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(54) Title: GAS BURNER, IN PARTICULAR FOR A COOKING APPLIANCE

(57) Abstract: The present invention relates to a gas burner (1), in particular for a cooking appliance, of the type that comprises a flame divider (30) comprising a plurality of first apertures (31) to allow the gas to escape, which are so realized as to generate a flame that propagates outwards from the burner (1) in a substantially axial direction with respect to an axis (A- A) of the burner (1). The invention is characterized in that said first apertures (31) are so realized as to have an elongated shape when viewed from above.

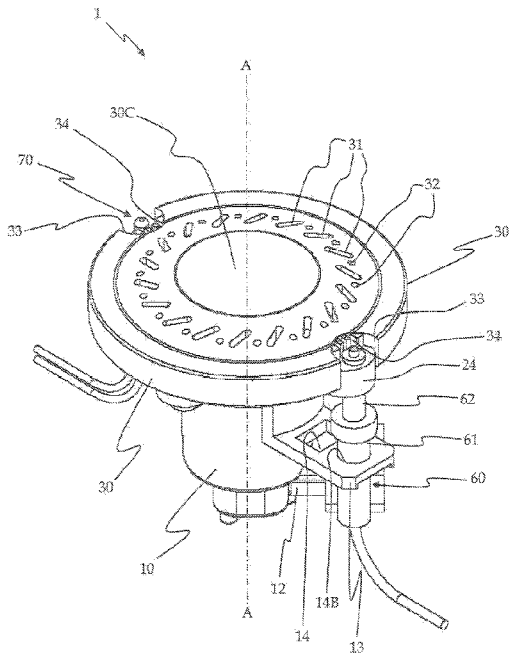

Fig. 1

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GAS BURNER, IN PARTICULAR FOR A COOKING APPLIANCE

DESCRIPTION

The present invention relates to a gas burner, in particular for a cooking appliance, according to the preamble of claim 1.

The present invention also relates to a cooking appliance comprising said gas burner.

At present, several typologies of cooking appliances for household use are available on the market, the most widespread one using one or more gas burners, wherein the amount of heat necessary for cooking food is generated through combustion of a gas appropriately mixed with air.

Such gas burners usually comprise a cup associated with supply means that supply gas to said burner.

Said supply means may comprise a Venturi effect chamber adapted to receive gas coming from an injector associated with a duct; in particular, the injector and/or the duct and/or the Venturi effect chamber may be either vertical, i.e. with their axis parallel to an axis of the burner cup, or horizontal, i.e. with their axis orthogonal to the axis of the burner cup.

Furthermore, the gas burners which are currently installed in household cooking appliances typically comprise:

- a body associated with said cup and comprising said Venturi effect chamber;
- a flame divider and/or cap associated with said body in such a way as to allow the gas to escape through a plurality of apertures.

Usually said body and flame divider and/or cap are positioned on the cooking top and use the air above the cooking top as primary air to be mixed with the gas.

The body is usually made of die-cast aluminium, while the flame divider is usually made of enamelled cast iron (or brass alloy or steel) and acts as a body closing element.

Known burners typically propagate a flame known as "crown flame"; a "crown flame" is a flame with a substantially radial direction of propagation, i.e. it

propagates outwards from the gas burner in a substantially radial direction with respect to the burner axis, and therefore in a direction which is substantially tangential to a visible surface of the cooking top. Said "crown flame", when emitted at an insufficient height above the cooking top, may cause low-O_2 combustion, resulting in the generation of a high level of unburnt products (CO and NO_x); in addition, due to the thermal content of the flame, it may lead to deformation and/or blackening of the portion of the cooking top around the burner.

Document No. EP1934532 in the name of the present Applicant discloses a burner comprising a body, wherein the flame divider also acts as a cap and is adapted to generate a "carpet flame", i.e. a flame that propagates outwards from the gas burner in a substantially axial direction with respect to the axis of the gas burner, and therefore in a direction which is substantially orthogonal to the visible surface of the cooking top.

As a result, document EP1934532 ensures all the advantages that distinguish a carpet flame from a crown flame, including optimal gas efficiency.

A carpet flame may be a total carpet flame or a perimetric carpet flame, depending on whether it covers a geometric figure (generally a circle) entirely or it covers just the peripheral portion of said geometric figure (generally a circular crown).

Also in the case of a perimetric carpet flame, it has been thought of providing a plurality of concentric rows of apertures adapted to generate a "carpet flame", in particular for the purpose of optimally heating also the central portion of the base of a cooking vessel positioned over the gas burner.

However, in such solutions the making of the plurality of apertures adapted to generate a "carpet flame" causes some problems, which are mainly due to the fact that only the outermost apertures can be adequately reached by the secondary air necessary for attaining an optimal gas combustion.

In fact, the flame emitted from the outermost apertures of the flame divider or cap adapted to generate a "carpet flame" creates a sort of barrier against secondary air, which, as a consequence, will not properly reach those apertures

which are closer to the centre of the flame divider or cap.

This inevitably implies a low-O_2 combustion, resulting in the generation of a high level of unburnt gases.

It has also been noticed that, in the burners known in the art, some difficulty is encountered in having the gas flow adequately to apertures located near an external edge of the flame divider, i.e. those apertures which are farthest from a central area of said flame divider; this occurs, in particular, when the carpet flame is a perimetric one.

This problem also inevitably leads to poor gas efficiency and low-O_2 combustion, resulting in the generation of a large quantity of unburnt gases.

Furthermore, it has also been noticed that known burners have a few additional drawbacks, arising from the fact that the cup can only be coupled to the burner body with much difficulty.

As a matter of fact, the user of such burners generally has no technical skills, and inevitably has trouble coupling the cup to the burner body, when necessary.

This difficulty is further amplified by the fact that the burner body may have to be separated from the cup quite often, e.g. in order to accurately and thoroughly clean such components.

One should also take into account that a wrong positioning of the burner body on the cup may cause the burner to operate incorrectly and may make it impossible to properly associate a cap or a pan supporting grate with said burner body. This may result in the risk of serious damage to both the user and the environment around the burner.

A further drawback is that known burners typically have components which are difficult to clean by a user, since their geometry is excessively complex.

In addition, the making of the plurality of apertures adapted to generate a "crown flame" or a "carpet flame" gives rise to several problems, mainly because a special drilling operation must be carried out in order to make said plurality of apertures. This inevitably involves longer times and higher costs for manufacturing the entire burner.

It should be pointed out that the technical solution described in EP1934532 can

only be conveniently used when the flame divider is quite thin, e.g. like the one employed in the preferred embodiment, which uses a metal sheet.

In this frame, it is the main object of the present invention to provide a gas burner, in particular for a cooking appliance, and an associated cooking appliance which are so realized as to overcome the drawbacks of prior-art solutions.

In particular, it is one object of the present invention to provide a gas burner which is so realized as to allow to obtain optimal gas efficiency while at the same time reducing production costs.

It is another object of the present invention to provide a gas burner which is so realized as to allow secondary air to adequately reach the cap apertures created in order to allow the gas to escape and generate a "carpet flame", in particular those apertures which are located in the proximity of an external edge of the burner and which are farthest from a central area of said burner.

It is a further object of the present invention to provide a gas burner which is so realized as to ensure optimal gas efficiency, i.e. so that also the gas can adequately reach all the cap apertures created in order to allow the gas to escape and generate a "carpet flame", in particular those apertures which are located in the proximity of an external edge of the cap and which are farthest from a central area of said cap.

It is a further object of the present invention to provide a gas burner which is so realized as to allow the cup to be coupled to the burner body quickly and without difficulty, even by users without any specific technical skills.

It is a further object of the present invention to provide a gas burner which is so realized as to ensure a safe coupling between the cup and the burner body and to prevent any burner malfunction.

It is another object of the present invention to provide a gas burner which so realized as to include removable components, so that the cooking top can be accurately cleaned after removing said components.

It is a further object of the present invention to provide a gas burner which is so realized as to facilitate the making of the plurality of apertures adapted to

generate the flame, resulting in shorter times and lower costs for manufacturing the entire burner.

Said objects are achieved by the present invention through a gas burner, in particular for a cooking appliance, and an associated cooking appliance incorporating the features set out in the appended claims, which are intended to be an integral part of the present description.

Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 is a perspective view of a gas burner, in particular for a cooking appliance, according to the present invention;
- Fig. 2 is a top view of the gas burner of Fig. 1;
- Fig. 3 is a perspective view of a possible variant of the gas burner of Fig. 1;
- Fig. 4 is a top view of the variant of Fig. 3;
- Fig. 5 is a sectional side view of the gas burner of Fig. 1;
- Fig. 6 is a sectional side view of the gas burner according to the present invention;
- Fig. 7 is a sectional side view of a detail of the burner of Fig. 6;
- Fig. 8 is an exploded perspective view of another embodiment of the burner according to the present invention;
- Fig. 9 is an exploded perspective view of a further embodiment of the burner according to the present invention;
- Fig. 10 is a sectional side view of the burner of Fig. 8.

Referring now to the annexed drawings, reference numeral 1 designates as a whole a gas burner, in particular for a cooking appliance, according to the present invention.

Said burner 1 comprises a cup 10 associated with supply means 11, 12 for supplying gas to said burner 1.

Preferably, said supply means comprise an injector 11 delivering gas coming from a duct 12.

In the annexed drawings, the duct 12 is positioned substantially horizontally, i.e.

with its axis substantially orthogonal to an axis A-A (visible in Figs. 1 and 2) of the burner 1; however, it may also be positioned vertically, i.e. with its axis parallel to the axis A-A.

It must be pointed out that in the annexed drawings the duct 12 is shown as realized in one piece with said cup 10; it is however clear that said duct 12 may also be provided as a body distinct from the cup 10, and then be associated therewith through known fastening means (not shown in the annexed drawings).

In particular, the burner 1 comprises a cup 10 and a burner body 20 (shown, for example, in Figs. 5, 6, 8, 9 and 10), associated with said cup 10.

The duct 12 and the injector 11 may be positioned substantially horizontally, i.e. with their axis substantially orthogonal to the axis of the burner 1, or they may also be positioned vertically, i.e. with their axis parallel to an axis A-A (visible in Fig. 1) of the burner 1.

It must be pointed out that, for the purposes of the present invention, the terms "vertical", "horizontal", etc. are used with reference to a burner 1 installed on a cooking top PC.

The burner 1 further comprises a flame divider 30 associated with said burner body 20 and comprising a plurality of first apertures 31 to allow the gas to escape, which are so realized as to generate a "carpet flame", i.e. a flame (not shown in the drawings) that propagates outwards from the burner 1 in a substantially axial direction with respect to the axis A-A of the burner 1.

It is clear from the above description that said first apertures 31 are so realized as to extend substantially parallel to the axis A-A of the burner 1.

In accordance with the present invention, said first apertures 31 are so realized as to have an elongated shape when viewed from above (i.e. when viewed in a substantially axial direction with respect to the axis A-A of the burner 1).

In particular, in the representation shown in the annexed drawings, said first apertures 31 are so realized as to have a substantially elliptic shape; it is however apparent that the elongated shape of said first apertures 31 may be different, e.g. substantially rectangular.

The particular shape of said first apertures 31 turns out to be especially

advantageous because they can be made easily and comfortably and because they can ensure optimal gas combustion.

In fact, the particular shape of the first apertures 31 allows to avoid the formation of a sort of barrier against secondary air, which can thus reach even the innermost portions of the flame divider 30, particularly in the presence of a food cooking container (not shown) placed over the burner 1, which otherwise might contribute to hindering the flow of secondary air.

This inevitably implies a high-O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases, without having to make complex and costly modifications to the realization of the burner 1.

As can be seen in Fig. 2, the flame divider 30 of the burner 1 is preferably so realized as to have a substantially circular shape when viewed from above.

It can also be seen in said drawing that each first aperture 31 comprises a first portion 31a, a second portion 31b and an intermediate portion 31c, said second portion 31b being closer to a central area 30C of the flame divider 30 than said first portion 31a.

As a consequence, each first aperture 31 is oriented in a substantially radial manner on said flame divider 30.

Preferably, each first aperture 31 is inclined relative to a radius R (in Fig. 2 a couple of radii R are indicated by dashed lines) of said flame divider 30; this means that said first portion 31a and second portion 31b of each first aperture 31 lie each on a different radius R. In the annexed drawings one can see that each first aperture 31 is not much inclined relative to the radius R, preferably not so much as to make a second axis A2 of each first aperture 31 perpendicular to the radius R.

Furthermore, in the annexed drawings said first apertures 31 are shown to be inclined in the same direction at substantially the same angle relative to said radius R; it is however clear that the inclination of each aperture 31 may also be different.

When the layout and/or the orientation and/or the geometry of the first apertures 31 are such as to not allow for an adequate propagation of the flame

between the first apertures 31, the burner 1 according to the present invention advantageously also comprises a plurality of second apertures 32, which are smaller than the first apertures 31 and offset therefrom.

In particular, each second aperture 32 is positioned between a pair of said first apertures 31; in addition, said second apertures 32 have a substantially circular shape when viewed from above.

Preferably, each second aperture 32 is positioned in the proximity of:

- a first portion 31a of a first aperture 31;
- a second portion 31b of a next first aperture 31.

In a preferred embodiment, the flame divider 30 comprises profiled portions 33 adapted to allow room for at least one ignition spark plug 60 and/or at least one thermocouple 70; in particular, as can be seen in Fig. 1, said at least one ignition spark plug 60 and at least one thermocouple 70 are associated with the cup 10 of the burner 1, e.g. through a bracket 13 preferably made as one piece with the cup 10 (Fig. 1 only shows the bracket 13 that allows the ignition spark plug 60 to be associated with the cup 10 of the burner 1).

Between the ignition spark plug 60 and/or the thermocouple 70 and the first apertures 31 and/or the second apertures 32 neighbouring to said ignition spark plug 60 and/or said thermocouple 70, ducts 34 are obtained which are adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes. Said ducts 34 first allow the flame to propagate from the ignition spark plug 60 towards the first apertures 31 and the second apertures 32, and then they allow the flame to reach the thermocouple 70 from the first apertures 31 and the second apertures 32.

