

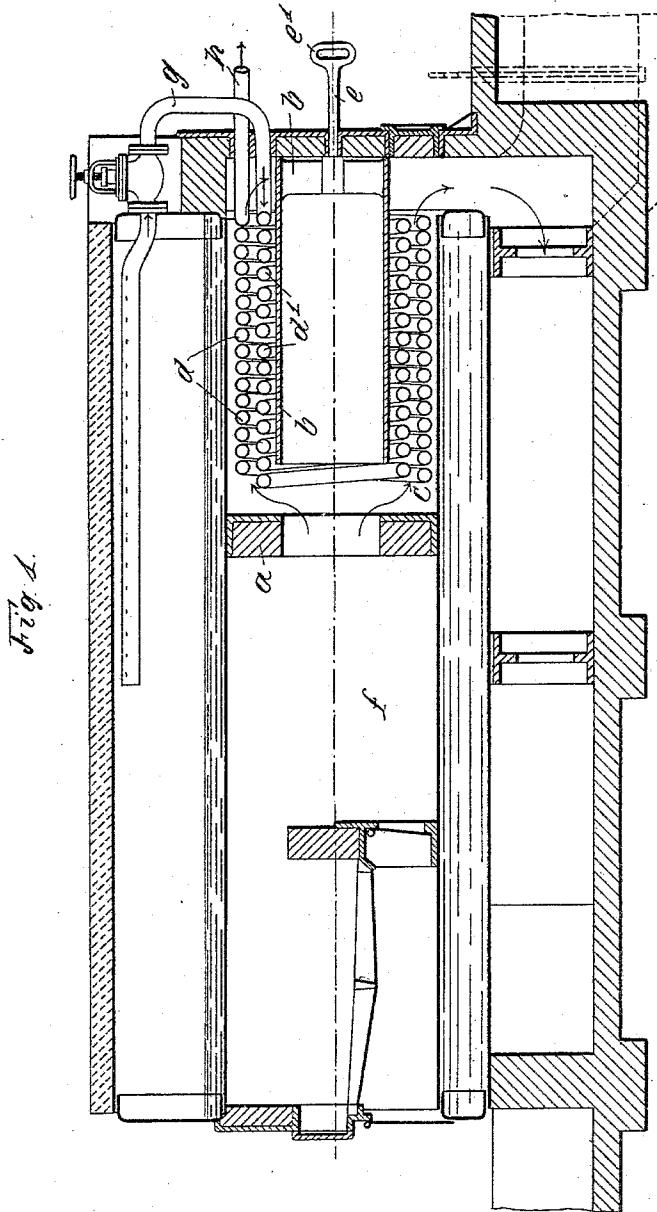
(No Model.)

2 Sheets—Sheet 1.

W. SCHMIDT.  
FLAME TUBE BOILER.

No. 565,041.

Patented Aug. 4, 1896.



