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(54) **A COOKING APPLIANCE HAVING A CONTROL KNOB**

(57) The present invention proposes a cooking appliance (100) comprising a main body (110), a control panel (120) provided on the main body (110), a switch (30) for adjusting a power level of a heat source, the switch (30) comprising a shaft (20) extending through the control panel (120) and a control knob (10) connected to the shaft (20) for rotating the shaft (20), wherein said control knob (10) comprising a knob body (11) having a guiding portion (12) in which the shaft (20) is arranged to extend. The present invention also proposes a method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) comprising the steps of: providing the cooking appliance (100) wherein the cooking appliance (100) comprises a main body (110); a control panel (120) provided on the main body (110), and a switch (30) having a shaft (20) extending through the control panel (120) for adjusting a power level of a heat source, creating a recess (21) on the shaft (20) of the switch (30); providing a control knob (10) wherein the control knob (10) has a guiding portion (12) in which the shaft (20) is arranged to extend, and the guiding portion (12) having at least one protrusion (13) shaped and dimensioned with respect to the recess (21) on the shaft (20), and mounting the control knob (10) to the shaft (20) such that the protrusion (13) and the recess (21) engage each other at a locked position in which the control knob (10) and the shaft (20) rotate together.

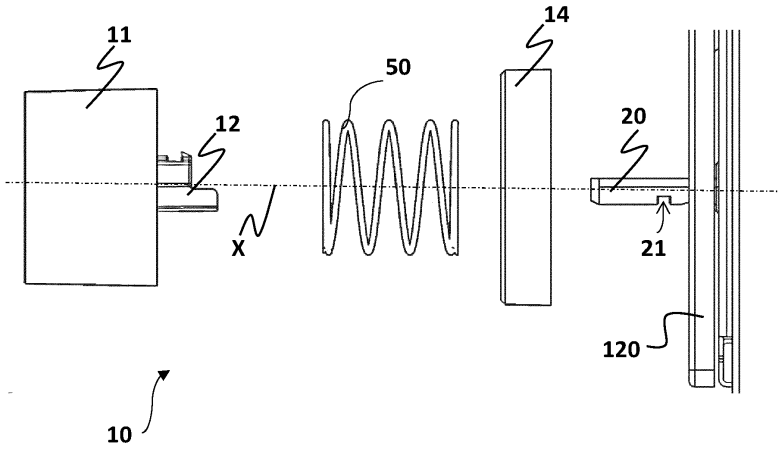

FIG. 3

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Description

Technical Field of the Invention

[0001] The invention relates to cooking appliances having a control knob connected to a shaft extending in a direction away from a control panel.

Background of the Invention

[0002] In cooking appliances, shafts are extending in the direction away from the control panel. The control knobs, provided on the shafts, are rotated and the power level of the heat source of the cooking appliance can be controlled. Since most of the control knobs are connected to the shafts without any locking mechanism, control knobs can be easily removed from the shafts.

[0003] Users can sometimes unintentionally apply more force to the control knobs than necessary. In such cases, control knobs may be disengaged by the shaft as a result of this random force. Thus, there is a need for a locking mechanism that enhances the safety of the cooking appliances.

[0004] A prior art publication in the technical field of the invention may be referred to as US2733083, which discloses a knob, a fastening device, and a shaft. The fastening device is used for knob detaching force required being greater than the incidental removal force exerted to prevent undesired separation of the knob from the shaft.

[0005] The invention provides an additional improvement to the prior art.

Summary of the Invention

[0006] An object of the present invention is to provide a control knob which is prevented from being easily removed during normal use.

[0007] The present invention proposes a cooking appliance comprising a main body, a control panel provided on the main body, a switch for adjusting a power level of a heat source, the switch comprising a shaft extending through the control panel, and a control knob connected to the shaft for rotating the shaft, wherein said control knob comprising a knob body having a guiding portion in which the shaft is arranged to extend. The cooking appliance can be a freestanding cooking appliance. The guiding portion is made of elastic material, preferably plastic material. The guiding portion is provided with at least one protrusion, the shaft is provided with at least one corresponding recess, both of the protrusion and the recess are being sized and shaped to engage each other at a locked position so that knob body and shaft rotate together. At the locked position, since the protrusion and the recess are engaged with each other, the knob body is prevented from moving slidably on the shaft. Therefore, when the user pulls the knob body at a locked position, the knob body is prevented from being removed from the shaft. This enables eliminating the safety problems likely to occur due to the control knob being removed from the shaft as a result of incidental removal force.

[0008] In a possible embodiment, the shaft is provided with at least one pushing hole as a through-hole which enables the guiding portion is accessed when the knob body is at the locked position. The pushing hole makes it easier to push the guiding portion when the knob body is in the locked position.

