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(54) Abstract Title: **A lock with a latch bolt operable from one side**

(57) A lock having a first side and a second side comprises a latch bolt 2, a drive 4 for retracting the latch bolt and a control device 6 located on one side transmitting the drive (via 12). The side of the lock from which the latch bolt can be engaged by the drive is determined by the position of the control device in relation to the latch. A handle acts via spindle 10 to operate the drive 4 and a similar drive located on the other side of the lock could be used to retract the latch bolt 2 only if the control device 6 (shown formed as a screw-in projection on the latch) were located on that side.

The lock shown is a multi-point fastening and rotation of the drive in the direction opposite to bolt retraction moves a bar 32 (via finger 38) to extend lock bolts and (via 42) to obstruct latch bolt retraction. Handle operation to retract the latch bolt also retracts the lock bolts. A key-operated device 14 acts in one direction (via 16) on the drive 4 to retract the latch and in the other direction (via 46) to extend a deadbolt 44. A slot in bar 32 allows the extension of bolt 44 only when the lock bolts are extended and a projection 56 on the extended bolt 44 engages a recess 58 to prevent lock bolt retraction.

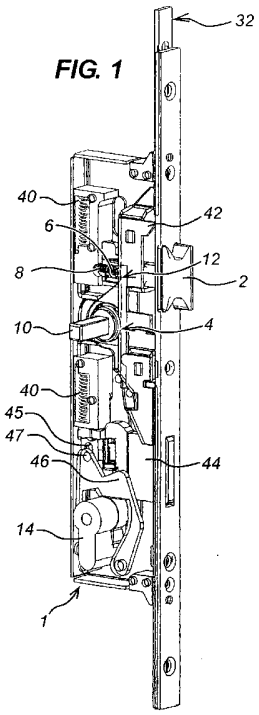

FIG. 1

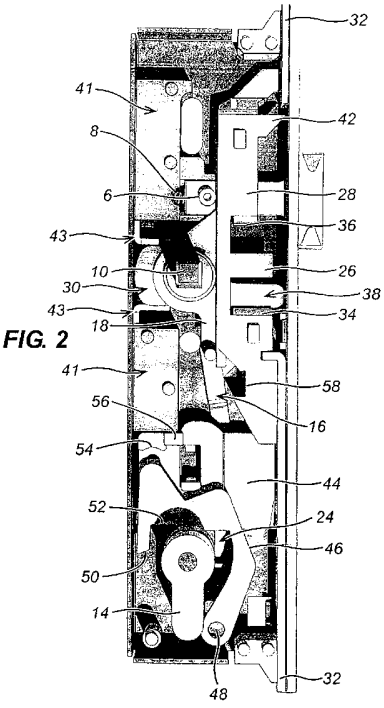

FIG. 2

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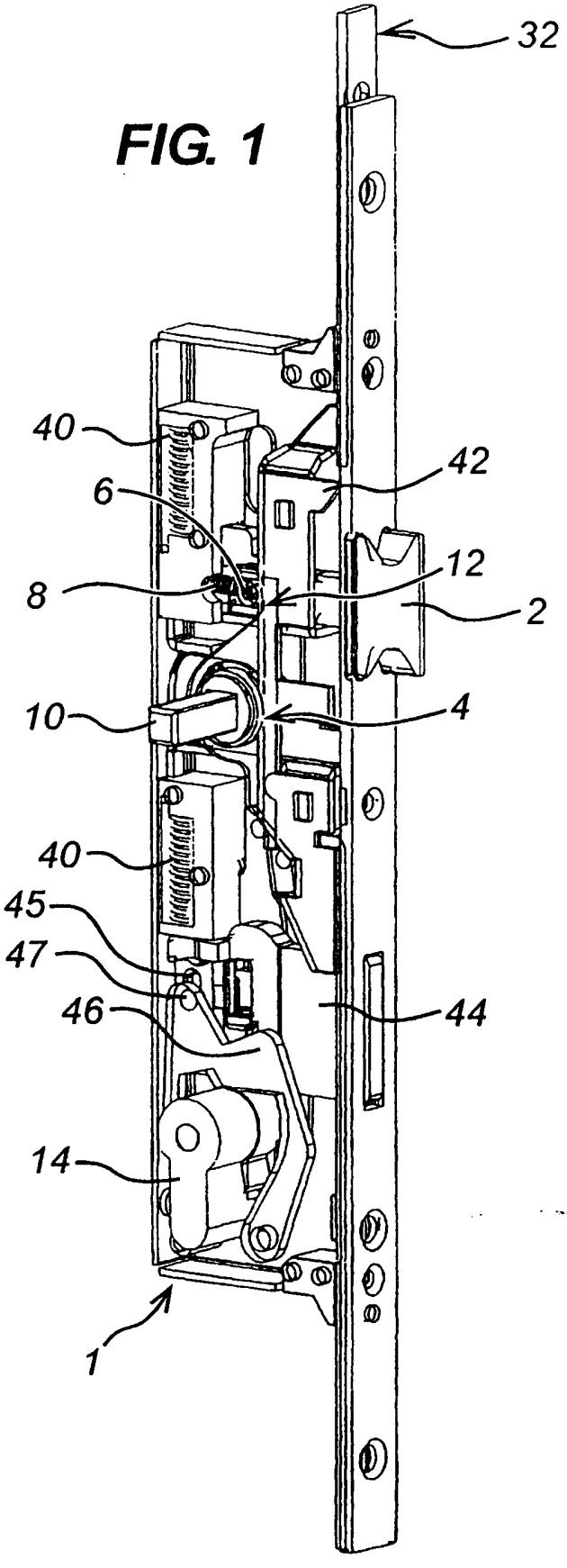
FIG. 1



