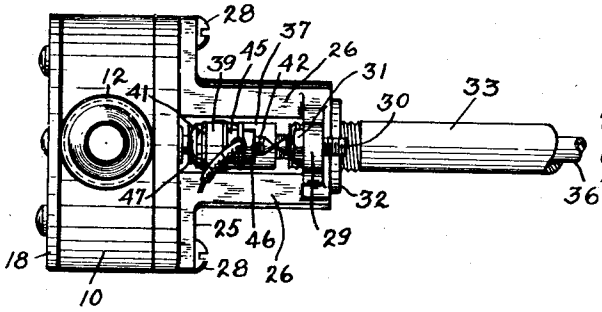
Jan. 6, 1942. V. O. BEAM ET AL 2,269,356

AUTOMATIC LIGHTER

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Fig. 2.



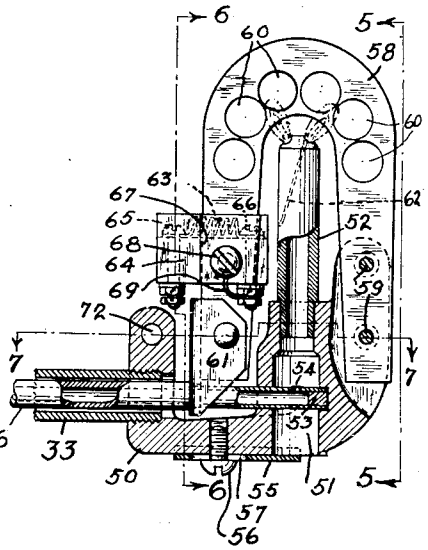


Fig. 6.

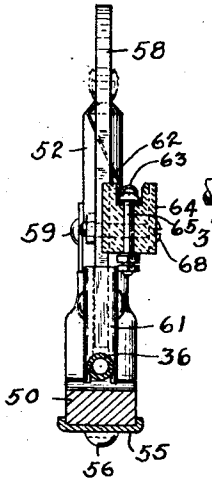


Fig. 8.

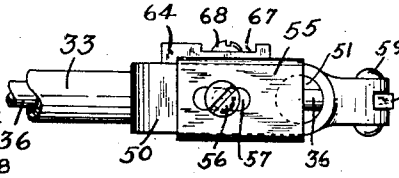


Fig. 5.

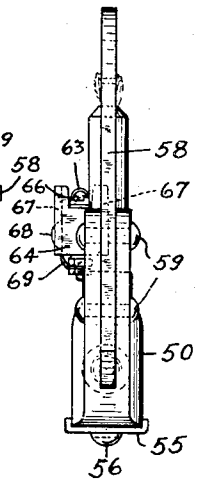
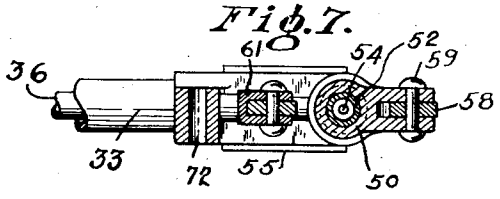


Fig. 7.



INVENTORS.
Vilynn O. Beam.
Julius Converse.
BY Lewis, Hudson & Kent
Their ATTORNEYS.

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2,269,356

UNITED STATES PATENT OFFICE

2,269,356

AUTOMATIC LIGHTER

Vilynn O. Beam, Cleveland Heights, and Julius Converse, East Cleveland, Ohio, assignors to The Bryant Heater Company, Cleveland, Ohio, a corporation of Ohio

Application March 6, 1939, Serial No. 260,034

10 Claims. (Cl. 158—117.1)

This invention relates to improvements in automatic lighters, that is means for lighting gas burners, particularly oven and broiler burners in domestic cooking ranges.

One of the objects of the invention is the provision of a lighter which shall be effective and dependable in action and which will automatically relight the gas of the burner in the event that there should be a short interruption in the supply.

Another object is the provision of an automatic lighter for ovens which shall be relatively flat and thin at the inner end, that is the end which comes into close relation with the burner, in order that it may protrude to as small an extent as possible into the working space of the oven.

Another object is the provision of a valve unit at the outer end of the lighter assembly which shall be relatively thin from front to rear so that it can be fitted outside the oven or into a recess in the double side wall of the oven where it will be inconspicuous and will be protected from damage.

Another object is the provision of a tubular conductor for gas fuel which shall function additionally as a control element with a lengthwise movement.

A further object is the provision of a pipe connection, thin both in plan and elevation, joining together the valve unit and the lighter unit, through which connection said tubular conductor extends, said connection being rotatably adjustable with respect to at least one of said units, whereby the pipe and tubular conductor may be of selected length and whereby the units may be selectively oriented to permit fitting the assembly to widely different installations with a minimum of changes.

