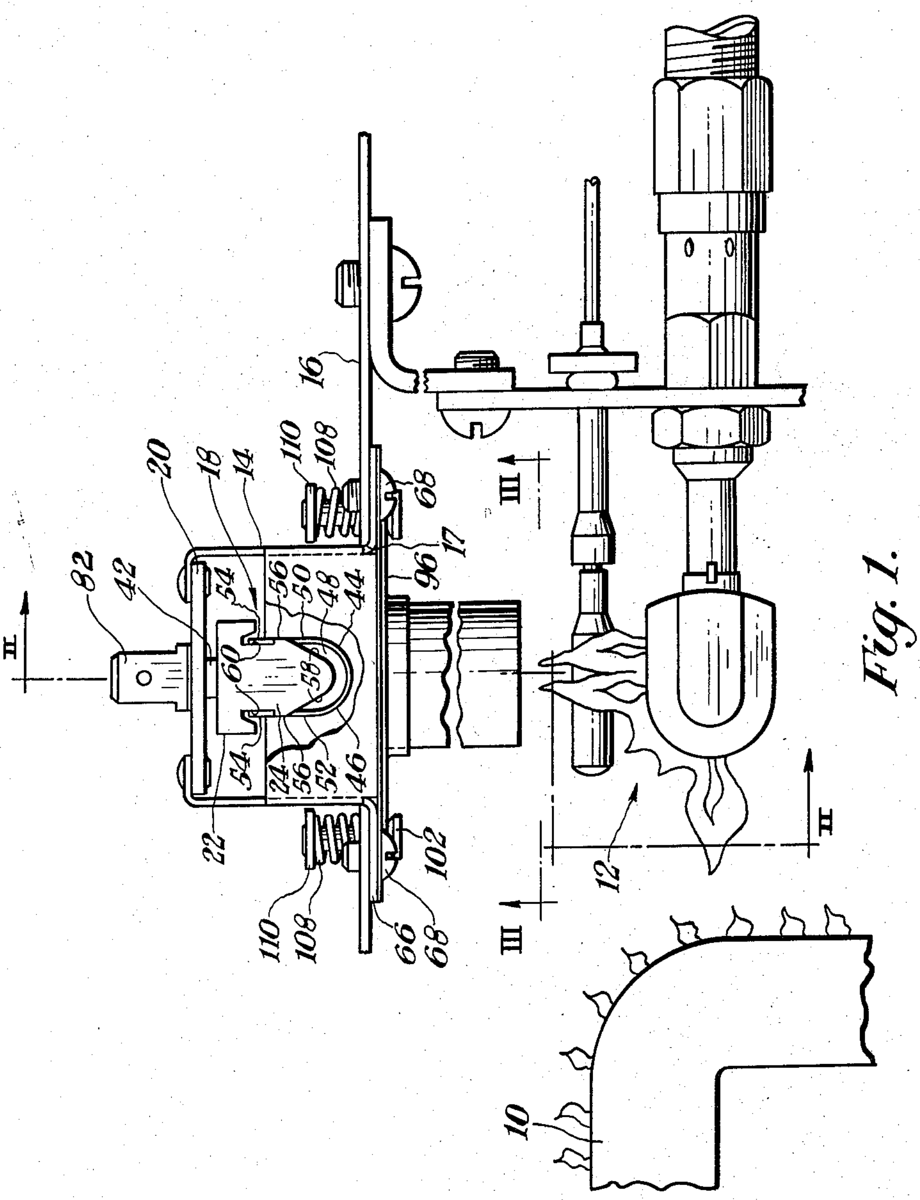
Sept. 2, 1958 W. S. KUNZLER 2,850,084

ELECTRIC IGNITION DEVICE FOR GASEOUS FUEL

Filed March 19, 1954 3 Sheets-Sheet 1



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ELECTRIC