

(No Model.)

2 Sheets—Sheet 1.

H. A. HOUSE.
STEAM GENERATOR.

No. 549,569.

Patented Nov. 12, 1895.

Fig. 1.

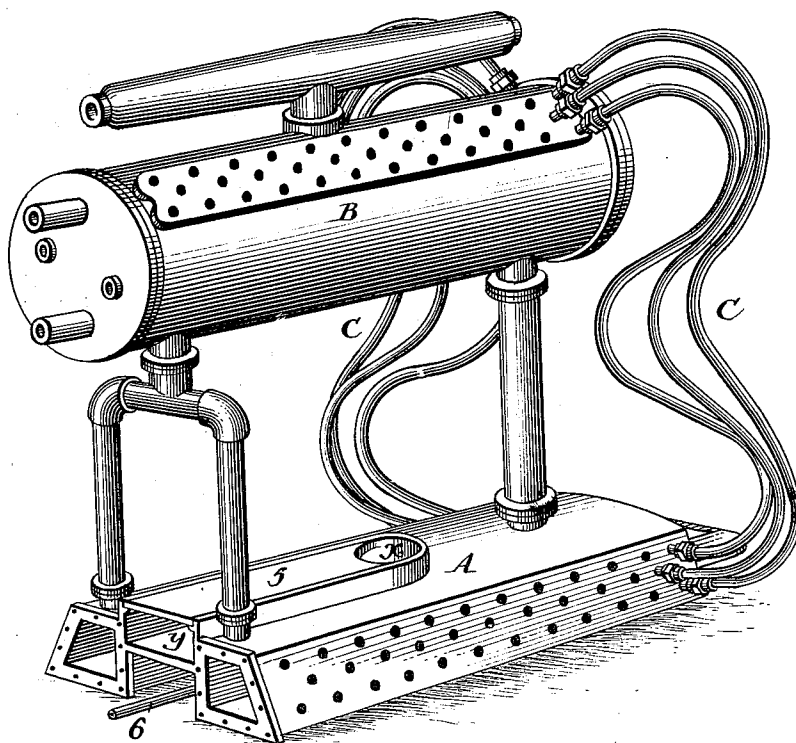
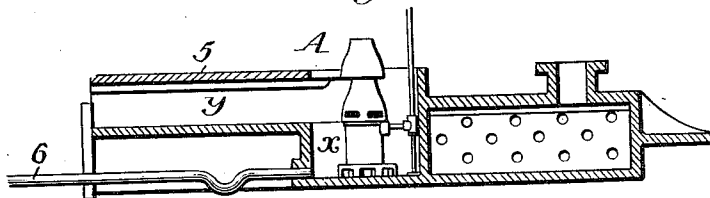


Fig. 2.



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Fig. 3.

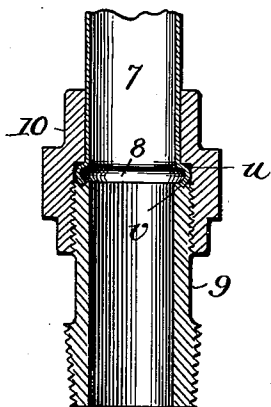


Fig. 4.

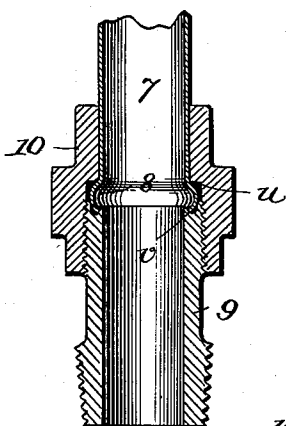


Fig. 5.

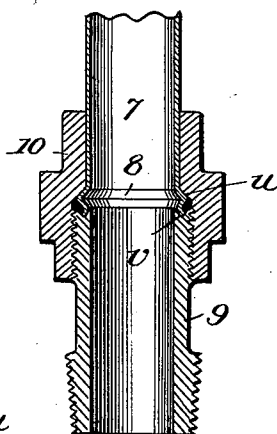
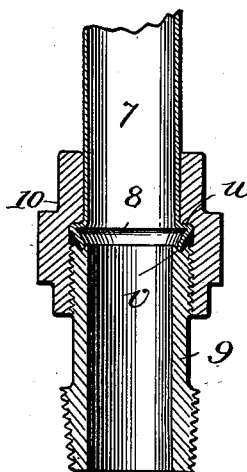


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY A. HOUSE, OF BRIDGEPORT, CONNECTICUT.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 549,569, dated November 12, 1895.

Application filed February 26, 1895. Serial No. 539,759. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. HOUSE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates more especially to that class of boilers intended for use with vapor-burners, although it is adapted in some of its features for boilers of a different character; and my invention consists in so constructing the parts as to prevent the overheating and burning away of the burner portion of the apparatus, to avoid the difficulties and dangers resulting from the escape of oil, to supply the burner with air in proper heated condition, and to form joints capable of standing the high pressure which is employed in boilers of this character, and to this end I construct the parts as fully set forth hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view illustrating a part of a marine boiler embodying my improvements. Fig. 2 is a longitudinal section of the hollow water-base, showing the burner. Figs. 3, 4, 5, and 6 are sectional views illustrating the coupling between the water-flues and the other portions of the boiler.

