April 16, 1940. E. BLOCH ET AL. 2,197,091

THERMOSTATIC CONTROL

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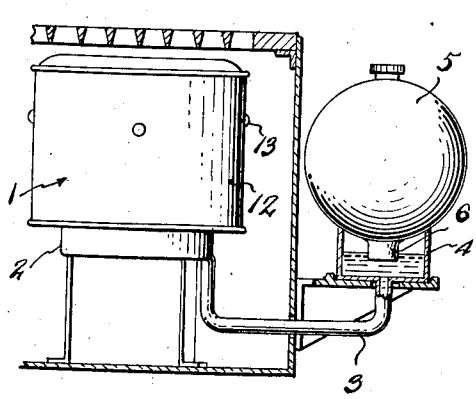


Fig. 1.

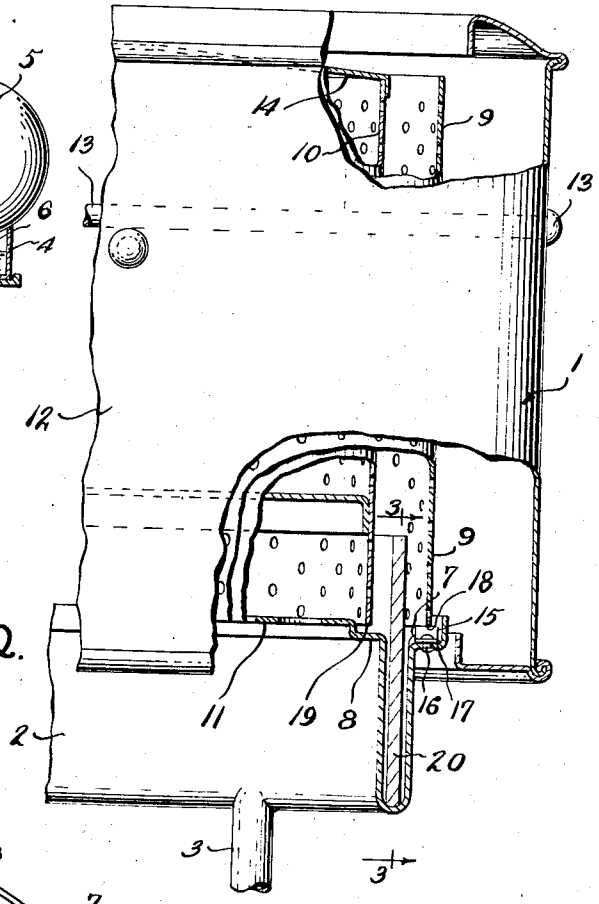


Fig. 2.

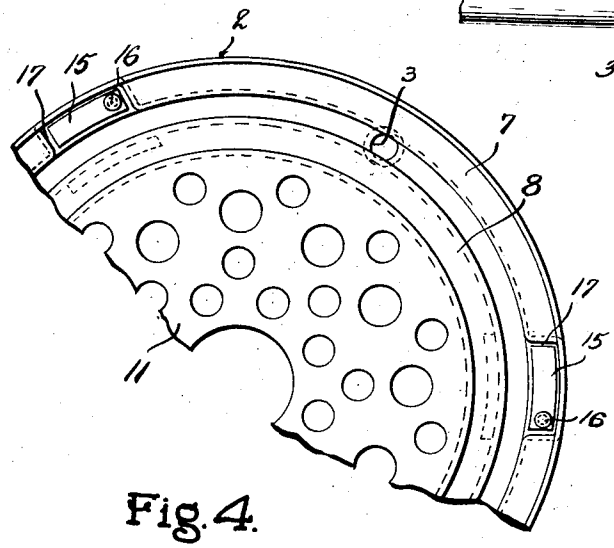


Fig. 4.

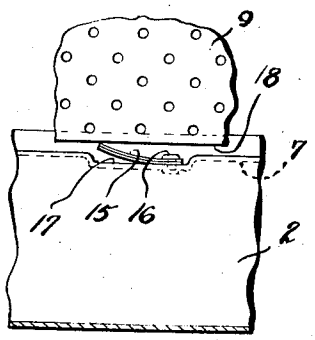


Fig. 3.

INVENTORS
Edward Bloch
Jacob Kesner Kahn

BY Barnes, Kisselle, Laughlin & Raisch
ATTORNEYS

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THERMOSTATIC CONTROL

Edward Bloch, Detroit, Mich., and Jacob Kesner Kahn, Chicago, Ill., assignors to W. M. Chace Company, Detroit, Mich., a corporation of Michigan

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5 Claims. (Cl. 158—90)

This invention relates to a burner for liquid fuels and more particularly to a thermostatic control for a liquid hydrocarbon fuel burner.

