

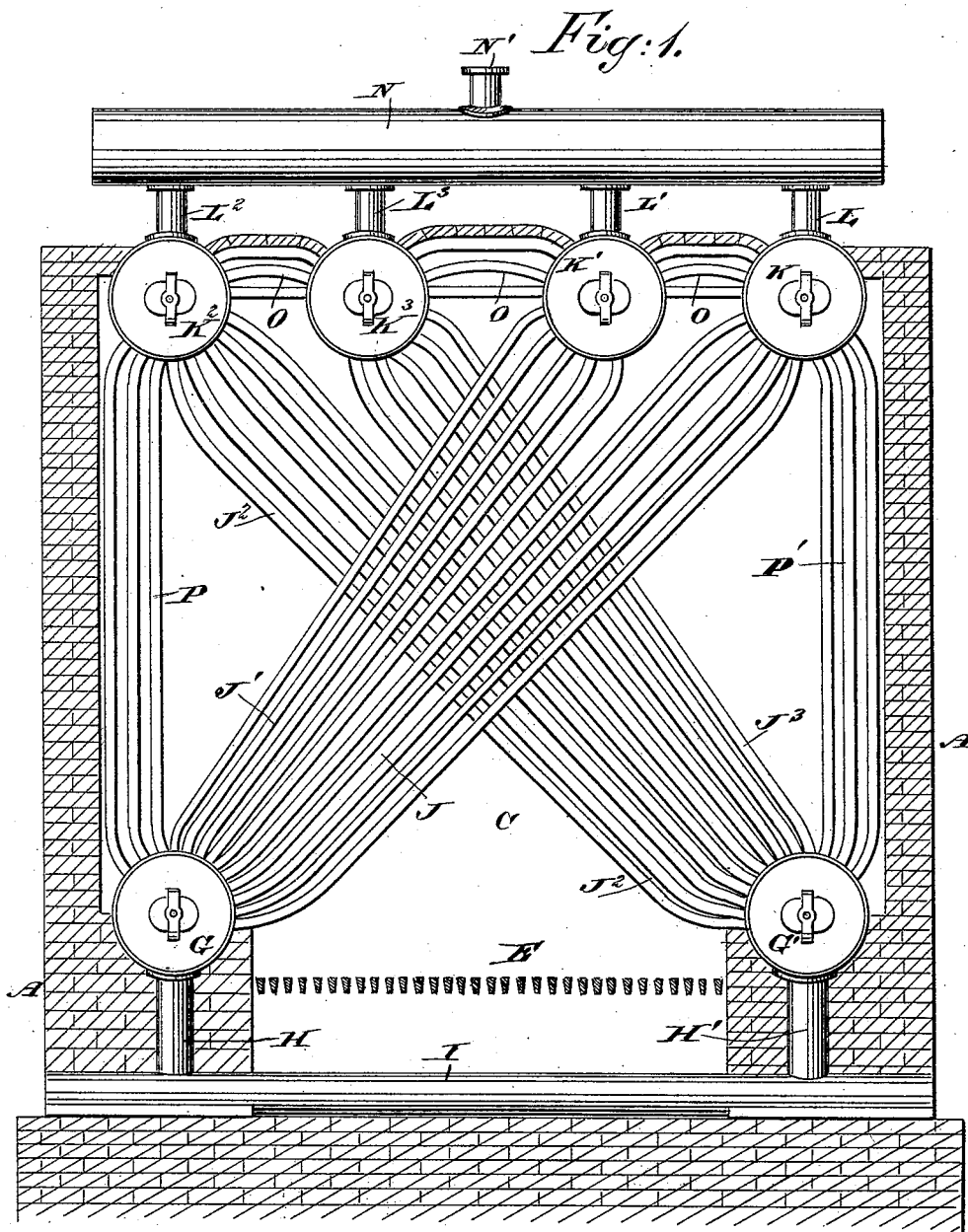
(No Model.)

2 Sheets—Sheet 1.

F. J. THRUN.
BOILER.

No. 489,344.

