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(72) Inventor: **Belloni, Francesco**
I-24124, Bergamo (IT)

(74) Representative: **Giavarini, Francesco et al**
Zanoli & Giavarini S.r.l.
Via Melchiorre Gioia, 64
20125 Milano (IT)

(71) Applicant: **ABB Technology AG**
8050 Zürich (CH)

(54) **Drive mechanism for medium voltage fuse switches.**

(57) A drive mechanism 1 for a Medium Voltage fuse switch comprising: a base plate 10 and a front plate 11 which defines an internal space housing an operating shaft 2 and a power shaft 3, coaxially mounted along a first longitudinal axis, the power shaft 3 being operatively connectable to a kinematic chain of a Medium Voltage fuse, the operating shaft 2 having a head 20 connectable to an operating handle for manual actuation of said operating shaft 2; a spring assembly 4 which comprises a first 41 and a second 42 spiral springs having a first end operatively coupled to said operating shaft 2, said spiral springs being loaded by rotation of said operating shaft 2 and actuating said power shaft 3 when released; latching means 5 for latching said power shaft 3 comprising a first 51 and a second 52 latching arm positioned on said power shaft 3; first 61 and second 62 release means for unlatching said power shaft 3 and allowing rotation thereof, the first release means 61 allowing a rotation of said power shaft 3 in an opposite direction with respect to said second release means 62.

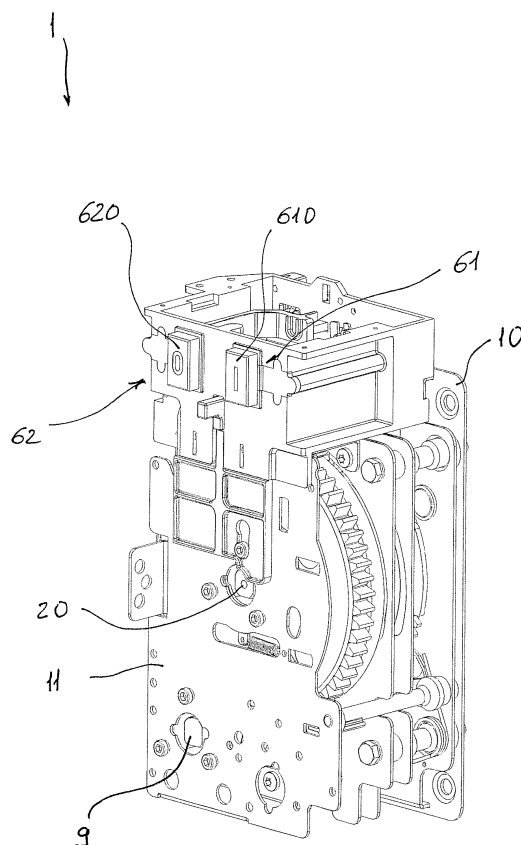


Fig. 1

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Description

[0001] The present invention relates to a drive mechanism for a Medium Voltage switch, in particular a drive mechanism for a Medium Voltage fuse switch, having improved features. For the purposes of the present application the term Medium Voltage is referred to applications in the range of between 1 and 52 kV.

[0002] Medium Voltage switches, in particular Medium Voltage fuse switches, are well known in the art and usually comprises a drive mechanism which is operatively connected to the kinematic chain of the switch and actuates it for opening and closing the contacts of the switch. Due to the speed needed for carrying out opening/closing operation, mechanical means are normally used to actuate the kinematic chain of the switch. In most cases, the drive mechanisms are based on springs which are loaded before carrying out the opening/closing operation; when the spring is released, the drive mechanism transmits the energy and the motion generated by the spring to the kinematic chain of the switch, thereby actuating the opening/closing operation with the required speed. In the mechanism of the known type the operation is usually carried out by an operator acting on an operating handle which is used to load the spring and actuate the release operation of the spring itself, thereby completing the opening/closing operation.

[0003] Even if the currently known drive mechanisms are certainly suitable to operate the opening/closing operation of a Medium Voltage switch, they are not totally satisfactory in terms of performances and/or manufacturing costs.

[0004] In particular, in the case of drive mechanism for Medium Voltage fuse switches, it would be desirable to have a simpler alternative to the existing system.

[0005] A further problem derives from the speed requirements of the opening/closing operation of the switch which involves an accurate dimensioning of the spring, as well as an accurate testing thereof.

[0006] Also, the characteristics of the spring may change during the operation life, thereby reducing also the speed characteristics of the associated switch under values that may no longer be acceptable.

[0007] It is therefore an object of the present invention to provide a drive mechanism for a Medium Voltage switch, in particular a drive mechanism for a Medium Voltage fuse switch, in which the above-mentioned drawbacks are avoided or at least reduced.

[0008] A further object of the present invention is to provide a drive mechanism for a Medium Voltage switch which does not require an excessively accurate dimensioning and pre-testing of the spring.

[0009] Another object of the present invention is to provide a drive mechanism for a Medium Voltage switch which allows to tune the characteristics of the spring and adapt it to the application in an easy way.

[0010] A further object of the present invention is to provide a drive mechanism for a Medium Voltage switch

which is easily adaptable to different applications.

[0011] Still another object of the present invention is to provide a drive mechanism for a Medium Voltage switch with reduced manufacturing, installation and maintenance costs.

[0012] Thus, the present invention relates to a drive mechanism for a Medium Voltage fuse switch which is characterized in that it comprises:

- 10 - a base plate and a front plate which defines an internal space housing an operating shaft and a power shaft, coaxially mounted along a first longitudinal axis, the power shaft being operatively connectable to a kinematic chain of a Medium Voltage fuse switch for opening/closing operation of said switch, the operating shaft having a head connectable to an operating handle for manual actuation of said operating shaft;
- 15 - a spring assembly which comprises a first and a second spiral springs having a first end operatively coupled to said operating shaft, said spiral springs being loaded by rotation of said operating shaft and actuating said power shaft when released, the first spiral spring determining a rotation of said power shaft in an opposite direction with respect to the rotation determined by said second spiral spring;
- 20 - latching means for latching said power shaft comprising a first and a second latching arm positioned on said power shaft;
- 25 - first and second release means for unlatching said power shaft and allowing rotation thereof, the first release means allowing a rotation of said power shaft in an opposite direction with respect to said second release means.

[0013] Thanks to the presence of the latching and release means, the drive mechanism for a Medium Voltage switch according to the invention allows to carry out the opening and closing operation very easily and effectively, as better explained in the following detailed description of preferred embodiments of the invention.

[0014] A Medium Voltage switch comprising a drive mechanism as described above is also part of the present invention.

