(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 404 680 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.11.2018 Bulletin 2018/47

(51) Int Cl.:
H01H 9/28 *(2006.01)* ***H01H 13/04*** *(2006.01)*

(21) Application number: **17171414.0**

(22) Date of filing: **16.05.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **DAV**
94046 Créteil Cedex (FR)

(72) Inventor: **LICKO, Lubos**
94046 Créteil CEDEX (SK)

(74) Representative: **Delplanque, Arnaud**
VALEO Comfort and Driving Assistance
76, rue Auguste Perret
Z.I. Europarc
94046 Créteil Cedex (FR)

(54) **A KNOB ASSEMBLY COMPRISING A SUB-ASSEMBLY AND A KNOB**

(57) A knob assembly (1) comprising a sub-assembly (2) and a knob (3), said sub-assembly (2) comprising:
- a housing (10),
- an arm (20) rotationally connected to the housing (10) such that the arm (20) rotates around a first rotational axis (A),
- a cover (30) defining a first space, said cover (30) being connected to the arm (20) such that the cover (30) rotates around a second rotational axis (B) parallel to said first rotational axis (A),
- guiding means (40) defining a relative movement between the cover (30) and the housing (10) such that, the cover (30) comes from a lock position, in which the knob (3) is accommodated in the first space and is inaccessible, to an unlock position, in which said knob (3) is accessible, through a combined movement around said first and second rotational axis.

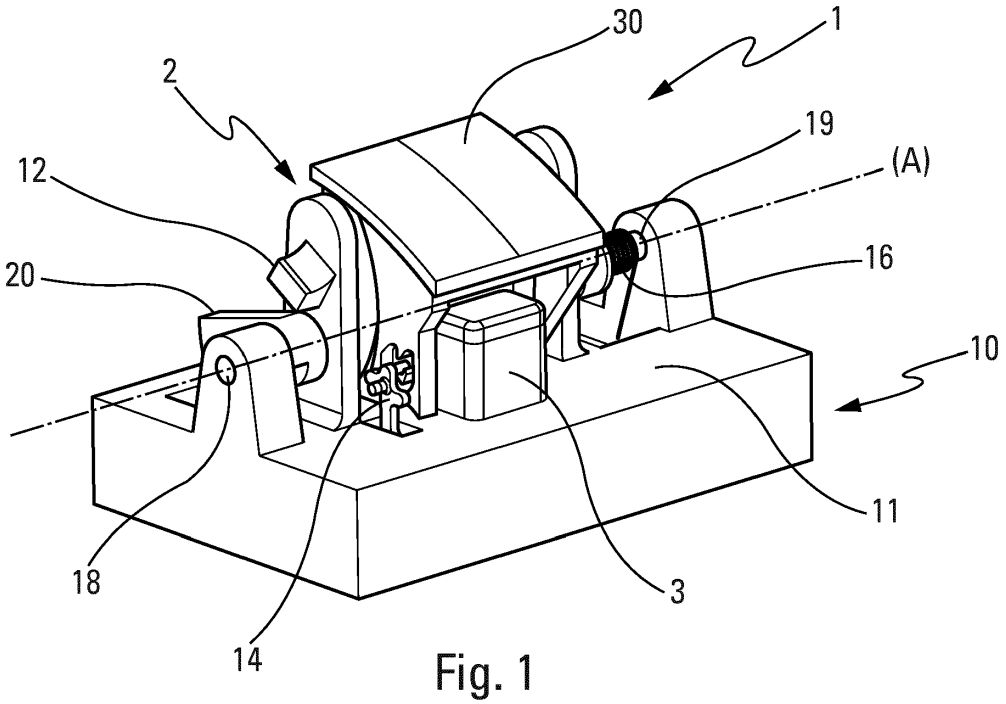


Fig. 1

EP 3 404 680 A1

Description

Field of the invention

[0001] The present invention relates to a knob's cover, for automotive, more particularly for emergency knob and the like.

Description of the related art

[0002] Automatic Emergency Call (eCall) is a system giving an automatic message to an emergency call center in case of a crash of the vehicle. Legislation for this technology has been adopted by the European Commission and will be mandatory in all new cars sold within EU after April 2018.

