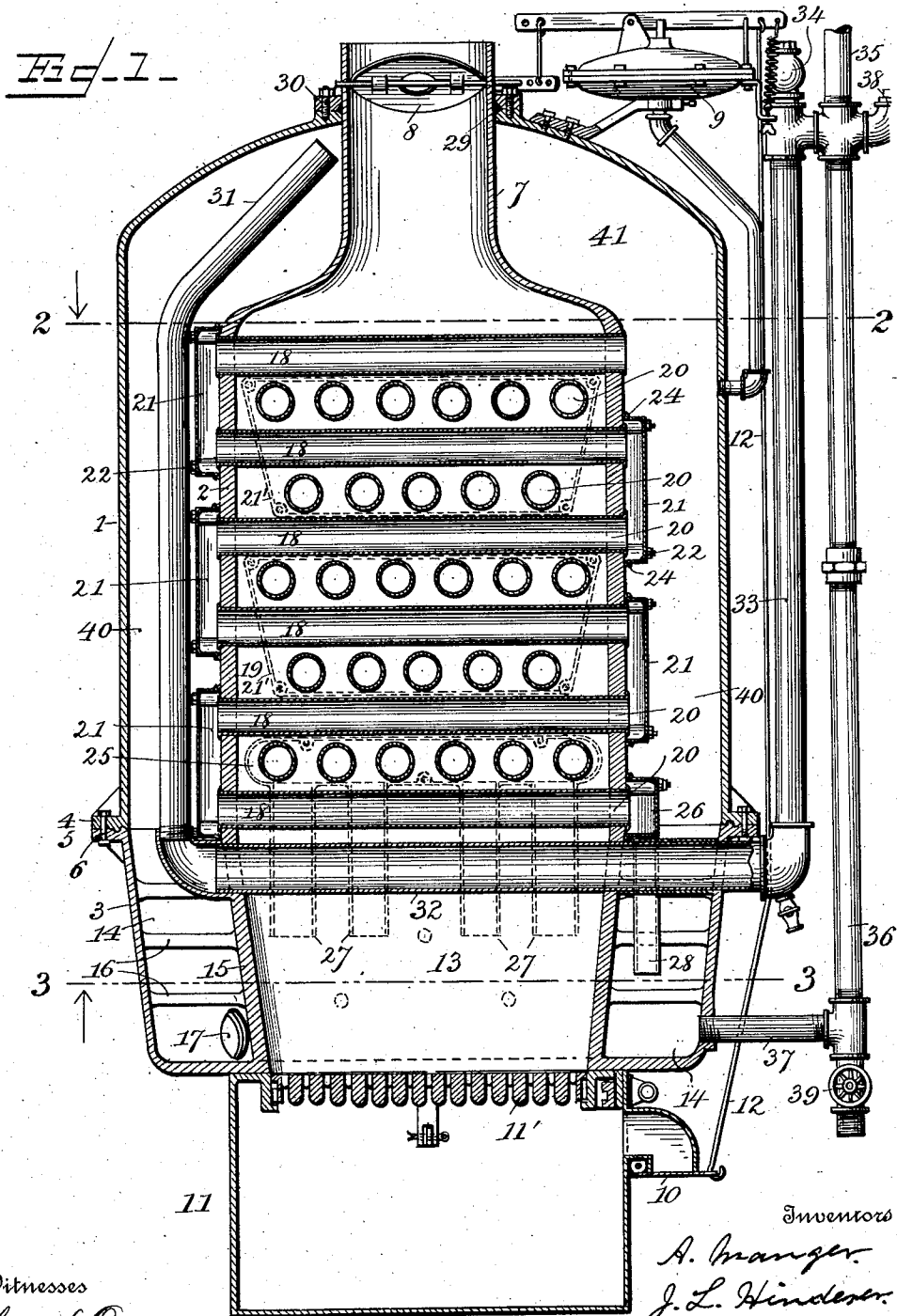


A. MAUGER & J. L. HINDERER.
 STEAM OR HOT WATER HEATER.
 APPLICATION FILED JULY 20, 1911.

1,027,389.

