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(54) Title: ROTARY CONTROL DEVICE INCLUDING A GAS TAP AND A CATENARY ELEMENT FOR BURNERS OF A
COOKING RANGE

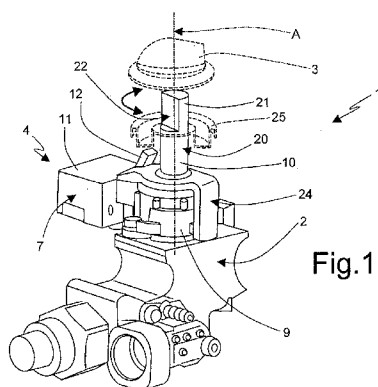


Fig.1

(57) Abstract: A control device (1) for the burners of a cooking range including a catenary element for controlling the lighting of the burners and a gas tap (2) provided with a rotary control stem; the catenary is of standard type, and therefore the catenary element is fixable onto the gas tap laterally to the rotary stem and includes a microswitch (7) actuated by the translation of a mobile control rod parallelly to the axis of the rotary stem of the gas tap; the control device further includes an annular washer (25) angularly fastenable in an integral and axially locked manner onto the rotary stem, in a position facing the control rod, the washer being provided on a first face thereof (27) facing in use towards the control rod with circumferential cam means (28) cooperating in use in sliding contact with a free end (26) of the control rod for converting each rotary motion of the washer, upon a rotation of the control stem (10) of the gas tap, into a translation motion of the control rod (12) so as to actuate the microswitch.

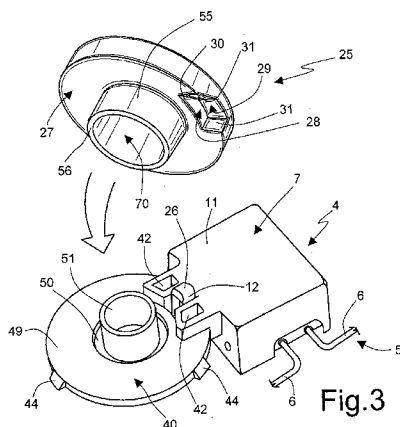


Fig.3



NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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**ROTARY CONTROL DEVICE INCLUDING A GAS TAP AND A
CATENARY ELEMENT FOR BURNERS OF A COOKING RANGE**

TECHNICAL FIELD

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The present invention relates to a control device for the burners of a cooking range, including a gas tap and a catenary element controlled by the rotational movement of a rotary shaft or stem of the gas tap.

10

BACKGROUND ART

15

The known control devices for the burners of a cooking range (either of the fitted type, or of the type belonging to a combined household appliance, e.g. including an oven and/or a dishwasher) are comprised, for each burner, of a gas tap and a catenary element provided with a microswitch, the actuation of which supplies voltage to a lighter circuit of the cooking range, of known type, which produces a spark at one or all burners.

20

Generally, the gas tap is provided with an axially moveable, rotary control shaft or stem, provided in use with a control knob, the rotation of which allows to dispense combustible gas to the burner.

25

In the device known from EP1194720B1, the axial movement of the stem/knob assembly is used to actuate the microswitch, thus producing the generation of the lighting spark simultaneously with the dispensing of the gas, specifically by means of a rocking or translating control lever of the microswitch, which is snappingly engaged, in axially integral but rotationally idle manner, with the mobile stem of the gas tap.

30

Such a device is not satisfactory because it is subject to wear due to the continuous sliding to which the snapping mechanism which secures the control lever of the microswitch, generally consisting of a catenary element, to the tap stem is subjected. .Furthermore, it is cumbersome and constructively complex and makes use of a modified, and thus not standard, catenary element.

Moreover, in some applications, it may not be desirable or possible to effectively use the possible axial movement of the control stem of the gas tap for actuating the microswitch. In this case, the gas tap must be equipped with a specifically made catenary element, adapted to actuate the microswitch by means of the rotational movement of the gas tap control stem, along at least a part of the angular extension of such a movement, such as shown in US-A-5,525,771. Therefore, also in this case, a standard type catenary may not be used and the device is cumbersome, complex and costly.