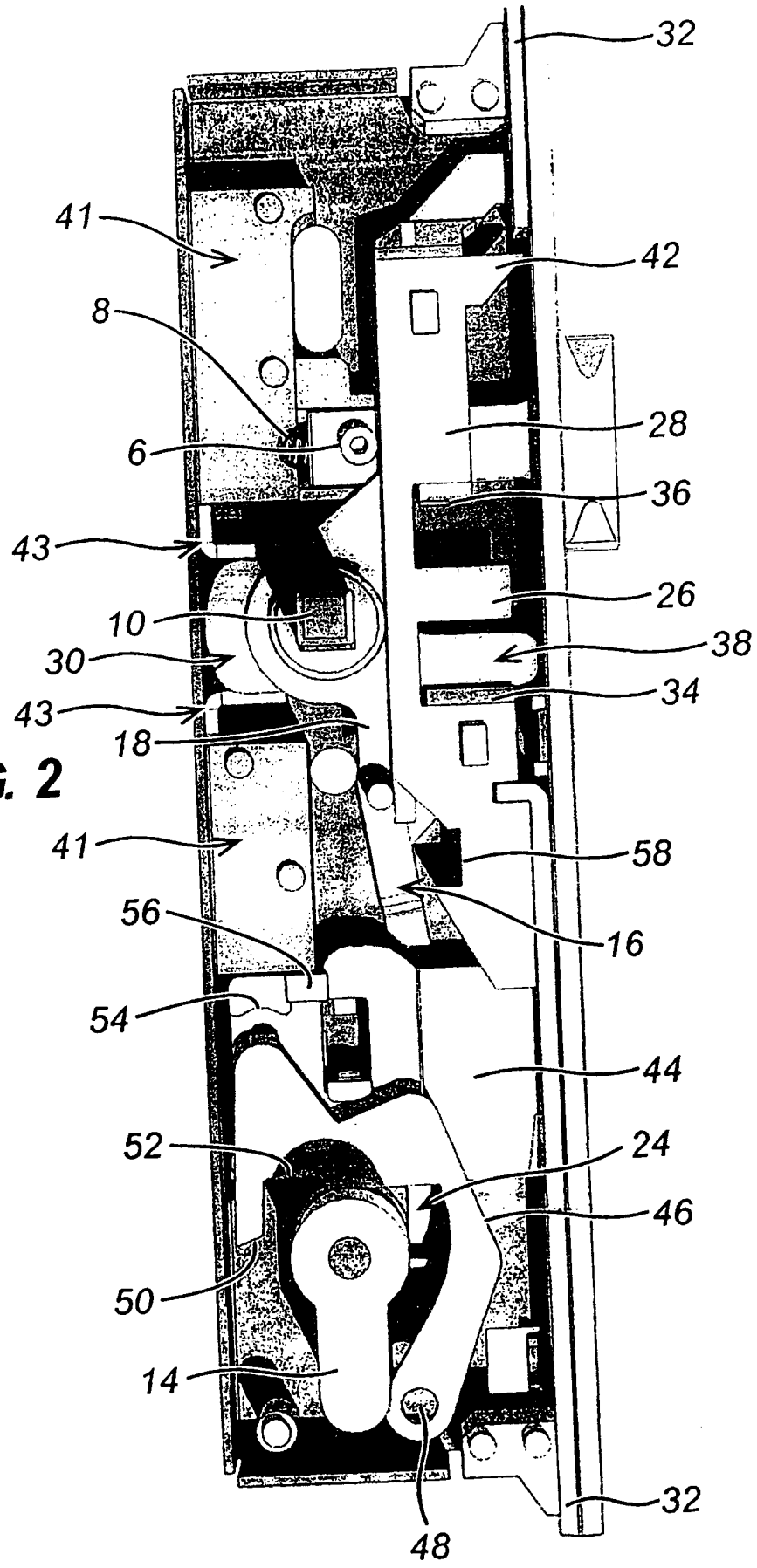

