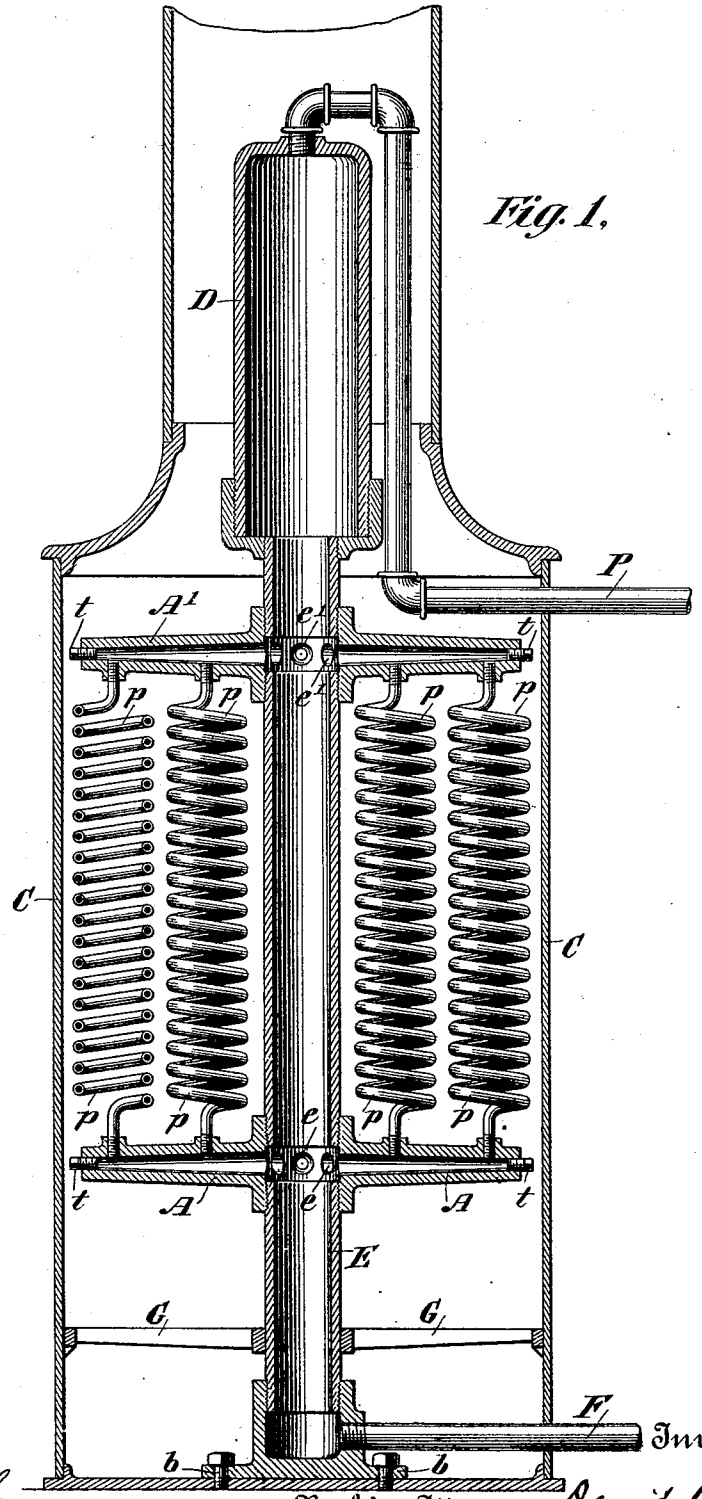
(No Model.) 2 Sheets—Sheet 1.

D. ROUSSEAU.

STEAM BOILER.

No. 508,532. Patented Nov. 14, 1893.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2,

