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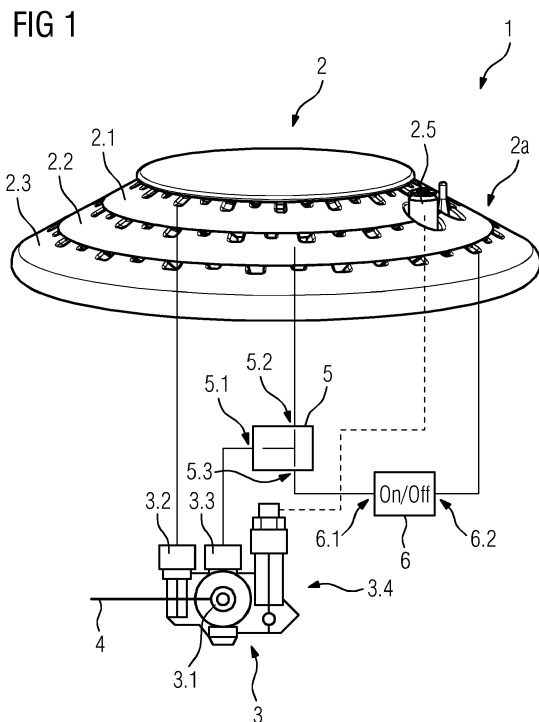
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GAS BURNER ARRANGEMENT AND HOB COMPRISING A GAS BURNER ARRANGEMENT

- (57)
- The invention relates to a gas burner arrangement comprising:

 - a gas burner (2) with at least three burner sections (2.1, 2.2, 2.3);
 - a gas tap (3) comprising at least one gas inlet (3.1) coupled with a gas supply line (4) and two gas outlets (3.2, 3.3);
 - a divider entity (5) comprising a divider inlet (5.1) and two or more divider outlets (5.2, 5.3);
 - an on/off valve (6) adapted to open/close a gas line;

wherein a first burner section (2.1) is coupled with a first gas outlet (3.2) of the gas tap (3), wherein the second gas outlet (3.3) of the gas tap (3) is coupled with the divider inlet (5.1), wherein a first divider outlet (5.2) is coupled with a second burner section (2.2), wherein the second divider outlet (5.3) is at least indirectly coupled with an inlet(6.1) of the on/off valve (6) and the outlet (6.2) of the on/off valve (6) is coupled with the third burner section (2.3).



Description

[0001] Generally, the present invention relates to the field of gas burners. More specifically, the present invention relates to a gas burner arrangement with a gas burner with at least three burner sections and a gas tap assembly for controlling the provision of gas to said flame sections.

BACKGROUND OF THE INVENTION

[0002] Gas burners are well-known in prior art. Specifically, cooking hob gas burners are known which comprise an injection holder, a burner crown and a burner cap. Said burner crown and burner cap form a combustion gas chamber providing a mixture of gas and primary air to a flame ring comprising a plurality of flame ports.

[0003] Gas burners are known which comprise two gas burner sections of different sizes, namely an inner burner section and an outer burner section, wherein the outer burner is greater than the inner burner. Gas is provided to said burner sections using a dual gas tap, i.e. a gas tap which provides two gas outlets.

[0004] Disadvantageously, gas burners comprising more than two burner sections can not be supplied by a dual gas tap because of the limited number of gas outlets.

SUMMARY OF THE INVENTION

[0005] It is an objective of the embodiments of the present invention to provide a gas burner arrangement with a gas tap assembly which can selectively provide gas to a gas burner comprising three or more burner sections in a technically simple and cost-efficient manner. The objective is solved by the features of the independent claims. Preferred embodiments are given in the dependent claims. If not explicitly indicated otherwise, embodiments of the invention and single features of said embodiments can be freely combined with each other.

[0006] According to an aspect, the invention relates to a gas burner arrangement. The arrangement comprises:

- a gas burner with at least three burner sections;
- a gas tap comprising at least one gas inlet coupled with a gas supply line and two gas outlets;
- a divider entity comprising a divider inlet and two or more divider outlets; and
- an on/off valve adapted to open/close a gas line.

