Oct. 30, 1934. H. C. MAUL 1,978,544

COOKING EQUIPMENT

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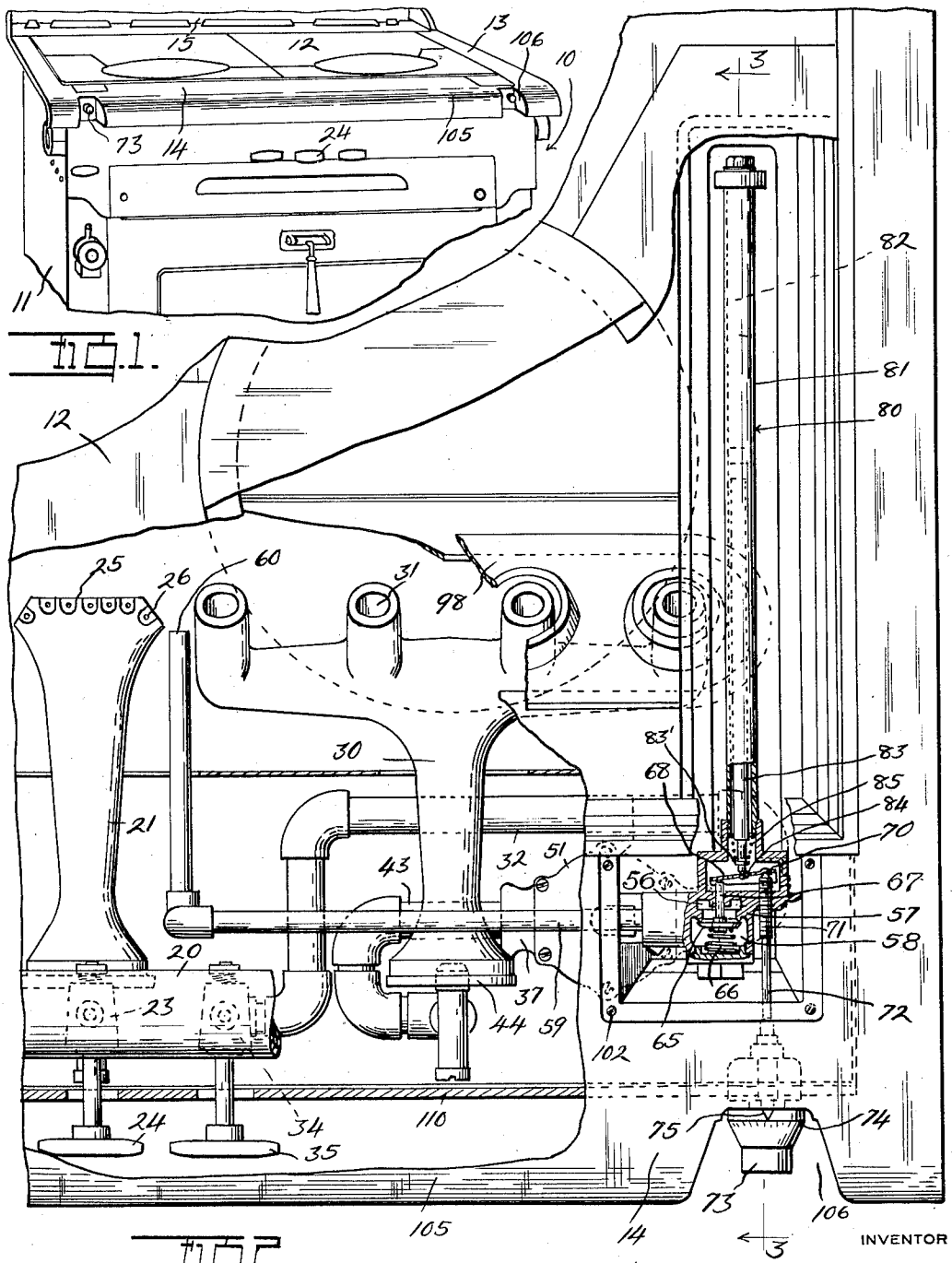


FIG. 1.

FIG. 2.

