

Sept. 2, 1958

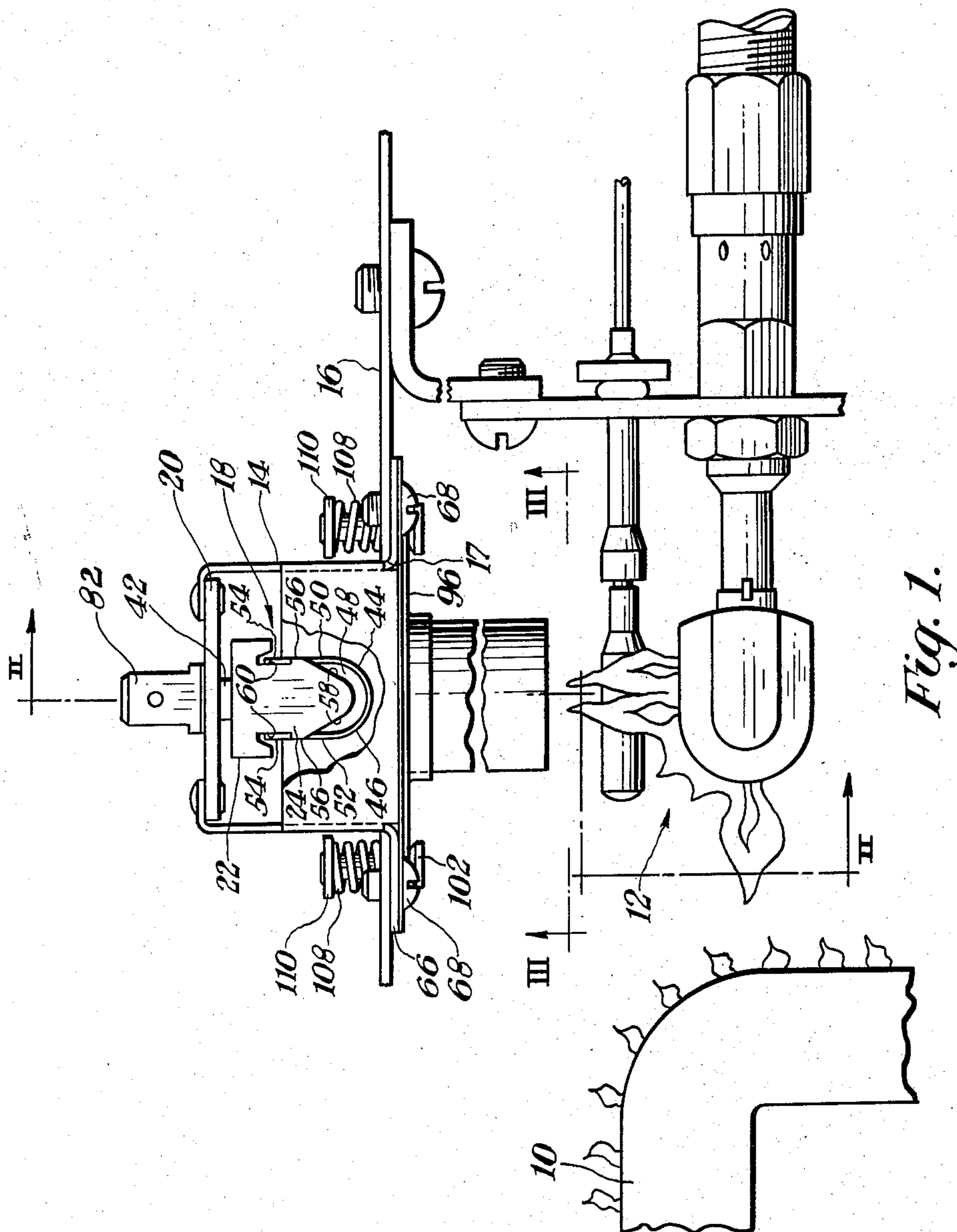
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2,850,084

