(No Model.)

C. H. ROSS.

BOILER.

No. 421,194. Patented Feb. 11, 1890.

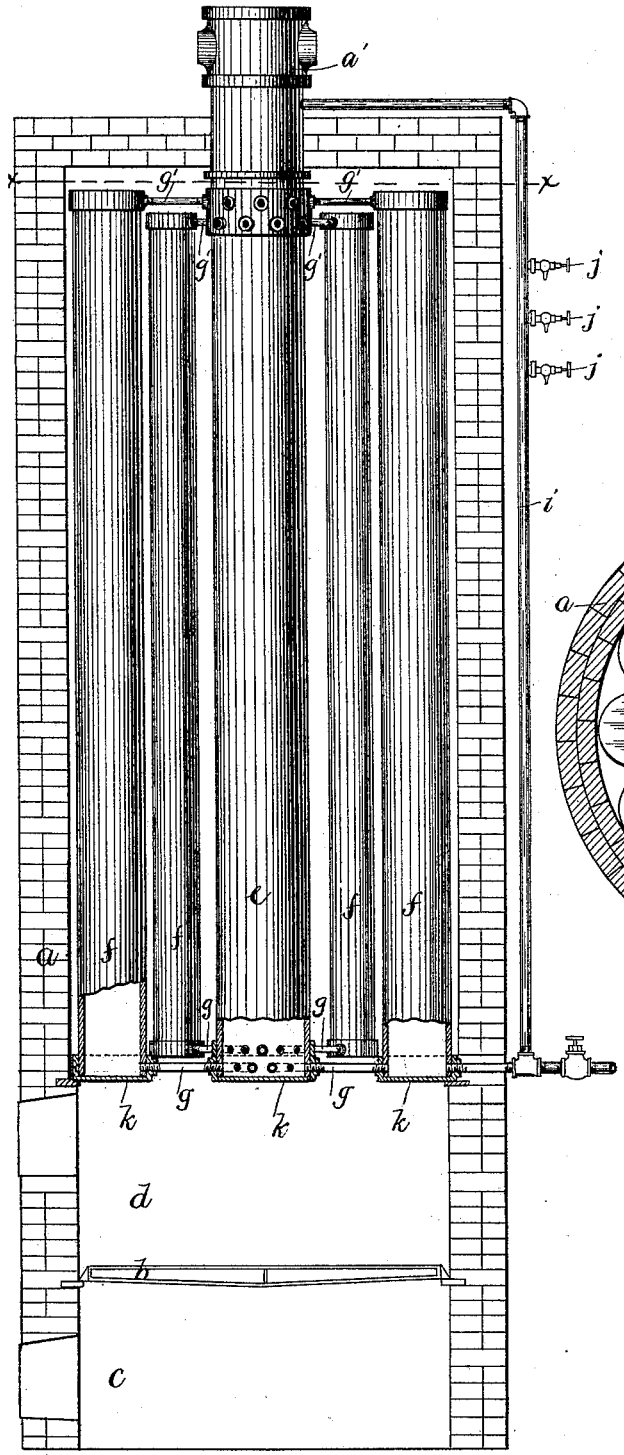

FIG. 1.

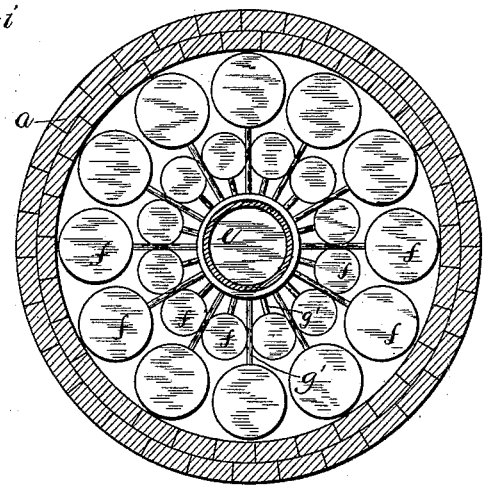

FIG. 2.

WITNESSES.
A. D. Harrison
H. E. Brown

INVENTOR.
C. H. Ross
by Wright Brown Quinby & Atty.

UNITED STATES PATENT OFFICE.

CHARLES H. ROSS, OF BOSTON, MASSACHUSETTS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 421,194, dated February 11, 1890.

Application filed June 10, 1889. Serial No. 313,649. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. ROSS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

This invention has for its object to provide a boiler of simple and inexpensive construction, adapted chiefly for either steam or hot-water heating apparatus.

