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(54) **Title**: SAFETY LOCK

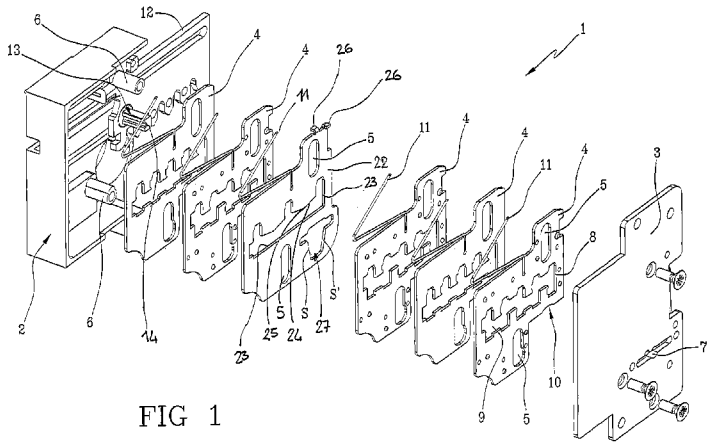


FIG 1

(57) **Abstract**: A safety lock (1), comprises a frame and a bolt member (12) movably mounted on the frame and shiftable by rotation of the key in the lock between a first position corresponding to an open condition of the lock and a second position corresponding to a closed condition of the lock. At least one safety plate (4) is movably mounted on the frame and is translatable by rotation of the key in the lock to a position enabling movement of the bolt member (12). Hooking means operates between the bolt member (12) and the at least one safety plate (4), following a thrust illicitly produced on the bolt member (12). Also provided is means for enabling rotation of the safety plate (4) to a maximum lifting-up position of the safety plate itself. The hooking means comprises a hook-shaped portion (16a, 16b) formed in a safety pin (13) of the bolt member (12) adapted to cross a window (8) of the safety plate (4).

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SAFETY LOCK

Description

Field of the invention

The present invention relates to a safety lock.

State of the art

In particular, the present invention relates to a safety lock of the type referred to as "plate lock", "lever lock" or "double-sided lock" comprising a bolt member movably mounted on a frame and shiftable by rotation of the key in the lock between a first position corresponding to an open condition of the lock and a second position corresponding to a closed condition of the lock. The safety lock further comprises a pack of safety plates or wafers movably mounted on the frame and shiftable by rotation of the key in the lock to a position enabling movement of the bolt member.

Each safety lock of the above described type can be opened/closed by a specific key preferably provided with double-sided tailpieces or blades the edges of which are indented and define the code or encryption of the key itself.

Also known are illicit opening instruments and techniques the efficiency of which is strongly connected with the experience and manual ability of the individual who makes attempts to illicitly open the lock. They consist of feeler pins or picklocks that, after tensioning the bolt member in the opening direction, slowly and selectively lift each individual safety plate in an attempt to detect the corresponding

enabling position (and consequently the height of the indented key edge corresponding to such a safety plate).

The application procedure for these instruments is rather long because it is necessary to repeat it for each individual safety plate and each key turn.

In recent years a widespread instrument for illicit opening of the safety locks has been adopted, also referred to as self-learning picklock, consisting of a rod simulating the key shank, on an end of which some pins are mounted transversely of the rod. The pins are slidably mounted with friction relative to the rod so that they are compatible with the shape of the key to be reproduced.

The bolt member is tensioned in the opening direction by a pusher and the manipulation instrument is subsequently inserted, all safety plates being pushed upwards by rotation of the instrument itself. Figs. 9-11 depict application of the manipulation instrument and pusher with reference to a safety lock of the conventional type.

Finally, by unique manoeuvring, encryption of the key (at a key turn) is obtained by oscillatory movements of the manipulation instrument aiming at finding the respective enabling position for each safety plate. In other words, the picklock of new generation simulates the presence of the key in the lock.

This new effraction technique is simplified with respect to the previously used techniques, and extends the range of possible users; in addition, it does not

leave any sign of burglary or effraction. In addition, traditional safety locks appear to be rather vulnerable relative to this new effraction technique.

Known from document EP1035278 is a lever or plate lock. A plate defines a slide channel for the safety pin provided with a recess that, together with a recess of the safety pin, makes detection of the lever position difficult.

Scope of the invention

In this context, the technical task underlying the present invention is to propose a safety lock overcoming the above specified drawbacks of the known art.

In particular, it is an aim of the present invention to make available a safety lock capable of preventing violation even in case of application of simplified effraction techniques.

It is a further aim of the invention to propose a safety lock that is reliable in terms of operation under normal use conditions.

The technical task mentioned and the aims specified are substantially achieved by a safety lock comprising the technical features set out in one or more of the appended claims.

Brief description of the drawings

Further features and advantages of the present invention will become more apparent from the description given by way of non-limiting example of a preferred but not exclusive embodiment of a safety lock

as shown in the accompanying drawings, in which:

- Fig. 1 is a diagrammatic perspective view divided into separate parts of a portion of a safety lock according to the present invention;
- Fig. 2 is an enlarged front view of a detail in Fig. 1;
- Figs. 3 and 4 are enlarged front views of the portion in Fig. 1 in two different operating conditions, in which some elements have been omitted to make others more prominent;
- Figs. 5-7 are a front view, a side view and an enlarged detail respectively, of a possible embodiment of an element of the safety lock of Fig. 1;
- Fig. 8 is an enlarged front view of the portion of Fig. 1, in which some elements have been removed to make others more prominent;
- Figs. 9-11 are perspective views of a lock of the conventional type in the closed condition and submitted to an illicit opening attempt by a manipulation instrument and a pusher.

Detailed description of the preferred embodiments of the invention

With reference to Fig. 1, generally identified by reference numeral 1 is a portion of safety lock shown in separate parts.

In particular, it is a lock referred to as "plate lock", "lever lock" or "double-sided lock", for example associable with bolt pins not shown.

Denoted at 2 is a box closed on one side by a cover 3 and containing a pack of safety plates 4 or tumbler plates or "gorges" movably mounted inside the box in a direction parallel to their plane. Box 2 defines a lock

frame.

In Fig. 1 the reference numerals relating to elements of the safety plates have been reproduced in one of the safety plate alone for the sake of simplicity. Denoted at 5 are slide slots of the safety plate adapted to respectively receive a pin 6 associated with box 2 for guiding movement of the safety plates inside the box.

An opening 7 on the cover (and a corresponding opening not shown, in the box base) enables insertion of a key for opening and closing the lock.

The safety plates 4 have windows 8 with indented edges that define passage grooves 9. The safety plates further comprise edge portions 10 designed to be engaged by indented edges of two double-sided tailpieces or blades of the key defining the code or encryption of the key itself.

Opening 7 of cover 3 (and the corresponding opening formed in the box base) defines a passage port for the key that is projected along a direction transverse to the lock also at the safety plates 4, under normal use conditions of the lock. As far as the safety plates 4 are concerned, the key passes below the edge portions 10 (alternatively, the safety plates may comprise slots adapted to receive the key under normal use conditions of the lock).

Generally, the frame defines a passage port for the key in the lock that is projected right through the lock and identifies a free passageway for insertion of the key transversely of the safety plates. Projection of opening 7 in each plane parallel to the safety plates 4

defines the passage port of the key in the lock.

