

(No Model.)

2 Sheets—Sheet 1.

N. W. PRATT.
WATER TUBE BOILER.

No. 547,565.

Patented Oct. 8, 1895.

Fig. 2.

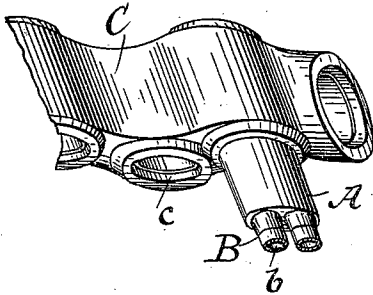
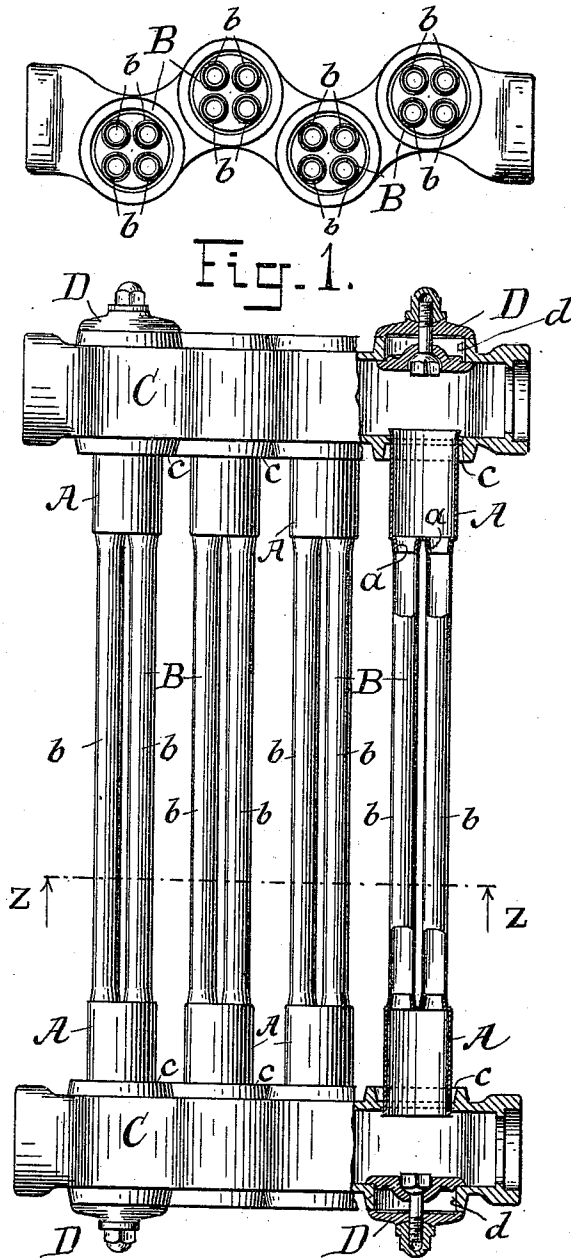


Fig. 3.



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2 Sheets—Sheet 2.

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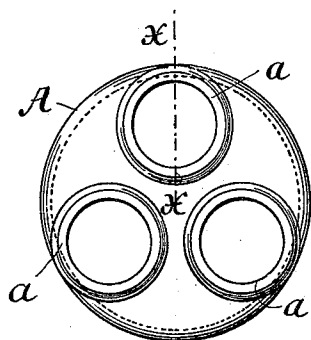


Fig. 4.

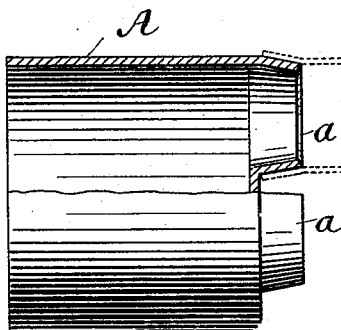


Fig. 5.

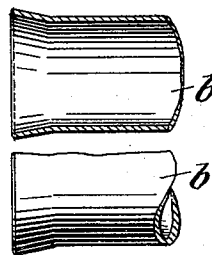


Fig. 6.

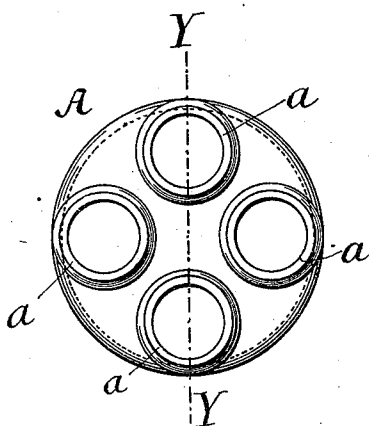


Fig. 7.

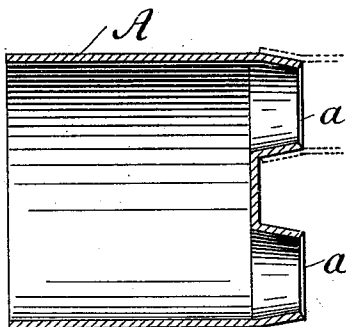


Fig. 8.

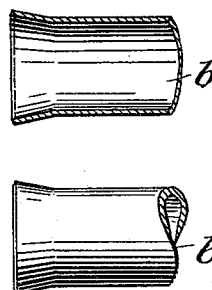


Fig. 9.

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UNITED STATES PATENT OFFICE.