INVENTOR

Henry C. Maul

BY

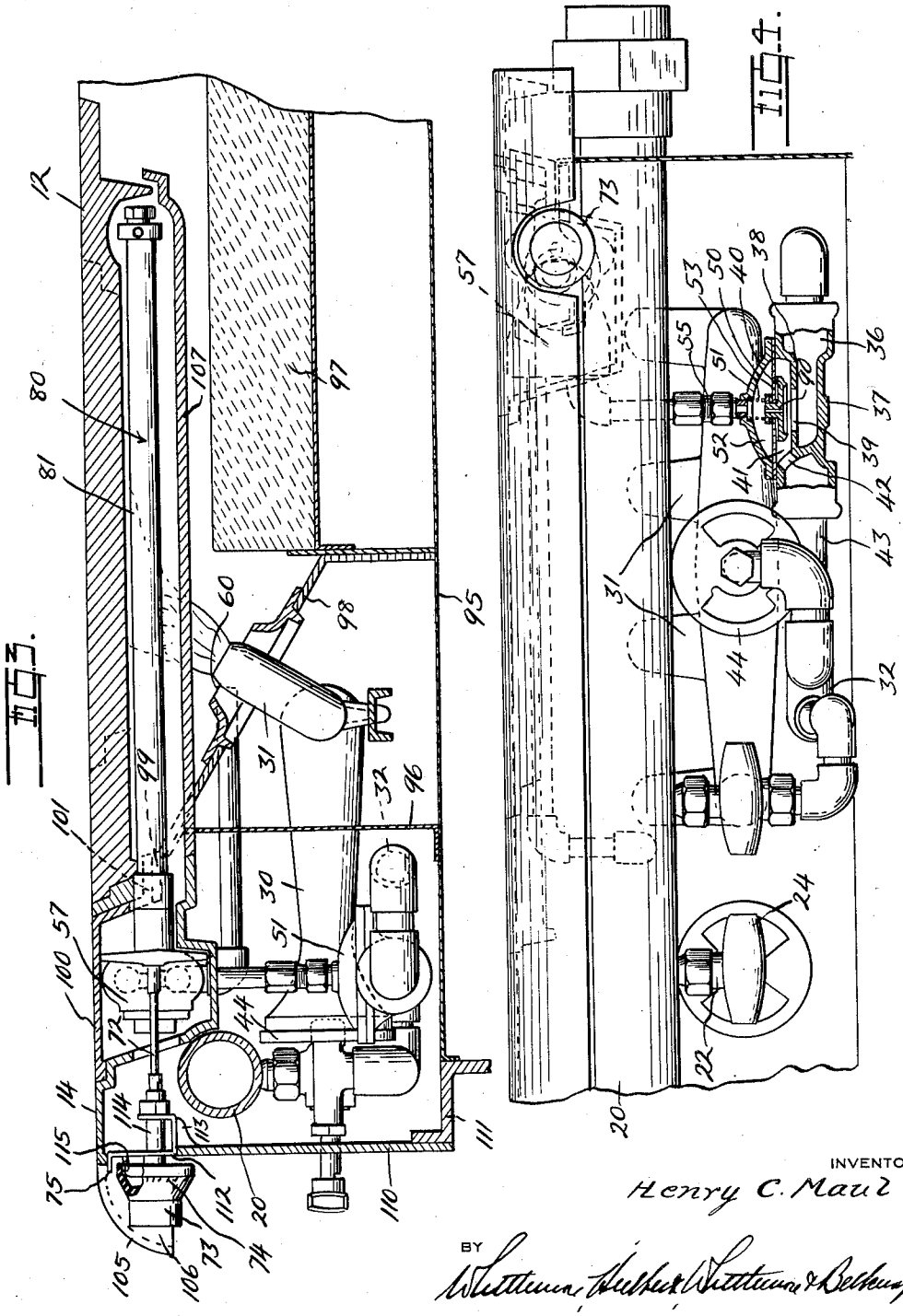
Whittemore, Hulbert, Whittemore & Belknap

ATTORNEYS

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INVENTOR
Henry C. Maul

BY
Whittemore, Hulbert & Whittemore & Belknap

ATTORNEYS

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1,978,544

COOKING EQUIPMENT

Henry C. Maul, Detroit, Mich., assignor to Detroit-Michigan Stove Company, Detroit, Mich., a corporation of Michigan

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9 Claims. (Cl. 236—15)

This invention relates generally to cooking equipment and relates more particularly to a means for controlling the operation of the heating elements of a gas-fired range.

One of the essential objects of the invention is to provide a control of the above mentioned character which will effect a saving in the fuel consumption of the range.

Another object of the invention is to provide a control means of the above mentioned character which, while operating to effect a saving in fuel consumption, will also operate to maintain the controlled portion of the range in a condition to start immediate cooking or in other words in a heated condition so that the controlled portion of the range need not be again reheated when it is desired to start a cooking operation.

