

J. L. VAUCLAIN.
SUPERHEATER.

APPLICATION FILED DEC. 30, 1911.

1,057,691.

Patented Apr. 1, 1913.

2 SHEETS—SHEET 1.

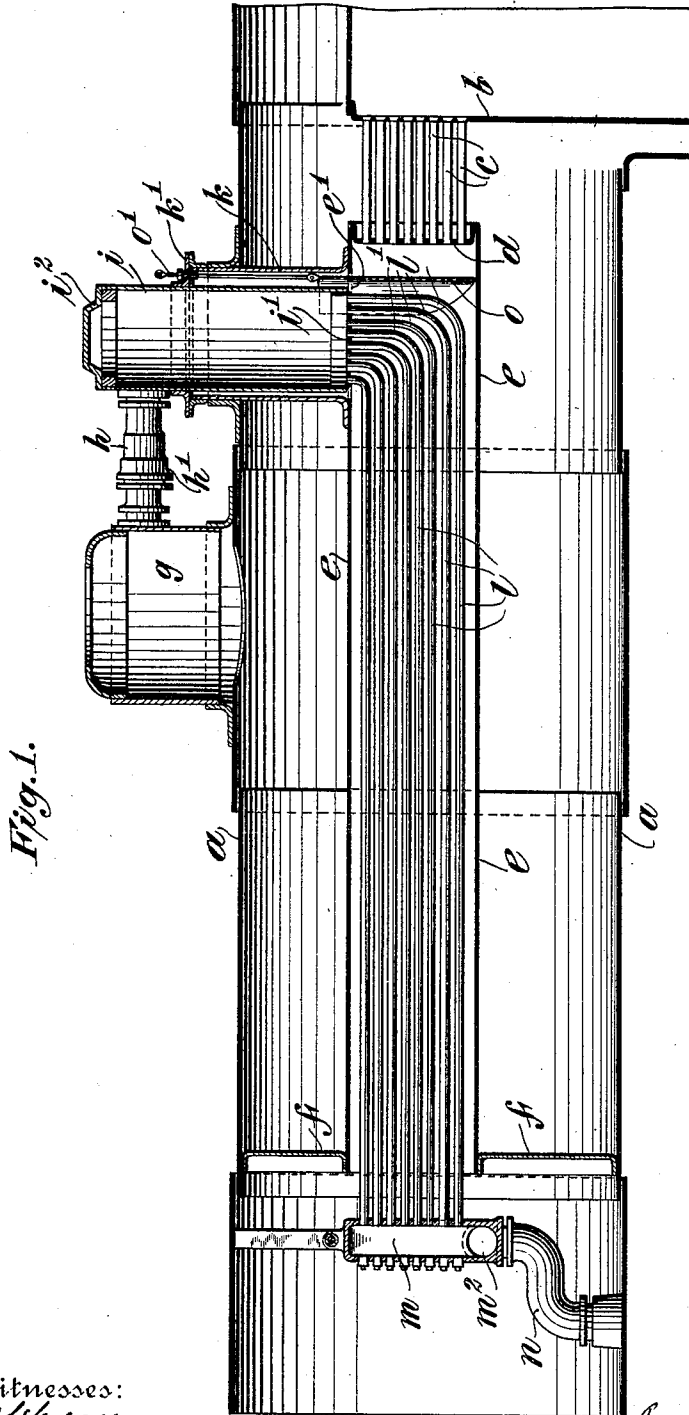


Fig. 1.

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2 SHEETS—SHEET 2.

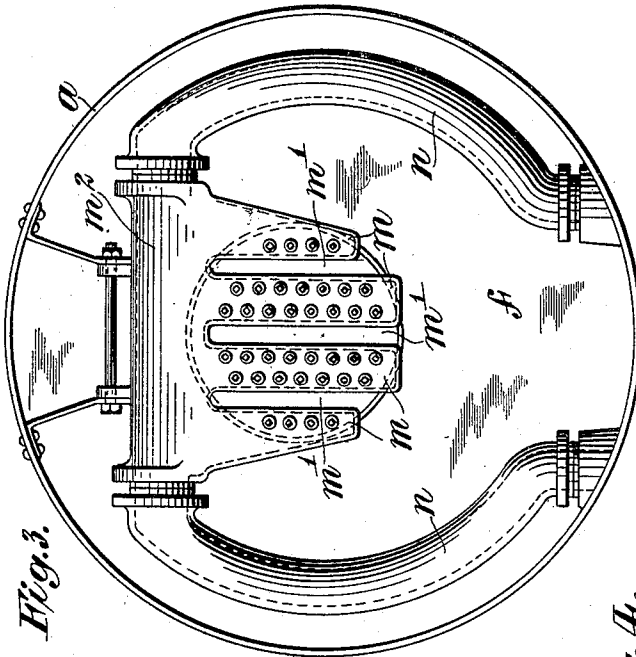


Fig. 3.

