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

KOCHVORRICHTUNG MIT BEDIENKNOPF

DISPOSITIF DE CUISSON AYANT UN BOUTON DE COMMANDE

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Description

TECHNICAL FIELD

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

KNOWN STATE OF THE ART

[0002] There are control panels provided on the bodies of cooking devices. In gas cooking devices, there are shafts 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 device can be controlled. The heat, emitted during operation of the cooking device, may lead to heating of the control knobs. This leads to a risk for the user.

[0003] The device, disclosed in the application DE102005032509, has a grip part connected with a servo-spindle in a movably transferable manner. The grip part is pivotable around a rotation axis in and from a position locked by a locking device. An integrated pressable-rotary mechanism loosens the locking device by an actuating movement of the grip part. The locking device has two resting units that are movable relative to each other with the grip part.

[0004] In prior art document GB 2 219 377 A a cooking device according to the preamble of claim 1 is described. In order to provide a control knob which does not affect the aesthetics of the cooking device, the control knob is only exposed when operational. Otherwise, the control knob is flush with the exterior configuration of the cooking device.

[0005] To fix a control knob to a control panel of a household appliance, prior art document WO 2012/089506 A1 discloses a control knob with a ring body and a closing part which are fixed together with tabs and housings.

[0006] Prior art document US 2 841 031 A discloses a control knob of a cooking device, wherein the inner body is hidden in the outer body during usage of the appliance or when the pressure on the outer body is released after rotation of the inner body. Said control knob has an initial flush alignment with the control panel.

BRIEF DESCRIPTION OF THE INVENTION

[0007] The object of the invention is to provide a cooking device which eliminates the risks occurring as a result of heating of the control knobs in cooking devices.

[0008] The present invention is a cooking device comprising a body, a control panel provided on the body, a control element for adjusting a power level of a heat source, the control element comprising a shaft extending through the control panel and a control knob connected to the shaft for rotating the shaft. Accordingly, the control knob comprises at least one outer body movable relative

to the shaft in an axial direction of the shaft, at least one inner body connected to the shaft in a manner not movable relative to the shaft wherein the inner body is located at least partly in an opening of the outer body and the inner body is exposed to be gripped by a user when the outer body is moved in a direction towards the control panel. Thus, even if the outer wall of the control knob is heated during usage of the cooking device, the control knob is controlled through the inner body hidden inside the outer body by the user. Thus, burning of the hand of the user is prevented.

[0009] At least one spring element is provided inside the control knob for pushing the outer body in a direction away from the control panel. Thus, as long as no pressure is exerted to the outer body by the user, the inner body is hidden inside the outer body.

[0010] A ring body is positioned on the control panel in a manner not movable relative to the control panel for guiding a movement of the outer body. Thus, guiding of the movement of the outer body is provided.

[0011] At least one tooth part is provided inside the ring body and a blocking part is provided on the outer body in a manner engaging to the tooth part for blocking a rotational movement of the outer body, when the outer body is pushed by the spring element to an end position in the direction away from the control panel. Thus, when the inner body is hidden inside the outer body, the rotation of the outer body is prevented.

[0012] In a probable embodiment of the invention, the control knob is configured in a manner providing an interruption of the contact between the blocking part and the tooth part, when the outer body is pushed towards the control panel. Thus, when the user pushes the outer body, the outer body has rotation freedom.

[0013] In a probable embodiment of the invention, at least one closing part is connected to the control panel, and at least one assembly tab and at least one tab housing are provided mutually between the closing part and the ring body. Thus, the assembly of the ring body to the control panel is provided.

[0014] The inner body comprises at least one grabbing wall. Thus, handling of the inner body by the user is facilitated.

[0015] In a probable embodiment of the invention, the inner body is provided in a form which is similar to a feather key. Thus, formation of sharp edges at the section where the user handles the inner body is prevented.

[0016] In a probable embodiment of the invention, the inner body comprises at least one shaft connection extension connected to the shaft. Thus, the assembly of the inner body to the shaft can be realized, and the shaft is rotated as the inner body is rotated.

[0017] In a probable embodiment of the invention, at least one stopper tab is provided on the outer wall of the inner body. Thus, the inner body is prevented from protruding through the opening provided on the outer body.

[0018] In a probable embodiment of the invention, the control element is a gas tap. Thus, a gas tap is provided

for controlling the power level of the heat source of the cooking device.

[0019] In a probable embodiment of the invention, the control element is a switch. Thus, a switch is provided for controlling an ignition and the power level of the heat source of the cooking device.

BRIEF DESCRIPTION OF THE FIGURES

[0020]

Fig. 1 is a representative view of the subject matter cooking device.

Fig. 2 is an exploded view of the control panel of the subject matter cooking device.

Fig. 3 and 4 are the representative isometric views of the control knob of the subject matter cooking device.

Fig. 5 and 6 are the exploded views of the control knob of the subject matter cooking device.

Fig. 7 and 8 are the representative cross sectional views of the control knob of the subject matter cooking device during use and when not in use.

Fig. 9 is the representative isometric views of the inner body of the control knob of the subject matter cooking device.

Fig. 10 is the representative isometric views of the outer body of the control knob of the subject matter cooking device.

DETAILED DESCRIPTION OF THE INVENTION

[0021] In this detailed description, the subject matter cooking device (1) is explained with references to examples in order to make the subject more understandable.

[0022] With reference to Fig. 1, 2 and 3, the subject matter cooking device (1) has a body (10) and at least one control knob (20) provided on a control panel (11). Said control knob (20) is connected to a control element (12) coming from a rear side of the control panel (11). Said control element (12) comprising a shaft (13) extending through the control panel (11) and the control knob (20) connected to the shaft (13) of the control element (12) for rotating the shaft. Thus, the shaft (13) can be rotated as the control knob (20) is rotated. In a possible embodiment, said control element (12) can be a gas tap or a switch.

[0023] As will be seen in Fig. 4, 5 and 6, the control knob (20) has at least one closing part (30) connected to the control panel (11), at least one ring body (40) connected to said closing part (30), and an inner body (60) inserted partially into said ring body (40), and an outer

body (70). Said outer body (70) is movable relative to the shaft (13) in an axial direction of the shaft (13) and the inner body (60) is connected to the shaft (13) in a manner not movable relative to the shaft (13).