IGNITION DEVICE FOR GASEOUS FUEL

Filed March 19, 1954 3 Sheets-Sheet 2

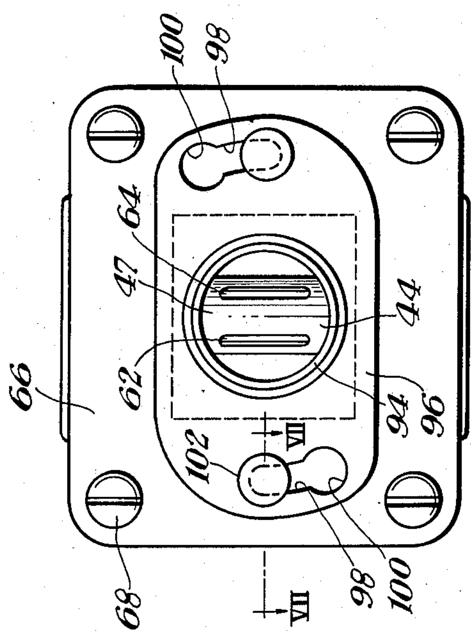

Fig. 3.

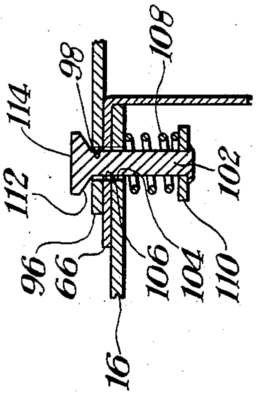

Fig. 7.

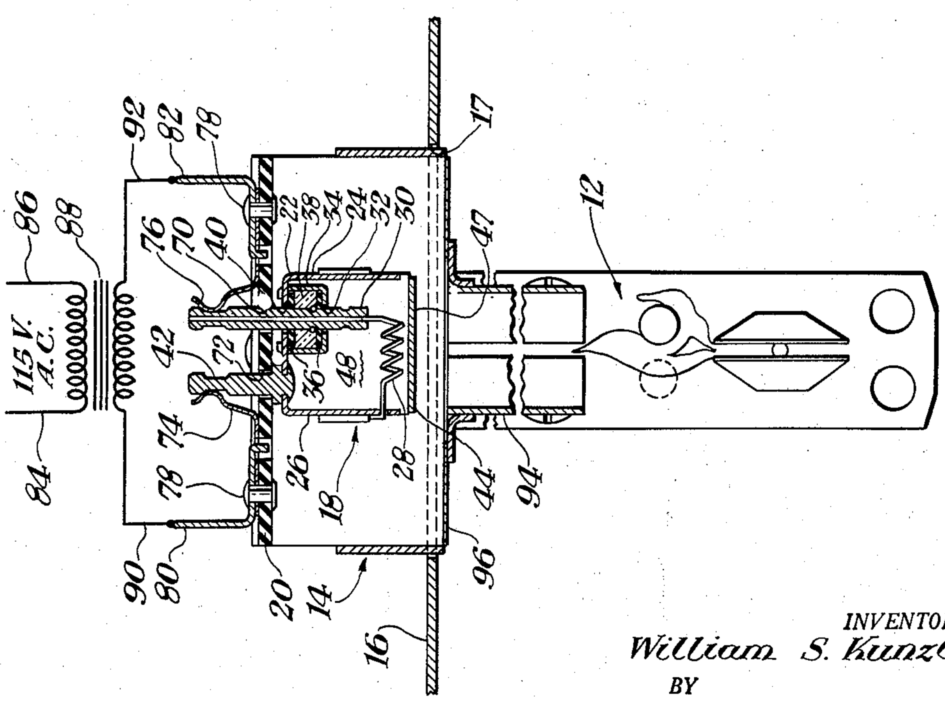

Fig. 2.

