March 19, 1963 M. QUERCIA 3,081,610

AUTOMATIC GAS LIGHTERS

Filed May 29, 1959 2 Sheets-Sheet 1

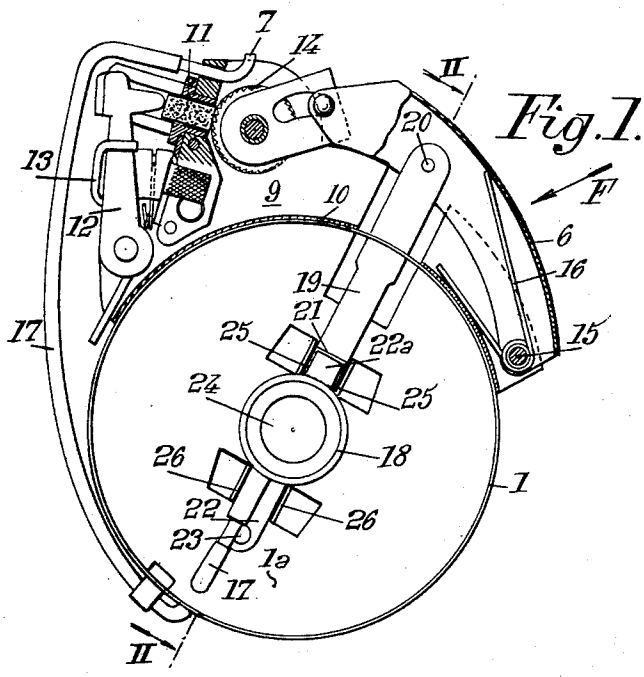



Fig. 1.

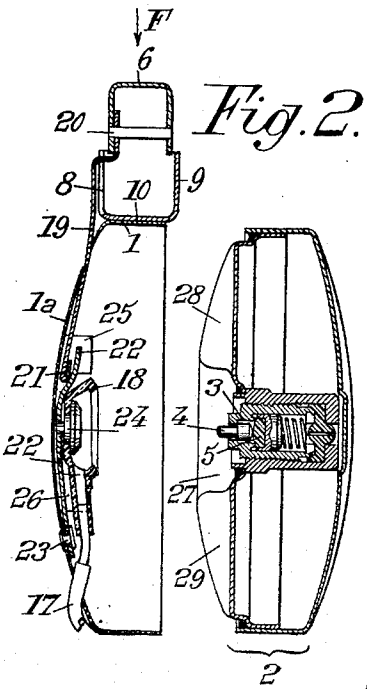



Fig. 2.

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March 19, 1963 M. QUERCIA 3,081,610

AUTOMATIC GAS LIGHTERS

Filed May 29, 1959 2 Sheets-Sheet 2

Fig. 3.

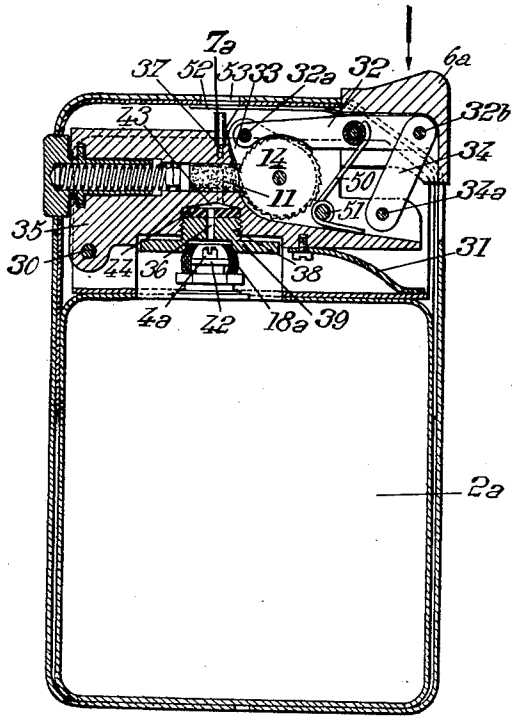
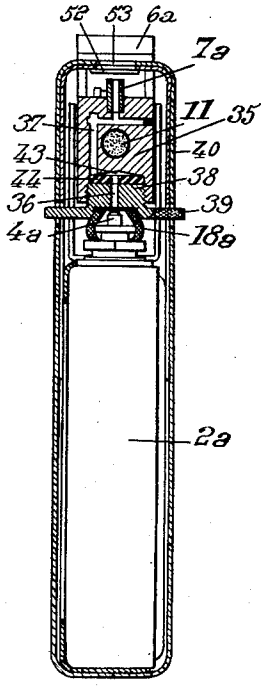



Fig. 4.




