

(No Model.)

2 Sheets—Sheet 1.

C. L. SEABURY.  
SECTIONAL STEAM BOILER.

No. 399,571.

Patented Mar. 12, 1889.

Fig. 2.

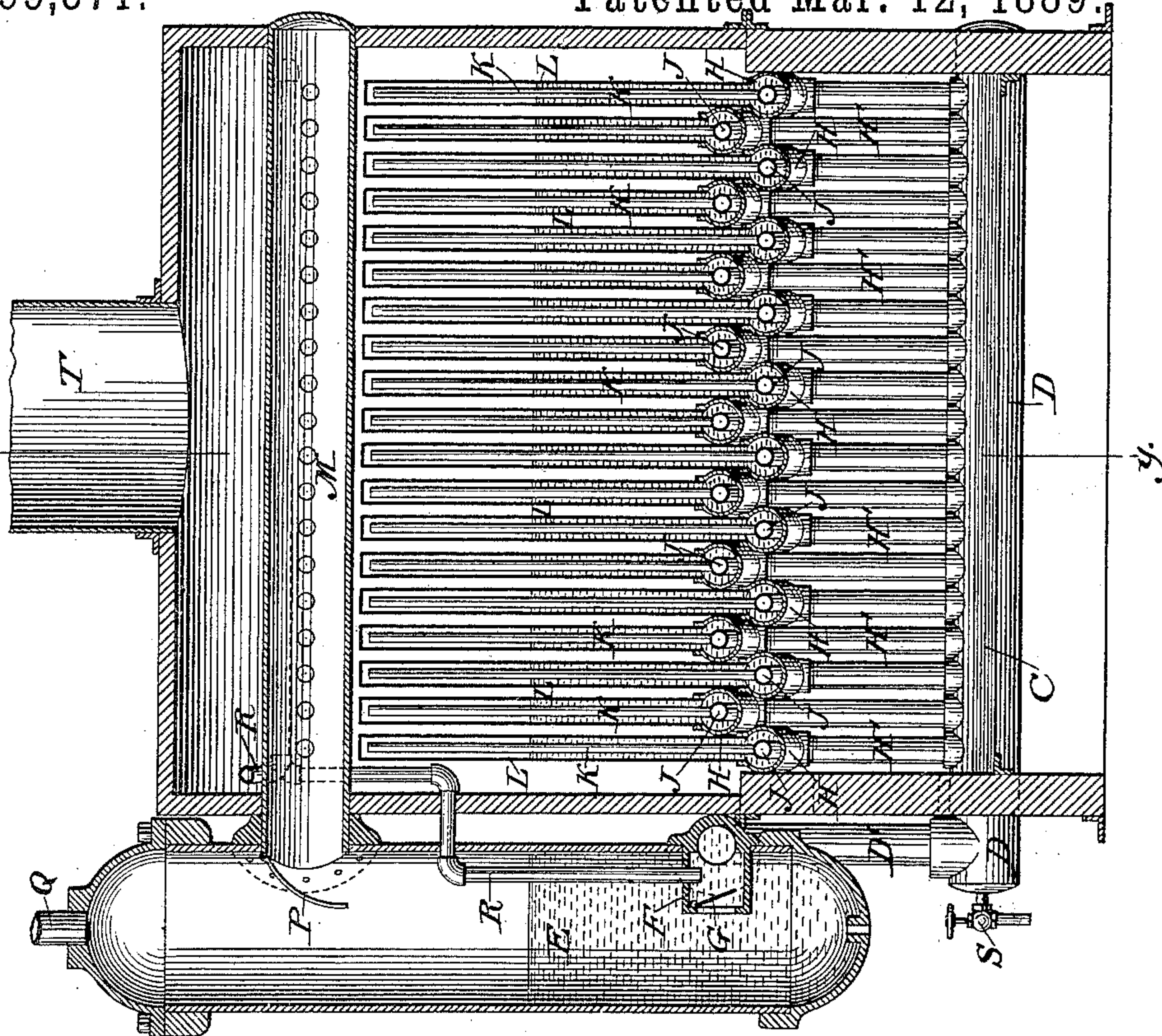
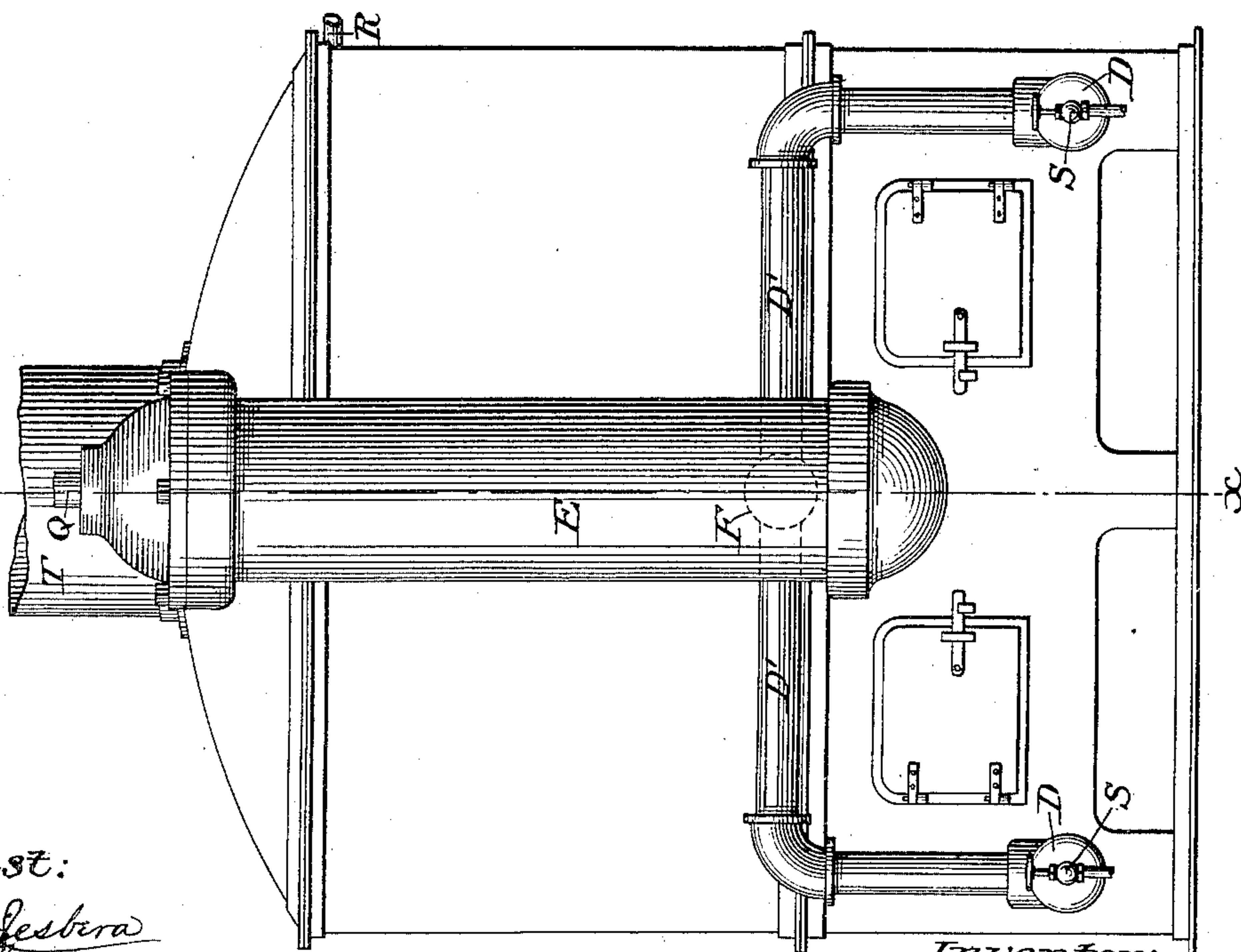


