March 26, 1929. W. E. TRENT 1,706,422

COMBINED GAS HEATING AND COOKING STOVE

Filed Oct. 12, 1922

Fig. 1.

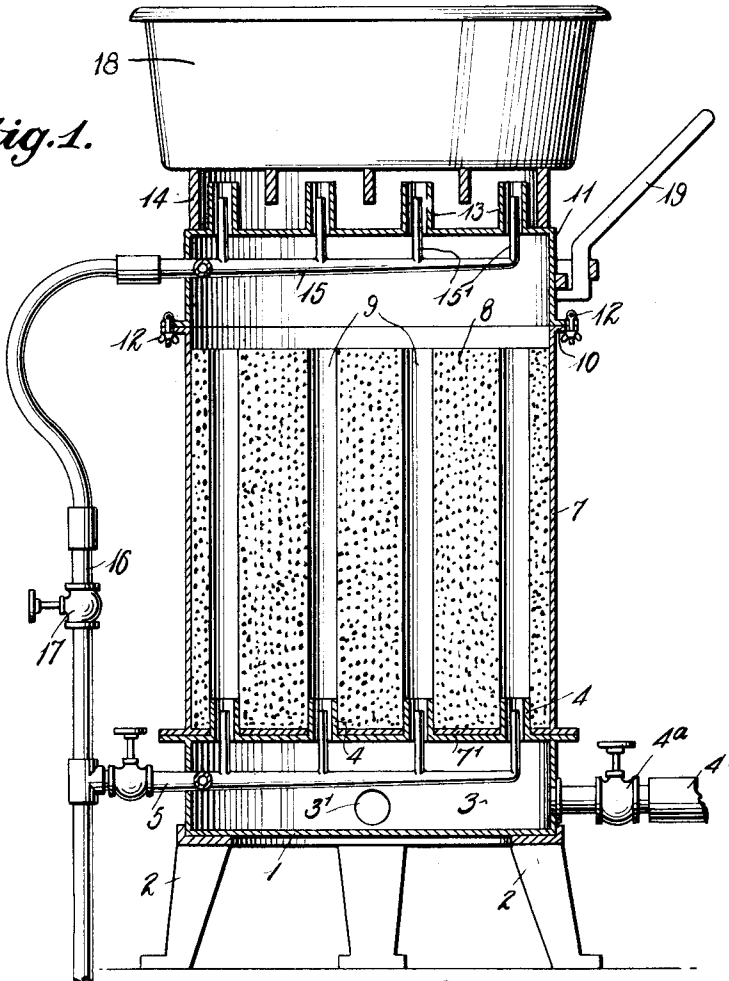
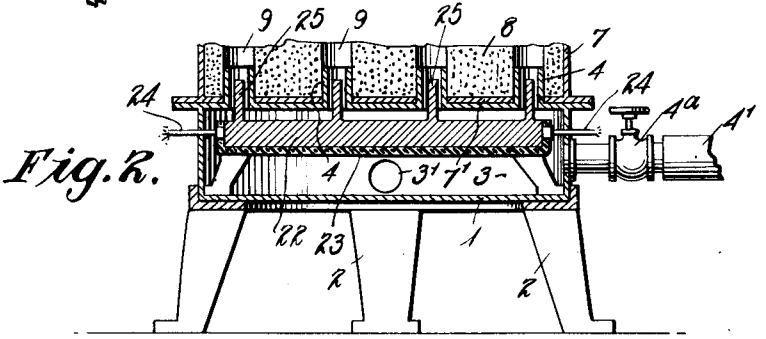


Fig. 2.



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UNITED STATES PATENT OFFICE.

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COMBINED GAS HEATING AND COOKING STOVE.

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The invention relates to improvements in gas heating and cooking stoves.

It is an object of the invention to provide a gas stove that is adapted to receive a replaceable container having a charge of comminuted carbonaceous fuel, the volatiles of which are vaporized when heat is applied thereto to produce the required gas that is utilized for heating or cooking purposes. The invention contemplates the provision of an apparatus of this character wherein only a relatively small quantity of fuel is necessary to vaporize a substantially greater quantity of the volatile constituents in the carbonaceous mass to produce gas in sufficient quantities for cooking and heating purposes, which gas is preferably consumed as it is generated.

