



(11) Publication number : **0 668 424 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **95300999.0**

(51) Int. Cl.<sup>6</sup> : **E05B 55/06**

(22) Date of filing : **16.02.95**

(30) Priority : **18.02.94 FI 940761**

(72) Inventor : **Nabb, Peter**  
**SF-25860 Björkboda (FI)**

(43) Date of publication of application :  
**23.08.95 Bulletin 95/34**

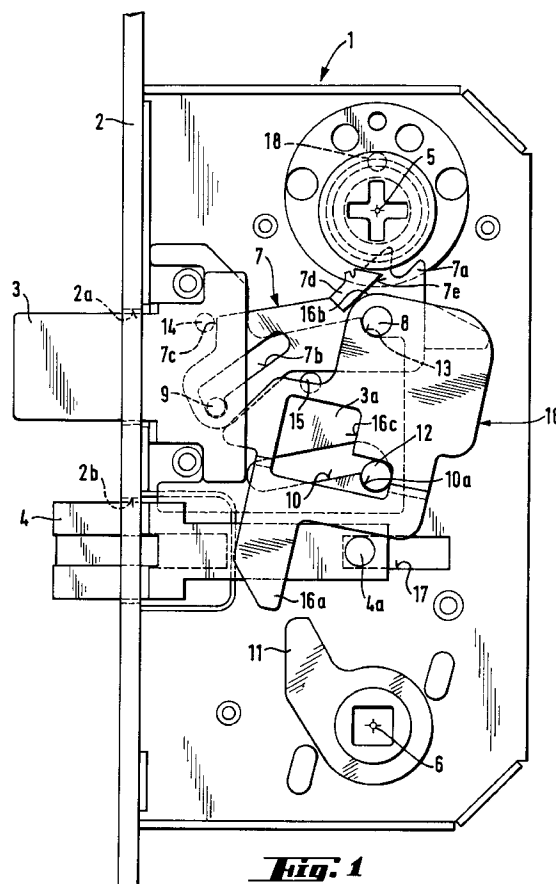
(74) Representative : **Newby, John Ross**  
**J.Y. & G.W. Johnson**  
**Furnival House**  
**14/18 High Holborn**  
**London WC1V 6DE (GB)**

(84) Designated Contracting States :  
**DE DK SE**

(71) Applicant : **BJÖRKBODA LAS OY AB**  
**SF-25860 Björkboda (FI)**

(54) **Door lock with a dead bolt and a latch bolt.**

(57) A lock mechanism includes a lock body (1) supporting a dead bolt (3) operated by a force transmission means from a first operating axis (5) at which a key-operated device can be installed and a latch bolt (4) operated by means of a follower (11) from a second operating axis (6) at which at least one door handle, turning knob or the like is installed. Force transmission from the follower (11) to the latch bolt (4) occurs through a force transmission piece (16) movably supported to the lock body (1). The force transmission means for the dead bolt (3) comprises a force transmission element (7) movable relative to the first operating axis (5) and arranged to move the force transmission piece (16) so that simultaneously as the dead bolt (3) is moved into its protruding locked position, the force transmission piece (16) is moved to disconnect the force transmission connection between the follower (11) and the latch bolt (4).



The invention relates to a lock mechanism equipped with a dead bolt and a latch bolt in accordance with the preamble of claim 1.

A door, which is equipped with a lock body including a separate dead bolt to be used as a locking bolt and a latch bolt to be operated by a door handle, can be subject to the following malfunction. When a person coming in from outside the door does not know whether the door is locked he first tries to open the door using the door handle. The draft seal of the door or possible warping thereof may allow the door to move somewhat on its hinges until the locking bolt acts to stop further opening of the door. At this point, however, the door frame may prevent the door handle-operated latch bolt from returning to its normal locking position, whereby the entire force urging the door towards the open position is directed against the locking bolt. As a consequence it may be difficult to withdraw the locking bolt because this bolt is now withholding the sealing force pressing the locking bolt against the door frame.

An aim of the invention is to provide an improved lock mechanism which prevents the above-noted malfunction occurring yet which is uncomplicated in design and construction and has unimpaired functional security.

