(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
14 May 2009 (14.05.2009)

PCT

(10) International Publication Number
WO 2009/060175 A1

(51) International Patent Classification:
E05B 9/08 (2006.01) *E05B 37/02* (2006.01)

(21) International Application Number:
PCT/GB2008/003663

(22) International Filing Date: 30 October 2008 (30.10.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0721803.5 6 November 2007 (06.11.2007) GB

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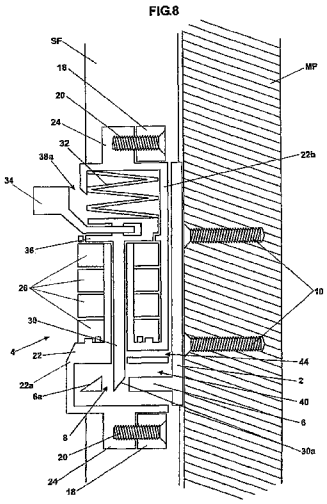
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(54) **Title:** LOCKS FOR WINDOWS AND DOORS

FIG.8



(57) **Abstract:** A lock for securing a window or door includes a locking pin (6) formed as part of a "locking plate (2) and which is securable to a moving part (MP) of the window or door by a pair of screws (10). A combination lock member (4) is securable to a stationary part (SF) of the window or door using a fixing plate (12). The combination lock member (4) has a plurality of combination dials (26) that are independently rotatable about a common axis and houses a locking column (30) that is biased towards a locking position where it engages with the locking pin (6) when the window or- door is closed. The locking column (30) is movable between the locking position and a retracted position where it does not engage with the locking pin (6) when the window or door is closed only when the plurality of combination dials (26) are in a predetermined alignment. When the window or door is closed, the locking pin (6) is received in an opening (40) in the combination lock member (4) and engages with the locking column (30) when the locking column is in the locking position to prevent the opening of the window or door.

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Locks for windows and doors

DESCRIPTION

Technical Field

The present invention relates to locks for windows and doors, and in particular to locks that include a combination lock (or permutation lock) member having a plurality of combination dials that are independently rotatable about a common axis.

Summary of the Invention

The present invention provides a lock for securing a window or door having a stationary part and a moving part, the lock comprising a locking pin securable to one of the stationary part and the moving part of the window or door, a combination lock member securable to the other of the stationary part and the moving part of the window or door, the combination lock member having a plurality of combination dials that are independently rotatable about a common axis and housing a locking column that is biased towards a locking position where it engages with the locking pin when the window or door is closed and is movable between the locking position and a retracted position where it does not engage with the locking pin when the window or door is closed only when the plurality of combination dials are in a predetermined alignment, such that, in use, when the window or door is closed the locking pin is received in an opening in the combination lock member and engages with the locking column when the locking column is in the locking position to prevent the opening of the window or door.

The lock may be used as the only device for securing the window or door or used in combination with a separate latch or locking mechanism for additional security.

The combination lock member may have any suitable configuration as long as it includes a plurality of combination dials that are independently rotatable about a common axis and allows axial movement of the locking column only when the combination dials are in the predetermined alignment. When the combination dials

are in an alignment other than the predetermined alignment then the combination lock member should prevent axial movement of the locking column such that the locking column is retained in the locking position. An example of a combination dial mechanism that may be used in the combination lock member of the present invention is disclosed in US 5934120.

The combination lock member will normally be securable to the stationary part of the window or door and the locking pin will normally be securable to the moving part of the window or door, but the reverse configuration is also possible.

The locking column may be selectively retained in the retracted position so that it does not engage with the locking pin when the window or door is closed. The lock may further include a lever for manually moving locking column to the retracted position and for selectively retaining the locking column in the retracted position.

The locking pin preferably includes an opening for receiving a part of the locking column. Engagement between the locking column and the locking pin is therefore effected by receiving the locking column in the opening of the locking pin when the window or door is closed. It will be readily appreciated that the engagement between the locking pin and the locking column may be provided by any suitable means such as interlocking wedges or cooperating engagement surfaces, for example.

An end part of one or both of the locking pin and the locking column is preferably chamfered so that contact between the locking pin and the locking column as the window or door is closed will move the locking pin against the bias to the retracted position.

The locking column is preferably spring-biased towards the locking position. However, it will be readily appreciated that the locking column may be biased to the locking position by any suitable biasing member.

The locking pin is preferably secured to the window or door by a locking plate and at least one mechanical fixing (e.g. a screw). For increased security, it is generally preferred that the at least one mechanical fixing used to secure the locking plate to the window or door cannot be accessed when the window or door is closed. For example, the at least one mechanical fixing can be substantially covered by the combination lock member when the window or door is closed.

The lock may further include a fixing plate that is secured to the window or door using at least one mechanical fixing (e.g. a screw). The combination lock member is preferably secured to the fixing plate using at least one mechanical fixing (e.g. a bolt). For increased security, it is generally preferred that the at least one mechanical fixing used to secure the fixing plate to the window or door cannot be accessed when the combination lock member is secured to the fixing plate. For example, the at least one mechanical fixing can be substantially covered by the combination lock member when the combination lock member is secured to the fixing plate.

It is also generally preferred that the at least one mechanical fixing used to secure the combination lock member to the fixing plate cannot be accessed when the window or door is closed. For example, the at least one mechanical fixing can be substantially covered by the moving part of the window or door when the window or door is closed.

The present invention further provides a first method (i.e. a combination lock mode) of using the lock described above, the method comprising the steps of rotating the plurality of combination dials to the predetermined alignment, closing the window or door such that the locking pin engages with the locking column to prevent the window or door from opening, and rotating the plurality of combination dials out of the predetermined alignment to retain the locking column in the locking position.

The present invention further provides a second method (i.e. child lock mode) of using the lock described above, the method comprising the steps of rotating the plurality of combination dials to the predetermined alignment, manually moving the

locking column towards the retracted position such that the locking pin no longer engages with the locking column, and opening the window or door. The method may further comprise the step of selectively retaining the locking column in the retracted position.

