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(11) **EP 1 045 349 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.10.2000 Bulletin 2000/42

(51) Int. Cl.⁷: **G07D 11/00, B65H 1/02**

(21) Application number: **00301659.9**

(22) Date of filing: **01.03.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **08.03.1999 SE 9900810**

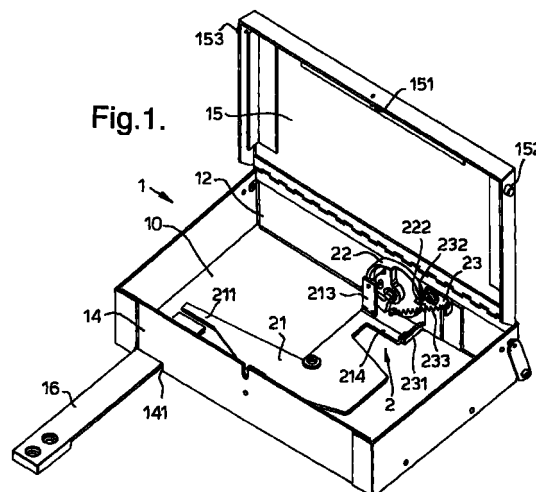
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(54) **A cassette locking mechanism**

(57) A lock mechanism (2) for a cassette (1) that is intended to be inserted into and removed from a banknote handling machine while in a locked state, wherein when the cassette (1) is inserted into the machine with a lid (15) of said cassette closed and locked, the cassette lid (15) is released by automatic actuation from elements (16,212, 142) in said machine and said lock mechanism (2) and raised as a result of the coaction between elements (152,153) on the lid (15) and in the machine, and wherein when the cassette (1) is removed from the machine the cassette lid (15) is closed as a result of corresponding coaction between said elements (152,153) and is locked by corresponding actuation from said elements (16,212,142) in the machine and said lock mechanism. The lock mechanism (2) includes on an inside (12) of the cassette (1) a rotor (22) which can be actuated by elements (232,233) in the lock mechanism, and a sealable turning device (225) provided on an outside (12') of the cassette (1). Said turning device can be turned from outside said cassette to mechanically actuate said rotor. The turning device (225) can not be actuated by movements of the rotor (22) during said actuation by means of the elements (232,233) in the lock mechanism (2). The rotor (22) can be actuated by the turning device (225) outside the cassette to reset the rotor (22) to a state in which the cassette (1) can be inserted into the machine with the lid (15) of the cassette closed and locked.



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Description

[0001] The present invention relates to a lock mechanism for a cassette which is intended to be inserted into and removed from a banknote handling machine while in a locked state. More specifically, the invention relates to a lock mechanism which is designed so that when the cassette is inserted into the machine with the cassette lid closed and locked, the cassette lid is released by automatic actuation from elements in the lock mechanism and opened in response to the coaction between elements on the lid and elements in said machine, and such that when the cassette is removed from the machine, the cassette lid is closed as a result of corresponding coaction between said elements on said lid and in said machine and the cassette is locked by corresponding actuation from said lock mechanism elements.

[0002] Earlier known cassettes of the aforementioned kind have often been designed so as to require access to a separate so-called loading frame in order to open a locked cassette externally of a banknote handling machine. By loading frame is meant in this document a plate on which there is mounted a probe for actuating the cassette locking mechanism. This requirement of a separate loading frame has been considered a drawback in practice in some cases.

[0003] The object of the present invention is to eliminate this drawback, among other things.

[0004] A lock mechanism of the aforementioned kind includes on the inside of the cassette a rotor which can be actuated by elements in the lock mechanism, and includes on the outside of the cassette a sealable rotor-actuating rotatable turning device.

[0005] This construction enables the cassette to be opened outside the banknote handling machine without requiring the aid of any type of probe or key. Because the rotor and activator in the lock mechanism are essentially balanced-out around their respective bearing points, the risk of a locked cassette being opened should it be dropped or subjected to violence is extremely slight.

