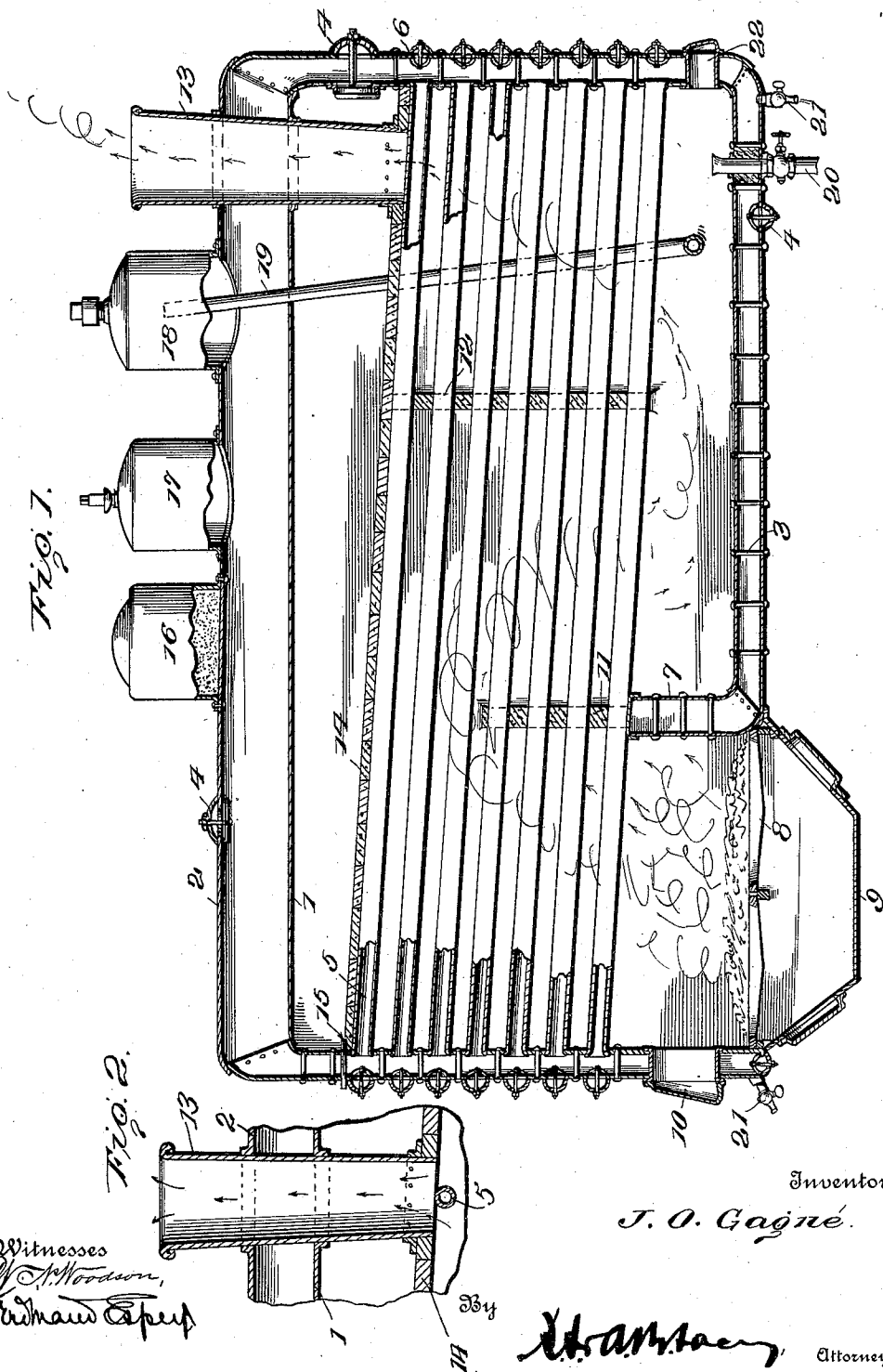


STEAM BOILER.

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Patented May 20, 1913.



COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH OMER GAGNÉ, OF SHERBROOKE, QUEBEC, CANADA.

STEAM-BOILER.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH OMER GAGNÉ, citizen of the United States, residing at Sherbrooke, Province of Quebec, Canada, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to steam boilers, especially adapted for use on locomotives, and has for its object the provision of a boiler of inexpensive construction, by which the water will be quickly converted into steam so that an economy of fuel will be effected.

The invention accomplishes the desired result by providing a plurality of water tubes about which the fire and the heated currents rising therefrom may circulate in a tortuous path, and combines with the tubes fire-proof bridge walls and a fire-proof arch or cover by which the heated currents will be held to the tubes throughout the length of the same.

