Jan. 23, 1951 H. H. HAGEMANN ET AL 2,539,075

GAS BURNER IGNITER

Filed Oct. 26, 1946 2 Sheets-Sheet 1

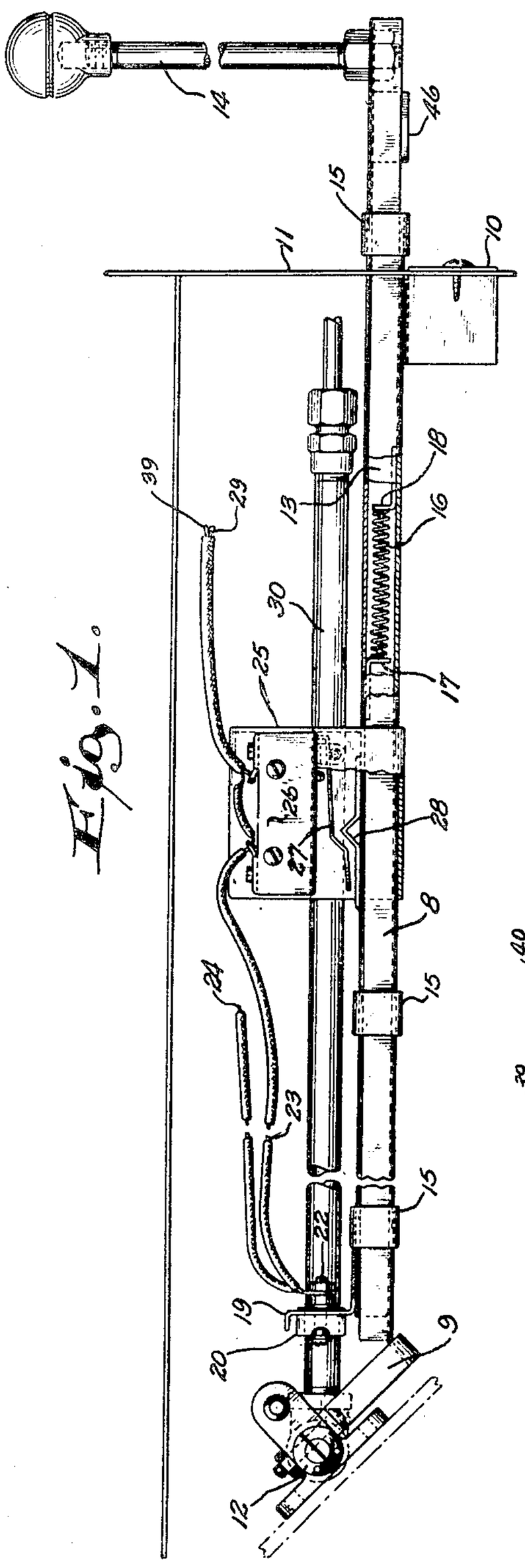

Fig. 1.

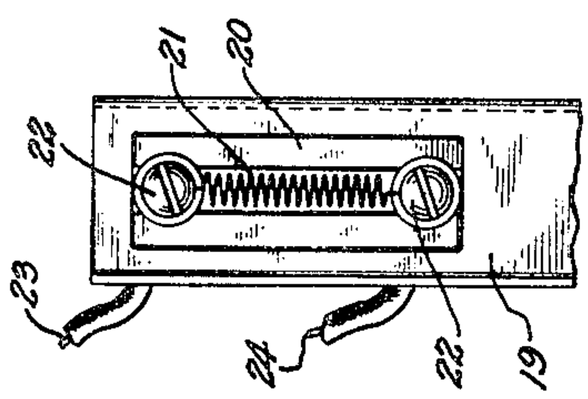

Fig. 5.

