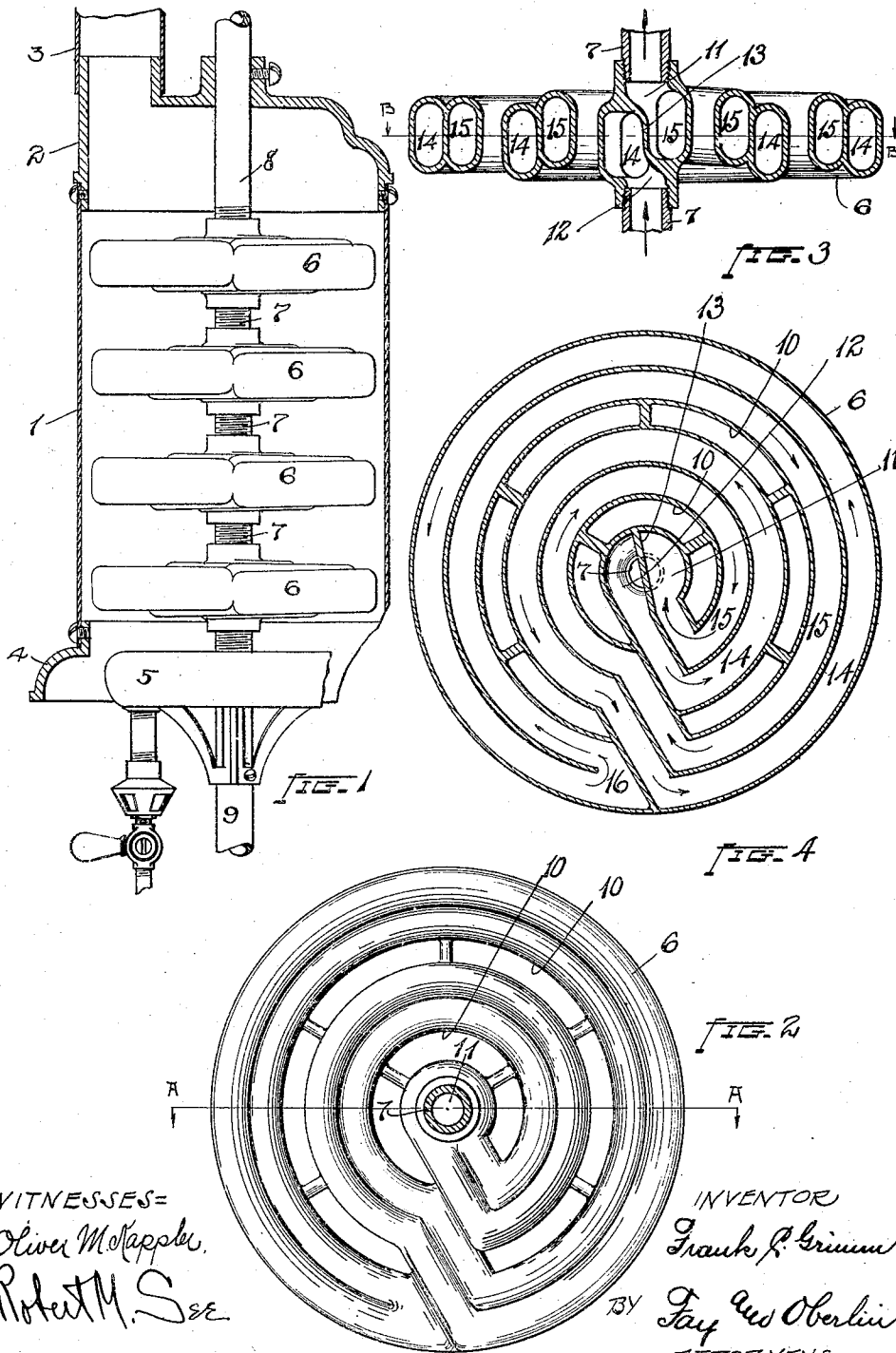


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WATER HEATER.
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1,053,491.

Patented Feb. 18, 1913.



WITNESSES=
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WATER-HEATER.

1,053,491.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK C. GRIMM, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Water-Heaters, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to water heaters, and its general object is the provision of a heater of the sectional type in which the water may be subjected to a large heating surface and which at the same time will occupy but a comparatively small space.

To the accomplishment of these and related objects, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail a certain construction embodying the invention, such disclosing means constituting, however, but one of various forms in which the principle of the invention may be used.

In said annexed drawing:—Figure 1 is a broken elevation of the improved heater with the casing shown in section; Fig. 2 is a plan view of one of the sections of the water container; Fig. 3 is a section on the line A—A of Fig. 2 and Fig. 4 is a section on the line B—B of Fig. 3.