[0024] In more details, the closing part (30) is provided in a cylindrical form, and it is connected to the control panel (11) from one face thereof. The control element (12) is passed through a hole (31) provided on the closing part (30). Moreover, there is at least one step (32) provided on the outer wall of the closing part (30), and there is at least one assembly tab (33) provided on said step (32). The ring body (40) is essentially provided in a cylindrical form. There is at least one knob housing (41) provided in an opening form on the ring body (40). There is at least one tab housing (43) provided on an inner wall (42) of the knob housing (41). The inner wall (42) may encircle the step (32) provided on the closing part (30). Thus, when the ring body (40) is placed on the closing part (30), the ring body (40) is seated onto the step (32) and the assembly tab (33) is placed to the tab housing (43) and fixation is provided.

[0025] As will be seen in Fig. 10, the outer body (70) is provided in a cylindrical form. The outer body (70) has a hollow structure. Moreover, an opening (72) is provided on the outer body (70). The opening (72) is essentially provided in a compliant form to the inner body (60). In other words, the inner body (60) may partially pass through the opening (72). There is at least one blocking part (71) provided on the outer wall of the outer body (70). There is at least one tooth part (44) provided on the inner wall (42) of the ring body (40) in a compliant manner to said blocking part (71). There is at least one support plate (73) supporting the outer body (70) from inside. A spring element (50), provided inside the control knob (20), contacts the closing part (30) from one end and it contacts the outer body (70) from the other end, and it begins pushing the outer body (70). Thus, the blocking part (71), provided at the outer body (70), and the tooth part (44), provided inside the ring body (40), are engaged to each other. By means of this, the rotation of the outer body (70) is prevented. Moreover, pluralities of scales (75) are provided on the outer body (70). At least one of said scales (75) extends from the side surface of the outer body (70) towards an outer body front face (74). Thus, the closed position where no gas passage occurs can be determined. The gas level can be shown also by the other scales (75).

[0026] As will be seen in Fig. 9, the inner body (60) has a shaft connection extension (61). Said shaft connection extension (61) is fixed onto the shaft (13) of the control element (12). Thus, when the inner body (60) is rotated, the shaft (13) is also rotated. Moreover, there is at least one leaf spring (65) provided inside the shaft connection extension (61). When the shaft (13) is placed into the shaft connection extension (61), the leaf spring (65) provides the inner body (60) to be fixed onto the shaft (13). In other words, uncontrolled separation of the inner body (60) from the shaft (13) is prevented. The inner body (60)

has at least one grabbing wall (62). Two grabbing walls (62) are essentially provided in a parallel manner such that there is a predetermined distance in between. Accordingly, the opening (72) provided on the inner body (60) and the outer body (70), is in a form similar to a feather key.

[0027] When the spring element (50) pushes the outer body (70), an inner body front face (64) of the inner body (60) and the outer body front face (74) of the outer body (70) are aligned. As long as a force which is in opposite direction to the spring force is not exerted, the outer body (70) stays in said condition.

[0028] During the assembly of the control knob (20), first of all, the outer body (70) is placed into the ring body (40), and afterwards, the inner body (60) and the spring element (50) are positioned inside the outer body (70) and all of them are fixed to the closing part (30) provided on the control panel (11). Meanwhile, the shaft connection extension (61) is fixed to the control element (12). In an alternative assembly manner, first of all, the inner body (60) is fixed to the shaft (13), and afterwards, the ring body (40) and the outer body (70) wherein the spring element (50) is positioned are passed through the inner body (60) and they are fixed to the closing part (30).

[0029] As will be seen in Fig. 7 and 8, during the usage of the control knob (20), first of all, the user pushes the outer body (70) towards the control panel (11) in the axis of the shaft (13) by a force (F). Thus, the inner body (60) partially passes through the opening (72), and the grabbing walls (62) protrudes from the outer body (70). Afterwards, the user can hold the inner body (60) through the grabbing walls (62) and he/she can rotate the shaft (13). In more details, the inner body (60) is exposed to be gripped by a user when the outer body (70) is moved in a direction towards the control panel (11). During pushing of the outer body (70) by the user, the spring force is overcome, and the blocking part (71) is removed from the tooth part (44). Thus, the outer body (70) has rotation freedom together with the inner body (60). When the user removes the pushing force exerted to the outer body (70), the outer body (70) is pushed outwardly as a result of the effect of the spring force, and the inner body (60) is hidden inside the outer body (70). Meanwhile, the blocking part (71) is fixed to the tooth part (44). In more details, the blocking part (71) is provided on the outer body (70) in a manner engaging to the tooth part (44) for blocking a rotational movement of the outer body (70), when the outer body (70) is pushed by the spring element (50) to an end position in the direction away from the control panel (11). By means of this, the rotation freedom of the outer body (70) is eliminated.

[0030] There is at least one stopper tab (63) provided on the outer wall of the inner body (60). Said stopper tab (63) is stopped onto the inner part of the outer body (70) when the outer body (70) is pushed towards the control panel (11), and said stopper tab (63) prevents the inner body (60) from protruding through the opening (72).

[0031] In a possible embodiment of the present inven-

tion, after the user makes the inner body (60) visible, he/she pushes the inner body (60) more, and he/she can activate an ignition function.

5 REFERENCE NUMERALS

[0032]

1	Cooking device
10	Body
11	Control panel
12	Control element
13	Shaft
20	Control knob
15 30	Closing part
	31 Hole
	32 Step
	33 Assembly tab
20 40	Ring body
	41 Knob housing
	42 Inner wall
	43 Tab housing
	44 Tooth part
25 50	Spring element
60	Inner body
	61 Shaft connection extension
	62 Grabbing wall
30 63	Stopper tab
	64 Inner body front face
	65 Leaf spring
70	Outer body
35 71	Blocking part
	72 Opening
	73 Support plate
	74 Outer body front face
	75 Scale
40 F	Force

Claims

1. A cooking device (1) comprising a body (10), a control panel (11) provided on the body (10), a control element (12) for adjusting a power level of a heat source, the control element (12) comprising a shaft (13) extending through the control panel (11) and a control knob (20) provided on the control panel (11) and connected to the shaft (13) for rotating the shaft, wherein the control knob (20) comprises at least one outer body (70) movable relative to the shaft (13) in an axial direction of the shaft (13), at least one inner body (60) connected to the shaft (13) in a manner not movable relative to the shaft (13) wherein the inner body (60) is located at least partly in an opening

