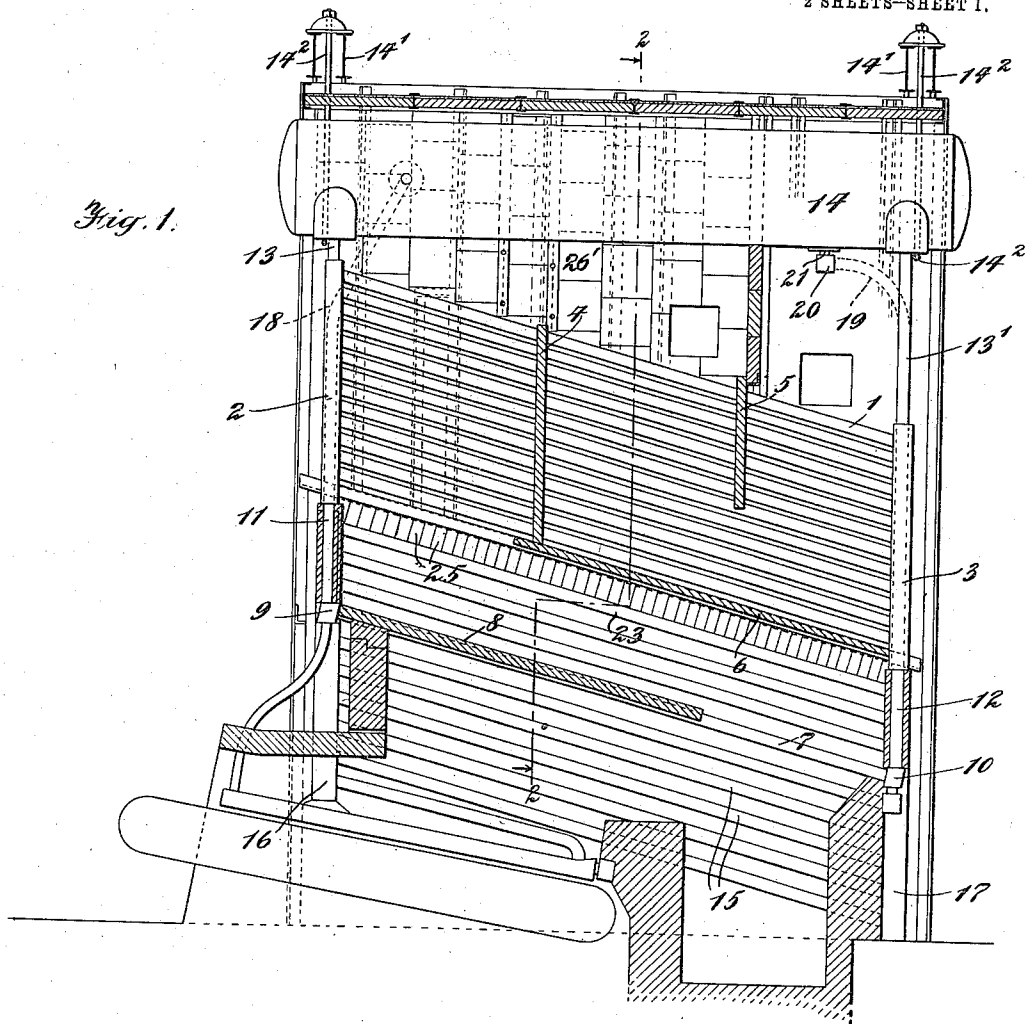


M. W. SEWALL.
STEAM BOILER SETTING.
APPLICATION FILED MAY 27, 1912.

1,090,947.

Patented Mar. 24, 1914.