The invention also contemplates the provision of a control which will prevent overheating and consequent burning out or warping of the controlled portion of the range and which will therefore reduce to a substantial extent the maintenance cost of the range.

The invention further provides a control which will efficiently function to positively limit the maximum temperature to which the controlled portion of the range is subjected.

Numerous other objects and advantages of this invention, such for example as the means for concealing the control means while rendering the same accessible for replacement or repair, will become more apparent as the following description proceeds, particularly when reference is had to the accompanying drawings wherein:

Figure 1 is a semi-diagrammatic fragmentary perspective view of a cooking range in which the invention is embodied;

Figure 2 is a fragmentary top plan view of the range with parts thereof broken away and other parts in section;

Figure 3 is a transverse sectional view taken substantially on the line 3—3 of Figure 2; and

Figure 4 is a fragmentary front elevational view of the range with parts thereof broken away and other parts in section.

Usually cooking ranges of the gas-fired type have, in addition to one or more ovens, a heat radiating top plate or grid on which a large part of the cooking is performed. The burners or heating elements for this top plate are disposed immediately beneath the same and are manually controlled. When such ranges are used in hotels, restaurants, clubs and the like, it is customary to turn on the burners which heat the top plate early in the morning and to permit these burners to run continuously until the restaurant or the like is closed at night. Actually, however, there are numerous intervals during the day when little or no cooking is done, however, it has been necessary to let the burners operate continuously to take care of orders when they are received. Ordinarily time is not available to reheat the top of the range each time a cooking operation is to be performed. Hence the continued operation of the burners over idle periods results in a decided waste of fuel. Furthermore the continuous operation of the burners causes the top of the range to become heated to such an extent that the top plate rapidly burns out or becomes warped, causing delays and added costs for repairs and maintenance.

In the present instance, however, the objectionable features just referred to have been overcome by the provision of an efficient means for controlling the operation of the heating elements for the top plate so that the maximum heat at this point will be held within desired limits. Moreover the invention provides a control which will be responsive to the placing on the top plate of a receptacle containing substances to be cooked. Thus the control will be wholly automatic in its operation, maintaining the top plate at a desired temperature which will prevent the range top from being destroyed by overheating.

Referring now to the drawings wherein one embodiment of the inventive idea is disclosed in detail, and wherein like reference characters designate corresponding parts throughout all views, the numeral 10 designates generally a gas range having a base portion 11 which contains a suitable oven, not shown. The top of the range on which the major portion of the cooking is performed comprises a plurality of removable plates 12 which form a sectional grid and have side, front and rear border members 13, 14 and 15, respectively, suitably mounted on the framework of the range. As usual, such plates 12 are formed of suitable material for transferring the heat from the burners beneath the same to the cooking receptacles thereon and are imperforate, however, it is to be understood that they may, if desired, be perforated or grille-like in form.

The range disclosed is a gas range, preferably of the heavy duty type, and has a gas manifold 20 which extends longitudinally of the range adjacent the front thereof below the front border member 14. As illustrated in Figure 1 of the drawings, the manifold preferably extends entirely through the range and projects from oppo-

site ends thereof so that suitable gas supply pipes (not shown) may be secured to one or both ends thereof.

Disposed substantially centrally of the range below the top thereof is a burner 21 which is connected to the manifold by a nipple 22. Any suitable means such as a valve 23 having a knob 24 accessible at the front of the range may be used to control the supply of gas from the manifold to this burner. Preferably the discharge end of the burner 21 terminates in a flaring nozzle 25 having discharge openings 26 so arranged as to direct jets of flame against a large portion of the under surface of the top of the range. In use the burner 21 operates continuously and functions as a pilot for the main burners and as a heater for the top of the range.

In the embodiment of the invention illustrated, two main burners 30 are provided, one being disposed on either side of the pilot burner 21. Each of these burners has a plurality of discharge nozzles 31 which are inclined as shown to direct jets of flame against the under side of the top of the range. Gas is conducted from the manifold 20 to the burners 30 by a conduit 32 and is under the control of a valve 34 having an operating knob 35.

Disposed between the conduit 32 and the burner 30 is a suitable thermostatically operated control mechanism which will now be described in detail. Referring to Figure 4 of the drawings, the discharge end of the conduit 32 is tapped into a chamber 36 in a suitable fitting 37. Also within the fitting 37 is a partition 38 having a port 39 controlled by a valve 40. When this valve is open, gas is allowed to flow from chamber 36 to a chamber 41 which is connected by way of a port 42 to a conduit 43 communicating directly with the inlet 44 of the burner. Thus when the valve 40 is open, gas may flow directly from the conduit 32 to the burner 30.

