Sheet 1, 3 Sheets.

F. Mörth.

Super-Heater.

No. 93,468. Patented Aug. 10, 1869.

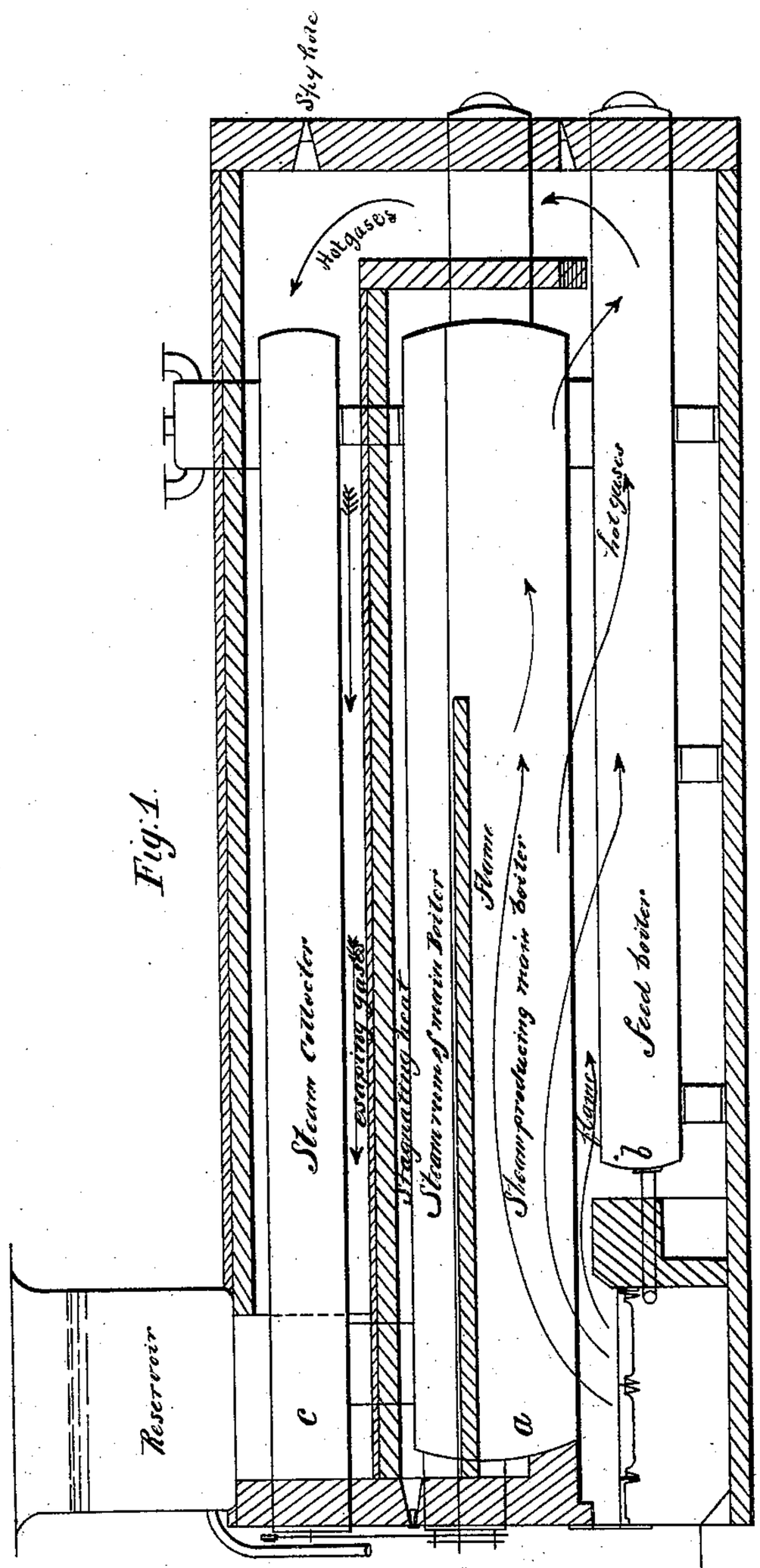


Fig. 1.