Patented Jan. 3, 1893.



WITNESSES:

Chas. Nida.
C. Sedgwick

INVENTOR

F. J. Thrun
BY

Munnell
ATTORNEYS.

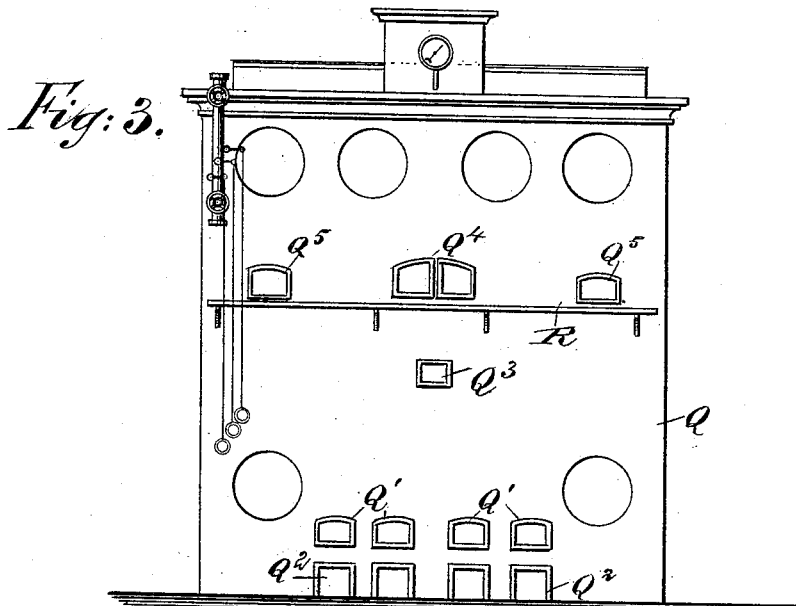
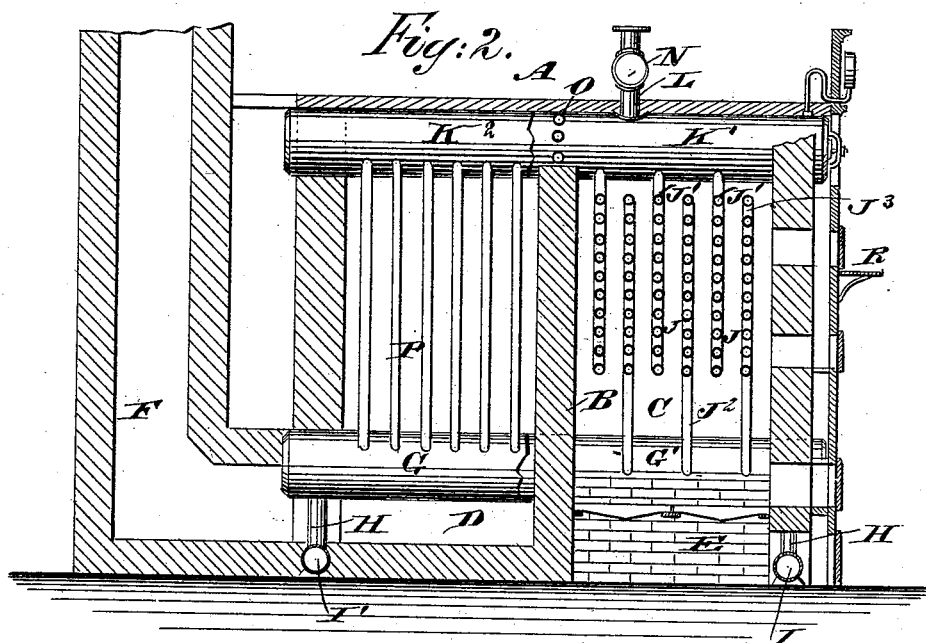
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UNITED STATES PATENT OFFICE.

FERDINAND J. THRUN, OF ROMEO, WISCONSIN.

BOILER.

