(No Model.) 2 Sheets—Sheet 1.

E. L. SCHNEIDER.

WATER HEATER.

No. 595,211. Patented Dec. 7, 1897.

Fig. 1.

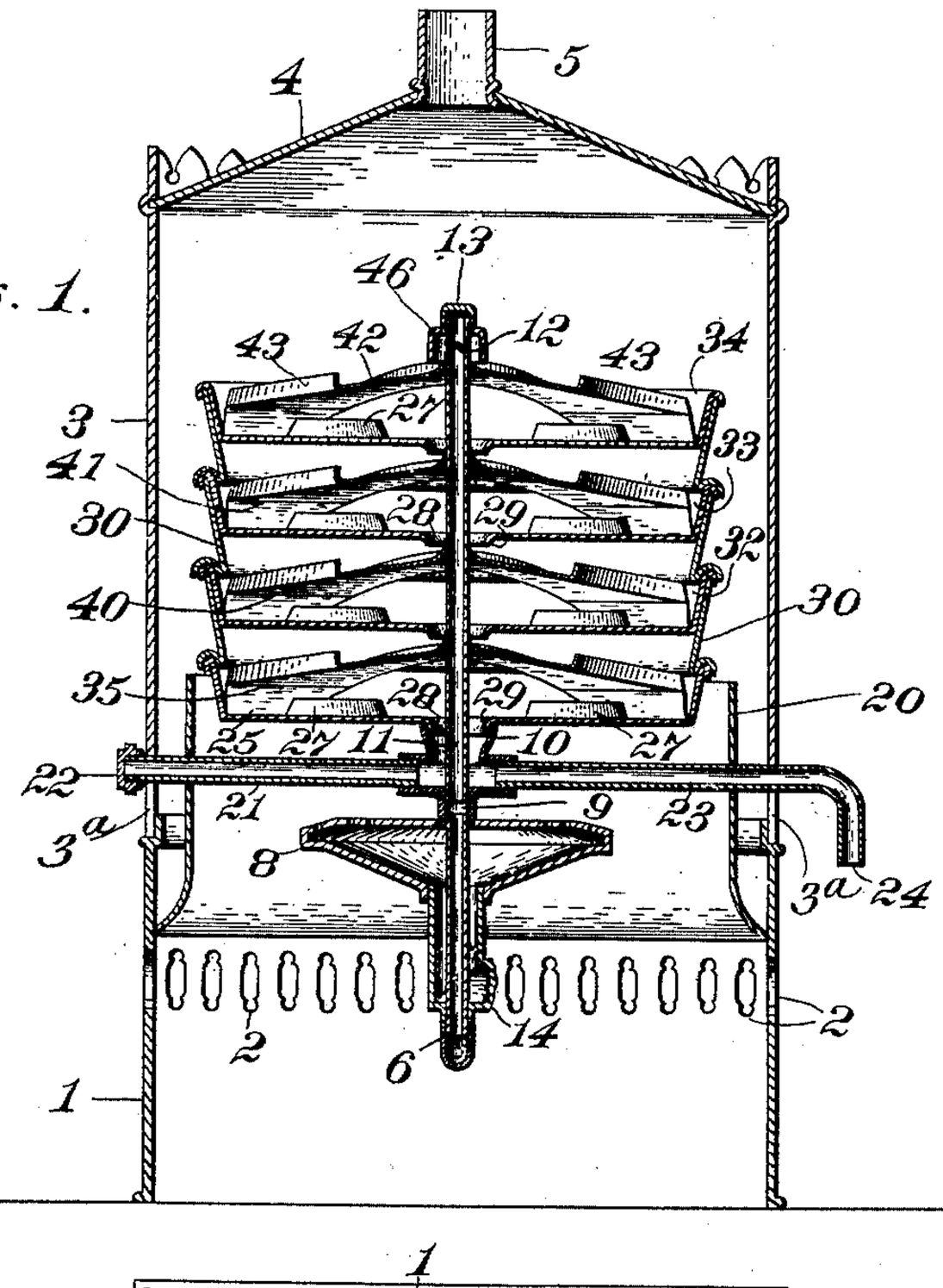
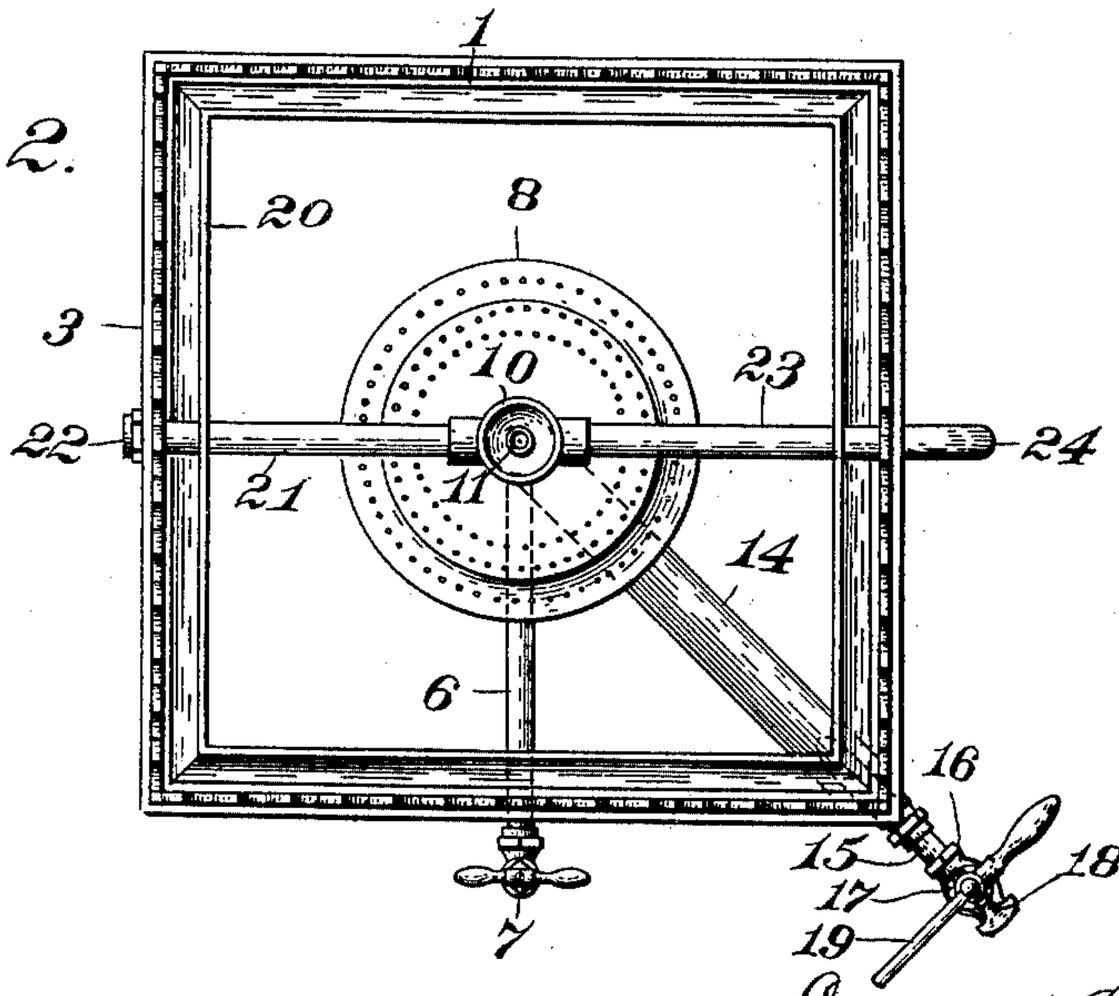