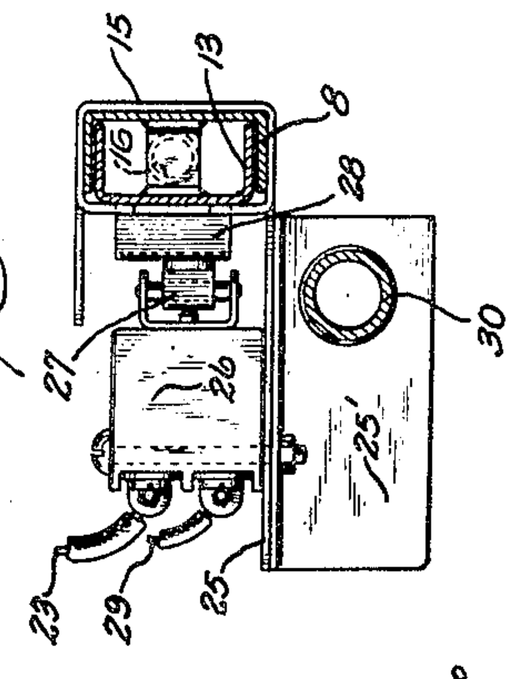

Fig. 4.

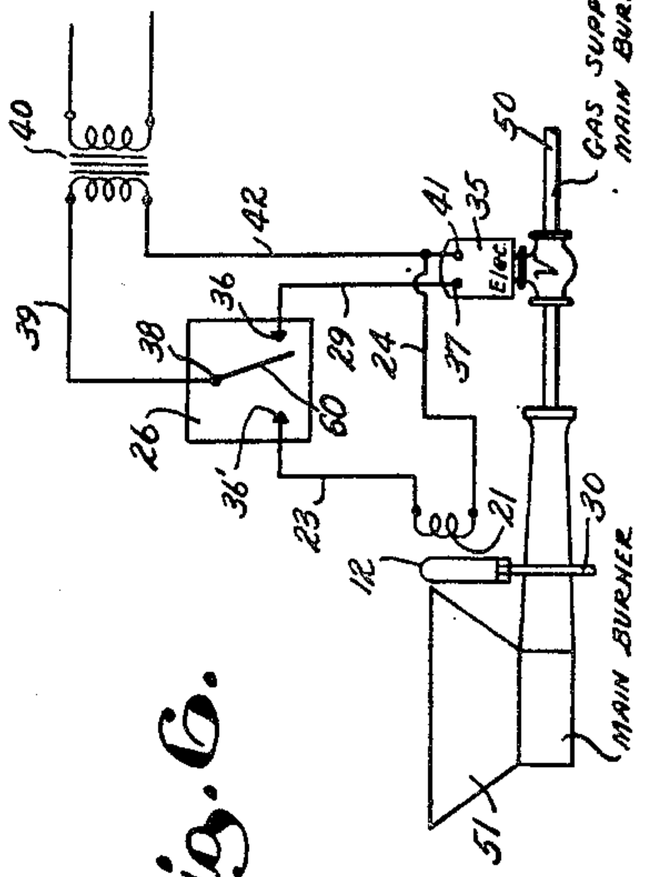

Fig. 6.

INVENTORS
Hans H. Hagemann &
Frederick F. Heise,
BY Morsell & Morsell
ATTORNEYS.