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FIG. 2

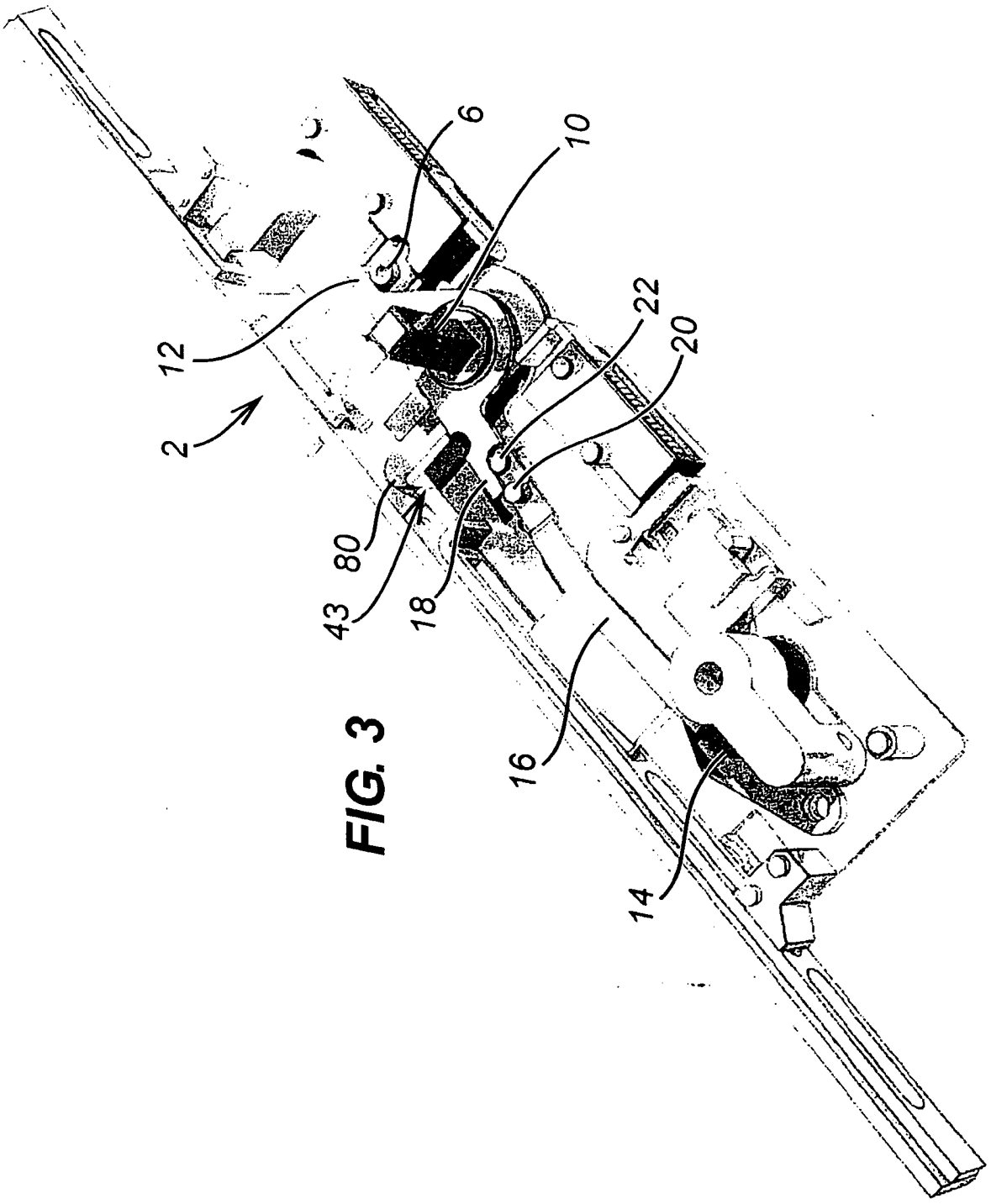