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

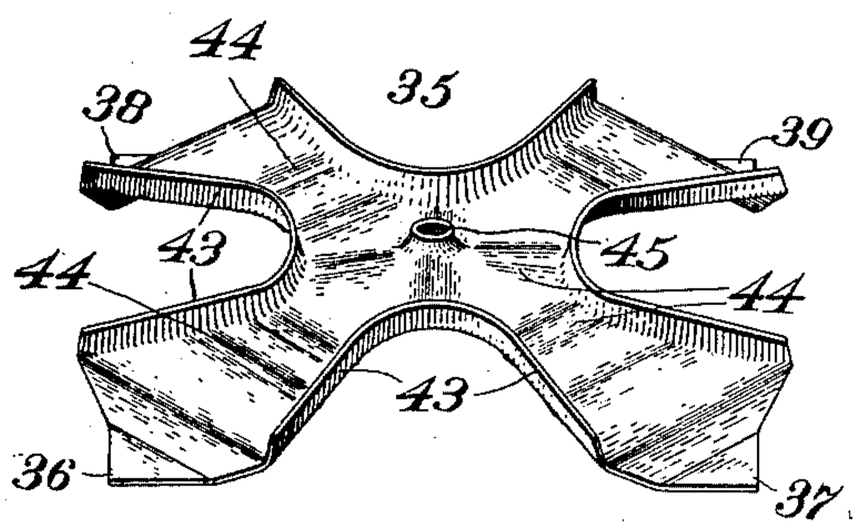


Fig. 4.

