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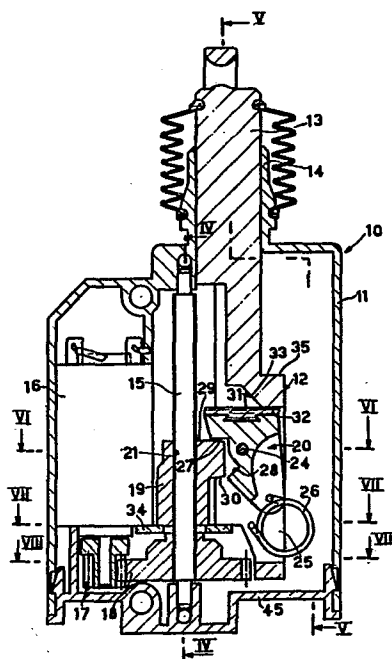
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⑤4 A device for actuating door safety lock latches of automotive vehicles, for central locking system.

57) A device for actuating door safety lock latches of automotive vehicles, for central locking systems, comprising a door latch actuating rod (13) projecting from a box-like body (11) and movable between a raised position and a lowered position, an electric motor (16) controlling the movement of said rod (13) by means of a kinematic chain (15, 17, 18) comprising an elastic connecting pawl (20) disengageable from said rod. Said pawl (20) is pivoted on a slide (12) solid with said rod and cooperates with a cursor (19) through two operating surfaces (27, 28) co-acting with a respective pair of surfaces (29, 30) of said cursor (19) and a third surface (31) co-acting with two surfaces (32, 33) of said slide (12) so that, when the rod is in the raised position, cursor (19) and pawl (20) are in engagement with a first pair of surfaces so as to permit movement of the rod — either manually or by the motor — to the lowered position, in which cursor (19) and pawl (20) are in engagement with a second pair of surfaces so as to permit either manual or motor-operated raising of said rod, terminal arrest means cooperating with said cursor and said slide.



A DEVICE FOR ACTUATING DOOR SAFETY LOCK LATCHES OF
AUTOMOTIVE VEHICLES, FOR CENTRAL LOCKING SYSTEM

The present invention relates to a device for actuating
the door safety lock latches of automotive vehicles in
which, when one of the door safety lock latches -
generally a front latch - is secured, all the other
5 latches are automatically also secured.

Devices of this kind are for example known from the DOS
2,541,675 and from the Italian application 52970 B/81, and
are required to satisfy certain specific requirements.

10

Firstly, all the door safety lock opening and closing
controls must also be capable of being actuated manually,
independently of the central locking system.

15 The devices must also be to the greatest possible extent
of small overall dimensions and silent in operation.

The object of the present invention is to embody a device
which satisfactorily meets such requirements. To this end,
20 invention embodies a device for actuating the door safety
lock latches of automotive vehicles which comprises a door
latch actuating a rod projecting from a box-like body and
movable between a raised position and a lowered position,
an electric motor controlling the movement of said rod by
25 means of a kinematic chain comprising an elastic
connecting pawl disengageable from said rod, characterized
in that said pawl is pivoted on a slide solid with said
rod and cooperates with a cursor through two operating
surfaces co-acting with a respective pair of surfaces of

said cursor and a third surface co-acting with two surfaces of said slide so that, when the rod is in the raised position, cursor and pawl are in engagement with a first pair of surfaces so as to permit movement of the rod
5 - either manually or by the motor - to the lowered position, in which cursor and pawl are in engagement with a second pair of surfaces so as to permit either manual or motor-operated raising of the rod, terminal arrest means cooperating with said cursor and with said slide.

10

The structural and functional characteristics of the invention, and its advantages over the known art, will become more apparent from an examination of the following illustrative description of one form of embodiment
15 thereof, with reference to the appended drawings in which: Figures 1, 2 and 3 are sections illustrating, respectively, the different operating conditions of a device embodied according to the invention;

Figure 4 is a section taken through the line IV-IV of
20 Figure 1;

Figure 5 is a section taken through the line V-V of Figure 1;

Figure 6 is a section taken through the line VI-VI of Figure 1;

25 Figure 7 is a section taken through the line VII-VII of Figure 1;

Figure 8 is a section taken through the line VIII-VIII of Figure 1;

Figures 9 and 10 show the manner in which two different
30 printed control circuits can be disposed in a device according to the invention;

Figure 11 shows a particular of a sliding contact in front

elevation;

Figure 12 is a view taken through the line F of Figure 11;

Figure 13 is a section taken through the line XIII-XIII of Figure 11; and

5 Figure 14 is a section taken through the line XIV-XIV of Figure 13.

With reference to the drawings, the actuating device according to the invention is indicated overall by 10 and
10 consists structurally of a box 11 within which is fitted a slide 12 solid with a control rod 13, which emerges through a guide sleeve 14 and which is connected in a manner per se known to the door lock.

15 Within the box 11 there is also fitted a rotatably supported screw 15 which is rotated by an electric motor 16 through a pair of gears 17, 18.

Said screw 15 is operationally connected to the slide 12,
20 in a disengageable manner which is explained subsequently, by a cursor 19 and a pawl 20, these being restrained respectively to the screw 15 and the slide 12.

More specifically, the cursor 19 is coupled to the screw
25 15 by a nut screw 21 and its translation along said screw is guided by a tongue 22 coupled to a groove 23 (Figure 6).