[0006] The invention will now be described in more detail with reference to the accompanying schematic drawings, in which

Fig. 1 is an oblique front view of a cassette that incorporates a lock mechanism;

Fig. 2 is an oblique rear view of the cassette shown in Fig. 1;

Fig. 3 illustrates an activator included in the lock mechanism;

Fig. 4 illustrates an arm included in the lock mechanism;

Fig. 5 illustrates a latch means included in the lock mechanism;

Fig. 6 illustrates turning element included in the lock mechanism;

Fig. 7 is an oblique front view of a rotor included in the lock mechanism; and

Fig. 8 is an oblique rear view of the rotor shown in Fig. 7.

[0007] Fig. 1 illustrates a cassette 1 which includes a lock mechanism 2 and which is shown in a state (closed and locked) in which the cassette is ready for insertion into a banknote handling machine (not shown); the cassette lid 15 will be closed and locked at this time, although it is shown raised so that the various elements of the lock mechanism can be clearly seen.

[0008] When inserting the cassette 1 into the machine with the cassette wall 14 first, a probe 16 fixedly mounted in the machine will protrude into a narrow opening 141 in the cassette wall 14 and thereby actuate a first arm 211 on an activator 21, which is rotatably mounted on the bottom 10 of the cassette, so as to turn the activator in a clockwise direction. Three events then take place.

[0009] Firstly, a first arm 142 connected to a second arm 212 on the activator 21 (see Fig. 2) will be turned anti-clockwise and therewith release a locking pin 151 fastened to the lid 15 (when the lid 15 is closed and locked, a hook 1421 on the first arm 142 prevents the lid from being opened). The lid 15 can therewith be opened.

Secondly, a guide pin 2131 attached to a third arm 213 on the activator 21 (see Fig. 3) moves into an intermediate slot or groove 221 on a rotor 22 movably mounted on the cassette wall 12; see Fig. 7.

[0010] Thirdly, a fourth arm 214 on the activator 21 causes a catch 23 to be turned anti-clockwise through the medium of an arm 231 on the catch 23 so that a hook 232 on the catch will move out of a notch 222 in the periphery of the rotor 22; see Figs. 5 and 7.

[0011] As the cassette 1 is withdrawn from the machine, the probe 16 entrains the activator 21, which is thus rotated anti-clockwise; the arm 142 is turned clockwise (see Fig. 2) and latches the locking pin 151 in the lid 15, while the guide pin 2131 moves into an outer groove or slot 223 on the rotor 22, which is therewith rotated anti-clockwise through the action of a pull spring 233; see Fig. 1.

[0012] Should the removed and locked cassette 1 be reinserted immediately into the machine, the cassette cannot be unlocked and opened through the medium of the probe 16 because the present position of the rotor is such that the guide pin 2131 will be located in the upper end of the outer groove or slot 223 in the rotor, therewith locking the activator 21 against rotation.

[0013] As insertion of the cassette 1 into the machine is continued, the probe 16 is led over the activator arm 211, so that the end of the probe will lie close to the distal wall 12 of the cassette.

[0014] When the cassette 1 has been inserted into the machine correctly and the activator 21 has been turned clockwise, as before described, the cassette lid 15 will be opened slightly, about 5-10 mm when the locking pin 151 has been released, as a result of the coaction between two guide pins 152, 153 on the outer edges of the lid 15 and two cam grooves provided in the machine and co-operating with said guide pins.

[0015] Before a cassette removed from the machine can be opened, it is necessary to break a "seal" 224 on the outer side 12' of the cassette wall 12 and to rotate a knob-like means 225 (see Fig. 2) attached mechanically to the centre of the rotor anti-clockwise through an angle of about 180°, therewith bringing the rotor to a position in which the guide pin 2131 is located in the lower end 2233 of the outer groove or slot 223. The groove or slot has a decreasing radius in the direction of movement, which causes the activator 21 to be rotated and actuate the locking arm 142 so as to release the locking pin 151 and enable the lid to be opened.

[0016] Fig. 3 illustrates the activator 21 with its appendages or arms 211, 212, 213 and its guide pin 2131 and arm 214. The configuration of the activator is partially governed by the wish to balance the activator so that the activator can be caused to carry out its function simply by swinging round the cassette as a whole.

[0017] Fig. 4 shows the arm 142 and its hook 1421.

[0018] Fig. 5 shows the catch 23 with its arm 231 and hook 232.

