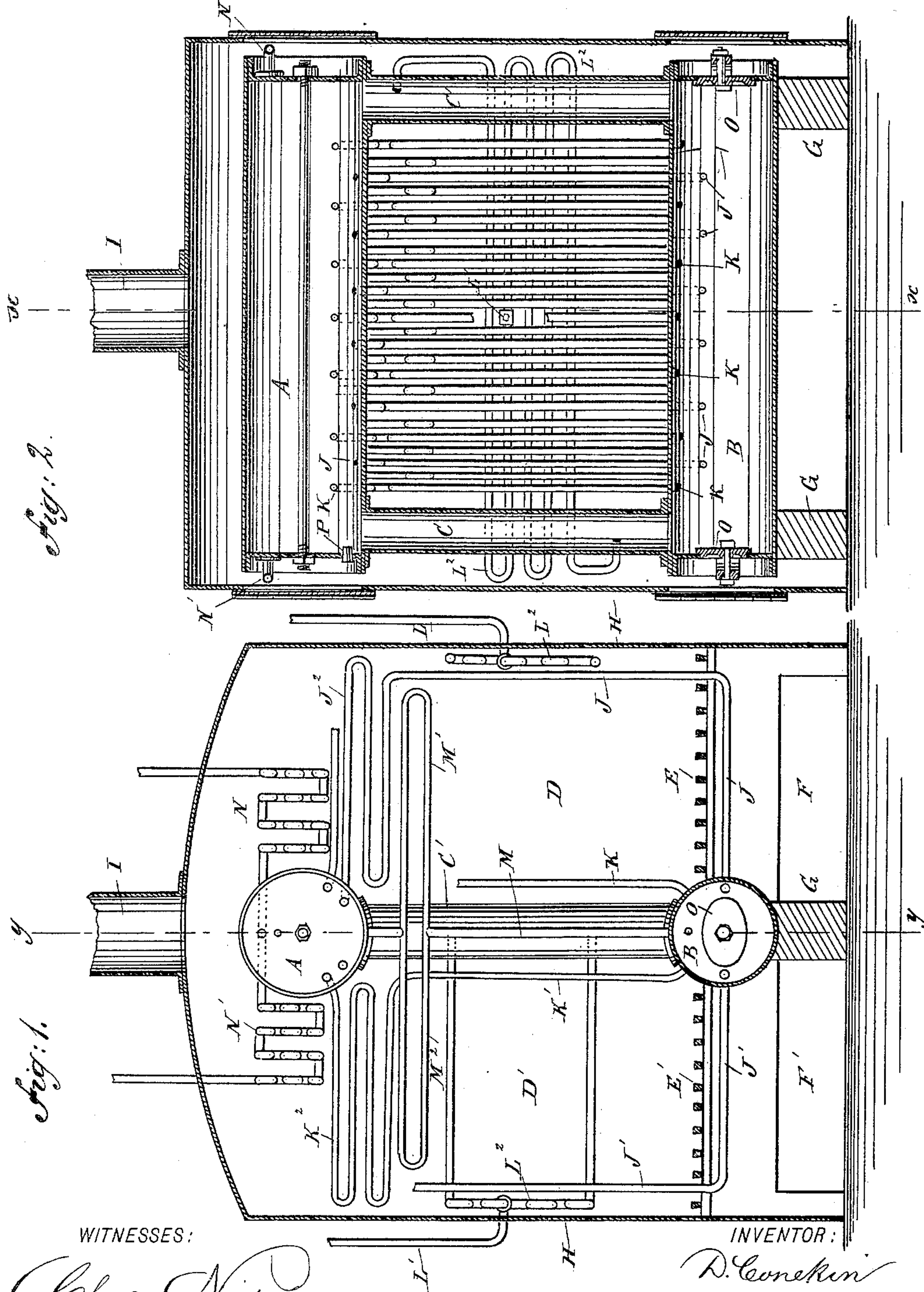


(No Model.)

D. CONEYKIN.  
STEAM BOILER.

No. 435,798.

Patented Sept. 2, 1890.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

DAWSON CONEKIN, OF WILMINGTON, NORTH CAROLINA, ASSIGNOR OF ONE-HALF TO EDMUND A. JABLONSKY, OF NEW YORK, N. Y.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 435,798, dated September 2, 1890.

Application filed January 8, 1890. Serial No. 336,217. (No model.)

