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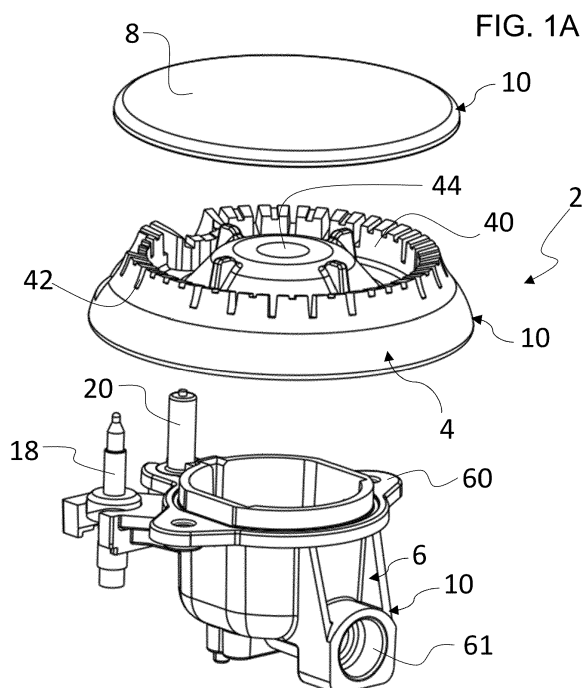
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(54) **AN IMPROVED COMPONENT OF A GAS BURNER**

(57) Component (10) of a gas burner (2) or an item to be placed over and/or in proximity of a gas burner (2),

characterized in that said component (10) and/or item comprises silicate mineral and waterglass.



## Description

### FIELD OF INVENTION

**[0001]** The present invention relates to a component of a gas burner, such as for example a cover of a gas burner, and/or relates to an item for a gas burner, in particular to be placed over and/or in proximity of a gas burner, such as for example a pan support or other cooking vessels.

**[0002]** The present invention relates also to a method for producing a component of a gas burner and/or to an item to be placed over and/or in proximity of a gas burner.

### STATE OF THE ART - PRIOR ART

**[0003]** Known burners commonly comprise an injector(s) holder, a base positioned on the injector(s) holder and a cover (called also "lid" or "cap") positioned on the base and defining with it a chamber for mixing and distributing the air-gas mixture.

**[0004]** The injector(s) holder is commonly made of die-cast aluminum and is provided with means for its fastening to the hob; moreover, on the injector(s) holder are mounted one or more injectors, that can be vertically or horizontally aligned and that are fluidically connected with one or more gas supply inlets.

**[0005]** Also, the base is commonly made of die-cast aluminum and is usually provided with one or more ducts for transferring the air-gas mixture to a corresponding distribution chamber that is closed on the top by the cover.

**[0006]** On the outer edge of the base a plurality of main and/or secondary doors are obtained for the generation of a group of flames suitable for heating the cooking vessels placed above the burner itself. Indeed, the base may also act as flame-spreader.

**[0007]** In some known solutions the base is made of brass.

**[0008]** The cover is commonly formed as a molded part, in particular is made of casting iron, that is provided with an enameling coating for an easier cleaning.

**[0009]** In some known solutions the cover is made of brass or is stamped from a metal sheet, for example from an aluminum sheet.

**[0010]** The above-mentioned known materials used for making the components of the gas burner, and in particular for making the cover, have high properties in terms of thermal stress and thermal shock resistance. More in detail, in correspondence of the flames, a stability to a temperature of about 800°C needs to be maintained.

**[0011]** Moreover, such materials also have a certain mechanical stability and tolerance, and also a certain electrical conductivity, so as to generate the spark to ignite the gas flame.

**[0012]** Furthermore, such materials need to be washable, even suitable to be washed in a dishwasher.

**[0013]** WO2014/027270 discloses an easy-to-clean and correspondingly aesthetic vitroc ceramic burners and

d/or pan supports.

**[0014]** Even if highly appreciated, the known components of a gas burner, and in particular the covers made of casting iron, are not so easy to produce. In particular, such components do not result to be fully optimized in terms of required materials and manufacturing process for their production and this is now a challenging aspect considering the rising of material cost, the shortage of material availability, the need of waste reducing and energy consumption, in particular for environmental sustainability.

**[0015]** Moreover, there is a safety need that, when the flames are generated, the components of the gas burner remain cooler than the ones of the known solutions.

### OBJECTS OF THE INVENTION

**[0016]** The object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which overcomes, at least in part, the drawbacks of traditional solutions.

**[0017]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is easier to produce.

**[0018]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is more eco-friendly to produce.

**[0019]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is lighter.

**[0020]** Another object of the invention is to propose a component of a gas burner that remains cooler when the flames are generated.

**[0021]** Another object of the invention is to propose an item to be placed over and/or in proximity of a gas burner that remains cooler when the flames are generated.

**[0022]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which has good and proper thermal properties, in particular in terms of thermal stress and thermal shock resistance.

**[0023]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which has good and proper mechanical properties, in particular in terms of mechanical stability and tolerance.

**[0024]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which has good and proper electrical properties, in particular so as to generate the spark to ignite the gas flame.

**[0025]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is easy to clean, and which is suitable to be washed in a dishwasher.

**[0026]** Another object of the invention is to propose a

component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is made of an alternative material in respect to the known solutions, while having substantially the same mechanical and thermal performances.

**[0027]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which has a particularly pleasant overall aesthetic effect.

**[0028]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is made of an alternative material in respect to the known solutions and which, at the same time, is easy-to-clean, has a pleasant appearance and is simple to manufacture.

**[0029]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner of simple construction and low cost.

**[0030]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner with low materials and productions costs.

**[0031]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which can be mass-produced quickly and efficiently.

**[0032]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which has an alternative and/or improved characterization, both in constructive and functional terms, with respect to the traditional ones.

**[0033]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which is harmless from a health point of view.

**[0034]** Another object of the invention is to propose a component of a gas burner or an item to be placed over and/or in proximity of a gas burner which meets high standards, both functionally and aesthetically, and at the same time has an affordable cost, thus allowing the possibility of its diffusion on a large scale.

### SUMMARY OF THE INVENTION

**[0035]** All these objects, both alone and in any combination thereof, and others which will result from the following description are achieved, according to the invention, with a component of a gas burner or an item to be placed over and/or in proximity of a gas burner with the features of claim 1.

**[0036]** The present invention relates to a component of a gas burner and/or an item to be placed over and/or in proximity of a gas burner, characterized in that said component and/or item comprises silicate mineral and waterglass.

**[0037]** Preferably, the component and/or item is ob-

tained by a wet mixture of a granulated silicate material with waterglass.

**[0038]** Preferably, the component and/or item comprises a mixture of a granulated/powdered silicate material pressed or molded with a waterglass binder.

**[0039]** Preferably, said silicate mineral is mica. Preferably, said silicate mineral is an expanded mica. Preferably, the mica-group mineral, when they are so referred to in the specification and claims, means a highly laminar phyllosilicate, and the mica-group mineral includes vermiculite, hydrobiotite, muscovite, paragonite, phlogopite, biotite, lepidolite, glauconite, chlorite, apophyllite or the like.