(72) of the outer body (70) and the inner body (60) is exposed to be gripped by a user when the outer body (70) is moved in a direction towards the control panel (11), wherein the control knob (20) comprises at least one spring element (50) provided inside the control knob, for pushing the outer body (70) in a direction away from the control panel (11), a ring body (40) positioned on the control panel (11) in a manner not movable relative to the control panel (11) for guiding a movement of the outer body (70) and wherein the inner body (60) comprises at least one grabbing wall (62), **characterized in that**

- at least one tooth part (44) is provided inside the ring body (40) and a blocking part (71) is provided on the outer body (70) in a manner engaging to the tooth part (44) for blocking a rotational movement of the outer body (70), when the outer body (70) is pushed by the spring element (50) to an end position in the direction away from the control panel (11) and
- the control knob (20) is designed such, that

- during the usage of the control knob (20), first of all, the user pushes the outer body (70) towards the control panel (11) in the axis of the shaft (13) by a force (F), wherein the inner body (60) partially passes through the opening (72), and the grabbing walls (62) protrudes from the outer body (70) in such way that the inner body (60) is exposed to be gripped by the user,
 - during pushing of the outer body (70) by the user, the spring force is overcome, and the blocking part (71) is removed from the tooth part (44) in such way, that the outer body (70) has rotation freedom together with the inner body (60), and
 - when the user removes the pushing force exerted to the outer body (70), the outer body (70) is pushed outwardly as a result of the effect of the spring force, and the inner body (60) is hidden inside the outer body (70), wherein meanwhile, the blocking part (71) is fixed to the tooth part (44).

2. The cooking device (1) according to Claim 1, wherein the control knob (20) is configured in a manner providing an interruption of the contact between the blocking part (71) and the tooth part (44), when the outer body (70) is pushed towards the control panel (11).
3. The cooking device (1) according to claims 1 or 2, wherein at least one closing part (30) is connected to the control panel (11), and at least one assembly tab (33) and at least one tab housing (43) are provided mutually between the closing part (30) and the

ring body (40).

4. The cooking device (1) according to any one of the preceding claims, wherein two grabbing walls (62) are provided essentially parallel to each other such that there is a predetermined distance in between.
5. The cooking device (1) according to Claim 4, wherein the inner body (60) is provided in a form which is similar to a feather key.
6. The cooking device (1) according to Claim 1, wherein the inner body (60) comprises at least one shaft connection extension (61) connected to the shaft (13).
7. The cooking device (1) according to any one of the preceding claims, wherein at least one stopper tab (63) is provided on the outer wall of the inner body (60).
8. The cooking device (1) according to Claim 1, wherein the control element (12) is a gas tap.
9. The cooking device (1) according to Claim 1, wherein the control element (12) is a switch.

Patentansprüche

1. Kochvorrichtung (1) mit einem Hauptteil (10), einem an dem Hauptteil (10) vorgesehenen Bedienfeld (11), einem Bedienelement (12) zum Einstellen einer Leistungsstufe einer Wärmequelle, wobei das Bedienelement (12) eine Welle (13) umfasst, die durch das Bedienfeld (11) hindurch verläuft, und einem an dem Bedienfeld (11) vorgesehenen Bedienknopf (20), der zum Drehen der Welle mit der Welle (13) verbunden ist, wobei der Bedienknopf (20) mindestens einen in Bezug auf die Welle (13) in deren axialen Richtung beweglichen Außenteil (70) und mindestens einen in Bezug auf die Welle (13) auf unbewegliche Weise damit verbundenen Innenteil (60) umfasst, wobei der Innenteil (60) zumindest teilweise in einer Öffnung (72) des Außenteils (70) angeordnet ist und freiliegt, so dass er von einem Benutzer angefasst werden kann, wenn der Außenteil (70) in eine Richtung zum Bedienfeld (11) hin bewegt wird, wobei der Bedienknopf (20) mindestens ein in ihm vorgesehenes Federelement (50) zum Drücken des Außenteils (70) in eine Richtung von dem Bedienfeld (11) weg und einen in Bezug auf das Bedienfeld (11) auf unbewegliche Weise daran angeordneten Ringteil (40) zum Führen einer Bewegung des Außenteils (70) und der Innenteil (60) mindestens eine Griffwand (62) umfasst,
dadurch gekennzeichnet, dass

- mindestens ein Zahnstück (44) in dem Ringteil

(40) und ein Sperrstück (71) so an dem Außenteil (70) vorgesehen ist, dass es zum Blockieren einer Drehbewegung des Außenteils (70) in das Zahnstück (44) eingreift, wenn der Außenteil (70) von dem Federelement (50) in Richtung von dem Bedienfeld (11) weg in eine Endposition gedrückt wird, und
- der Bedienknopf (20) so gestaltet ist, dass

-- der Benutzer bei der Benutzung des Bedienknopfes (20) zunächst den Außenteil (70) auf der Achse der Welle (13) mit einer Kraft (F) zum Bedienfeld (11) hin drückt, wobei sich der Innenteil (60) teilweise durch die Öffnung (72) hindurchbewegt und die Griffwand (62) so aus dem Außenteil (70) vorsteht, dass der Innenteil (60) freigelegt wird und vom Benutzer angefasst werden kann,

-- beim Drücken des Außenteils (70) durch den Benutzer die Federkraft überwunden und das Sperrstück (71) derart aus dem Zahnstück (44) entfernt wird, dass der Außenteil (70) zusammen mit dem Innenteil (60) frei drehbar ist, und

-- der Außenteil (70), wenn der Benutzer keine Druckkraft mehr darauf ausübt, infolge der Wirkung der Federkraft nach außen gedrückt wird und der Innenteil (60) in dem Außenteil (70) verborgen ist, wobei das Sperrstück (71) derweil an dem Zahnstück (44) fixiert ist.

2. Kochvorrichtung (1) nach Anspruch 1, wobei der Bedienknopf (20) so konfiguriert ist, dass er für eine Unterbrechung des Kontakts zwischen dem Sperrstück (71) und dem Zahnstück (44) sorgt, wenn der Außenteil (70) zum Bedienfeld (11) hin gedrückt wird.

