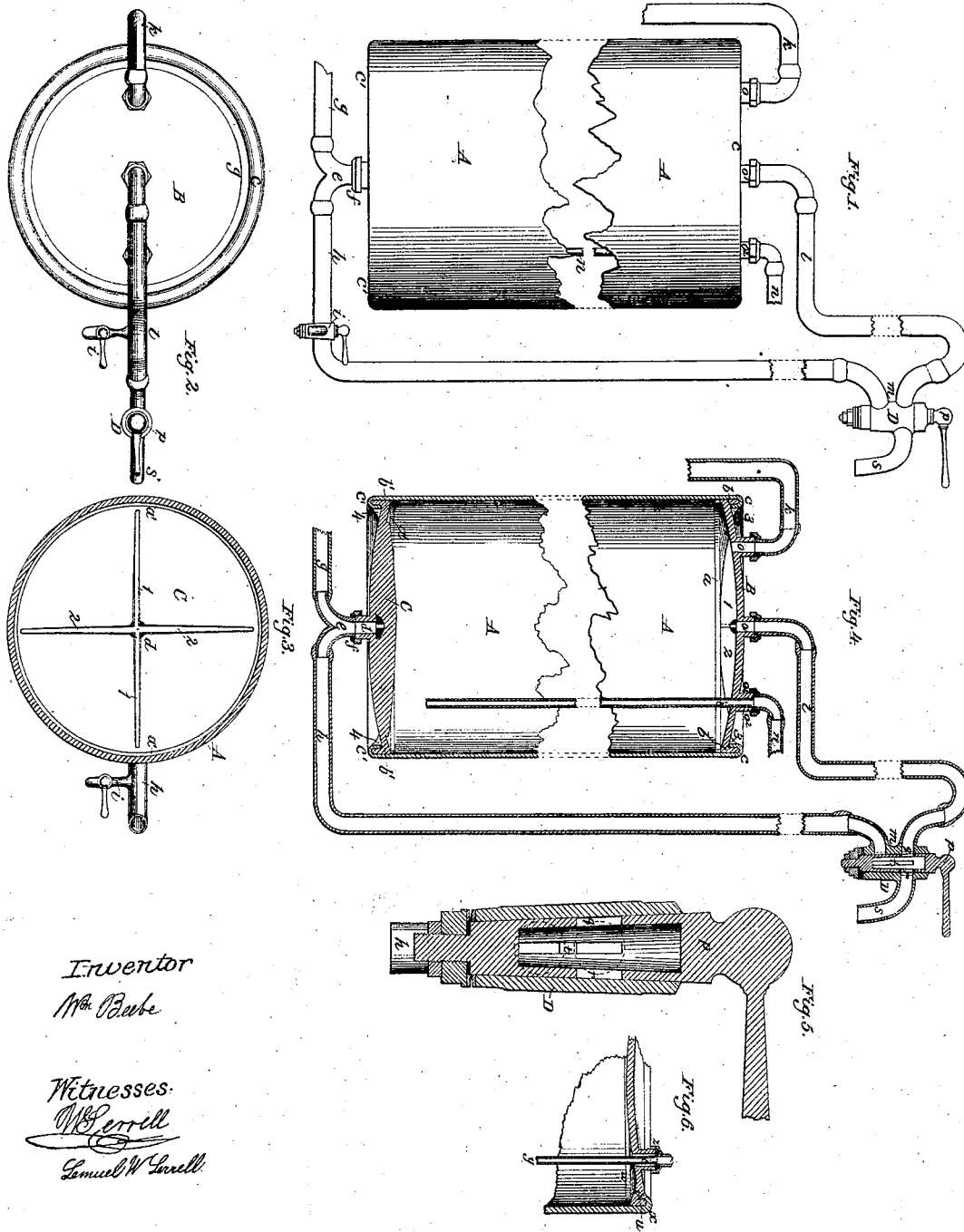


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W. BEEBE.

APPARATUS FOR THE CIRCULATION OF HOT WATER.



Inventor  
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Witnesses:  
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# UNITED STATES PATENT OFFICE.

WILLIAM BEEBE, OF NEW YORK, N. Y.