[0019] Fig. 6 illustrates the turning device 225 which is coupled mechanically to the rotor 22 and which includes a lug 2252 provided with a central hole. The lug 2252 and a lug 224 attached mechanically on the outside 12' of the cassette wall together form means for securing the aforesaid "seal". The lug 224 has a hole 2241 which is positioned closely adjacent the hole in the lug 2252 when the cassette is closed and locked. When the cassette is closed and locked and situated outside the machine, there is normally applied to the cassette a seal in the form of, e.g., steel wire threaded through both holes and secured with a sealing plug.

[0020] Fig. 7 shows the rotor 22 from within the cassette, while Fig. 8 shows the same rotor as seen from its rear side. The pull spring 233 is fastened to the attachment means 224 at the bottom of the rotor in a manner such as to cause the rotor to attempt to rotate anti-clockwise. The position in which the guide pin 2131 is located in the grooves or slots 221 and 223 to the left in Fig. 7 determines the status of the mechanism at that moment in time. There are four possible states of the mechanism: A) the cassette is locked and ready for insertion into the banknote handling machine; B) the cassette is open in the banknote handling machine; C)

the cassette is locked externally of the machine; and D) the cassette is open externally of the machine.

[0021] In state A) the guide pin is located in the centre of the outer curve 2231 (broken line) and the latch hook 232 is located in the notch 222 and therewith holds the rotor 22 in position.

