E. F. FISHER.

GAS BURNING GRATE.

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1,249,366.

Patented Dec. 11, 1917.

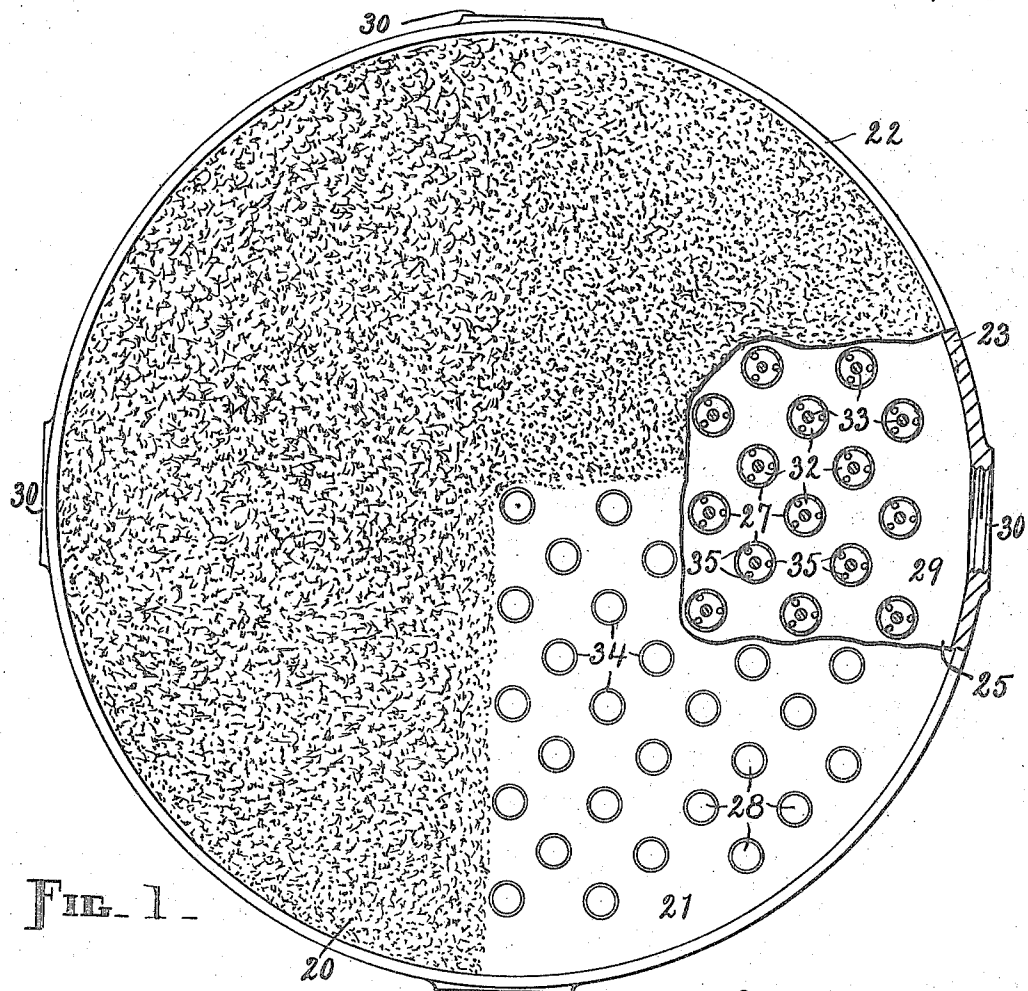


FIG. 1.

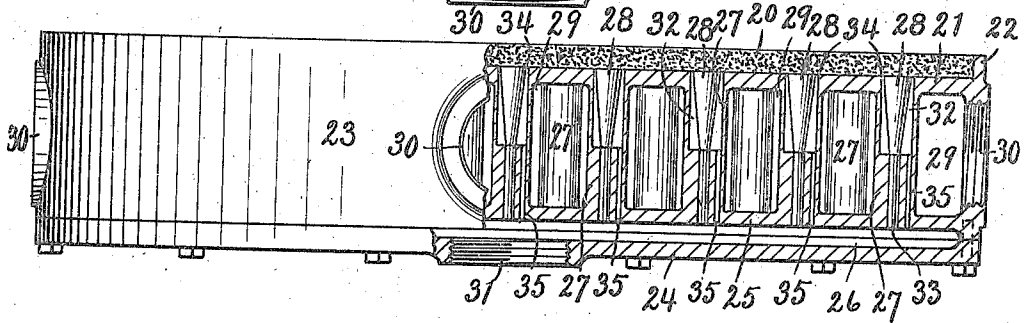


FIG. 2.