ELECTRIC IGNITION DEVICE FOR GASEOUS FUEL

Filed March 19, 1954

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

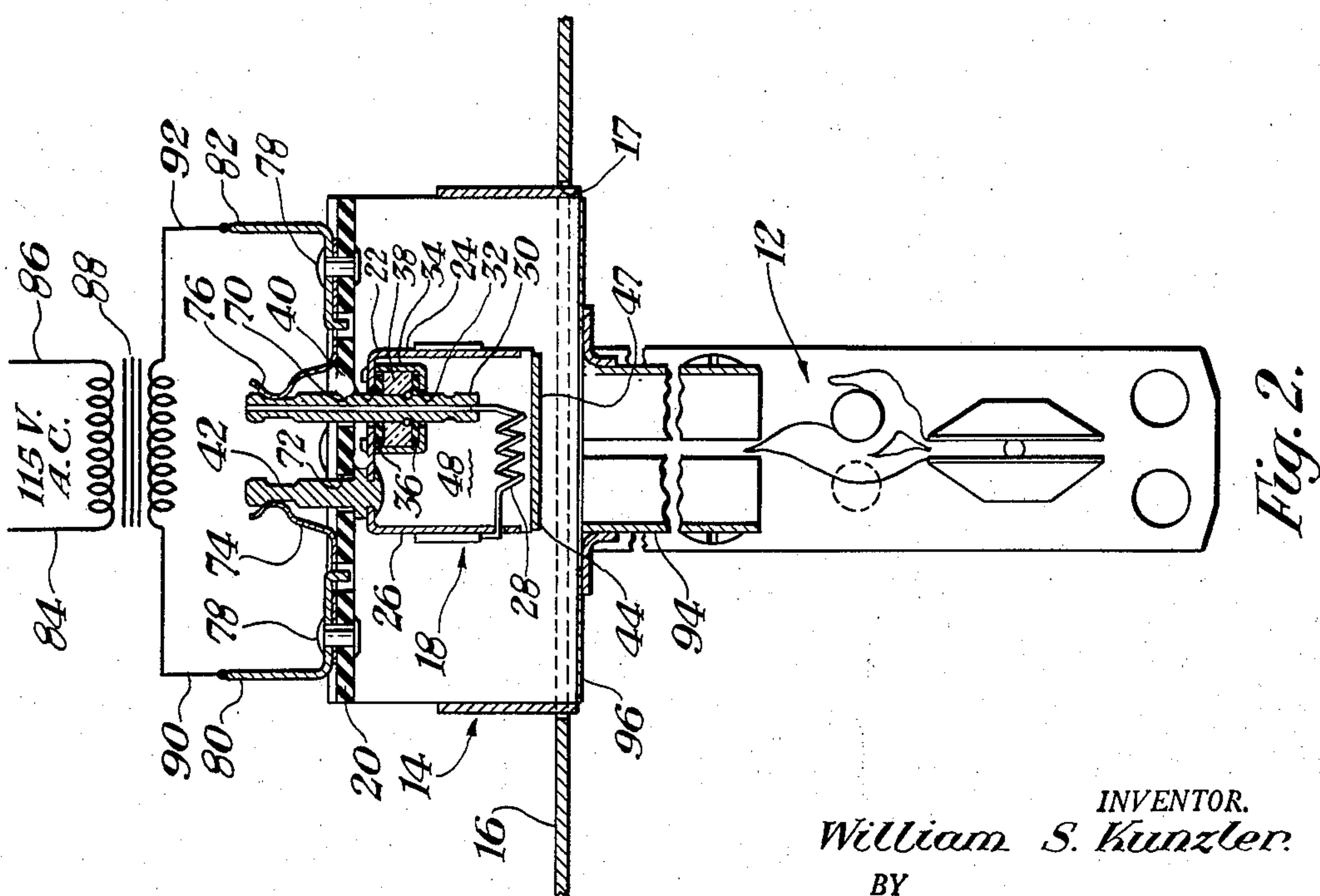


Fig. 2.

