The present invention concerns a gas burner control system, and more particularly a control system which permits remote control of starting and terminating the operation of a burner, and also includes safety devices which prevent escape of gas from the burner in the absence of combustion.

Arrangements of this general type are known which comprise a gas control body having an inlet for the gas supply, a first outlet connectable to the main gas burner and a second outlet connectable to a pilot flame gas burner and containing a main gas valve for controlling the flow of gas to the main burner and a pilot flame gas valve for controlling the flow of gas to the pilot flame burner. In addition, there is a housing combined with the gas control body and containing electrical and mechanical control devices for actuating the valves and also causing ignition of the pilot flame.

More particularly, the known arrangements also comprise a solenoid valve acting as the above-mentioned main gas valve and requiring a rather involved electrical control system.

It has been found that the use of a solenoid valve in a gas burner control system entails rather high cost in view of the solenoid valve itself and the related and necessary circuitry.

It is therefore one object of the invention to provide for a gas burner control system which operates entirely satisfactorily in every respect and under any conditions but does not require the use of a solenoid valve.

An additional object of this invention is to provide for a control system as mentioned above which is rather simple in construction and yet entirely reliable in operation.

With the above objects in view a gas burner control system according to the invention comprises, in combination gas inlet means; a main gas burner means; a main gas valve arranged between said gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve arranged between said gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means including ignitor means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized when gas flows through said pilot flame gas valve to said pilot flame gas burner means, and energizing means for energizing said ignitor means; electric valve control means including electromagnet means for holding when energized said pilot flame gas valve in open position once the latter has been moved to open position, and thermo-electric means responding to exposure to the heat of said pilot flame by energizing said electromagnet means so as to hold said pilot flame gas valve open as long as there is a pilot flame; and control means for controlling said main gas valve and said pilot flame gas valve and said igniting means, including electromotor means, motor switch means in circuit with said electromotor means for controlling the latter, switch means in circuit with said igniting means for controlling the latter, rotary cam means rotatable by said electromotor means and actuating in different rotational positions said motor and ignition switch means, respectively, a mechanical actuating member cooperating with both said main gas valve and said pilot flame gas valve and movable by said electromotor means between a plurality of positions, in one of which said actuating member places both said main gas valve and said pilot flame gas valve in closed position, in a second one of which said actuating member places said pilot flame gas valve in open position while leaving said main gas valve closed, and in a third one of which said actuating member places both said main gas valve and said pilot flame gas valve in open position.

It will be seen from the description further below that the control system according to the invention has many advantages over the prior art. One of these advantages is also due to the fact that the valves used in the system can be arranged in such a manner that the gas pressure coming from the mains and acting on the valve tends to close or to keep the valves closed which does not counteract the resilient means which are provided for urging the valves at all times toward a closed position thereof. In addition to the elimination of the conventional solenoid valve the arrangement according to the invention makes it possible to arrange a comparatively small number of elements within the gas control body of the system. The entire arrangement can be constructed easily in such a manner that it requires comparatively small space and can be mounted without any difficulty within conventional gas-operated heating devices of any kind.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a diagrammatic illustration of a gas burner control system according to the invention, all movable members thereof being shown in idle position;

FIG. 2 is a similar diagrammatic illustration, the movable elements thereof being shown in the position which they assume when the operation of the system is started;

FIG. 3 is another diagrammatic illustration of the same system, the moving elements thereof being shown in the position which they assume while the main gas burner is in operation; and

FIG. 4 is a diagrammatic, cross-sectional elevation of a control system according to the invention, some portions of the electrical equipment thereof being omitted for the sake of clarity.

The arrangement as illustrated by FIGS. 1–3 comprises at least one main gas burner 10 and a pilot flame gas burner 11 mounted adjacent to the main burner. The pilot flame gas burner is supplemented by an automatic igniting device which comprises an igniter 12 of some suitable conventional type, e.g. a spark gap connected with the energizing devices of the ignition arrangement as described further below. When a pilot flame is produced by the pilot flame burner 11 then this flame reaches not only the gas issuing from the nozzles of the main gas burner 10 but reaches also a thermocouple 13 which constitutes one portion of a conventional thermoelectric safety arrangement.

