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(71) Applicant: **ATOMA ROLTRA S.p.A.**
10090 Cascine Vica - Rivoli (IT)

(72) Inventor: **Ottino, Franco**
56017 San Giuliano Terme (IT)

(74) Representative: **Franzolin, Luigi et al**
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) Key unit for a door of a motor vehicle

(57) Key unit (1) for a door (2) of a motor vehicle, provided with an external cylindrical casing (15) and a key cylinder (28) housed inside the casing (15), capable of being connected for operation to a lock (3) associated with the door (2) and angularly movable with respect to the casing (15) by means of an operating key to enable/disable the opening of the lock (3) from the outside of the vehicle; the casing (15) has an external radial extension (23) carrying fixing means (25) for the rigid connection of the casing (15) to the door (2).

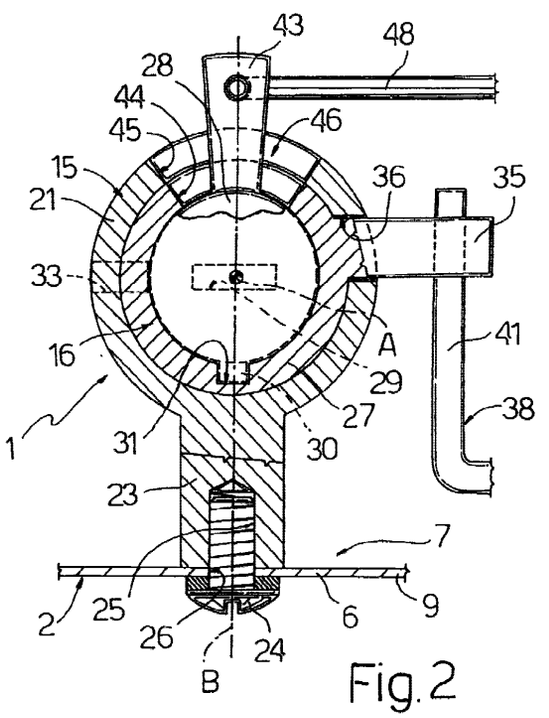

Fig. 2

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Description

[0001] The present innovation relates to a key unit for a door of a motor vehicle.

[0002] As is known, the door of a motor vehicle generally comprises a lower box-shaped portion formed by an outer panel and an inner panel, carrying a lock and a key unit connected for operation to the lock.

[0003] Normally, the key unit comprises a casing shaped essentially in the form of a cylindrical cup and fixed to the outer panel of the door, and a key cylinder engaged in an axially fixed position within the casing and angularly movable with respect to the casing by means of an operating key to disable or enable the opening of the lock from the outside of the motor vehicle (by activating or disengaging the security function respectively).

[0004] In particular, the key cylinder carries a plurality of engagement elements, which are normally pushed by corresponding springs to a position of connection to a radial groove of the casing, making the key cylinder and the casing angularly integral with each other, and are selectively releasable from the aforesaid groove as a result of the interaction with the outer profile of the operating key.

[0005] The casing is connected prismatically to the inside of a shaped through hole which is formed in the outer panel of the door and has a D-shaped profile: in other words, it consists of a portion in the form of an arc of a circle whose opposite ends are joined by a straight portion.

[0006] The casing is also provided with an annular end flange which, when in use, is positioned so that it bears on the outer panel of the door in the vicinity of the hole, and can be fixed axially by means of a U-clip fitted on the lateral wall of the casing and interacting with the outer panel by bearing on it on the opposite side from the flange.

[0007] Key units of the type described are relatively vulnerable to forcing. This is because it is normally possible to use a screwdriver or an elongated tool to force the key cylinder to rotate rigidly together with the casing about its axis, by deforming or damaging the sheet metal, usually thin, which forms the edge of the shaped hole of the outer door panel, thus disengaging the security function of the lock.

[0008] The object of the present innovation is to provide a key unit for a door of a motor vehicle which is not subject to the problem specified above which is associated with the known key units.

