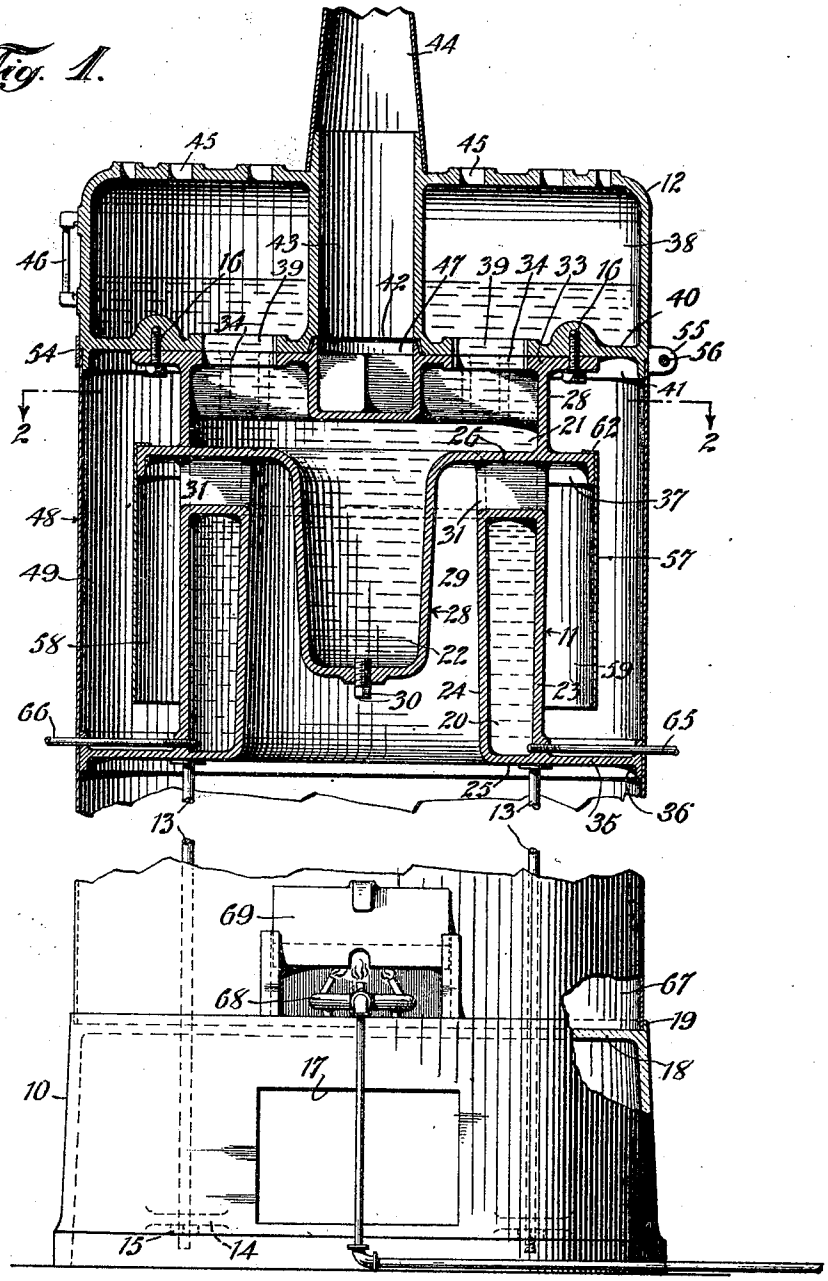
Aug. 7, 1928. 1,680,166

L. N. MOSS ET AL

STEAM GENERATOR

Filed Aug. 26, 1926 2 Sheets-Sheet 1

Fig. 1.



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2 Sheets-Sheet 2

Fig. 2.

