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(54) **GAS STOVE**

GASHERD

CUISINIÈRE À GAZ

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(56) References cited:
EP-A1- 2 720 107 EP-A1- 3 096 085
WO-A1-2017/026960 GB-A- 2 419 036
US-A1- 2019 338 955

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Description

[0001] The present invention relates to a gas stove.

[0002] A gas stove can comprise a gas burner and a gas valve. The gas valve is suitable for adjusting a flow of combustion gas from a main gas pipe of the gas stove to the gas burner. For actuating the gas valve, an actuation knob can be provided. The actuation knob is fixed to a rotatable actuation stem of the gas valve. By rotating the actuation knob, the actuation stem is rotated too, and the flow of combustion gas is controlled.

[0003] EP 3 096 085 A1 describes a household appliance operating assembly having an operating shaft, an operating knob mounted non-rotatably on the operating shaft, the control knob having a mounting member for mounting the control knob on the operating shaft, wherein the mounting member is set up to produce a frictional connection with the operating shaft.

[0004] GB 2 419 036 A describes a switch device for a gas burner including a body engaged with a housing. The body defines an axial hole for rotatably receiving a driven shaft which has a first end secured in a rotation knob and a second end engaged with a barrel which can be rotated by the driven shaft.

[0005] It is one object of the present invention to provide an improved gas stove.

[0006] Accordingly, a gas stove is provided. The gas stove comprises a gas valve, which has an actuation stem for actuating the gas valve, an actuation knob for actuating the actuation stem, and a connection element, which couples the actuation knob to the actuation stem, wherein the actuation knob is connected to the connection element in a form-locking manner, so that the actuation knob is removable from the gas stove for maintenance purposes. The gas stove further comprises a top sheet, wherein the top sheet comprises a front side, which is assigned to the actuation knob, and a back side, which is assigned to the gas valve, wherein the top sheet has a breakthrough, through which the connection element is at least partly guided, and wherein the connection element comprises a cone-shaped basic section that is at least partly received in the breakthrough.

[0007] Due to the fact that the actuation knob can be easily removed, it is possible to clean it, for example by using a dishwasher. On the other hand, when the actuation knob is removed, the connection element prevents liquids and particles from entering functional parts like electronics or a switch harness of the gas stove.

[0008] The gas stove can be named gas hob. The gas stove is a household appliance. For this reason, the gas stove can be named household gas stove. The actuation stem can be rotated to adjust the flow of combustion gas from a main gas pipe to the gas burner. Depending on an angle of rotation of the actuation stem, the flow of combustion gas from the main gas pipe to the gas burner can be increased, decreased, or completely blocked. The gas valve preferably is a gas regulating valve. The gas valve is suitable for regulating a stream of combustion

gas from the main gas pipe to the gas burner continuously or stepwise. In particular, the gas valve is a so-called step valve.

[0009] The actuation knob is coupled to the actuation stem in such a way that rotating the actuation knob results in a rotational movement of the actuation stem. The coupling between the actuation stem and the actuation knob is done by means of the connection element. "Form-locking" or "positive locking" in this context means that the actuation knob and the connection element mesh with each other or are engaged with each other in such a way that a torque can be transferred. Furthermore, the connection can be loosened by means of a tool or tool-free. The form-locking connection can be put into practice by means of clips, threads, pins, a snap on connection or the like. When removing the actuation knob, the connection element stays attached to the actuation stem. "Maintenance purposes" include cleaning, replacing or the like of the actuation knob.

[0010] According to an embodiment, the actuation knob is removable from the gas stove by applying a force on the actuation knob that acts along an axis of rotation of the actuation stem.

[0011] Preferably, the force can be applied to the actuation knob by hand. In particular, there are not needed any tools for removing the actuation knob.

[0012] According to a further embodiment, the connection element is connected to the actuation stem in a form-locking manner.

[0013] This prevents the connection element from rotating towards the actuation stem when applying a torque to the connection element by means of the actuation knob.

[0014] According to a further embodiment, the connection element comprises a recess that receives the actuation stem in a form-locking manner.

[0015] The recess can be a cylindrical bore with a lateral flattening. Preferably, the actuation stem can have a corresponding shape. That means, the actuation stem is cylinder-shaped and has a lateral flattening. The connection element can be pressed on the actuation stem to connect the connection element to the actuation stem.

[0016] The gas stove further comprises a top sheet, wherein the top sheet comprises a front side, which is assigned to the actuation knob, and a back side, which is assigned to the gas valve, and wherein the top sheet has a breakthrough, through which the connection element is at least partly guided.

[0017] The top sheet can be made of steel, in particular of stainless steel, glass-ceramic or tempered glass. The top sheet can have a thickness of approximately 0.5 to 3 mm. However, the thickness is arbitrary. The breakthrough can be a cylindrical bore. The top sheet can be named cover sheet. The top sheet covers a cooking trough of the gas stove. The cooking trough can be a deep-drawn metal sheet. Between the cooking trough and the top sheet is provided a space which can receive an electronic board or circuit board and the gas valve.