The pawl 20 is however pivoted at 24 within a seating 25
30 of the slide 12 and its rotation is contrasted by a needle spring 26. The pawl 20 further features two operating surfaces 27, 28 intended to cooperate with a respective

pair of surfaces 29, 30 of the cursor 19, and a third surface 31, made of damping material, cooperating with two surfaces 32, 33 of the slide 12, as will be explained subsequently.

5

The functioning of the device according to the invention is as follows.

In the condition illustrated in Figure 3, the rod 13 is
10 raised and the door of the automotive vehicle can be opened. The central locking system for locking all the door latches is then actuated through the agency of one of the actuation devices operationally connected to identical
15 devices on the other doors by a central control unit (not illustrated). This starts the motor 16 which, through the kinematic chain 17, 18, 15 displaces the cursor from the position of Figure 3 to that of Figure 1. During its translation, the cursor 19 entrains the slide 12 and then the rod 13, which becomes lowered so as to actuate in a
20 manner per se known the locking of the door safety latches of the vehicle. The downward run of the slide 12 first terminates against a wall 34 (as shown by the dashed and dotted lines of Figure 3), while the cursor 19 continues its run and also stops against the wall 34 after rotating
25 the pawl 20 to the position of Figure 1, against the action of the spring 26.

In this condition, the rod 13 can clearly be returned to the raised position of Figure 3, either again by the
30 action of the cursor 19 or by a simple manual traction. The upward run of the rod 13 terminates with the notch 35 abutting the upper wall of the body 11 (Figure 2), while,

if controlled to do so, the cursor 19 proceeds to the end of its run (Figure 3), causing oscillation of the pawl 20 to return it to the start-of-cycle position.

5 The operation of the device described above can be controlled by a central unit to which all the devices in the automotive vehicle doors are connected. The connection can be advantageously implemented through printed circuits 36 or 37 (Figures 9, 10) connected to the motor
10 16, on which circuits sliding contacts act. Only one pair of contacts 38 restrained to the slide 12 acts on the circuit of Figure 9, while on the circuit of Figure 10 there act two pair of contacts 39 restrained to the slide 12 and cursor 19 respectively.

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Said sliding contacts 38, 39 can for example be as shown in Figures 11-14, i.e. mounted on an insulating substrate 40 by means of a prong 41 and an elastic tooth 42. The prong 41 is inserted into a seating 43, while the tooth 42
20 engages snap-wise with an undercut portion 44.

Preferably, though not necessarily, the control circuit can be of the type described and illustrated in the co-pending application No. 20.848 A/84 of the same
25 Applicant.

The advantages of a device embodied according to the invention are, chiefly, a very high degree of silence in operation, resulting from a very low operating speed made
30 possible by the kinematic chain comprising the pair of gears 17, 18, the screw 15 and the cursor 19 with nut screw 21 constructed of material of low friction

coefficient to make it reversible. Said kinematic chain with the stops (limit switches) for the cursor 19 and slide 12 either centred or adjacent with respect to the screw 15 - and in on way coupled to rotating parts -
5 prevent the screw and cursor from locking at the end of their run, thus always ensuring the correct functioning of the device.

A further important advantage of the device according to
10 the invention is that the pawl changes from one operation to the other with a minimum of slip between the co-acting surfaces 28, 30 and 27, 29 and thus with negligible wear. Moreover, during operation, the maximum contact area between the surfaces 28, 30 and 27, 29 exists at the start
15 of and during the operation phase before the cursor entrains the pawl 29 into rotation. On the other hand, while the pawl 29 passes between the positions of Figures 1 and 3, a minimum contact area between the surfaces 28, 30 and 27, 29 will have a matching low degree of reaction
20 of the spring, such reaction becoming zero at the dead centre during the passage of the said spring 26 between the positions shown in Figures 1 and 3.

Additionally, the disposition of said kinematic chain,
25 with the axes of the motor 16 and screw 15 parallel, permits very small overall dimensions; a stopper plug is applied to the base of the box 11 (when the device has been fitted inside the door) to prevent infiltrations of water.

CLAIMS

1. A device for actuating door safety lock latches of automotive vehicles, for central locking systems, comprising a door latch actuating rod projecting from a box-like body and movable between a raised position and a
5 lowered position, an electric motor controlling the movement of said rod by means of a kinematic chain comprising an elastic connecting pawl disengageable from said rod, characterized in that said pawl is pivoted on a slide solid with said rod and cooperates with a cursor
10 through two operating surfaces co-acting with a respective pair of surfaces of said cursor and a third surface co-acting with two surfaces of said slide so that, when the rod is in the raised position, cursor and pawl are in engagement with a first pair of surfaces so as to permit
15 movement of the rod - either manually or by the motor - to the lowered position, in which cursor and pawl are in engagement with a second pair of surfaces so as to permit either manual or motor-operated raising of said rod, terminal arrest means cooperating with said cursor and
20 said slide.

2. A device according to claim 1, characterized in that said kinematic chain consists of at least one pair of gears and screw-nut screw in which said nut-screw is
25 formed in said cursor.

3. A device according to claims 1 and 2, characterized in that said electric motor and said screw have parallel axes and are operationally linked through a pair of gears.

4. A device according to claims 1 and 2, characterized in that said terminal arrest means consist of walls of said box-like body and are either centred or adjacent with respect to said screw.