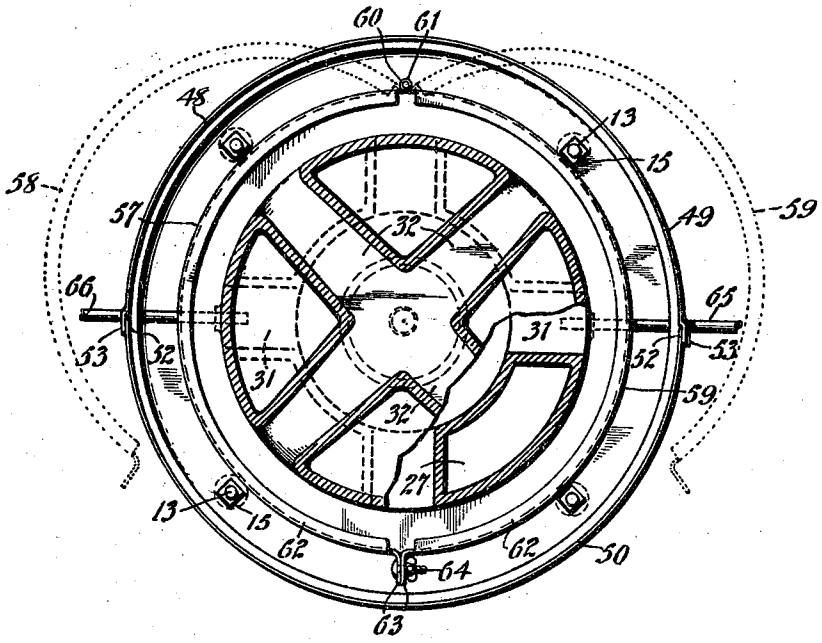
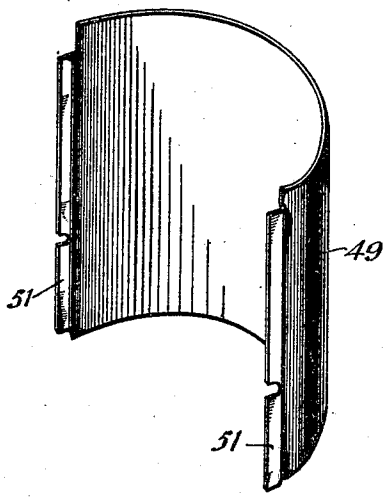


Fig. 3.



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UNITED STATES PATENT OFFICE.

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STEAM GENERATOR.

Application filed August 26, 1926. Serial No. 131,724.

This invention relates to the class of steam generators and water heaters.

The principal object of the present invention is the production of a steam generator or water heater embodying novel features of construction by virtue of which a comparatively increased thermal efficiency is obtained with a given amount of fuel.

Another object of the invention resides in the provision of a steam generator or water heater especially adapted for burning oil or gas and which embodies structural features permitting cleaning operations to be readily carried out, especially to permit the removal of soot from the walls of the heat passages.

The nature of the invention and its distinguishing features and advantages will appear when the following specification is read in connection with the accompanying drawing, in which—

Figure 1 is a sectional elevation of a steam generator embodying the features of the present invention, portions being broken away.

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1, and the sections of the inner shell being shown in an opened position in dotted lines.

Fig. 3 is a perspective view of one section of the outer shell.

The steam generator or water heater of the present invention will include three main sections, a base section 10, an interior section 11, and a top or dome section 12. The said sections are arranged in superposed relationship and are held together in any preferred manner. In the present instance the interior section 11 is supported above the base section 10 by suitable posts or supports 13 which extend vertically from suitable lugs 14 inside of the base section 10. Nuts 15 maintain the association of the sections 10 and 11 and also permit the separation of the sections when the nuts 15 are removed. The top section 12 is held in place on the interior section 11 by suitable fastening elements such as the studs 16. The top section 12 may be removed by removing the studs 16.

The base section 10 consists of an integral casting of hollow construction having an opening 17, a wall 18, and a flange 19.

The interior section 11 consists of a casting formed to provide intercommunicating water spaces 20, 21 and 22. The water space 20 is formed by the inner and outer cylindrical walls 23 and 24 respectively, lower wall 25, and upper wall 26 having openings 27 therein. The water space 21 is formed by the section 28 of the outer wall 24 which extends above the upper wall 26. The water space 22 is formed by a wall structure 28ª in the nature of a well which extends down into a cylindrical heat chamber 29 formed by the inner wall 24. A fusible plug 30 is arranged in the bottom of the wall structure 28. The fusible plug 30 constitutes a means to prevent the section 11 from burning out when the water in the wall space 22 diminishes to a certain low level. The interior section 11 is also provided with a group of heat passages or flues 31 which extend through the water space 20 and are arranged radially. The flues 31 serve for conducting heat radially outward from the chamber 29. A second group of heat passages or flues 32 is also provided above the group of flues 31 and said flues 32 extend radially in the water space 21. Each of the flues 32 opens through the wall section 28 and communicates at a central point with each other. The top 33 of the section 11 has openings 34 therein which communicate with the water space 21 between the flues 32. The section 11 has an annular web 35 at the bottom thereof, and the said web 35 has a flange 36. The wall 26 is extended beyond the outer wall 24 and is provided with a depending flange 37.

