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Antxia Uribetxeberria

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(54) **DUAL FUEL PILOT LIGHT BURNER**

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B66F 3/44 (2006.01)
F23Q 9/00 (2006.01)

(52) **U.S. Cl.**
CPC ***F23Q 3/008*** (2013.01); ***B66F 3/44*** (2013.01); ***F23Q 9/00*** (2013.01)

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CPC F23D 14/04; F23D 14/06; F23D 14/10; F23D 14/105; F23Q 9/04
USPC 431/264, 354, 355; 126/226–228, 253, 126/401–414
See application file for complete search history.

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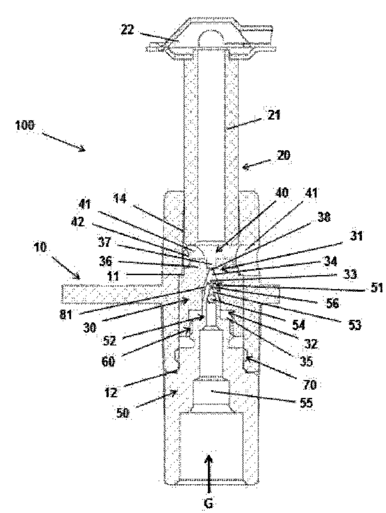
(57) **ABSTRACT**

A dual pilot light burner assembly suitable for working with a first type of gas or a second type of gas. According to one implementation the assembly includes a support, a regulating sleeve having a first nozzle, an air and gas mixing and intake chamber, and an injector having a second nozzle. The regulating sleeve is moveable with respect to the injector for placing the first supply nozzle in a first position with respect to the second supply nozzle for the delivery of the first type of gas to the pilot nozzle. The regulating sleeve moveable with respect to the injector for placing the first supply nozzle in a second position with respect to the second supply nozzle for the delivery of the second type of gas to the pilot nozzle. The regulating sleeve including structure accessible by an external tool and capable of receiving an end of the tool for use in moving the regulating sleeve between the first and second positions.