45 **[0015]** Further characteristics and advantages of the invention will emerge from the description of preferred, but not exclusive embodiments of a drive mechanism for a Medium Voltage fuse switch according to the invention, non-limiting examples of which are provided in the attached drawings, wherein:

Figure 1 is a perspective front view of a possible embodiment of a drive mechanism according to the invention;

55 Figure 2 is a perspective rear view of a possible embodiment of a drive mechanism according to the invention;

Figure 3 is a plan view of an embodiment of the op-

erating shaft, power shaft and spring assemblies used in a drive mechanism according to the invention;

Figure 4 is an exploded view of the assemblies of figure 3;

Figure 5 is rear view of a drive mechanism according to the invention, with the latching and release means in a first operating position;

Figure 6 is rear view of a drive mechanism of figure 5, with the latching and release means in a second operating position;

Figure 7 is rear view of a drive mechanism of figure 5, with the latching and release means in a third operating position;

Figure 8 is rear view of a drive mechanism of figure 5, with the latching and release means in a fourth operating position.

[0016] With reference to the attached figures, a drive mechanism for a Medium Voltage fuse switch according to the invention, globally designated with the reference numeral 1, generally comprises a base plate 10 and a front plate 11 that define an internal space. Additional plates, e.g. plate 13, can also be present between the front 11 and base 10 plate. The drive mechanism also comprises a number of components for its connection to a Medium Voltage switch that can be of conventional type and that will not be described in details.

[0017] An operating shaft 2 and a power shaft 3 are housed in said internal space and are coaxially mounted along a first longitudinal axis, the power shaft 3 being operatively connectable to a kinematic chain of a Medium Voltage fuse switch through conventional linking system to actuate the opening/closing operation of said switch. The operating shaft 2 has a head 20 connectable to an operating handle for manual actuation of said operating shaft, through a hole positioned on the front plate 11 of the drive mechanism 1.

[0018] The drive mechanism 1 of the invention further comprises a spring assembly 4 which comprises a first 41 and a second 42 spiral springs, also positioned in the internal space between the base plate 10 and the front plate 11.

[0019] The first and second spiral springs 41 and 42, respectively have a first end 411 and 421 which are operatively coupled to said operating shaft 2 and a second end 412 operatively couplable to said power shaft 3. The first and second spiral springs 41, 42 are loaded by rotation of said operating shaft 2 and actuates said power shaft 3 when released, the first spiral spring 41 determining a rotation of said power shaft 3 in an opposite direction with respect to the rotation determined by said second spiral spring 42.

[0020] One of the characterizing features of the drive mechanism 1 according to the invention resides in that it is provided with latching means 5 for latching said power shaft 3, said latching means comprising a first 51 and a second 52 latching arm which are positioned on said pow-

er shaft 3.

[0021] A further characteristics of the drive mechanism 1 according to the invention resides in that it is also provided with first 61 and second 62 release means for unlatching said power shaft 3 and allowing rotation thereof; in particular, as better explained hereinafter, the first release means 61 allows a rotation of said power shaft 3 in a direction which is opposite with respect to the rotation allowed by said second release means 62.

[0022] In practice, the closing operation is carried out by loading one of said first or second spiral springs 41 and 42, e.g. the spiral spring 41; once the spring is loaded the power shaft is latched by said latching means 5. In these conditions, the closing spring is loaded, while the power shaft 2 is latched in a position corresponding to the open position of the contacts of the associated fuse switch. The closing operation is actuated by acting on one of said release means, e.g. the release means 61, thereby unlatching the power shaft 3 and allowing a rotation of said power arm 3 in a first direction, e.g. clockwise with respect to a front view of the drive mechanism 1.

[0023] Correspondingly, the opening operation is carried out by loading the other one of said first or second spiral springs 41 and 42, e.g. the spiral spring 42; once the spring is loaded the power shaft is latched by said latching means 5. In these conditions, the opening spring is loaded, while the power shaft 2 is latched in a position corresponding to the closed position of the contacts of the associated fuse switch. The opening operation is actuated by acting on one of said release means, e.g. the release means 62, thereby unlatching the power shaft 3 and allowing a rotation of said power arm 3 in a second direction which is opposite with respect to the rotation allowed by said second first means 61, e.g., in this case, counterclockwise with respect to a front view of the drive mechanism 1.

[0024] Loading of the spiral springs 41 and 42 is conveniently carried out simultaneously; closing operation is then carried out by acting, e.g., on the release means 61, while opening operation is correspondingly carried out by acting on the release means 62.

[0025] With reference to figure 3 and 4, in the drive mechanism 1 according to the invention, the operating shaft 2 preferably comprises a first subassembly 21 which in turns comprises a disk 22 of substantially circular shape which is mounted perpendicularly with respect to said first longitudinal axis and further comprises a first plate element 23 which protrudes perpendicularly from the edge of said disk 22 in the direction of the head 20 of said operating shaft 2. The first plate element 23 is operatively couplable to the second ends 412 and 422 of said first 41 and second 42 spiral springs.

[0026] According to a preferred embodiment of the invention, the spring assembly 4 preferably comprises a first lever 43 which has a base element 44 coaxially mounted on the first subassembly 21 of said operating shaft 2 in correspondence of the disk 22. The base element 44 of the first lever 43 is conveniently provided with

fixing means 441 for the first ends 411, 421 of said first and second spiral springs 41, 42. As an example, said fixing means can be constituted by a groove into which said first ends, 411 and 412, of said first and second spiral springs, 41 and 42, are secured.

[0027] A distal end 45 of said first lever 43 protrudes from the edge of said disk 22 and is operatively coupled with said first plate element 23 of said first subassembly 21.

[0028] According to a particularly preferred embodiment of the drive mechanism 1 of the invention, said first lever 43 comprises adjusting means 46 which are operatively coupled to said first plate element 23 for adjusting the preload of said first 41 and second 42 spiral springs. In this way the speed characteristics of the first and second springs, 41 and 42, can be changed, or at least fine-tuned, according to needs, thereby allowing accurate calibration of the speed characteristics of the drive mechanism and/or compensating variations due to, e.g., aging of the spring itself or other mechanical components of the drive mechanism and/or of the switch. In particular, the adjusting means 46 are preferably positioned so as to cooperate with said first plate element 23 of said operating shaft 2. In practice, according to this embodiment, the adjusting means 46 allow to rotate the first lever 40 (onto which the first ends, 411 and 412, of the first and second spiral springs, 41 and 42, are fixed) with respect to the disk 22 of the operating shaft 2, thereby changing the pre-load of the spiral springs 41, 42 and consequently also their speed characteristics.

[0029] As an example, said adjusting means 40 can comprise a hole, preferably a threaded hole, positioned on the distal end portion 45 of said first lever 43 and screw means 48 inserted in said hole and abutting against the first plate element 23 of said operating shaft 2. Thus, by rotating the screw 48, the second lever 42 can be rotated to a more or less great extent with respect to the operating shaft 2, consequently changing the pre-load applied to the spiral springs 41 and 42.

