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### (54) Lock Mechanisms

(57) A lock mechanism is provided having a security device (17) such that if a component (15) of the mechanism is removed by unauthorised means, the lock mechanism is jammed in the locked position. In a specific embodiment, the component (15) comprises a back

plate having a pin (16) which normally holds a jamming lever (17) in a raised position. If the back plate (15) is removed, this also removes the pin (16) and the jamming lever (17) drops into a position in which it engages a shoulder (20) on a dead bolt (12), maintaining the dead bolt in the locked position.

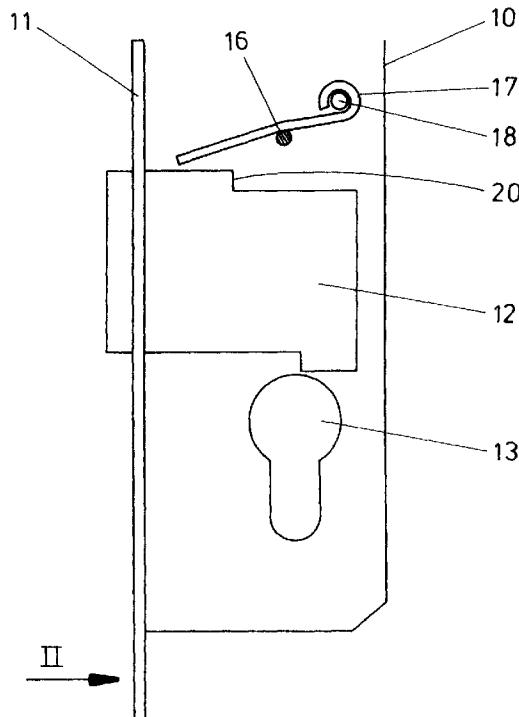


FIG. 1

## Description

The invention relates to lock mechanisms.

Locks commonly used in PVC doors and some wooden or composite type doors, generally have a latch to hold the door closed, a door handle to operate the latch so as to open the door or to pull the door closed and a dead bolt operated by the use of a key. The dead bolt locks the door in its frame and prevents operation of the lock by use of the door handle.

These door locks are strong and generally effective, but we have appreciated that there is a possible attack area from the security point of view. Even when a door as described is closed and deadlocked by means of a key, it may be possible to remove a component of the lock to achieve unauthorised unlocking of the lock. For example, it may be possible to break off a back plate carrying the external door handle by inserting a screw driver or similar implement between the back plate and the door and levering the back plate away from the door. Now that this possible attack area has been appreciated, the obvious solution would be to use much stronger mounting screws for the back plate and fit anti-drill door handles and back plates, but this would make the existing locks much more expensive and the cost would probably only be justified for high security applications.

Once the back plate has been removed, the exposed lock barrel can be twisted and broken away to leave a large hole in the lock case allowing access to the internal parts of the dead bolt mechanism. A device can be inserted into the hole to pull the dead bolt back allowing the door to operate as if not locked.

We have devised a relatively inexpensive modification to existing door locks which overcomes or reduces the above mentioned problem.

The invention provides a lock mechanism having a security device such that if a component of the mechanism is removed by unauthorised means, the lock mechanism is jammed in the locked position.

The component may for example comprise a lock cylinder, unauthorised removal of the lock cylinder causing the lock mechanism to be jammed in the lock position.

Alternatively, the component may comprise an external back plate, the back plate cooperating with the lock mechanism such that if the back plate is removed from the lock mechanism, the lock mechanism is jammed in the locked position.

The lock mechanism may have a jamming member biased into a jamming position, the jamming member normally being retained in an unjamming position, against the action of the bias, by a member extending from the component into the lock mechanism.

The member extending from the component may comprise a pin.

The jamming member may be biased into the jamming position by gravity.

The jamming member may comprise a pivotally

mounted lever which, when the component is removed, drops into a position in which it engages with a shoulder on a dead bolt.

The jamming member may be shaped and/or positioned such that when it drops into the jamming position, it obscures any access hole into the locking mechanism thus reducing the risk that the locking mechanism can be reset by an unauthorised person.