Still other objects and features of novelty will appear as we proceed with the description of that embodiment of the invention which, for the purposes of the present application, we have illustrated in the accompanying drawings, in which:

Fig. 1 is an elevational view of the lighter assembly.

Fig. 2 is a bottom plan view of the same with a portion of the lighter unit shown in horizontal section in order to more fully illustrate the invention.

Fig. 3 is a vertical sectional view taken substantially on the line 3—3 of Fig. 4.

Fig. 4 is a vertical sectional view taken substantially on the line 4—4 of Fig. 3.

Fig. 5 is an end view of the lighter unit turned up out of its normal horizontal position.

Fig. 6 is a sectional view taken substantially on the line 6—6 of Fig. 2.

Fig. 7 is a vertical sectional view taken substantially on the line 7—7 of Fig. 2.

Fig. 8 is an end view of the lighter unit as seen in Fig. 2, and

Fig. 9 is a diagram showing the application of the invention to a gas burner.

We will describe first the valve unit at the outer end of the assembly. This unit comprises a casting 10 having a more or less flat and circular cavity 11 and two threaded cylindrical extensions 12 and 13, the extension 12 being adapted to be connected with a pipe leading to the main burner, these parts being indicated at 14 and 15 in Fig. 9. Extension 13 is adapted to be connected with the incoming fuel line marked 16 in Fig. 9, which may be controlled by a hand valve marked 17 in that figure.

On the outer side of the valve unit there is a removable circular plate 18. On the back wall of this plate at the middle thereof there is mounted a spring 19 having a series of radially extending fingers which engage a valve piece 20 and tend to force it into engagement with its seat. The valve piece may be moved off of its seat by a plunger 21 which slides within a central bore formed in the inner wall of the casting. In this wall there is also mounted a diaphragm 22 which engages the plunger 21 and is itself engaged by a plunger 23 that extends through and is guided by a central hole in a circular plate 24 which closes the inner side of the casting 10. The plate 24 forms part of another casting which comprises in addition reenforcing ribs 25, and a pair of arms 26 upon the inner ends of whch there is a ring 27. This second casting is attached to casting 10 by means of screws 28 shown threaded into two of four evenly spaced threaded holes 28' in casting 10. It will be apparent therefore that casting 10 may be caused to assume different radial positions with respect to the plate 24, these positions being 90° apart.

Ring 27 has a downwardly projecting extension 29 in which is threadably mounted an electric contact 30. When the contact 30 has been adjusted axially to the desired position it may be locked therein by means of a lock nut 31. A flanged nut 32 with a circular periphery fits within the ring 27 and is adapted to be threaded upon one end of a pipe 33 which is of relatively small diameter so as to present a minimum obstruction in the oven. In fact this pipe may frequently be positioned behind a cross member in the front wall of the oven marking the division between

by an electric conductor 70 with a source of current 71. Any convenient means may be employed for mounting the valve unit and the lighter unit upon fixed elements of the range or other apparatus in which the invention is employed. To facilitate mounting of the lighter unit we provide in one portion of the base 50 a bolt or screw hole 72.

Referring further to Fig. 9 of the drawings, where an electric circuit for the igniter coil is illustrated, we have there shown manual means for closing the circuit consisting of a switch blade 73 attached to the hand valve 17 and adapted when that valve is in the open position to engage a contact 74 at the end of electric conductor 44. The blade 73 is connected in any suitable manner, as by a flexible conductor 75 with the current source 71. It will be appreciated that instead of a manual valve and switch these elements may be automatically operated under thermostatic control if desired. It will also be appreciated that they may be separately controlled if desired and that the valve 17 may be removed from the main fuel intake line and put into the pilot line 40. But assuming that the installation is as illustrated in Fig. 9, when the parts are in the positions there shown no gas will flow to the main or pilot burner and no current will flow through the igniter circuit. To start the burner the operator opens valve 17 and closes the igniter circuit by the hand switch 73, 74. Gas will then flow to the pilot burner and will envelop the coil 63. At the same time a circuit will be completed through the coil from current source 71 through conductor 75, switch 73, 74, conductor 44, across contacts 42 and 30 then in engagement to pipe 33, and from pipe 33 to coil 63 and back through conductor 70 to the source. The coil is thereby energized and ignites the gas at the pilot which heats the element 58 causing it to expand and to push the tubular conductor 36 to the left, which accomplishes two things, that is it operates through plunger 23, diaphragm 22 and plunger 21 to open the main burner gas valve and to shift the movable contact 42 away from engagement with the fixed contact 30. The coil circuit is thereby broken and the coil deenergized. Gas flows to the main burner and is ignited by the pilot flame. In the event that there should be any cessation in gas supply the pilot burner would, of course, go out and the thermal element would contract, closing the main burner valve and causing the contacts 42 and 30 to again engage. As soon as gas comes on again the pilot will immediately ignite, as the coil 63 will remain energized while the gas is temporarily off. The lighting cycle will then continue, that is the gas to the main burner will be turned on and ignited and the coil will be deenergized. In order to discontinue operation of the burner the supply of gas either to the main burner or to the pilot burner must be cut off manually or otherwise. If anything goes wrong in the latter unit so that the pilot fails to ignite or goes out after being ignited, the main burner valve 20 will close and cannot be opened again until the difficulty is remedied.