Patented May 21, 1912.

4 SHEETS-SHEET 1.



Witnesses

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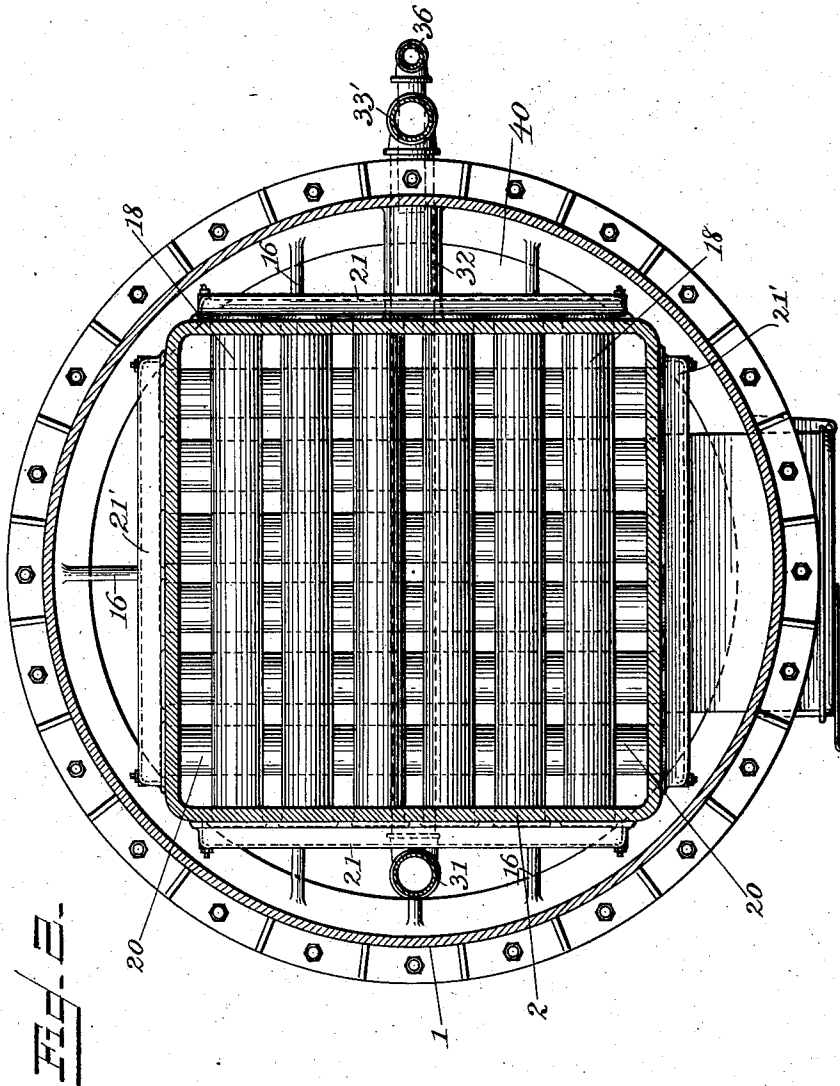
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4 SHEETS-SHEET 2.