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# AUTOMATIC GAS LIGHTERS

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The invention relates to automatic gas lighters, that is to say to gas lighters in which the operation of a single control member causes gas to be fed to the burner and pyrophoric means to ignite the gas flowing out from said burner.

According to an essential feature of the present invention, the pyrophoric means for producing a jet of sparks are arranged in such manner that said jet of sparks is at least approximately parallel to the gas stream flowing out from the burner, at the place where this jet of sparks meets said gas stream.

Preferred embodiments of the present invention will be hereinafter described with reference to the accompanying drawings given merely by way of example and in which:

FIG. 1 shows, in an elevational and sectional view, the support of the tank and of the mechanism, and also the mechanism (the tank itself being not shown), of a gas lighter made according to the invention.

FIG. 2 is a sectional view on the line II—II of FIG. 1 showing the above mentioned support and the gas tank removed from its housing in said support.

FIG. 3 is an axial sectional view of a gas lighter made according to another embodiment of the invention.

FIG. 4 is a cross sectional view of the lighter of FIG. 3.

It is pointed out that FIGS. 1 and 2 show only the mechanism of the lighter, its fuel tank and the elements which connect these parts together whereas the casing or external cover in which these elements are enclosed is not shown.

In the construction of FIGS. 1 and 2, the mechanism and the gas tank of the lighter are carried by a common support including a ring **1** and a side wall $1_a$ so that the whole constitutes a kind of cup-shaped structure in which is housed a removable gas tank **2**, whereas the mechanism of the lighter is mounted on the outer side of ring **1**.

The tank is in the form of a circular flat box, the peripheral wall of which fits against the inner wall of ring **1**. The gas outlet orifice **3** of said tank is provided in one of the side faces of this flat box. This orifice is controlled by a valve **5** the rod **4** of which extends substantially in the direction of the axis of the flat box. Of course, ring **1** and the peripheral portion of the tank instead of being of circular shape might be of oval or polygonal shape.

The mechanism of the lighter includes a push-piece **6** for actuating valve **5**, an igniting device which will be hereinafter described being controlled by the same push-piece **6**, and a burner **7**. This mechanism is mounted between the two wings **8** and **9** of a U-shaped piece having its bottom **10** fixed, for instance by welding, against the external face of ring **1**.

The igniting device, which, in this embodiment of the invention, is of the mechanical type, includes a ferrocerium flint **11** applied by a lever **12** subjected to the action of a spring **13** against a sparking-wheel **14** connected with push-piece **6** in such manner as to be rotated in the clockwise direction (FIG. 1) through a unidirectionally working device (such as a ratchet-wheel) when push-piece **6** is pivoted about its axis **15** in the direction of arrow F against the action of a return spring **16**.

According to the invention, the jet of sparks produced



by sparking-wheel **14** (and which issues from the lighter through an aperture provided for this purpose in the casing thereof, not shown) extends at least approximately in the same direction as the stream of gas under pressure flowing out from burner **7**, in such manner that, at the place where said jet and said stream meet together, they are at least approximately coaxial or parallel to each other. Thus, ignition is particularly reliable and furthermore clogging of the lighter by residues of flint **11** is avoided.

Furthermore, the burner should open very close to the level of the aperture through which the sparks issue from the casing, which permits of making use of the whole height of the flame.

Burner **7** may be constituted by a mere pipe which extends along the path of travel of the sparks and can be sent in the desired direction as shown by FIG. 1.

Burner **7** is connected with the outlet orifice of the fuel tank through a tube or conduit **17** starting from a bell-shaped piece **18** made of a resilient material (such as rubber) kept in position near the sidewall $1_a$ of the cup-shaped structure. When tank **2** is fitted in said cup-shaped structure **1**—$1_a$, bell-shaped piece **18** covers orifice **3** and the outer end of the rod **4** of valve **5**, thus constituting a gas tight connection between the outlet orifice **3** of the tank and tube **17** leading to burner **7**.