[0003] Usually when a car is involved in a crash either the driver when he or she is still capable or a passenger or bystander has to call the emergency call center through the 112 number, or any equivalent number like 911 in the United States of America, to report the accident and to report the location of the crashed vehicle. In case of a serious crash in a remote area, valuable time may go by before the crash is reported. Also by standers or passengers may have difficulty in reporting the exact location of the crashed vehicle.

[0004] The eCall system installed in the vehicle can overcomes these problems by sending an automatic message in a standardized format, containing the location of the vehicle on the basis of an in-built GPS location device. The message will go to the 'Public Safety Answering Point' (fire brigade, police or ambulance call center), where a decision is made on the appropriate response to the alert. As time is of the essence in this kind of situation, this process will save valuable time.

[0005] A knob has to be dedicated to this emergency call system. These knobs, or SOS knobs, are usually positioned on a roof module. As the use of this knob leads to an emergency call, it is important that said knob is not actioned inadvertently or by mistake.

[0006] Known SOS knobs are simple push knobs positioned on the dashboard of the vehicle. Such push knobs can easily be pressed by mistake by the driver or a passenger.

[0007] In order to protect these knobs from unintentional actuation, other SOS knob assemblies are known in which a cover protects the knob and blocks its access when said cover is in a locking position. In said assemblies, the cover is opened by a single rotation around bearing in housing.

[0008] The disadvantage of this solution is the location of the bearing, which must have a quite long distance to SOS knob in order to avoid collisions during the opening movement. Such assemblies are too big for some dome roof modules and are not suitable to use in every customer packages.

Summary of the invention

[0009] Consequently, the invention aims to solve the technical problem of providing a knob assembly for covering a knob that will have a reduced size in order to respect the requirements and to be usable in every customer packages.

[0010] Accordingly, the invention relates to a knob assembly comprising a sub-assembly and a knob, said sub-assembly comprising:

- a housing,
- an arm rotationally connected to the housing such that the arm rotates around a first rotational axis (A),
- a cover defining a first space, said cover being connected to the arm such that the cover rotates around a second rotational axis (B) parallel to said first rotational axis (A),
- guiding means defining a relative movement between the cover and the housing such that, the cover comes from a lock position, in which the knob is accommodated in the first space and is inaccessible, to an unlock position, in which said knob is accessible, through a combined movement around said first and second rotational axis.

[0011] In such knob assembly, thanks to the combined movement around the two rotational axis, the volume required for the cover to come from the lock position to the unlock position is reduced. Such knob assembly respects the size requirements. Furthermore, the passage from the lock position to the unlock position is simple, quick and do not need a complex action of the user. This simplicity and speed of use is important as the knob assembly is meant to be used in case of emergency.

[0012] The invention can also comprise any of the following features taken individually or in any technically possible combination:

- the guiding means comprise a guiding pin provided on one of the housing or the cover,
- the guiding means comprise a guiding groove provided in the other of the housing or the cover,
- the guiding pin is housed in the guiding groove,
- the pin is provided on the housing,
- the groove is provided on the cover,
- the movement of the cover between the lock and the unlock position is defined by the shape of its guiding groove and the position of the guiding pin,
- the housing comprises at least one stop arm that stops the rotational movement of the arm around said first rotational axis when the cover is in the unlock position,
- the angular stroke of the arm between the lock position and the unlock position is comprised between 30° and 60°,
- the guiding means are configured so that a manual compression of the cover in a first direction triggers

said relative movement,

- the housing comprises a locking member that locks the cover in the lock position and unlocks said cover after said manual compression of the cover in the first direction,
- the cover is driven from the lock position to the unlock position by a force transmitted by a spring,
- the groove is opened on distal end to let the pin being introduced in the groove when assembling the knob assembly,
- the cover comprises at least one lower wall in the vicinity of said groove distal end to avoid disengagement of said pin,
- the cover has a U shape,
- the cover comprises an actuation zone on its top,
- the cover comprises lateral sides on which is disposed the groove,
- the first space defined by the cover is located between the actuation zone and the lateral sides of the cover,
- the groove is curved,
- in said lock position the groove extends along a longitudinal axis (C) oriented perpendicularly to a housing base,
- the housing comprises two first shafts in which are disposed projections of said arm and forming said first rotational axis (A),
- the arm comprises two second shafts in which are disposed projections of said cover and forming said second rotational axis (B),
- the cover comprises two grooves, one on each of its lateral side,
- the housing comprises two pins housed in said guiding grooves,
- the knob is a push knob,
- the push knob is inaccessible for actuation when the cover is in the lock position and accessible for actuation when the cover is in the unlock position,
- the push knob is an SOS knob.