Drawings

Figure 1 is a perspective view of a locking plate that forms part of a window lock according to the present invention;

Figure 2 is a front perspective view of a combination lock member that forms part of a window lock according to the present invention;

Figure 3 is a rear perspective view of a combination lock member that forms part of a window lock according to the present invention;

Figure 4 is a cross-sectional view through the combination lock member;

Figure 5 is a cross-sectional view through the window lock of the present invention showing the engagement between the locking pin of the locking plate and the locking column of the combination lock member;

Figure 6 is a perspective view of a fixing plate that is used to fixedly secure the combination lock member to a stationary part of the window;

Figure 7 is a rear perspective view showing the combination lock member secured to the fixing plate, which in turn is fixedly secured to a stationary part of the window; and

Figure 8 is a cross-sectional view through the combination lock member and the locking plate showing how the locking plate is fixedly secured to a moving part of the window and how a locking column of the combination member is engageable with a locking pin of the locking plate to securely lock the moving and stationary parts of the window together.

An example of window lock according to the present invention will now be described with reference to Figures 1 to 8. However, it will be readily appreciated that the same lock may also be used to secure a door.

The window lock consists of two separate parts, namely a locking plate 2 and a combination lock member 4. The locking plate 2 includes an integral locking pin 6 with an aperture or opening 8. The locking plate 2 is fixedly secured to a moving part of a window by a pair of screws 10. The combination lock member 4 is fixedly secured to a stationary part of the window as described in more detail below. In the case of double-hung window, the moving part of the window will slide relative to the surrounding stationary frame. In the case of casement window, the moving part will pivot relative to the surrounding stationary frame. The orientation and position of the locking plate 2 and the combination lock member 4 relative to the window will depend on the type of the window and this is described in more detail below.

The combination lock member 4 is fixedly secured to the stationary part of the window by means of a fixing plate 12 (Figures 6 and 7). The fixing plate 12 is fixedly secured to the stationary part of the window by a pair of screws 14. Each end of the fixing plate 12 includes an outwardly extending bracket or flange 16 having a fixing block 18 with an internally screw-threaded bore for receiving a fixing bolt 20.

The outer casing 22 of the combination lock member 4 includes a pair of corresponding fixing blocks 24, each having an internally screw-threaded bore for receiving one of the fixing bolts 20. The combination lock member 4 is inserted into the fixing plate 12 such that the ends of the outer casing 22 are located within the outwardly extending brackets 16 and the internally screw-threaded bores in the respective fixing blocks 18, 24 are aligned. The combination lock member 4 can then be secured to the fixing plate 12 using the fixing bolts 20.

The combination lock member 4 includes four combination dials 26 that are independently rotatable about a common axis. Each combination dial 26 is marked with ten digits ('0' to '9') and rotatable so that different four digit combinations can be aligned with a marker 28 on the outer casing 22. For example, in Figure 2 the four digit combination that is aligned with the marker 28 is '3186' but rotating the lower most combination dial one location to the right will produce a different four digit combination '3187'.

A locking column 30 is located within the outer casing 22 of the combination lock member 4 and is free to slide in a direction parallel with the common axis of the combination dials 26 when the combination dials are in a predetermined alignment; which alignment will correspond to a particular four digit combination being aligned with the marker 28 on the outer casing. The locking column 30 is biased in a locking direction by a coil spring 32 (i.e. downwardly as shown in Figure 4) and can be moved against the bias in an opening direction (i.e. upwardly as shown in Figure 4) when the combination dials 26 are in the predetermined alignment. If the combination dials 26 are in any other alignment then the locking column 30 cannot be moved at all. In other words, if the combination dials 26 are in the predetermined alignment then the locking column 30 can be moved from a locking position to a retracted position against the bias of the coil spring 32 but is retained in the locking position when the combination dials are in any other alignment.

A lever 34 is pivotally secured to a head part 36 of the locking column 30 and can be used to manually move the locking column against the bias in an opening direction when the combination dials 26 are in the predetermined alignment. The lever 34 slides in an L-shaped slot 38 in the outer casing with a vertical part 38a and a horizontal part 38b. Sliding the lever 34 along the vertical part 38a in the opening direction moves the locking column 30 from the locking position to the retracted position. Once the locking column 30 is in the retracted position, the lever 34 can be moved along the horizontal part 38b (i.e. pivoted relative to the head part 36 of the locking column) to temporarily retain the locking column in the retracted position.

The outer casing 22 includes an aperture or opening 40 for receiving the integral locking pin 6 of the locking plate 2. It will therefore be readily appreciated that the combination lock member 4 and the locking plate 2 must be fixedly secured to the stationary and moving parts of the window in such a way that the locking pin 6 is received in the aperture 40 when the window is closed. If the window is a casement window then the aperture 40 must allow for the pivoting movement of the locking pin 6 as it enters the combination lock member 4. However, for a double-hung window

where the moving part slides relative to the stationary part than the aperture 40 can be made just large enough to receive the locking pin 6. Although the aperture 40 is covered by the locking plate 2 when the window is closed, it will generally be preferred that the aperture is kept as small as possible to reduce the risk of tampering where an object or tool is inserted into the aperture with the aim of interfering with the combination dial mechanism or moving the locking column 30 to the retracted position.

Figures 7 and 8 show a situation where the window lock is secured to a casement window. The fixing plate 12 is fixedly secured to the stationary frame SF (either a side jamb or the bottom jamb) with the curved face 22a of the outer casing on which the combination dials 26 are accessible facing into the room. The locking plate 2 is fixedly secured to a part of the frame of the moving part MP of the window that also faces into the room and which does not interfere with the closing of the window. To accommodate the thickness of the locking plate 2, the combination lock member 4 is spaced slightly away from the edge of the stationary frame SF that contacts the frame of the moving part MP of the window. In some cases, the thickness of the locking plate 2 can be at least partly accommodated by fixing the locking plate in a rebate provided in the moving part MP of the window. The fixing plate 12 can also be fixed in a rebate provided in the stationary frame SF of the window if this is necessary to ensure the proper alignment between the locking column 30 and the locking pin 6.

