Oct. 17, 1944. L. S. KAUFFMAN ET AL 2,360,607

ELECTRIC IGNITER FOR GASEOUS FUEL BURNERS

Filed March 25, 1941 2 Sheets-Sheet 1

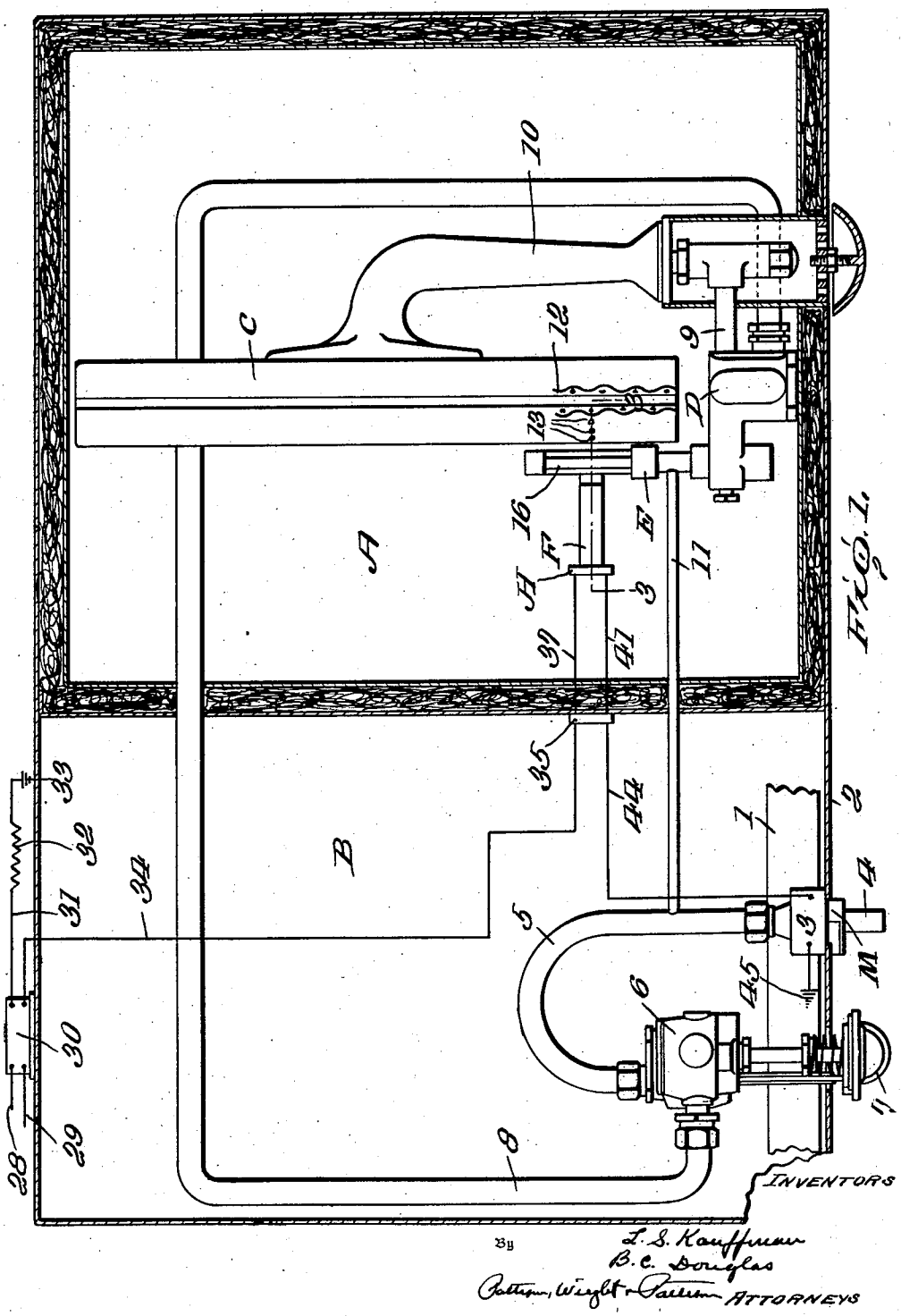


FIG. 1.

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Filed March 25, 1941 2 Sheets-Sheet 2

FIG. 2.

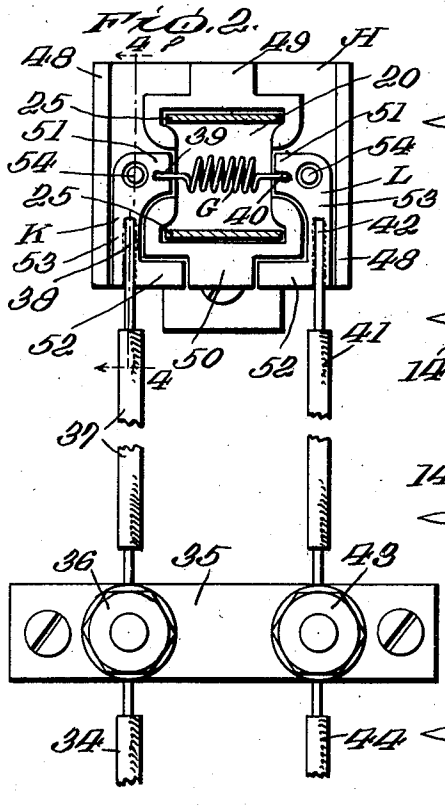


FIG. 5.