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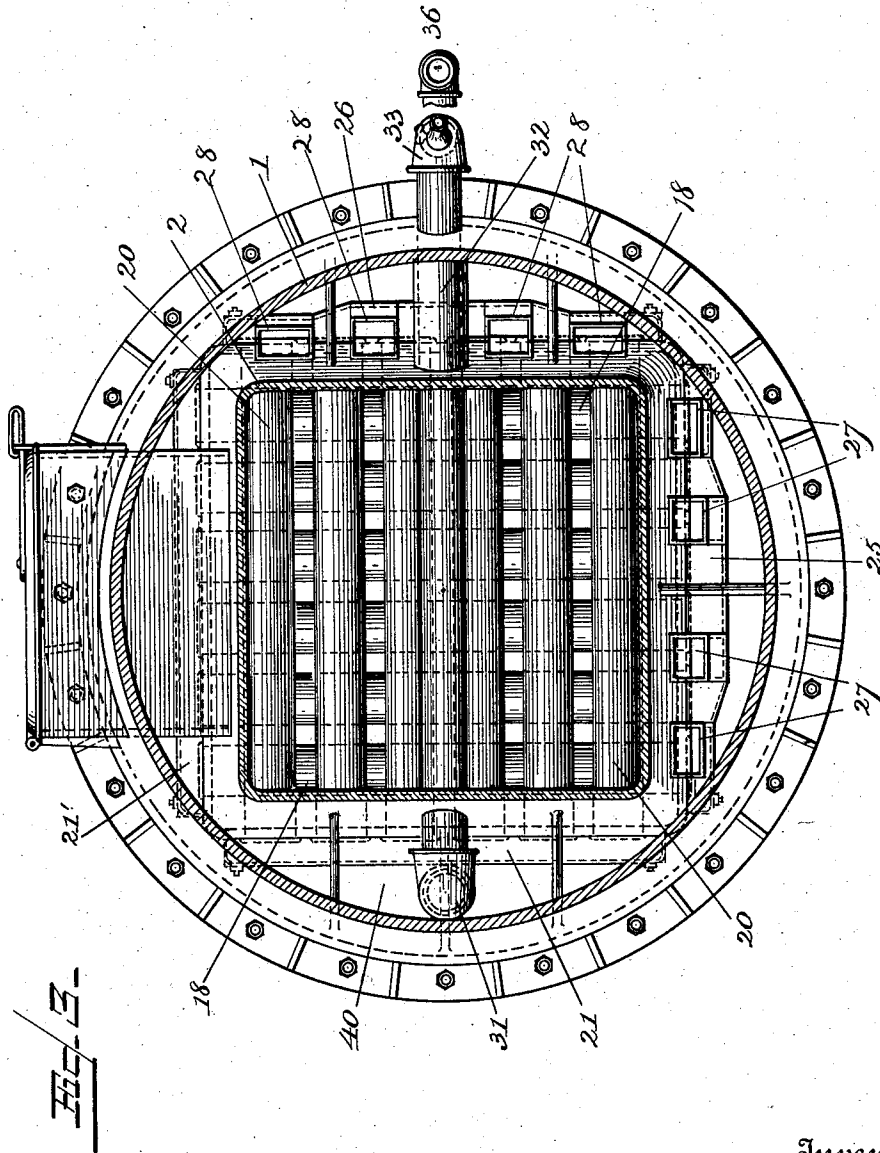
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 4

