Aug. 28, 1934. E. J. HORTON 1,972,016

BURNER

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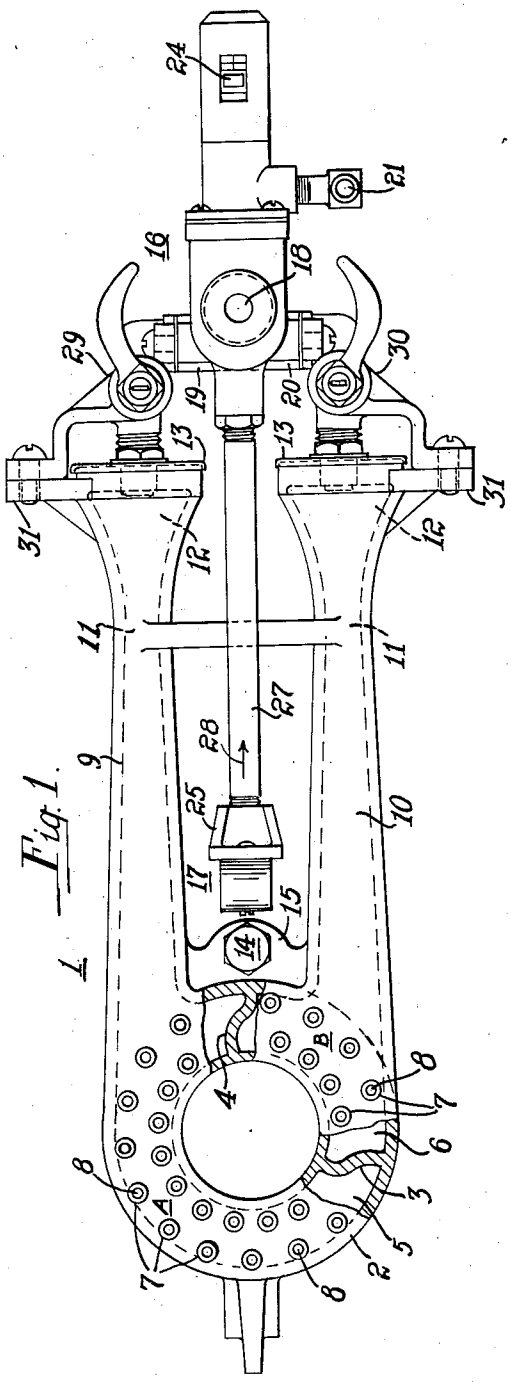


Fig. 1.

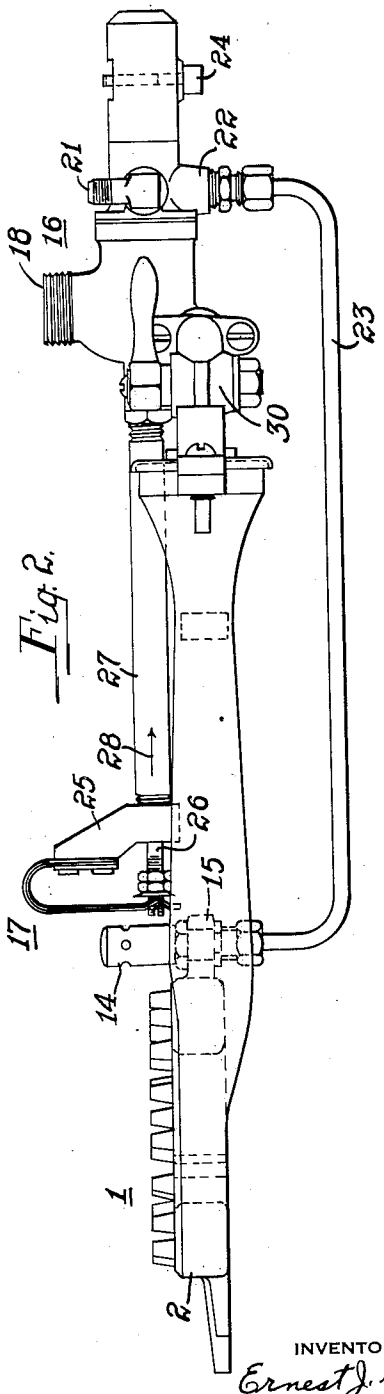


Fig. 2.