[0009] The aforesaid object is achieved by the present innovation, in that it relates to a key unit for a door of a motor vehicle, comprising an external cylindrical casing and a key cylinder which is housed inside the said casing, which is capable of being connected for operation to a lock associated with the said door and is angularly movable with respect to the said casing by means of an operating key to disable/enable the opening of the said lock from the outside of the motor vehicle, fastening means being provided for axially and angularly fixing the said casing to the said door, characterized in that the said fastening means comprise at least one extension projecting radially outwards from the said casing and carrying fixing means for connecting the casing rigidly to the said door.

[0010] The present innovation also relates to a door for a motor vehicle, provided with a lock and a key unit comprising, in turn, an external cylindrical casing and a key cylinder, housed within the said casing, connected to the said lock for operation and angularly movable with respect to the casing by means of an operating key to disable/enable the opening of the said lock from the outside of the motor vehicle, fastening means being provided to fix the said casing of the said key axially and angularly to the said door, characterized in that the said fastening means comprise at least one extension projecting radially outwards from the said casing and means for rigidly fixing the said extension to the said door.

[0011] To enable the present innovation to be understood more clearly, a preferred embodiment is described below, purely by way of example and without restriction, with reference to the attached drawings, in which:

Figure 1 shows in a perspective view a key unit according to the present innovation, fixed inside a compartment of a door of a motor vehicle and connected for operation to a lock associated with the door;
Figure 2 is a cross section through the key unit of Figure 1 fixed to the door of the motor vehicle; and
Figure 3 is an axial section through the key unit of Figure 2.

[0012] With reference to Figure 1, the number 1 indicates as a whole a key unit according to the present innovation carried by a door 2 of a motor vehicle (not illustrated) and connected for operation to a lock 3 (of a known type, illustrated schematically in broken lines in Figure 1) associated with the door 2.

[0013] The door 2 comprises, in a known way, a lower box-shaped portion 4, delimited by an outer panel 5 and an inner panel 6 forming between them a compartment 7 in which the key unit 1 and the lock 3 can be housed. For this purpose, the inner panel 6 has an aperture (not shown in the attached figures) for the introduction of the key unit 1 and the lock 3 into the compartment 7.

[0014] In greater detail, the inner panel 6 has an essentially C-shaped profile and comprises a main portion 8, which is essentially flat, and opposing end portions, only one of which is visible in Figure 1 where it is indicated by 9, projecting orthogonally from corresponding vertical side edges of the main portion 8 and joined along corresponding terminal side angles to the outer panel 5.

[0015] The lock 3 is formed essentially by a casing 11, located inside the compartment 7 of the door 2 and fixed to the end portion 9 of the inner panel 6, and an opening and closing unit 12 (of a known type, only partially visible in Figure 1), housed for the most part inside the casing 11.

[0016] The opening and closing unit 12 comprises, in a known way, a closing mechanism (not illustrated) capable of interacting with a stop integral with an upright (also not illustrated) of the door 2; a lever (not illustrated) for opening the lock 3 from the inside, connectable to an inner handle (also not illustrated) of the door 2; a lever 13 for opening the lock 3 from the outside, connected for operation to the key unit 1; and a security lever 14 for disabling and enabling the opening of the lock 3 from the outside (activating and disengaging the security function respectively) which is also connected for operation to the key unit 1.

[0017] With reference to the attached figures, the key unit 1 comprises a casing 15 in the form of a cylindrical cup, mounted on the door 2 with its axis A orthogonal to the outer and inner panels 5, 6, and an externally cylindrical key block 16, housed coaxially inside the casing 15 in such a way as to be movable with respect to the latter, connected for operation to the opening and security levers 13, 14 to cause their operation, and projecting partially from the casing 15 with one of its end portions when in use, engaging in a through hole 17 (not visible in the attached figures) formed in the outer panel 5 of the door 2.

[0018] The casing 15 comprises a discoid end wall 20 and a cylindrical lateral wall 21 projecting from a perimetric edge of the end wall 20. In particular, the casing 15, when in use, is housed completely within the compartment 7 of the door 2, and carries, at the opposite end to the end wall 20, an annular end flange 22 which, when in use, can be positioned to bear against the outer panel 5 of the door 2.

