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

(11) Publication number: **0 449 367 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91200654.1**

(51) Int. Cl.5: **E05B 65/20**

(22) Date of filing: **23.03.91**

(30) Priority: **29.03.90 IT 2092090 U**

(43) Date of publication of application:
02.10.91 Bulletin 91/40

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI LU NL SE

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(54) Improved arrangement for motor vehicle centralised door-locking system actuation.

(57) A motor vehicle door centralised system actuation arrangement comprising a door-locking actuation shaft (13), projecting from a box housing (11) and moving between the up and down positions, and an electro-motor (16) controlling the movement of the said shaft (13) through a kinetic chain with a releasable flexible pawl (20) connecting it to the shaft itself (13). The said pawl (20) is pinned to a slide (12) integral with the shaft (13) and operates by way of a cursor (19) through a first pair of operative faces (27,28) co-acting with a respective pair of faces (29,30) on the said cursor. The pawl (20) also has a second pair of operative faces (31,32) operating with a leaf spring (26) located between the pawl (20) and a seat (25) for the said slide (12).

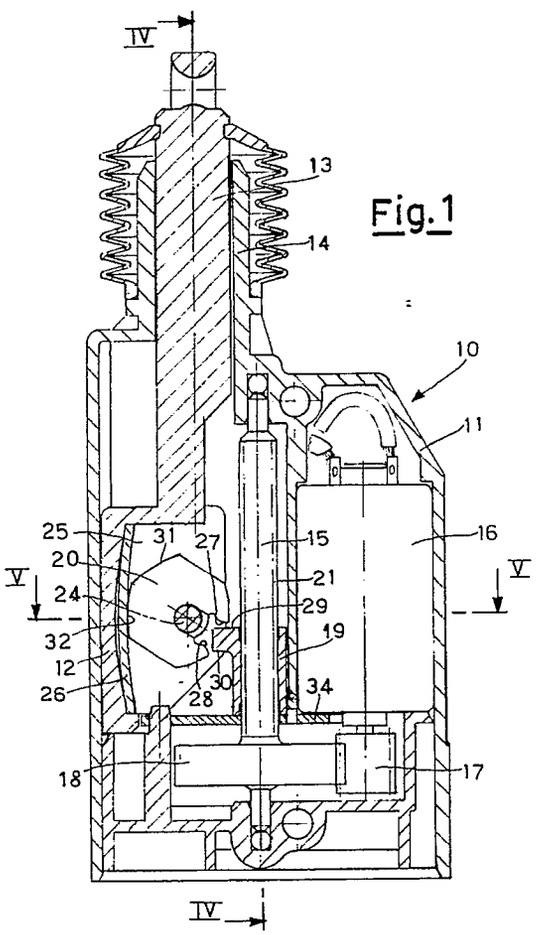

Fig.1

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The present invention relates to an improved arrangement for actuating motor vehicle door locks whereby, a closure of one of the locks generally at the front, is automatically accompanied by a closure of all other locks.

Arrangements of this type are known for instance from DOS 2.541.675 and Italian application 52970 B/81 and must satisfy a number of requirements.

Above all the lock open/close controls must also allow manual actuation, independent from the centralised control system. These must also have the smallest possible overall dimensions and a very low actuation noise level. To satisfy the above requirements an arrangement which is subject of Italian application 21741 B/84 has already been proposed.

This arrangement comprises a door lock actuation shaft projecting from a box housing and moving between the up and down positions. The movement of the shaft is controlled by an electromotor through a kinematic chain comprising a releasable flexible pawl connecting with the shaft, which is pinned to a slide integral with the shaft and operates in conjunction with a cursor through two operative faces co-acting with a respective pair of faces on the said cursor and a third face coacting with two surfaces of the said slide. When the shaft is in the up position, the cursor and pawl are engaged with a first pair of faces to allow the movement, driven manually or by motorised means, into the down position where the cursor and pawl are engaged with a second pair of faces to allow lifting of the shaft, both manually and by motorised means. End stop means operate in conjunction with the said cursor and the said slide.

The operation of an arrangement of this type has proved to be fully satisfactory.

However, the automotive industry has in the meantime requested further improvements, both with regard to operating silence and compactness.

This has involved further design study intended to eliminate as much as possible from the arrangement any sources of noise and eventually so that components may result not only in reduced space requirements, but also in simplified design, with consequent lower manufacturing cost.