EP-A-1500881 brilliantly solves the above-described problems in the case of actuating the microswitch obtained by means of the axial movement of the control stem of the gas tap. In this case, indeed, a flanged annular bushing is snappingly mounted to the stem and may thus rotate integrally with the same, in addition to translate along with the stem; the flanged part of such a bushing is used to interact with the lever of the microswitch, actuating it and thus allowing to use standard-type catenaries and to considerably simplify the whole device.

It is however apparent that this solution is not applicable when the actuation of the microswitch of the catenary element belonging to the control device is desired to be carried out by using the rotation (and not

the translation, which may also be absent or insufficient) of the control stem of the gas tap.

DISCLOSURE OF INVENTION

5 It is the object of the present invention to provide a control device for the burners of a cooking range, which may be actuated by means of the only rotation of the control stem of the gas tap, while displaying the same advantages as the device in EP-A-1500881,
10 specifically the possibility of using a standard-type catenary which may be actuated by means of the translation of the control stem thereof parallelly to the stem of the tap. It is a further object of the invention to provide a control device of the aforesaid type which
15 is also cost-effective to be manufactured, easy and rapid to be assembled, of reduced size and of high reliability.

According to the present invention, a control device for the burners of a cooking range is made as defined in claim 1.

20 Specifically, according to the invention, the device comprises a catenary element for controlling the lighting of the burners and a gas tap provided with rotary control stem. The catenary element is fixable onto the gas tap laterally to the rotary stem and includes a microswitch
25 actuated by the translation of a mobile control rod parallelly to the axis of the rotating stem of the gas tap. According to an aspect of the invention, the catenary element belongs to a standard type catenary and the control device comprises, in combination, an annular
30 washer, which is angularly fastenable in an integral and axially locked manner to the rotary stem, in a position facing a free end of the control rod axially and

overhangingly protruding from a body of the microswitch; the annular washer is provided, on a first face thereof, facing the control rod in use, with cam means of the circumferential type cooperating in use in a sliding
5 contact with the free end of the control rod for converting, at least along an angular arc of predetermined width, a rotational motion of the washer, upon rotation of the control rod of the gas tap, into a
10 translating motion of the control rod of an extent so as to actuate the microswitch.

According to a further aspect of the invention, the control device further comprises an annular shouldering element and a through annular lid crossed, in use, by the control stem of the gas tap and secured to the annular
15 shouldering element on the side opposite to the annular washer, so that the latter is axially locked to the stem, sandwiched between the shouldering element and the lid, in use.

In this manner, an overall device of simple
20 structure is obtained, which is very easy and rapid to be assembled and of small dimensions, which despite being actuated in rotation by the gas tap stem, uses a standard-type catenary, i.e. of the type normally used
25 for the translating actuation by the gas tap. Furthermore, the reliability of the control device as a whole is greatly increased, specifically as compared to devices of the type of that in US-A-5,525,771, and the costs are greatly reduced, both because of the structural
30 simplification of the device and, above all, in virtue of scale economics which may be attained by using the same catenary for equipping both the control devices made according to the invention and control devices made according to EP-A-1500881, for example.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the present invention will be apparent from the following description of a preferred embodiment thereof, only provided by way
5 of non-limitative example, with reference to the accompanying drawing figures, in which:

- figure 1 shows a three-quarters side perspective view of a control device made according to the invention with parts removed and parts shown only diagrammatically
10 with a dashed line for simplicity;

- figure 2 shows, on an enlarged scale and in a three-quarters perspective view from the top, the device parts removed from figure 1 and mounted in an assembled manner on a catenary element belonging to the control
15 device in figure 1; and

- figures 3 and 4 show corresponding perspective views of the control device part according to the invention shown in figure 2, in different assembling stages.
20

BEST MODE FOR CARRYING OUT THE INVENTION

In figures from 1 to 4, numeral 1 indicates as a whole a control device for the burners of a cooking range (known and not shown for simplicity), comprising a
25 standard-type, thus known, gas tap 2, provided in use with a control knob 3 and an element 4 of a catenary 5, known as a whole and of which only the element 4 is illustrated, along with a pair of electric wires 6
30 (figure 3) connected in cascade to other identical elements 4 (not shown) for controlling the lighting of the mentioned burners (known and not shown) of the aforesaid cooking range (also known and not shown) by

actuating a lighter device (also of known type and not shown for the sake of simplicity).

