No. 659,623. Patented Oct. 9, 1900.

J. MALLET & A. R. MOSLER.

STEAM BOILER.

(Application filed Mar. 22, 1900.)

(No Model.) 2 Sheets—Sheet 1.

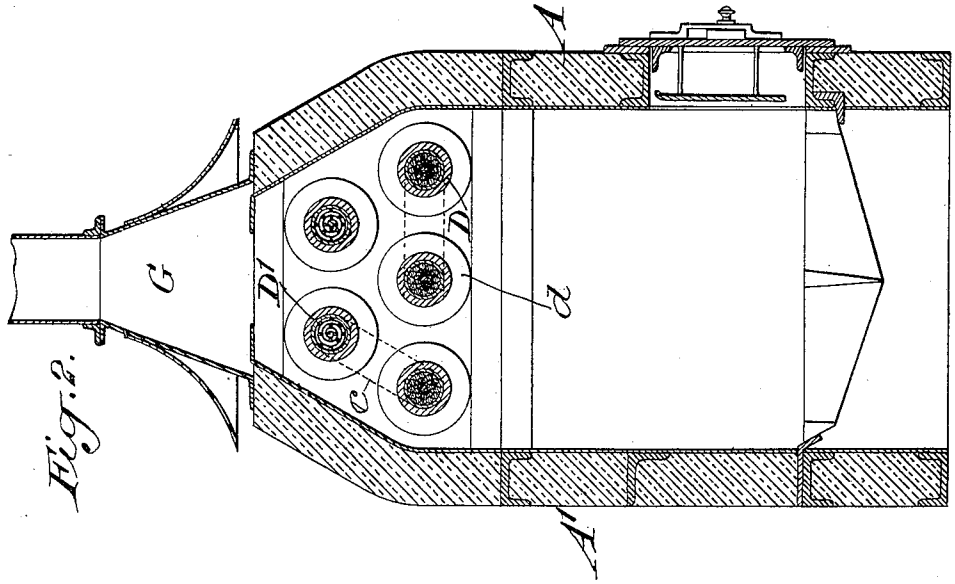


Fig. 2.

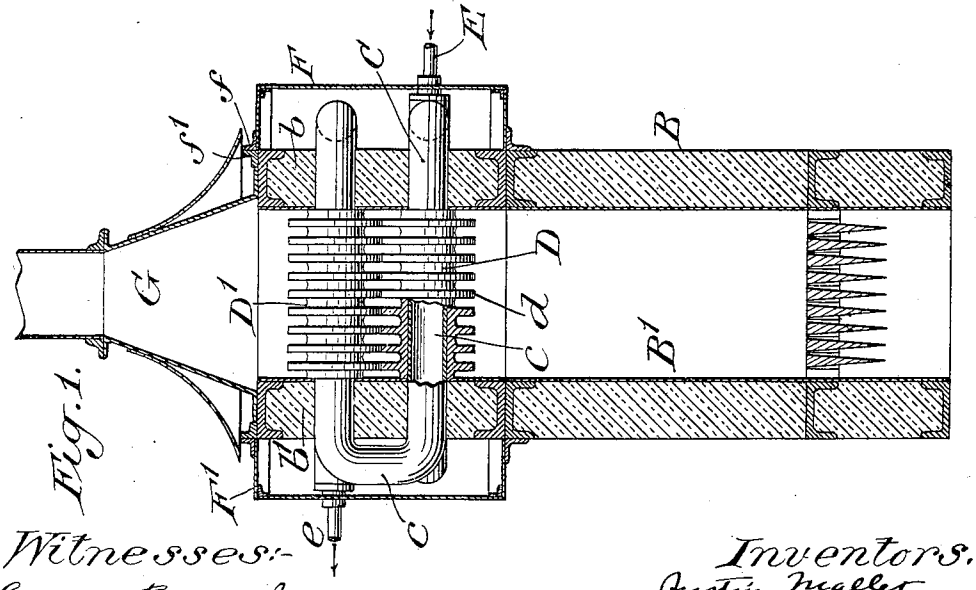


Fig. 1.

Witnesses:-
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Edward Wieser.

Inventors:-
Justin Mallet
Arthur R. Mosler
By Brown & Seward
their Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 4.

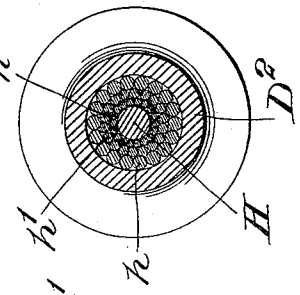


Fig. 6.

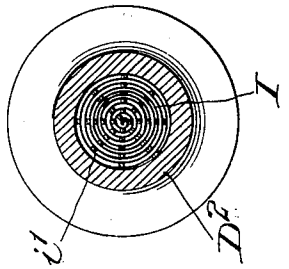


Fig. 3.