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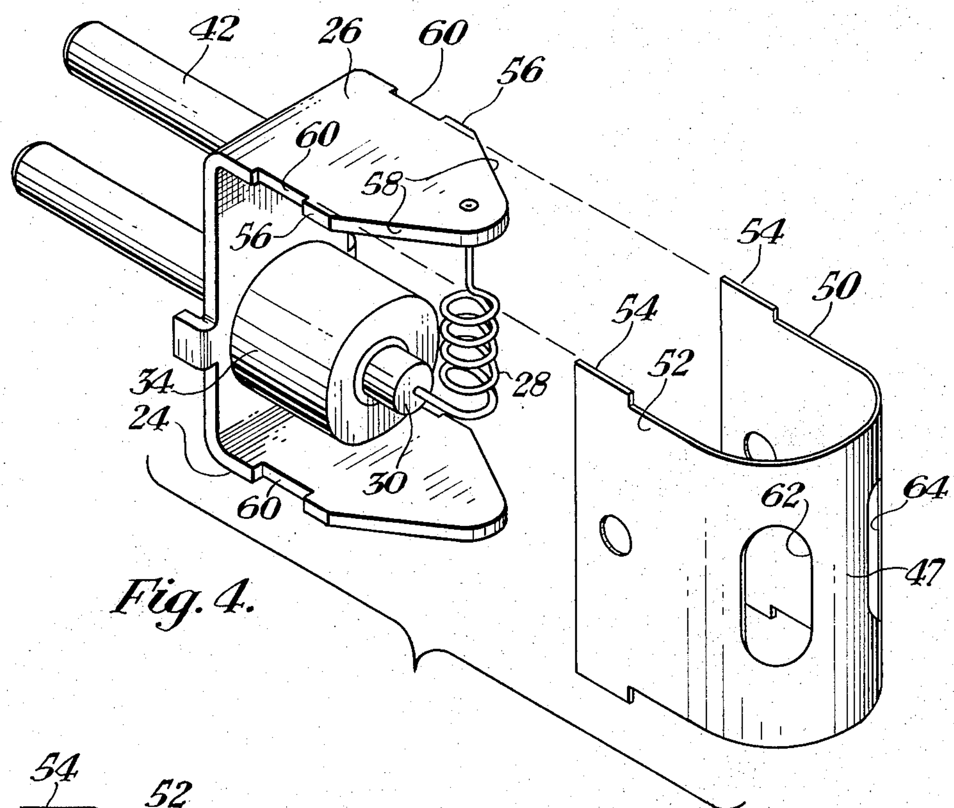

Fig. 4.

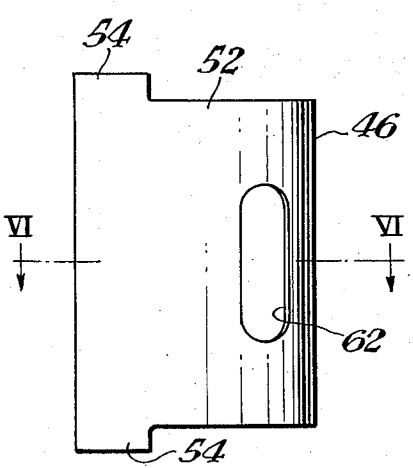

Fig. 5.

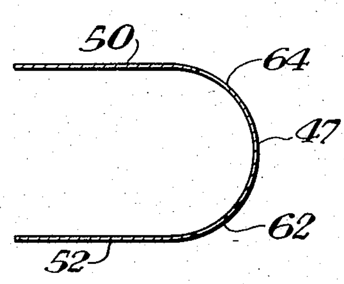

Fig. 6.

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ELECTRIC IGNITION DEVICE FOR GASEOUS FUEL

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Application March 19, 1954, Serial No. 417,466

4 Claims. (Cl. 158—115)

This invention relates to electric ignition devices for gaseous fuel burners and, more particularly, to electric resistance igniters.

The wire material of which electric resistance igniters are made may be catalytic or noncatalytic. An example of the former is platinum-iridium alloy which displays a high minimum life and uniform ignition performance from day to day as well as ability to ignite a wide variety of gas-air mixtures when the wire is brought to suitable temperature. Combustion occurs on the surface of this metal catalytically with the evolution of gases which exert a quenching effect tending to prevent ignition. This accounts for the relatively high ignition temperatures required with catalytic metals in general.