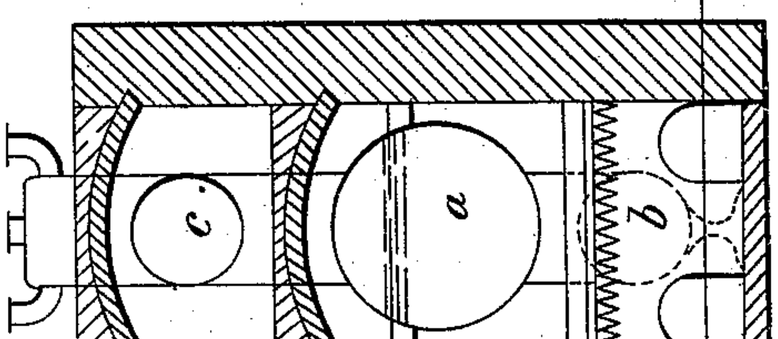


Fig. 2.

Witnesses
C. O. Paget
Josef Fingerlos

Inventor
F. Mörth

Sheets, 3 Sheets.

F. Mörth.

Super-Heater.

No. 93,468. Patented Aug. 10, 1869.

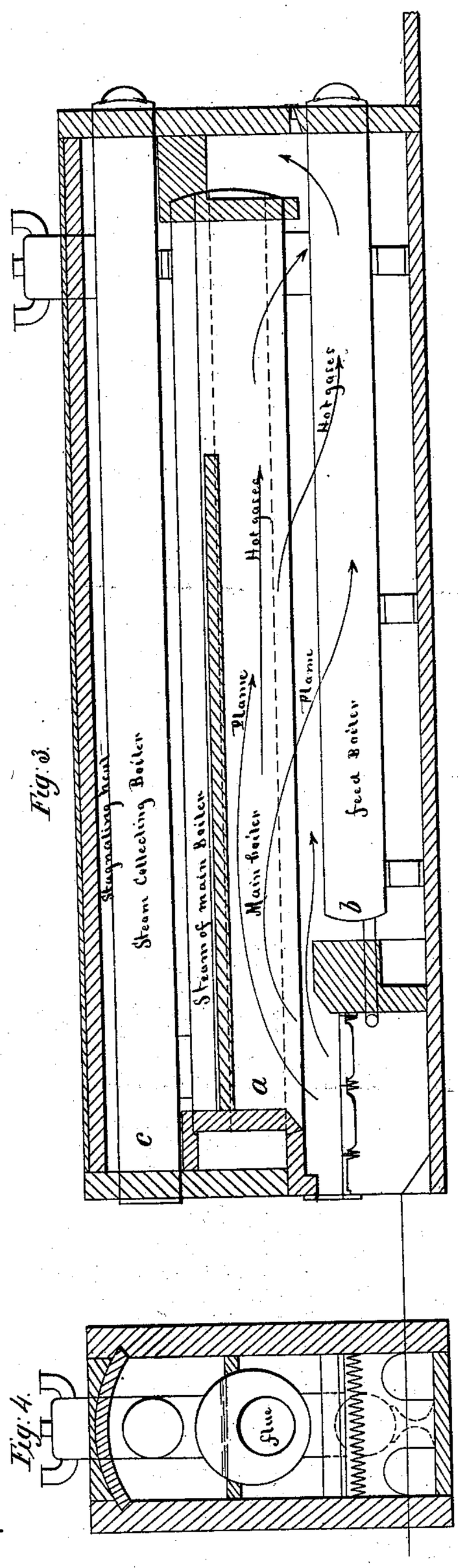


Fig. 3.

Fig. 4.

Witnesses
C. A. Paget
Josef Singerlog

Inventor
F. Mörth

Sheet 3, 3 Sheets.

F. Mörth.

Super-Heater.

No. 93,468. Patented Aug. 10, 1869.

Fig: 7.

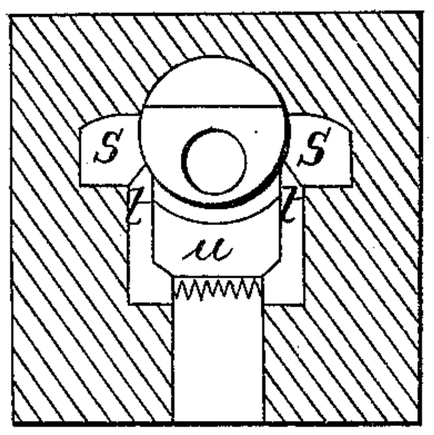


Fig: 8.