## APPARATUS FOR THE CIRCULATION OF HOT WATER.

Specification of Letters Patent No. 4,311, dated December 16, 1845.

*To all whom it may concern:*

Be it known that I, WILLIAM BEEBE, of the city, county, and State of New York, cooking-range manufacturer, have invented and made and applied to use certain new and useful improvements in the mechanical means of constructing boilers and supplying and circulating hot water for domestic or other purposes, the intent of such improvements being, first, to maintain an equable supply of water from any elevated source through a secondary or detached boiler into a boiler or waterback in contact with the fire employed either in cooking or for any other usual purpose, but the supply so arranged that a circulation shall be maintained between the two boilers, while by a simple perforation in the supply pipe any steam generated shall not force the water out of the boilers on any temporary suspension of the elevated supply, and, secondly, to furnish the means of maintaining or suspending a circulation of hot water up to any height not above the head of the supply or of drawing hot water from the boilers below at that height for a bath or for any domestic or other purpose, for which improvements I seek Letters Patent of the United States, and that the said improvements and the mode of constructing, applying, and using the same and the effects produced thereby are fully and substantially shown and set forth in the following description and in the drawing annexed to and making part of this my specification, of said improvements, wherein—

Figure 1, represents an elevation of the two ends of a vertical cylindrical boiler which may be of any convenient length and is shown as in place for use. Fig. 2, is a plan of the same. Fig. 3, is a plan of one mode of making the inside of the heads or ends. Fig. 4, is a sectional elevation of the apparatus. Fig. 5 is a section of the circulating cock invented and employed by me for these purposes, and Fig. 6, represents a variation in the mode of forming the heads or ends of the boiler, and except in this last figure the same letters and numbers as marks of reference apply to the like parts in each figure.

A, is the body of the boiler; B, the upper head; C, the lower head each convex outward and having cross ribs 1, 2, inside to strengthen them. Two metal plate rings  $a$ ,  $a'$  soldered on inside one near each end

of the boiler serve as stops or rabbets against which the edges of the heads are stopped in place, a flanch rim  $b$ , or  $b'$ , tapered to the edge is cast or made as an integral solid part of each head, and at  $c$ , or  $c'$ , the sheet metal of the boiler cylinder is dressed round so as to be turned over and inside all around each end of the boiler and the angles 3, 3,—4, 4, are then filled in with solder. By this mode a very strong boiler is made of lighter materials in proportion than can be used when the parts are riveted together. The lower head C, has a ferrule  $d$ , cast or made solid with the head in the center to take a breeches or branch pipe  $e$ , which is secured on the ferrule  $d$ , by a joint nut  $f$ , with a collar fitted to press the flanch of the pipe  $e$ , on the top of the ferrule  $d$ . From the branch  $e$ , a lower leading pipe  $g$ , communicates with the lower part of a principal boiler or with the lower part of a water back in a cooking range, and from the other part of the branch  $e$ , a circulating pipe  $h$ , turns upward and has near the branch  $e$ , a cock  $i$ , for emptying and cleaning the boiler. The leading pipe  $h$ , leads from the upper part of the secondary boiler A, to the upper part of the principal boiler or water back of the cooking range, and the central circulating pipe  $l$ , is intended to be led upward to any height within the level of the head of water furnishing the supply as at  $m$ , where it is to join the circulating cock D, hereafter described.

Each of the pipes  $k$ , and  $l$ , are to be connected to the upper boiler head B, by joint nuts screwed on ferrules  $o$ , and  $o'$ , cast or made solid with the boiler head in the same manner as the lower branch pipe  $e$ . The supply pipe  $n$ , is to communicate with any sufficiently elevated head of water, that will furnish the needful supply it is to be extended downward to within a few inches of the bottom of the boiler and may have a common stop cock at any convenient part outside the boiler to shut off the supply. The part of this pipe  $n$ , within the boiler is to be made as a tube with a flanch on the upper end to overlie the top of the ferrule  $o^2$ , and above this is to be the collar of a joint nut to screw on the ferrule  $o^2$ . By this mode of making a casting the heads with the solid ferrules, and securing the pipes with joint nuts any or all of the pipes can be detached for repair in case of accident without disturbing the boiler and can each be secured