[0030] Preferably, the power shaft 3 comprises a second subassembly 31 comprising a second, L shaped, lever 32 having a flat base 33 rotationally mounted along said first longitudinal axis perpendicularly thereto; a second plate element 34 protrudes perpendicularly from said flat base 33 in the direction of the head 20 of said operating shaft 2.

[0031] In practice, the first 23 and second 34 plate elements protrude respectively from the disk 22 and the flat base 33 along parallel directions. Also, said second plate element 34 is positioned at a distance from said first longitudinal axis which is greater than the distance of said first plate element 23 from said first longitudinal axis; in other words, the length of the flat base 33 is greater than the diameter of the disk 22. Preferably, as shown in figure 4, the length of the second plate element 34 is greater than the length of said first plate element 23.

[0032] As shown in the attached figures, the preferably the second plate element 34 is operatively couplable with

the second ends, 412 and 422, of said first and second spiral springs, 41 and 42.

[0033] Preferably, the second subassembly 31 of the power shaft 3 further comprises a main body 35 having a first side 36 which is fixed to the flat base 33 of said second, L shaped, lever 32. Said main body 35 has a second side, e.g. parallel and opposite to said first side 36, onto which said first 51 and second 52 latching arm are positioned.

[0034] With reference to figure 2 and 5-8, according to a preferred embodiment of the drive mechanism 1 of the invention, said latching means 5 comprises a first 53 and a second 54 latching pawls slidingly mounted on a third plate 13; the first 53 and second 54 sliding latching pawls are movable between a latching position and a released position and are operatively associable respectively with said first 51 and second 52 latching arm.

[0035] Also, according to a particularly preferred embodiment of the drive mechanism 1 of the invention, said first 61 and second 62 release means comprise a first 610 and a second 620 release buttons positioned on the front of said drive mechanism 1.

[0036] In details, the functioning will be explained with reference to figures 5-8, showing a preferred embodiment of the invention..

[0037] With reference to figure said figures, said first 53 and second 54 latching sliding pawl are slidingly mounted in a corresponding groove, 530 and 540, in a third plate 13, positioned in between said base 10 and front 11 plates.

[0038] Figure 5 shows an operating situation in which the first and second spiral springs, 41 and 42, are loaded and the power shaft 3 is kept by the latching means 5 in a position corresponding to the open position of the contacts of an associated switch.

[0039] According to this embodiment, in such a situation, the first sliding pawl 53 is kept in a first latching position by a first latching lever 55, in which first latching position the first latching sliding pawl 53 abuts against said first latching arm 51.

[0040] With reference to figure 6, when said first latching lever 55 is released, the first latching sliding pawl 53 slides in the groove 530 and is moved in a first releasing position, in which first releasing position the power shaft 3 is free to rotate in a first direction, in the present case counterclockwise with respect to a rear view of the drive mechanism 1.

[0041] The power arm 3 rotates transmitting motion and energy to the contact system of the associated switch till the position of figure 7 is reached. In such a position, the power shaft 3 is kept by the latching means 5 in a position corresponding to a situation of closed contacts in the associated switch, one of the two spiral springs is release while the other one is still loaded.

[0042] In the position of figure 7, the second latching sliding pawl 54 is kept in a second latching position by a second latching lever, which is not shown since hidden by the third plate 13, but which is similar to the first latch-

ing lever 55. As shown in figure 7, in said second latching position, the second latching sliding pawl 54 abuts against said second latching arm 52 mounted on the power shaft 3.

[0043] As shown in figure 8, when said second latching lever is released, the second latching sliding pawl 54 slides in the groove 540 and is moved in a second releasing position, in which second releasing position the power shaft 3 is free to rotate in a second direction which is opposite to said first direction, in the present case clockwise with respect to a rear view of the drive mechanism 1.

[0044] The power arm 3 thus rotates, transmitting motion and energy to the contact system of the associated switch till it reaches a position corresponding to the its position of figure 7. In such a position, the power shaft 3 is in a position corresponding to a situation of open contacts in the associated switch, both spiral springs 41 and 42 being released.

[0045] Preferably, the latching means 5 comprises a first 57 and a second locking means for respectively locking said first 55 and second latching levers. The second locking means are not shown since hidden by the third plate 13, but they are similar to the first locking means 57.

[0046] The first locking means 57 can be for example consist of a rotating pin having a first position (fig. 5) in which it interferes with the first latching lever 55 blocking it, and a second position (fig. 6) in which first latching lever 55 is released. Similar set-up is possible also for the second locking means and the second latching lever.

[0047] The first 57 and second locking means are conveniently actuated by said first 610 and a second 620 release buttons. A lever system, comprises, levers 630, 640, and 650 can be foreseen for connecting the release button 620 with the associated second locking means. Also, return springs 550 and 540 can also be foreseen to help the return into position of the first 55 and second latching levers.

[0048] In a particularly preferred embodiment of the drive mechanism 1 according to the invention, a second operating shaft 9 is also present. The second operating shaft 9 is preferably mounted on a second longitudinal axis parallel to said first longitudinal axis and can be advantageously used to carry out the earthing operation of the switch acting on a shaft which is independent from the first (main) operating shaft 2 which is used for the opening and closing operation.

[0049] As it can be seen from the above description, the drive mechanism 1 for a Medium Voltage switch, in particular for a Medium Voltage fuse switch, of the present invention has a number of advantages with respect to the Medium Voltage switches equipped with conventional drive mechanisms.

[0050] In particular, the opening/closing operation can be easily actuated by acting on the release buttons 610 and 620.

[0051] Also, the presence of the adjusting means 46 does not require an excessively accurate dimensioning

and pre-testing of the spiral springs 41 and 42, since the speed characteristics of the springs can be calibrated and fine-tuned after assembling. Moreover, the adjusting means 46 allow adjusting the speed characteristics of the spiral springs 41 and 42, in case of variation over the time of the characteristics of the spring itself and/or of the associated mechanical components.

[0052] It is worth noting that the above mentioned functionalities (i.e., releasing means and adjusting means) can be implemented in a relatively easy manner, with a reduced number of components of relatively simple structure. Thus, the drive mechanism of the invention is also effective from an economical standpoint.

[0053] In general, the structure of the drive mechanism of the invention is very compact and can be adapted, with only a few modification, to a number of different Medium Voltage applications.

[0054] The drive mechanism for a Medium Voltage fuse switch of the invention can also comprise further components and functionalities that have not been described in details as they can be of conventional kind.

[0055] The drive mechanism for a Medium Voltage fuse switch thus conceived may undergo numerous modifications and come in several variants, all coming within the scope of the inventive concept. Moreover, all the component parts described herein may be substituted by other, technically equivalent elements. In practice, the component materials and dimensions of the device may be of any nature, according to need and the state of the art.