[0019] According to an important aspect of the present innovation, the casing 15 is provided with an integral fixing element 23 of essentially parallelepipedal shape, extending radially outwards from the lateral wall 21 and capable of being connected rigidly to the end portion 9 of the inner panel 6 by means of a screw 24. In particular, the screw 24 engages in a blind threaded hole 25 formed in the fixing element 23 and having an axis B orthogonal to the axis A, and in a through hole 26, also having the axis B, made in the end portion 9 of the inner panel 6 of the door 2.

[0020] With particular reference to Figures 2 and 3, the key block 16 comprises a push-in element 27 in the form of a cylindrical cup, engaging the casing 15 in an axially movable way and in an angularly fixed position, and connected for operation to the opening lever 13 of the lock 3, and a key cylinder 28 engaging in an axially fixed position the push-in element 27, forming a seat 29 for engaging an operating key (not illustrated) and connected for operation, when in use, to the security lever 14 of the lock 3.

[0021] The key cylinder 28 is connected angularly to the push-in element 27 in a selectively releasable way, and can be released angularly from the push-in element 27 as a result of the interaction with the operating key. For this purpose, the key cylinder 28 carries a plurality of engagement elements 30 (which are known and are only partially illustrated in Figure 2), which are normally pushed by corresponding springs (not illustrated) into a position of connection to a radial groove 31 of the push-in element 27, thus making the key cylinder 28 and the push-in element 27 angularly integral with each other (Figure 2), and are selectively releasable from the groove 31 by the effect of the interaction with the outer profile of the operating key.

[0022] The push-in element 27 is axially loaded by a cylindrical coil spring 32 housed inside the casing 15 and interposed between the end wall 20 and an end wall of the push-in element 27. The axial extraction of the push-in element 27 from the casing 15 is prevented by means of a cylindrical pin 33 projecting radially inward from the lateral wall 21 of the casing 15 and engaging in a slot 34 formed in a lateral wall of the push-in element 27 and elongated in a direction parallel to the axis A. In the absence of external actuation, the push-in element 27 is pushed by the spring 32 into a protruding rest position (Figure 3) in which it projects partially from the casing 15, engaging in the hole 17 of the outer panel 5 of the door 2, and is retained within the casing 15 by the contact between the pin 33 and an end of the slot 34 adjacent to the spring 32.

[0023] The push-in element 27 also has an outer radial projection 35, which engages slidably in an elongate slot 36 formed in the lateral wall 21 of- the casing 15 and extending in a direction parallel to the axis A, and is capable of interacting with, and imparting a force to, a lever mechanism 37 for operating the opening lever 13.

[0024] In particular, the lever mechanism 37 (Figure 1) comprises a lever 38 having an intermediate portion hinged by means of a pivot pin 39 on an appendage of the casing 11, and two arms 40, 41 extending radially from the intermediate portion; one of these arms (40) is connected by a link 42 to an end portion of the opening lever 13, while the other arm (41) is L-shaped and is moved by the pressure of the projection 35.

[0025] The push-in element 27 is movable axially against the action of the spring 32 from the protruding rest position to a retracted position in which it operates the opening lever 13 by means of the lever mechanism 37.

[0026] The key cylinder 28 also has an external radial projection 43, which is engaged slidably in a first circumferential slot 44 formed in the lateral wall of the push-in element 27, and an essentially T-shaped second slot 45, formed in the lateral wall 21 of the casing 15 and having a first portion 46 (Figure 2) in the form of an arc of a circle, superimposed on the slot 44 in the protruding rest position of the push-in element 27, and a second recti-

linear portion 47 (Figure 1) parallel to the axis A.

[0027] The projection 43 is connected by a link 48 to an end portion of the security lever 14, in such a way that a rotation of the key cylinder 28, by means of the key, with respect to the push-in element 27 about the axis A corresponds to an operation of the safety lever 14.

[0028] In use, the security function is activated by introducing the operating key fully into the seat 29 of the key cylinder 28, in such a way as to disengage the engagement elements 30 from the groove 31 of the push-in element 27, and rotating the key cylinder 28, by means of the key, about the axis A.