**[0040]** Ideally, said mica is vermiculite. More ideally, said expanded mica is expanded vermiculite.

**[0041]** Preferably, said silicate mineral is silicate of the vermiculite series. Preferably, the diameter of the particles of expanded vermiculite in the final component is typically of about 0,2 - 2 mm, more preferably of about 0,7 - 1,2 mm. If appropriate, vermiculite particles which have sizes above or below the limits or foreign materials are removed by sieving or classification before production of the molded component.

**[0042]** In a possible embodiment of the invention, the starting mixture can contain 10 - 85% by weight of vermiculite. Ideally, the starting mixture can contain 70 - 80% by weight of vermiculite or other mica mineral. Advantageously, this also serves to improve the thermal insulation properties.

**[0043]** Preferably, the vermiculite or other mica mineral is provided as powder.

**[0044]** In a possible embodiment of the invention, the final component and/or item after the drying can contain 15 - 95% by weight of vermiculite or other mica mineral. Ideally, the final component and/or item after the drying can contain 85 - 90% by weight of vermiculite or other mica mineral.

**[0045]** Preferably, said waterglass is potassium or sodium waterglass. Advantageously, said potassium or sodium waterglass acts as a binder in order to firmly hold the materials pressed together, i.e. to improve the mechanical stability. Preferably, said waterglass is an aqueous solution of potassium silicate. Ideally, Preferably, said waterglass is K43. Ideally, said potassium waterglass is the one identified by the trade name "Betol K43 T" supplied by Wöllner GmbH. Conveniently, said waterglass may be K19. Conveniently, said waterglass may be K28. Ideally, said waterglass is a mixture comprising about 25 - 50% of silicic acid and potassium salt. Ideally, in said waterglass the molar ratio of silicic acid and potassium salt is 2,6 - 3,2.

**[0046]** Preferably, said waterglass is characterized by the following reaction:  $M_2CO_3 + nSiO_2 \rightarrow M_2O \cdot nSiO_2 + CO_2$  wherein "M" is Sodium (Na) or Potassium (K), while "n" is from 1 to 4.

**[0047]** Ideally, said waterglass is potassium silicate and is characterized by the following reaction:  $K_2CO_3 + 2SiO_2 \rightarrow K_2O \cdot 2SiO_2 + CO_2$ .

**[0048]** In a possible embodiment of the invention, the starting mixture can contain 10 - 60% by weight of potassium waterglass. Ideally, the starting mixture can contain 20-30% by weight of potassium waterglass.

**[0049]** In a possible embodiment of the invention, the final component and/or item after the drying can contain less than 30% by weight of potassium waterglass. Ideally, the final component and/or item after the drying can contain 10 - 15% by weight of potassium waterglass.

**[0050]** In a possible embodiment, the component and/or item comprises the following weight - related composition:

- 70 - 80 % by weight of vermiculite or other mica mineral,
- 20 - 30 % by weight of potassium waterglass.

**[0051]** Preferably, the relationship between waterglass and solid content comprising vermiculite (and eventually further solid), or other mica mineral, is between 20-70%. More preferably, it is 28-43%. Ideally, such relationship is about 43% before the drying step.

**[0052]** Preferably, the component and/or item is finished so as to have a high conductivity that is suitable for an arc to ignite.

**[0053]** Preferably, the waterglass in the finished component and/or item is stable in the sense that it is at the temperatures not building in electrical insulating SiO<sub>2</sub> layer.

**[0054]** In a possible embodiment, the component and/or item does not contain fibers and, in particular, is fiber-free. Advantageously, the component and/or item has mechanical stability even without the addition of fibers.

**[0055]** In a possible embodiment, the component and/or item contains fibers and, preferably, contains less than about 5% of fibers.

**[0056]** Conveniently, the materials in the component and/or item, in particular in terms of the waterglass (for example for comparing Si and K), may be suitably identified for example by one of the following techniques: X-ray Diffraction (XRD), Scanning/Reflection Electron Microscopy (REM), Energy-Dispersive X-ray Spectroscopy (EDX), Raman Spectroscopy, Nuclear magnetic resonance (NMR) spectroscopy and X-ray Fluorescence (XRF).

**[0057]** Preferably, the component of the gas burner is a cover (also called "lid" or "cap"), that is a piece that - together with an underlying base - defines a chamber for mixing and/or distributing the air-gas mixture.

**[0058]** Preferably, the cover may have any shape or dimensions of the known gas burner. For example, the cover may be disk-shaped, ring-shaped, plate-shaped, or with an elongated shape, flat or concave.

**[0059]** Preferably, the component of the gas burner is a base on which the cover is positioned. Preferably, said base is configured to act as flames spreader.

**[0060]** Preferably, the component of the gas burner is an injector holder, that is a component on which at least

one injector is mounted.

**[0061]** Ideally, the openings for the exiting of flames are defined on the base and/or on the cover.

**[0062]** Preferably, said item to be placed over and/or in proximity of a gas burner comprises a support for a pan or cooking vessel. Ideally, said item is grid shaped. Ideally, said item comprises at least one supporting arm.

**[0063]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner is obtained by a moist powder mixture that is pressed and dried.

**[0064]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner comprises a colored additive. Preferably, said colored additive is configured so as to maintain its color within the temperature range of room temperature until about 850°C, more preferably until about 1100°C.

**[0065]** Ideally, said colored additive comprises inorganic pigments. For example, said colored additive comprises inorganic pigments supplied by Alfarben. For example, said inorganic pigments can comprise one of the following:

- Chrome antimony titanium buff rutile
- Nickel Antimony Titanium Yellow Rutile
- Bismuth Vanadate,
- Zinc Ferrite
- Cobalt Aluminate Blue Spinel,
- Cobalt Chromite Blue-Green Spinel,
- Black Iron Manganese Oxide
- Chrome Oxide Green
- Red Iron Oxide
- Chromium iron oxide
- Manganese antimony titanium buff rutile
- Copper chromite black spinel

**[0066]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner comprises a thermochromic material. Preferably, said thermochromic material is an additive. Preferably, said thermochromic material is configured to change its optical properties according to the temperature. Preferably, said thermochromic material is configured to change reversibly its optical properties according to the temperature.

**[0067]** Preferably, said optical properties relate to colors. Preferably, said optical properties relate to light reflection and/or light adsorption.

**[0068]** Preferably, said thermochromic material comprises a dye or pigment.

**[0069]** Preferably, said thermochromic material is configured to change its optical properties (colors) within the temperature range of about 50-200°C, more preferably within the temperature range of about 50-100°C, ideally within the temperature range of about 60-80°C. Preferably, said thermochromic material is configured to have an activation temperature of changing its optical properties of about 50 - 60°C.

**[0070]** Preferably, said thermochromic material is configured to maintain a first color at a first temperature that is significantly lower than the temperature of the flames exiting from the gas burner.

**[0071]** Preferably, said thermochromic material comprise thermochromic liquid crystals (TLC).

**[0072]** Preferably, said thermochromic material comprise titanium dioxide (TiO<sub>2</sub>).

**[0073]** Preferably, said thermochromic material comprise Zinc oxide (ZnO).

**[0074]** Preferably, said thermochromic material and/or said colored material area added to the mixture during its preparation.

**[0075]** Advantageously, said thermochromic material allows to easily and quickly identify overheating, thus being useful for safety. Moreover, said thermochromic material contributes to a pleasant and distinctive design of the component.