Claims

1. A drive mechanism (1) for a Medium Voltage fuse switch **characterized in that** it comprises:

- a base plate (10) and a front plate (11) defining an internal space housing an operating shaft (2) and a power shaft (3), coaxially mounted along a first longitudinal axis, the power shaft (3) being operatively connectable to a kinematic chain of a Medium Voltage fuse switch for opening/closing operation of said switch, the operating shaft (2) having a head (20) connectable to an operating handle for manual actuation of said operating shaft (2);
- a spring assembly (4) which comprises a first (41) and a second (42) spiral springs having a first end (411, 421) operatively coupled to said operating shaft (2), said spiral springs (41, 42) being loaded by rotation of said operating shaft (2) and actuating said power shaft (3) when released, the first spiral spring (41) determining a rotation of said power shaft (3) in an opposite direction with respect to the rotation determined by said second spiral spring (42);
- latching means (5) for latching said power shaft (3) comprising a first (51) and a second (52)

- latching arm positioned on said power shaft (3);
- first (61) and second (62) release means for unlatching said power shaft (3) and allowing rotation thereof, the first release means (61) allowing a rotation of said power shaft (3) in an opposite direction with respect to said second release means (62).
2. The drive mechanism (1) according to claim 1, **characterized in that** said operating shaft (2) comprises a first subassembly (21) comprising a disk (22) perpendicularly mounted with respect to said first longitudinal axis and further comprising a first plate element (23) protruding perpendicularly from the edge of said disk (22) in the direction of the head (20) of said operating shaft (2).
 3. The drive mechanism (1) according to claim 2, **characterized in that** said spring assembly (4) comprises a first lever (43) having a base element (44) coaxially mounted on the first subassembly (21) of said operating shaft (2) and a distal end (45) protruding from the edge of said disk (22), said base element (44) being provided with fixing means (441) for the first ends (411, 421) of said first and second spiral springs (41, 42), said distal end (45) being operatively coupled with said first plate element (23) of said first subassembly (21).
 4. The drive mechanism (1) according to claim 3, **characterized in that** said fixing means (441) comprises a groove in which said first ends (411, 412) of said first and second spiral springs (41, 42) are secured, and further **characterized in that** said distal end (45) of said first lever (43) comprises adjusting means (46) operatively coupled to said first plate element (23) for adjusting the preload of said first (41) and second (42) spiral springs.
 5. The drive mechanism (1) according to one or more of the preceding claims, **characterized in that** said power shaft (3) comprises a second subassembly (31) comprising a second, L shaped, lever (32) having a flat base (33) rotationally mounted along said first longitudinal axis perpendicularly thereto, and a second plate element (34) perpendicularly protruding from said flat base (33) in the direction of the head (20) of said operating shaft (2), the second subassembly (31) further comprising a main body (35) having a first side (36) fixed to the flat base (33) of said second, L shaped, lever (32) and a second side onto which said first (51) and second (52) latching arm are positioned.
 6. The drive mechanism (1) according to claim 5, **characterized in that** said second plate element (34) is operatively couplable with the second ends (412, 422) of said first and second spiral springs (41, 42).
 7. The drive mechanism (1) according to one or more of the preceding claims, **characterized in that** said latching means (5) comprises a first (53) and a second (54) latching sliding pawl slidably mounted on a third plate (13) and movable between a latching position and a released position and operatively associable with said first (51) and second (52) latching arm.
 8. The drive mechanism (1) according to claim 7, **characterized in that** said first (53) and second (54) latching sliding pawl are slidably mounted in a corresponding groove (530, 540) in said third plate (13), the first sliding pawl (53) being kept in a first latching position by a first latching lever (55), in which first latching position said first latching sliding pawl (53) abuts against said first latching arm (51), said first latching sliding pawl (53) being moved in a first releasing position when said first latching lever (55) is released, in which first releasing position the power shaft (3) is free to rotate in a first direction, the second latching sliding pawl (54) being kept in a second latching position by a second latching lever, in which second latching position said second latching sliding pawl (54) abuts against said second latching arm (52), said second latching sliding pawl (54) being moved in a second releasing position when said second latching lever is released, in which second releasing position the power shaft (3) is free to rotate in a second direction opposite to said first direction.
 9. The drive mechanism (1) according to claim 8, **characterized in that** said latching means (5) comprises a first (57) and a second locking means for respectively locking said first (55) and second (56) latching levers.
 10. The drive mechanism (1) according to one or more of the preceding claims, **characterized in that** said first (61) and second (62) release means comprise a first (610) and a second (620) release buttons positioned on the front of said drive mechanism (1).
 11. The drive mechanism (1) according to claims 9 and 10, **characterized in that** said first (610) and a second (620) release buttons respectively act on said first (57) and second locking means.
 12. A Medium Voltage fuse switch **characterized in that** it comprises a drive mechanism (1) according to one or more of the preceding claims.

