W. Mont. Storm,

Steam-Boiler Fire-Tube.

No. 49,199. Patented Aug. 1, 1865.

Fig. 1.

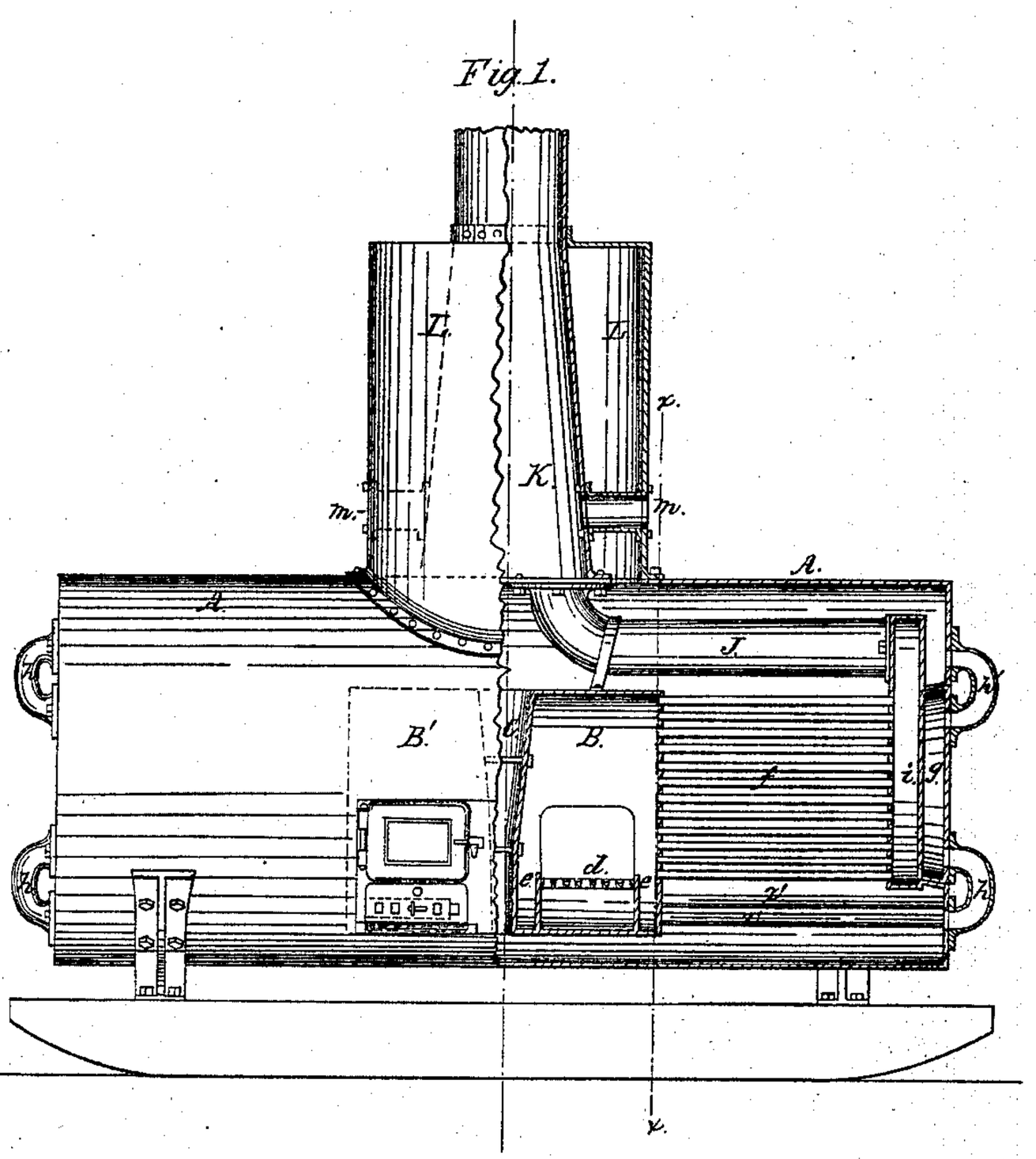


Fig. 2.