The gas valve can be mounted to the cooking trough. Preferably, the gas stove has a plurality of gas valves, actuation knobs and connection elements. Accordingly, the top sheet has a plurality of breakthroughs. In the following, only one gas valve, only one actuation knob and only one connection element is referred to, respectively. The gas valve is preferably arranged below the top sheet. That means, the gas valve faces the back side of the top sheet. The actuation knob is arranged above the top sheet. That means, the actuation knob faces the front side of the top sheet. The top sheet is arranged between the gas valve and the actuation knob.

[0018] The connection element comprises a cone-shaped basic section that is at least partly received in the breakthrough.

[0019] The basic section is guided through the breakthrough. The basic section receives the actuation stem.

[0020] According to a further embodiment, the connection element comprises a disc-shaped blocking section that is assigned to the back side of the top sheet, wherein a diameter of the blocking section is bigger than a diameter of the breakthrough.

[0021] The blocking section faces the back side of the front sheet. When the connection element is pulled off the actuation stem, it lies against the back side of the top sheet and prevents the connection element from being removed from the actuation stem. This locking or blocking function of the blocking section can be achieved by the diameter of the blocking section being bigger than the diameter of the breakthrough.

[0022] According to a further embodiment, the gas stove further comprises a flexible gasket that is at least partly received in the breakthrough.

[0023] The gasket can be made of silicone or of any other flexible material. The gasket prevents liquids or particles from entering the space that is provided between the top sheet and the cooking trough. The cone-shaped basic section of the connection element can contact the gasket circumferentially.

[0024] According to a further embodiment, the connection element comprises an attachment stem that is received in a corresponding recess of the actuation knob in a form-locking manner.

[0025] The attachment stem protrudes from the cone-shaped basic section of the connection element. The attachment stem is cylinder-shaped and has a lateral flattening. The actuation knob comprises a cylindrical attachment section that has a recess for receiving the attachment stem. The recess is a cylinder-shaped bore with a corresponding lateral flattening.

[0026] According to a further embodiment, the actuation knob and/or the connection element are each formed integrally.

[0027] "Integrally" or "monolithic" means that actuation knob and the connection element each form one common part and are not assembled of different parts. The actuation knob and/or the connection element are both preferably made of plastic. The actuation knob and/or the

connection element can be made of acrylonitrile butadiene styrene (ABS), polypropylene (PP), polyethylene (PE) or any other suitable plastic material. The actuation knob and/or the connection element can be made by injection molding. The actuation knob and/or the connection element can also be made of metal.

[0028] Further features and advantages of the present invention will become apparent from the subsequent description and dependent claims, taken in conjunction with the accompanying drawings, in which:

Fig. 1 shows a schematic top view of one embodiment of a gas stove;

Fig. 2 shows a schematic perspective view of the gas stove according to Fig. 1;

Fig. 3 shows a schematic exploded perspective view of the gas stove according to Fig. 1;

Fig. 4 shows a schematic perspective view of one embodiment of a knob arrangement for the gas stove according to Fig. 1;

Fig. 5 shows a schematic back view of one embodiment of a knob for the knob arrangement according to Fig. 4; and

Fig. 6 shows a schematic back view of one embodiment of a connection element for the knob arrangement according to Fig. 4.

[0029] In the Figures, like reference numerals designate like or functionally equivalent elements, unless otherwise indicated.

[0030] Fig. 1 shows a schematic top view of an embodiment of a gas hob or gas stove 1. Fig. 2 shows a schematic perspective view of the gas stove 1. Fig. 3 shows a schematic exploded perspective view of the gas stove 1. In the following, Figs. 1 to 3 are referred to at the same time.

[0031] The gas stove 1 can be a household appliance or part of a household appliance. The gas stove 1 comprises a cooking trough 2. The cooking trough 2 is a deep-drawn metal sheet. The gas stove 1 further has at least one gas burner arrangement 3. The number of gas burner arrangements 3 is arbitrary. As Fig. 1 shows, there can be provided five gas burner arrangements 3.

[0032] Each gas burner arrangement 3 comprises a gas valve 4 which is attached to a main gas pipe 5, a gas burner 6 and a gas conduit 7 which connects the gas valve 4 to the associated gas burner 6. The gas valve 4 preferably is a gas regulating valve. The gas valve 4 is suitable for regulating a stream of combustion gas from the main gas pipe 5 to the gas burner 6 continuously or stepwise. In particular, the gas valve 4 is a so-called step valve. The gas valve 4 is preferably clamped to the main gas pipe 5.