**[0076]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner comprises an UV adsorber (stabilizer).

**[0077]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner comprises the encapsulation of the thermochromic material in a polymeric matrix.

**[0078]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner comprises an age resistant binder.

**[0079]** Optionally, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner may be coated.

**[0080]** Advantageously, the cover is not provided with an enameling coating.

**[0081]** Advantageously, the cover is not made of casting iron.

**[0082]** The present invention also relates to a gas burner having at least one component with one or more of the above-mentioned features. Preferably, the gas burner has a cover with one or more of the above-mentioned features.

**[0083]** The present invention also relates to a method for manufacturing a component of a gas burner and/or an item to be placed over and/or in proximity of a gas burner, characterized in that it comprises the following steps:

- mixing the starting materials, wherein said starting materials comprise silicate and waterglass, wherein preferably said silicate is vermiculite and more preferably is expanded vermiculite,
- pressing the mixture in a mold having a shape configured so as to define the final shape of the component or item to be manufactured,
- drying the component or item so obtained.

**[0084]** Preferably, the method may comprise, after the drying step, an additional coating of the component or item so obtained. Preferably, said coating may comprise a colored additive and/or a thermochromic material

**[0085]** Ideally, the final shape of the component and/or item to be manufactured is defined by the mold without requiring further machining or processing.

**[0086]** Preferably, the drying phase is performed by heating.

**[0087]** Ideally, the heating is performed by oven or IR radiation, UV radiation, microwave radiation.

**[0088]** Preferably, the heating temperature of the drying phase is below 300°C (measured at the core). Ideally, the heating temperature of the drying phase is at about 200 - 250°C.

**[0089]** Preferably, the drying step lasts for a 10 -120 minutes, more preferably for almost 20 - 30 minutes, at about 120 - 300°C, more preferably at about 200 - 250°C.

**[0090]** Preferably, the drying phase is performed by removing the component from the mold. Preferably, the method for producing said component and/or item comprises the following steps:

- it is prepared a moist powder mixture comprising silicate and waterglass, wherein preferably said silicate is vermiculite and more preferably is expanded vermiculite,
- the mixture so prepared is pressed inside a die so as to obtain a shaped body corresponding to the shape of the component,
- the shaped body so obtained is dried.

**[0091]** Preferably, said component of a gas burner and/or said item to be placed over and/or in proximity of a gas burner is obtained by a mixture of electrically conductive powder that is pressed with waterglass and then dried, wherein the drying temperature is below 300°C.

**[0092]** Advantageously, the temperatures required for the production of the components and/or items according to the invention are lower than the temperatures of the known production methods, thus being more eco-friendly.

## DESCRIPTION OF THE FIGURES

**[0093]** The present invention is hereinafter further clarified in some of its preferred embodiments shown for purely exemplifying and non-limiting purposes with reference to the accompanying drawings, in which:

Figure 1A shows an exploded perspective view of a burner according to the invention in a first embodiment,

Figure 1B shows a perspective view of the assembled burner of Fig. 1A,

Figure 2A shows an exploded perspective view of a burner according to the invention in a second embodiment,

Figure 2B shows a perspective view of the assembled burner of Fig. 2A,

Figure 3A shows an exploded perspective view of a

- burner according to the invention in a third embodiment,
- Figure 3B shows a perspective view of the assembled burner of Fig. 3A,
- Figure 4A shows an exploded perspective view of a burner according to the invention in a fourth embodiment,
- Figure 4B shows a perspective view of the assembled burner of Fig. 4A,
- Figure 5A shows an exploded perspective view of a burner according to the invention in a fifth embodiment,
- Figure 5B shows a perspective view of the assembled burner of Fig. 5A.

#### DETAILED DESCRIPTION OF THE INVENTION AND OF ITS PREFERRED AND EXEMPLARY EMBODIMENTS

**[0094]** The present invention relates to a component - that is indicated with the reference number "10" - of a gas burner 2 and/or an item to be placed over and/or in proximity of a gas burner 2, wherein said component and/or item comprises silicate mineral and waterglass.

**[0095]** Preferably, the component 10 and/or item is obtained by a wet mixture of a granulated silicate material with waterglass.

**[0096]** Preferably, the component 10 and/or item comprises a mixture of a granulated/powdered silicate material pressed or molded with a waterglass binder.

**[0097]** Preferably, said silicate mineral is mica. Conveniently, the mica-group mineral may include vermiculite, hydrobiotite, muscovite, paragonite, phlogopite, biotite, lepidolite, glauconite, chlorite, apophyllite or the like.

**[0098]** Preferably, said silicate mineral is an expanded mica. Ideally, said mica is vermiculite. More ideally, said expanded mica is expanded vermiculite.

**[0099]** Preferably, said waterglass is potassium or sodium waterglass. Ideally, said waterglass is a mixture comprising about 25 - 50% of silicic acid and potassium salt. Ideally, in said waterglass the molar ratio of silicic acid and potassium salt is 2,6 - 3,2.

**[0100]** Preferably, the component 10 according to the invention is a component of a gas burner 2 to be mounted on a hob, preferably on a built-in hob. Conveniently, the burner 2 is suitable for heating pans or, in general, cooking utensils (such as, for example, plates, grills, grill pans, saucepans, etc.).

**[0101]** Conveniently, the gas burner 2 may have a single group of flames or multiple (i.e. two, three or more) groups of flames. Conveniently, the gas burner 2 may have also a simmering flame.

**[0102]** Conveniently, the gas burner 2 may be configured to intake the primary air from above the cooking hob and/or from below the cooking hob.

**[0103]** Conveniently, the gas burner 2 may be provided with a spark igniter 18 and/or a thermocouple 20 or may be without them.

**[0104]** As can be seen from the figures, the component 10 according to the invention of the gas burner 2 may be a cover 8 (also called "lid" or "cap") and/or a base 4 and/or an injector(s) holder 6 of said gas burner 2, wherein the cover 8 is the component on the top of the gas burner 2 and is positioned above the base 4 that, in turn, is positioned on the injector(s) holder 6 that is the component on which at least one injector is mounted.

**[0105]** Conveniently, the components 10 according to the invention are defined by the covers 8 of the gas burner 2.

**[0106]** Preferably, said cover 8 may be configured to define with the base 4 at least one chamber 40 for mixing and/or distributing the air-gas mixture.

**[0107]** Preferably, the cover 8 may be (according to a plan view) disk-shaped (see for example the embodiments of figure 1A, 1B and 5A, 5B), ring-shaped (see for example the embodiments of figure 2A, 2B), plate-shaped, or with an elongated shape (see for example the embodiments of figure 4A, 4B), with an ring-elongated shape (see for example the embodiments of figure 3A, 3B). Preferably, the cover 8 may be flat or concave. Conveniently, the cover 8 has two dimensions (length and width) that are quite larger than the third dimension (thickness).

**[0108]** Preferably, the base 4 - and in particular at least one distribution chamber 40 defined in the base 4 - may be (according to a plan view) disk-shaped, ring-shaped, with an elongated shape or with a ring-elongated shape.