[0009] In a possible embodiment, the guiding portion has a pushing end facing the pushing hole at the shaft when the knob body is at the locked position.

[0010] In a possible embodiment, the cooking appliance comprises a gas tap which is connected to the shaft. The cooking appliance can be a gas cooking appliance.

[0011] In a possible embodiment, a knob collar is removably mounted on the shaft. Thus, when the user desires to change the knob collar, the user can remove the knob collar from the shaft without damaging it. Knob collar placed between the control panel and the knob body.

[0012] In a possible embodiment, a slot in which the knob body is partly positioned inside is disposed on the inner face of the knob collar. Thus, mounting the control knob to the knob collar is simplified.

[0013] In a possible embodiment, the knob collar is slidably movable on the shaft between a first position in which it hides the pushing hole and a second position in which it allows access to the pushing hole. Thus, the appearance of the cooking appliance is improved.

[0014] In a possible embodiment, a resilience member is disposed between the knob body and the knob collar so that the knob body is movable relative to the knob collar by manipulating against the force of the resilience member. The resilience member can be a spring, in particular a helical spring.

[0015] In a possible embodiment, the recess has a polygonal cross-section, preferably rectangular. Thus, the protrusion inserts into the recess easily.

[0016] In a possible embodiment, the protrusion has at least a partly inclined portion which is inclined with respect to the longitudinal axis of the knob body. Thus, the protrusion is prevented from being damaged during the disengaging from the recess.

[0017] In a possible embodiment, the knob body has at least two slits that partly extend along the guiding portion. Thus, the flexibility of the guiding portion is increased.

[0018] In a possible embodiment, an indicator in the form of a lengthwise recess is provided on the knob body. Thus, the user can detect the heat level easily by using the knob body and the control panel.

[0019] In a possible embodiment, a method of mounting a control knob on a shaft of a cooking appliance comprising the steps of providing the cooking appliance wherein the cooking appliance comprises a main body; a control panel provided on the main body, and a switch having a shaft extending through the control panel for adjusting a power level of a heat source; creating a recess

on the shaft of the switch; providing a control knob wherein the control knob has a guiding portion in which the shaft is arranged to extend, and the guiding portion having at least one protrusion shaped and dimensioned with respect to the recess on the shaft and mounting the control knob to the shaft such that the protrusion and the recess engage each other at a locked position in which the control knob and the shaft rotate together. Thus, the knob body is prevented from moving slidably on the shaft.

[0020] In a possible embodiment, a method of mounting a control knob on a shaft of a cooking appliance comprising further the step of creating at least one pushing hole on the shaft as a through-hole which enables the guiding portion is accessed when the knob body is at the locked position; providing a pushing end on the guiding portion facing the pushing hole at the shaft when the knob body is at the locked position. The pushing hole enables the user can access to the guiding portion when the knob body is in the locked position.

[0021] In a possible embodiment, a method of mounting a control knob on a shaft of a cooking appliance comprising further the step of pushing the pushing end of the guiding portion by inserting a tool into the pushing hole to disengage the protrusion from the recess when demounting is needed. Thus, the demounting is simplified.

Brief description of the figures

[0022] The accompanying drawings are given solely for the purpose of exemplifying the invention whose advantages over prior art were outlined above and will be explained in detail hereinafter:

Fig. 1 is a perspective view of the cooking appliance in which the switch assembly can be attached according to the present invention.

Fig. 2 is a perspective view of the knob body which is connected to the shaft according to the present invention.

Fig. 3 is an exploded view of the switch assembly according to the present invention.

Fig. 4 is another exploded view of the switch assembly shown in Fig. 3, according to the present invention.

Fig. 5 is a perspective view of the switch according to the present invention.

Fig. 6 is a perspective view of the gas tap and the shaft according to the present invention.

Detailed description of the figures

[0023] The present invention proposes a cooking appliance (100) comprising a main body (110), a control panel (120) provided on the main body (110), a switch (30) for adjusting a power level of a heat source, the switch (30) comprising a shaft (20) extending through the control panel (120) and a control knob (10) connected to the shaft (20) for rotating the shaft (20), wherein said control knob (10) comprising a knob body (11) having a guiding portion (12) in which the shaft (20) is arranged to extend. Referring to Fig. 1, the control panel (120) is provided on the main body (110). The control knob (10) is disposed on the control panel (120). The guiding portion (12) is provided with at least one protrusion (13), the shaft (20) is provided with at least one corresponding recess (21) and both the protrusion (13) and the recess (21) are being sized and shaped to engage each other at a locked position so that knob body (11) and shaft (20) rotate together. As seen in Fig. 2, the protrusion (13) is formed on the upper part of the guiding portion. The shaft (20) is inserted into the guiding portion (12). As seen in Fig. 3, the recess (21) is formed on the lower part of the shaft (20). When the protrusion (13) and the recess (21) are engaged to each other, the knob body (11) is connected to the shaft (20). When the knob body (11) is slided on the shaft (20) fully, the knob body (11) is brought to the locked position. Since the protrusion (13) is inserted into the recess (21) when the knob body (11) is at a locked position, the knob body (11) is prevented from moving horizontally on the shaft (20).

