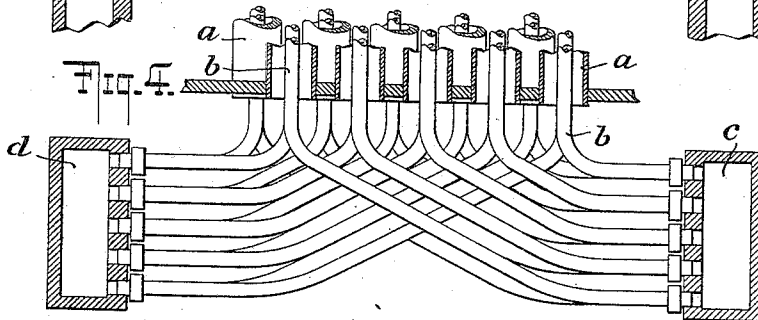
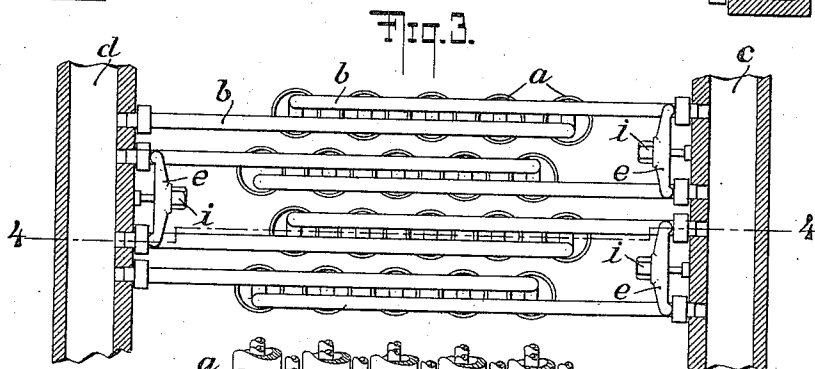
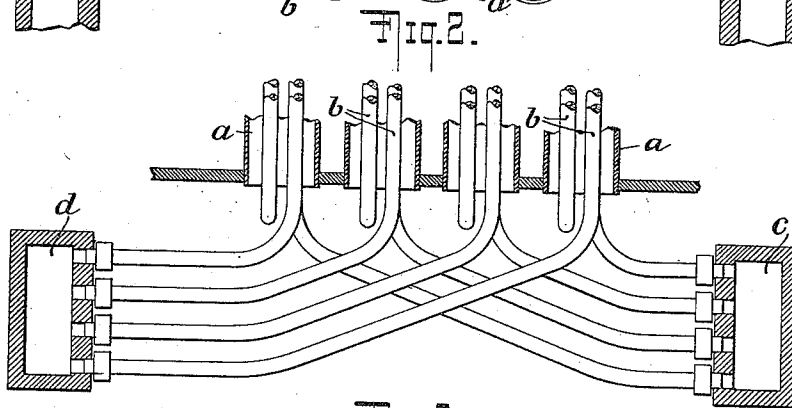
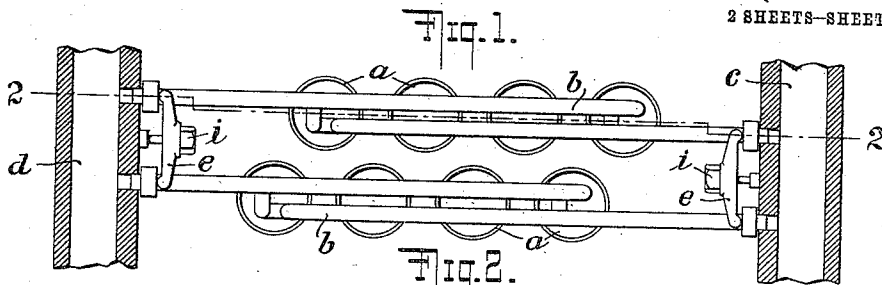


W. SCHMIDT & P. THOMSEN.
SMOKE TUBE SUPERHEATER.
APPLICATION FILED OCT. 3, 1912.

1,063,394.

Patented June 3, 1913.

2 SHEETS—SHEET 1.



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Fig. 5.