[0033] The cooking trough 2 is covered by means of a cover plate or top sheet 8. The top sheet 8 covers the cooking trough 2. The top sheet 8 is a glass plate or a glass-ceramic plate. The top sheet 8 can also be made of metal, in particular stainless steel. The top sheet 8 has

a front side 9 and a back side 10. The front side 9 is averted the cooking trough 2. The back side 10 is facing the cooking trough 2. The top sheet 8 comprises a number of breakthroughs 11. The number of breakthroughs 11 is the same as the number of gas valves 4. Each gas valve 4 has its own breakthrough 11. The breakthroughs 11 are cylindrical bores. In the following only one breakthrough 11 and only one gas valve 4 will be referred to.

[0034] The gas valve 4 is arranged below the top sheet 8. That means, the gas valve 4 faces the back side 10 of the top sheet 8. The gas valve 4 has an actuation stem 12 which is guided through the breakthrough 11. In particular, the actuation stem 12 can be guided from the back side 10 to the front side 9 of the top sheet 8. However, the actuation stem 12 can end before the top sheet 8 so that it is not guided through the breakthrough 11. The actuation stem 12 can be rotated around an axis of rotation R to adjust the flow of combustion gas from the main gas pipe 5 to the gas burner 6. Depending on an angle of rotation of the actuation stem 12, the flow of combustion gas from the main gas pipe 5 to the gas burner 6 can be increased, decreased or completely blocked. An electronic board or circuit board (not shown) is arranged between the gas valve 4 and the top sheet 8. In use of the gas stove 1, the circuit board has to be protected from fluids like water or spilled food. The actuation stem 12 can be guided through the circuit board.

[0035] As can be seen in Fig. 4, each gas valve 4 has a knob arrangement 13 for actuating the actuation stem 12. "Actuating" in this context, means rotating. The knob arrangement 13 comprises an actuation knob 14. The actuation knob 14 is shown in Fig. 5 in a back view. The actuation knob 14 is preferably made of plastic. The actuation knob 14 can be made of acrylonitrile butadiene styrene (ABS), polypropylene (PP), polyethylene (PE) or any other suitable plastic material. The actuation knob 14 can be made by injection molding. The actuation knob 14 can also be made of metal.

[0036] The actuation knob 14 has a basic section 15. The basic section 15 is cylinder shaped. From a front side of the basic section 15, a gripping section 16 protrudes. The gripping section 16 is bar-shaped. The gripping section 16 can be gripped with two fingers to rotate the actuation stem 12. An attachment section 17 protrudes from a backside of the basic section 15. That means the gripping section 16 and the attachment section 17 are arranged on opposite sides of the basic section 15. The attachment section 17 is cylinder-shaped. The attachment section 17 has a recess 18 which is arranged centrally in the attachment section 17. The recess 18 has a circular shape with a flattening 19. The actuation knob 14 is integrally formed. "Integrally" or "monolithic" means that the basic section 15, the gripping section 16 and the attachment section 17 form one common part and are not assembled of different parts.

[0037] The knob arrangement 13 further comprises a connection element 20. The connection element 20 is

suitable of connecting the actuation knob 14 to the actuation stem 12. The connection element 20 is preferably made of a plastic material like ABS, PP, PE or any other suitable plastic material. The connection element 20 is formed integrally. The connection element 20 can be an injection molded part. Alternatively, the connection element 20 can be made of metal.

[0038] The connection element 20 has a basic section 21 that is cone shaped. An attachment stem 22 protrudes from the basic section 21. The attachment stem 22 is cylinder-shaped and has a flattening 23. The attachment stem 22 can be pressed into the attachment section 17 of the actuation knob 14. The flattenings 19, 23 prevent a rotation of the actuation knob 14 relative toward the connection element 20. In this way, the actuation knob 14 can be connected to the connection element 20 in a form-locking manner. "Form-locking" or "positive locking" in this context means that the attachment stem 22 and the attachment section 17 engage each other in such a way that the actuation knob 14 is not rotatable toward the connection element 20.

[0039] However, the connection between the actuation knob 14 and the connection element 20 can be loosened without tools or tool-free. This means, the actuation knob 14 can be pulled off the connection element 20 by applying a force F (Fig. 3) on the actuation knob 14. The force F acts along the axis of rotation R. The actuation knob 14 and the connection element 20 can be connected to each other using threads, clips, pins, a snapping connection or the like. There can also be provided a design that needs a tool to disconnect the actuation knob 14 from the connection element 20.

[0040] Fig. 6 shows a back view of the connection element 20. The connection element 20 has a recess 24. The recess 24 is a circular bore that comprises a flattening 25. The recess 24 is provided in the basic section 21. The recess 24 can receive the actuation stem 12 in a form-locking manner. For this purpose, the actuation stem 12 has a flattening that corresponds to the flattening 25.

[0041] The connection element 20 is prevented from being pulled off the actuation stem 12 by means of a disc shaped locking section or blocking section 26. The blocking section 26 radially protrudes from the basic section 21. The blocking section 26 is arranged between the cooking trough 2 and the top sheet 8. That means, the blocking section 26 is arranged below the top sheet 8 (Fig. 2). The blocking section 26 has a diameter d_{26} that is bigger than a diameter d_{11} of the breakthrough 11. In this way, the blocking section 26 is blocked by the top sheet 8 when the connection element 20 is pulled off the actuation stem 12.