**[0109]** Preferably, the base 4 may be provided with one or more ducts 44 for transferring the air-gas mixture to a corresponding distribution chamber 40 that may be defined in the same base or that is closed on the top by the cover 8. Conveniently, the base 4 may comprise one or more pieces.

**[0110]** Preferably, the base 4 may act as a flame spreader. In particular, the base 4 may be provided with openings 42 for the exiting of the flames.

**[0111]** Conveniently, in other possible embodiments, the division of the flames is performed by the cover, and not by the base 4, and in this case corresponding opening may be defined on the cover. Conveniently, in other possible embodiments, the division of the flames is performed by the cooperation of the cover 8 with the base 4.

**[0112]** Preferably, the gas burner 2 may comprise at least one linear Venturi channel. Conveniently, said at least one linear Venturi channel may be aligned substantially horizontally or vertically. Conveniently, said at least one linear Venturi channel may be defined inside the base 4 or inside the injector (s) holder 6 or by positioning the base 4 on the injector (s) holder 6.

**[0113]** Preferably, the gas burner 2 may comprise at least one radial Venturi. Conveniently, said at least one radial Venturi channel may comprise at least one duct exiting on a chamber so as to cause a radial Venturi effect. Conveniently, said at least one duct and chamber may be both defined inside the base 4. Conveniently, said at least one duct may be defined in the base 4 while the

chamber is defined by positioning the cover 8 on the base 4.

**[0114]** Conveniently, the gas burner 2 (see for example embodiment of figures 2A, 2B) may comprise an annular cavity 50 for separating an inner central distribution chamber 40' and an external annular distribution chamber 40".

**[0115]** Conveniently, the gas burner 2 (see for example embodiment of figures 3A, 3B) may comprise an inner cavity 50 surrounded by an annular distribution chamber 40 that may be divided in two symmetrical branches.

**[0116]** Preferably, the gas burner 2 consists exclusively of the base 4, the injector(s) holder 6 and the cover 8.

**[0117]** Preferably, the injector(s) holder 6 is provided with means 60 for its fastening to the hob. Conveniently, on the injector(s) holder 6 is mounted at least one injector, that can be vertically or horizontally aligned and that is fluidically connected with one or more gas supply inlets 61.

**[0118]** Preferably, the injector(s) holder 6 may comprise at least one concave piece defining at least one well or cup wherein at least one injector is installed. Conveniently, the injector(s) holder 6 may be (according to a plan view) disk-shaped or with an elongated shape. Conveniently, within the injector(s) holder 6 may be defined (or housed) one or more cavities and one or more ducts or Venturi ducts.

**[0119]** The operation of the gas burner 2 according to the invention is traditional. In particular, the gas, which arrives in the injector(s) holder 6 from a gas supply inlet 61, exits from each injector and is mixed with the primary air drawn from above and/or below the cooking hob. The flow of gas - primary air mixture reaches then a distribution chamber for feeding a corresponding flame of group of flames.

**[0120]** The gas burner 2 may be for example of small size and with a single ring of flame (see figures 1A and 1B), may be of the type having high burning power and with two concentric groups of flames (see figures 2A and 2B), may be of elongated type with an inner and an external group of flames (see figures 3A and 3B), may be of elongated type with a single external group of flames (see figures 4A and 4B) and may be with two groups of flames that are superimposed on each other (see figures 5A and 5B).

**[0121]** Conveniently, the item according to the invention to be placed over and/or in proximity of the gas burner may be a support for a pan or a cooking vessel. Preferably, said item may be grid shaped and/or may comprise at least one supporting arm.

**[0122]** In the following, some examples are provided of the starting mixture and of the composition in a component 10 - according to the invention - of the gas burner 2 and/or in the item - according to the invention - to be placed over and/or in proximity of the gas burner.

**[0123]** Conveniently, the materials in the component 10 and/or item according to the invention, in particular for

waterglass, may be suitably identified by one of the following techniques: X-ray Diffraction (XRD), Scanning/Reflection Electron Microscopy (REM), Energy-Dispersive X-ray Spectroscopy (EDX), Raman Spectroscopy, Nuclear magnetic resonance (NMR) spectroscopy and X-ray Fluorescence (XRF).

#### Example 1

**[0124]** In a first example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 70 - 80% by weight of vermiculite and about 20 - 30% by weight of waterglass K43.

**[0125]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 85 - 90% by weight of vermiculite and about 10 - 15% by weight of waterglass K43.

#### Example 2

**[0126]** In a second example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 60 - 70% by weight of vermiculite and about 30 - 40% by weight of waterglass K28.

**[0127]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 88 - 92% by weight of vermiculite and about 8-12% by weight of waterglass K28.

#### Example 3

**[0128]** In a third example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 45 - 55% by weight of vermiculite and about 45 - 55% by weight of waterglass K19.

**[0129]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 84 - 92% by weight of vermiculite and about 8-16% by weight of waterglass K19.

#### Example 4

**[0130]** In a fourth example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 70 - 80% by weight of vermiculite, about 20 - 30% by weight of waterglass K43 and about 1 - 3% of wollastonite.

**[0131]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 82 - 89% by weight of vermiculite, about 10 - 15% by weight of waterglass K43 and about 1 - 3% of wollastonite.

Example 5

**[0132]** In a fifth example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 70 - 80% by weight of vermiculite, about 20 - 30% by weight of waterglass K43 and about 0,5 - 2 % by weight of S-glass fiber.

**[0133]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 82 - 89% by weight of vermiculite, about 10 - 15% by weight of waterglass K43 and about 0,5 - 2 % by weight of S-glass fiber.

Example 6

**[0134]** In a sixth example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 15 - 35% by weight of vermiculite, about 15 - 25% by weight of waterglass K43, about 2 - 3% of wollastonite, about 5 - 10% by weight of Titanium dioxide, about 20 - 30% by weight of Aluminum oxide, about 10 - 20% by weight of silica and about 5 - 10 % by weight of Zirconium silicate.

**[0135]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 17 - 45% by weight of vermiculite, about 7 - 12% by weight of waterglass K43, about 3 - 4% of wollastonite, about 6 - 12% by weight of Titanium dioxide, about 22 - 35% by weight of Aluminum oxide, about 12 - 24% by weight of silica and about 6 - 12 % by weight of Zirconium silicate.

Example 7

**[0136]** In a seventh example, the component 10 of the gas burner 2 and/or the item to be placed over and/or in proximity of a gas burner 2 is obtained by mixing about 50 - 60% by weight of vermiculite, about 20 - 30 by weight of waterglass K43, about 1 - 3 % of S-glass fiber, about 10 - 20 % by weight of Zirconium silicate and about 1 - 5 % by weight of colored additive.

**[0137]** The final component 10 and/or item, that is obtained after the pressing and the subsequent drying of said mixture, comprises about 56 - 68 % by weight of vermiculite, about 10 - 15% by weight of waterglass K43, about 1 - 3 % of S-glass fiber, about 11 - 24 % by weight of Zirconium silicate and about 1 - 6 % by weight of colored additive.