The invention also seeks to improve generally the construction of locomotive steam boilers to promote their efficiency and increase their durability.

The invention resides in certain novel features which will be hereinafter fully set forth and particularly claimed.

In the drawings, Figure 1 is a longitudinal section of a steam boiler embodying my invention; Fig. 2 is a detail transverse section.

In carrying out my invention, I employ inner and outer shells 1—2, which are preferably constructed of sheet metal and are braced throughout substantially their entire length by stay-bolts 3, as will be readily understood. Manholes 4 are provided at various points on the outer shell to facilitate access to the water space between the shells for the purpose of repairing or cleaning the parts when such work is necessary. A plurality of water tubes 5 are secured in and extend between the front and rear ends of the inner shell and the joints are made water-tight in the usual or any preferred manner. In the outer shell, directly opposite the ends of the water tubes, are provided hand holes 6 in order that access may be had to the tubes if the same are to be cleaned or repaired or a new tube substituted for an old or worn-out tube.

The bottom or lower side of the shells terminates short of the front wall or end of

the boiler and a water leg 7 is secured to the front end of the bottom and extends vertically therefrom to about the plane of the lowermost tubes, as clearly shown, the space between the front end of the boiler and the said water leg constituting a firebox, in which are supported the usual grate bars 8. An ash-pan 9 is supported below the grate bars and a fuel door 10 is provided in the front end of the boiler to afford access to the firebox when it is necessary to feed the fire. Upon the water leg 7 I build a bridge wall 11 of fire-brick, broken pieces of fire-clay, or similar material thoroughly cemented or otherwise secured together, and extending up at least half way the height of the series of tubes. Between the said bridge wall 11 and the rear end of the boiler, a similar wall or partition 12 is built around the tubes to extend transversely across the boiler, and constructed of the same materials as the bridge wall 11. The heat rising from the fire-box will obviously be forced to pass upward in front of the bridge wall, then rearwardly over the same, down between the same and the partition 12, thence passing under said partition and again upwardly to the stack 13, passing out through the shells 1 and 2, as shown. To further confine the heated currents around the tubes and prevent the same passing directly to the top of the inner shell I provide the roof or horizontal partition 14, which is constructed of the same materials as the bridge walls or may be of large refractory tiles, the said roof or horizontal partition extending the full length of the boiler, as shown.

It is intended that the water level of the boiler should be at the highest point or front end of the said roof or horizontal partition, and a fusible plug 15 is secured through the shells at this point, so that if the water level should fall below this point and the temperature reach a dangerously high point the plug will be melted and the engineer notified of the condition in ample season to prevent an explosion.

A sand-box 16 is mounted upon the top of the outer shell in the usual manner, and 17 and 18 are the usual steam domes provided on the boiler and communicating with the space between the shells, the dome 18 affording communication with a pipe 19 by which the steam is conveyed to the engine cylinders. The said pipe 19 passes downwardly through the boiler and through the

series of water tubes 5 and then diverges from the boiler to the engine cylinders at points near the bottom of the boiler so that the steam in the said pipe will be exposed to the heated currents passing to the stack 13.

The exhaust pipe 20 from the engine cylinders may be led into the boiler through the bottom of the same, and suitable blow-off cocks 21 are provided to permit the water space to be emptied whenever it is necessary to clean out or repair the boiler. At the rear end of the boiler I provide a clean-out door 22, by which access is obtained to the space between the water tubes 5 and the bottom of the boiler, so that any sediment that may have collected therein may be easily withdrawn.

It will be readily seen from the foregoing description that I have provided a boiler of very simple construction by which a body of water will be provided around the entire fire-box and combustion chamber, it being understood that water is supplied to the space between the inner and outer shells so as to flow therefrom through the tubes 5, and as the steam is generated, the same rises into the large space at the top of the boiler and in the steam domes in the usual manner. The shells are thoroughly braced by the stay-bolts 3 and the fire acts directly on

the front ends of the shells and the water leg 7, so that the steam will be quickly generated and an economy of fuel effected.

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

A steam boiler comprising inner and outer shells each consisting of a top, ends, sides, and bottom spaced apart throughout their extent to define an intervening water space, the bottoms of the shells terminating short of the front ends thereof and being up-turned to form a water leg in direct communication with the water space, grate bars supported by and extending between said water leg and the front end of the inner shell, a bridge wall supported by and rising from the water leg, water tubes extending between the ends of the inner shell, some of the tubes passing through the bridge wall, a refractory partition between said bridge wall and the rear ends of the shells, a refractory roof between the ends of the shells above the tubes, and a stack rising from said roof adjacent the rear end thereof and extending through and beyond the shells.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH OMER GAGNÉ. [L. S.]

Witnesses:

E. B. WORTHINGTON,
R. M. STENSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."