The invention more specifically comprises a stove having gas making instrumentalities embodying a removable container receiving a charge of comminuted coal and oil, which container is positioned above burners or jets by means of which heat is generated to remove gases from the charge, which gases are then consumed for heating or cooking purposes. When the jets are lighted and a very small quantity of heat produced, heat passing through the openings in the plastic fuel causes a vaporization of a materially larger quantity of the volatile constituents thereof. The gases thus produced from the fuel pass to a main burner, being mixed with the proper quantities of air, and are there consumed for heating or cooking purposes. When the gas making burner is cut off, the production of gas from the fuel mass ceases, so that a removable charge will last for a considerable period of time, and gas may be intermittently produced therefrom when it is desired.

As a modification of my invention, I may use an electric heater for vaporizing the volatiles in the fuel mass in lieu of a gas burner. The electric heater may be constructed in various manners, so long as sufficient heat is produced to cause a gasification of the lighter volatiles. Whether an electric or a gas heater is used, when the volatiles in a container have been largely removed, the coked residue therein is discharged and a new charge of green fuel placed upon the stove.

In the accompanying drawings, Fig. 1 represents a vertical section of an embodiment of the invention showing an auxiliary gas heater, and Fig. 2 illustrates a vertical section of a modified form of the invention wherein an electric heater is employed.

Referring now more particularly to the drawings, wherein like reference characters indicate corresponding parts, the numeral 1 designates a stove having supporting legs 2, which may be of any conventional form. The stove is provided with an auxiliary burner 3, having a plurality of burner jets 4 extending therefrom, said burner receiving gas from a gas supply 4′ controlled by the valve 4^a. Air is introduced to said burner through the air feed pipe 5 controlled by a suitable valve, and is, of course, admitted in sufficient quantities to support combustion thereof. The burner 3 is provided with an opening 3′, into which a lighting instrument may be inserted for initially lighting the burner.

Disposed upon the burner 3, there is a removable container 7, preferably constructed of metal or the like and having a bottom wall or base 7′ provided with a plurality of apertures therein. This container receives a fuel charge 8, preferably of comminuted coal and oil, in such relative quantities as to be of a plastic consistency. The fuel mass is placed in the container 7 and has formed therein a plurality of openings 9 extending vertically therethrough, which openings may be formed in the mass by the use of mandrels or the like. The fuel charge in the container 8 is preferably the amalgam produced in a manner disclosed in my Patent 1,420,164 granted June 20, 1922. The openings 9 in the fuel substantially align with the openings in the base 7 of the replaceable container so as to permit the base 7 to be seated upon the burner 3 with burner jets 4 extending through the openings in the base 7 into the openings 9 in the fuel charge. The upper portion of the container 7 is open ended to permit a free exist of the gases, in a manner which will later be described.

The upper part of the container 7 is formed with an off-set flange 10, adapted to receive and support a burner 11, which may be detachably united thereto by fastening devices 12 or otherwise. This burner 11 is

formed so as to provide a substantial gas receiver, having a plurality of burner jets 13 along the upper surface thereof, directly beneath the grid 14 of the stove. To support the combustion of the gasified fuel produced from the mass 8 by the heat from the burner 4, an air pipe 15 enters the burner 11, and is formed with nozzles 15′ passing up into the jets 13. Air is admitted to this pipe through the extension 16 of the air feed pipe controlled by valve 17. A suitable cooking receptacle 18 may be placed upon the grid, when the gas is being used for cooking purposes, or, if desired, the gas may be burned to heat various articles placed upon the grid or for various other purposes. The burner 11 is freely removable from the upper part of the container 7 by removing the detachable fasteners 12 and using a lifter 19. When it has been removed, then the container 7 may be removed from the auxiliary burner and a new one substituted in place thereof. Such removal, however, is only required when the fuel charge in the container has been gasified and this fuel is to be replaced by a fresh charge. When the apparatus is in use, a container with a fuel charge is placed upon the auxiliary burner 3 and gas admitted to the jets 4 by opening the valve 4^a. Air is also admitted to the gas and the combustible charge ignited. The heat from this charge is directed into the vertical openings 9, this heat being sufficient to penetrate the carbonaceous fuel, gasifying the volatiles thereof, which pass out through the openings and into the burner 11. The burner jets 13 of the main burner 11 are, of course, lighted, and the vaporized volatiles from the fuel mass consumed, as produced, for cooking or heating purposes by the burner 11. I have found that by using a composite fuel charge a very small quantity of fuel burned by the auxiliary burner is sufficient to generate a large quantity of gas from the fuel mass 8, which is sufficient for any domestic purposes. It is therefore preferable to have the auxiliary burner provided with very small jets, as little fuel is required for the generation of substantially greater relative quantities of combustible gases from the fuel mass. The auxiliary burner 3 is kept in operation as long as the production of heating or cooking gases is desirable, and whenever gas is no longer needed, it is only necessary to shut off the supply of gas through the auxiliary burner 3. The gas can then be turned on at a later time, which results in the production of combustible gases from the fuel mass which are burned by the main burner 11. When the charge has been placed on the auxiliary burner, the same may be intermittently lighted from time to time or continuously used until all of the volatiles in the fuel mass have been gasified. The replaceable container 7 is then removed, with its coked residue, and a charge of green fuel substituted in place thereof.

