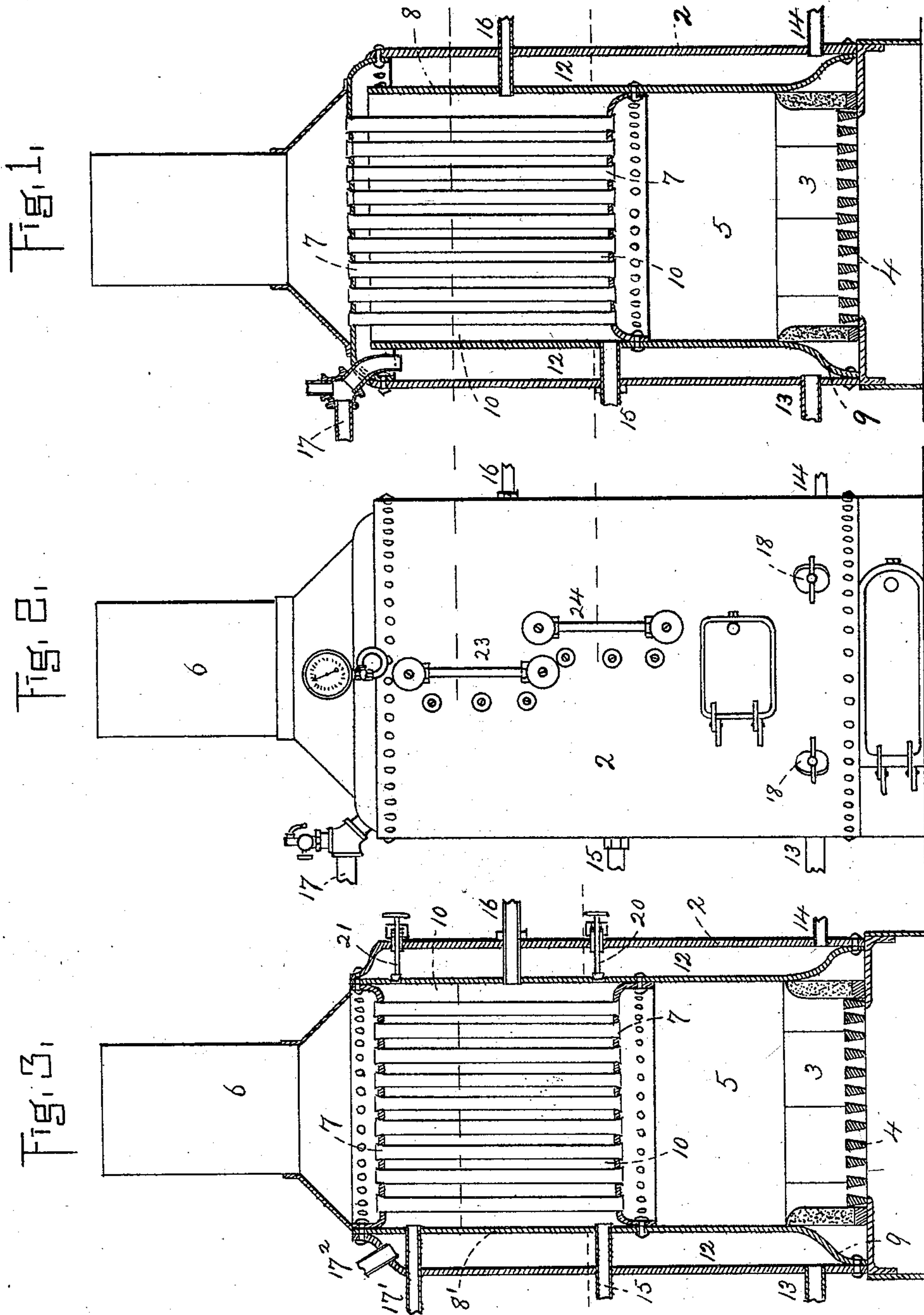


(No Model.)

T. L. & T. J. STURTEVANT.
BOILER.

No. 487,793.

Patented Dec. 13, 1892.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS L. STURTEVANT AND THOMAS J. STURTEVANT, OF FRAMINGHAM,
MASSACHUSETTS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 487,793, dated December 13, 1892.

Application filed May 9, 1892. Serial No. 432,264. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. STURTEVANT and THOMAS J. STURTEVANT, citizens of the United States, residing at Framingham, in the
5 county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boilers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as
10 will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

15 This invention relates to improvements in the construction of boilers whereby it becomes possible to use bad water without danger of serious injury, such as the formation of scale or the deposit of impurities upon the
20 inaccessible portions thereof.

Incidentally in carrying out our improvements we are enabled to separate the water from the steam prior to its delivery for use, and thereby reduce the liability of the boiler
25 to prime.

The essential features of our invention, more particularly adapted to boilers of a vertical type, consist in placing a cylinder or partition within the boiler-shell proper and in uniting
30 the lower end of such cylinder by a tight joint therewith; furthermore, in leaving the upper end of said cylinder open to permit of a common steam-space, as likewise a common steam-delivery pipe; moreover, in providing
35 separate water-feed and blow-off pipes, and likewise in the arrangement to permit of separate water-levels.

The drawings represent, in Figure 1, a vertical sectional elevation of a boiler embodying
40 our invention. Fig. 2 is an elevation of the same. Fig. 3 is a vertical sectional elevation of a modified form of a boiler under our invention.