It is known that in the operation of liquid hydrocarbon fuel burners, the volume of air required to produce a usable amount of heat during the period from the time when the starting rings are ignited to the time when the burner is heated to about 1000° F. is greater than during the period after the burner reaches about 1000° F. After the burner is heated, the fuel is more completely vaporized and, hence, more perfect combustion results and less air is required. Heretofore, it has been necessary for the user to wait for a minute or more until the burners would produce sufficient heat. Efforts have been made to introduce larger amounts of air during the starting period in order to force combustion, so as to give usable heat almost instantly, but these air controls have been manually operated on a more or less "guesswork" basis with the result that excessive carbon is deposited on the cooking utensils during the time the extra air is supplied.

It is the object of this invention to automatically and properly control the volume of air admitted into the combustion chamber of a liquid hydrocarbon fuel burner during the initial starting or warming up period of the burner and thereafter while the burner is operating at its highest or approximately highest combustion chamber temperature.

In the drawing:

Fig. 1 is an elevational view showing a liquid hydrocarbon fuel burner.

Fig. 2 is an enlarged fragmentary showing partly in section of the burner.

Fig. 3 is a section along the line 3—3 of Fig. 2.

Fig. 4 is a detail fragmentary plan view of the fuel bowl of the burner.

Referring more particularly to the drawing for purposes of description and not by way of limitation there is shown a liquid hydrocarbon fuel burning system comprising a burner generally designated 1, and a fuel bowl 2 connected by the pipe line 3 to the fuel supply reservoir 4. As the liquid fuel is withdrawn from the reservoir 4 additional fuel is supplied to the reservoir from the tank 5 provided with the discharge spout 6. The tank 5 is filled with liquid fuel from time to time and then placed upon the reservoir 4 with the spout 6 beneath the surface level of the fuel in the reservoir. As herein shown the fuel is fed by gravity from the reservoir 4 through pipe line 3 to the fuel bowl 2.

The fuel bowl 2, as shown, takes the form of a ring having a U cross section. The circular bowl 2 is provided with an outer circumferential flange 7 and an inner circumferential flange 8. The outer circumferential flange 7 serves as a support for the outer perforated metal cylinder 9 and the inner circumferential flange 8 serves as a support for the inner perforated metal cylinder 10. The top of the cylinder 10 is closed by the plate 14. The circumferential flange 8 is also spanned by the perforated plate portion 11. As herein shown the bowl 2 with its flanges 7 and 8 and perforated plate 11 are formed from a single stamping.

An outer cylindrical metal shell 12 surrounds the perforated metal cylinders 9 and 10. The cylinders 9, 10 and 12 are fixed together by the rods 13 so that the cylinders are raised and lowered as a unit.

For controlling the amount of air that is admitted into the combustion chamber, that is, the space between the outer and inner perforated cylinders 9 and 10, it is proposed to raise and lower these perforated cylinders relative to the fuel bowl 2. To this end it is proposed to interpose a thermostatic metal means between the bowl 2 and the perforated cylinders. This means takes the form of a plurality of preferably bimetal strips 15. Each strip is riveted or otherwise secured adjacent one end as at 16 to a depression 17 in the flange 7. The number and the size of the thermostatic metal strips 15 will vary, of course, with the weight of the unit that must be raised and lowered and the temperatures at which it is desirable to raise and lower the unit. In the burner unit herein disclosed, three such bimetal strips 15 satisfactorily raised and lowered the unit 9, 10, 12 at the temperature required.

When the burner is cold, that is, not in operation, the bimetal strips 15 curve upwardly holding the perforated cylinders 9 and 10 about one-sixteenth of an inch above the flanges 7 and 8. This permits air to flow through the clearance between the lower edges 18 and 19 of the perforated cylinders 9 and 10 and the flanges 7 and 8 into the combustion chamber or space between the perforated cylinders 9 and 10. When the temperature in the vicinity of the bimetal strips 15 reaches about 600° F., the bimetal strips straighten out and move to a position within the depressions 17 flush with the upper surface of the flange 7. Thus as the normally curved bimetal strips 15 straighten out the perforated cylinders 9 and 10 are lowered until they seat

upon the flanges 7 and 8 and thus cut off this source of air. This lowering of the perforated cylinders 9 and 10 on the flanges 7 and 8 takes place approximately five minutes after the burner is lighted. However, the time and temperature at which the bimetal strips 15 lower the cylinders 9 and 10 on to flange 7 can be changed to suit the kind of fuel being burned. Thus after the burner gets under way and the walls of the combustion chamber, that is, the cylinders 9 and 10, are heated, air thereafter enters the combustion chamber only through the perforations in the cylinders 9 and 10.