As can be seen in particular in Fig. 5, the burner 1 also comprises a burner body 20 associated with said cup 10 and comprising a Venturi effect chamber 21, in particular said chamber 21 being positioned substantially coaxial to said injector 11.

In the annexed drawings, said Venturi effect chamber 21 extends substantially vertically in a central position inside the burner body 20; it is clear that the Venturi effect chamber 21 may also extend in a substantially horizontal direction

or be positioned otherwise inside the burner body 20.

The burner 1 is so shaped as to allow primary air taken from above the cooking top PC to be fed to the Venturi effect chamber 21. For this purpose, the cooking top PC and the burner body 20 are mutually so arranged as to create passages that put the volume above the cooking top PC and around the burner 1 in communication with the inside of the cup 10.

The burner 1 further comprises a flame divider 30 associated with said burner body 20 and comprising a plurality of first apertures 31 to allow the gas to escape, which are so realized as to generate a "carpet flame", i.e. a flame (not shown in the drawings) that propagates outwards from the burner 1 in a substantially axial direction with respect to the axis A-A of the burner 1, a compartment (designated as a whole by reference numeral 22) being obtained between the burner body 20 and the flame divider 30 to allow the gas to flow from the chamber 21 to said plurality of apertures 31.

It is clear from the above description and from the sectional view of the burner 1 shown in Fig. 5 that said first apertures 31 are so realized as to extend substantially parallel to the axis A-A of the burner 1.

The first apertures 31, which are directly obtained in the flame divider 30, cause the flame divider 30 to act also as a cap, not only as a top cover for the burner body 20, thus clearly distinguishing the burner 1 according to the present invention from traditional "cup" burners, wherein the flame dividing means are obtained in the outer perimeter of the burner body (precisely at the external interface between the body and the cap).

It should be noted that the burner body 20 and the flame divider 30 are typically realized as separate elements to be then associated with each other through methods known in the art.

As can be seen in particular in Fig. 2, the burner body 20 and the flame divider 30 lie substantially entirely over a cooking top PC of a cooking appliance (not shown in the drawings).

According to the present invention, said compartment 22 comprises:

- a substantially straight first section 22a, said first section 22a being

positioned horizontally on top of the Venturi effect chamber 21;

- a second section 22b substantially directed downwards, in particular towards the cup 10;
- a third section 22c substantially directed upwards, in particular towards the flame divider 30.

It is clear that the above-mentioned characteristics of the compartment 22 specifically refer to a sectional side view of the burner 1, in particular of the compartment 22.

Said compartment 22 is shaped substantially like a sickle with the blade turned upwards, in particular, when viewing a side section of the compartment 22, starting from the axis A-A and extending towards the outside of the burner 1; in substance, the shape of the compartment 22 is similar to that of a question mark laid down (i.e. substantially horizontal).

Advantageously, the cross-sectional area of the compartment 22 grows larger starting from the first section 22a to the second section 22b and to the third section 22c.

Preferably, the compartment 22 has a shape substantially corresponding to the shape of the top of the burner body 20 and of the underside of the flame divider 30, in that said compartment 22 is obtained in the space between the burner body 20 and the flame divider 30.

As a result, in order to obtain the aforementioned shape of the compartment 22, the burner body 20 comprises a substantially U-shaped housing 23 that surrounds the upper portion of the Venturi effect chamber 21, and the flame divider 30 comprises a wall 30P that protrudes under the flame divider 30 towards said housing 23. A function of said housing 23 is to create an expansion chamber for the purpose of obtaining a constant and regular gas outflow. The Applicant has experimentally verified that the overall shape of the compartment 22 is such as to ensure optimal gas mixing and outflow speed.

It is apparent from the above description that the particular shape of the compartment 22 allows to provide a burner 1 which is so realized as to allow the gas to adequately reach the first apertures 31 of the flame divider 30, said first

apertures 31 being adapted to allow the gas to escape and generate a "carpet flame". In fact, thanks to the particular shape of the compartment 22, the gas is already conveyed at the exit of the Venturi effect chamber 21 towards the first apertures 31 in a safe and accurate manner.

As a result, said shape of the compartment 22 allows to ensure optimal efficiency from gas combustion along with lower production costs of the burner 1.

The cup 10 and the burner body 20 may then comprise fastening means 40, 50 (visible in Fig. 5), which allow said components to be mutually coupled.

As can be seen in Fig. 2, the first apertures 31 of the flame divider 30 are so realized as to have an elongated shape when viewed from above (i.e. when viewed in a substantially axial direction with respect to the axis A-A of the burner 1).

In particular, in the representation shown in the annexed drawings, said first apertures 31 are so realized as to have a substantially elliptic shape; it is however apparent that the elongated shape of said first apertures 31 may be different, e.g. substantially rectangular and, preferably, with bevelled corners.

The particular shape of said first apertures 31 turns out to be especially advantageous because they can be made easily and comfortably and because they can ensure optimal gas efficiency.

In fact, the particular shape of the first apertures 31 allows to avoid the formation of a sort of barrier against secondary air, which can thus reach even the innermost portions of the flame divider 30, particularly in the presence of a food cooking container (not shown) placed over the burner 1, which otherwise might contribute to hindering the flow of secondary air.

As a consequence, also the particular shape of the first apertures implies a high-O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases, without having to make complex and costly modifications to the realization of the burner 1.

As can be seen in Fig. 2, the flame divider 30 of the burner 1 is preferably so realized as to have a substantially circular shape when viewed from above.

It can also be seen in said drawing that each first aperture 31 comprises a first

portion 31a, a second portion 31b and an intermediate portion 31c, said second portion 31b being closer to a central area 30C of the flame divider 30 than said first portion 31a.

As a consequence, each first aperture 31 is oriented in a substantially radial manner on said flame divider 30.

Preferably, each first aperture 31 is inclined relative to a radius R (in Fig. 2 a couple of radii R are indicated by dashed lines) of said flame divider 30; this means that said first portion 31a and second portion 31b of each first aperture 31 lie each on a different radius R. In the annexed drawings one can see that each first aperture 31 is not much inclined relative to the radius R, preferably not so much as to make a second axis A2 of each first aperture 31 perpendicular to the radius R.

Furthermore, in the annexed drawings said first apertures 31 are shown to be inclined in the same direction at substantially the same angle relative to said radius R; it is however clear that the inclination of each aperture 31 may also be different.

The burner 1 according to the present invention further comprises a plurality of second apertures 32 for flame propagation.

In particular, each second aperture 32 is positioned between a pair of said first apertures 31; in addition, said second apertures 32 have a substantially circular shape when viewed from above.

Preferably, each second aperture 32 is positioned in the proximity of:

- a first portion 31a of a first aperture 31;
- a second portion 31b of a next first aperture 31.

In a preferred embodiment, the flame divider 30 comprises profiled portions 33 adapted to allow room for at least one ignition spark plug 60 and/or at least one thermocouple 70; in particular, as can be seen in Fig. 1, said at least one ignition spark plug 60 and at least one thermocouple 70 are associated with the burner 1, e.g. through a bracket 13 (Fig. 1 only shows the bracket 13 that allows the ignition spark plug 60 to be associated with the burner 1).

Between the ignition spark plug 60 and/or the thermocouple 70 and the first

apertures 31 and/or the second apertures 32 neighbouring to said ignition spark plug 60 and/or said thermocouple 70, ducts 34 are obtained which are adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes. Said ducts 34 first allow the flame to propagate from the ignition spark plug 60 towards the first apertures 31 and the second apertures 32, and then they allow the flame to reach the thermocouple 70 from the first apertures 31 and the second apertures 32.

Fig. 6 is a sectional side view of the burner 1.

In this drawing as well, the burner 1 comprises a cup 10 associated with supply means 11, 12 for supplying gas to said burner 1.

Preferably, said supply means comprise an injector 11 (e.g. like the one shown in Fig. 5) delivering gas coming from a duct 12.

In the annexed Figure 6, the duct 12 is positioned substantially horizontally, i.e. with its axis substantially orthogonal to an axis A-A (also visible in said Fig. 6) of the burner 1; however, it may also be positioned vertically, i.e. with its axis parallel to the axis A-A.

Furthermore, the duct 12 is shown as realized in one piece with said cup 10; it is however clear that said duct 12 may also be realized as a body distinct from the cup 10, and then be associated therewith through known fastening means (not shown in the annexed drawings).

The burner 1 also comprises a burner body 20 associated with said cup 10 and comprising a Venturi effect chamber 21, in particular said chamber 21 being positioned substantially coaxial to said injector 11.

Said Venturi effect chamber 21 extends substantially vertically in a central position inside the burner body 20; it is clear that the Venturi effect chamber 21 may also extend in a substantially horizontal direction or be positioned otherwise inside the burner body 20.

The burner 1 further comprises a flame divider 30 associated with said burner body 20 and comprising a plurality of first apertures 31 to allow the gas to escape, which are so realized as to generate a "carpet flame", i.e. a flame (not shown in the drawings) that propagates outwards from the burner 1 in a

substantially axial direction with respect to the axis A-A of the burner 1.

It is clear from the above description that said first apertures 31 are so realized as to extend substantially parallel to the axis A-A of the burner 1.

The first apertures 31, which are directly obtained in the flame divider 30, cause the flame divider 30 to act also as a cap, not only as a top cover for the burner body 20, thus clearly distinguishing the burner 1 according to the present invention from traditional "cup" burners, wherein the flame dividing means are obtained in the outer perimeter of the burner body (precisely at the external interface between the body and the cap).

It must be pointed out that the burner body 20 and the flame divider 30 may be made either as one piece or as separate elements to be then associated with each other through methods known in the art.

As can be seen in particular in Figs. 6 and 7, the burner 1 comprises coupling means allowing the cup 10 and the burner body 20 to be fastened to each other.

In accordance with the present invention, said coupling means comprise snap fitting means 40, 50.

In particular, said snap fitting means comprise at least one pin 40 and at least one clip 50, in particular said at least one clip 50 being made of elastic material and being adapted to receive said at least one pin 40 so as to exert a snap fitting action.

In a preferred embodiment, said at least one pin 40 comprises a pair of pins 40 adapted to be associated with the burner body 20 of the burner 1, and said at least one clip 50 comprises a pair of clips 50 adapted to be associated with the cup 10. It is however clear that the snap fitting means 40, 50 may be associated otherwise with the burner 1; for example, the pins 40 may be associated with the cup 10, while the clips 50 may be associated with the burner body 20 of the burner 1; likewise, it is clear that the pins 40 and the clips 50 may also be in a number of one or greater than two.

Preferably, each pin 40 comprises:

- a first end 41 adapted to be coupled to the burner body 20, in particular to a stem 24 extending from a lower portion of the burner body 20;

- a second end 42 adapted to be coupled to said at least one clip 50, in particular said second end 42 being round and bigger than an intermediate body 43 of the pin 40.

Said first end 41 of the pin 40 is so realized as to fit into a cavity 24C (visible in Fig. 5) of said stem 24; for example, said first end 41 may be so realized as to have a thread adapted to be coupled to a female thread of said cavity 24C. In this embodiment, said intermediate body 43 of the pin 40 is advantageously equipped with gripping means facilitating the screwing of the pin 40 into the cavity 24C of the stem 24. Such an arrangement turns out to be particularly advantageous when the burner body 20 and the pin 40 are made of different materials. For example, the burner body 20 may be made of aluminium alloy, whereas the pin 40 may be made of steel, the latter material offering the advantage of being less subject to wear than aluminium. In the case wherein the burner body 20 and the pin 40 are made of the same material, the two elements can be made as one piece.

Preferably, each clip 50 (as shown in particular in Fig. 7) is substantially U-shaped and comprises:

- a curved base 51, adapted to fit into a first window 14 of the cup 10;
- a pair of bent ends 52, adapted to hook onto the edges of said first window 14;
- a restriction 53, in particular obtained between said base 51 and said pair of bent ends 52, said restriction 53 being adapted to hold the first end 41 of the pin 40 in such a way as to provide a snap fitting between the pin 40 and the clip 50.

In particular, said first window 14 is obtained in a bracket 13 associated with the cup 10, said bracket 13 being in particular made as one piece with the cup 10 or mechanically fastened thereto.

The special provision of the snap fitting means 40, 50 according to the present invention allows to provide a gas burner 1, in particular for a cooking appliance, which is so realized as to allow the cup 10 to be coupled to the burner body 20 quickly and without difficulty, even by users without any specific technical skills. At the same time, the snap fitting means 40, 50 according to the present invention

allow to obtain a burner 1 characterized by a safe coupling between the cup 10 and the burner body 20 that avoids any malfunction of the burner 1.

In addition, said snap fitting means 40, 50 allow to properly position the burner body 20 and, as a result, to properly associate the flame divider 30 and possibly a pan supporting grate (not shown in the drawings) with the burner body 20, thus preventing any damage to both the user of the burner 1 and to the environment around the burner 1.

In Fig. 5 one can also notice that the burner body 20 and the flame divider 30 lie substantially entirely over a cooking top PC of a cooking appliance (not shown in the drawings).

Furthermore, said Fig. 5 also shows that between the burner body 20 and the flame divider 30 a compartment 22 is obtained for letting the gas flow from the chamber 21 to said plurality of first apertures 31.

Said compartment 22 comprises:

- a substantially straight first section 22a, said first section 22a being positioned horizontally on top of the Venturi effect chamber 21;
- a second section 22b substantially directed downwards, in particular towards the cup 10;
- a third section 22c substantially directed upwards, in particular towards the flame divider 30.

It is clear that the above characteristics of the compartment 22 particularly refer to a sectional side view of the burner 1 and of the compartment 22 (e.g. like the one of Fig. 5).

Said compartment 22 is shaped substantially like a sickle with the blade turned upwards, in particular, when viewing a side section of the compartment 22, starting from the axis A-A and extending towards the outside of the burner 1; in substance, the shape of the compartment 22 is similar to that of a question mark laid down (i.e. substantially horizontal).

Preferably, the compartment 22 has a shape substantially corresponding to the shape of the top of the burner body 20 and of the underside of the flame divider 30, in that said compartment 22 is obtained in the space between the burner body

20 and the flame divider 30.