The aim of the invention is achieved with the arrangement set out in claim 1 and in the other claims. In accordance with the invention, there is provided a lock mechanism including a lock body supporting a dead bolt operated by a force transmission means from a first operating axis at which a key-operated device can be installed to move between a protruding locked position and a withdrawn open position and a latch bolt operated by means of a follower from a second operating axis at which at least one turnable handle, knob or the like can be installed which is characterised in that force transmission from the follower to the latch bolt occurs through a force transmission piece movably supported to the lock body, and in that the force transmission means for the dead bolt comprises a force transmission element movable relative to the first operating axis and arranged to move the force transmission piece so that simultaneously as the dead bolt is moved into its protruding locked position, the force transmission piece is moved into a position in which the force transmission connection from the follower to the latch bolt require to move the latter, can no longer be established.

Thus, with a lock mechanism according to the invention, it is impossible to operate the latch bolt by means of a handle or knob operating via the second operating axis if the dead bolt is in its locked position.

A constructionally advantageous arrangement can be secured if the force transmission piece is plate-like and is supported to turn coaxially with said force transmission element. In this case the force transmission element may comprise a guiding mem-

ber extending in the direction of a turning axis of the force transmission element and acting on a curved guiding surface provided on said force transmission piece so that the force transmission piece is positively guided in accordance with the movements of the force transmission element.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows an embodiment of a lock mechanism according to the invention with the lock body shown opened to reveal its contents, with both bolts in their protruding position and with the force transmission means between the latch bolt and the follower for the latch bolt shown disconnected, and

Figure 2 shows the lock mechanism of Figure 1 with the dead bolt withdrawn and with the force transmission means between the follower and the latch bolt shown connected.

In the drawings, 1 indicates a lock body to be installed in a door or the like which is provided with a front plate 2, which includes an opening 2a for a dead bolt 3 and an opening 2b for a latch bolt 4. The lock body 1 has a first operating axis 5, at which at least on the outer side of the door a key operated operating device (not shown), for instance a cylinder lock, can be installed for operating the dead bolt 3. For this purpose the lock body 1 includes a force transmission element 7 turnably supported on a pin 8 and having a bifurcated member 7a to receive a pin 18 turnable about the operating axis 5 to provide bolt-moving thrust to the element 7 and a guiding groove 7b to convey that thrust to a pin 9 for withdrawing the dead bolt 3.

The dead bolt 3 includes a plate-like member 3a, which is provided with the pin 9 and further stationary pins 14 and 15, a stop surface 13 and a guiding groove 10 including a stop surface 10a. In this case dead-locking of the dead bolt 3 is accomplished by means of several different members independent of each other so that the stop surface 10a cooperates with a pin 12 in the lock body 1, the stop surface 13 cooperates with the pin 8 in the lock body and additionally the pin 14 of the dead bolt cooperates with a stop surface 7c on the force transmission element 7.

Withdrawing the dead bolt 3 from its protruding locked position shown in Figure 1 is accomplished via the guiding groove 7b in the force transmission element 7 acting on the pin 9 in the dead bolt plate 3a. Before actual withdrawal can occur, however, dead-locking of the dead bolt 3 must be released. This is achieved by ensuring that at the same time as the force transmission element 7 is turned by pin 18, the stop surface 7c moves from behind the pin 14 into its releasing position. Releasing of the dead-locking provided by the stop surface 10a and the pin 12 on the one hand and the stop surface 13 and the pin 8 on the

other hand, requires a moving of the plate-like member 3a of the dead bolt slightly in the direction of the front plate 2 of the lock housing and then downwards in Figure 1. These movements are accomplished by a shaping of the guiding groove 7b which acts on the pin 9 and by additionally arranging for the force transmission element 7 to act on the pin 15 in the dead bolt member 3a. A withdrawing movement of the dead bolt 3 can now be made, this being guided by the guiding groove 7b and the pin 9 and by the guiding groove 10 and the pin 12.