Having thus described our invention, we claim:

1. Apparatus of the class described, comprising a valve unit, an electric contact unit and a lighter unit, said lighter unit comprising a U-shaped thermal element, a pilot arranged between the legs of said thermal element and an electric igniter in circuit with said contact unit, means for positioning and holding said units in definitely spaced relation, the principal planes of the valve and lighter units being at right angles to each other, means for adjusting one or the other of said last named units angularly around an axis connecting the said units, and means for adjusting the contact unit angularly about the same axis with respect to both the valve and lighter units.

2. In apparatus of the class described, a valve unit, a lighter unit comprising a U-shaped thermal element, a pilot arranged between the legs of said thermal element and an electric igniter, an electric circuit for said igniter, a contact unit comprising a pair of electric contacts in said circuit, means for holding said units in definitely spaced relation, and means for adjusting the valve unit and contact unit angularly with respect to each other around an axis connecting the said units, whereby the most desirable angular position of the contact unit may be maintained regardless of the angular position of the valve unit.

3. In apparatus of the class described, a lighter unit comprising an electric igniter, an electric circuit therefor, a contact unit comprising a pair of contacts for said circuit, a pipe section for spacing apart said two units, and a nut threaded upon said pipe section adjacent said contact unit, said contact unit comprising a ring rotatably mounted upon said nut, and means for locking said ring in any one of a plurality of angular positions upon said nut, whereby the nut may be threaded down tightly without regard to the desired angular position of the ring.

4. In apparatus of the class described, a pilot, an electric igniter therefor, an electric circuit for said igniter, a thermally responsive element arranged to be heated by the pilot flame, a tubular conductor for conveying gas to said pilot, an operative connection between said thermally responsive element and said tubular conductor for shifting the latter longitudinally when the thermally responsive element expands, a main burner valve, a pair of electric contacts in said igniter circuit, and means actuated by the longitudinal movement of said tubular conductor for opening said main burner valve and separating said contacts.

5. In apparatus of the class described, a pilot, an electric igniter therefor, an electric circuit for said igniter, a normally open switch and a pair of normally closed contacts in said circuit, a thermally responsive element arranged to be expanded by the flame from said pilot, a tubular conductor for conveying gas to said pilot, a manual valve for controlling the flow of gas to said tubular conductor, an operative connection between said thermally responsive element and said tubular conductor for shifting the latter longitudinally when the thermally responsive element expands, a main burner valve, and means actuated by the longitudinal movement of said tubular conductor in response to the expanding action of the thermally responsive element for opening said main burner valve and separating said contacts.

6. In apparatus of the class described, a pilot, an electric igniter therefor, an electric circuit for said igniter, a thermally responsive element arranged to be heated by the pilot flame, a tubular conductor for conveying gas to said pilot, an operative connection between said thermally responsive element and said tubular conductor for shifting the latter longitudinally when the thermally responsive element expands, a valve con-

trolling the flow of gas to said tubular conductor, a switch in said igniter circuit adapted to be closed by the operator simultaneously with the opening of said valve, a valve adapted to control the flow of gas to the main burner, and means actuated by the longitudinal movement of said tubular conductor for opening said main burner valve.

7. In apparatus of the class described, a fixed pilot, an electric igniter therefor, an electric circuit for said igniter, a thermally responsive element arranged to be affected by the pilot flame, a tubular conductor for conveying gas to said pilot, said tubular conductor having a slide mounting in the base of said pilot and having an aperture always in communication with the interior of the pilot, an operative connection between said thermally responsive element and said tubular conductor for shifting the latter longitudinally when the thermally responsive element expands, a valve controlling the flow of gas to said tubular conductor, a switch in the igniter circuit, a valve adapted to control the flow of gas to a main burner, and means actuated by the longitudinal movement of said tubular conductor for opening said main burner valve.

