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(54) Device for the opening and closing of doors and windows with a selector for changing the sliding direction of a slider.

(57) A device for the opening and closing of doors and windows in particular of the type which can be opened by both the wing opening mode and the "wasistas" opening mode, comprising a handle (1) fixed to the window and a pinion (11) integral with the handle unit and axially slidable by locking means (7) housed in the handle unit and able to engage it in one or the other, or in both of the two racks (16,17) opposite one another and offset with respect to the sliding axis integral with a rod of the opening system (15) of the window. Alternatively, operating means can have a push-button (21) elastically slidable by pressing in a seat of said handle unit. The device allows for the selection of one type or the other of said openings, blocking the one which is not required, with a simple and comfortable movement and with the locking the opening of the window in a closed position.

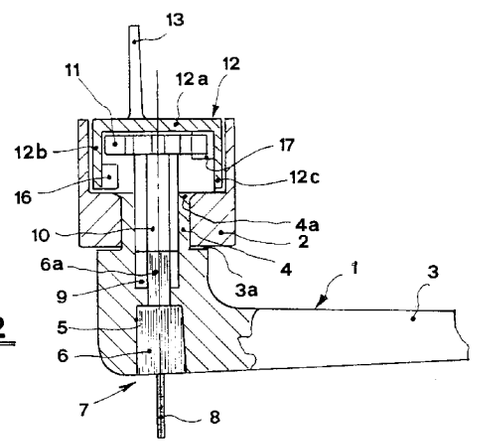

Fig. 2

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The present invention relates to a device for the closing and opening of doors and windows with a movement selector. More particularly the present invention relates to a device with a handle of the cremone bolt type wherein it is possible to transmit its movement to the closing rods in one direction or the other, by choice of the user.

The known devices for the opening and closing of doors and windows with a cremone bolt type handle normally comprise a handle unit fixed to one wing of the window and a pinion integral with the handle unit engaged in toothed means, for example a rack, integral with a rod which is able to slide vertically on the free side of the wing, that is opposite the hinge. A 90° rotation of the handle causes the rotation of the pinion with which it is integral, which in turn, interlocking with the rack, causes the vertical sliding of the rod which, in proximity to the upper and lower ends holds the closing pins. The closing pins are suited to engage in two corresponding locking strikers placed on the fixed window frame. Following the rotation of the handle and the consequent vertical sliding of the rod, the two pins can engage and disengage with the locking strikers causing the closing and opening of the door or window.

In devices for the opening and closing of doors and windows with dual opening systems, that is with wing opening as well as "wasistas" opening, the same components are provided for with the difference that the handle can make a further rotation of 90° to a position of 180° from the closing position. With the first rotation of 90° a vertical movement of the rod and relative pins is caused allowing for the opening mode, whereas with the second rotation of 90° causing a further sliding of the rod, a specific mechanism of a known type is operated, which, releasing the wing from the upper hinge, allows for the "wasistas" opening mode.

In particular, the known types of cremone bolt handles, mounted on doors and windows which can have both a wing opening mode and a "wasistas" opening mode, also called "tilt-and-turn", have the handle in a lowered position when the window is closed, in a horizontal position when the window is open in the wing mode and in a raised position when the window is open in the "wasistas" mode. It is evident that whereas the manual movement of the handle from the lowered to horizontal position is simple and natural, the movement from the horizontal position to the raised position is uncomfortable and inconvenient. Furthermore, in certain circumstances, for instance for reasons of security in hospitals, schools and the like, it is desirable to be able to open the window in the "wasistas" mode, while blocking the opening in the wing mode. Currently the problem is resolved by mounting a specific supplementary device on the window comprising a key-lock. In cremone bolt handles of a known type associated with a key-lock, while it is possible to lock the handle unit in a closed position, it is not possible to lock only one of the two opening systems in cases of windows having both a wing opening mode and a "wasistas" opening mode.

The principal object of the present invention is to provide a device for the closing and opening of windows comprising a cremone bolt handle unit in which the movement of the closing rods can be transmitted in one direction or the other by choice of the user.