16 Claims, 8 Drawing Sheets



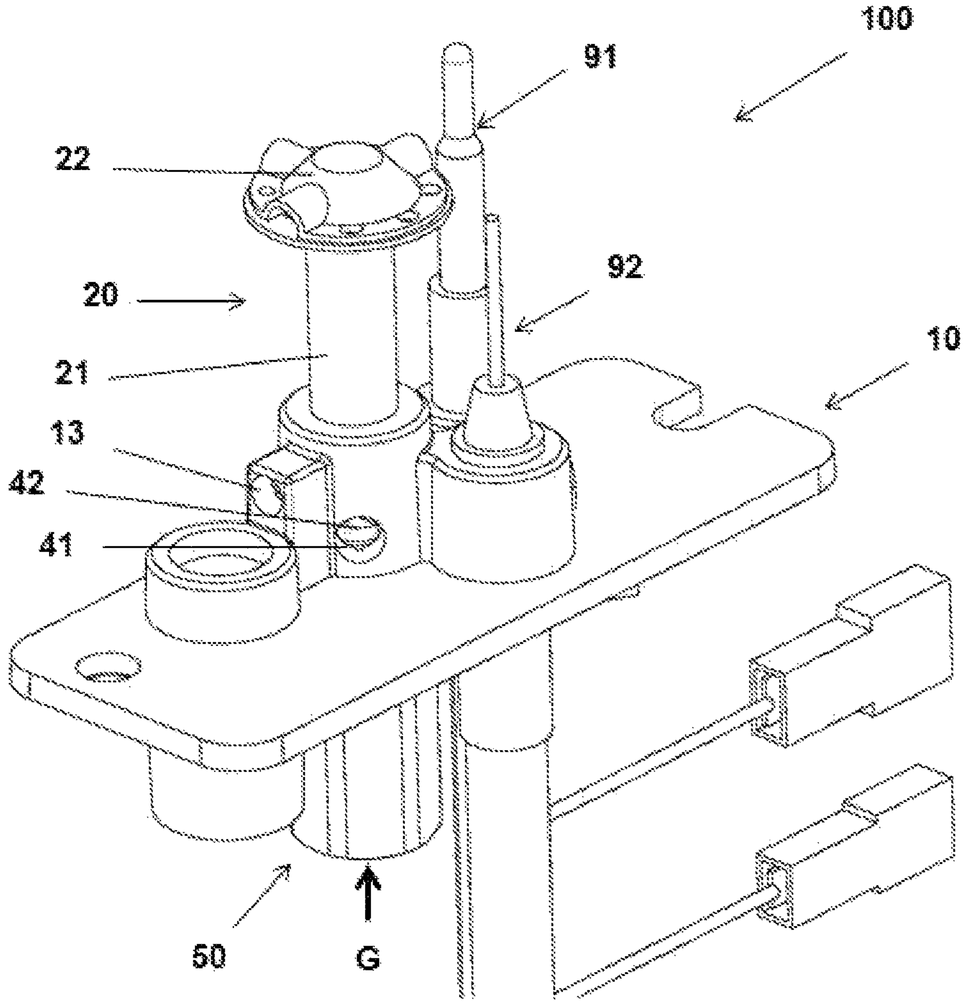


Fig. 1

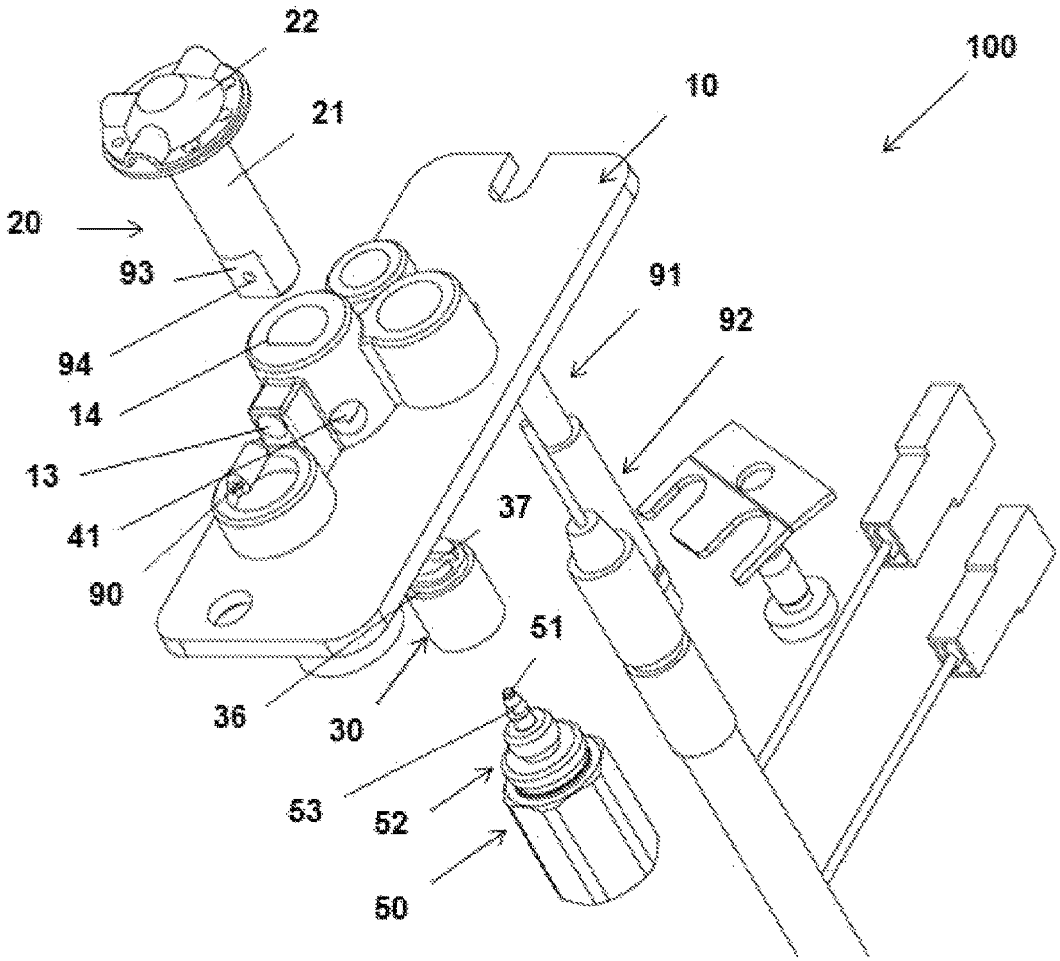


Fig. 2

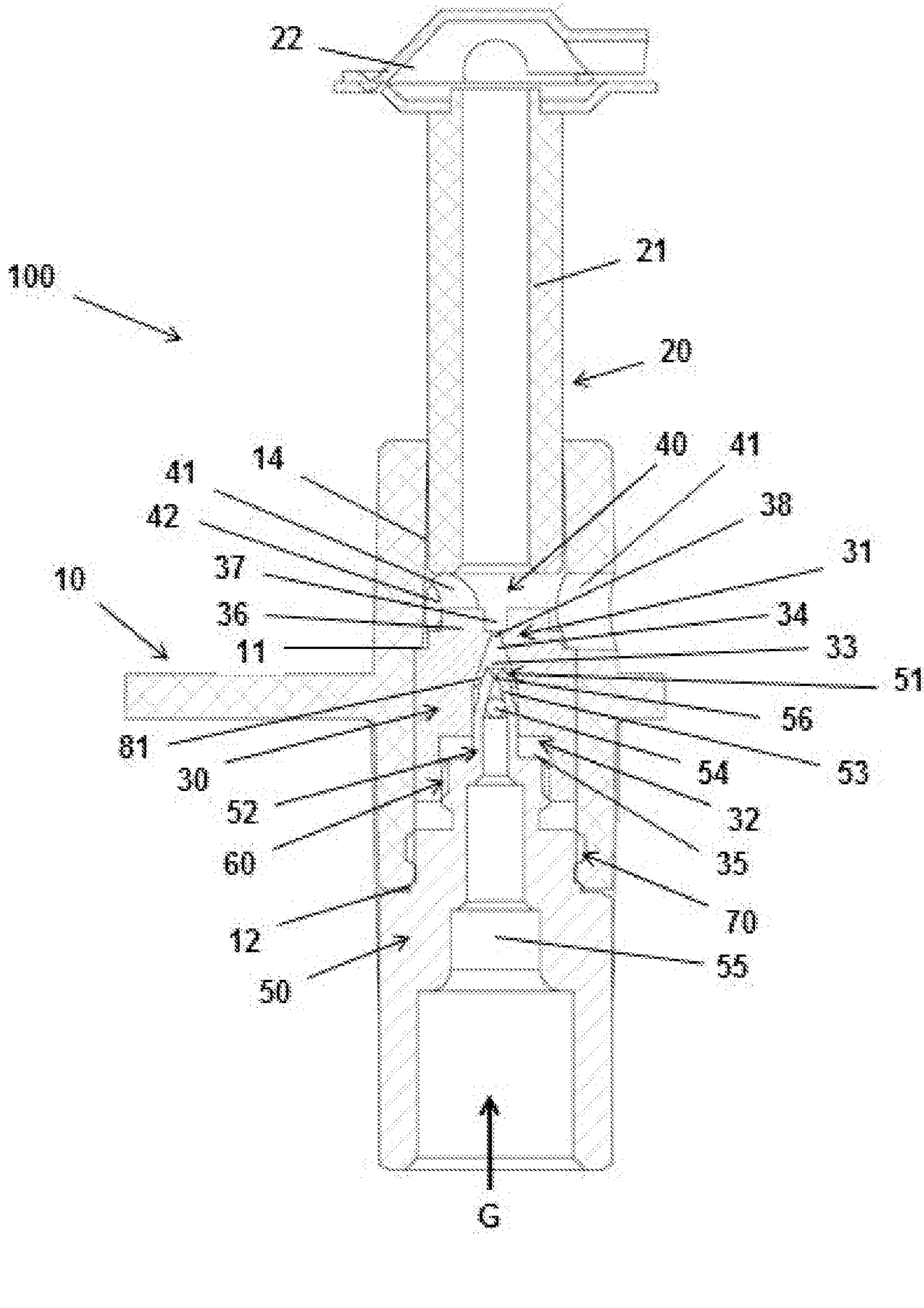

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Fig. 3

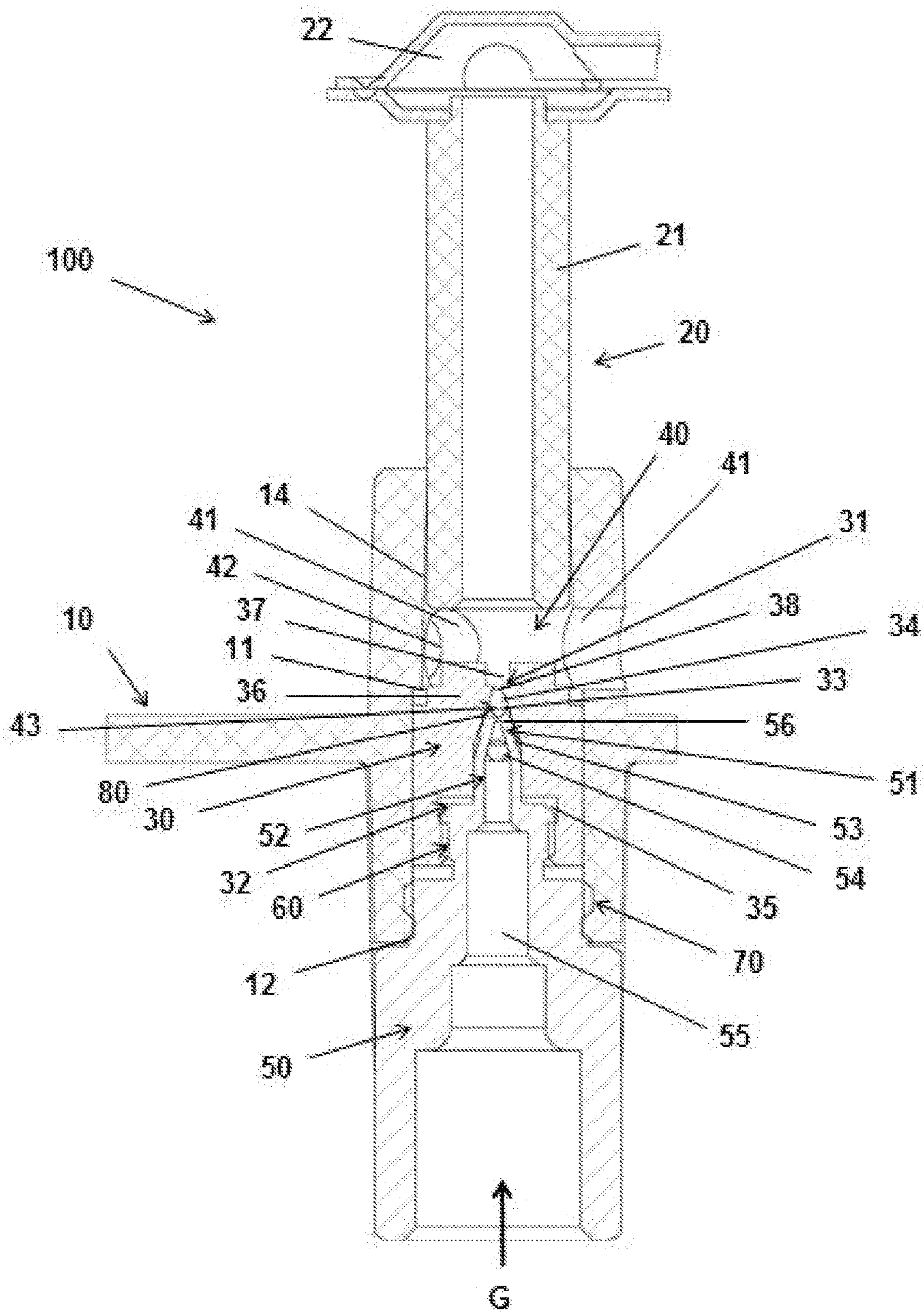
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Fig. 4