5

5. A device according to claim 1, characterized in that said box-like body is closed at its base by a stopper.

6. A device according to claim 1, characterized in that
10 said pawl is made elastic through the agency of a needle spring acting between said slide and said pawl.

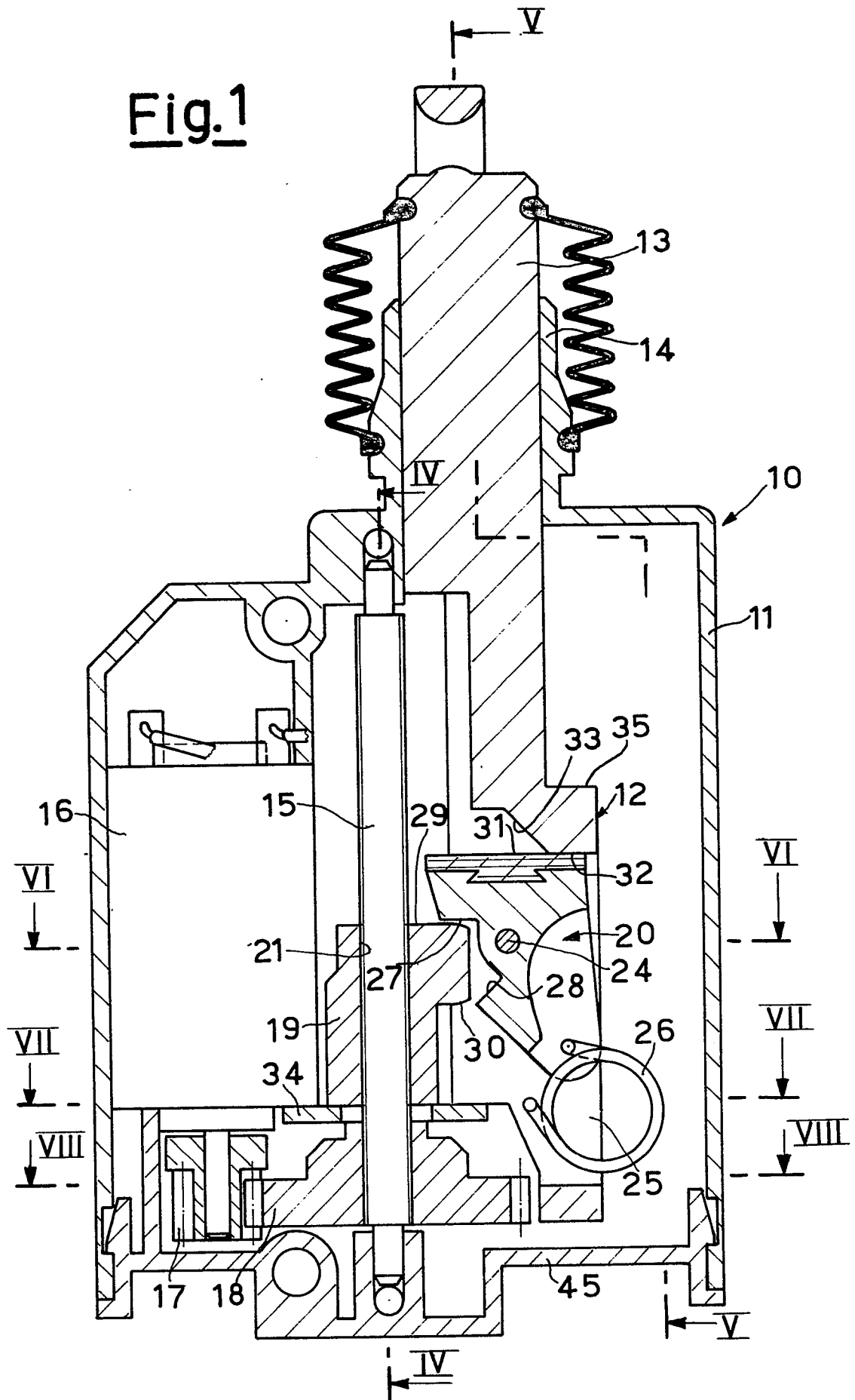
Fig.1