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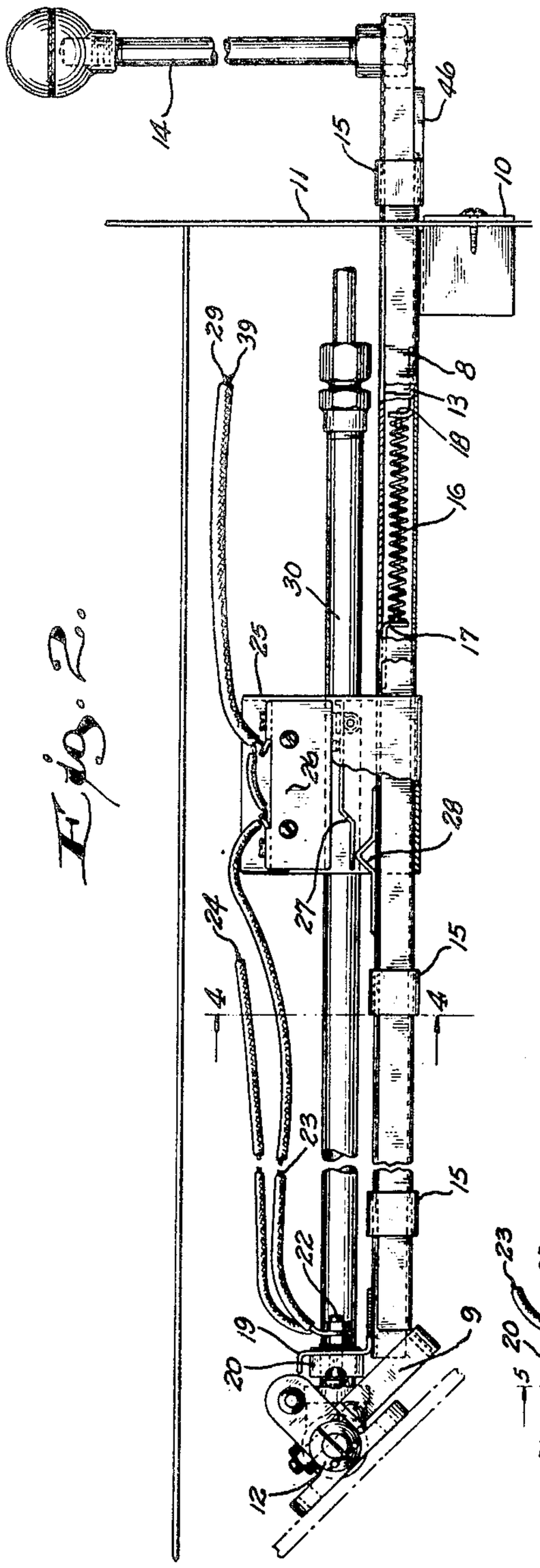

Fig. 2.

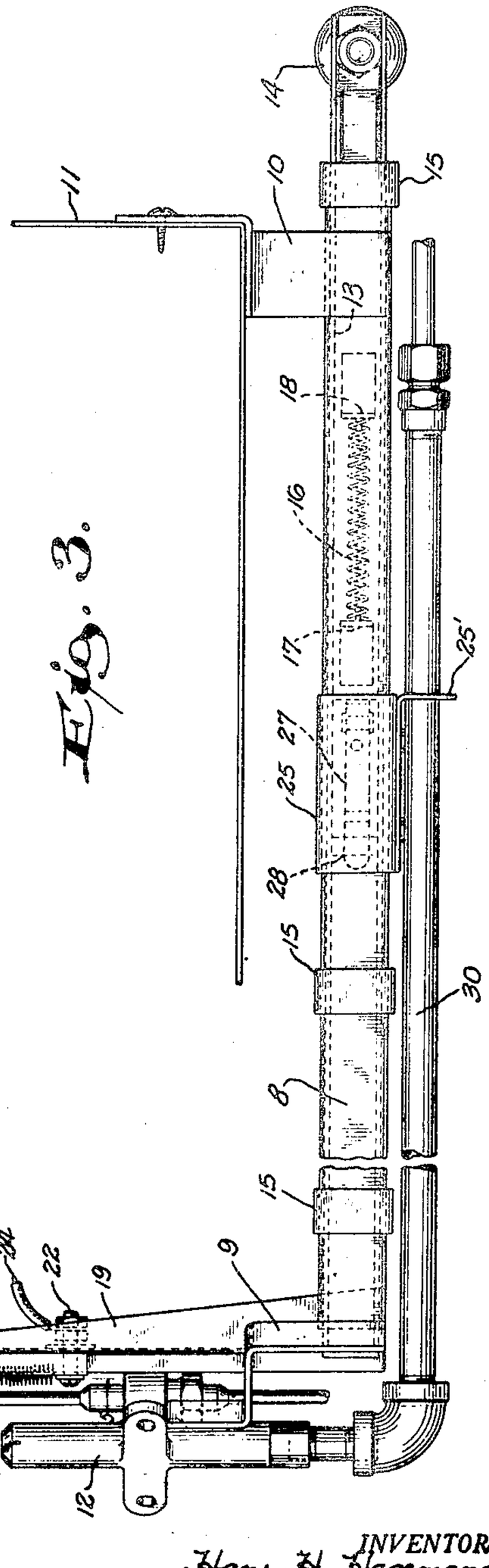

Fig. 3.

