(No Model.)

C. J. M. HAŸNA.

STEAM BOILER.

No. 381,368. Patented Apr. 17, 1888.

Fig. 1.

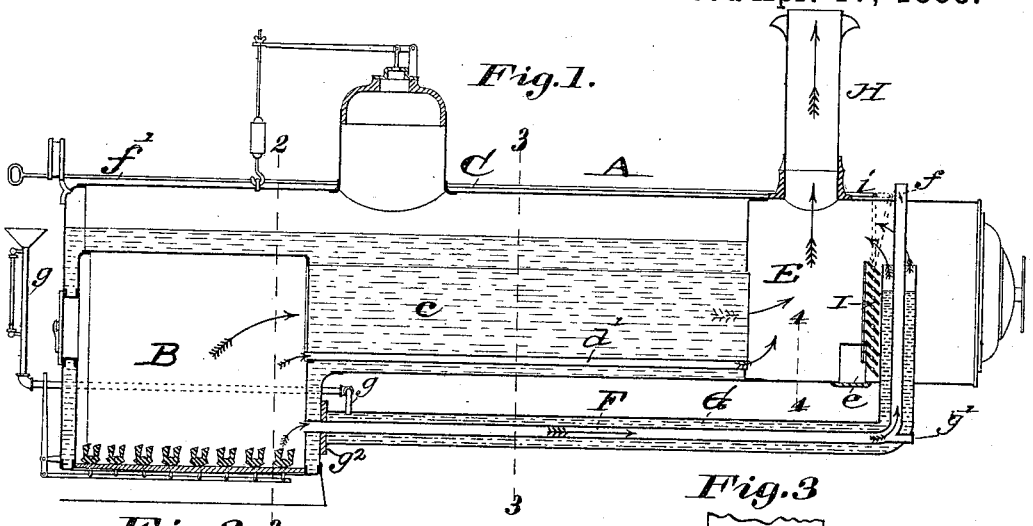


Fig. 2.

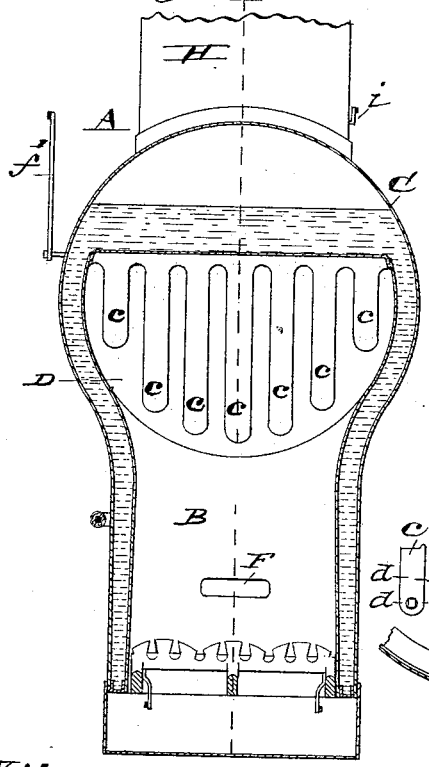


Fig. 3

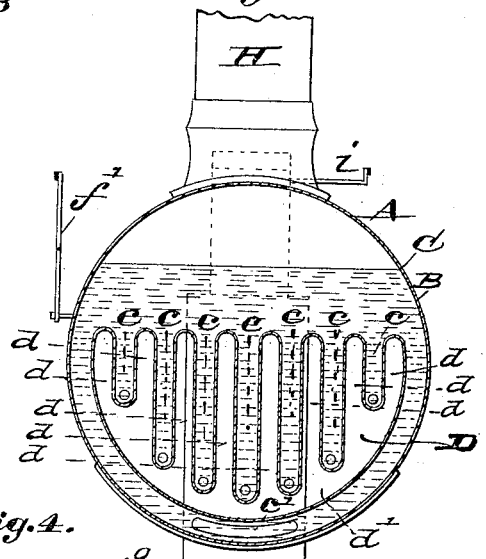


Fig. 4.