**[0138]** Preferably, said colored additive comprises inorganic pigments. For example, said colored additive comprises inorganic pigments supplied by Alfarben. For example, said inorganic pigments can comprise one of the following:

- Chrome antimony titanium buff rutile
- Nickel Antimony Titanium Yellow Rutile

- Bismuth Vanadate,
- Zinc Ferrite
- Cobalt Aluminate Blue Spinel,
- Cobalt Chromite Blue-Green Spinel,
- Black Iron Manganese Oxide
- Chrome Oxide Green
- Red Iron Oxide
- Chromium iron oxide
- Manganese antimony titanium buff rutile
- Copper chromite black spinel

**[0139]** Preferably, said colored additive may be a thermochromic material.

15 ADVANTAGES

**[0140]** From what has been said it is clear that the solution according to the invention is somewhat more advantageous than the traditional ones, and in particular:

- the manufacturing costs are significantly reduced,
- the materials costs are significantly reduced,
- is eco-friendly,
- is no hazardous to health
- is high-temperature resistant and has optimum thermal insulating properties,
- has very good mechanical strength,
- is mechanically and dimensionally stable over a wide range of temperature,
- is low in weight, thus also allowing a reduction of the transportation costs,
- is aesthetically pleasant
- has a long service life,
- is safer.

**[0141]** The present invention has been illustrated and described in some of its preferred embodiments, but it is understood that executive variants can be applied to them in practice, without however departing from the scope of protection of the present patent for industrial invention.

**[0142]** In the preceding discussion of the invention, unless stated to the contrary, the disclosure of alternative values for the upper or lower limit of the permitted range of a parameter, coupled with an indication that one of the values is more highly preferred than the other, is to be construed as an implied statement that each intermediate value of the parameter, lying between the more preferred and the less preferred of the alternatives, is itself preferred to the less preferred value and also to each value lying between the less preferred value and the intermediate value.

**[0143]** The features disclosed in the foregoing description or the following drawings, expressed in their specific forms or in terms of a means for performing a disclosed function, or a method or a process of attaining the disclosed result, as appropriate, may separately, or in any combination of such features be utilized for realizing the



invention in diverse forms thereof.

## Claims

1. Component (10) of a gas burner (2) or an item to be placed over and/or in proximity of a gas burner (2), **characterized in that** said component (10) and/or item comprises silicate mineral and waterglass. 5
2. Component or item according to claim 1, **characterized in that** said silicate mineral comprises mica, preferably comprises an expanded mica. 10
3. Component or item according to one or more of the preceding claims, **characterized in that** said silicate mineral is vermiculite, preferably is expanded vermiculite. 15
4. Component or item according to one or more of the preceding claims, **characterized in that** said waterglass is potassium or sodium waterglass. 20
5. Component or item according to one or more of the preceding claims, **characterized in that** said waterglass is an aqueous solution of potassium silicate. 25
6. Component or item according to one or more of the preceding claims, **characterized in that** said waterglass is a mixture comprising silicic acid and potassium salt, wherein preferably the molar ratio of silicic acid and potassium salt is 2,6 - 3,2. 30
7. Component or item according to one or more of the preceding claims, **characterized in that** said silicate mineral is vermiculite and **in that** it contains 15 - 95% by weight of vermiculite or another mineral of mica-group. 35
8. Component or item according to one or more of the preceding claims, **characterized in that** said waterglass is potassium waterglass and **in that** it contains less than 20% by weight of potassium water glass. 40
9. Component or item according to one or more of the preceding claims, **characterized in that** it also comprises a colored additive. 45
10. Component or item according to one or more of the preceding claims, **characterized in that** it also comprises a thermochromic material configured to change its optical properties according to the temperature. 50
11. Component or item according to one or more of the preceding claims, **characterized in that** is obtained starting from said silicate material, in form of powder, mixed with said waterglass acting as a binder. 55
12. Component according to one or more of the preceding claims, **characterized in that** said component is shaped as a cover (8) of a gas burner (2) wherein said cover (8) is the component on the top of said gas burner (2).
13. Component according to one or more of the preceding claims, **characterized in that** said component is shaped as a base (4) and/or as an injector(s) holder (6) of a gas burner (2), wherein:
  - the base (4) is the component of the gas burner that is positioned on the injector(s) holder (6), and
  - said base (4) is closed on its top by a cover (8) that is positioned above said base (4).
14. Method for manufacturing a component (10) of a gas burner (2) and/or an item, to be placed over and/or in proximity of a gas burner, according to one or more of the preceding claims, **characterized in that** it comprises the following steps:
  - mixing the starting materials, wherein said starting materials comprise silicate and waterglass, wherein preferably said silicate is vermiculite and more preferably is expanded vermiculite, and wherein preferably said waterglass is potassium waterglass,
  - pressing the mixture in a mold having a shape configured so as to define the final shape of the component or item to be manufactured,
  - drying the component or item so obtained, preferably with an additional coating after drying.
15. Gas burner (2) suitable to be mounted on a hob, preferably on a built-in hob, **characterized in that** it comprises at least one component according to one or more of the preceding claims.