[0013] The invention also relates to a roof module integrating the knob assembly described above.

[0014] The invention will be better understood on the light of the following description which is only indicative and which is not intended to limit said invention, accompanied with the following figures:

- Figure 1 is a perspective view of a knob assembly according to an embodiment of the invention, wherein the cover is in lock position,
- Figure 2 is a sectional side view of a knob assembly according to the same embodiment of the invention, wherein the cover is in lock position,
- Figure 3 is another perspective view of a knob assembly according to said embodiment of the invention, wherein the cover is in lock position,
- Figure 4 is a sectional view of a knob assembly according to the same embodiment of the invention, wherein the cover is in unlock position,
- Figure 5 is a perspective view of a knob assembly according to the same embodiment of the invention, wherein the cover is in unlock position.

Detailed description

[0015] As illustrated on figure 1 to 5, the invention relates to a knob assembly 1 comprising a sub-assembly 2 and a knob 3, said sub-assembly 2 comprising a housing 10, an arm 20, a cover 30 and guiding means 40.

[0016] The arm 20 is connected to the housing 10 such that the arm 20 rotates around a first rotational axis (A).

[0017] The cover 30 defines a first space that can accommodate a knob 3. The cover 30 is rotationally connected to the arm 20 such that the cover 30 rotates around a second rotational axis (B) parallel to said first rotational axis (A).

[0018] The guiding means 40 define a relative movement between the cover 30 and the housing 10. Here, a manual compression of the cover 30 in a first direction causes the cover 30 to come from a lock position, in which the knob 3 is accommodated in the first space and is inaccessible, to an unlock position, in which said knob is accessible, through a combined movement around said first and second rotational axis.

[0019] By accessible it is meant that a user can access to the knob 3 with his finger.

[0020] The guiding means 40 comprise a guiding pin 42 provided on one of the housing 10 or the cover 30 and a guiding groove 44 provided in the other of the housing 10 or the cover 30, the guiding pin 42 being housed in the guiding groove 44.

[0021] According to a preferred embodiment illustrated in figures 1 to 5, the pin 42 is provided on the housing 10 and the groove 44 is provided on the cover 30.

[0022] The housing 10 comprises advantageously at least one stop arm 12 that stops the rotational movement of the arm 20 around said first rotational axis (A) when the cover 30 is in the unlock position. By stopping the movement of the arm 20, the stop arm 12 allows to stop the movement of the cover 30 in the unlock position.

[0023] Advantageously, the stop arm 12 is placed on the housing 10 such that the angular stroke of the arm 20 between the lock position and the unlock position is comprised between 30° and 60°.

[0024] When the cover 30 is in the lock position, it can be maintained in this position by one or more locking means. Advantageously, the housing 10 comprises a locking member 14 that locks the cover 30 in the lock position. Such locking member 14 unlocks the cover 30 after said manual compression of the cover in the first direction.

[0025] Said locking means comprises here a cam 15 connected to the housing 10 and a slot 17 provided in said cover 30. Said cam 15 is locked in said slot 17 in said lock position. When the cover 30 is actuated in said first direction, said cam 15 is guided by a configured

shape given to edges of said slot 17 and the cover 30 is then unlocked.

[0026] Once the cover 30 is unlocked, it is driven from the lock position to the unlock position by a force that may be transmitted by a spring 16.

[0027] The groove 44 may be open on distal end to let the pin 42 being introduced in the groove when assembling the knob assembly.

[0028] As schematically illustrated in figures 2 and 4, the guiding groove 44 may comprise at least one lower wall 32 in the vicinity of said groove distal end to avoid disengagement of said pin 42.

[0029] Said pin 42 is here at an end of said groove 44 in said lock position and at another end of said groove 44 in said unlock position.

[0030] According to a preferred embodiment illustrated in figure 1 to 5, the cover has a U shape. It comprises an actuation zone on its top and has lateral sides on which is disposed the groove 44 and/or the slot 17. The first space defined by the cover 30 is located between the actuation zone and the lateral sides of the cover 30.

[0031] Advantageously, the cover 30 may comprises two symmetrical grooves 44, 45, one on each of its lateral side, and the housing may comprises two symmetrical pins 42, 43 housed in said guiding grooves 44, 45.