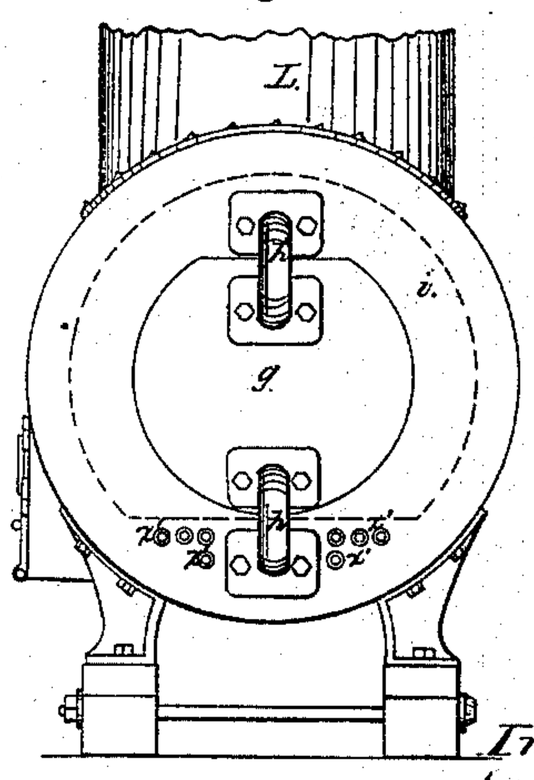
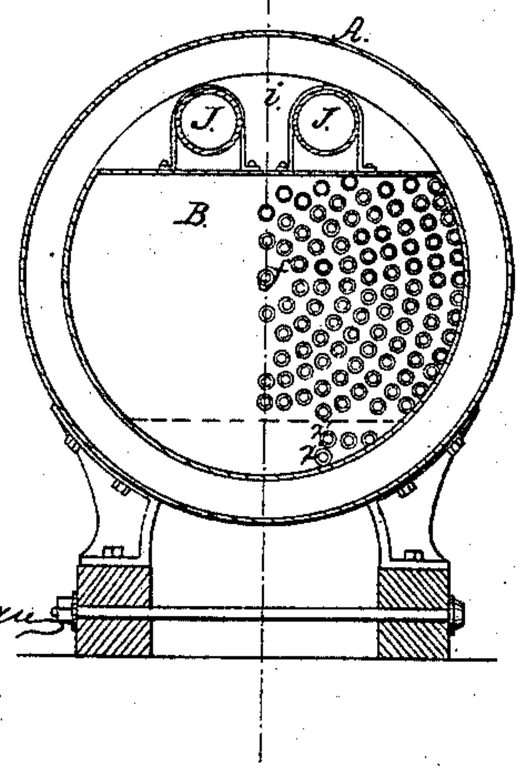


Fig. 3.



Witnesses;

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UNITED STATES PATENT OFFICE.

WM. MONT STORM, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND R. CHARLTON MITCHELL, OF SAME PLACE.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **49,199**, dated August 1, 1865.

To all whom it may concern:

Be it known that I, WILLIAM MONT STORM, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Boilers, principally intended for portable purposes, and of which the following specification, taken in connection with the accompanying drawings, embraces a full and fair description.

Figure 1 shows an elevation or side view of my boiler, (which, as will be seen, is of the horizontal tubular-flue class,) having two central furnaces divided by a water-leg or midfeather, C, each portion of the boiler from the middle (meaning on each side of a line drawn vertically through it) being a counterpart of the other. In Fig. 1 the boiler is shown broken off, exhibiting a central vertical sectional view on the one part and an exterior view of the counterpart. Fig. 2 is an end view, the details of which will be hereinafter explained. Fig. 3 is a cross-section through *x x* of Fig. 1.

A A, constituting the shell of the boiler, is a simple cylinder. B B′ (dotted in) are the fire-boxes, with the water-space C between them.

The grate *d*, Fig. 1, in lieu of being extended quite to the sides of the fire-boxes, is supported upon independent partition-walls *e e*, for a purpose presently to be explained.

The principal objects I desire to attain are, first, great heating-surface in small space, combined with facility for cleansing and repair; second, a form involving the greatest strength with the least number of internal braces; third, free circulation of the water and dry steam.

