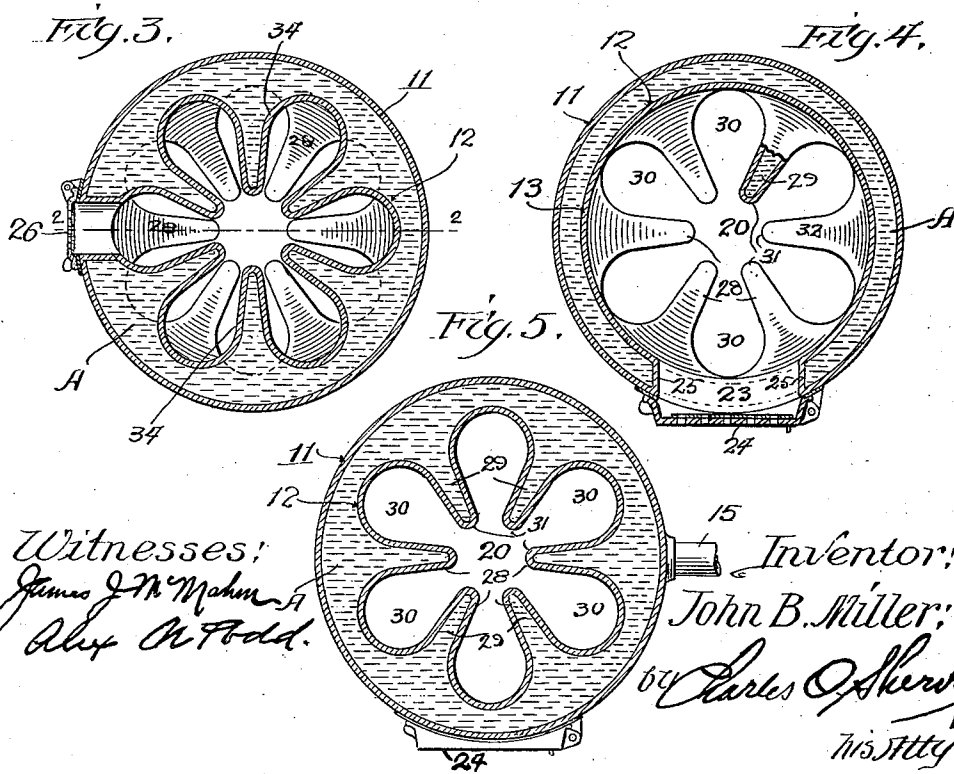
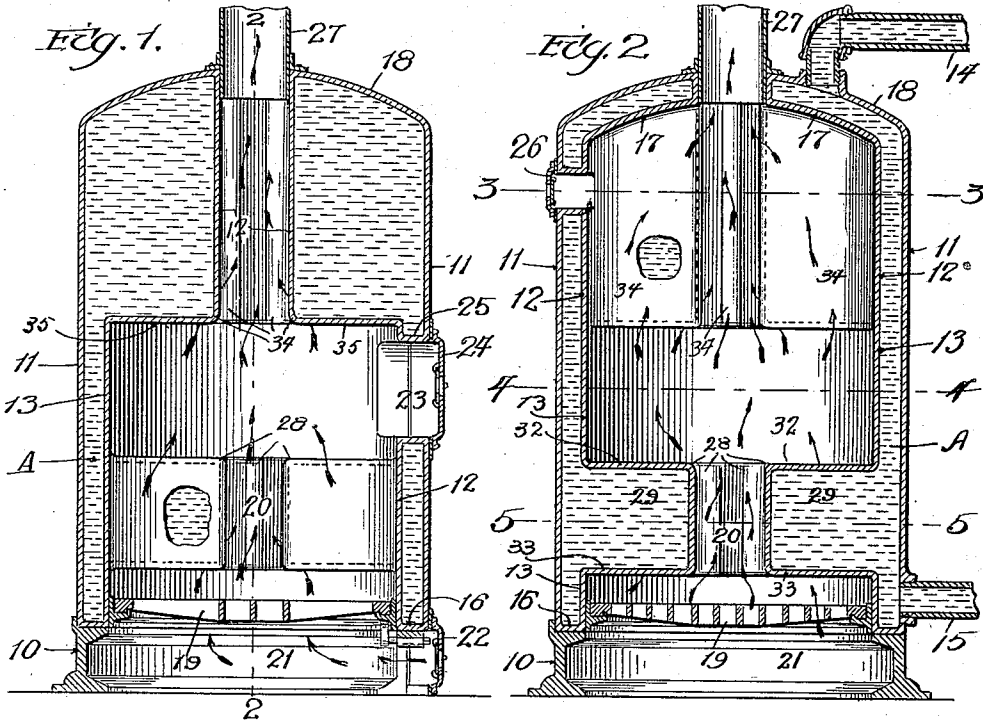


J. B. MILLER.
HOT WATER HEATER.
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1,018,256.

Patented Feb. 20, 1912.



