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S. SAWYER'S IMPROVED STEAM BOILER.

75057

PATENTED

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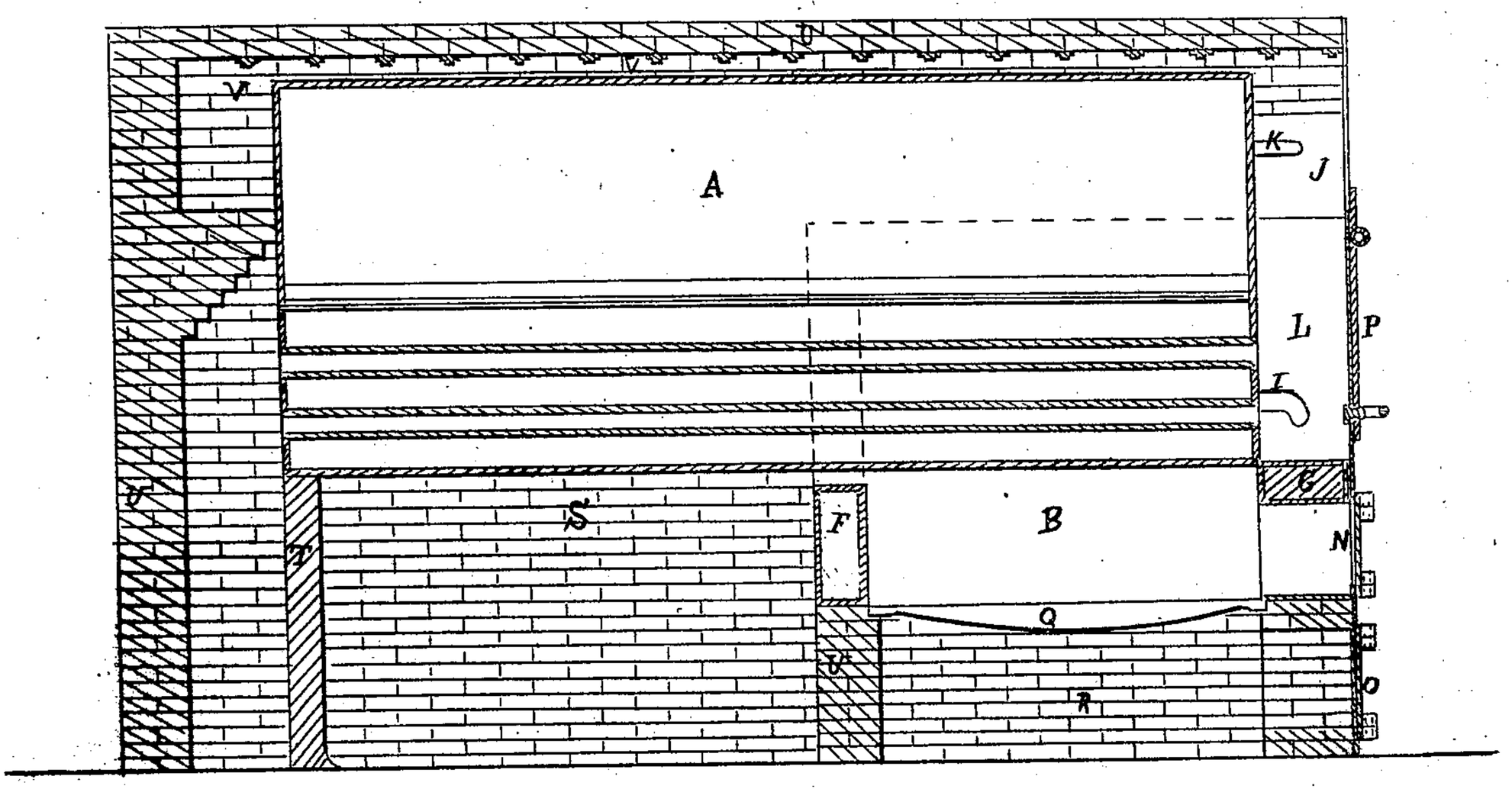

Fig. 2.