By way of example, a specific embodiment of the invention will now be described, with reference to the accompanying drawings, in which :-

15 Figure 1 is a diagrammatic view of an embodiment of locking mechanism according to the invention, partly in section, looking from the exterior of the lock;

20 Figure 2 is a view of the lock mechanism shown in Figure 1, looking in the direction of arrow II of Figure 1;

25 Figure 3 is a view similar to Figure 1 but showing the lock mechanism after unauthorised entry has been attempted; and

30 Figure 4 is a view of the mechanism shown in Figure 3, looking in the direction of arrow IV of Figure 3.

The lock mechanism shown in the Figures has a 35 number of conventional prior art components which do not therefore need to be described. For the purposes of illustrating the invention it is only necessary to refer to the lock casing 10, face plate 11, dead bolt 12 and lock cylinder 13.

35 Figure 1 shows the lock mechanism in the unlocked position, with the dead bolt 12 withdrawn into the lock casing 10. A key can however be inserted into the lock cylinder 13 and be used to move the dead bolt 12 into a locking position in which it protrudes substantially from the face plate 11, as shown in Figure 3.

40 As can be seen from Figures 2 and 4, the exterior door handle 14 is mounted on a back plate 15. We have discovered that it is possible to break the back plate 15 away from the door and this leaves a sufficient length of 45 the lock cylinder 13 projecting such that the lock cylinder can be twisted and broken away with an appropriate tool, gaining access to the interior of the lock.

45 In this embodiment of the invention, a pin 16 projects from the back plate 15 to hold up, against gravity, a lever 17 which is pivotally mounted in the lock mechanism at 18.

50 If the back plate is broken away in the lock mechanism according to this invention, this withdraws the pin 16 through a hole 19 in the lock casing (see figure 3) and this in turn causes the lever 17 to drop down into a 55 position shown in Figures 3 and 4 in which the free end of the lever abuts a shoulder 20 on the dead bolt 12. Thus any attempt to tamper with the lock mechanism in

order to withdraw the dead bolt will fail because the shoulder 20 jams against the free end of the lever 17.

It will be seen that in the jammed position of Figure 3, the lever 17 obscures the hole 19 thus preventing unauthorised resetting.

The lock mechanism can only be reset from inside or outside by the use of special tools only available to the manufacturers locksmiths. Position jigs may be provided to show the correct position to drill a reset hole into the lock case allowing the device to be reset prior to door furniture being refitted. The device can vary in shape to offer different reset positions.

The above embodiment of the invention has been described with respect to the unauthorised removal of a back plate, by way of example only. Other embodiments of the invention are possible in which jamming of the lock mechanism in the locked position is brought about by unauthorised removal of some other component, for example unauthorised removal of a lock cylinder.

Furthermore, although the jamming of the lock mechanism is brought about in the specific embodiment by means of a lever 17 abutting a shoulder on a dead bolt, other forms of jamming component are possible. It is not essential that the jamming component acts directly on a dead bolt. A jamming component may for example be arranged to inter-engage with other moving parts of a lock mechanism, for example drive cogs or other components which move when the lock moves from a locked to an unlocked condition.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

## Claims

1. A lock mechanism having a security device such that if a component of the mechanism is removed by unauthorised means, the lock mechanism is jammed in the locked position.
2. A lock mechanism as claimed in Claim 1, in which the component comprises a lock cylinder, unauthorised removal of the lock cylinder causing the lock mechanism to be jammed in the locked position.
3. A lock mechanism as claimed in Claim 1, in which the component comprises an external back plate, the back plate cooperating with the lock mechanism such that if the back plate is removed from the lock mechanism, the lock mechanism is jammed in the locked position.
4. A lock mechanism as claimed in any one of the preceding claims, having a jamming member biased into a jamming position, the jamming member normally being retained in an unjamming position, against the action of the bias, by a member extending from the component into the lock mechanism.
5. A lock mechanism as claimed in Claim 4, in which the member extending from the component comprises a pin.
6. A lock mechanism as claimed in Claim 4 or Claim 5, in which the jamming member is biased into the jamming position by gravity.
7. A lock mechanism as claimed in any one of Claims 4 to 6, in which the jamming member comprises a pivotally mounted lever which, when the component is removed, drops into a position in which it engages with a shoulder on a dead bolt.
8. A lock mechanism as claimed in any one of Claims 4 to 7, in which the jamming member is shaped and/or positioned such that when it drops into the jamming position, it obscures any access hole into the locking mechanism thus reducing the risk that the locking mechanism can be reset by an unauthorised person.