A first particular object of the present invention is to provide a device of the above mentioned type applicable to doors and windows of the type that have both the wing and "wasistas" opening modes which is able to operate one or the other of the opening systems while contemporaneously locking the one that is not required.

A second particular object of the present invention is to provide a device of the above mentioned type which offers the possibility of chosing the functions of: locking the window closed, locking the window in the "wasistas" opening mode, locking the window in the wing opening mode.

A final object of the present invention is to provide a device of the above mentioned type wherein the activation of the two distinct functions of wing opening mode and "wasistas" opening mode can be accomplished by means of the same 90° rotation of the handle.

The above mentioned objects are accomplished with the device according to the present invention wherein the toothed means integral with the sliding rod, in which the handle operated pinion engages, comprise two opposing racks offset with respect to the rotational axis of the pinion and, in said handle unit, control means are provided for the axial sliding of said pinion to place it in at least two distinct operative positions wherein it is respectively engaged in said first rack or in said second rack. In particular a third operative position can be provided for, wherein the pinion engages in both of the racks, thus preventing any rotation, and accomplishing the object of blocking the opening of the window.

The device according to the present invention finds concrete and advantageous application in doors and windows having both wing and "wasistas" opening modes, but it can also be utilized in other cases, for example in doors and windows with the possibility of operating an opening limiting device.

Further characteristics and advantages of the device for the opening and closing of doors and windows according to the invention will be made more apparent in the following description of some of its possible embodiments, given as examples, but not limitative, with reference to the attached drawings in which:

- figure 1 is an exploded perspective view of the device according to the invention;
- figure 2 is a transversal sectional view of the

device according to the invention;

- figure 3 is an enlarged exploded perspective view of some components of the device according to the invention;
- figure 4 is a cross section of a simplified alternative embodiment of the device according to the invention.

With reference to figures 1 and 2, 1 generically indicates a handle unit of a type known as a "cremone bolt" handle comprising a case 2 and a handle 3 having a tubular protrusion 4 by means of which it rotatingly engages in the case 2. The axial sliding of the handle is prevented by a projection 3a, constituting the base from which the protrusion 4 extends, and by a clinch 4a formed on the free end of the same protrusion 4. The projection 3a and the clinch 4a abut the two opposite faces of the wall of the case 2 wherein the protrusion 4 is rotatingly engaged.

Inside the handle 3, in a position coaxial to the protrusion 4, a seat 5 is formed within which the cylinder 6 of a lock generically indicated with 7 is housed, said lock being operable by means of a key 8. Another polygonal seat 9 constitutes the inside of the tubular protrusion 4 stretching towards the other seat 5. Inside seat 9, an axially slidable stem 10 with a cross section equal to that of seat 9 is housed and holds a pinion 11 at its end. The stem 10 is rigidly connected to a pin 6a of the lock 7, whereas the pinion 11 engages in a plate 12 with a double rack which, by means of a protrusion 13 projecting from the face opposite the stem 10, engages in a guide block 14 integral with the opening system of the window schematically indicated with a rod 15.

The double rack plate 12, housed in the case 2 of the cremone bolt 1, is substantially shaped as a U with a base 12a and two sides 12b and 12c respectively. On the side 12b of the plate 12 a first rack 16 borders the free edge of said side and occupies a width of less than half of the width of the side 12b. A second rack 17 extends along the base 12a for a width of less than half of the width of the side 12c. In this way the two racks 16 and 17 are opposite one another but offset with respect to the rotation axis of the pinion 11. The thickness of the pinion 11 is not greater than the width of either of the two racks 16 and 17, in order to assure that, when it is completely engaged with one of the two, the other is certainly free.

The lock 7 is arranged in such a way as to allow the positioning of the key 8 in three different positions: one central position, illustrated in figure 1, and two positions rotated by 90° in directions clockwise and counter-clockwise with respect to said central position. When the key 8 is in the central position the pinion 11 engages contemporaneously in the rack 16 and the rack 17, therefore making it impossible to rotate the handle 3 and therefore open the window. Rotating the key 8 in one direction or the other, an axial sliding of the pinion 11 is produced away from or towards the base 12a of the plate 12 allowing therefore the engagement of the pinion in either the rack 16 or the rack 17, as shown in figure 2. In one case, rotating the handle 3, the pinion 11 is rotated by an equal angle with consequent sliding in one direction of the rod of the opening system 15. In the other case, the same rotation of the handle 3 causes the sliding in the other direction of the rod of the opening system 15 which operates a "wasistas" opening mechanism, of conventional type, whereas in the previous case it allowed the wing opening mode of the window.