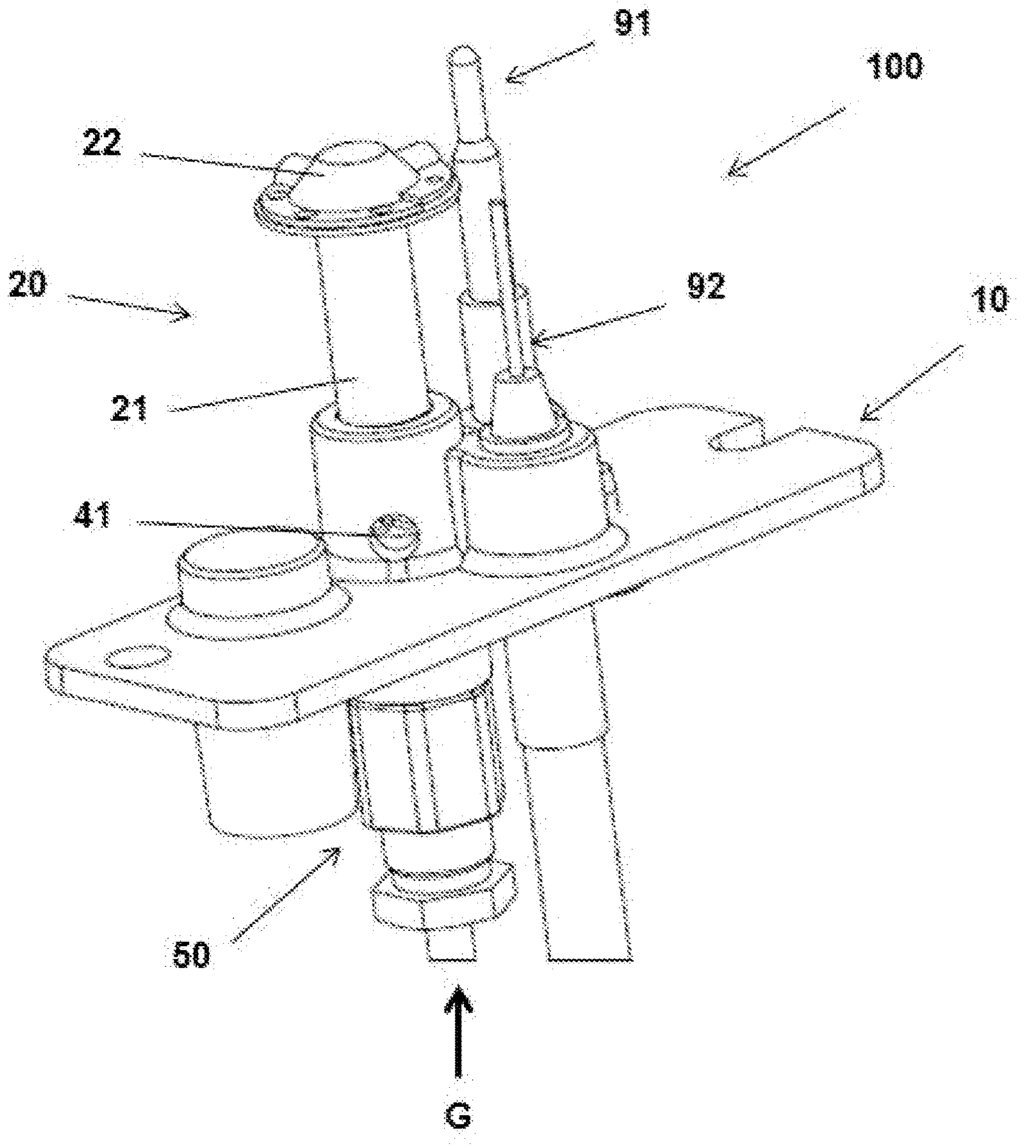

FIG. 5

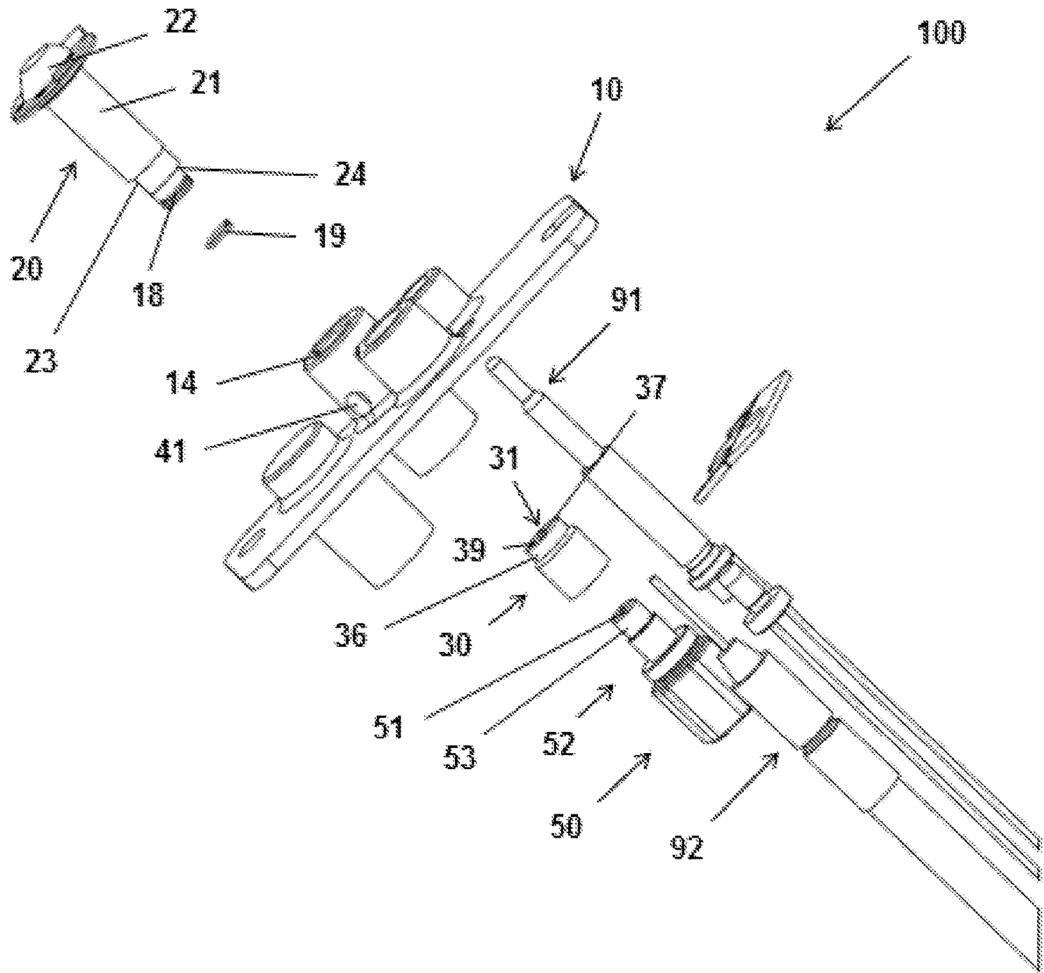

FIG. 6

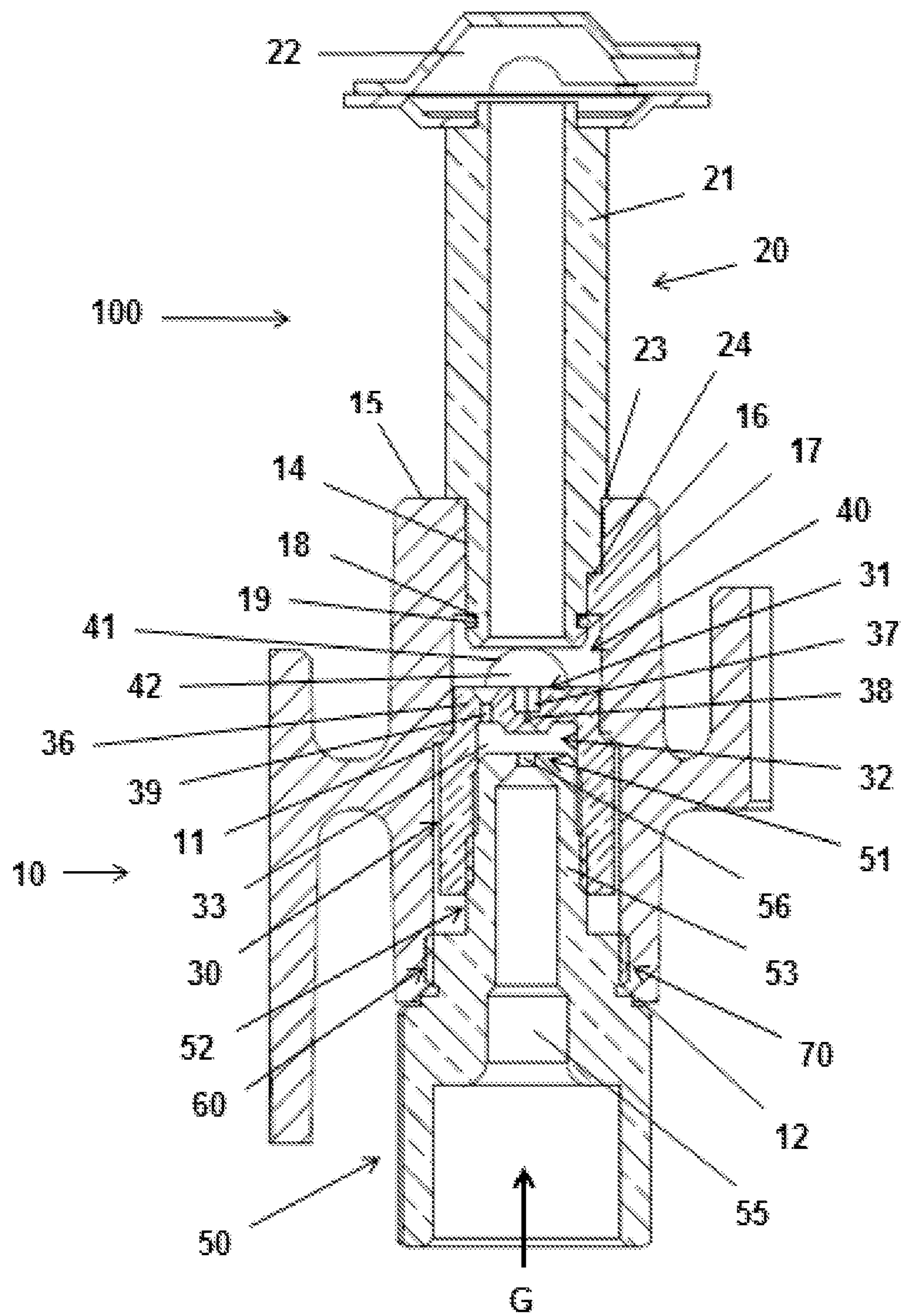
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FIG. 7

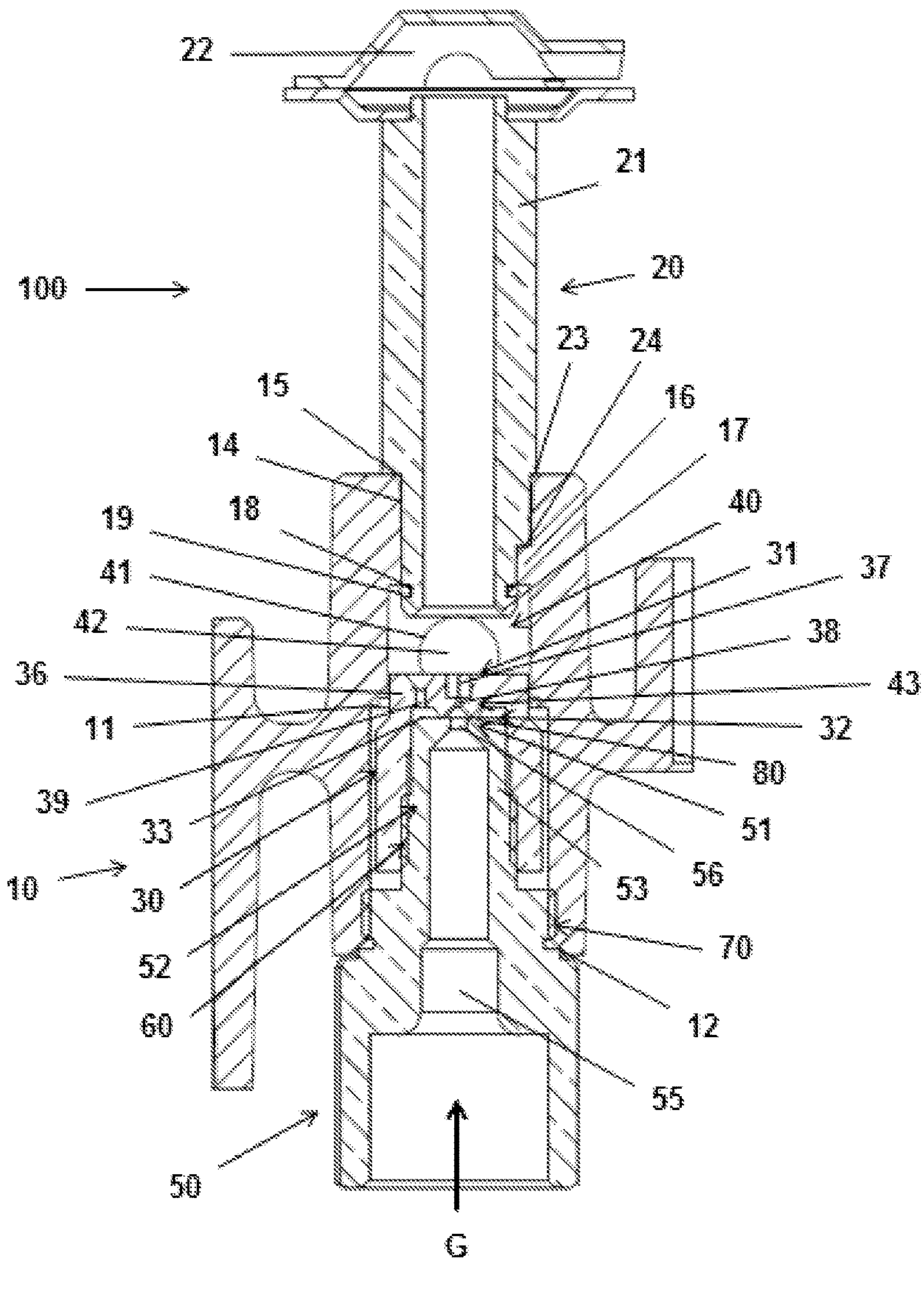
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FIG. 8

DUAL FUEL PILOT LIGHT BURNER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application relates to and claims the benefit and priority to Spanish Patent Application No. P201330885, filed Jun. 14, 2013.