Fig. 1.



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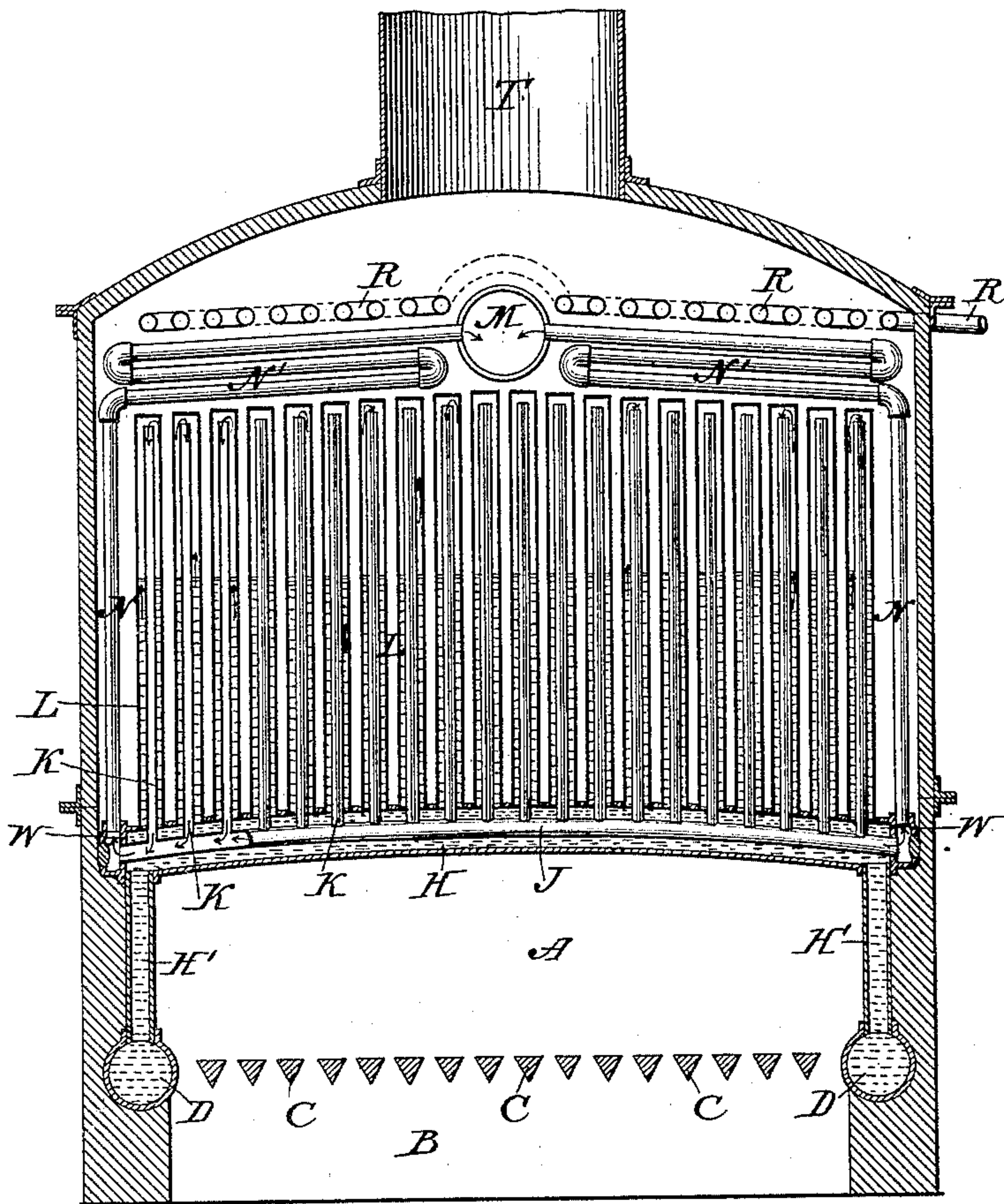
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*Fig. 3.* Patented Mar. 12, 1889.



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# UNITED STATES PATENT OFFICE.

CHARLES L. SEABURY, OF NEW YORK, N. Y.

## SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 399,571, dated March 12, 1889.

Application filed November 13, 1888. Serial No. 290,669. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. SEABURY, of the city, county, and State of New York, have invented certain new and useful Improvements in Sectional Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is a front elevation of my improved sectional steam-boiler; Fig. 2, a central vertical section in line *xx* of Fig. 1, and Fig. 3 a cross-section in line *yy* of Fig. 2.