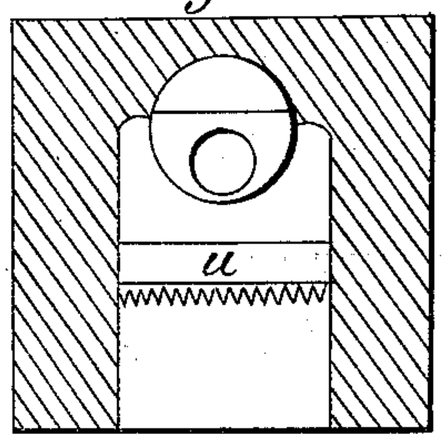


Fig: 5.

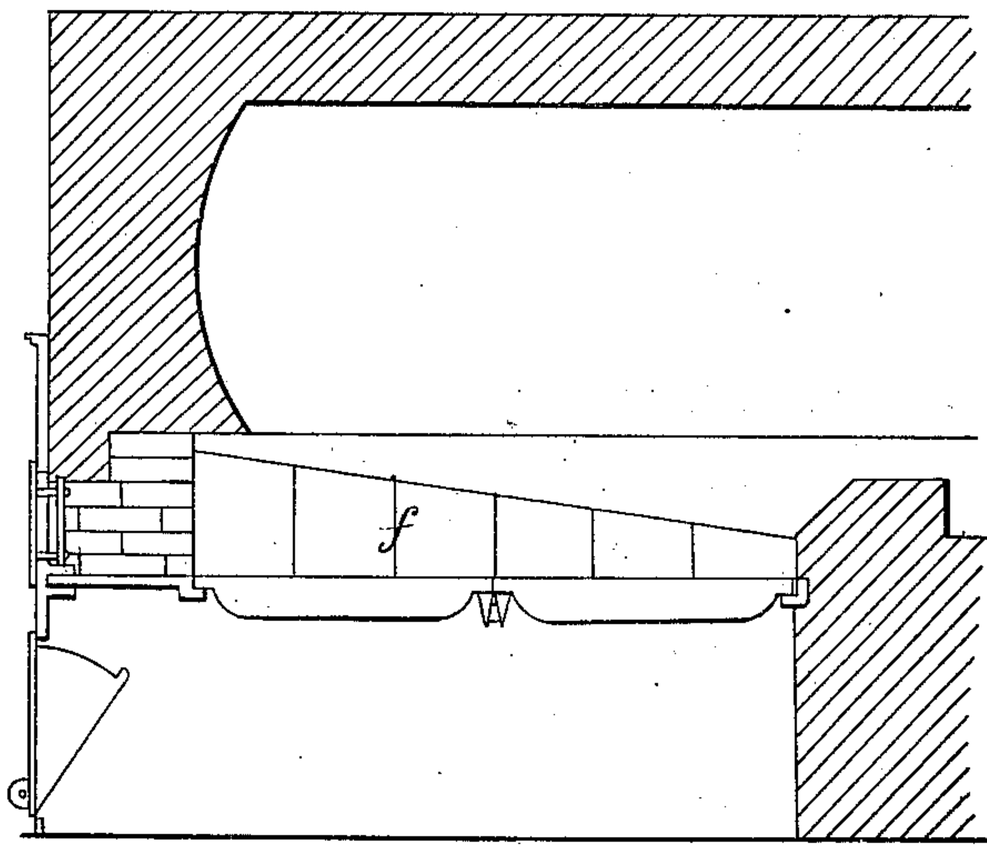


Fig: 6.