TECHNICAL FIELD

The present invention relates to a dual pilot light burner suitable for dual household appliances which can be supplied with gaseous fuels of several types, particularly natural gas (NG) or liquefied gas (LPG).

BACKGROUND

Household appliances such as stoves including dual pilot light burners are known in the state of the art.

Pilot light burners are used to control turning on gas burners in a household appliance and for monitoring the flame of the burners. These pilot light burners comprise a gas inlet, a sleeve with a nozzle to provide an outlet for the gas, a chamber in fluid communication with the injector where the air and gas is mixed according to the type of gas used, and a burner head where the combustion of the mixture takes place, the burner head being adjacent to the gas burner in the household appliance. However, users commonly use different types of gas, natural gas (NG) and liquefied gas (LPG) being the most common. The pilot light burner is manufactured based on one type of gas, and if the user has any other type of gas in their home, parts in the pilot light burner must be changed in order to adapt it to the latter type of gas.

WO2011134725 A2 describes a pilot light burner, suitable for working with gaseous fuels of several types, particularly natural gas (NG) or liquefied gas (LPG), comprising a support, a regulating sleeve comprising a first supply nozzle to supply gas, an air and gas mixing and intake chamber in fluid communication with the regulating sleeve, and an injector operatively cooperating with the regulating sleeve, comprising a second supply nozzle to supply gas, the second nozzle being able to be located with respect to the first nozzle in a first position for supplying a first gas, and a second position for supplying a second gas.

SUMMARY OF THE DISCLOSURE

According to some implementations, a dual pilot light burner suitable for working with gaseous fuels of several types, such as for example, natural gas (NG) or liquefied gas (LPG), is provided that comprises a support, a regulating sleeve comprising a first supply nozzle to supply gas, an air and gas mixing and intake chamber in fluid communication with the regulating sleeve, and an injector operatively cooperating with the regulating sleeve, the injector comprising a second supply nozzle to supply gas, the second nozzle being able to be located with respect to the first nozzle in a first position for supplying a first gas, and a second position for supplying a second gas. In order to adapt the pilot light burner to one of the first and second gases the regulating sleeve is operated with a tool directly from outside pilot light burner to move the regulating sleeve and arranging the second nozzle in the first or second position with respect to the first nozzle.

The dual pilot light burner allows changing the type of gas without changing any parts and using a simple tool, such as, for example, a screwdriver from outside the burner. Unlike the dual pilot light burners of the state of the art, the pilot light burner does not require any intermediate actuation means incorporated in the pilot light burner assembly, but rather it is the very tool acting directly on the regulating sleeve, causing the movement thereof, and the movement to at least two possible positions regulates one type of gas or the other. An easy-to-operate dual pilot light burner is thus obtained with a minimum number of parts, and both the assembly time of the burner and its final cost are therefore reduced.

These and other advantages and features will become evident in view of the drawings and the detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a perspective view of a first embodiment of a dual pilot light burner.

FIG. **2** is an exploded perspective view of the dual pilot light burner of FIG. **1**.

FIG. **3** is an axial section view of the dual pilot light burner of FIG. **1** regulated for natural gas (NG).

FIG. **4** is an axial section view of the dual pilot light burner of FIG. **1** regulated for liquefied gas (LPG).

FIG. **5** shows a perspective view of a second embodiment of a dual pilot light burner.

FIG. **6** is an exploded perspective view of the dual pilot light burner of FIG. **5**.

FIG. **7** is an axial section view of the dual pilot light burner of FIG. **5** regulated for natural gas (NG).

FIG. **8** is an axial section view of the dual pilot light burner of FIG. **5** regulated for liquefied gas (LPG).

DETAILED DESCRIPTION

FIG. **1** shows a perspective view of a first embodiment of a dual pilot light burner **100**. FIG. **2** is an exploded perspective view of the dual pilot light burner of FIG. **1**.

The dual pilot light burner **100** for a household appliance, such as a stove for example, is suitable for working with gaseous fuels of several types, such as, for example, natural gas (NG) or liquefied gas (LPG). The dual pilot light burner **100** comprises a support **10** with a plurality of housings in which different elements of the burner **100** can be arranged. In the embodiment of the dual pilot light burner shown in FIGS. **1**, and **2**, there are arranged in the support **10** a regulating sleeve **30**, an injector **50**, a burner head **20**, the burner head **20** comprising a tubular duct **21** that is removably attached to the support **10**, and a pilot light nozzle **22** attached to an end of the tubular duct **21**, a safety thermocouple **91**, and a spark generator **92** such as a spark plug.

FIG. **3** is an axial section view of the dual pilot light burner of FIG. **1** regulated for natural gas (NG), and FIG. **4** is an axial section view of the dual pilot light burner of FIG. **1** regulated for liquefied gas (LPG). The regulating sleeve **30** comprises a first supply nozzle **31** to supply a first gas at one end, and the support **10** comprises an air and gas mixing and intake chamber **40** which is in fluid communication with the regulating sleeve **30** through the first nozzle **31**. The injector **50** comprises a second nozzle **51** at one end which allows the supply of a second gas. Both parts, the regulating sleeve **30** and the injector **50**, are operatively cooperating such that the nozzles **31** and **51** can be positioned relative to one another. Therefore, the second nozzle **51** can be positioned with respect to the first nozzle **31** in a first position in which the gas flow supplied to the air and gas mixing and intake chamber **40** is defined through the first nozzle **31**, and the second nozzle **51** can also be positioned in a second position in which the gas flow supplied to the air and gas mixing and intake chamber **40** is defined through the second nozzle **51**, the first nozzle **31** having no effect on the gas supply in the second position. Once the gas is taken into the chamber **40**, it is mixed with air coming from the outside through a port **41**, and the mixture is supplied to the burner head **20** which is in fluid communication with the air and gas mixing and intake chamber **40**. The gas and air mixture is supplied to the pilot light nozzle **22** through the tubular duct **21**, and combustion occurs.

With the configuration defined above, the dual pilot light burner **100** can be used with, for example, natural gas (NG) and with liquefied gas (LPG), natural gas (NG) being supplied through the first nozzle **31** and liquefied gas (LPG) being supplied through the second nozzle **51**. To perform the regulation, the regulating sleeve **30** is movable and the injector **50** is fixed, the regulating sleeve **30** being able to be operated with a tool, such as a screwdriver for example, directly from the outside without the cooperation of intermediate actuation means between the regulating sleeve **30** and the injector **50**. By moving the regulating sleeve **30**, and with it also moving the first nozzle **31**, the second nozzle **51** can be arranged in the first or second position, and natural gas (NG) or liquefied gas (LPG) can therefore be supplied with a simple operation, without changing any part, and with a minimum number of elements.

In the embodiment of the dual pilot light burner **100** shown in FIGS. **1-4**, the support **10** is a molded aluminum part with a plurality of housings projecting from the surface of the support **10**, wherein machining operations have been performed to thus allow locating the different elements of the burner **100** mentioned above. The burner head **20** is located in one of the housings, the tubular duct **21** being assembled from the upper portion of the support **10** through a port **14** made in the housing and going through the support **10**. The air and gas mixing and intake chamber **40** is located inside the housing, in the port **14**, which is a through hole. According to some implementations the chamber **40** comprises two air inlet ports **41**, the ports **41** extending through a wall of the housing.

According to other embodiments, the housing that forms the port **14** is not molded as a single part with the support **10**. In such embodiments the housing may constitute a separate part that is assembled on the support **10**.