In order to control valve **5** from push-piece **6**, I make use of an element **19** which extends along the end wall $1_a$ of the cup-shaped structure and which is slidable thereon under the action of push-piece **6**. This element **19** is advantageously constituted by a sliding bar one of the ends of which is pivoted at **20** to push-piece **6** and the other end of which is of greater thickness at **21** so as to cooperate with the cam-shaped free end $22_a$ of a lever constituted by a resilient plate **22** fixed at its other end at **23** to the side wall $1_a$ of the cup-shaped structure, said plate **22** passing between said side wall $1_a$ and bell-shaped piece **18**. Bell-shaped piece **18** is fixed on resilient plate **22** by means of a rivet the head **24** of which constitutes, in bell-shaped piece **18**, rigid means for pushing in the rod **4** of valve **5**.

Lugs **25** and **26** formed by cutting small portions of side wall $1_a$ and bending said portions at right angles to said side wall serve to position and to guide elements **19** and **22** respectively.

Orifice **3** is located at the centre of a circular recess **27** provided in the side wall of the tank so as to form a bearing surface for the edge of bell-shaped piece **18**. On opposite sides of this circular recess **27** are provided radial recesses **28** and **29** forming a passage for elements **19** and **22** respectively and for a portion of tube **17** when reservoir **2** is fitted in position in ring **1**.

Tank **2** being thus fitted and kept in position in support **1**—$1_a$, the operation of the lighter takes place as follows.

When push-piece **6** is pivoted in the direction of arrow F about axis **15**, bar **19** is caused to slide along the side wall $1_a$ of the cup-shaped structure and its thickened end **21** is driven as a wedge between the end $22_a$ of resilient plate **22** and side wall $1_a$. This displacement moves plate **22** away from side wall $1_a$ and applies rivet head **24** against the end of valve rod **4** thus causing valve **5** to open. At the same time, the edge of bell-shaped piece **18** is tightly applied against the side wall of tank **2**. Gas flows out from tank **2** through orifice **3**, passes into bell-shaped piece **18** and thence through conduit **17** to burner **7**. During this pivoting movement about axis **14**, push-piece **6** has rotated sparking-wheel **14** so that the gas flowing out from burner **7** is immediately ignited. As long as push-piece **6** is kept in its lower position, valve **5** remains open. The flame is therefore maintained. When push-piece **6** is released, its return spring **16** returns it and therefore bar **19** into the initial positions shown by FIGS. 1 and 2, which enables the rivet head **24** located in the in-

side of bell-shaped piece 18 to return in its initial position close to the side wall $1_a$ of the cup-shaped structure under the effect of the resilient action of the wall of said bell-shaped piece and of resilient plate 22 which supports it. Valve 5 is closed by its own return spring and the lighter is ready for a new operation.

FIGS. 3 and 4 show another embodiment of the invention.

In this embodiment, fuel tank $2_a$ has its gas outlet orifice and the valve mounted therein located on the peripheral wall of the tank, the control rod of said valve being shown at $4_a$. Burner $7_a$ and the igniting device are carried by a common support 35 having its under surface located opposite said orifice and said valve.

Support 35 is pivoted with respect to tank $2_a$ about an axis 30 fixed with respect to the tank, a spring 31 interposed between tank $2_a$ and support 35 resiliently opposing movement of support 35 toward tank $2_a$. Conduit 36—37 which leads to burner $7_a$ opens into the under surface of support 35, opposite the gas outlet orifice of tank $2_a$. In order to obtain a gas tight connection between said orifice and conduit 36—37, I provide a resilient sleeve $18_a$, for instance of rubber or a similar material, having one of its edges fixed either to support 35 around conduit 36 or, as shown by the drawings, on a flange 42 surrounding the valve. The other edge of said sleeve $18_a$ is free and is applied either against the wall of the tank around the gas outlet orifice thereof or, as shown by the drawings, against the under wall of support 35 around conduit 36. The whole is arranged in such manner that, when a control push-piece $6_a$ is depressed, support 35 first pivots in the clockwise direction about axis 30 against the action of spring 31 so as to open the valve controlling the gas outlet orifice of tank $2_a$ before the igniting device is operated. During this movement, resilient sleeve $18_a$ is tightly compressed between the parts to be connected together whereby a gas tight connection is ensured.

A throttling member 38 is mounted in a portion of the gas conduit means 36—37 provided in support 35, so as to make it possible to reduce the flow rate of gas from said conduit means. Said throttling member 38 is a screw engaged in a threaded blind hole 43 provided in support 35 opposite rod $4_a$ and coaxially with respect thereto.