When the key is introduced into opening 7 (or in the corresponding opening formed in the box base) and rotated around its axis, the indented edges of the double-sided key blades come into contact in succession with the edge portions 10 of the safety plates 4 causing translation of same (upwards with reference to Fig. 1) against the action of spring means 11 (or under gravity).

In the following, reference will be made to the position of Fig. 1 in which rotation of the key causes lifting up of the safety plates, by this term generally meaning a movement in the vertical direction and upwards.

Denoted at 12 is a bolt member, for example made with a sheet metal plate slidably mounted inside box 2 and associable with the bolt pins not shown. In other words, the bolt member 12 is movably mounted on the frame and is shiftable by rotation of the key in the lock between a first position corresponding to an open condition of the lock and a second position corresponding to a closed condition of the lock (Figs. 3 and 4 correspond to the second position).

In particular, movement of the safety plates 4 caused by rotation of the key is substantially perpendicular to movement of the bolt member 12 on passing from the first to the second positions and vice versa. With reference to the example shown, movement of the bolt member 12 is horizontal.

The key windows 8 and the key double-sided profiles are

such shaped that rotation of the key lifts the safety plates 4 to such positions that movement of the bolt member 12 is enabled. In other words, the safety plates 4 are movably mounted on the frame and shiftable by rotation of the key in the bolt to an enabling position of the movement of the bolt member.

In particular, the bolt member comprises a safety pin 13 or "mentonnet" protruding through the windows 8 of the safety plates. The height of the indented edges or double-sided blades of the key enables alignment of the passage grooves 9 of the safety plates that define a free passageway for the safety pin 13 between the tooth tips of windows 8, at a key turn.

In the example shown each safety plate comprises four passage grooves 9 sequentially defining the passageway of the safety pin 13 at four key turns. The number of the safety plates can vary; in the example shown five safety plates are provided which correspond to five different heights of each side of the key encryption.

In accordance with the present invention, the safety pin 13 has at least one recess 14 facing away from bolt pins (or the like), not shown.

With reference to Fig. 3, the recess 14 is for example formed with inclined cuts 15 so as to create an upper hook-shaped portion 16a and a lower hook-shaped portion 16b. Alternatively, as shown in Figs. 5-7, the recess 14 is of rectangular shape defining an upper hook-shaped portion 16a and a lower hook-shaped portion 16b.

One of the safety plates 4 as shown for example in Fig. 2 will be described hereinafter in detail. The features

described in the following can be present in at least one of the safety plates. If these features are present in all safety plates of the lock, the description made for the plate in Fig. 2 will be also valid, by analogy, for different plates.

Denoted at 17 is a tooth of the toothed profile defining window 8. In the example of the safety plate shown in Fig. 2 a lower tooth is alternated with an upper tooth. Alternatively, a safety plate can only comprise either upper teeth (see the second and fifth safety plates in Fig. 1 starting from cover 3) or lower teeth.

Each tooth 17 defines a passage groove 9.

At least one tooth (preferably the tooth corresponding to the first opening turn) comprises a recess 18 similar to that provided on the safety pin 13, for example. Recess 18 faces the bolt pins (or the like), not shown. The recess 18 can be formed with cuts, for example inclined, so as to create at least one upper hooking portion 20a.

In general, the safety lock according to the present invention comprises hooking means operating between the bolt member 12 and at least one safety plate 4, as a result of a thrust illicitly produced on the bolt member 12 (arrow A).

In particular, the hooking means comprises at least one hook-shaped portion formed in the safety pin 13 of the bolt member 12, the hooking opening of which preferably is oriented according to the opening direction of the bolt member. Advantageously, two hook-shaped portions

are formed: an upper hook-shaped portion and a lower hook-shaped portion.

In addition, the hooking means comprises a hook-shaped portion formed in a tooth 17 of window 8 of the safety plate 4, preferably the hooking opening of which is oriented according to the closing direction of the bolt member. In particular, the opening of the hooking portion of the safety plate faces the bolt pins (or the like), not shown.

Advantageously, at least one upper hooking portion 20a is provided.

In accordance with a possible embodiment, the safety plate according to the present invention further comprises means suitable to enable rotation of the safety plate 4 in a plane parallel to the safety plate itself, when the safety plate is in a position of maximum lifting-up of the safety plate itself.

In particular, it is provided that at least one of the two slide slots 5, preferably the lower slot, be adapted to enable rotation/inclination of the safety plate in the plane of the safety plate itself in the maximum lifting-up position (Fig. 4). In particular, at least one slide slot 5, preferably the lower slot, comprises an enlarged portion 21 in which pin 6 can be positioned enabling rotation of the safety plate in its own plane.

Described hereinafter is operation of the safety lock, with reference to an illicit opening attempt using instruments of the new generation.

With reference to Fig. 3, a tensioning device similar to the one denoted at T in Figs. 9-11 is inserted in the opening 7, tensioning the bolt member 12 against the safety plates 4 and the anti-manipulation plate 12 in the opening direction of the lock (arrow A).

Subsequently, a rod provided with pins at one end, is inserted, which rod raises all plates to the maximum lifting-up position (Fig. 4). The rod is similar to that denoted at ST in Figs. 9-11.

By causing oscillation of the manipulation instrument, an attempt is made to find the pattern of the double-sided key profile at the first key turn.

Oscillation of the manipulation instrument and simultaneous thrust on the lock member cause hooking between the safety pin and the corresponding tooth of the safety plate (Fig. 4).

In addition, the pusher discharges its thrust on the safety plate that, due to the enlarged portion 21 of the lower slide slot, can rotate in its own plane further helping in hooking the safety pin to the tooth of the safety plate.

The safety plate is therefore locked to a height that does not correspond to the opening height so that the manipulation instrument cannot detect the key double-sided profile.

In accordance with a possible embodiment, the safety lock 1 advantageously comprises a shield S movably mounted on the frame and shiftable, preferably translatable, due to displacement of the at least one

safety plate 4, to an enabling position. Displacement of the shield S takes place between a permission position for passage of the key or other, in which said passage port is clear, and at least one obstruction position in which said passage port is at least partly obstructed by said shield S.

Advantageously, the shield is disposed inside the frame, internally of box 2 for example.

Generally, shield S is adapted to generate a growing obstruction of the passage port of the key depending on the shield position; for instance, shield S at least has a substantially inclined profile S'.

In accordance with a possible embodiment, the shield is disposed parallel to the safety plates 4 and preferably is formed with an anti-manipulation plate 22.

The anti-manipulation plate 22 is disposed parallel to the safety plates 4. As shown in Fig. 1, the anti-manipulation plate 22 is disposed in an intermediate position relative to the pack of safety plates 4; alternatively, the anti-manipulation plate can be disposed at any position relative to the pack of safety plates 4.

Slide slots of the anti-manipulation plate 22 have been identified by reference numeral 5; they are adapted to respectively receive a pin 6 associated with box 2 for guiding the movement of the anti-manipulation 22 plate inside box 2.

The anti-manipulation plate 22 comprises a window 23 having an indented edge. In particular, the window has

an inclined profile 24 defining at least one apex 25. In the example shown, two opposite inclined profiles define an apex 25. The position of apex 25 corresponds to overcoming of a groove 9 with reference to the opening movement of the safety pin 13 relative to the safety plates 4. In particular, the anti-manipulation plate 22 shown in the figure comprises two apices 25 corresponding to overcoming of the first and third grooves 9 respectively, with reference to the opening movement of the safety pin 13 relative to the safety plates 4.