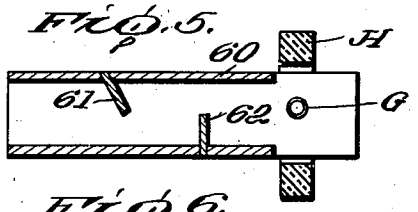


FIG. 6.

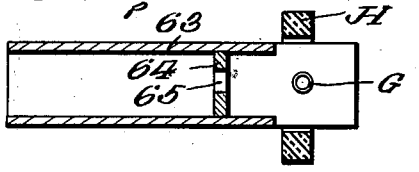


FIG. 7.

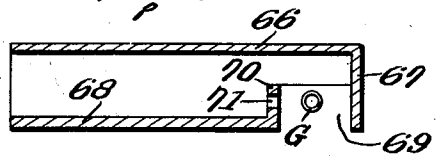


FIG. 8.

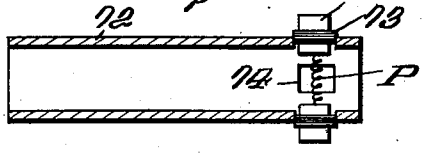


FIG. 4.

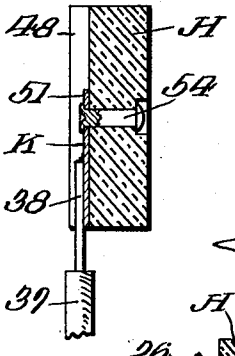


FIG. 9.

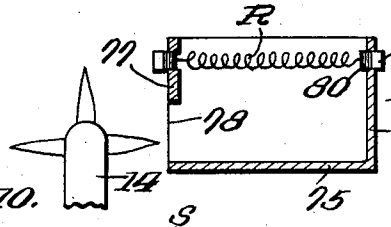


FIG. 10.

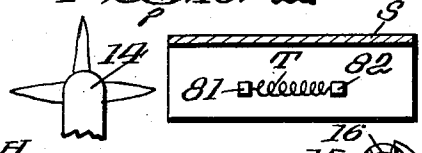
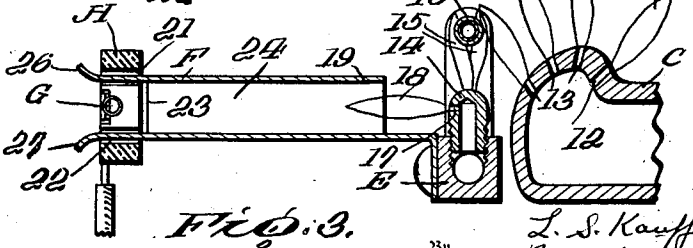


FIG. 3.



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Patented Oct. 17, 1944

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UNITED STATES PATENT OFFICE

2,360,607

ELECTRIC IGNITER FOR GASEOUS FUEL BURNERS

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Application March 25, 1941, Serial No. 385,178

20 Claims. (Cl. 175—115)

This invention pertains to an electric igniter for inclusion in an electric ignition system for gaseous fuel burners. The present igniter is particularly well suited for use in a system utilized for igniting the gas burner in the oven of a gas cooking range. Its use however need not be so specifically limited and the particular system in which it is incorporated can be widely varied. The system might be manual or it might be fully or semi-automatic in nature. In the accompanying drawings we have illustrated the invention in combination with a fully automatic system applied to a gas cooking range for igniting the oven burner thereof.

One of the primary objects of the invention is that of providing an igniter which is cheap and simple of manufacture yet highly efficient operation and which has a long operating life.

Another object of the invention is that of providing an igniter which can be quickly and readily applied to or removed from its proper position within the system and particularly with respect to the burner which it operates to ignite.

A still further object of the invention is the provision of an igniter which will operate satisfactorily on an extremely low current voltage.

A still further object of the invention resides in the improved manner and method of constructing the igniter and its associated supporting construction.

Other objects as well as improved results of the invention are obtained from the provision of an igniter having the aforestated broad objects, and a full understanding of these will appear in detail from a reading of the following description in conjunction with the accompanying drawings.

In the drawings:

Fig. 1 is a horizontal cross sectional view through a range having applied thereto the present improved invention and illustrates the same as incorporated into a fully automatic electric ignition system for the oven burner of said range.

Fig. 2 is a front end view of the igniter and its carrier, the view being partly schematic in nature to illustrate other associated parts.

Fig. 3 is a detail vertical sectional view on line 3—3 of Fig. 1.

Fig. 4 is a vertical sectional view through the ignition coil carrier.

Figs. 5 to 10 inclusive are vertical sectional views, partly schematic in nature, illustrating modified forms of the invention.