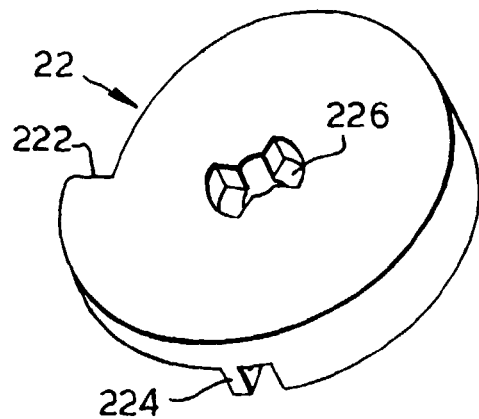
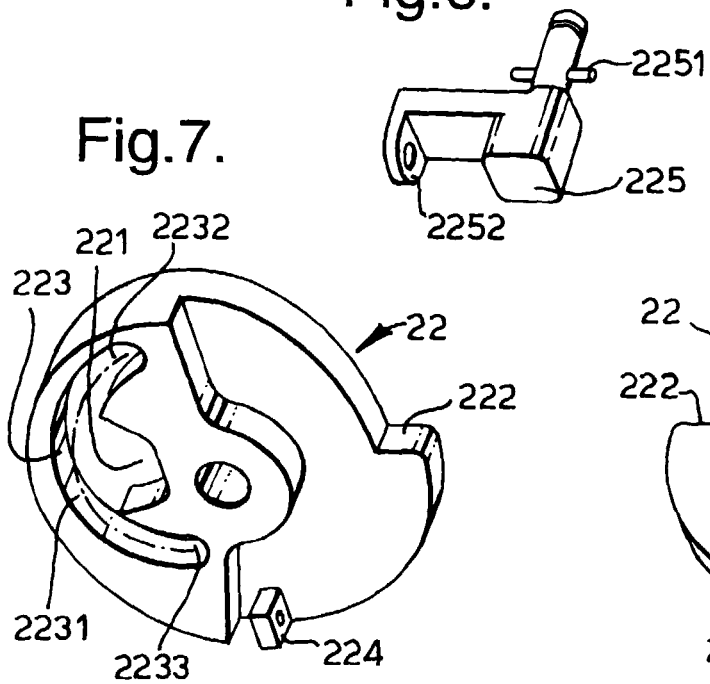
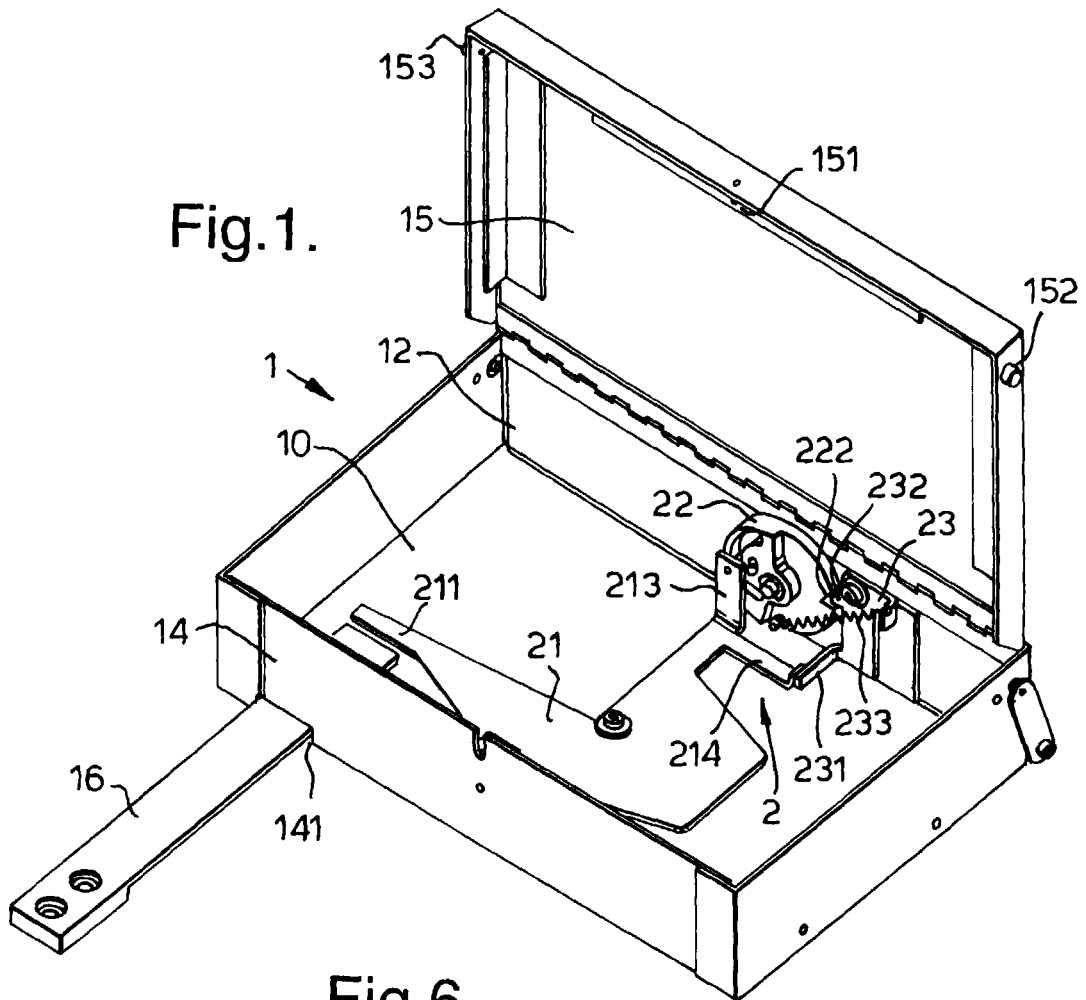
[0022] In state B) the rotor 22 and the activator 21 have rotated so that the guide pin 2131 is located in the upper right hand corner of the centre slot or groove 221. Rotation of the rotor has been made possible by virtue of the fourth arm 214 of the activator 21 pushing the latch hook 232 out of the notch 222 on the rotor.