[0024] Referring to Fig. 4, the shaft (20) is provided with at least one pushing hole (22) as a through-hole which enables the guiding portion (12) is accessed when the knob body (11) is at the locked position. The pushing hole (22) is formed on the part of the shaft (22) extending out of the control panel (120) wherein the pushing hole (22) is closer to the control panel (120) than the recess (21). Therefore, the pushing hole (22) enables the user access to the guiding portion (12) when the knob body (11) is at the locked position.

[0025] As seen in Fig. 5, the shaft (20) is positioned inside the guiding portion (12). The knob body (11) can be brought into a locked position in which the protrusion (13) and the recess (21) are engaged with each other. Thus, the knob body (11) and the shaft (20) are connected and able to rotate together. The knob body (11) can also be brought into an unlocked position in which the protrusion (13) and the recess (21) are not engaged with each other. The user can push the guiding portion (12) through the pushing hole (22) by using a tool or his/her hand. By applying force onto the guiding portion (12), the guiding portion (12) stretches downwardly. For example, when demounting is needed, pushing a pushing end (17) of the guiding portion (12) by inserting a tool into the pushing hole (22) helps to disengage the protrusion (13) from the recess (21). When the guiding portion (12) is pushed downwardly, the protrusion (13) comes out of the recess (21) to disengage. To shift the knob body (11) from the locked position to the unlocked position, the knob body (11) must be pulled when the protrusion (13) comes out of the recess (21).

[0026] As mentioned above, the guiding portion (12) has the pushing end (17) facing the pushing hole (22) at the shaft (20) when the knob body (11) is at the locked position. When the knob body (11) is at the locked position, the user can apply force onto the pushing end (17) through the pushing hole (22). When the pushing end (17) is pushed by the user, the guiding portion (12) stretches downward. Thus, the protrusion (13) provided on the guiding portion (12) comes out of the recess (21).

[0027] Referring to Fig. 6, the cooking appliance (100) comprises a gas tap (40) which is connected to the shaft (20). The gas tap (40) having a flow control member controlled by the shaft (20) which is rotated by said control knob (10).

[0028] According to the present invention, the knob collar (14) is removably mounted on the shaft (20) and placed between the control panel (120) and the knob body (11). The knob collar (14) has a hollow shape with a bottom wall having a connection hole (23) in which the shaft (20) extends. Said connection hole (23) is formed on a raised portion at the bottom wall of the knob collar (14). An inner face of the knob collar (14) is provided with a slot (19) in which the knob body (11) is partly positioned inside. The inner face of the knob collar (14) faces the knob body (11) when the knob body (11) and knob collar (14) is connected. At least one portion of the knob body (11) can be snap-fitted into the slot (19) of the knob collar (14). Thanks to the snap-fit connection, the knob body (11) is removably mounted to the knob collar (14). Moreover, the knob collar (14) can be slidably movable on the shaft (20) between a first position in which it hides the pushing hole (22) and a second position in which it allows access to the pushing hole (22). In Fig. 1, the knob collar (14) is at the first position. In order to shift the knob collar (14) from the first position to the second position, the knob collar (14) is pulled by the user. In Fig. 5, the knob collar (14) is at the second position.

[0029] As seen in Fig. 2, the knob body (11) has at least two slits (15) that partly extend along the guiding portion (12). The slits (15) are formed on both lateral sides of the pushing end (17). Said slits (15) make the pushing end (17) flexible and allow to be pushed for disengagement.

[0030] The cooking appliance (100) further comprises a resilience member (50) which is disposed between the knob body (11) and the knob collar (14) so that the knob body (11) is movable relative to the knob collar (14) by manipulating against the force of the resilience member (50). An end of the resilience member (50) is guided on the bottom wall of the knob collar (14) and in the proximity of the raised portion of the knob collar (14) which helps to keep the resilience member (50) in its position. The other end of the resilience member (50) is guided on a bottom wall of the knob body (11).

[0031] According to the present invention, the recess (21) has a polygonal cross-section, preferably rectangular. Since the recess (21) is shaped and dimensioned with respect to the protrusion (13), the cross-section of the recess (21) can vary. The protrusion (13) has at least a partly inclined portion (18) which is inclined with respect to the longitudinal axis of the knob body (X). This inclined portion (18) allows the engagement of the recess (21) and protrusion (13) when the knob body (11) is moved relative to the cooking appliance (100).