[0042] The knob arrangement 13 further comprises a gasket 27. The gasket 27 can be made of silicone, for example. The gasket 27 is received in the breakthrough 11. The connection element 20, in particular the basic section 21 thereof, is received in the gasket 27. The gasket 27 together with the connection element 20 prevents liq-

uids from entering the cooking trough 2.

[0043] The knob arrangement 13 has a plurality of advantages. It allows to remove the actuation knob 14 in a safe way, preferably without tools. The actuation knob 14 can then be easily cleaned, for example in a dishwasher. The knob arrangement 13 protects inner parts of the gas stove 1 against liquids, particles or the like. The complexity is reduced, in particular, a length of the actuation stem 12 can be reduced. It is possible to combine the knob arrangement 13 with concepts of illumination, for example light guides, power indicators or the like.

Reference Numerals:

[0044]

1	gas stove
2	cooking trough
3	gas burner arrangement
4	gas valve
5	main gas pipe
6	gas burner
7	gas conduit
8	top sheet
9	front side
10	back side
11	breakthrough
12	actuation stem
13	knob arrangement
14	actuation knob
15	basic section
16	gripping section
17	attachment section
18	recess
19	flattening
20	connection element
21	basic section
22	attachment stem
23	flattening
24	recess
25	flattening
26	blocking section
27	gasket
d11	diameter
d26	diameter
F	force
R	axis of rotation

Claims

1. A gas stove (1), comprising a gas valve (4), which has an actuation stem (12) for actuating the gas valve (4), an actuation knob (14) for actuating the actuation stem (12), and a connection element (20), which couples the actuation knob (14) to the actuation stem (12), wherein the actuation knob (14) is connected

to the connection element (20) in a form-locking manner, so that the actuation knob (14) is removable from the gas stove (1) for maintenance purposes, wherein the gas stove (1) further comprises a top sheet (8), wherein the top sheet (8) comprises a front side (9), which is assigned to the actuation knob (14), and a back side (10), which is assigned to the gas valve (4), wherein the top sheet (8) has a breakthrough (11), through which the connection element (20) is at least partly guided, and wherein the connection element (20) comprises a cone-shaped basic section (21) that is at least partly received in the breakthrough (11).

2. The gas stove according to claim 1, wherein the actuation knob (14) is removable from the gas stove (1) by applying a force (F) on the actuation knob (14) that acts along an axis of rotation (R) of the actuation stem (12).
3. The gas stove according to claim 1 or 2, wherein the connection element (20) is connected to the actuation stem (12) in a form-locking manner.
4. The gas stove according to claim 3, wherein the connection element (20) comprises a recess (24) that receives the actuation stem (12) in a form-locking manner.
5. The gas stove according to one of claims 1 - 4, wherein the connection element (20) comprises a disc-shaped blocking section (26) that is assigned to the back side (10) of the top sheet (8), and wherein a diameter (d26) of the blocking section (26) is bigger than a diameter (d11) of the breakthrough (11).
6. The gas stove according to one of claims 1 - 5, further comprising a flexible gasket (27) that is at least partly received in the breakthrough (11).
7. The gas stove according to one of claims 1 - 6, wherein the connection element (20) comprises an attachment stem (22) that is received in a corresponding recess (18) of the actuation knob (14) in a form-locking manner.
8. The gas stove according to one of claims 1 - 7, wherein the actuation knob (14) and/or the connection element (20) are each formed integrally.

Patentansprüche

1. Gasherd (1), der ein Gasventil (4), das einen Betätigungsschaft (12) zum Betätigen des Gasventils (4) aufweist, einen Betätigungsknopf (14) zum Betätigen des Betätigungsschafts (12) und ein Verbindungselement (20) umfasst, das den Betätigungs-