[0032] When the cover is in the lock position the groove extends sensibly along a longitudinal axis (C) oriented perpendicularly to a housing base. The manual compression of the cover 30, causing the cover 30 to come from the lock position to the unlock position, is exerted along said longitudinal axis (C) in direction of a base 11 of the housing 10.

[0033] The movement of the manual compression of the cover 30 is represented on figure 2 by an arrow parallel to said longitudinal axis (C).

[0034] As illustrated in figure 3, the housing may comprise two first shafts 18, 19 in which are disposed projections 22, 23 of said arm 20 and forming said first rotational axis (A).

[0035] The spring 16 may be a helical torsion spring disposed on said arm projection 22 and comprising a first end in abutment against the housing base 11 and another end in abutment against said arm 20.

[0036] The arm 20 may also comprise two second shafts 24, 25 in which are disposed projections 34, 35 of said cover 30 and forming said second rotational axis (B).

[0037] The knob assembly may also comprise a push knob 3. Said push knob 3 is disposed inside the first space defined by the cover 30 and is inaccessible for actuation when the cover 30 is in the lock position. The push knob 3 is accessible for actuation when the cover 30 is in the unlock position. The knob may be an SOS knob.

[0038] As explained before, a disadvantage of the known SOS knob assemblies with cover is the location of the bearing, which must have a quite long distance to SOS knob in order to avoid collisions during the opening movement.

[0039] The use of a combined movement around two rotational axis allows to reduce the space needed by the cover to come from the lock position to the unlock position.

[0040] The movement of the cover 30 between the lock and the unlock position is here defined by the shape of its guiding groove 44 and the position of the guiding pin 42.

[0041] In a preferred embodiment illustrated in figures 1 to 5, the groove is sensibly curved. Such curved guiding groove 30 allows a movement of the cover 30 which is not a simple rotation or a simple translation. Here, the cover 30 is first roughly moved perpendicularly to said housing base 11 in a first portion (O) of said movement and then shifted laterally in a second portion (P) of said movement. Said first (O) and second (P) portions of said movement correspond here roughly to a half of the movement of said pin 42 in said groove 44.

[0042] The stroke of the cover 30 needed to allow the access to the first space is reduced and the volume required for the cover to come from the lock position to the unlock position is reduced.

[0043] The actuation of said push knob 3 according the illustrated embodiments needs two actions from the user in order to be actuated. The first action is the manual compression of the cover 30 in a first direction in order to make the cover 30 coming from the lock position to the unlock position. After said manual compression, the push knob 3 is accessible for the user. More particularly, when the cover 30 is in the unlock position, a user can access to the knob with his finger.

[0044] The second action of the user needed to actuate the push knob 3 is the compression of the knob, for example with the user's finger.

[0045] The knob assembly according the invention allows protecting the knob 3 from being pressed inadvertently or by mistake by the driver or a passenger and still allows accessing the knob 3 by a simple and quick action from the user.

[0046] The invention also relates to a roof module integrating the knob assembly described above.

[0047] The invention has been described above with the aid of embodiments shown in the figures, without limitation of the general inventive concept.

[0048] Many other modifications and variations are suggested by those skilled in the art, after reflection on the various embodiments illustrated in this application. These embodiments are given by way of example and are not intended to limit the scope of the invention, which is determined exclusively by the claims below.

Claims

1. A knob assembly (1) comprising a sub-assembly (2) and a knob (3), said sub-assembly (2) comprising:

   - a housing (10),
   - an arm (20) rotationally connected to the hous-

ing (10) such that the arm (20) rotates around a first rotational axis (A),
- a cover (30) defining a first space, said cover (30) being connected to the arm (20) such that the cover (30) rotates around a second rotational axis (B) parallel to said first rotational axis (A),
- guiding means (40) defining a relative movement between the cover (30) and the housing (10) such that, the cover (30) comes from a lock position, in which the knob (3) is accommodated in the first space and is inaccessible, to an unlock position, in which said knob (3) is accessible, through a combined movement around said first and second rotational axis.

2. A knob assembly (1) according claim 1, wherein said guiding means (40) comprise a guiding pin (42) provided on one of the housing (10) or the cover (30) and a guiding groove (44) provided in the other of the housing (10) or the cover (30), the guiding pin (42) being housed in the guiding groove (42).

