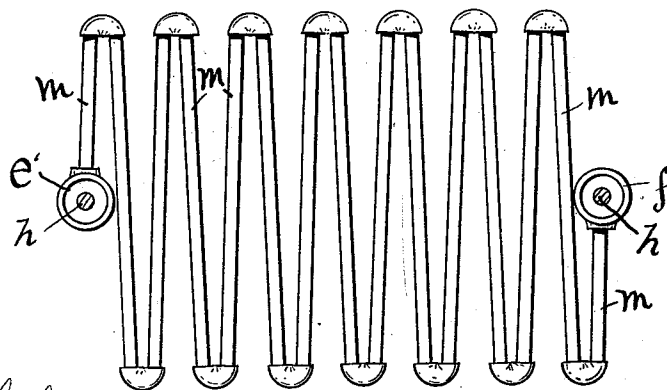
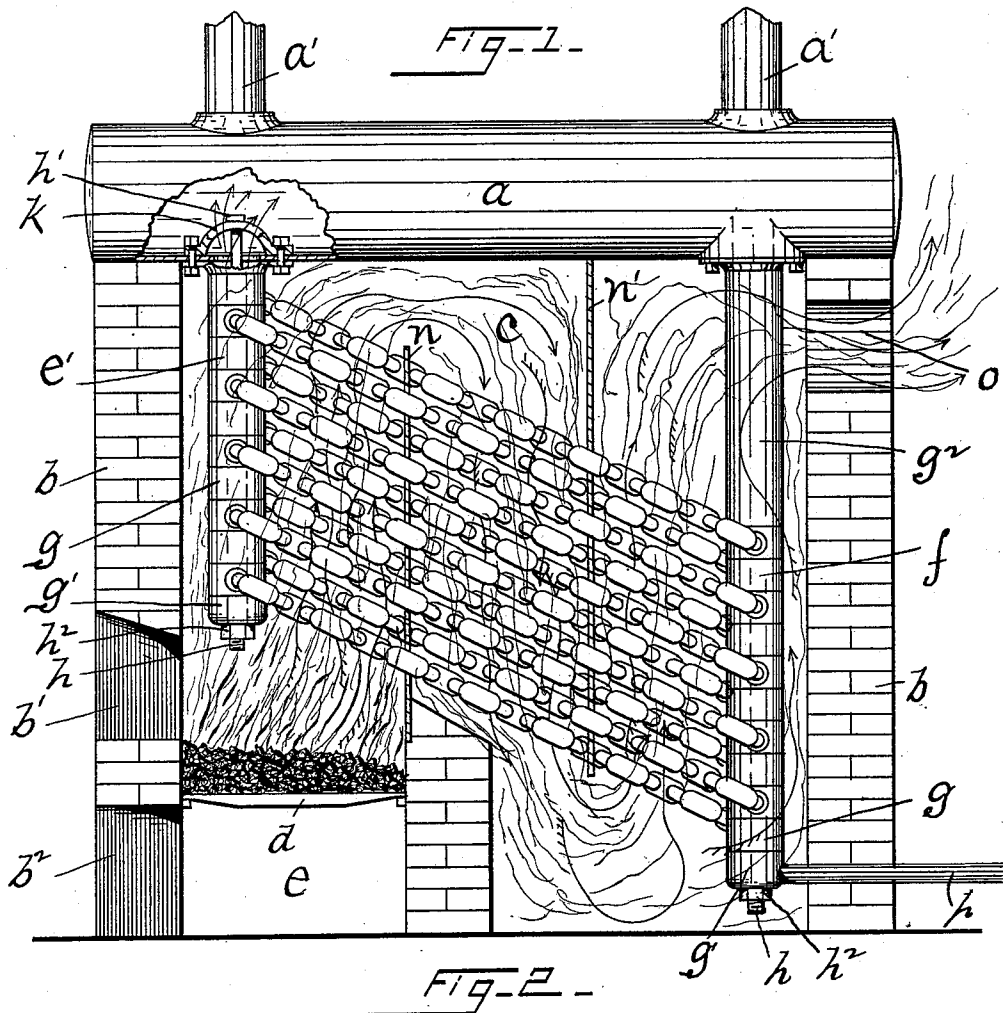


(No Model.)