Advantageously, with the object of locking one type of opening when the other type is desired, the rack 16, as shown in figure 3, has a central area 16a with teeth that are open on both sides and two side areas 16b with teeth that are closed on the internal side of the plate 12 by means of walls 18 and 19. In this way the sliding of the pinion 11 can occur only when it is in a central position corresponding to the condition of closed window.

In figure 4 a simplified alternative embodiment of the device according to the present invention is illustrated. In it, identical reference numbers identify the same components of the embodiment described above and illustrated in figures 1, 2 and 3.

According to this embodiment, the stem 10 of the pinion is rigidly connected to a stem 20 of a push-button 21 housed in the seat 5 and protruding from said seat under the force of a spring 22 coaxial to the seat 5 and abutting its base. Due to the force of the spring 22, the push-button 21 is kept in a position protruding from the seat 5 and the pinion 11 is constantly engaged in the rack 16, so that by rotating the handle 3, the upward sliding of the rod of the opening system 15 and the consequent wing opening of the window are obtained. Pressing the pushbutton 21, the pinion is made to slide towards the bottom of the plate 12 disengaging from the rack 16 and engaging in the rack 17, so that by rotating the handle 3, a downward sliding of the rod of the opening system 15 is produced, in turn operating the "wasistas" opening device. In this simplified embodiment, the possibility of locking the window in a closed position is not provided for.

If the mechanism which controls the "wasistas" opening must be operated by means of an upward sliding of the rod, it is sufficient to move the rack 16 towards the base 12a and the rack 17 towards the edge of the side 12c.

As described above, the advantages of the device according to the present invention are evident. In both of the embodiments described above it is in fact possible to chose in a simple and convenient way between the two possibilities of opening the window while contemporaneously locking that of the two which is not required. In the case of the device provided with a lock, it is also possible to lock the window in a closed position. Finally the operation of the de-

vice is extremely convenient and easy in that both the pre-chosen functions can be operated with a 90° rotation of the handle in the same direction.

Claims

1. Device for the opening and closing of doors and windows, in particular of the so-called cremone bolt type, comprising a handle unit (1) fixed to the window and a pinion (11) integral with the handle unit engaged in toothed means (12) integral with a rod (15) which is slidable along one side of the window following the rotation of said pinion, characterized by the fact that said toothed means (12) comprise two opposing racks (16,17) offset along the rotational axis of the pinion (11) and by the fact that command means (7) are provided for in said handle unit (1) for the axial sliding of said pinion (11) to place it in at least two distinct operative positions wherein it is engaged respectively with either of said racks (16,17).