My invention has for its object to obtain in the least space the greatest possible heating-surface for the water and steam, with a free circulation throughout the boiler and facility for readily reaching every part thereof for repairs.

It consists in the combination and arrangement with each other and with the necessary adjuncts, as hereinafter particularly described and claimed, of a series of vertical concentric tubes arranged over the fire-box and within the heating-chamber of the furnace in detachable sections, as set forth.

In the accompanying drawings, A represents the fire-box, B the ash-pit, and C the grate-bars, of the furnace for the boiler, the same being inclosed by suitable walls and provided with doors and dampers in the customary manner.

D D are large horizontal pipes mounted one on each side of the fire-box to extend the length thereof at about the level of the grate-bars. The rear ends of these lateral pipes are closed. Their front ends project out through the front wall of the fire-box and are severally connected by means of branch pipes D' D' with a central vertical drum, E, properly supported at the front of the boiler on the outside thereof, with its lower end elevated above said basal pipes D D and its upper end extending to the top of the boiler.

The pipes D' D' are nearly of the same diameter as the lateral pipes D, and their connection with the drum E is made by means of a valve-chamber, F, which is fitted to the side of the drum to project therein at a short dis-

tance above the bottom thereof, and to which the pipes D' D' are both coupled.

Communication is established between the drum E and the valve-chamber F by means of a large port governed by a valve, G, opening into the valve-chamber and adapted to close automatically under the influence of an overbalancing pressure therein.

The fire-box A is overarched by a double series of transverse pipes, H H H, preferably slightly curved from end to end, and which are coupled at each end with the underlying lateral pipe D by means of vertical connecting-pipes H' H'. The two lateral pipes are thus made to serve as circulating-manifolds, and free communication is established between them through each of the transverse pipes H. The couplings of the vertical pipes H' H' are of suitable character to form steam-tight joints and yet allow of a ready detachment of either of the transverse pipes H from the lateral manifolds D D without disturbing any of the others. An inner tube, J, is carried concentrically through each transverse pipe H and through the plug or partition W, Fig. 3, closing each end of said pipe. A series of small vertical tubes, K K, are inserted through openings in the upper side of each pipe H and screwed into the upper side of its inner concentric tube, J. These upright tubes K K extend nearly to the top of the furnace and are left open, and each is inclosed by a larger concentric standing tube, L, closed at its upper end and which is screwed at its lower end into the opening in the pipe H, through which the inclosed upright tube K projects. Communication is thus established between each transverse inner tube, J, through the standing concentric tubes K and L with the transverse pipe H, and each transverse pipe H, with its series of upright or standing tubes, constitutes a detachable steam-generating manifold or section in the boiler.

A steam-drum, M, is mounted centrally above the tops of the standing tubes L L in a direction parallel with the lateral manifolds D D, and each of the inner tubes, J, of the transverse steam-generating manifolds H H is connected by a pipe, N, with said drum, the connecting-pipe N being formed with a



return-bend, as shown at N' in Fig. 3, filling the space in the furnace above the standing tubes L L on each side of the drum M. The front end of the steam-drum M opens directly  
5 into the vertical drum E, being connected thereto by a suitable coupling, and is provided with a hood or deflecting-plate, P, (see Fig. 2,) fitted over its open end to cause the steam passing out thereinto to be diverted  
10 downward, so as to precipitate any water carried therewith.

The steam-delivery pipe Q is fitted to the top of the vertical drum E.

The feed-water pipe R for the boiler is preferably carried with horizontal return-bends back and forth in the top of the furnace above the standing pipes L L of the steam-generating manifolds H H, (see Fig. 3 and dotted lines, Fig. 2,) and is finally led to the valve-chamber F, with which it is connected. Each lateral circulating-manifold is provided with a blow-off cock, S, at its outer end.

The furnace is inclosed above the fire-box in a suitable outer casing, the side walls of which are adapted to be readily detached, preferably in sections, to admit of being taken down in order to reach the detachable steam-generating manifolds or sections H H and permit of the removal and replacement of  
30 any one of them.

The top of the furnace is covered in by the casing and fitted with a smoke stack or flue, T, in the usual manner.