To make a correct air and gas mixture in the air and gas mixing and intake chamber **40** according to if the gas supply is natural gas (NG) or liquefied gas (LPG), the amount of air is different, being lower in the case of natural gas (NG) and greater in the case of liquefied gas (LPG). The dual pilot light burner **100** allows the differentiated air supply into the chamber **40** due to the movement of the regulating sleeve **30**. The air regulation is performed when the regulating sleeve **30** is operated directly with a tool and is moved arranging the second nozzle **51** in the first or second position. As the regulating sleeve **30** is moved, the body of the regulating sleeve **30** interferes with the ports **41** of the chamber **40**, defining a passage **42** in the port **41** which is lower in the first position corresponding to natural gas (NG) than in the second position corresponding to liquefied gas (LPG). Therefore, and while at the same time as setting the dual pilot light burner **100** to natural gas (NG) or to liquefied gas (LPG) with the movement of the regulating sleeve **30**, the primary air needed in the air and gas mixing and intake chamber **40** is regulated.

The manner in which the regulating sleeve **30** and the injector **50** are placed and arranged to operatively cooperate in the embodiment illustrated in FIGS. **1-4** is described below. The injector **50** is a part with a central body, the outer surface of may be substantially polyhedral and the inside of which may be substantially cylindrical. According to some implementations the injector has a substantially conical-shaped end **52** projecting from an upper end of the central body, and in the outlet vertex **53** of which the second nozzle **51** is arranged. There is formed inside the injector **50** an inner duct **55** allowing fluid communication between a lower end of the injector **50** where the external gas G inlet is formed and the second nozzle **51**. To assemble the injector **50** in the support **10**, the injector **50** has a lower threaded area, and the port **14** also has a threaded area in its lower area, these threaded areas defining attachment means **70** between the injector **50** and the support **10** when they are attached to one another.

The regulating sleeve **30** may be a substantially cylindrical part comprising an inner duct **32**. The inner duct **32** in turn comprises a lower chamber **35** and an upper chamber **33**, the upper chamber **33**, according to some implementations being substantially conical-shaped. The upper chamber **33** is in fluid communication with the air and gas mixing and intake chamber **40** when the regulating sleeve **30** is assembled in the pilot light burner **100**. The first nozzle **31** of the regulating sleeve **30** is arranged at an upper end **36** of the regulating sleeve **30**, in an outlet vertex **34** of the upper chamber **33**.

The support **10** comprises at its through port **14** a certain diameter in the upper inlet area of the support **10**, and in the air and gas mixing and intake chamber **40** the port **14** increases in diameter, a horizontal internal wall which is a stop **11** being formed. The regulating sleeve **30** comprises a threaded area in the lower portion of the lower chamber **35**, in the wall thereof, and the injector **50** has at its end **52** and above the lower threaded area for attachment with the support **10**, an upper threaded area, these threaded areas defining attachment means **60** when they are attached to one another. The regulating sleeve **30** is arranged on the injector **50**, the threaded area of the lower chamber **35** of the regulating sleeve **30** is attached to the upper threaded area of the injector **50**, and the regulating sleeve **30** and the injector **50** are thus attached to one another.

Once the regulating sleeve **30** is assembled in the injector **50**, the assembly is located in the housing of the support **10** where the burner head **20** is located. The regulating sleeve **30** and injector **50** assembly is assembled in a fixed manner in the housing from the lower portion of the support **10** and through the through port **14** from the larger diameter. The injector **50**, with the regulating sleeve **30** incorporated therein, is located inside the housing of the support **10**, the lower threaded area of the injector **50** is attached to the threaded area of the through hole **14** forming the attachment means **70**, the injector **50** being able to move in the support **10** until the injector **50** is located on a stop **12** of the support **10**. The injector **50** is thus permanently fixed in the support **10**.

The regulating sleeve **30**, which is attached to the injector **50** by attachment means **60**, can move in the axial direction of the port **14** of the support **10** in both directions, and therefore both the regulating sleeve **30** and the injector **50** are operatively cooperating. The movement in both directions has stops, such that when one of the natural gas (NG) or liquefied gas (LPG) is to be regulated, the regulating sleeve **30** is operated with the tool turning which is capable of turning the regulating sleeve **30** in both directions. By turning the regulating sleeve **30** in the direction of opening with respect to the injector **50**, as the injector **50** is fixed in the support **10**, the regulating sleeve **30** moves in the threaded attachment **60** until the upper end **36** of the regulating sleeve **30** contacts the stop **11** of the support **10**. By turning the regulating sleeve **30** in the direction of closing with respect to the injector **50**, the regulating sleeve **30** moves in the threaded attachment **60** until the inner surface of the upper chamber **33** of the regulating sleeve **30** contacts the outer surface of the outlet vertex **53** of the end **52** of the injector **50**. The outlet vertex **53** and the upper chamber **33** may be substantially conical-shaped surfaces, but in this embodiment the conical-shaped surfaces have a different trailing angle, so contact between both surfaces occurs in a contact area **80** in a portion of each of the surfaces along the entire periphery thereof.

The regulating sleeve **30** can thus move inside the support **10** in a path located between the stop **11** with the support **10** in the upper area, and the contact area **80** with the injector **50** in the lower area. The stop **11** and the contact area **80** are positions corresponding to the first position and to the second position of the second nozzle **51**. The dual pilot light burner **100** can thus be regulated for natural gas (NG) or liquefied gas (LPG) in a simple manner by simply moving the regulating sleeve **30** directly with a tool against a contact area **80** and against a stop **11**, respectively. With this configuration of the dual pilot light burner **100**, the regulating sleeve **30** and the injector **50** are arranged coaxially with respect to one another, and in turn the assembly formed by both is arranged coaxially with respect to the port **14** of the support **10**.

FIGS. **5-8** show a second embodiment of the dual pilot light burner. FIG. **5** shows a perspective view of a second embodiment of a dual pilot light burner. FIG. **6** is an exploded perspective view of the dual pilot light burner of FIG. **5**. FIG. **7** is an axial section view of the dual pilot light burner of FIG. **5** regulated for natural gas (NG), and FIG. **8** is an axial section view of the dual pilot light burner of FIG. **5** regulated for liquefied gas (LPG). The features of the dual pilot light burner of this second embodiment, are similar to those of the dual pilot light burner of the first embodiment with differences that are described below.

The second nozzle **51** can be positioned with respect to the first nozzle **31** in a first position, in which the gas flow supplied to the air and gas mixing and intake chamber **40** is defined through the first nozzle **31**, and the second nozzle **51** can also be positioned in a second position, in which the gas flow supplied to the air and gas mixing and intake chamber **40** is defined also through the first nozzle **31**, the second nozzle **51** having no effect on the gas supply in the second position.

As shown in FIGS. **6**, **7** and **8**, the injector **50** is a part with a central body, the outer surface of which may be substantially polyhedral and the inside of which may be substantially cylindrical. The injector **50** has an end **52** projecting from the upper end of the central body which may be substantially cylindrical-shaped. In an outlet vertex **53** of the injector **50** there is arranged the second nozzle **51**. The regulating sleeve **30** may be a substantially cylindrical part comprising an inner duct **32**. The inner duct **32** in turn comprises, in its upper area near to the air and gas mixing and intake chamber **40**, an upper chamber **33**, the upper chamber **33** being, according to some implementations being substantially cylindrical-shaped. The regulating sleeve **30** comprises a threaded area in its lower portion, in a wall thereof, and the injector **50** has at its end **52**, and above the lower threaded area for attachment with the support **10**, an upper threaded area, these threaded areas defining attachment means **60** when they are threaded together.