When the window is closed, the flat face 22b of the outer casing 22 lies adjacent the locking plate 2 and the locking pin 6 is received in the aperture 40 in the flat face of the outer casing. It will also be noted that the fixing bolts 20 used to secure the combination lock member 4 to the fixing plate 12 are covered by the frame of the moving part MP of the window so that the combination lock member cannot be removed from the fixing plate when the window is closed.

During the initial fixing of the window lock, the combination lock member 4 is secured to the fixing plate 12 when the window is open so that the fixing bolts 20 can

be inserted into the aligned screw-threaded bores in the respective mounting blocks 18, 24.

When the window is closed, the locking column 30 is located in the aperture 8 provided in the locking pin 6 to prevent lateral movement of the locking plate 2 relative to the combination lock member 4. This in turn means that the moving part MP of the window is securely locked to the stationary frame SF and the window cannot be opened. The engagement between the locking column 30 and the locking pin 6 is shown clearly in Figure 5. The aperture 8 in the locking pin 6 will usually be slightly larger than the locking column 30 to allow for minor misalignments (e.g. fixing tolerances) when the locking plate 2 and fixing plate 12 are fixedly secured to the moving and stationary parts of the window, respectively. It will therefore be readily appreciated that the locking plate 2 may be able to move very slightly in the lateral direction until the locking column 30 comes into contact with an inner surface of the aperture 8 in the locking pin 6.

If the combination dials 26 are in the predetermined alignment then the lever 34 can be used to manually move the locking column 30 against the bias of the coil spring 32 to the retracted position where the locking column is no longer located in the aperture 8 of the locking pin 6. The locking column 30 is disengaged from the locking pin 6 so that the window can be opened. If the lever 34 is released while it is still in the vertical part 38a of the L-shaped slot then the locking column 30 will be biased back to the locking position by the coil spring 32. As an open window is closed, the locking pin 6 will be received in the aperture 40 in the flat part 22b of the outer casing and will come into contact the locking column 30. The chamfered end faces 6a and 30a of the locking pin 6 and the locking column 30 will cooperate to move the locking column to the retracted position against the bias of the coil spring 32. This allows the locking pin 6 to pass underneath the locking column 30 so that the window can close properly. As the aperture 8 in the locking pin 6 becomes axially aligned with the locking column 30 then the locking column will be biased by the coil spring 32 to the locking position shown in Figure 8 where it is received in the aperture. In other words, if the lever 34 is still in the vertical part 38a of the L-shaped slot then the

window will be automatically locked by the engagement between the locking column 30 and the locking pin 6 as soon as it is closed.

If the window is to remain locked then the combination dials 26 can be rotated so that they are no longer in the predetermined alignment. The locking column 30 is retained in the locking position by the combination dials 26 and the window will remain securely locked until the combination dials are rotated to the predetermined alignment. This means that once the combination dials 26 have been rotated so that they are no longer in the predetermined alignment, the window can only be opened by someone who knows the four digit combination for the particular combination lock member. The combination lock member 4 cannot be removed from the fixing plate 12 because it is impossible to access the fixing bolts 20 when the window is closed and the screws 14 that are used to fixedly secure the fixing plate 12 to the stationary frame SF of the window cannot be accessed because they are covered by the combination lock member. Similarly, the locking plate 2 cannot be removed from the moving part MP of the window because the screws 10 are covered by the flat part 22b of the outer casing of the combination lock member 4 as shown in Figure 8.

If the combination dials 26 are kept in the predetermined alignment then the lever 34 will act as a child lock since the window can only be opened by manually moving the locking column 30 to the retracted position against the bias of the coil spring 32 to disengage the locking column from the locking pin 6.

If the window is to be allowed to open freely (or if the window is to be locked by a separate locking mechanism provided elsewhere on the frame) then the lever 34 can be pivoted relative to the head part 36 of the locking column 30 to slide along the horizontal part 38b of the L-shaped slot to temporarily retain the locking column in the retracted position. In this case the locking column 30 cannot be biased to the locking position by the coil spring 32 and is therefore disengaged from the locking pin 6, which can pass freely underneath it as the window is closed.

The window lock can be retrofit to any existing window frame. The choice of screw type for securing the locking plate 2 and the fixing plate 12 may depend on whether the window frame is made of wood, aluminium or uPVC, for example. Different mechanical fixings may also be used if necessary. It is preferred that most parts of the window lock (and in particular the locking plate, fixing plate, outer casing and locking column) are made of a strong rigid material such as steel.

When the window lock is purchased, the combination lock member 4 may have a standard or "factory-set" four digit combination. The four digit combination should therefore be changed to something more secure by the purchaser. For additional security, the four digit combination may also be changed periodically. A special tool (not shown) can be used to change the four digit combination and hence the predetermined alignment of the combination dials 26. When it is not needed the tool may be stored in a slot 42 in the locking plate 2. An aperture 44 is provided in the flat part 22b of the outer casing for the entry of the tool. To alter the four digit combination the combination dials 26 must first be placed in the current predetermined alignment so that the current four digit combination is aligned with the marker 28 on the outer casing 22. The tool is then inserted into the aperture 44 and the combination dials 26 are rotated until the new four digit combination is aligned with the marker 28. It will be noted that the aperture 44 is covered by the locking plate 2 when the window is closed so that the four digit combination can only be changed when the window is open.

The tool (not shown) engages with two tapered edge pins 46 that are connected in a ring to each other. Each combination dial 26 consists of a pair of coaxial wheels (not shown) that rotate together when they are engaged. The inner wheels actually prevent the axial movement of the locking column 30 when they are not in the predetermined alignment and the outer wheels have the digits '0' to '9' on their outer surfaces and are rotated by the user. The ring sits at the base of the combination dial mechanism and is in contact with the inner wheels but not the outer wheels. Engagement between the tool (not shown) and the tapered edge pins 46 has the effect of raising the ring against the bias of the coil spring 32 (which is transmitted through the head part of the

locking column) and hence raising the inner wheels. Once the inner wheels are disengaged from the outer wheels then the outer wheels can be rotated by the user until a new four digit combination is aligned with the marker 28 while the inner wheels remain stationary in the predetermined alignment that allows axial movement of the locking column 30. When the tool is removed the bias of the coil spring 32 will lower the inner wheels to re-engage them with the outer wheels.