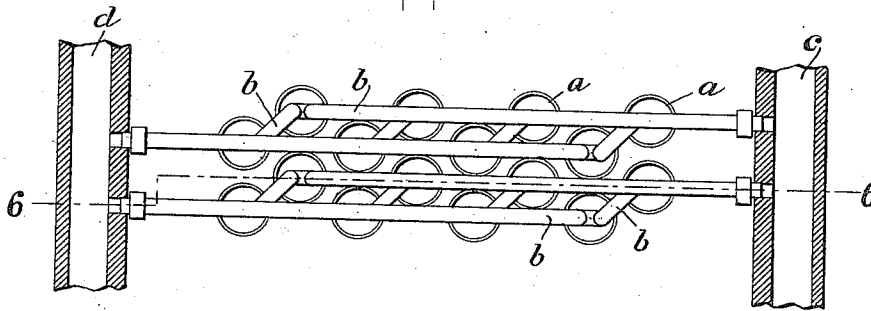
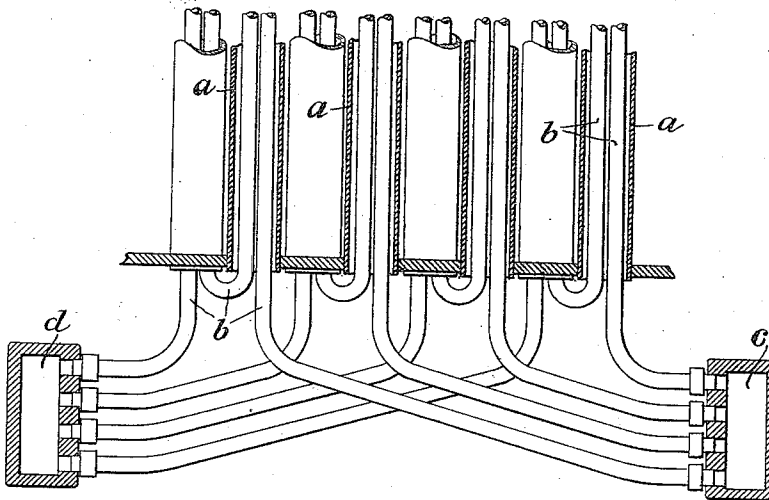


Fig. 6.



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SMOKE-TUBE SUPERHEATER.

1,063,394.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed October 3, 1912. Serial No. 723,661.

To all whom it may concern:

Be it known that we, WILHELM SCHMIDT and PETER THOMSEN, subjects of the King of Prussia, Emperor of Germany, residing at Cassel-Wilhelmshöhe, Germany, have invented a certain new and useful Improvement in Smoke-Tube Superheaters, of which the following is a specification.

Our invention relates to superheaters in which superheating pipes are positioned in some or all of the smoke tubes of a boiler which tubes may be of any convenient diameter. When all the smoke tubes are not used to contain superheater pipes, such tubes as are so used may or may not be larger than the remaining tubes.

In superheaters of the above referred to type it has usually been difficult, in consequence of the large number of pipe ends belonging to the superheater elements, to so arrange such ends that they could be easily and conveniently connected to the steam collectors while at the same time they and their fastening means would remain accessible and capable of ready inspection even after installation was complete.

Our invention herein avoids the above difficulty.

It consists, substantially, in so arranging the ends of the superheater elements of a given row that all the saturated steam ends are bent toward and connected to a common steam collector positioned to one side of the smoke tubes involved while all the superheated steam ends are similarly bent toward and connected to a second similar steam collector positioned at the opposite side of said tubes; furthermore the inlet openings of all said saturated steam ends as well as the discharge openings of all said superheated steam ends are arranged in a single row.

Our invention is applicable to all kinds of smoke tube boilers.

The exact nature of our invention will be better understood by referring to the accompanying drawings in which—

Figure 1 represents a front view, partly in section, of a part of a boiler equipped with one form of the invention; Fig. 2 represents a section taken along the line 2—2 of Fig. 1, Figs. 3 and 4 represent views, corresponding to Figs. 1 and 2, of a modified form of our invention, and Figs. 5 and 6 represent views corresponding to Figs. 1

and 2, of still a third modification of our invention.

In Figs. 1 and 2 each smoke tube *a* contains four pipe lengths (two U-shaped loops) arranged in series as one coil to constitute a superheater element *b*. A wet steam collector *c* is arranged at one side of the row of smoke tubes and a superheated steam collector *d* upon the opposite side. The lower ends of each row of superheater elements are each bent toward and connected to the wet steam collector with their inlet openings in one and the same row; similarly the upper ends are bent toward and connected to the superheated steam collector with their discharge openings in one and the same row. The two ends belonging to the two rows of superheater elements, which terminate perpendicularly over one another are joined to their appropriate steam collectors by a clamping plate *e* and a single bolt *i*.