FIG. 1A

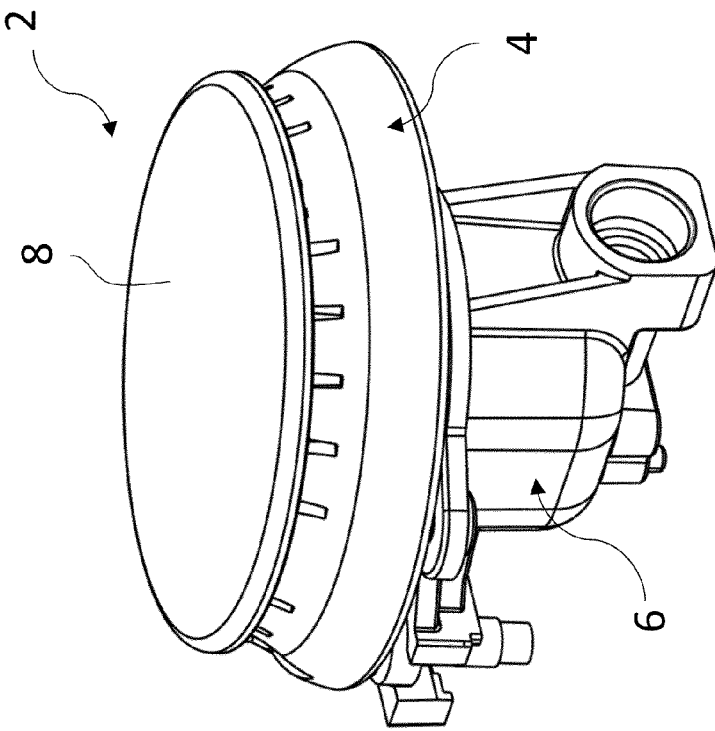
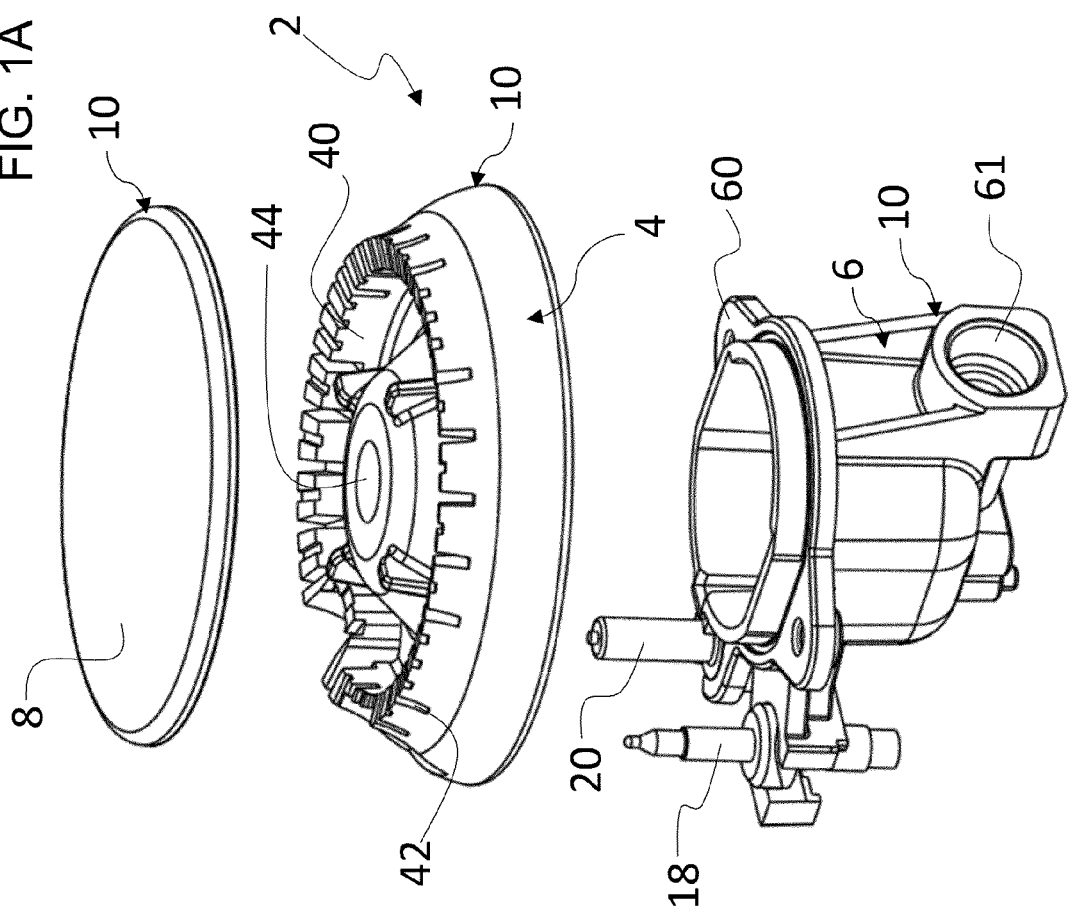