3. A knob assembly (1) according claim 2, wherein the pin (42) is provided on the housing (10) and the groove (44) is provided on the cover (30), the movement of the cover (30) between the lock and the unlock position being defined by the shape of its guiding groove (44) and the position of the guiding pin (42).

4. A knob assembly (1) according claim 3, wherein said groove (44) is open on distal end to let the pin (42) being introduced in the groove (44) when assembling the knob assembly.

5. A knob assembly (1) according claim 4, wherein the cover (30) comprises at least one lower wall (32) in the vicinity of said groove distal end to avoid disengagement of said pin (42).

6. A knob assembly (1) according claims 2 to 5, wherein said groove (44) is curved.

7. A knob assembly (1) according claims 2 to 6, wherein in said lock position the groove (44) extends along a longitudinal axis (C) oriented perpendicularly to a housing base.

8. A knob assembly (1) according any of the preceding claims, wherein the housing (10) comprises at least one stop arm (12) that stops the rotational movement of the arm (20) around said first rotational axis (A) when the cover (30) is in the unlock position.

9. A knob assembly (1) according any of the preceding claims, wherein the guiding means are configured so that a manual compression of the cover (30) in a first direction triggers said relative movement.

10. A knob assembly (1) according the preceding claim, wherein the housing (10) comprises a locking member (14) that locks the cover (30) in the lock position and unlocks said cover (30) after said manual compression of the cover (30) in the first direction.

11. A knob assembly (1) according any of the preceding claims, wherein the cover (30) is driven from the lock position to the unlock position by a force transmitted by a spring (16).

12. A knob assembly (1) according any of the preceding claims, wherein the housing (10) comprises two first shafts (18, 19) in which are disposed projections (22, 23) of said arm (20) and forming said first rotational axis (A).

13. A knob assembly (1) according any of the preceding claims, wherein the arm (20) comprises two second shafts (24, 25) in which are disposed projections (34, 35) of said cover (30) and forming said second rotational axis (B).

14. A knob assembly (1) according any of the preceding claims, wherein the knob (3) is a push knob (3), said push knob (3) being inaccessible for actuation when the cover (30) is in the lock position and accessible for actuation when the cover (30) is in the unlock position.

