

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

1,049,155.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

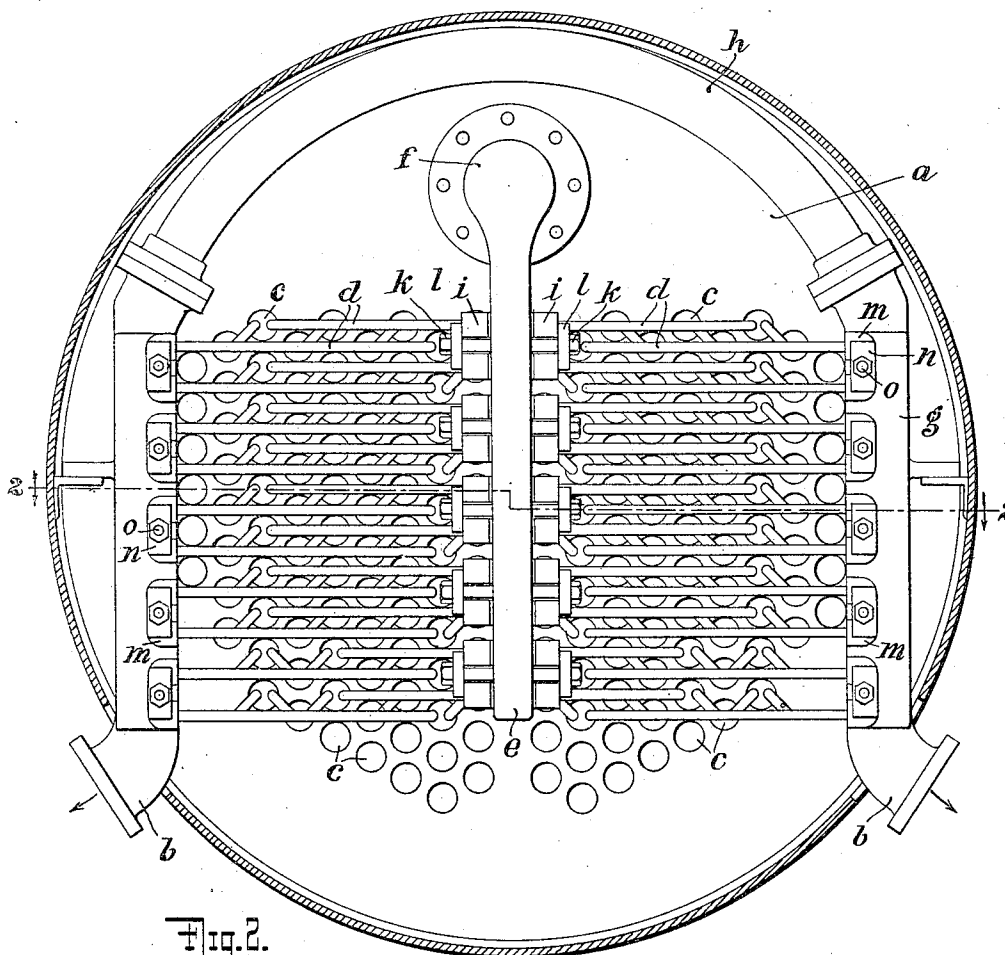
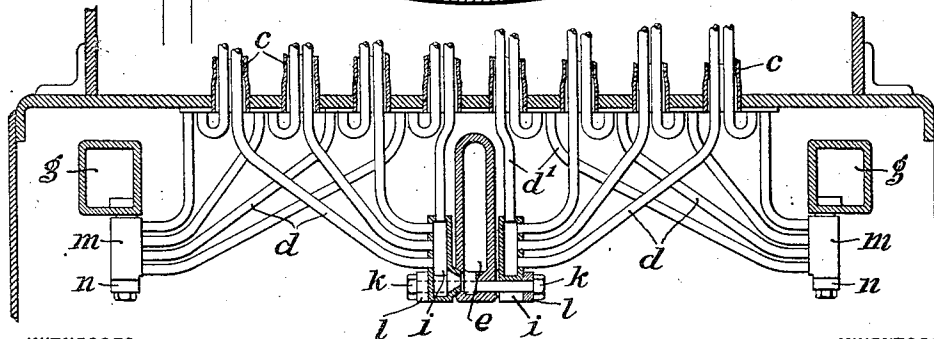


Fig. 2.