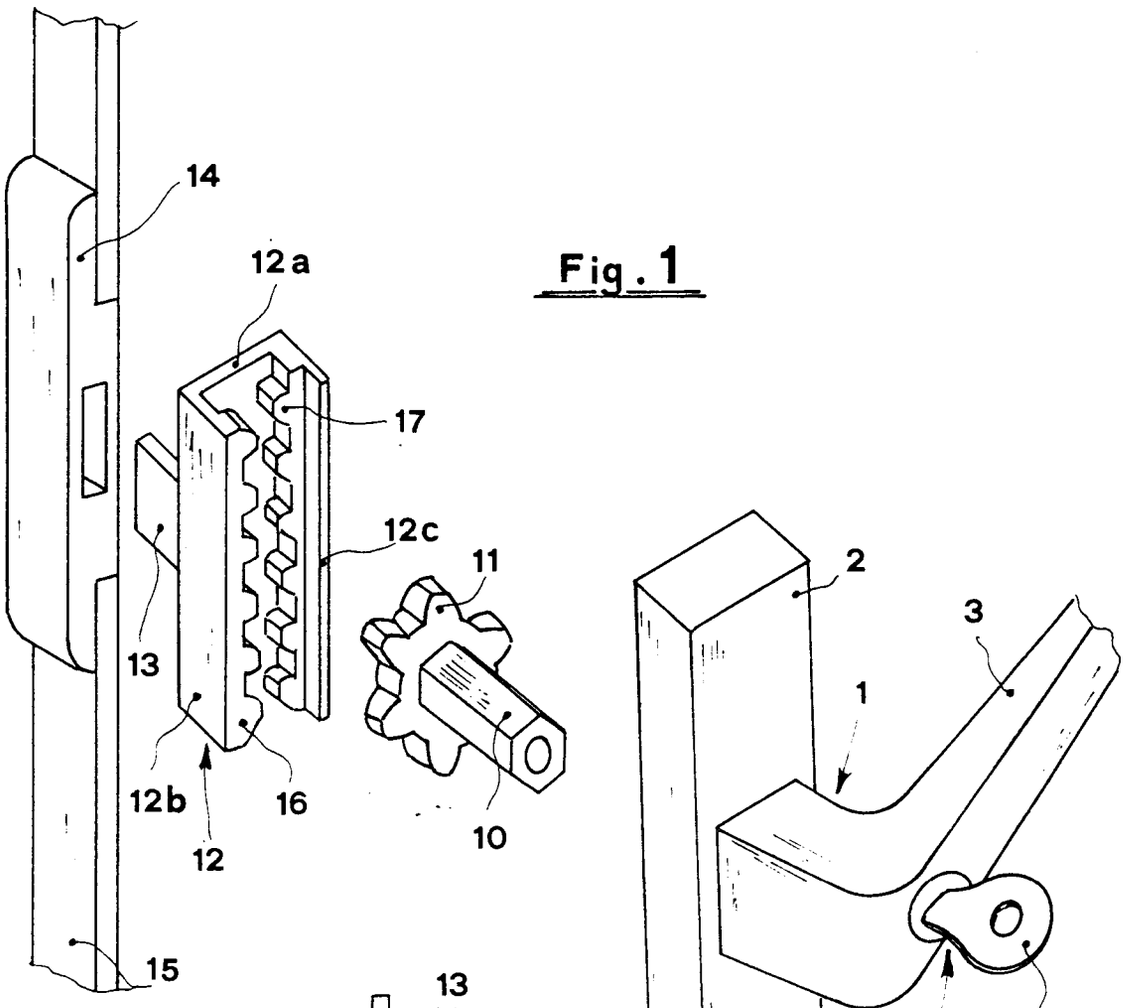
2. Device according to claim 1, wherein said opposing racks (16,17) are formed on the two sides of aplate (12) housed in said handle unit and substantially shaped as a U the base (12a) of which is connected to said slidable rod (15), one of said racks (16) extending along the free edge of one of said sides (12b) and the other (17) along the base of the other of said sides (12c), each of them having a width no greater than half the width of said sides.

3. Device according to the previous claims, wherein said command means (17) of the axial sliding of the pinion (11) comprise a lock, the slidable pin (6a) of which is integral with said pinion (11), said lock having three operative positions, corresponding to three different sliding positions of its pin, in said positions said pinion being engaged respectively in one or the other of said racks, or in both.

4. Device according to claims 1 and 2, wherein said command means (7) of the axial sliding of the pinion (11) comprise a push-button (21) integral with the pinion and elastically slidable in a seat (5) formed in said handle unit (1), elastic means (22) being interposed between said push-button and the bottom of said seat suited to maintain the push-button in a position protruding from the seat, so that said pinion is normally engaged in the rack (16) extending along the free edge of said side (12b) and can be engaged in the other rack (17) by the pushing of said button.

5. Device according to the previous claims, wherein the rack (16) extending along the free edge of the side (12b) of said U-shaped plate (12) has a central portion (16a) of open teeth and two portions (16a,b) on either side with teeth that are closed internally, whereby the axial sliding of said pinion is possible only when it is in the central position.

6. Device according to the previous claims, wherein said door and window are equipped with both wing opening mode and "wasistas" opening mode.