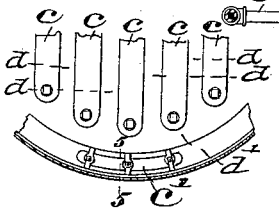
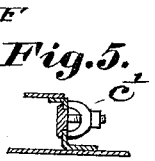


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

CLEEMENTINA J. M. HAŸNA, OF ST. LOUIS, MISSOURI.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 381,368, dated April 17, 1888.

Application filed March 7, 1887. Serial No. 229,926. (No model.)

To all whom it may concern:

Be it known that I, CLEEMENTINA J. M. HAŸNA, of St. Louis, Missouri, have made a new and useful Improvement in Steam-Boilers, of which the following is a full, clear, and exact description.

The improvement relates, partly, to the flue construction and to the means for consuming the smoke and preventing the escape of ignited sparks, substantially as is illustrated in the annexed drawings, making part of this specification, in which—

Figure 1 is a vertical longitudinal section, on the line 1 1 of Fig. 2, of a boiler having the improvement embodied therein. Fig. 2 is a vertical transverse section on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section on the line 3 3 of Fig. 1. Fig. 4 is a detail upon an enlarged scale, being a vertical transverse section on the line 4 4 of Fig. 1; and Fig. 5 is a vertical longitudinal section on the line 5 5 of Fig. 4.

The same letters of reference denote the same parts.

The boiler A illustrated in the drawings is of the locomotive type; but I desire not to be wholly restricted thereto. Save as the boiler is modified by the improvement, its construction is a familiar one.

B represents the furnace-chamber.

C represents the barrel of the boiler.

D represents the flue space leading from the furnace-chamber through the barrel C to the chamber E. The flue-space D is a series of vertical passages, *d*, arranged side by side and united at the lower end by means of the semicircular continuous passage *d'*. By this means a large amount of heating-surface is obtained and the flue-space is capable of being readily cleaned. The water-spaces *c c* can be reached for cleaning by means of the hand-holes *c'*, Figs. 4, 5.

F represents a flue leading from the furnace-chamber at a level below that of the barrel C to a point beyond the farther end of the barrel when it is carried upward into the chamber E; and, if desired, the flue F may be extended, as shown in Fig. 1, entirely through the chamber, so as to discharge into the outer air; and it is provided with a damper, *f*, whose rod *f'* is carried to the other end of the boiler, by means of which the draft through the flue F is regulated. The flue F is surrounded by a water-chamber, G, which, by means of the pipe *g*, can be filled with water.

The chamber G is entirely independent of the water-space of the boiler, and the chamber extends not only along the horizontal portion of the flue F, but also upward into the chamber E, where it is open, so that the steam generated in the chamber G by reason of the heat passing through the flue F can escape into the chamber E, where it serves a double purpose—to quench the fire and sparks, which otherwise might escape into the stack H, and to condense and precipitate the smoke in the chamber E, whence the precipitation can be removed through the opening provided at *e*.

A screen, I, made like a set of blind-slats and operated from the opposite end of the boiler by means of the rod *i*, is used to prevent the heat from the flue space C from encountering the water-chamber G when it is undesirable to have the steam generated in the chamber E. The chamber G is also protected from the heat of the furnace chamber by means of the non heat-conducting plate g^2. By removing the stopper *g'* the flue F can be reached for cleaning.

I claim—

1. The combination of the furnace-chamber, the chamber beyond the barrel, and the flue leading from the furnace chamber beneath the barrel and extended upward through the smoke-box E, as described, said flue being surrounded by a water-chamber open at the top, substantially as described.

2. In a boiler-furnace, the screen in front of the upturned portion of the chamber G, in combination with the chamber E, as and for the purpose described.

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Witnesses:

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