A portion 37 of the gas conduit means opens in the vicinity of the periphery of the bottom of the blind hole 43 whereas another portion 36 of said conduit means extends axially through part 38. Between said throttling part 38 and the bottom of blind hole 43 is interposed a disc 44 of plastic material (such as rubber) provided with a hole in its centre, opposite conduit 36. The bottom of blind hole 43 is made slightly concave so that the tightening of disc 44 is maximum at its periphery and thus prevents any gas leakage between part 38 and support 35.

In order to improve the gas tight connection between resilient sleeve $18_a$ and the portion of the under wall of part 38 surrounding the orifice of conduit 36, it is advantageous to provide a frusto-conical recess in said part 38 so that the top edge of sleeve $18_a$ is guided and centered in said frusto-conical recess during the pivoting movements of support 35 toward tank $2_a$.

To make it possible to move part 38, this part carries, integral therewith, a disc 39 having a milled edge which projects from the casing 40 of the lighter through slots provided therein.

Owing to the operation of this disc 39, it is possible, by compressing resilient disc 44, to reduce the flow of gas through conduit means 36—37.

As in the embodiment of the invention illustrated by FIGS. 1 and 2, sparking wheel 14 is mounted in such manner with respect to flint 11 that the point where the sparks are produced is located below the level at which burner $7_a$ opens, so that at the outlet of said burner the stream of gas is substantially parallel to the jet of sparks produced by the igniting device.



In order to connect sparking wheel 14 with control push-piece $6_a$, this push-piece is made rigid with a lever 32 which, at one of its ends, is pivoted at $32_a$ to an eccentric 33 for driving sparking-wheel 14 through a ratchet-wheel and, at its other end at $32_b$, is pivoted to one of the ends a link 34 the other end of which is pivoted at $34_a$ to support 35. A return spring 50 surrounding an axis 51 fixed with respect to support 35 bears on the one hand on this support and on the other hand against lever 32 so as to urge said lever always toward the position shown by the drawings.

There is fixed to push-piece $6_a$ a resilient plate 52 which, in the position of rest shown by the drawings, is resiliently applied against the inner wall of the casing of the lighter so as to cover an aperture 53 provided therein for the passage of the flame.

The lighter shown by FIGS. 3 and 4 works as follows.

When push-piece $6_a$ is depressed in the direction of the arrow, said push-piece first moves with support 35 due to the fact that spring 31 yields before spring 50 is deformed; the whole therefore pivots about axis 30 toward tank $2_a$. Support 35 drives valve rod $4_a$ toward the inside of tank $2_a$ so that gas can flow out from said tank and pass, through sleeve $18_a$ and conduit means 36—37, to burner $7_a$. When push-piece $6_a$ is further depressed (spring 50 now being deformed), resilient plate 52 is retracted from aperture 63 and sparking-wheel 14 is rotated in the clockwise direction. The spark jet produced by the friction of said sparking-wheel against flint 11 causes ignition of the gas flowing out from burner $7_a$. The flame passing through aperture 53 remains as long as push-piece $6_a$ is kept depressed. When push-piece $6_a$ is released, springs 50 and 31 return the parts to their initial positions shown by the drawings.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. A lighter of the type employing as fuel an inflammable gas, this lighter comprising in combination support means, a burner for discharging a stream of said gas into the atmosphere, said burner being carried by said support means, pyrophoric means for producing a jet of sparks carried by said support means, said pyrophoric means being arranged with respect to said burner so that said jet of sparks is at least substantially parallel to said stream at the place where said jet meets said stream, a fuel tank detachably assembled with said support means, said fuel tank being provided with an orifice in one wall thereof, a valve mounted in said orifice, a conduit carried by said support means, one end of said conduit opening into said burner, manual control means carried by said support means and operatively connected both with said valve and with said pyrophoric means for opening said valve and operating said pyrophoric means in response to a continuous displacement of said control means, and connecting means for connecting the other end of said conduit with said orifice in gas tight fashion when said tank is assembled with said support means and said control means is actuated to open said valve, said connecting means comprising a bell-shaped resilient piece movably carried by said support means, said conduit branching off at its last mentioned end from the inside of said bell-shaped piece, said bell-shaped piece being located opposite said orifice, when said tank is assembled with said support means, with the concavity of said bell-shaped piece turned toward said orifice, the manual control means being operatively connected with said bell-shaped piece to press the edge thereof against the outer wall of said trunk around said orifice when said control member is operated to open said valve.