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UNITED STATES PATENT OFFICE.

JOHN B. MILLER, OF CHICAGO, ILLINOIS.

HOT-WATER HEATER.

1,018,256.

Specification of Letters Patent.

Patented Feb. 20, 1912.

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To all whom it may concern:

Be it known that I, JOHN B. MILLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Hot-Water Heaters, of which the following is a specification.

This invention relates to hot water heaters or low pressure boilers, of that class adapted for heating dwellings or other buildings, but capable of heating water for other purposes, and its main object is to increase the heating efficiency of water heaters of this class.

Another object is to provide a water heater wherein the temperature of the water is raised quickly and economically maintained at a high degree of temperature.

Another object is to provide a water heater wherein the grate and inner shell of the water space coöperate to produce a subdivided firepot having a heating surface of abnormally large area arranged for direct contact with the body of burning fuel.

Other objects and advantages will appear in the course of this specification, and with said objects and advantages in view, this invention consists in the several novel features hereinafter described and claimed.

The invention is clearly illustrated in the drawing furnished herewith in which:—

Figure 1 is a central, vertical section through a hot water heater embodying one form of my invention, Fig. 2 is a central, vertical section taken on line 2—2 Figs. 1 and 3, Fig. 3 is a detail, horizontal section taken on line 3—3 Fig. 2, Fig. 4 is a detail, horizontal section taken on line 4—4 Fig. 2, and Fig. 5 is a detail, horizontal section taken on line 5—5 Fig. 2.

In the embodiment of the invention which I have chosen to illustrate its application, the heater has a base 10, on which rests the casing of the heater. An outer shell 11, here shown as of cylindrical formation, combined with an inner shell 12, comprises the casing of the heater and inclose a water space A, into which open the main feed pipe 14, and return pipe 15, of the system. The inner and outer shells are connected at the bottoms by an annular bottom 16, the top 17, of the inner shell preferably paralleling the top 18, of the outer shell. The heater is provided with a grate 19, of any well known

form of construction, above which is the fire box containing firepot 20, and below, the ash pit 21. Access to the ash pit is afforded through an opening closed by an ash door 22, and access to the fire box is afforded through an opening 23, closed by a fuel door 24. The inner and outer shells are joined by a web 25, that surrounds the opening 23. A check 26, opening into the interior of the inner shell, may be provided near the upper end of the heater, and a central opening may be provided at the top for a smoke flue 27. The exact location of the check and smoke flue openings are of course not material to the invention, broadly considered, but are convenient ones in the form of the invention illustrated in the drawing.

Immediately above the gate—that is at the firepot—the inner shell 12, is formed with radially disposed convolutions 28, that provide deep water pockets 29, and interspaces 30, therebetween, the water pockets being part of the water space of the heater, and the interspaces 30, entirely forming the wall of the firepot. The convolutions of the inner shell are somewhat in the form of radial, hollow ribs, extending inward toward the center of the heater and the ends 31, of said ribs all grouped around the center of the heater and spaced somewhat apart to leave a central space. The top and bottoms of the hollow ribs are closed by walls 32, 33, that extend in from cylindrical portions 13, of the inner shell. The convolutions 28 of the inner shell provide heating surfaces of abnormally increased area, and afford water pockets, extending into the fire bed, and whose walls contact directly with the mass of burning fuel. This construction evidently increases the heating efficiency in water heaters of this class without necessarily increasing their size and consumption of fuel. By reason of the gaps between the ends of the hollow ribs of the convolutions in the fire bed, the fire spreads readily from one interspace 30, to another and a large mass of burning fuel is thus provided, into which extend the pockets, containing thin or comparatively thin sheets of water, thus making it possible to quickly and economically heat small quantities of the water and thereby cause a rapid circulation of hot water.