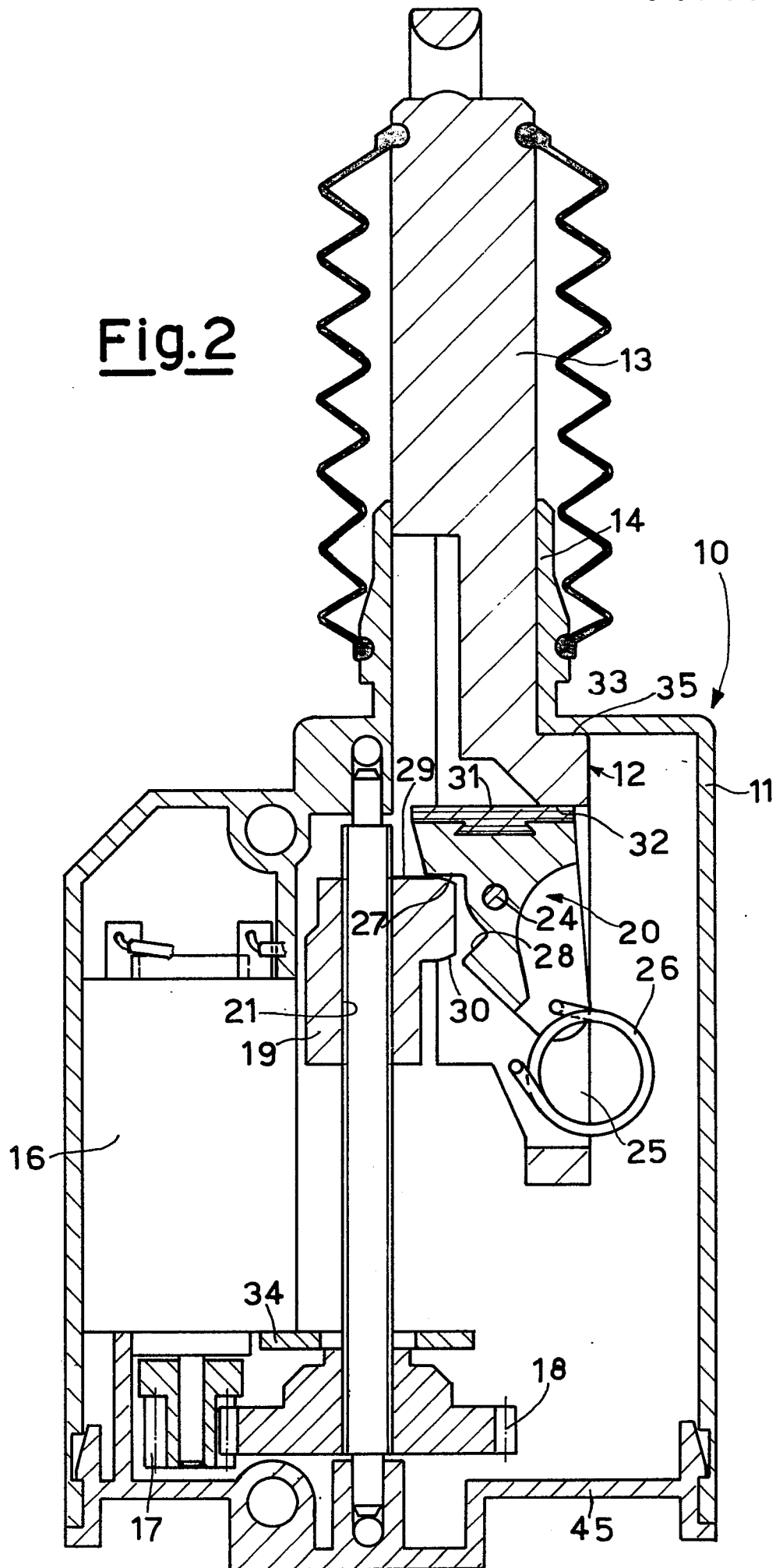
Fig.2

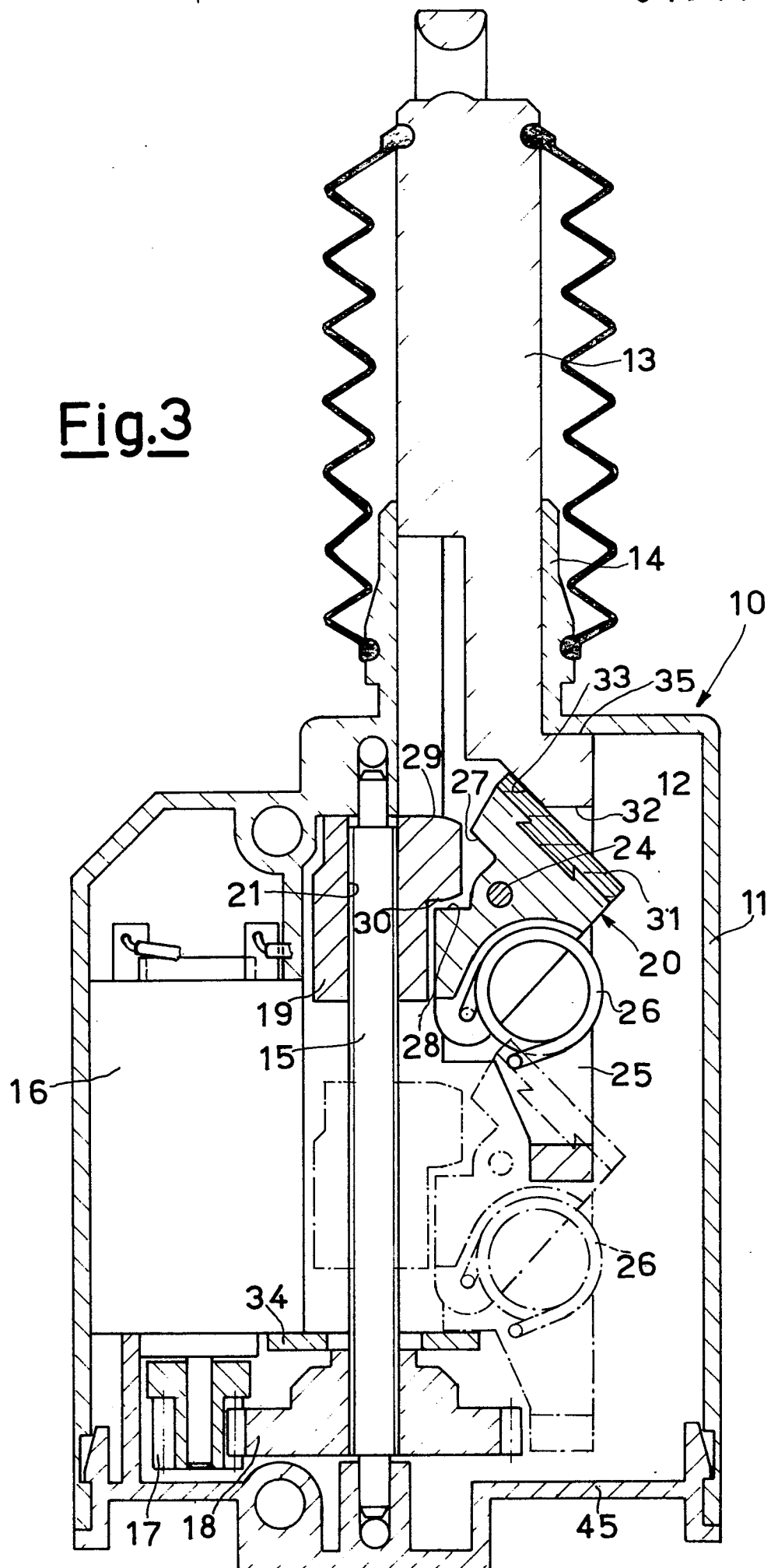
Fig.3

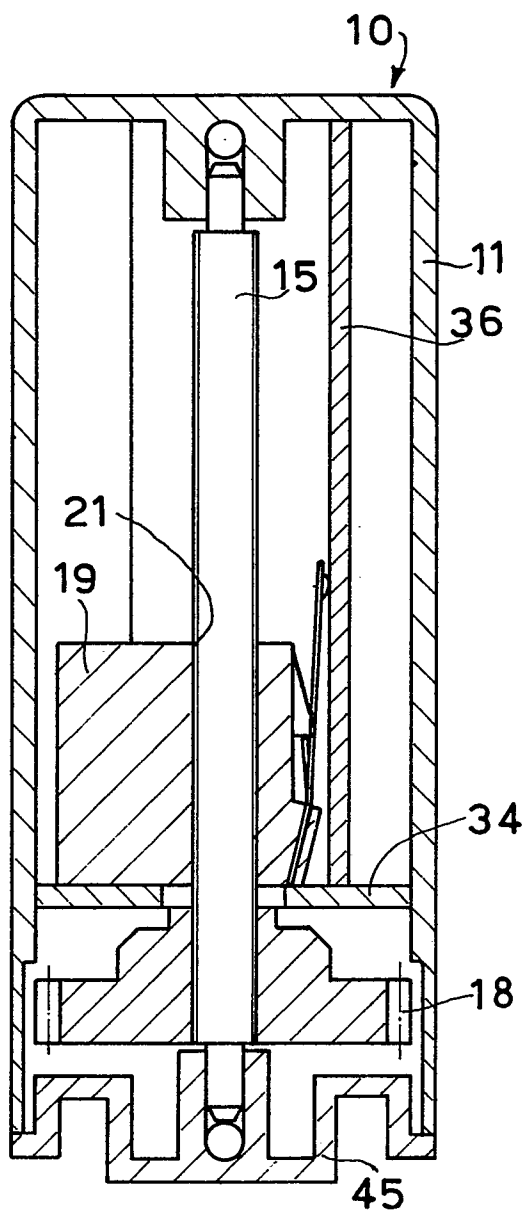
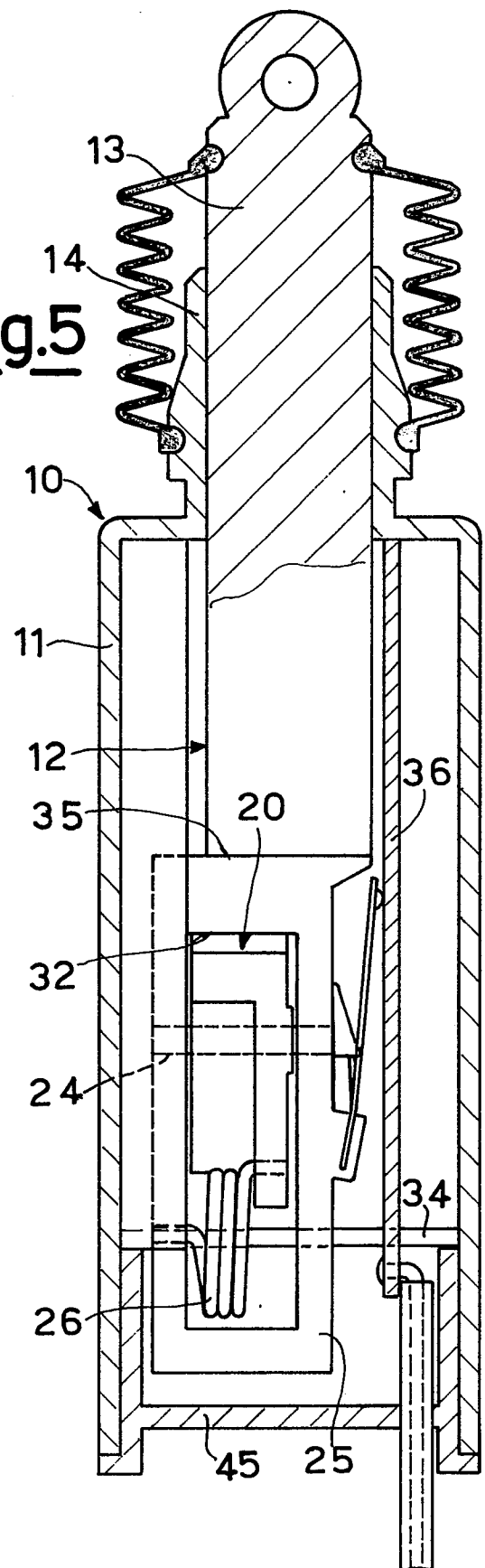
Fig.4Fig.5