Referring now to Figures 1 to 4 inclusive of the drawings, A is a conventional insulated gas cooking range oven adjacent to which is disposed a chamber B within which are usually disposed the burners for the cooking top portion of the range. The chamber B is ordinarily referred to as the cooking top burner chamber, but no illustration of the burners therein is given as they form no part of the present invention and illustration of them would complicate the clearest illustration of the parts which actually compose the present invention.

An oven burner appears at C and this burner can be of varying constructions to best meet the particular desired requirements. A main gas supply pipe or conduit 1 is disposed within the front end of the cooking top burner chamber behind the front panel or closure 2 thereof and a manually operable valve 3 is associated therewith and is manually operable from the front of the range by a suitable valve operating handle 4. This valve controls the flow of gas from the main supply pipe through a gas pipe 5 which has connection with a thermostatically operated oven temperature heat control mechanism and fuel control valve 6. Such controls are in common use today and the nature of their constructions and mode of operation is well understood by those skilled in the art so that no specific description of it is deemed necessary further than to say that this device operates in response to the temperature within the oven A to maintain the same at any specific degree at which the device is set. Exteriorly of the front of the range the device is provided with a temperature setting handle and dial indicator designated as an entirety at 7.

This oven temperature control device, as mentioned, controls the flow of fuel from the main gas supply pipe to the oven burner. A pipe 8 interconnects this oven temperature control with a safety valve designated as an entirety at D. The safety control valve can be constructed in many ways well understood by those skilled in the art and is so constructed as to include a normally closed valve with some suitable bias which holds the valve in a closed position so as to prevent the passage of gas from the valve through the outlet pipe 9 which delivers gas into the air and gas inlet manifold 10 of the oven burner.

Around the safety valve D there is provided a by-pass so as to permit by-passing of a small amount of gas through the pipe 11 which is connected to a pilot light or burner designated as an entirety by E.

Referring to Figure 3 of the drawings which best illustrates its construction, it will be seen that the pilot light burner E is closely associated

with the main oven burner C. This close association is provided to enable the pilot burner to act as an igniter for the main burner. The main burner in addition to having main burner ports 12 is provided with a series of chain lighter ports 13 in its side wall adjacent the pilot light. The pilot light is provided with a burner jet 14 having a plurality of burner orifices in its upper end at which are burned a plurality of flames 15 which flames will cause the ignition of the gas issuing from the nearest adjacent main burner chain lighter port from which ignition will rapidly progressively proceed over the remaining chain lighter ports to the main burner ports of the main burner.

The flames 15 of the pilot light burner perform the further function of heating a thermo-responsive element 16 which through suitable connection, well understood by those in the art, operates when heated to open the normally closed valve in the safety valve D and permit gas to flow through the pipe 9 to the main oven burner.

The jet 14 of the pilot light is provided in its side wall with a burner port 17 at which a flame 18 can burn and which will when burning cause the ignition or operation of the pilot light flames 15.

A flash tube F is associated with the pilot burner and is in the form of an elongated open ended tube which is preferably, although not necessarily, disposed in a horizontal plane and extends in a direction away from the pilot burner as well as the main burner so as to put one of its ends substantially remote to both the pilot and the main burners. The end 19 of this tube is in separated relationship to the pilot burner but has its open end in substantial axial alignment with the pilot light burner port 17 so that gas issuing from said port enters the flash tube and is projected therethrough all as is well understood by those skilled in the art. It is further well understood by those skilled in this art that if igniting means is applied to the gas issuing from the remote open end of the flash tube ignition will occur and flash back through the tube to ignite the gas at the port 17 and cause the burning of the flame 18 thereat.

To accomplish the aforementioned well understood flash ignition we provide at the remote open end of the tube an igniter which is in the form of a coil of wire G which coil at the proper time is brought to a temperature sufficiently high to cause the ignition of the gas within the flash tube, as will hereinafter be more fully described.

The ignition coil G is mounted upon a carrier H, the exact construction of which is best illustrated in Figures 2 and 4 of the drawings.

The carrier H might be well termed a coil mounting block and must be made of some suitable dielectric material and we have found it desirable to utilize a ceramic block. Whatever the particular material used in the composition of the block or mounting H it should have a center opening 20 the size and configuration of which should be preferably substantially the same as that of the cross sectional size and configuration of the flash tube, or at least the end of the flash tube upon which it is mounted. It is highly desirable to provide for quick and easy installation and removal of the coil mounting or carrier block H on the flash tube and this we have provided for by extending the ends 21 and 22 of the top and bottom respectively of the flash tube beyond the ends 23 of the side walls 24 of the flash tube and providing the block H at the top and bottom of its center opening 20 with suitably sized and shaped passages or openings 25 for telescopically receiving said flash tube and extensions 21 and 22.

Although it is not absolutely necessary we have provided against accidental displacement of the carrier H from the end of the flash tube by having the flash tube ends 21 and 22 extend through and beyond the block and then bending their outer ends upwardly and downwardly respectively as indicated at 26 and 27.

