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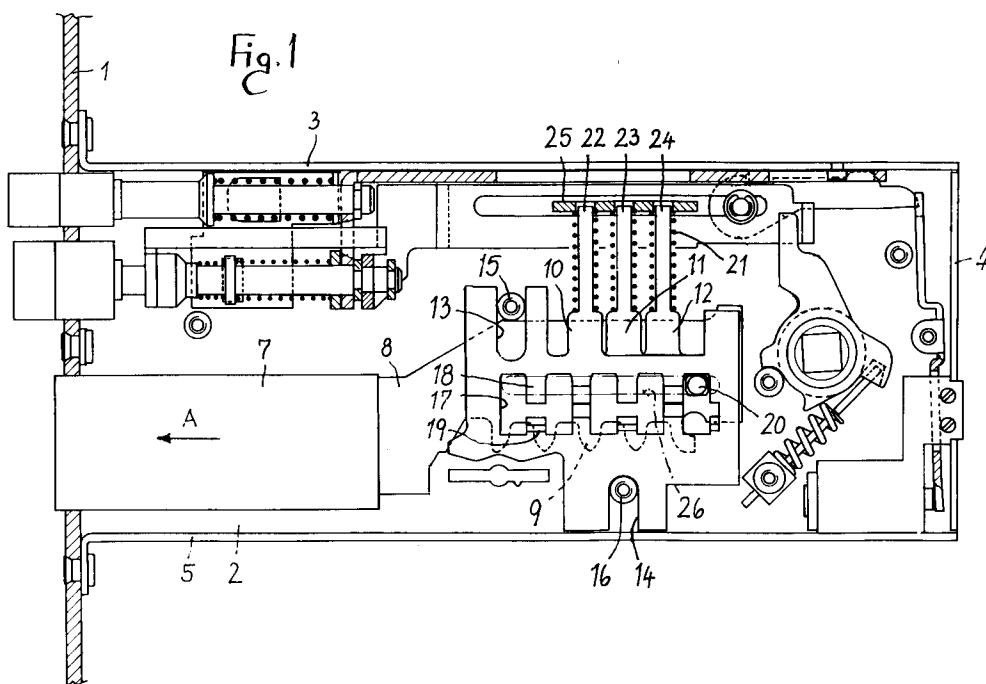
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Modiano & Associati S.r.l. Via Meravigli 16
I-20123 Milan (IT)**(54) **Improvement in multiple-tumbler locks.**

(57) Improvement in multiple-tumbler locks, particularly of the double-web type, provided, on the bolt, with a pivot (20) which cooperates with the tumblers (10,11,12) to engage the bolt (7) at each turn of the key, characterized in that the opposite ends of the

pivot (20) are guided in slots (26,27) which are formed in the side walls (2,6) of the lock casing and are elongated in a direction which is parallel to the bolt (7) sliding direction (A).

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The present invention relates to an improvement in multiple-tumbler locks, particularly in double-web locks.

As is known, in double-web locks the bolt is engaged after every turn by means of tumblers which are guided at right angles to its sliding direction in contrast with the action of return springs.

The tumblers are constituted by plates which have a particular shape, are arranged mutually side by side in a pack and are provided with openings which are elongated in the bolt sliding direction. Respective sets of oppositely arranged teeth are formed along the longitudinal edges of these openings. The passage formed between the ends of the oppositely arranged teeth and between the teeth of each set has a constant and preset width. The teeth of each set furthermore alternately have the same height, so as to form a double combination which is encoded by varying the height of the teeth of the tumblers. The bolt is blocked by means of a square pivot which is fixed on it and which, at each turn, engages between the teeth of one set; whereas the bolt advances by virtue of the key, which at each turn, for a first part of its rotation, acts on the tumblers and aligns the pivot and the passage formed between the oppositely arranged ends of the teeth adjacent to the pivot, so as to allow the pivot to pass through this passage when the key moves the bolt during a second part of its rotation. Finally, during the final part of the rotation of the key the tumblers, under the thrust of the spring, return to the position in which the pivot engages between the teeth to block the bolt.

In locks of the described type, the bolt is guided not only in the opening of the front wall of the casing but also by a pivot which slideably engages in slots which are elongated in the bolt sliding direction and are formed in the tang of said bolt.