[0029] The angular movement of the key cylinder 28 is then transmitted, by means of the projection 43 and the link 48, to the security lever 14, which rotates about its axis of pivoting to the casing 11, from a configuration in which the opening of the lock 3 by the operation of the push-in element 27 is enabled to a configuration in which the aforesaid opening is disabled, and in which the operation of the push-in element 27 produces an idle travel of the opening lever 13.

[0030] The opening of the lock 3 from the outside is carried out by pressing the key block 16 towards the outer panel 5 of the door 2 against the action of the spring 32. The push-in element 27, together with the key cylinder 28, moves axially from the protruding position to the retracted position, and simultaneously exerts a force, by means of its projection 35, on the arm 40 of the lever 38.

[0031] The aforesaid force causes the lever 38 to rotate about the pin 39 and consequently causes an axial movement of the link 42, which causes the rotation of the opening lever 13 about its axis of pivoting to the casing 11 and, if the security function is disengaged, the opening of the lock 3.

[0032] An examination of the characteristics of the key unit 1 made according to the present innovation will clearly reveal the advantages provided by it.

[0033] In particular, the rigid fastening of the casing 15 of the key unit 1 to the end portion 9 of the inner panel 6 of the door 2 provided by the fixing element 23 prevents the forcing of the lock 3 by a rigid rotation of the key unit 1 about itself, which might otherwise be obtained by forcing the key cylinder 28 to rotate by means of an elongated tool inserted into the seat 29.

[0034] Finally, it is clear that modifications and variations can be made to the key unit 1 without departure from the scope of protection of the present innovation.

Claims

1. Key unit (1) for a door (2) of a motor vehicle, comprising an outer cylindrical casing (15) and a key cylinder (28) housed inside the said casing (15), which can be connected for operation to a lock (3) associated with the said door (2) and is angularly movable with respect to the said casing (15) by means of an operating key to disable/enable the opening of the said lock (3) from the outside of the motor vehicle, fastening means (23, 24, 25) being provided to fix the said casing (15) axially and angularly to the said door (2), characterized in that the said fastening means comprise at least one extension (23) projecting radially outwards from the said casing (15) and carrying fixing means (25) for the rigid connection of the casing (15) to the said door (2).

2. Key unit according to Claim 1, characterized in that the said fixing means comprise a threaded hole (25) which can be engaged by a screw (24) for connecting the said casing (15) to the said door (2).

3. Key unit according to Claim 2, characterized in that the said hole (25) has an axis (B) which is radial with respect to the said casing (15).

4. Key unit according to any one of the preceding claims, characterized in that it comprises a cylindrical push-in element (27) engaging in the said casing (15) in an axially movable way and in an angularly fixed position, connected for operation to the said lock to cause its opening from the outside of the motor vehicle, and engaged in an axially fixed position by the said key cylinder (28).

5. Door (2) for a motor vehicle, provided with a lock (3) and a key unit (1) comprising, in turn, an outer cylindrical casing (15) and a key cylinder (28) which is housed inside the said casing (15), is connected for operation to the said lock (3) and is angularly movable with respect to the casing (15) by means of an operating key for disabling or enabling the opening of the said lock (3) from the outside of the vehicle, fastening means (23, 24, 25) being provided to fix the said casing (15) of the said key unit (1) axially and angularly to the said door (2), characterized in that the said fastening means comprise at least one extension (23) projecting radially outwards from the said casing (15) and means (24, 25, 26) for rigidly fixing the said extension (23) to the said door (2).

6. Door according to Claim 5, characterized in that it comprises a box-shaped lower portion (4) delimited by an outer panel (5) and an inner panel (6) forming between them a compartment (7), and in that the said casing (15) of the said key unit (1) is housed completely inside the said compartment (7) and the said key cylinder (28) projects from the said door (2) via a through hole (17) in the said outer panel (5).

7. Door according to Claim 5 or 6, characterized in that the said fixing means comprise a first threaded hole

(25) formed in the said extension (23), a second through hole (26) formed in the said inner panel (6) of the said door (2), and a connecting screw (24) engaging in the said first and second holes (25, 26).