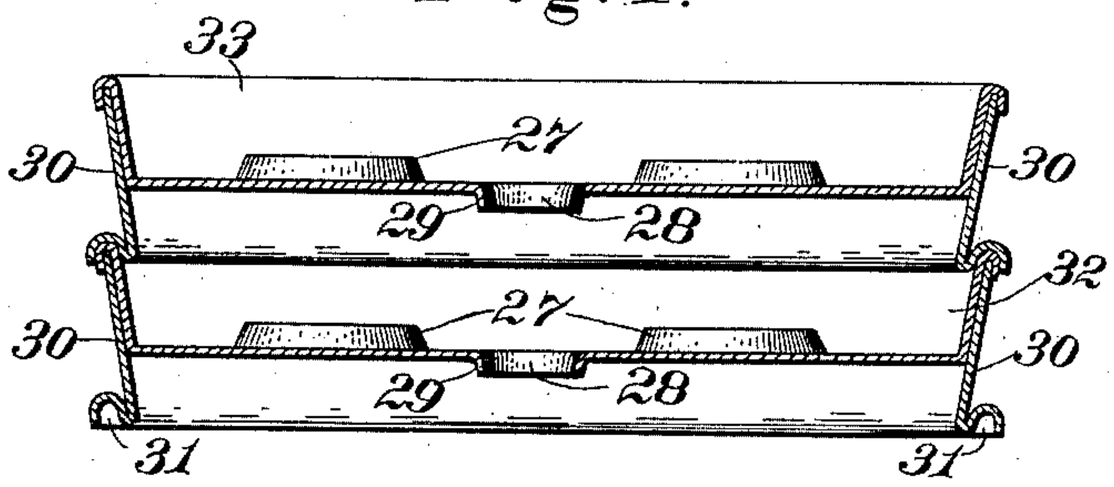
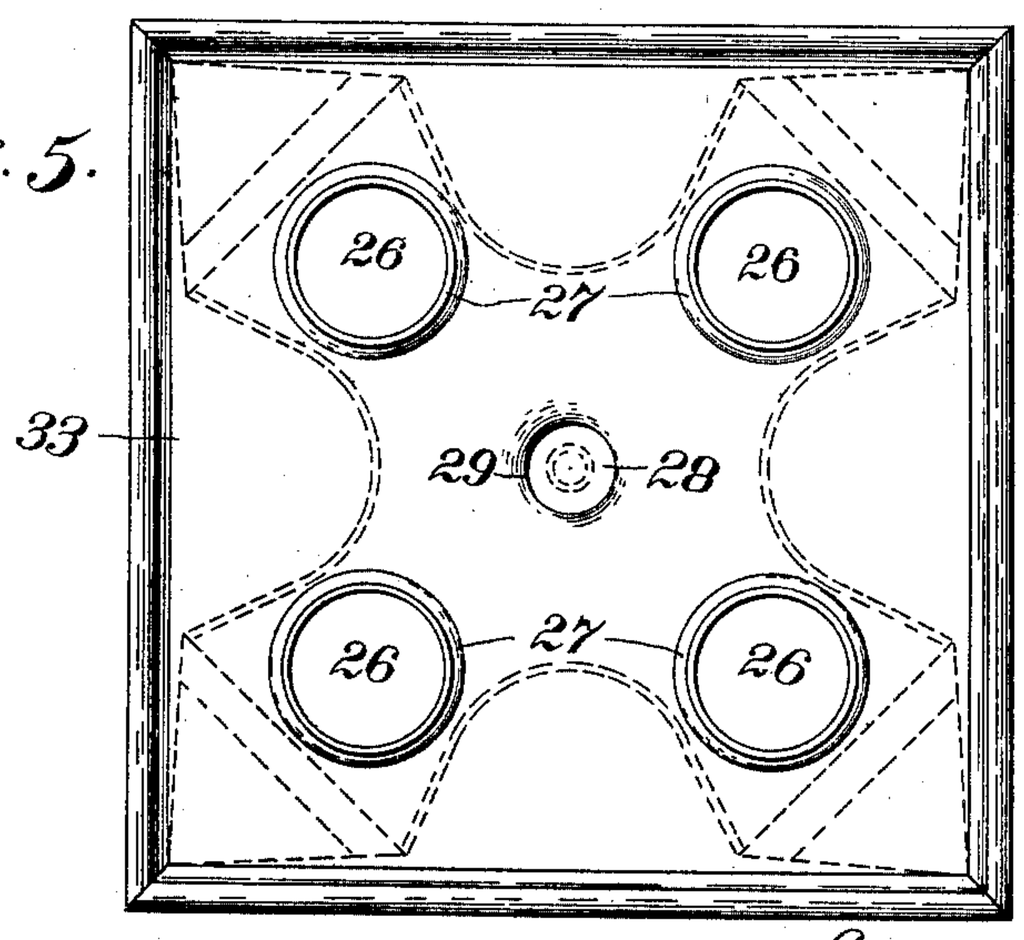


Fig. 5.