The apparatus selected to illustrate our invention consists in a modification of the common vertical tubular type of boiler and is composed of the outer shell 2, a fire-box 3,
45 grate-bars 4, combustion-chamber 5, smoke-stack 6, and flues 7.

50 To carry out our invention and to enable pure and impure water to be used in the same

system, as likewise to enable a single boiler to carry different water-levels in its different parts, we have disposed within the shell 2 a second cylinder or partition 8, the lower edge
55 9 of which is riveted to the outer shell or bottom plate to create a steam and water tight joint, while within or under it at this point are placed the grate-bars 4. The upper portion of said boiler contains the series of
60 vertical steam-generating tubes 7. Said cylinder is somewhat smaller in diameter than the shell 2 to create in this instance an outer steam and water space or annular chamber 12, which is supplied with a feed-pipe 13 and
65 a blow-off 14. Similarly the tubular portion 8 forms a second water-space 10 and is fitted with a supply-pipe 15 and a blow-off 16 independent of the others.

A common steam-discharge pipe is shown at
70 17, and the mouth of this pipe is placed below the upper end of the inner cylinder 8, in order that water carried over may be separated from the steam prior to the entrance of the latter within the delivery 17. Presuming this boiler
75 is used for marine purposes and is now in operation with the smoke escaping by way of the flues 7 to the stack, it is evident that the generating of steam occurs in both water-spaces and the steam in common finds its way
80 to the discharge-pipe 17. In our invention it is intended that in this special instance the outside water-space 12 shall be fed with salt-water, while the inner space 10 is supplied with pure water. The heating-surface for the
85 water-space 10 being the larger, the greater part of the steam is generated here, and being free to escape from all points at the top of the cylinder 8, there is little or no tendency to cause priming. The steam from the space 10
90 in passing into the steam-discharge is freed from any water it may contain and commingles with that made in the less effective steam-space 12.

Since only pure water from some tank or
95 reservoir (not shown) is fed to the interior water-space 10 its surfaces are not liable to be incrustated with scale or sediment. On the other hand, the outside water-space 12 being supplied with salt or impure water will, as the
100 water is evaporated, collect much scale and sediment. This, however, is in this case easily

removed by means of the hand-holes 18. (See Fig. 2.) For marine service the salt water evaporated more than supplies the waste of the pure water by leakage, &c., and consequently no large storage-reservoirs of pure water are required.

In ordinary evaporators the steam, being of low pressure, is not generally utilized directly, but is condensed and again heated. In our invention the evaporator forms a part of the boiler and is operated by the same fire, while in addition to supplying pure water, which it produces from the salt or impure water, it prevents the boiler from priming and separates any entrained water from the steam before it escapes into the steam-delivery pipe 17.

In Fig. 3 is shown a modified construction in which two distinct boilers are employed, one within the other, the inner boiler or cylinder 8' being united by steam-joints with the shell 2 of the outer boiler. Each is provided with a separate supply-pipe and blow-off, as in the previous example. A distinctive feature in this modification consists in providing separate steam-delivery pipes 17' 17²; furthermore, in providing valves 20 21, by means of which the two boilers may intercommunicate or not, as may be desired, and said boilers carry separate steam-gages 23 24. The same general purposes are to be seen in both types here described; but, in addition thereto, the modification in Fig. 3 provides that each boiler may be worked separately. When the valves are both open, pure water is used in both boilers. When the lower valve is closed and the upper open, pure water may be used in one and impure in the other. Moreover, when both valves are closed, said boilers can be used under different pressures and for different purposes, and in case one breaks down the other may be worked independently.

What we claim is—

1. A boiler for steam-generating purposes composed of two upright water-tight receptacles the tops of which are at approximately the same height, each having an independent water-space, which is separated from the water-space of the other, and each being provided with independent water-supply and blow-off pipes, combined with a common steam-delivery pipe, whereby different water-

levels may be carried in the same boiler with a common steam-space, substantially as explained.

2. In a vertical boiler, the combination, with two upright steam-generators the tops of which are at approximately the same height and one of which is inclosed within the other, said generators having independent water-spaces, the water-space of one being separated from the water-space of the other, of a fire-box common to both, a common steam-delivery pipe, and interconnecting steam-spaces at the upper portions of said generators, substantially as specified.

3. The combination, with two steam-boilers, one inclosed by the other and adapted to have the inside shell or partition 8 common to both, of valves for connecting said boilers, a fire-box in common to both, independent supply and blow-off pipes for each, and independent steam-delivery pipes, substantially as described.

4. The combination, with a steam-boiler having the inner shell 8, two independent feed-pipes, and a common steam-delivery, of two water-gages and two independent blow-off pipes, whereby different kinds of water and different water-levels can be carried, substantially as stated and set forth.

5. A vertical tubular steam-generator having a water-space 10, an inclosing outside steam-generator 2, provided with a water-space 12, combined with a fire-box in common to both, independent supply-pipes for each generator, and a common steam-delivery pipe, substantially as explained.

6. A steam-generator, an outside inclosing steam-generator 2, and a fire-box in common to both, combined with means for interconnecting the water-spaces of said generators, separate steam-delivery pipes for each generator, together with independent feed-pipes for the same, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS L. STURTEVANT.
THOMAS J. STURTEVANT.

Witnesses:

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