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BURNER

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Application August 11, 1932, Serial No. 628,282

1 Claim. (Cl. 158—105)

This invention relates to burners of the type adapted to burn gaseous fuels, and more particularly to a multiple burner adapted for either manual or automatic control.

An object of this invention is the provision of a multiple burner, formed as a unitary structure, in which any one or all of the burners may be used according to particular requirements for heat.

Another object of the invention is the provision of a multiple burner, constructed as a single unit, and so arranged that combustion at one burner shall not affect nor impair combustion at any other burner of the unit.

A further object of the invention is the provision of a multiple burner, of unitary construction, having a single pilot burner adapted to serve all of the burners, and an automatic cut-off mechanism adapted to shut off the supply of fuel to all of the burners, including the pilot burner, in case the flame at the pilot burner is extinguished.

In the majority of cases, hot water heaters are subject to three rates of demand for hot water, minimum, normal and maximum. These demand rates occur largely on separate or different days.

Heretofore, it has been the practice to use one burner for satisfying each of these demands. The capacity of such burners, therefore, had to be such as to take care of the maximum demand for hot water, and in order to satisfy the normal and minimum requirements the gas or fuel was throttled at the burner to reduce the fuel consumption and the heat developed by the burner. Since burners of this type are designed to burn the fuel efficiently when turned on full, they are not efficient when operating at less than capacity.

It is therefore an object of this invention to provide a unitary multiple burner which in operation is the equivalent of a plurality of separate burners, any one of which may be operated alone, or all operated together. Thus, for example, if the unit includes two burners, each of different capacity, three heat combinations are available for meeting the three most common rates of demand for hot water. The smaller of the burners, when on full, will develop sufficient heat to satisfy the minimum demand, the larger will satisfy normal demand, and when both burners are on full, the maximum hot water demand may be met. Thus all requirements for hot water may be satisfied with a single unit, and each burner of the unit may be operated, whether singly or collectively at its maximum capacity and efficiency; consequently material economies in fuel may be realized.

Other objects of the invention will, in part, be apparent and will, in part, be obvious from the following description taken in conjunction with the accompanying drawing, in which:

Figures 1 and 2 are views in top plan and side elevation, respectively, of a multiple burner provided with a single pilot burner, and an automatic cut-off mechanism arranged and constructed in accordance with an embodiment of the invention.

Throughout the drawing and the specification like reference characters indicate like parts.

In the drawing a multiple burner unit 1 is shown. The unit comprises a hollow member or body 2, preferably of ring shape, having partitions 3 and 4 therein which divide the interior of the body into a plurality of isolated compartments or chambers 5 and 6. The top face of the body is provided with nipples 7 having passages 8 therein through which fuel may discharge from the chambers and be ignited. Chambers 5 and 6 with their nipples 7, therefore constitute separate burners, designated, for convenience, A and B, respectively.

In order that a combustible mixture of fuel and air may be supplied to either or both of burners A and B, conduits 9 and 10 are provided which communicate separately with the interior thereof. The outer ends of these conduits terminate in Venturi throats 11 and mixing chambers 12 into which fuel and air enter, in the usual manner, to form a combustible mixture. The air flow into the mixing chambers may be adjusted by means of valves 13 of usual construction.

The burner body 2 and the conduits 9 and 10 may, as shown, be cast as a single piece or unit and when so constructed will be practically as cheap to manufacture as a single burner of the same capacity.

In practice, it is proposed to make the burners A and B of different capacities, so that the necessary amount of heat required under particular conditions may be had with maximum efficiency. Thus, if only a relatively small amount of heat is required for heating water, for example, the smallest burner of the unit may be used separately, or if more heat is required, the larger burner of the unit may be used separately; or if the full capacity of the burner unit is required, both or all of the individual burners may be operated. Thus, for example, if the total capacity of the burner is taken as a unity, then burner B may be designed for a capacity of one third, and burner A for a capacity of two-thirds, hence burner chamber A would have twice the capacity of burner B. Therefore, with a burner unit of this

design, a unit is provided which, in effect, is the equivalent of three separate burners, all combined as a single unit.

With a burner of this design, each burner of the unit may be operated at full capacity which is the most efficient manner of operating burners of this type because combustion is more complete.

Since the individual burners of this unit are not embraced or surrounded by another burner, the combustion at one burner will not impair nor affect the combustion at any other burner when all of the burners are in operation.