[0032] The cooking comprises an indicator (16) in the form of a lengthwise recess which is provided on the knob body (11). The indicator (16) is formed on the outer face of the knob body (11) and helps the user to indicate the position of the control knob (10).

[0033] A method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) comprising the steps of; providing the cooking appliance (100) wherein the cooking appliance (100) comprises a main body (110); a control panel (120) provided on the main body (110), and a switch (30) having a shaft (20) extending through the control panel (120) for adjusting a power level of a heat source, creating a recess (21) on the shaft (20) of the switch (30), providing a control knob (10) wherein the control knob (10) has a guiding portion (12) in which the shaft (20) is arranged to extend, and the guiding portion (12) having at least one protrusion (13) shaped and dimensioned with respect to the recess (21) on the shaft (20), mounting the control knob (10) to the shaft (20) such that the protrusion (13) and the recess (21) engage each other at a locked position in which the control knob (10) and the shaft (20) rotate together. The control knob (10) comprises a knob body (11) which is connected to the shaft (20). The protrusion (13) provided on the knob body (11), has at least partly inclined portion (18) which is inclined with respect to the longitudinal axis of the knob body (X). The recess (21) formed on the shaft (20) has a rectangular cross-section. When the protrusion (13) and the recess (21) are engaged to each other, the knob body (11) is connected to the shaft (20).

[0034] A method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) comprising further the step of; creating at least one pushing hole (22) on the shaft (20) as a through-hole which enables the guiding portion (12) is accessed when the knob body (11) is at the locked position and providing a pushing end (17) on the guiding portion (12) facing the pushing hole (22) at the shaft (20) when the knob body (11) is at the locked position. The pushing hole (22) enables the user can push the pushing end (17) when the knob body (11) is at the locked position. Thus, the demounting is simplified. The pushing hole (22) can be hidden by knob collar (14) which is slidably mounted on the shaft (20). The knob collar (14) is movable between the first position in which it hides the pushing hole (22) and the second position in which it allows access to the pushing hole (22).

[0035] A method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) comprising further the step of; pushing the pushing end (17) of the guiding portion (12) by inserting a tool into the pushing hole (22) to disengage the protrusion (13) from the recess (21) when demounting is needed. User can also push the

pushing end (17) through the pushing hole (22) with his/her hand. In order to remove the knob body (11) from the shaft (20), the knob body (11) must be pulled when the pushing end (17) is pushed by the user.

[0036] Reference numbers:

10. Control knob

11. Knob body
12. Guiding portion
13. Protrusion
14. Knob collar
15. Slit
16. Indicator
17. Pushing end
18. Inclined portion
19. Slot

20. Shaft

21. Recess
22. Pushing hole
23. Connection hole

30. Switch
40. Gas tap
50. Resilience member
100. Cooking appliance

110. Main body
120. Control panel

Claims

1. A cooking appliance (100) comprising:

a main body (110);
a control panel (120) provided on the main body (110);
a switch (30) for adjusting a power level of a heat source, the switch (30) comprising a shaft (20) extending through the control panel (120) and a control knob (10) connected to the shaft (20) for rotating the shaft (20), wherein said control knob (10) comprising a knob body (11) having a guiding portion (12) in which the shaft (20) is arranged to extend, **characterized in that** the guiding portion (12) is provided with at least one protrusion (13);
the shaft (20) is provided with at least one corresponding recess (21); and
both of the protrusion (13) and the recess (21) are being sized and shaped to engage each other at a locked position so that the knob body (11) is prevented from moving slidably on the shaft (20).

2. The cooking appliance (100) according to Claim 1, wherein the shaft (20) is provided with at least one pushing hole (22) as a through-hole which enables the guiding portion (12) is accessed when the knob body (11) is at the locked position.

3. The cooking appliance (100) according to Claim 2, wherein the guiding portion (12) has a pushing end (17) facing the pushing hole (22) at the shaft (20) when the knob body (11) is at the locked position.

4. The cooking appliance (100) according to any of the preceding claims, wherein the shaft is connected to the gas tap (40).

5. The cooking appliance (100) according to any of the preceding claims, wherein a knob collar (14) is removably mounted on the shaft (20) and placed between the control panel (120) and the knob body (11).

6. The cooking appliance (100) according to Claim 5, wherein the knob collar (14) has a slot (19) which is disposed on an inner face of the knob collar (14) in which the knob body (11) is partly positioned.

7. The cooking appliance (100) according to Claim 5 or Claim 6, wherein the knob collar (14) is slidably movable on the shaft (20) between a first position in which it hides the pushing hole (22) and a second position in which it allows access to the pushing hole (22).

