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(71) Applicant: **Giovenzana International B.V.**
1077 XX Amsterdam (NL)

(72) Inventor: **GIOVENZANA, Massimo**
Dubai (AE)

(74) Representative: **Ripamonti, Enrico et al**
Giambrocono & C. S.p.A.
Via Rosolino Pilo, 19/B
20129 Milano (IT)

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(54) **CONTROL DEVICE FOR CONTROLLING THE OPERATION OF A USER, HAVING AN INTRINSIC SAFETY**

(57) A control device (1) for controlling the operation of a mechanic, electric, pneumatic, hydraulic/oleodynamic, or similar user comprising a basic body (2) in the middle of which a rotating shaft (10) torsionally coupled with a rotating knob (19) which rotates on said basic body (2) is installed, such shaft (10) being functionally connected to electric connectors suitable for supplying electric power to said user when the knob (19) is in a first operating position on said body and for interrupting said supplying of electric power when the knob is in a second operating position on said body. The knob (19) supports a selector member (40) for selecting the movement of the knob (19) on said basic body (2), said selector member (40) being torsionally integral with the knob (19), but rather being movable orthogonally to it, said selector member (40) comprising interception means (42) suitable for cooperating with counter-interception means (35) provided in said basic body (2), the cooperation between such interception means and counter-interception means (42, 35) preventing the rotation of the knob (19) placed on said basic body (2), the separation of such interception means and counter-interception means (42, 35) making it possible the knob (19) to rotate from the first operating position towards the second operating position and vice-versa.

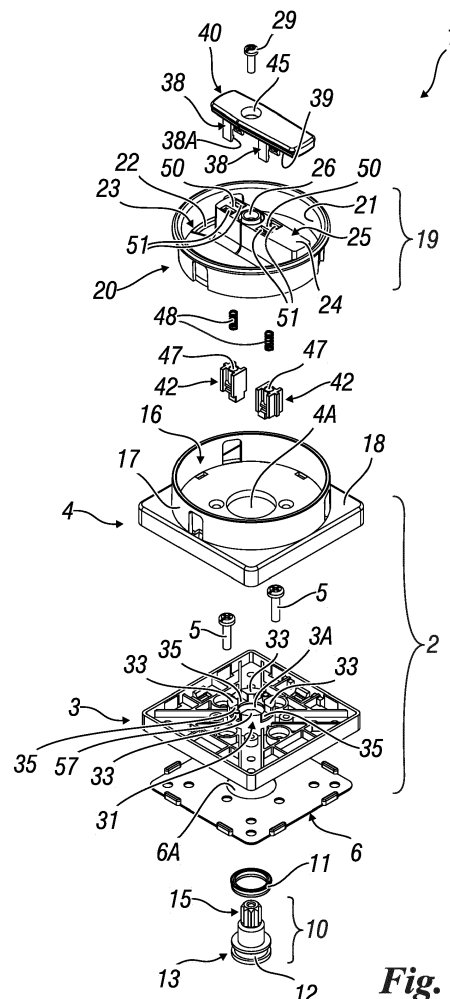


Fig. 2

Description

[0001] The object of the present invention is a control device for controlling the operation of a user, according to the preamble of the main claim.

[0002] By the term "user" we mean an operating machine, in particular a machine tool intended for wood, metal, glass machining operations; with the term "user" we also mean a substation or electric switchboard or another device, machine or an electric, mechanic, pneumatic, hydraulic, oleodynamic or of another type of device, machine or apparatus the operation of which can be activated and/or deactivated upstream of the same.

[0003] By the phrase "control device for controlling the operation of a user" we mean a device which controls the activation and deactivation of the operation of said user. Such control device comprises a rotary knob which rotates on a fixed body and is able to assume two operating position: in a first operating position, the knob allows such user activation (i.e. its operation), whereas in the second position it deactivates the user operation.

[0004] According to the above considerations, it is known that, for example, in the field of machine tools there is a need for providing safety systems which prevent to accidentally shutdown such machines; this in order to mainly prevent mechanical and electrical problems to the machine.

[0005] For this reason, devices which control the activation and deactivation, i.e. the operation or not of a user (and in the case under consideration the electric power supply to the machine) are often placed in a different position with respect to said control panel of the machine or user, hence the intervention on the above-mentioned devices can be only intentionally performed, so it cannot result from an accidental manipulation by the personnel in charge of the machine operation. This is also established by the regulations in force.

[0006] However, the decentralized positioning (with respect to the control panel of the machine) of said control device might entail problems bound to the distance between device and machine. For instance, the personnel or machine operator shall move from the switchboard control panel towards the control device for activating the machine, thus leaving the whole machine entirely without human surveillance (even though for a very short period of time).

[0007] Other problems bound to such separation distance of the activation/deactivation device for activating/deactivating the electric power supply (i.e. activating/deactivating the operation of the user) might reside in the embodiment of such device comprising the rotary knob on the fixed body: these component parts are subject to very severe regulations and they cannot be modified unless said function of controlling said activation is not nullified.

[0008] DE19939717 describes a manually operated device suitable for being used along with a commutation device having a rotary knob. Such device has the char-

acteristics indicated in the preamble of claim 1 of the present document.

[0009] DE20009737 describes a device similar to that disclosed in DE19939717 comprising a basic body, on which a rotary knob is present that comprises interceptor means suitable for cooperating with interceptor counter-means integral with such basic body to prevent the knob from rotating. Such rotation is only enabled if said means and counter-means do not reciprocally cooperate.

[0010] An object of the present invention is to provide a control device for controlling the operation of a user which allows, always and in any case, the correct operativity, but which always allows that the activation and deactivation of said operation takes place in a voluntary manner, hence avoiding such user to be involuntarily shutdown.