As a consequence, in order to obtain said shape of the compartment 22, the burner body 20 comprises a substantially U-shaped housing 23 surrounding the upper part of the Venturi effect chamber 21, and the flame divider 30 comprises a wall 30P extending under the flame divider 30 towards said housing 23.

It is apparent from the above description that the particular shape of the compartment 22 allows to provide a burner 1 which is so realized as to allow the gas to adequately reach the first apertures 31 of the flame divider 30, said first apertures 31 being adapted to allow the gas to escape and generate a "carpet flame". In fact, thanks to the particular shape of the compartment 22, the gas is already conveyed at the exit of the Venturi effect chamber 21 towards the first apertures 31 in a safe and accurate manner.

As a result, said shape of the compartment 22 allows to ensure optimal gas efficiency along with lower production costs of the burner 1.

As can be seen in Fig. 2, the first apertures 31 of the flame divider 30 are so realized as to have an elongated shape when viewed from above (i.e. when viewed in a substantially axial direction with respect to the axis A-A of the burner 1).

In particular, in the representation shown in the annexed drawings, said first apertures 31 are so realized as to have a substantially elliptic shape; it is however apparent that the elongated shape of said first apertures 31 may be different, e.g. substantially rectangular, possibly with bevelled corners.

The particular shape of said first apertures 31 turns out to be especially advantageous because they can be made easily and comfortably and because they can ensure optimal gas efficiency.

In fact, the particular shape of the first apertures 31 allows to avoid the formation of a sort of barrier against secondary air, which can thus reach even the innermost portions of the flame divider 30, particularly in the presence of a food cooking container (not shown) placed over the burner 1, which otherwise might contribute to hindering the flow of secondary air.

As a consequence, also the particular shape of the first apertures implies a high-

O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases, without having to make complex and costly modifications to the realization of the burner 1.

As can be seen in Fig. 2, the flame divider 30 of the burner 1 is preferably so realized as to have a substantially circular shape when viewed from above.

It can also be seen in said drawing that each first aperture 31 comprises a first portion 31a, a second portion 31b and an intermediate portion 31c, said second portion 31b being closer to a central area 30C of the flame divider 30 than said first portion 31a.

As a consequence, each first aperture 31 is oriented in a substantially radial manner on said flame divider 30.

Preferably, each first aperture 31 is inclined relative to a radius R (in Fig. 2 a couple of radii R are indicated by dashed lines) of said flame divider 30; this means that said first portion 31a and second portion 31b of each first aperture 31 lie each on a different radius R. In the annexed drawings one can see that each first aperture 31 is not much inclined relative to the radius R, preferably not so much as to make a second axis A2 of each first aperture 31 perpendicular to the radius R.

Furthermore, in the annexed drawings said first apertures 31 are shown to be inclined in the same direction at substantially the same angle relative to said radius R; it is however clear that the inclination of each aperture 31 may also be different.

The burner 1 according to the present invention further comprises a plurality of second apertures 32 for flame propagation.

In particular, each second aperture 32 is positioned between a pair of said first apertures 31; in addition, said second apertures 32 have a substantially circular shape when viewed from above.

Preferably, each second aperture 32 is positioned in the proximity of:

- a first portion 31a of a first aperture 31;
- a second portion 31b of a next first aperture 31.

The flame divider 30 further comprises profiled portions 33 adapted to allow

room for at least one ignition spark plug 60 and/or at least one thermocouple 70; in particular, said at least one ignition spark plug 60 and at least one thermocouple 70 are associated with the burner 1 through the brackets 13, in particular said brackets 13 comprising second windows 14B (visible in Fig. 6) adapted to receive said ignition spark plug 60 and thermocouple 70.

Between the ignition spark plug 60 and/or the thermocouple 70 and the first apertures 31 and/or the second apertures 32 neighbouring to said ignition spark plug 60 and/or said thermocouple 70, ducts 34 are obtained which are adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes. Said ducts 34 first allow the flame to propagate from the ignition spark plug 60 towards the first apertures 31 and the second apertures 32, and then they allow the flame to reach the thermocouple 70 from the first apertures 31 and the second apertures 32.

Fig. 8 shows an exploded perspective view of another embodiment of the burner 1 according to the present invention.

In this embodiment as well, the burner 1 comprises a cup 10 associated with supply means 11, 12 for supplying gas to said burner 1.

Preferably, said supply means comprise an injector 11 (visible in Fig. 10) delivering gas coming from a duct 12.

In the annexed Figures 8 and 10, the duct 12 is positioned substantially horizontally, i.e. with its axis substantially orthogonal to an axis A-A of the burner 1; however, it may also be positioned vertically, i.e. with its axis parallel to said axis A-A.

Furthermore, the duct 12 is shown as realized in one piece with said cup 10; it is however clear that said duct 12 may also be provided as a body distinct from the cup 10, and then be associated therewith through known fastening means (not shown in the annexed drawings).

The burner 1 also comprises a burner body 20 associated with said cup 10 and comprising a Venturi effect chamber 21, in particular said chamber 21 being positioned substantially coaxial to said injector 11.

In the annexed drawings, said Venturi effect chamber 21 extends substantially

vertically in a central position inside the burner body 20; it is clear that the Venturi effect chamber 21 may also extend in a substantially horizontal direction or be positioned otherwise inside the burner body 20.

The burner 1 further comprises a flame divider 30 associated with said burner body 20 and comprising a plurality of first apertures 31 to allow the gas to escape, which are so realized as to generate a "carpet flame", i.e. a flame (not shown in the drawings) that propagates outwards from the burner 1 in a substantially axial direction with respect to the axis A-A of the burner 1.

It is clear from the above description and from the sectional view of Fig. 10 that said first apertures 31 are so realized as to extend substantially parallel to the axis A-A of the burner 1.

The first apertures 31, which are directly obtained in the flame divider 30, cause the flame divider 30 to act also as a cap, not only as a top cover for the burner body 20, thus clearly distinguishing the burner 1 according to the present invention from traditional "cup" burners, wherein the flame dividing means are obtained in the outer perimeter of the burner body (precisely at the external interface between the body and the cap).

It must be pointed out that the burner body 20 and the flame divider 30 may be made either as one piece or as separate elements to be then associated with each other through methods known in the art.

As can be seen in particular in Figs. 8 and 9, the burner 1 comprises coupling means 40, 50; 60, 70 allowing the cup 10 and the burner body 20 to be fastened to each other.

In accordance with the present invention, said coupling means comprise:

- at least one ignition element 60 for igniting the flame of said burner 1, wherein the ignition element 60, in particular a spark plug, comprises a first part 61 coupled to the cup 10 and a second part 62 coupled to the burner body 20, and/or
- at least one detection element 70 for detecting the flame of said burner 1, wherein said detection element 70, in particular a thermocouple, comprises a first segment 71 coupled to the cup 10 and a second segment 72 coupled to the

burner body 20.

In the representation shown in the annexed Figures 8 to 10, the burner 1 comprises an ignition element 60 and a detection element 70, in particular arranged on opposite sides with respect to the cup 10 and to the burner body 20. It is however clear that the burner 1 according to the present invention may be equipped with only one or more ignition element(s) 60 or with only one or more detection element(s) 70.

As can be seen in Fig. 8, said first part 61 and second part 62 of said at least one ignition element 60 and/or said first segment 71 and second segment 72 of said at least one detection element 70 comprise first fitting means 61a, 62a; 71a, 72a allowing said first part 61 and second part 62 and/or said first segment 71 and second segment 72 to be fastened together; as a result, said first fitting means 61a, 62a; 71a, 72a also allow to secure the cup 10 to the burner body 20.

Preferably, said first fitting means 61a, 62a; 71a, 72a comprise male connectors 61a; 71a adapted to be associated with respective female connectors 62a; 72a, in particular, said male connectors 61a; 71a and female connectors 62a; 72a being of the Faston type.

The first part 61 of the ignition element 60 and/or the first segment 71 of the detection element 70 are associated with the cup 10 of the burner 1 through at least one bracket 13, in particular said at least one bracket 13 including a second window 14B adapted to receive said first part 61 and/or said first segment 71.

Furthermore, the second part 62 of the ignition element 60 and/or the second segment 72 of the detection element 70 are associated with the burner body 20 of the burner 1 through at least one sector 25 of the burner body 20, said sector 25 being preferably perforated in a manner such as to laterally enclose or embrace said second part 62 and/or said second segment 72. It is clear that said at least one sector 25 is preferably obtained while manufacturing the burner body 20; however, it may also be obtained after manufacturing said burner body 20.

Advantageously, each sector 25 can permanently house the second part 62 of the ignition element 60 and/or the second segment 72 of the detection element 70, since this reduces the number of mutually separable components and hence

complexity or the likeliness of any mistakes when assembling the components. It must also be underlined that the present invention is not limited to such an embodiment, since the second part 62 of the ignition element 60 and/or the second segment 72 of the detection element 70 may be separable from each other and/or from the burner body 20.

The special provision of the coupling means 40, 50; 60, 70 according to the present invention allows to provide a gas burner 1, in particular for a cooking appliance, which is so realized as to include removable components, so that the cooking top can be accurately cleaned after removing said components, since the cooking top will have no protrusions which might hinder the cleaning operations.

The special provision of the coupling means according to the present invention also allows to provide a gas burner 1, in particular for a cooking appliance, which is so realized as to allow the cup 10 to be coupled to the burner body 20 of the burner 1 quickly and without difficulty, even by users without any specific technical skills.

At the same time, the coupling means according to the present invention allow to obtain a burner 1 characterized by a safe coupling between the cup 10 and the burner body 20 of the burner 1 that avoids any malfunction of the burner 1. In fact, should the burner body 20 be incorrectly positioned on the cup 10, resulting in the coupling means being fastened improperly, the ignition element 60 and/or the detection element 70 will prevent the burner 1 from operating.

In addition, said coupling means 40, 50; 60, 70 allow to properly position the burner body 20; as a result, they allow to properly associate both the flame divider 30 and a pan supporting grate (not shown in the drawings) with the burner body 20, thus preventing any damage to both the user of the burner and to the environment around the burner 1.

Moreover, as can be seen in Fig. 9, which shows a further embodiment of the burner 1 according to the present invention, the coupling means may also comprise second snap fitting means 40, 50, adapted to make the connection between the cup 10 and the burner body 20 even firmer.

In particular, said second snap fitting means comprise at least one pin 40 and at least one clip 50, in particular said at least one clip 50 being made of elastic material and being adapted to receive said at least one pin 40 so as to exert a snap fitting action.

In a preferred embodiment, said at least one pin 40 comprises a pair of pins 40 adapted to be associated with the burner body 20, and said at least one clip 50 comprises a pair of clips 50 adapted to be associated with the cup 10. It is however clear that the snap fitting means 40, 50 may be associated otherwise with the burner 1; for example, the pins 40 may be associated with the cup 10, while the clips 50 may be associated with the burner body 20 of the burner 1; likewise, it is clear that the pins 40 and the clips 50 may be in a number greater than two.

Preferably, each pin 40 comprises:

- a first end 41 adapted to be coupled to the burner body 20, in particular to a stem 24 extending from a lower portion of the burner body 20;
- a second end 42 adapted to be coupled to said at least one clip 50, in particular said second end 42 being round and bigger than an intermediate body 43 of the pin 40.

Said first end 41 of the pin 40 is so realized as to fit into said stem 24, e.g. said first end 41 may be so realized as to have a thread adapted to be coupled to a female thread (not shown) of said stem 24. In this embodiment, said intermediate body 43 of the pin 40 is advantageously equipped with gripping means facilitating the screwing of the pin 40 into the stem 24. Such an arrangement turns out to be particularly advantageous when the burner body 20 and the pin 40 are made of different materials. For example, the burner body 20 may be made of aluminium alloy, whereas the pin 40 may be made of steel, the latter material offering the advantage of being less subject to wear than aluminium. In the case wherein the burner body 20 and the pin 40 are made of the same material, the two elements can be made as one piece.

Preferably, each clip 50 is substantially U-shaped and comprises:

- a curved base 51, adapted to fit into a first window 14 of the cup 10;

- a pair of bent ends 52, adapted to hook onto the edges of said first window 14;
- a restriction 53, in particular obtained between said base 51 and said pair of bent ends 52, said restriction 53 being adapted to hold the first end 41 of the pin 40 in such a way as to provide a snap fitting between the pin 40 and the clip 50,

in particular, said first window 14 being obtained in a bracket 13 associated with the cup 10, said bracket 13 being in particular made as one piece with the cup 10 or mechanically fastened thereto.

Also the special provision of the second snap fitting means 40, 50 according to the embodiment shown in Fig. 9 allows to provide a gas burner 1, in particular for a cooking appliance, which is so realized as to allow the cup 10 to be coupled to the burner body 20 quickly and without difficulty, even by users without any specific technical skills.

At the same time, also the second snap fitting means 40, 50 according to the present invention allow to obtain a burner 1 characterized by a safe coupling between the cup 10 and the burner body 20 that avoids any malfunction of the burner 1.

In addition, also said second snap fitting means 40, 50 allow to properly position the burner body 20 and, as a result, to properly associate the flame divider 30 and possibly a pan supporting grate (not shown in the drawings) with the burner body 20, thus preventing any damage to both the user of the burner 1 and to the environment around the burner 1.

In Fig. 10 one can also notice that the burner body 20 and the flame divider 30 lie substantially entirely over a cooking top PC of a cooking appliance (not shown in the drawings). As a consequence, a further advantage deriving from the provision of the coupling means 40, 50; 60, 70 is that they facilitate the cleaning of said cooking top PC, in that the burner 1 according to the present invention will have no parts protruding from the cooking top PC when the burner body 20 and the flame divider 30 are separated from the cup 10.

Furthermore, said Fig. 10 also shows that between the burner body 20 and the

flame divider 30 a compartment (designated as a whole by reference numeral 22 in Fig. 10) is obtained for letting the gas flow from the chamber 21 to said plurality of first apertures 31.

Said compartment 22 comprises:

- a substantially straight first section 22a, said first section 22a being positioned horizontally on top of the Venturi effect chamber 21;
- a second section 22b substantially directed downwards, in particular towards the cup 10;
- a third section 22c substantially directed upwards, in particular towards the flame divider 30.

It is clear that the above-mentioned characteristics of the compartment 22 specifically refer to a sectional side view of the burner 1 and of the compartment 22.