To be practical an ignition system of the present nature must operate at a low voltage and must be inexpensive. With a low voltage it is essential to avoid any voltage drop due to poor electrical contact or connection between any of the current conducting parts. To prevent voltage drops and to provide a carrier which can be constructed cheaply and can be quickly assembled, we utilize an unique construction. Before describing the construction of the carrier the electric circuit will be referred to. The source of current supply can constitute the ordinary electric circuit found in homes or places of business and from this conventional source of current supply current is brought to the range over the lead-in wires 28 and 29 which are connected to a transformer 30 which can be positioned at the rear of the range or any other suitable convenient point. The current supply will ordinarily be at 120 volts or thereabout and the transformer 30 will reduce this to the voltage which has been found adequate for heating the ignition coil G to the necessary temperature to cause ignition of the gas which flows to or over it. A lead-off 31 is taken from one side of the transformer and includes a resistor 32 and this side of the circuit is suitably grounded to the range or otherwise as at 33. The other side of the transformer has a lead-off conductor 34 which is carried to a terminal block 35 positioned on the exterior side of the oven and within the cooking top burner chamber. This terminal block is illustrated in detail in Fig. 2 of the drawings. The wire 34 is electrically connected to the binding post 36 on the terminal block and from this binding post a conductor 37 extends into the oven and has its inner end welded or in some like manner secured as at 38 to a metallic lug or arm K which is mounted on the carrier block H in the specific manner hereinafter to be described. This arm or lug is positioned at one side of the carrier block opening 20 while a similar arm L is positioned at the opposite side. The ignition coil extends across the opening 20 and has its ends welded or similarly secured to these oppositely positioned metallic arms as indicated at 39 and 40 respectively. A conductor 41 has its end 42 welded to the metallic arm L and is connected to the second terminal post 43 on the terminal block 35. A conductor 44 leads from the terminal post 43 to an electric switch designated as an entirety at M.

This switch is normally open and has one side or one of its terminals suitably grounded as at 45. The switch functions to provide a predetermined time cycle of the closed condition of the normally open electric circuit which includes the ignition coil G. The switch is associated with the operating handle 4 of the manually operable fuel control valve 3. The exact construction of the switch need not be given as it could be varied and it in itself forms no specific part of the present invention. It is sufficient to state that when the valve handle 4 is operated to open

the valve 3 the electric switch is moved to a closed position to close the electric circuit and that after the circuit has remained closed for a predetermined time interval the switch will automatically operate to break the circuit which cannot again be closed without manual manipulation of the gas valve handle 4.

From the foregoing description a description of a cycle of operation of the system should be clearly understandable. Attention is directed to the fact that so far as a cycle of operation is concerned it will be identical in respect to the modified forms of the invention hereinafter specifically described.

When it is desired to utilize the oven the gas valve 3 is opened by manipulating the manual valve handle 4. Opening of the valve permits gas to flow through the oven heat control mechanism 6 and to the safety valve D through the pipe 8. A portion of the gas delivered to the safety valve reaches the burner jet of the safety pilot valve E through the by-pass pipe 11 and is discharged through the burner orifices thereof with the result that gaseous fuel is projected into and through the flash tube F. Simultaneously with the opening of the gas valve 3 the electric circuit is closed through the electric switch M and current is delivered to the ignition coil G. Within a very short time this ignition coil reaches a temperature sufficient to ignite the combustible fuel mixture within the flash tube F with the result that an explosion occurs, as is well understood by those familiar with this type of flash lighter, and the ignited mixture flashes back through the open end 19 of the flash tube adjacent the pilot light burner and causes ignition at the burner orifices thereof and brings about the burning of the flames 15 and 18. The flames 15 play upon and about the thermo-responsive element 16 and within a very short time interval the response of this member to the heat of these flames causes it to open the safety valve D against its bias which permits an immediate flow of gas to the main burner C through the pipe 9 and the intake manifold 10 of said burner. The fuel within the burner travels to all the burner orifices thereof including the chain lighter ports 13 and upon issuing from said ports the gas is ignited by the closely adjacent flames 15 of the pilot light burner and the flames 46 of the chain lighter cause the ignition of the gas issuing from the main burner ports 12 so that the flames 47 burn thereat. The cycle of the electric switch M is properly timed so that shortly after the main burner has been ignited the electric circuit is automatically broken and the system can be put through a similar cycle of operation only through again manually operating the gas valve handle 4.

The foregoing system has definite advantages. The circuit is closed for only a very limited period of time thus reducing the time during which the coil remains in a heated condition. Additionally the system is cheap to operate because there is no constant burning pilot light operating when the main burner is not in operation as is the case in many systems, and which when true of course increases fuel consumption which is a material item in many localities in the country. Absence of a constant burning pilot light is also advantageous in preventing increase of kitchen temperature which it is particularly desirable to avoid in hot climates of the country.