- knopf (14) mit dem Betätigungsschaft (12) koppelt, wobei der Betätigungsknopf (14) auf formschlüssige Weise mit dem Verbindungselement (20) verbunden ist, so dass der Betätigungsknopf (14) zu Wartungszwecken vom Gasherd (1) abnehmbar ist, wobei der Gasherd (1) ferner ein Deckblech (8) umfasst, wobei das Deckblech (8) eine Vorderseite (9) umfasst, die dem Betätigungsknopf (14) zugeordnet ist, und eine Rückseite (10), die dem Gasventil (4) zugeordnet ist, wobei das Deckblech (8) einen Durchbruch (11) aufweist, durch den das Verbindungselement (20) zumindest teilweise geführt ist, und wobei das Verbindungselement (20) einen kegelförmigen Grundabschnitt (21) umfasst, der zumindest teilweise in dem Durchbruch (11) aufgenommen ist.
2. Gasherd nach Anspruch 1, wobei der Betätigungsknopf (14) durch Anwenden einer Kraft (F) darauf, die entlang einer Rotationsachse (R) des Betätigungsschafts (12) wirkt, vom Gasherd (1) abnehmbar ist.
 3. Gasherd nach Anspruch 1 oder 2, wobei das Verbindungselement (20) auf formschlüssige Weise mit dem Betätigungsschaft (12) verbunden ist.
 4. Gasherd nach Anspruch 3, wobei das Verbindungselement (20) eine Vertiefung (24) umfasst, die den Betätigungsschaft (12) auf formschlüssige Weise aufnimmt.
 5. Gasherd nach einem der Ansprüche 1 - 4, wobei das Verbindungselement (20) einen scheibenförmigen Sperrabschnitt (26) umfasst, der der Rückseite (10) des Deckblechs (8) zugeordnet ist, und ein Durchmesser (d26) des Sperrabschnitts (26) größer ist als ein Durchmesser (d11) des Durchbruchs (11).
 6. Gasherd nach einem der Ansprüche 1 - 5, der ferner eine flexible Dichtung (27) umfasst, die zumindest teilweise in dem Durchbruch (11) aufgenommen ist.
 7. Gasherd nach einem der Ansprüche 1 - 6, wobei das Verbindungselement (20) einen Befestigungsschaft (22) umfasst, der auf formschlüssige Weise in einer entsprechenden Vertiefung (18) des Betätigungsknopfs (14) aufgenommen ist.
 8. Gasherd nach einem der Ansprüche 1 - 7, wobei der Betätigungsknopf (14) und/oder das Verbindungselement (20) jeweils einteilig ausgebildet sind.
- Revendications**
1. Cuisinière à gaz (1) comprenant une vanne de gaz (4), laquelle dispose d'une tige d'actionnement (12) pour actionner la vanne de gaz (4), d'un bouton d'actionnement (14) pour actionner la tige d'actionnement (12) et d'un élément de raccord (20) qui couple le bouton d'actionnement (14) à la tige d'actionnement (12), dans laquelle le bouton d'actionnement (14) est raccordé à l'élément de raccord (20) sous la forme d'un verrouillage, de sorte que le bouton d'actionnement (14) peut être enlevé de la cuisinière à gaz (1) à des fins d'entretien, dans laquelle la cuisinière à gaz (1) comprend en outre une tôle de dessus (8), dans laquelle la tôle de dessus (8) comprend un côté avant (9) réservé au bouton d'actionnement (14) et un côté arrière (10) réservé à la vanne de gaz (4), dans laquelle la tôle de dessus (8) présente un passage (11) à travers lequel l'élément de raccord (20) est au moins partiellement guidé, et dans laquelle l'élément de raccord (20) comprend une section de base conique (21) qui est au moins partiellement reçue dans le passage (11).
 2. Cuisinière à gaz selon la revendication 1, dans laquelle le bouton d'actionnement (14) peut être enlevé de la cuisinière à gaz (1) par l'application d'une force (F) sur le bouton d'actionnement (14) qui agit sur un axe de rotation (R) de la tige d'actionnement (12).
 3. Cuisinière à gaz selon la revendication 1 ou 2, dans laquelle l'élément de raccord (20) est raccordé à la tige d'actionnement (12) autobloquante.
 4. Cuisinière à gaz selon la revendication 3, dans laquelle l'élément de raccord (20) comprend un affaissement (24) qui réceptionne la tige d'actionnement (12) autobloquante.
 5. Cuisinière à gaz selon l'une des revendications 1-4, dans laquelle l'élément de raccord (20) comprend une section de blocage discoïde (26) réservée au côté arrière (10) de la tôle de dessus (8) et dans laquelle un diamètre (d26) de la section de blocage (26) est plus grand qu'un diamètre (d11) du passage (11).
 6. Cuisinière à gaz selon l'une des revendications 1-5, comprenant en outre un joint souple (27) au moins partiellement reçu dans le passage (11).
 7. Cuisinière à gaz selon l'une des revendications 1-6, dans laquelle l'élément de raccord (20) comprend une tige de fixation (22) réceptionnée dans un affaissement correspondant (18) du bouton d'actionnement (14) autobloquant.
 8. Cuisinière à gaz selon l'une des revendications 1-7, dans laquelle le bouton d'actionnement (14) et/ou l'élément de raccord (20) sont chacun formés d'un seul tenant.