In the prior art it has been usual to either bend both the saturated steam ends and the superheated steam ends of each row of superheater elements toward the same side of the smoke tubes, or else to bend both the saturated steam ends and the superheated steam ends of half of each row of superheater elements to one side and the ends of the other half of each row to the opposite side. This arrangement necessarily brought the rows of inlet and discharge openings very close together, so that connecting said ends to the steam collectors became very difficult, especially when the smoke tubes employed were of small diameter. With our invention, as above described, this number of rows is reduced one half and the vertical distance between adjacent rows correspondingly increased. Connecting the pipe ends to the steam collectors is thus much more easily accomplished while the clamping plates *e* and bolts *i* are very accessible and readily removable. A further advantage of this construction is that it requires but a single steam collector of simple prismatic form upon each side of the smoke tubes.

In the form shown in Figs. 3 and 4 each superheater element *b* is constituted of a single U-shaped loop. As in Figs. 1 and 2, so, here, all the saturated steam ends are bent toward and connected to a steam collector on one side of the smoke tubes while

all the superheated steam ends go similarly to a steam collector on the opposite side. Specifically, the upper ends of the top row of superheater elements and the lower ends of the second row, immediately beneath, are joined to the wet steam collector while the upper ends of the second row and the lower ends of the third row are joined to the superheated steam collector and so on alternately. The distance between adjacent rows of tube ends is thus, as to either steam collector, substantially greater than that given by the arrangement shown in Figs. 1 and 2. The clamping plates *c* may thus be longer for the same arrangement and size of smoke tubes and ends, plates and bolts *i* are rendered more accessible and capable of inspection.

In the modification shown in Figs. 5 and 6 each superheater element *b* consists of two similar coils arranged in series and located in two adjacent smoke tubes belonging to different rows. A row of superheater elements in this case, therefore, refers to elements which are contained in two rows of smoke tubes instead of in one as before. Instead of being arranged vertically on both sides of the smoke tubes, as shown, the steam collectors may likewise be arranged horizontally above or below the smoke tubes.

Having described our invention, we claim:

1. A smoke tube superheater comprising, in combination, a boiler provided with parallel rows of smoke tubes, steam collectors on opposite sides of said tubes and parallel rows of superheater elements in some of said smoke tubes all the wet steam ends of each row of said elements being bent to one of said collectors and all the superheated steam ends being bent to the other of said collectors, the openings of said wet steam ends and of said superheated ends lying respectively each in a single row.

2. A smoke tube superheater comprising, in combination, a boiler provided with parallel rows of smoke tubes, steam collectors on opposite sides of said tubes and perpendicular to said rows, and parallel rows of superheater elements in some of said smoke tubes all the wet steam ends of each row of said elements being bent to one of said collectors and all the superheated steam ends being bent to the other of said collectors, the openings of said wet steam ends

and of said superheated ends lying respectively each in a single row.

3. In a smoke tube superheater comprising, in combination, a boiler provided with parallel rows of smoke tubes, and steam collectors on opposite sides of said tubes and perpendicular to said rows, a row of superheater elements in one of said smoke tube rows, all the wet steam ends of said row of elements being connected in a single row to one of said collectors and all the superheated steam ends of said row being connected in a single row to the other of said collectors.

4. A smoke tube superheater comprising, in combination, a boiler provided with parallel rows of smoke tubes, steam collectors on opposite sides of said tubes and parallel rows of superheater elements in adjacent rows of smoke tubes, all the wet steam ends of each of said rows of elements being connected in a single row to one of said collectors and all the superheated steam ends being similarly connected to the other of said collectors, adjacent rows of ends belonging to adjacent rows of elements being further connected in pairs now to one collector and then to the other alternately.

5. A smoke tube superheater comprising, in combination, a boiler provided with parallel rows of smoke tubes, steam collectors on opposite sides of said tubes and perpendicular to said rows, and parallel rows of superheater elements in adjacent rows of smoke tubes, all the wet steam ends of each of said rows of elements being connected in a single row to one of said collectors, the ends of elements belonging to different rows being also arranged in rows, and all the superheated steam ends of the several rows of elements being similarly arranged and connected to the other of said collectors, adjacent rows of ends belonging to adjacent rows of elements being further connected in pairs now to one collector and then to the other alternately.

In testimony whereof, we have hereunto set our hands in the presence of two subscribing witnesses.

WILHELM SCHMIDT.
PETER THOMSEN.

Witnesses:

EGMONT DOETLOFF,
JULIUS FRANK.