WITNESS

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ELMER F. FISHER, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO HIMSELF, ARTHUR B. LEWIS, AND FREDERICK G. WOODEN, TRUSTEES, ALL OF SPRINGFIELD, MASSACHUSETTS.

GAS-BURNING GRATE.

1,249,366. Specification of Letters Patent. Patented Dec. 11, 1917.

Application filed December 23, 1916. Serial No. 138,607.

To all whom it may concern:

Be it known that I, ELMER F. FISHER, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Gas-Burning Grate, of which the following is a specification.

My invention relates to hydrocarbon burners or grates for burning gas as fuel for heating purposes in stoves or ranges, steam and hot-water boilers, and other heaters, and consists essentially of a hollow casing having a perforated top covered with a quantity of refractory material, such as carborundum by preference, and divided by suitable interior members into gas and water chambers and passages, the former opening through the perforations in said top beneath said refractory material, together with such auxiliary and subsidiary parts and members as may be necessary or desirable in order to render the device complete and serviceable, all as hereinafter set forth.

The primary object of my invention is to produce a gas burner or grate with which an intense heat can be generated or produced and this without destroying the grate, to these ends said grate being water-cooled and an indestructible or refractory material being employed on or as a part of said grate. The gas passes into and through the refractory material and burns therein and thereon, and said material acts to support combustion, by absorbing the heat generated from the combustion of the gaseous fuel and heating the same, and also to radiate the heat generated therein. I have found that carborundum in a granular form, of say six to eight grains in size, is the best medium for this purpose, since this material does not crumble or disintegrate under intense heat, like other refractory materials such as pumice-stone, broken fire-brick, and silicate, and it is black or dark colored and therefore a very superior radiating, and in a sense generating as well, agent when compared to the other materials just mentioned, or to asbestos or mineral-wool, all of which are white or light-colored. The gas burns in, through, over and around the carborundum, the flames playing through the interstices therein, and the whole becomes an intense glowing mass which is exceedingly hot and would shortly burn out the support upon which such mass rests were no provision made to counteract the effect of the heat on such support. My specially constructed support, whereby I am able to circulate water in and through the same and at the same time get an adequate supply of gas to the refractory material on top, enables me to employ to the best advantage carborundum.

A further object is to provide a water-cooled gas-burning grate that is comparatively simple and inexpensive both in construction and operation.

Still another object is to provide a grate of this kind that can be very readily adapted and applied to steam and hot-water boilers and the like, without making prohibitive or even very extensive changes or alterations in the heaters themselves.

Other objects and advantages will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the means illustrated in the accompanying drawings, in which—

Figure 1 is a top plan in partial section of a grate which embodies a practical form of my invention; and Fig. 2, a side elevation and partial section of said grate.

Similar numerals designate similar parts throughout the several views.

Various other changes or modifications may be made without departing from the spirit of the invention.

The grate illustrated in the drawings comprises a circular hollow casing and a mass of carborundum 20. Said casing consists of a top 21 having a raised edge or rim 22 to confine the carborundum 20, which latter is placed on said top, a depending annular side wall 23 to the bottom of which is bolted or otherwise secured a bottom or floor plate 24, a diaphragmal member or floor 25 spaced from said plate to form a gas chamber 26, and vertical tubular members 27 which are provided with spreader gas tips 28. A water chamber 29 is formed within the wall 23 between the top 21 and the floor 25 and around the tubular members 27. Four openings 30 are provided in the wall 23, any two of which may be used as the inlet to and the outlet from the water chamber 29, the other two being plugged. An opening 31 is provided in the center of the plate 24, which plate constitutes the floor of the gas chamber 26, to admit gas to said chamber,