In the class of boilers (more especially intended for marine boilers) illustrated in the drawings there is a hollow foundation A, a drum B, and series of bent water-tubes C. In employing this class of boilers in apparatus for burning liquid fuel it has been usual to arrange the burner between the base and the drum B, where all the parts are exposed to a very intense heat, as the flame from the burner is deflected downward and against the base and outward against the tubes, and all parts of the burner are subjected to the action of the flame and some parts are apt to be overheated and burned out. Another difficulty has been that in case of any overflow of the oil when the parts are cool or the combustion is obstructed in any way, so as to prevent the parts from being fully heated, the oil passes to the base and overflows the same and is apt to saturate the woodwork and cause fires, while the burner cannot be provided with pans or receptacles in such case for col-

lecting the oil, because the said pans or receptacles are subjected to the action of the flame when the apparatus is in full operation and would soon become burned out. In order to overcome this difficulty, I form within the base A a receptacle *x*, which, being formed in the said base, is surrounded by the water contained therein and will therefore not burn out, while I am also enabled thereby to carry the burner to a lower position and can therefore more advantageously employ the flame in heating the parts. The said receptacle may be formed in any suitable manner. As shown, it is circular in character, open at the top and closed at the bottom, and communicates at one side with a longitudinal recess or passage *r*, covered by a cap-plate 5, forming an air-duct through which the air can pass to the receptacle *x*, being thereby properly directed to the burner, so as to flow in the most effective manner to the flame, and being also thoroughly heated in consequence of the heating of the cap-plate 5 by the flame.

From the receptacle *x* extends a pipe 6, preferably bent so as to form a trap, and through which any oil which leaks into the receptacle may at once be conducted to a suitable receptacle or reservoir.

Inasmuch as the oil receptacle is formed within the base, it cannot possibly become overheated, and as the lower portions of the burner are within said receptacle and immediately adjacent to the water-chambers of the base these parts cannot become overheated and burned out.

In apparatus of this character it is common to use steel tubes, and it has been found very difficult to couple the said tubes to the base and dome of the boiler. Generally the tubes have been flanged at the ends and the flanges clamped between parts of the coupling, but owing to the stiff and uncompressible character of the metal it has been necessary to make use of packings in connection with the clamps and flanges, and these are very apt to burn out or be displaced by the pressure, which in this class of boilers is very high, and the difficulties incident to the joints heretofore formed have been very great. In order to overcome these difficulties, I make use of a joint of an entirely-different character—that is, I so bend the end of the tube as to form

an annular flexible flange, adapted to suitable bearings in the coupling-pieces, so that the screwing together of the said pieces will tend to put the said flange under tension, while any increase of internal pressure will tend to carry the said flange more firmly against its bearings and form a tighter joint. I have found that by this means a most effective joint can be secured without the use of packings. The flanges and coupling-pieces may be differently formed, so as to secure this result. As shown in Fig. 3, the tube 7 is first bent outward and then inward at the ends, forming an annular flange 8, curved in cross-section, and the threaded nipple 9 has at the inner end an annular recess *v* to receive the end of the flange, while the nut 10 has a shoulder *u*, that bears upon the upper portion of the flange. As a result, when the nut is screwed against the flange and upon the nipple the shoulder *u* bearing upon the flange tends to compress and put the same under tension, forcing its edge down into the groove *v*, while any internal pressure tends to force outward the flange and bring its outer face to bear more firmly against the shoulder *u* and the outer edge of the groove *v*.

In the construction shown in Fig. 4 the parts are somewhat differently proportioned, but the general construction and arrangement are the same. In the construction shown in Fig. 5 the flange is first bent outward and then inward, and the shoulder *u* bears upon the outward-projecting portion of the flange and the edge of the flange at the end bears against the outer face of the recess *v* and any internal pressure tends to straighten the lower in-turned section of the flange and force its upper portion and its lower edge more firmly against their bearings.

The construction shown in Fig. 5 is generally similar to that shown in Fig. 6, except that the inner shoulder of the flange is more abrupt and more nearly a horizontal, the result being substantially the same. In all these constructions the flange is put under tension as the nut or cap is screwed upon the nipple and the internal pressure tends to bring portions of the flange to bear more firmly against their bearings.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. A high pressure steam generator provided with a hollow water base and having a receptacle formed in the said base, in combination with a removable vapor producing burner arranged within the said receptacle, substantially as shown and for the purpose set forth.

2. A high pressure steam generator having a hollow water base and a receptacle within the said base in combination with a liquid fuel burner arranged within said receptacle and a drip pipe or conduit leading from the said receptacle, substantially as and for the purpose set forth.

3. A high pressure steam generator provided with a hollow water base, and a receptacle formed therein, and a horizontal air duct leading laterally from said receptacle in combination with a liquid fuel burner arranged within said receptacle, substantially as and for the purpose set forth.

4. A generator having a hollow water base, with a receptacle formed therein and a channel *v* leading to said receptacle and provided with a cap plate 5 combined with a liquid fuel burner arranged in the receptacle, substantially as and for the purpose set forth.

5. The combination in a steam generator, of water and steam receptacles and connecting pipes, said pipes being bent to form curved flexible flanges at the ends and nipples provided with bearings for the ends of the flanges, and nuts with bearings for outward extending portions of the flanges, substantially as set forth.

6. The combination in a joint for the water flues of a generator, said flues bent at the ends to form curved flexible flanges, nipples having bearings for the ends of the said flanges, and nuts having bearings for the outward projecting portions of said flanges, whereby the said flanges may be put under tension by screwing down said nuts, substantially as set forth.

7. The combination of a flue or tube having the ends bent to form curved flexible flanges and nipples and nuts constructed to bear upon and compress and further bend the said flanges, and with bearings against which the flanges are forced by the inner pressure, substantially as set forth.

8. A high pressure steam generator provided with a hollow water base formed with the receptacle therein, a horizontal air duct leading from said receptacle at a convenient height thereof, a pipe or conduit leading from the bottom of the receptacle and having a trap therein, and a liquid fuel burner located in said receptacle, substantially as shown and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY A. HOUSE.

Witnesses:

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I. A. FAIRGRIEVE.