No. 676,919. Patented June 25, 1901.

W. SCHMIDT.

SUPERHEATER.

(Application filed Oct. 4, 1899.)

(No Model.)

Fig. 2.

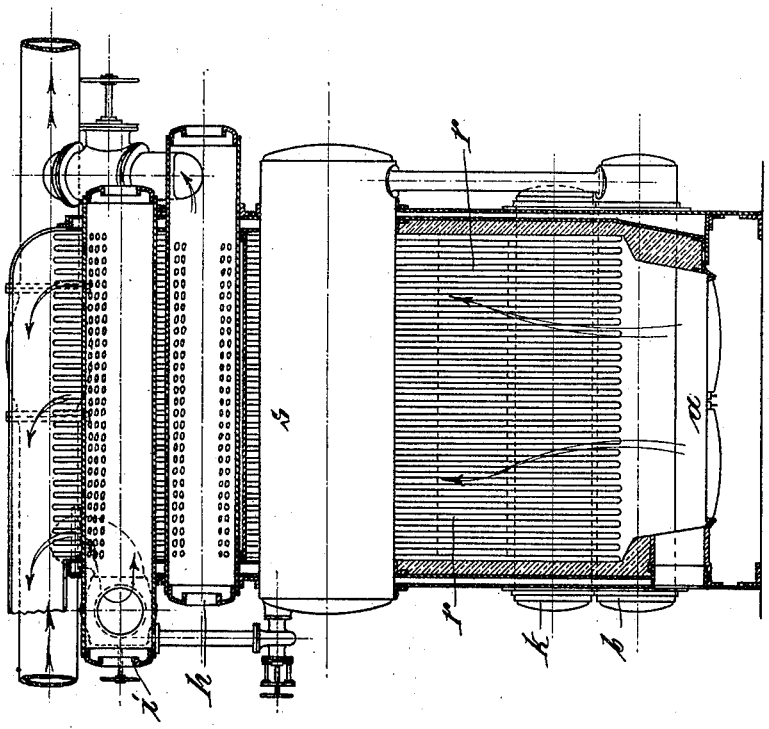
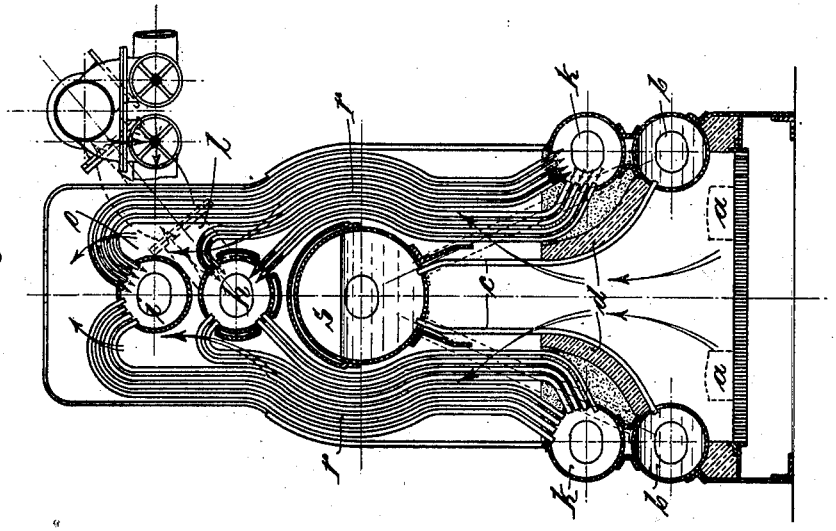


Fig. 1.



Witnesses:
Emil Kayser
Arthur Scholz

Inventor
Wilhelm Schmidt
by Robert Keiffer
Attorney.

UNITED STATES PATENT OFFICE.

WILHELM SCHMIDT, OF WILHELMSHÖHE, GERMANY.

SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 676,919, dated June 25, 1901.

Application filed October 4, 1899. Serial No. 732,513. (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 Wilhelmshöhe, near Cassel, in the Province of Hesse-Nassau, German Empire, have invented certain new and useful Improvements in Superheating Arrangements with Separate Firings, of which the following is an exact specification.

Hitherto many industrial experiments have been made to improve superheating arrangements having special firings and to protect these superheaters against glowing and burning. In most of these experiments the superheater either formed a part of the boiler and was fired by the same or it was arranged separately, having a special separate firing, the burning and the glowing of the pipes being prevented by intercalation of Chamotte walls.