[0011] Another object is to provide a device of an above-mentioned type which is simple to manufacture and also applicable to similar control devices according to the state of the art, even already in use, by performing a minimum intervention thereon.

[0012] Another object is to provide a control device of the above-mentioned type which allows an operator of the user, for instance a machine tool, to intervene on such device without going away from the machine, hence maintaining the actual visual surveillance in any moment while the machining operation is in progress.

[0013] These objects and others that will be evident to a person skilled in the art are achieved by a control device for controlling the operation of a user according to the main claim.

[0014] In order to make the present invention better understandable, the following drawings are attached hereto for merely exemplary, non-limitative, purposes, in which:

figure 1 is a top view of a device according to the invention;

figure 2 is an exploded perspective view of the device depicted in figure 1;

figure 3 is a top perspective view of the device depicted in figure 1;

figure 4 is a cross-sectional view according to the cross-plane 4-4 in figure 1, the device according to the invention being in a first operating position;

figure 5 is a cross-sectional view similar to that depicted in figure 4, the device according to the invention being in a second operating position;

figure 6 shows a cross-sectional view according to the cross-plane 6-6 in figure 1, the device according to the invention being in the first operating position; figure 7 is a cross-sectional view similar to that depicted in figure 6, the device being in the second operating position; and

figure 8 is a cross-sectional view according to the cross-plane 8-8 in figure 7.

[0015] With reference to the above-mentioned figures,

a device according to the invention is generally indicated with reference numeral 1. It comprises a basic body 2 comprising two parts 3 and 4 coupled with each other by way of a snap-fit coupling; figure 2 shows screws 5 used for fixing the part 3 (and hence the basic body 2) to a control panel (not shown) of a user. It goes without saying that the constraint of the basic body 2 to the panel can be made with any other known modes. In addition, the basic body 2 comprises a bottom seal 6 coupled, in a way known by itself, with the (lower) part 3 of the body 2.

[0016] Such component parts and seal have corresponding central holes 3A, 4A, and 6A suitable for accommodating a rotary shaft 10 in the basic body 2. A seal 11 is inserted inside an annular recess 12 of a base portion 13 of such shaft 10.

[0017] Said shaft is coupled, in a manner that is known by itself, with electric connectors that subject to the assumed function by the shaft with respect to the body 2, allow or not the activation of a user; for instance, the position assumed by the shaft 10 can allow electric power to be supplied to a user (not shown), such as an operating machine, for instance a machine tool intended for wood, metal, glass machining operations; or such user can be a substation, an electrical switchboard, a device or a similar equipment. Such shaft comprises a channeled or toothed portion 15 suitable for projecting from a hole 4A of the (upper) part 4 of the body 2 within a cavity 16 delimited by a circular shoulder 17 which raises from a free flat face 18 in the upper part 4A of the body 2.

[0018] Within said cavity 16 a knob 19 is accommodated, having a body 20 suitable for being torsionally coupled with the channeled or toothed portion 15 of the shaft 10 and capable of rotating inside said cavity 16. As an example, the knob 19 has a circular cross-section body 20, featuring an edge 21 delimiting, on an upper face 22 of such body, a recess 23. A block 25 (or gripping part of the knob) at least partially hollow is raised from such upper face 22, said block featuring a hole 26 suitable for accommodating, in torsional engagement (obtained in any known manner), the portion 15 of the shaft 10. As an example, a screw 29 axially engages said shaft 10 to said knob 19.

[0019] In the hole 4A of the upper part 4 of the body 2 also penetrates a central portion 31 of the lower part 3 of the body 2, said central portion 31 projecting inside the above-mentioned cavity 16. The central portion 31 includes a plurality of shoulders 33 angularly separated and circularly delimiting recesses 35 therebetween.

[0020] The recesses are spaced away from each other, for instance, by an angle of 90°.

[0021] In correspondence with said central portion 31 there are parallel elastic arms 38 projecting from a lower part 39 of a member 40 superimposed to one end flat part 24 of the block 25 and acting as selector member suitable for locking and releasing (as will be described here below) the rotation of the knob 19 inside the cavity 16, said arms 38 being snapped (by way of their hook-shaped end 38A) into bodies 42 inserted within seats 43

obtained in the block 25. The bodies 42 are suitable for being positioned within said recesses 35 so as to define a first operating position of the knob 19 wherein it allows for electric power being supplied to the user and a second operating position (reached by rotating the knob allowed by the releasing member of such rotation according to the modes which will be described here below) wherein such knob interrupts said power supply.

[0022] The selector member 40 has a wide hole 45 in correspondence with the screw 29, but wider than the latter so that such screw does not interfere with said member.

[0023] The bodies 42 comprise a central hole 47 suitable for accommodating a respective spring 48 put on a pivot 49 projecting toward a block part 50 of the block 25 delimited by two slits 51 present in this block and suitable for receiving, passing therethrough, the arms 38 of the selector or locking/releasing member 40. The selector or locking/releasing member 40 is therefore always torsionally associated with the knob 19, but is axially movable (in the direction of the longitudinal axis M of the device 1) through the movement of the arms 38 inside the slits 51.

[0024] Such axial movement (i.e. along the axis M) makes it possible to rise the selector member 40 from the block 25 of the knob 19 on which it is in a resting position; such raising movement takes place by dragging the bodies 42 which contrast the springs 48 that tend to push such bodies internally the block 25, i.e. towards and on the central portion 31 of the lower part 3 of the body 2. It goes without saying that the bodies 42 themselves can feature elastic protrusions which cooperate with the springs 48, or as an alternative to the springs 48, to obtain said contrasting object.