Witnesses  
Emil Kayser  
Julius Faube

Inventor  
Wilhelm Schmidt  
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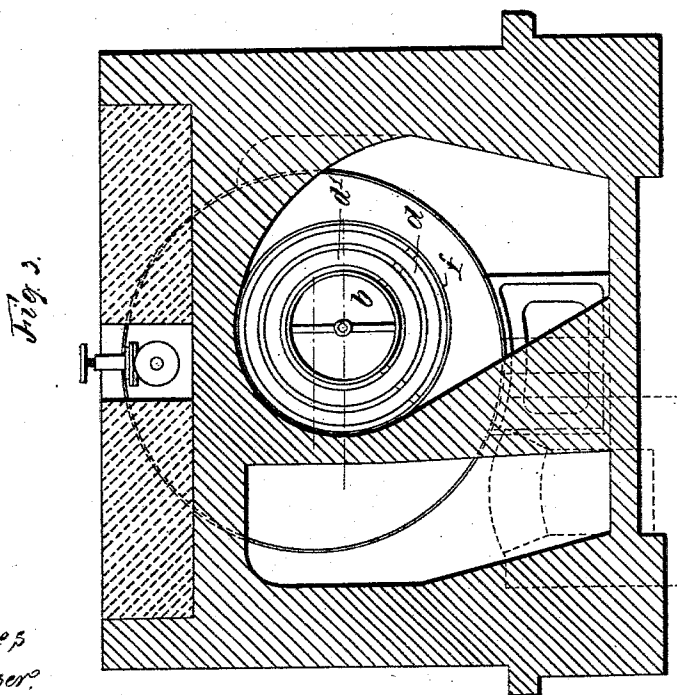
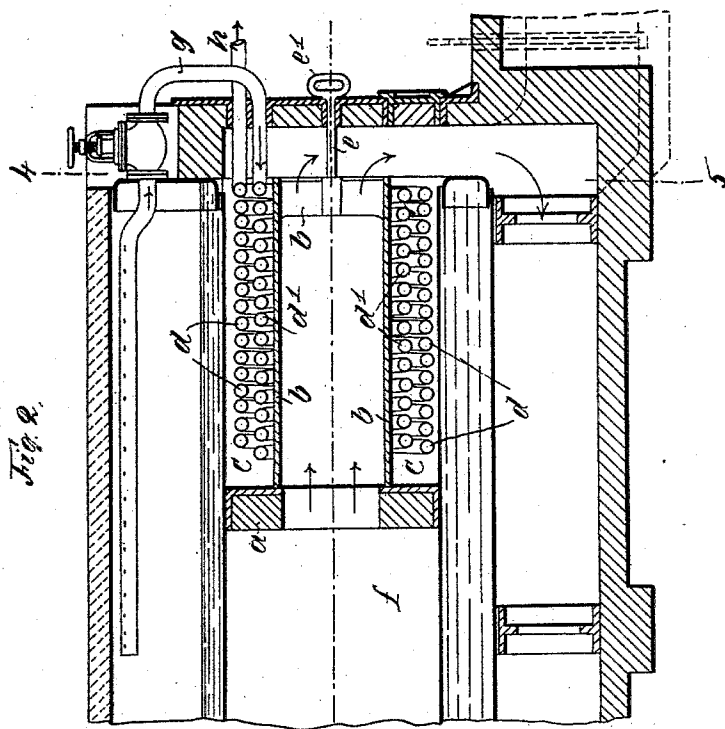
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2 Sheets—Sheet 2.

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FLAME TUBE BOILER.

No. 565,041.

Patented Aug. 4, 1896.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILHELM SCHMIDT, OF BALLENSTADT, GERMANY.

## FLAME-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 565,041, dated August 4, 1896.

Application filed December 16, 1895. Serial No. 572,334. (No model.)

*To all whom it may concern:*

Be it known that I, WILHELM SCHMIDT, a subject of the King of Prussia, German Emperor, and a resident of Ballenstadt-on-the-Harz, in the Duchy of Anhalt, and of Aschersleben, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Flame-Tube Boilers, of which the following is an exact specification.

This invention refers to flame-tube boilers, such as Cornwall, Lancashire, or Galloway boilers and similar types, and my improvements in boilers of said sorts relate to the combination of the flame tube or tubes with a superheater or superheaters and with means for regulating the action of the fire-gases upon said superheaters, as is fully described hereinafter.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the different views, and in which—

Figure 1 is a vertical longitudinal section through one form of construction of my novel combination. Fig. 2 is a similar view, the front portion of the boiler being broken off and the device for regulating the action of the fire-gases upon the superheater having another position; and Fig. 3 is a vertical cross-section taken on line 4 5 of Fig. 2.

Referring to Figs. 1 and 2, *a* is an annular body arranged within the flame-tube and dividing the space inclosed by the latter into a front chamber and a rear chamber. *b* is a horizontal cylinder arranged within the rear chamber, concentrically with the flame-tube, and forming thus with said tube an annular space *c*. This space receives the superheater *d d'*, which in the form of construction shown consists of two series of coils arranged one within the other.