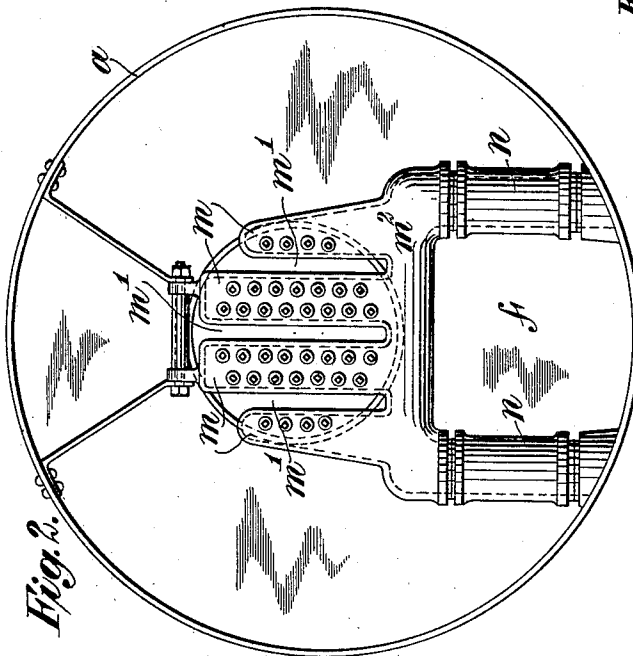


Fig. 2.

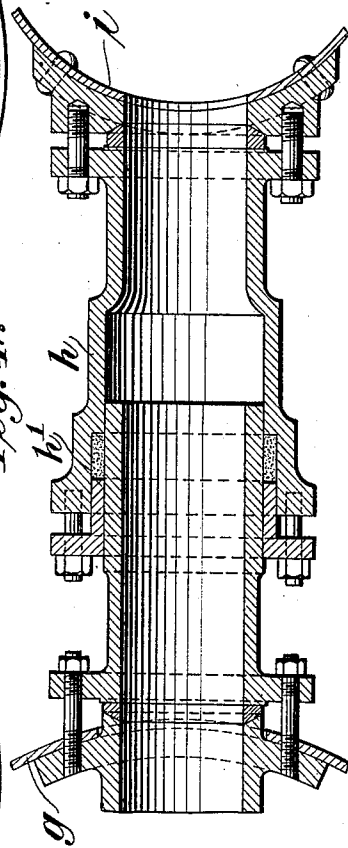


Fig. 4.

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UNITED STATES PATENT OFFICE.

JACQUES L. VAUCLAIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO LOCOMOTIVE SUPERHEATER COMPANY, A CORPORATION OF NEW JERSEY.

SUPERHEATER

1,057,691.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed December 30, 1911. Serial No. 668,722.

To all whom it may concern:

Be it known that I, JACQUES L. VAUCLAIN, a citizen of the United States, residing in Philadelphia, Philadelphia county, State of Pennsylvania, have invented certain new and useful Improvements in Superheaters, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

10 This invention relates to superheaters for locomotive and like boilers in which the superheater pipes are located in a group in a large fire-tube or flue on the boiler.

The object of the invention is to facilitate the insertion and removal of the individual superheater pipes and in accordance with the invention the steam from the boiler is delivered to a steam dome, which is preferably auxiliary to the main dome and has in its bottom a tube sheet in which the ends of the superheater pipes, turned up at substantially a right angle to their length, are suitably secured. The pipes extend forwardly through the flue into the smoke-box where they are secured in the usual manner in vertical headers separated in vertical planes so as to permit the bent pipes to be introduced between them from the forward end and secured in the headers.

30 The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated and in which—

Figure 1 is a view partly in longitudinal, vertical section, showing so much of a steam boiler of ordinary type as is necessary to enable the application of the invention thereto to be understood. Fig. 2 is a view of the same in front elevation but on a somewhat larger scale. Fig. 3 is a view similar to Fig. 2 but showing a slightly different construction of the header. Fig. 4 is a detail view, on a larger scale than that of Figs. 2 and 3, showing the preferred form of the joint in the steam pipe between the main dome and the auxiliary dome.

The invention is illustrated in the drawings as applied to a locomotive boiler of ordinary construction, the shell *a*, and the rear tube sheet *b* being constructed and arranged in any usual or suitable manner. Fire-tubes *c* are shown as extended forward from the tube sheet *b* and secured in a tube sheet *d* which itself is secured in the rear end of a large flue *e* which is secured at its forward end in the front flue sheet *f*. In the