For placing the entire system into service and also for operating the system by remote control a main switch 14 is provided in one of the supply lines 15, 16 which connect the arrangement with a supply of electric energy. As will be seen the arrangement is operated mainly by means of an electromotor which for the sake of clarity of the drawing is not fully illustrated but is symbolically represented by the circular symbol 20 in FIGS. 1–3.
This motor circuit 20 is connectable with the main supply lines 15, 16 via the control contact sets 28 and 29, the operation of which will be described further below. When the circuit 20 is in operation it rotates a shaft, not shown, which carries a multiple cam arrangement 22 and an eccentric member e.g. a crank pin 30. The cam arrangement 22 cooperates with the motor switch contacts 28 and the ignition control contacts 24 while the second pair of motor switch contacts 29, connected in parallel with the contacts 28, is operated by the main gas valve 36 or rather its valve stem 35 as will be described further below. The operation of the crank pin 30 serves to operate the main gas valve 36 and the pilot flame gas valve 21 in such a manner that starting from the idle position shown in FIG. 1 a rotation of the shaft and of the crank pin through about 180° causes the pilot flame gas valve 21 to open. During a portion of this rotation through 180° the ignition switch contacts 24 are actuated so as to energize the igniter device 12 and to ignite the gas issuing from the pilot flame gas burner 11. A further rotation of the shaft and crank pin returns the cam arrangement 22 to its original starting position in which the pilot flame gas valve is given freedom to stay in open position or to return to closed position. If the pilot flame gas valve 21 is kept in open position by any means described further below, then the main gas valve 36 is opened and the electromotor is stopped. If, however, the pilot flame gas valve 21 is not kept in open position but returns to its closed position then also the main gas valve 36 is again closed and the operation of the mechanism is restored so that the attempted igniting procedure is repeated.

In the illustrated embodiment of the invention the multiple cam arrangement 22 consists of a single cam disc 22 provided at one portion of its circumference with at least one, preferably a plurality of small lobes cooperating with a cam follower member attached to the nearest one of the normally open motor switch contacts 28, and with another lobe 27 located approximately diametrically opposite to the lobes 23 and also cooperating with the above mentioned cam follower. As can be seen from FIGS. 1–3, closing of the motor switch contacts 28 causes also closing of the adjacent main switch contacts 24, while in the respectively opposite position both switch contacts 24 and 28 are simultaneously open. The crank pin 30 constitutes the pivot for a rocking lever 31 which in its operative engagement at one of its ends 32 with the cam disc 22 and at its other end 34 in operative engagement with the valve stem 35 of the main gas valve 36. Of course, the multiple cam arrangement 22 may also consist of at least two cam discs arranged next to each other on the shaft which is driven by motor, one of these cam discs carrying on its circumference at least one lobe for actuating in the manner described above the ignition switch contacts 24 while the other cam disc carries one lobe angularly offset about 180° relative to the just mentioned lobe or lobes of the first cam disc serving for actuating the motor switch contacts 28.

The preferred embodiment of the invention as illustrated is equipped with a one-piece cam disc 22 as described above. The ignitor 12 may be constructed in the manner of a spark plug comprising a spark gap which cooperates with an ignition transformer or ignition coil 25 having a secondary winding in circuit with the ignitor 12 while its primary is connected via the ignition switch contacts 24 in circuit with the energy supply lines 15 and 16, a capacitor 26 being connectable in parallel with the primary winding of the ignition transformer 25 in a well known manner. Instead of a spark gap ignitor 12 also an igniter e.g. an inductive igniter cooperating with a suitable transformer, may be used. As shown in the drawings, the circumference of the cam disc 22 carries a plurality of small lobes which serve to repeatedly and consecutively open and close the ignition contacts 24 so as to produce in a well known manner sparks across the spark gap 12. The diametral opposed lobe 27 is rotating the motor, switch contacts 23 closed and thus keeps the motor operating irrespective of whether the contacts 29 are open or closed, but when a certain angular position, namely the end of a complete rotation from the starting position is reached, the cam follower will drop from the highest point of the lobe 27 and return the switch contacts 23 to normal open position so as to stop the further operation of the motor. This condition is illustrated in FIG. 4 as will be explained further below. For all practical purposes the contacts 28 serve for stopping the motor operation.

On the other hand, the pair of motor switch contacts 24 serves mainly for starting the operation of the electromotor. For this reason the contacts 29 are arranged in such a manner that they can be actuated by the valve stem 34 of the main gas valve 36. As long as the main gas valve 36 is in closed position, the contacts 29 are also kept in closed condition.