3. Kochvorrichtung (1) nach Anspruch 1 oder 2, wobei mindestens ein Abschlusstück (30) mit dem Bedienfeld (11) verbunden und mindestens einen Montagevorsprung (33) an dem Abschlusstück (30) und diesem gegenüber mindestens eine Vorsprungaufnahme (43) an dem Ringteil (40) vorgesehen ist.

4. Kochvorrichtung (1) nach einem der vorhergehenden Ansprüche, wobei zwei Griffwände (62) im Wesentlichen parallel zueinander vorgesehen sind, so dass ein vorgegebener Abstand zwischen ihnen liegt.

5. Kochvorrichtung (1) nach Anspruch 4, wobei der Innenteil (60) in einer Form vorgesehen ist, die einer Passfeder ähnelt.

6. Kochvorrichtung (1) nach Anspruch 1, wobei der In-

nenteil (60) mindestens einen Wellenverbindungszapfen (61) umfasst, der mit der Welle (13) verbunden ist.

7. Kochvorrichtung (1) nach einem der vorhergehenden Ansprüche, wobei an der Außenwand des Innenteils (60) mindestens ein Anschlagvorsprung (63) vorgesehen ist.

8. Kochvorrichtung (1) nach Anspruch 1, wobei es sich bei dem Bedienelement (12) um einen Gashahn handelt.

9. Kochvorrichtung (1) nach Anspruch 1, wobei es sich bei dem Bedienelement (12) um einen Schalter handelt.

Revendications

1. Appareil de cuisson (1) comprenant une carrosserie (10), un panneau de commande (11) agencé sur la carrosserie (10), un élément de commande (12) pour régler un niveau de puissance d'une source de chaleur, l'élément de commande (12) comprenant une tige (13) s'étendant à travers le panneau de commande (11) et un bouton de commande (20) disposé sur le panneau de commande (11) et raccordé à la tige (13) pour faire tourner la tige,

dans lequel le bouton de commande (20) comprend au moins un corps extérieur (70) mobile par rapport à la tige (13) dans une direction axiale de la tige (13), au moins un corps intérieur (60) raccordé à la tige (13) de manière fixe par rapport à la tige (13), dans lequel le corps intérieur (60) est situé au moins en partie dans une ouverture (72) du corps extérieur (70) et le corps intérieur (60) est mis à découvert pour être saisi par un utilisateur lorsque le corps extérieur (70) est déplacé dans une direction vers le panneau de commande (11),

dans lequel le bouton de commande (20) comprend au moins un élément de ressort (50) agencé à l'intérieur du bouton de commande pour pousser le corps extérieur (70) dans une direction éloignée du panneau de commande (11), un corps de bague (40) positionné sur le panneau de commande (11) de manière fixe par rapport au panneau de commande (11) pour guider un mouvement du corps extérieur (70), et dans lequel le corps intérieur (60) comprend au moins une paroi de saisie (62), **caractérisé en ce que :**

- au moins une partie dentée (44) est agencée à l'intérieur du corps de bague (40) et une partie de blocage (71) est agencée sur

le corps extérieur (70) de manière à engre-
ner sur la partie dentée (44) pour bloquer
un mouvement de rotation du corps exté-
rieur (70), lorsque le corps extérieur (70) est
poussé par l'élément de ressort (50) jusqu'à
une position de fin de course dans la direc-
tion éloignée du panneau de commande
(11), et

- le bouton de commande (20) est conçu de
telle manière que :

- au cours de l'utilisation du bouton de com-
mande (20), en premier lieu, l'utilisateur
pousse le corps extérieur (70) vers le pan-
neau de commande (11) dans l'axe de la
tige (13) avec une force (F), dans lequel le
corps intérieur (60) passe en partie à travers
l'ouverture (72), et les parois de saisie (62)
dépassent du corps extérieur (70) de telle
manière que le corps intérieur (60) est mis
à découvert pour être saisi par l'utilisateur,
- pendant la poussée du corps extérieur (70)
par l'utilisateur, la force du ressort est con-
trée, et la partie de blocage (71) est éloignée
de la partie dentée (44) de telle manière que
le corps extérieur (70) présente une liberté
de rotation conjointement avec le corps in-
térieur (60), et

- lorsque l'utilisateur annule la force de
poussée exercée sur le corps extérieur (70),
le corps extérieur (70) est poussé vers l'ex-
térieur du fait de l'effet de la force de ressort,
et le corps intérieur (60) est caché à l'inté-
rieur du corps extérieur (70), dans lequel,
entre-temps, la partie de blocage (71) est
fixée à la partie dentée (44).

2. Appareil de cuisson (1) selon la revendication 1,
dans lequel le bouton de commande (20) est confi-
gué de manière à fournir une interruption du contact
entre la partie de blocage (71) et la partie dentée
(44) lorsque le corps extérieur (70) est poussé vers
le panneau de commande (11).
3. Appareil de cuisson (1) selon la revendication 1 ou
2, dans lequel au moins une pièce de fermeture (30)
est connectée au panneau de commande (11), et au
moins une languette d'assemblage (33) et au moins
un réceptacle de languette (43) sont agencés réci-
proquement entre la pièce de fermeture (30) et le
corps de bague (40).
4. Appareil de cuisson (1) selon l'une quelconque des
revendications précédentes, dans lequel deux pa-
rois de saisie (62) sont agencées essentiellement
de façon parallèle l'une à l'autre de manière à mé-
nager une distance prédéterminée entre celles-ci.
5. Appareil de cuisson (1) selon la revendication 4,

dans lequel le corps intérieur (60) est agencé sous
une forme qui est similaire à une clavette.

6. Appareil de cuisson (1) selon la revendication 1,
dans lequel le corps intérieur (60) comprend au
moins un prolongement de connexion de tige (61)
raccordé à la tige (13).
7. Appareil de cuisson (1) selon l'une quelconque des
revendications précédentes, dans lequel au moins
une languette d'arrêt (63) est agencée sur la paroi
extérieure du corps intérieur (60).
8. Appareil de cuisson (1) selon la revendication 1,
dans lequel l'élément de commande (12) est un ro-
binet à gaz.
9. Appareil de cuisson (1) selon la revendication 1,
dans lequel l'élément de commande (12) est un com-
mutateur.