In the operation of this improved sectional  
35 boiler the heat and products of combustion of the fuel on the grate C C pass up freely around and between the pipes of the steam-generating manifolds H H, and around the steam-drum M, and between the coils N' of the steam-tubes N N and of the feed-water pipe R above them before passing off through the smoke-stack T. The feed-water, heated more or less in its passage through the coils of pipe in the top of the furnace, is delivered  
40 into the valve-chamber F, its flow thence into the drum E being prevented by the valve G, which will close under the pressure of the feed-water. The water will therefore pass from said chamber F through the pipes  
50 D' into the lateral circulating-manifolds D D, and thence through upright pipes H' into the several transverse steam-generating manifolds H, and, flowing around the tubes J J, inclosed therein, will pass up into the upright  
55 tubes L and rise therein to the desired water-level, to be converted into steam by the exposure of said pipes to the direct heat of the fire. The steam generated in the manifolds H H will pass up the standing pipes L thereof, thence down the central inner tubes, K, and out through the connecting-pipes N and N' to the drum M, and it is subjected continuously in its course through said tubes, as well as in the drum M, to the heat of the furnace, so as to be dried thereby.

From the drum M the steam passes freely into the vertical separating-drum E, being

deflected downward therein by the hood P. Any water possibly carried over with the steam will thereby be separated and discharged into the drum E, and any excess of water accumulating from this source in said drum will pass by means of the valve G back into the circulating-pipe D', while the steam is left free to pass perfectly dry up into the  
75 delivery-pipe Q.

I claim as my invention—

1. The combination, in a sectional steam-boiler, with its fire-box and furnace, and with lateral circulating-manifolds placed one on  
80 each side of the fire-box and connected with a water-supply pipe, of a series of detachable steam-generating manifolds or sections mounted in the furnace over the fire-box, each consisting of a transverse pipe spanning  
85 the fire-box and connected at each end to corresponding vertical tubes in the two lateral manifolds, an inner tube inclosed within the transverse pipe and whose open ends project beyond the closed end of said  
90 pipe, a series of upright tubes closed at their upper end and whose lower ends are fitted to the transverse pipe to communicate freely therewith, open-ended upright tubes fitted to said inner tube to communicate therewith  
95 and extend therefrom up into the upright closed tubes nearly to the top thereof, and discharge-tubes connecting the two ends of the transverse pipe with a suitable delivery-pipe, substantially in the manner and for the  
100 purpose herein set forth.

2. The combination, in a sectional steam-boiler, of the lateral manifolds D D, the interposed detachable manifolds H H, the standing pipes L L, fitted to said detachable  
105 manifolds, the inclosed tubes J K, the steam-delivery pipes N, connected with said inclosed tubes, and a steam-drum, M, to which all of said delivery-pipes are connected, substantially in the manner and for the purpose  
110 herein set forth.

3. The combination, in a sectional steam-boiler, of the lateral manifolds D D, the interposed detachable manifolds H H, the standing pipes L L, fitted to said detachable  
115 manifolds, the inclosed tubes, the steam-delivery pipes N, connected with said inclosed tubes, a vertical drum, E, connected mediately at its upper end with said steam-delivery pipes and at its lower end with the two lateral  
120 manifolds, and a water-supply pipe communicating therewith, substantially in the manner and for the purpose herein set forth.

4. The combination, in a sectional steam-boiler, of the lateral circulating-manifolds, the interposed detachable steam-generating  
125 manifolds, the standing pipes fitted to said detachable manifolds, the connected tubes inclosed in the standing pipes and detachable manifolds, the steam-delivery pipes connected  
130 with said inclosed inner tubes, a vertical drum connected mediately at its upper end with said steam-delivery pipes, a valve-chamber communicating with the lower end of said



drum and with the two lateral circulating-  
manifolds, a valve controlling the communi-  
cation with the drum and opening inwardly  
into the chamber, and a water-supply pipe  
5 connected with said chamber, substantially  
in the manner and for the purpose herein set  
forth.

In testimony whereof I have signed my name  
to this specification in the presence of two  
subscribing witnesses.

CHAS. L. SEABURY.

Witnesses:

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E. M. WATSON.