The latch bolt 4 is provided with a pin 4a, which receives its guidance from a guiding groove 17 in the lock body. The lock body also includes a second operating axis 6 at which a door handle (not shown), turning knob or the like, can be mounted to move the latch bolt 4 into its withdrawn position by means of a follower 11. For this purpose the lock body includes a plate-like force transmission piece 16 turnably supported on the pin 8 and having a cam 16a, which acts on the pin 4a in the latch bolt. Thus, the follower 11 is in force transmitting engagement with the latch bolt 4 only through the cam 16a, which is shown in Figure 2 in a position where it can act to transmit force from the door handle to the latch bolt 4. It will be noted that in Figure 2 the dead bolt 3 is in its withdrawn position to allow opening of the door.

The force transmission piece 16 can be turned by means of the force transmission element 7 into the position shown in Figure 1, where the cam 16a remains outside the range of the turning movement of the follower 11. In this position force transmission from the operating axis 6 to the latch bolt 4 is impossible and the bolt 4 can be withdrawn only by first moving the dead bolt 3 from the operating axis 5 into its withdrawn position as shown in Figure 2.

In practice, in accordance with the embodiment of lock mechanism illustrated, turning of the force transmission piece 16 from one position into another is accomplished under positive guidance by means of the force transmission element 7. For this purpose the force transmission element 7 is provided with a protrusion 7d extending in the direction of its turning axis and including a guiding surface 7e, which acts on a guiding surface 16b arranged on the force transmission piece 16. Thus, when the dead bolt 3 is moved into its protruding locked position, simultaneously, the means for force transmission from the operating axis 6 to the latch bolt 4 is disconnected, and *vice versa*. On the other hand, withdrawing of the dead bolt 3 does not as such also move the latch bolt 4, but it does accomplish turning of the force transmission piece 16 so that the cam 16a thereof is moved into a position where it can be contacted by the follower 11 thus enabling force transmission from the operating axis 6 to the latch bolt 4 to be reestablished.

The force transmission piece 16 is provided with an opening 16c for the pin 12. Movement of the force

transmission piece 16 into the position shown in Figure 1 to disconnect force transmission from the axis 6 can be accomplished in some other way, for instance by means of a spring. A positively guided operation, however, appears to provide a functionally more secure solution. Movement of the latch bolt 4 into its protruding position is conventionally accomplished by means of a spring (not shown).

The invention is not to be considered as being limited to the embodiment illustrated since several variations thereof are feasible including variations which have features equivalent to, but not necessarily literally within the meaning of, features in any of the following claims.

### Claims

1. A lock mechanism, including a lock body (1) supporting a dead bolt (3) operated by a force transmission means from a first operating axis (5) at which a key-operated device can be installed to move between a protruding locked position and a withdrawn open position and a latch bolt (4) operated by means of a follower (11) from a second operating axis (6) at which at least one turnable handle, knob or the like can be installed, **characterised in that** force transmission from the follower (11) to the latch bolt (4) occurs through a force transmission piece (16) movably supported to the lock body (1), and in that the force transmission means for the dead bolt (3) comprises a force transmission element (7) movable relative to the first operating axis (5) and arranged to move the force transmission piece (16) so that simultaneously as the dead bolt (3) is moved into its protruding locked position, the force transmission piece (16) is moved into a position in which the force transmission connection from the follower (11) to the latch bolt (4) required to move the latter, can no longer be established.
2. A lock mechanism according to claim 1, **characterised in that** the force transmission piece (16) is plate-like and is supported to turn about the same axis (8) as the force transmission element (7).
3. A lock mechanism according to claim 1 or claim 2, **characterised in that** the movements of the force transmission piece (16) are positively guided by the force transmission element (7).
4. A lock mechanism according to claim 3, **characterised in that** the force transmission element (7) provides a guiding surface (7e) extending in the direction of a turning axis of the force transmission element (7) and acting on a curved guid-

ing surface (16b) provided on the force transmission piece (16).

5. A lock mechanism according to claim 4, **characterised in that** the guiding surface (7e) is formed on a protrusion (7d) of the transmission element (7).