Each tubular member 27 has a central bore 32 therethrough, and the upper half of such bore, which extends through the top 21, is enlarged, and one of the tips 28 is located in such bore, the tip being conical in shape with its large end uppermost, and having a tail-piece 33 that fits into the smaller lower portion of said bore. Thus each tip is seated in one of the tubular members 27 with the top of said tip approximately on a level with the upper surface of the top 21. The top of said tip is slightly smaller in diameter than the diameter of the upper end of the bore 32 in which the tip is located, so that a narrow annular slit 34 is left between said top of the tip and the wall of said bore to allow the gas to escape into the mass 20. Three (more or less) passages 35 are made in the lower and more solid half of each member 27, around the central bore therein, to enable the gas in the chamber 26 to ascend into the enlarged portion of said bore, when the gas impinges on the conical tip therein and escapes through the slit 34 around said tip. From the above it is clear that the gas which enters the chamber 26 ascends through the tubular members 27 into the carborundum where combustion takes place, and that the water in the chamber 29 cools and protects the parts.

The grate may be connected with the water system of the heater or boiler, with which such grate is incorporated, the water passing through such grate thus being taken from said boiler and returned thereto, or, said grate may be connected with the house system to heat the hot-water tank or the water therein of said last-named system.

I am aware that refractory material, other than carborundum, has been employed in gas-burning grates having solid supports, and I am also aware that hollow grates have been provided for the purpose of heating water, hence I do not seek to claim either of these features *per se*.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a gas-burning grate, of a casing comprising a perforated top, depending walls, and a bottom plate, a diaphragmal member spaced from said plate to form a gas chamber below and a water chamber above, partitioning members forming ducts in said water chamber, said ducts being so arranged that they are surrounded by the water in said water chamber, and open at their bases into said gas chamber and at their tops through the perforations in said casing top, and spreader gas tips forming with the walls of said perforations gas-exit slits.

2. The combination, in a gas-burning grate, of a casing comprising a perforated top, depending walls, and a bottom plate, a diaphragmal member spaced from said plate to form a gas chamber below and a water chamber above, partitioning members forming ducts in said water chamber, said ducts being so arranged that they are surrounded by the water in said water chamber, and open at their bases into said gas chamber and at their tops through the perforations in said casing top, spreader gas tips forming with the walls of said perforations gas-exit slits, and refractory material on said last-named top, said material being too coarse to pass through said slits.

3. The combination, in a gas-burning grate, with a casing comprising a perforated top, depending walls, and a bottom plate, a diaphragmal member spaced from said plate to form a gas chamber below and a water chamber above, and partitioning members forming ducts in said water chamber, said ducts being so arranged that they are surrounded by the water in said water chamber, and open at their bases into said gas chamber and at their tops through the perforations in said casing top, of conical tips seated in said ducts and extending into said perforations, said tips forming with the walls of said perforations annular gas-exit slits.

4. The combination, in a gas-burning grate, with a casing comprising a perforated top, depending walls, and a bottom plate, a diaphragmal member spaced from said plate to form a gas chamber below and a water chamber above, and partitioning members forming ducts in said water chamber, said ducts being so arranged that they are surrounded by the water in said water chamber, and open at their bases into said gas chamber and at their tops through the perforations in said casing top, of conical tips seated in said ducts and extending into said perforations, said tips forming with the walls of said perforations annular gas-exit slits, and refractory material on said last-named top.

5. The combination, in a gas-burning grate, with a casing comprising a perforated top, depending walls, and a bottom plate, a diaphragmal member spaced from said plate to form a gas chamber below and a water chamber above, and tubular members in said water chamber, said tubular members having bores therein which are enlarged at the top and open through the perforations in said casing top, and also having passages therein which lead from the enlarged portions of said bores to said gas chamber, of conical tips in said enlarged portions of said bores, said tips being provided with tail-pieces that are received in the smaller portions of said bores, and forming with the walls of said perforations annular gas-exit slits.

6. The combination, in a gas-burning grate, with a casing comprising a perforated

top, depending walls, and a bottom plate, a diaphragmal member spaced from said plate to form a gas chamber below and a water chamber above, and tubular members in said water chamber, said tubular members having bores therein which are enlarged at the top and open through the perforations in said casing top, and also having passages therein which lead from the enlarged portions of said bores to said gas chamber, of conical tips in said enlarged portions of said bores, said tips being provided with tail-pieces that are received in the smaller portions of said bores, and forming with the walls of said perforations annular gas-exit slits, and refractory material on said last-named top, said material being too coarse to pass through said slits.

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