The general purpose of the present invention is to achieve an arrangement able to satisfy the further requirements quoted above and, to that effect, according to the invention an actuation arrangement has been conceived for motor vehicle door lock closure centralised systems of the type comprising a shaft (13) actuating the door lock projecting from a box housing (11) and moving between the up and down positions, an electro-motor (16) controlling the movement of the said shaft (13) through a kinetic chain comprising a releasable flexible pawl (20) connecting with the shaft (13), characterised in that the said pawl (20) is engaged in a slide (12) integral with the shaft (13) and cooperates with a cursor (19) through a first pair of operative faces (27,28) co-acting with a respective pair of surfaces (29,30) on the said cursor, the said pawl (20) also having a second pair of operative faces (31,32) cooperating with a leaf spring (26) located between the pawl (20) and a seating (25) in the said slide (12), so that when the shaft (13) is in the up position, the face (30) of cursor (19) engages with face (28) of the pawl (20), the surface (31) of which engages with the leaf spring (26) to allow movement of the shaft (13), both manually and by motorised means, into the down position where face (29) of the cursor is engaged with face (21) of the pawl (20), which has its face (32) engaged with the loaf spring (26) to allow lifting of the shaft, both manually and by motorised means, with the said cursor and slide in cooperation with end stop means.

The structural and operational features of the invention and their advantages compared with known technique will appear more obviously from examination of the following description, referring to the appended drawings, showing an example of implementation of the invention. In the drawings:

- Figures 1,2 and 3 are sections respectively illustrating the various operative conditions of an arrangement produced according to the invention;
- Figure 4 is a section along line IV-IV in Figure 1; and
- Figure 5 is a section along line V-V in Figure 1.

With reference to the drawings, the actuating arrangement referred to here bears reference number 10 and consists structurally of a box 11 inside which is mounted a slide 12 integral with a control shaft 13, projecting through a guide channel 14, and connecting in a known manner with the door lock.

Inside the box 11 a screw 15 is also located so as to rotate under the control of an electro-motor 16 through a pair of gears 17,18. The screw 15 and gear 18 are preferably (Fig.3) moulded as a single plastic material component with the advantage of precision and cost, and furthermore by means of the metal core 36, the diameter of the screw may be particularly limited in favour of the system performance which can develop a high thrust load.

The said screw 15 is functionally connected with slide 12, in a releasable manner as will be explained, by means of a cursor 19 and a pawl 20, which are respectively linked to screw 15 and slide 12.

More specifically, the cursor 19 is coupled to the screw 15 by means of a lead screw 21 and its

movement along the screw is guided by a tongue 22 coupled within a channel 23 (Fig.5).

The pawl 20 engages as a rider on pins 24 of one piece between a seating 25 for slide 12 and its rotation is typically braked by a leaf spring 26 acting between the pawl itself and the bottom wall of the seating 25. The pawl 20 also has two operative faces 27,28 intended to cooperate with a respective pair of faces 29,30 on the cursor 19, and two surfaces 31,32 cooperating with the leaf spring 26, as will be explained, to define the two extreme positions of slide 12.

The operation of the arrangement according to the Invention is as follows.

Under the conditions in Fig. 3 the shaft 13 is raised and the motor vehicle door can be opened. Centralised closure of all of the motor vehicle door locks can now be controlled by operation of one of the actuating means, functionally connected with identical means on other doors by way of a centralised control (not shown here). This triggers the starting of motor 16, which through the kinetic chain 17,18,15 moves the cursor 19 from the position in Fig. 3 to that in Fig. 1. During its transfer the cursor 19 drives the slide 12 and consequently shaft 13 which is lowered, thus controlling in a known manner the closure of the door lock safety means. The downwards stroke of slide 12 is completed first, while cursor 19 continues its stroke and comes to a stop against the wall 34 after rotating the pawl 20 into the position in Fig.1, against the loading of spring 26. In this condition it is now clear that shaft 13 can be placed in the raised position in Fig. 3, either by further action of cursor 19, or by means of a simple manual pull. On completion of the rising stroke of shaft 13 the cursor 19 if actuated, continues to the end of its stroke (Fig. 3) triggering oscillation of the pawl 20 to bring it into the initial cycle position.

Operation of the arrangement described above may be controlled by means of a centralised unit to which are connected all the arrangements for the motor vehicle door.

The control circuit may be of whatsoever type suited to the purpose.