Fig.6

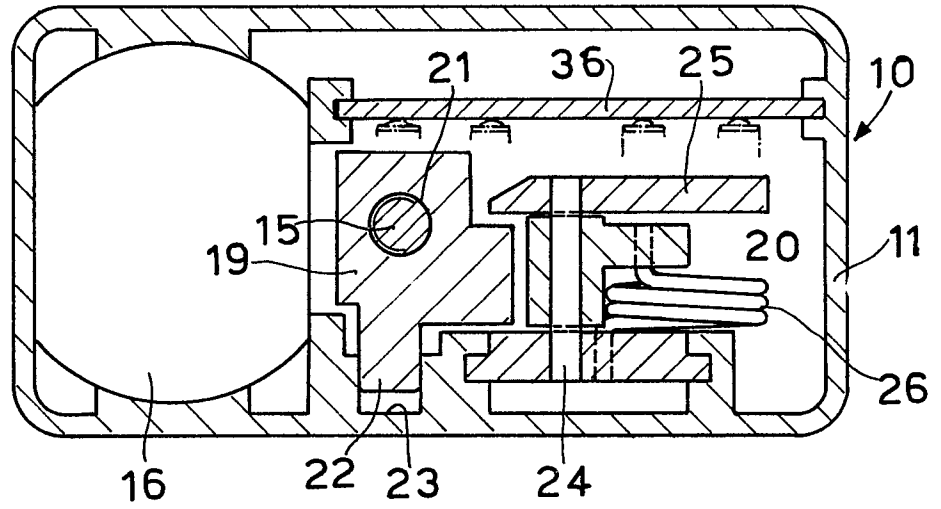


Fig.7

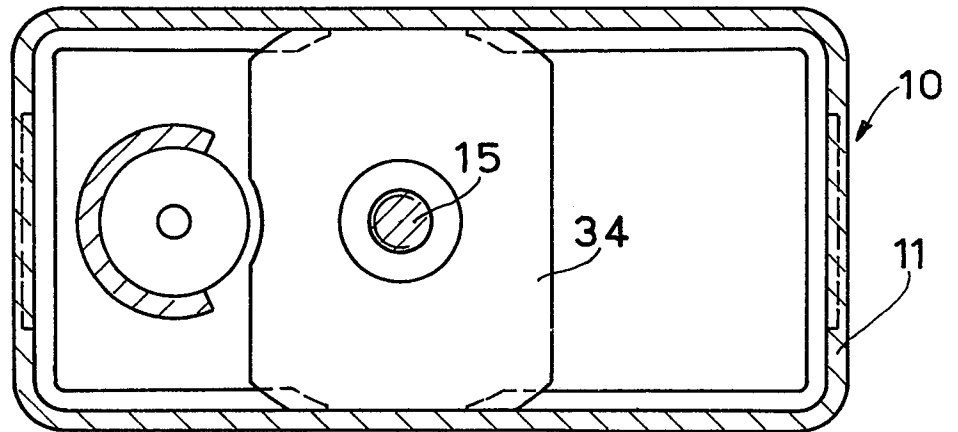


Fig.8

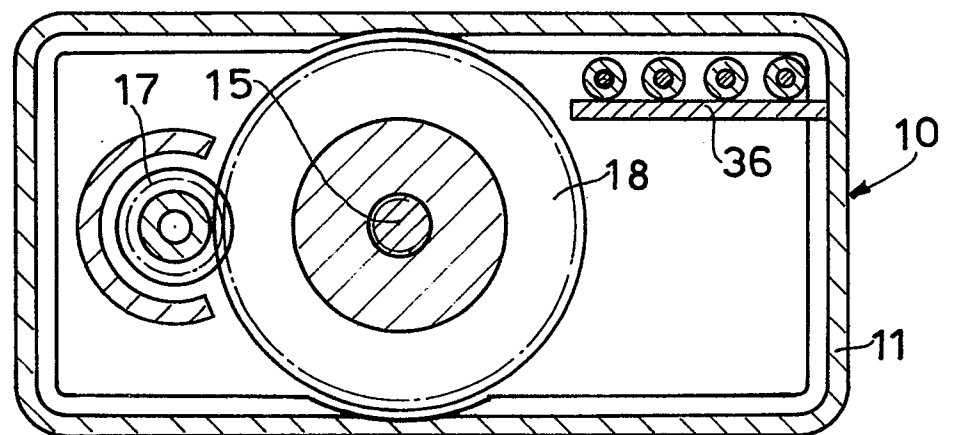


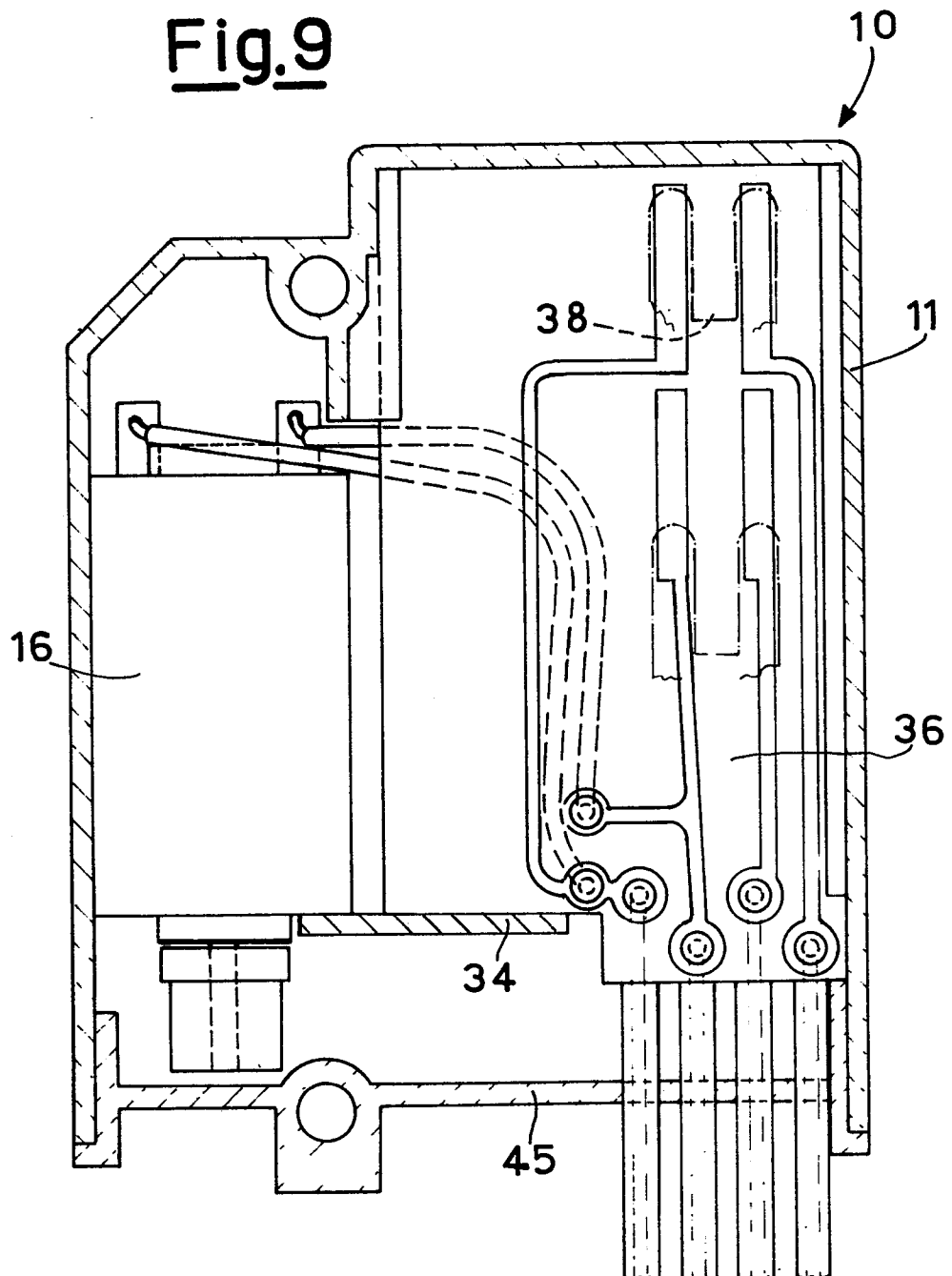
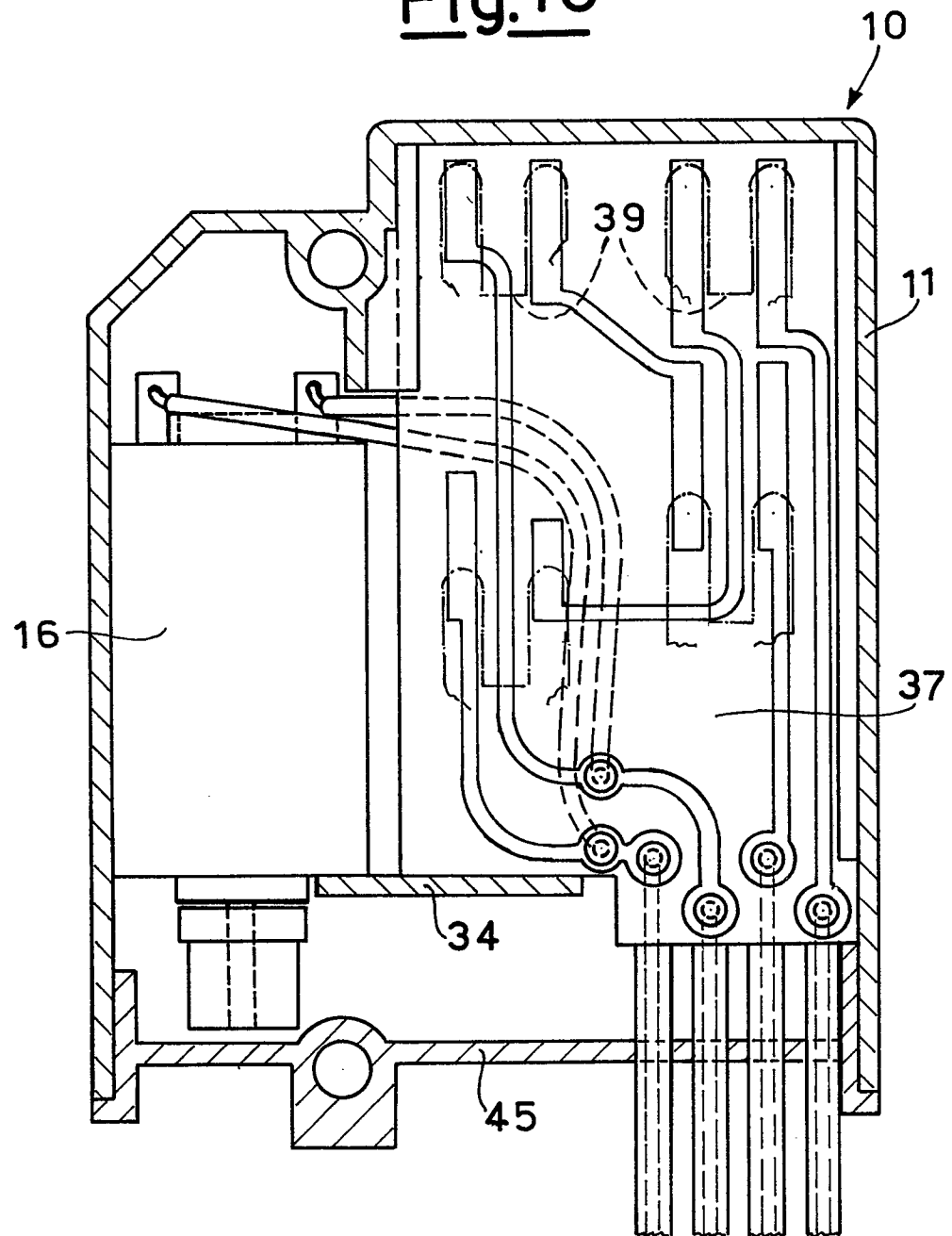
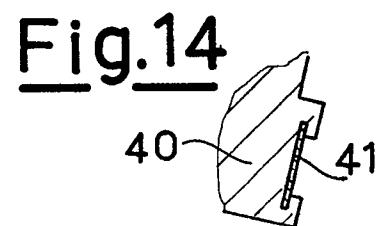
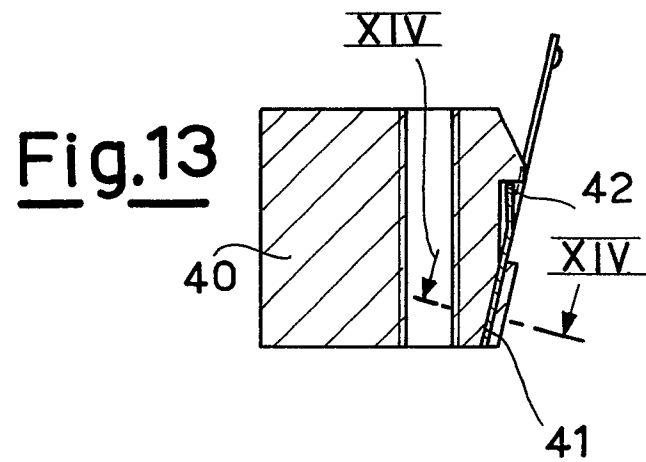