The valve 40 is secured to a diaphragm 50 which closes one side of the chamber 41, the arrangement being such that fluctuation of the diaphragm actuates the valve 40. A cap 51 secured to the fitting 37 provides a chamber 52 to which the other side of the diaphragm 50 is exposed. A spring 53 disposed in the chamber 52 and engaging the cap 51 tends to move the valve 40 to its closed position.

Tapped into the chamber 52 is a conduit 55 which communicates with a chamber 56 in a housing 57. A second chamber 58 is provided in the housing 57 and receives a conduit 59 which has its discharge end 60 disposed beneath the range top between the burners 21 and 30.

A valve 65 mounted in the housing 57 controls communication between the chambers 56 and 58. Normally this valve 65 is held closed by a spring 66 but is provided with a stem 67 engaged by a lever 68 fulcrumed at one end on the end 70 of a shank 71 threaded in the housing 57. Preferably this shank is provided with a stem 72 to which a suitable knob 73 is slidably keyed in any desired manner. Thus by rotating the knob 73, the shank 71 will be moved longitudinally to adjust the fulcrum of the lever 68. Any suitable means such as the indicia 74 on the knob and a pointer 75 may be used to indicate the adjustment of this fulcrum.

Disposed beneath the top of the range so as to be responsive to the heat thereof is a thermo-responsive device designated generally by the reference character 80. Preferably this device comprises an outer tubular member 81 and rods 82 and 83, respectively. As shown, the member 81 is fixedly secured at one end to the housing 57, while the rods 82 and 83 are loosely disposed within said tubular member. Preferably the rod 82 is formed of carbon and abuts the closed outer end of the member 81, while the rod 83 is formed of metal having a lower coefficient of expansion than that of the tubular member 81 and has a pointed end 84 engaging the lever 68 intermediate the ends thereof. A spring 85 is sleeved upon the rod 83 between the adjacent end of the tubular member 81 and a flange 83' formed on the rod 83 and acts to constantly hold this rod in engagement with the lever 68.

The difference in the expansion and contraction of the tubular member 81 and the rods 82 and 83 incident to changes in the temperature of the range top effect a rocking of the lever 68 and thus an actuation of the valve 65 which operates to control the exhaust from chamber 52 by way of conduits 55 and 59. For supplying a fluid to the chamber 52 to be exhausted therefrom, the valve 40 is provided with a restricted passage 90 which places the chamber 52 in communication with the chamber 36 and thus in communication with the source of gas supply when the valve 34 is opened.

The operation of the structure as thus far described is as follows: When the operation of the range is to be started, both the valves 23 and 34 will be opened and the burners 21 and 30 lighted. Both of these burners will operate until the range top reaches a maximum temperature determined by the setting of the knob 73 and thus of the thermostat. When this temperature is reached, the tubular member 81 will be elongated more than the rods 82 and 83, thus relieving the pressure of the rod 83 on the lever 68 so that the spring 66 may close the valve 65.

The closing of the valve 65 will seal the chamber 52 and will permit the building up of a pressure in this chamber by virtue of the passage of gas from the chamber 36 into the chamber 52 by way of the passage 90. When the pressure in the chamber 52 has been raised sufficiently to equal that in chamber 36, the valve 40 will be closed by the spring 53 and the supply of gas to the burner 30 will be cut off.

The continuous operation of the burner 21 will however, under normal conditions, maintain the range top at the desired maximum temperature. Should, however, the range top fall below this desired maximum temperature or should the range top be cooled by placing thereon one or more receptacles containing substances to be cooked, the thermo-responsive element 80 will respond immediately to this drop in temperature of the range top to increase the pressure of the rod 83 on the lever 68 and to thus effect an opening of the valve 65. The opening of this valve will permit the gas in chamber 52 to escape to the conduit 59 and this gas being discharged from the end 60 of this conduit will immediately be ignited by the flames of the pilot burner 21. Further, as soon as the pressure is decreased in chamber 52, the pressure in gas chamber 36 acting on valve 40 will open this valve, thus admitting gas directly to the main burner 30 which will then be ignited either by the pilot burner or by the flame from the discharge end 60 of conduit 59. Obviously the burning of the main burner will continue until the desired maximum temperature is again reached, at which time the thermostat will be actuated to again close the

valve 40 to cut off the supply of fuel to the burner 30.