Said compartment 22 is shaped substantially like a sickle with the blade turned upwards, in particular, when viewing a side section of the compartment 22, starting from the axis A-A and extending towards the outside of the burner 1; in substance, the shape of the compartment 22 is similar to that of a question mark laid down (i.e. substantially horizontal).

Preferably, the compartment 22 has a shape substantially corresponding to the shape of the top of the burner body 20 and of the underside of the flame divider 30, in that said compartment 22 is obtained in the space between the burner body 20 and the flame divider 30.

As a consequence, in order to obtain said shape of the compartment 22, the burner body 20 comprises a substantially U-shaped housing 23 surrounding the upper part of the Venturi effect chamber 21, and the flame divider 30 comprises a wall 30P extending under the flame divider 30 towards said housing 23.

It is apparent from the above description that the particular shape of the compartment 22 allows to provide a burner 1 which is so realized as to allow the gas to adequately reach the first apertures 31 of the flame divider 30, said first apertures 31 being adapted to allow the gas to escape and generate a "carpet flame". In fact, thanks to the particular shape of the compartment 22, the gas is

already conveyed at the exit of the Venturi effect chamber 21 towards the first apertures 31 in a safe and accurate manner.

As a result, said shape of the compartment 22 allows to ensure optimal gas efficiency along with lower production costs of the burner 1.

Also in the embodiment shown in Figs. 8, 9 and 10, the first apertures 31 of the flame divider 30 are so realized as to have an elongated shape when viewed from above (i.e. when viewed in a substantially axial direction with respect to the axis A-A of the burner 1).

In particular, in the representation shown in the annexed Figures 8, 9 and 10, said first apertures 31 are so realized as to have a substantially elliptic shape; it is however apparent that the elongated shape of said first apertures 31 may be different, e.g. substantially rectangular.

The particular shape of said first apertures 31 turns out to be especially advantageous because they can be made easily and comfortably and because they can ensure optimal gas efficiency.

In fact, the particular shape of the first apertures 31 allows to avoid the formation of a sort of barrier against secondary air, which can thus reach even the innermost portions of the flame divider 30, particularly in the presence of a food cooking container (not shown) placed over the burner 1, which otherwise might contribute to hindering the flow of secondary air.

As a consequence, also the particular shape of the first apertures implies a high-O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases, without having to make complex and costly modifications to the realization of the burner 1.

Also in the embodiments of Figs. 8, 9 and 10, the flame divider 30 of the burner 1 is preferably so realized as to have a substantially circular shape when viewed from above.

In addition, also in such embodiments each first aperture 31 comprises a first portion 31a, a second portion 31b and an intermediate portion 31c, said second portion 31b being closer to a central area 30C of the flame divider 30 than said first portion 31a.

As a consequence, each first aperture 31 is oriented in a substantially radial manner on said flame divider 30.

Preferably, each first aperture 31 is inclined relative to a radius R (in Fig. 5 a plurality of radii R are indicated by dashed lines) of said flame divider 30; this means that said first portion 31a and second portion 31b of each first aperture 31 lie each on a different radius R. In the annexed drawings one can see that each first aperture 31 is not much inclined relative to the radius R, preferably not so much as to make a second axis A2 of each first aperture 31 perpendicular to the radius R.

Furthermore, in the annexed drawings said first apertures 31 are shown to be inclined in the same direction at substantially the same angle relative to said radius R; it is however clear that the inclination of each first aperture 31 may also be different.

In the embodiments shown in Figs. 8, 9 and 10, the burner 1 also comprises a plurality of second apertures 32 for flame propagation.

In particular, each second aperture 32 is positioned between a pair of said first apertures 31; in addition, said second apertures 32 have a substantially circular shape when viewed from above.

Preferably, each second aperture 32 is positioned in the proximity of:

- a first portion 31a of a first aperture 31;
- a second portion 31b of a next first aperture 31.

In a preferred embodiment, the flame divider 30 comprises profiled portions 33 adapted to allow room for said at least one ignition element 60 and/or said at least one detection element 70.

Between the ignition element 60 and/or the detection element 70 and the first apertures 31 and/or the second apertures 32 neighbouring to said ignition element 60 and/or said detection element 70, ducts 34 (visible in Fig. 1 and 2) are obtained which are adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes. Said ducts 34 first allow the flame to propagate from the ignition element 60 towards the first apertures 31 and the second apertures 32, and then they allow the flame to reach the detection element

70 from the first apertures 31 and the second apertures 32.

From the above description and from the annexed drawings, it can be noted that the burner 1 comprises a cup 10 associated with supply means 11, 12 for supplying gas to said burner 1.

In particular, said supply means comprise an injector 11 delivering gas coming from a duct 12.

The burner 1 also comprises a cup 10 and a burner body 20 associated with said cup 10, the burner body 20 comprising a Venturi effect chamber 21, in particular said chamber 21 being positioned substantially coaxial to said injector 11.

In the annexed drawings, said Venturi effect chamber 21 extends substantially vertically in a central position inside the burner body 20; it is clear that the Venturi effect chamber 21 may also extend in a substantially horizontal direction or be positioned otherwise inside the burner body 20.

The burner 1 further comprises a flame divider 30 associated with said burner body 20 and comprising a plurality of first apertures 31 to allow the gas to escape, which are so realized as to generate a flame (not shown in the drawings).

In accordance with the present invention, said flame divider 30 is made of a sintered material, in particular said sintered material consisting of stainless steel, a ceramic material or a metal alloy.

Sintering is a process that allows to obtain solid bodies having a predefined shape from powders of different materials. There are many sintering methods, all of which have the following characteristics in common:

- step of powder compression;
- step of thermal compaction of the green body.

During said two steps, the powder particles progressively join together, thus increasing the density of the object.

As a consequence, the realization of the flame divider 30 according to the present invention turns out to be particularly advantageous, in that it facilitates the making of the plurality of first apertures 31 adapted to generate the flame, thus reducing the production times and costs of the entire burner 1. As a matter of fact, such a special realization of the flame divider 30 allows to obtain very

complex shapes without having to carry out costly machining operations on hard materials.

Sintering also allows to obtain first apertures 31 with any shape, regardless of the desired thickness of the flame divider 30.

In a preferred embodiment of the burner 1 according to the present invention, said plurality of first apertures 31 are made during the sintering process in a manner such as to generate a "carpet flame", i.e. a flame that propagates outwards from the burner 1 in a substantially axial direction with respect to the axis A-A of the burner 1.

Accordingly, it is apparent that said first apertures 31 are so realized as to extend substantially parallel to the axis A-A of the burner 1.

Moreover, said first apertures 31 are so realized as to have an elongated shape when viewed from above (i.e. when viewed in a substantially axial direction with respect to the axis A-A of the burner 1).

In particular, in the representation shown in the annexed drawings, said first apertures 31 are so realized as to have a substantially elliptic shape; it is however apparent that the elongated shape of said first apertures 31 may be different, e.g. substantially rectangular and, preferably, with bevelled corners.

The particular shape of said first apertures 31 turns out to be especially advantageous because they can be made easily and comfortably and because they can ensure optimal gas combustion.

In fact, the particular shape of the first apertures 31 allows to avoid the formation of a sort of barrier against secondary air, which can thus reach even the innermost portions of the flame divider 30, particularly in the presence of a food cooking container (not shown) placed over the burner 1, which otherwise might contribute to hindering the flow of secondary air.

This inevitably implies a high-O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases, without having to make complex and costly modifications to the realization of the burner 1.

As can be seen in Fig. 2, the flame divider 30 of the burner 1 is preferably so realized as to have a substantially circular shape when viewed from above.

It can also be seen in said drawing that each first aperture 31 comprises a first portion 31a, a second portion 31b and an intermediate portion 31c, said second portion 31b being closer to a central area 30C of the flame divider 30 than said first portion 31a.

As a consequence, each first aperture 31 is oriented in a substantially radial manner on said flame divider 30.

Preferably, each first aperture 31 is inclined relative to a radius R (in Fig. 2 a plurality of radii R are indicated by dashed lines) of said flame divider 30; this means that said first portion 31a and second portion 31b of each first aperture 31 lie each on a different radius R. In the annexed drawings one can see that each first aperture 31 is not much inclined relative to the radius R, preferably not so much as to make a second axis A2 of each first aperture 31 perpendicular to the radius R.

Furthermore, in the annexed drawings said first apertures 31 are shown to be inclined in the same direction at substantially the same angle relative to said radius R; it is however clear that the inclination of each first aperture 31 may also be different.

The burner 1 according to the present invention further comprises a plurality of second apertures 32 for flame propagation.

In particular, each second aperture 32 is positioned between a pair of said first apertures 31; in addition, said second apertures 32 have a substantially circular shape when viewed from above.

Preferably, each second aperture 32 is positioned in the proximity of:

- a first portion 31a of a first aperture 31;
- a second portion 31b of a next first aperture 31.

In a preferred embodiment, the flame divider 30 comprises profiled portions 33 adapted to allow room for at least one ignition spark plug 60 and/or at least one thermocouple 70; in particular, as can be seen in Fig. 1, said at least one ignition spark plug 60 and at least one thermocouple 70 are associated with the cup 10 of the burner 1, e.g. through a bracket 13 preferably made as one piece with the cup 10.

Between the ignition spark plug 60 and/or the thermocouple 70 and the first apertures 31 and/or the second apertures 32 neighbouring to said ignition spark plug 60 and/or said thermocouple 70, ducts 34 are obtained which are adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes. Said ducts 34 first allow the flame to propagate from the ignition spark plug 60 towards the first apertures 31 and the second apertures 32, and then they allow the flame to reach the thermocouple 70 from the first apertures 31 and the second apertures 32.

The advantages of a gas burner 1 according to the present invention are apparent from the above description.

In particular, the provisions of the present invention allow to provide a burner 1 which is so realized as to allow to obtain optimal gas efficiency along with lower production costs.

In fact, the particular shape of the first apertures 31 allows to avoid the formation of a sort of barrier against secondary air, which can thus reach even the innermost portions of the flame divider 30.

A further advantage of the burner 1 according to the present invention is that its particular realization allows to obtain a high-O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases.

In addition, the provisions of the present invention allow to provide a burner 1 having a reduced number of components; this facilitates assembly and/or disassembly and/or cleaning operations.

Thanks to the peculiar shape of the compartment 22, the burner 1 according to the present invention is so realized as to allow the gas to adequately reach the first apertures 31 of the flame divider 30, said first apertures 31 being adapted to generate a "carpet flame".

The provisions of the present invention therefore allow to provide a burner 1 which is so realized as to allow to obtain optimal gas efficiency along with lower production costs of said burner 1.

A further advantage of the burner 1 according to the present invention is therefore that the particular realization of the compartment 22 and of the first

apertures 31 allows to obtain a high-O_2 combustion, resulting in the generation of only a small quantity (or even in the absence) of unburnt gases.

In addition, the provisions of the present invention allow to provide a burner 1 having a reduced number of components; this facilitates assembly and/or disassembly and/or cleaning operations.

A further advantage of the present invention is that the provision of the snap fitting means 40, 50 according to the present invention allows to provide a gas burner 1 which is so realized as to allow the cup 10 to be coupled to the burner body 20 quickly and without difficulty, even by users without any specific technical skills.

At the same time, the snap fitting means 40, 50 according to the present invention allow to obtain a burner 1 characterized by a safe coupling between the cup 10 and the burner body 20 that avoids any malfunction of the burner 1.

In addition, said snap fitting means 40, 50 allow to properly position the flame divider 30 and, as a result, to properly associate the flame divider 30 and possibly a pan supporting grate (not shown in the drawings) with said burner body 20, thus preventing any damage to both the user of the burner 1 and to the environment around the burner 1.

Also the special provision of the coupling means 40, 50; 60, 70 shown in Figs. 8, 9 and 10 allows to provide a gas burner 1, in particular for a cooking appliance, which is so realized as to include removable components, so that the cooking top can be accurately cleaned after removing said components, since the cooking top will have no protrusions which might hinder the cleaning operations.

Furthermore, the provision of said coupling means 40, 50; 60, 70 according to the present invention allows to provide a gas burner 1 which is so realized as to allow the cup 10 to be coupled to the burner body 20 quickly and without difficulty, even by users without any specific technical skills.

At the same time, the coupling means 40, 50; 60, 70 allow to obtain a burner 1 characterized by a safe coupling between the cup 10 and the burner body 20 that avoids any malfunction of the burner 1. In fact, should the burner body 20 be incorrectly positioned on the cup 10, resulting in the coupling means being

fastened improperly, the ignition element 60 and/or the detection element 70 will prevent the burner 1 from operating.

In addition, said coupling means 40, 50; 60, 70 allow to properly associate the flame divider 50 and possibly a pan supporting grate (not shown in the drawings) with said burner body 20, thus preventing any damage to both the user of the burner 1 and to the environment around the burner 1.

A further advantage deriving from the provision of the coupling means 40, 50; 60, 70 is that they facilitate the cleaning of a cooking top PC that houses the burner 1, in that the burner 1 according to the present invention will have no parts protruding from the cooking top when the burner body 20 and the flame divider 30 are separated from the cup 10.

The use of a sintered material for manufacturing the flame divider 30 according to the present invention turns out to be particularly advantageous, in that it facilitates the making of the flame divider 30. In particular, the present invention allows to create the plurality of apertures 31 and 32 in a single step, whatever the thickness of the flame divider 30, thereby reducing the production times and costs of the entire burner 1.

In fact, said particular realization of the flame divider 30 allows to obtain very complex shapes without having to carry out costly machining operations on hard materials.

It will also be appreciated that sintering allows to obtain first apertures 31 and/or second apertures 32 having a constant section along the whole thickness of the flame divider 30, since such a process (unlike alternative technologic processes) requires no drafts. Therefore, when the flame divider 30 is to generate a carpet flame, the first apertures 31 and/or the second apertures 32 will remain vertical throughout their extension.

The burner 1 described herein by way of example may be subject to many possible variations without departing from the novelty spirit of the inventive idea; it is also clear that in the practical implementation of the invention the illustrated details may have different shapes or be replaced with other technically equivalent elements.