According to the invention the crank pin 30 serves as pivot for a rocker lever 31 as mentioned above. The rocker lever 31 may be shaped according to any means described further below. For instance, it may be provided with a round bore concentric with its pivoting axis and fitting over the crank pin 30, while the two end portions 32 and 34 of the lever 31 are provided each with a longitudinal slot shaped to at least partly embrace a portion of the valve stem 33 of the pilot flame gas valve 21 or the valve stem 35 of the main gas valve 36, respectively, so as to be always in operative engagement therewith. On the other hand, the preferred embodiment of the rocking lever 31 as illustrated in the drawings consists in an elongated slot 37 in the center portion of the lever 31, the width of the longitudinal slot 37 corresponding to the diameter of the crank pin 30 so that the lever 1 is supported by the pin 30 both pivotally and slidably. On the other hand, at least one of the lever ends 32 or 34 is also provided with a longitudinal slot or fork engaging a portion of one of the valve stems 33 or 35, the other lever end of the lever 31 engaging the other valve stem in a similar manner. In the preferred embodiment as illustrated by FIG. 4, the end 32 of the rocking lever 31 is provided with a longitudinal slot or fork 38 engaging a portion of the valve stem arrangement 33 of the pilot flame gas valve 21. It is an advantage of the above described embodiment that the engagement between the end 32 of the rocking lever 31 and a portion of the valve stem 33 is located outside the gas control body 40 so that also the electromagnet device 39 can be located outside the body 40 inside the housing 52.

As can be seen particularly from FIG. 4, the gas control body 40 is provided with a gas inlet or pipe connection 41 and a main gas outlet or pipe connection 42. The gas inlet 41 communicates with a main valve chamber 45 in which operates the main gas valve 36 which is urged by the spring 44 into closing position with respect to the valve seat 43. When the main valve 36 is open the chamber 45 communicates with a main chamber 46 that is in direct connection with the outlet 42. The valve chamber 45 is connected to a tubular duct 47 with another valve chamber 48 in which operates the pilot gas valve 21 which is urged by spring 50 to closing position relative to the valve seat 49. The entire gas control body 40 is tightly closed on top by a cover plate 51. However, the valve stems 33° and 35 of the above mentioned valves extend through the cover plate 51 in upward direction, the valve stems passing through the respective openings in a gas-tightly sealed manner. In the space above the cover plate 51 are arranged the motor 20, not shown, the cam disc 22 with the lobes 23 and 27, the crank pin 30, the rocker lever 31, the switch contacts 24, 28 and 29 and the electromagnet device 39.
The electrical connections, the ignition transformer 25 and the capacitor 26 are not shown in FIG. 4 for the sake of clarity. All the mentioned elements and parts for a certain delay behind the flipping movement of the lever 31 and the actual opening of the valve 21. This is due to the fact that the bushing 55 must first be lifted by the pivoting movement of the rocking lever 31 until the stop plate 59 at the end of the lower valve stem portion 33' is engaged by the bottom of the vanes 32. The duration of the delay in flipping time during which non-combusted gas that may exist in the apparatus, are permitted to escape before initiation takes place. As the pilot flame gas valve 21 is further lifted by the movement of the rocking lever 31 finally the armature plate 53 reaches the electromagnet 54 and is brought into resilient engagement therewith on account of the action of the spring 58 in the coupling bushing 55. The pilot flame gas valve 21 reaches its full opening position when the armature plate 53 is in engagement with the electromagnet 54 and when the cam disc 22 has carried out a rotation of 90°. At that the thermostat switch plurality of small cam lobes has acted on the contacts 24 and 28. Since the motor switch contacts 29 are still in closed position the temporary and alternating closing and opening of the contacts 28 has no effect. However, the repeated closing and opening of the ignition contacts 24 has the effect that the lifting arrangement of the ignitor 12 and the transformer 25 and capacitor 26 are actuated. The resulting sparks across the ignitor 12 ignite the gas issuing from the pilot flame burner 11 so that the resulting pilot flame heats the thermocouple 13. Whereby a thermocurent is produced which serves to energize the electromagnet 54 so that now the armature plate 53 and together with the latter also the pilot flame gas valve 21 will be held in open position as long as the pilot flame heats the thermocouple 13 and as long as the magnetic attraction of the armature plate 53 is not overcome by force.

