

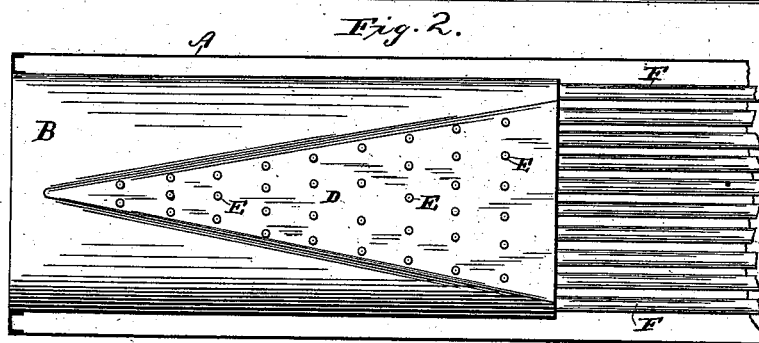
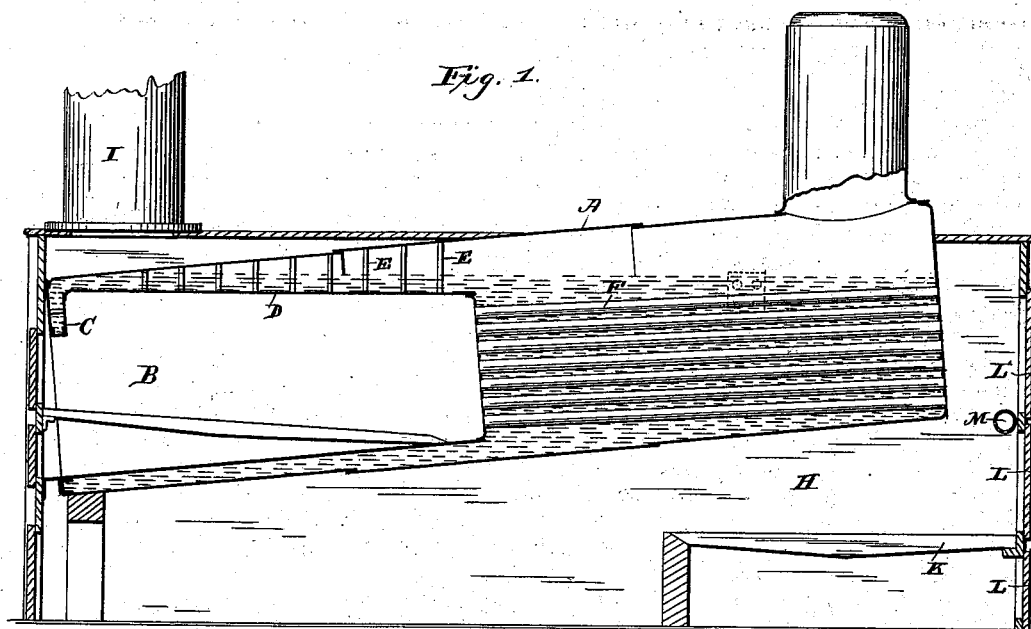
(No Model.)

J. A. MUMFORD.

STEAM BOILER.

No. 382,657.

Patented May 8, 1888.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOSEPH A. MUMFORD, OF HANTSPORT, NOVA SCOTIA, CANADA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 382,657, dated May 8, 1888.

Application filed October 22, 1887. Serial No. 253,113. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. MUMFORD, of Hantsport, Nova Scotia, Canada, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

In the boilers of this class, as heretofore constructed with the outer shell set in an inclined position and with an inclined or tapering fire-box in one end of the same, difficulty has been experienced in obtaining sufficient flue-room on the head of the fire-box to adapt the boiler for use when the water is impure and at the same time keep the fire-box and flues at all times below the level of the water; and, further, it has been found that the gases and products of combustion were not fully consumed nor their heat utilized before they were allowed to pass off up the chimney.

The object of my present invention is to overcome the above-mentioned defects, reduce the cost of manufacture, and adapt the boiler for use under certain conditions which would render other boilers of the class undesirable and expensive, the said invention consisting in certain novel details in the construction of the fire-box and the boiler and in the setting of the latter, as will be hereinafter described, and pointed out particularly in the claims at the end of this specification.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of a boiler and setting constructed in accordance with my invention. Fig. 2 is a top plan view of the boiler, showing the triangular shape of the flat top section of the fire-box.

Similar letters of reference in both figures indicate the same parts.