arrangement shown the main steam dome *g* is connected by a steam pipe *h*, having a telescoping, packed joint *h'*, as shown in detail in Fig. 4, with an auxiliary steam dome *i* which is suitably supported within an internal shell *k* secured at its lower end to the large flue *e*, the latter being cut away or provided with an opening as at *e'* to permit the hot gases to circulate around the dome *i* below the cap *h'* of the casing *k*. In the bottom of the dome *i* is secured a tube sheet *i'*, in which the ends *l'* of the superheater pipes *l*, bent upward at substantially right angles as shown, are secured in any suitable manner. The superheater pipes are extended forwardly through the flue *e* and at its forward end are secured, as usual, in the rear face of headers *m* which are separated in vertical planes by spaces *m'* which are sufficiently wide to permit the superheater pipes to be inserted between them. The spaces are also sufficiently high to permit the introduction of the pipes having the longest members *l'*. As the tubes are introduced in this manner they are properly secured at their rear, upper ends, to the tube sheet *i'* and at their forward ends to the rear face of the proper header. The several vertical headers or header members *m* are secured to a cross header *m²* which, as shown in Fig. 2, may be at the lower ends of the vertical headers, or, as shown in Fig. 3 may be at the upper ends thereof. The delivery pipes *n*, by which the superheated steam is conducted to the cylinders, are connected to the cross header *m²* in any usual or suitable manner as shown in Figs. 2 and 3.

It will be observed that the superheater pipes may be introduced and removed readily and that their rear upper ends can be secured in the tube sheet *i'* when the cap *i²* of the dome *i* is removed while their forward ends are secured in the headers *m* in the usual manner. The flow of the steam, it will be observed, is unidirectional. If desired, a damper *o* may be located within the flue *e* and provided with a rod *o'* by which it may be raised or lowered and supported in an adjusted position. There is shown in the drawings one flue *e* only, with a single group of superheater pipes, but it will be understood that there may be other flues, as usual in boilers of this type, with or without superheater pipes. It will also be understood that the details of construction and arrangement may be varied in other particu-

lars to suit different conditions of use and that the invention is not limited to the particular construction and arrangement shown and described herein.

I claim as my invention:—

1. The combination of a steam boiler, a flue, a steam dome receiving steam at its top and having a tube sheet at its lower end, a series of superheater pipes bent upwardly at their rear ends and secured in said tube sheet, and a header to which the superheater pipes are secured at their forward ends.
2. The combination of a steam boiler, a longitudinal flue therein, an internal casing secured to the boiler shell and to said flue, a steam dome disposed within said internal casing and receiving steam at its upper end and having a tube sheet at its lower end, a series of superheater pipes bent upwardly at their rear ends and secured in said tube sheet, and a header to which said pipes are secured at their forward end.
3. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, a steam dome receiving steam at its upper end and having a tube sheet at its bottom, a series of superheater pipes having their rear ends bent upwardly and secured in said tube sheet, and a header to which said pipes are secured at their forward end.
4. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, an internal casing secured to the boiler shell at its upper end and to the flue at its lower end, a steam dome disposed within said casing and receiving steam at its upper end and having a tube sheet at its lower end, a series of superheater pipes having their rear ends bent upwardly and secured in said tube sheet, and a header to which said pipes are secured at their forward ends.
5. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, a main steam dome, an auxiliary steam dome receiving steam at its upper end from the main dome and having a tube sheet at its lower end, a series of superheater pipes having their rear ends bent upwardly and secured in the tube sheet, and a header to which said pipes are secured in said forward end.
6. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, an internal casing secured at its upper end to the shell and at its lower end to the flue, a main steam dome, an auxiliary steam dome disposed within said internal casing and receiving steam at its upper end from the main dome and having a tube sheet at its lower end, a series of superheater pipes bent upwardly at their rear

ends and secured in said tube sheet, and a header to which the pipes are secured at their forward ends.

7. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, an internal casing secured to the shell at its upper end and to the flue at its lower end, a main steam dome, an auxiliary steam dome disposed within said casing and receiving steam at its upper end from the main dome and having a tube sheet at its lower end, a series of superheater pipes secured at their rear ends in said tube sheet, and a header to which the said pipes are secured at their forward end.

8. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, a steam dome receiving steam at its upper end and having a tube sheet at its lower end, a series of superheater pipes bent upwardly at their rear ends and secured in said tube sheet, and a series of headers to which the said pipes are secured at their forward ends, said headers being spaced vertically to permit the introduction of said pipes.

9. In a steam boiler, the combination of a boiler shell, a flue extended longitudinally through the same, an internal casing secured at its upper end to said shell and at its lower end to said flue, a steam dome disposed within said shell and receiving steam at its upper end and having at its lower end a tube sheet, a series of superheater pipes bent upwardly at their rear ends and secured in said tube sheet, and a series of vertical headers to which said pipes are secured at their forward ends, said headers being separated vertically to permit the introduction of said pipes.

10. The combination of a steam boiler, a flue, a series of superheater pipes located in said flue and bent upwardly at their rear ends within the flue, means to distribute steam to the upwardly bent rear ends of said tubes through the wall of said flue, and means to collect steam from the forward ends of said tubes.

11. The combination of a steam boiler, a flue, a steam chamber, a series of direct flow superheater pipes located in said flue and receiving steam at their rear ends from said steam chamber and extended at their forward ends beyond said flue, and a header receiving steam from said superheater pipes at their forward ends.

This specification signed and witnessed this 14th day of October A. D., 1911.

JACQUES L. VAUCLAIN.

Signed in the presence of—

FRANKLIN ABBOTT,
A. M. VAUCLAIN.