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George DuBois
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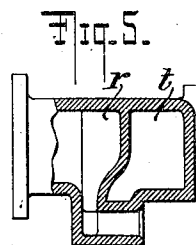
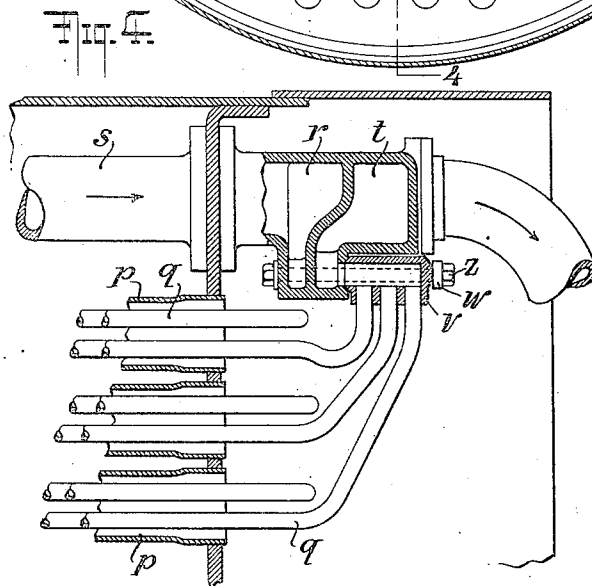
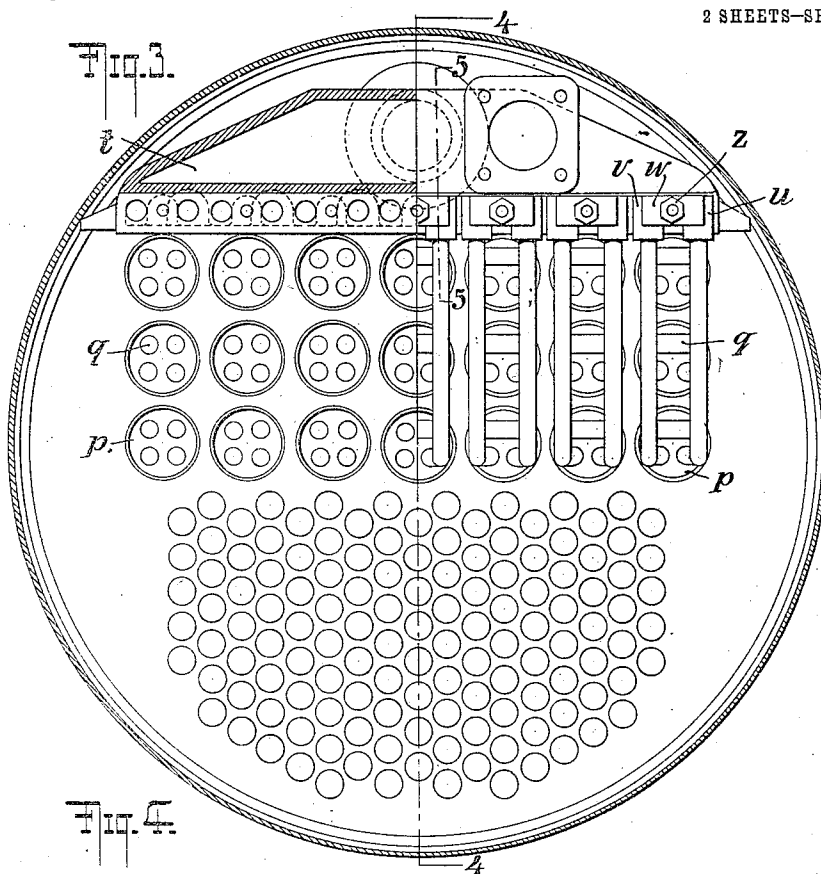
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SMOKE-TUBE SUPERHEATER.

1,049,155.

Specification of Letters Patent.

Patented Dec. 31, 1912.

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To all whom it may concern:

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

Our invention relates to smoke tube superheaters and particularly to such superheaters in which a plurality of tube ends from the superheater elements are connected to intermediate fixtures or sub-headers which, in turn, are removably joined to suitable collectors for wet and superheated steam. In the prior art such arrangements have been employed in order to make the bolts or other connecting means by which the tube ends are joined to the intermediate fixtures more accessible and to lessen their number. In the prior art, also, superheaters of this type have either had the superheater element ends enter wall surfaces directly facing to the smoke tubes or almost directly facing, and since those end portions of the superheater elements which carry superheated steam naturally become hotter than those end portions which carry saturated steam, they are subject to a greater corresponding expansion, so that there has been grave risk in the type of construction referred to of the tube ends tearing loose.