5

10

15

20

25

30

35

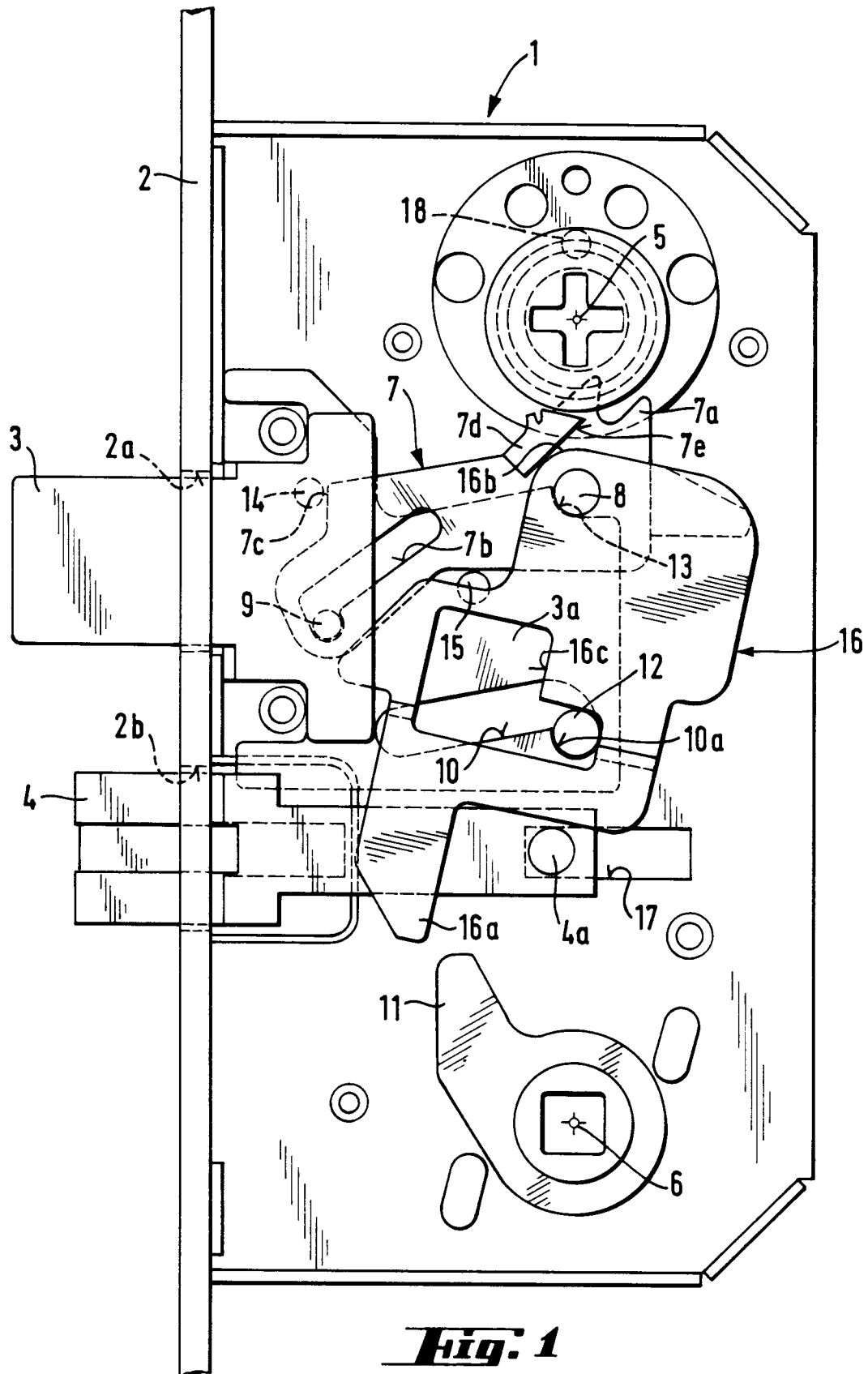
40

45

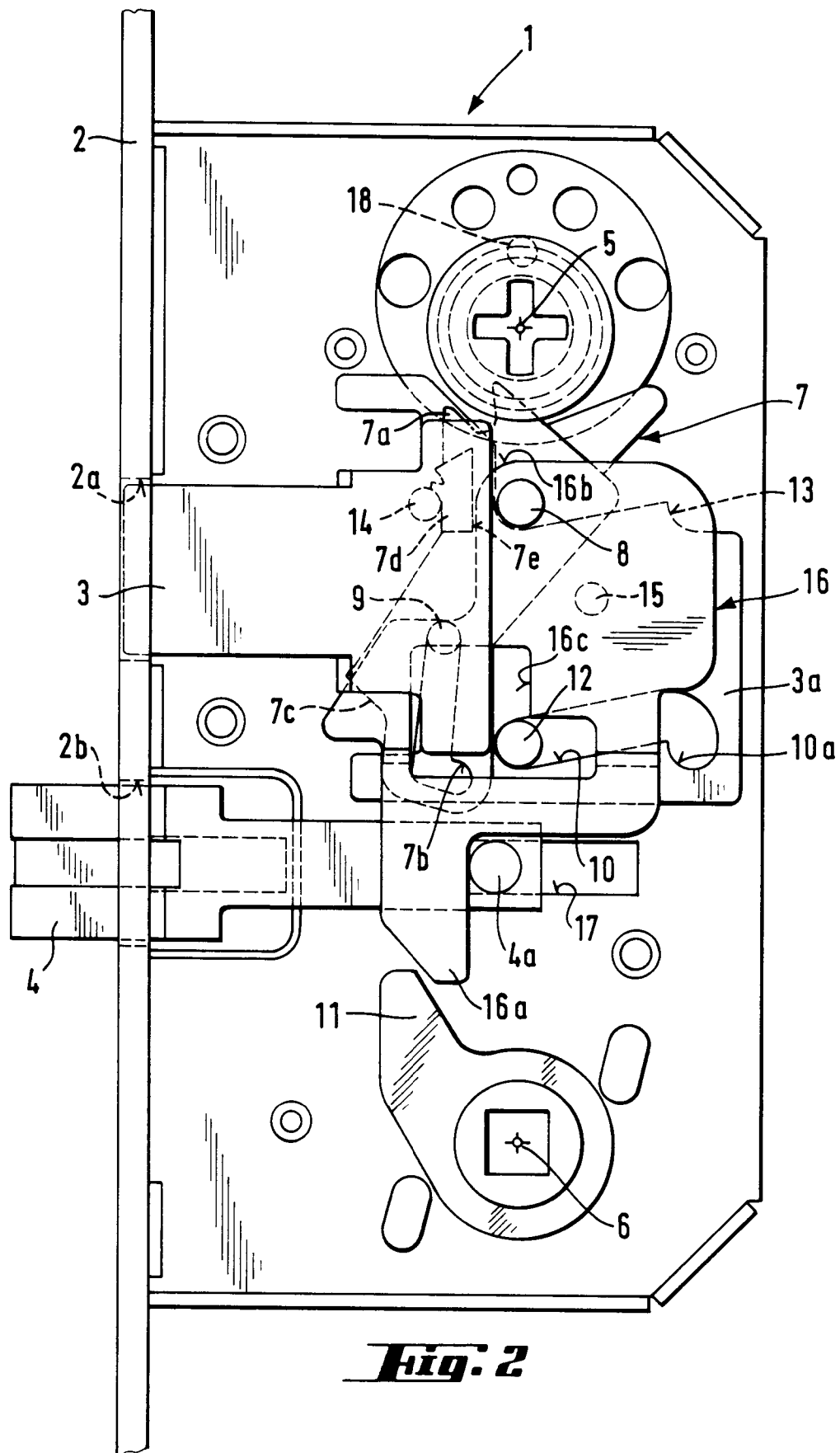
50

55

**4**



**Fig. 1**





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 95 30 0999

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB-A-2 134 170 (NORCROS INVESTMENTS LTD.) 8 August 1984 * abstract * * page 1, right column, line 110 - line 117; figure 1 *	1	E05B55/06
A	---	2-5	
X	US-A-3 990 277 (MULLICH) 9 November 1976 * abstract *	1	
A	---		
A	US-A-3 808 849 (ALEXANDER) 7 May 1974 ---		
A	DE-A-11 30 323 (DOERPINGHAUS) 24 May 1962 ---		
A	GB-A-2 268 969 (TALLERES DE ESCORIAZA SA) 26 January 1994 -----		
The present search report has been drawn up for all claims			<b>TECHNICAL FIELDS SEARCHED (Int.Cl.6)</b>  E05B E05C
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>29 May 1995</b>	Examiner <b>Soederberg, J</b>
<b>CATEGORY OF CITED DOCUMENTS</b> 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 03.92 (P04CON)