These slots hinder reduction of the bulk of the lock casing. In sizing the tang, the width of the slots in fact adds to the thickness of the square pivot, so that it is necessary to provide a sufficiently wide tang which, as such, negatively affects the height of the casing and indirectly has negative effects on the sizing of the other mechanical parts of the lock.

The aim of the present invention is to provide an improvement which allows to obviate the drawbacks of conventional locks.

This aim is achieved by an improvement in multiple-tumbler locks, particularly of the double-web type, provided, on the bolt, with a pivot which cooperates with the tumblers to engage the bolt at every turn, characterized in that the opposite ends of said pivot are guided in slots which are formed in the lateral walls of the lock casing and are

elongated in a direction which is parallel to the bolt sliding direction.

Further particularities of the invention will become apparent from the following description of a preferred embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a view of a double-web lock after the cover has been removed to show the internal elements;

figure 2 is a view of said lock with the cover in closed position; and

figure 3 is a sectional view taken along the plane III-III of figure 2.

With reference to the above figures, the numeral 1 designates the front wall of the lock casing, which furthermore comprises a bottom 2 which is surrounded by a peripheral wall composed of an upper wall 3, a rear wall 4 and a lower wall 5. The numeral 6 designates the casing closure cover.

A rectangular opening is provided in the front wall 1, and the bolt 7 is driven through it; a tang 8 is connected to the bolt.

The tang 8 is constituted by a plate which is thinner than the bolt 7 and is arranged in the central plane of said bolt; the plate has, along its lower edge, a plurality of teeth 9 which form a rack.

Three tumblers 10, 11, 12 are arranged on each side of the tang and are constituted by mutually adjacent shaped plates.

The plates have two slots 13 and 14 which are elongated at right angles to the bolt sliding direction A and are engaged by bushes 15, 16 which are fixed to the bottom 2 and keep them guided.

An opening 17 is formed in each plate and is elongated in the direction A; two sets of oppositely arranged teeth 18, 19 protrude from the longitudinal edges of said opening; the sets have a different length for each tumbler, and the teeth of each set are alternately identical.

A pivot 20 engages between the teeth 18 of the upper set; the pivot has a substantially square cross-section and protrudes from both sides of the tang 8 to which it is rigidly coupled. The thickness of the pivot 20 is equal to the tooth space of the sets 18 and 19 and to the width of the passage formed between the ends of the opposite pivots, so as to allow the pivot 20 to pass through said passage when the tumblers are actuated by the key.

The engagement of the pivot 20 in the tooth spaces is provided by means of springs 21 which are inserted in rods 22, 23 and 24 which extend from the tumblers 10, 11 and 12 at right angles to the direction A and are guided in a wing 25 which is rigidly coupled to the bottom 2. The springs 21 act between the wing 25 and respective shoulders formed at the base of the rods, so as to push the

tumblers astride the pivot 20, which engages the tooth spaces of the set of teeth 18.

In order to guide the bolt 7 in the direction A, the opposite ends of the pivot 20 protrude from the external tumblers which are adjacent to the bottom 2 and to the cover 6 to engage in slots 26 and 27 of the bottom 2 and respectively of the cover 6. The slots 26 and 27 are elongated in the direction A and are not shorter than the slots 17 of the tumblers.

Conveniently, the portions of the square pivot 20 which engage the slots 26 and 27 are cylindrical and have a diameter which is less than the thickness of the pivot, so as to form opposite shoulders which, as shown in figure 3, abut on the internal edges of the slots 26 and 27, thereby to prevent transverse movements of the tang and keep the bolt guided longitudinally.

As can be seen, the prerogative of the invention is to be found in the fact that the tang 8 no longer has guiding slots, as in the prior art, and can thus be produced with a smaller width.

In this manner it is possible to reduce the width of the casing (the distance between the upper wall 3 and the lower wall 5) and provide a lock which can be installed as a rail lock in casements produced from metallic profiled elements.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