CLAIMS

1. A lock for securing a window or door having a stationary part (SP) and a moving part (MP), the lock comprising:

a locking pin (6) securable to one of the stationary part and the moving part of the window or door (MP);

a combination lock member (4) securable to the other of the stationary part and the moving part of the window or door (SP), the combination lock member (4) having a plurality of combination dials (26) that are independently rotatable about a common axis and housing a locking column (30) that is biased towards a locking position where it engages with the locking pin (6) when the window or door is closed and is movable between the locking position and a retracted position where it does not engage with the locking pin (6) when the window or door is closed only when the plurality of combination dials (26) are in a predetermined alignment;

such that, in use, when the window or door is closed the locking pin (6) is received in an opening (40) in the combination lock member (4) and engages with the locking column (30) when the locking column (30) is in the locking position to prevent the opening of the window or door.

2. A lock according to claim 1, wherein the locking column (30) may be selectively retained in the retracted position.

3. A lock according to claim 1 or claim 2, further comprising a lever (34) for manually moving locking column (30) to the retracted position and for selectively retaining the locking column (30) in the retracted position.

4. A lock according to any preceding claim, wherein the locking pin (6) includes an opening (8) for receiving a part of the locking column (30).

5. A lock according to any preceding claim, wherein an end part (6a,30a) of one or both of the locking pin (6) and the locking column (30) is chamfered.

6. A lock according to any preceding claim, wherein the locking column (30) is spring-biased towards the locking position.

7. A lock according to any preceding claim, wherein the locking pin (6) is secured to the window or door by a locking plate (2) and at least one mechanical fixing (10).

8. A lock according to claim 7, wherein the at least one mechanical fixing (10) used to secure the locking plate (2) to the window or door cannot be accessed when the window or door is closed.

9. A lock according to claim 7 or claim 8, wherein the at least one mechanical fixing (10) used to secure the locking plate (2) to the window or door is substantially covered by the combination lock member (4) when the window or door is closed.

10. A lock according to any preceding claim, further comprising a fixing plate (12) that is secured to the window or door using at least one mechanical fixing (14).

11. A lock according to claim 10, wherein the combination lock member (4) is secured to the fixing plate (12) using at least one mechanical fixing (20).

12. A lock according to claim 11, wherein the at least one mechanical fixing (14) used to secure the fixing plate (12) to the window or door cannot be accessed when the combination lock member (4) is secured to the fixing plate (12).

13. A lock according to claim 11 or claim 12, wherein the at least one mechanical fixing (14) used to secure the fixing plate (12) to the window or door is substantially covered by the combination lock member (4) when the combination lock member (4) is secured to the fixing plate (12).

14. A lock according to any of claims 11 to 13, wherein the at least one mechanical fixing (20) used to secure the combination lock member (4) to the fixing plate (12) cannot be accessed when the window or door is closed.

15. A lock according to claim 14, wherein the at least one mechanical fixing (20) used to secure the combination lock member (4) to the fixing plate (12) is substantially covered by the window or door when the window or door is closed.

16. A lock according to any of claims 7 to 15, wherein the at least mechanical fixing (10;14;20) is one of a screw and a bolt.

17. A method of using the lock according to any preceding claim, the method comprising the steps of:

rotating the plurality of combination dials (26) to the predetermined alignment;

closing the window or door such that the locking pin (6) engages with the locking column (30) to prevent the window or door from opening; and

rotating the plurality of combination dials (26) out of the predetermined alignment to retain the locking column (30) in the locking position.

18. A method of using the lock according to any of claims 1 to 16, further comprising the steps of:

rotating the plurality of combination dials (26) to the predetermined alignment;

manually moving the locking column (30) towards the retracted position such that the locking pin (6) no longer engages with the locking column (30); and

opening the window or door.

19. A method according to claim 18, further comprising the step of selectively retaining the locking column (30) in the retracted position.