According to the invention, the catenary 5 is a standard-type catenary and the catenary element 4
5 comprises a microswitch 7, also of known type, integrally mounted in use to a body 9 of the gas tap 2, which is in turn provided with a rotary and, possibly, axially mobile control stem 10 about and along an axis A, arranged vertically in use.

10 The microswitch 7 comprises, in turn, a body 11 from which it overhangingly protrudes, from the side of the body 11 facing in use towards the control stem 10 of the gas tap 2, a translating and/or rocking control rod 12, which is, in any case, adapted to move in use parallelly
15 to the axis A and, thus, to the stem 10, to actuate by the translation thereof the microswitch 7 in a known manner and which therefore is not described in detail for simplicity, consequently by actuating the mentioned lighting device of the household appliance.

20 Specifically, the catenary element 4 is fixable to the gas tap 2 laterally to the rotary stem 10 and immediately under a segment 20 of the stem 10 axially protruding from the body 9 and displaying a free end 21 provided with a prismatic cut 22 for receiving the knob 3
25 in use. In the preferred embodiment shown herein, the catenary element 4 is fixed to the body 9 of the gas tap 2 by means of snapping fastening means 24, of known type, which are carried in a known manner integrally by the body 11 of the microswitch 7, e.g. either made in one
30 piece with the same or also snappingly secured thereto.

According to a main aspect of the invention, the control device 1 further comprises an annular washer 25 which is angularly fastenable in an integral and axially

locked manner to the rotary rod 10, in a position facing a free end 26 (figure 3) of the control rod 12, axially and overhangingly protruding from the body 11 of the microswitch 7.

5 Specifically, the annular washer 25 is provided, on a first face 27 thereof, facing in use towards the control rod 12, with cam means 28 of "circumferential type" cooperating in use in a sliding contact with the
10 free end 26 of the control rod 12, which is appropriately shaped for the purpose, for converting at least along an angular arc ARC of predetermined width (figure 4), a rotary motion of the washer 25, upon a rotation of the control stem 10 of the gas tap 2, into a translating motion parallelly to the axis A of the control rod 12 to
15 such an extent to actuate the microswitch 7.

The cam means 28 are of the "circumferential type" because they consist of a sliding surface 29 of radial width either equal to or slightly larger than the
20 dimension of the free end 26 of the control rod 12, which surface 29 extends, indeed in a circumferential direction, onto a portion of the first face 27 of the annular washer 25 having an angular extension equal to that of the angular arc ARC of predetermined width. Furthermore, the sliding surface 29 is at least partially
25 not coplanar and flushed with the face 27 of the washer 25, but diverges from it in the direction of the axis A.

Specifically, the sliding surface 29 diverges from the face 27 of the washer 25 in a varying manner along the angular arc ARC of predetermined width and belongs to
30 a circumferential protrusion or (in the shown case) depression 30 integrally obtained in one piece with the annular washer 25 on the face 27 and having a varying height in the direction of the axis A; the

circumferential protrusion or depression, in this case the depression 30, is delimited at the opposite circumferential ends thereof by opposite oblique surfaces 31, in this case reciprocally facing towards the inside
5 of the depression 30.

According to a further aspect of the invention, the control device further comprises an annular shouldering element 40 (figures 3 and 4) and an annular lid 41
10 (figure 2) intended to be crossed through, in use, by the control stem 10 of the gas tap 2 and secured to the annular shouldering element 40 on the side opposite to the annular washer 25, so that the latter is axially sandwiched between the annular shouldering element 40 and the lid 41, therefore onto the stem 10, in a manner shown
15 in greater detail below.

Specifically, in use, the annular washer 25 is arranged in abutment against the annular shouldering element 40 on the side of the first face 27 thereof, while the annular shouldering element 40 is integral in
20 use with the body 11 of the microswitch 7, which is in turn integrally fixed to the body 9 of the gas tap 2, as already mentioned.

More in detail, the annular lid 41, the annular shouldering element 40, the body 11 of the microswitch 7
25 and the body 9 of the gas tap 2 are reciprocally fixed in a removable manner, by means of snapping connection means 24; for example, the shouldering element 40 may form an integral part of the snapping connection means 24, or may be in turn snappingly connected, by the means 42, to the
30 body 11 of the microswitch 7, on which in turn the connection means 24 will be fixed. The lid 41 is, in turn, provided with snapping fastening means 43 complementary to the snapping fastening means 44 of the

shouldering element 40, obtained peripherally to the same.