The fuel bowl 2 is provided with the usual cylindrical wick 20. To start the burner the fuel on the wick is ignited in the usual manner. Initially the fuel burns at the top edge of the wick 20, but as soon as the burner heats up, the flame lifts away from the upper edge of the wick. The heat developed by the combustion of the fuel and air in the combustion chamber in turn vaporizes the fuel conducted upwardly by the wick from the fuel bowl 2. It will be noted that the wick is narrower than the distance between the perforated cylinders 9 and 10 so that in the starting of the burner before it warms up the air passing about the lower edges 18 and 19 of the cylinders 9 and 10 can pass upwardly to the place in the combustion chamber where it is mixed with the fuel and burned. After the burner is turned off and cooled to below a temperature of about 600° F. at the bimetal strips, the bitmetal strips again flex upwardly and raise the perforated cylinders 9 and 10 to their original position about one-sixteenth of an inch above the flanges 7 and 8. Since the bimetal strips 15 curve upwardly upon a decrease in temperature and downwardly upon an increase in temperature after reaching about 600° F. the high expanding side or lamina is located on the upper or top side of the strips 15.

We claim:

1. A burner for liquid hydrocarbon fuels comprising a source of liquid fuel, a combustion chamber connected with the source of fuel wherein the fuel is mixed with air and burned, a support relative to which the combustion chamber is shiftable to vary the amount of air admitted into the combustion chamber, and a temperature responsive laminated metal means responsive to the temperature of combustion of said fuel and air to shift the combustion chamber relatively toward its support as the temperature rises to decrease the amount of air admitted into the combustion chamber.

2. A burner for liquid hydrocarbon fuels comprising a source of liquid fuel, a combustion chamber connected with the source of fuel wherein the fuel is mixed with air and burned, a support relative to which the combustion chamber is shiftable to vary the amount of air admitted into the combustion chamber, and a temperature responsive laminated metal means for supporting the combustion chamber in spaced relation with its support when the burner is initially ignited whereupon the laminated metal means responds to the rise in temperature and lowers the combustion chamber upon its support to decrease the amount of air admitted into said combustion chamber.

3. A burner for liquid hydrocarbon fuels comprising a source of liquid fuel, a combustion chamber having one or more air inlets in its side walls and having an open end, a closure for the open end of the combustion chamber, the said combustion chamber being relatively shiftable away from the closure for the open end to admit air through its open end into the combustion chamber and relatively shiftable toward the closure to close the open end of the combustion chamber, and a heat responsive laminated metal means for holding the open end of the combustion chamber in spaced relation with its closure support when the burner is initially ignited whereupon as the temperature rises the temperature responsive means moves the combustion chamber relatively to its closure to close the open end of the combustion chamber at a predetermined temperature and decrease the amount of air admitted into the combustion chamber.

4. A burner for liquid hydrocarbon fuels comprising a source of liquid fuel, a combustion chamber member having one or more air inlets in its side walls and having an open end, a closure member for the open end of the combustion chamber, the said combustion chamber being relatively shiftable away from the closure for the open end to admit air through its open end into the combustion chamber and relatively shiftable toward the closure to close the open end of the combustion chamber, and a temperature responsive means in the form of laminated metal strips each secured at one end to one of said members and having its free end contacting the other member positioned between the closure member and the combustion chamber member for holding the open end of the combustion chamber in spaced relation with its closure support when the burner is initially ignited whereupon as the temperature rises the temperature responsive means moves the combustion chamber relatively to its closure to close the open end of the combustion chamber at a predetermined temperature and decrease the amount of air admitted into the combustion chamber.

5. A burner for liquid hydrocarbon fuels comprising a source of liquid fuel, a combustion chamber in the form of perforated cylinders positioned one within the other in spaced relation, a support for supporting the perforated cylinders and serving as a closure to prevent admittance of air into the combustion chamber about the lower edges of the said perforated cylinders, and a temperature responsive laminated metal means positioned between the closure support and the lower edges of the cylinders for holding the cylinders in spaced relation with the said closure support when the burner is first ignited to admit air into the combustion chamber between the cylinders through the space between the support and the lower edges of the cylinders whereupon as the temperature rises the laminated metal means lowers the perforated cylinders into contact with the closure support to prevent further flow of air around the bottom edges of the perforated cylinders into the combustion chamber.

EDWARD BLOCH.
JACOB KESNER KAHN.