*To all whom it may concern:*

Be it known that I, DAWSON CONEKIN, of Wilmington, in the county of New Hanover and State of North Carolina, have invented  
5 a new and Improved Steam-Boiler, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved steam-boiler specially  
10 adapted for marine purposes and which is simple, durable, and compact in construction, insures perfect circulation of the water, and presents a large heating-surface.

The invention consists of two connected  
15 drums placed one above the other, a series of pipes leading from the lower drum under the grate-bars of the fire-box and up through the latter at one side to connect with the upper drum, a second series of pipes leading from  
20 the lower drum upward through the fire-box on the other side, also to connect with the upper drum, and a third series of pipes connecting the two drums and provided with bends or coils extending across the top of the  
25 fire-box.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

30 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a transverse section of the improvement on the line *x x* of Fig. 2, and Fig. 35 2 is a longitudinal section of the same on the line *y y* of Fig. 1.

The improved steam-boiler is provided with an upper steam-drum A, connected with a  
40 water-drum B by one or more vertical tubes C C', on the sides of which are arranged the fire-boxes D and D', having their longitudinally-extending grate-bars E and E' extending horizontally a short distance above the  
45 middle of the lower drum B, as is plainly shown in Fig. 1.

Below the grate-bars E and E' are arranged the ash-pits at F and F', respectively, into which extends the larger part of the under  
50 side of the water-drum B. The bottom of the lower drum B is supported on suitable brick-

work or bars G, and the fire-boxes, as well as the ash-pits and the upper part of the boiler, are inclosed in a suitably-constructed casing H, from the top of which leads the smoke-  
55 stack I to carry off the gases and other products of combustion.

From the water-drum B extends first horizontally a series of pipes J and J', respectively passing under the grate-bars E and E'  
60 to within a short distance of the sides of the casing H, and then extending upward on the outer sides of the fire-box D or D', then formed into coils J<sup>2</sup>, forming part of the top of the fire-box and extending transversely to  
65 connect with the lower part of the steam-drum A. A second series of pipes K and K' leads from the water-drum B, extends upward on the inner sides of the fire-boxes D and D', and then in the upper part of the latter forms  
70 transversely-extending coils of pipe K<sup>2</sup>, connecting with the steam-drum A above the entrance of the pipes J and J', respectively, and below the water-level in the said steam-drum, as is plainly shown in Fig. 1. The pipes J K  
75 and the pipes J' K' are arranged alternately, as is plainly shown in Fig. 2, and thus surround the sides and the tops of the fire-boxes D and D' with pipes through which the water is to  
80 circulate to take up the heat from the fire-boxes D and D', respectively.

In order to increase the heating capacity of the boiler, a series of pipes M is provided, which connect the bottom of the drum A with  
85 the top of the drum B, and each is provided with transversely-extending bends or coils M' and M<sup>2</sup>, arranged on the top of the fire-boxes D and D', respectively, and located below the coils J<sup>2</sup> and K<sup>2</sup>. The series of coils M', M<sup>2</sup>, J<sup>2</sup>, and K<sup>2</sup> form the top for the fire-boxes D  
90 and D'.

On each side of the casing H are arranged feed-pipes L and L', connected with a suitable source of water-supply, and each extending  
95 inward to connect with a longitudinally-extending coil of pipe L<sup>2</sup>, the upper end of which connects with the tube C', while the other lower end connects with the oppositely-arranged tube C, so that the feed-water entering one of the pipes L or L' passes into the coils of pipe  
100 L<sup>2</sup>, and the water then flows downward through the lower parts of the coils of pipe L<sup>2</sup>, while



steam which may be generated in the said coils of pipe passes through the upper part of the coil of pipe in the upper end of the tube C' to pass to the steam-drum A. The coils of pipe L<sup>2</sup> are arranged close to the inside of the casing H next to the upwardly-extending parts of the series of pipes J and J'. (See Fig. 1.)

From one or both ends of the steam-drum A lead the coils of pipe N and N', arranged longitudinally above the coils of pipe J<sup>2</sup> K<sup>2</sup> on the sides of the steam-drum A, the said coils of pipe N and N' serving to superheat the steam passing from the upper part of the steam-drum A into the said pipes N and N', from which the steam is carried to its destination.