In all cases, the lid 41, the washer 25 and the shouldering element 40 are shaped so as to be assembled
5 on the body 11 of the microswitch 7 before fixing the latter to the body 9 of the gas tap 2, by means of the snapping connection means 24, so as to form in use a pre-mountable unit 45 with the catenary element 4, (figure 2) which may be tested separately from the gas tap 2.

10 For this purpose, the annular shouldering element 40 consists of a disc 49 (or a portion of a disc), symmetric with respect to axis A, having a circular shallow recess 50 in the middle of which a cylindrical sleeve 51 is arranged, which is coaxially mountable in use with the
15 stem 10 of the gas tap 2, and which axially and protrudingly extends from the disc 49 (or portion of the disc) on the side facing the lid 41.

Similarly, the annular washer 25, which is also symmetric with respect to axis A, is axially provided
20 with a second cylindrical sleeve 55, which protrudingly and axially extends from the washer 25 on the side of the (lower) face 27 of the washer 25 and which is shaped so as to idly couple in use onto the cylindrical sleeve 51 in an axial abutment, with an annular end edge 56
25 thereof, against the annular shouldering element 40, within the shallow recess 50 of the same.

On the side opposite to the cylindrical sleeve 55, the annular washer 25 is provided with a bottom wall 58
30 (figure 4) provided with a cotter perforation 60, adapted to engage, in an angularly integral manner, the axial cut 22 made on the free end 21 of the control stem 10 of the gas tap 2, indeed normally provided for receiving the control knob 3 only, and which is specifically adapted

(e.g. elongated) to also accommodate the washer 25 through the bottom wall 58 of the latter.

For molding convenience, as the elements 25, 40 and 41 are all made of an injection-molded, synthetic plastic material, the washer 25, which is comprised of many construction elements as shown, is obtained in a single piece of complex shape but without undercuts by making the depression 30 as "negative" of a varying depth annular groove 61 obtained on a face 62 of the washer 25 opposite to the face 27; "negative" meaning that the depression 30 displays some voids where the depth of the groove 61 is progressively reduced until it is cancelled, and some solid parts (to progressively cancel themselves and finish) where the groove 61 displays voids. Furthermore, the sleeve 55 is made as a double-wall tubular element, an internal wall 70 of which (intended to be coupled on the outside of the sleeve 51) is connected to the external wall through the edge 56 and the wall 58 is obtained as a terminal bottom part of the internal wall 70, as diagrammatically shown by a dashed line in figure 1.

CLAIMS

1. A control device (1) for the burners of a cooking range comprising a catenary element (4) for
5 controlling the lighting of the burners and a gas tap (2) provided with a rotary stem (10); wherein the catenary element is fixable onto the gas tap laterally to the rotary stem and includes a microswitch (7) actuated by the translation of a mobile control rod (12) parallelly
10 to the axis of the rotating stem of the gas tap; **characterized in that** said catenary element belongs to a standard type catenary (5), the control device further comprising an annular washer (25), which is angularly fastenable in an integral and axially locked manner on
15 the rotary stem, in a position facing a free end (26) of the control rod axially protruding from a body (11) of the microswitch, said annular washer being provided, on a first face (27) thereof, facing the control rod in use, with cam means (28) of the circumferential type
20 cooperating in use in sliding contact with said free end of the control rod (12) for converting, at least along an angular arc (ARC) of predetermined width, a rotary motion of the washer (25), consequent to a rotation of the control rod (10) of the gas tap, into a translation
25 motion of the control rod (12) of an extent so as to actuate the microswitch (7).

2. A device according to claim 1, characterized in that said cam means (28) of the circumferential type
30 consist in a sliding surface (29) of radial width either equal to or slightly larger than the size of said free end of the control rod and which extends in a

circumferential direction on a portion of said first face (27) of the annular washer having an angular extension equivalent to that of said angular arc (ARC) of predetermined width, said sliding surface (29) being at
5 least partially not coplanar and flushed with said first face (27) of the washer, but diverting from it in the direction of said axis (A) of the stem of the gas tap.

10 3. A device according to claim 2, characterized in that said sliding surface (29) diverges from said first face (27) of the washer in said axial direction in a variable manner along said angular arc (ARC) of predetermined width.