8. Door according to Claim 6 or 7, characterized in that the said key unit (1) comprises a cylindrical push-in element (27) engaging with the said casing (15) in an axially movable way and in an angularly fixed position, connected for operation to the said lock (3) to cause its opening from the outside of the motor vehicle, fitted through the said hole (17) of the said outer panel (5) and engaged in an axially fixed position by the said key cylinder (28).

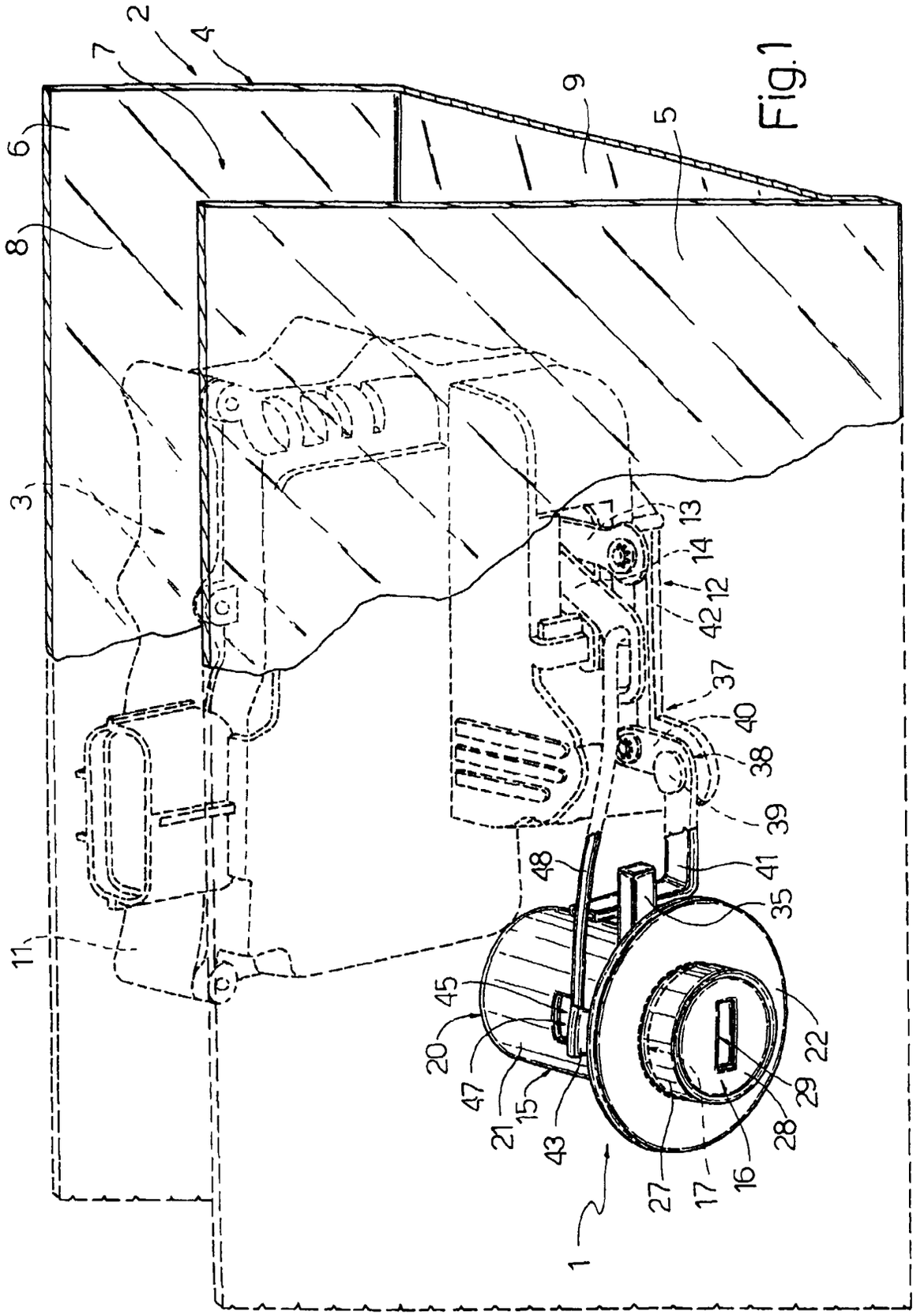
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Fig.1