[0007] A first burner section is coupled with a first gas outlet of the gas tap. The second gas outlet of the gas tap is coupled with the divider inlet. A first divider outlet is at least indirectly coupled with a second burner section and the second divider outlet is coupled with an inlet of the on/off valve. The outlet of the on/off valve is coupled with the third burner section.

[0008] Said gas burner arrangement is advantageous because a gas burner with at least three burner sections can be selectively provided with gas using standard com-

ponents, namely a dual gas tap, a divider entity and an on/off valve. Thereby a technically simple and cost-efficient solution for supplying gas to a multi-section gas burner is disclosed.

[0009] According to embodiments, the first gas outlet of the gas tap is a secondary gas outlet and the second gas outlet of the gas tap is a main outlet. Said main outlet may comprise a greater outlet cross-section than the secondary outlet. Thereby two or more burner sections can be coupled with said main outlet.

[0010] According to embodiments, the gas tap comprises a safety valve coupled with a flame control entity arranged at the gas burner. The flame control entity may be adapted to monitor whether a flame is provided at one or more burner sections of the gas burner. For example, the flame control entity may be a thermocouple. The flame control entity may be provided at the inner burner section or between an inner and a middle burner section.

[0011] According to embodiments, the safety valve is adapted to shut off a gas connection between the gas inlet and the gas outlets of the gas tap based on information provided by the flame control entity. So, when the flame control entity indicates that there is no flame at the gas burner, the safety valve is closed. Thereby the provision of gas to the gas burner can be stopped if the flame at the gas burner is extinguished.

[0012] According to embodiments, the safety valve is a magnetic valve. Thereby a control of the safety valve by means of a thermocouple can be simplified.

[0013] According to embodiments, the gas burner comprises multiple concentric, ring-shaped burner sections. Thereby, pieces of cookware comprising different sizes or diameters can be heated by one and the same gas burner.

[0014] According to embodiments, the first burner section is an inner burner section, the second burner section is a middle burner section and the third burner section is an outer burner section. Preferably, the gas burner assembly is configured such that the inner burner section can be powered alone and together with one or more of said further burner sections but the middle and the outer burner section can only be powered together with the inner burner section. Thereby the usability of the gas burner arrangement is simplified.

[0015] According to embodiments, the size of the burner sections increases from the first to the third burner section. Thus, the first burner section may comprise the lowest heating power and the outer burner section may provide the greatest heating power.

[0016] According to embodiments, the first burner section is directly coupled with the first gas outlet of the gas tap. Said first gas outlet may be the primary outlet. Thereby the first burner section is activated as a prioritized burner section when the gas tap is opened.

[0017] According to embodiments, the second burner section is coupled via the divider entity without passing the on/off valve with the second gas outlet of the gas tap. Thereby, the second burner section is activated (specif-

ically, together with the first burner section) if the second gas outlet of the gas tap is opened.

[0018] According to embodiments, the third burner section is coupled via the divider entity and the on/off valve with the second gas outlet of the gas tap. Thereby it is possible to control the third burner section independently, i.e. the third burner section can be activated when the second burner section is active in order to provide highest heating power level at the gas burner or the third burner section is switched off in order to provide medium heating power level.

[0019] According to embodiments, the on/off valve is adapted to be controlled independently from the gas tap. Said independent control can be provided by different control means provided at the gas tap and the on/off valve.

[0020] According to embodiments, the burner sections are integrated in a burner crown or burner crown assembly of the gas burner. Said burner crown assembly may comprise multiple flame rings which can be superimposed or stacked in order to build said burner crown.

[0021] According to a further aspect, the invention refers to a gas hob with a gas burner arrangement configured according to anyone of the preceding embodiments.

[0022] According to yet a further aspect, the invention relates to a method for controlling a gas burner with at least three burner sections using a gas tap assembly comprising at least a gas tap with at least one gas inlet and two gas outlets, a divider entity and an on/off-valve. The method comprises the steps of:

- controlling a first and a second burner section of the gas burner using control means of the gas tap; and
- controlling the third burner section using control means of the on/off-valve.