[0025] With said dragging, the bodies 42 raise from the recesses 35 of such central portion 31, going out therefrom. It is thus possible, without ever taking the hand off the selector member 40 (hence, off the block 25 of the knob 19 which such member 40 is torsionally integral therewith), to rotate the knob 19 placed on said central portion 31 as long as said bodies 42 are not positioned in correspondence with other recesses 35 of the portion 31 and their respective springs 48 push them into such recesses 35, thus locking the rotation of the knob 19 itself. As a matter of fact, upon releasing the member 40, the knob 19 steadily stops in the second operating position.

[0026] Note that the member 40 does not support loads because the torsional force suitable for rotating the knob 19 is only supported by the body 20 of the knob itself. In particular, the rotation of the latter takes place by only acting on the above-mentioned block 25 (or gripping part of the knob), as is usual in every control device having a rotary knob.

[0027] Such rotation is also performed by the shaft 10 which is torsionally integral with the knob (or even better, only with the block 25 through the hole 26), thus interrupting/enabling electric power to be supplied to the user. In such rotation action, no load is consequently imposed

to the member 40 superimposed to the flat part 24 of the block 26 and which, as described above, includes the screw 29 without the latter interfering with said member 40.

[0028] It is noted that the arms 38 never go out from the slit 51 and never detach from the bodies 42 which they are coupled with via a snap-in coupling.

[0029] Also, the recesses 35 of the portion 31 can be in any even number (for instance, in the number of four, as it is shown in the figures) and might be separated by any angle as a function of the position of the connectors (not shown) functionally connected to the shaft 10 (i.e. which the shaft can, directly or indirectly, cooperate with, in order to supply, or not, power to the user hence activating or deactivating its operation).

[0030] Thanks to the invention a control device is provided for controlling the rotation of the knob 19 for supplying, or not, power to a user.

[0031] Such device comprises the blocking/releasing member and component parts (such as, for instance, the bodies 42) easy to be manufactured and installed to obtain a (complex) knob 19 used to selectively control the electric power supply.

[0032] Such control, as already said, is performed by rotating the knob from the first position (wherein a buttonhole 60 is located for instance in correspondence with a value "0", as shown in figures 1 and 3) towards a second operating position (not shown), where the buttonhole is for instance located in correspondence with a value "1". Such values are highlighted on the bottom of the cavity 16 of the upper part 4 of the body 2.

[0033] The present invention has been described as capable of activating one user by supplying electric power thereto (as, for instance, in the case of an electric motor). Obviously, the control device for controlling the operation (which, as already said here above, means capable of activating, but also deactivating the operation of a user) can be used in the event the user operates in the pneumatic, hydraulic, oleodynamic or mechanic mode or by means of actuators that can be activated or deactivated via the knob 19 installed in an electric, pneumatic, or the like power supply network, of such actuators (such as pumps or the like). For instance, the knob 19 can operate or close a valve for a fluid fed to a user.

[0034] Obviously, other solutions are possible on the basis of the preceding description and they have to be considered to fall within the scope of the invention, as set forth in the following claims.

Claims

1. A control device (1) for controlling the operation of a user, said device (1) comprising a basic body (2) in the middle of which a rotary shaft (10), torsionally coupled with a knob (19) which rotates on said basic body (2), is installed, such shaft (10) being functionally connected to supplying means suitable for sup-

plying said user when the knob (19) is in a first operating position on said body and for interrupting said supplying when the knob is in a second operating position on said body, the knob (19) bearing a selector member (40) for selecting the movement of the knob (19) on said basic body (2), said selector member (40) being torsionally integral with the knob (19), such selector member (40) being movable orthogonally to the knob along a longitudinal axis (M) of the device (1) and comprising interception means (42) suitable for cooperating with counter-interception means (35) provided in said basic body (2), the cooperation between such interception means and counter-interception means (42, 35) preventing the rotation of the knob (19) on said basic body (2), the separation of such interception means and counter-interception means (42, 35) making it possible to rotate the knob (19) from the first operating position towards the second operating position and vice-versa, the selector member (40) being elastically movable along the longitudinal axis (M) of the device (1) and being always connected to a gripping part or block (25) of the knob (19) and superimposing to an end flat part (24) of such block (25), **characterized in that** the selector member (40) comprises projecting arms (38) that project from one of its own lower part (39) and inserted into slits (51) of the end flat part (24) of the gripping part or block (25) of the handle (19), said arms (38) being coupled with bodies (42) movably inserted within corresponding seats (43) obtained within said gripping part or block (25), said bodies (42) being suitable for moving within said seats (43) contrasting an elastic force and defining the interception means.

2. The device according to claim 1, **characterized in that** said elastic force is alternatively generated by a spring (48) which cooperates with a corresponding movable body (42) or by an elasticity of every moving body (42).
3. The device according to claim 2, **characterized in that** each spring (48) is inserted within its respective hole (47) in the respective movable body (42).
4. The device according to claim 1, **characterized in that** the movable bodies (42) are suitable for cooperating with recesses (35) obtained in a part (31) of the basic body (2) of the control device (1), said recesses being separated from each other in such a way as to be able to circulate and defining the operating positions of the handle (19), said recesses being the counter-interception means.
5. The device according to claim 1, **characterized in that** the power supply means are electrical connectors.

6. The device according to claim 1, **characterized in that** the supplying means are alternatively valve or mechanical members.

7. The device according to claim 1, **characterized in that** the basic body (2) of the knob is associated with a control panel of the user.