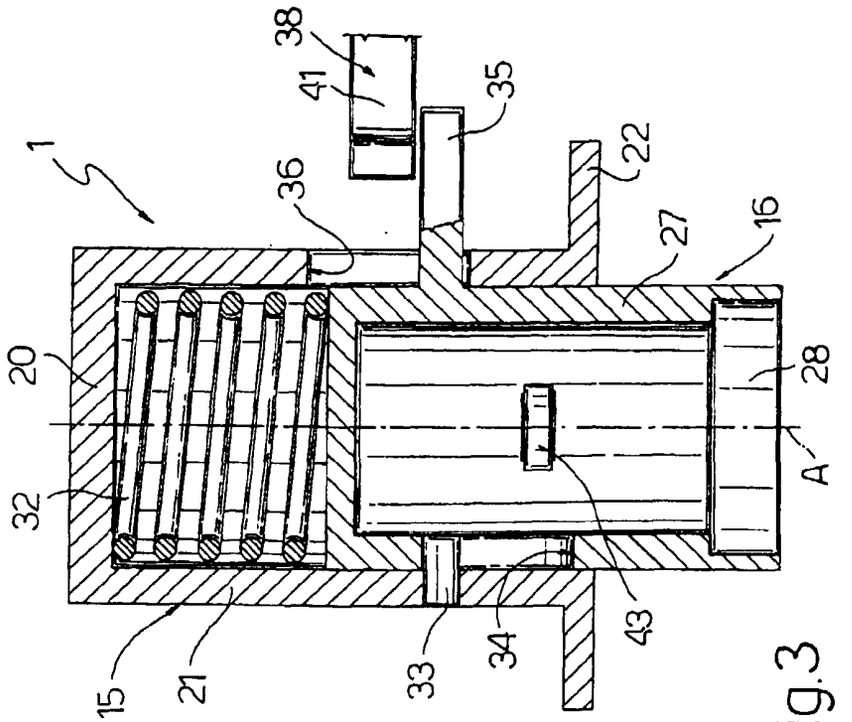
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Fig.3

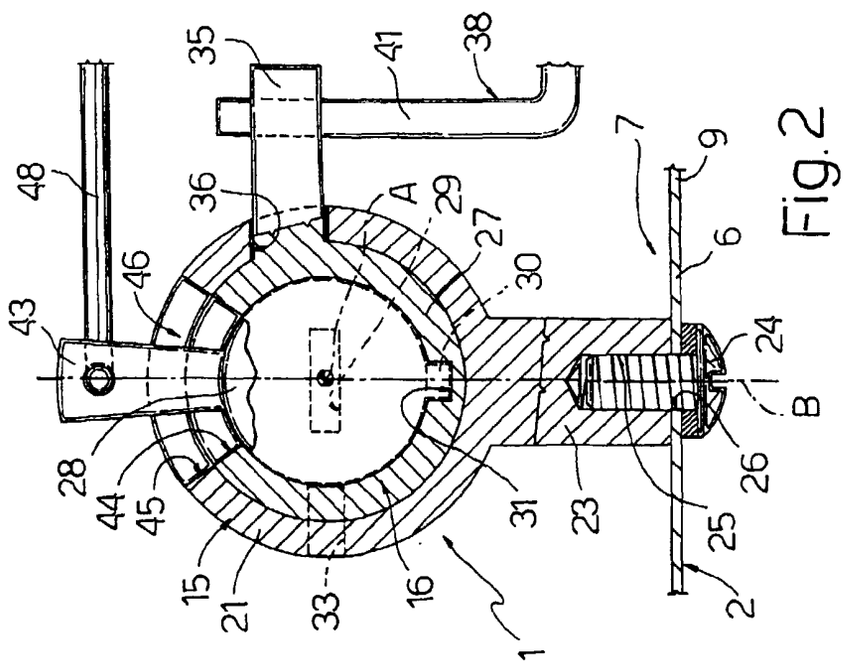
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Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 8022

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 March 2001	Pieracci, A

CATEGORY OF CITED DOCUMENTS

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