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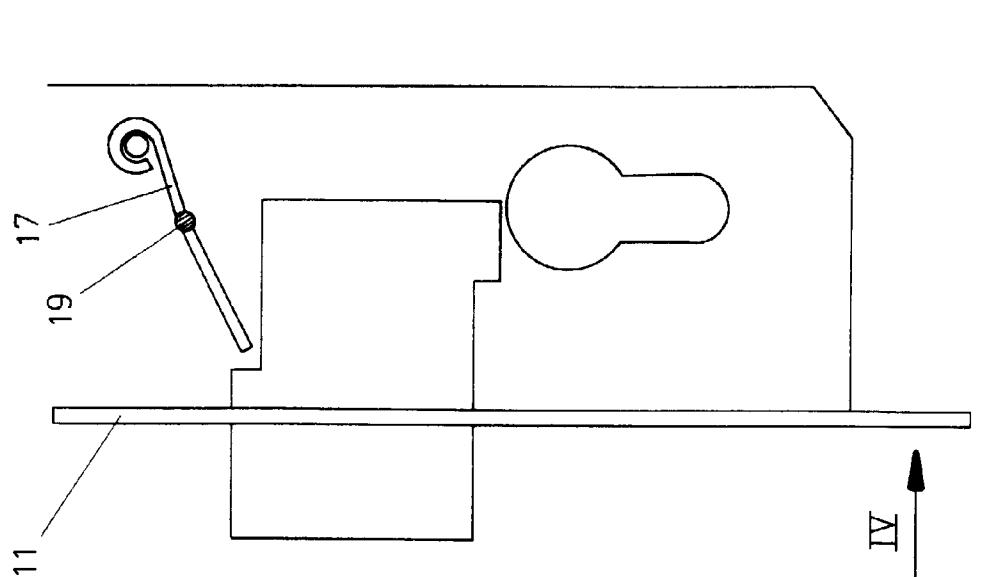
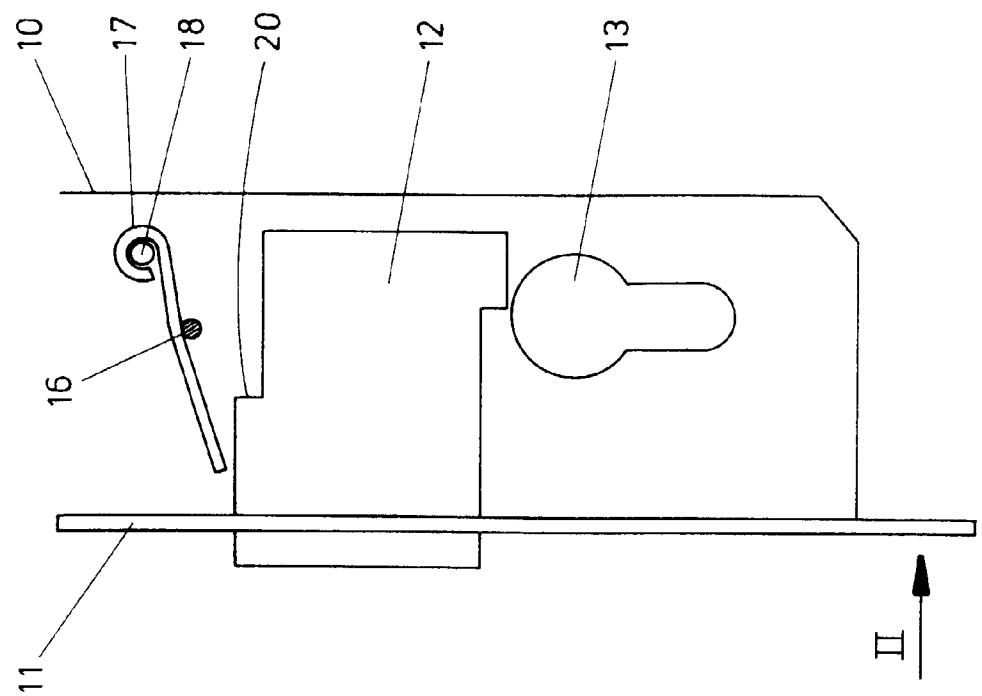
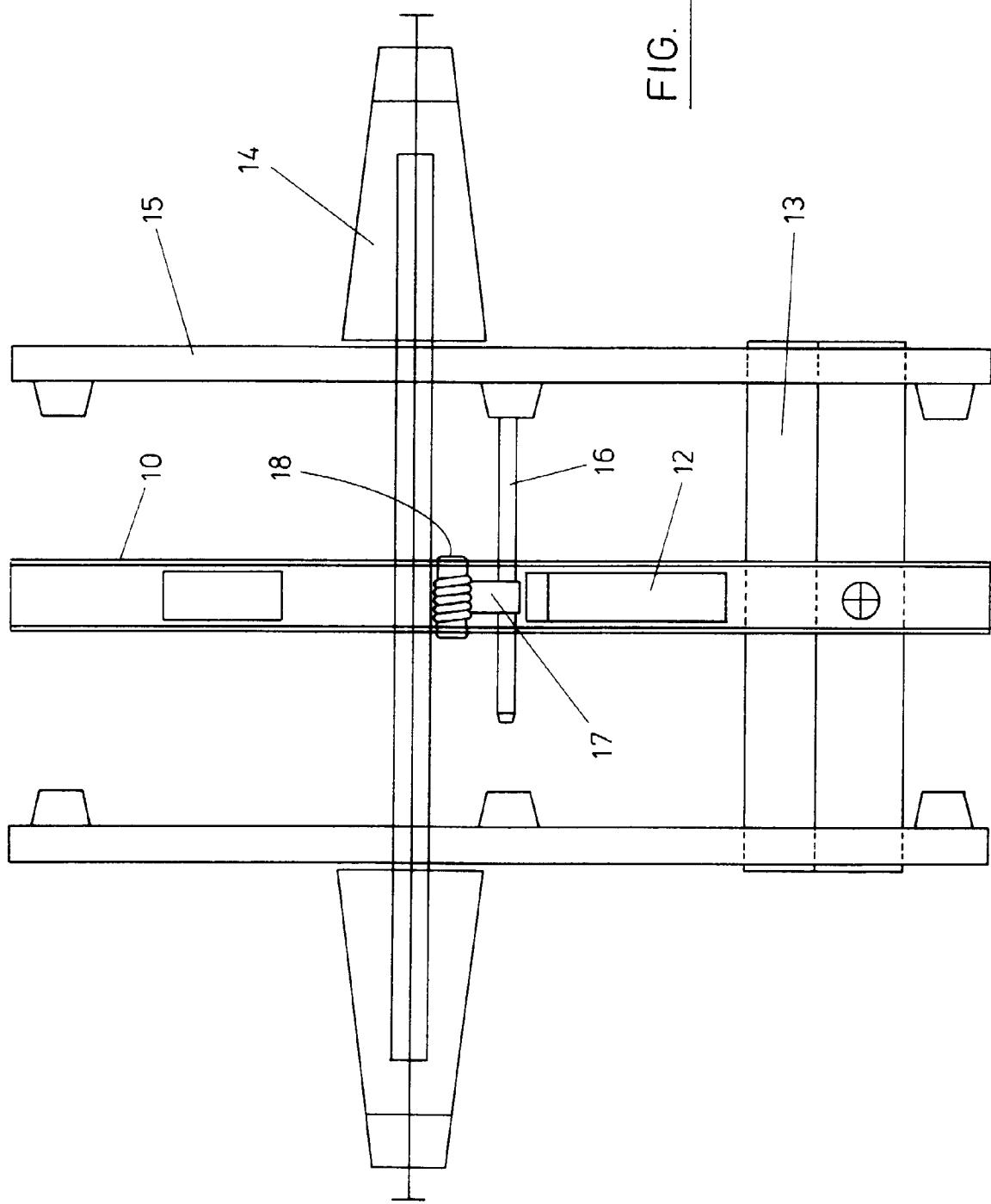
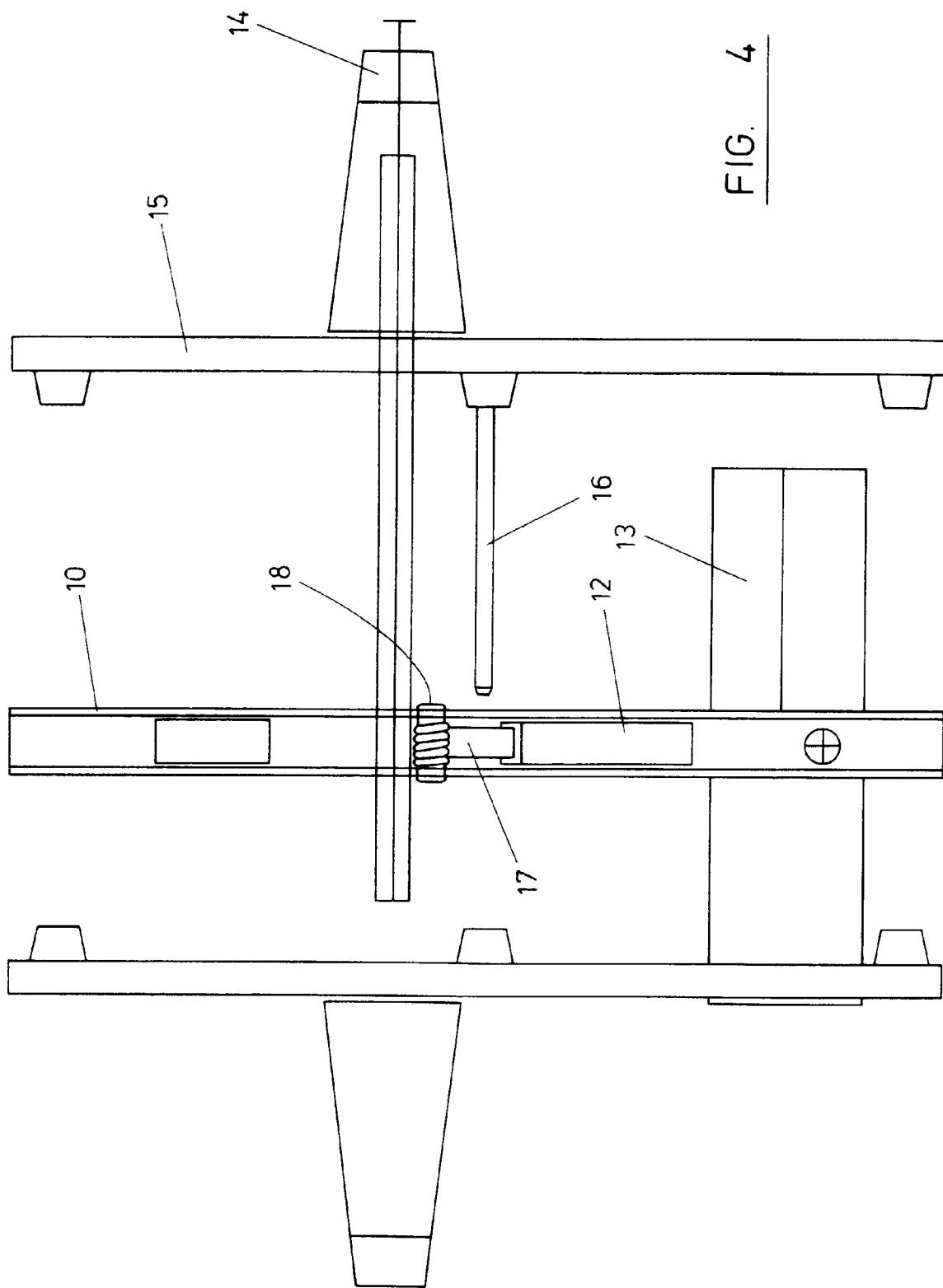


FIG. 2







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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 0417

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	US 1 691 030 A (E. M. BENHAM ET AL.) 13 November 1928 * page 1, line 69 – page 2, line 22 * -----	1,3-5	E05B17/20
X	US 2 228 971 A (J. E. PANKRATZ) 14 January 1941 * column 1, line 41 – column 3, line 11 * -----	1,2,6,7	
X	DE 33 31 584 A (KIRCHMANN-NIEDERDRENK KG GMBH & CO) 21 March 1985 * page 4, line 16 – page 6, line 18 * -----	1,2,4,7	
X	EP 0 530 979 A (FRIEDMAN, JACOB) 10 March 1993 * column 5, line 20 – column 7, line 52 * -----	1,2,4,8	
TECHNICAL FIELDS SEARCHED (Int.Cl.6)			
E05B			
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search		Examiner
MUNICH	11 May 1998		Vacca, R
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	