The cylinder *b* is firmly connected with a rod *e*, extending outward through the rear wall of the masonry of the boiler and having at its end a handle *e'*. By means of said rod the cylinder *b* may be longitudinally displaced, so as to lie either with its front end against the annular body *a* (compare Fig. 2) or with its rear end against the masonry wall aforementioned. (Compare Fig. 1.) If the cylinder *b* is in the position shown in Fig. 1,

the fire-gases will all be compelled to pass through the annular space containing the superheater, and the steam passing through the latter will thus be exposed to the action of said hot gases, *i. e.*, will be superheated. If, however, the cylinder *b* is in the position shown in Fig. 2, the fire-gases are all compelled to pass through said cylinder and cannot flow around the coils of the superheater. The steam flowing through said coils becomes therefore not superheated, but is merely dried.

The cylinder *b* when in the position shown in Fig. 2 grows, as a matter of course, rather hot, and it might seem that the superheater, although prevented from being directly acted on by the fire-gases, be yet exposed to a strong heat, so that the steam flowing through the coils might yet be superheated. The superheater, although heated from one side, is, however, cooled from the other side, *i. e.*, from the neighboring portion of the flame-tube *f*, and the temperature existing in the space containing the superheater is thus a medial one, provided the cylinder *b* be in the position shown in Fig. 2.

The cylinder *b* need not, as a matter of course, be either in the position shown in Fig. 1 or in that shown in Fig. 2, but there may be intermediate positions, so that the fire-gases flow partly through the cylinder *b* and partly through the space containing the superheater. The degree of superheating may thus be regulated according to any requirement.

I wish it to be understood that the superheater need not indispensably be formed by just two series of coils. There may as well be employed but one series, or, if desired, more than two. This depends partly on the diameter of the flame-tube, partly on the diameter of the superheating-pipe, and partly on the maximum degree of superheating required. If employing more than one series of coils, I prefer to let the wet steam enter first the inner or innermost series, so as to consume as much as possible of the heat radiated by the regulating organ *b*. I have represented such an arrangement in the form of construction shown. The wet steam flows through the pipe *g* into the coils *d'*, and enters thereafter in a dried state the coils *d*,

within which it is superheated. The superheated steam is then led away to the engine (not shown) through the pipe *h*.

I wish it further to be understood that the regulating organ need not indispensably be formed by a cylinder, such as shown, but other mechanisms, such as valves, slides, and the like, may as well be employed. The whole arrangement represented is merely to be regarded as an example.

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is—

1. In a boiler of the Cornwall, Lancashire, or Galloway type, the combination with the boiler proper, the wide horizontal flame-tube, and the means for keeping the latter constantly covered with water, of a superheater arranged within said flame-tube in close proximity to the wall of the same, so that said superheater may be exposed to the cooling action of the water surrounding the respective part of the said flame-tube; and means for diverting the fire-gases at will from the said superheater, for the purpose as described.

2. In a boiler of the Cornwall, Lancashire, or Galloway type, the combination with the boiler proper, the wide horizontal flame-tube, and the means for keeping the latter con-

stantly covered with water, of a hollow cylinder arranged within said flame-tube, so as to form an annular space between itself and the respective part of the same; a superheater consisting of two series of coils arranged within said annular space; one of said series being situated near to the respective part of the said flame-tube, so that it may be exposed to the cooling action of the water surrounding said part, and being connected at its front end with the front end of the other series of coils; the latter being situated within said first series, and being connected with its rear end to the steam-space of the boiler, so that said second series may be protected against the radiant heat of the wall of said hollow cylinder by the wet steam caused to pass through the said second series, and may protect in its turn the said first series against said radiant heat; and means for diverting the fire-gases at will from the said annular space, for the purpose as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILHELM SCHMIDT.

Witnesses:

FRITZ SPERLING,  
W. HAUPT.