In order to avoid this disadvantage, our present invention comprises running at least one end of each superheated element into a wall of the subheader which is parallel or approximately parallel to the smoke tubes; fastening the tube ends into a wall parallel to the smoke tubes assumes that such tube ends when they leave the smoke tubes, are bent at right angles. In this way the superheater elements are given sufficient elasticity to compensate for the different degrees of expansion of the ends of the elements.

In the construction just set forth it is best to arrange the steam collectors either upon one side or the other, or above or below the smoke tubes, since then both ends of each superheater element may be joined to wall surfaces parallel to the smoke tubes. In case, however, through lack of room or for any other reasons, it is necessary to place steam collectors partially in front of or very nearly in front of smoke tubes carrying superheater elements, then part of the

tube ends can be joined to walls facing the smoke tubes. Care must be taken, however, that no more than one end of any particular element be thus joined if the elasticity of the element is to be preserved.

Referring to the drawing, Figure 1 represents a sectional elevation through the smoke box of a locomotive provided with a superheater arranged according to the present invention; Fig. 2 is a section taken along the line 2—2 of Fig. 1. Fig. 3 represents a view similar to that of Fig. 1 of a modified form of our invention; Fig. 4 is a partial section taken along the line 4—4 of Fig. 1; and Fig. 5 a partial section taken along the line 5—5 of Fig. 3.

In Figs. 1 and 2, *a* is the smoke box of the boiler, *c* the smoke tubes, *d* and *d'* superheater elements, *e* the wet steam collector, arranged in the center of the smoke box and joined at *f* to a pipe going to the steam dome, and *g* is a superheated steam collector joined by a pipe *h* to a similar collector (not shown) on the other side of the boiler. Outlets *b* from the bottom of each steam collector *g* connect to the steam chests. The four wet steam ends belonging to each row of smoke tubes are joined to an intermediate sub-header *i* by beading, soldering or in any other preferred manner. Three of these tubes open into a wall of the fixture which is parallel to the smoke tubes, while one of said ends opens into a wall facing said smoke tubes. Each of the four fixtures *i* is removably connected to the wet steam collector *e* by means of a screw bolt *k* which passes clear through the steam collector *e* and projects beyond in each side and two strap pieces *l*. The four superheated steam ends corresponding to these wet steam ends are similarly joined to sub-headers *m*; in this case, however, each two sub-headers *m* are joined to the superheated steam collector by a single screw bolt instead of each four sub-headers. For the fixtures *m* all the tube ends enter a wall parallel to the smoke tubes, so that each individual element has sufficient elasticity to take up the variation of extension.

Each four superheater elements whose ends are joined to common sub-headers are at once removable from the smoke tubes by loosening all screw bolts or equivalent connecting arrangements.

In the form illustrated in Figs. 3 and 4, the superheater elements *q* are placed in specially enlarged smoke tubes *p*, one superheater element to each smoke tube. The steam collectors lie above the smoke tubes and comprise in this case a single casting containing compartments *r* and *t* for wet and superheated steam respectively, the former being connected by a pipe *s* to the steam dome and the latter having an outlet to the steam chest. The wet steam end belonging to each vertical row of superheater elements connected to a single sub-header *u* and the corresponding superheated steam ends to an intermediate fixture *v*. Each two fixtures are joined to their particular steam collectors by means of a bolt *z* and strap *w*. All tube ends of the superheated elements open into walls of the intermediate fixtures which are parallel to the smoke tubes.

Having described our invention, we claim:
1. A smoke tube superheater, provided with superheated and saturated steam collectors, superheater elements in the smoke

tubes and sub-headers between the superheater element ends and the steam collectors, so arranged that at least one end of a superheater element enters a wall of its sub-header which is substantially parallel to the smoke tubes.

2. A smoke tube superheater, provided with superheated and saturated steam collectors, superheater elements in the smoke tubes and sub-headers between the superheater element ends and the steam collectors, so arranged that each end of a superheater element enters a wall of a sub-header which is substantially parallel to the smoke tubes.

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

WILHELM SCHMIDT.
PETER THOMSEN.

Witnesses:

EGMONT DOETSLOFF,
JULIUS FRANKE.