Resistance coils brought to incandescence by the passage of electric current therethrough have been used extensively to ignite flowing combustible fuels such as gas-air mixtures. Such igniters have been supported in housings of various types for protecting the coil and facilitating ignition. In addition, resistance coils of various configuration are employed to surmount numerous difficulties found in electric ignition devices. A straight wire igniter or a sine wave type igniter would avoid the difficulty found in a helix type igniter, that is, a concentration of evolved gases in the spaces between the coils. However, the former igniters would require a close current regulation to insure proper igniter coil life. This is apparent from the length of resistance wire used in such igniters since a particular quantity of current must flow over a shorter length of wire and when ignition occurs, these igniters are subjected to a high temperature gradient over their short length, in the presence of the cooling effect of the flowing gas-air mixture on the small mass.

In either case, the use of a helical coil, a straight wire or a sine wave type involved one common difficulty differing only in degree and depending upon the length of resistance wire utilized. The normal operation of electric ignition systems depends upon the flowing of gas-air mixtures through a flash tube and thence to an igniter wire adjacent one end of the tube. As pointed out above, when the mixture impinges upon the wire, the combustion occurs on the wire and the ignited mixture is flashed back through the tube. However, before ignition, there is a cooling effect experienced by the igniter wire, caused by the relatively fast flow of mixture toward and around the wire. Heretofore, this cooling effect could only be overcome by elevating the temperature of the igniter at the instant of ignition by increasing the normal flow of current in the igniter circuit.

Another disadvantage found in the present day use of electric ignition systems is the inaccessibility of the various parts which go to make up such a system. Heretofore, it was necessary to employ an experienced serviceman to replace a "spent" igniter and this required the dismantling of the range and the manipulation of several electrical and mechanical connections.

In a preferred embodiment of this invention, a baffle

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means is provided for preventing a frontal flow of gas-air mixture to an igniter coil, such means deflecting the flow of the mixture toward openings provided in the shield, which openings then, in turn, allow the mixture to surround the coil thus insuring complete impingement of the mixture.

The igniter coil and its housing are constructed and arranged to be easily plugged in a receptacle whereby instant removal of the coil and housing can be effected without dismantling the range or oven. To facilitate this removal, the flash tube assembly is made to be detachable from the oven wall by a mere manual twist of the tube.

It will be apparent from the foregoing brief description that one of the objects of the invention is to facilitate the instant removal and servicing of ignition wires used in electric ignition systems without the burdensome dismantling of oven parts.

Another object of the invention is to embody the igniter housing device in a small compact unit having the operational feature of a plug-in coil.

Another object of the invention is to control the flow of the gas-air mixture to the igniter coil thereby permitting the ignition of gas at lower coil temperatures.

Other objects and advantages will become apparent from the accompanying specification and claims in connection with the accompanying drawings wherein:

Fig. 1 is a plan view of the improved electric ignition device in position near a main burner and its associated pilot burner;

Fig. 2 is a cross section along line II—II in Fig. 1;

Fig. 3 is an elevational view taken along line III—III of Fig. 1;

Fig. 4 is a perspective view of the igniter housing unit and associated parts;

Fig. 5 is an enlarged side elevation of the shield separated from the housing;

Fig. 6 is a cross section along line VI—VI of Fig. 5; and

Fig. 7 is a cross section along line VII—VII of Fig. 3.

Referring more particularly to the drawings, Fig. 1 thereof depicts a heating means for an oven comprising a main burner **10**, an automatic pilot burner generally indicated at **12**, a casing **14** supported on oven wall **16**, having an elongated igniter housing assembly **18** of substantially rectangular formation in plan detachably secured to the bottom wall **20** of casing **14**.

Referring now more particularly to the ignition housing assembly **18**, the arrangement comprises a support bracket **22** having integral therewith two side substantially rectangular plates **24**, **26**, as shown in Fig. 2. An igniter coil **28** has one end secured as by solder to one end of side plate **26** while the other end of the igniter coil **28** is soldered to one end of plug-in pin **30**. Arranged longitudinally of housing assembly **18** and adjacent plate **24**, pin **30** projects through openings **32**, **40** in cup **34** being insulated from cup **34** by means of mica washers **36** and a suitable ceramic cement filling **38** which secures the pin **30** to the support bracket **22**. Also secured to support bracket **22**, as by riveting or other suitable means, is plug-in pin **42**.