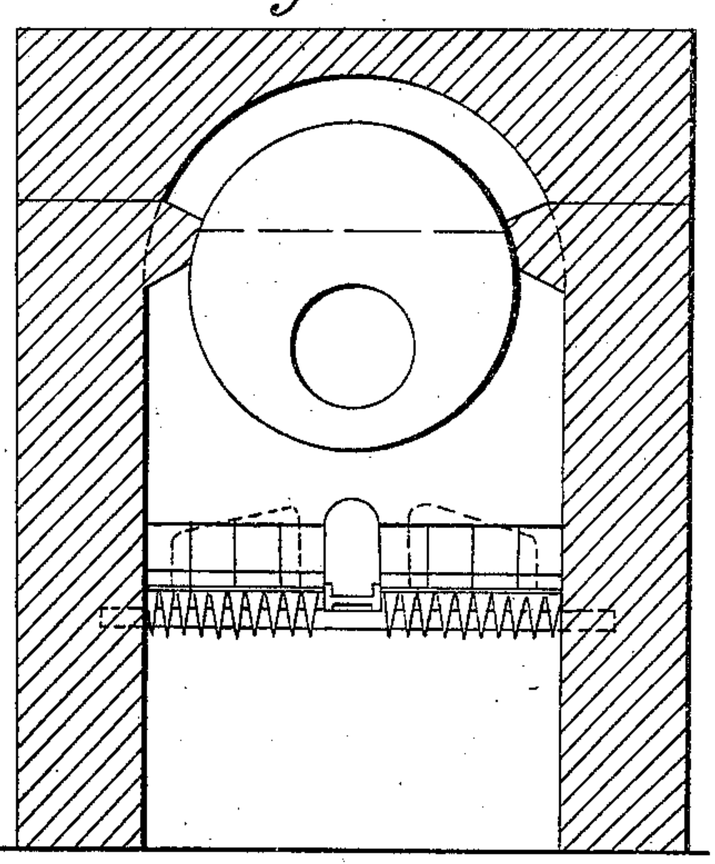


Fig: 9.

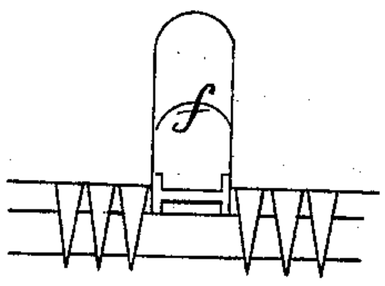
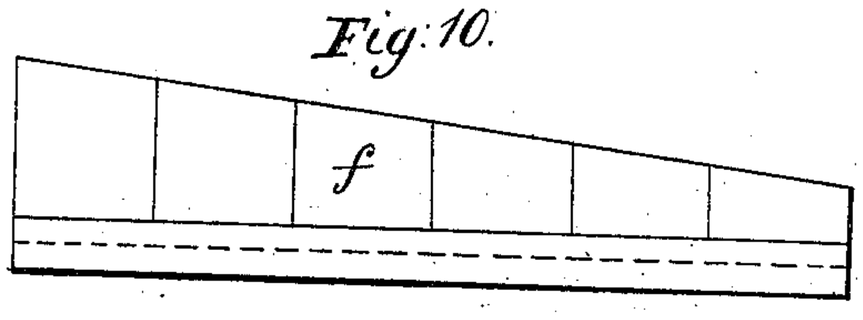


Fig: 10.



Witnesses

C. A. Pagot
Josef Fingesloss

Inventor

F. Mörth

United States Patent Office.

FRANZ MÖRTH, OF VIENNA, AUSTRIA.

Letters Patent No. 93,468, *dated August* 10, 1869.

IMPROVEMENT IN COMBINED FURNACE AND 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, FRANZ MÖRTH, of Vienna, in the Empire of Austria, have invented new and useful Improvements in the Construction and Arrangement of Steam-Boilers, and in their Furnaces, Grates, and Flues; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification.

The arrangement of the boilers, according to part of these improvements, is shown in Figures 1 and 2, and somewhat modified in Figures 3 and 4.

The construction consists of one main boiler, acting as steam-producer, and two minor boilers, of which the one acts as feed-boiler, the other as steam-collector.

The steam-producing boiler is placed between the other two, mostly smaller boilers, of which the upper one, serving as steam-collector, can also, from the way it is built in, serve for superheating the steam.

The other second minor boiler, fixed below the main boiler, serves as a feed-boiler, in which, from the way it is built into the furnace, the water may be preparatorily heated.

In the accompanying drawings—

The main boiler is indicated by the letter *a*, the feed-boiler by the letter *b*, and the steam-collector by the letter *c*.

The feed-boiler and the steam-collector are joined to the main boiler by means of tubes, which are, preferably, of the same diameter as the minor boilers.

The feed-boiler is fed with water, by preference, from its front end, while the man-hole, for cleaning the same, is conveniently situated at its back end.

This system of boilers has the advantage of holding a larger quantity of water and steam than any of the old systems.

Another advantage is, that almost the entire surface of the boilers is exposed to the heat, and in consequence of this more equalized exposure, the durability of the boilers is increased.