The invention consists in a boiler or water-heater composed of a central vertical drum or cylinder and a series of smaller vertical drums arranged concentrically around the central drum and connected at their upper and lower ends with the upper and lower portions of the central drum, the lower ends of all of said drums being on practically the same level and located over a furnace or fire-box, the arrangement being such that the bottoms of all the drums are exposed to the heat from the fire, which also has access to the vertical sides or peripheries of the drums. The difference in size between the central drum and each of the smaller drums is such as to maintain a constant circulation of water, the water flowing in one direction in the central drum and in the opposite direction in the surrounding drums. An equalizing-pipe is provided outside of the central drum, said pipe communicating with the upper and lower portions of the central drum.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical section of my improved boiler and its casing or setting. Fig. 2 represents a section on line *x x*, Fig. 1.

The same letters of reference indicate the same parts in both of the figures.

In the drawings, *a* represents a casing or setting of masonry, at the lower portion of which is a furnace, of which *b* is the grate, *d* the fire-box, and *c* the ash-pit.

e represents the central vertical drum, and *f f* represent the surrounding drums, which are arranged concentrically around the drum *e* and are parallel therewith. The lower ends of the drums *e f* are practically on the same level, and are all above the fire-box, so that they are equally exposed to the heat. The lower ends of the drums *f* are connected with the lower end of the central drum *e* by radiating-pipes *g*, and the upper ends of the drums *f* are connected to the central drum at a point below the upper end of the latter by radiating-pipes *g'*. There is therefore a constant circulation of water from one end of the central drum into the corresponding ends of the surrounding drums *f* and from the opposite ends of the drums *f* into the central drum. The central drum is larger than either of the surrounding drums, and the difference in size is sufficient to cause the water to flow in one direction through the central drum and in the opposite direction through the surrounding drums, so that a constant circulation is insured. The central drum is extended above the surrounding drums and passes through the top of the setting *a*, above which it is provided with a head *a'*, having branches or connections for the pipes which conduct hot water or steam to the radiators.

In the preferred construction, and in order to utilize the space to the best advantage, the inner circle of drums *f'*, surrounding the drum *e*, is of somewhat smaller diameter than the drum *f*, which latter, it will then be seen, can be made large enough to form a complete circle, with but very small spaces between the drums, and the drums *f'* will occupy the most of the space so inclosed, and that without interfering with the connecting-pipes or circulation through all the drums.

i represents an equalizing-pipe, the main portion of which is arranged outside of the setting. Said pipe is connected at its upper end with the upper portion of the central drum *e* and at its lower end with the lower portion of said drum. Said pipe is provided at suitable points outside the setting or casing with gage-cocks *j*.

Each of the drums is a length of tubing, which may be of wrought-iron, steel, or other suitable metal. The drums are provided with flanged heads *k*, which are screwed upon or otherwise affixed to the ends of the drums. The connecting-pipes *g* are engaged with the heads of the drums *f* and *e*, and the pipes *g'* are also engaged with the heads on the upper ends of the drum *f*.

It will be seen that the drums constituting the chief portions of the boiler made of sections of tubing enable the boiler to be manufactured at a comparatively small expense.

For some purposes very light thin tubing may be employed, as when heavy pressure is not experienced.

The location of the drums with their lower ends at a practically uniform height above the fire-box is an important feature and insures a thorough and uniform circulation. It has been proposed to make a boiler composed of vertical tubes, one of which is central and the others arranged concentrically around it, as shown in Patent No. 294,875; but in that patent the outer tubes extend down to the grate and the water in them would be subjected to a higher degree of heat than that in the other tubes, so the circulation would be imperfect.

In my boiler the outer drums do not receive more heat than the others, and the arrangement is such that a continuous and rapid circulation is maintained.

I claim—

1. In a water-heater, the combination, with the fire-box and the central drum of relatively large diameter, of the series of drums of smaller diameter concentrically arranged around the same with their lower ends at substantially the same level above the fire-box, the independent heads secured to said drums at each end, and the pipes secured in said heads and connecting the top and bottom of the smaller drums with the top and bottom, respectively, of the large drum, substantially as described.

2. In a water-heater, the combination, with the central drum of relatively large diameter and the series of outer drums arranged concentrically around the same and connected thereto at top and bottom, of the series of smaller drums arranged concentrically around the inner drum within the circle formed by the outer drums and connected to the central drum at top and bottom, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 13th day of May, A. D. 1889.

C. H. ROSS.

Witnesses:
C. F. BROWN,
A. D. HARRISON.