In order that the burner unit shown may be utilized with hot water heaters, of the storage type, having thermostatic valve mechanism, (not shown) for turning on and shutting off the fuel in accordance with the temperature of the water, a pilot burner 14 is provided. The pilot burner may be mounted on a lug 15 so located that the flame of the pilot will ignite the fuel discharging from the nipples of any or all of the individual burners of the unit.

The fuel for the pilot burner would be on at all times, and so, for this reason, the pilot burner should be connected to the fuel line at a point ahead of the automatic valve mechanism referred to above but not shown herein.

It often happens that the source of supply of fuel fails, in which case the pilot flame would go out, or the pilot flame may be accidentally extinguished from other causes. Therefore, unless the supply of fuel be positively shut off from both the pilot burner and the other burners of the unit, fuel would escape and under certain conditions might result in explosions or fire. To guard against such contingencies, an auxiliary multiple valve 16 is provided which is under the control of a temperature responsive means 17 disposed adjacent the pilot burner.

This multiple valve is shown in my copending application Serial No. 593,469, filed February 17, 1932, and assigned to Ruud Manufacturing Company, a corporation of the State of New Jersey. Said application has resulted in Patent No. 1,885,724, issued November 1, 1932. In general, the multiple valve includes a valve for controlling the flow of fuel to each of the mixing chambers 12 from the main supply line, not shown, the fuel entering the valve through an inlet port 18 and discharging through outlet ports 19 and 20. Valve 16 also includes a valve which controls the flow of fuel to the pilot burner, the fuel entering from the supply line through an inlet port 21 and discharging through an outlet port 22 connected to a pipe 23 leading to the pilot burner.

In operation, the pilot valve is opened by means of a latch 24, so that fuel may flow to the pilot burner, where it is ignited. The pilot flame heats the thermal responsive means 17, here shown as a curved bimetallic strip. One end of the strip is rigidly secured to a block 25 and the other end bears against the end of a stem 26 disposed in a pipe 27. The pipe is threaded into the body of valve 16 at one end and forms a guide for the stem as well as a support for block 25. As the strip deflects upon being heated, stem 26 is shifted in the direction of arrow 28, thereby opening the valve which controls the flow of fuel to burners A and B. The pilot flame ignites the fuel delivered to these burners. As the strip continues to deflect, the pilot valve is opened further until latch 24 is released, thereby placing both valves under the control of the bimetallic member. Thus, if the pilot flame goes out for any reason, the bimetallic strip returns to its cold position, causing both valves to close, and shutting off the fuel supply to all of the burners, including the pilot burner. In order to relight the burner, it is necessary to open the pilot valve as above described.

In order that the burners of burner unit 1 may be used separately or collectively, manually operated shut-off valves 29 and 30 are interposed between outlets 19 and 20 of cut-off valve 16 and the respective mixing chambers 12. Thus, by opening one or the other of these shut-off valves or opening both of them, three degrees of heat may be obtained from the burner unit. Whether one or all of the burners of the unit are employed, the pilot burner and the automatic cut-off valve, serves them all.

As shown in the drawing, the manually operated valves are secured to lugs 31 on the mixing chamber conduits and to the body of the cut-off valve, thereby providing a rigid and substantial unitary construction.

It will be apparent that the automatic cut-off valve may be dispensed with if desired, and in such case, the manually operated valves would be connected to the source of supply. In such case, the burners whether used singly or collectively would be placed in operation by merely opening one or the other or both of the manually operated valves 29 and 30 and then igniting the gas or fuel in the customary manner.

While but one form of the invention has been shown and described herein, it will be apparent to those skilled in this art that various modifications and changes may be made without departing from either the spirit or the scope of the invention. It is desired, therefore, that only such limitations shall be placed on the invention as are imposed by the prior art and the appended claim.

What I claim as new and desire to secure by Letters Patent is:

A burner unit comprising a hollow burner body of substantially ring-shape having partitions therein dividing said body into a plurality of independent burners of different capacities and located equidistant from the center of the body, individual conduits communicating with said burners, said conduits having mixing chambers into which fuel and air may be introduced to supply each burner with a combustible mixture, and means for controlling the supply of fuel to each burner so that any one of said burners may be operated singly or all of the burners may be operated at the same time.

ERNEST J. HORTON.