The top or dome section 12 consists of an integral casting of hollow construction to provide a steam chamber 38 which communicates with the water space 21 by virtue of the openings 34 and openings 39 which register with the openings 34. The openings 39 are in the bottom wall 40 of the section 12 which is also provided with a depending flange 41 and a central recess 42. Arranged centrally of the section 12 is an up-take flue 43 which extends through the steam chamber 38 and has connected to the upper end thereof a chimney or pipe 44 which conducts off the gases, and gives the necessary draft. The upper wall of the section 12 is provided with steam outlets 45 which have pipe con-

nections to any suitable appurtenances of the heating system. The section 12 is provided with a gage glass 46 which indicates the level of the water in the steam chamber 38. The recess 42 accomodates a neck 47 on the top 33 of the section 11, and thus communication is established between the flues 32 and the up-take flue 43.

In order to provide passageways for the heat issuing through the flues 31 from the chamber 29 and to conduct the same first downwardly and then upwardly to the flues 32, there is provided an outer shell 48 preferably of sheet metal. The said shell 48 is made up of two sections 49 and 50, each of which is semi-cylindrical. The section 49 is offset to provide flanges 51 so as to overlap the edges 52 of the section 50, as shown at 53 in Fig. 2. The lower edges of the sections 49 and 50 are received within and are disposed against the flange 19 and rest upon the wall 18, whereas the upper edges of the sections 49 and 50 lie against the flange 41 and are held in place by a band 54 which is divided and held in clamping engagement by virtue of lugs 55 and a suitable clamping bolt 56. The flange 36 prevents the sections 49 and 50 from collapsing inwardly at an intermediate point. An interior or inner shell 57 is provided and is arranged between the shell 48 and the outer wall 24 of the section 11. The shell 57 comprises sections 58 and 59 which are identical in construction and which are hingedly connected together as at 60 by virtue of a bolt 61. The upper edge of each section 58 and 59 has a flange 62 which rests on the flange 37. Each of the sections 58 and 59 has an apertured lug 63, and the apertures in said lugs 63 accommodate a suitable clamping device 64 which releasably maintains the sections 58 and 59 in shell forming relationship.

Water is admitted to the water space 20 by an inlet pipe 65, and water of condensation is returned from the system to the water space 20 by a return pipe 66.

It will be apparent that portions of the section 11, the lower portion of the shell 48, and the wall 18 of the section 10 form a combustion chamber 67. In the present instance there is employed a burner 68 of any preferred type for burning gas, and the said burner is arranged within the combustion chamber 67. A suitable slide or regulator 69 is provided which serves for regulating the amount of air entering the combustion chamber 67. It will also be apparent that the combustion chamber 67 is in communication with the heat chamber 29.

From the foregoing description taken in conjunction with the accompanying drawings, it will be apparent that there has been described a steam generator or water heater having a novel arrangement of heating surfaces, that the heat is compelled to pass along a tortous course obviating the loss of heat unnecessarily by radiation; and that parts may be removed for readily removing products of combustion, such as soot.

We claim:

1. In a steam generator, a combustion chamber, an interior section arranged above the combustion chamber, said interior section including heating walls forming intercommunicating water spaces and a heat chamber; said water spaces consisting of a water space surrounding said heat chamber, a water space above said heat chamber, and a water space extending into said heat chamber; relatively spaced inner and outer shells surrounding said interior section providing a tortuous passageway for the heat; a top section directly above said interior section, said top section having a steam chamber and steam outlets, and water inlets establishing communication between the steam chamber and one of said water spaces, an uptake flue extending through said top section, radial flues establishing communication between said heat chamber and said passageway, and radial flues establishing communication between said passageway and said uptake flue.

2. In a heater of the class described, a water chamber, an outer removable shell of separable parts, and an inner dividing shell comprising hingedly connected sections, said shells coacting with said water chamber to provide a heat passageway leading downwardly and then upwardly of the heater.

3. In a heater of the class described, an interior section constructed to provide a water space, radial heat passageways arranged in groups, one group of passageways arranged above the other, the upper group of passageways leading to a central uptake passage, and a removable shell surrounding said interior section to form a heat passage in conjunction with said passageways.

4. In a steam generator, an upper section constructed to provide a steam chamber; and an interior section below the upper section, said interior section constructed to provide a water space, radial flues arranged in groups, one group of flues arranged above the other, said water space being in communication with said steam chamber, an uptake flue extending through said steam chamber in communication with the upper group of heat flues, and a removable shell surrounding said interior section to form a heat passage in conjunction with said flues.

5. In a water heater or steam generator, an interior section constructed to provide intercommunicating water spaces, a heat chamber and radial groups of flues, the flues of one group communicating with each other at a central point, said water spaces consisting of a water space surrounding

said heat chamber, a water space above said heat chamber, and a water space extending into said heat chamber, one group of flues extending through the water space surrounding the heat chamber and being in communication with the heat chamber, and the other group of flues extending through the water space above said heat chamber, and removable shells surrounding said interior section to form a heat passage in conjunction with said flues.

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