The heads of the water-drum B are provided with man-holes O, of suitable construction, to clean out the sediment settling in the bottom of the said drum. In one of the heads of the steam-drum A is arranged a plug P, which when removed permits of introducing a hose into the drum A to clean the latter and the pipes leading therefrom to the water-drum B. The level of the water in the steam-drum A is usually above the entrance of the coils of pipe K<sup>2</sup>, so that a complete circulation of cold water takes place from the steam-drum A downward by means of the tubes C and C' to the water-drum B, and from the latter the heated water passes upward by the pipes J, K, J', K', and M, so that the water in the said pipes is rapidly heated by the heat generated in the fire-boxes D and D', through which pass the said pipes. It will be seen that the water passing into the water-drum B in a somewhat cooled state is not greatly agitated in the said drum B, and consequently the impurities usually found in the water can settle in the bottom of the said drum B, which bottom is not exposed to much heat, as it extends into the ash-pits F and F'. The sediment can be removed through the man-holes O, as previously described. The steam accumulating in the steam-drum A above the level of the water passes into the coils of pipe N and N', which are exposed to the heat passing upward from the fire-boxes D and D' before entering the chimney I, so that the steam in the said coils of pipe N and N' is thoroughly superheated. It will be seen that by this arrangement (the series of pipes M J K and J' K') a large number of circulating-pipes can be employed in a very small space, thus making the boiler very compact in construction, so as to take up little room and eminently fitting the boiler for marine purposes.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A steam-boiler comprising a water-drum having its lower portion projecting below the grate into the ash-pit, a steam-drum above the water-drum, vertical tubes connecting the two drums, and pipes leading from opposite sides

of the water-drum below the grate and extending up through the fire-box at the sides thereof and connected with the lower part of the steam-drum, said pipes being coiled to form a part of the top of the fire-box, substantially as described.

2. A steam-boiler comprising a steam-drum having its lower portion projecting below the grate into the ash-pit, a steam-drum above the water-drum, tubes connecting the two drums, pipes leading from opposite sides of the water-drum below the grate and extending up through the fire-box at the sides thereof and connected with the lower part of the steam-drum, and pipes leading from the upper part of the water-drum up through the fire-box and connected with the steam-drum above the entrance of the first-named pipes, each of the said pipes being provided with bends or coils extending across the top of the fire-box and forming part of the top of the fire-box, substantially as herein shown and described.

3. In a steam-boiler, the combination, with a steam-drum, a water-drum arranged below the said steam-drum, and tubes for connecting the said steam-drum with the said water-drum, of a fire-box arranged at each side of the said tubes, a series of pipes leading from the said water-drum beneath the grate-bars of the fire-box, then upward on the outside of the same to form a coil of pipes which extend across the top of the fire-box to connect with the said steam-drum, and a second series of pipes leading upward from the water-drum on the inside of the fire-box and then formed into a coil of pipes arranged across the top of the fire-box and connected with the steam-drum, substantially as shown and described.

4. In a steam-boiler, the combination, with a steam-drum, a water-drum arranged below the said steam-drum, and tubes for connecting the said steam-drum with the said water-drum, of a fire-box arranged at each side of the said tubes, a series of pipes leading from the said water-drum beneath the grate-bars of the fire-box, then upward on the outside of the same, and then across, forming a coil of pipe extending across the top of the fire-box to connect with the said steam-drum, a second series of pipes leading upward from the water-drum on the inside of the fire-box, and then formed into a coil of pipes arranged across the top of the fire-box and connected with the steam-drum, and a feed-pipe leading into a coil of pipe arranged longitudinally next to the upwardly-extending part of the first series of pipes, the ends of the coil of pipe connecting with the said tubes, substantially as shown and described.

5. In a steam-boiler, the combination, with a steam-drum, a water-drum arranged below the said steam-drum, and tubes for connecting the said steam-drum with the said water-drum, of a fire-box arranged at each side of the said tubes, a series of pipes leading from the said water-drum beneath the grate-bars of the fire-box, then upward on the outside of



the same, and each then forming a coil of pipe extending across the top of the fire-box to connect with the said steam-drum, a second series of pipes leading upward from the wa-  
5 ter-drum on the inside of the fire-box, and then each formed into a coil of pipe arranged across the top of the fire-box and connected with the steam-drum, a feed pipe leading into  
10 a coil of pipe arranged longitudinally next to the upwardly-extending part of the first se-

ries of pipes, the ends of the coil of pipe connecting with the said tubes, and coils of pipe extending from the said steam-drum and arranged across the top of the fire-box to super-heat the steam, substantially as shown and 15 described.

DAWSON CONEKIN.

Witnesses:

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THEO. G. HOSTER.