2 SHEETS—SHEET 1.



Witnesses:
Geo. C. Cheney.
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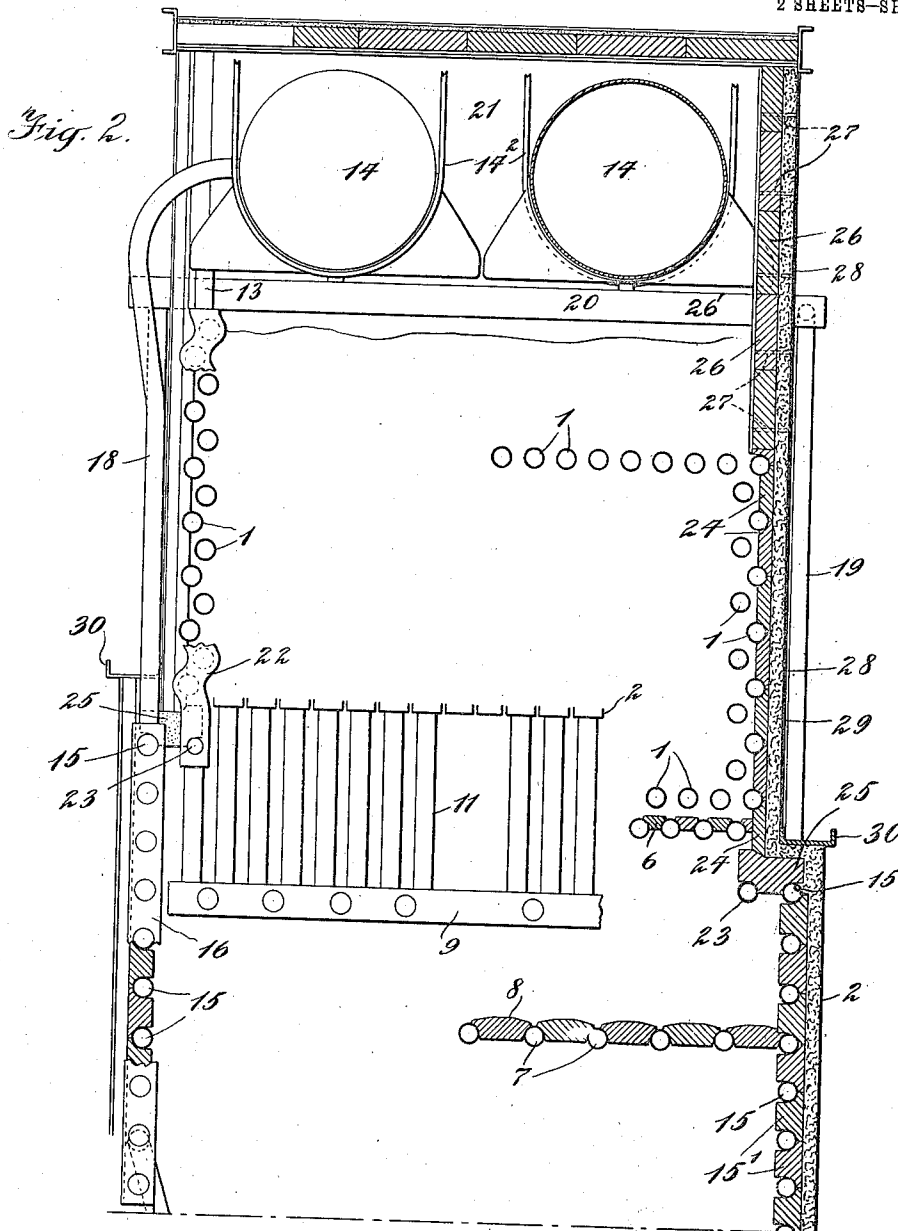
Inventor
Minott W. Sewall
By his Attorneys
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UNITED STATES PATENT OFFICE.

MINOTT W. SEWALL, OF NEW YORK, N. Y., ASSIGNOR TO THE BABCOCK & WILCOX COMPANY, OF BAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

STEAM-BOILER SETTING.

1,090,947.

Specification of Letters Patent.

Patented Mar. 24, 1914.

Application filed May 27, 1912. Serial No. 699,861.

To all whom it may concern:

Be it known that I, MINOTT W. SEWALL, a citizen of the United States, residing at New York city, borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Boiler Settings, of which the following is a specification.