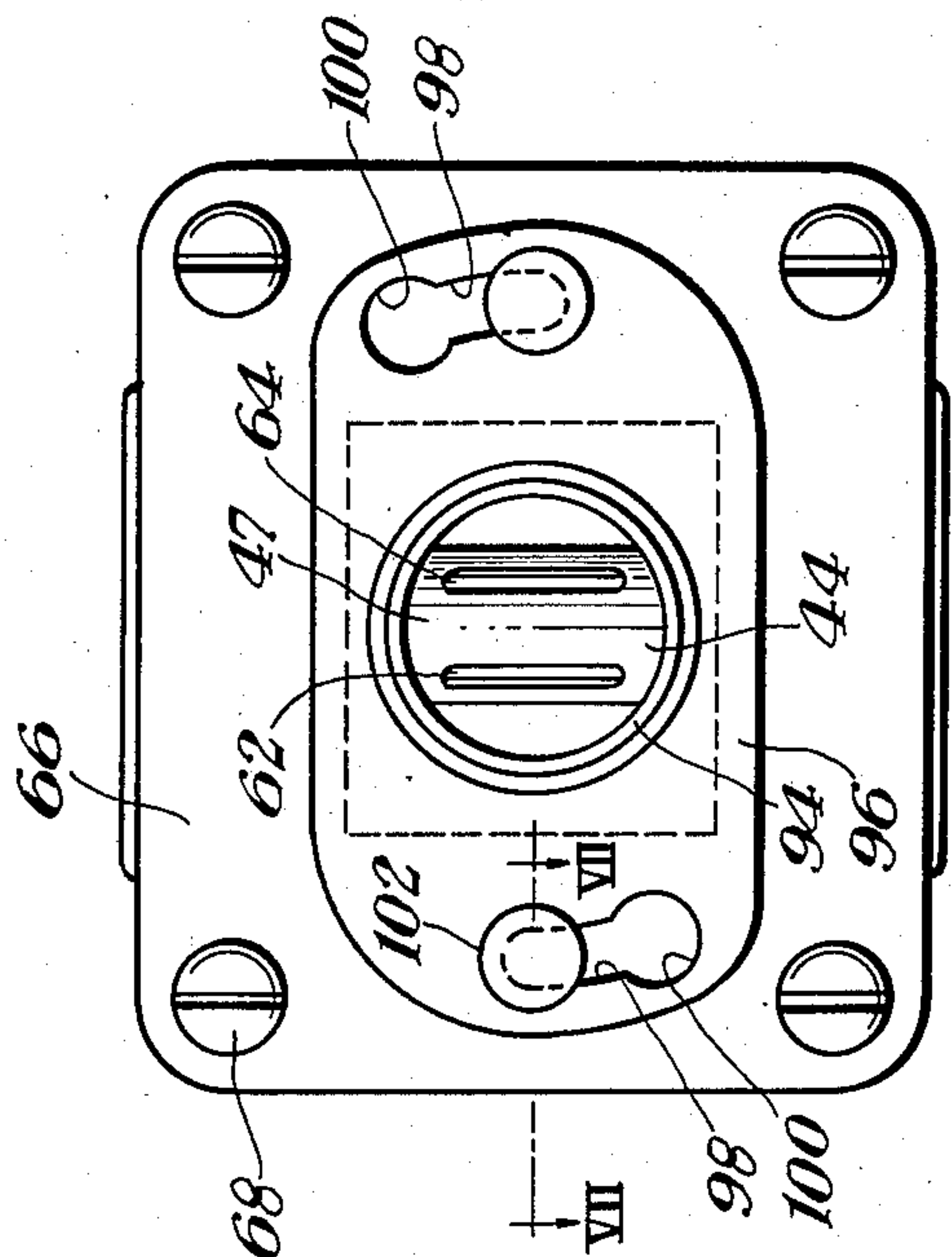


Fig. 3.