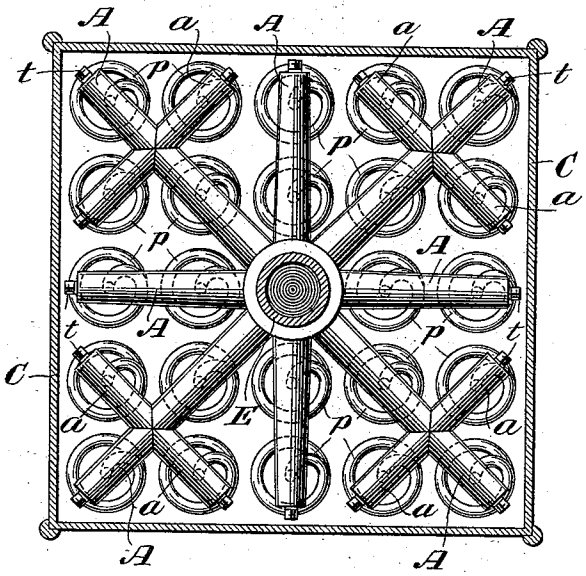


Fig. 3,

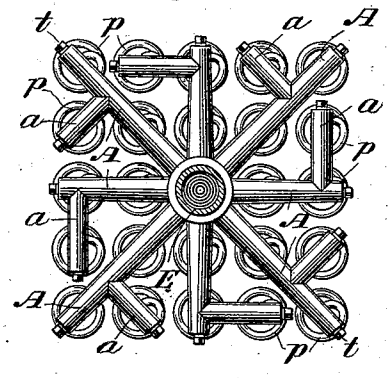


Fig. 4,

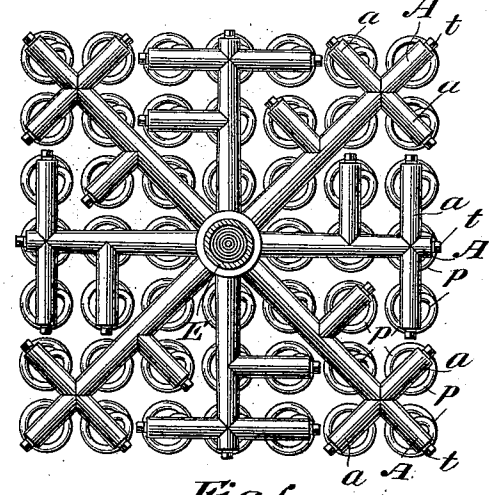


Fig. 5,

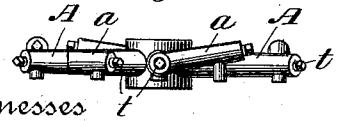
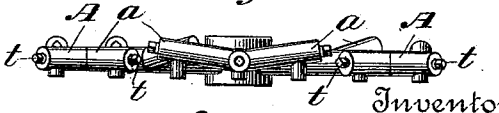


Fig. 6,



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DAVID ROUSSEAU, OF NEW YORK, N. Y.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 508,532, dated November 14, 1893.

Application filed December 21, 1892. Serial No. 455,965. (No model.)

To all whom it may concern:

Be it known that I, DAVID ROUSSEAU, a citizen of the United States of America, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention is directed particularly to that type of steam generators known as coil or pipe boilers in which the pipes or coils through which the water circulates are secured at their opposite ends either to the heads of the boiler or to the sides of the boiler flues, and its objects are, first, to devise a boiler of the type named in which the pipes may be readily put in place or detached for repairs; second, to so construct boilers of this type that the pipe portions thereof may readily expand and contract under varying temperatures without subjecting the boiler to undue strains and leakage resulting therefrom; third, to render the pipes easily attachable to and detachable from the boilers at all times, either for repairs or the substitution of new pipes; fourth, to devise a pipe boiler which shall have a maximum heating surface arranged within a minimum amount of space by attaching pipes to radial arms having lateral branches, in such manner as to inclose a maximum number of pipes within any form of boiler chamber; fifth, to accomplish all the results necessarily attributable to the special type of pipe boiler hereinafter described.

The points of novelty which I deem as of my invention will be particularly pointed out in the claims at the end of this specification.

In order that the invention may be fully understood reference is had to the accompanying drawings in which—

Figure 1 is a vertical longitudinal section taken through my improved form of boiler showing some of the parts thereof in elevation. Fig. 2 is a horizontal section taken through Fig. 1 at a point below the pipes and their lower supporting arms and as seen looking from the bottom toward the top of the drawing. Figs. 3 and 4 are similar sectional views of modified forms, while Figs. 5 and 6 are side elevational views of such modified forms as seen looking respectively at Figs. 3 and 4 from the bottom toward the top of the drawing.

Reference is had to the drawings in detail in all of which like letters of reference represent like parts wherever used.

C is the boiler chamber surrounding the boiler and sustaining it in an upright position by screws *b b*, said chamber being provided at the top with the usual outlet for smoke and at the bottom with grate bars G G as clearly shown in Fig. 1.

E is a water drum constituting the main or body portion of the boiler and acting as the support thereof, D being a steam drum at the upper end provided with the usual steam pipe P.

F is a feed water pipe which supplies water at the base of the water drum.

