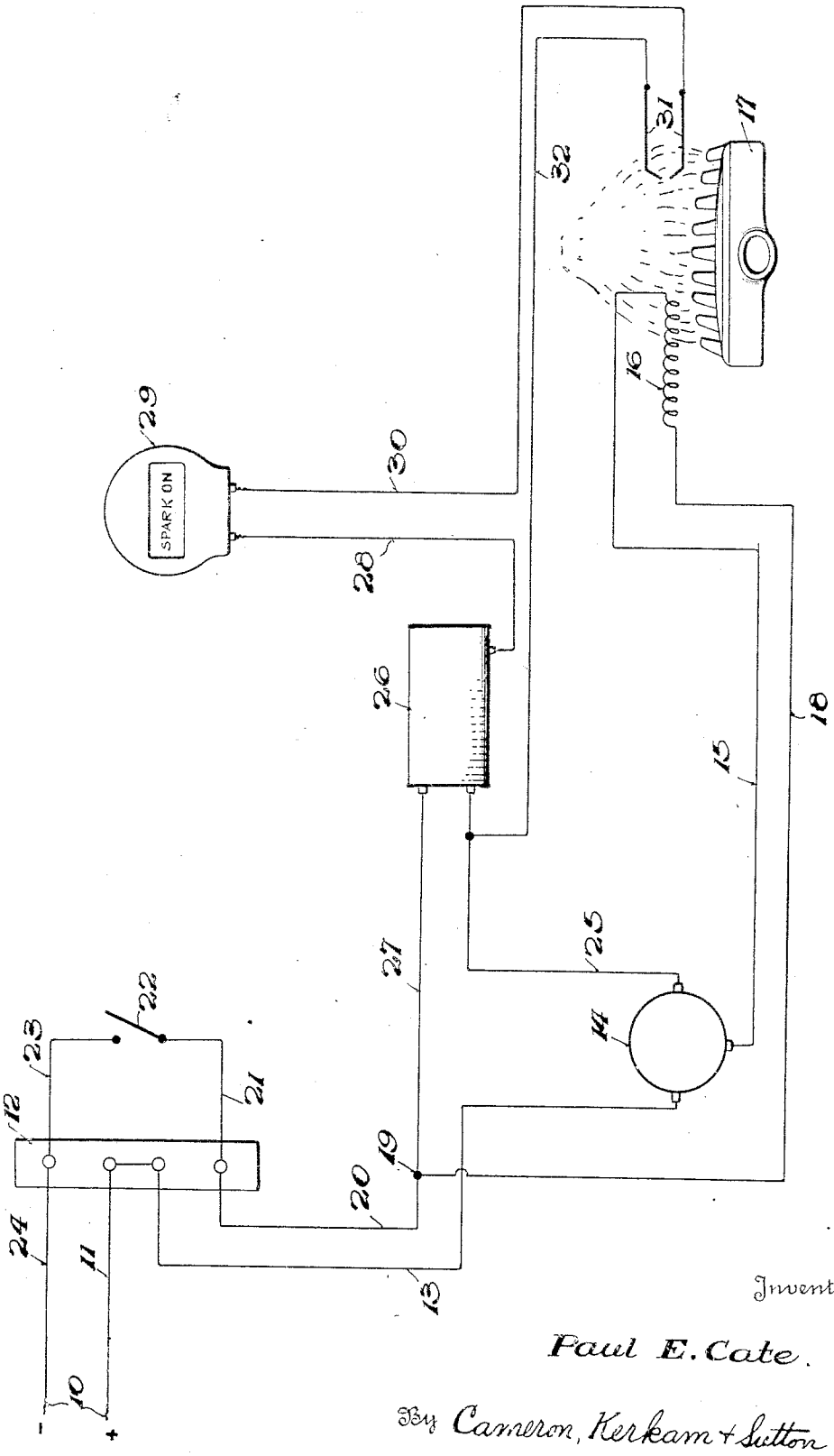
May 4, 1943. P. E. CATE 2,318,195

IGNITION SYSTEM

Filed Nov. 1, 1939



Inventor

Paul E. Cate.