My invention relates to a steam boiler setting, and more particularly to the construction of the lining of the side walls, which is divided into three sections. The lowermost section comprises a series of water tubes and intermediate bricks supported upon said tubes, the tubes being expanded into front and rear manifolds supported at the bottom so their expansion is in an upward direction. The intermediate section comprises a lining of fire bricks supported upon the outside vertical rows of tubes comprised in an inclined bank of tubes; and the uppermost section comprises a lining of fire brick bolted to the outer steel casing. The steam and water drums are supported from overhead beams in an open chamber, the generating tubes are connected directly to the drums and the expansion of the vertical headers and their connections is downward. Between the lowermost and the intermediate sections I provide an expansion joint which will permit a relative movement between these two sections without distortion of the walls.

The invention will be understood from the accompanying drawings in which—

Figure 1 is a vertical longitudinal section; and Fig. 2 a view in part elevation and part section, the right-hand portion being a vertical section on the plane of the line 2—2 of Fig. 1, and the left-hand portion an elevation of the pressure parts, only one header with its tubes, however, being shown.

Similar reference numerals indicate similar parts in the several views.

For the purpose of illustrating one application of my invention, I have shown a standard form of boiler construction comprising a bank of inclined generating tubes 1, the tubes being expanded into uptake and downtake headers 2 and 3. Transverse baffles 4 and 5 divide the bank of tubes into a plurality of passes beginning at the steam uptake end. Supported on the lowermost row of tubes is a baffle 6 extending from the

rear header to the transverse baffle 4. The furnace is supplied with fuel by a traveling grate of any approved construction and preferably inclined. Above the furnace is a series of roof tubes 7, the ends of said tubes being expanded into front and rear boxes 9 and 10, respectively. A baffle 8 is supported upon tubes 7 and extends from the front box 9 rearwardly. The uptake headers 2 are connected to box 9 by tubes 11, and the downtake headers 3 are connected to box 10 by tubes 12. The uptake headers are connected to the steam and water drums 14 by tubes 13; and the downtake headers are connected to said drums by tubes 13'. In this standard form of boiler construction the gases, before coming into contact to a substantial extent with the water tubes, are carried below the first and second passes toward the rear of the boiler and thence back to the first pass between the roof 8 and the baffle 6 before entering upon the course that they take across the uptake end of the bank of tubes.

As above stated, the side walls of the setting are divided into three sections, the lowermost extending from the floor level and comprising water tubes 15 extending from substantially the grate level to the roof tubes 7, and above the roof tubes to the bank of tubes 1, and from the front to the rear wall, and are inclined substantially parallel with the tubes of the bank 1. The tubes 15 support recessed bricks 15' so as to expose one side of the tubes as shown in Fig. 2, and said tubes are expanded into front and rear manifolds 16 and 17, respectively, said manifolds being supported on suitable structural work resting upon the floor.

The front manifolds 16 are connected to drums 14 by tubes 18. The rear manifolds 17 are connected by tubes 19 to a cross box 20 nipped to the undersides of the drums 14.

The steam and water drums are supported in an open chamber 21, free and clear without the usual brick covering, from overhead beams 14' by means of suspension straps 14². The expansion of the headers 2 and 3, and their connections, is downward, and, to permit of the downward expansion of the headers 2 and 3 and of the upward expansion of the manifolds 16 and 17 without distortion of the side walls, I make the outside front and rear headers 22 of greater length than the headers into which the other

tubes of the bank are expanded, and expand into the lower ends of these headers two tubes 23, as shown in Fig. 2. The tubes of the side vertical rows above tubes 23 support the fire bricks or tiles 24. Resting upon the topmost tubes 15 and upon the tubes 23 are fire bricks 25, the latter being recessed to conform to the tubes. The lowermost row of bricks 24 is supported on the bricks 25.

The uppermost section of the lining is composed of fire bricks or tiles 26 held in place by bolts 27 passing through straps 26' and outer steel casing 28. The latter carries the weight of the bricks 26, thus relieving the upper side tubes of the boiler of the weight which would otherwise come upon them. Between the steel casing and the lining of tubes and fire bricks above described is a layer of non-conducting material 29.

As shown in Fig. 2, the lowermost section of the setting is offset from the sections above it. The verticals extending upwardly from the channel iron 30 are bolted through the inner vertical flange of said iron, and the verticals extending downwardly are attached to the web of the channel at its underside by angle iron clips.