Denoted at 26 is a displacement wing, in particular a lifting-up wing, extending transversely of the planar extension of the anti-manipulation plate 22. In the example shown in the figures two displacement wings 26 are provided which extend away from the plane of the anti-manipulation plate 14 towards opposite directions.

The displacement wing 26 extends in such a manner that it is disposed transversely of at least one safety plate 4 parallel to the anti-manipulation plate 22.

In addition, the displacement wing 26 is for example disposed at an upper edge of the anti-manipulation plate 22.

In this manner, due to the movement of the safety plate 4 against the action of the displacement wing 26, the safety plate 4 drags along the anti-manipulation plate 22. In particular, with reference to the example shown, when the safety plate 4 rises, it drags along the anti-manipulation plate 22.

The displacement wings 26 define constraint means

between the anti-manipulation plate 22 (shield S) and at least one safety plate. Said constraint means is operative when passing to the enabling position of the safety plate.

In accordance with a possible embodiment for example shown in the accompanying drawings, at least one first displacement (lifting) of the anti-manipulation plate 22 and correspondingly of shield S is therefore generated by displacement (lifting) of at least one safety place 4 instead of being generated by the key that, at the anti-manipulation plate 22, preferably has maximum piercing.

The inclined profile 25 is adapted to interact with the bolt member 12, in particular the safety pin 13, to make the anti-manipulation plate 22 further rise, for instance until it is disposed so that its apex 26 rests on the safety pin 13, on passage between the second position and first position of the bolt member 12.

Advantageously, the inclined profile 25 terminates at a support position of the anti-manipulation plate 22 on the bolt member 12, at apex 26 for example.

In general terms, the inclined profile 25 defines a shaped profile adapted to (preferably further) lift the anti-manipulation plate to a further obstruction position, as clarified when describing operation of the lock according to the present invention.

In other words, the shaped profile 25 and safety pin 13 form translation cam means operating between the anti-manipulation plate 22 and the bolt member 12.

With reference to the example shown, the anti-manipulation plate 22 comprises a passage slot 27 for the key. Advantageously, the passage slot 27 is delimited by a closed profile P.

Preferably, the passage slot 27 comprises a first or upper portion substantially closely following or comprising the area of the key passage port (in a plane parallel to the safety plates) and a second or lower portion of varying width along the height of the anti-manipulation plate. By the term "height" it is intended the vertical size of the anti-manipulation plate with reference to Fig. 1 or 2; by width it is intended the horizontal size of the anti-manipulation plate with reference to Fig. 1 or 2, in the plane of the plate itself.
In particular, the width of the lower portion of slot 27 increases from a lower edge of the lower portion, in which it is smaller than the width of the passage port, until opening into the upper portion where it is the same as or greater than the width of the passage port. In general terms, the lower portion of slot 27 has at least one size smaller than the corresponding size of the passage port in the plane of the anti-manipulation plate.

The lower portion of slot 27 confines a portion of the anti-manipulation plate 22 defining said shield S.

In accordance with a possible embodiment, not shown, the anti-manipulation plate 22 comprises a passage opening for the key (having an open or closed profile) provided with a first portion substantially closely following or comprising the area of the key passage port and a second portion confining the shield.

In case of normal use of the lock, the anti-manipulation plate 22 is usually disposed to a height in which the upper portion of slot 27 is aligned with opening 7 and is extended enough to closely follow or comprise such a passage port. If the anti-manipulation plate 22 lifts up as a result of raising of the safety plates 4 and possibly also due to the action of the safety pin 13, the lower portion comes close to opening 7, so that in at least one obstruction position of the anti-manipulation plate the key passage port is at least partly obstructed by a portion of the anti-manipulation plate 22 defining said shield.

Generally, the shaped profile 25 and safety pin 13 form translation cam means operating between the anti-manipulation plate 22 and bolt member 12 to bring the shield S to at least one further obstruction position in which the passage port is further at least partly obstructed by the shield.

In general, the safety lock according to the present invention can comprise translation cam means operating between the shield S and the bolt member 12 to bring the shield S to at least a further obstruction position in which the passage port is further at least partly obstructed by the shield.

Operation of the safety lock will be hereinafter described with reference to an illicit opening attempt using instruments of the new generation.

The tensioning device T is inserted into opening 7 tensioning the bolt member 12 against the safety plates 4 and the anti-manipulation plate 22 in the opening

direction of the lock (arrow A).

Subsequently, a rod ST provided with pins at one end is inserted, which rod raises all plates to the maximum lifting-up position.

By causing oscillation of the manipulation instrument an attempt is made to find the double-sided profile of the key blade at the first key turn.

The anti-manipulation plate 22 (or generally the shield S) is raised by the manipulation instrument and the safety plates 4, thus partly obstructing the key passage port. Possibly partial sliding of the bolt member 12 according to arrow A causes further raising of the anti-manipulation plate 22 and further obstruction of the passage port.

This involves locking of the manipulation instrument inside the lock, so that the instrument cannot make the key turn and can be released only by proposing the initial conditions again and therefore setting to zero the position of the pins on the rod, which will bring about, as a result, impossible detection of the double-sided profile of the key directly from the safety plates.

As an alternative to the above, shield S can be mounted inside the safety lock in such a manner that it is shiftable even due to movement of the bolt member alone from the closed position to the open position causing the translation cam means to intervene.

As an alternative to the above, the constraint means between the anti-manipulation plate and the safety

plates can be different, and lower wings on the safety plates adjacent to the anti-manipulation plate can be for example provided.

5

C L A I M S

1. A safety lock (1), comprising:
- a frame,
- a bolt member (12) movably mounted on the frame and shiftable by rotation of the key in the lock between a first position corresponding to an open condition of the lock and a second position corresponding to a closed condition of the lock,
- at least one safety plate (4) movably mounted on the frame and translatable by rotation of the key in the lock to a position enabling movement of the bolt member (12),

characterised in that it comprises:
- hooking means operating between the bolt member (12) and said at least one safety plate (4), following a thrust illicitly produced on the bolt member (12), and
- means for enabling rotation of the safety plate (4) to a maximum lifting-up position of the safety plate itself, wherein said means for enabling rotation of the safety plate (4) comprises at least one slide slot (5) adapted to allow rotation/inclination of the safety plate in the plane of the safety plate itself to a maximum lifting-up position, and wherein said slide slot (5) comprises an enlarged portion (21) in which a pin (6) can be positioned thus enabling rotation of the safety plate in its own plane.

2. A safety lock (1) as claimed in claim 1, wherein said hooking means comprises a hook-shaped portion (16a, 16b) formed in a safety pin (13) of the bolt member (12) adapted to cross a window (8) of the safety plate (4).

3. A safety lock (1) as claimed in claim 2, wherein the

hooking opening of said hook-shaped portion is oriented according to an opening direction of the bolt member (12).

4. A safety lock (1) as claimed in claim 2 or 3, wherein said hooking means comprises an upper hook-shaped portion (16a) and a lower hook-shaped portion (16b) formed in the safety pin (13) of the bolt member (12).