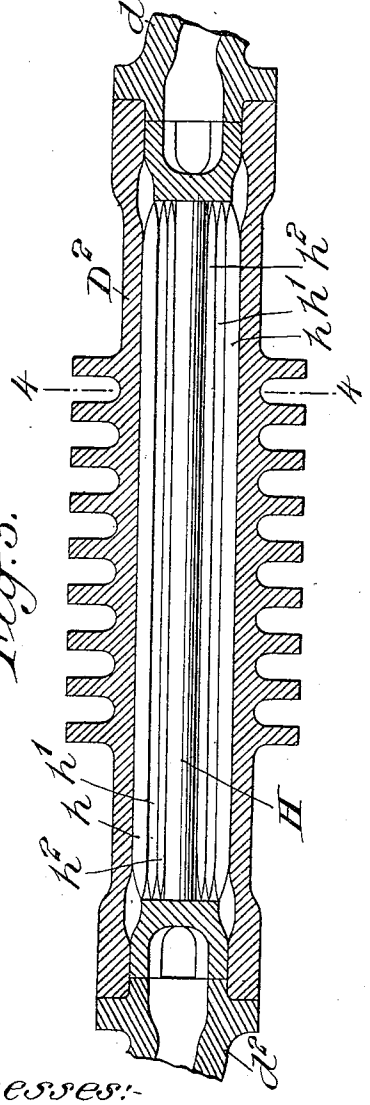
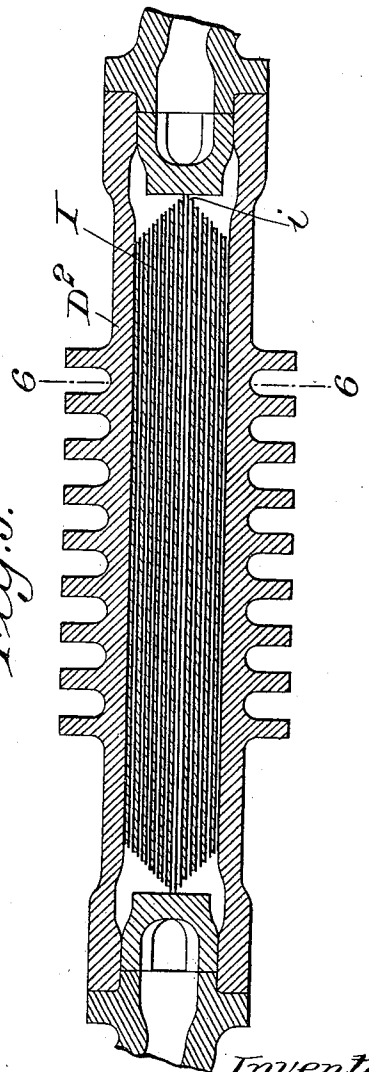


Fig. 5.



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UNITED STATES PATENT OFFICE.

JUSTIN MALLET, OF MARSEILLES, FRANCE, AND ARTHUR R. MOSLER, OF NEW YORK, N. Y.; SAID MALLET ASSIGNOR TO SAID MOSLER.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 659,623, dated October 9, 1900.

Application filed March 22, 1900. Serial No. 9,725. (No model.)

To all whom it may concern:

Be it known that we, JUSTIN MALLET, a citizen of the Republic of France, and a resident of Marseilles, France, and ARTHUR R. MOSLER, a citizen of the United States, and a resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Steam-Boiler, of which the following is a specification.

Our invention relates to a steam-boiler, with the object in view of providing a simple and effective boiler for flashing water into steam as it is fed to the interior of the boiler.

A practical embodiment of our invention is represented in the accompanying drawings, in which—

Figure 1 is a transverse vertical section through the furnace and boiler. Fig. 2 is a vertical section taken from front to rear through the furnace and boiler. Fig. 3 is an enlarged view in detail showing one of the boiler-sections with a bunch of rods within it. Fig. 4 is a transverse section through the line 4 4 of Fig. 3. Fig. 5 is an enlarged view in detail of a boiler-section with the convolute coil within it, and Fig. 6 is a transverse section through the line 6 6 of Fig. 5.

The front and rear walls of the furnace are denoted, respectively, by A A′ and the side walls by B B′. The upper portions of the side walls B B′—viz., *b b′*—are made separable from the lower portions B B′ and also from the front and rear walls A A′, so that these walls, together with the boiler sustained by them, may be bodily removed from the furnace for cleaning, repairs, or renewal.

