Aug. 16, 1932. A. FRIEDMAN 1,871,783

DUAL GAS BURNER

Original Filed Feb. 27, 1928

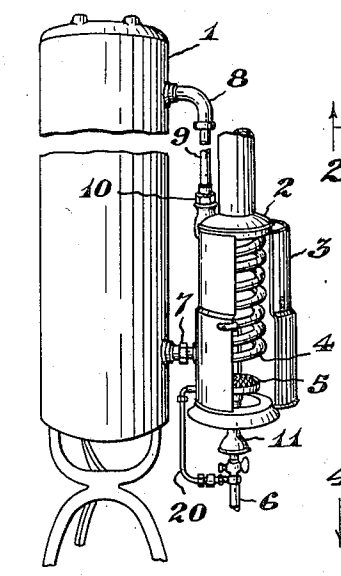


Fig. 1.

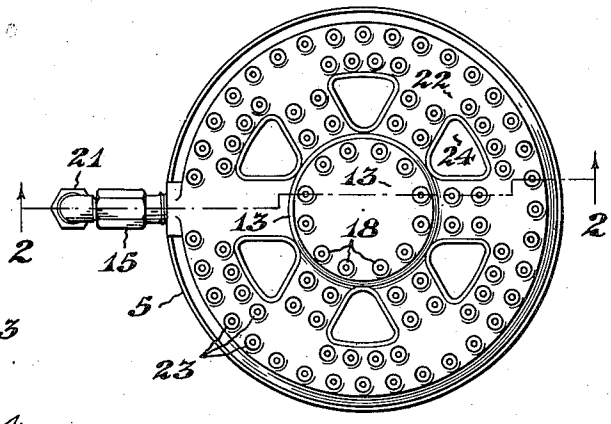


Fig. 3.

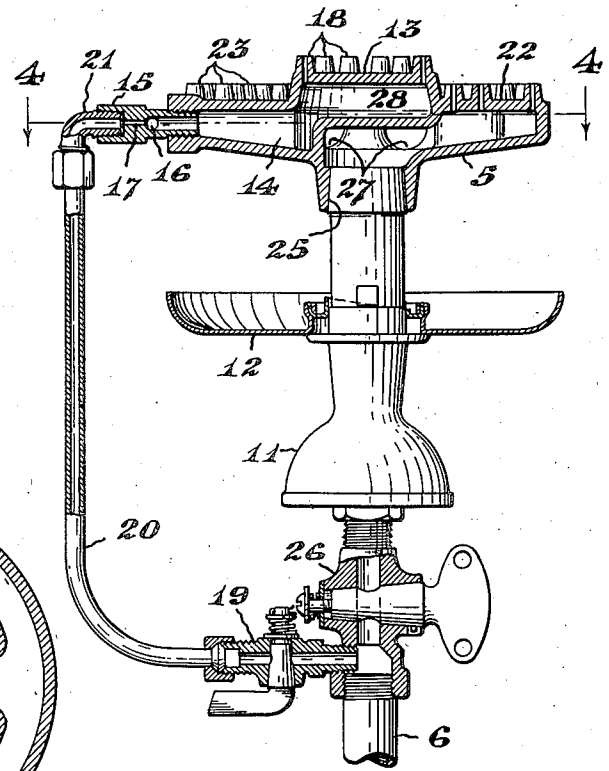


Fig 2.

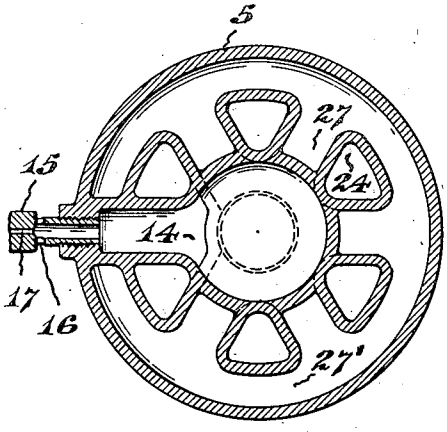


Fig. 4.

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1,871,783

UNITED STATES PATENT OFFICE

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DUAL GAS BURNER

Original application filed February 27, 1928, Serial No. 257,221. Divided and this application filed December 15, 1930. Serial No. 502,287.

This invention relates to gas burners and is filed as a divisional application of my copending application for United States Letters Patent Serial Number 257,221, filed February 27, 1928, for gas burner.

In gas burners of conventional type which are used in connection with domestic hot water supply heaters a very common method of using the burner is to operate it so that it burns at all times with a very small flame that supplies just enough heat to maintain the storage water of the system at approximately the desired temperature.

The ordinary and most common type of blue flame gas burner is not particularly well adapted to be used in this manner and if it is turned down too low the flame is easily extinguished by drafts and changes of pressure in the gas, both of which have been the source of many accidents.

Another difficulty encountered when burners of the stated type are operated with very low flame is due to the tendency they have of flashing back and burning in the mixing tube. A burner operating in this manner produces a considerable amount of carbon monoxide.