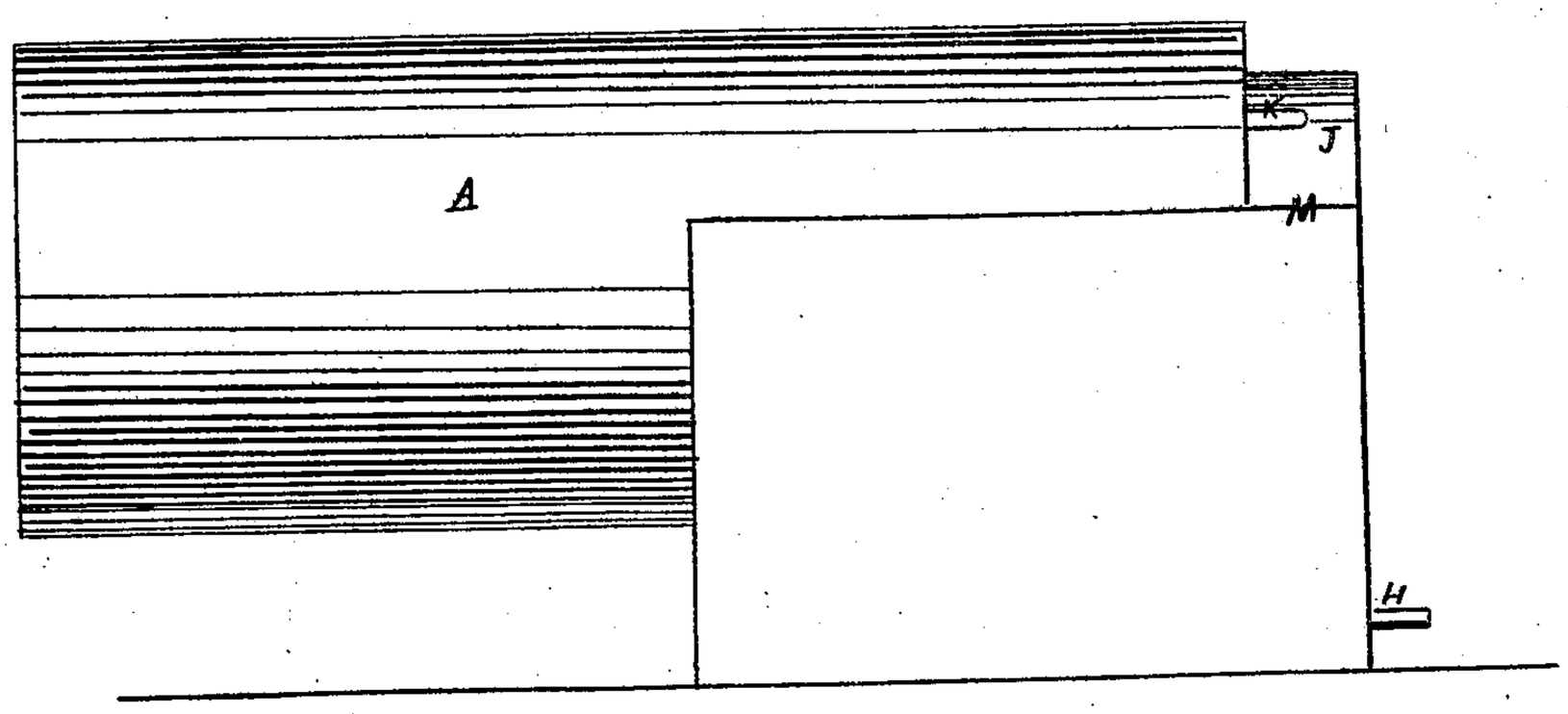

Fig. 1

Witnesses { N. B. Lombard, Chas A. Jordan.

Sylvanus Sawyer Inventor.