The boiler consists of several tubular sections extending across the interior of the furnace above the fire-chamber and arranged in staggered relation to one another, so as to break up the flame from the fire-chamber and cause it to come in contact with a greater amount of tubular surface. The several tubular sections within the furnace and which constitute the boiler may be parts of a continuous tube, as shown in Figs. 1 and 2, or they may be separate sections—such, for example, as shown in detail in Figs. 3 and 5—connected at their ends by suitable couplings. Referring to the form shown in Figs. 1 and 2, a continuous tube C, of malleable iron, is provided at suitable intervals with tubular jackets D, of cast iron or steel, the said jackets D being each provided with annular flanges *d* at short intervals apart throughout its length. The distances between the several tubular jackets D are intended to be such as to leave a length of unjacketed tube C between them to permit the said tube C to extend through the wall of the furnace and be there provided with a return-bend *c*. The number of jacketed sections may be three or more, the present arrangement being that where five of the sections are employed. The tube C is shown as extending continuously from the water-inlet pipe E and through the several tubular jackets D D′, &c., to the steam-exit pipe *e*. The return-bends *c* exterior to the removable sections *b b′* of the furnace-wall are housed by suitable casings F F′, which casings are removably secured to the furnace-walls conveniently by means of angle-plates *f f′*. The furnace is provided at its top with an uptake G, which permanently rests upon the front and rear walls of the furnace, the sections *b b′* of the side walls having a removable engagement with the base of the uptake to permit the boiler as a whole to be slid out of the furnace. Within the boiler-sections D D′, located within the furnace, we provide means for laminating the steam as follows: In the present instance we have shown bundles of rods in the three lower sections of the boiler and a convolute coil of sheet metal in the two upper sections.

Referring to the laminating means shown in Figs. 3 and 4, we provide a central core H, which may be a solid cylindrical rod of metal extending from end to end of the section, and around this central core H we arrange layers of rods bearing a certain relation to one another and to the space between the core and the interior wall of the boiler-section D^2, as follows: The rods *h*, which occupy the outer position next to the inner wall of the boiler-tube, are of such diameter that each will touch its adjacent rods and also the interior wall of the tube. The rods *h′*, forming the next interior layer, are of such size that they will each touch its adjacent rods and also touch two adjacent rods *h*, while the rods h^2, forming the interior layer,

are of such size that they will each touch their adjacent rods and also two adjacent rods h' and the exterior surface of the core H. This arrangement of rods reduces the spaces between the rods to a minimum compared with the mass of metal in the rods, and thereby provides, by the conduction of the heat from the wall of the tube to the several rods within it, a mass of hot metal which shall be very great in amount as compared with the strips or layers of steam intermediate of the rods, thereby drying it and superheating it to a great advantage while permitting it to flow unobstructedly throughout the length of the boiler-section.

Referring to the means for laminating the steam, (shown in Figs. 5 and 6,) the interior of the section D^2 is provided with a sheet of metal formed into a convolute coil, the space between the coils being preferably equal to or less than the thickness of the sheet of metal. The sheet of metal is denoted by I, and its edge i, which forms the center of the coil, is preferably made longer than the outer edge, which form of blank when the sheet is coiled produces conical ends to the coil, leaving thereby freedom for the steam to escape from one boiler-section to another. To hold the successive coils of the sheet I separated, we introduce thin longitudinal strips i', extending longitudinally of the coil and at such intervals as may be required. A feasible way of coiling the sheet I we find to be to coil two sheets simultaneously and then slip one of them endwise out of position, following the sheet as it is being removed by parting-strips i' to maintain the coils properly separated. This internal arrangement serves the purpose of laminating the steam and affords a hot surface of metal throughout the interior of the tube because of the continuity of the wall of the sheet from the interior wall of the tube to its center. It also provides a free passage for the steam longitudinally along the interior of the tubular section.

In the form shown in Figs. 3 and 4 the jackets D^2 are fitted at their ends with couplings d' d^2 for attaching them to an adjacent section, and the interior continuous tube C is omitted.

It is obvious that changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of our invention. Hence we do not wish to limit ourselves strictly to the structure herein shown and described; but

What we claim is—

1. The combination with several tubular sections connected at their ends to form a continuous tube extending back and forth through the interior of a furnace, of tubular jackets embracing the said tubular sections within the furnace, the said tubular jackets being provided with series of annular flanges, substantially as set forth.

2. A boiler comprising connected tubular sections, one or more of said tubular sections being provided with steam-laminating means consisting of a central cylindrical core and layers of rods surrounding the core and other tubular sections provided with steam-laminating means consisting of a sheet of metal coiled in convolute form, substantially as set forth.

3. A boiler comprising connected tubular sections, one or more of said sections being provided with means for laminating the steam within it, said laminating means consisting of a sheet of metal formed in a convolute coil, the coils being spaced apart to permit the stem to pass between them, substantially as set forth.

4. A boiler-tube provided with means for laminating the steam within it, said laminating means consisting of a sheet of metal formed in a convolute coil, the coils being spaced apart to permit the steam to pass between them, substantially as set forth.

5. A boiler-tube provided with means for laminating the steam within it, said laminating means consisting of a sheet of metal having one of its two opposite edges shorter than the other, the said sheet of metal being formed in a convolute coil and the coils spaced apart to permit the steam to pass between them, substantially as set forth.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 19th day of March, 1900.

JUSTIN MALLET.
ARTHUR R. MOSLER.

Witnesses:
FREDK. HAYNES,
EDWARD VIESER.