As now the cam disc 22 continues its rotation the cam pin 30 also rotates so that the rocking lever 31 is forced to pivot because the valve stem arrangement 33 is held in lifted position. This pivoting of the rocking lever 31 causes the lever end 34 to open the main gas valve 36. Consequently the gas can now flow freely from the valve chamber 45 through the central chamber 46 and through the outlet 42 to the main gas burner 10 where the gas issues from the main burner nozzles is not ignited by the pilot flame. The spaces occupied by gas in these position the condition of the arrangement are indicated in FIG. 3 by the dotted areas. Simultaneously with the opening of the main gas valve 36 the extension 60 of the valve stem 35 engages the armature 30 of the motor switch 29 so that the latter assume open condition and the electromotor is stopped after it has produced a full revolution of the cam disc 22 and of the crank pin 30. This position of the entire arrangement existing after the electromotor has been stopped is illustrated by FIG. 3 which therefore illustrates the conditions existing when the main burner 10 is in operation. In this case the cam disc 22 is opened for instance on account of the action of a room thermostat, then the current flow between the thermocouple 13 and the electromagnet 54 is interrupted by the de-energization of the relay switch 62. Consequently the pilot flame gas valve 21 will be closed under all circumstances and in particular the armature plate 53 will be separated from the electromagnet 54 by the action of the valve spring 50. As with the valve spring 44. However in this case also the main gas valve 36 is closed. Should for any reason the supply of electric energy through the lines 15 and 16 discontinued, then the present gas supply fail, then first of all the flames of the main burner 10 and the pilot flame are extinguished so that the thermocouple 13 is no longer heated and consequently the electromagnet 54 is de-energized. As a result also in this case the armature plate...
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53 drops off and the pilot flame gas valve 21 as well as the main gas valve 36 move to closed position. The closing of the main gas valve 36 in all these cases also produces closing of the gas switch contacts 29 so that the whole system is again in readiness for starting the operation of the electromotor as soon as for instance the thermostat switch 61 is closed again. However, should at the time of re-closing of the thermostat switch 61 gas not be available then the whole cycle of operations is repeated until after the return of the gas supply an ignition is effected.

If at any time an appliance equipped with the control system is intended to be taken out of service, all that is necessary is to open the main switch 14 wherever this main switch may be located for the purpose of remote control. In this manner it is very easy to apply remote control to a gas heated appliance or device because merely by operating the main switch 14 it can easily be ignited or extinguished without any necessity of carrying out any control operation at the appliance itself.

It is evident that the control system according to the invention can be applied in the same manner to gas burners of any size and number as will be readily understood by those skilled in the art.

It will be understood that each of the elements described above or two or more together, may also find a useful application in other types of a gas burner control system differing from the types described above.

While the invention has been illustrated and described as embodied in a gas burner control system comprising electrical and mechanical control elements, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed and desired to be secured by Letters Patent is:

1. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve arranged between said gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve arranged between said gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; in circuit with said ignitor means for energizing the latter; electrical valve control means including electromagnet means for holding when energized said pilot flame gas valve in open position once the latter has been moved to open position, and thermodruck means responding to exposure to the heat of said pilot flame by energizing said electromagnet means so as to hold said pilot flame gas valve open as long as there is a pilot flame; and control means for controlling said main gas valve and said pilot flame gas valve in closed position, in a second one of which positions said actuating member places said main gas valve and said pilot flame gas valve in open position and motor switch means in circuit with said electromotor means for maintaining said electromotor means energized as long as gas flows through said pilot flame gas valve to said pilot flame gas burner means in a third one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in closed position, in a second one of which positions said actuating member places said pilot flame gas valve in open position while leaving said main gas valve closed, and in a third one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in closed position. It is evident that the control system according to the invention can be applied in the same manner to gas burners of any size and number as will be readily understood by those skilled in the art.

2. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve arranged between said gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve arranged between said gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; energizing means in circuit with said ignitor means for energizing the latter; and electric control means including electromagnet means for holding when energized said pilot flame gas valve in open position once the latter has been moved to open position, and thermodruck means responding to exposure to the heat of said pilot flame by energizing said electromagnet means so as to hold said pilot flame gas valve open as long as there is a pilot flame; and control means for controlling said main gas valve and said pilot flame gas valve and pivotable about said eccentric means as the latter is rotated by said electromotor means between a plurality of positions, in one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in closed position, in a second one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in closed position, in a second one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in open position while leaving said main gas valve closed, and in a third one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in open position.

3. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; energizing means in circuit with said ignitor means for energizing the latter; and electrical control means including electromagnet means for holding when energized said pilot flame gas valve in open position once the latter has been moved to open position, and thermodruck means responding to exposure to the heat of said pilot flame by energizing said electromagnet means so as to hold said pilot flame gas valve in closed position, in a second one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in open position while leaving said main gas valve closed, and in a third one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in open position.
gas valve open as long as there is a pilot flame; and control means for controlling said main gas valve and said pilot flame gas valve in closed position, and arranged between said main gas valve and said pilot flame gas valve in open position while leaving said main gas valve closed, and in a third one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in open position.

4. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.

5. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.

6. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.

7. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.

8. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.

9. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.

10. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve including a valve plate and a valve stem and arranged between said main gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; and adjusting means for controlling said main gas valve and said pilot flame gas valve in open position.
valve open as long as there is a pilot flame; and control means for controlling said main gas valve and said pilot flame gas valve and said igniting means, including electromotor means, motor switch means in circuit with said electromotor means for controlling the latter and including first switch means operable by said valve stem of said main gas valve so as to be in closed position as long as said main gas valve is in closed position, and second switch means connected in parallel with said first switch means so as to interrupt the electromotor circuit when both said valves are in open position, ignition switch means in circuit with said igniting means for controlling the latter, multi-lobe rotary cam means rotatable by said electromotor means, at least one first lobe actuating in one first rotational position said ignition switch means and a second lobe actuating said second switch means in a second rotational position angularly up to about 180° offset against said first position and actuating in different rotational positions said second switch means and ignition switch means, respectively, eccentric means rotatable by said electromotor means jointly with said cam means, and a rocking lever means operatively connected near one end thereof with said valve stem of said main gas valve and near its other end with said valve stem of said pilot flame gas valve and pivotable about said eccentric means as the latter is rotated by said electromotor means between a plurality of positions, in one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in closed position, in a second one of which positions said actuating member places said pilot flame gas valve in open position while leaving said main gas valve closed, and in a third one of which positions said actuating member places both said main gas valve and said pilot flame gas valve in open position.

7. A gas burner control system as claimed in claim 4, wherein said eccentric means includes a rotatable crank pin, and wherein said rocking lever means is pivotably mounted on said crank pin, said ends of said rocking lever means being slotted in radial direction and embracing a portion of said valve stems, respectively, for transmitting motion therebetween.

8. A gas burner control system as claimed in claim 4, wherein said eccentric means includes a rotatable crank pin, and wherein said rocking lever means is pivotably mounted on said crank pin.

9. A gas burner control system as claimed in claim 3, wherein said valve stem of said pilot flame gas valve is composed of two coaxial parts, one of said parts being attached to the valve plate thereof, the other part including an armature plate cooperating with said electromagnet means, an elastic coupling axially slidable on both said parts within predetermined limits being provided for electrically coupling said two parts together, said one end of said rocking lever means operatively engaging said electric coupling.

10. A gas burner control system as claimed in claim 4, wherein said valve stem of said main gas valve includes an extension beyond the point where it is operatively engaged by the respective end of said rocking lever means, said extension being arranged to engage and acetate said first switch means when said main gas valve is in closed position.

11. A gas burner control system as claimed in claim 1, wherein said main gas valve includes an elastic member tending to hold said main gas valve in closed position, and wherein said pilot flame gas valve includes an elastic member tending to hold said pilot flame gas valve in a closed position, said elastic members being so dimensioned that their combined forces exerted in operation are sufficient for overcoming the holding effect of said electromagnet means and thus for separating said pilot flame gas valve from said electromagnet means for permitting said valve to close under action of said elastic members associated therewith.

12. A gas burner control system, comprising, in combination, gas inlet means; main gas burner means; a main gas valve arranged between said gas inlet means and said main gas burner means for controlling the flow of gas to the latter; pilot flame gas burner means adjacent to said main gas burner means; a pilot flame gas valve arranged between said gas inlet means and said pilot flame gas burner means for controlling the flow of gas to the latter; electrical igniting means adjacent to said pilot flame gas burner means for igniting a pilot flame when said igniting means are energized while gas flows through said pilot flame gas valve to said pilot flame gas burner means; energizing means in circuit with said ignitor means for energizing the latter; electric valve control means including electromagnet means for holding when energized said pilot flame gas valve in open position once the latter has been moved to open position, and thermoelastic means responding to exposure to the heat of said pilot flame by energizing said electromagnet means so as to hold said pilot flame gas valve open as long as there is a pilot flame; and control means for controlling said main gas valve, said pilot flame gas valve, and said igniting means and including drive means, actuating means operated by said drive means and operatively connected to said pilot flame gas valve, said igniting means and said main gas valve for sequentially opening said pilot flame gas valve, energizing said igniting means and opening said main gas valve, and means cooperating with said actuating means and operatively connected to said drive means for maintaining the latter in operation until both of said valve means are open and said igniting means has ignited the pilot flame, so that said drive means will continue to operate said actuating means and the latter repeat the sequence of operations until ignition of the pilot flame has been effected while both valve means are open.

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