Preferably the thermo-responsive member and associated mechanism as well as the manifold 20 are concealed but are readily accessible for repairs or replacements. As shown, 95 is the top structure of the oven of the range. Supported on this top structure is a ray shield 96 of usual construction and refractory elements 97 also of usual construction. Likewise supported from the oven top 95 is an inclined plate 98 through which the burner nozzles 31 extend. Preferably this plate 98 terminates in a horizontal flange 99 disposed below and spaced from the under surface of the front border frame 14 of the range top.

Formed in the front border member 14 and immediately over the housing 57 is an opening closed by a cover plate 100. This cover plate has a horizontal flange 101 adapted to be engaged between the flange 99 and the adjacent under surface of the border frame 14 and is held in place by bolts or the like 102. It will be apparent that by removing the bolts 102, the plate 100 may be lifted forwardly and upwardly to withdraw the flange 101 thereof from engagement between the member 99 of the adjacent portion of the top to thus provide for removal of this plate and ready access to the housing 57 and associated structure.

The front border frame 14 is extended as clearly illustrated in Figures 1 to 3, inclusive, of the drawings to form the apron 105 which slightly overhangs the subjacent portion of the front of the range. This apron is preferably provided with indentations 106 to receive the knobs 73.

To prevent direct impingement of the flames of the burner 30 on the thermo-responsive element 80, the latter is preferably enclosed in a housing 107 which extends laterally inwardly from the adjacent side frame member 13. This housing, however, terminates immediately beyond the thermo-responsive element as clearly illustrated in Figure 2 of the drawings.

The burners, the manifold 20, and the conduits which connect this manifold to the several burners are concealed by the front plate 110 which may be conveniently bolted at its lower end to a portion 111 of the frame of the range. Thus by removing the bolts holding this plate in position, the plate may be removed to provide access to the manifold, the burners and the housing 37, as will be readily apparent.

For supporting the shaft 72, the front plate may be provided at its upper edge and at the proper point with a U-shaped strap 112 which is suitably supported by a flange 113 formed on the plate 110. The legs of the strap support the bushing 114 for the shaft 72 as is clearly illustrated in Figure 3 of the drawings.

To frictionally restrain rotation of the shaft 72 and thus adjustment of the thermostat, the strap 112 may be provided with a struck-out tongue 115 adapted to engage the inner periphery of the knob adjacent the upper end thereof. The strap may be provided further at its upper end with an outwardly extending pointed flange which constitutes the pointer 75 previously referred to.

From the above, it will be apparent that the invention provides means whereby the top of the range may be limited to a predetermined maximum temperature throughout the operation of the range. When not in use very little gas will be consumed, however, the range top will be maintained at such a temperature that it will respond quickly for cooking when it is desired to perform a cooking operation. Moreover the arrangement is such that the range top will not be excessively heated at any time. Thus a material saving in gas is effected and danger of the top becoming overheated and either being burned out or warped will be eliminated. As a result the over-all cost of maintenance has been reduced.

As usual the range top parts, particularly the circular portions thereof, are readily removable so that if desired, the receptacle containing the substance to be cooked may be exposed directly to the flame from the burners.

Although the embodiment of the invention illustrated includes two thermo-responsive elements and a separate control for each main burner, it is apparent that the thermo-responsive elements might be located at points other than opposite ends of the range top, and one thermo-responsive element instead of two might be utilized for controlling the flow of fuel to all of the main burners of the range.

Therefore, while one embodiment of the invention has been described with some detail, it is to be understood that the description is for the purposes of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

What I claim as my invention is:

1. A gas range having a heating top for supporting cooking vessels and including a plurality of removable plates forming a sectional grid, a burner beneath the top of the range in position to heat the same, a gas manifold, means for conducting gas from the manifold to said burner, a valve controlling the passage of gas through said conducting means, a thermostat beneath and responsive to the temperature of the heating top of the range, said thermostat being entirely free of said top so that the plates thereof may be removed at will, and actuating means for said valve including means operable by said thermostat, the construction and arrangement of the cooking top, thermostat, valve and actuating means being such that the thermostat will maintain the top of the range in a heated condition so that it need not be again reheated when it is desired to start a cooking operation, and will prevent overheating and consequent burning out or warping of the heating plates.