NAT W. PRATT, OF BROOKLYN, NEW YORK.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 547,565, dated October 8, 1895.

Application filed February 11, 1895. Serial No. 538,033. (No model.)

To all whom it may concern:

Be it known that I, NAT W. PRATT, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

This invention relates to water-tube boilers; and it consists in a unit of heating-surface which is composed of a group or cluster of water-tubes having a single cup or nipple secured to each end of said cluster and in circulatory connection with each tube of the cluster, whereby the cluster can be attached to headers at each end by simply securing such cups to the headers, and said unit can be detached from the headers, in readiness for removal, by freeing such cups from their attachment to the headers.

It also consists in so constructing the headers that a single hole in each will serve to receive the ends of such unit, and one hand-hole in alignment with said hole will serve to give access to said unit, and, therefore, to each tube of the cluster forming a part of the same; and it further consists in certain details of construction, all as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a view, partially in section, of several units of heating-surface secured to headers at each end in accordance with the invention. Fig. 2 shows a transverse section of the same on line Z Z of Fig. 1. Fig. 3 represents in perspective a part of a header and a portion of a unit of heating-surface attached thereto. Fig. 4 shows an end view of a preferred form of cup or nipple adapted to be secured to a cluster of three tubes to form there-with a unit of heating-surface and to enable such cluster to be attached to a header. Fig. 5 represents the said cup, partly in side view and partly in longitudinal section, on line $x x$ of Fig. 4. Fig. 6 represents two tubes adapted to be attached to such cup, one of the tubes being in longitudinal section and a portion of the other being in side view. Fig. 7 shows an end view of a preferred form of cup or nipple adapted to be secured to a cluster of four tubes. Fig. 8 represents a vertical section of such cup on line Y Y of Fig. 7. Fig. 9 shows two tubes adapted to be attached to such cup,

one of the tubes being in longitudinal section and the other in side view.

B denotes the unit of heating-surface, which is composed of a group or cluster of water-tubes b and a cup or nipple A secured to each end of said cluster. These nipples are preferably of wrought iron, or other malleable metal, formed into cup shape, and are preferably "struck up," so as to produce upon the base thereof as many auxiliary nipples or tubular projections a as there are tubes in the cluster which is to form a part of the unit. The tubular projections a are preferably frusto-conical in shape, and the ends of the tubes b are made bell-mouthed to fit said projections exteriorly, the projections being of sufficient length to enable them to be welded to the tubes. If desired, however, the tubes may fit and be welded to the projections a interiorly of the latter, and both the projections and the ends of the tubes may be straight, as will be readily understood.

In securing a cluster of tubes to two cups or nipples A the separate tubes b are inserted into or over the projections a on the nipples, one of said nipples being at each end of a cluster, and said projections are welded to the respective tubes in any suitable manner, or are firmly attached thereto so that each cluster with its end cups A can be combined with or be removed from the headers as a unit. The headers C are furnished with a series of holes c , of a size to receive the nipples A, and in axial alignment with said holes is a series of hand-holes d on the opposite sides of the headers.

In combining the units B of heating-surface with the headers C the nipples A of each unit are inserted into the holes C in the headers, and the free ends of the nipples are expanded or upset over the walls of said holes, as shown in Fig. 1, access to the nipples being obtained for such purpose through the hand-holes d . These hand-holes are then covered by caps D, which are secured to the headers in any suitable manner. The number of tubes in a cluster may be two or more, the nipple shown in Fig. 4 being adapted to receive a cluster of three tubes, that shown in Fig. 7 to receive a cluster of four tubes and a cluster of that number being shown in Fig. 2, while a cluster of two tubes is shown in Fig. 3 as attached to

a header C by a nipple A. Although I prefer to provide the cups or nipples A with tubular projections *a*, yet it will be seen that such projections may be omitted and the ends of the tubes *b* be welded (as electrically) to the base of the nipples, in alignment with holes therein; or the ends of the tubes may be inserted in said holes and be therein secured.

From the foregoing it will be understood that the invention enables a multiple number of tubes, in clustered form, to be quickly and conveniently secured to the headers without the necessity of separately attaching each individual tube to the headers, and that such clustered tubes, with their end cups, (forming the unit of heating-surface,) can be removed from the headers, should occasion require, through a single hand-hole in the headers for each cluster, thereby saving much time and expense.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A unit of heating surface for a water-tube boiler consisting of two end cups intermediate to which are connected a group of tubes, the said cups being constructed to have their free ends expanded for connection with headers, substantially as set forth.

2. A device for connecting a cluster of boiler-

tubes to headers, consisting in a cup-shaped nipple having upon its base tubular projections adapted to receive and to be secured to the individual tubes of the cluster and having its free end adapted to be expanded into a header to secure the nipple thereto, substantially as set forth.

3. The combination with a cluster of boiler-tubes, of two cup-shaped nipples located upon the ends of such cluster, and having tubular projections which receive and are secured to the individual tubes of the cluster, the said nipples being adapted to have their free ends expanded or upset into a header to connect the parts, substantially as and for the purposes specified.

4. The combination with two headers each having holes to receive boiler-tube connections, of a cluster of tubes having at each end a single cup-shaped nipple which is attached to the individual tubes of the cluster, the free ends of said nipples being expanded or upset over the walls of said holes, thereby securing the cluster of tubes and their nipples to the headers, substantially as set forth.

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Witnesses:

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