[0023] The terms "essentially", "substantially" or "approximately" as used in the invention means deviations from the exact value by +/- 10%, preferably by +/- 5% and/or deviations in the form of changes that are insignificant for the function.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The various aspects of the invention, including its particular features and advantages, will be readily understood from the following detailed description and the accompanying drawings, in which:

Fig. 1 shows a schematic functional diagram of a gas burner arrangement according to a first embodiment; and

Fig. 2 shows a schematic functional diagram of a gas burner arrangement according to a second embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0025] The present invention will now be described more fully with reference to the accompanying drawings, in which example embodiments are shown. However, this invention should not be construed as limited to the embodiments set forth herein. Throughout the following description similar reference numerals have been used to denote similar elements, parts, items or features, when applicable.

[0026] Fig. 1 illustrates a first embodiment of a gas burner arrangement 1. The gas burner arrangement 1 comprises a gas burner 2 comprising multiple burner sections, in the present embodiment three burner sections 2.1, 2.2, 2.3. The burner sections 2.1, 2.2, 2.3 are provided at a burner crown 2a, which may be a burner crown 2a which can be disassembled in multiple burner crown parts. More in detail, the burner sections 2.1, 2.2, 2.3 may be formed by different sized flame rings which can be superimposed or stacked on top of one another in order to build a multi-section burner crown 2a. In order to provide gas to one or more of said burner sections 2.1, 2.2, 2.3, a gas tap assembly is used which is described in the following in closer detail.

[0027] The gas tap assembly comprises a gas tap 3, a divider entity 5 and an on/off-valve 6. The gas tap 3 may be a dual gas tap comprising at least one gas inlet 3.1 and two gas outlets 3.2, 3.3. The gas inlet 3.1 may be coupled with a gas supply line 4 which provides gas to the gas tap 3 (e.g. from a gas bottle or a central gas supply line). The gas tap 3 may comprise a control element (not shown in the figures). By actuating said control element a user is able to control the gas tap 3. According to an example, a user may be able to control whether gas is supplied to the first, to the second or both gas outlets 3.2, 3.3 or both gas outlets 3.2, 3.3 are closed (i.e. switched off).

[0028] In addition, the gas tap 3 may comprise a safety valve 3.4 adapted to shut off the gas flow through the gas tap 3 if the flame at the gas burner 2 is extinguished. Said safety valve 3.4 may be, for example, a magnetic valve. In order to receive information if at least one burner section provides a flame, the gas burner 2 may comprise at least one flame control entity 2.5. Said flame control entity 2.5 may be, for example, a thermocouple.

[0029] The first gas outlet 3.2 of the gas tap 3 is coupled, preferably directly coupled (i.e. without any intermediate entities) with a gas inlet of the gas burner 2 through which gas is provided to the first burner section 2.1. So, in other words, the first burner section 2.1 is directly supplied with gas by the first gas outlet 3.2 of the gas tap 3. Said first gas outlet 3.2 may be, for example, a secondary outlet of the gas tap 3. Said secondary outlet may comprise a smaller outlet cross section than the second gas outlet 3.3 which may be a main outlet.

[0030] As shown in Fig. 1, the second gas outlet 3.3 of the gas tap 3 is coupled with a divider entity 5. Said

divider entity 5 comprises a divider inlet 5.1 and at least two divider outlets 5.2, 5.3. Said divider entity 5 may be a passive entity providing a gas path splitting from a single gas path to at least two gas paths. Said divider entity 5 may be, for example, a T-splitter or Y-splitter. So, by means of said divider entity 5, gas can be provided to two or more burner sections 2.2, 2.3 using separate gas pipes. In the present embodiment, the divider inlet 5.1 is coupled, preferably directly coupled (i.e. without any intermediate entities) via a gas pipe with the second gas outlet 3.3. The first divider outlet 5.2 is coupled, preferably directly coupled (i.e. without any intermediate entities) via a gas pipe with a further burner section, e.g. the second burner section 2.2. The provision of gas to the second burner section 2.2 can be controlled using control means included in the gas tap 3. If gas is provided at said second gas outlet 3.3, said gas flows via the divider entity 5 towards the second burner section 2.2 and is provided at the flame ports of said second burner section 2.2.