The advantages of an arrangement designed according to the invention can be summarised into greater silence of operation, obtained by means of the characteristic cooperation of the moulded pawl 20 and the leaf spring 26, and improved compactness thanks to the different design and arrangement of pawl 20 itself and of the relevant spring.

The system is also economical since the leaf spring 26 can be produced from sheet in an extremely simple manner.

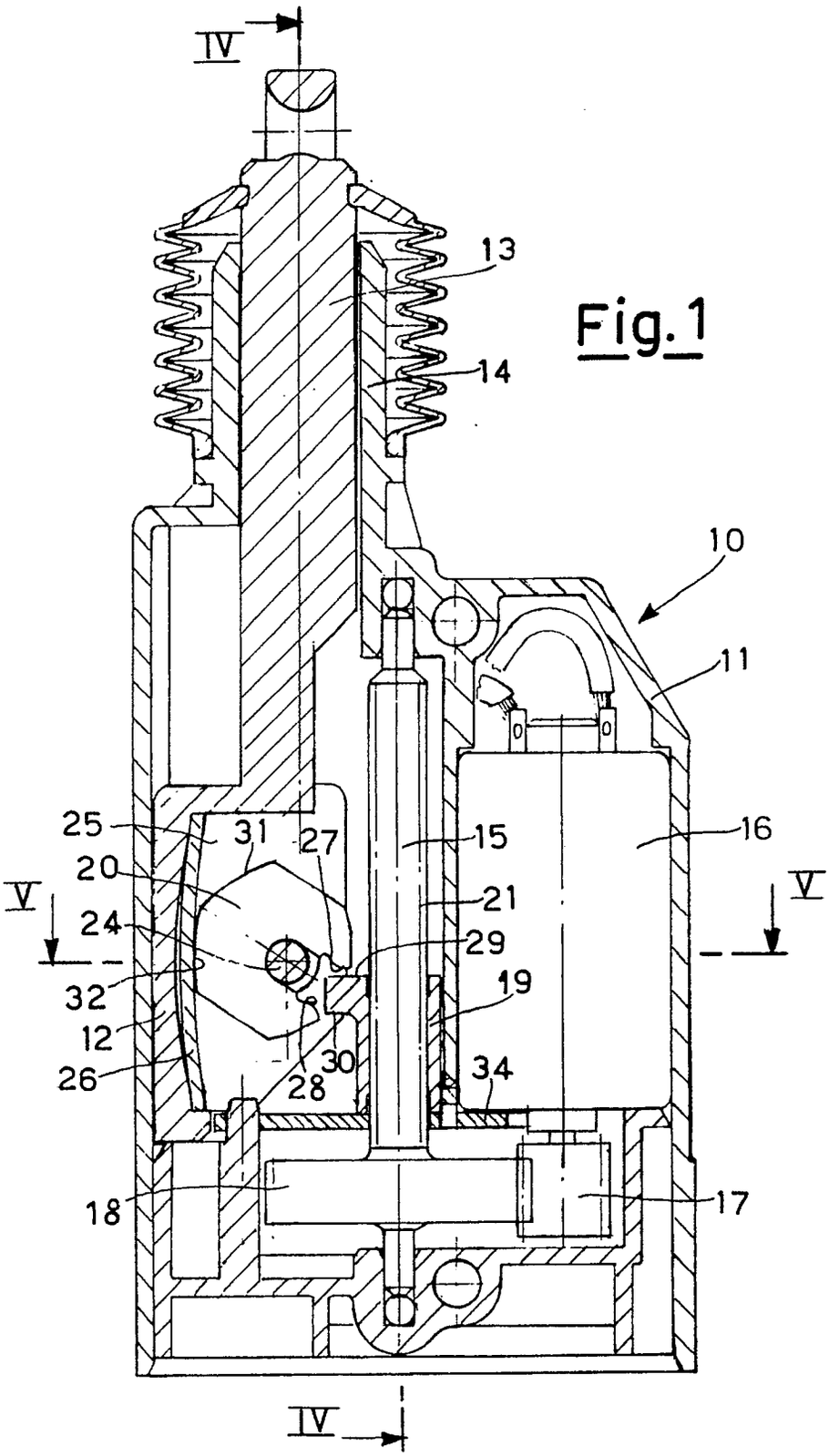
In addition the pins 24 for pawl 20 recessed of one piece from the body of the arrangement eliminate a component and the relevant assembly operation.