14
12a
17
12c
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12b
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Fig. 1

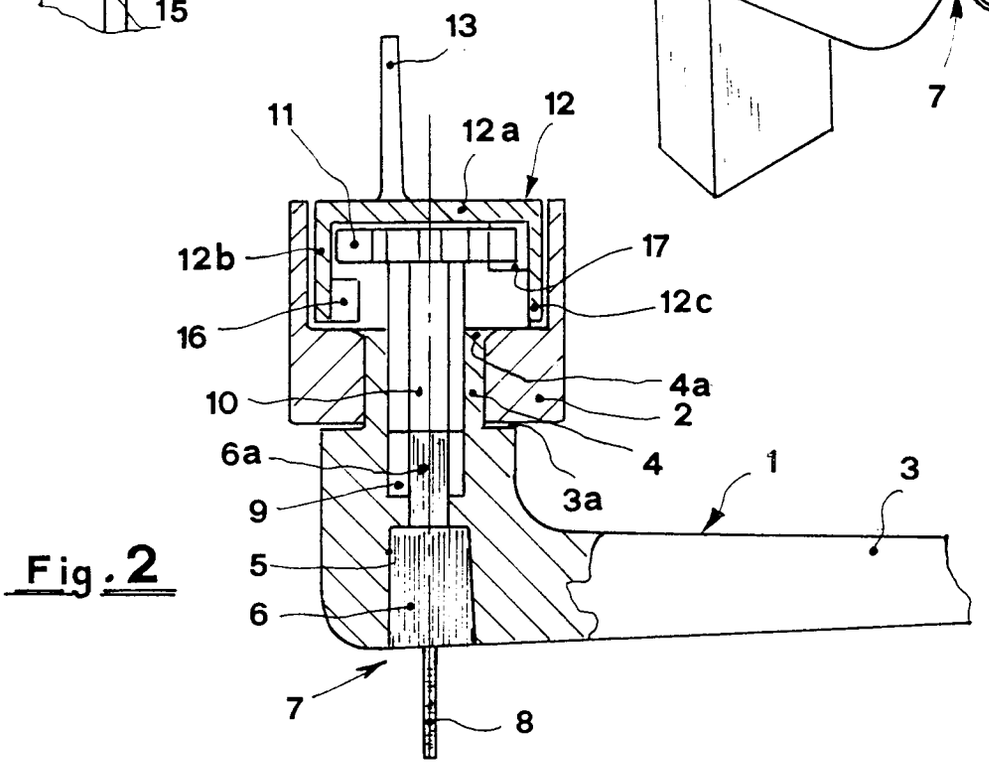
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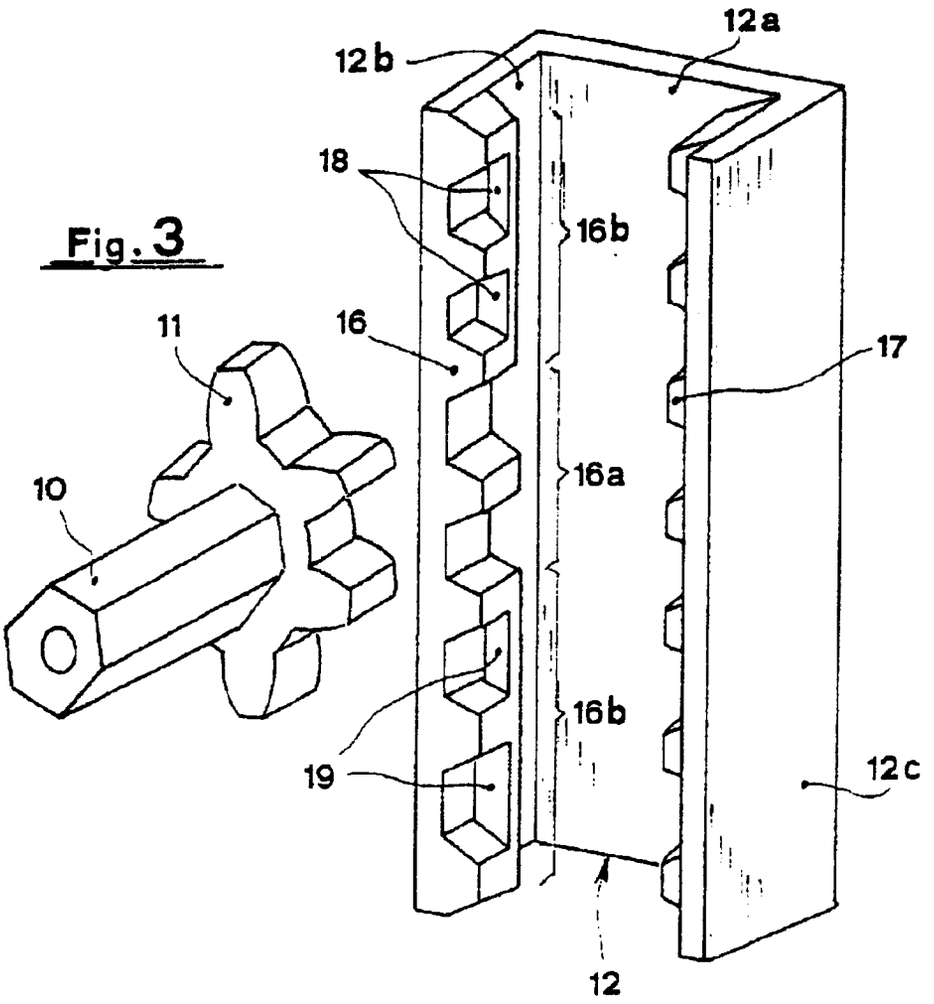
Fig. 2