In particular, the present invention may be implemented by using first apertures 31 having an elongated shape other than elliptic, such as, for example, a rectangular shape with bevelled corners.

A further variant is shown in Figs. 3 and 4; as can be seen in such drawings, those first apertures 31 and/or second apertures 32 neighbouring to said ignition spark plug 60 and/or said thermocouple 70 are so realized as to include second ducts 35 adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes. Said second ducts 35 first allow the flame to propagate from the ignition spark plug 60 towards the first apertures 31 and/or the second apertures 32, and then they allow the flame to reach the thermocouple 7 from the first apertures 31 and/or the second apertures 32. Furthermore, as is especially visible in the top view of Fig. 4, said second ducts 35 may be so realized as to further elongate the shape of said first apertures 31 and/or of said second apertures 32 (it should be noted that in Figs. 3 and 4 the second ducts 35 are not shown when associated with the second apertures 32). De facto, in the variant shown in Figs. 3 and 4 said second ducts 35 are integrated into at least one of the first apertures 31 and/or at least one of the second apertures 32, so as to form a single entity (preferably an elongated hole) of said flame divider 30 and thus simplify the realization thereof.

A further variant is conceivable which employs first apertures 31 having an elongated shape other than elliptic, such as, for example, a rectangular shape with bevelled corners.

It can therefore be easily understood that the present invention is not limited to the above-described burner and cooking appliance, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

CLAIMS

1. A gas burner (1), in particular for a cooking appliance, of the type that comprises a flame divider (30) comprising a plurality of first apertures (31) to allow the gas to escape, which are so realized as to generate a flame that propagates outwards from the burner (1) in a substantially axial direction with respect to an axis (A-A) of the burner (1),
characterized in that
said first apertures (31) are so realized as to have an elongated shape when viewed from above.

2. A burner (1) according to claim 1, characterized in that said first apertures (31) are so realized as to have a substantially elliptic and/or rectangular shape with bevelled corners.

3. A burner (1) according to one or more of the preceding claims, characterized in that said burner (1) is so realized as to have a substantially circular shape when viewed from above.

4. A burner (1) according to one or more of the preceding claims, characterized in that each first aperture (31) comprises a first portion (31a), a second portion (31b) and an intermediate portion (31c), said second portion (31b) being closer to a central area (30C) of the flame divider (30) than said first portion (31a).

5. A burner (1) according to claim 4, characterized in that each first aperture (31) is oriented in a substantially radial manner on said flame divider (30).

6. A burner (1) according to claims 3 and 4, characterized in that each first aperture (31) is inclined relative to a radius (R) of said flame divider (30).

7. A burner (1) according to claims 3 and 4, characterized in that said first portion (31a) and second portion (31b) of each first aperture (31) lie each on a different radius (R).

8. A burner (1) according to one or more of the preceding claims 6 and 7, characterized in that said first apertures (31) are inclined in the same direction at substantially the same angle relative to a radius (R) of the flame divider (30).

9. A burner (1) according to one or more of the preceding claims,

characterized in that it comprises a plurality of second apertures (32) which are smaller than the first apertures (31) and offset therefrom, in particular when the layout and/or the orientation and/or the geometry of the first apertures (31) are such as to not allow for an adequate propagation of the flame between the first apertures (31).

10. A burner (1) according to claim 9, characterized in that each second aperture (32) is positioned between a pair of said first apertures (31).

11. A burner (1) according to one or more of claims 9 and 10, characterized in that said second apertures (32) have a substantially circular shape when viewed from above.

12. A burner (1) according to one or more of claims 9 to 11, characterized in that each second aperture (32) is positioned in the proximity of:

- a first portion (31a) of a first aperture (31);
- a second portion (31b) of a next first aperture (31).

13. A burner (1) according to claim 1, characterized in that said flame divider (30) comprises profiled portions (33) adapted to allow room for at least one ignition spark plug (60) and/or at least one thermocouple (70).

14. A burner (1) according to claim 13, characterized in that it comprises a plurality of ducts (34) obtained on said flame divider (30) and/or on a burner body (20), said ducts (34) being located between said ignition spark plug (60) and/or said thermocouple (70) and said first apertures (31) and/or said second apertures (32).

15. A burner (1) according to claim 13, characterized in that those first apertures (31) and/or second apertures (32) neighbouring to said ignition spark plug (60) and/or said thermocouple (70) are so realized as to include second ducts (35) adapted to allow the flow of a limited quantity of gas for flame ignition and/or detection purposes.

16. A cooking appliance comprising a gas burner (1) according to one or more of the preceding claims 1 to 15.

17. A gas burner (1), in particular for a cooking appliance, of the type that comprises:

- a cup (10) associated with supply means (11, 12) for supplying gas to said burner (1);
- a burner body (20) associated with said cup (10) and comprising a Venturi effect chamber (21);
- a flame divider (30) associated with said burner body (20) and comprising a plurality of first apertures (31) to allow the gas to escape, which are so realized as to generate a flame that propagates outwards from the burner (1) in a substantially axial direction with respect to an axis (A-A) of the burner (1), a compartment (22) being obtained between the burner body (20) and the flame divider (30) to allow the gas to flow from the chamber (21) to said plurality of apertures (31),

characterized in that

said compartment (22) comprises:

- a substantially straight first section (22a), said first section (22a) being positioned horizontally on top of the Venturi effect chamber (21);
- a second section (22b) substantially directed downwards, in particular towards the cup (10);
- a third section (22c) substantially directed upwards, in particular towards the flame divider (30).

18. A burner (1) according to claim 17, characterized in that said compartment (22) is shaped substantially like a sickle with the blade turned upwards.

19. A burner (1) according to one or more of the preceding claims 17 and 18, characterized in that said compartment (22) has a shape substantially corresponding to the shape of the top of the burner body (20) and of the underside of the flame divider (30).

20. A burner (1) according to one or more of the preceding claims 17 to 19, characterized in that said burner body (20) comprises a substantially U-shaped housing (23) that surrounds the upper portion of the Venturi effect chamber (21).

21. A burner (1) according to claim 20, characterized in that said flame divider (30) comprises a wall (30P) that protrudes under the flame divider (30) towards said housing (23).

22. A burner (1) according to one or more of the preceding claims 17 to 21, characterized in that said first apertures (21) are so realized as to have an elongated shape when viewed from above.

23. A burner (1) according to claim 22, characterized in that it comprises a plurality of second apertures (32) for flame propagation.

24. A burner (1) according to claim 17, characterized in that said flame divider (30) comprises profiled portions (33) adapted to allow room for at least one ignition spark plug (60) and/or at least one thermocouple (70).

25. A burner (1) according to one or more of the preceding claims 17 to 24, characterized in that it is so shaped as to allow primary air taken from above the cooking top (PC) to be fed to the Venturi effect chamber (21), the cooking top (PC) and the burner body (20) being mutually so arranged as to create passages that put the volume above the cooking top (PC) and around the burner (1) in communication with the inside of the cup (10).

26. A cooking appliance comprising a gas burner (1) according to one or more of the preceding claims 17 to 25.

27. A gas burner (1), in particular for a cooking appliance, of the type that comprises:

- a cup (10) associated with supply means (11, 12) for supplying gas to said burner (1);
- a burner body (20) associated with said cup (10) and comprising a Venturi effect chamber (21);
- coupling means allowing said cup (10) and said burner body (20) to be fastened to each other,

characterized in that

said coupling means comprise snap fitting means (40, 50).

28. A burner (1) according to claim 27, characterized in that said snap fitting means comprise at least one pin (40) and at least one clip (50), in particular said at least one clip (50) being made of elastic material and being adapted to receive said at least one pin (40) so as to exert a snap fitting action.

29. A burner (1) according to claim 28, characterized in that said at least one

pin (40) comprises a pair of pins (40) adapted to be associated with the burner body (20), and said at least one clip (50) comprises a pair of clips (50) adapted to be associated with the cup (10).

30. A burner (1) according to one or more of claims 28 and 29, characterized in that said pin (40) comprises:

- a first end (41) adapted to be coupled to the burner body (20), in particular to a stem (24) extending from a lower portion of the burner body (20);
- a second end (42) adapted to be coupled to said at least one clip (50), in particular said second end (42) being round and bigger than an intermediate body (43) of the pin (40).

31. A burner (1) according to claim 30, characterized in that said first end (41) is so realized as to fit into a cavity (24C) of said stem (24).

32. A burner (1) according to one or more of claims 28 and 29, characterized in that said clip (50) is substantially U-shaped and comprises:

- a curved base (51), adapted to fit into a first window (14) of the cup (10);
- a pair of bent ends (52), adapted to hook onto the edges of said first window (14);
- a restriction (53), in particular obtained between said base (51) and said pair of bent ends (52), said restriction (53) being adapted to hold the first end (41) of the pin (40).

33. A burner (1) according to claim 32, characterized in that said first window (14) is obtained in a bracket (13) associated with the cup (10).

34. A burner (1) according to claim 27, characterized in that a compartment (22) is obtained between the burner body (20) and the flame divider (30) for letting the gas flow from the chamber (21) to said plurality of apertures (31), said compartment (22) comprising:

- a substantially straight first section (22a), said first section (22a) being positioned horizontally on top of the Venturi effect chamber (21);
- a second section (22b) substantially directed downwards, in particular towards the cup (10);
- a third section (22c) substantially directed upwards, in particular towards

the flame divider (30).

35. A burner (1) according to claim 34, characterized in that said burner body (20) comprises a substantially U-shaped housing (23) surrounding the upper part of the Venturi effect chamber (21), and said flame divider (30) comprises a wall (30P) extending under the flame divider (30) towards said housing (23).

36. A burner (1) according to claim 27, characterized in that it comprises a flame divider (30) associated with said burner body (20), said flame divider (30) comprising a plurality of first apertures (31) to allow the gas to escape, said first apertures (31) being in particular so realized as to generate a flame that propagates outwards from the burner (1) in a substantially axial direction with respect to an axis (A-A) of the burner (1).

37. A burner (1) according to claim 36, characterized in that each first aperture (31) comprises a first portion (31a), a second portion (31b) and an intermediate portion (31c), said second portion (31b) being closer to a central area (30C) of the flame divider (30) than said first portion (31a).

38. A burner (1) according to one or more of claims 36 and 37, characterized in that it comprises a plurality of second apertures (32) for flame propagation.

39. A burner (1) according to claim 38, characterized in that each second aperture (32) is positioned between a pair of said first apertures (31).

40. A burner (1) according to claim 27, characterized in that said flame divider (30) comprises profiled portions (33) adapted to allow room for at least one ignition spark plug (60) and/or at least one thermocouple (70).

41. A cooking appliance comprising a gas burner (1) according to one or more of the preceding claims 27 to 40.

42. A gas burner (1), in particular for a cooking appliance, of the type that comprises:

- a cup (10) associated with supply means (11, 12) for supplying gas to said burner (1);
- a burner body (20) associated with said cup (10) and comprising a Venturi effect chamber (21);
- coupling means (40; 50; 60, 70) allowing said cup (10) and said burner

body (20) to be coupled together,

characterized in that

said coupling means comprise:

- at least one ignition element (60) for igniting the flame of said burner (1), wherein the ignition element (60), in particular a spark plug, comprises a first part (61) coupled to the cup (10) and a second part (62) coupled to the burner body (20), and/or
- at least one detection element (70) for detecting the flame of said burner (1), wherein said detection element (70), in particular a thermocouple, comprises a first segment (71) coupled to the cup (10) and a second segment (72) coupled to the burner body (20).

43. A burner (1) according to claim 42, characterized in that it comprises an ignition element (60) and a detection element (70), in particular arranged on opposite sides with respect to the cup (10) and to the burner body (20).

44. A burner (1) according to one or more of the preceding claims 42 and 43, characterized in that said first part (61) and second part (42) of said at least one ignition element (60) and/or said first segment (71) and second segment (72) of said at least one detection element (70) comprise first fitting means (61a, 62a; 71a, 72a) allowing said first part (61) and second part (62) and/or said first segment (71) and second segment (72) to be fastened together.

45. A burner (1) according to claim 44, characterized in that said first fitting means (61a, 62a; 71a, 72a) comprise male connectors (61a; 71a) adapted to be associated with respective female connectors (62a; 72a), in particular said male connectors (61a; 71a) and female connectors (62a; 72a) being of the Faston type.

46. A burner (1) according to one or more of the preceding claims 42 to 45, characterized in that said first part (61) of the ignition element (60) and/or said first segment (71) of the detection element (70) are associated with the cup (10) of the burner (1) by means of at least one bracket (13), in particular said at least one bracket (13) including a second window (14B) adapted to receive said first part (61) and/or said first segment (71).

47. A burner (1) according to one or more of the preceding claims 42 to 46,

characterized in that said second part (62) of the ignition element (60) and/or said second segment (72) of the detection element (70) are associated with the burner body (20) by means of at least one sector (25) of the burner body (20), said sector (25) being preferably perforated in a manner such as to laterally embrace said second part (62) and/or said second segment (72).

48. A burner (1) according to claim 42, characterized in that a compartment (22) is obtained between the burner body (20) and the flame divider (30) for letting the gas flow from the chamber (21) to said plurality of apertures (31), said compartment (22) comprising:

- a substantially straight first section (22a), said first section (22a) being positioned horizontally on top of the Venturi effect chamber (21);
- a second section (22b) substantially directed downwards, in particular towards the cup (10);
- a third section (22c) substantially directed upwards, in particular towards the flame divider (30).

49. A burner (1) according to claim 42, characterized in that it comprises a flame divider (30) associated with said burner body (20), said flame divider (30) comprising a plurality of first apertures (31) to allow the gas to escape, said first apertures (31) being in particular so realized as to generate a flame that propagates outwards from the burner (1) in a substantially axial direction with respect to an axis (A-A) of the burner (1).

50. A burner (1) according to claim 49, characterized in that said first apertures (31) are so realized as to have an elongated shape when viewed from above.

51. A burner (1) according to one or more of the preceding claims 42 to 50, characterized in that said coupling means comprise second snap fitting means (40, 50).

52. A burner (1) according to claim 51, characterized in that said second snap fitting means comprise at least one pin (40) and at least one clip (50), in particular said at least one clip (50) being made of elastic material and being adapted to receive said at least one pin (40) so as to exert a snap fitting action.