8. In apparatus of the class described, a lighter unit comprising an electric igniter, an electric circuit therefor, a valve unit, a contact unit comprising a pair of contacts for said circuit, a pipe section connected at one end to said lighter unit, said contact unit comprising a bracket mounted upon and rotatable with respect to the other end of said pipe section, said bracket and valve unit being rotatably adjustable with respect to each other, a control element operatively associated with said lighter unit slidable in said pipe section, said control element carrying rotatably one of the contacts of said contact unit, said bracket carrying the other contact of said contact unit.

9. In apparatus of the class described, a lighter unit comprising an electric igniter, an electric circuit therefor, a valve unit, a contact unit comprising a pair of contacts for said circuit, a pipe section connected at one end to said lighter unit, said contact unit comprising a hollow bracket mounted upon and rotatably adjustable with respect to the other end of said pipe section, said valve unit being connected to said bracket in one of a series of different angular adjustments about the axis of the pipe section, a control element operatively associated with said lighter unit slidable in said pipe section, said control element carrying within said hollow bracket one of the contacts of said contact unit, and said bracket carrying the other contact of said contact unit.

10. In apparatus of the class described, a lighter unit comprising an electric igniter, an electric circuit therefor, a valve unit, a contact unit comprising a pair of contacts for said circuit, a pipe section connected at one end to said lighter unit, said contact unit comprising a hollow bracket mounted upon and rotatably adjustable with respect to the other end of said pipe section, said valve unit being connected to said bracket in one of a series of different angular adjustments about the axis of the pipe section, a control element operatively associated with said lighter unit slidable in said pipe section, said control element carrying within said hollow bracket one of the contacts of said contact unit, said bracket carrying the other contact of said contact unit, and a plunger also carried by said control element extending through said hollow bracket into operative relation with said valve unit.

VILYNN O. BEAM.
JULIUS CONVERSE.

Jan. 6, 1942. G. HAFERGUT 2,269,369

PROCESS AND DEVICE FOR ELECTRIC ARC WELDING

Filed July 17, 1939 2 Sheets-Sheet 1

Fig. 1

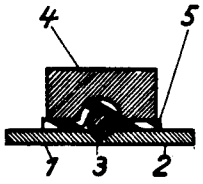


Fig. 2

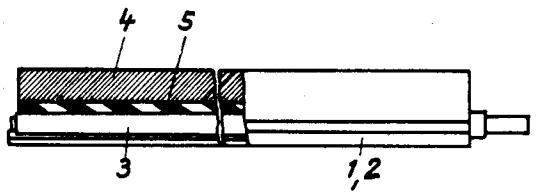


Fig. 3

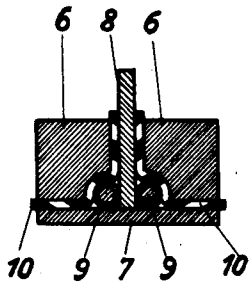


Fig. 4

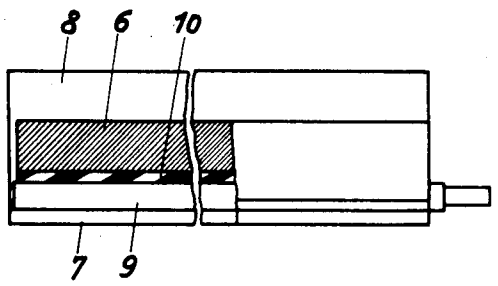


Fig. 5

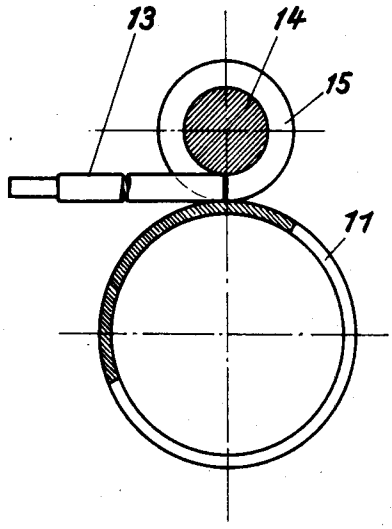
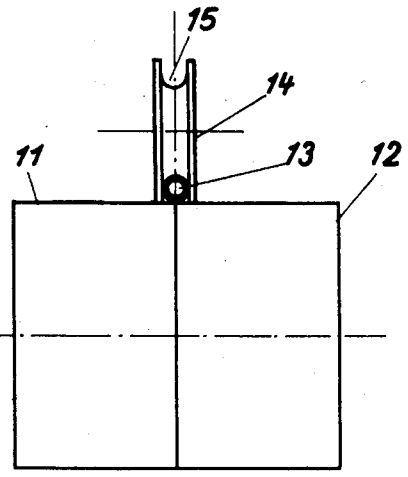


Fig. 6



Inventor,
Georg Hafergut,
By Sommers & Young Attys