A and A′ are hollow spider like boiler heads preferably of cast metal having lateral arms *a a* as clearly shown in Fig. 2.

t t t are screw plugs in the ends of the parts A A′ adapted to afford access to the interior portion of said parts to facilitate the cleaning thereof.

p, p, p, &c., constitute the pipe portions of the boiler, said pipes being of spiral shape with their opposite ends extending in alignment with the axes of the spirals and provided respectively with right and left screw threads adapted to fit in like screw threads in the parts A A′, *a a* as clearly shown in Fig. 1, the arrangement being such that the entire strain due to expansion and contraction of the spirals is brought directly to bear upon the screw-threads without any wrenching or torsional effect. This arrangement of the spiral pipes also facilitates the ready taking apart of the structure for repairs, cleaning and the like.

e and *e′* are interior openings between the parts A A′ and the water drum E, this water drum being preferably made of three sections screw threaded into the body portions of the parts A A′.

By providing laterally extending arms *a a* as shown in Figs. 2, 3 and 4, I am enabled to arrange side by side, a large number of spiral pipes *p, p, p* within a square or rectangular boiler chamber C. Where these lateral arms are used I prefer to have the lower set inclined with relation to the parts A as shown

in Figs. 5 and 6 for the purpose of affording easy access to the screw plugs *t* so that any one or all of the pipes may be cleaned without disturbing any portion of the boiler.

I do not limit myself to a rectangular form or disposition of the parts A *a* as it is obvious that I may utilize any form of boiler chamber and arrange the lateral arms *a* to suit the shape or conformationof said chamber.

I am aware that a steam boiler or generator has heretofore been constructed of horizontally arranged tubes sustained in the side walls of a boiler case or shell, which pipes are connected together by vertically disposed helical coils or pipes, the ends of which are in alignment with the axes of the coils and secured to the horizontal pipes by detachable couplings, and I make no claim hereinafter broad enough to include such a structure, my claims being directed to two hollow boiler heads united together by spirally arranged pipes screw-threaded into the inner faces of the boiler heads of the nature referred to, the arrangement being such that the entire boiler may be taken apart if need be or any one of the helical pipes or tubes removed at pleasure.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A pipe boiler having two hollow boiler heads A A′ and spiral pipes provided with axially extending screw threaded ends held in position by corresponding screw threads in the inner faces of the boiler heads substantially as described.

2. A pipe boiler having two hollow boiler heads and intermediate expansible pipes screw threaded at their opposite ends and held in place between the boiler heads by corresponding screw threads on the inner faces thereof the ends of the tubes being located substantially at right angles to the inner faces of the boiler heads, substantially as shown and described.

3. A pipe boiler having two hollow boiler heads sustained by a central water drum with which said boiler heads are connected in combination with spiral pipes secured by screw threads at their opposite ends to said boiler heads substantially as described.

4. A pipe boiler having a centrally located water drum sustaining a pair of hollow boiler heads having radially disposed arms in combination with spiral pipes screw threaded at their opposite ends and secured to said arms by corresponding screw threads therein substantially as described.

5. A pipe boiler consisting of a central hollow drum sustaining a pair of boiler heads having hollow radially disposed arms communicating with said drum in combination with a series of spiral pipes secured to said arms and communicating therewith, substantially as described.

6. A pipe boiler having a pair of independent boiler heads consisting of hollow radial arms provided with additional lateral or branch arms in combination with a series of expansible pipes uniting both sets of arms in pairs, substantially as described.

7. A pipe boiler having a centrally disposed water drum which sustains two boiler heads provided with hollow radially disposed arms and additional lateral hollow arms in combination with spiral pipes joining said set of arms in pairs, the boiler heads being in communication with the water drum substantially as described.

8. A pipe boiler consisting of a pair of boiler heads having hollow arms communicating with a central water drum in combination with spiral pipes joining said arms and screw plugs in the outer ends of the arms for affording facility for cleaning, substantially as described.

9. A pipe boiler having a pair of boiler heads consisting of hollow radially disposed arms and additional hollow lateral arms secured to said radial arms at an angle and provided with screw plugs, whereby the arms may be easily cleaned, substantially as described.

10. A pipe boiler consisting of a hollow central sustaining water drum carrying a pair of independent boiler heads provided with radial arms and lateral branch arms in combination with spiral pipes having right and left hand screw threads on their opposite ends adapted to be secured in corresponding screw threads in the opposite pairs of arms, screw plugs in the outer ends of said arms, an inlet pipe at the base of the water chamber, a steam dome at the top thereof and a steam pipe connected therewith, substantially as described.

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