The arrangement also adds to the life of the ignition coil by removing it from any direct contact with the flames of either the pilot light or main burners and assuring that it is not subjected to the intense heat which exists immediately adjacent the flames burned by these burners. This positioning of the ignition coil is of course accomplished by the provision of the flash tube which were it not utilized would necessitate the positioning of the ignition coil very closely adjacent the flames of either one of the burners. As the life of the ignition coil to some extent depends upon ambient temperature the separation of the ignition coil from the area closely adjacent the burners will add to the life of the coil.

Attention is also directed to the fact that this time that the exact system illustrated in the drawings and hereinbefore described does not have to be followed or adopted. Changes can be made without departing from the spirit of the invention. As an example, the pilot light burner could be dispensed with and the main burner directly ignited by the ignition coil in conjunction with a flash tube which would be associated with the main burner.

To further add to the life of the system it is advisable to utilize some heat resistant electric current conducting material for the wires or conductors 37 and 41, which are within and subjected to the high temperatures which at times prevail in the oven chamber A. Nickel or nickel chromium have been found suitable material. As for the ignition coil itself it is also highly essential that the same be composed of a material which will not quickly break down under the ambient temperatures to which it will be subjected and in this sense a material which is heat resistant. We have found platinum to have the desired characteristics although this of course is not the only metal which would function satisfactorily in the form of a coil.

As mentioned, the arrangement is such that the ignition coil can be quickly and easily applied to or removed from the flash tube and furthermore the coil, its carrier and associated parts are comparatively cheap so that in the event of their failure they can be cheaply replaced. On the score of the necessity of replacement, attention is called to the fact that to obtain approval of the American Gas Association the ignition coil must have a life of 25,000 cycles of operation and that test has proven that our coil does have a life greater than that required for approval.

The ease of fabrication and assembly of the igniter will appear by reference specifically to Figures 2 and 4 of the drawings. The holder or carrier H cooperates to simplify the mounting or application thereon of the metallic arms or lugs K and L upon which is mounted the ignition coil G.

To this end the carrier has countersunk and elevated portions. At its vertical edges the carrier is provided with upstanding flanges 48. The opening 20 of the carrier throughout the greater portion of its top and side edges is provided with an upstanding flange composed of an elevated portion of the carrier. The elevated portion at the top of the opening is designated as an entirety at 49 and that at the bottom as 50. At the sides of the opening the flanges formed by the elevated portions of the carrier do not meet so as to provide an opening for the reception of the upper legs 51 of the metallic arms K and L. The lower legs 52 of the arms lie in the de-

pression between the elevated portions 48 and 50 of the carrier as is likewise true of the interconnecting or intermediate leg portions 53 of the arms. The result of this is that the arms K and L are countersunk within the carrier and fit quite snugly within their seats so that they can be sufficiently securely fastened in place by a single bolt or rivet 54 one of which passes through each of the arms and through the carrier.

From the foregoing it will be evident that by merely disconnecting the conductors 37 and 41 from the terminal posts 36 and 43 a new ignition unit can be quickly and easily placed upon the flash tube. In the drawings the flash tube is illusrated as substantially square in cross sectional configuration but by tests we have proven that the shape of the flash tube is in fact immaterial to a proper functioning of the system. A rectangular tube is desirable in that it simplifies the construction of providing for quick detachable supporting connection between the tube and carrier but the same principle of connection could be easily and readily adapted to tubes having other cross sectional configurations such as rectangular, round or any other shape which might be for any specific reason desirable.

The ignition coil is illustrated as extending across the flash tube from side to side thereof which disposes it in a horizontal plane. Tests have proven that this particular disposition of the coil in respect to the tube is not essential to successful operation, as will more fully appear in the hereinafter following description of Figures 5 to 10 inclusive of the drawings. The coil can be disposed in a vertical plane or the coil can be disposed with its axis in parallel to the axis of the tube rather than transverse thereof without impairing the operation of the system. In all installations however it is of course highly essential to avoid any possibility of short-circuiting of the electric current and it will be obvious that this is well provided for in the arrangement thus far described.

It is to be recognized that the igniter must properly function irrespective of the exact nature of fuel used for the burners. In some portions of the country natural gas is used while in others manufactured gas is employed. Natural gas has a higher ignition temperature than most other commercial gases and will under certain conditions ignite at about 1400° F. but we have found that the temperature of the ignition coil must be considerably higher than the ignition point or temperature of the gas to be ignited. To provide for variables of conditions which the igniter must successfully meet we have provided for a coil temperature of approximately 2,000° F. and to obtain this temperature the voltage impressed upon the coil is approximately two and one-quarter volts. At this voltage the current has approximately three amperes. The voltages and the amperages are of course variable in accordance with the size of wire used in the coil, the nature of the material of which the coil is composed and the size of the coil both as to diameter and length.