[0031] The second divider outlet 5.3 is coupled via said on/off valve 6 with yet a further burner section, e.g. the third burner section 2.3. The inlet 6.1 of the on/off valve 6 is coupled with the second divider outlet 5.3 of the divider entity 5 and the outlet 6.2 of the on/off valve 6 is coupled, preferably directly coupled (i.e. without any intermediate entities) with the third burner section 2.3. By means of said on/off valve 6 it is possible to enable or disable a flow of gas from the divider entity 5 to the third burner section 2.3.

[0032] By means of upper-described gas burner assembly 1 the following operation modes may be possible:

- providing gas to a single burner section, namely the first burner section 2.1. Said first burner section 2.1 may be the smallest burner section with the lowest heating power (e.g. providing heating power in the range of approximately 0.3KW to 1KW);
- providing gas to a pair of burner sections, namely the first and the second burner section 2.1, 2.2. Said pair of burner sections may provide heating power in the range of approximately 1KW to 2.5KW). The gas tap 3 may be configured such that gas can only be provided at the second gas outlet 3.3 if gas is simultaneously provided at the first gas outlet 3.2 (i.e. the second burner section 2.2 can only be activated when also the first burner section 2.1 is active);
- providing gas to three burner sections 2.1, 2.2, 2.3 by opening the on/off valve 6. Said triple of burner sections may provide heating power in the range of approximately 1.6KW to 4KW). The gas tap 3 may be configured such that gas can only be provided at the second gas outlet 3.3 if gas is simultaneously provided at the first gas outlet 3.2 (i.e. the third burner section 2.3 can only be activated when also the first and the second burner sections 2.1, 2.2 are active).

[0033] Fig. 2 shows a further embodiment of a gas burner arrangement 1 which comprises more than three

burner sections. In the present embodiment, the gas burner 2 comprises four burner sections 2.1, 2.2, 2.3, 2.4. In the following, the additional or differing features of the embodiment according to Fig. 2 with respect to the embodiment of Fig. 1 are explained. Apart from that the features and the interaction of features described before with respect to the embodiment of Fig. 1 do also apply to the embodiment of Fig. 2.

[0034] The main difference is that the second divider outlet 5.3 is not directly coupled with the on/off valve 6 but said second divider outlet 5.3 is coupled with a further divider entity 7, namely the inlet 7.1 of said further divider entity 7. Said further divider entity 7 may be configured identical or different to the divider entity 5. Said further divider entity 7 is adapted to split the gas stream provided by the second divider outlet 5.3 in two or more partial gas streams. A first partial gas stream is provided at the first divider outlet 7.2 and a second partial gas stream is provided at a second divider outlet 7.3. Both divider outlets 7.2, 7.3 are coupled via on/off valves 6, 8 with burner sections 2.3, 2.4, namely the first divider outlet 7.2 via on/off valve 6 with the third burner section 2.3 and the second divider outlet 7.3 via on/off valve 8 with the fourth burner section 2.4. On/off valves 6, 8 can be controlled independently from each other and independently from the gas tap 3 in order to activate/ deactivate the burner sections 2.3, 2.4 independently.

[0035] Different to the upper-described embodiment according to Fig. 2, the pair of divider entities 5, 7 can be substituted by a single divider entity which comprises three divider outlets. One of said outlets is directly coupled with a burner section and the other two outlets are coupled with different burner sections via on/off valves.

[0036] It should be noted that the description and drawings merely illustrate the principles of the proposed gas burner arrangement. Those skilled in the art will be able to implement various arrangements that, although not explicitly described or shown herein, embody the principles of the invention.