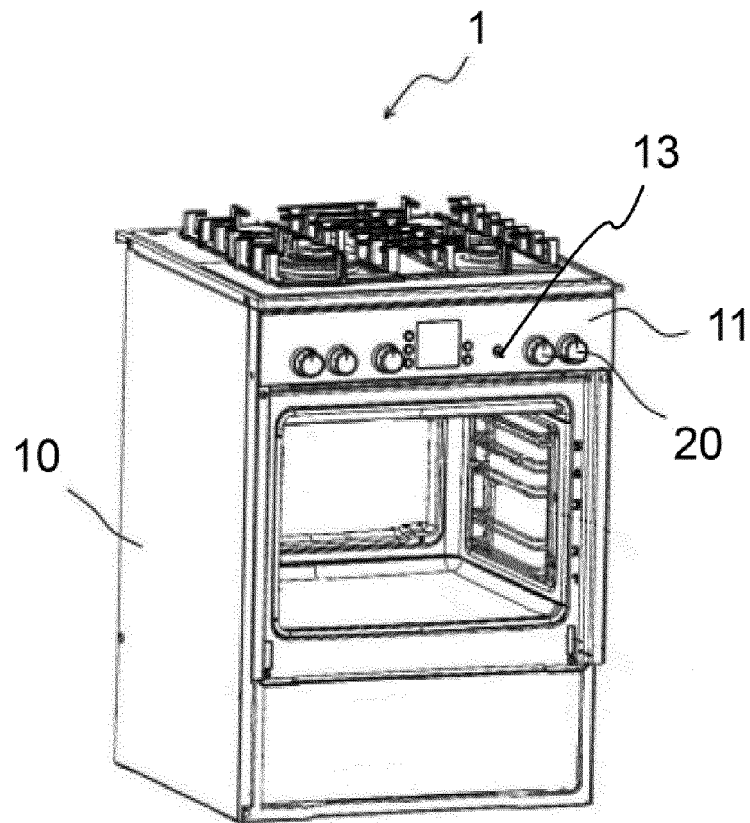


Fig.1

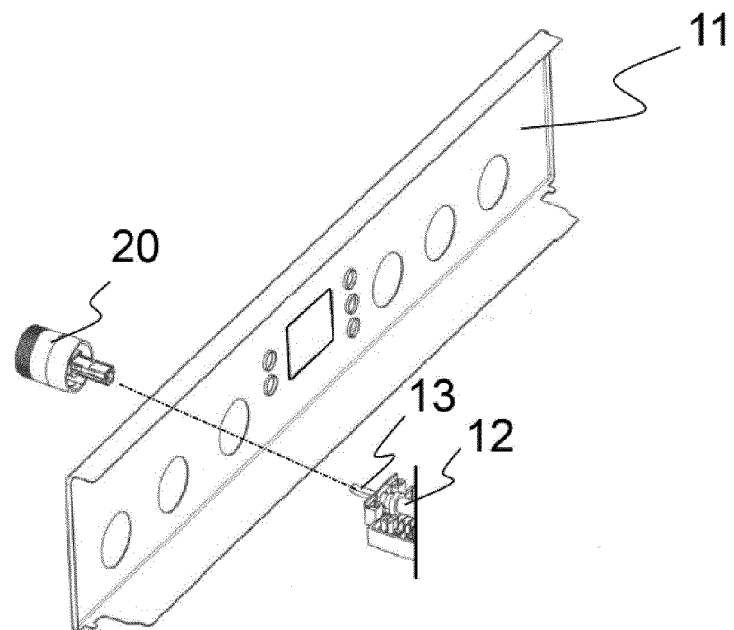


Fig.2

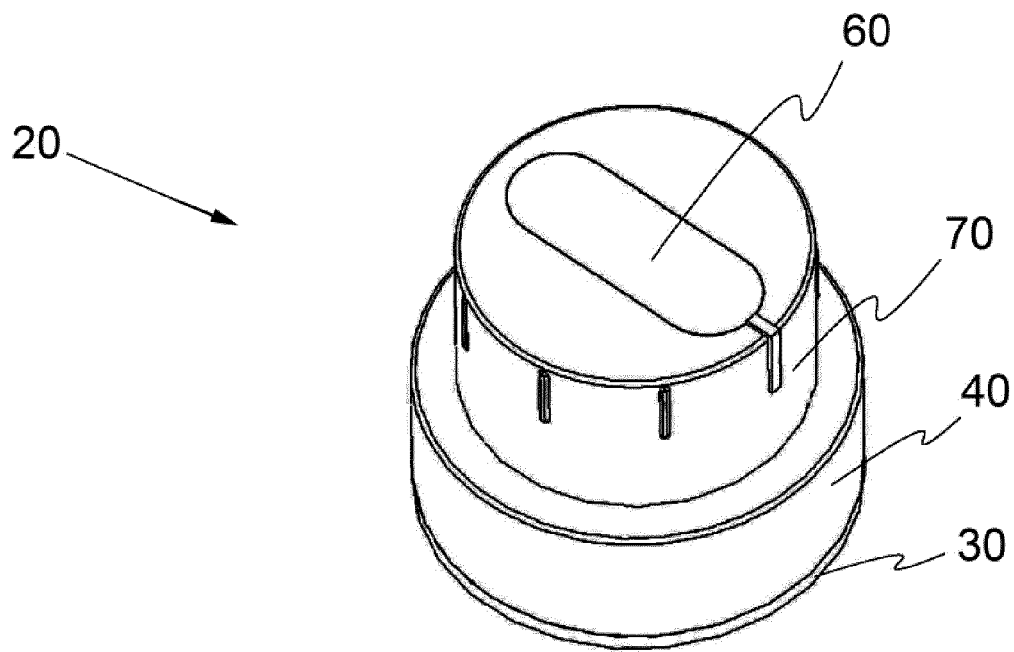


Fig.3