Proportionally large quantities of heat are necessary to render a superheater effective, and in practice the first manner of building superheaters only has shown favorable results with certain installations; but with ordinary boilers—as, for instance, marine boilers, for which only small space is available—they have not proved successful. The second manner—viz., intercalation of Chamotte side walls—is impracticable with superheaters having special firings for the reason that they do not prevent the glowing and rapid destruction of the superheating-pipes owing to the radiated heat influencing the superheating-pipes.

For marine boilers the employment of Chamotte side walls is impracticable owing to their heavy weight and fragility. The question of employing highly-superheated steam in marine boilers becoming more and more important, it is essential to build superheating arrangements in which the glowing and burning of the superheating-pipes during the inactivity of the machine is prevented and by means of which, nevertheless, a thorough superheating of large quantities of steam is effected. To attain this end, I propose to adopt a way hitherto not employed in practice—viz., I do not combine, as hitherto, a boiler having its own firing with a separate superheating arrangement; but I consider the superheater as a chief element and connect it in a suitable manner with an auxiliary boiler having the only reason to destroy the dangerous influences resulting from the separate firing of the superheater.

In my improved superheating arrangement I employ a firing being wholly independent of the firing of the principal boiler. I conduct the steam of the principal boiler into the superheater protected by the pipes of an auxiliary boiler of suitable construction. Thereby I attain that the proportionally hot fire-gases before passing around the superheating-pipes pass around the water-pipes of the auxiliary boiler, thereby the glowing and burning of the superheater-pipes being prevented and nevertheless a large quantity of heat being employed for superheating the steam within the superheating arrangement.

The essential point of my invention is the independence of the superheating arrangement and of the principal boiler and the possibility to employ the steam of the auxiliary boiler in conjunction with the steam of the principal boiler.

In order to make my invention more clear, I refer to the accompanying drawings, in which I beg to give an example where the auxiliary boiler is built into the superheater proper. Thereby all possible losses of heat are prevented and the fire-gases are allowed to pass over the whole surface of the superheating-pipes, a good protection for the same being created by the water-pipes of the auxiliary boiler.

Figure 1 represents a vertical section through my arrangement; and Fig. 2 illustrates an elevational view, partly being in section.

In the drawings, *a* represents the firing. On both sides, somewhat higher than the firing itself, the water-drums *b* of the auxiliary boiler are arranged. *s* illustrates the steam-drum of the same, which might be raised or lowered at convenience. Both are connected by pipes *c*, curved at the lower part. *r* illustrates the superheating-pipes, the feet of which are covered with gravel and separated from the pipes *c* by means of Chamotte walls *d*. When now the fire-gases tend to pass around the water-tube *c*, they are obliged to contract the more they approach to the end of the curve of the tubes *c*, owing to the Chamotte walls *d*. Arrived at

the end of the curves they have a free passage and pass along the whole length of the superheating-pipes *r*. The admission of the steam coming from the principal boiler is effected by the tube *o* conducting the steam to a steam-drum *i*. From here the steam through the pipe *r* flows down to the receptacle *k*, from there, as clearly to be seen from the drawings, again upward into the steam-drum *h*, where a pipe *l* conducts the highly-superheated steam to the engine.

In my invention it is an essential point that I have two different streams of heat, the one arising from the fire and the other coming from the chief boiler and passing from the top drum *i* to the lower drum *k* and rising again onto the drum *h*, whereby the heat of the fire-gases is utilized during the whole passage.

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

In superheaters, the combination with a main and an auxiliary boiler, a firing *a*, a water-drum *b* and a steam-drum *s*, which can be varied in its position, water-pipes *c* curved at their bottom extremities and connecting the water-drum *b* to the steam-drum *s*, an accumulating-drum *i* fed from the main boiler, an accumulating-drum *h*, both drums *i h* being arranged vertically above the steam-drum *s*, a drum *k* located above the water-drum *b*, superheating-pipes *r* partly leading from the drum *i* into the drum *k* and partly from the latter into the drum *h*, means for separating the lower extremities of the water-pipes and of the superheating-pipes from each other, for the purpose as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILHELM SCHMIDT.

Witnesses:

GUST. C. KOTHE,

JULIUS FRANKE.