FIG. 1

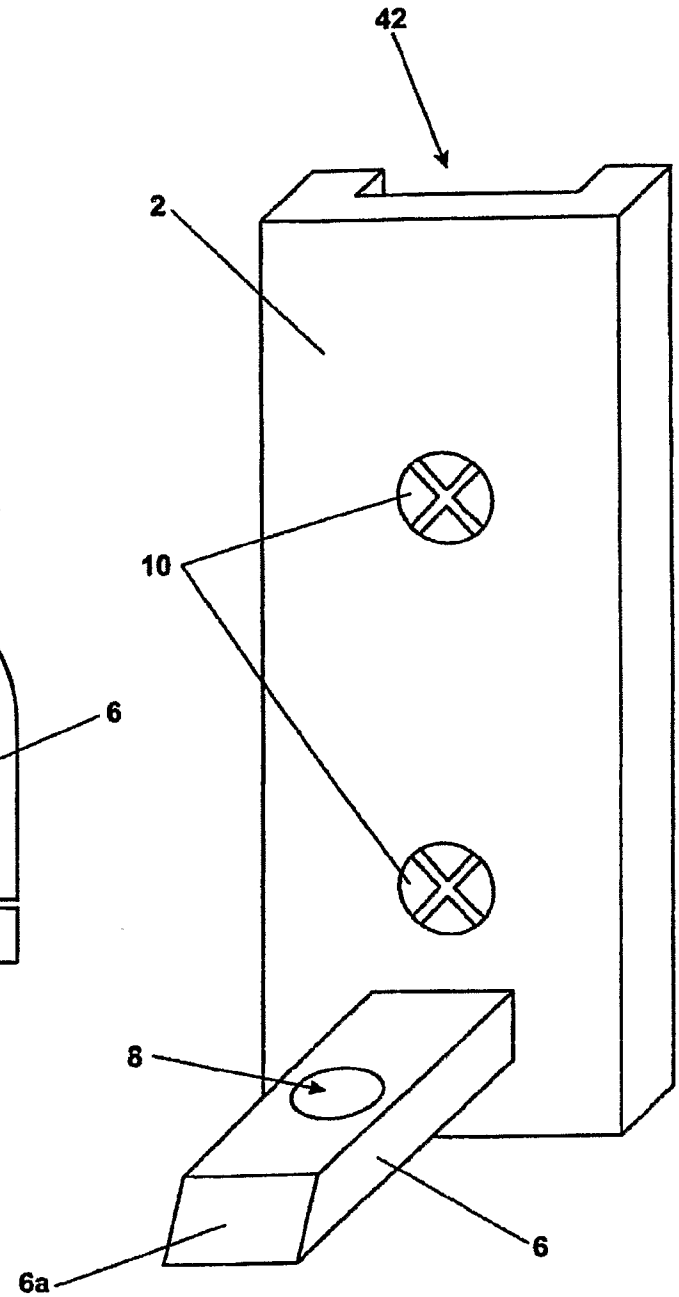


FIG. 5

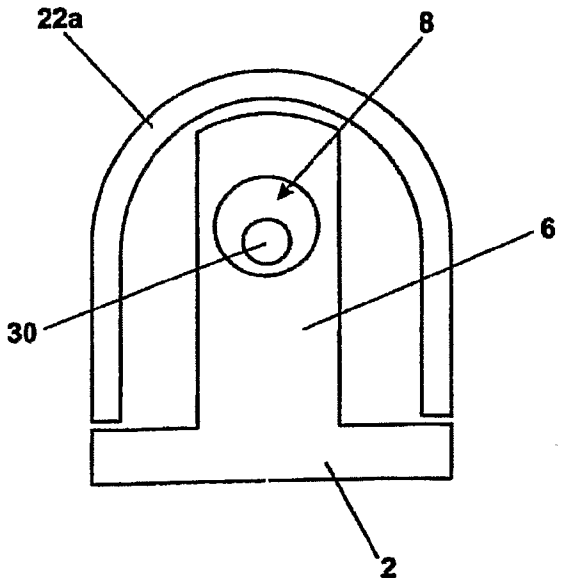


FIG. 2

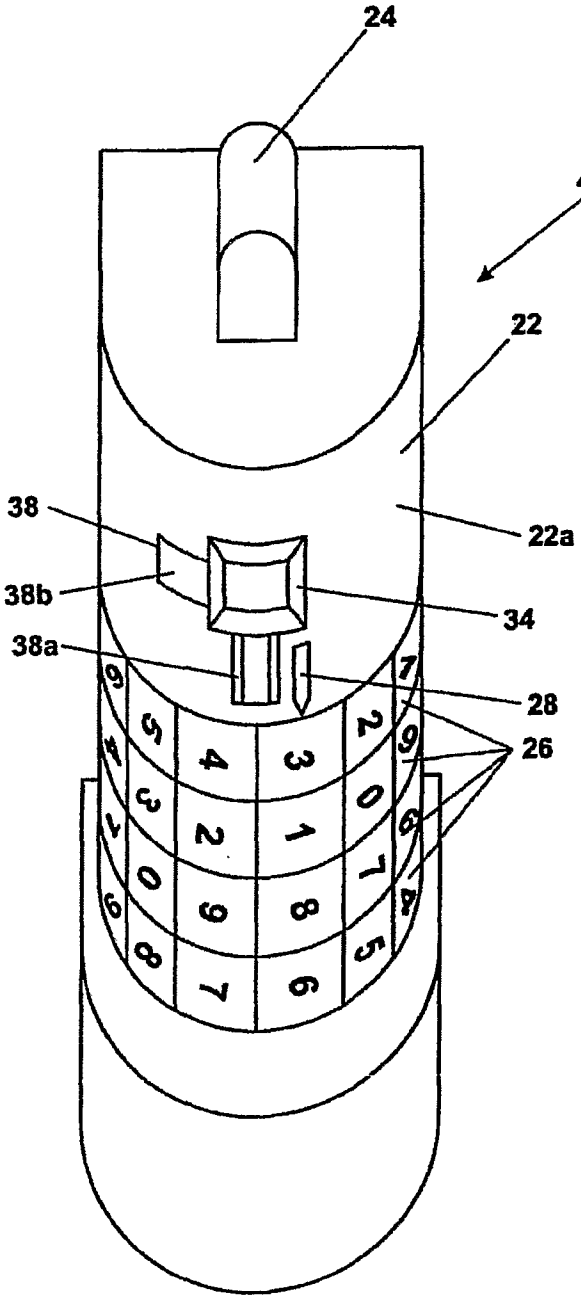
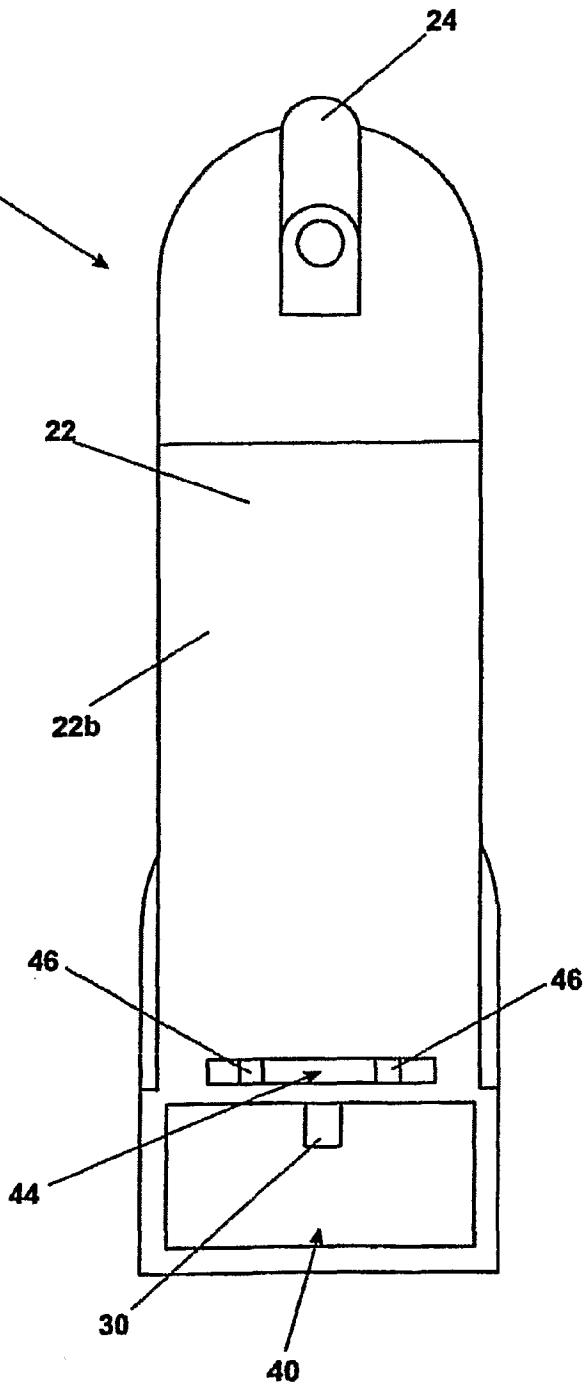