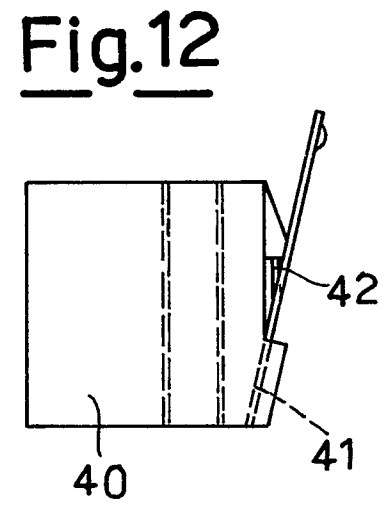
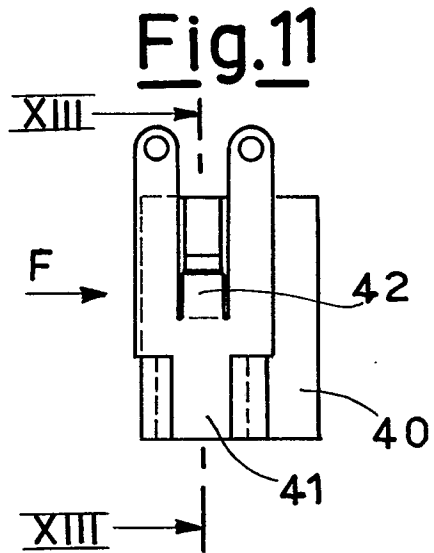
Fig.9

Fig.10





European Patent
Office

EUROPEAN SEARCH REPORT

0164145

Application number

EP 85200667.5

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	FR - A1 - 2 500 877 (SOCIETE DITE: ROLTA S.P.A.) * Fig. 1-2 * -----	1
		CLASSIFICATION OF THE APPLICATION (Int. Cl.4) E 05 B 65/36
		TECHNICAL FIELDS SEARCHED (Int. Cl.4) E 05 B
The present search report has been drawn up for all claims		
Place of search VIENNA	Date of completion of the search 16-07-1985	Examiner CZASTKA
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		