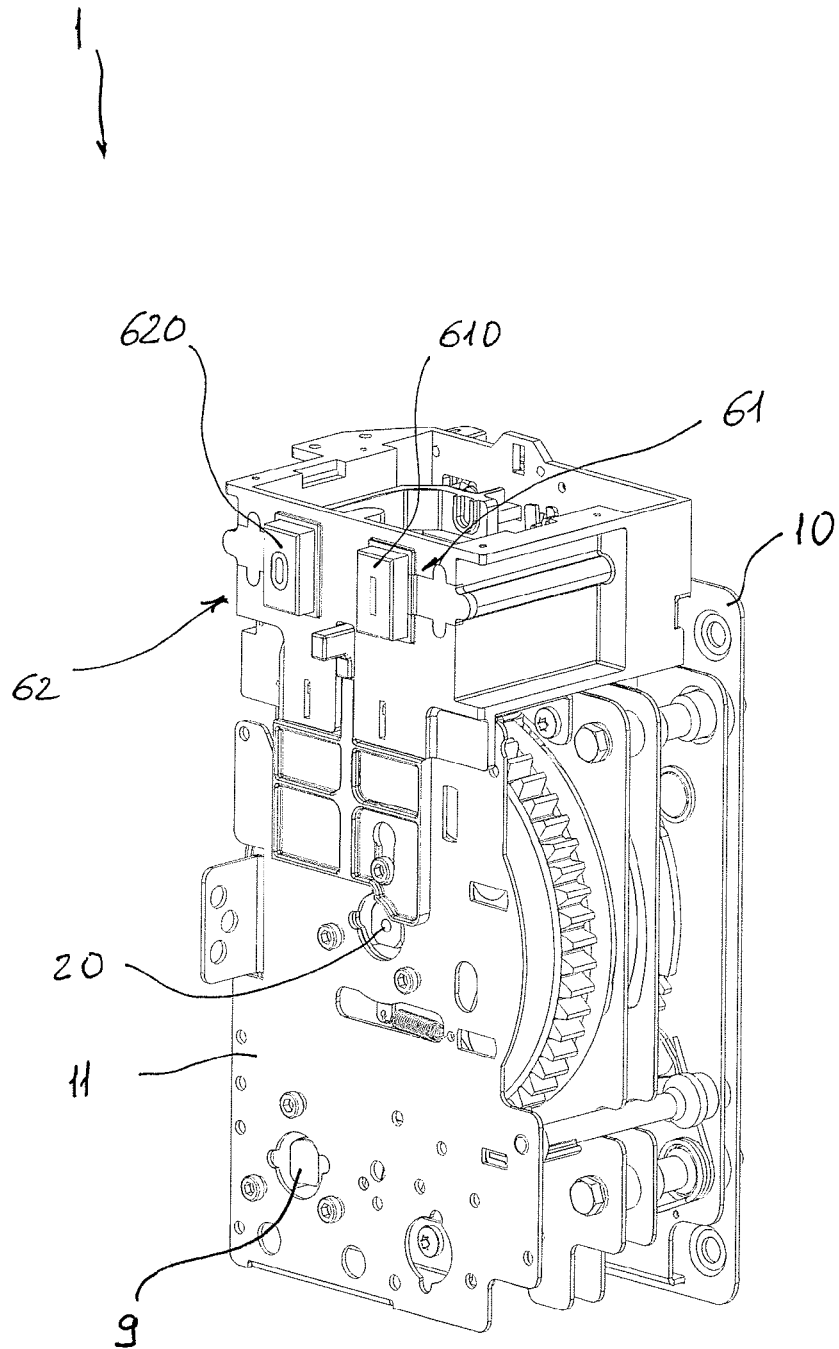


Fig. 1

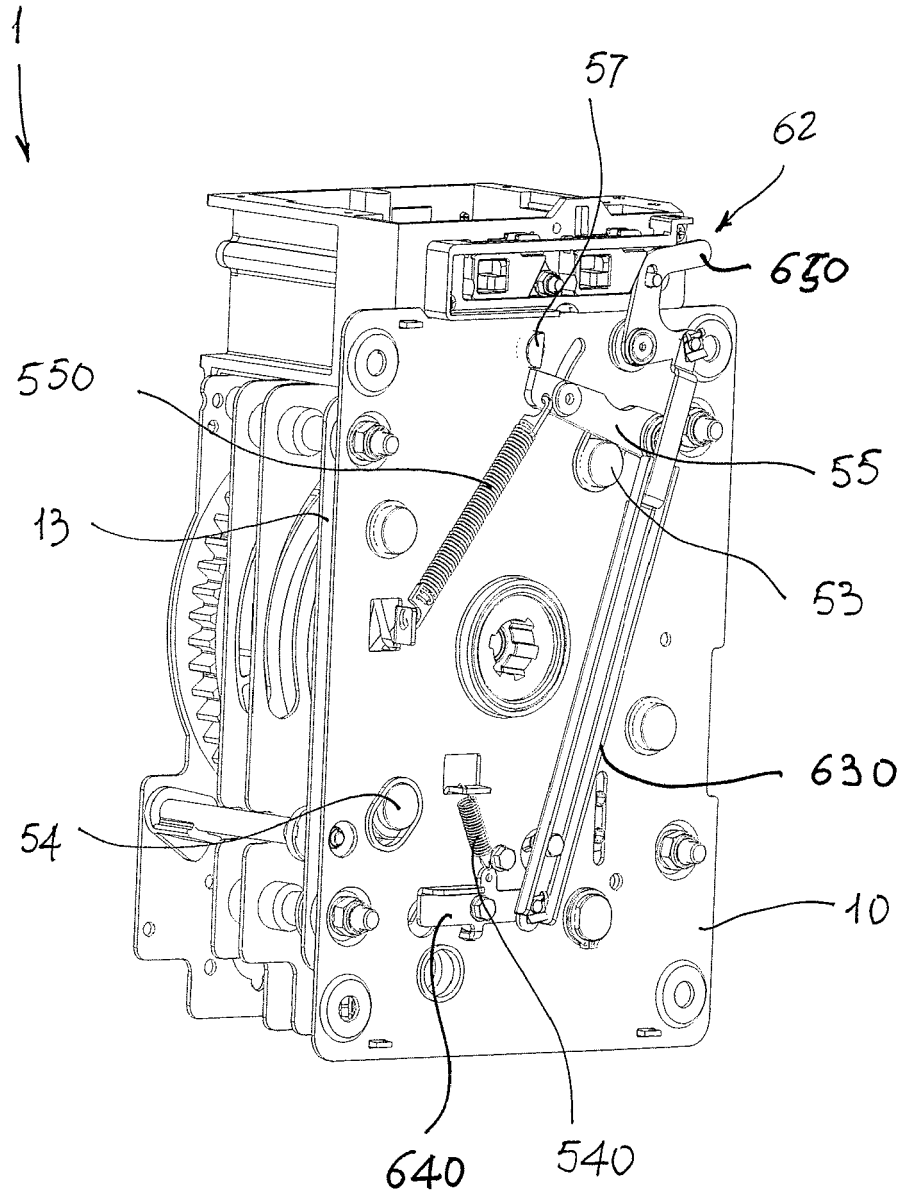


Fig. 2

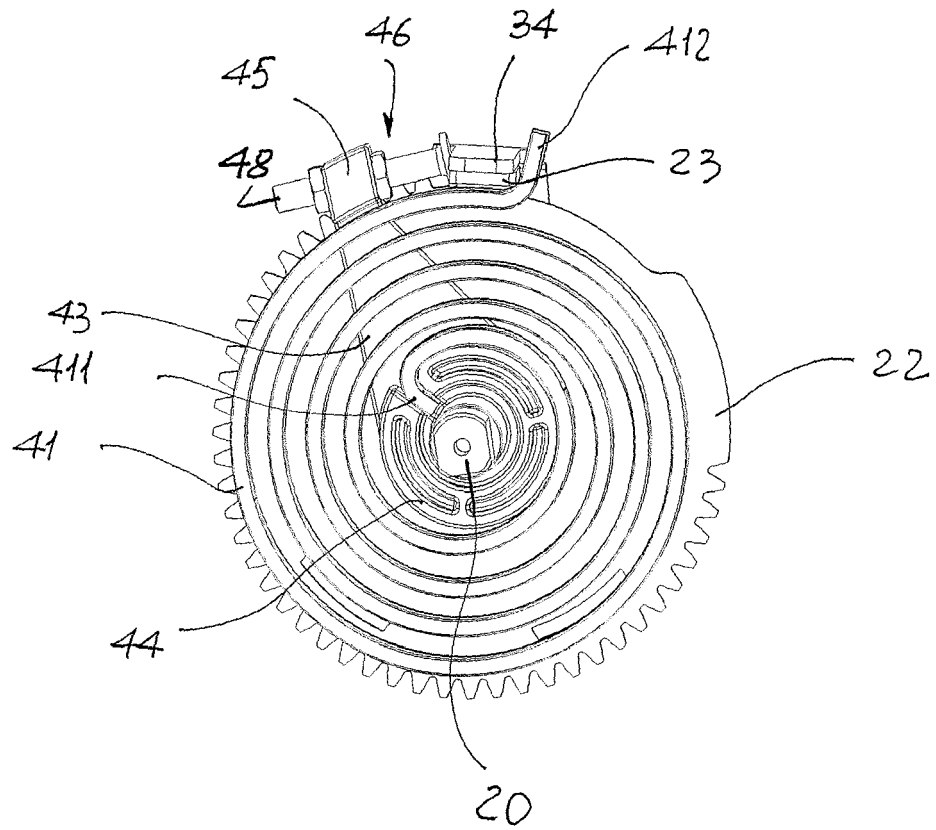


Fig. 3

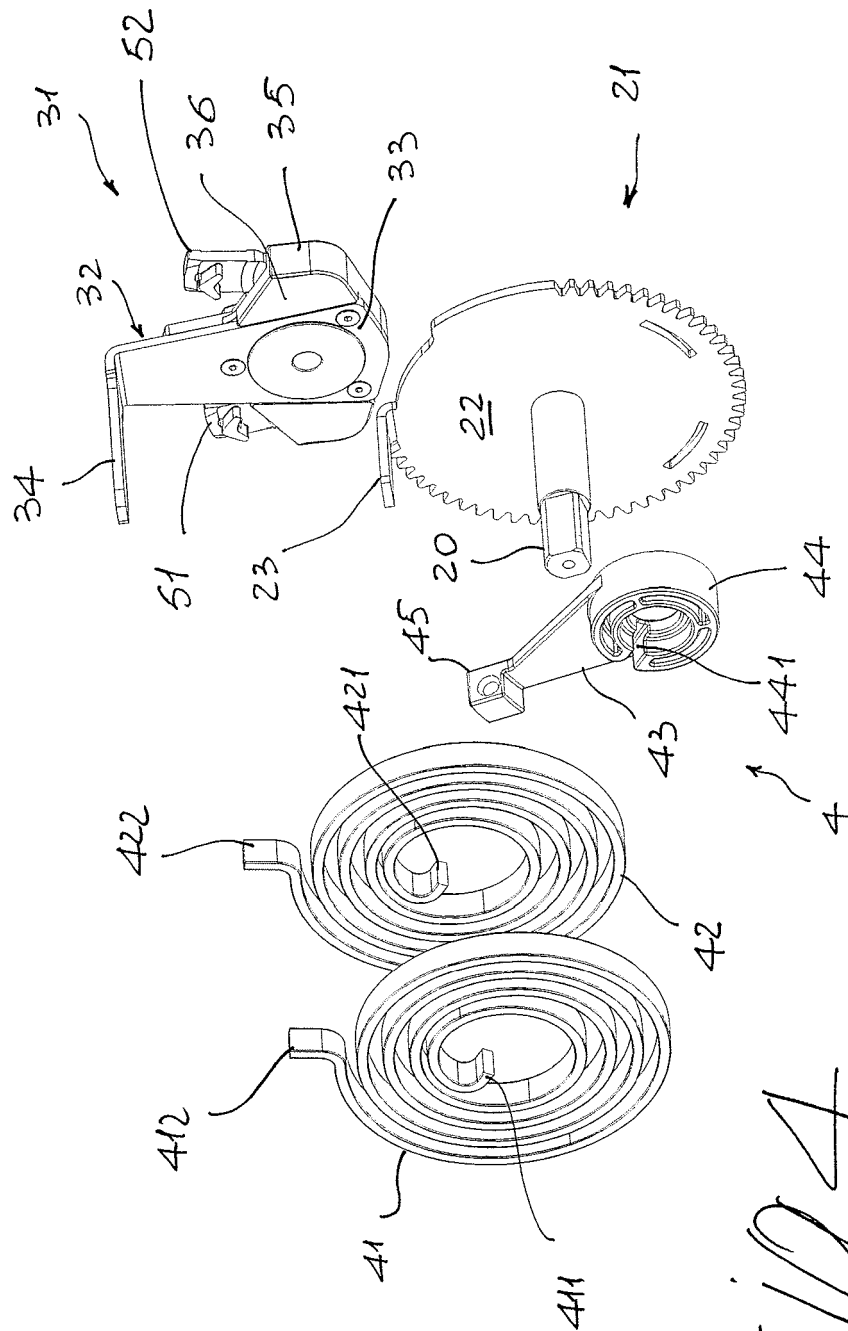


Fig. 4

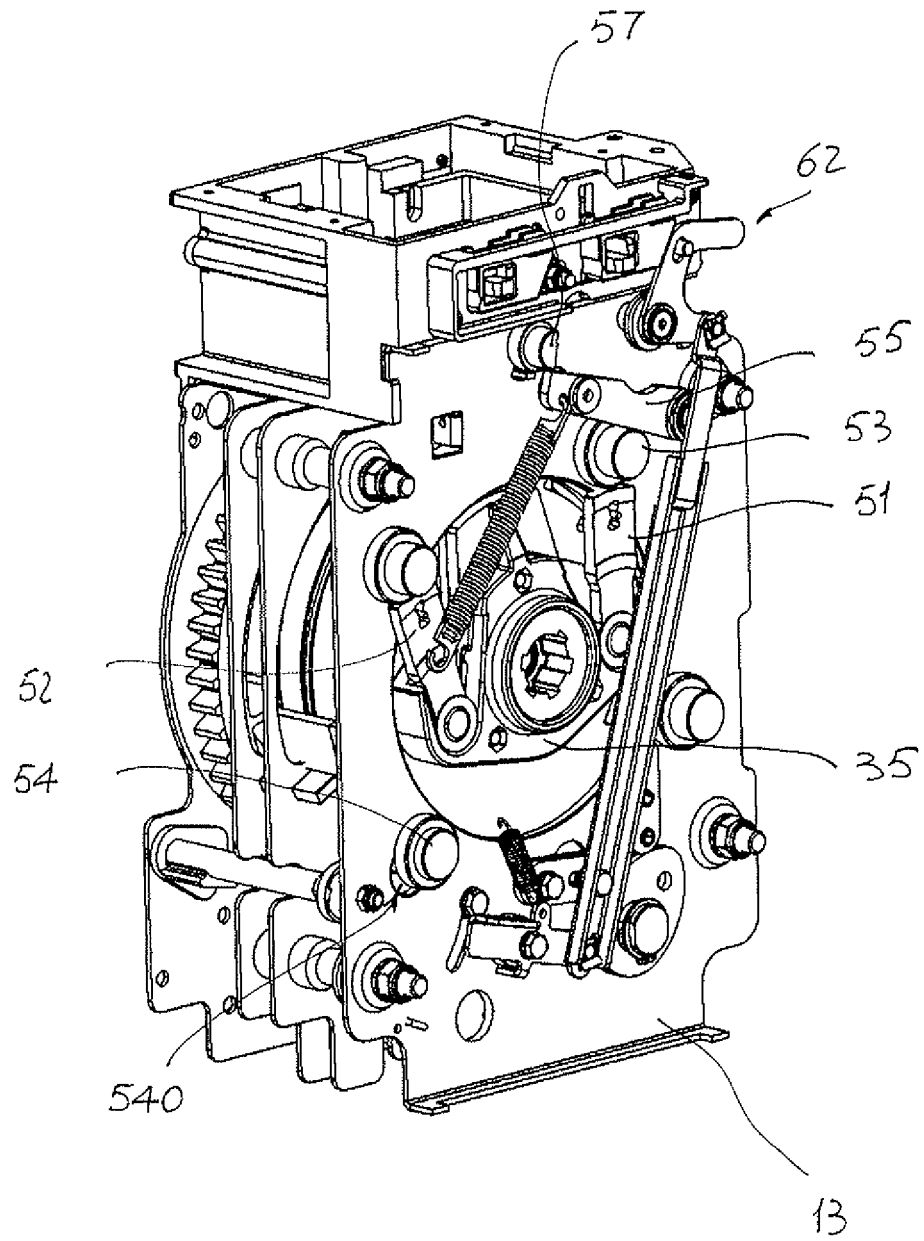


Fig. 5

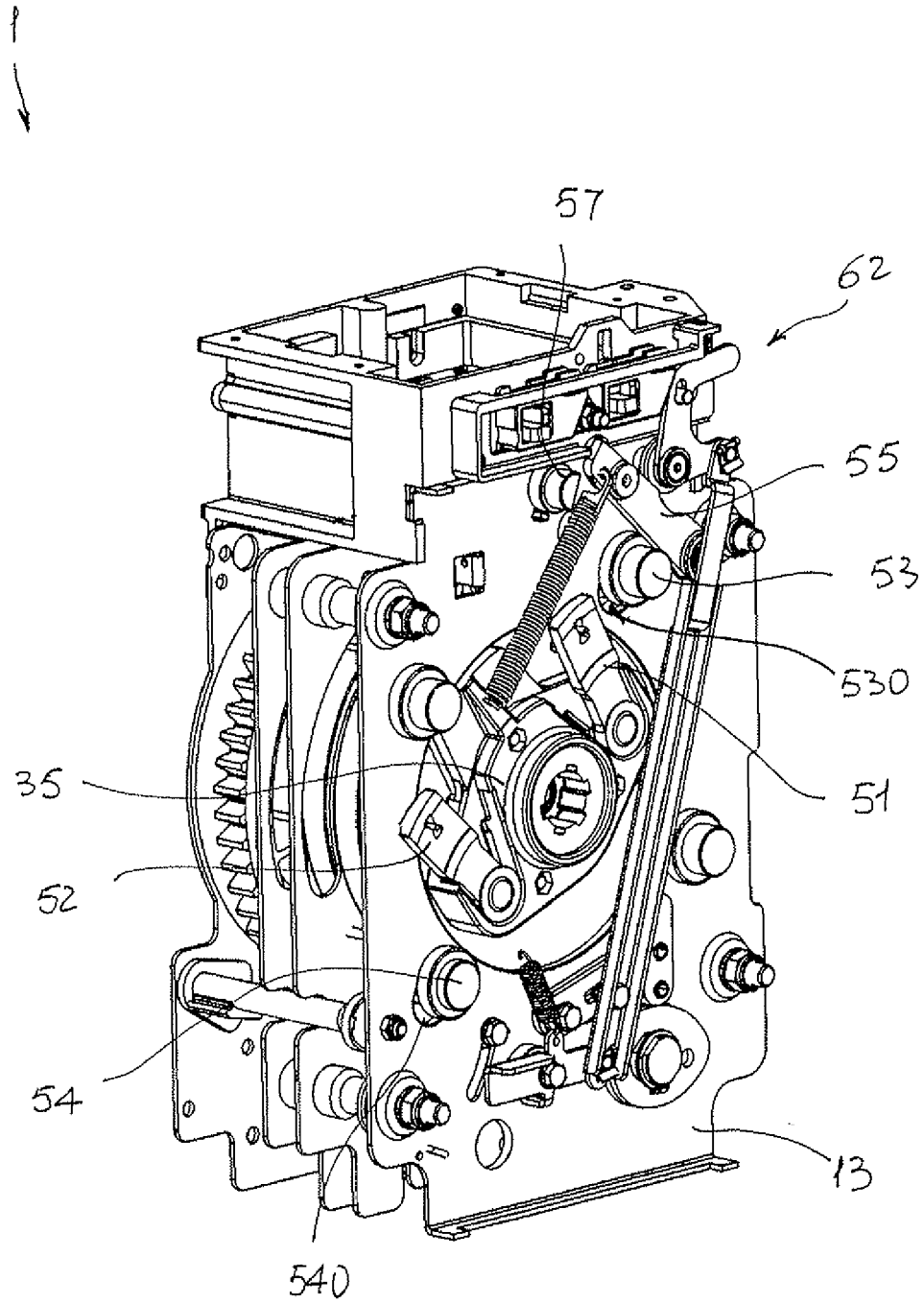


Fig. 6