A further advantage is, that from the much larger steam-room, in which the steam can be superheated, or at least kept at its normal pressure, a suddenly-increased consumption of steam will not necessitate so much subsequent stoking as would otherwise be required,

Another fact worth notice is, that on account of the large steam-room in this boiler-construction, one of the chief causes of explosion is obviated; that is to say, if we accept that theory of explosions as correct, according to which an explosion may often be referred to the fact of the water gathering, during interrupted working, an increased amount of superfluous heat, and the steam becoming simultaneously cooled down and condensed, whereupon any attempt to let off steam gives a sudden shock to the entire mass of water, and causes the sudden evolution of a vast amount of steam.

In building the boiler-furnace, I make it a principle to expose the boiler as much as possible to the flame of the fire, which is of the greatest advantage to a large production of steam.

On this account the boiler is provided with as few flues as possible, and the arrangement of these flues or smoke-channels varies, of course, according to the construction of the boilers, as my construction of furnace may be applied to various kinds of boilers.

Thus, for instance, steam-boilers with one or two flues, and with external firing, were always so arranged that the heat streamed backward along the under side of the boiler, then forward through one or two flues, and, finally, parting to the right and left, flowed back again along the sides of the boiler, through the side-channels, into the chimney, by which arrangement much heat was lost, especially by long boilers.

Now, according to my principle of firing, illustrated in the accompanying drawings, a steam-boiler of this description would have a much larger surface exposed to the flame and greatest heat of the fire, that is to say, not only the bottom of the boiler, but also the sides, which in the other construction would have partly only received the heat of the smoke-channels, and partly covered by the brick-work forming the same. The waste heat would then, further, after passing through one or both flues, have been allowed to escape into the chimney, without passing again along the sides of the boiler.

Another part of my improvements consists in the employment of stagnating heat, for keeping the steam produced at the proper pressure, and preserving it from being cooled and condensed by the brick-work surrounding the boiler. In figs. 1 and 2 this stagnating heat is shown, employed merely for the upper part of the main steam-producing boiler *a;* in Figures 3 and 4, it extends also to the uppermost steam-collecting boiler.

This stagnating heat is obtained by separating the upper part of the main boiler, (and in figs. 3 and 4 also the steam-collector,) by means of partitions, in such a way that a separate space, free from draught, is formed, to which the heated gases have access, but which does not form a passage for the same.

In some cases I find it advantageous to employ a kind of partition, formed of fire-brick, dividing the fire-hearth into two equal parts, each of which will then have to be supplied with fuel through a separate door.

This partition, which I term "fire-tongue," is shown in Figures 5 and 6, and indicated by the letter *f*. It slopes downward and backward, so as to allow the

flame from one of the two hearth-departments to stream over toward the other, and so cover the entire breadth of the boiler.

The object of this "fire-tongue" is to enable the one-half of the grate to be cleaned or stoked, without seriously disturbing the firing of the boiler, as in that case the fire on the other grate may continue in full combustion, the flame passing over the "fire-tongue," along the entire breadth of the boiler.

Thus, where a number of boilers is in use, the one half of the grates may be supplied in sequence with fuel, and then, when this is in full combustion, the other half of the grates may be stoked, one after the other.

In order to enlighten the passing of the flames from the grates along the boiler, I prefer to make the fire-bridge horizontal, (instead of being parallel to the curve of the boiler,) and inclined toward the grate.

This construction of fire-bridge also often enables the back part of the space between the boilers to be easier cleaned. Fig. 5 shows a fire-bridge of this description.

Figures 7 and 8 illustrate the alteration of an ordinary boiler-furnace into one according to my invention. Fig. 7 represents a boiler-furnace according to the old system, with the side-channels *s s* and partition-walls *t t*. The fire-bridge *u* is also curved parallel to the boiler-bottom. Fig. 8 shows the furnace altered according to my improvements, the partition-walls *t t* being removed, and the fire-bridge *u* made horizontal, so as to expose almost the entire surface of the boiler, below the water-level, to the action of the flame.

Figure 9 is a side view, and Figure 10 a horizontal section of the fire-tongue described above, and shown, together with a part of the boiler and furnace, in figs. 5 and 6.

Having thus fully described the nature of my improvements, I will now proceed to specify my exact claims.

I claim—

1. The combination and arrangement of the boilers *a b c* with each other and with the furnace thereof, substantially as herein set forth.

2. The arrangement of the hot-air space or chamber with the upper surface of the boilers *a* and *c*, with reference to each other and the hot-water boiler *b*, when constructed substantially as herein described.

F. MÖRTH.

Witnesses:

C. O. PAGET,

WM. HÜMING.