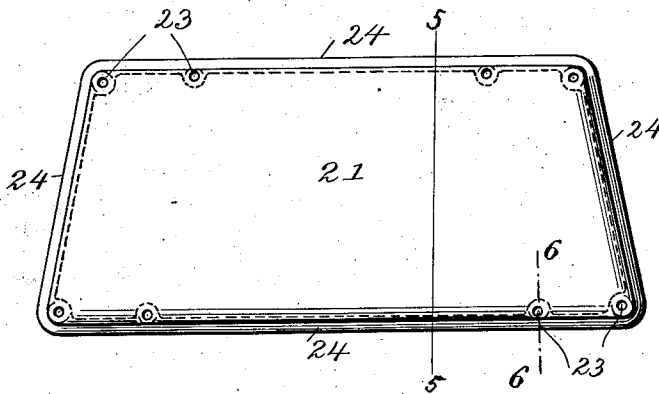


Fig. 5 Fig. 6

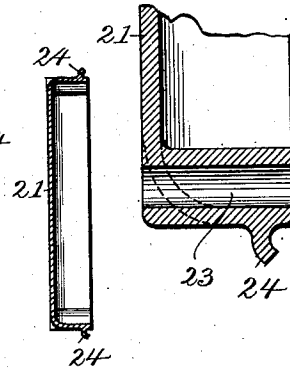


Fig. 7

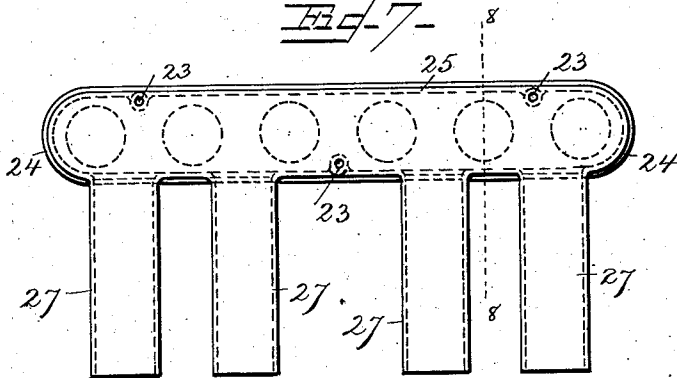


Fig. 8

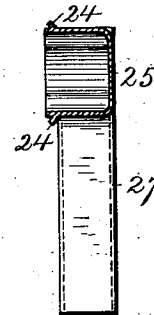
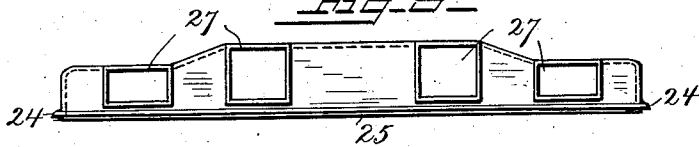


Fig. 9



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UNITED STATES PATENT OFFICE.

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STEAM OR HOT-WATER HEATER.

1,027,389.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed July 20, 1911. Serial No. 639,597.

To all whom it may concern:

Be it known that we, ANDREW MAUGER and JESSE L. HINDERER, citizens of the United States, residing at Massillon, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Steam or Hot-Water Heaters; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates primarily to means for furnishing heat for buildings, has especial reference to devices in which steam or hot water is used as the heating medium, has for its object economy in construction and in the consumption of fuel and efficiency in operation; and the invention consists in certain improvements in construction, which will be hereinafter described and claimed.

In the accompanying drawings, which form part of this specification:—Figure 1 represents a vertical transverse section partly in elevation of a heater embodying our invention. Fig. 2 is a transverse or horizontal section on line 2—2, Fig. 1, looking down. Fig. 3 is a like view on line 3—3, Fig. 1 looking up. Fig. 4 is an elevation of one of the headers detached. Fig. 5 is a transverse section of the same on line 5—5 Fig. 4. Fig. 6 is an enlarged sectional detail of part of one of the headers. Fig. 7 is an elevation of the lower header provided with drop-tubes, detached. Fig. 8 is a vertical transverse section of the same on line 8—8, Fig. 7, and Fig. 9 is an inverted plan of the header shown in Fig. 7.

Reference being had to the drawings and the designating characters thereon, the numeral 1 indicates the upper part or section of the outer casing of the heater, 2 the inner casing which is provided at its lower end with an extension 3 which is connected to the outer casing by flanges 4, 5, respectively and bolts 6, in the usual manner. The upper end of the inner casing is provided with a stack 7 which extends through the upper end of the outer casing and is provided with a damper 8 operated by a fluid pressure damper regulator 9, of any preferred and approved form of construction, and to

which a draft regulating member or door 10, admitting air into the ash pan 11, below the grates 11', is connected by rod 12. The damper and draft regulator requires no further elucidation, as it forms no part of the present invention.

13 indicates the furnace or fire-box, which is surrounded by a water-leg 14 between the wall 3 and the wall 15, and in which water-leg are stiffening bars 16. The water-leg is provided with suitable openings 17 for cleaning purposes, provided with suitable screw-plugs, not shown.

18 indicates horizontal water tubes, which are supported at their ends in the wall 2 of the inner casing and extend across the combustion chamber 19, between the four walls of the inner casing. 20 indicates like water tubes which also cross the combustion chamber, preferably at a right angle to the tubes 18 and are supported at their ends in the wall 2 of the inner casing, as shown in Figs. 1, 2 and 3.