2. An arrangement as defined in claim 1 in which said support means includes an elongated bar movable upon actuation of said control means toward said valve for opening the latter; and guide means on said one wall of said fuel tank for guiding said bar during the movement thereof.

3. A lighter according to claim 1 in which said tank is in the form of a box having one continuous peripheral wall and two lateral walls, said peripheral wall being detachably fixed to said support means, said orifice being provided in one of said lateral walls, said valve being movable in a direction at least substantially perpendicular to said lateral wall.

4. A lighter according to claim 1 in which said support includes a cup-shaped structure, said tank being in the form of a box fitting in said cup-shaped structure, said orifice being provided in the side wall of said box turned toward the side wall of said cup-shaped structure, said valve being movable in a direction at least substantially perpendicular to said side walls, and said manual control means includes a resilient plate carried by said bottom of said cup-shaped structure so that one end of said resilient plate is movable opposite said valve in said perpendicular direction, between said side walls of the cup-shaped structure and of the tank respectively, said resilient plate end carrying said bell-shaped piece, and a part slidable between said resilient plate and said side wall of said cup-shaped structure and operable from the outside of the lighter for moving said resilient plate toward said side wall of said tank.

5. A lighter of the type employing as fuel an inflammable gas, this lighter comprising in combination a fuel tank, support means movably guided with respect to said fuel tank, a burner for discharging a stream of said gas into the atmosphere, said burner being carried by said support means, pyrophoric means carried by said support means, said pyrophoric means being arranged with respect to said burner so that a jet of sparks emitted by said pyrophoric means is at least substantially parallel to said stream of gas at the place where said jet meets said stream, said fuel tank being provided with an orifice in one wall thereof, a valve mounted in said orifice, conduit means carried by said support mean, one end of said conduit means opening into said burner, said support means being arranged to cooperate with said valve so as to open it in response to a movement of said support means toward said tank, the other end of said conduit means opening into a surface of said support means turned toward said tank, manual control means carried by said support means for moving it toward said tank, said control means being operatively connected with said pyrophoric means to operate said pyrophoric means in response to a continuous displacement of said control means, and a resilient sleeve which is mounted to have one edge applied in gas tight fashion against said tank around said orifice, and to have its other edge tightly applied against said well of said support means around said other end of said conduit means in response to such a movement of said support means toward said tank.

6. A lighter according to claim 5 further comprising, in said conduit means, a resilient washer and an adjustable screw cooperating therewith to adjust the maximum flow rate of gas through said conduit means.

7. A lighter using gaseous fuel and comprising, in combination, support means; a burner for discharging a stream of gas into the atmosphere and being carried by said support means; igniting means carried by said support means for igniting said stream of gas; a fuel tank detachably assembled with said support means, said fuel tank being formed with an orifice in one wall thereof; a valve fixed to said tank in said orifice; a conduit carried by said support means and having one end communicating with said burner; manually operated control means carried by said support means and operatively associated with said valve for controlling the latter when said tank is assembled in said support means; and connecting means communicating with the other end of said conduit and cooperating with said control means for providing a gas tight connection between said orifice and said other end of said conduit when said control means is operated to open said valve and said control means being also operatively connected to said igniting means for actuating the latter while said valve is opened.



8. A lighter according to claim 7 in which said means for connecting the other end of said conduit with said orifice comprise a bell-shaped resilient piece movably carried by said support, said conduit branching off at its last mentioned end from the inside of said bell-shaped piece, said bell-shaped piece being located opposite said orifice when said tank is assembled with said support with the concavity of said bell-shaped piece turned toward said orifice, the manual control member being operatively connected with said bell-shaped piece to press the edge thereof against the outer wall of said tank around said orifice when said control member is operated to open said valve.

9. A lighter according to claim 7 in which said manually operable control means includes a member facing said fuel tank and movably guided with respect to said fuel tank and arranged to cooperate with said valve so as to open it in response to a movement of said member toward said tank, said other end of said conduit opening into said member, said connecting means for connecting the other end of said conduit with said orifice including a resilient sleeve which is mounted to have its one edge applied in gas tight fashion against said tank around said orifice, and to have its other edge tightly applied against said member around said other end of said conduit in response to such a movement of said member toward said tank.

10. A lighter according to claim 7 further including means in said conduit for adjusting the maximum flow rate of gas therethrough.