SPECIFICATION forming part of Letters Patent No. 489,344, dated January 3, 1893.

Application filed June 13, 1892. Serial No. 436,622. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND J. THRUN, of Romeo, in the county of Marathon and State of Wisconsin, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

The invention relates to tubular boilers, and its object is to provide a new and improved boiler, which is simple and durable in construction, and arranged to quickly and economically generate steam and insure a complete and perfect circulation of the water.

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

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 all the figures.

Figure 1 is a front view of the improvement with the front plate removed and the brick work in section; Fig. 2 is a reduced longitudinal sectional elevation of the improvement; and Fig. 3 is a front view of the same.

The improved boiler is provided with a suitable brick work A, provided with a bridge wall B, dividing the interior of the brick work into a front compartment C, connected at the upper end of the bridge wall B with the rear compartment D. The front compartment C contains the grate E, of any approved construction, and the rear compartment D is connected at its bottom with the chimney F.

In the brick work A and at the sides thereof on the sides of the grate E are arranged the water drums G and G', connected at their front and rear ends by tubes H and H', respectively with transversely extending mud drums I I' formed with suitable bases set on a solid foundation of the brick work A. The side water drum G is connected by sets of tubes J with a drum K arranged in the upper part of the brick work A vertically above the bottom water drum G', the said sets of tubes J extending diagonally within the brick work A, as plainly shown in Fig. 1. A second set of tubes J' extends diagonally from the bottom side drum G and connects with a second drum K' arranged next to the drum K in the

upper part of the brick work A. The other side drum G' is connected by similar sets of tubes J² and J³ with water drums K² and K³ respectively, located in the same horizontal plane that contains the drums K and K'. The drum K², however, is located directly above the side drum G, as will be readily understood by reference to Fig. 1.

The several top drums K, K', K² and K³ are connected by short tubes L, L', L² and L³ with a transversely-extending steam dome N in cylindrical form, and provided at its top preferably at the middle, with an outlet N' for drawing off the steam. The several top drums K, K', K² and K³, are connected with each other by short pipes O and the top drum K² is connected by return tubes P with the side drum G and in a similar manner the drums K and G' are connected with each other by return pipes P' which with the pipes P are arranged vertically as shown in Fig. 1.

The ends of the drums G, G', K, K', K² and K³ are provided with suitable manholes for conveniently cleaning the said drums whenever necessary. On the front of the brick work A is arranged an iron front Q provided with the usual fuel doors Q' for introducing the necessary fuel onto the grate E and below the said fuel doors are arranged ash pit doors Q² for removing the ashes from the ash pit under the grate. In the middle of the front Q are arranged doors Q⁴ which give access to the connecting tubes J, J', J² and J³ at their intersection so as to clean the same whenever necessary. Similar doors Q⁵ on the sides of the front Q serve to give convenient access to the vertical return tubes P and P'.

A door Q³ is arranged above the fuel doors Q' and near the middle of the front Q for connection with a chute to pass shavings, saw-dust and other light fuel into the fire-box above the grate E. A transversely-extending running board R is also arranged on the front Q and is supported on suitable brackets thereon, erected below the doors Q⁴ and Q⁵. I prefer to support the front ends of the upper drum K, K', K² and K³ in the iron front Q and in a like manner support the rear ends of the said drums in an iron frame supported from the base of the rear mud drum I'. The

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feed water is preferably introduced at the rear mud drum I'.

The operation is as follows: When the several drums and tubes are filled with water so that the water reaches a level somewhat above the middle of the upper drum K, K', K² and K³, and a fire is started on the grate E, then the heat of the fire will heat the tubes J, J', J² and J³, at their intersection in the front compartment, the heat then rising and passing over the top of the bridge wall B into the rear compartment D down the same again through the intersecting tubes J, J', J² and J³ to finally pass into the chimney F leading into the bottom of the said rear compartment. It will be seen that by this arrangement of heating, the water is quickly heated in the tubes J, J', J² and J³ so that the water rises therein and flows from the bottom side drums G, G', to the top drums K, K', and K² and K³ respectively. The steam separating from the water in the drums K, K', K² and K³ passes through the short tubes L, L', L², L³ into the dome N from which it can be withdrawn for further use. The return flow of the water takes place through the side top drums K, K² and their tubes P', P, leading to the side bottom drums G', G, as above described. Thus, a complete circulation of water is obtained in all the drums and tubes, and the water is quickly generated into steam which passes in a very dry state to the dome N. By passing the heat first through the front compartment C, and then over the bridge wall B into the rear compartment and down the same, before it reaches the chimney F, the heat is utilized to the fullest advantage.