53. A burner (1) according to one or more of claims 51 and 52, characterized in that said at least one pin (40) comprises a pair of pins (40) adapted to be associated with the burner body (20), and said at least one clip (50) comprises a pair of clips (50) adapted to be associated with the cup (10).

54. A burner (1) according to one or more of the preceding claims 51 to 53, characterized in that said at least one pin (40) comprises:

- a first end (41) adapted to be coupled to the burner body (20), in particular to a stem (24) extending from a lower portion of the burner body (20);
- a second end (42) adapted to be coupled to said at least one clip (50), in particular said second end (42) being round and bigger than an intermediate body (43) of the pin (40).

55. A burner (1) according to one or more of the preceding claims 51 to 54, characterized in that said at least one clip (50) is substantially U-shaped and comprises:

- a curved base (51), adapted to fit into a first window (14) of the cup (10);
- a pair of bent ends (52), adapted to hook onto the edges of said first window (14);
- a restriction (53), in particular obtained between said base (51) and said pair of bent ends (52), said restriction (53) being adapted to hold the first end (41) of the pin (40) in such a way as to provide a snap fitting between the pin (40) and the clip (50).

56. A cooking appliance comprising a gas burner (1) according to one or more of the preceding claims 42 to 55.

57. A gas burner (1), in particular for a cooking appliance, of the type that comprises a flame divider (30) comprising a plurality of first apertures (31) to allow the gas to escape, which are so realized as to generate a flame,
characterized in that
said flame divider (30) is made of a sintered material, in particular said sintered material consisting of stainless steel or a ceramic material or a metal alloy.

58. A burner (1) according to claim 57, characterized in that said first apertures (31) are created during the sintering process, and are so realized as to

generate a flame that propagates in a substantially axial direction with respect to an axis (A-A) of the burner (1).

59. A burner (1) according to one or more of the preceding claims 57 and 58, characterized in that said first apertures (31) are so realized as to have an elongated shape when viewed from above.

60. A burner (1) according to claim 59, characterized in that said first apertures (31) are so realized as to have a substantially elliptic and/or rectangular shape with bevelled corners.

61. A burner (1) according to one or more of the preceding claims 57 to 60, characterized in that said burner (1) is so realized as to have a substantially circular shape when viewed from above.

62. A burner (1) according to one or more of the preceding claims 57 to 61, characterized in that each first aperture (31) comprises a first portion (31a), a second portion (31b) and an intermediate portion (31c), said second portion (31b) being closer to a central area (30C) of the flame divider (30) than said first portion (31a).

63. A burner (1) according to claim 62, characterized in that each first aperture (31) is oriented in a substantially radial manner on said flame divider (30).

64. A burner (1) according to claims 61 and 62, characterized in that each first aperture (31) is inclined relative to a radius (R) of said flame divider (30).

65. A burner (1) according to claims 61 and 62, characterized in that said first portion (31a) and second portion (31b) of each first aperture (31) lie each on a different radius (R).

66. A burner (1) according to one or more of the preceding claims 64 and 65, characterized in that said first apertures (31) are inclined in the same direction at substantially the same angle relative to a radius (R) of the flame divider (30).

67. A burner (1) according to one or more of the preceding claims 57 to 67, characterized in that it comprises a plurality of second apertures (32) for flame propagation, in particular said second apertures (32) having a substantially circular shape when viewed from above.

68. A burner (1) according to claim 67, characterized in that each second

aperture (32) is positioned between a pair of said first apertures (31), in particular each second aperture (32) being positioned in the proximity of:

- a first portion (31a) of a first aperture (31);
- a second portion (31b) of a next first aperture (31).

69. A burner (1) according to claim 57, characterized in that said flame divider (30) comprises profiled portions (33) adapted to allow room for at least one ignition spark plug (60) and/or at least one thermocouple (70).

70. A burner (1) according to claim 69, characterized in that it comprises a plurality of ducts (34) obtained on said flame divider (30) and/or on a burner body, said ducts (34) being located between said ignition spark plug (60) and/or said thermocouple (70) and said first apertures (31) and/or said second apertures (32).

71. A burner (1) according to any one of the preceding claims 57 to 70, characterized in that said first apertures (31) have a constant cross-section along the whole thickness of said flame divider (30).