11. In a lighter using gaseous fuel, in combination, a casing having an upper wall formed with an aperture; burner means in said casing and having an outlet opening beneath and closely adjacent said aperture for emitting a stream of gas in one direction and substantially central through said aperture; pyrophoric means enclosed in said casing beneath said outlet opening of said burner means for emitting a jet of sparks outwardly substantially through the center of said aperture and in a direction substantially parallel to the direction of said stream of gas.

12. In a lighter using gaseous fuel, in combination, a casing having an upper wall formed with an aperture; burner means in said casing and having an outlet opening beneath and closely adjacent said aperture for emitting a stream of gas in one direction and substantially central through said aperture; closure means associated with said aperture and movable between a closed position in which said closure means closes said aperture and an open position; pyrophoric means enclosed in said casing beneath said outlet opening of said burner means for emitting a jet of sparks outwardly substantially through the center of said aperture and in a direction substantially parallel to the direction of said stream of gas; and manually operated control means operatively connected with said closure means and said pyrophoric means for actuating said pyrophoric means and for simultaneously moving said closure means from the closed to the open position thereof.

13. In a lighter using gaseous fuel, in combination, a casing having an upper wall formed with an aperture; burner means in said casing and having an outlet opening beneath and closely adjacent said aperture for emitting a stream of gas in one direction and substantially central through said aperture; resilient closure plate means associated with said aperture and movable between a closed position in which said resilient closure plate means closes said aperture and an open position, said resilient closure plate means being biased so as to tend to stay in said

closed position thereof; pyrophoric means enclosed in said casing beneath said outlet opening of said burner means for emitting a jet of sparks outwardly substantially through the center of said aperture and in a direction substantially parallel to the direction of said stream of gas; and manually operated control means operatively connected with said closure plate means and said pyrophoric means for actuating said pyrophoric means and for simultaneously moving said closure plate means from the closed to the open position thereof.

14. A lighter using gaseous fuel and comprising, in combination, a fuel tank having an end wall formed with an orifice; a valve mounted in said orifice and being movable between open and closed positions; support means adjacent said end wall and including movable means movable between an inactive position and an active position in which said movable means engages said valve to move the latter to the open position thereof; biasing means operatively connected to said movable means and tending to keep the latter in said inactive position thereof; conduit means carried by said movable means and having one end portion adjacent said valve and another end portion distant therefrom; a burner for discharging a stream of gaseous fuel in one direction and communicating said other end portion of said conduit means; pyrophoric means for emitting a jet of sparks, said pyrophoric means being carried by said movable means and arranged with respect to said burner so that said jet of sparks emitted by said prophoric means is substantially parallel to said stream of gaseous fuel discharged by said burner; resilient connecting means carried by said movable means and communicating with said one end portion of said conduit for providing a gas tight connection between said orifice and said one end portion of said conduit upon moving of said movable means to the active position thereof; and manually operable control means operatively connected to said movable means and said pyrophoric means for first moving said movable means against the force of said biasing means from the inactive to said active position thereof so as to open said valve and to simultaneously provided a gas tight connection between said orifice and said one end portion of said conduit and for then actuating said pyrophoric means.

15. In a lighter using gaseous fuel, in combination, a casing; fuel tank means removably mounted in said casing and including a valve having a tubular discharge member and a first abutment face about said discharge member and an elongated operating member slidably arranged in the interior of said tubular discharge member and protruding beyond the same and permitting flow of fuel gas through said tubular discharge member upon depression of said operating member; a fuel gas igniting and burner mechanism located in said casing and including abutment means spaced from and aligned along a common axis with said operating member and being formed with a second abutment face; a sleeve of elastically compressible material fixed to one of said means and surrounding said discharge member and abutting against said abutment face of the other of said means; a gas conduit communicating with the interior of said sleeve for guiding fuel gas emanating from said tubular discharge member of said valve to the burner of said combined igniting and burner mechanism; and operating means operatively connected to one of said two means for moving the same substantially in direction of said axis toward the other of said two means so that said abutment means engages said operating member to depress the latter and to simultaneously elastically compress said sleeve so as to open said discharge member while providing substantially gas-tight connection between said discharge member and said gas conduit.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,664,008 | Gessman | Dec. 29, 1953 |
| 2,836,044 | Zellweger | May 27, 1958 |
| 2,948,134 | Quercia | Aug. 9, 1960 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 476,085 | Great Britain | Dec. 1, 1937 |
| 694,810 | Great Britain | July 29, 1953 |