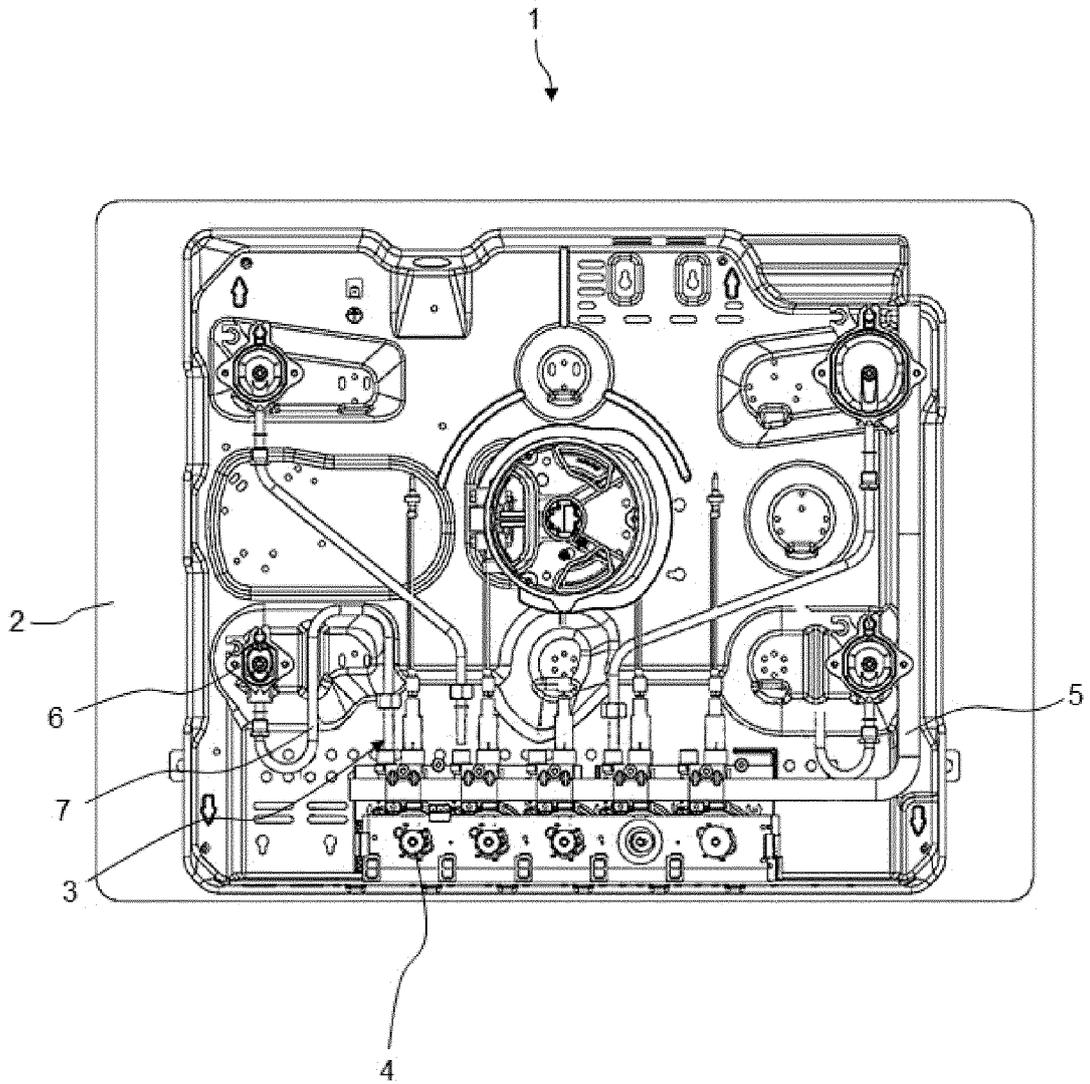


Fig. 1

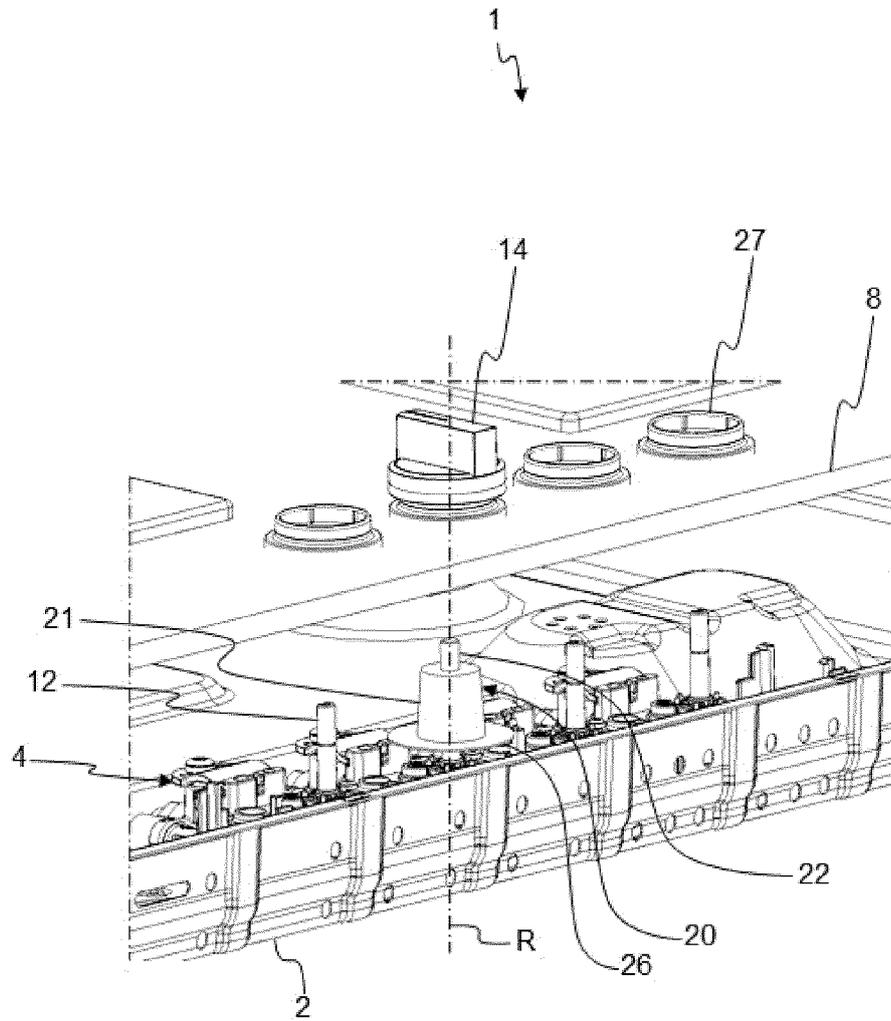


Fig. 2

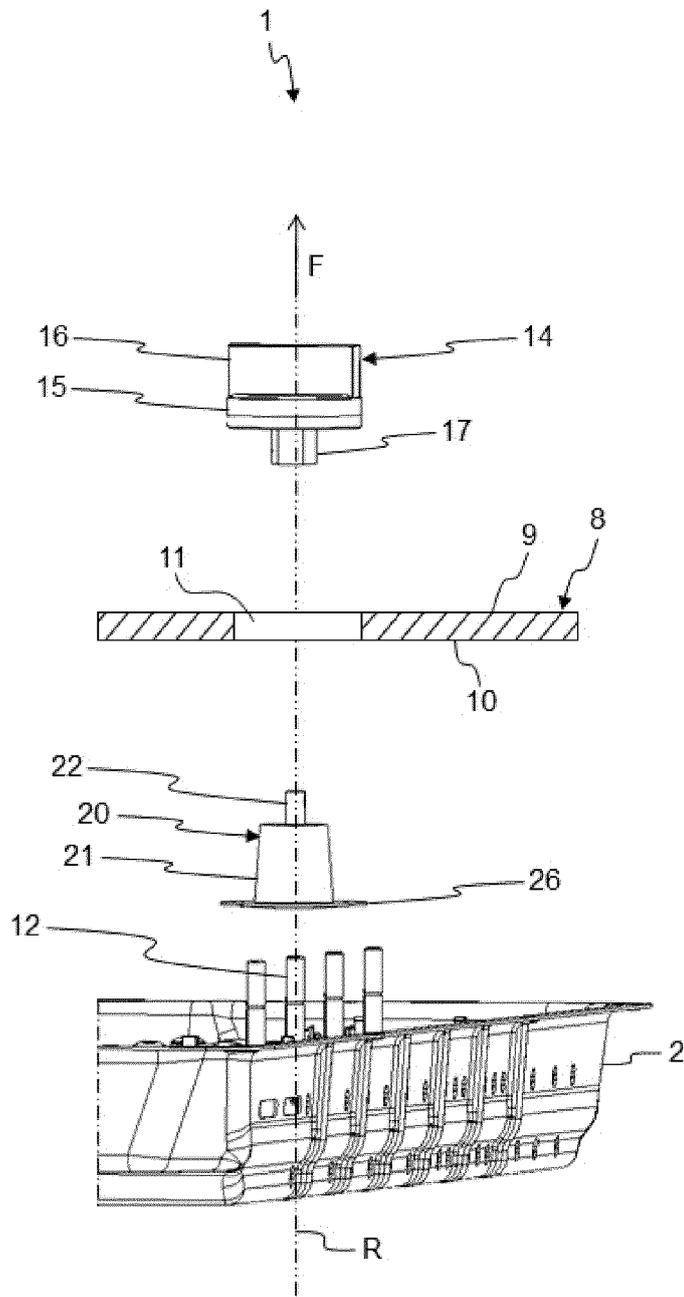