72. A cooking appliance comprising a gas burner (1) according to one or more of the preceding claims 57 to 71.

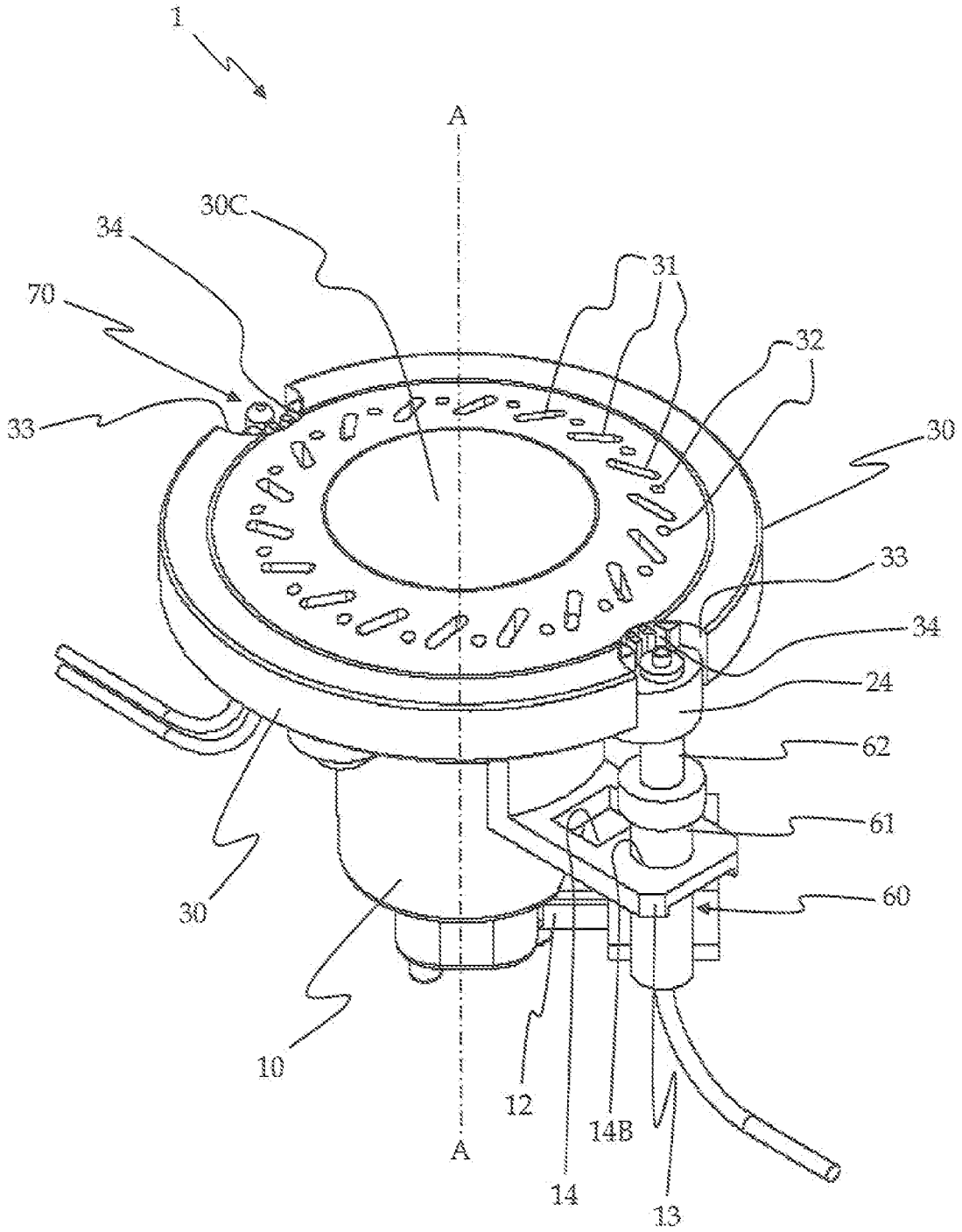


Fig. 1

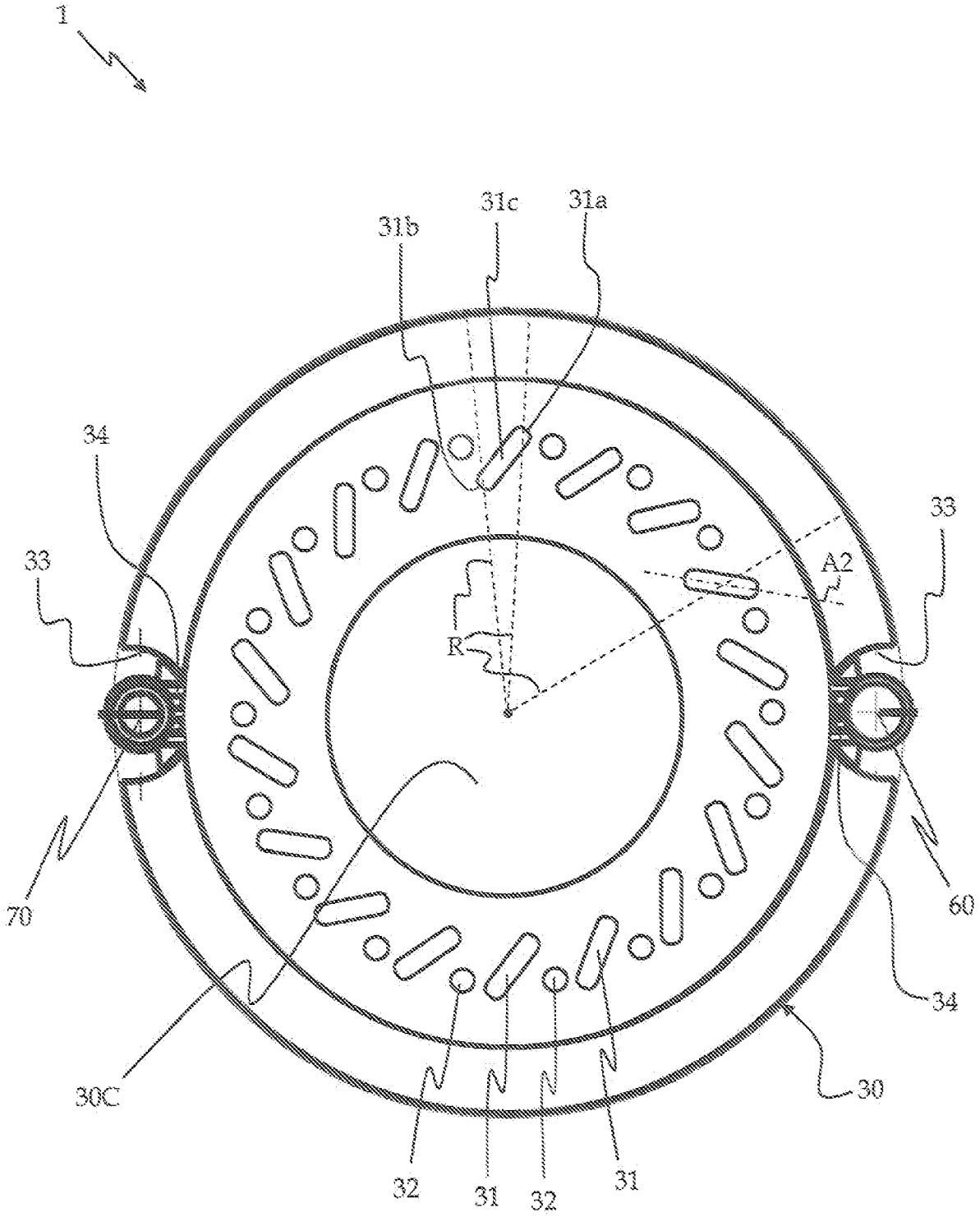


Fig. 2

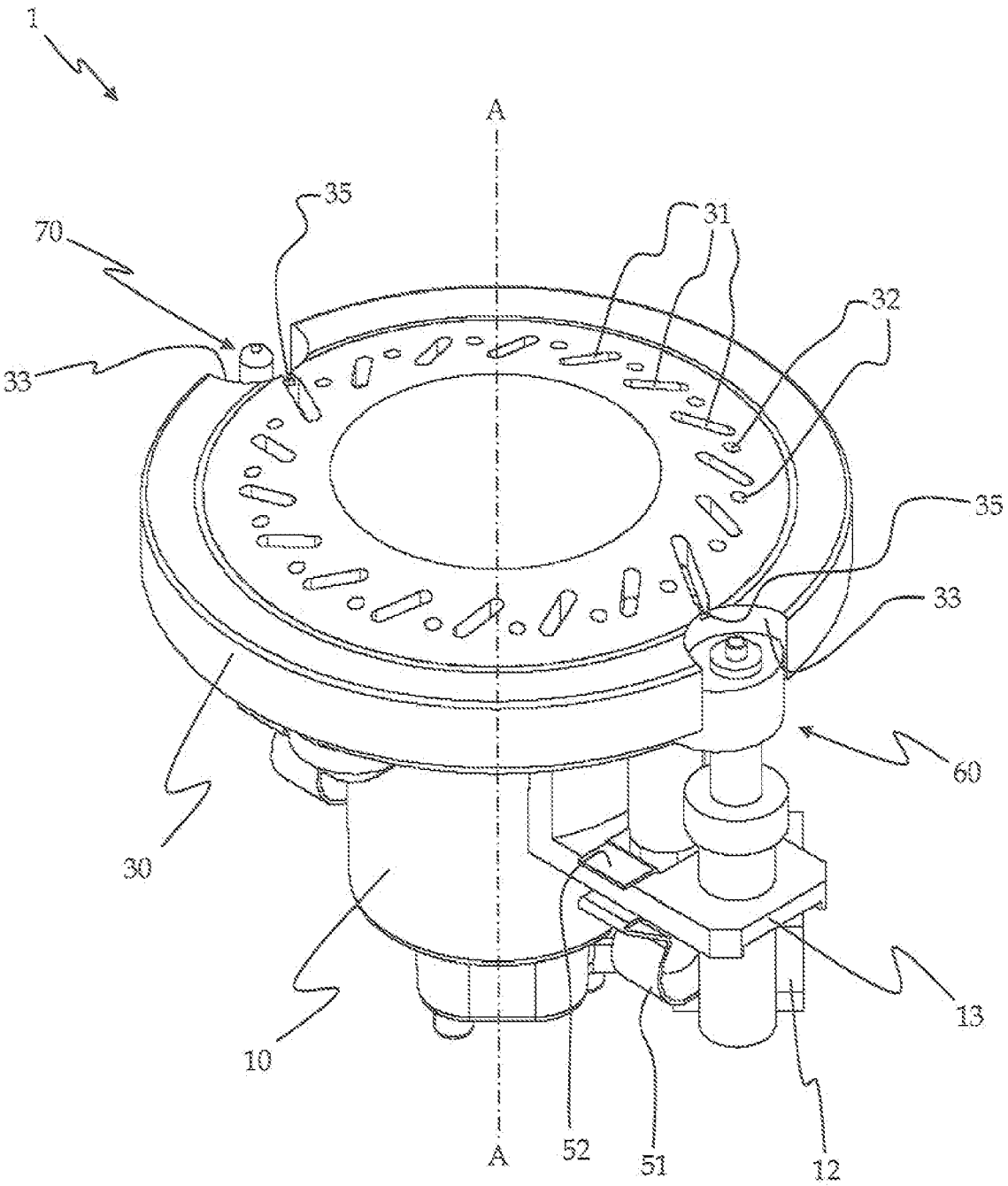


Fig. 3

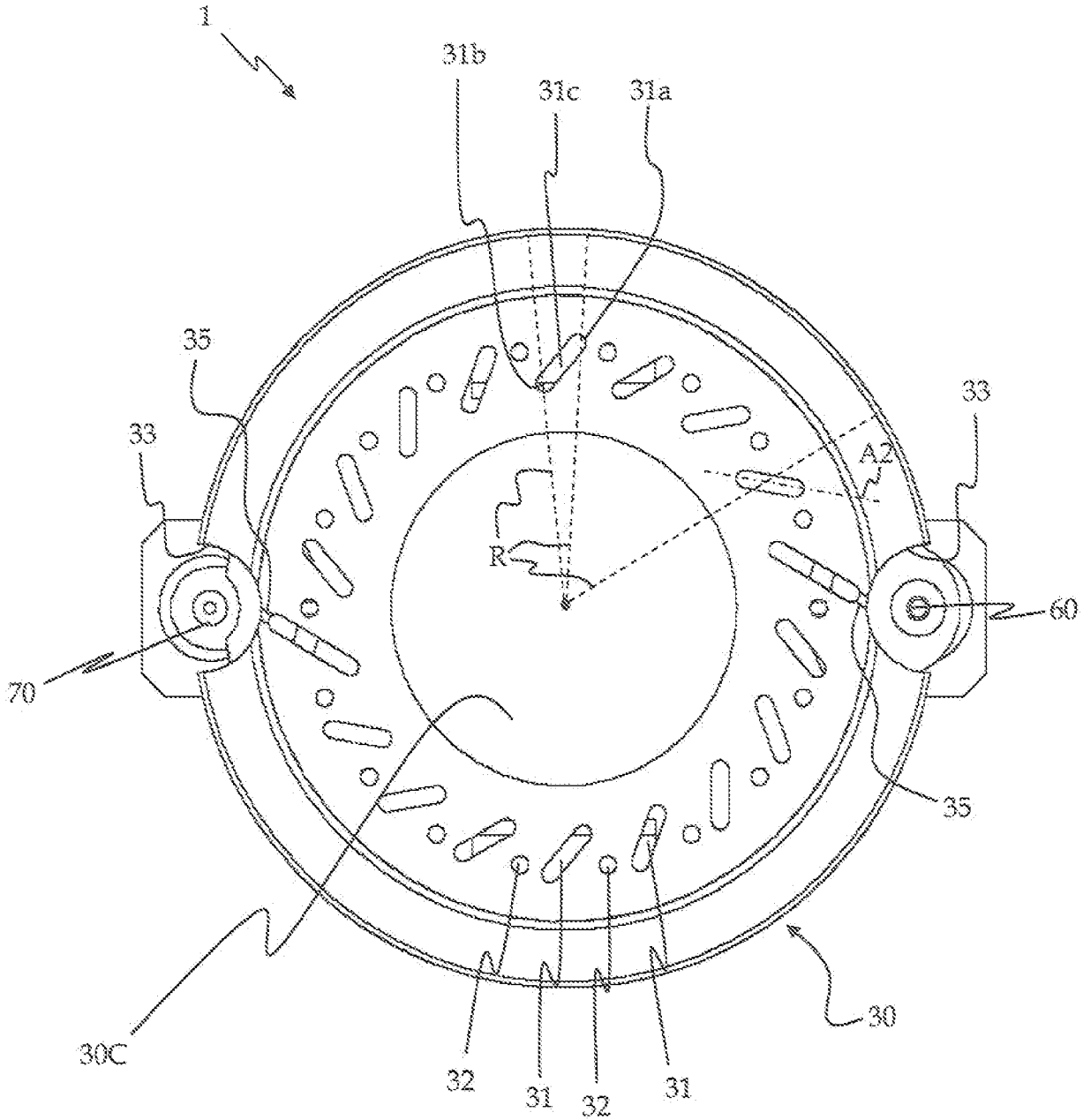
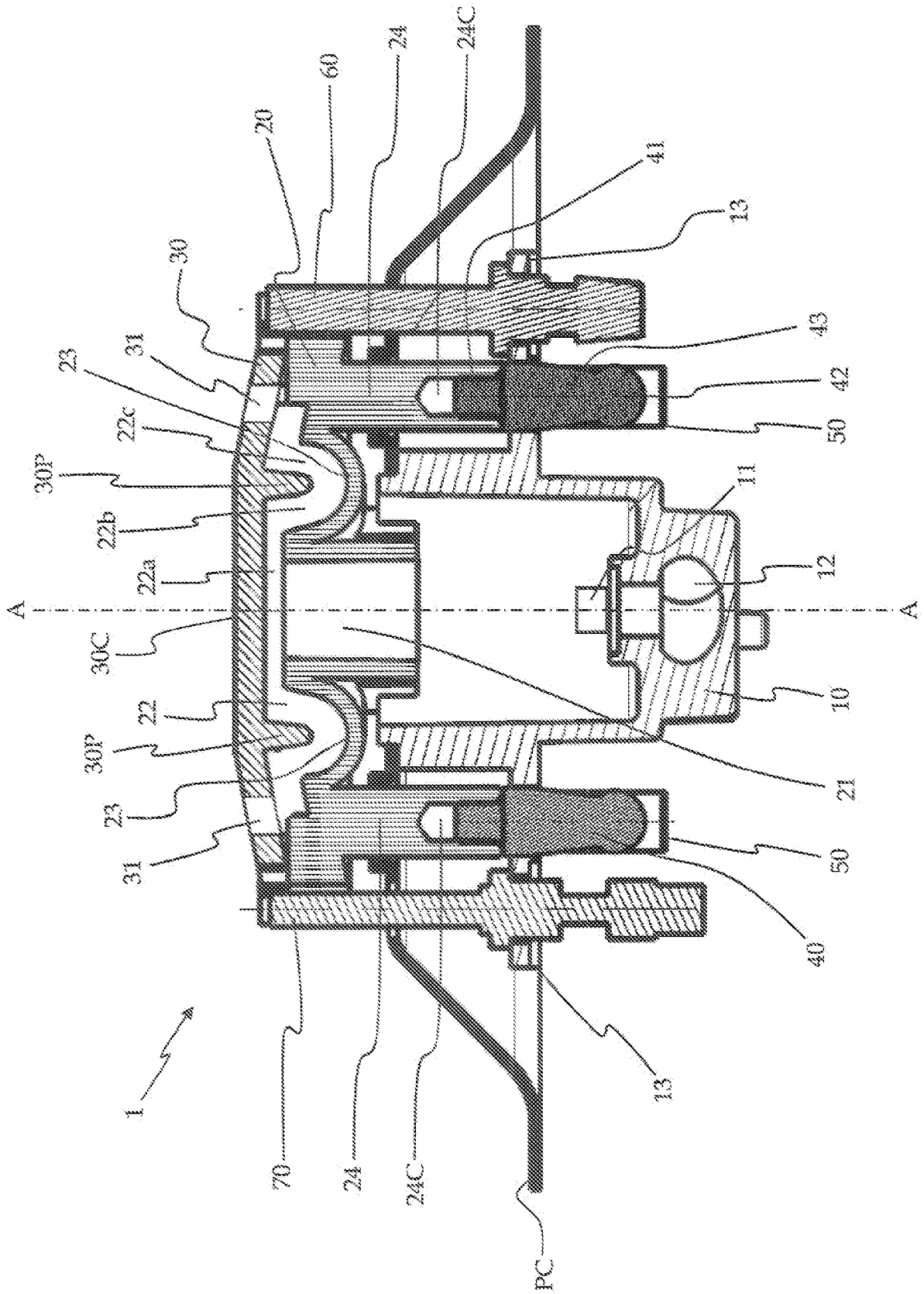


Fig. 4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PC
13
40
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10
12
11
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13
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24C
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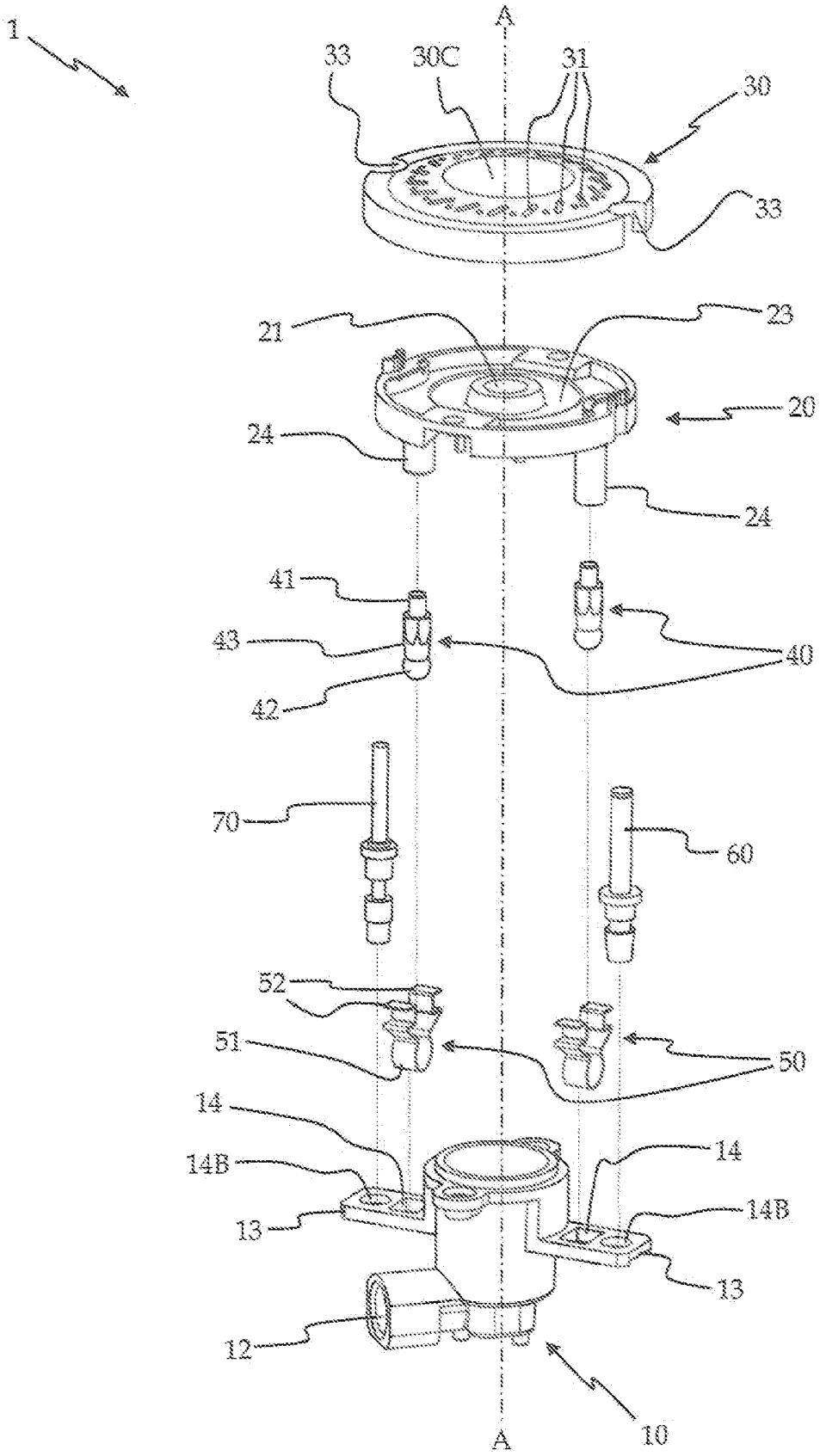
A
30C
22
30P
23
31
A

Fig. 5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13
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14B
13
12
10
A