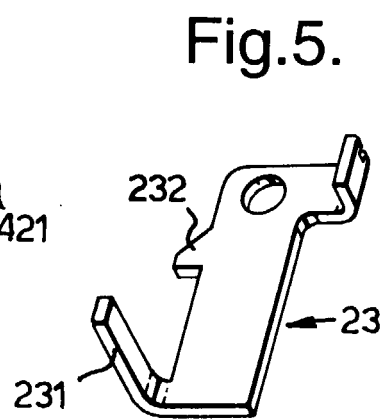
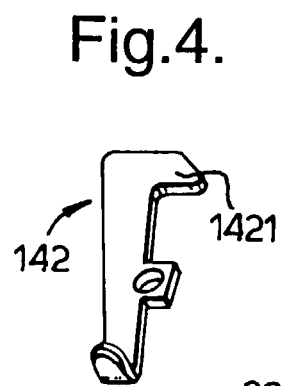
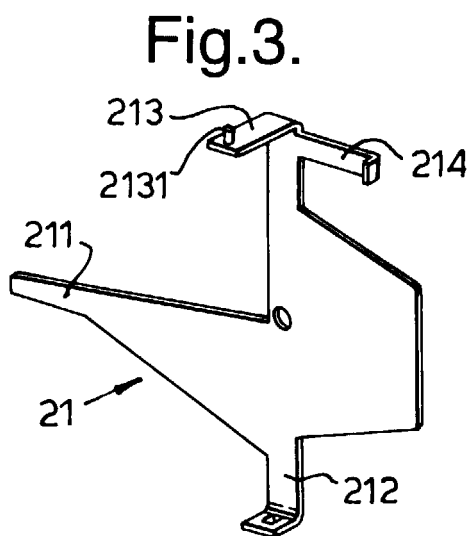
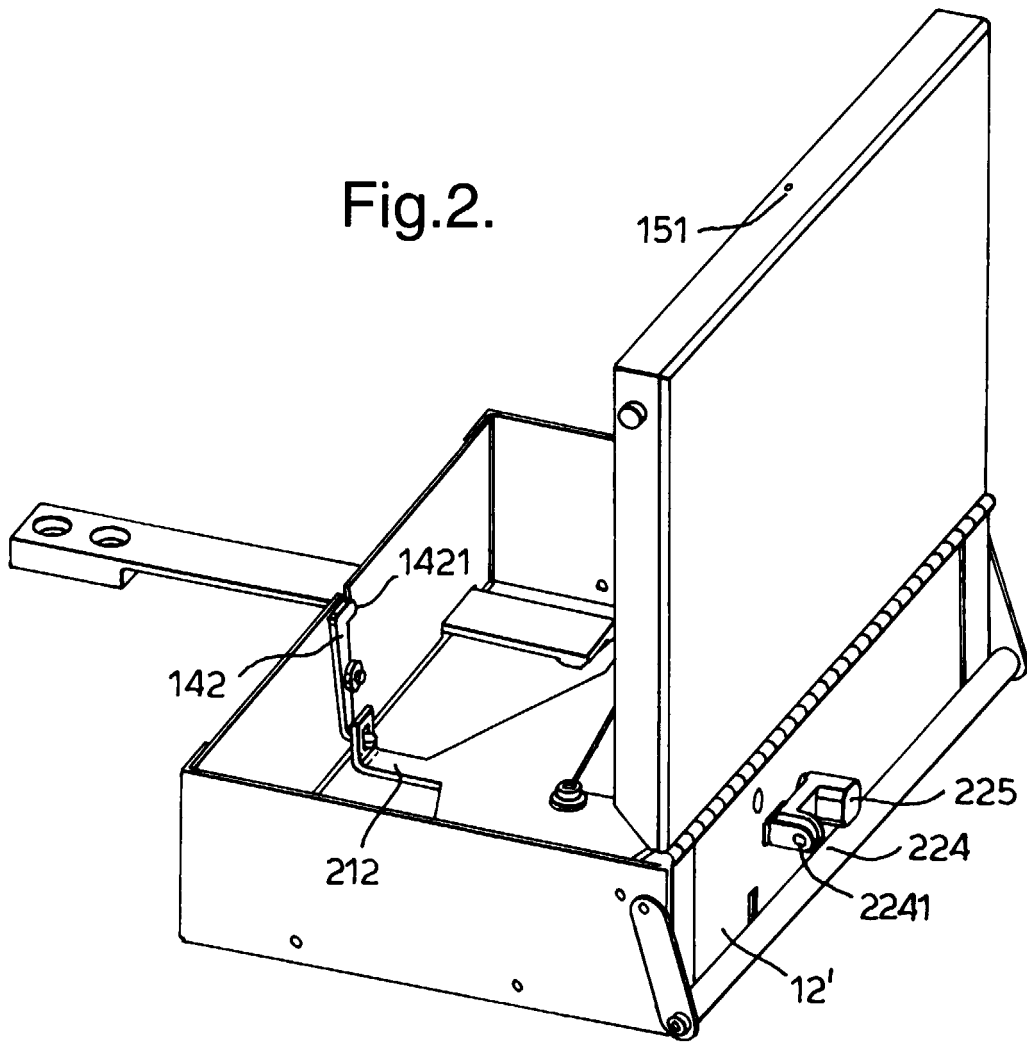
[0023] In state C) the activator 21 has been rotated back to its original position and the rotor 22 has been rotated further in an anti-clockwise direction, so that the guide pin 2131 is located in the upper end 2232 of the outer groove or slot 223. The activator 21 is locked in this position and cannot be rotated, i.e. the cassette cannot be opened with the probe 16.