Claims

1. Arrangement for actuation of motor vehicle door lock centralised closing system of the type comprising a door lock actuating shaft (13) projecting from a box housing (11) and moving between the up and down positions, an electro-motor (16) controlling the movement of the said shaft (13) through a kinetic chain comprising a releasable flexible pawl (20) connecting with the shaft (13) itself, characterised in that, the said pawl (20) is engaged in a slide (12) integral with the shaft (13) and cooperates with a cursor (19) through a first pair of operative faces (27,28) co-acting with a respective pair of faces (29,30) of the said cursor, the said pawl (20) also having a second pair of operative faces (31,32) cooperating with a leaf spring (26) located between the pawl (20) and a seating (25) of the said slide (12), so that, with the shaft (13) in the up position, the face (30) of the cursor (19) is engaged with the face (28). of pawl (20), which has its face (31) engaged with the leaf spring (26) to allow movement of the shaft (13), driven manually or by motorised means, into the down position where the face (29) of the cursor is engaged with face (27) of the pawl (20), which has its face (32) engaged with the leaf spring (26) to allow lifting of the shaft, driven manually or by motorised means, with the said cursor and slide cooperating with end stop means.

2. Arrangement according to claim 1, characterised in that, the said pawl (20) is mounted on pins (24) recessed of one piece out of the box (11).

3. Arrangement according to claim 1, characterised in that, the said kinetic chain comprises a screw (15) and a gear (18) over-moulded in plastic material onto a metal core (36).