8. The cooking appliance (100) according to Claim 5 - 7, wherein a resilience member (50) is disposed between the knob body (11) and the knob collar (14) so that the knob body (11) is movable relative to the knob collar (14) by manipulating against the force of the resilience member (50).

9. The cooking appliance (100) according to any of the preceding claims, wherein the recess (21) has a polygonal cross-section, preferably rectangular.

10. The cooking appliance (100) according to any of the preceding claims, wherein the protrusion (13) has at least partly inclined portion (18) which is inclined with respect to the longitudinal axis of the knob body (X).

11. The cooking appliance (100) according to any of the preceding claims, wherein the knob body (11) has at least two slits (15) that partly extend along the guiding portion (12).

12. The cooking appliance (100) according to any of the preceding claims, wherein an indicator (16) in the form of a lengthwise recess is provided on the knob body (11).

13. A method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) comprising the steps of:

- providing a cooking appliance (100) wherein the cooking appliance (100) comprises a main body (110); a control panel (120) provided on the main body (110), and a switch (30) having a shaft (20) extending through the control panel (120) for adjusting a power level of a heat source,
- creating a recess (21) on the shaft (20) of the switch (30);
- providing a control knob (10) wherein the control knob (10) has a guiding portion (12) in which the shaft (20) is arranged to extend, and the guiding portion (12) having at least one protrusion (13) shaped and dimensioned with respect to the recess (21) on the shaft (20); and
- mounting the control knob (10) to the shaft (20) such that the protrusion (13) and the recess (21) engage each other at a locked position in which the control knob (10) and the shaft (20) rotate together.

14. A method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) according to Claim 13, comprising the further steps of:

- creating at least one pushing hole (22) on the shaft (20) as a through-hole which enables the guiding portion (12) is accessed when the knob body (11) is at the locked position; and
- providing a pushing end (17) on the guiding portion (12) facing the pushing hole (22) at the shaft (20) when the knob body (11) is at the locked position.

15. A method of mounting a control knob (10) on a shaft (20) of a cooking appliance (100) according to Claim 14, comprising the further step of:
pushing the pushing end (17) of the guiding portion (12) by inserting a tool into the pushing hole (22) to disengage the protrusion (13) from the recess (21) when demounting is needed.