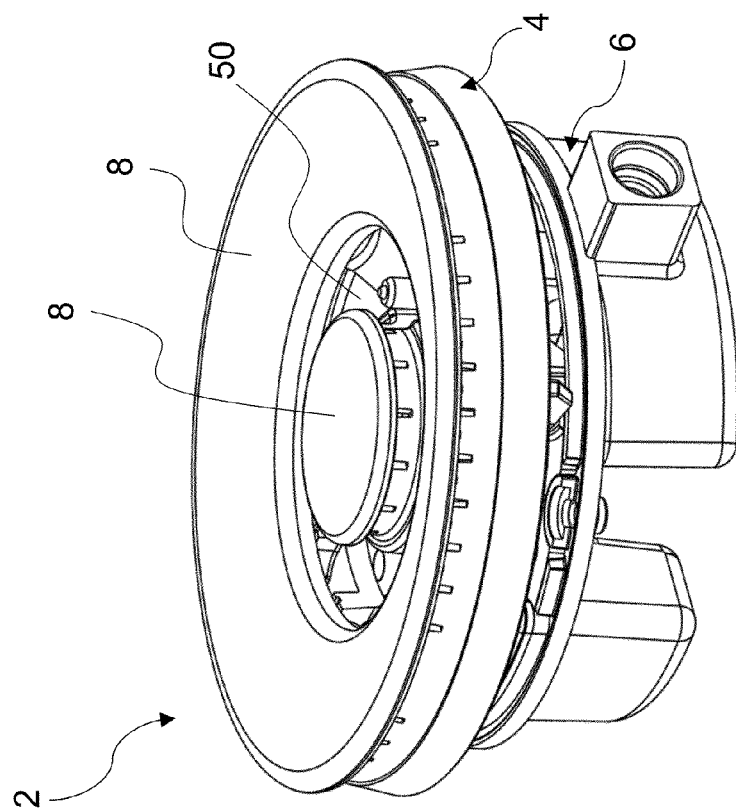
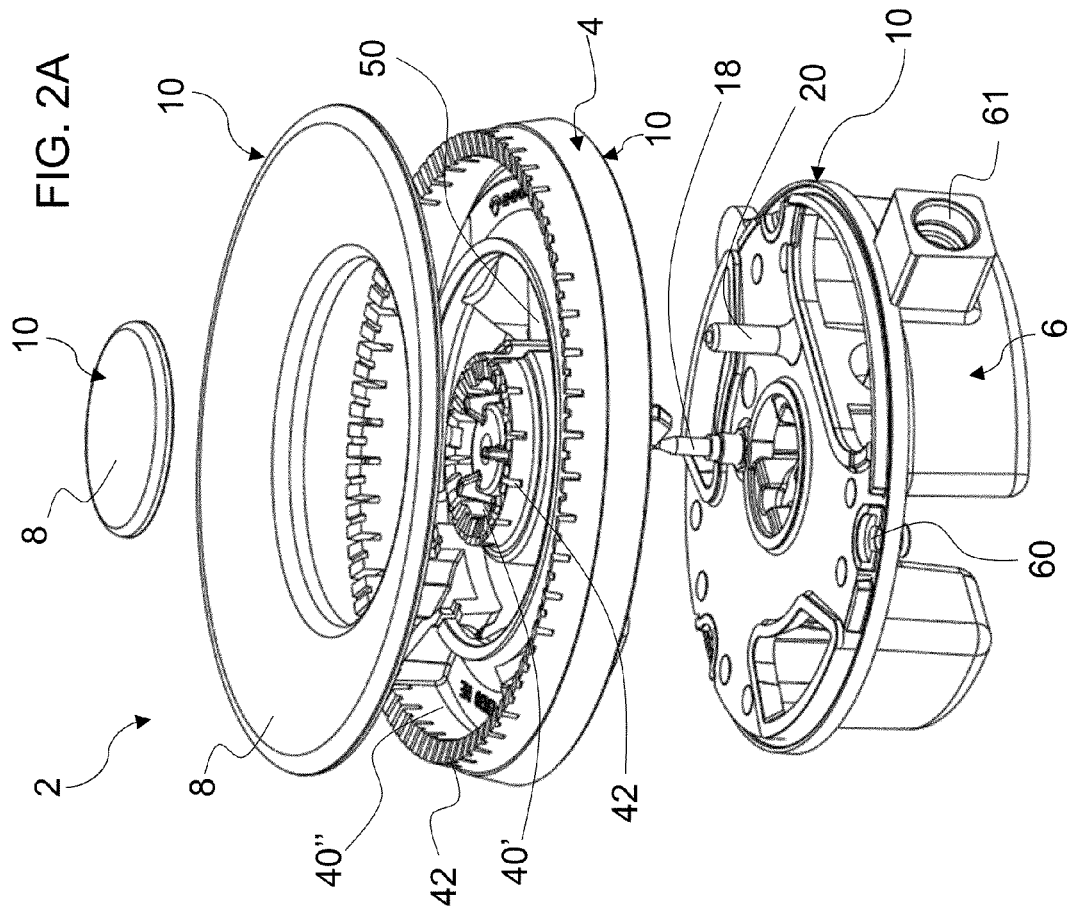
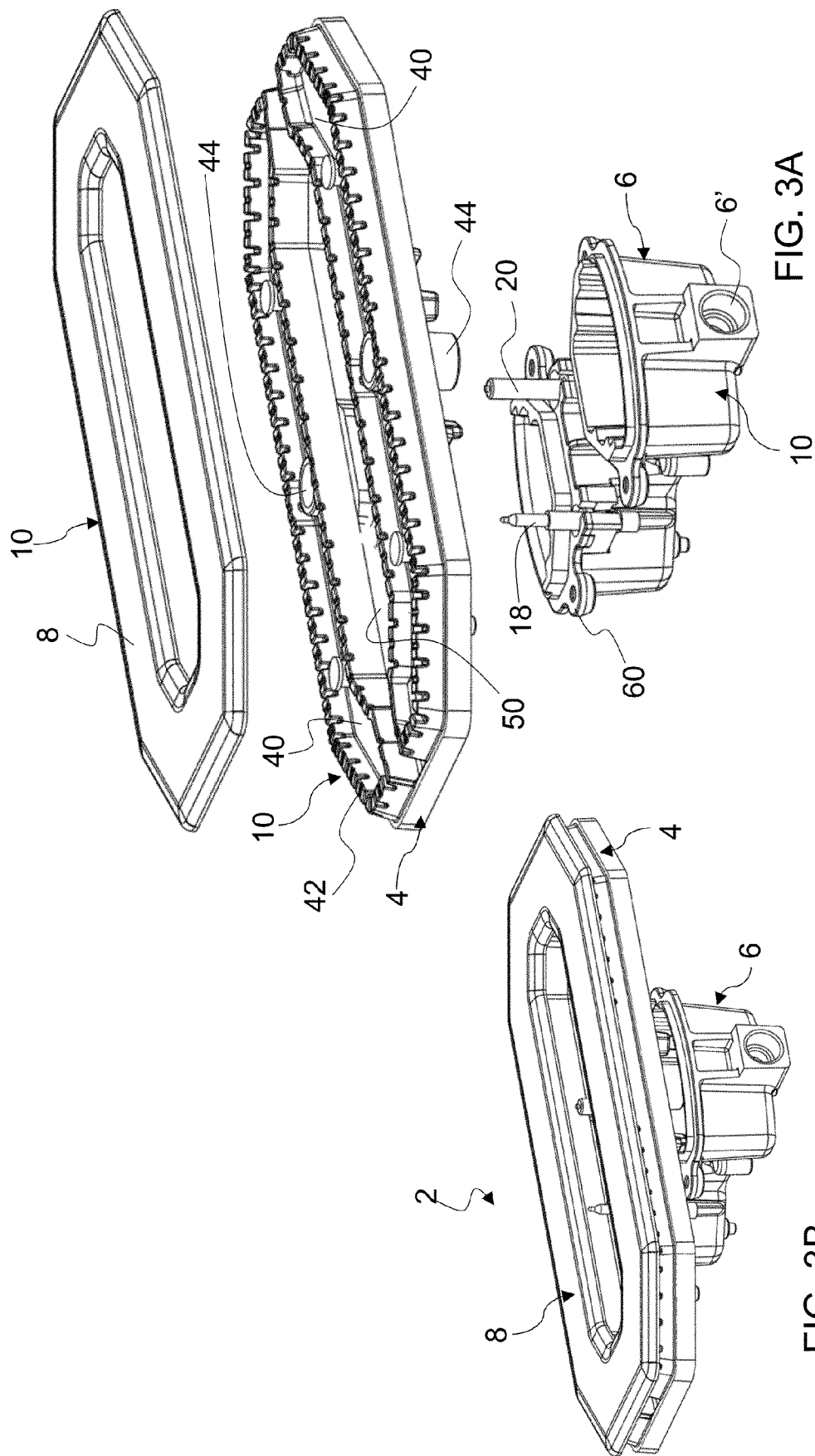