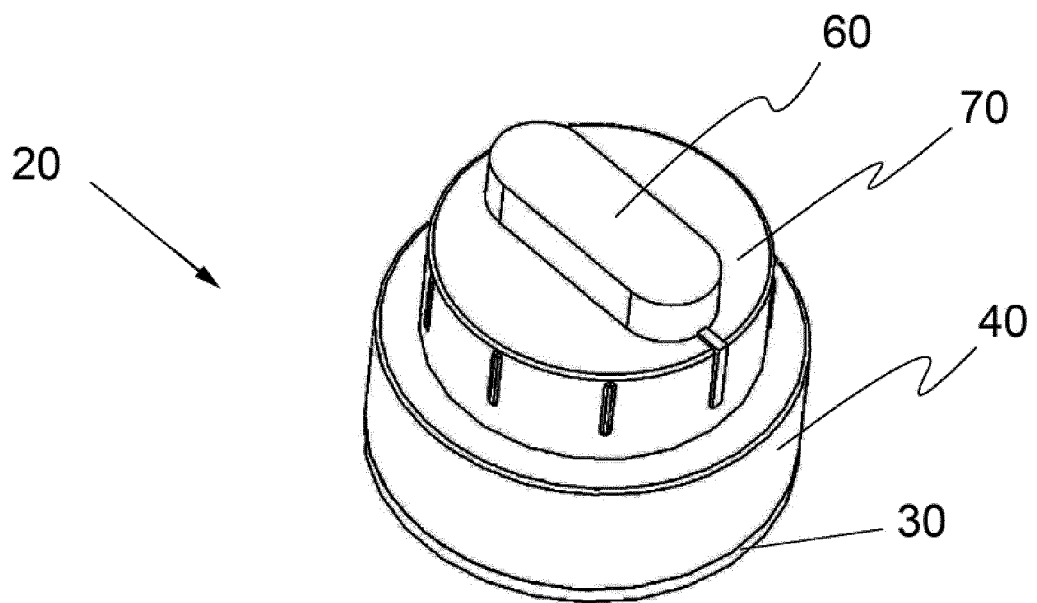


Fig.4

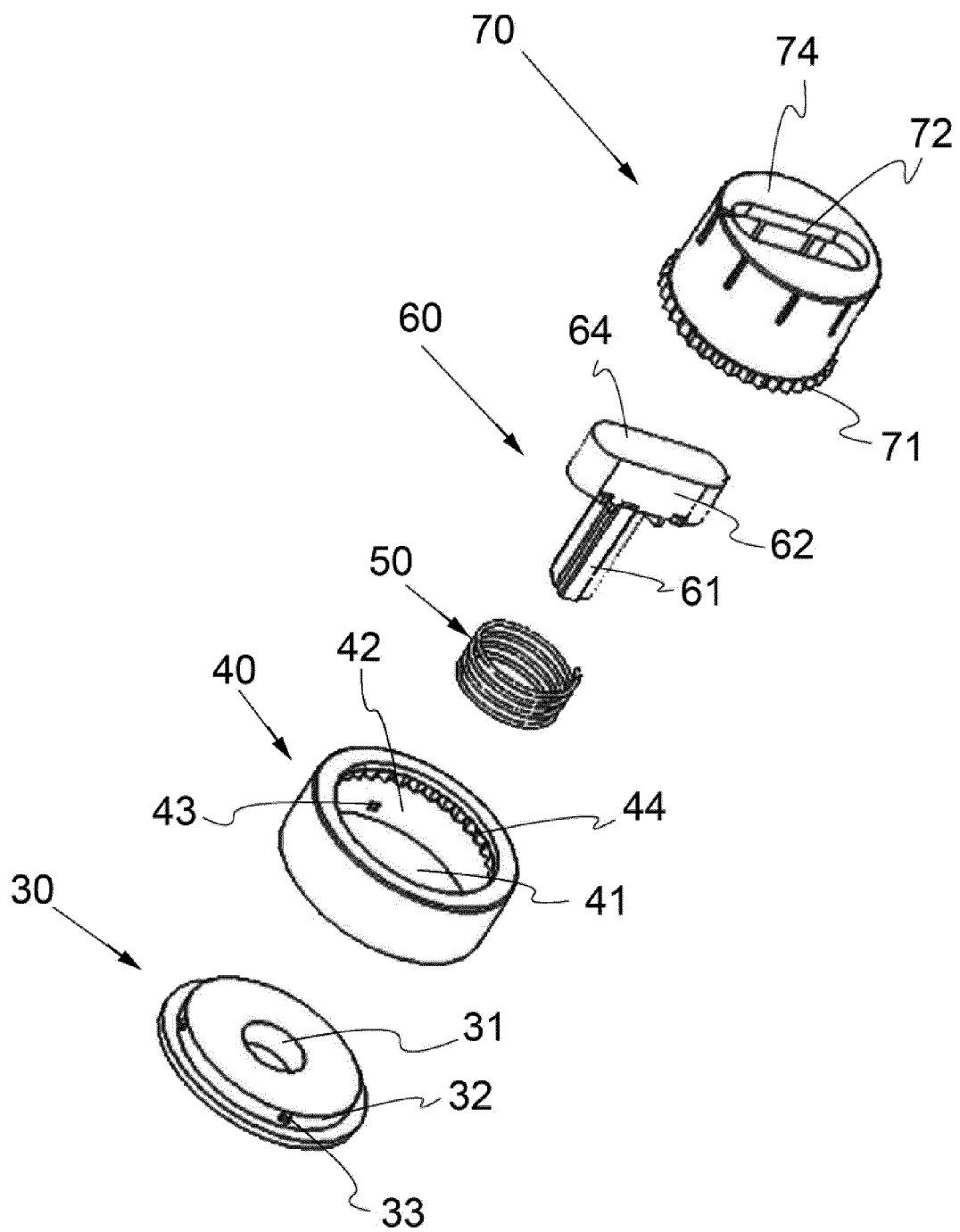


Fig.5

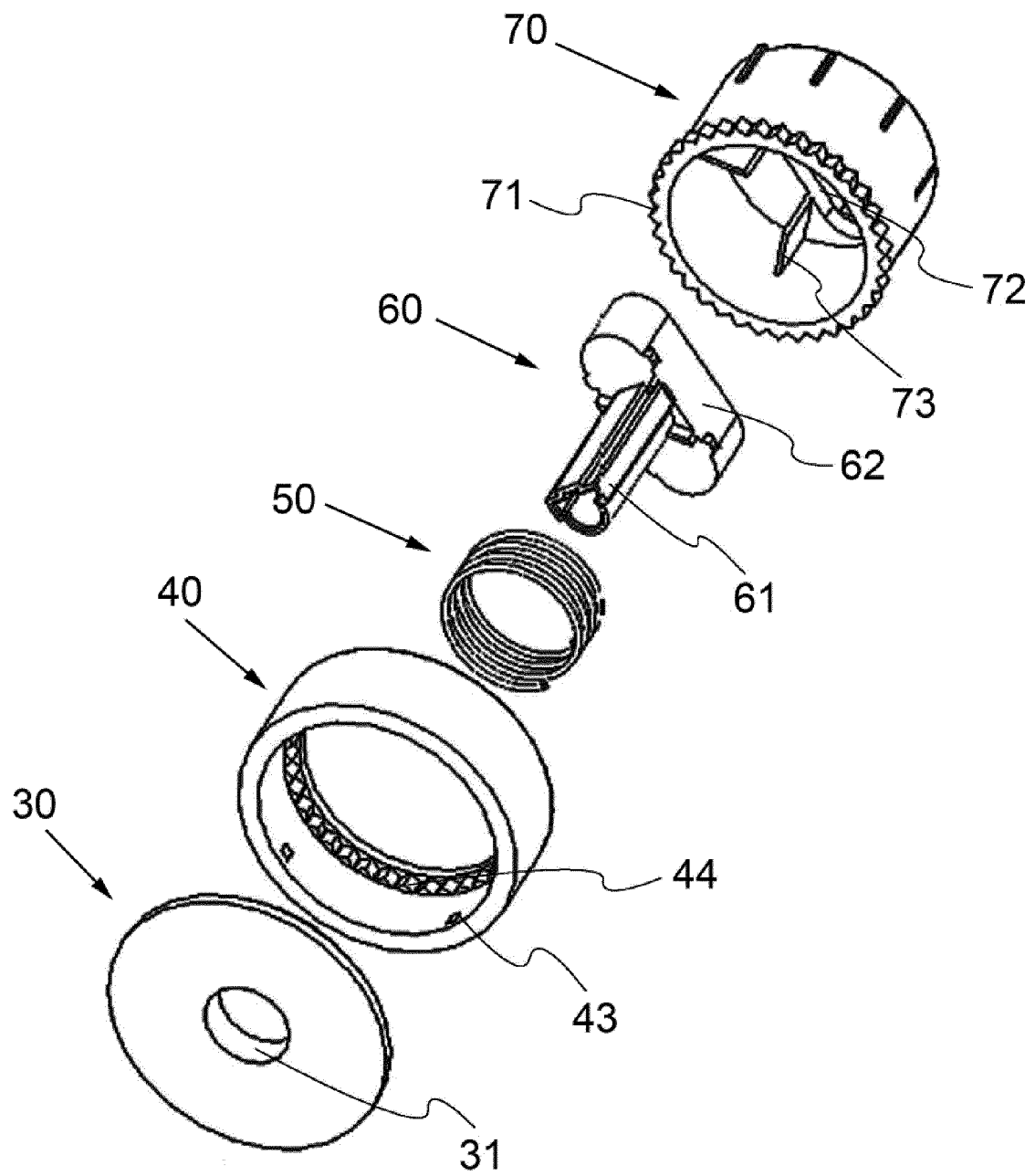