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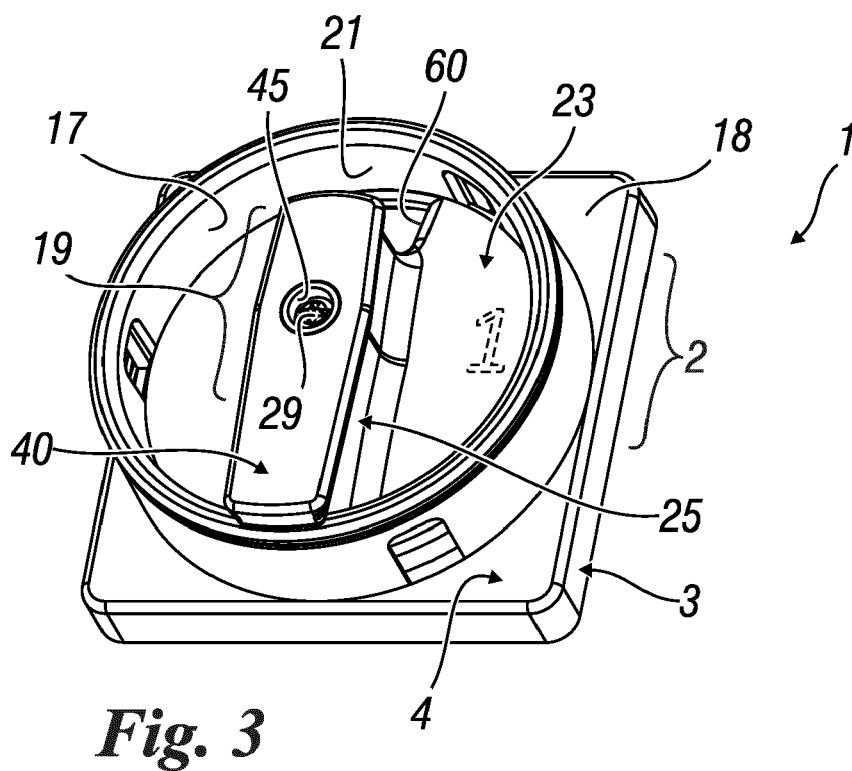
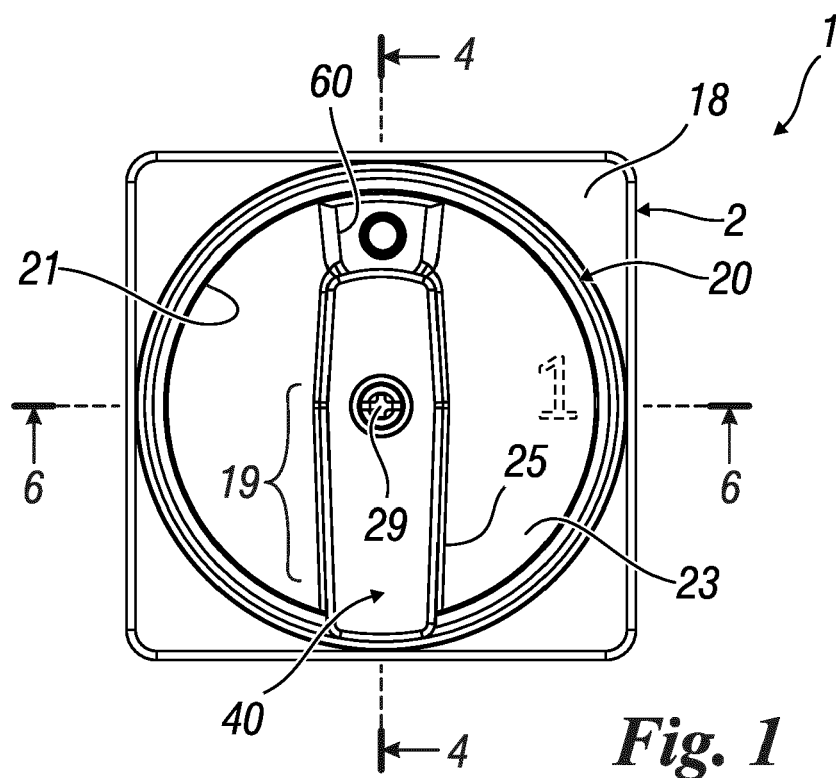
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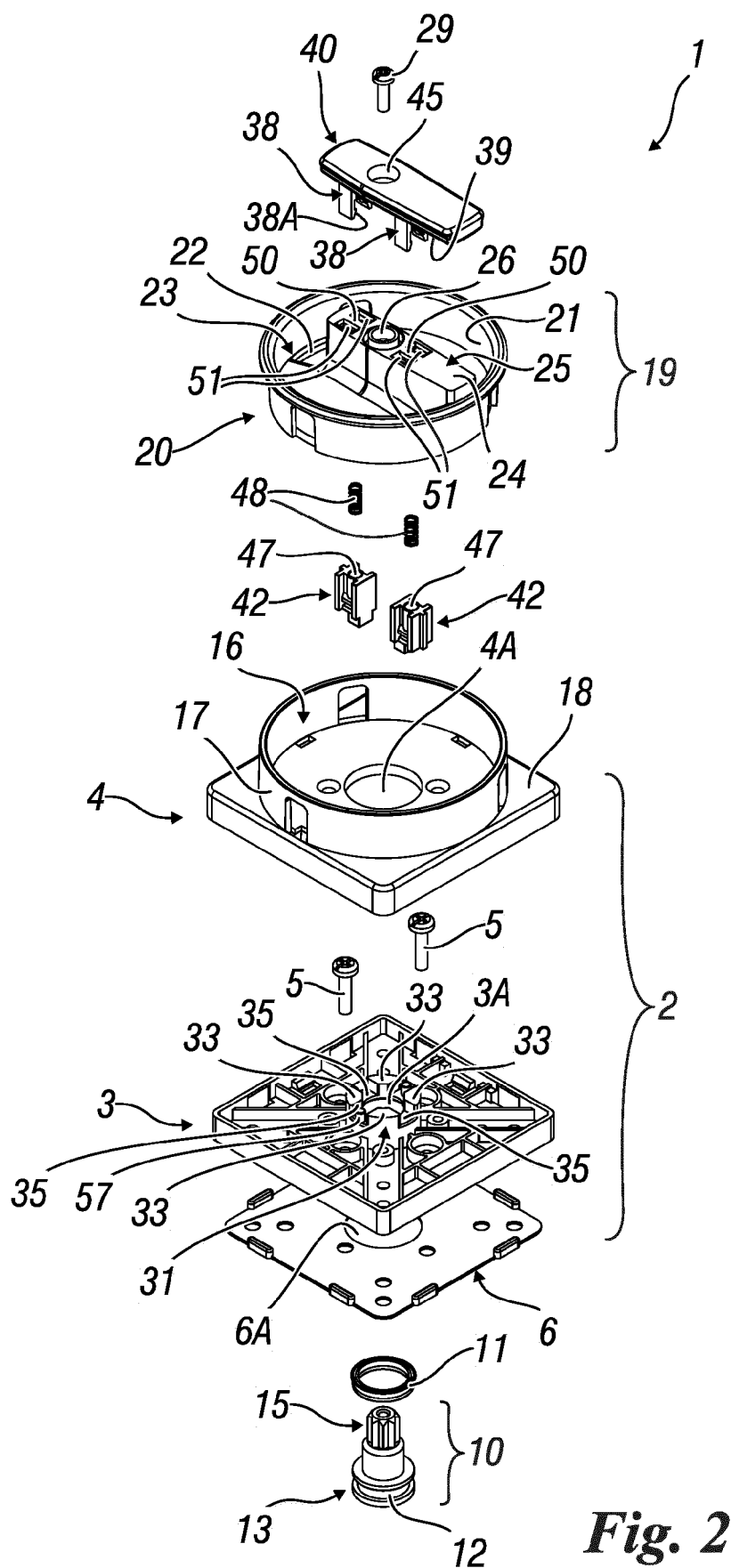