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UNITED STATES PATENT OFFICE.

EMANUEL L. SCHNEIDER, OF ANN ARBOR, MICHIGAN.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 595,211, dated December 7, 1897.

Application filed February 8, 1897. Serial No. 622,558. (No model.)

To all whom it may concern:

Be it known that I, EMANUEL L. SCHNEIDER, a citizen of the United States, residing at Ann Arbor, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Water-Heaters; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to instantaneous water-heaters, and has for its object the improvement of devices burning gas or oil for heating water to be used for lavatory or culinary purposes in the shortest time.

My invention consists particularly in the original construction and arrangement of the superimposed pans found in many heaters of this character and in the provision of sheet-metal forms between adjacent pans, each form filling the dual office upon the lower and upper sides, respectively, of a spreader for the ascending heated products of combustion and a runway through which the water introduced at the top in its descent reaches each pan. A considerable increase of water-heating surface is obtained by the introduction of the sheet-metal forms.

Each constituent element of my invention is described in detail and its office, together with the mode of operation of the whole, fully explained hereinafter.

Referring to the accompanying drawings, wherein like numbers designate like parts throughout the several views, Figure 1 represents a vertical mid-sectional view of my invention. Fig. 2 represents a top plan view with pans and sheet-metal forms removed, showing burner, gas and water pipe connections, and stop-cocks. Fig. 3 represents a perspective view of one sheet-metal form. Fig. 4 represents a vertical section of two pans detached, one above the other, showing their construction and manner of supporting one upon the other. Fig. 5 represents a plan view of one pan, the broken lines indicating the position of the form related to that pan.

Considering Fig. 1, there will be seen a casing, usually of tinned sheet-iron, consisting of a lower portion 1, provided with a horizontal series of apertures 2, a body portion 3, having an ornamental upper edge, and a pyramidal top 4, opening into and supporting a cylindrical chimney 5. Chimney 5 is fixed to top 4, the top being supported and secured within casing portion 3 near its ornamental edge in any convenient manner. (See Fig. 1.) Through casing portion 1 passes water-supply pipe 6. At its outer end pipe 6 joins a cut-off cock 7, which may itself be connected to water-service pipes or a reservoir. Within the casing pipe 6 turns upwardly and passes centrally through an ordinary crown or spray gas-burner 8, terminating in a vertical and screw-threaded orifice 9 of a cross-pipe or catch-basin 10. Orifice 9 fills the office of a pipe-coupling joining pipe 6 with a perpendicular pipe 11. Pipe 11 near its upper end is pierced by a number of holes 12, while its extreme end is closed by a cap 13, as my invention is customarily made. Burner 8 possesses a mixing-chamber 14, (see Fig. 2,) and a pipe 15 leads from it through casing portion 1 to a gas-cock 16, which may be connected with the supply of gas. Burner 8 is operated upon the Bunsen principle. The stem 17 of gas-cock 16 is hollow and permits gas to flow through it. A second gas-cock 18 is joined to stem 17, and projecting from cock 18 is an igniting-tube 19. Though closed as regards burner 8, gas may flow through the stem of cock 16 and be admitted to tube 19 by cock 18. A jet from tube 19, in flame, will be turned toward burner 8 as cock 16 is opened to admit gas thereto. The body portion 3 of the casing is not permanently secured to the lower portion 1. When it is desired to light burner 8, portion 3 of the casing is lifted and the jet of flame from igniting-tube or pilot-burner 19 turned toward the main burner. The act of directing burner 19 turns stem 17 of cock 16 and admits gas to main burner 8. Parts 16 to 19 being of known construction and operation need not be further explained.

In Figs. 1 and 2 will be observed a galvanized-iron heat-shield 20, fitting the casing interiorly.

Again considering Fig. 1, catch-basin 10 will be seen to join two pipes, affording outlets therefrom. One of these pipes 21, after passing through shield 20 and casing portion 3, is closed by a removable cap 22. The remaining outlet-pipe 23, after passing through shield and casing, is bent downwardly to form a spout 24. The shield or lining 20 is sup-

ported by pipes 21 and 23, as shown, and a part of the shield is cut away or a suitable orifice provided through which the jet of flame from tube 19 may reach the burner. As it would unnecessarily add to the drawings, this orifice through the shield is not shown. To enable portion 3 of the casing to be readily removed and replaced, recesses 3ª 3ª are cut from the lower edge upon opposite sides, and pipes 21 23 enter the recesses when portion 3 is placed upon portion 1 of the casing.

