

J. F. TAYLOR.
Sectional Steam Boilers.

No. 158,754.

Patented Jan. 12, 1875.

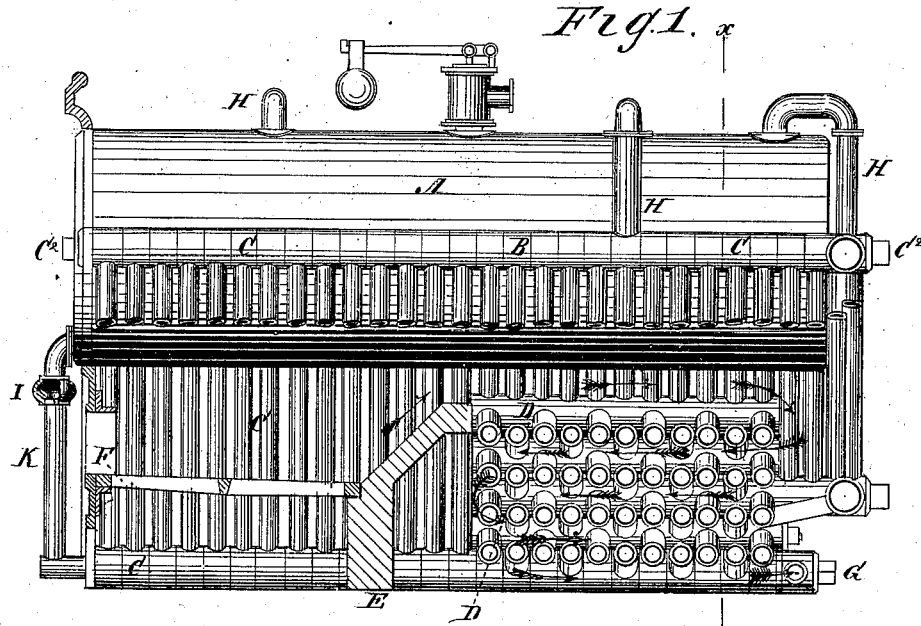


Fig. 3.



Fig. 2.

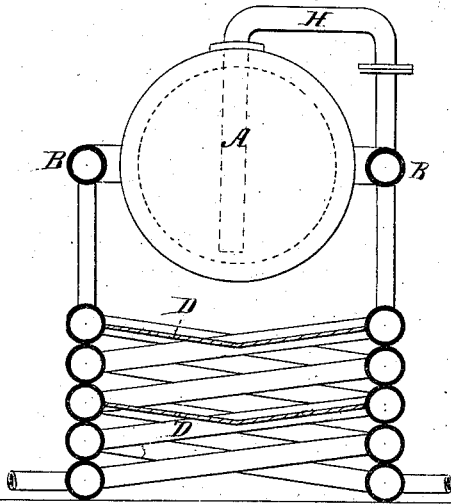
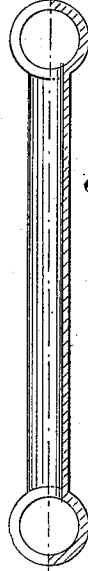


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN F. TAYLOR. OF CHARLESTON, SOUTH CAROLINA.

IMPROVEMENT IN SECTIONAL STEAM-BOILERS.

Specification forming part of Letters Patent No. **158,754**, dated January 12, 1875; application filed October 28, 1874.

To all whom it may concern:

Be it known that I, JOHN F. TAYLOR, of the city and county of Charleston and State of South Carolina, have invented a new and Improved Combined Cylinder and Sectional Boiler; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a sectional side elevation; Fig. 2, a transverse vertical section through line *x x*; Figs. 3 and 4, detail views of the tubes.

The object of my invention is to provide a steam-boiler in which the superior advantages of a cylinder-boiler are retained, while the objection to it, arising from the waste of heat, are obviated. It consists in combining a wrought-iron cylinder-boiler with a cast-iron sectional boiler, which latter encompasses the cylinder in the place of the masonry, and utilizes a great deal of the wasted heat by heating the feed-water, which is first admitted to the sectional boiler, the draft from the furnace being so directed among the portions of the sectional boiler as to secure the greatest possible effective power of the fuel.

In the drawing, A represents the wrought-iron cylinder-boiler. B is the cast-iron sectional boiler, which encompasses the cylinder-boiler. The said sectional boiler is constructed of the cast pipes or tubes C, which are bolted tightly together by the rods C², the said tubes having at each end a cylindrical section at right angles to the tubes, for the purpose of forming, when bolted together, a continuous pipe communicating with all of the tubes. F is the furnace-grate; E, the bridge-wall, and D the diaphragm for directing the draft from the furnace through the sectional boiler. G are the feed-pipes, through which the water is introduced into the sectional boiler, and H are the pipes that connect the sectional with the cylinder boiler, and through which the said cylinder is supplied with water already heated. These pipes H pass down through the cylinder-boiler and open into the bottom of the same below the water-line, so that the feed-water does not come in contact with the steam. K are pipes, having downwardly-opening check-valves I, that allow the passage

of the water from the cylinder to the sectional boiler, but oppose its passage in a reverse direction.

The object of the downwardly-opening valve in pipe K is to insure the feeding of the cylinder-boiler from the highest point of the sectional boiler, where the water is the hottest, and yet to allow a circulation of water from the said cylinder to the sectional boiler, if, in any event, the water in the cylinder-boiler becomes higher in the same than in the sectional boiler. This condition may occur under the following circumstances: If the feed-pumps are stopped, or fail to supply the sectional boiler with water as fast as it is evaporated in the same, the heating-surface of the sectional boiler being in proportion to the amount of water contained greater than the cylinder-boiler, the water would fall in the former much more rapidly than it would in the latter; or, in the event of a sudden generation of a large body of steam in the sectional boiler, the entire contents of the same may be forced into the cylinder-boiler, and the pipes of the sectional boiler burn in consequence thereof. The downwardly-opening valves are intended to obviate this difficulty, by allowing a circulation from the cylinder to the sectional boiler in either of the above emergencies.

Experience proves that cylinder-boilers make more steam per square foot of heating-surface than any other ordinary boiler; that they are less liable to injury or accident from shortness of water, and can be made stronger and more durable.

The objection to cylinder-boilers hitherto has been that the waste of fuel is very great, owing, mainly, to the shortness and directness of the flue, the absorption of the heat by the masonry, and the reduction of the steam by the introduction of cold feed-water directly into the body of the boiler.

It will be observed that, while I have preserved all of the advantages of a cylinder-boiler, I have also obviated all of the above-described objections to the same, by making the flue more tortuous, and thereby utilizing a greater portion of the heat, and also by combining with the cylinder-boiler a sectional boiler, which takes the place of the masonry, and utilizes heat which would otherwise be

lost, by raising the temperature of the feed-water almost to that of the water in the boiler proper before introducing the same, thus increasing the effective power of the steam-generating boiler.

Having thus described my invention, what I claim as new, is—

1. The combination, with a cylinder and sectional boiler, of the pipes H, which feed the water from the top of the sectional boiler to the bottom of the cylinder-boiler through the steam-space, and the pipes K, having down-

wardly-opening valves I, substantially as and for the purpose described.

2. The cylinder-boiler A, in combination with the pipes H and K, the valves I, and the sectional cast-iron boiler B, constructed, as described, of the tubes C, arranged as shown, the rods C², and the diaphragms D, substantially as and for the purpose described.

JOHN F. TAYLOR.

Witnesses:

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