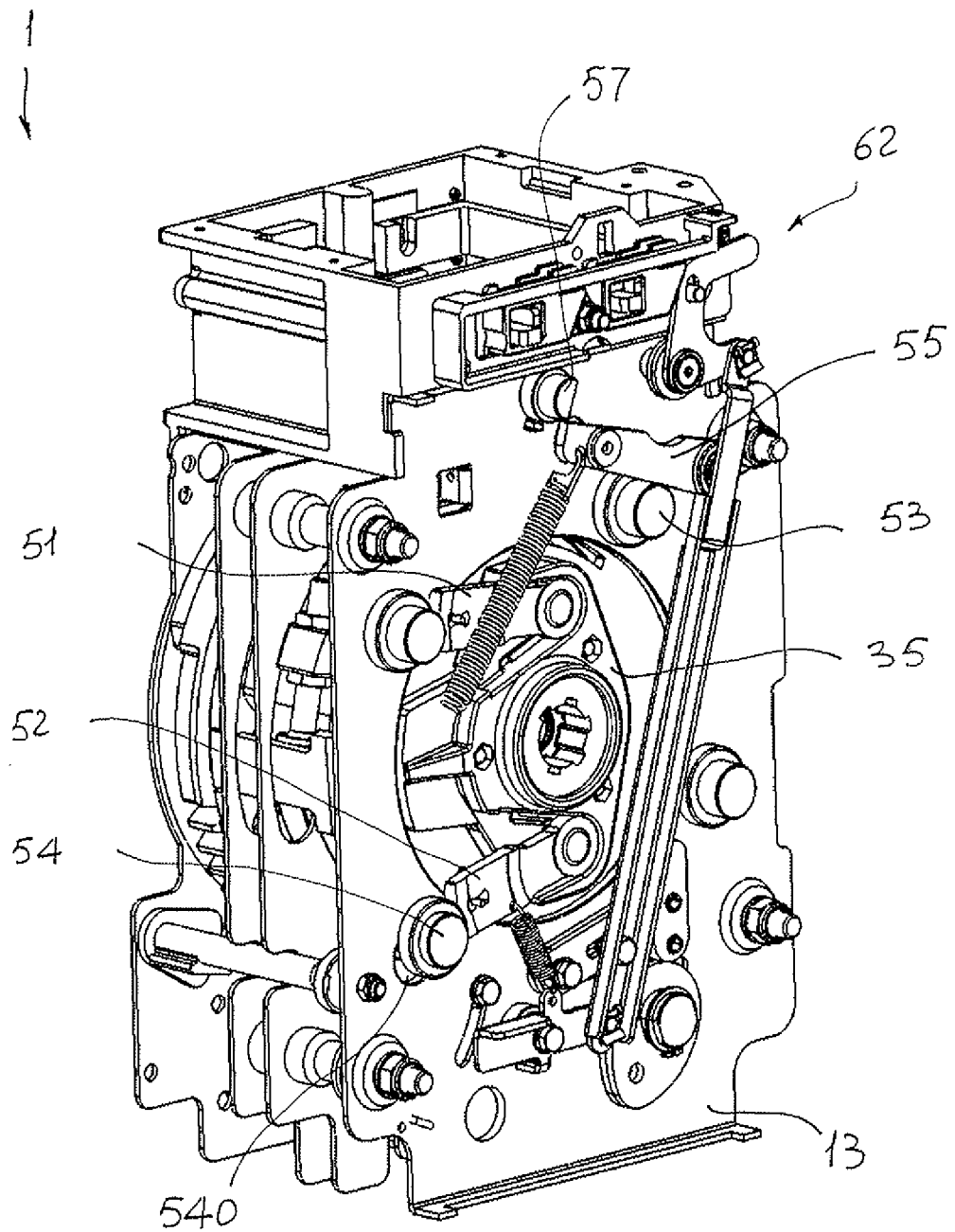


Fig. 7

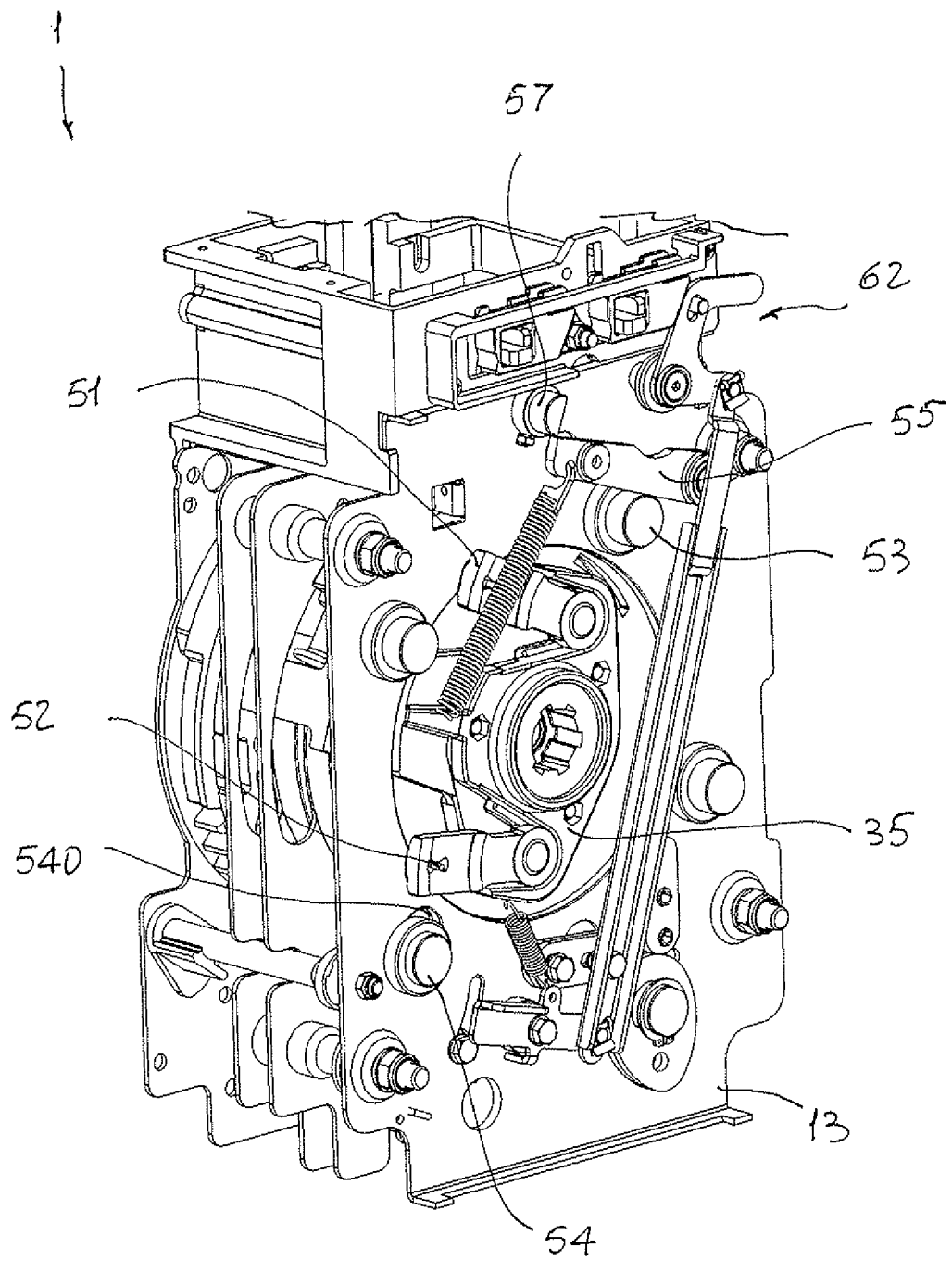


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 9345

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	US 4 683 357 A (OPFER JOHN C [US]) 28 July 1987 (1987-07-28)	1,12	INV. H01H3/30
A	* column 4, line 33 - column 6, line 19; figures 1,7,8 *	2-11	
A	----- US 4 578 551 A (LIN CHESTER H [US]) 25 March 1986 (1986-03-25) * abstract; figure 1 * -----	1-12	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) H01H
Place of search Munich		Date of completion of the search 10 September 2009	Examiner Simonini, Stefano
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 15 9345

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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10-09-2009

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 4683357	A	28-07-1987	CA	1276960 C	27-11-1990

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