T. M. EDWARDS.
STEAM OR HOT WATER HEATER.

No. 532,773.

Patented Jan. 22, 1895.



Witnesses

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UNITED STATES PATENT OFFICE.

THOMAS M. EDWARDS, OF NEW LONDON, CONNECTICUT.

STEAM OR HOT-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 532,773, dated January 22, 1895.

Application filed June 18, 1894. Serial No. 514,994. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. EDWARDS, a citizen of the United States, residing in the city and county of New London and State of Connecticut, have invented certain new and useful Improvements in Steam or Hot-Water Heaters, which improvements are fully set forth and described in the following specification, reference being had to the accompanying sheet of drawings.

The object of this invention is to produce a hot water heater or steam generator the construction of which shall be such that a very large proportion of the water to be heated or converted into steam will be exposed to the action of the furnace heat and which shall also utilize to the greatest extent possible all of the caloric products of combustion. My said heater also provides for a free and constant circulation of water and reaches these desirable results by simple and easily constructed apparatus.

In order that my invention may be more readily explained and understood the accompanying drawings have been provided, in which—

Figure 1 illustrates my said heater in side elevation, the usual surrounding walls of brick work, used in connection with the same, being shown in vertical, central section, in order that the parts of the generator proper may be more clearly understood, and Fig. 2 is a plan view of a single section or system of steam pipes located within the furnace.

Referring to the drawings the letter *a* denotes a dome, supported upon walls of brick work *b* which serve to inclose a chamber *c* within which is located an ordinary furnace consisting of a grate *d* which serves to support the fire and beneath which grate is located the ash-pit *e*. Through the front wall of chamber *c* are openings *b'*—*b''* leading respectively to the fire-pot and ash-pit. Extending downward from dome *a* into chamber *c*, near the front end thereof, is a pipe composed of a large number of collars or ring-sections *g* said pipe being denoted as a whole by reference letter *e'* and at the opposite or rear end of chamber *c* is a similar pipe *f* likewise composed of ring sections *g*. In order to close the lower end of pipes *e'* and *f* the lower section *g'* of each of said pipes is

closed or formed cup shape as readily understood by reference to Fig. 1.

The several sections *g* composing pipes *e'* and *f* are supported and held in vertical alignment by means of a rod or bolt *h* passing centrally therethrough. The upper end of each rod or bolt *h* extends upward through an arch-shaped yoke *k* located over each opening from dome *a* to pipes *e'* and *f*, and such upper end of each rod or bolt is provided with a head *h'*. The lower end of each rod or bolt is threaded and passes outward from pipes *e'* and *f* through an opening provided therefor in the lower or cup-section *g'* of each of said pipes. A nut *h''*, when introduced on the threaded end of each of the rods *h* and screwed home against the cup sections *g'*, serves to bind closely together the several sections composing each pipe *e'* and *f* and to hold the upper end of each of said pipes in close contact with the dome *a*.

It will be seen by reference to Fig. 1 that each pipe *e'* and *f* is suspended from the center of yokes *k*, one or more of which yokes may be used in the manner substantially like the spokes of a wheel, and it will be also seen that by reason of the construction of yokes *k* the passage of water and steam from pipes *e'* and *f* to the dome or vice versa will be in no way retarded.