S. SAWYER'S, IMPROVED STEAM BOILER.

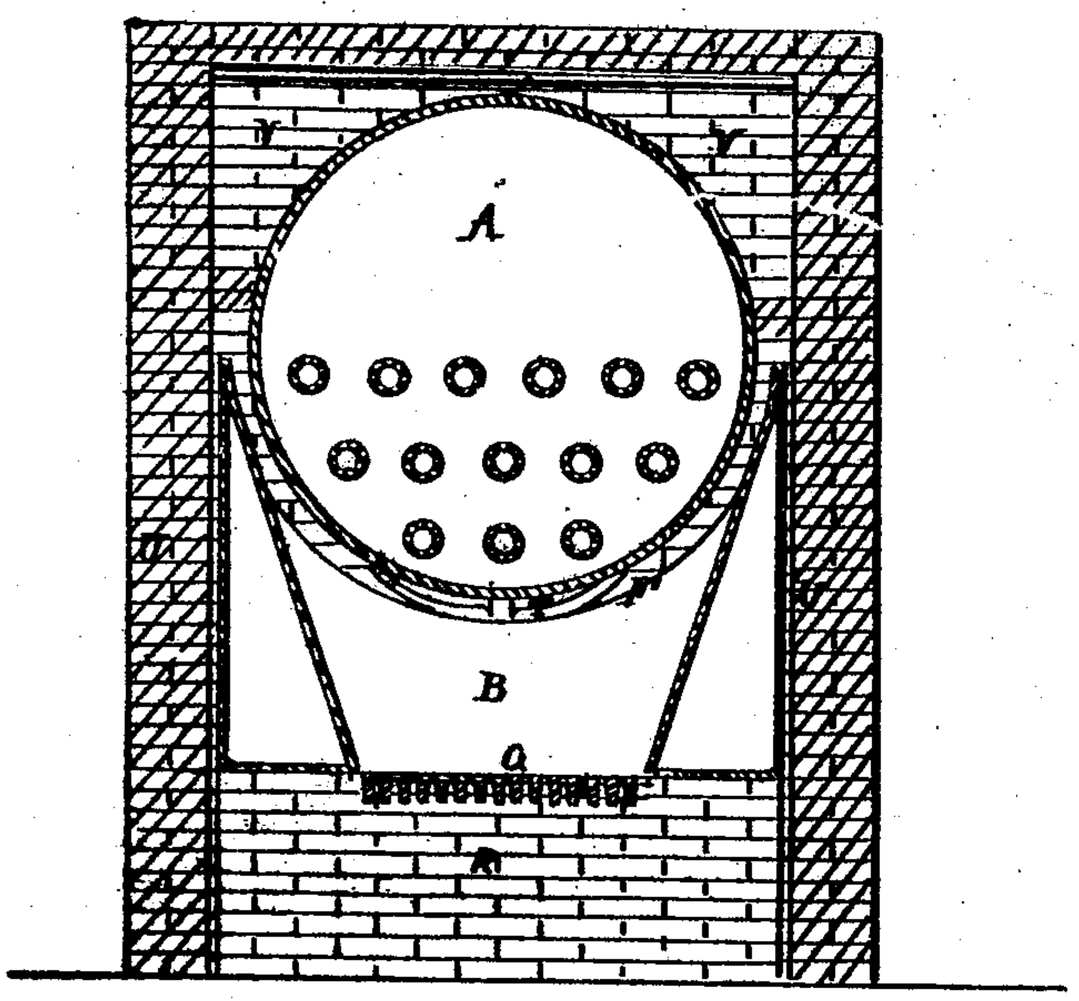

Fig. 3

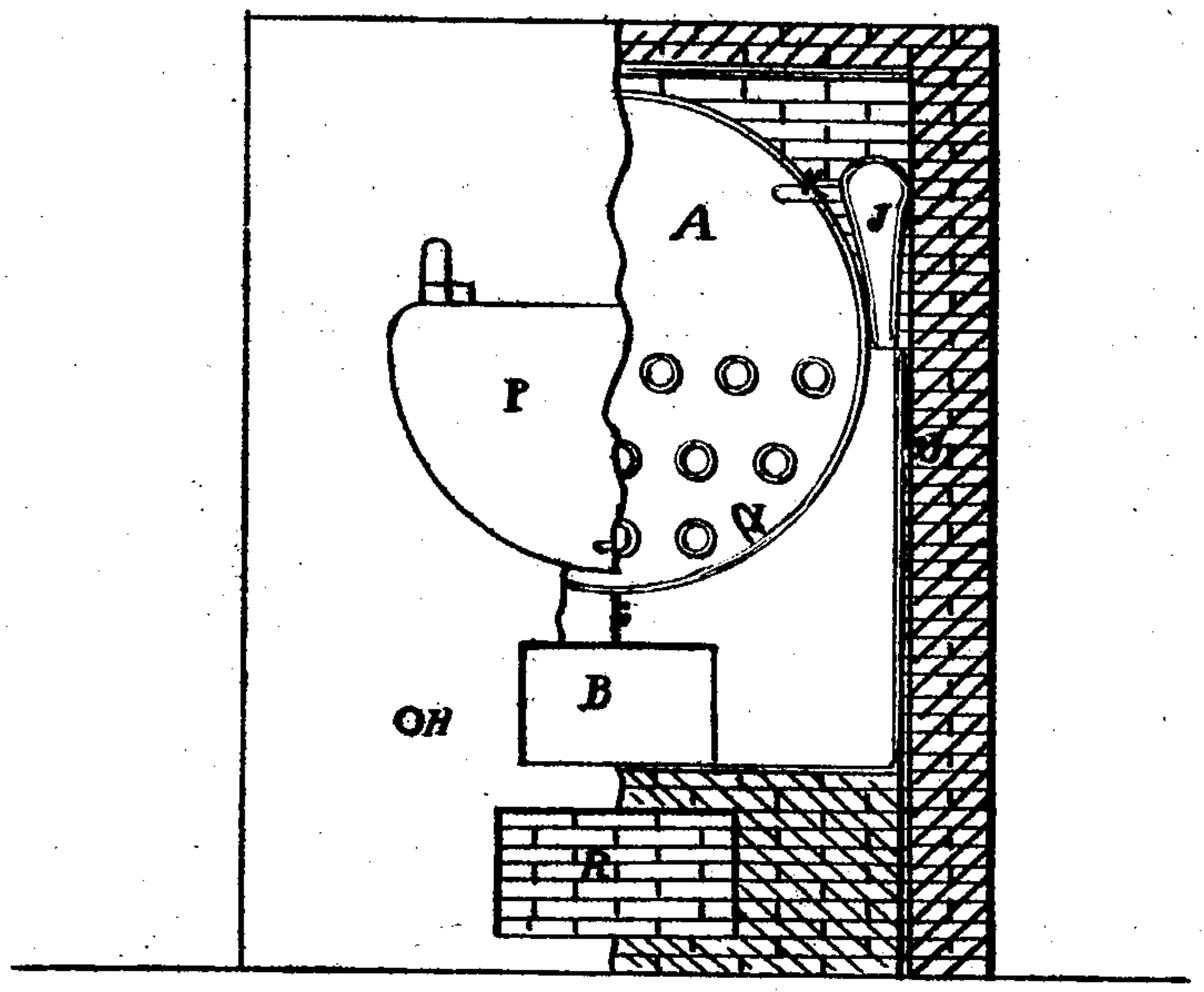

Fig. 4

Wibnesses. { N. C. Lombard
Chas. A. Jordan. } Sylvanus Sawyer Inventor.

United States Patent Office.

SYLVANUS SAWYER, OF FITCHBURG, MASSACHUSETTS.

Letters Patent No. 75,057, *dated March* 3, 1868.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SYLVANUS SAWYER, of Fitchburg, in the county of Worcester, and State of Massachusetts, have invented a new and useful Improvement in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my boiler removed from the setting.

Figure 2 is a vertical longitudinal section through the centre of boiler and the masonry of its setting.

Figure 3 is a vertical transverse section through the fire-box and the setting.

Figure 4 is an end elevation of the boiler and setting, with one-half of the boiler front, with fire-box and ash-pit doors, removed.

In all the drawings the same letters refer to the same parts.