List of reference numerals

[0037]

1	gas burner arrangement
2	gas burner
2a	burner crown
2.1	first burner section
2.2	second burner section
2.3	third burner section
2.4	fourth burner section
2.5	flame control entity
3	gas tap
3.1	gas inlet
3.2	first gas outlet
3.3	second gas outlet
3.4	safety valve
4	gas supply line

- 5 divider entity
- 5.1 divider inlet
- 5.2 first divider outlet
- 5.3 second divider outlet
- 6 on/off valve
- 6.1 inlet
- 6.2 outlet
- 7 further divider entity
- 7.1 inlet
- 7.2 first divider outlet
- 7.3 second divider outlet
- 8 on/off valve

Claims

1. Gas burner arrangement comprising:

- a gas burner (2) with at least three burner sections (2.1, 2.2, 2.3);
- a gas tap (3) comprising at least one gas inlet (3.1) coupled with a gas supply line (4) and two gas outlets (3.2, 3.3);
- a divider entity (5) comprising a divider inlet (5.1) and two or more divider outlets (5.2, 5.3);
- an on/off valve (6) adapted to open/close a gas line;

wherein a first burner section (2.1) is coupled with a first gas outlet (3.2) of the gas tap (3), wherein the second gas outlet (3.3) of the gas tap (3) is coupled with the divider inlet (5.1), wherein a first divider outlet (5.2) is coupled with a second burner section (2.2), wherein the second divider outlet (5.3) is at least indirectly coupled with an inlet (6.1) of the on/off valve (6) and the outlet (6.2) of the on/off valve (6) is coupled with the third burner section (2.3).

- 2. Gas burner arrangement according to claim 1, wherein the first gas outlet (3.2) of the gas tap (3) is a secondary gas outlet and the second gas outlet (3.3) of the gas tap (3) is a main outlet.
- 3. Gas burner arrangement according to claim 1 or 2, wherein the gas tap (3) comprises a safety valve (3.4) coupled with a flame control entity (2.4) arranged at the gas burner (2).
- 4. Gas burner arrangement according to claim 2, wherein the safety valve (3.4) is adapted to shut off a gas connection between the gas inlet (3.1) and the gas outlets (3.2, 3.3) of the gas tap (3) based on information provided by the flame control entity (2.5).
- 5. Gas burner arrangement according to claim 3 or 4, wherein the safety valve (3.4) is a magnetic valve.
- 6. Gas burner arrangement according to anyone of the

preceding claims, wherein the gas burner (2) comprises multiple concentric, ring-shaped burner sections (2.1, 2.2, 2.3).

- 7. Gas burner arrangement according to anyone of the preceding claims, wherein the first burner section (2.1) is an inner burner section, the second burner section (2.2) is a middle burner section and the third burner section (2.3) is an outer burner section.
- 8. Gas burner arrangement according to claim 7, wherein the size of the burner sections (2.1, 2.2, 2.3) increases from the first to the third burner section (2.1, 2.2, 2.3).
- 9. Gas burner arrangement according to anyone of the preceding claims, wherein the first burner section (2.1) is directly coupled with the first gas outlet (3.2) of the gas tap (3).
- 10. Gas burner arrangement according to anyone of the preceding claims, wherein the second burner section (2.2) is coupled via the divider entity (5) without passing the on/off valve (6) with the second gas outlet (3.3) of the gas tap (3).
- 11. Gas burner arrangement according to anyone of the preceding claims, wherein the third burner section (2.3) is coupled via the divider entity (5) and the on/off valve (6) with the second gas outlet (3.3) of the gas tap (3).
- 12. Gas burner arrangement according to anyone of the preceding claims, wherein the on/off valve (6) is adapted to be controlled independently from the gas tap (3).
- 13. Gas burner arrangement according to anyone of the preceding claims, wherein the burner sections (2.1, 2.2, 2.3) are integrated in a burner crown (2a) or burner crown assembly of the gas burner (2).
- 14. Cooking hob comprising a gas burner arrangement configured according to anyone of the preceding claims.
- 15. Method for controlling a gas burner (2) with at least three burner sections (2.1, 2.2, 2.3) using a gas tap assembly comprising at least a gas tap (3) with at least one gas inlet (3.1) and two gas outlets (3.2, 3.3), a divider entity (5) and an on/off-valve (6), the method comprising the steps of:
 - controlling a first and a second burner section (2.1, 2.2) of the gas burner (2) using a control element of the gas tap (3); and
 - controlling the third burner section (2.3) using a control element of the on/off-valve (6).