[0024] In state D) the rotor 22 has been rotated clockwise with the aid of the turning device 225, such as to position the guide pin 2131 in the lower end 2233 of the outer groove or slot 223. Since the radius of the groove or slot decreases in the direction of movement, the activator 21 will have been rotated by said movement so as to cause the arm 142 to release the lid. The radial distance of the guide pin to the centre of the rotor determines whether the arm 142 lies over the locking pin 151 or not. The shorter the centre distance, the greater the angle through which the arm has been rotated away from the locking pin. As will be seen from Fig. 8, a pin 2251 mounted on the turning device 225 extends in a groove or slot 226 in the rotor 22 and functions to transfer movement of said turning device 225 to the rotor 22. The groove or slot 226 includes an angle of 85°, so that the turning device 225 will not be actuated by rotation of the rotor 22 between state A) and state C. More specifically, the turning device 225 is seated on a torsion spring (not shown) which acts so that the turning device stands horizontally, as shown in Fig. 2. When in this position the turning device 225 is prevented from rotating clockwise by a bead on the outside of the wall 12. As before mentioned, the rotor 22 is coupled to the turning device 225 by the pin 2251 which runs in the groove or slot 226 on the rear side of the rotor. The groove, or slot, includes an angle which corresponds to the angle through which the rotor rotates between state A) and state C). If movement of the turning device 225 is counter-directional to said movement of the rotor 22, the rotor will be influenced by movement of the turning device. Thus, when wishing to open the cassette, the turning device is rotated anti-clockwise through an angle of about 160° from state C) to state D). Movement of the turning device is then counter-directional to the earlier rotation of the rotor. The cassette can be opened in this way, even when the mechanism is in state A).

Claims

1. A lock mechanism (2) for a cassette (1) that is intended to be inserted into and removed from a banknote handling machine while in a locked state, wherein when the cassette (1) is inserted into the machine with a lid (15) of said cassette closed and locked, the cassette lid (15) is released by automatic actuation from elements (16, 212, 142) in said machine and said lock mechanism (2) and raised as a result of the coaction between elements (152, 153) on the lid (15) and in the machine, and wherein when the cassette (1) is removed from the machine the cassette lid (15) is closed as a result of corresponding coaction between said elements (152, 153) and is locked by corresponding actuation from said elements (16, 212, 142) in the machine and said lock mechanism, **characterised** in that the lock mechanism (2) includes on an inside (12) of the cassette (1) a rotor (22) which can be actuated by elements (232, 233) in the lock mechanism, and a sealable turning device (225) provided on an outside (12') of the cassette (1), wherein said turning device can be turned from outside said cassette to mechanically actuate said rotor, wherein the turning device (225) can not be actuated by movements of the rotor (22) during said actuation by means of the elements (232, 233) in the lock mechanism (2), and wherein the rotor (22) can be actuated by the turning device (225) outside the cassette to reset the rotor (22) to a state in which the cassette (1) can be inserted into the machine with the lid (15) of the cassette closed and locked.
2. A lock mechanism according to Claim 1, **characterised** in that the rotor (22) is adapted for rotation in a given direction (e.g. anti-clockwise from a starting position (A) to more than one subsequent, distinct intermediate position (B, C) through the medium of elements in the lock mechanism (232, 233, 213); and in that the turning device (225) is adapted to rotate the rotor (22) in an opposite direction (clockwise) from a last intermediate position (C) back to a position (D) nearest the starting position (A).







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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 1659

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Place of search MUNICH		Date of completion of the search 30 June 2000	Examiner Friedrich, A
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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