Fig. 6

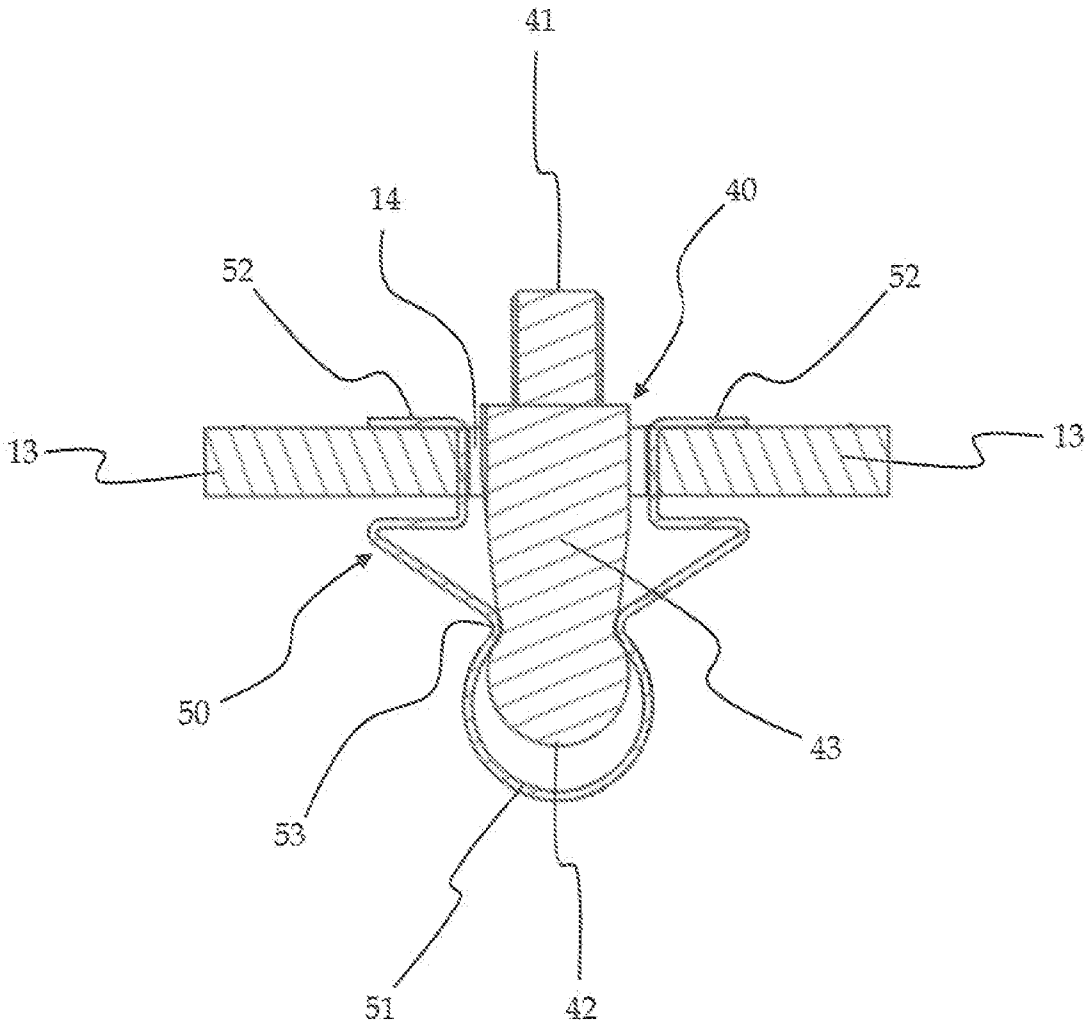
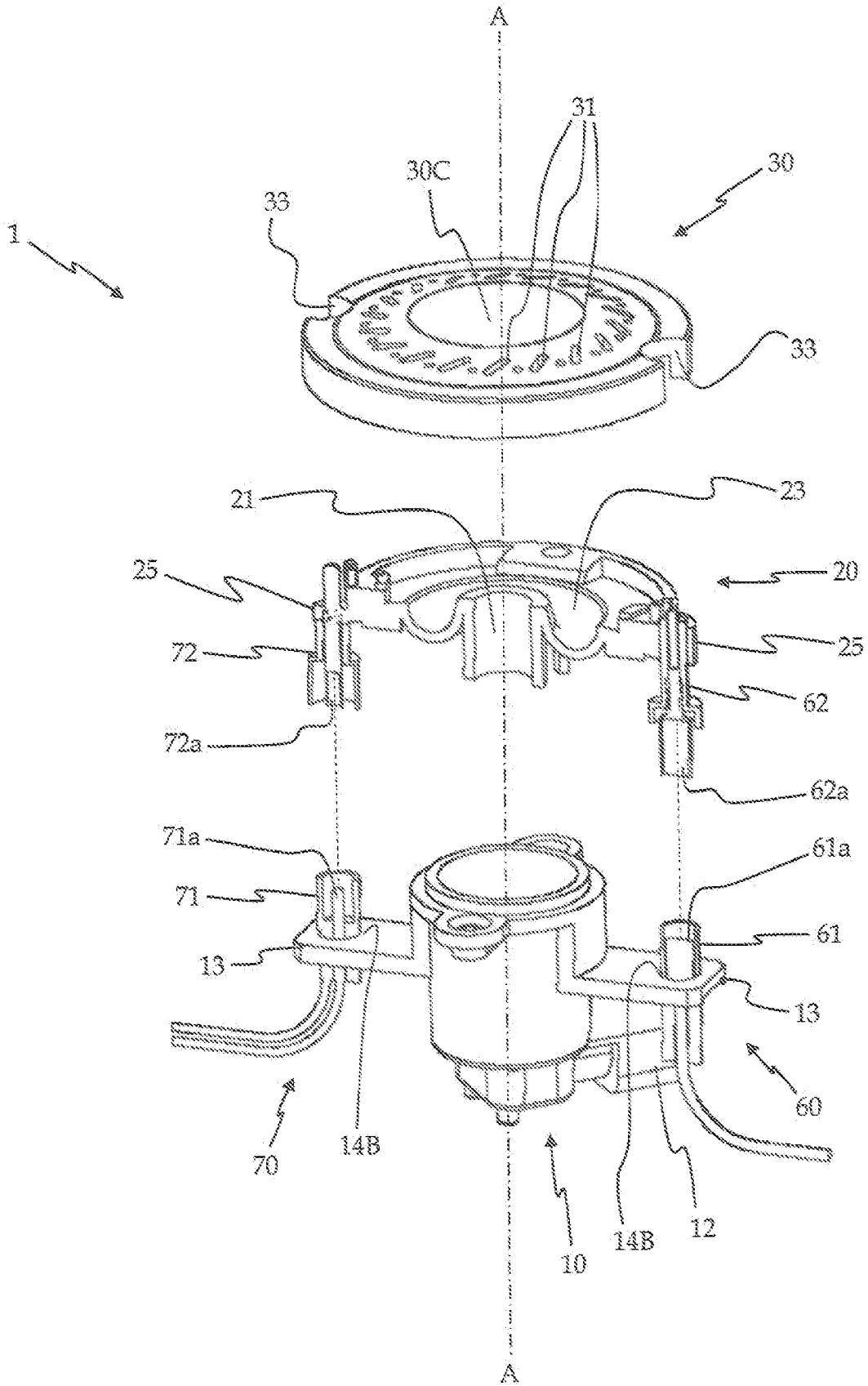


Fig. 7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13
13
60
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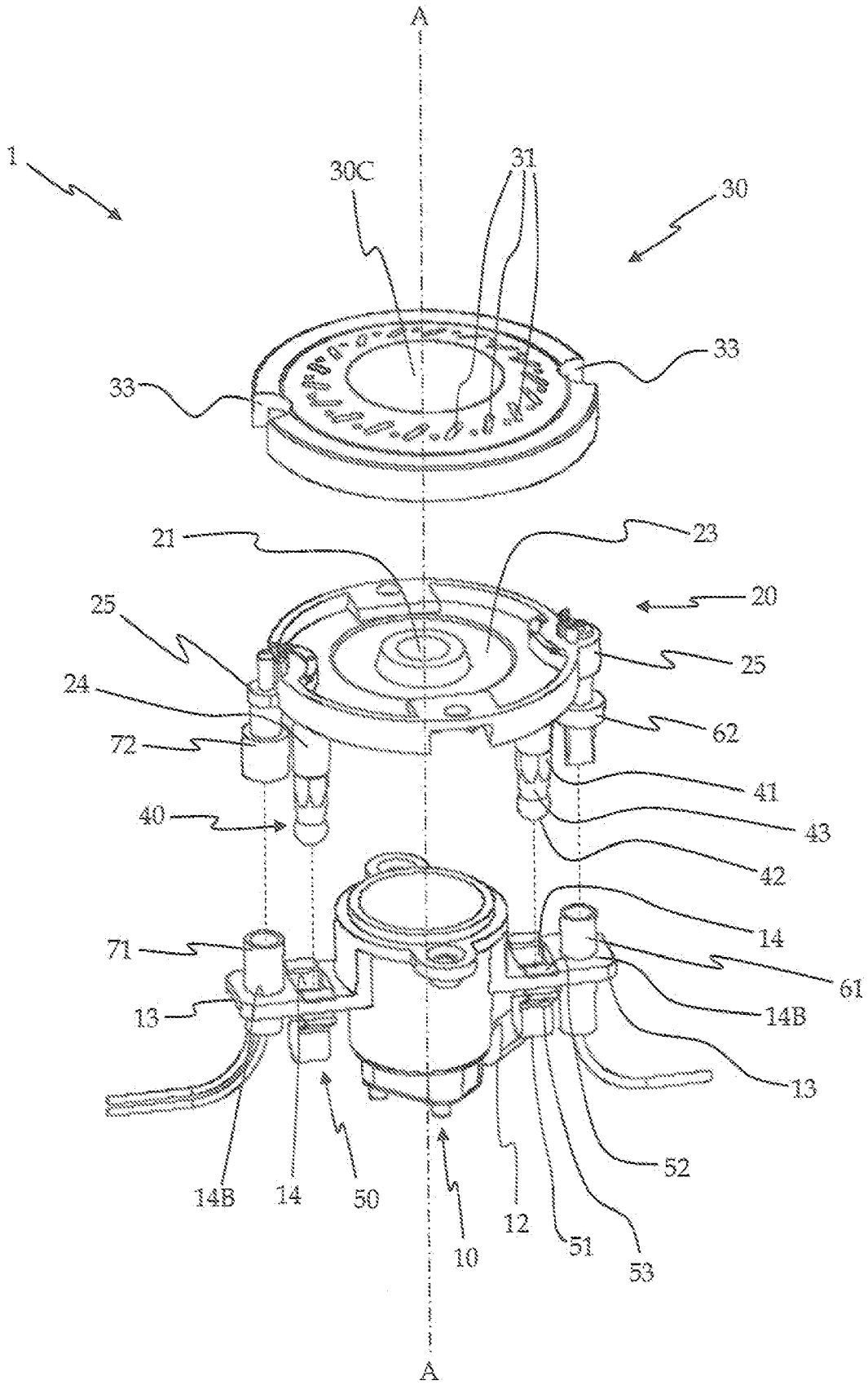
14B
10
14B
12
A

Fig. 8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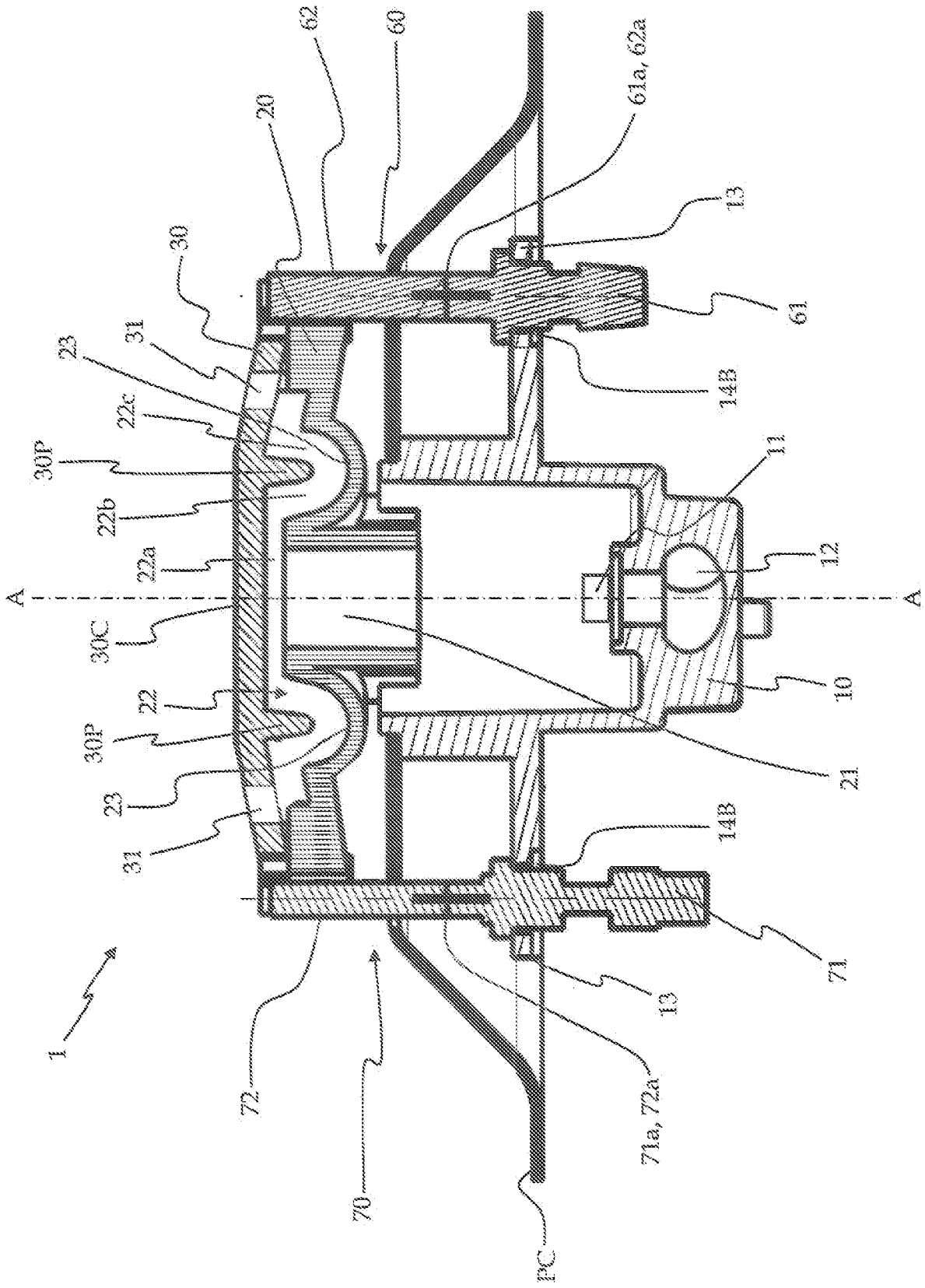
14B
14
50
12
10
51
53
A

Fig. 9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30
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22b
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30C
10
22
30P
21
23
14B
31
71
1
13
72
71a, 72a
70
PC

Fig. 10