Referring to Fig. 1, it will be seen that the outer shell, A, of the boiler is held in an inclined position in the setting by ordinary steps or projections bolted to its sides. At the front end is located the fire-box B, fitting within, and for a large part of its circumference being parallel with, the said outer shell. The front edges of the shell and fire-box may be simply brought together and riveted, but are prefer-

ably only so united at the bottom, the upper edges being brought down parallel to, but at a slight distance from, each other for a short distance and there united, forming the water-front C, leaving only about sufficient open space for the furnace and ash-pit doors.

The fire-box is constructed cylindrical, so as to lie parallel to the outer shell except for a comparatively small area at the top, where it is made flat or level from front to rear. This flat section D, (see Fig. 2,) it will be seen, is triangular in shape, and may be stayed and bolted to the outer shell by bolts E, so as to render the same as strong as the cylindrical portion.

The flue-tubes F are secured in the end of the fire-box, either slightly inclined from front to rear or in line with the top of the fire-box, as may be desired, running parallel, however, with the outer shell at the sides. It will thus be seen that while I have an increased flue-space, and consequently an increased number of flues, I keep all parts of the fire-box and flues below the level of the water, which is shown in dotted lines.

As before mentioned, it has been found that much of the heat and gases generated in the fire-box passes off without being utilized; but in the present instance I make use of the space H beneath the upper end of the boiler as a combustion-chamber, wherein I may, by letting in air or steam, burn the unconsumed gases and pass the heat so generated, together with that which passes through the flues, beneath and around the outside of the outer shell back to the space above the front end of the boiler, where it passes off up the smoke-stack or chimney I. As a further means of utilizing this space beneath the rear end of the boiler, I may locate therein a grate, K, for burning sawdust or other light fuel to assist in consuming the before-mentioned gases. The rear end of the setting is provided with furnace and ash-pit doors L, as in an ordinary furnace, an upper door, L', being provided for cleaning or repairing the rear end of the flues in the boiler. For the purpose of injecting air or steam into the said chamber or space a perforated pipe, M, is shown located just above the furnace-door, the perforations being pointed downward to assist in the draft, and when the grate K is used for

burning fine fuel to assist in its combustion, according to a well-known principle governing the burning of fine fuel. I do not, however, wish to be limited to this precise construction, as it is obvious that perforations may be made in the wall, or any of the well-known forms of blowers or injectors may be employed and accomplish the same result in a more or less efficient manner.

At the front end of the boiler, beside the furnace and ash-pit doors, a door for cleaning the space beneath the boiler-shell is provided.

It is obvious that the fire-box may be first formed cylindrical and then the top section bent in, in which case the top would either have to be depressed at the center or the diameter of the cylindrical portion increased in order to keep the whole of the top section below the water-level.

It will be seen from the above that I have produced a boiler highly efficient and economical in use, and one, by reason of its peculiar position and arrangement of fire boxes, occupying but very little space.

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

1. The combination, with the inclined cylindrical boiler, of the inclined partly-cylindrical fire-box located in the same, having the triangular-shaped substantially flat level top section, as set forth.

2. The combination, with the inclined cylindrical boiler provided with the water-front, as described, of the inclined cylindrical fire-box located therein, having the triangular shaped substantially flat top section, and flues connecting the rear end of the fire-box with the rear end of the boiler, substantially as described.

3. The combination, with an inclined boiler having the fire-box in its lower end and flues connecting said fire-box with the rear raised

end, of a combustion-chamber located beneath its raised end, with an air or steam supply therein and a smoke-exit, substantially as described.

4. The combination, with an inclined boiler, a fire-box located in its lower end, and flues connecting said fire-box with the raised end, of a chamber located beneath said raised end, with air or steam supply therein, and a smoke-exit above its lower end, whereby the smoke and products of combustion pass from the fire-box through the flues beneath the forward end of the boiler, commingling with the air or steam therein, thence around over the outside of the boiler, and out over its lower end, as set forth.

5. The combination, with an inclined boiler, a fire-box located in its lower end, and flues connecting said fire-box with the raised end, of a secondary fire-box located beneath said raised end through which the products from the first-named fire box pass before reaching the smoke-exit, substantially as described.

6. The combination, with an inclined boiler, a fire-box located in its lower end, and flues connecting said fire-box with the raised end, of a grate located beneath said raised end, and doors at the rear of said boiler for supplying fuel to said last-named grate and for removing the ashes, substantially as described.

7. The combination, with an inclined cylindrical boiler having the fire-box in its lower end, and flues connecting said fire-box with the raised end, of a grate and combustion-chamber located beneath said raised end, and a smoke-exit above its lower end, substantially as described.

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