FIG. 3



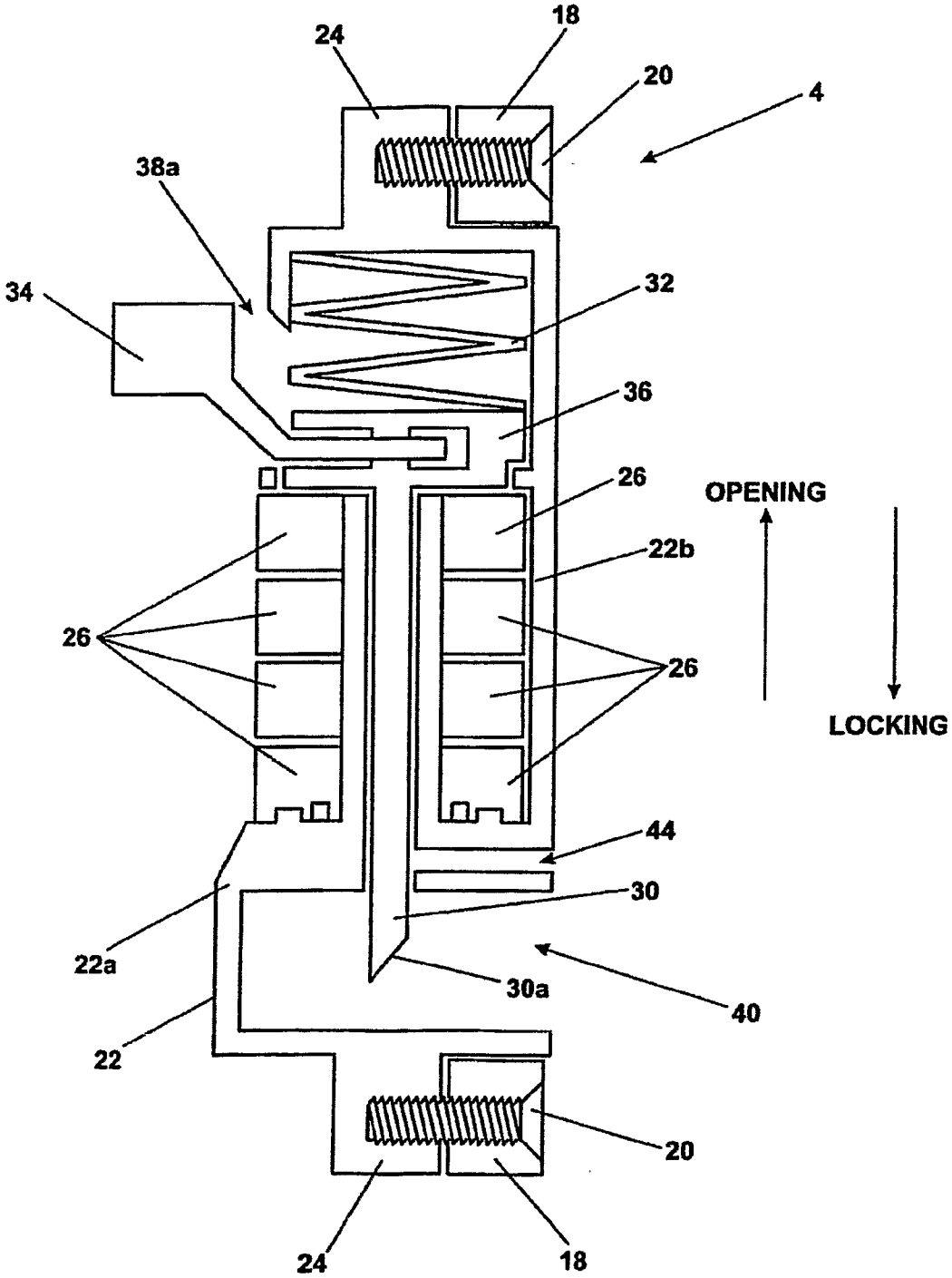

24
18
20
4
38a
34
32
36
26
OPENING
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LOCKING
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22a
30a
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18