It is to overcome these and other difficulties encountered in the operation of gas fired domestic water heaters that my invention is particularly directed to.

One of the objects of my invention is to provide a gaseous fuel burner that may be operated with a small flame that is not easily extinguished and that provides just sufficient heat to maintain the liquid contents of a storage container at a predetermined temperature.

A further object of my invention is to provide in a single burner casting, two independently operable burners which are so arranged that the gas is uniformly supplied to all of the ports of the two burners.

In general my improved burner consists of two independent burners integrally formed in a single casting, either burner of which may be operated independently of the other, depending upon the quantity of heat required.

At the present time there are several kinds of domestic heaters which are provided with a small burner that can be operated at full capacity without over-heating the water. Heaters of this sort are commonly referred to as flat rate heaters. It is found in practice that this type of water heater will furnish hot water at a given rate and when the demand exceeds the capacity of the heater it is necessary to wait for a considerable length of time before the water is again brought up to the desired temperature.

In my improved burner provision is made for maintaining a constant supply of hot water for normal demands. Provision is also made for increasing the capacity of the water heater at such times as may be desired.

I accomplish this by the use of a double burner which at times may be operated at a low rate of gas consumption to supply the normal demand for hot water. When an amount of water in excess of the normal demand is desired, the capacity of the heater may be increased by bringing a second or auxiliary burner into operation and continuing its use so long as the abnormal demand for hot water continues.

Referring to the drawing: Figure 1 is a perspective view of a gas fired storage water heater of the conventional type embodying one form of my improved burner.

Figure 2 is an enlarged view partly in section of the burner and associated parts and in which the burner head is shown in a sectional view taken on line 2—2 of Figure 3.

Figure 3 is a plan view of the burner or burner head shown in Figure 2.

Figure 4 is a sectional view taken on line 4—4, Figure 2.

In Figure 1, the numeral 1 indicates a storage tank providing a container for the water which is heated by a side-arm circulating heater 2. The heater 2 consists of a heater casing or jacket 3, which provides a housing for the circulating coils 4, and my improved gas burner 5. The circulating coils 4 are placed in communication with the tank 1 at their lower end by means of the union connection 7, and at their upper end by a short section of pipe 9, which is connected to its upper end to the L fitting 8, received in a suit-

ably tapped opening in the tank 1 and at its lower end to the union-connection 10 of the circulating coils.

My improved burner head 5, is mounted on the upper tapered end 25 of a Bunsen tube 11 of conventional design. A drip pan 12 is carried on this tube below the burner for the purpose of receiving and evaporating the water which results from the condensation of the products of combustion from the gas burner 5, that collect on the heater coils 4.

The raised portion 13 of the burner, is provided with a series of burner ports 18 communicating with the chamber 28. The chamber 28 and ports 18 are adapted to be supplied with a combustible mixture of gas and air by way of the cored passageway 14 and a gas and air mixing tube 15, which is connected to an L fitting 21 communicating with the gas supply conduit 20. The conduit 20 is in turn connected to a gas cock 19, which is in communication with a source of gas supply 6.

The lower top face 22 of the burner 5 is provided with a series of raised ports 23 which can be operated independently of the ports 18. The outer ports of this portion of the burner are adapted to be placed in communication with the central hub portion of the burner by way of the hollow spokes which form the passageways 27.

The central portion of the underside of the burner terminates in a ground and tapered neck adapted for reception upon the end 25 of the Venturi mixing tube 11. Gas is supplied to the mixing tube 11 by way of the fuel feed conduit 6, and is under control of the gas cock 26. Gas from the supply conduit 6, may be burned at either one or both of the series of ports 18 and 23. The ports 23, of the lower portion 22, of the burner, are supplied with gas by way of the cored passageways 27 and 27′ shown in Figure 4.

By this construction it is possible to provide in a single casting, two independent blue flame burners of different capacity, either one of which may be operated independently of the other in the manner indicated by foregoing description.

When it is desired to operate the heater at a normal rate the gas cock 19 only is opened. By operating the heater at a normal rate I mean supplying heat to the system at a rate equal to the radiation and other heat losses of the system at a predetermined usable hot water temperature.

Thus, if it is desired to keep on hand a tank full of water at a temperature of approximately 150° F., a mixing tube 15 will be used having an orifice 17 of such size that the B. t. u. output of the burner comprising the ports 18, is just sufficient to accomplish this object. It is, of course, understood that room temperature, feed water temperature and other conditions will affect the operation of this system. Any one, or the combination of all of the effects mentioned ordinarily will not cause the water temperature to vary any great extent.

When an unusual amount of hot water is desired, both of the cocks 19 and 26 are opened and gas is burned at all of the ports of the burner 5. The ports 18 are positioned somewhat higher than the ports 23, because the individual flames from the ports 18 are somewhat smaller than the flames from the ports 23, and furthermore, because the flames from the ports 18 are used to light the gas issuing from the ports 23 when this portion of the burner is put into use.