We have discovered a further pecularity in respect to the platinum wire igniter. It was found that when the igniter was first put into use it was necessary to use three amperes of current in order to obtain ignition; but that after the same coil had been operated for a few thousand cycles the amperage could be reduced. This proved to be true irrespective of whether or not the igniter was used in connection with natural or manufactured gas. Upon careful examination it was found this was due to the platinum becoming a more active catalyst. As respects natural gas this catalytic action must have been caused by a break-down of the hydrocarbons in the natural gas since platinum acts as a catalyst only in the presence of free hydrogen. It is this fact that accounts for the possibility of obtaining ignition with a platinum coil with a manufactured air-gas mixture at a lower coil temperature than is required for natural air-gas mixture.

As stated, after a few thousand cycles of operation on natural gas the amperage impressed upon the coil could be reduced to at least 2.7 amperes which cause a reduction in the coil temperature from 2000°. F. to approximately 1800° F.

Upon examination of the coil it was further found that the surface of the wire composing the coil had been etched or eroded and this had materially increased the surface area of the wire, and we believe this fact may have helped to increase the catalytic action which resulted in the possibility of employing, after a few thousand cycles of operation, a lower amperage than was necessary when the coil was first put into service.

The foregoing knowledge and discoveries led us to operate the coil for from ten to twenty minutes with a current of four amperes and we then found that a coil so operated or treated would operate to cause satisfactory ignition of the air-gas mixture at a lower amperage current on the coil than would otherwise be required. It is believed that the higher current value caused the surface to erode more rapidly and thus speed up the catalytic action. Accordingly by so treating the coils prior to their installation in an ignition system they will operate satisfactorily over a wider range of voltage variation and this will assure more efficient operation as satisfactory operation will occur even should the amperage across the ignition coil drop for any reason.

Hereinbefore it has been mentioned that the igniter will operate satisfactorily even though it be disposed in respect to the flash tube in a manner different from that illustrated in Figures 1 to 4 of the drawings, and this notwithstanding the fact that we discovered that under some conditions the air-gas mixture or stream in the flash tube had a tendency to cool the ignition coil. The fact that this did occur led us to the conception and production of several flash tubes provided with baffling means designed to prevent this cooling of the ignition coil and also the production of flash tubes in which the ignition coil is positioned in various ways.

Having reference to Figure 5 of the drawings, 60 designates a flash tube upon which is mounted the ignition carrier or holder H with the ignition coil G. Interiorly the tube is provided with a pair of baffle plates 61 and 62 so positioned and arranged as to prevent excessive cooling of the ignition coil by the gas-air mixture delivered into the tube from the pilot light or other burner with which the tube is associated.

Figure 6 of the drawings illustrates a further baffling arrangement. Here again the ignition carrier H and ignition coil G are mounted on the end of a flash tube 63 which interiorly is provided with a vertical baffle 64 which completely blocks off the interior flash tube with the exception of a small centrally positioned opening or orifice 65 for the passage of the air-gas mixture to the ignition coil.

Figure 7 is a still further example of protecting the ignition coil G. In this instance the flash tube 66 is provided with an exterior end wall 67 and the bottom 68 of the flash tube adjacent the end wall is cut out or away to provide an opening 69 within which is positioned the ignition coil. At its front side the opening is provided with an upstanding flange or baffle 70 which protects the ignition coil against cooling by the air-gas flow mixture. This baffle is provided with an opening or passageway 71 which permits the air-gas mixture to reach the coil. The air-gas mixture can also reach the coil by passing over the open end of the baffle 70 and downwardly in the opening 69 within which the coil is positioned.

In the forms of the invention appearing in Figures 5 to 7 inclusive the ignition coil is disposed in a horizontal plane. In Figure 8 of the drawings we illustrate an ignition coil P disposed in a vertical plane in respect to a flash tube 72. In this instance the coil carrier Q is provided with a suitable insulating material or medium 73 which telescopically receives one end of the flash tube and the tube adjacent the coil is provided with an opening 74.

Figures 9 and 10 of the drawings are illustrative of constructions in which the ignition coils are disposed with their longitudinal axes in alignment or parallelism with the longitudinal axes of the flash tubes. In Figure 9 the flash tube is designated at 75 and has a rear wall 76 and a front wall 77. The front wall is provided with an opening 78 through which enters the air-gas mixture which is to be ignited. The ignition coil R extends throughout the length of the flash tube but is positioned above the front end opening 78 of the tube so that it is behind the front wall 77 of the tube so as to prevent the air-gas mixture from having a tendency to rapidly cool the coil. The coil is mounted on a suitable carrier 79 which telescopes the tube and it is insulated therefrom by suitable insulating material 80.

In Figure 10 of the drawings the flash tube is designated at S and is of the type having not only open ends but an open bottom. that is to say, the tube is bottomless. The ignition coil T is positioned within the flash tube and has its longitudinal axis in alignment with that of the tube. The coil is supported by suitable supports 81 and 82 which will of course be suitably electrically insulated away from the flash tube.

It is to be noted that in respect to certain of the modified forms of the invention the desirable feature of the quick application to and removal from the flash tube of the ignition coil is not obtained and for this reason these forms of the invention are not considered to be as desirable as the preferred form notwithstanding the fact that they will operate satisfactorily and with adequate efficiency.