I desire to make this boiler adaptable to the combustion as fuel of petroleum or highly bituminous coal, for which purpose it is necessary to supply a warm or hot draft. In view of this I insert several tubes, *x′ x′*, (see Figs. 1, 2, and 3,) that communicate from the exterior of each end of the boiler (and with the open air) at one of their extremities, while the opposite extremities of said tubes *x′ x′* communicate with the space between the walls *e e*, that bound the grate *d* and the walls of the fire-box. In burning ordinary coal—say anthracite—this would be of little avail, or unnecessary, as anthracite gives off but little gas during its ignition, the tubes *x′ x′* being applied for the special purpose of supplying a heated supporter of combustion to the more volatile vapors and gases that usually escape unutilized when petroleum or highly bituminized coal is used as fuel.

In place of an ordinary grate, as shown, a pan of sand or a hollow plate of some porous and cohesive mineral fabric would be applied when a fluid—such as petroleum—was used as a fuel, such fuel being fed to such substitute for a grate from a properly-arranged reservoir, the supply being regulated automatically in some one of several ways that would be readily conceived by any expert—such as, for instance, relates to and is governed by the temperature or the pressure of the steam within the boiler.

To embrace great heating-surface in small space the use of tubes has been found most available in practice. As will be at once understood, the smaller the tubes and the closer together more heating-surface can be had in a given space; but as circulation and the separation of the steam from the water render necessary in practice a space between such tubes, (not theoretically necessary,) so in practice, as is well known, it is found that for the passage of the gaseous products of combustion through a tube the smaller the tube the shorter it must be, or it will choke; hence, if I had a single furnace at the end of my boiler and the products of combustion had to pass through such small tubes, as I can by its shown arrangement employ, it could not possibly operate satisfactorily.

A single central furnace would, in a measure, overcome the practical objections pointed out; but there would be no absolute ability to make the hot products of combustion flow with equality through the counterpart series of tubes; hence I employ the double central furnace B B′, separated by the water-space C, increasing thereby my fire-surface, strengthening the walls of the furnace, supplying a central circulation-passage for the water, and having the well-known advantage of "trimming" each fire alternately, and thus keeping steady steam.

A damper of any convenient location or form can be applied as relating to the tubes *x′ x′*,

or, of course, they can be dispensed with in special cases.

For convenience of cleaning or replacement of any of the flue-tubes *f*, I have a false head or tampion, *g*, at each end of my boiler, that is removable, and which is hollow, and through which the water of the boiler circulates, and from which any steam therein formed may escape, said false head *g* being connected with the main body of the boiler by the conduits *h h'*. To remove *g* it is only necessary to unscrew the tap-bolts that bind *h h'* to the boiler, those bolts that bind said conduits to *g* not requiring removal.

As will be readily understood by inspection of the drawings, the products of combustion pass from the furnace B through the tubes *f* into the smoke-box *i*, thence through the two comparatively large flues J, that, being located in the steam-space, help to dry the steam, and which are connected (see Fig. 1) with the chimney K, which passes centrally through the steam-drum L.

I have anticipated putting a tube or passage, as at *m m*, properly throttled to prevent the escape of smoke, longitudinally through the steam-drum and chimney, so that I could locate upon the boiler an engine at one end and a pump at the other end.

Having now described my improved steam-boiler, what I claim is—

1. The relative arrangement of the parts of my steam-boiler substantially as follows, viz: in a cylindrical horizontal shell, the arrangement of two independent furnaces located at its middle, with grate-bars running transversely to its length, said furnaces being separated by a water space or leg, and their products of combustion respectively passing right and left through flues (preferably small tubes) to chambers *i i*, and thence through some proper conduit to their final exit, all substantially as described.

2. Being aware that hollow stay-bolts are not new, I disclaim such; but I claim, in conjunction with the other general arrangement of the parts of this boiler, the application of a series of auxiliary draft-heating tubes running the entire length of the horizontal shell from its end to its furnaces, respectively, in the manner and for the reason given.

3. The hollow head or tampion, with its conduits, for circulation, substantially in the manner and for the purposes described.

4. The application of the sleeve *m m* through the steam-drum and chimney, for the objects described.

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Witnesses:
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