5. A safety lock (1) as claimed in one or more of claims 2-4, wherein the safety pin (13) has at least one recess (14) oriented according to an opening direction of the bolt member (12).

6. A safety lock (1) as claimed in one or more of claims 2-5, wherein said hooking means comprises a hook-shaped portion formed in a tooth (17) of the window (8) of the safety plate (4).

7. A safety lock (1) as claimed in claim 6, wherein the hooking opening of said hook-shaped portion is oriented according to a closing direction of the bolt member (12).

8. A safety lock (1) as claimed in one or more of the preceding claims, wherein the safety plate (4) comprises two slide slots (5) and wherein at least one lower slide slot is adapted to enable rotation/inclination of the safety plate in the plane of the safety plate itself to the maximum lifting-up position.

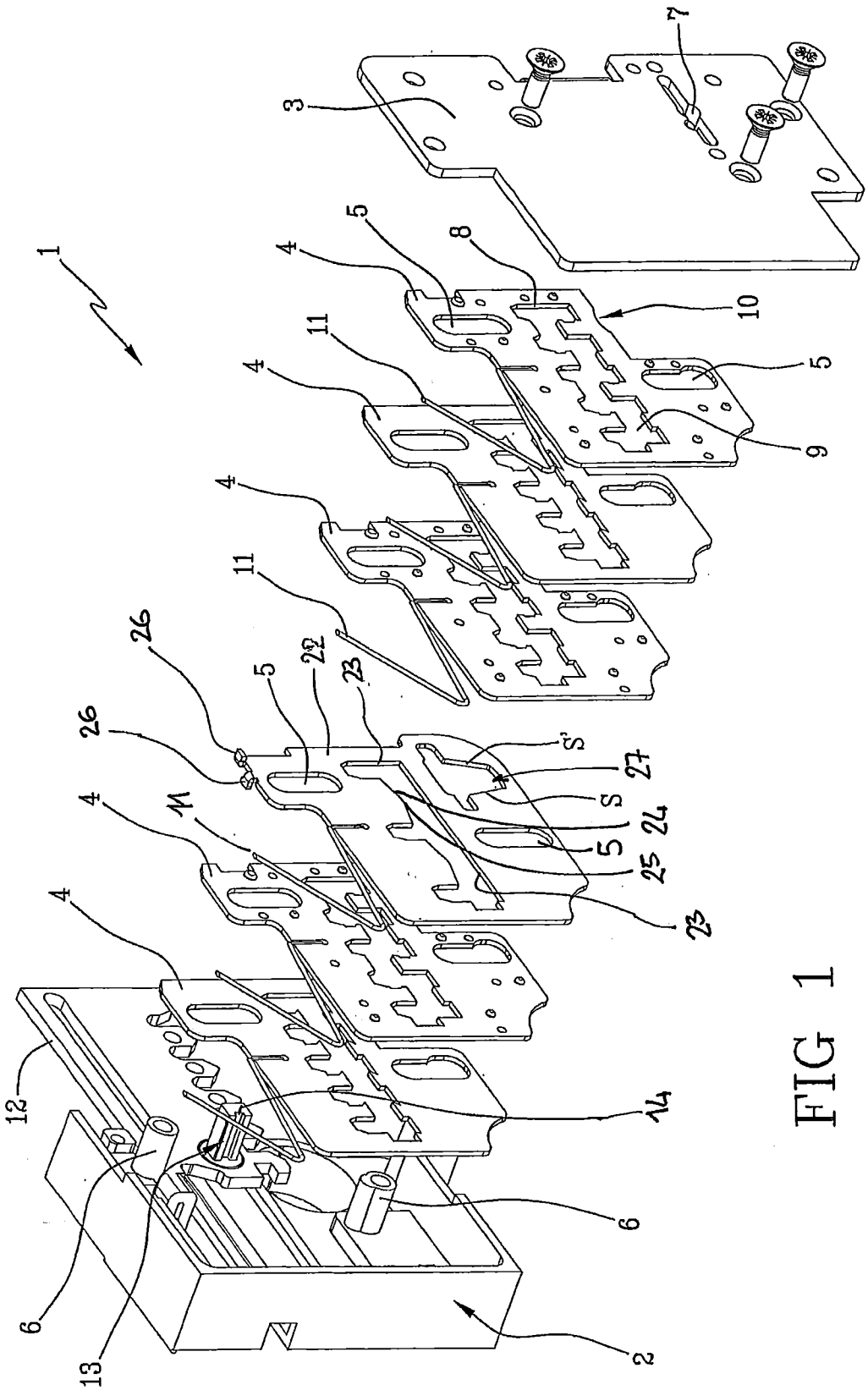


FIG 1

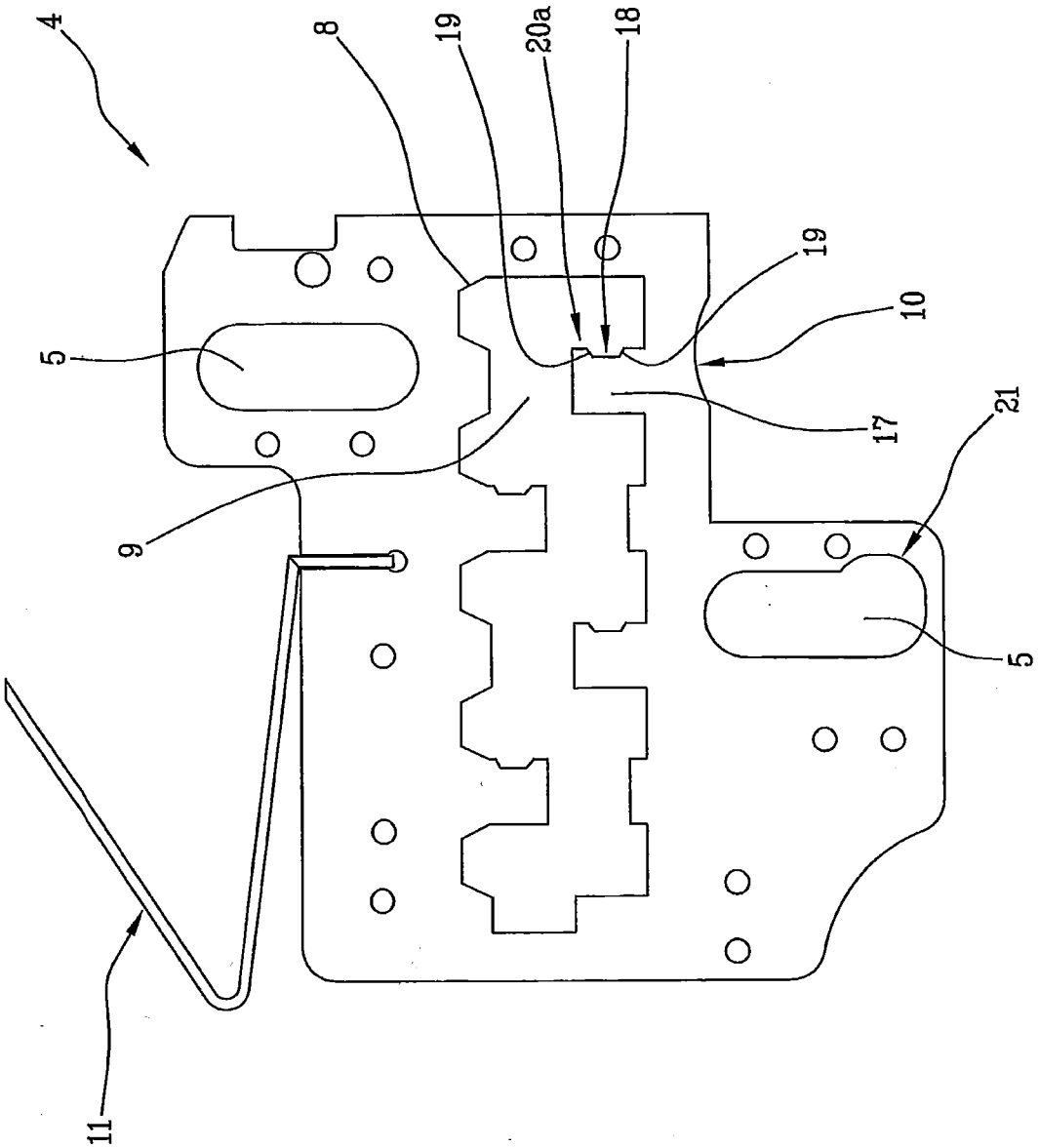


FIG.2

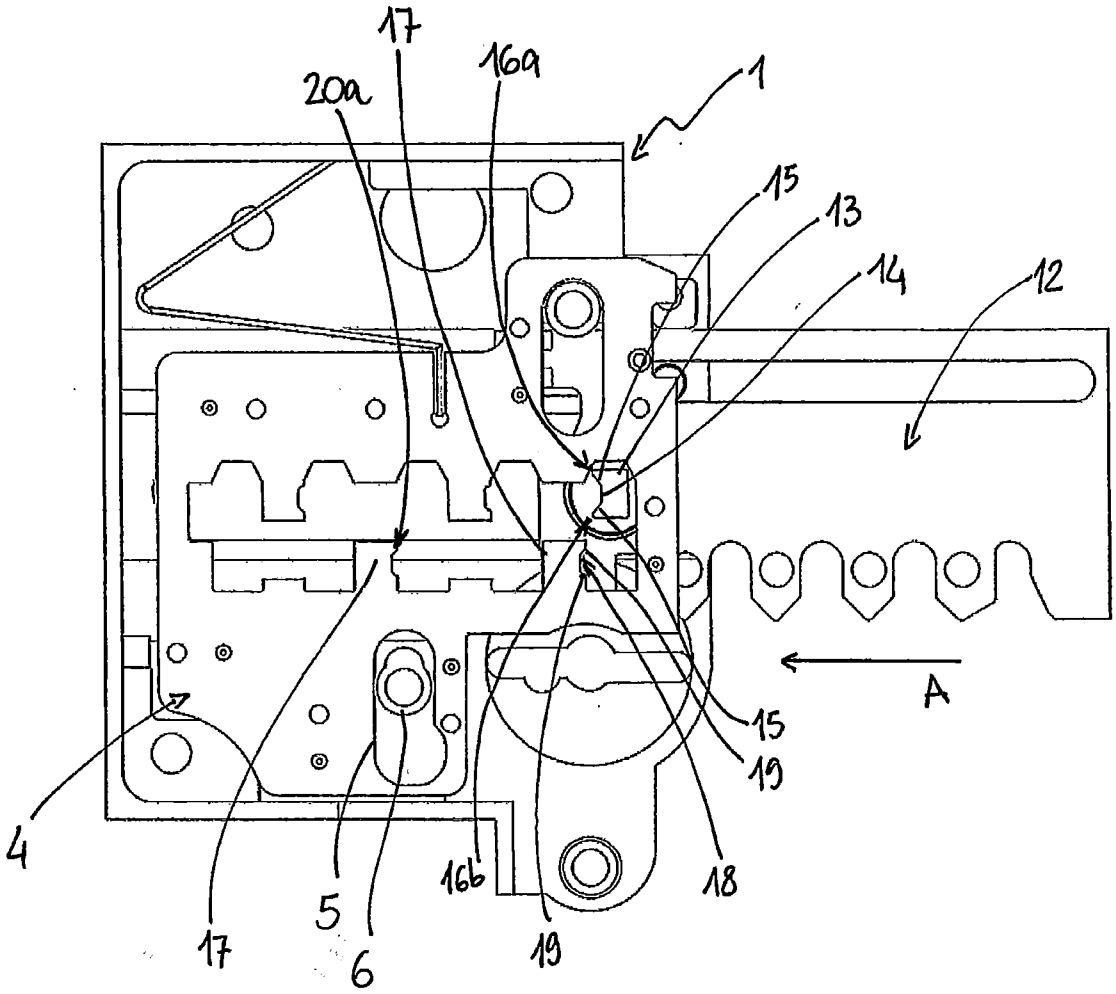


FIG.3

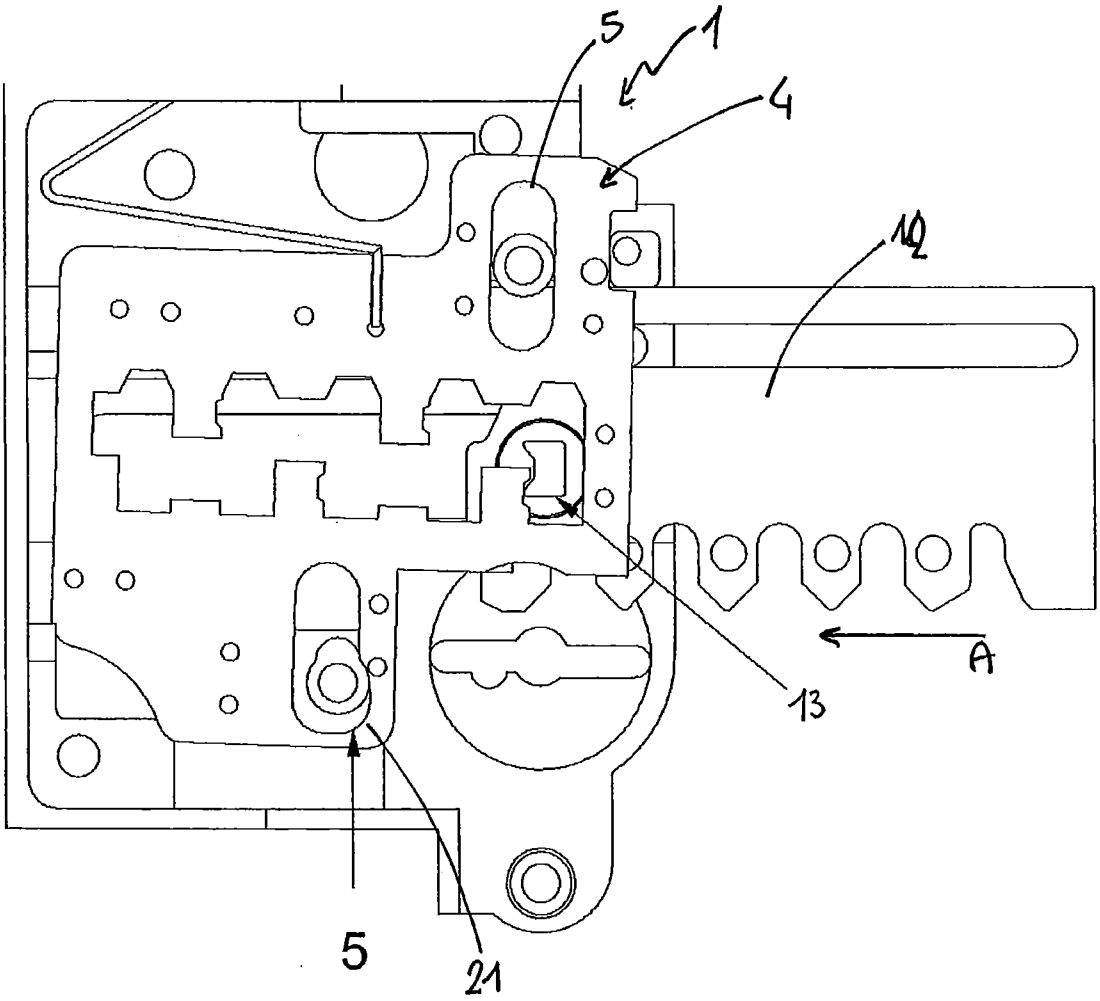


FIG.4

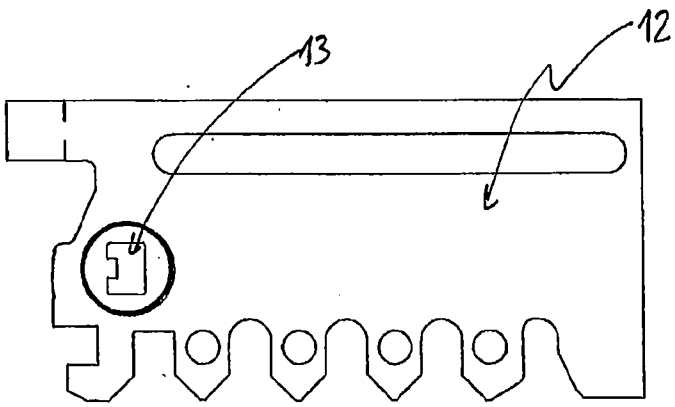


FIG.5

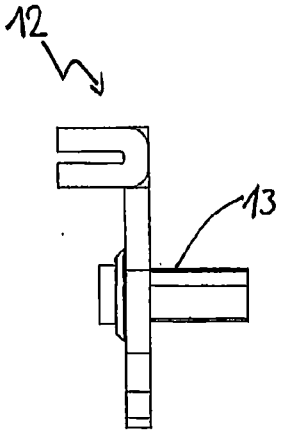


FIG.6

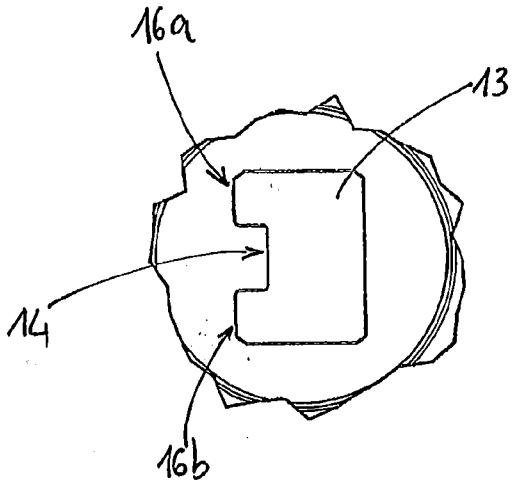


FIG.7

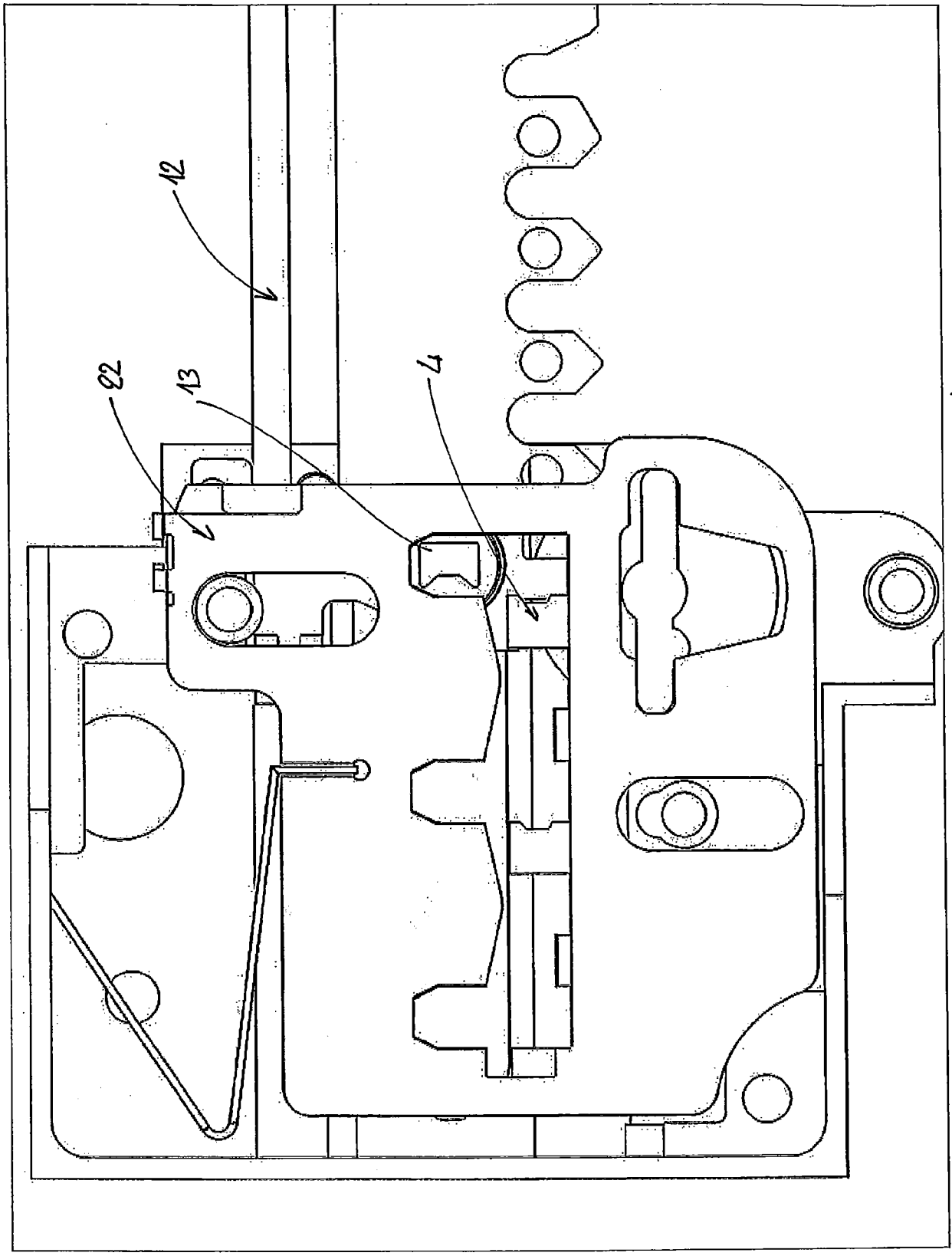


FIG.8

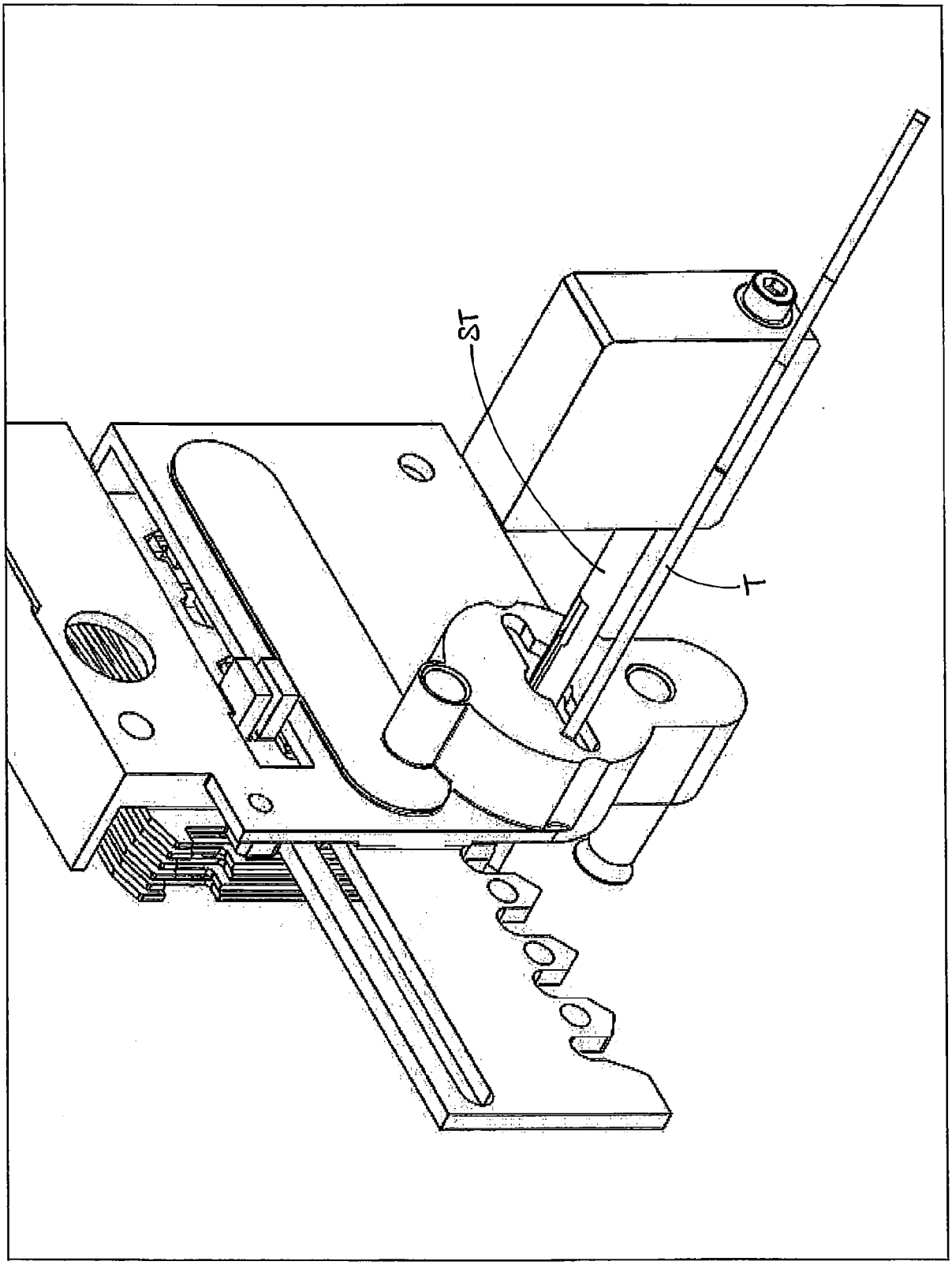


FIG. 9

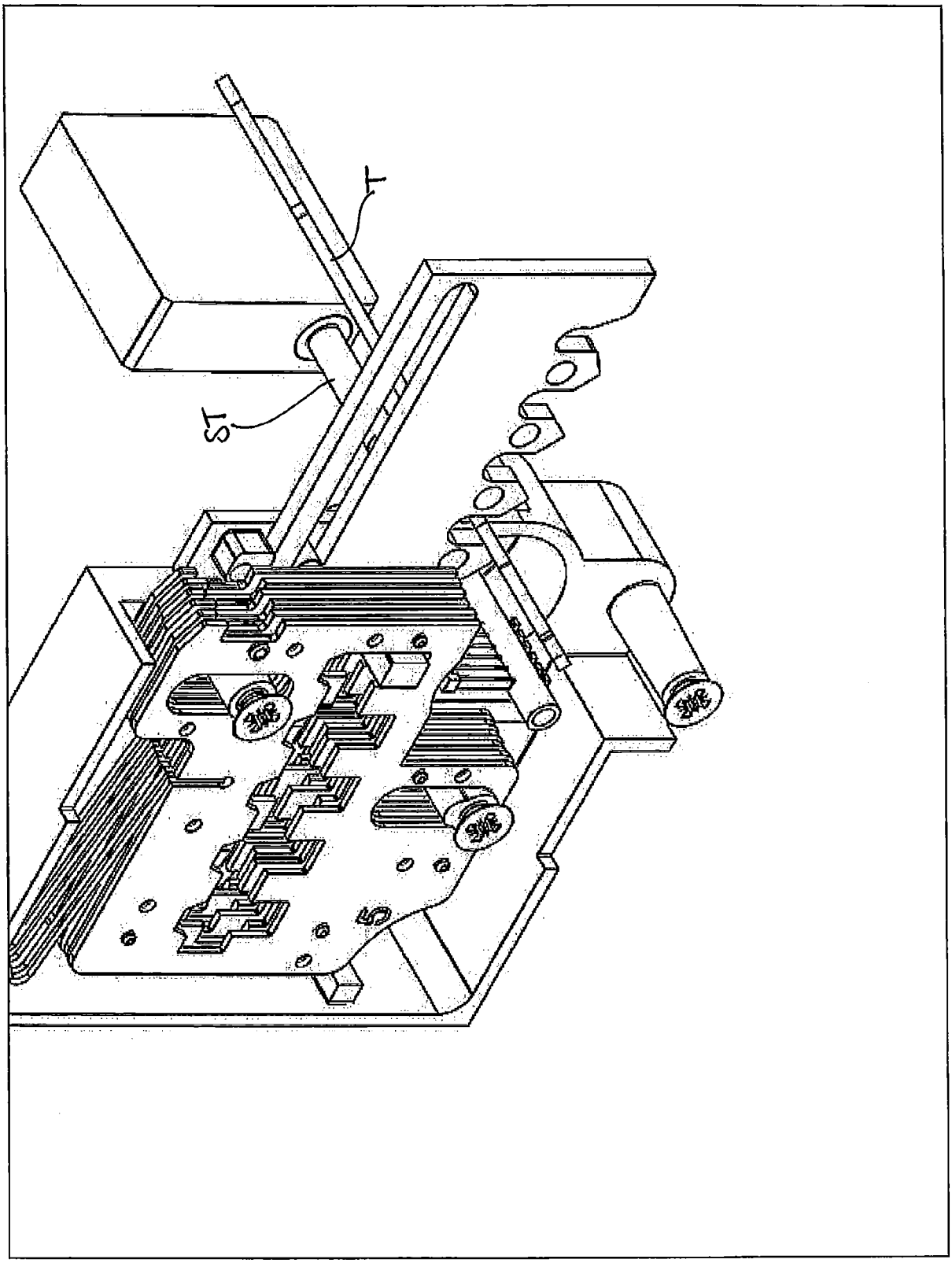


FIG. 10

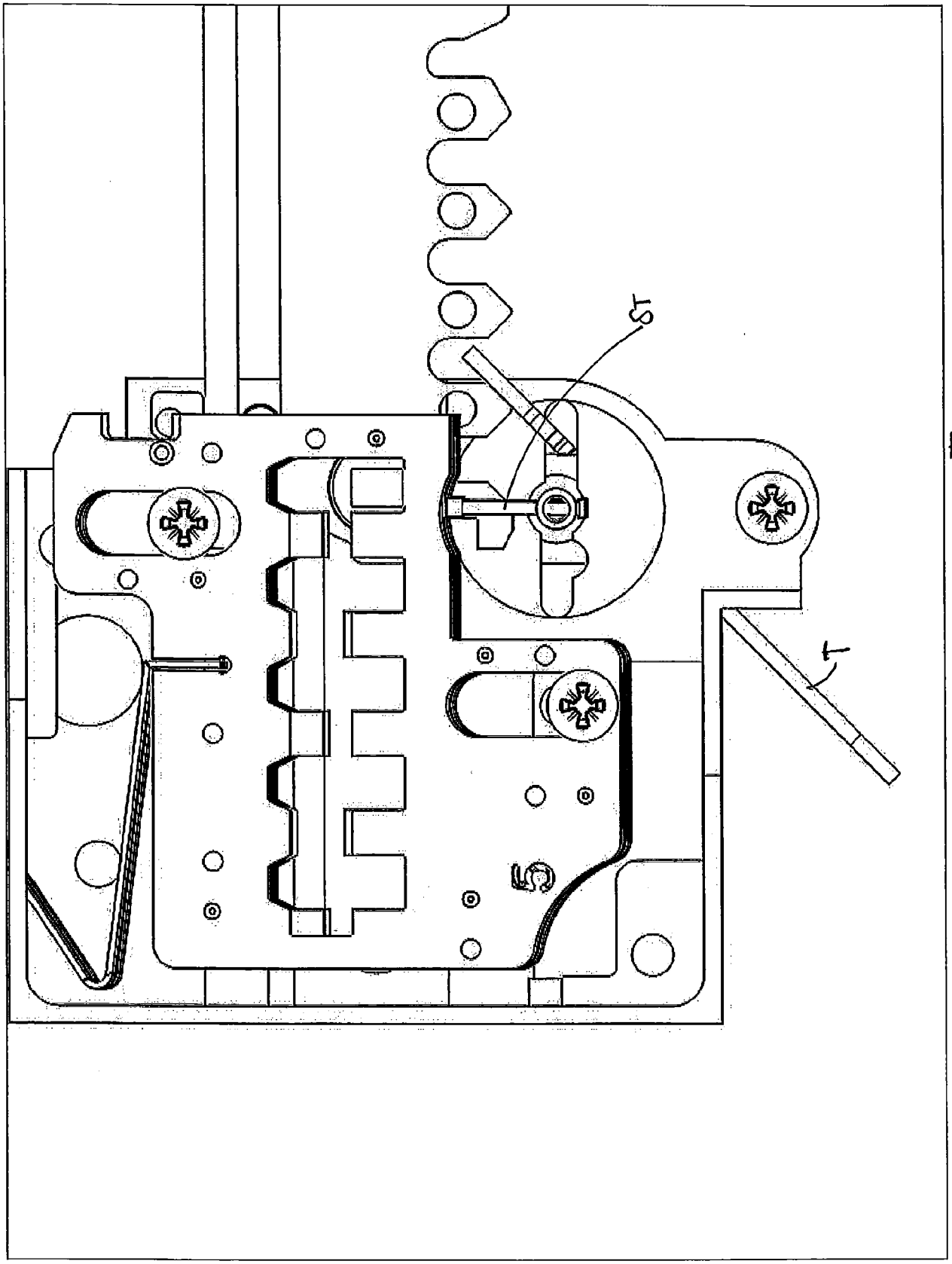


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/050439