2. A gas range having a heating top for supporting cooking vessels and including a plurality of movable plates forming a sectional grid, a burner beneath the top in position to heat the same, a gas manifold, means for conducting gas from said manifold to said burner, a valve controlling the passage of gas through said conducting means, a thermostat adjacent and responsive to the temperature of the heating top, said thermostat being entirely free of said top so that the plates thereof may be removed at will, actuating means for said valve including means operable by said thermostat, and manually operable means for regulating the action of said actuating means.

3. A gas range having a heating top for supporting cooking vessels, a burner beneath the top of the range in position to heat the same, a gas manifold, means for conducting gas from said manifold to said burner, a valve controlling the passage of gas through said conducting means, a thermostat adjacent and responsive to the temperature of the heating top, said thermostat being entirely free of said top whereby portions thereof may be moved relative to the

thermostat if desired, actuating means for said valve including means operable by said thermostat, manually operable means for regulating the action of said actuating means, said top having side, front and rear border members, the front border member being disposed over said valve and actuating means and having an opening affording access to said parts, a cover for said opening, said front border member being extended to provide an apron overhanging the subjacent portion of the front of the range and said apron having a recess receiving the manually operable regulating means aforesaid.

4. A gas range having a heating top for supporting a cooking vessel, a gas manifold, a pilot burner connected to said manifold and disposed beneath the top of said range in position to heat the same, main burners upon opposite sides of the pilot burner beneath the top of the range in position to heat the same, said main burners being sufficiently close to the pilot burner to be ignited thereby, means for conducting gas from the manifold to said main burners, valve means controlling the passage of gas through said conducting means, thermostatic means beneath and responsive to the temperature of the heating top of the range, said thermostatic means being entirely free of said top, actuating means for said valve means including means operable by said thermostatic means, manually operable means for regulating the action of said actuating means, said top having side, front and rear border members, the front border member being disposed over said valve means and actuating means and having means affording access to said parts, said front border member being extended to provide an apron overhanging the subjacent portion of the front of the range, said apron having means receiving the manually operable regulating means aforesaid, and means for protecting the thermostatic means from direct impingement of flames from the main burners aforesaid including means extending inwardly from the said side flame members.

5. A gas range having a heating top for supporting cooking vessels, a burner beneath the top in position to heat the same, a gas manifold, means for conducting gas from the manifold to said burner, a valve controlling the passage of gas through said conducting means, a thermostat beneath and responsive to the temperature of the heating top, said thermostat being entirely free of said top so that portions thereof may be moved relative to the thermostat if desired, and actuating means for said valve including means operable by said thermostat.

6. A gas range having a heating top for supporting cooking vessels, a burner beneath the top of the range in position to heat the same, a gas manifold, means for conducting gas from the manifold to said burner, a valve controlling the passage of the gas through said conducting means, a thermostat adjacent and responsive to the temperature of the heating top, said thermostat being entirely free of said top so that portions thereof may be moved relative to the thermostat if desired, actuating means for said valve including means operable by the thermostat, and means for regulating the action of said actuating means.

7. A gas range having a heating top for supporting cooking vessels, a gas manifold, a pilot burner connected to said manifold and disposed beneath the top of said range in position to heat the same, means for controlling the supply of gas from the manifold to the pilot burner, a main burner beneath the top of the range in position to heat the same, said main burner being sufficiently close to the pilot burner to be ignited thereby, means for conducting gas from the manifold to said main burner, a valve controlling the passage of gas through said conducting means, a thermostat beneath and responsive to the temperature of the heating top, said thermostat being entirely free of said top, and actuating means for said valve including means operable by said thermostat.

8. A gas range having a heating top for supporting cooking vessels and including a plurality of removable plates forming a sectional grid, a gas manifold, a pilot burner connected to said manifold and disposed beneath the top of said range in position to heat the same, means for controlling the supply of gas from the manifold to said pilot burner, a main burner beneath the top of the range in position to heat the same, said main burner being sufficiently close to the pilot burner to be ignited thereby, means for conducting gas from the manifold to said main burner, a valve controlling the passage of gas through said conducting means, a thermostat adjacent and responsive to the temperature of said heating top, said thermostat being entirely free of said top, and actuating means for said valve including means operable by said thermostat.

9. A gas range having a heating top for supporting cooking vessels, a burner beneath said top in position to heat the same, a gas manifold, means for conducting gas from said manifold to said burner, a valve controlling the passage of gas through said conducting means, a thermostat adjacent and responsive to the temperature of the heating top, said thermostat being entirely free of said top, and actuating means for said valve including means operable by said thermostat, said thermostat, valve and actuating means being entirely concealed but readily accessible.

HENRY C. MAUL.