The subject-matter of my invention relates to an improved mode of constructing boilers for generating steam and other similar purposes, and consists in constructing the fire-box, so called, separate from the main boiler, and connecting it with the same by means of steam-chambers, and by suitable steam and water-pipes, so arranged that when the water is at the proper height in the main boiler it will entirely fill all that part of the furnace-casing that is directly exposed to the heat, and also permit the steam generated therein to pass freely into the main boiler without carrying the water along with it; and it also consists in so constructing the water-space of the furnace-casing, and so arranging the supply and delivery-pipes thereof that the supply of water will be caused to circulate around the furnace before it enters the main boiler, as will be described.

In the accompanying drawings, my invention is shown in combination with a tubular boiler, having a cylindrical shell, with the masonry of the furnace arranged in a manner not unusual, except so far as to adapt it to my invention.

In the drawings, A is an ordinary tubular boiler, with a cylindrical shell, the lower portion of which is extended forward beyond the line of the front tube-sheet, as shown, and resting upon the front portion of my improved furnace-casing, by which the front end of the boiler is supported. B is the furnace or fire-box, which is provided with door N and grates Q, in the usual manner. It is made with two walls and a water-space, as shown, and does not differ materially from the ordinary form of fire-box in common use in boilers, excepting that it is closed at the upper side. The front end is made to fit the boiler, as shown, but at the sides and back end there is sufficient space left between them to serve as a flue. The water-space, at the front end of the fire-box, is divided in the centre, between the fire-door N and the upper shell of the fire-box, by the partition G, so that all the water entering the furnace-casing through the feed-pipe H must pass to the rear of the water-space, on that side of the fire-box, and through the water-space in the bridge-wall F to the other side, and then forward to the front end, thus making a complete circuit of the fire-box exposed to a high heat before it can enter the main boiler through the pipe I. J is a steam-drum, attached to the furnace-casing at the front end, which is of the form, in cross-section, shown in fig. 4, and rises above the fire-box sufficiently high to afford a steam-space in it above the water-line in the main boiler. It extends for a considerable distance lengthwise of the fire-box, and its lower extremity connects with the water-space of the fire-box by an opening occupying its entire horizontal area. By means of such free communication with the fire-box, the rapid escape of the steam generated by the intense heat in the fire-box is prevented from lifting the water, in the form of foam, and discharging it into the main boiler, thus emptying the fire-box of its water, and permitting the destruction of its fire-surface by the intense heat of the fire. The steam-space in the drum is connected with the main boiler by the pipe K. This steam-drum and pipe should be duplicated on the opposite side of the furnace, at the point M. O is the ash-pit door; P, the door communicating with the smoke-box L. R is the ash-pit, S the smoke-flue under the boiler, and T the bracket by which the rear end of the main boiler is supported. U U are the brick walls enclosing the boiler and furnace, provided with the usual bearings or supports for the boiler, and V is the return-smoke flue over the top of the boiler, and leading to the chimney.

It is evident that my invention may be applied to other forms and styles of boiler than the one represented in the drawings.

The advantages, among others, to be obtained by the use of my improved furnace, are—

First, convenience of construction, on account of its being made separate from the main boiler.

Second, its applicability to all kinds of boilers which are constructed without fire-box furnaces, whether new or already in use, with common brick furnaces.

Third, the facility with which the furnace may be replaced when worn out, without disturbing the main boiler. This I consider an important advantage, from the fact that the furnace is the most perishable part of a steam-boiler, and often requires to be renewed or extensively repaired, while the remainder of the boiler is in good condition.

4. The utilization of the heat, which in a brick furnace is largely absorbed by the brick walls of the fire-box, for the purpose of raising the temperature of the water before it enters the main boiler.

What I claim as my invention, and wish to secure by Letters Patent, is—

The combination of the detached fire-box, the steam-drums or chambers, and the main boiler, arranged substantially as described.

Executed at Boston, this thirteenth day of July, 1867.

SYLVANUS SAWYER.

Witnesses:

N. C. LOMBARD,

CHAS. A. JORDAN.