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05B21/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 035 278 A2 (BJÖRKBODA LAS OY AB) 13 September 2000 (2000-09-13) column 4, line 53 - column 5, line 2; figures 1,7a	1
A	WO 03/080969 A1 (BJÖRKBODA LAAS OY AB) 2 October 2003 (2003-10-02) figures 1,2	1
A	GB 2 308 862 A (WEALTHSAFE LTD) 9 July 1997 (1997-07-09) page 7, line 4 - line 13; figures 1,7	1
A	EP 0 903 455 A2 (CISA SPA) 24 March 1999 (1999-03-24) paragraphs [0023], [0031]; figures	1

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 May 2012	06/06/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Van Beurden, Jason

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/050439

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 228 286 A (CLARK) 22 August 1990 (1990-08-22) figures 1,2	1
A	WO 2009/057170 A1 (CISA SPA) 7 May 2009 (2009-05-07) figures 2,4	1,6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2012/050439

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1035278 A2	13-09-2000	AT 296935 T	15-06-2005
		CZ 20000879 A3	15-11-2000
		DE 60020425 D1	07-07-2005
		DE 60020425 T2	27-04-2006
		EE 200000200 A	16-10-2000
		EP 1035278 A2	13-09-2000
		ES 2241551 T3	01-11-2005
		FI 990519 A	11-09-2000
		HU 0001131 A2	28-05-2001
		NO 20001245 A	11-09-2000
		PL 338845 A1	11-09-2000
		PT 1035278 E	30-09-2005
		RU 2230865 C2	20-06-2004
		UA 64764 C2	15-12-2000
WO 03080969 A1	02-10-2003	AT 302315 T	15-09-2005
		AU 2003216937 A1	08-10-2003
		CA 2477141 A1	02-10-2003
		DE 60301342 D1	22-09-2005
		DE 60301342 T2	08-06-2006
		DK 1490570 T3	14-11-2005
		EP 1490570 A1	29-12-2004
		ES 2246469 T3	16-02-2006
		FI 20020587 A	28-09-2003
		HR 20040831 A2	30-06-2005
		IL 163738 A	24-12-2009
		MX PA04008872 A	20-06-2005
		PL 208004 B1	28-02-2011
		US 2005126237 A1	16-06-2005
		WO 03080969 A1	02-10-2003
GB 2308862 A	09-07-1997	GB 2308862 A	09-07-1997
		IT TO960995 A1	09-06-1998
EP 0903455 A2	24-03-1999	EP 0903455 A2	24-03-1999
		ES 2203864 T3	16-04-2004
		IT BO970565 A1	18-03-1999
		PT 903455 E	28-11-2003
GB 2228286 A	22-08-1990	NONE	
WO 2009057170 A1	07-05-2009	AT 510984 T	15-06-2011
		CN 101842542 A	22-09-2010
		EP 2212493 A1	04-08-2010
		ES 2366159 T3	17-10-2011
		WO 2009057170 A1	07-05-2009