15. A knob assembly (1) according claim 14, wherein the push knob (3) is an SOS knob.

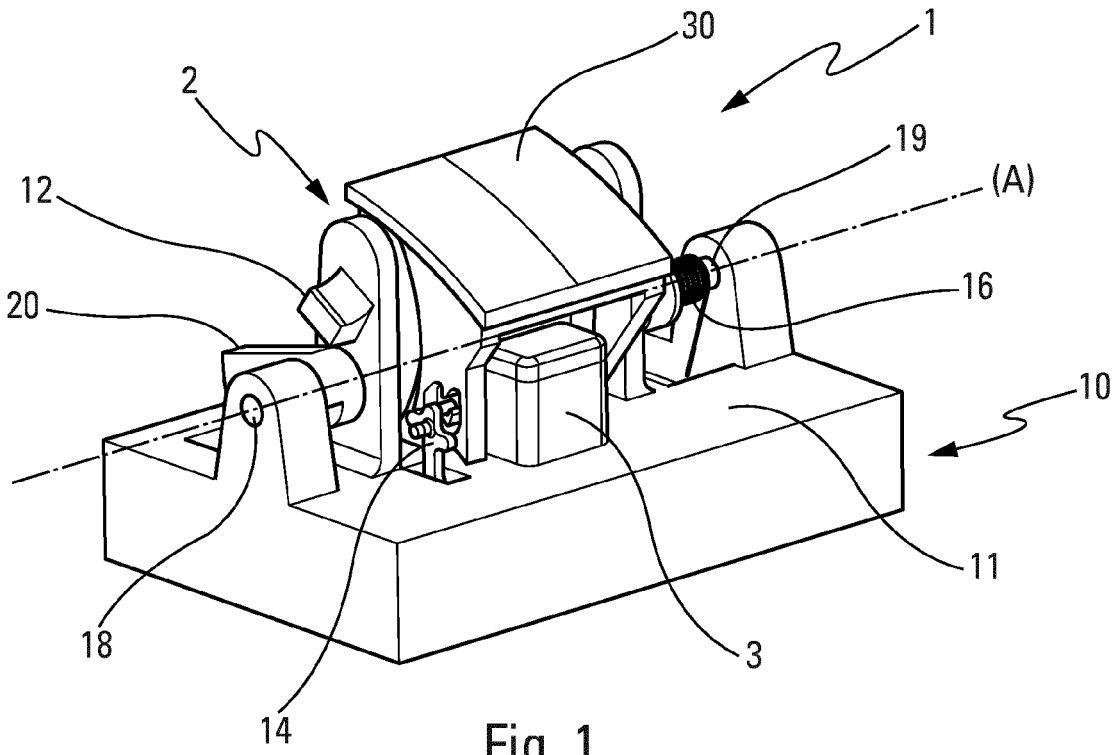


Fig. 1

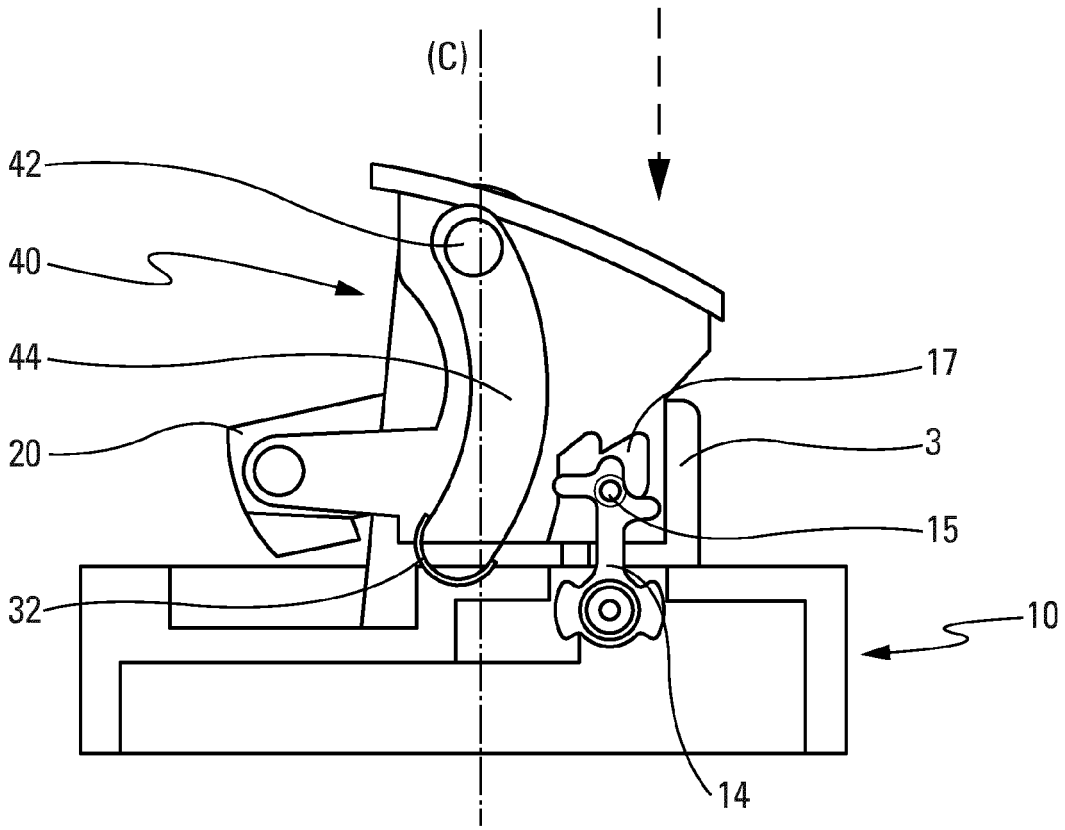


Fig. 2

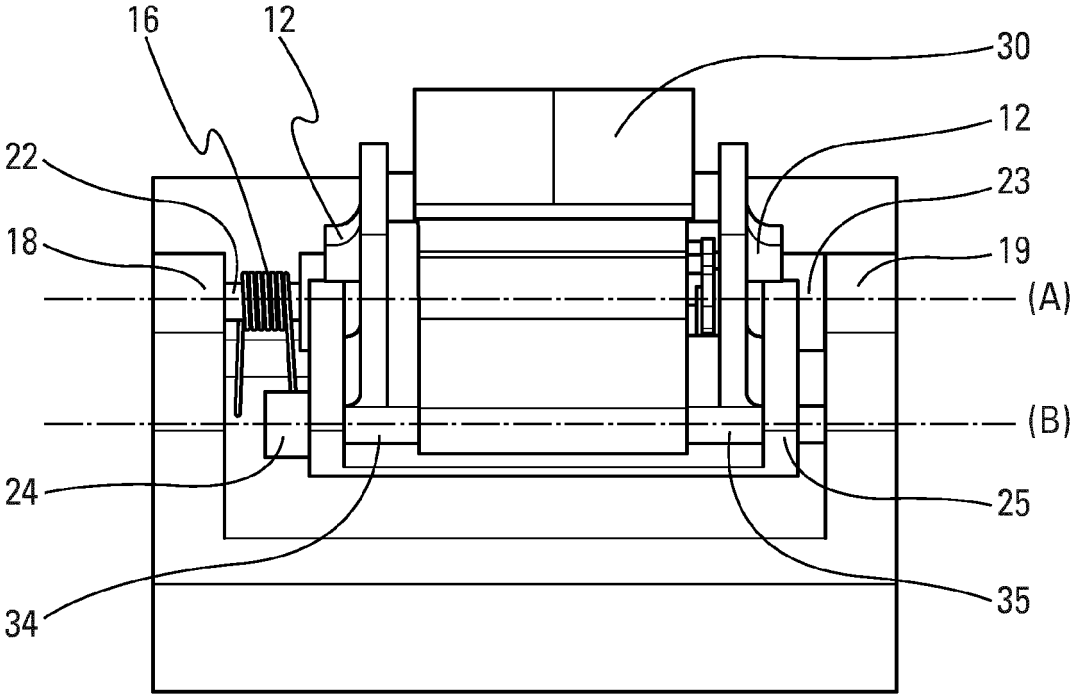


Fig. 3

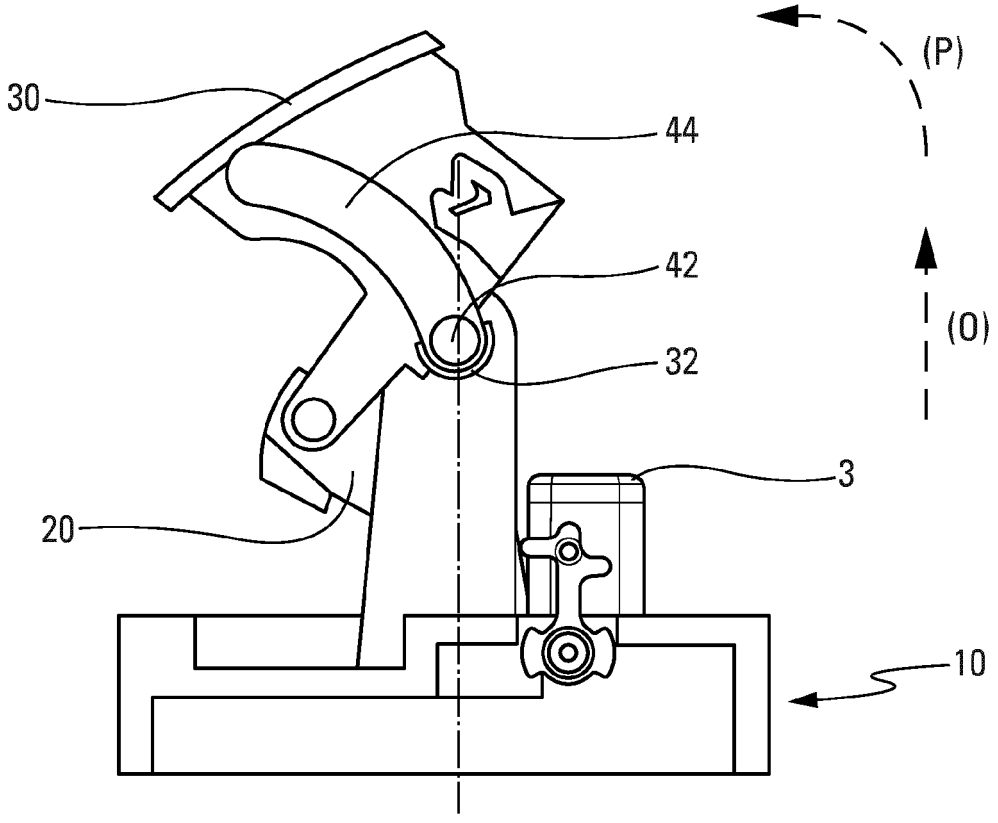


Fig. 4

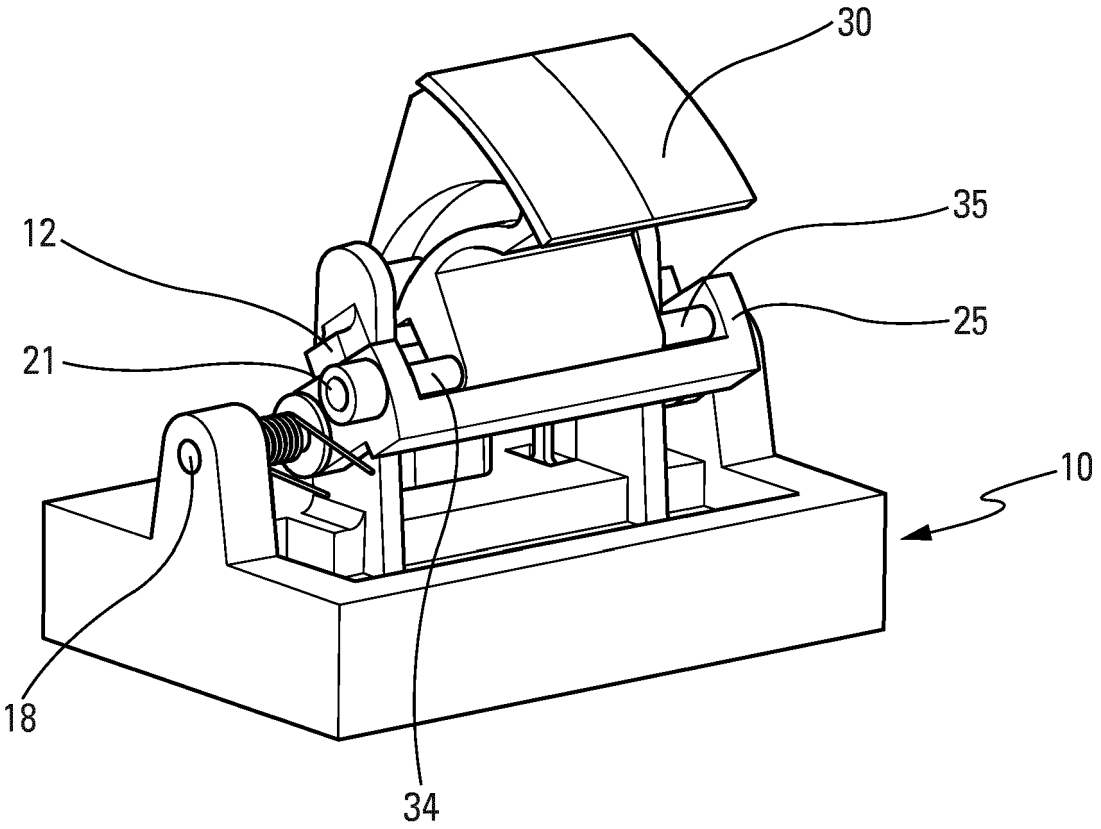


Fig. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 17 1414

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2017/069440 A1 (TERRY JOSHUA KYE [US] ET AL) 9 March 2017 (2017-03-09) * abstract; figures 1-3 * * paragraph [0001] * * paragraph [0005] * * paragraph [0025] - paragraph [0034] *	1-15	INV. H01H9/28 H01H13/04
A	US 2014/166448 A1 (KRIEGER HARALD [DE] ET AL) 19 June 2014 (2014-06-19) * figures 1-4 *	1	
A	US 2014/262702 A1 (OLEY DENNIS ALAN [US] ET AL) 18 September 2014 (2014-09-18) * figures 4-8 *	1	
A	JP 2009 187837 A (CHICHIBU FUJI CO LTD; FUJI ELEC FA COMPONENTS & SYS) 20 August 2009 (2009-08-20) * abstract; figures 1, 2 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

H01H
G05G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 November 2017	Bilard, Stéphane

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 17 1414

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-11-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2017069440 A1	09-03-2017	US 9818555 B1	14-11-2017
		US 2017069440 A1	09-03-2017
US 2014166448 A1	19-06-2014	CN 103871793 A	18-06-2014
		EP 2743948 A1	18-06-2014
		US 2014166448 A1	19-06-2014
US 2014262702 A1	18-09-2014	NONE	
JP 2009187837 A	20-08-2009	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82