Above the water pockets in the fire box

may be arranged a second series of water pockets, formed by radially disposed convolutions 34, of the inner shell 12, substantially like those below; said convolutions 5 present hollow rib structures like the ones below, but are preferably arranged in staggered relation thereto, whereby the flames and products of combustion arising from the interspaces of the subdivided firepot below, may strike the bottoms of said pockets and pass through the interspace between the hollow ribs. As shown said upper convolutions may extend down from the top 17, of the inner shell to a plane just above the 15 fuel door 24, where they are provided with bottom walls 35.

From the above it is perfectly obvious that the water space provided between the shells, 11, 12, embraces, in addition to the annular 20 space between the shells, lower pockets arranged contiguous with the fuel, and practically embedded therein, and also upper pockets staggered with respect to the lower pockets, and providing interspaces for the 25 circulation and escape of the flames and products of combustion.

By arranging the walls of the convolutions in an upright manner, there are no horizontal ledges for collecting soot, etc., with the 30 exception of the tops of the lower water pockets, so that practically no effort is required for maintaining the surfaces of the inner shell clean.

I realize that various alterations and modifications of this device are possible without 35 departing from the spirit of my invention, and I do not therefore desire to limit myself to the exact form of construction shown and described.

40 I claim as new and desire to secure by Letters Patent:

1. A hot water heater, comprising a casing formed with a water space surrounding a firebox and having radially disposed water 45 pockets and interspaces therebetween at the bottom of the firebox, forming a subdivided firepot.

2. A hot water heater, comprising inner and outer shells having therebetween a water 50 space, the inner shell being formed with radially disposed convolutions around the fire bed of the firebox and providing water pockets and interspaces therebetween, the interspaces opening into a central space in the 55 fire bed and forming a subdivided firepot.

3. A hot water heater, comprising inner and outer spaced shells having therebetween a water space, the inner shell inclosing a firebox and having radial convolutions providing 60 ing water pockets opening from said water space, and interspaces therebetween, located immediately above a grate and co-acting therewith to form a subdivided firepot.

4. A hot water heater, comprising inner

and outer spaced shells, forming therebetween a water space, the inner shell inclosing a firebox and being formed with radial hollow ribs, the hollows of which open from said water space, said ribs providing therebetween interspaces and located immediately 70 above grate bars to form a subdivided firepot.

5. A water heater, comprising inner and outer spaced shells forming therebetween a water space, the inner shell having radially 75 disposed hollow ribs projecting in toward the center of the heater at the fire bed portion and providing water pockets therein opening to said water space, and interspaces therebetween coöperating with a grate to 80 form a subdivided firepot.

6. A water heater, comprising inner and outer spaced shells, the inner shell being formed with convolutions surrounding a central open space, said convolutions providing water pockets opening from said water 85 space, and providing interspaces therebetween opening directly to the central opening and coöperating with a grate located immediately below said convolutions to form a 90 subdivided firepot.

7. A water heater, comprising a cylindrical outer shell, and an inner shell having a cylindrical portion, and formed with radially 95 disposed narrow hollow ribs projecting inward below said cylindrical portion, and providing thin water pockets opening from the space between said outer and inner shells, said ribs providing interspaces therebetween, coöperating with a grate to act as a subdivided 100 firepot.

8. A water heater, comprising inner and outer shells, having therebetween a water space, said inner shell being formed with sets of upper and lower radially disposed 105 convolutions providing pockets opening from said water space, and interspaces therebetween, the convolutions of one set being staggered with respect to the other and the interspaces of the lower set acting in conjunction with a grate to form a subdivided 110 firepot.

9. A water heater, comprising inner and outer shells having therebetween a water space, said inner shell being formed with 115 upper and lower convolutions, each providing water pockets opening from said water space, and interspaces therebetween, the interspaces of the lower convolutions being staggered with respect to those of the upper ones and co-acting with a grate to form a subdivided firepot. 120

10. A water heater, comprising inner and outer shells, having a water space therebetween, the inner shell being formed with a cylindrical portion, and two sets of radially 125 disposed convolutions, one set above and one set below said cylindrical portion, said con-

volutions providing water pockets and interspaces therebetween, the interspaces of the lower convolutions being staggered with respect to those of the upper convolutions and
s co-acting with a grate to form a subdivided firepot.

In testimony whereof, I have hereunto

signed my name at Chicago, Cook county, Illinois, this 24 day of October 1911.

JOHN B. MILLER.

Witnesses:

JAMES J. McMAHON,
ALEX. N. TODD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