Fig. 2

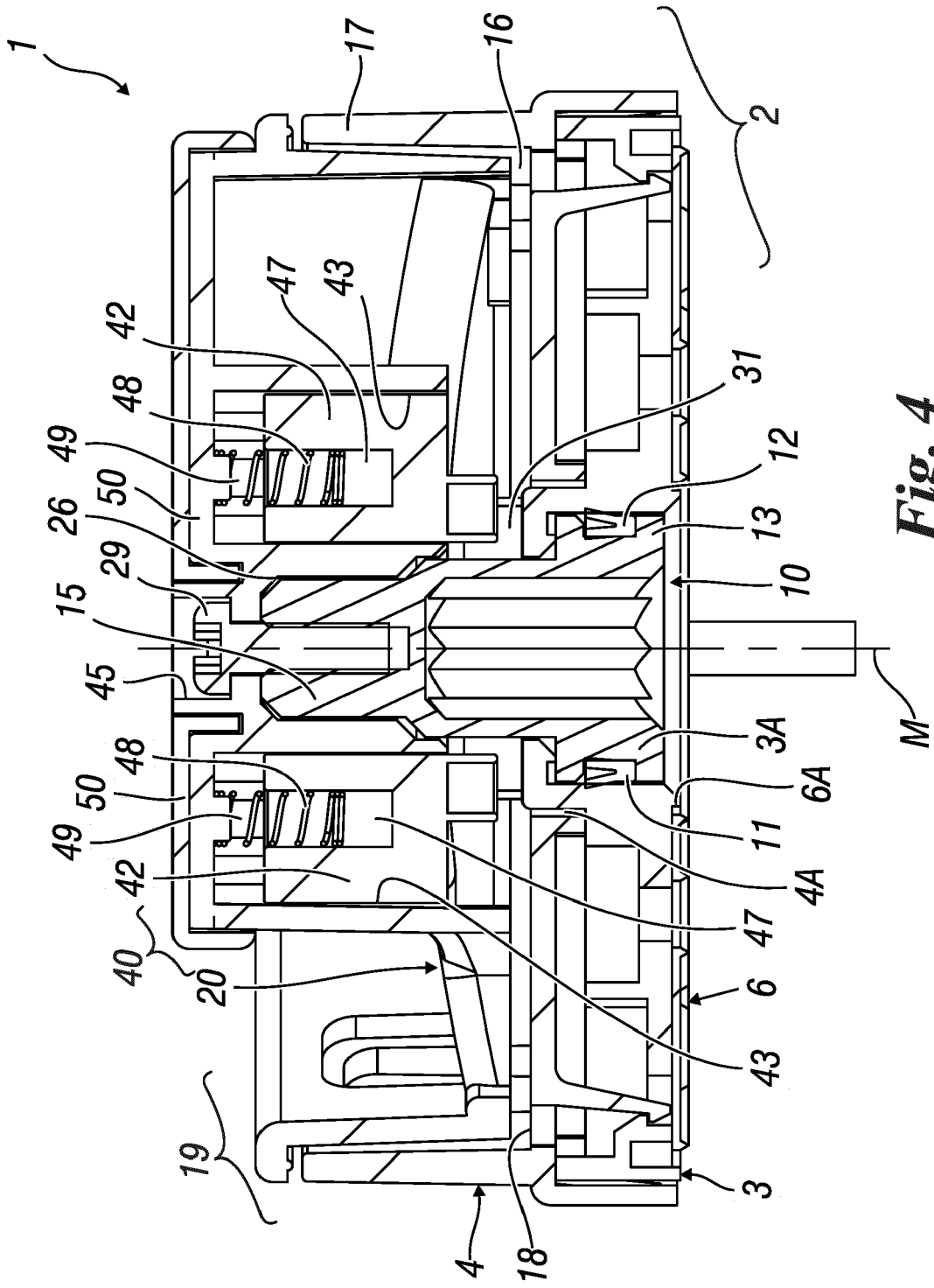


Fig. 4

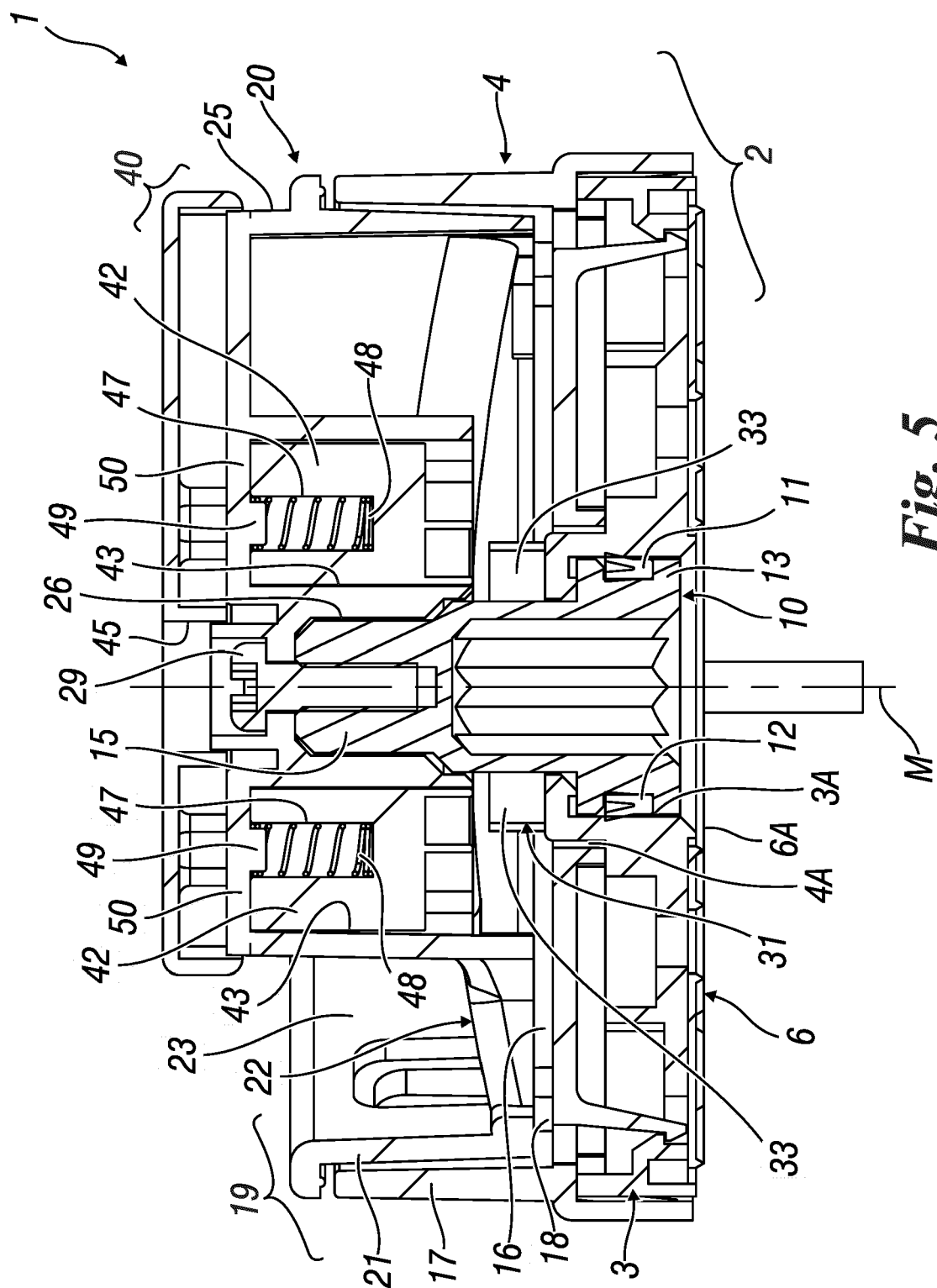


Fig. 5

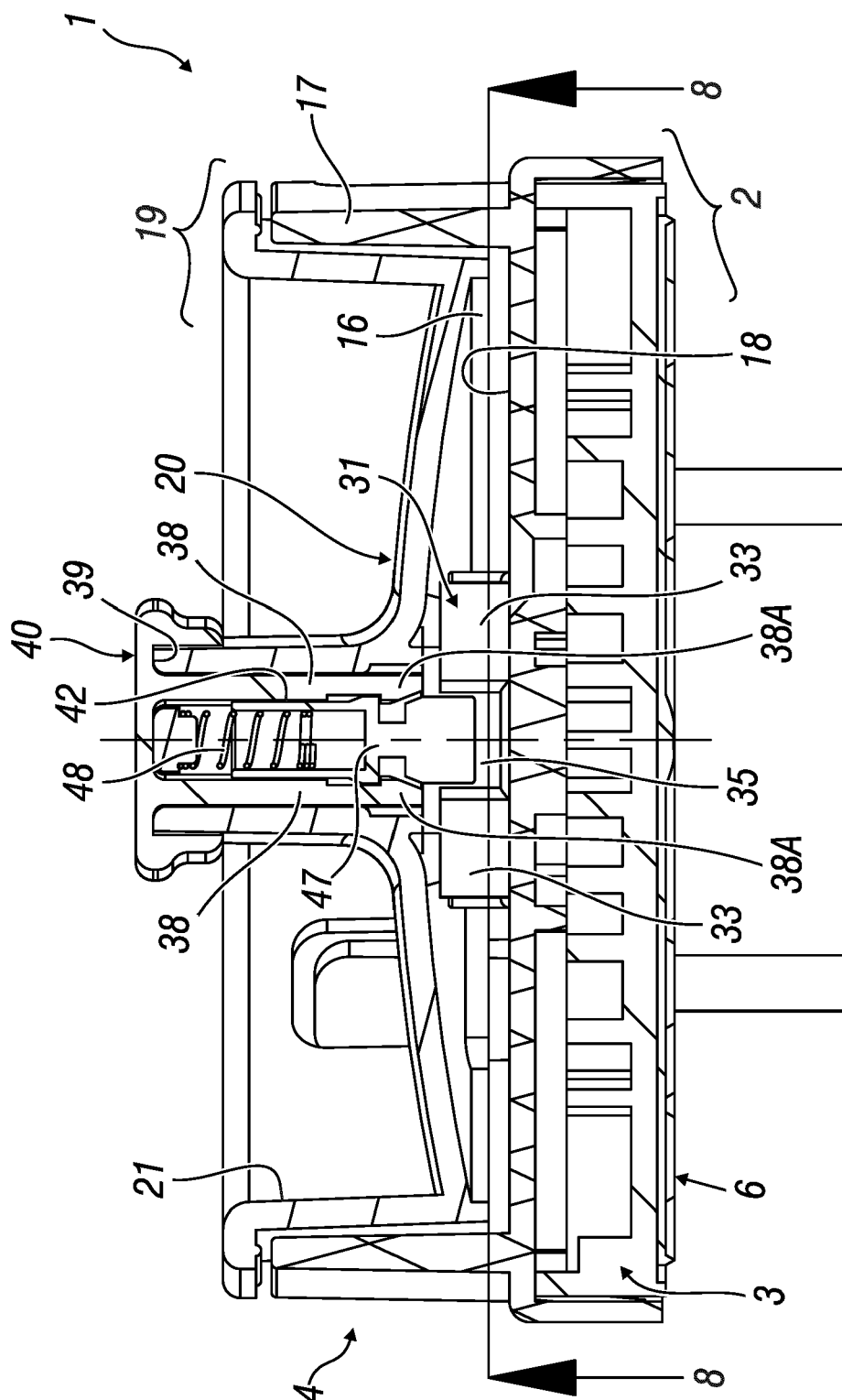


Fig. 6

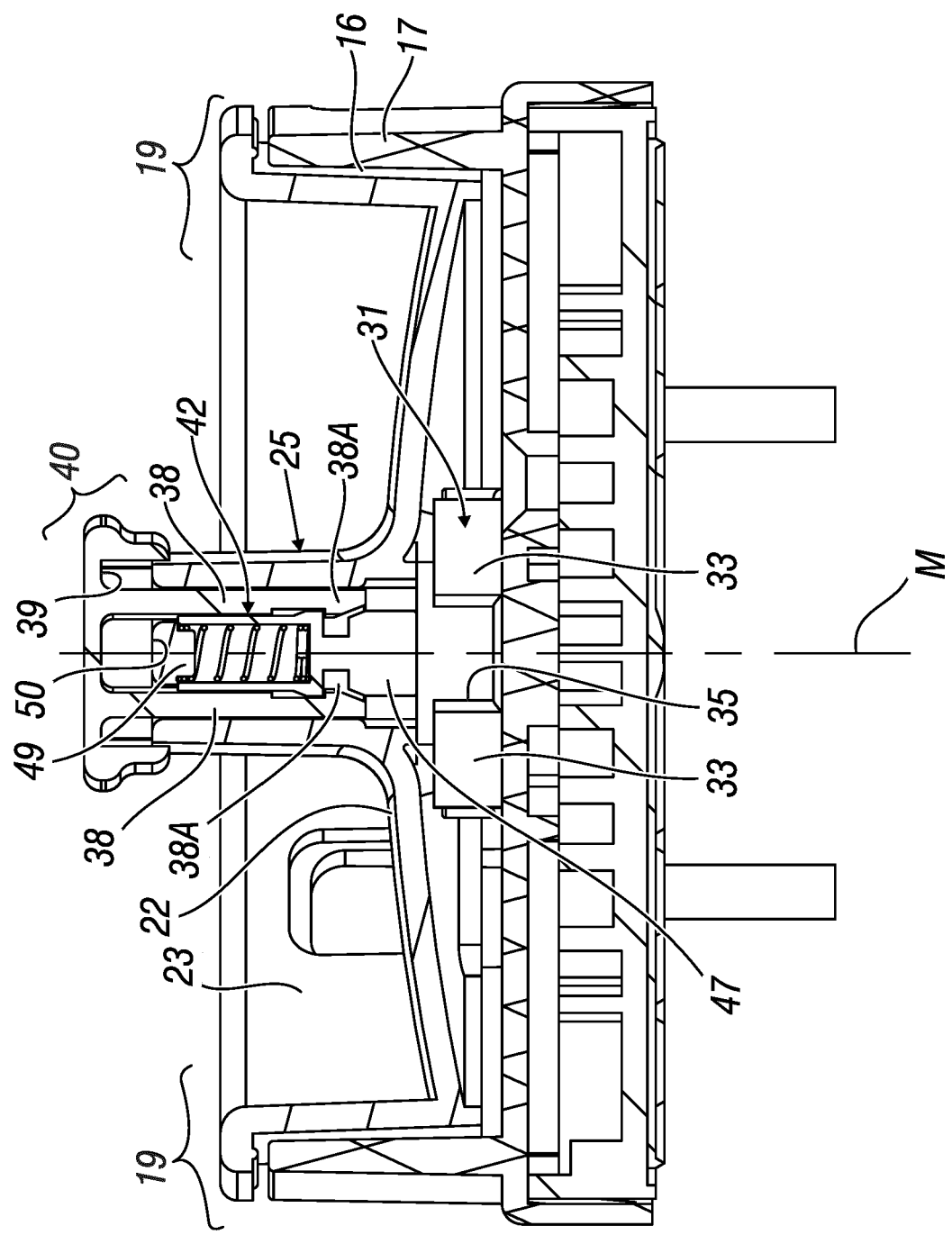


Fig. 7