IV
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IV

Fig.1

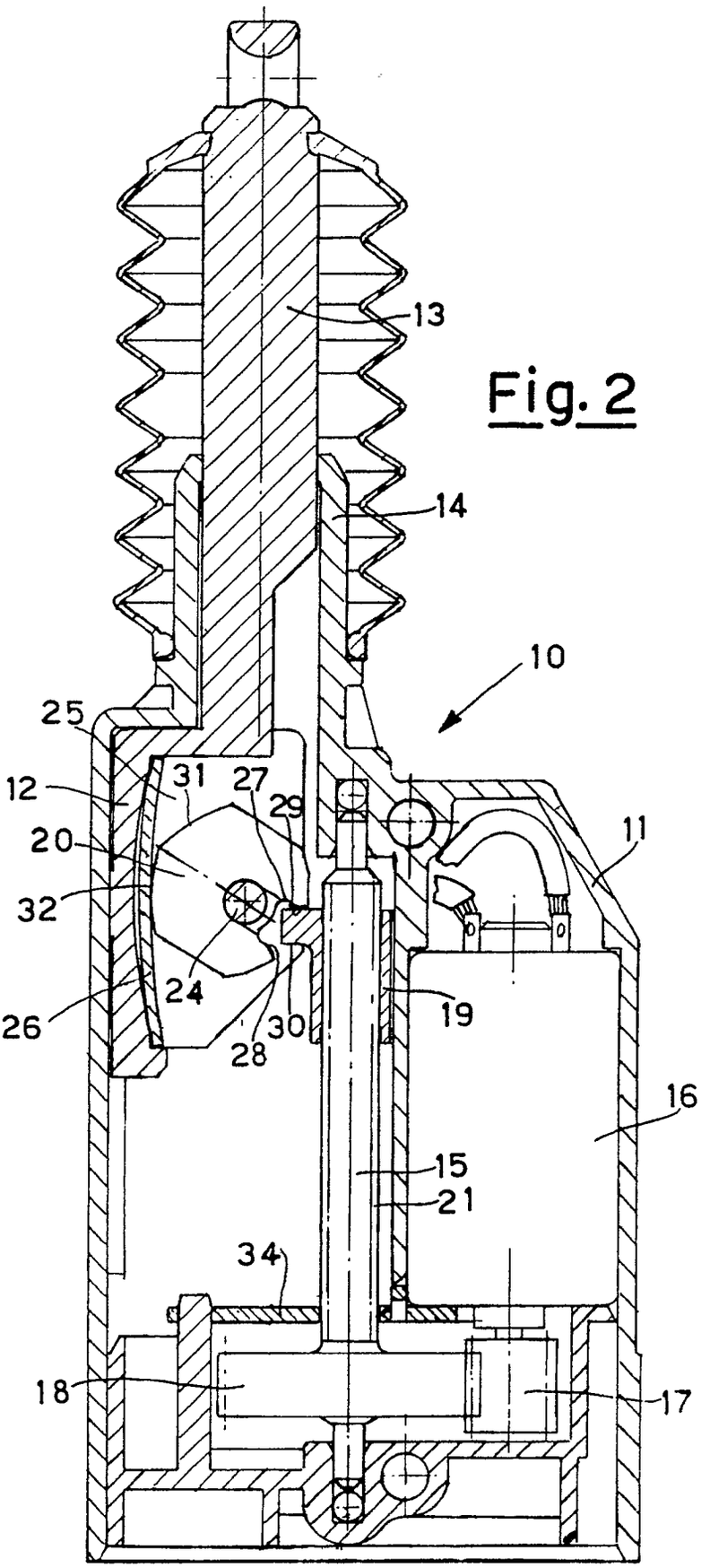


Fig. 2

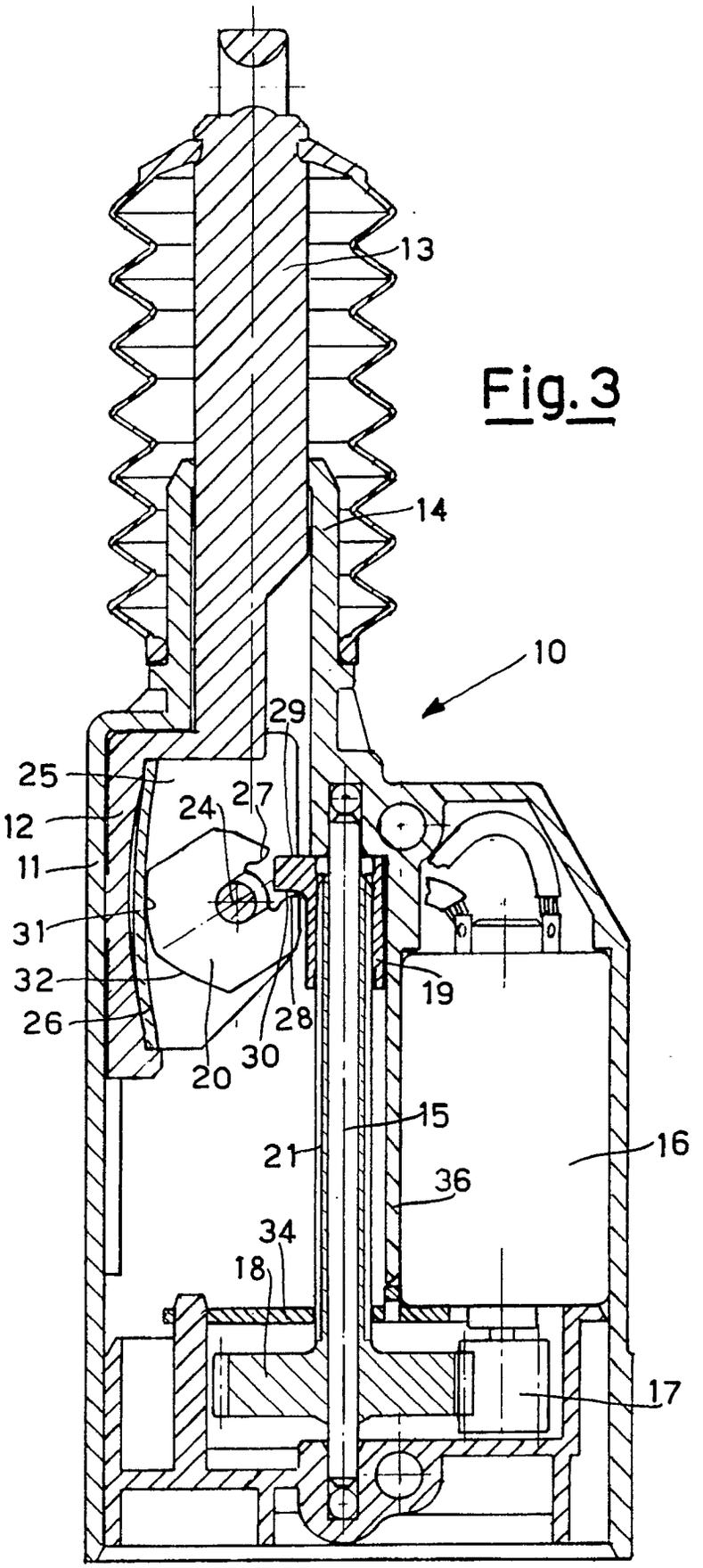


Fig.3

Fig.4

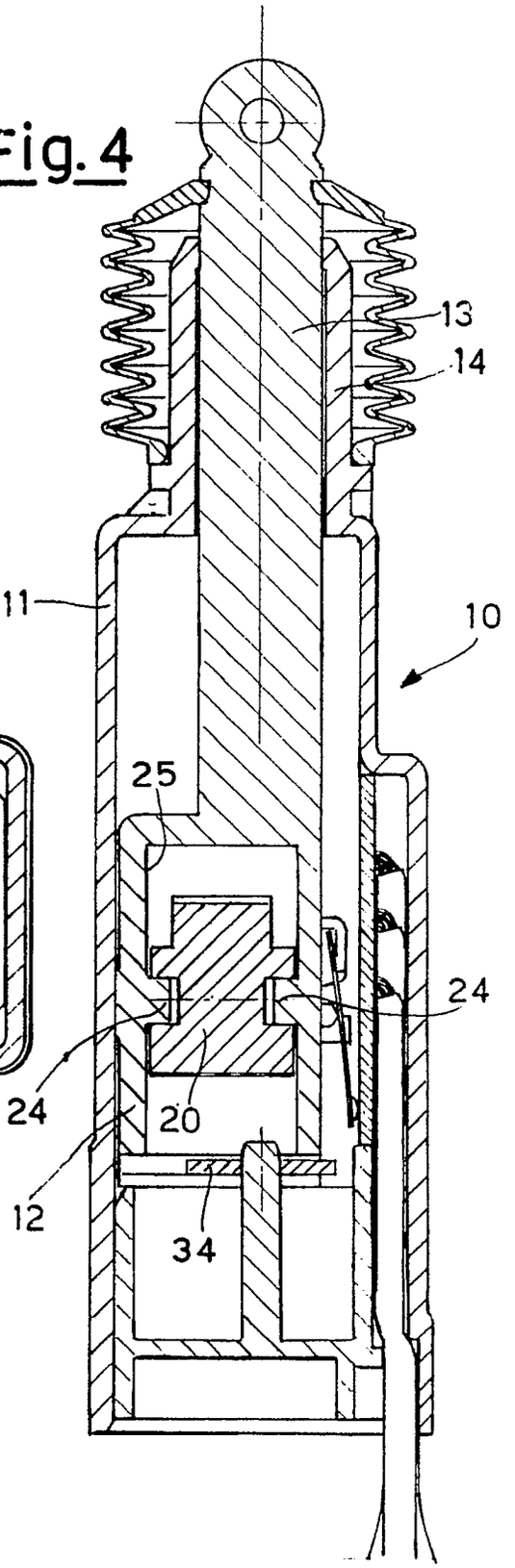
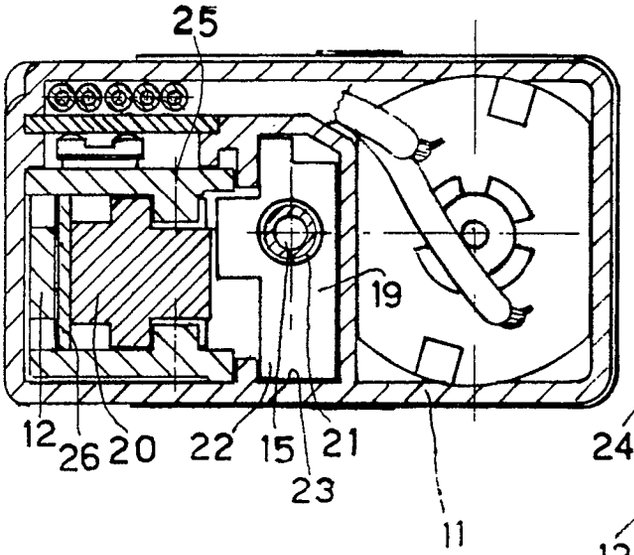


Fig.5



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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 91200654.1

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP - A3 - 0 281 671 (VDO ADOLF SCHINDLING AG) * Fig. 1-6; claim 1-20 *	1-3	E 05 B 65/20
A	FR - A1 - 2 596 096 (VACHETTE) * Fig. 1-6; claim 1-12 *	1-3	
A	FR - A1 - 2 546 218 (TROUILLET ET CHARDON) * Fig. 1-7; claim 1-6 *	1-3	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 05 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	17-05-1991	CZASTKA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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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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