INVENTORS
Hans H. Hagemann &
BY Frederick F. Heise,
Morsell & Morsell
ATTORNEYS.

Patented Jan. 23, 1951

2,539,075

UNITED STATES PATENT OFFICE

2,539,075

GAS BURNER IGNITER

Hans H. Hagemann, Evansville. Ind., and Frederick F. Heise, Milwaukee, Wis., assignors to L. J. Mueller Furnace Company, Milwaukee, Wis., a corporation of Wisconsin

Application October 26, 1946, Serial No. 705,944

6 Claims. (Cl. 158—115)

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This invention relates to improvements in gas burner igniters.

In the field of gas operated burners, such as are used for industrial purposes or for household heating, it is common practice to fixedly associate with the burner or the pilot burner, an electric igniter coil. Conventional igniter coils are anchored in the zone of the burner flame and consequently are apt to burn out frequently. Also, where the igniter coil is utilized to ignite a burner pilot there is an operational hazard if the igniter coil is energized at such times as the main gas valve for the main burner is open.

With the foregoing in mind it is the primary object of the present invention to provide a gas burner ignition coil normally removed from the zone of the burner but selectively movable toward and away from the burner to be ignited thereby, with the operation of the igniter coil being positively interlocked with the main gas valve to prevent opening of the latter when the ignition coil is energized and in burner igniting position.

A further object of the invention is to provide a simple, efficient, safe, and readily accessible means for igniting the gas issuing from the burner of a gas appliance.

A further object of the invention is to provide, in a gas burner igniter, means for insuring maximum life of an ignition coil through the mounting of the coil on an instrumentality which projects the coil into the region of gases issuing from a burner only while the coil is energized for ignition purposes, with the mechanism functioning to retract the coil away from the burner flame region at such times as the coil is inoperative.

A further object of the invention is to provide in a gas burner igniter positive electrical means for interlocking the operation of the igniter coil with the automatic main gas control in a manner so that it is impossible to electrically open the main gas control valve during periods when the igniter coil is energized.

A further object of the invention is to provide a unitary gas burner igniter assembly which may be mounted in proper relation to a gas appliance burner and which may be easily removed for cleaning and servicing.

A further object of the invention is to provide a gas burner igniter wherein the electrical coil is energized only when it is projected into the burner flame region and is automatically deenergized when it is retracted from the burner flame region.

A further object of the invention is to provide a gas burner igniter which is of very simple construction, is easily operated, is relatively inexpensive to manufacture and install, is strong and durable and prolongs the life of the igniter coil, and is well adapted for the purposes described.

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With the above and other objects in view, the invention consists of the improved gas burner igniter and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views,

Fig. 1 is a plan view of the improved gas burner igniter in its inoperative position, parts being broken away and in section to show structural details;

Fig. 2 is a view similar to Fig. 1 only showing the apparatus in a position with the igniter coil projected into the burner flame zone for ignition purposes;

Fig. 3 is a side view of the showing in Fig. 2;

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 2 and on a larger scale;

Fig. 5 is an enlarged fragmentary detail view taken on line 5—5 of Fig. 3; and

Fig. 6 is a schematic view of the assemblage including a wiring diagram for the improved gas burner igniter and appliance gas valve.

Although the invention is not to be restricted to the illustrated embodiment the improved gas burner igniter is herein illustrated in operative association with the pilot burner which may be associated with a gas conversion burner (see Fig. 6) for a household heating appliance. It is to be understood, however, that in its broader aspects the invention is concerned with an instrumentality or mechanism whereby an electrically energized igniter coil may be projected adjacent a gas burner and subsequently removed from the zone of the burner and deenergized after gas issuing from the burner has been ignited. Obviously, within the contemplation of the present invention the improved igniter may be used in conjunction with gas operated industrial burners, household burners whether the same be original equipment or conversion burners, and especially with the pilot burners of such equipment.