15 4. A device according to claim 2 or 3, characterized in that said sliding surface (29) belongs to a circumferential protrusion or depression (30) integrally obtained in one piece with said annular washer on said first face of the same and having variable height
20 in the direction of said axis (A) of the stem (10) of the gas tap.

25 5. A device according to claim 4, characterized in that said circumferential protrusion or depression (30) is delimited at its opposite circumferential ends, by reciprocally facing opposite oblique surfaces (31).

30 6. A device according to any of the preceding claims, characterized in that it further comprises an annular shouldering element (40) and an annular lid (41) crossed through, in use, by the control stem of the gas

tap and secured to the annular shouldering element on the side opposite to said annular washer (25), so that the latter is axially locked on the stem (10), sandwiched between the shouldering element and the lid, in use.

5

7. A device according to claim 6, characterized in that said annular washer (25) is abuttingly arranged in use against the annular shouldering element (40) on the side of said first face (27).

10

8. A device according to one of claims 6 or 7, characterized in that said annular shouldering element (40) is integral in use with said body (11) of the microswitch, which is in turn in use integrally fixed to a body (9) of said gas tap.

15

9. A device according to claim 8, characterized in that said annular lid (41), said annular shouldering element (40), said body (11) of the microswitch and said body (9) of the gas tap are reciprocally fixed in a removable manner, by means of snapping connection means (24).

20

10. A device according to claim 9, characterized in that said lid (41), washer (25) and shouldering element (40) are shaped so as to be assembled (11) on the body of the microswitch before fastening the latter to the body (9) of the gas tap, so as to form, in use, with said catenary element (4), a unit (45) which may be pre-mounted and tested.

25

30

11. A device according to any of claims from 6 to 10, characterized in that said annular shouldering element (40) consists of a disc (49) or a portion of a disc having a circular shallow recess (50) provided coaxially therewith in the middle of which there is arranged a first cylindrical sleeve (51) coaxially mountable in use with the stem of the gas tap, and which axially and protrudingly extends from the disc or portion of the disc on the side facing said lid (41) in use.

12. A device according to claim 11, characterized in that said annular washer (25) is provided coaxially therewith with a second cylindrical sleeve (55), which protrudingly extends axially from the washer on the side of said first face (27) of the washer and which is shaped so as to idly couple in use on said first cylindrical sleeve (51) and to axially abut, with an annular end edge (56) thereof, against said annular shouldering element (40), within said shallow recess (50) of the same.

13. A device according to claim 12, characterized in that on the side opposite to said second cylindrical sleeve (55) said annular washer is provided with a bottom wall (58) provided with a cotter perforation (60), adapted to engage in an angularly integral manner an axial cut (22) made on a free end (21) of said control stem of the gas tap, normally provided for the reception of a control knob (3).

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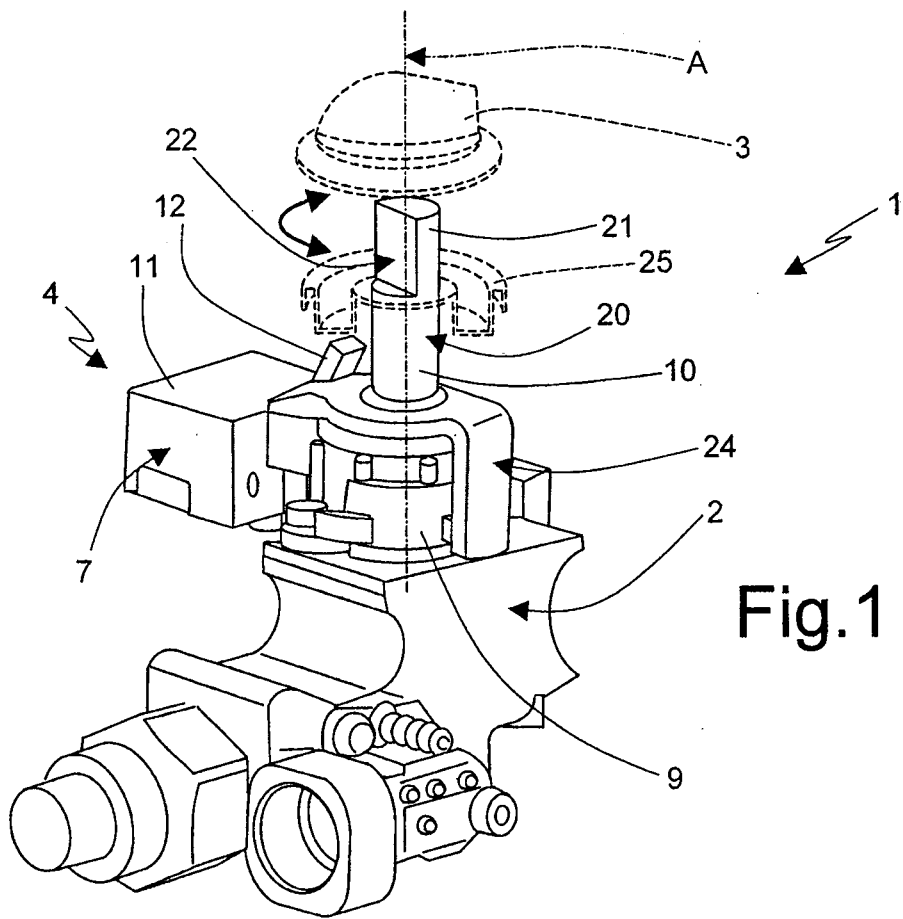