At the outer end of support bracket **22**, a U-shaped shield **44** having its bottom portion **46** and baffle plate **47** of semicircular cross-section, bridges the open end of chamber **48** formed by the parallel side plates **24**, **26** of bracket **22**, and parallel sides **50**, **52** of shield **44**. Sides **50**, **52** have extending therefrom tongues **54** which are urged by the resiliency of sides **50**, **52** into engagement with projections **56** on side plates **24**, **26**, as shown in Fig. 1.

In assembling shield **44** to support bracket **22**, the outer edges of sides **50**, **52** engage the inclined surfaces **58** of side plates **24**, **26**, and by applying a slight manual force to shield **44**, the sides **50**, **52** will spring apart as the respective edges slide along inclined surfaces **58** until tongues **54** have traveled beyond projections **56** and into slots **60**. The bottom portion **46** of the U-shaped shield **44** is provided with elongated openings **62**, **64** and with baffle plate **47** longitudinally disposed therebetween substantially as shown in Figs. 5 and 6 and which will be more fully described hereinafter.

The casing **14** has depending therefrom an overhanging rectangular frame **66** overlying the edges adjacent opening **17** in wall **16** and supporting four threaded screws **68** for securing the casing to the wall through aligning openings in the frame and wall, as previously indicated. The bottom wall **20** of the casing is formed from mica sheets or any other suitable insulation material having similar rigidity and has two apertures **70**, **72** formed therein for the reception of plug-in pins **30** and **42** respectively. It is to be noted here that plug-in pins **30**, **42** are insulated from the casing **14** as are pin sockets **74**, **76** which are attached to the mica wall by rivet **78**.

Also riveted to wall **20** and communicating with pin sockets **74**, **76** by means of rivet **78** are terminal angle plates **80**, **82** as shown in Fig. 2. Pin sockets **74**, **76** may be formed from any suitable conducting material and so shaped as to be adapted to resiliently retain the plug-in pins **30**, **42**. The leads **84**, **86** are connected to a suitable source of electrical energy, such as **115** volts house current, and the transformer **88** will serve to step down this current to the requisite rated voltage of the ignition coil **28**. The ignition device of this invention is completed by the provision of a pair of leads **90**, **92**, electrically connecting the secondary of transformer **88** to terminal angle plates **80**, **82**, respectively.

The flow of gas-air mixture from the pilot burner **12** is directed to the ignition coil **28** by means of a flash tube **94**, which may be of any desired length depending upon the proximity of the pilot burner with respect to the coil. The flash tube **94** is integral with a cover plate **96** which is detachably secured to frame **66** of casing **14**. Referring more particularly to Figs. 3 and 7, there is shown a curved slot **98** at each end of cover plate **96**, an enlarged aperture **100** at one end of each of the slots and a pin means **102** extending through the slots and aligning openings **104**, **106** formed in the frame **66** and oven wall **16** respectively.

A light coil spring **108** encircles each pin **102** and is retained under compression by lock washers **110** secured to the pins at the ends thereof. Having apertures **100** slightly larger than heads **114** of pins **102**, the cover plate **96** is first positioned adjacent the oven wall and casing at a slight angle than that shown in Fig. 3, so that apertures **100** will allow heads **114** to pass therebetween. Rotating the plate **96** causes the shank of the pins to follow the relatively narrow slots **98** thereby effecting a slight compression of springs **108** due to the sliding motion of the inclined surfaces **112** on the edges of the slots. Since the heads **114**, at this point, are larger than the corresponding portion of the slots, the cover plate is resiliently held to both the oven wall and the casing frame. This arrangement for the cover plate offers a twist lock means for detachably securing the flash tube **94** to an oven wall and casing and may be accomplished by the mere manual twisting of the flash tube.