FIG.4

FIG. 6

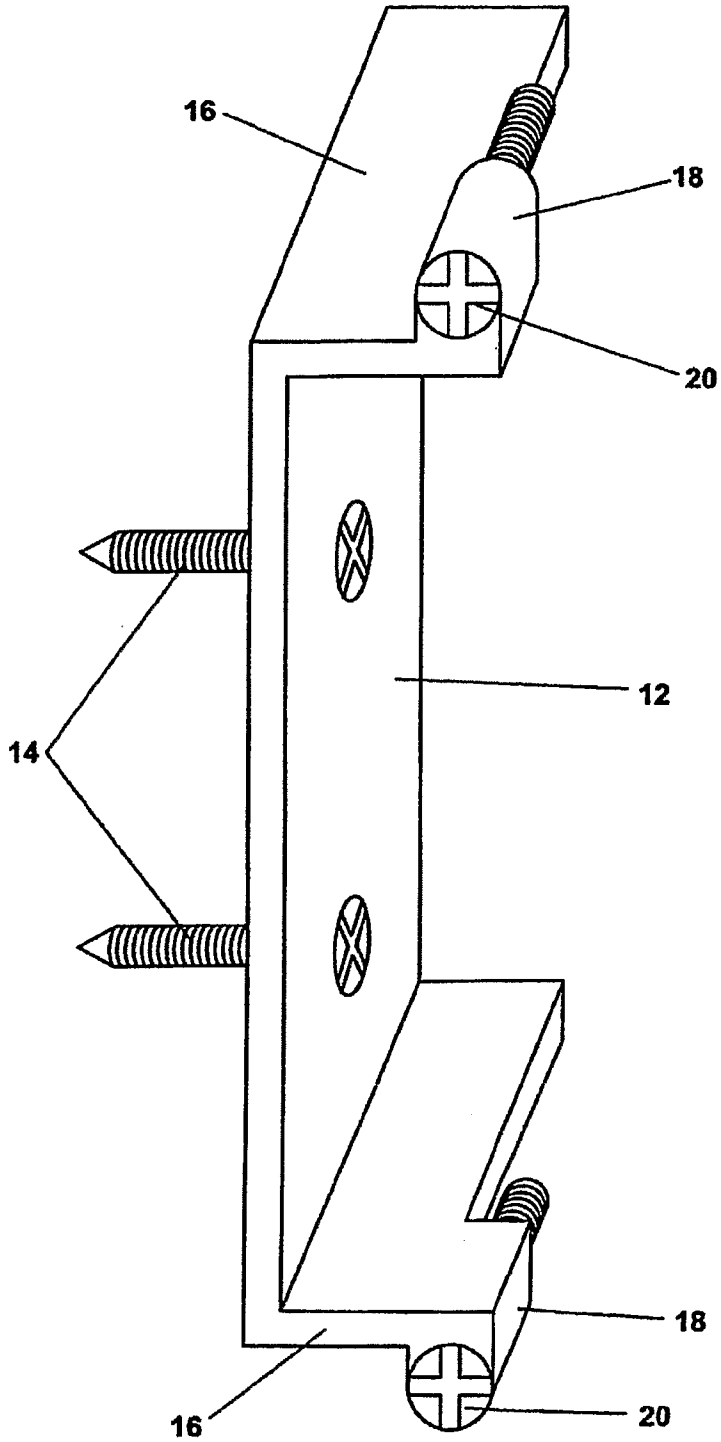


FIG. 7

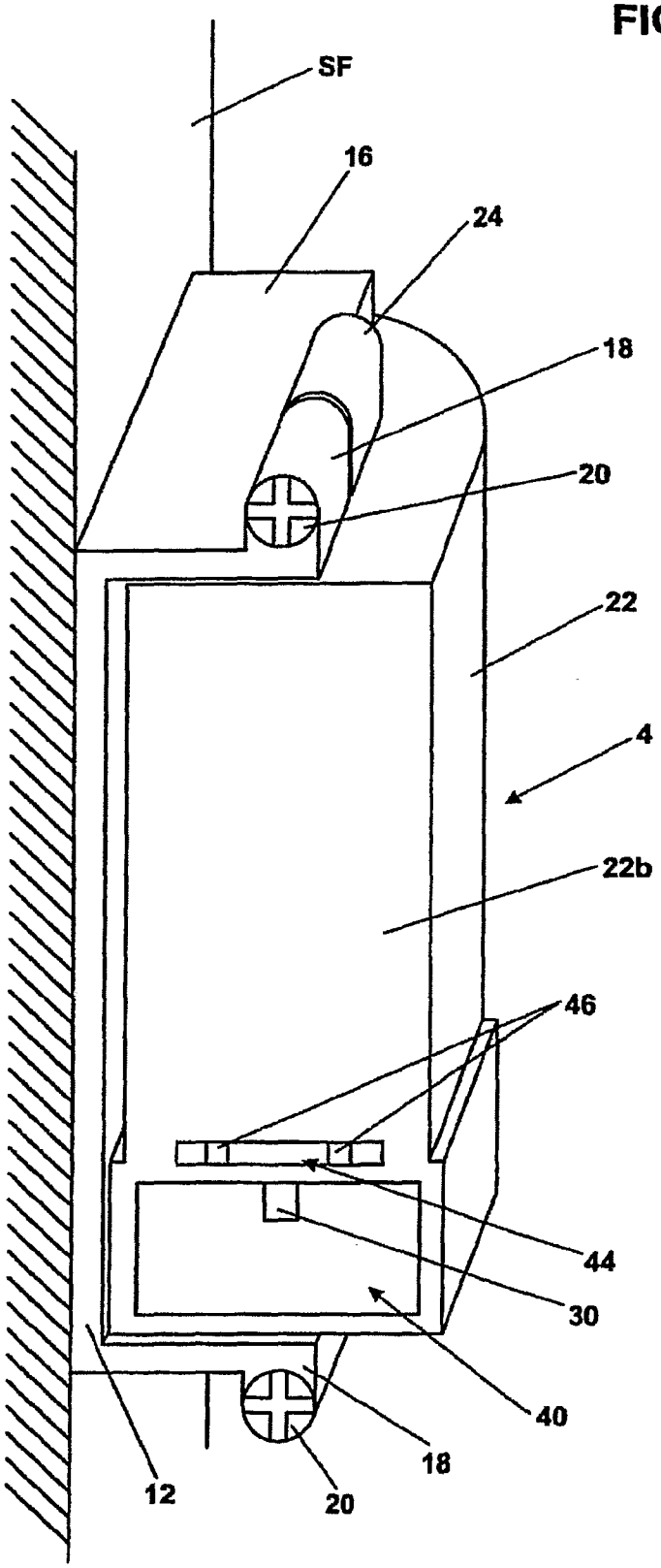
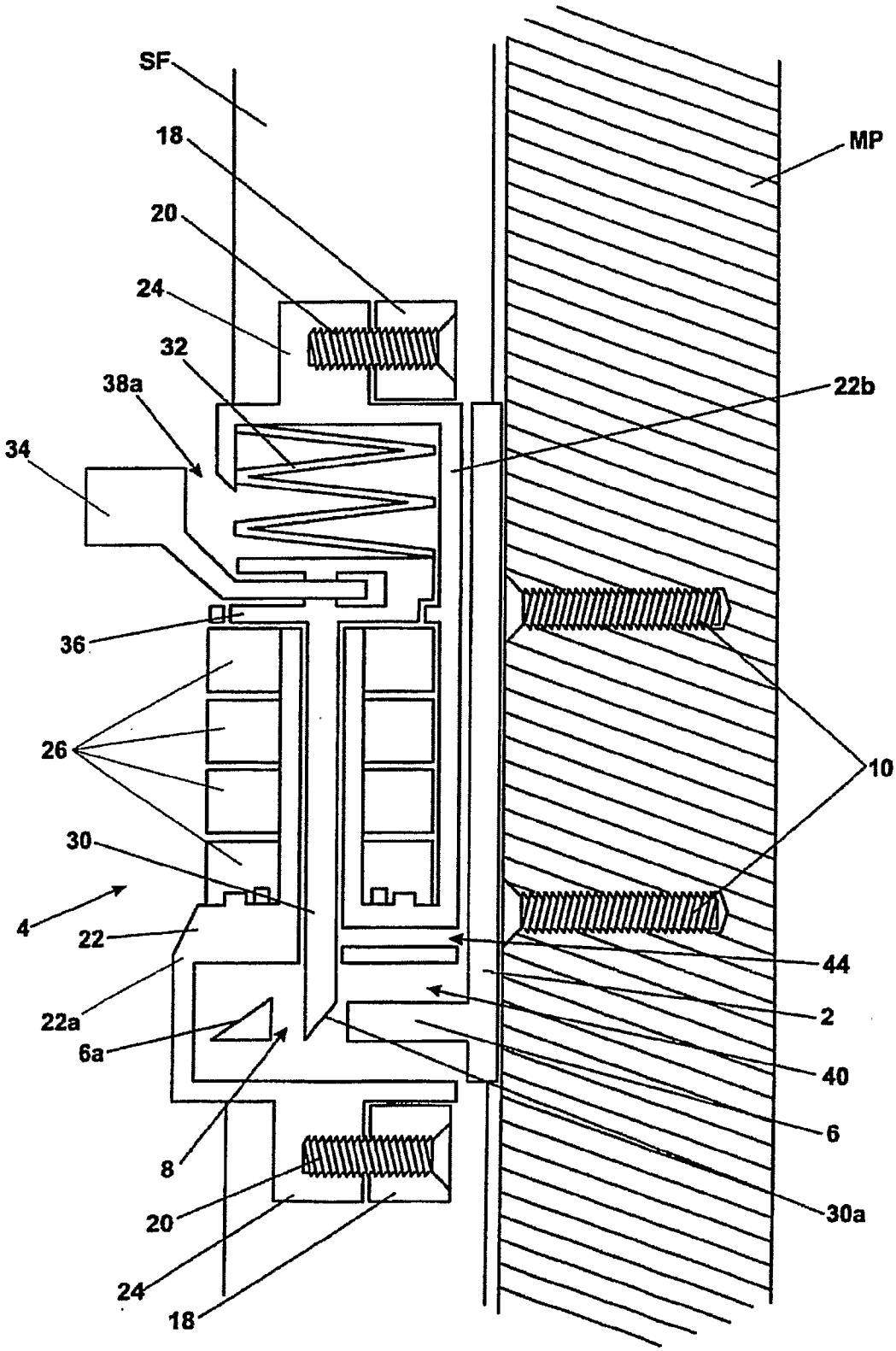


FIG.8


SF
18
20
24
32
38a
34
36
26
30
4
22
22a
6a
8
20
24
18
MP
22b
10
44
2
40
6
30a

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/003663

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05B9/08
ADD. E05B37/02

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 practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 719 776 A (MOLNAR RICHARD [US]) 19 January 1988 (1988-01-19)	1-3,5-7, 10,11, 14-19
Y	the whole document	8,9,12, 13

X	US 4 123 923 A (BAKO LAZLO) 7 November 1978 (1978-11-07) the whole document	1-7, 17-19

Y	GB 638 764 A (LASSMAN & COMPANY LTD; DAVID FREEDENBERG; SAMUEL LASSMAN) 14 June 1950 (1950-06-14)	8,9,12, 13
A	the whole document	1-4,6-19

A	FR 2 891 568 A (THIRARD SOC PAR ACTIONS SIMPLI [FR]) 6 April 2007 (2007-04-06) the whole document	1-4,6-19

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

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