Fig.6

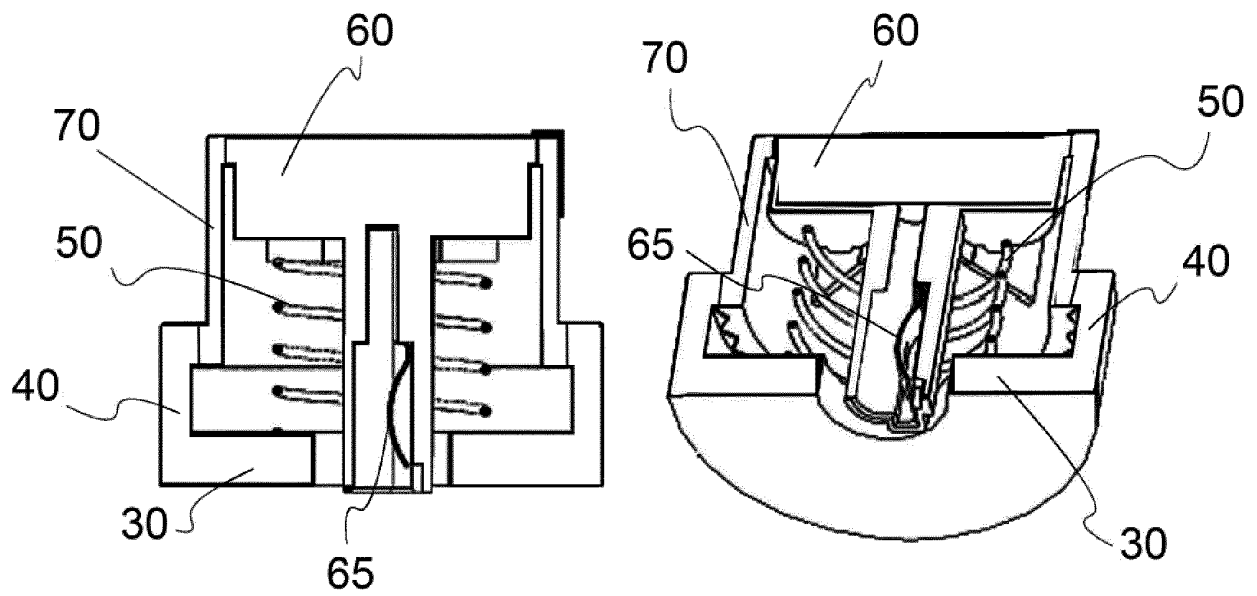


Fig.7

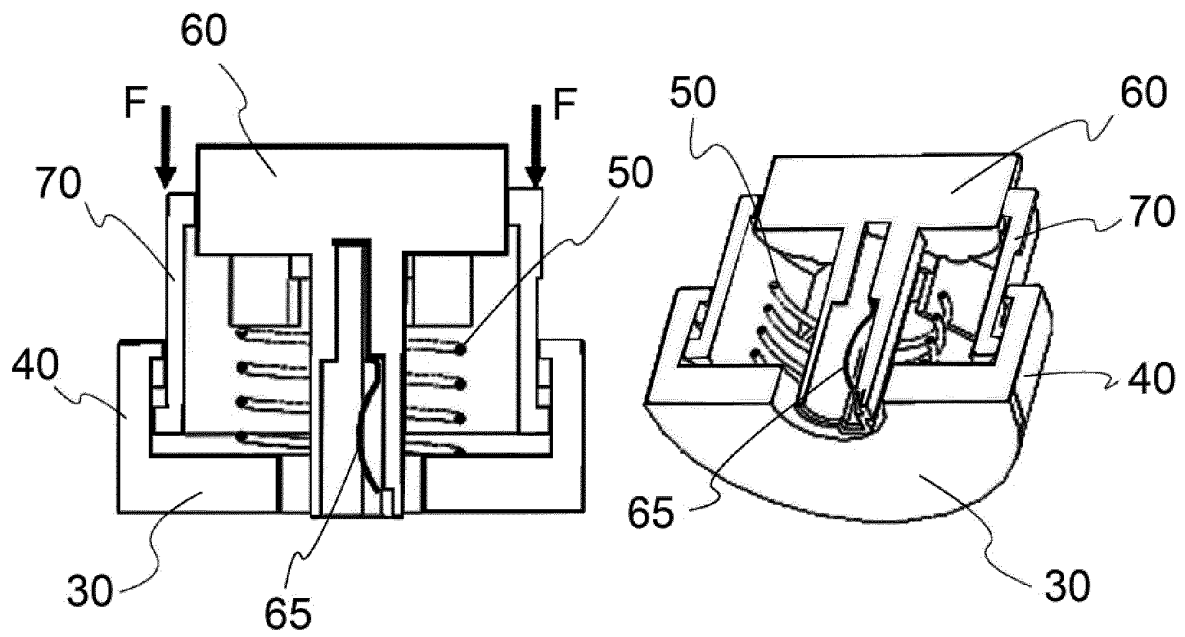


Fig.8

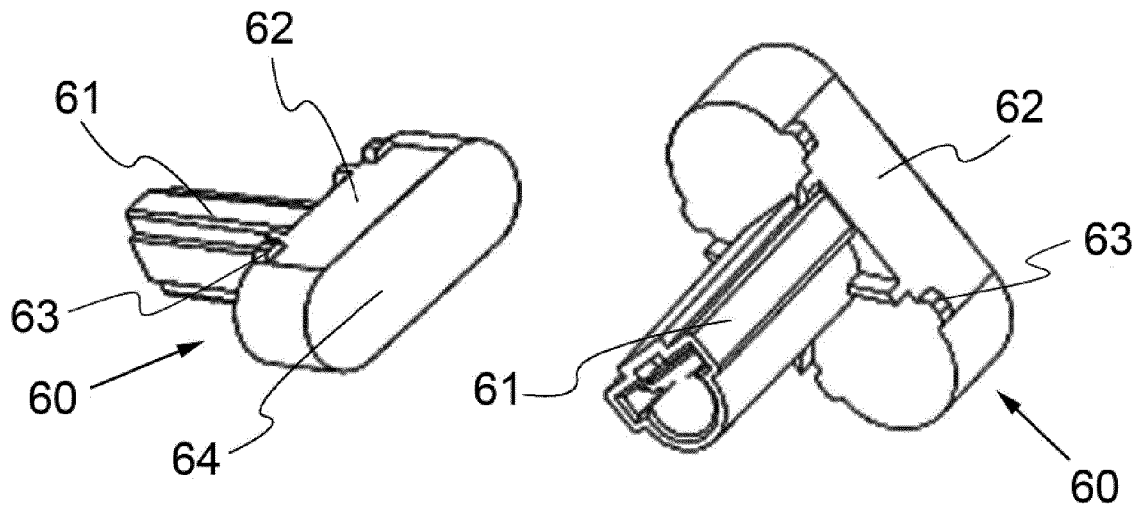