The resistor 32 is a very important element or feature in the present invention. The ignition coil will reach a temperature sufficient to ignite the gas on the extremely small voltage of one and one-quarter volts. The major normal resistance in the circuit is the ignition coil the resistance of which is extremely low, namely, about three-quarter ohms. Thus the ignition system can be operated on a low voltage low resistance circuit but it has been found highly desirable to eliminate fluctuation in the resistance of the circuit as an increase in the normal resistance will cause a large variation in the current. It has been found that even with an extremely small increase in normal resistance the performance of the system will be adversely affected.

It will be obvious that an increase in resistance in the circuit can arise from many causes such as for instance corroded contacts; variations in the length of wires constituting the circuit or loose or poor connections which can be caused by expansion and contraction which will take place during the heating and cooling of those connections which are subjected to the heat generated by the gas burner C.

We have endeavored to guard against variations in the resistance by providing welded connections and avoiding as many connections in the circuit as possible in the heat zone of the gas burner. Mainly however the resistance is maintained constant, or substantially so, by the provision of the resistor 32 taken together with the fact that a voltage higher than that necessary to operate the ignition coil is used in the circuit. The voltage is however still quite low and is not sufficiently strong to injure or unpleasantly affect the operator of the range should for some reason the circuit become short-circuited and the operator receive an electric shock.

With a higher voltage than is required by the ignition coil and the provision of the resistor 32 the entire voltage of the circuit is present at the switch M when the switch is closed and this higher voltage will break or carry through any dirt or surface film or poor contact at the switch much more readily than would the extremely low voltage which could be utilized to operate the ignition coil were the resistor eliminated. Immediately after the switch is closed however the very low voltage exists and is impressed upon the ignition coil and the closed electric circuit.

Thus it is possible to utilize successfully a low voltage ignition coil and a circuit normally having an extremely low resistance.

We claim:

1. In a gas range or the like, a gas burner and a source of fuel supply therefor, a valve for controlling the flow of fuel to said burner, an open ended flash tube adjacent and extending in a direction away from said burner but so associated with said burner as to receive gas issuing from one of the burner ports thereof, an electric circuit, an electric resistance element in said circuit adapted to be heated when said circuit is closed, a plate constituting a carrier for said resistance element, said carrier being mounted exteriorly on said flash tube at a point remote to said burner, and said resistance element being positioned on said carrier and disposed in the path of travel of said gas through said tube and acting to ignite the same.

2. In a gas range or the like, a gas burner and a source of fuel supply therefor, a valve for controlling the flow of fuel to said burner, an open ended flash tube adjacent and extending in a direction away from said burner but so associated with said burner as to receive gas issuing from one of the burner ports thereof, an electric circuit, an electric resistance element in said circuit adapted to be heated when said circuit is closed, said resistance element being mounted upon a carrier, said carrier being mounted exteriorly upon said flash tube at a point remote to said burner, said carrier having quick detachable connection with said flash tube, and said resistance element being positioned in the path of

travel of the gas through said tube and acting to ignite the same.

3. In a gas range or the like, a gas burner and a source of fuel supply therefor, a valve for controlling the flow of fuel to said burner, an open ended flash tube adjacent and extending in a direction away from said burner but so associated with said burner as to receive gas issuing from one of the burner ports thereof, an electric circuit, an electric resistance element in said circuit adapted to be heated when said circuit is closed, said resistance element being mounted upon a carrier having an opening adapted to telescopically receive said flash tube to provide for quick detachable connection between the carrier and the tube, and said resistance element being positioned in the path of travel of the gas through said flash tube for causing the ignition thereof.

4. In a gas range or the like, a gas burner and a source of fuel supply therefor, a valve for controlling the flow of fuel to said burner, an open ended flash tube adjacent and extending in a direction away from said burner but so associated with said burner as to receive gas issuing from one of the burner ports thereof, an electric circuit, an electric resistance element in said circuit adapted to be heated when said circuit is closed, a carrier for said resistance element having an opening therein adapted to telescopically receive that end of said flash tube which is remote to said burner to provide a quick detachable connection between the flash tube and the resistance element, and said resistance element extending transverse said carrier opening and as a consequence thereof in the path of travel of the gas through said flash tube, whereby said gas is ignited by said resistance element.

5. In a gas range or the like, a gas burner and a source of fuel supply therefor, a valve for controlling the flow of fuel to said burner, an open ended flash tube adjacent and extending in a direction away from said burner but so associated with said burner as to receive gas issuing from one of the burner ports thereof, an electric circuit, an electric resistance element in said circuit adapted to be heated when said circuit is closed, said resistance element being positioned in the path of travel of the gas through said tube, and said tube being internally provided with a baffle acting to reduce the cooling effect of said moving gas upon said resistance element.

6. A construction such as defined in claim 3 wherein, the ends of said tube beyond the opening of said carrier are bent outwardly to prevent accidental detachment or displacement of said carrier from said flash tube.