Each section *g* of pipe *e'* is connected by means of steam pipe *m* to its corresponding section *g* in pipe *f*, said steam pipe *m* being preferably disposed in a zigzag manner as shown in plan view in Fig. 2. Said pipes *m* extend laterally a considerable distance beyond the stand-pipes *e'* and *f* and serve to conduct the water by a zig-zag course toward pipe *e'*. The cooler portions of water, when returned to the stand-pipe *f*, are first influenced by those products of combustion that have been in a large degree relieved of caloric yet are enough hotter than said returning water to raise the temperature of the latter. As the water seeks to circulate and travel upward through pipes *m* the heat in the furnace grows more and more intense and said water is finally discharged from pipes *m* into the stand-pipe *e'* in a super-heated condition. Pipes *m*, are placed on an incline as shown and, to accomplish this, pipe *f* is made considerably longer than the pipe *e'*, said pipe

f being elongated by means of a pipe section *g*², of desired length, introduced between the sections *g* and the dome *a*.

When my device is in use water standing in pipes *f* is caused to travel by action of the heat upward through the inclined pipes *m*; into pipe *e'*, and thence into the dome displacing the cooler water which then passes downward into pipe *f* and as the same becomes heated, again passes into pipe *m* and it will then be understood that a complete and constant circulation of water is provided from the dome through pipe *f*, pipes *m* and pipe *e'* back to the dome, from which dome steam or water may be delivered through one or more pipes *a'* to be used for heat or power.

Suitably supported within chamber *c* and extending nearly to the dome *a* is a baffle-plate *n* and extending downward from said dome nearly to the floor is a similar plate *n'*, the location of said baffle-plates being readily understood by reference to Fig. 1. These baffle-plates *n* and *n'* fit within the spaces formed by the bends or turns in the pipes *m*, and serve to direct the products of combustion by an indirect course calculated to utilize the heat in the most economical manner until such products finally escape through an opening *o* provided in the rear wall of brick work *b* into a suitable chimney or flue.

Assuming now that a generator of the described construction is provided and ready for use (water having been introduced in any proper manner) and a suitable fire provided on grate *d*, it will be seen that the products of combustion will pass upward from said fire against the bottom of dome *a* around pipe *e'* and through pipes *m*, over baffle-plate *n* and down again through pipes *m*, under the lower end of baffle-plate *n'* and thence upward again through pipes *m* surrounding pipe *f* and finally outward through opening *o*, the directions taken by said products of combustion in its action upon pipes *e'*, *f* and *m* being shown by arrows in Fig. 1. It will thus be seen that said products of combustion will be utilized so long as any heat remains in the same.

An outlet pipe *p* may be provided leading from the lower cup section *g'* of pipe *f* by

means of which, when desired, water may be drained from the device, said last named section *g'* being the lowest point in which water will settle. This pipe *p* may also be utilized as a feed-pipe.

My device being composed of sections as described, may be made of any desired capacity, longer or shorter rods *h* being used in accordance with the number of sections *g* employed. It is very simple in its construction, is not expensive to produce, may be easily operated and serves to generate steam quickly with a comparatively small body of fire.

Having thus described my invention, I claim—

1. In a steam generator, in combination, a steam-dome of cylindrical form, water chambers *e' f* suspended from said dome, and pipes, arranged in an inclined horizontal zigzag form, connecting the said water chambers, substantially as specified.

2. In a steam generator, in combination, a steam-dome, having a hole in the under side near each end, a yoke over each hole, a water chamber suspended from the dome at each hole, comprising a series of sections, the bottom section being cup shape and perforated, a bolt through each chamber and its respective yoke, for securing the sections together and supporting them from the dome, and pipes connecting said water chambers; said connecting pipes being highest at the end immediately over the fire-pot, as and for the purpose specified.

3. In a steam generator, in combination, a cylindrical dome, a furnace, water chambers suspended from said dome within the said furnace, pipes arranged in horizontal zigzag form connecting said water chambers, and baffle-plates within said furnace for providing an indirect circulation between said connecting pipes, said plates fitting within the spaces formed by the bends or turns in the pipes all substantially as and for the purposes specified.

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Witnesses:

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