FIG. 1B





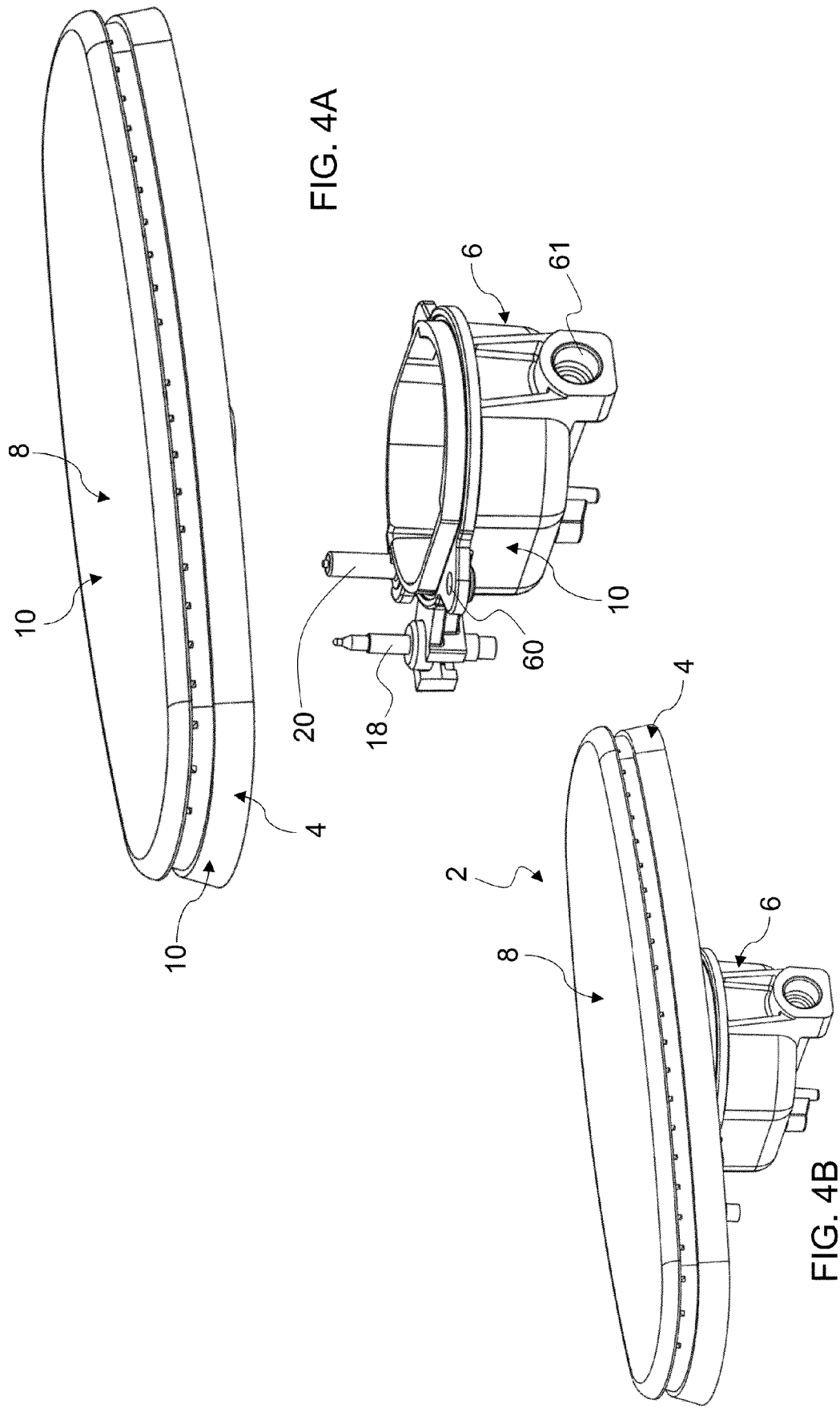


FIG. 5A

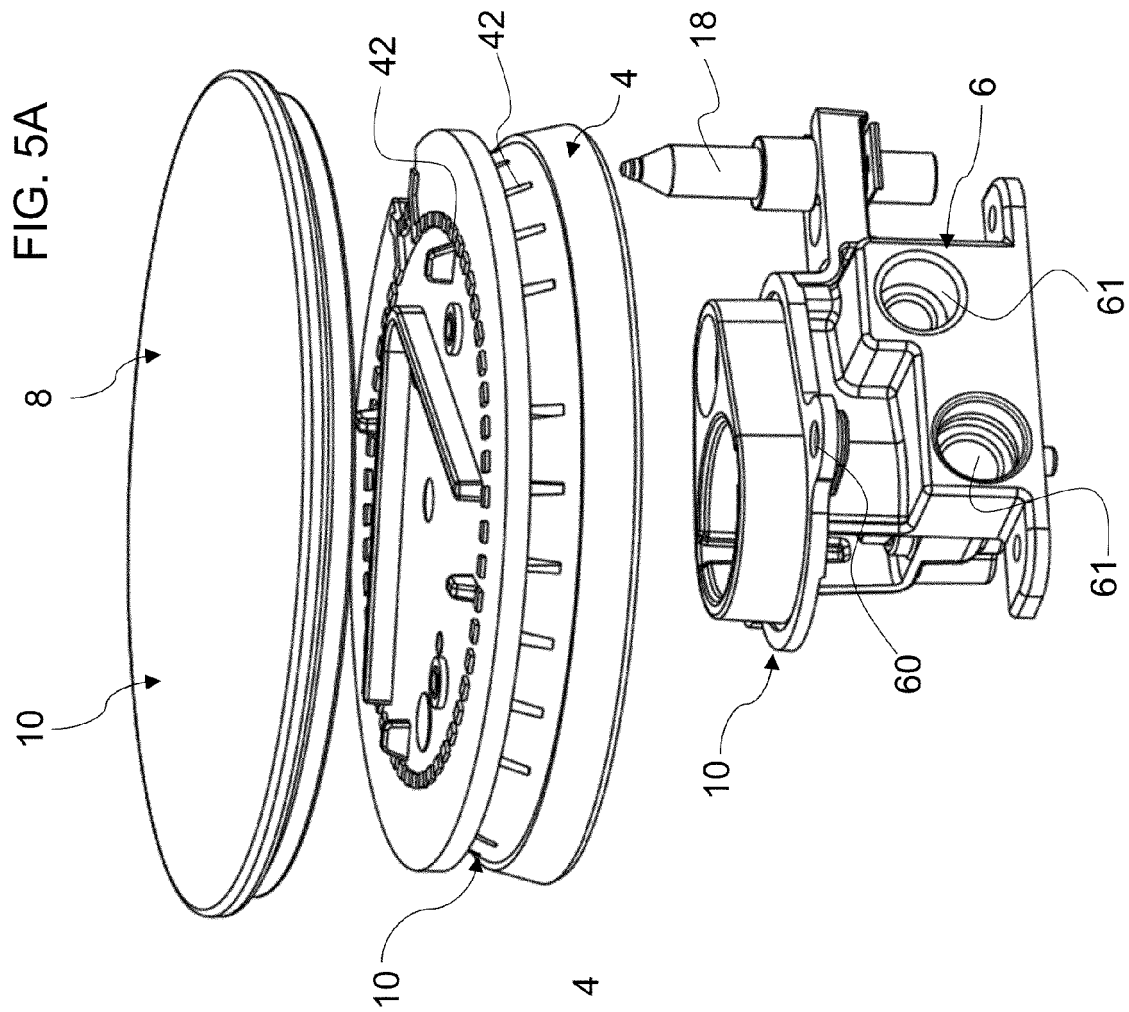
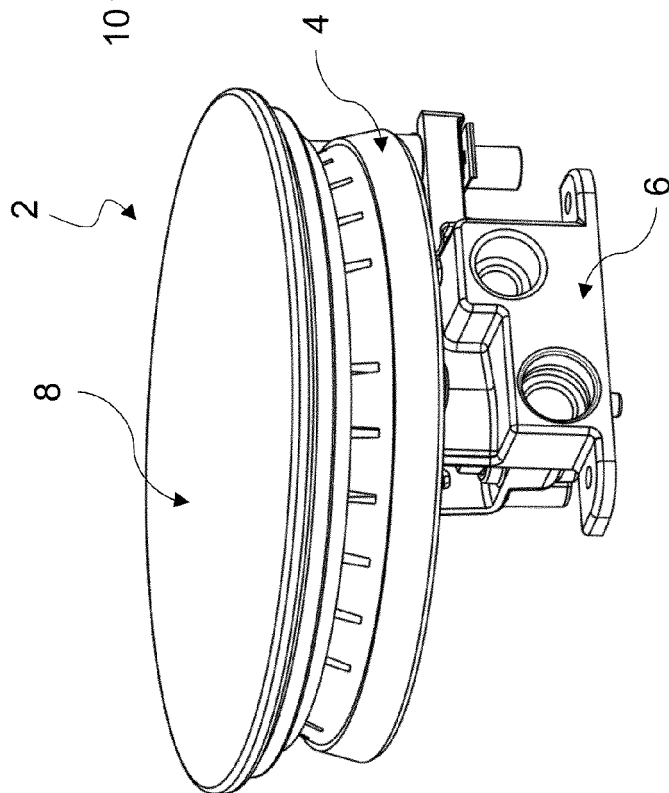


FIG. 5B





## EUROPEAN SEARCH REPORT

Application Number

EP 23 19 8487

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Y	DE 198 09 590 A1 (VIESSMANN WERKE KG [DE]) 23 September 1999 (1999-09-23) * column 1, line 49 - column 4, line 15 * * figures 1-5 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) F23D F23M
A	Gerhard Lagaly ET AL: "Silicates" In: "Ullmann's Encyclopedia of Industrial Chemistry", 15 June 2000 (2000-06-15), Wiley-VCH, Weinheim, XP055291480, ISBN: 978-3-527-30673-2 DOI: 10.1002/14356007.a23_661, * the whole document *	1-14	
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Place of search <b>Munich</b>		Date of completion of the search <b>21 February 2024</b>	Examiner <b>Rudolf, Andreas</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82



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