In operation of the system, before ignition, a gas-air mixture is allowed to flow through the flash tube **94**. The direct impingement of the mixture upon the ignition coil is impeded by the baffle plate **47** of shield **44** which plate operates as a deflecting baffle plate for directing the mixture to the openings **62**, **64**. Passing through these openings, the mixture impinges on the sides of the coil and because a slight pressure exists behind the baffle portion **47** adjacent the coil caused by the rushing mixture passing through openings **62**, **64**, some of the mixture flowing through the opening is sucked back toward the underside of the baffle plate and consequently impinges upon the front portion of the coil. This arrangement and design of the shield **44**, in effect, slows down the flow of the mixture and allows the coil to be exposed to the mixture from all sides simultaneously. Upon ignition the ignited gas flows back through the flash tube to light the pilot and main burner as is well known in the art.

In the event of ignition coil failure, easy removal and replacement is facilitated by the plug-in feature of the igniter housing. This function can be performed by a housewife or anyone not skilled in the intricate electrical ignition system found in most everyday electrical appliances of this type. In fact, the operation requires no more than is necessary to replace a common household fuse. The operator need only twist the flash tube to disengage it from the wall of an oven, pull out the spent igniter coil, insert a new one, and replace the flash tube to its original position, all this without the cumbersome procedure of moving the entire appliance away from its adjoining wall, dismantling the back of the oven, loosening and disassembling various associated electrical and mechanical connections, and then repeat these steps in the reverse order.

It will be understood that many changes may be made in the details of construction and arrangement of parts without departing from the scope of the invention so that this description and accompanying drawings are intended by way of illustration only and are not to be construed in a limiting sense.

I claim:

1. An electric ignition device for a flowing fuel comprising a housing having an enclosed chamber therein, a resistance wire carried by said housing within said chamber and having an igniter coil portion positions in proximate relation to one wall of said housing, said igniter coil portion having a longitudinal axis, said wall having an elongated opening positioned on either side of and spaced from said igniter coil portion, each of the elongated openings having the major axis thereof substantially parallel to the longitudinal axis of said igniter coil portion for deflecting the flow of fuel away from said igniter coil portion upon passing through the openings, whereby a quenching effect tending to retard ignition due to the rapid cooling of said igniter coil portion caused by the flow of fuel is prevented.

2. In an electric ignition device for a flowing gas-air mixture, the combination comprising a housing, said housing including a support bracket, a first side plate projecting from one end of said support bracket transversely to the plane thereof, a second side plate projecting from the other end of said support bracket transversely to the plane thereof and being in a spaced substantially parallel relationship with said first side plate, a shield having spaced side members secured to said side plates remote from said support bracket and having a medial portion cooperable with said housing for defining an enclosed chamber therein, an opening on each side member oppositely disposed on either side of the medial portion of said shield for emitting fuel to said chamber, an insulated prong secured to said support bracket and having a projection within said chamber, and an igniter coil positioned wholly between the openings in said shield within said chamber in proximate relation to said wall and being shielded from entering fuel by the medial portion of said shield, said coil having one end secured to said first side plate and the other end connected to said projection.

3. An electric ignition device as defined in claim 2 wherein the openings are elongated and are substantially equal in length to said igniter coil.

4. In an electric ignition device for a flowing gas-air mixture, the combination comprising a housing having an enclosed chamber therein, one wall of said housing having a surface arcuate in cross section and having opposed openings defining a chord thereacross and a medial por-

tion therebetween, a resistance wire including an igniter coil positioned within said chamber in proximate relation to said one wall of said housing, said igniter coil having a longitudinal axis extending substantially parallel with the surface and substantially perpendicular to said chord, of said wall, and a flash tube directed toward said one wall for supplying fuel to said chamber through said openings, said one wall being adapted to have a baffling effect on the fuel supplied by said flash tube for directing the flow of fuel to said openings and away from said coil whereby a quenching effect tending to retard ignition due to the rapid cooling of said coil caused by the flow of fuel is prevented.

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