Referring now more particularly to the drawings, it will appear that an elongated horizontally disposed outer channel member is designated by the numeral 8. This channel, when the assembly is installed, is maintained in a stationary condition through brackets 9 and 10 respectively, carried by opposite ends thereof which are suitably secured to stationary portions of the apparatus with which the improved burner ig-

niter is associated. For instance, the bracket 10 at the outer end of the channel member 8 is secured to a rigid supporting element 11 while the bracket 9 at the inner end of the channel member 8 is rigidly attached to the boss portion of a pilot burner 12. The latter may have associated therewith a conventional thermo-couple 52 (see Fig. 3).

Mounted for longitudinal sliding movement within the outer channel member 8 is an inner channel member 13 which projects beyond the outer end of the outer channel member and has affixed to said projecting extremity a laterally extending operating handle 14. The channels 8 and 13 are relatively slidably held in assembled relation by encircling clips 15. An elongated coiled tension spring 16 positioned within the inner channel member 13 and having opposite ends thereof anchored to lugs 17 and 18 carried respectively by the inner and outer channel members, normally maintains the inner channel member in the position of Fig. 1 relative to the outer channel member.

At the end of the channel assembly adjacent the burner there is an upwardly projecting bracket 19 whose lower end is rigidly affixed to the inner channel member 13. On an upper outer face portion of said bracket 19 is an insulator block 20 which carries an electrical ignition coil 21. Opposite ends of the ignition coil 21 are attached to the machine screws 22 carrying nuts which are insulated from the metal of the upright bracket 19 by means of mica washers. Said screws 22 serve as terminals for the connection of circuit wires 23 and 24.

An intermediate portion of the outer channel member 8 has affixed thereto a flanged switch bracket 25. On an extended horizontal flange of the switch bracket there is rigidly mounted, by means of suitable bolts, an electric switch element 26 having mounted on its inner face a pivotal, yielding, contact element 27. The latter is adapted to be positively operated to open and close the switch through a plate formed with a protuberance 28 mounted on the adjacent side wall of the reciprocating inner channel member 13.

The electrical switch 26 is included in the circuit to the ignition coil 21 and it will be noted that one of the circuit wires 23 extends from the ignition coil to a binding post 36' on the switch 26, another binding post on the switch carrying a circuit wire 29 which ultimately extends to the source of electrical energy, as does the circuit wire 24. The wiring arrangement is shown schematically in Fig. 6 and will be dealt with more fully hereinafter. At this point it may be observed that, when the gas burner igniter is in the normal position of Fig. 1, the operating protuberance 28 is disengaged from the switch contact element 27 and the electrical circuit to the ignition coil 21 is therefore broken. When the inner channel member 13 is forwardly shifted to project the ignition coil 21 into proximity to the burner 12, then the protuberance 28 rides on the switch contact element 27, pivoting it inwardly to close the switch and thus close the electrical circuit to the ignition coil 21.

In the exemplification under consideration, the burner 12 is a pilot burner and is supplied with gas by means of an elongated gas pipe 30 and suitable fittings attached thereto. As will be noted from Figs. 3 and 4, the channel-carried bracket 25 has a down-turned apertured flange 25' which is passed through by the gas pipe 30

and which thereby serves to support the gas pipe and hold it to the assembly.

A wiring diagram, such as might be used in a typical installation, is shown in Fig. 6. A conventional electrically operated valve 35 controls the flow of gas through a gas supply pipe 50 to the main burner 51 (see Fig. 6), it being understood that in the embodiment under consideration, the pilot burner 12 functions to light the main gas burner, as required.