In Fig. 2 of the drawings, I have disclosed another embodiment of this invention wherein the base of the stove is provided with an electric grid 22 seated in a suitable housing 23 connected with the terminals 24. This grid is partially formed with upstanding resistance elements 25 adapted to enter the cored openings 9 in fuel mass 8 to assist in generating the necessary heat for passage through said openings to remove the volatiles therefrom. The auxiliary electric heater is decidedly preferable at times where a very rich gas is desirable, as it is apparent that the gas produced thereby will not be diluted with some products of combustion, which occurs when an auxiliary gas heater is employed. Various forms of electric heaters may be used for this purpose, and I have only attempted to disclose one structure which I have found satisfactory. The gases produced by the heat from the electric heater pass on into the main burner 11, which is identically the same as the burner disclosed in Fig. 1. This burner has the air feed 16 with the jets 15 and is removable so as to permit the container 7 to be replaced whenever desired.

From the foregoing, it will be apparent that I have provided a combined gas making plant and stove, which is highly susceptible of use in localities where municipal gas is not obtainable or is relatively high in price. The replaceable containers receiving the comminuted coal and oil may be freely mounted over the auxiliary burners, and when the gaseous materials in a charge contained therein have been vaporized, then the container, with its coked residue is removed, and a new charge of green fuel placed over the auxiliary burner. The coke produced is highly susceptible for use in furnaces, stoves, and the like. A single charge of material, however, is sufficient to produce a great deal of gas, so that it is not necessary to replace the containers every time the stove is to be used. It may frequently happen that a single container will be sufficient for producing gases intermittently over a long period of time.

Having thus described my invention, what I claim is:

1. A stove of the character described comprising a base member having openings in the upper wall thereof, a fuel receiver disposed thereon and adapted to receive a formed charge of carbonaceous fuel having passageways extending therethrough and to maintain such charge with said passageways in alignment with said openings, means in said base for generating heat and directing flow thereof through said passages, a burner associated with the end of said receiver re-

mote from said base member to receive gases generated in said receiver, and means for supplying air in controlled quantities to said burner.

2. A portable stove comprising a base member having a plurality of spaced openings in the upper wall thereof, a fuel receiver adapted to be seated thereon with openings in the bottom thereof in alignment with the first-mentioned openings, means for generating heat and directing flow thereof through said openings into a fuel charge in said receiver, a burner associated with the upper end of said receiver, and means for supplying air in controlled quantities to said burner.

3. A portable stove comprising a base member having top, bottom and side walls defining a hollow space, a plurality of upwardly-extending nozzles defining openings in the top wall thereof, a fuel receiver seated thereon and adapted to receive a formed charge of carbonaceous fuel having passageways extending therethrough and to maintain such charge with said passageways in alignment with said nozzle openings with said nozzles extending into said passageways, means for leading a combustible gas to said hollow base member, means for supplying air to support combustion of said gas and to direct the products of combustion longitudinally of said passageways, a burner comprising a plurality of jets seated on said receiver in gas-receiving relation to said receiver, and means for supplying air in controlled amounts to said jets.

In testimony whereof I affix my signature.

WALTER EDWIN TRENT.