Fig.1

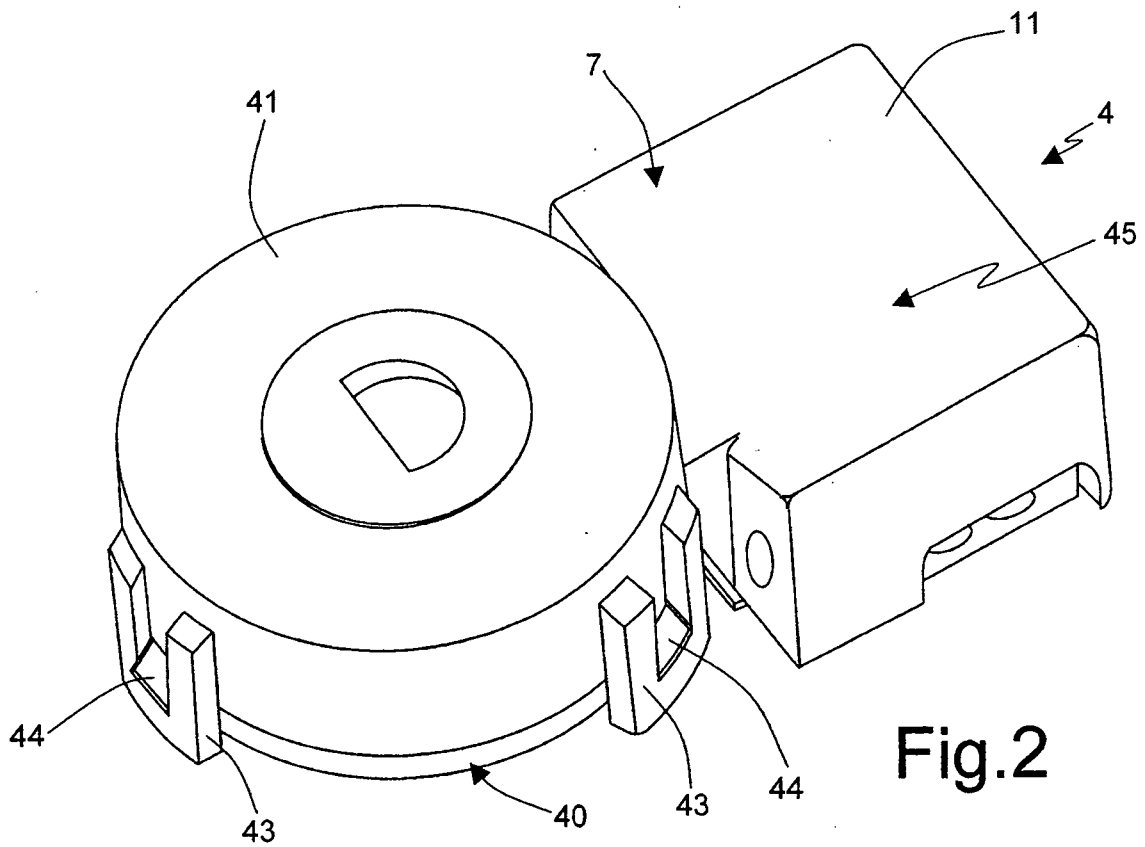


Fig.2

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