Fig. 3

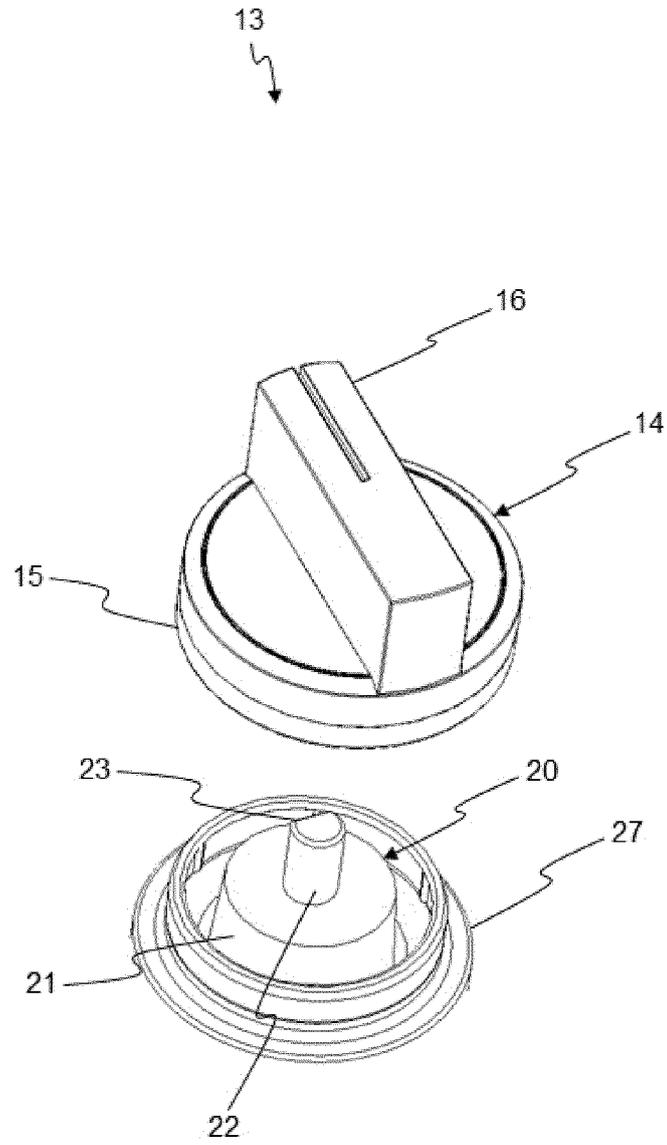


Fig. 4

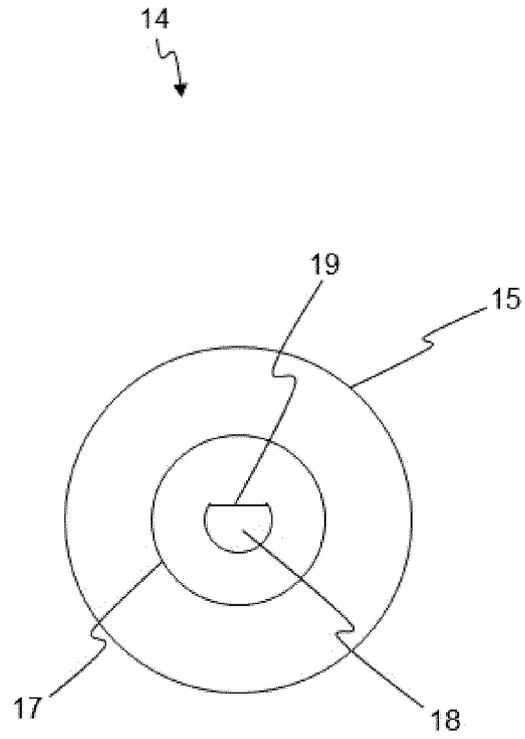


Fig. 5