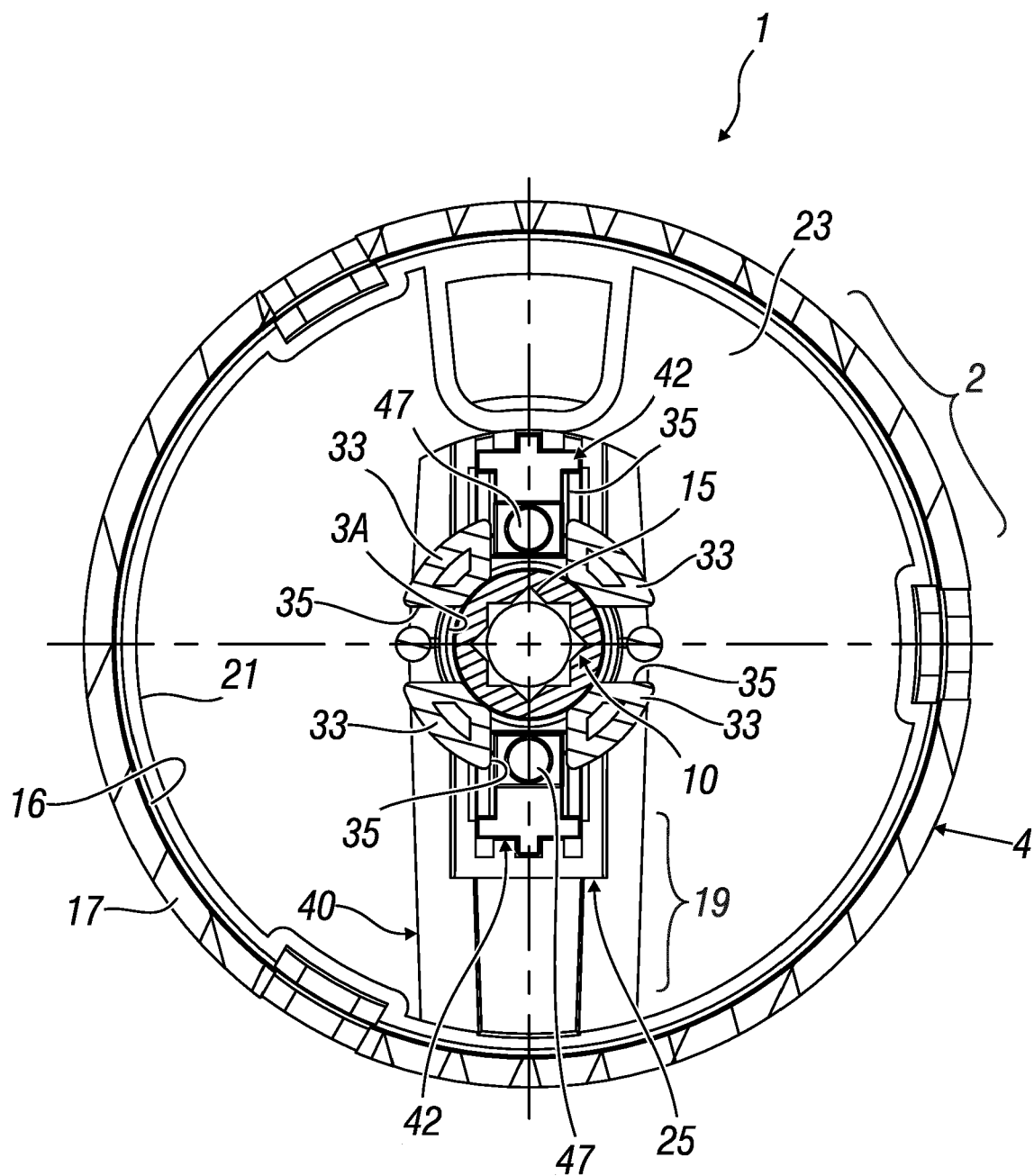


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 20 15 9345

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A	DE 199 39 717 A1 (MOELLER GMBH [DE]) 22 February 2001 (2001-02-22) * column 3, lines 12-66 * * column 4, line 52 - column 5, line 26 * * figures 1,3,5,6 *	1-7	INV. H01H3/20 H01H3/08 H01H9/28 H01H19/36
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			TECHNICAL FIELDS SEARCHED (IPC)
			H01H G05G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 August 2020	Examiner Glamann, C
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- DE 19939717 [0008] [0009]
- DE 20009737 [0009]