On the switch 26 which is operated through reciprocation of the inner channel member 13, there is a normally closed terminal 36 which is connected by the circuit wire 29 to a transformer terminal 37 on the gas valve 35. In series with said gas valve are manual valves (not shown), but as the igniter circuit is normally in its inoperative condition the electromagnetic valve 35 is energized and hence is open. Terminal 38 on the switch 26 is connected by a circuit wire 39 with a low voltage terminal on a transformer 40. The transformer thus functions to operate the main gas valve and another terminal on the transformer is connected to a gas valve terminal 41 by a circuit wire 42, this being the terminal to which the circuit wire 24 from the ignit. - coil 21 is also attached.

Where the pilot burner 12 is used in an installation with a main gas burner 51 it is a recognized fact that for safety, gas should not be permitted to flow from the main burner when the pilot burner 12 is being ignited. When it is necessary to ignite the pilot burner 12, a pilot gas cock (not shown) in the gas supply pipe 30 should first be opened following which gas will issue from the ports of the pilot burner 12. When this condition attains, the operator then grasps the operating handle 14 and pushes the inner channel member 13 toward the left relative to the drawings, elongating the coiled spring 16. As the upright bracket 19 of the assembly is rigidly carried by the inner channel member 13, the movement described will project the igniter coil 21 into close proximity to the upper end of the pilot burner 12, as shown in Figs. 2 and 3, whereupon the coil will glow and issuing gases from the pilot burner will be ignited. In the non-igniting or retracted position of the inner channel member 13 with the coil 21 removed from the burner 12, as in Fig. 1, the gas valve electrical circuit is energized through the normally bridged terminals 36 and 38 of the switch 26, the bridging being accomplished by the movable switch arm 60. However, upon movement toward the left of the inner channel member 13, the protuberance 28 engages the switch arm 27 to actuate the switch mechanism and break the circuit through the gas valve 35 because switch terminals 36 and 38 are then unbridged while switch terminals 36' and 38 become bridged by switch arm 60 (see Fig. 6). The ignition coil 21 is thereby energized. As has been noted, at this stage of operations gas is issuing from the pilot burner 12 and is ignited by the glowing coil 21 in proximity thereto. It should be observed that movement of the inner channel 13 to the left relative to the drawings accomplishes, through the electrical circuits, two functions: The circuit to the main gas valve is broken (a desirable safety precaution), and the circuit to the igniter coil 21 is closed.

As soon as ignition of the burner 12 is effected, which can be determined by a visual inspection or by the operation of instruments in the equipment, the operating lever 14 is released whereby

the spring 16 contracts to its normal condition and moves the inner channel member 13 to the right relative to the drawings, returning the parts to the position of Fig. 1 wherein the igniter coil 21 is removed from the burner 12 and from the zone of the flame. In returning to the last mentioned "at rest" position of the apparatus, the electrical circuit which had energized the igniter coil 21 is broken and the circuit through the gas valve 35 is restored with said valve being held open relative to the supply pipe 50. Hence, the gas valve is then free to operate according to the demands placed upon it by conventional controlling devices (not shown).

In the operation of the mechanism forward movement of the inner channel member 13 is limited by a stop 46 fast on the handle end of said channel member which ultimately abuts the adjacent clip 15. In the retraction of the inner channel member movement is limited by the bracket 19 engaging the outer clip 15.

The mechanism is so arranged that simultaneous operation of the gas valve 35 and the igniter coil 21 is impossible. This is a highly desirable safety feature which eliminates any possibility of opening the main gas valve while the ignition coil is energized for the purpose of igniting the pilot burner. It will further be observed that the igniter coil is only temporarily in the region of the high ambient temperature of the burner. It is normally in the retracted position and, hence, will not be damaged or burned out by the heat of the burner flame.

The improved gas burner igniter is furthermore susceptible of easy operation and is foolproof in that when the operating handle 14 is released, the parts are automatically retracted to the desired "at rest" position. The mechanism is adaptable to various types of burner installations, is relatively inexpensive, and is well-suited for the purposes described.