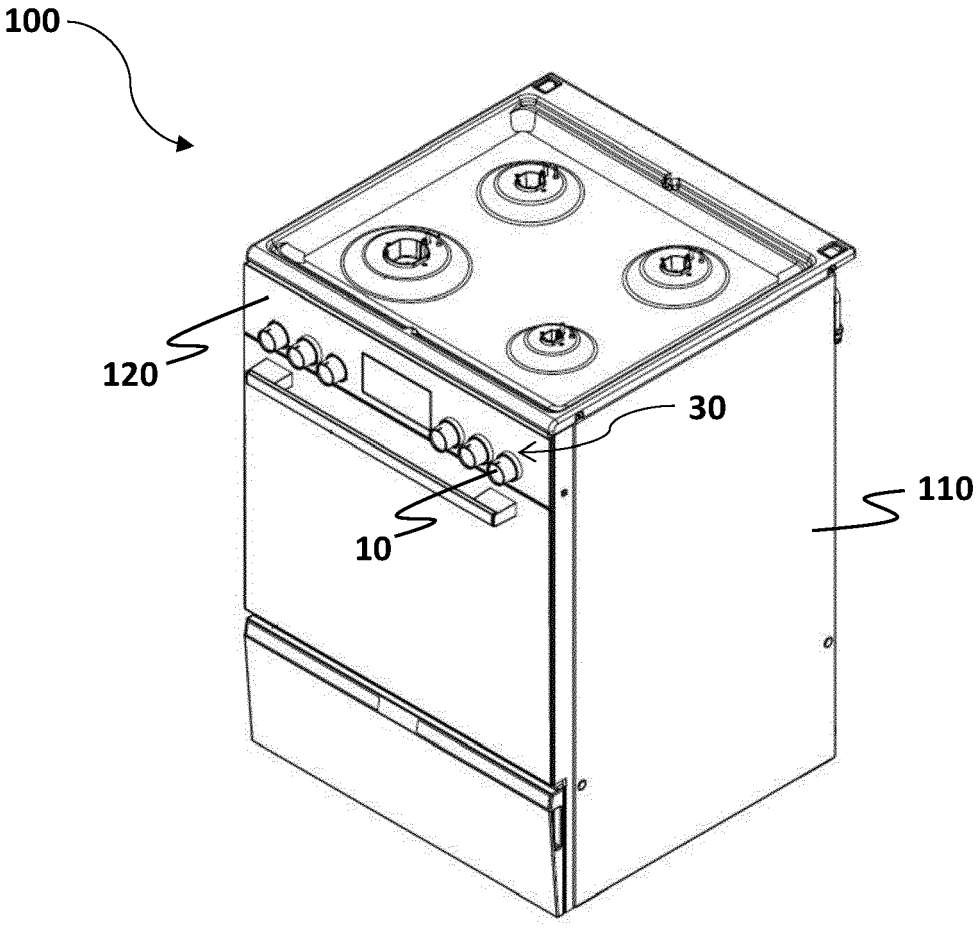

FIG. 1

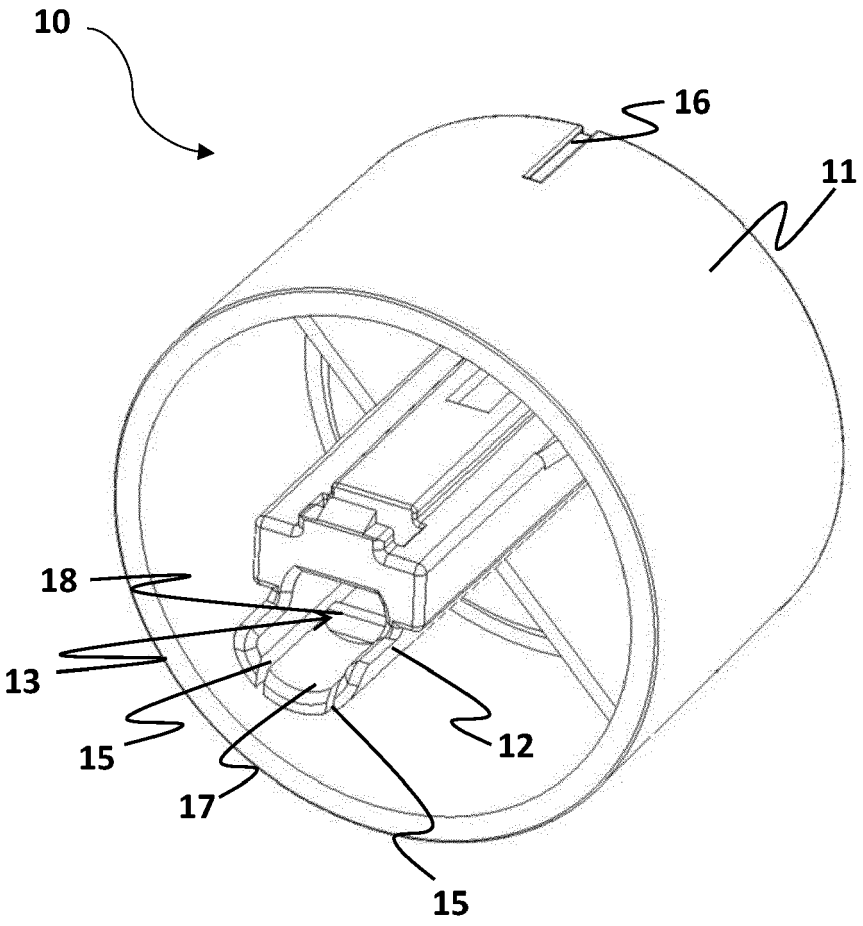

FIG. 2

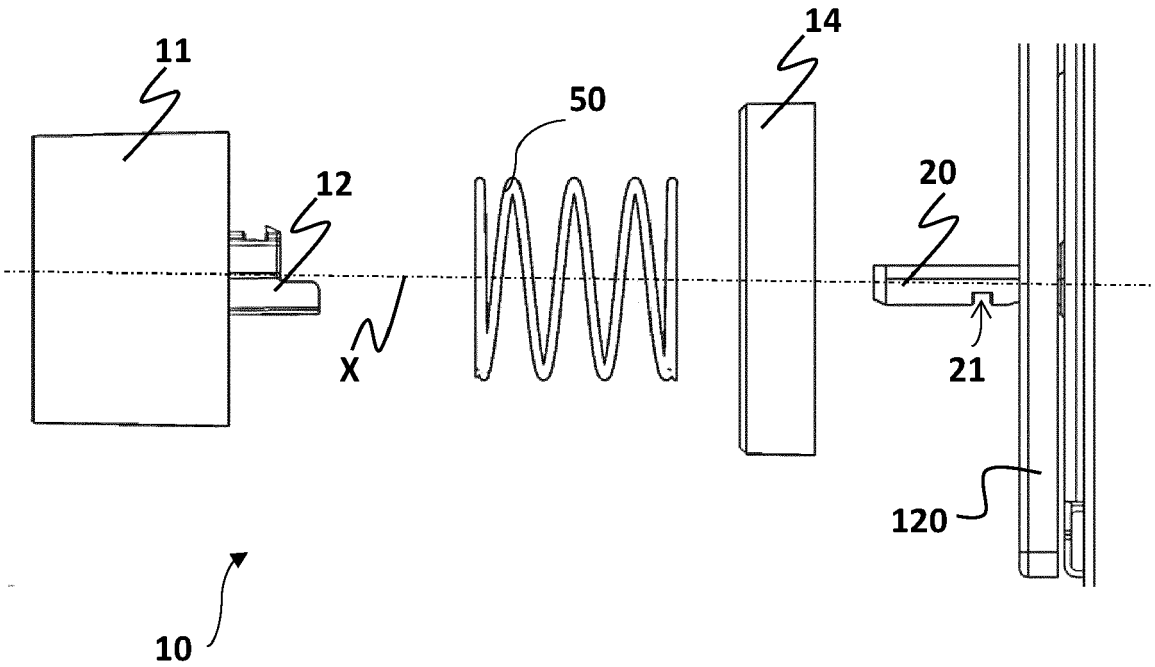

FIG. 3

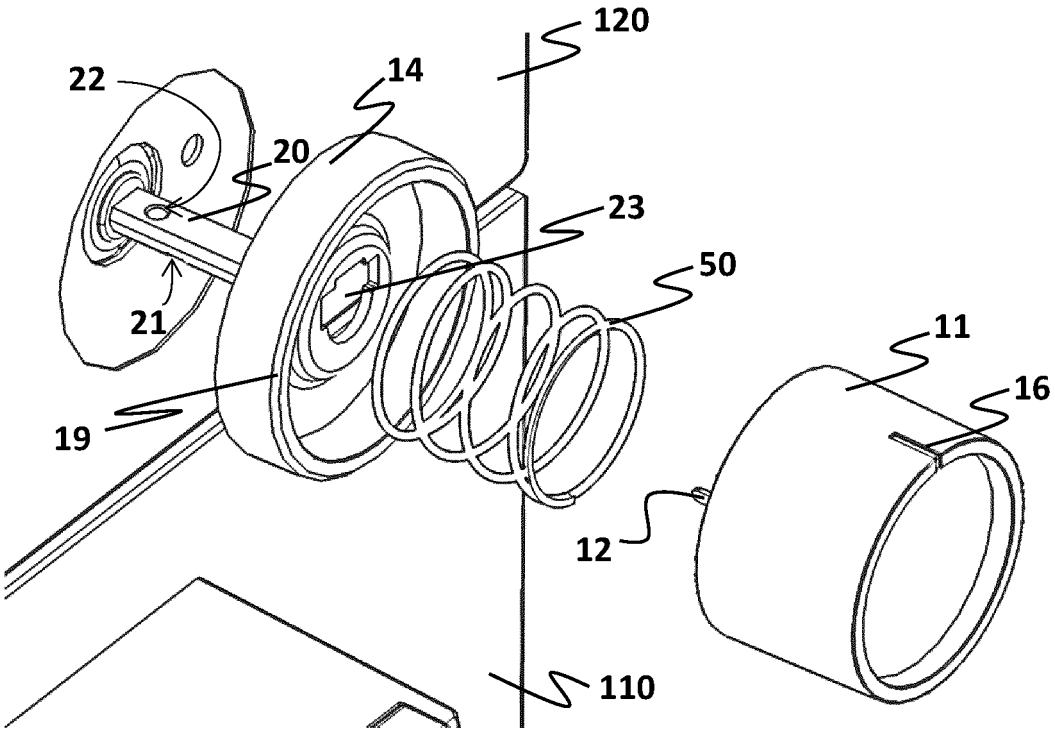

FIG. 4

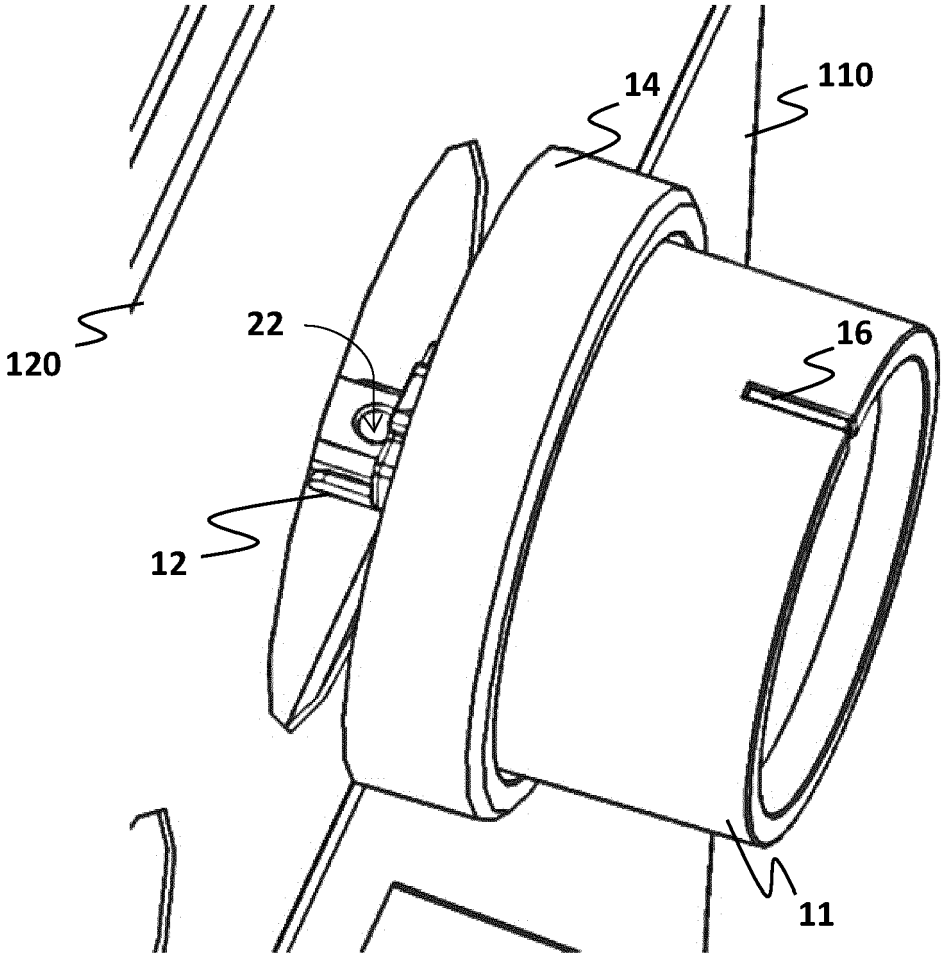

FIG. 5

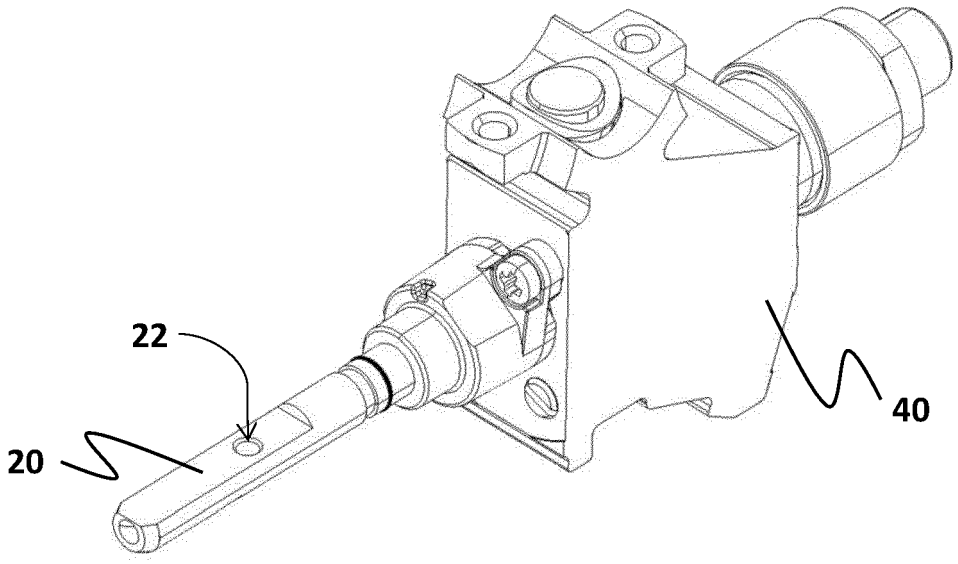

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 21 21 1454

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	EP 2 620 831 A2 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 31 July 2013 (2013-07-31) * paragraphs [0001], [0029]; figures *	1,4,9, 10,12,13 5,6,8,11 2,3,7, 14,15	INV. F24C3/12 G05G1/12
Y	US 2 849 891 A (MILLS HERBERT E) 2 September 1958 (1958-09-02) * figures 2,3 *	5,6,8	
Y	JP S59 81816 U (N.N.) 2 June 1984 (1984-06-02) * figure 13 *	11	
A	JP S54 169694 U (N.N.) 30 November 1979 (1979-11-30) * figure 1 *	1-14	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 May 2022	Verdoodt, Luk

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 21 1454

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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06-05-2022

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2733083 A **[0004]**