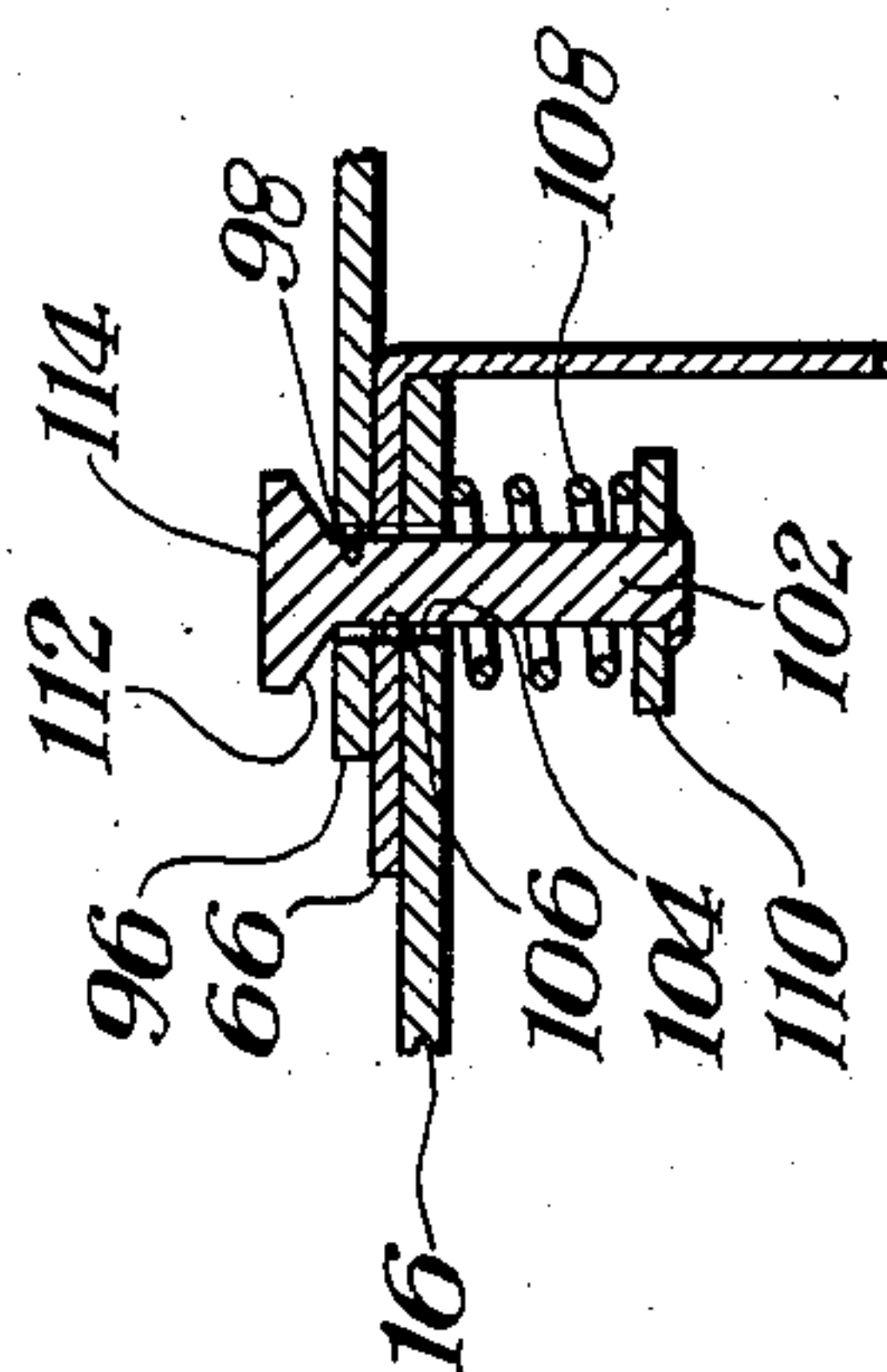


Fig. 7.