By Cameron, Kerkam & Sutton

Attorneys

Patented May 4, 1943

2,318,195

UNITED STATES PATENT OFFICE

2,318,195

IGNITION SYSTEM

Paul E. Cate, Knoxville, Tenn., assignor to The Fulton Syphon Company, Knoxville, Tenn., a corporation of Delaware

Application November 1, 1939, Serial No. 302,409

1 Claim. (Cl. 175—115)

This invention relates to ignition systems and more particularly to ignition systems providing a high tension spark for ignition purposes. Even more particularly this invention relates to high tension spark ignition systems suitable for use with domestic gas ovens, top burners, heaters or any other device burning fuel capable of ignition by high tension sparks.

The present invention provides an ignition system which automatically ignites the burner by a high tension spark when the fuel is turned on and which will reignite the burner when the flame is extinguished by reason of temporary failure of the fuel supply or for any other reason. The present invention likewise provides visual means for indicating when the ignition spark is on.

It is accordingly an object of the present invention to provide a novel high tension spark ignition system which will automatically ignite the burner when the fuel is turned on.

Another object of the present invention is to provide a novel high tension spark ignition system which will automatically reignite the burner when the flame is extinguished by reason of the temporary failure of the fuel supply or for any other reason.

Another object of the present invention is to provide a novel high tension spark ignition system which will visually indicate when the spark is on.

Another object of the present invention is to provide a novel high tension spark ignition system which will use a minimum amount of current during ignition periods of the burner.

A still further object of the present invention is to provide a novel high tension spark ignition system which is compact, durable, cheap to manufacture, easy to install on existing installations and one which has no moving parts to wear and get out of adjustment.

Heretofore various high tension spark ignition systems have been proposed for igniting burners in which various means have been provided for opening the spark circuit after the burner has been ignited. Various bimetallic elements and thermostats subjected to the flame of the burner have been used to open the spark circuit after ignition and in other cases the conductivity of the flame of the burner has been used to operate relays to open the spark circuit. These systems have proved expensive to install and difficult to keep in adjustment. The present invention overcomes these difficulties while satisfying the above mentioned objects and possessing the desired advantages by using a resistance having a high temperature coefficient of resistivity in a relay circuit and subjecting it to the flame of the burner to block the current passing through the relay when the burner is ignited and thereby open the spark circuit.

In the accompanying drawing an illustrative embodiment of the novel ignition system of the present invention is shown as applied to the usual gas burner but it is to be expressly understood that this embodiment is shown for the purposes of illustration only, that the novel ignition system of the present invention is suitable for use with any device burning fuel that can be ignited by a high tension spark and that this illustrative embodiment is not to be construed as a limitation on the present invention reference being had to the appended claim to determine the scope of the present invention.

In the accompanying drawing 10 is any suitable source of supply of electricity the positive side of which is connected by an electrical conduit or wire 11 to a suitable terminal strip 12 on the gas valve (not shown). From terminal strip 12 a wire 13 leads to a suitable relay 14. From relay 14 a wire 15 leads to one side of a suitable resistance 16 having a suitable high temperature coefficient of resistivity. Resistance 16 is designed to be heated by the flame from burner 17. A wire 18 leads from the other side of resistance 16 and is connected at 19 with a wire 20 leading to terminal strip 12. A wire 21 connects wire 20 with one side of a suitable switch 22 here shown schematically and designed to be closed by the opening of the gas valve in any suitable way. Wire 23 leads from the other side of switch 22 to terminal strip 12 and continues as wire 24 to the negative side of the source of electrical supply 10.

From the third side of relay 14 a wire 25 leads to one side of the primary windings of a suitable high tension coil 26, the other side of the primary windings being connected at 19 with wire 20 by wire 27. From the secondary windings of high tension coil 26 a wire 28 leads to a suitable visual signal 29, such as a neon glow tube. Signal 29 is connected by wire 30 with a suitable spark gap 31, arranged adjacent burner 17, the other side of spark gap 31 being connected by wire 32 to wire 25.