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

1. A boiler comprising two bottom water drums arranged on the sides of the brick work, sets of diagonal tubes leading from the said bottom water drums, top water drums connected with the sets of diagonal tubes, vertically arranged return tubes connecting the bottom water drums with the side top drums, and sets of pipes connecting the top water drums with each other, substantially as shown and described.

2. A boiler comprising two bottom water drums arranged on the sides of the brick work, sets of diagonal tubes leading from the said bottom water drums, top water drums connected with the sets of diagonal tubes, vertically arranged return tubes connecting the bottom water drums with the side top drums, sets of pipes connecting the top water drums with each other, and mud drums extending transversely below the bottom water drums and connected with the same by short tubes, substantially as shown and described.

3. A boiler comprising two bottom water drums arranged on the sides of the brick work, sets of diagonal tubes leading from the said bottom water drums, top water drums

connected with the sets of diagonal tubes, vertically arranged return tubes connecting the bottom water drums with the side top drums, sets of pipes connecting the top water drums with each other, and a dome arranged transversely above the said top water drums and connected with the same by short tubes substantially as shown and described.

4. A boiler comprising brick work having a bridge wall dividing the interior of the brick work into a front and rear compartment connected with each other over the top edge of the bridge wall, a grate arranged in the said front compartment, bottom water drums arranged in the interior of the said brick work at the sides thereof, top water drums arranged in the upper part of the said brick work, sets of diagonally-extending tubes connecting the bottom water drums with the top water drums, and vertically-arranged return water tubes connecting the side top drums with the bottom water drums, substantially as shown and described.

5. A boiler comprising brick work having a bridge wall dividing the interior of the brick work into a front and rear compartment connected with each other over the top edge of the bridge wall, a grate arranged in the said front compartment, bottom water drums arranged in the interior of the said brick work at the sides thereof, top water drums arranged in the upper part of the said brick work, sets of diagonally-extending tubes connecting the bottom water drums with the top water drums, vertically-arranged return water tubes connecting the side top drums with the bottom water drums, and pipes connecting the said top water drums with each other, substantially as shown and described.

6. A boiler comprising brick work having a bridge wall dividing the interior of the brick work into a front and rear compartment connected with each other over the top edge of the bridge wall, a grate arranged in the said front compartment, bottom water drums arranged in the interior of the said brick work at the sides thereof, top water drums arranged in the upper part of the said brick work, sets of diagonally-extending tubes connecting the bottom water drums with the top water drums, vertically-arranged return water tubes connecting the side top drums with the bottom water drums, pipes connecting the said top water drums with each other, and transversely-extending mud drums located below the bottom water drums and connected with the same by short tubes, substantially as shown and described.

7. A boiler comprising brick work having a bridge wall dividing the interior of the brick work into a front and rear compartment connected with each other over the top edge of the bridge wall, a grate arranged in the said front compartment, bottom water drums arranged in the interior of the said brick work at the sides thereof, top water drums arranged in

the upper part of the said brick work, sets of diagonally-extending tubes connecting the bottom water drums with the top water drums, vertically - arranged return water drums, pipes connecting the said top water drums with each other, transversely-extending mud drums located below the bottom water drums and connected with the same by short tubes, and a chimney connected with the bottom of the said rear compartment, substantially as shown and described.

FERDINAND J. THRUN.

Witnesses:

GEO. FARRINGTON,
BERT BRADLEY.