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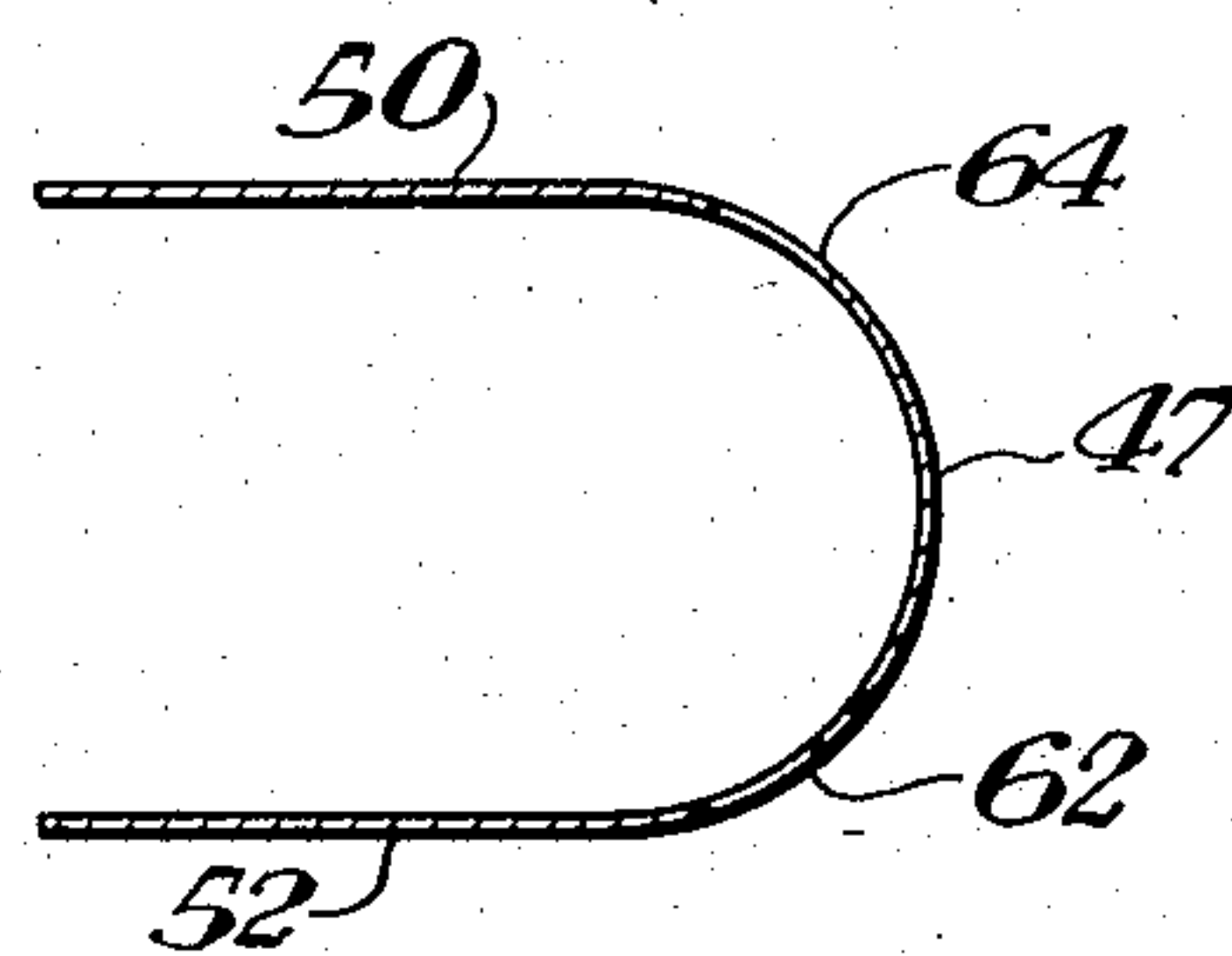
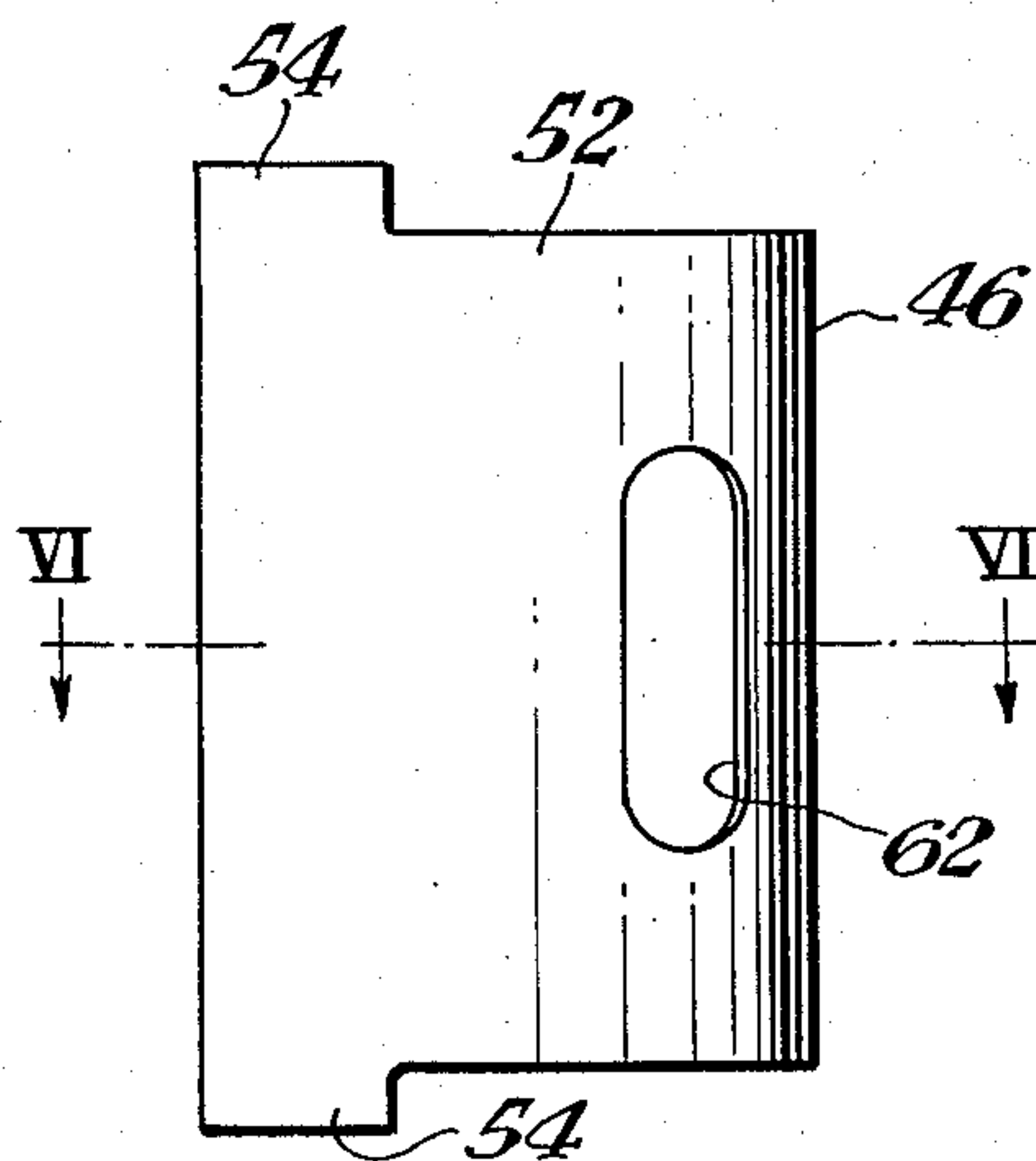
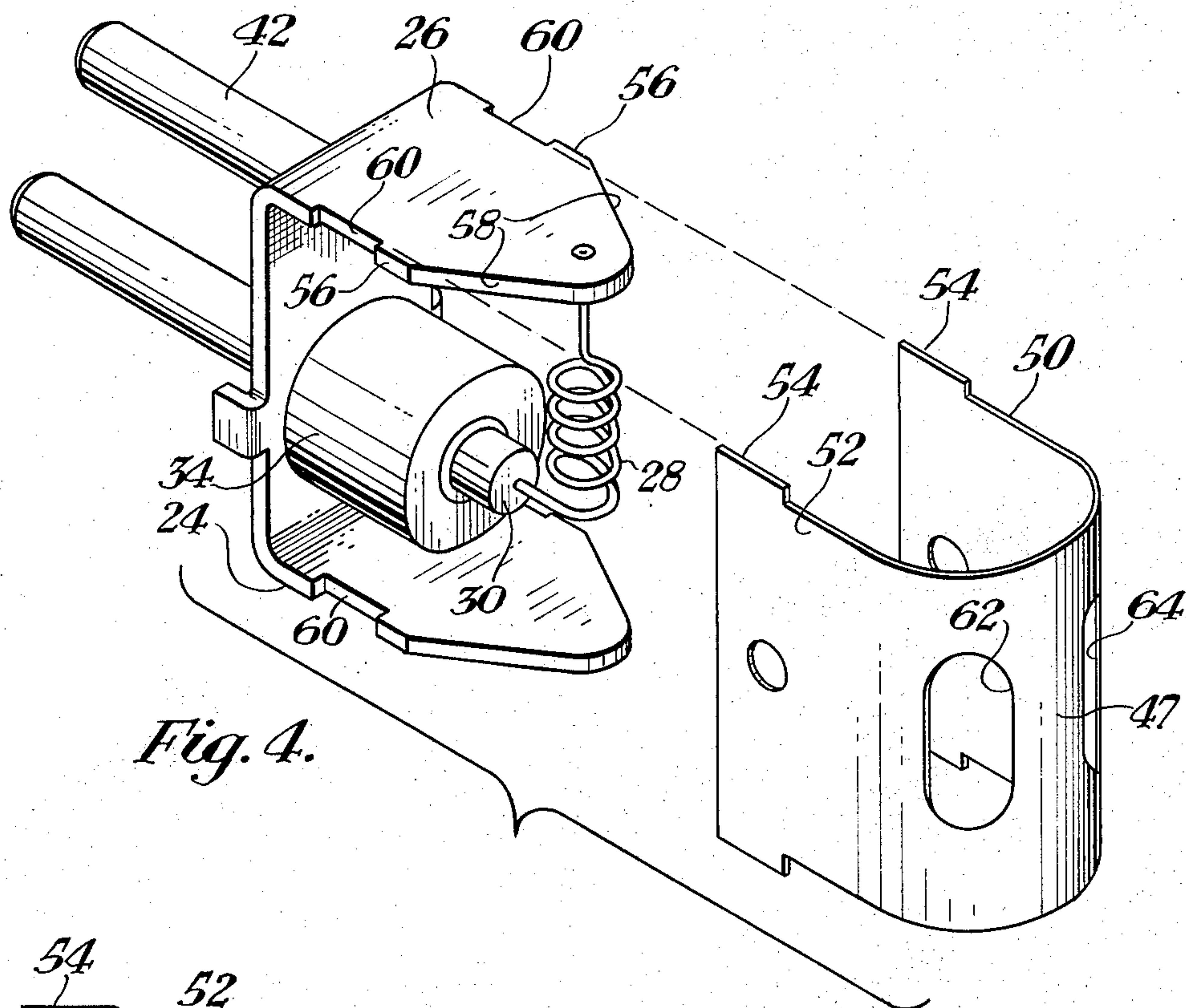
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3 Sheets-Sheet 3



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ELECTRIC IGNITION DEVICE FOR GASEOUS FUEL

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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 positioned 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-

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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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References Cited in the file of this patent

UNITED STATES PATENTS

774,844	Kellermann	Nov. 15, 1904
1,664,918	Dester	Apr. 3, 1928
2,286,610	Focke et al.	June 16, 1942
2,296,686	Ragan	Sept. 22, 1942
2,385,699	Fox	Sept. 25, 1945
2,487,754	Cohn	Nov. 8, 1949
2,648,951	McDougal	Aug. 18, 1953

FOREIGN PATENTS

284,205	Switzerland	May 1, 1953
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