When the natural gas (NG) or liquefied gas (LPG) dual pilot light burner **100** is to be regulated, the regulating sleeve **30** is operated with the tool that is capable of turning the regulating sleeve in both directions. By turning the regulating sleeve **30** in the direction of opening with respect to the injector **50**, as the injector **50** is fixed in the support **10**, the regulating sleeve **30** moves in the threaded attachment **60** until the upper end **36** of the regulating sleeve **30** contacts the stop **11** of the support **10**. By turning the regulating sleeve **30** in the direction of closing with respect to the injector **50**, the regulating sleeve **30** moves in the threaded attachment **60** until the inner surface of the upper chamber **33** of the regulating sleeve **30** contacts the outer surface of the outlet vertex **53** of the end **52** of the injector **50**. The outlet vertex **53** and the upper chamber **33** may be substantially flat-shaped surfaces, but in this embodiment the conical-shaped surfaces have a different trailing angle, so contact between both surfaces occurs in a portion of each of the surfaces, that is the contact area **80**.

In the first embodiment of the dual pilot light burner **100**, as shown in FIGS. **3** and **4**, the first nozzle **31** comprises a gas supply hole **38**, and the second nozzle **51** comprises an injection hole **56**. The injector **50** comprises at its end **52** one or more holes **54**. When the regulating sleeve **30** is positioned as shown in FIG. **3** for the delivery of natural gas (NG), the holes **54** communicate the inner duct **55** of the injector **50** with the duct **43** defined between the first nozzle **31** and the injector **50**. When the regulating sleeve **30** is assembled in the injector **50**, the end **52** of the injector **50** is housed in the inner duct **32** of the regulating sleeve **30**, forming a gap **81** between the outer surface of the end **52** and the inner surface of the inner duct **32**. When the regulating sleeve **30** contacts the injector **50** in the contact area **80**, the holes **54** are located before the contact area **80** in the direction of the gas flow.

When the dual pilot light burner **100** is set to natural gas (NG), and therefore the second nozzle **51** is located in the first position, the gas G introduced through the lower end of the injector **50** flows through the inner duct **55** and exits through both the injection hole **56** and through the holes **54** of the injector **50**. These gas flows are capable of finally exiting together through gas supply hole **38** of the first nozzle **31** of the regulating sleeve **30**, since the diameter of the gas supply hole **38** is greater than the diameter of the injection hole **56** of the second nozzle **51**. The gas flow towards the air and gas mixing and intake chamber **40** is therefore defined, in this first position of the second nozzle **51** corresponding to natural gas (NG), by the gas supply hole **38**.

When the dual pilot light burner **100** is set to liquefied gas (LPG), and therefore the second nozzle **51** is located in the second position, the regulating sleeve **30** contacts the injector **50** in the contact area **80**. In this situation, the gas introduced through the lower end of the injector **50** and flowing through the inner duct **55**, can only exit through the injection hole **56** of the second nozzle **51**, since the holes **54** are located below the contact area **80** in the direction of the gas flow. As explained above, duct **43** is defined between the first nozzle **31** and the injector **50**, specifically a path is defined, through which the gas flows, linking the injection hole **56** and the gas supply hole **38**. Since the diameter of the injection hole **56** is smaller than the diameter of the gas supply hole **38**, the gas flow exits through the gas supply hole **38** of the first nozzle **31** towards the air and gas mixing and intake chamber **40**, the gas flow in this second position of the second nozzle **51** therefore being defined by the injection hole **56**.

In the second embodiment of the dual pilot light burner **100**, as shown in FIGS. **7** and **8**, the first nozzle **31** comprises the gas supply hole **38**, and at least a second gas supply hole **39**, and the second nozzle **51** comprises the injection hole **56**. The first gas flow corresponding to natural gas (NG), supplied to the air and gas mixing and intake chamber **40**, is defined by the amount of gas flow passing through the gas supply hole **38** and the second gas supply hole **39** of the first nozzle **31**, corresponding to the first position of the second nozzle **51**, as shown in FIG. **7**. The injection hole **56** has a sufficient diameter to give way to natural gas flow (NG), the gas supply hole **38** and the second gas supply hole **39** being which define the natural gas flow (NG).

The second gas flow corresponding to liquefied gas (LPG), supplied to the air and gas mixing and intake chamber **40**, is defined by the duct **43**, defined in this second embodiment by the path that links the gas supply hole **38** of the first nozzle **31**, and the injection hole **56** of the second nozzle **51**, corresponding to the second position of the second nozzle **51**, as shown in FIG. **8**, the regulating sleeve **30** being displaced until it makes contact with the injector **50** at contact area **80**. The diameter of the gas supply hole **38** is smaller than the diameter of the injection hole **56**, the gas supply hole **38** defining the liquefied gas flow (LPG).

According to some implementations of the first and second embodiments, the burner head **20** is assembled once the injector **50** and the regulating sleeve **30** are assembled in the support **10**. To that end, the tubular duct **21** is first introduced in the port **14** of the support **10**, and the pilot light nozzle **22** is then assembled at the end of the tubular duct **21**.

In the first embodiment of the dual pilot light burner **100**, as shown in FIGS. **1** and **2**, to enable fixing the tubular duct **21** to the support **10**, the support **10** comprises an additional port **13** in a housing adjacent to the housing where the regulating sleeve **30**, the injector **50**, and the tubular duct **21** are located. This additional port **13** is substantially horizontal and communicates the outside with the port **14** of the support **10**, both ports **13** and **14** being substantially perpendicular with respect to one another. Fixing means **90**, a clamping screw for example, is housed in the additional port **13** such that it allows fixing the tubular duct **21** when it is housed in the port **14**. To establish the position of the tubular duct **21** in the port **14**, the tubular duct **21** comprises along the periphery thereof a planar area **93** with a notch **94** therein, and the port **14** has the same shape as the tubular duct **21** along the periphery thereof. The tubular duct **21** is thus positioned in the port **14** of the support **10**, and the fixing means **90** clamp the tubular duct **21** with the end thereof in the notch **94** of the planar area **93** of the tubular duct **21**.

In the second embodiment of the dual pilot light burner **100**, as shown in FIGS. **5-8**, to enable fixing the tubular duct **21** to the support **10**, the tubular duct **21** of the burner head **20** has a cylindrical shape and comprises a first protrusion **23** that fits in the outer surface of one end **15** of the port **14** of the support **10**. The tubular duct **21** also comprises a second protrusion **24** which fits in an internal protrusion **16** of the port **14**, the internal protrusion **16** being located between the air and gas mixing and intake chamber **40** and the end **15** of the port **14**. Close to a lower end **17** of the tubular duct **21**, is a peripheral groove **18**, the lower end **17** being located, when the tubular duct **21** is fixed to the support **10**, between the air and gas mixing and intake chamber **40** and the second protrusion **24** of the tubular duct **21**. A washer **19** is arranged in the groove **18**, which is for example a metal C-shaped washer with a circular section. When the tubular duct **21** is assembled to the support **10**, the washer **19** is compressed, and the lower end **17** of the tubular duct **21** can pass through the second protrusion **24**. And when the tubular duct **21** is disassembled from the support **10** with a small pull, the washer **19** is compressed, and allows the passage of the lower end **17**, and thus the tubular duct **21**. Thus, it can secure the tubular duct **21** to the support **10**, by fitting the washer **19** in the bottom of the second protrusion **24**.

When the injector **50** together with the regulating sleeve **30** and the burner head **20** are fixed in the support **10**, the air and gas mixing and intake chamber **40** is formed in the gap comprised between the tubular duct **21** and the regulating sleeve **30**, the primary air inlet ports **41** being arranged in the air and gas mixing and intake chamber **40**.

To enable correctly operating the regulating sleeve **30** with the tool from the outside in setting the dual pilot light burner **100** to natural gas (NG) or to liquefied gas (LPG), the regulating sleeve **30** comprises an indentation **37** on the outer surface of its upper end **36** which allows coupling the tool thereto.

In the first embodiment of the dual pilot light burner **100** shown in FIGS. **1-4**, the indentation **37** is a groove arranged at the outer surface of the end **36**. The groove allows coupling the end of a tool, such as, for example, a flat-head screwdriver. The gas supply hole **38** of the first nozzle **31** of the regulating sleeve **30**, that is located on the upper end **36** in the outlet vertex **34** of the upper chamber **33**, has the outlet in the indentation **37**.