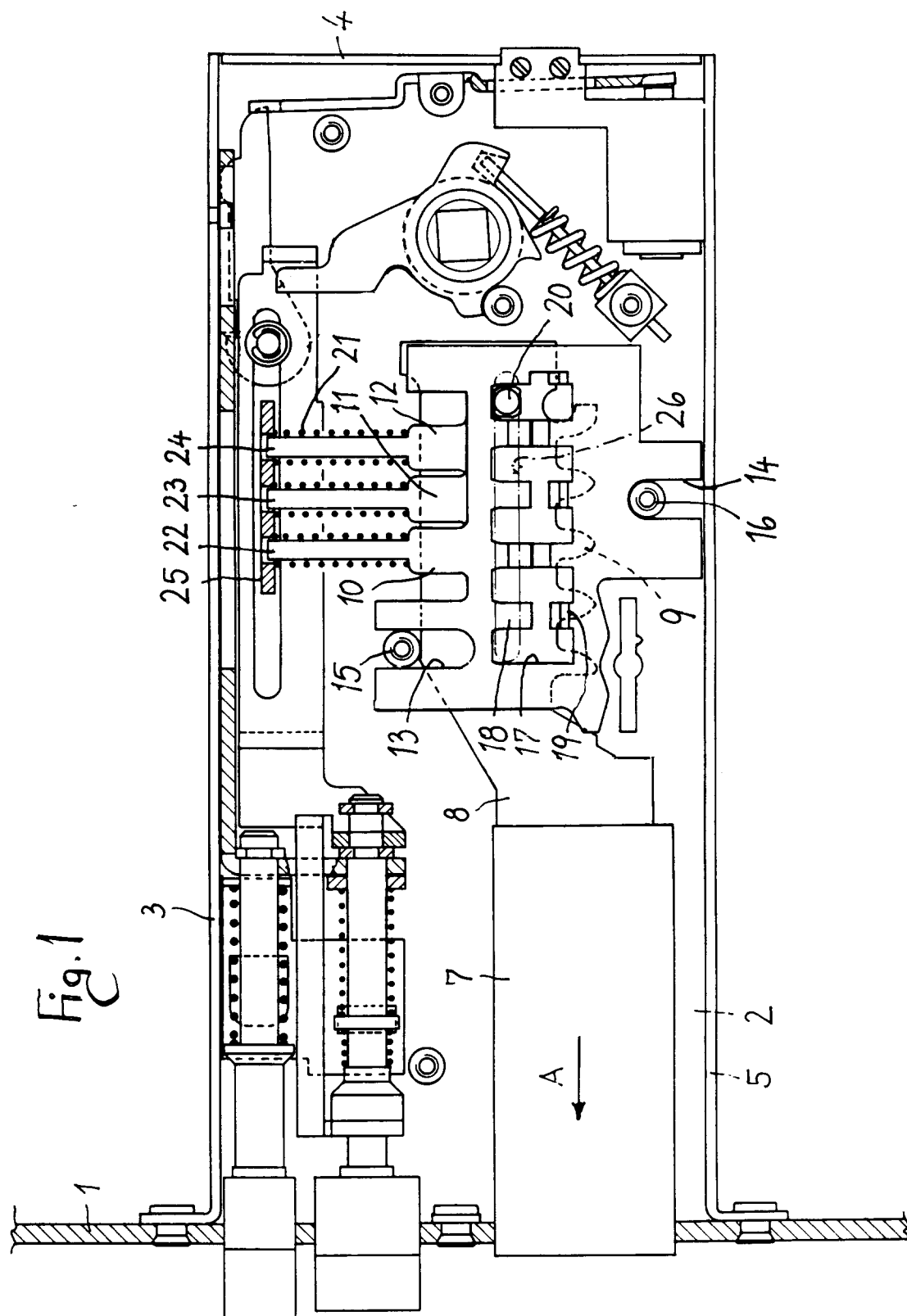
In practice, the materials employed, as well as the contingent shapes and dimensions, may be any according to the requirements.

