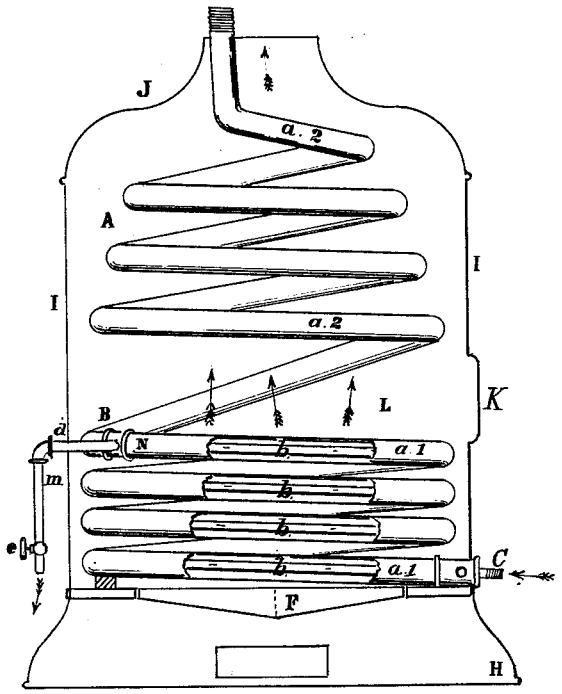
W. S. SALISBURY.

Water-Coil Steam-Generator.

No. 200,938. Patented March 5, 1878.



Witnesses,

E. W. Lucker.

Inventor,

Wilbur S. Salisbury

UNITED STATES PATENT OFFICE.

WILBER S. SALISBURY, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY J. BRIMMER, OF ADAMS, NEW YORK.

IMPROVEMENT IN WATER-COIL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **200,938**, dated March 5, 1878; application filed October 31, 1877.

To all whom it may concern:

Be it known that I, WILBER S. SALISBURY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Coil Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, and with the accompanying detailed description set forth what I consider the best means of carrying out my invention.

Figure 1 is a vertical section.

a^1 a^2 is a continuous coil of lap-welded or other pipe, formed in two sections, A and B. Section A is the steam-chamber for holding and superheating the steam. Section B forms the fire-box and generator, and is supplied with an inner pipe of less diameter than the inside of large pipe, and with a T or other suitable connection at the end C, and a ring of wrought-iron is welded or shrunk on at N, to give extra thickness for drilling and tapping through to connect with the small coil *b* inside of the main coil a^1. The said small coil of pipe *b* in the interior of a^1 is for the purpose of conducting and heating the feed-water, and is provided with small holes drilled in slanting from the outside to center at various distances apart throughout its length, the lower end having suitable connection with a feed-pump (not represented) through the T on the large pipe a^1. The top end of the small pipe *b* is closed up, and a hole drilled just back from the end, and tapped so that a piece of steam-pipe, *d*, can be screwed therein, thereby forming a continuous connection with the outside pipe *m* and steam-cock *e*, for blowing off or passing outboard any surplus water that may be pumped in; or, by partially opening the steam-cock *e*, it can be used as an overflow, and in case of very pure water being used it may be taken in through the feed-pump, and be made to perform its work over. With the steam-cock *e* closed, the water has no other means of exit except through the slanting holes, which being drilled in reference to the water's being pumped in at the bottom, as shown, it is therefore sent upward on the inside of the large pipe a^1, and over a much greater surface than if drilled straight in from outside to center. Fire can be started within section B without any water in the coils, or with them partially or all filled up. In case there is no water upon starting up, one has only to start the pump by hand slowly until steam is raised sufficient to work the steam-pump. On the other hand, if starting up with water in one or more coils, steam is readily raised to work the pump until the water-gage (not represented) shows the required amount. Then the pump may be regulated to keep up a constant supply.

The operative action of the feed-water is in its being distributed throughout the body of water contained in the large pipe a^1 or over the pipe at each pulsation of the pump, thereby effectually infusing the feed-water at the right moment to secure the greatest benefit from the heat. The T on the lower end of the large pipe is supplied with a suitable connection (not represented) for the purpose of blowing off to free the coils from any sediment or mineral deposit.

The top end of section A is provided with an elbow, or any suitable connection with the steam-pipe leading to the engine. The small coil of pipe *b* is made extra strong, and coiled to center the large pipe, thereby permitting the same to be readily screwed in and out when necessary. The coil a^1 a^2 is firmly fastened by straps and bolts to a base, H, said base having a dumping-grate, F, while a cast-iron top, J, encircles the top, and rests upon a stout sheet-iron shell, I, which incloses the coils, and which is provided with a suitable door for firing into the section B, and has also fastenings for attaching the same to the base H.

Many modifications may be made in the details of the apparatus, and some of the features of the invention may be used without the whole.

I attach importance to the coil a^1 a^2 in having the open space L large enough for a feed-passage for all fuel fed through the door K into the fire-box section B; also, in the con-

necting upper section A for a steam-chamber, whereby the steam becomes more effectually dried or superheated in its passage to the engine; and, further, by this manner of construction the three, four, or more convolutions may be used for the generating-section B, and as many convolutions for the steam-chamber A as may be desired to secure the best practical results.

I attach importance to the small coil *b* as a feed-water conductor and heater, and the mode of drilling the holes slanting to further the distribution of the feed-water throughout the greatest surface of pipe or water at each pulsation of the pump; also, in taking the water in at the bottom, so as to always insure a supply in the lower coils, thereby more effectually protecting them from too intense heat; also, to the connecting-pipes *d* and *m* and steam-cocks *e;* and, furthermore, to the mode of removing the inside coil by screwing in and out.

I claim as my invention—

1. A coil-boiler consisting of an upper heating or steam-drying section, A, and a lower generating-section, B, provided with a feed-pipe, *d*, also feeding-space L, between the sections, arranged for passing in fuel, as described and shown.

2. A coil-boiler with an upper and lower section, the lower section being provided with a coil in its interior of small pipe, said inner coil being provided with slanting holes, connecting-pipes *d* and *m*, and steam-cock *e*, all constructed and arranged substantially as shown and described.

3. A coil-boiler with an upper and lower section, the lower section B having a removable inner coil receiving its feed-water supply at the bottom through the T on the large pipe, substantially as shown and described.

WILBER S. SALISBURY.

Witnesses:
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