18 February 2009	25/02/2009

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/003663

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 667 263 A (ROGERS EDWARD PARRY) 6 June 1972 (1972-06-06) the whole document -----	1-3,5-19
A	US 1 579 126 A (MAXWELL MAXWELL C) 30 March 1926 (1926-03-30) the whole document -----	1-4,6-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2008/003663

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4719776 A	19-01-1988	NONE	
US 4123923 A	07-11-1978	AR 220542 A1	14-11-1980
		AU 513074 B2	13-11-1980
		AU 3534878 A	25-10-1979
		BR 7802658 A	24-07-1979
		CA 1074141 A1	25-03-1980
		CH 629275 A5	15-04-1982
		DE 2816073 A1	07-06-1979
		ES 468469 A1	01-01-1979
		FR 2410111 A1	22-06-1979
		GB 1588103 A	15-04-1981
		HK 30583 A	02-09-1983
		IT 1102157 B	07-10-1985
		JP 1201522 C	25-04-1984
		JP 54076400 A	18-06-1979
		JP 58033346 B	19-07-1983
		ZA 7806101 A	31-10-1979
GB 638764 A	14-06-1950	NONE	
FR 2891568 A	06-04-2007	NONE	
US 3667263 A	06-06-1972	GB 1288631 A	13-09-1972
US 1579126 A	30-03-1926	NONE	