What is claimed as the invention is:

1. The combination with a gas burner and a gas supply line therefor, of a gas pilot burner, an electric igniter for said pilot burner, an electric gas supply line control valve, an electrical circuit including said igniter, an electrical circuit including said valve, a reciprocatable member carrying the igniter to selectively move the same to and from the zone of the pilot burner, and a switch controlling both of said electrical circuits, said switch having separate contacts for the separate circuits with said switch being automatically operated by movement of the reciprocatable member toward the pilot burner to simultaneously break the circuit to the valve and to close the circuit to the igniter and automatically operated by a reverse movement of the reciprocatable member to simultaneously close the circuit to the valve and to break the circuit to the igniter, the contacts of the igniter circuit being normally open and those for said valve circuit being normally closed.

2. In combination, an electrically operated gas valve for a main gas burner supply pipe, a gas pilot burner, an electrical heating element, an electrical circuit including said heating element, an electrical circuit including said gas valve, means mounting said heating element for movement toward and away from the flame zone of said pilot burner, an electrical switch controlling both of said circuits, said switch having separate contacts for the separate circuits with the contacts of the heating element circuit being normally open and those of said valve circuit being normally closed, and means actuated by movement of said heating element mounting means for operating said electric switch.

3. In combination, an electrically operated gas valve, a main gas burner supply pipe associated therewith, a gas pilot burner, an electrical heating element, an electrical circuit including said heating element, an electrical circuit including said gas valve, means mounting said heating element for movement toward and away from the flame zone of said pilot burner, an electrical switch controlling both of said circuits, said switch having separate contacts for the separate circuits with the contacts of the heating element circuit being normally open and because of said valve circuit being normally closed, and means automatically actuated by movement of said heating element mounting means toward the pilot burner to operate said switch in a manner to simultaneously break the circuit to the gas valve and to close the circuit to the heating element and upon a movement of said mounting means away from the pilot burner to simultaneously close the circuit to the gas valve and to break the circuit to the heating element.

4. A fluid fuel burner igniter, comprising a gas burner, a fixedly mounted outer channel member there adjacent, a switch carried by said outer channel member, electrical circuits including said switch, an inner channel member reciprocatably mounted within the outer channel member, an electric igniter carried by said inner channel member and movable toward and away from the flame zone of said gas burner upon reciprocations of the inner channel member, said electric igniter being included in one of said electrical circuits, spring means between the inner channel member and the outer channel member to yieldingly resist movement of the inner channel member in one direction, means carried by the inner channel member to engage and operate said electric switch upon movements of the inner channel member, and means for moving said inner channel member.

5. The combination with a gas burner and a gas supply line therefor, of a gas pilot burner, an electric igniter for said pilot burner, an electric gas supply line control valve, an electrical circuit including said igniter, an electric circuit including said valve, a reciprocatable member carrying the igniter to selectively move the same to and from the zone of the pilot burner, and a switch controlling both of said electrical circuits, said switch having separate contacts for the separate circuits with said switch being automatically operated by movements of the reciprocatable member in both directions, the contacts of the igniter circuit being normally open and those for said valve circuit being normally closed, said reciprocatable member functioning to actuate said switch to close the circuit in which the igniter is included when said reciprocatable member is moved in a direction toward the pilot burner.

6. In combination, an electromagnetic gas valve, a main gas burner supply pipe associated therewith, a gas pilot burner, an electrical heating element, an electrical circuit including said heating element, an electrical circuit including said gas valve, a supporting structure, an elongated member reciprocatably movably associated with the supporting structure, an electrical switch mounted adjacent the path of movement of the elongated member, said switch

being included in both of said electrical circuits and having separate contacts for the separate circuits, a yielding member to actuate the switch contacts, the heating element being carried by said reciprocatable elongated member whereby reciprocatory movements of said elongated member are effective to move the heating element toward and away from the flame zone of the pilot burner, and a protuberance carried by said elongated member and engageable and disengageable with the yielding member, the contacts of the heating element circuit being normally open and those for said valve circuit being normally closed, said reciprocatable member functioning to actuate said switch to close the circuit in which the igniter is included when said reciprocatable member is moved in a direction toward the pilot burner.

HANS H. HAGEMANN.
FREDERICK F. HEISE.

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