From the foregoing description it will be understood that as the headers 2 and 3 have direct connection with the drums, which latter are supported from overhead beams, the expansion of the headers will be downward and the lower tubes 23 of the boiler will have a downward movement. The manifolds 16 and 17 and the tubes 15 of the side walls, being supported at the bottom, have a movement upward, resulting in a considerable relative movement, which may be as much as half an inch, between the lower tubes 23 and the uppermost tubes 15. These two rows of tubes being in the same inclined plane and bridged by the bricks 25, the downward movement of the tubes 23 and the upward movement of the top row of tubes 15 will tilt the brick 25 without disturbance of the outer non-conducting covering except a slight compression between the brick 25 and the channel 30, and without any distortion of the outer steel casing, or distress to the fire brick lining. It is also to be noted that the upper surface of the bridge brick 25 is formed so that a standard side boiler wall brick can be used in connection with it in the same manner as if the shoulder on the bridging were a boiler tube.

In my Patent No. 1,064,175, dated June 10, 1913, the application for which was filed of even date herewith, I have shown a boiler setting with the side walls constructed as herein described and claimed.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A boiler setting comprising side walls having a lining of water tubes divided into sections offset from each other, and means

to permit the movement of said sections relative to each other vertically in opposite directions without distortion of the walls.

2. A boiler setting comprising side walls having one section lined with water tubes, front and rear manifolds into which said tubes are expanded, and another section lined with water tubes, front and rear headers into which said latter tubes are expanded, and means to permit the movement of said manifolds and headers with their connecting tubes in opposite directions without distortion of the walls.

3. A boiler setting comprising side walls having one section lined with water tubes, front and rear manifolds into which said tubes are expanded, another section lined with water tubes and front and rear headers into which said latter tubes are expanded, said manifolds being supported at their bases permitting their expansion upward, and said headers supported from overhead permitting their expansion downward, and means to permit such relative vertical movement without distortion of the walls.

4. A steam boiler setting comprising side walls having a lining of water tubes divided into sections offset from each other so as to be capable of movement in opposite directions, and a movable bridge between the said sections to permit vertical movement of the sections without distortion of the walls.

5. A boiler setting comprising side walls having a lining of water tubes divided into sections offset from each other and capable of movement in opposite directions, fire bricks supported on said tubes, and a bridge resting upon the uppermost tube of the lower section and the lowermost tube of the upper section to permit a relative movement in opposite directions of said sections without distortion of the walls.

6. A boiler setting comprising side walls having one section lined with water tubes suspended from overhead, and a lower section supported from the floor line, said sections being offset, and means to permit the movement of said sections in opposite directions without distortion of the walls.

7. A boiler setting having the furnace side walls composed of water tubes and fire bricks supported thereon, and the upper or boiler walls composed of water tubes and bricks supported thereon, an outer lining of non-conducting material and steel plates, and means to permit of a relative movement vertically in opposite directions of the tubes of said sections without distortion of the walls.

8. A boiler setting comprising side walls having one section lined with water tubes, fire bricks supported thereon, front and rear manifolds into which said tubes are expanded, another section having water tubes and fire bricks supported thereon, the tubes

of said latter section being included in a bank of generating tubes, front and rear headers into which said generating tubes are expanded, and means to permit a relative movement vertically of the tubes of said sections without distortion of the walls.

9. A steam boiler comprising a bank of inclined tubes, front and rear headers into which said tubes are expanded, steam and water drums from which said headers are suspended, fire bricks supported on the outside rows of tubes of said bank, a row of water tubes below and independent of said bank of tubes, fire brick supported upon said lower row of tubes, front and rear manifolds into which the tubes of said lower row are expanded, and means to permit the movement of said headers and manifolds with their connected tubes vertically in op-

posite directions without distortion of the walls.

10. A boiler setting comprising side walls having one section lined with water tubes, front and rear manifolds into which said tubes are expanded, and another section lined with water tubes, and front and rear headers into which said latter tubes are expanded, said front and rear headers being independently connected by pipes to the steam drum.

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

MINOTT W. SEWALL.

Witnesses:

JOHN A. W. DIXON,
E. P. TERRY.