21, 21' indicate headers secured to the wall 2 by bolts 22 which pass through openings 23, shown in Fig. 8, and on the headers are flanges 24 which engage suitable packing or other material to produce a tight joint between the headers and the outer surface of the wall 2.

25, 26, respectively indicate the lower headers which are provided with drop-tubes 27, 27, and 28, which extend down into the water-leg.

29 indicates a packing around the stack 7, which is secured in position by an annular flange 30, as shown in Fig. 1.

31 indicates a pipe extending up into the steam space of the heater or boiler to take steam from its highest point and conduct it down into a pipe 32 which crosses the fire-box above the fuel, and in which the temperature of the steam is increased, and from which the steam passes through pipe 33 provided with a low pressure safety valve 34, into pipe 35, and on to the radiators in the building to be heated.

The several parts described, except the water tubes 18 and 20, are preferably made of cast iron, but the tubes may be cast integral with the inner casing 2 and may be manufactured at low cost of construction.

36 indicates the return pipe for water of

condensation from the radiators, which water is conducted into the water-leg 14 by pipe 37.

38 indicates a refilling plug and 39, a valve or stop-cock for drawing off the water from the boiler and the radiators when hot water is used as the heating medium. When hot water is used, the position of pipe 31 must be varied accordingly, so as to take the water from the highest point in the boiler and conduct it through pipe 32 in the fire-box 13 for delivery to the pipe 33 and the radiators in the building.

In the operation of the heater or boiler, water from the water-leg 14, rises through drop tubes 28 into headers 26, flows through the lower group of tubes 18 into header 21, then rises and flows on upward successively through the several groups of tubes 18 and headers 21 until it reaches the top group of said tubes, when it is discharged into the water space 40 between the inner and outer casings 1 and 2. Water rising through drop tubes 27 flows into header 25, thence through group of tubes 20 and headers 21' upward successively until it reaches the top group of tubes 20, when it is discharged into the water space 40.

The steam rising in the steam space 41 is subject to the heat of the waste products of combustion passing through the stack 7, thus utilizing the heat units produced by the fuel to their maximum.

Having thus fully described our invention, what we claim is—

1. A heater comprising a casing provided with alternately arranged groups of water tubes at an angle to each other, a water leg, drop tubes communicating with said leg and with said water tubes and headers connecting the water tubes in alternate groups, and an inclosing casing.

2. A heater comprising a casing having a water leg formed therein, groups of water tubes at an angle to each other and engaging the walls of said casing, headers communicating with the lower of each group of tubes and provided with drop tubes extend-

ing into said water-leg, and headers connecting the alternately arranged groups of tubes, and an inclosing casing.

3. A heater comprising a casing having a water-leg therein, groups of water tubes at an angle to each other and supported in the walls of said casing, drop-tubes communicating with said water-leg and said tubes, headers connecting alternate groups of tubes, and a casing surrounding the tubes and the headers and in conjunction with the tube supporting-casing forming a water space.

4. A heater comprising a casing having a water-leg, a concentrically arranged fire pot and a combustion chamber above the fire-pot, water tubes in alternate groups arranged at an angle to each other within the combustion chamber and supported in the walls thereof, headers connecting said groups of water tubes, and an inclosing casing.

5. A heater comprising a casing having a water-leg, a concentrically arranged fire-pot, a combustion chamber above the fire-pot, groups of water tubes at an angle to each other and crossing the combustion chamber, headers connecting said groups of water tubes, and an inclosing casing connected to the outer wall of the water-leg.

6. A heater comprising an inclosing casing, a casing provided with a water-leg, horizontally arranged groups of water tubes at an angle to each other, supported in the latter casing and communicating with said water-leg, an annular water chamber and an annular steam chamber formed by said casings and an extension of the latter casing, and a pipe communicating with the steam chamber, extending through the fire-box and connecting with a supply pipe.

In testimony whereof we affix our signatures, in presence of two witnesses.

ANDREW MAUGER.

JESSE L. HINDERER.

Witnesses:

JOHN A. GRAHAM,

JOHN C. LOWE.