Fig. 3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18
16b
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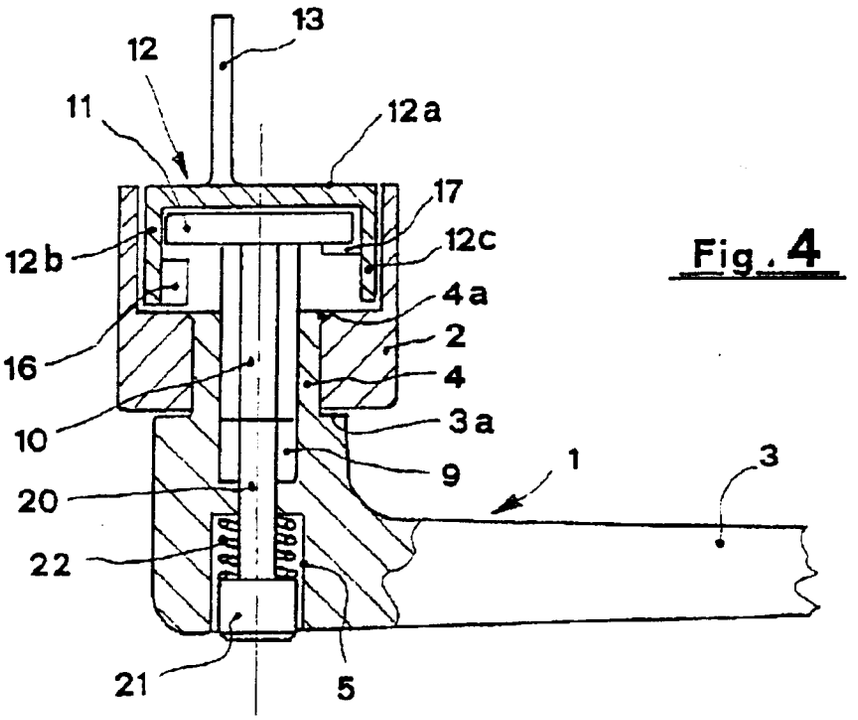
16b
19
12c
12

Fig. 4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12a
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12c
12b
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16
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3a
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EUROPEAN SEARCH REPORT

Application Number
EP 93 83 0405

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.5)
X Y	DE-B-12 66 173 (JÄGER-FRANK K.G.) * the whole document * ---	1,2,5,6 4	E05C9/02 E05D15/52
Y	FR-A-2 589 340 (PASSOT) * the whole document * ---	4	
A	US-A-1 811 265 (FLYNN) * page 1, line 59 - line 66; figures 1-4 * -----	3	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

E05C
E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 November 1993	VESTIN, K

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