Immediately above the aperture formed in the bottom of the burner communicating with the mixer tube 11, there is provided a plate or horizontal wall 28 which serves to uniformly deflect the gases from the mixer tube 11 to the several passageways 27 of the main burner. The lower wall of the passageways 27 slant upwardly as shown in Figure 2 thereby decreasing the cross-sectional area of the passageways 27 as their outer ends are approached and in this manner supplying gas to the various ports 22 of the burner at a uniform pressure. The pilot burner portion of the burner is provided with raised ports 18 which are so positioned that a pair of ports are provided adjacent each of the secondary air passages 24 formed in the burner. By reason of this arrangement an adequate supply of air is provided for supporting combustion of the gas issuing from each of the ports 18 of the pilot burner.

My improved gas burner is not limited in its use to the particular type of side arm water heater shown in Figure 1. It could be used in connection with internal fired storage water heaters as well as the type shown here, without any material changes in the burner construction. Its use could be extended to other heating appliances as well as water heaters, particularly appliances adapted to operate normally at a predetermined rate and where it would be advantageous to provide some means to take care of abnormal heating demands.

I am aware that gas burners have been proposed heretofore in which a single burner head is utilized to provide two independently operable burners. Such prior burners however are not capable of meeting the present day stringent requirements directed to efficiency and low carbon monoxide production. Such requirements are fully satisfied by my improved burner by reason of the novel method of distribution of gas to the lower portion of the burner in which the upper or center portion of the burner cooperates by providing a deflecting wall therefore and by reason of providing and locating all of the raised ports of the burner so that each port can be freely supplied with secondary air from at least

one side without interference from any of the other burner ports.

Furthermore, it is to be understood that the particular forms of apparatus shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration and that various modifications of said apparatus and procedure can be made without departing from my invention as defined in the appended claims.

Having described my invention, what I claim is:

1. A blue-flame gas burner comprising a burner head having a main burner portion comprising a centrally located inlet formed in the under side thereof and an annularly arranged ported outer passageway communicating with the inlet by way of a plurality of radially disposed ported passageways, a pilot burner portion comprising a centrally located ported chamber having a wall above the centrally located inlet of said main burner portion whereby gas is deflected uniformly to the radially disposed passageways, and means for independently supplying a combustible mixture of gas and air to said main and said pilot burner portions and the burner ports formed therein.

2. A blue-flame gas burner comprising a burner head having two independently operable portions providing a large capacity burner and a small capacity burner, the upper face of said burner head having raised ports for the burner portions with the ports of the small capacity burner located in a plane above the level of the ports of the large capacity burner, said burner head having a hollow hub and hollow spokes communicating with a hollow rim with the ports of the small capacity burner located in the hub and the ports of the large capacity burner located in the spokes and rim, and means for independently supplying a combustible mixture of gas and air to the burner portions of said burner head.

3. A blue-flame gas burner comprising a burner head having two independently operable portions providing a large capacity burner and a small capacity burner, the upper face of said burner head having raised ports for the burner portions with the ports of the small capacity burner located in a plane above the level of the ports of the large capacity burner, said burner head having a hollow hub and hollow spokes communicating with a hollow rim with the ports of the small capacity burner located in the hub and the ports of the large capacity burner located in the spokes and rim and all of the said ports of said burner being located adjacent to the marginal edges of the burner whereby they are supplied with secondary air, and means for independently supplying a combustible mixture of gas and air to the burner portions of said burner head.

4. A wheel-shaped hollow gas burner comprising ported hub, rim and spoke portions, the ports of said burner being formed in the upper face thereof and arranged in single rows about the marginal edges of the burner so as to be freely exposed to a continuous supply of secondary air, and means for independently controlling the fuel supplied to said hub portion and the fuel supplied to said spoke and rim portions.

5. A wheel-shaped hollow gas burner comprising ported hub, rim and spoke portions, the ports of said burner being formed in the upper face thereof and arranged in single rows about the marginal edges of the burner so as to be freely exposed to a continuous supply of secondary air, and a wall in said burner for uniformly deflecting gas to said spoke portions and for separating said hub portion from the rest of the burner so as to provide in a single burner two distinct and independently operable burner portions.

6. In a gas burner, a hollow burner head having a plurality of passageways with ports formed in the upper face of the burner head communicating with said passageways, a partition wall in said burner head for preventing communication between certain of said passageways whereby two separate and independently operable burner portions are formed in the burner head, one of which constitutes the central portion of the burner head, and means for independently supplying and controlling the supply of gas to such burner portions, the gas supply of one of such portions being directed vertically against an imperforate wall of the burner head whereby it is deflected laterally and supplied at a substantially uniform pressure to the ports in communication with this portion of the burner.

7. In a gas burner, a hollow burner head having an upper face with burner ports formed therein and being formed with a plurality of separated passageways with the burner ports arranged in single rows along the marginal edges of such passageways whereby each burner port is exposed on at least one side to a continuous supply of fresh air to complete the combustion of the fuel supplied to such port, a partition wall in said burner head for separating the same into two separate burner portions, and means for independently controlling the supply of gas to the separate burner portions of said burner head.

In testimony whereof I affix my signature.

ARTHUR FRIEDMAN.