on with a tight joint in like manner. In that part of the pipe *n*, which is near the inside of the boiler head are to be made one, two, or more small orifices or perforations through the pipe as at +. The effects of these are first, that they convert the supply of water into a safety valve, as the pressure of the steam generated within the boilers cannot exceed the hydrostatic pressure of the supplying head without forcing the supply water back which without these perforations would empty the boiler by forcing the water out through that part of the pipe *n* that is within the boiler A. The second effect is that if by accident the supply of water should be temporarily suspended the steam will go off by these orifices and not empty the boiler by driving the water before it, or if any section of the ground pipes conveying the supply are temporarily emptied for repairs these perforations + prevent the supply pipe *n*, from acting as a siphon to empty the boiler so that these simple arrangements provide fully against three forms of injurious or inconvenient accident.

The circulating cock D, before referred to, and shown sectionally in full size in Fig. 5 is made with two branches behind, one to take the lower circulating pipe *h*, the other taking the upper circulating pipe *l*, and having a long barrel finishing with a bib *s*. The barrel contains a hollow plug *p*, made with three vertical slots into the hollow of the plug. Of these the two upper and shorter slots *q*, *r*, are opposite that branch which is jointed to the upper pipe *l*, and these open to the bib *s*, as shown in Fig. 4, so that hot water will be drawn through the pipe *l*, from the upper and hottest part of the boiler A. The third or longest slot *t*, shown best in Fig. 5, is at a right angle with the slots *q*, and *r*, and is long enough to open to both the pipes *l*, and *h*, and as shown in Fig. 5, when that is at a right angle with Fig. 4, the supply of hot water ceases and the slot *t*, and the hollow of the plug *p*, from a way for a free and constant circulation of the hottest water upward through the pipe *l*, and downward through the pipe *h*, to the bottom of the boiler A, or by turning the blank part of the plug *p* to the double openings both the circulation and supply of hot water are shut off. By this mode one boiler in a basement room having one line of pipe with a series of these cocks can supply every room in the building with hot water provided that the highest room is below the head from which the supply is drawn.

Fig. 6, represents a second mode of forming the boiler heads. These are shown as convex inward instead of outward and are made without ribs to the insides; the cir-

cumference is finished with a haunch *v*, inside the flanced rim *u*, which stops on a fillet ring *w*, on the inside of the cylinder as in Fig. 4. The metal edges *x*, of the cylinder are dressed over and around the inside of the rim *u*, and the groove formed by the haunch is filled in with solder as before described. In this figure the supply pipe or tube *y*, is shown as not filling the ferrule *z*, and the small orifices +, are shown as near the top of the ferrule.

I do not intend to limit myself to any size or proportion of the parts employed herein as these must be mechanically determined by the local necessities of any given situation, and although these arrangements have been predicated on the wants of private dwellings in the city of New York as connected with the use of the Croton water I do not intend confining myself thereto but to use all or any of the several parts thereof in any situation or for any purpose where the same may be made useful.

I do not claim to have invented the mode of causing a circulation of water between a principal boiler or water back and the boiler A, by the pipes *g* and *h*, as this is in common use neither do I claim to have invented the arrangement or application of the pipes *k*, or *l*, to the circulation of hot water within a building except as hereinafter stated. But

I do claim as new and of my own invention—

1. I do not claim to have invented or introduced the pipe *u*, to lead in the supply of water from any competent head; but I do claim the mode described of forming this pipe with perforations or orifices +, near the boiler head for the purpose of securing the boiler against accidental injury in the manner and with the effects described and set forth.

2. I do not claim to have invented the hollow plug *p*, of the cock D; but I do claim the mode of making and fitting the said plug with the short slots *q* and *r*, to draw hot water by the bib *s*, in combination with the long slot *t*, at right angles with the two former for the purpose of maintaining a circulation of hot water in the pipes *h*, and *l*, or suspending the same by turning the blank part of the plug *p*, to the pipes *h*, and *l*, substantially as the same are described and shown.

In witness whereof I have hereunto set my hand and seal in the city of New York this thirteenth day of May one thousand eight hundred and forty five.

WM. BEEBE. [L. s.]

Witnesses:

W. SERRELL,  
LEMUEL W. SERRELL.