The heater comprises broadly a water container surrounded by a casing which may be of any desired form or construction. In the drawing is illustrated a casing comprising a cylindrical section 1 surmounted by a top 2 having a flue 3 and provided at its lower end with a bottom member 4 inclosing a burner 5 with which is connected a fuel inlet provided with a valve and regulator.

The water container inclosed within the casing comprises a plurality of similar sections 6 which are connected with each other by threaded nipples 7, the uppermost section being connected with an outlet pipe 8, and the lower section connected with an inlet pipe 9. Each section 6 is in general form a coil, preferably of the form shown in Figs. 2 and 4, in which it will be seen to comprise concentric convolutions connected successively with each other, and having

spaces 10 between the successive convolutions. At the center of the coil there is provided an outlet opening 11 and an inlet opening 12, the two openings being separated by a wall 13 and being so formed that the outlet opening 11 is stepped above the inlet opening 12.

The coil throughout its length is formed with two adjacent passages 14 and 15 which communicate with each other at their outer ends 16, the passage 14 communicating at its inner end with the inlet opening 12 and the passage 15 communicating at its inner end with the outlet opening 11. The passage 14 rises gradually throughout its length from the inlet opening to its outer end 16 and the passage 15 from its outer end 16, which is of substantially the same level as the outer end of the passage 14, rises gradually from such outer end to the outlet opening 11. The adjacent passages 14 and 15 are separated merely by a common wall, and this wall may be formed either as a single partition as shown in the drawings, or by two contiguous pieces which together form the wall.

In operation, hot gases, or other heating medium, rises within the casing and around and between the convolutions of the coils of the water container. The water, because of the peculiar formation of the sections, is forced to flow throughout the whole length of each coil and then back throughout that same length before it can pass from the inlet to the outlet opening of the section. It is thus subjected to a maximum extent of heating surface and yet the peculiar construction of the sections allows the sections to be made compact and to occupy a comparatively small space. Any steam that may be formed in the container at any point will be led upwardly and out of the heater by reason of the gradually rising passages, so that any tendency of the steam to exert a dangerous pressure within the container, is prevented.

It is to be understood that the dimensions of the various parts may be varied as desired, and that other changes may be made, also. For instance the section may be formed with zig-zagged passages instead of in the form of a coil, or even if made as a coil, the successive convolutions may be connected with each other at separated points.

Other changes within the scope of my invention may also suggest themselves to

those skilled in the art, after familiarizing themselves with the invention disclosed herein.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the construction herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a water heater, a water container composed of a plurality of sections, each section being provided with an inlet opening and an outlet opening adjacent to each other, and with two substantially co-extensive passages separated by a common wall, said passages communicating at their corresponding ends respectively with the inlet and outlet openings and communicating at their other ends with each other.

2. In a water heater, a water container composed of a plurality of sections, each section comprising a coil provided with an inlet opening and an outlet opening adjacent to each other, and with two substantially co-extensive passages separated by a common wall and extending through the coil, said passages communicating at their corresponding ends respectively with the inlet and outlet openings and communicating at their other ends with each other.

3. In a water heater, a water container composed of a plurality of sections, each section comprising a coil of general spiral form, the coil being centrally provided with an inlet opening and an outlet opening adjacent to each other, and being provided with two substantially co-extensive passages separated by a common wall and extending through the coil, said passages communicating at their inner ends respectively with the

inlet and outlet openings and communicating at their outer ends with each other.

4. In a water heater, a water container composed of a plurality of sections, each section comprising a coil of general spiral form, the coil being provided with an inlet opening and with an outlet opening adjacent to, and higher than, the inlet opening, and provided with two substantially co-extensive passages separated by a common wall and extending through the coil, said passages communicating at their corresponding ends respectively with the inlet and outlet openings and communicating at their other ends with each other, the one passage rising gradually from the inlet opening to its other end and the other passage rising gradually from its corresponding end to the outlet opening.

5. In a water heater, a water container composed of a plurality of sections, each section comprising a coil of general spiral form having spaces between its successive convolutions, the coil being centrally provided with an inlet opening and with an outlet opening adjacent to, and higher than, the inlet opening, and being provided with two substantially co-extensive passages separated by a common wall and extending through the coil, said passages communicating at their inner ends respectively with the inlet and outlet openings and communicating at their outer ends with each other, the one passage rising gradually from the inlet opening to its outer end, and the other passage rising gradually from its outer end to the outlet opening.

Signed by me, this 21st day of September, 1912.

FRANK C. GRIMM.

Attested by—

ROBERT M. SEE.

CHRISTINE E. ARNS.