In the second embodiment of the dual pilot light burner **100** shown in FIGS. **5-8**, the indentation **37** is also a groove arranged on the outer surface of the end **36**, the gas supply hole **30** having the outlet near the indentation **37**.

However, other indentations at the end **36** of the regulating sleeve **30** are possible, such as a radial or star-shaped indentation, for example.

Once the dual pilot light burner **100** is assembled, when it is to be set to natural gas (NG) or to liquefied gas (LPG), in the first embodiment of the dual pilot light burner **100**, the fixing means **90** is released, and the burner head **20** is removed, and in the second embodiment of the dual pilot light burner **100** the tubular duct **21** is pulled to remove the burner head **20**. Then, the inside of the housing of the support **10** is accessed through the port **14** with the end of the tool. The end of the tool is coupled to the indentation **37** of the regulating sleeve **30** and it is turned in either direction either until the upper end **36** of the regulating sleeve **30** contacts the stop **11** of the support **10** in the case of setting to natural gas (NG), or until the inner surface of the upper chamber **33** of the regulating sleeve **30** contacts the outer surface of the outlet vertex **53** of the end **52** of the injector **50** at the contact area **80**, in the case of setting to liquefied gas (LPG). The pilot light nozzle **22** can be a single-pilot or multi-pilot light nozzle corresponding to the number of burners served by the dual pilot light burner **100**. In the case of a single pilot light, the pilot light nozzle **22** can have a port that is axial with respect to the tubular duct **21** (not depicted in the drawings), such that the burner head **20** would not have to be removed to set the pilot assembly to the different types of gas. In this case, the regulating sleeve **30** would be accessed with the tool directly through the tubular duct **21**.

What is claimed is:

1. A dual pilot light burner assembly suitable for use with a first type of gas and a second type of gas, the assembly comprising:

a pilot nozzle adapted for providing a flame to a burner,

an air and gas mixing and intake chamber, an injector having at or near a distal end an injection hole, the injector having an inner duct that extends from a proximal gas inlet to the distal end, the injector having one or more holes situated proximal to the injection hole; and

a regulating sleeve located between the injector and air and gas mixing and intake chamber, the regulating sleeve including an inner duct with an upper chamber in fluid communication with the air and gas mixing and intake chamber via a gas supply hole located in a distal end of the upper chamber, the regulating sleeve moveable with respect to the injector for placing the gas supply hole in a first position with respect to the injection hole of the injector, when the regulating sleeve is in the first position the one or more holes of the injector and the injection hole are in fluid communication with the upper chamber of the regulating sleeve and the regulation of the first type of gas to the pilot nozzle is provided by the gas supply hole of the regulating sleeve, when the regulating sleeve is in the second position a portion of the distal end of the injector located between the injection hole and the one or more holes is in contact with a portion of the inner duct of the regulating sleeve and the regulation of the second type of gas to the pilot nozzle is provided by the injection hole of the injector, the gas supply hole of the regulating sleeve having a diameter that is greater than the diameter of the injection hole of the injector, the regulating sleeve comprising structure accessible by an external tool, the structure capable of receiving an end of the tool for use in moving the regulating sleeve between the first and second positions,

wherein the structure accessible by the external tool is an indentation for the attachment of the tool,

wherein the indentation is arranged on an outer surface of an upper end of the regulating sleeve, and

wherein the indentation is located at the outlet of the gas supply hole.

2. An assembly according to claim **1**, wherein the first type of gas is natural gas and the second type of gas is liquefied gas.

3. An assembly according to claim **1**, wherein each of the distal end of the injector and the upper chamber of the regulating sleeve is conical-shaped.

4. An assembly according to claim **1**, wherein the regulating sleeve and the injector operatively cooperate by a threaded engagement, the threaded engagement allowing an axial movement of the regulating sleeve in a first direction toward the first position and an axial movement of the regulating sleeve in a second direction opposite the first direction toward the second position.

5. An assembly according to claim **1**, further comprising a support with a port, the pilot nozzle attached to a burner head having a tubular duct therein, the burner head removably attached to the support, the regulating sleeve, the injector and the tubular duct being assembled in an axial arrangement in the port of the support, the air and gas mixing and intake chamber being arranged in the port between the regulating sleeve and the tubular duct.

6. An assembly according to claim **5**, wherein when in the first position a portion of the regulating sleeve is configured to abut a first stop located on the support.

7. An assembly according to claim **1**, wherein the air and gas mixing and intake chamber comprises one or more air inlet ports that provide a passage for letting air into the air and gas mixing and intake chamber, the area of the passage being determined by the position of the regulating sleeve such that when the regulating sleeve is in the first position the passage comprises a first area and when the regulating sleeve is in the second position the passage comprises a second area that is greater than the first area.

8. A dual pilot light burner assembly suitable for use with a first type of gas and a second type of gas, the assembly comprising:

a pilot nozzle adapted for providing a flame to a burner, an air and gas mixing and intake chamber; and

an injector having at a distal end an injection hole, the injector having an inner duct that extends from a proximal gas inlet to the distal end; and

a regulating sleeve located between the injector and air and gas mixing and intake chamber, the regulating sleeve including an inner duct with an upper chamber in fluid communication with the air and gas mixing and intake chamber via first and second gas supply holes located at a distal end of the upper chamber, the regulating sleeve moveable with respect to the injector for placing the first and second gas supply holes in first and second positions with respect to the injection hole of the injector, when the regulating sleeve is in the first position the injection hole is in fluid communication with the upper chamber of the regulating sleeve and the regulation of the first type gas to the pilot nozzle is provided by the first and second gas supply holes of the regulating sleeve, when the regulating sleeve is in the second position a portion of the distal end of the injector contacts the regulating sleeve so that the injection hole of the injector is in direct abutment with the first gas supply hole of the regulating sleeve and the regulation of the second type of gas to the pilot nozzle is provided by the first gas supply hole of the regulating sleeve, the first gas supply hole of the regulating sleeve having a diameter that is less than the diameter of the injection hole of the injector, the regulating sleeve comprising structure accessible by an external tool, the structure capable of receiving an end of the tool for use in moving the regulating sleeve between the first and second positions.

9. An assembly according to claim **8**, wherein the first type of gas is natural gas and the second type of gas is liquefied gas.

10. An assembly according to claim **8**, wherein the regulating sleeve and the injector operatively cooperate by a threaded engagement, the threaded engagement allowing an axial movement of the regulating sleeve in a first direction toward the first position and an axial movement of the regulating sleeve in a second direction opposite the first direction toward the second position.

11. An assembly according to claim **8**, further comprising a support with a port, the pilot nozzle attached to a burner head having a tubular duct therein, the burner head removably attached to the support, the regulating sleeve, the injector and the tubular duct being assembled in an axial arrangement in the port of the support, the air and gas mixing and intake chamber being arranged in the port between the regulating sleeve and the tubular duct.

12. An assembly according to claim **11**, wherein when in the first position a portion of the regulating sleeve is configured to abut a first stop located on the support.

13. An assembly according to claim **8**, wherein the air and gas mixing and intake chamber comprises one or more air inlet ports that provide a passage for letting air into the air and gas mixing and intake chamber, the area of the passage being determined by the position of the regulating sleeve such that when the regulating sleeve is in the first position the passage comprises a first area and when the regulating sleeve is in the second position the passage comprises a second area that is greater than the first area.

14. An assembly according to claim **8**, wherein the structure accessible by the external tool is an indentation for the attachment of the tool.

15. An assembly according to claim **14**, wherein the indentation is arranged on an outer surface of an upper end of the regulating sleeve.

16. An assembly according to claim **15**, wherein the indentation is located at the outlet of the first gas supply hole.

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