FIG 1

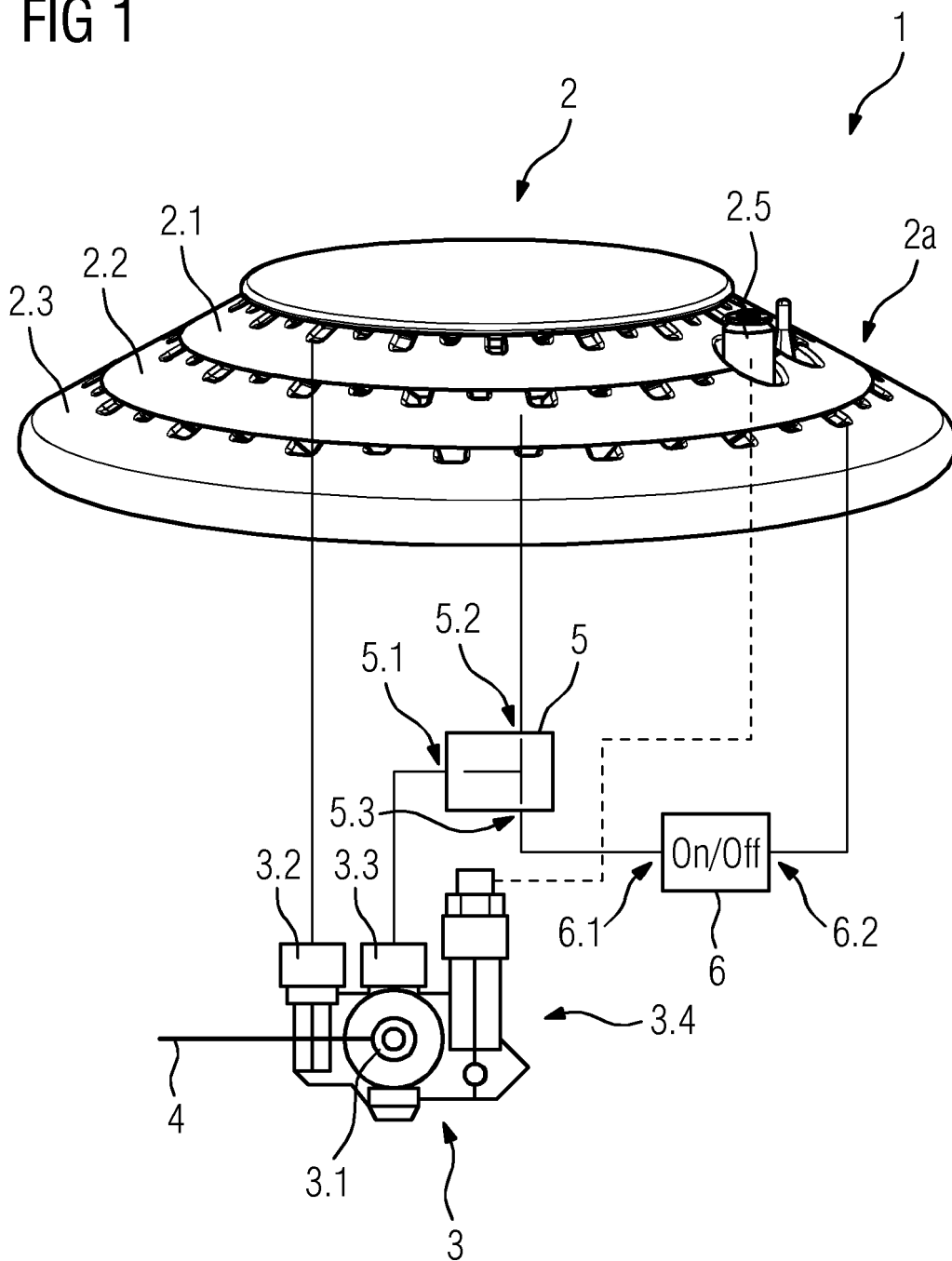
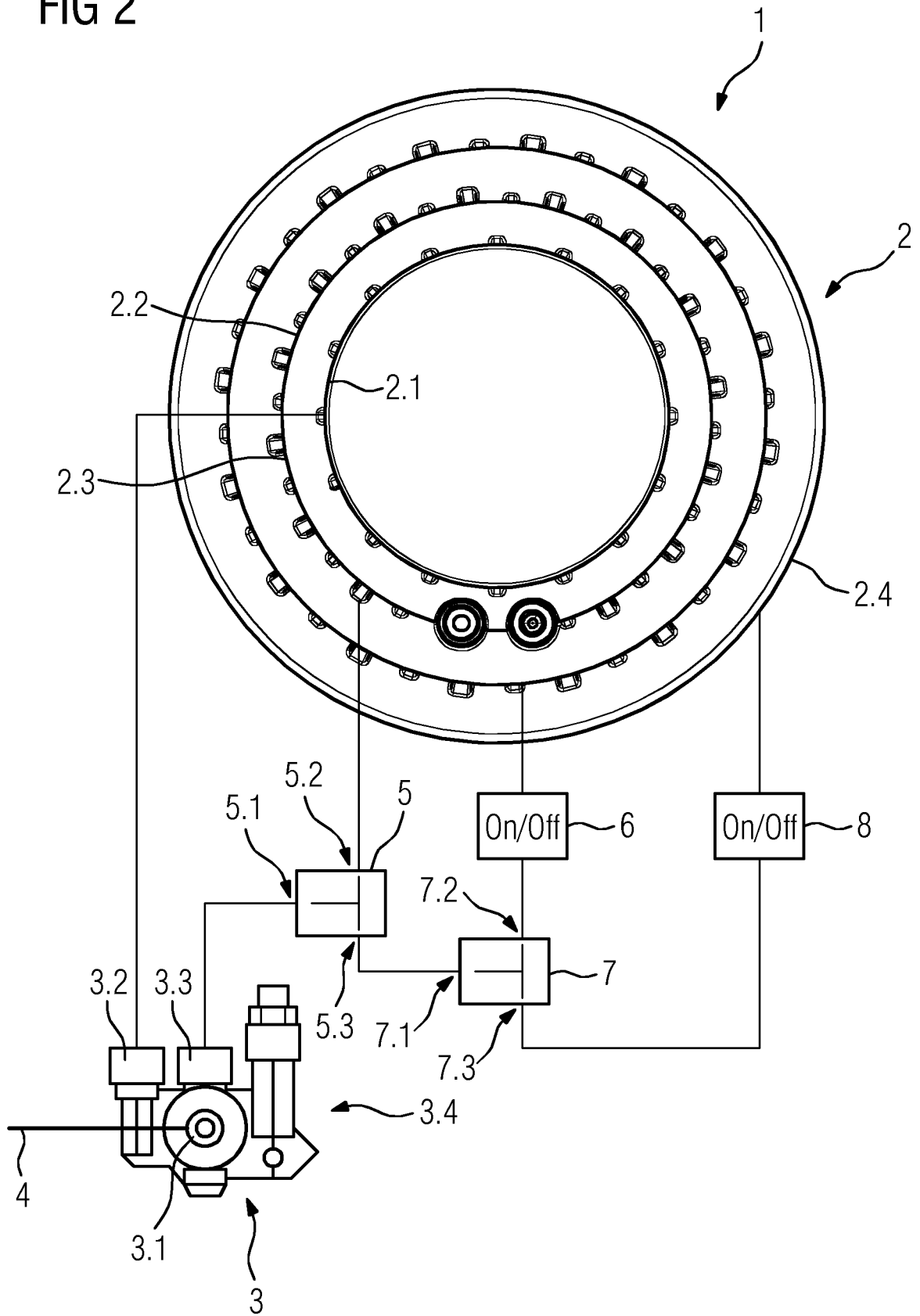


FIG 2





EUROPEAN SEARCH REPORT

 Application Number
 EP 16 20 6000

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 May 2017	Examiner Theis, Gilbert
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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