With the illustrative embodiment of the novel ignition system of the present invention set up as above described, to ignite the burner the valve supplying gas to the burner is opened, thereby closing switch 22. Closing switch 22 allows current to flow from the source of electrical supply 10 through wires 11 and 13 to relay 14. From

relay 14 current then flows through wire 15 and resistance 16, resistance 16 being cold and hence offering the minimum resistance to the passage of current. From resistance 16 the circuit is completed through wires 18, 20, 21, switch 22, and wires 23 and 24 to the source of electrical supply 10. Current flowing through this resistance circuit operates relay 14 and current then passes through wire 25 to the primary windings of high tension coil 26, the primary winding circuit being completed through wires 27, 20, 21, switch 22, and wires 23 and 24 to the source of electrical supply 10. Current flowing through the primary windings of high tension coil 26 induces a high tension current in the secondary windings of coil 26 this high tension current passing by wire 28 to visual indicator 29 causing it to glow, and from there passes by wire 30 to the spark gap 31 where a high tension spark is created and burner 17 is ignited, the spark gap circuit being completed by wire 32 connecting with wire 25.

When burner 17 ignites, resistance 16 is rapidly heated and due to its high temperature coefficient of resistivity its resistance rapidly builds up to a point where the current flowing in the resistance circuit is reduced below that necessary to operate relay 14. Relay 14 then opens the circuit to the primary windings of high tension coil 26. High tension current is then no longer induced in the spark gap circuit, visual indicator 29 ceases to glow and the high tension spark across gap 31 terminates.

If for any reason the flame at burner 17 should be extinguished while the gas supply valve is open and switch 22 closed resistance 16 rapidly cools and due to its high temperature coefficient of resistivity its resistance rapidly drops allowing a rapidly increasing current to flow in the resistance circuit. This current rapidly increases to the point necessary to operate relay 14. Relay 14 then closes the circuit to the primary windings of high tension coil 26 and current flows therethrough inducing a high tension current in the secondary windings of coil 26 causing visual indicator 29 to glow and creating a high tension spark at gap 31 to reignite burner 17. When burner 17 is reignited resistance 16 is reheated and relay 14 opened to terminate the spark at gap 31 as described above.

It will now be apparent that the present invention provides a novel ignition system suitable for use with any type of device using fuel capable of ignition by a high tension spark which will automatically ignite the device when fuel is supplied thereto, which will reignite the device when the flame is extinguished and fuel still supplied thereto and which will provide a visual indication indicating when the spark is on. It is also apparent that this novel system uses the minimum amount of current during ignition periods of the device, is compact, durable, cheap, easy to install on existing installations, and one which has no moving parts to get out of adjustment.

To those skilled in the art changes in or modifications of the above described illustrative embodiment of the present invention will now be suggested without departing from the inventive concept of the invention and reference should be had to the appended claim to determine the scope of the present invention.

What is claimed is:

In an ignition system for a gas burner, gas ignition means located in position to ignite gas flow from said burner, a source of electricity, a relay for connecting said gas ignition means with said source of current to control the flow of current through said gas ignition means, and means for blocking the flow of current through said relay to effect the opening of the circuit through said gas ignition means when said burner is ignited including a resistance coil always connected in series with the coil of said relay, said resistance coil being subjected directly to the heat of the burner flame when the gas is ignited and responsive only to the presence or absence of the burner flame, said resistance coil determining the current flow to said relay to determine the operation of said relay in controlling the flow of current to said gas ignition means, said resistance having a high temperature coefficient of resistivity to substantially block the flow of current through said relay, to open the circuit through said gas ignition means and thereby discontinue operation of the same, when said resistance is heated by the existence of a gas flame at said burner, and said resistance coil reestablishing the flow of current through said relay and effecting the reactuation of said gas ignition means automatically when said resistance coil is cooled upon extinguishment of the burner flame.

PAUL E. CATE.