Fig.9

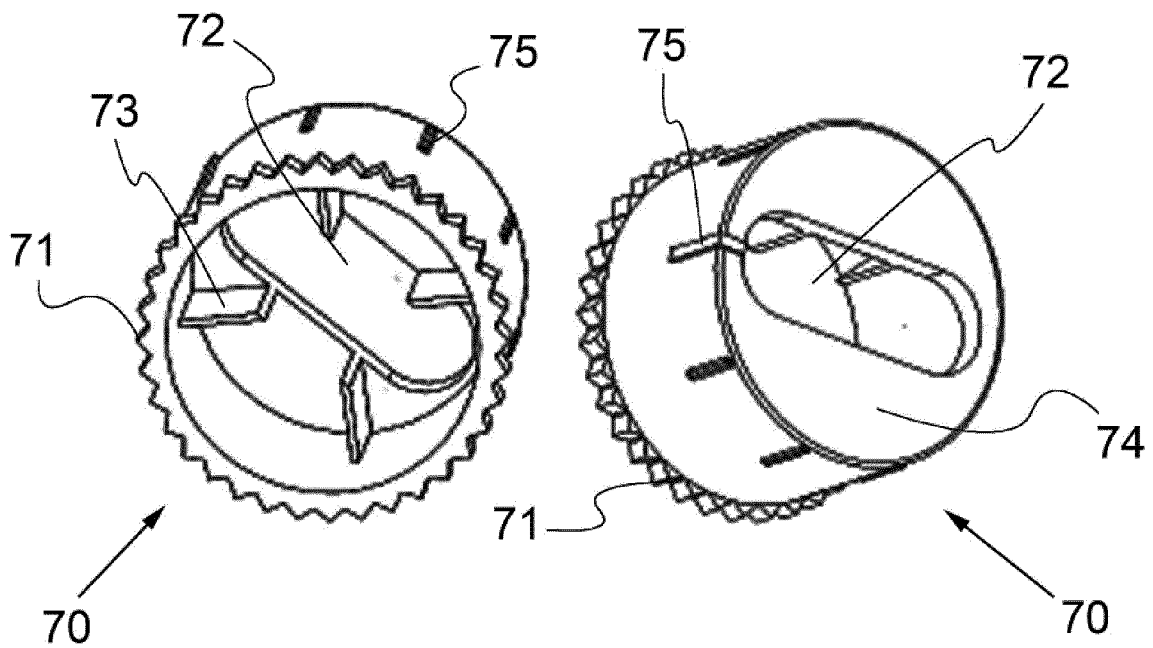


Fig.10

REFERENCES CITED IN THE DESCRIPTION

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