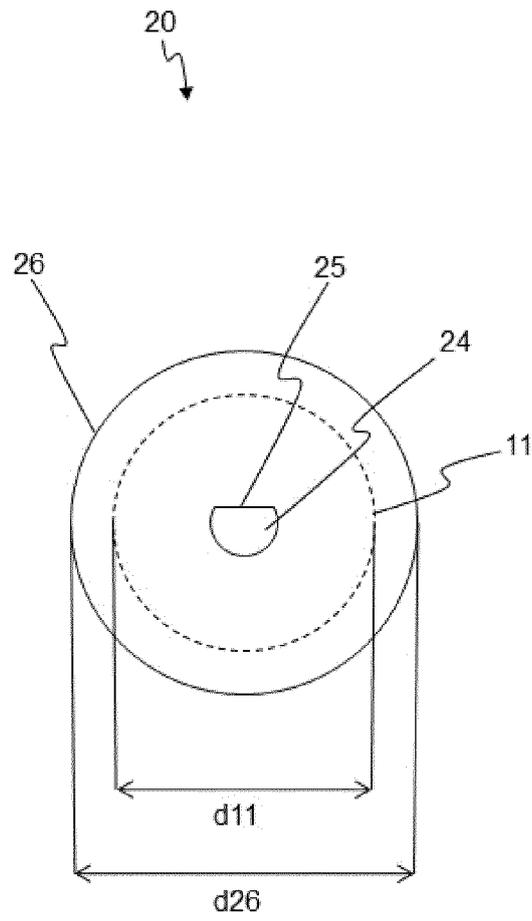


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 3096085 A1 [0003]
- GB 2419036 A [0004]