length of the pipes H and their return-bends gives an elasticity to their connection with the vertical drums and the steam-drum or intermediate drum, thus allowing for the expansion and contraction of the parts subjected to heat without injury to their connections.

At the front end of each sediment-tube is a plug S for removing the sediment from the drums in the usual manner. Each intermediate drum has a pipe T at its rear end communicating therewith, which also communicates with the pipe L of the steam-drum K.

Having thus described my invention, what I claim is—

1. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of pipes bent in any suitable form or outline, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, and a horizontal steam-drum located over the series of pipes and fire-box and extending from the front to the rear and connected to each vertical drum by a separate pipe having one or more return-bends, the latter pipes extending by and laterally overlapping each other.

2. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of pipes bent in any suitable form or outline, the pipes in one series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, a horizontal steam drum located over the series of pipes and fire-box and extending from the front to the rear, intermediate drums having communication with said steam-drum, and a pipe communicating with said intermediate drums and each vertical drum and extending by and laterally overlapping each other.

3. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of pipes bent in any suitable form or outline, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series shall overlap the pipes in the other series, a horizontal steam-drum located over the series of pipes and fire-box, intermediate drums having communication with said steam-drum, and a pipe to each intermediate drum, having a return-bend and communicating with a vertical drum on the same side.

4. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of U-shaped pipes, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, and a horizontal steam-drum located over the series of pipes and fire-box and extending from the front to the rear of the same and connected to each vertical drum by a separate pipe having one or more return-bends, the several pipes extending by and laterally overlapping each other.

5. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of U-shaped pipes, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, a horizontal steam-drum located over the fire-box and extending from the front to the rear of the same, intermediate drums communicating with said steam-drum, and pipes communicating with said intermediate drums and extending by and overlapping each other and communicating with the vertical drums.

6. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of pipes bent in any suitable form or outline, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series shall overlap the pipes in the other series, a horizontal steam-drum located over the series of pipes and fire-box, intermediate drums having communication with said steam-drum, and a pipe to each vertical drum having a return-bend and communicating with an intermediate drum, the pipe from one vertical drum extending by and overlapping laterally the pipe from the opposite vertical drum.

7. In a sectional steam-boiler, the combination of two vertical drums, one upon each side of the fire box or grate, two series of U-shaped pipes, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series shall overlap the pipes in the other series, a horizontal steam-drum

located over the series of pipes and fire-box, intermediate drums having communication with said steam-drum, and a pipe to each vertical drum, having a return-bend and communicating with an intermediate drum, the pipe from one vertical drum extending by and overlapping laterally the pipe from the opposite vertical drum.

8. A steam-boiler composed of a series of sections, each consisting of two vertical drums, one upon each side of the fire box or grate, two series of pipes bent into any suitable form or outline, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, and a horizontal steam-drum located over the series of pipes and fire-box and extending from the front to the rear and connected to each vertical drum by a separate pipe having one or more return-bends, the latter pipes extending by and laterally overlapping each other.

9. A steam-boiler composed of a series of sections, each consisting of two vertical drums, one upon each side of the fire box or grate, two series of pipes bent in any suitable form or outline, the pipes in one series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, a horizontal steam-drum located over the series of pipes and fire-box, intermediate drums having communication with said steam-drum, and a pipe communicating with said intermediate drums and each vertical drum and extending by and laterally overlapping each other.

10. A steam-boiler composed of a series of sections, each consisting of two vertical drums, one upon each side of the fire box or grate, two series of U-shaped pipes, the pipes in one series communicating at both ends with one of said vertical drums and the pipes of the other series communicating at both ends with the other of said vertical drums, both series projecting inward over and nearly to the other side of the grate, so that the pipes in one series laterally overlap the pipes in the other series, and a horizontal steam-drum located over the series of pipes and fire-box and extending from the front to the rear of the same and connected to each vertical drum by a separate pipe having one or more return-bends, the several pipes extending by and laterally overlapping each other.

11. A steam-boiler composed of a series of sections, each consisting of two vertical drums, one upon each side of the fire box or grate, two series of U-shaped pipes, the pipes in one series communicating at both ends with one

of said vertical drums and the pipes of the
other series communicating at both ends with
the other of said vertical drums, both series
projecting inward over and nearly to the other
5 side of the grate, so that the pipes in one se-
ries laterally overlap the pipes in the other
series, a horizontal steam-drum located over
the fire-box and extending from the front to
the rear of the same, intermediate drums
10 communicating with said steam-drum, and
pipes communicating with said intermediate

drums and extending by and overlapping
each other and communicating with the ver-
tical drums.

In testimony whereof I have hereunto set 15
my hand in the presence of two subscribing
witnesses.

ALFRED T. TREGURTHA.

Witnesses:

EDWIN W. BROWN,
CARRIE E. NICHOLS.