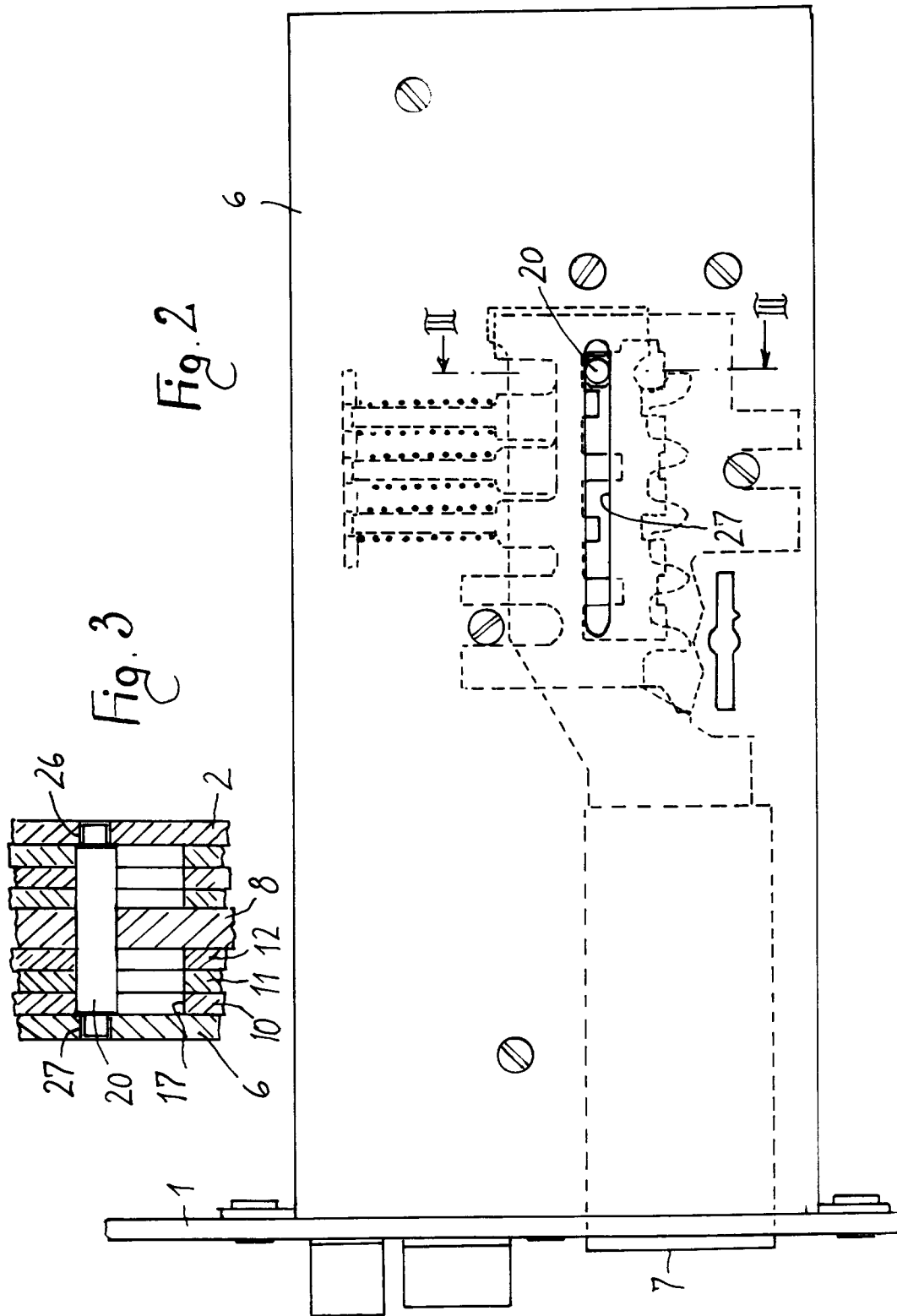
Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Improvement in multiple-tumbler locks, particularly of the double-web type, provided, on the bolt, with a pivot (20) which cooperates with the tumblers (10, 11, 12) to engage the bolt (7) at each turn, characterized in that the opposite ends of said pivot (20) are guided in slots (26, 27) which are formed in the lateral walls (2, 6) of the lock casing and are elongated in a direction which is parallel to the sliding direction (A) of the bolt (7).

2. Improvement according to claim 1, characterized in that the portions of the ends of the pivot (20) which engage in the slots (26, 27) are cylindrical and have a diameter which is less than the thickness of the pivot (20), so as to create opposite shoulders for abutment on the internal edges of the slots (26, 27).







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EUROPEAN SEARCH REPORT

Application Number

EP 93 10 4730

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	GB-A-620 947 (GOLDSTEIN) * page 3, line 80 - line 127; figures * ---	1	E05B21/00
A	DE-C-520 683 (MARQUARDT) * the whole document * ---	1	
A	DE-C-347 566 (NIEDERDRENK) * the whole document * ---	1	
A	DE-C-526 442 (BAUMGARTEN) * the whole document * ---	1	
A	US-A-3 762 192 (ERRANI) * abstract; figures * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E05B
Place of search THE HAGUE		Date of completion of the search 25 JUNE 1993	Examiner GIMENEZ BURGOS 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			