The shape of bottom pan 25 of the series or "stack" of pans appears in Fig. 1, and in Fig. 5 the position of the flanged apertures 26 is shown. Ordinarily the pans of my invention are rectangular, and apertures 26 are formed one near each corner, and it will be noted that the flanges 27 rise above the bottom of the pan, thus preventing water from falling through the apertures until a certain depth has accumulated, while affording ample passage for hot gases. Central aperture 28 (see Fig. 5) is usually less in diameter than the others through the same pan and is encircled by a flange 29, turned oppositely—that is to say, projecting below the bottom of the pan. Water at any depth flows freely through aperture 28 and drips from flange 29. Attention is called to the fact that central aperture 28 and flange of bottom pan 25 direct the falling water into catch-basin 10, to be finally discharged through spout 24.

With the exception of the extra side walls 30, possessing the lower edge grooves 31, (see Fig. 4,) each of the remaining pans 32 33 34 is a substantial copy of bottom pan 25. Each has corner apertures 26, encircled by upturned flanges 27, and central apertures 28, surrounded by depending drip-flanges 29, in all respects identical with those described in connection with pan 25. Side walls 30 guard the casing from heat and prevent the escape of gases. They extend entirely around each pan, except pan 25.

In Fig. 3 is represented in full the quadrupedal sheet-metal form 35, having the four points or feet 36 37 38 39, designed to rest in the corners and upon the bottoms of the pans 25 32 33 34, as indicated by broken lines in Fig. 5. There are four of these forms (numbered 35 40 41 42) and they are arranged one in each pan, as shown in Fig. 1. Each form has upturned edges 43 and transverse wrinkles or baffles 44, and it will be understood that upon the upper surface of the form the water spreads out between edges 43 in flowing toward the feet, while the lower surface of the form retards and spreads the ascending products of combustion. Each form has also a central aperture 45, numbered only once in Fig. 3, which fits somewhat closely the perpendicular pipe 11.

Let the parts be assembled as indicated in Fig. 1, pipe 11 being screwed into orifice 9 of catch-basin 10, casing portions 3 and 4 being removed, whereupon it will stand perpendicularly and rigidly. Now unscrew cap 13 and slip the pans and forms alternately by means of their central orifices upon the pipe 11. It will be noted (see also Fig. 4) that grooves 31, edging the extra side walls of each pan, engage the upper edges entirely about the pan immediately beneath. Usually the catch-basin supports the stack of pans, which is very light even though water be flowing through the system. Any other convenient support may obviously be introduced within the purview of my invention. Then a thimble or hood 46, having a threaded orifice adapted to engage the end of pipe 11, is placed thereupon to receive internally the jets of water issuing from holes 12 and cause them to fall upon upper form 42. Cap 13 and the casing may now be replaced.

Assuming the burner to be lighted and the water turned on, it is believed to be clear from the foregoing that the upper surface of every pan and form will be continually covered with water and their lower surfaces subjected to hot gases.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a water-heater, the combination of a pan having a discharge-opening through the central portion thereof, and flanged openings 27, an outlet-pipe leading from said discharge-opening, a metal form supported in said pan and having a central portion arranged to cover the discharge-opening of said pan, and distributing portions adapted to cover said flanged openings, piping for supplying water to said form, and a burner adapted to heat the pan and form, substantially as described.

2. In a water-heater, the combination of a pan having a discharge-opening through the central portion thereof, and flanged openings 27, an outlet-pipe leading from said discharge-opening, a metal form 42 supported in said pan having a central portion arranged to cover the discharge-opening of said pan, and distributing portions adapted to cover said flanged openings, the distributing portions of said form provided with transverse corrugations, piping for supplying water to said form, and a burner adapted to heat the pan and form, substantially as described.

3. A water-heater, comprising a series of pans, each pan having a discharge-opening, flanged openings 27 and a flanged rim, the pans being connected by walls 30, each wall adapted to form a seat for a pan above and being provided with a flange at its lower portion adapted to rest upon the flanged rim of the pan below, an outlet-pipe leading from the discharge-opening of the lowest pan, piping for supplying water, and a burner adapted to heat said pans, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EMANUEL L. SCHNEIDER.

Witnesses:
M. J. CAVANAUGH,
GEO. J. HALLER.