7. For use in an electrical ignition system for a gaseous fuel burner having an open ended flash lighter tube arranged in ignition relationship therewith, a carrier having an opening therein adapted to telescopically receive one end of said tube so that said carrier opening is positioned in communicating relationship with the interior of said flash tube, said carrier provided with depressed portions forming seats at opposite sides of said carrier opening, metallic arms shaped to fit within said seats and each being electrically connected in the electric circuit of said system, means securing said arms in their seats, and an electric resistance element extending across the opening in said holder and supported by and having electrical connection with the arms at the opposite sides of said opening.

8. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a plate constituting a carrier, and said carrier plate having an opening therein mounted upon the remote end of said flash tube and having its opening in registry with the open remote end of said tube, and said resistance ignition element being mounted on said carrier and extending across said carrier opening.

9. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a carrier having an opening therein of a size and configuration substantially the same as a vertical cross section of said flash tube, said carrier being telescopically mounted on the remote end of said flash tube, and said resistance ignition element being mounted on said carrier and extending across the opening thereof and in the current of gas issuing from the remote open end of said tube.

10. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, said tube at its remote end having extending portions from a pair of its oppositely disposed walls, a carrier having an opening therein of a size substantially the size of said tube and telescopically receiving said extending tube ends, and said resistance ignition element extending transverse said carrier opening and in the path of gas issuing from the remote open end of said tube.

11. A construction such as defined in claim 10 wherein, the extending ends of said tube extend beyond said carrier and are bent at an angle to prevent said carrier from being accidentally displaced from the open end of the flash tube.

12. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a carrier having an opening therein for telescopically receiving the open remote end of said flash tube, one of the walls of said carrier at the opposite sides of the opening therein being provided with depressions forming seats, metallic members in said seats, said resistance ignition element extending across said carrier opening and having its opposite ends welded or in similar manner secured to said metallic members, said electric circuit having terminals remote to the

heat of said burner, conductors leading from said terminals to said metallic members, and one each of said conductors being welded or similarly secured to said metallic members.

13. For use with a gas burner igniter of the flash tube type in which said tube is open ended, a plate constituting a carrier, said carrier having an opening adapted to snugly telescopically receive one end of said flash tube, an electric resistance ignition element mounted on said carrier and extending transverse the opening therein, said ignition element being supported by being secured to the carrier at points thereof at opposite sides of said carrier opening and an electric circuit together with a source of current supply for said ignition element.

14. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a carrier having an opening therein mounted upon the remote end of said flash tube and having its opening in registry with the open remote end of said tube, said resistance ignition element mounted on the corner and extending across said carrier opening, and a baffle positioned in said flash tube intermediate its ends and acting to reduce the speed of travel of gas through said tube and over said resistance ignition element.

15. For use with a gaseous fuel receiving and conducting flash tube, an igniter comprising a member provided with an opening adapted to telescopically receive an end of said flash tube, metallic arms rigidly secured to said member at opposite sides of the opening thereof, and an electric resistance element extending across the opening in said member and supported by and having electrical connection with said metallic arms at the opposite sides of said opening.

16. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a carrier provided with an opening therein, said carrier opening telescopically receiving said flash tube and positioned thereon at a point remote to said burner, said resistance ignition element being mounted on said carrier and extending transverse the carrier opening and the tube and in the path of travel of gas through said tube, and a baffle positioned in said flash tube intermediate its ends and acting to reduce the speed of travel of gas through said tube and over said resistance ignition element.

17. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a carrier provided with an opening therein, said carrier opening telescopically receiving said flash tube and positioned thereon at a point remote to said burner, said resistance ignition element being mounted on said carrier and extending transverse the carrier opening and the tube and in the path of travel of gas through said tube, and a pair of baffles positioned in spaced relationship in said flash tube intermediate its ends and acting to reduce the speed of travel of gas through said tube and over said resistance ignition element.

18. A construction as defined in claim 17 wherein, one of said baffles extends from the top of said tube and the other of said baffles extends from the bottom of said tube, and both of said baffles extending in a direction transverse the tube but only partially thereacross.

19. An electric lighter arrangement comprising a ported gas burner, an open ended and elongated flash tube having one end positioned adjacent but in separated relationship to and receiving gas issuing from a port of said burner and its other end positioned remote to said burner, an electric circuit, an electric resistance ignition element in said circuit and adapted to ignite said gas when said circuit is closed, a carrier having an opening therein, said ignition element being mounted on said carrier and extending transverse its opening, said carrier opening telescopically receiving said tube whereby the carrier is mounted upon and supported by said tube, said ignition element being in the path of travel of gas through said tube, said carrier being positioned on said tube adjacent its end which is remote to said burner, said remote tube end having portions bent outwardly at an angle to prevent said carrier from being accidently displaced from the tube, and said tube bent portions being depressible to permit the carrier to be mounted upon or removed from the tube.

20. A construction as defined in claim 8 wherein, that end of the tube which extends through the carrier opening is flared outwardly to prevent accidental displacement of the carrier from the tube end, and the flared portion of said tube being depressible to permit the carrier to be mounted upon or removed from the tube.

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