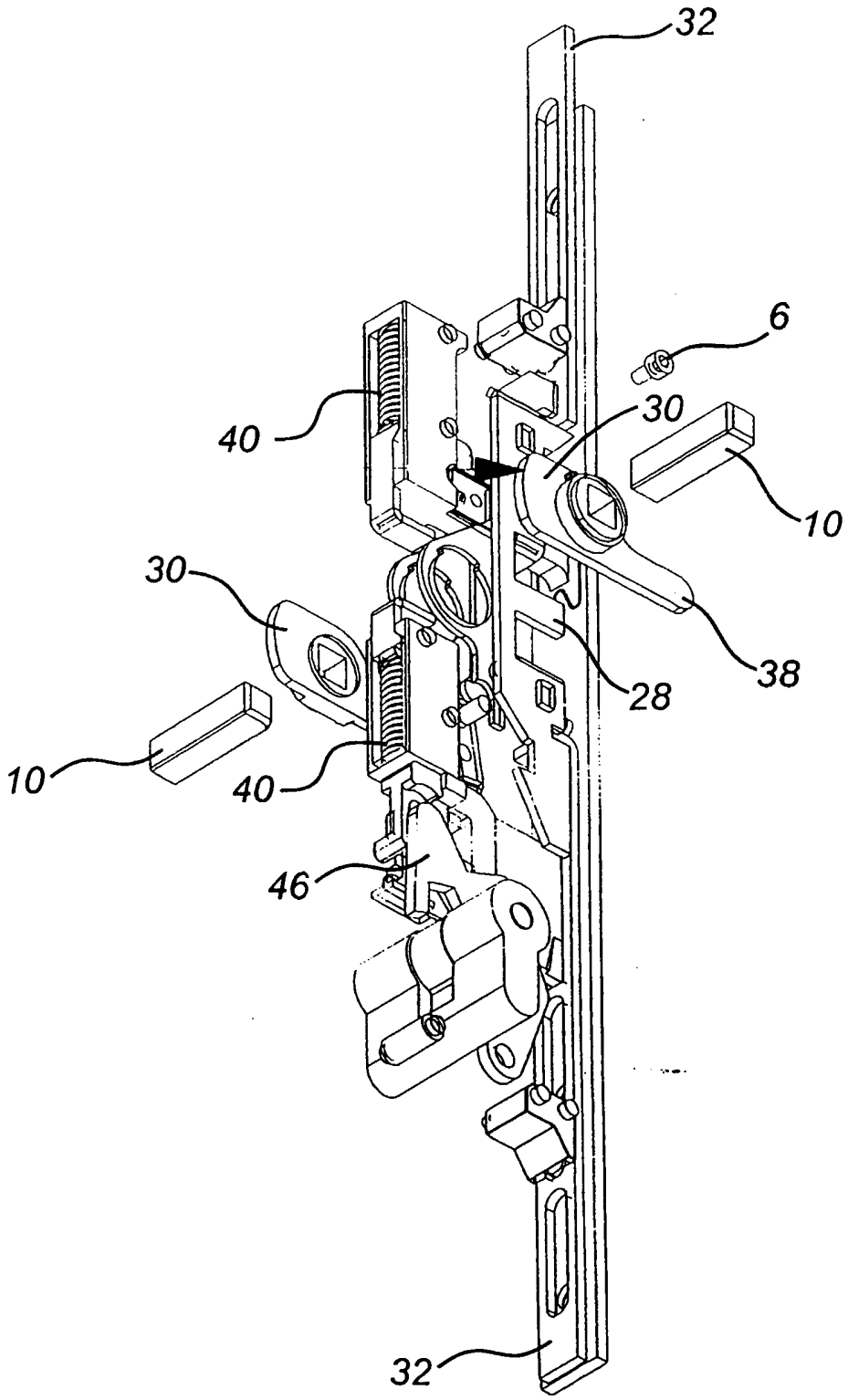


FIG. 3

FIG. 4



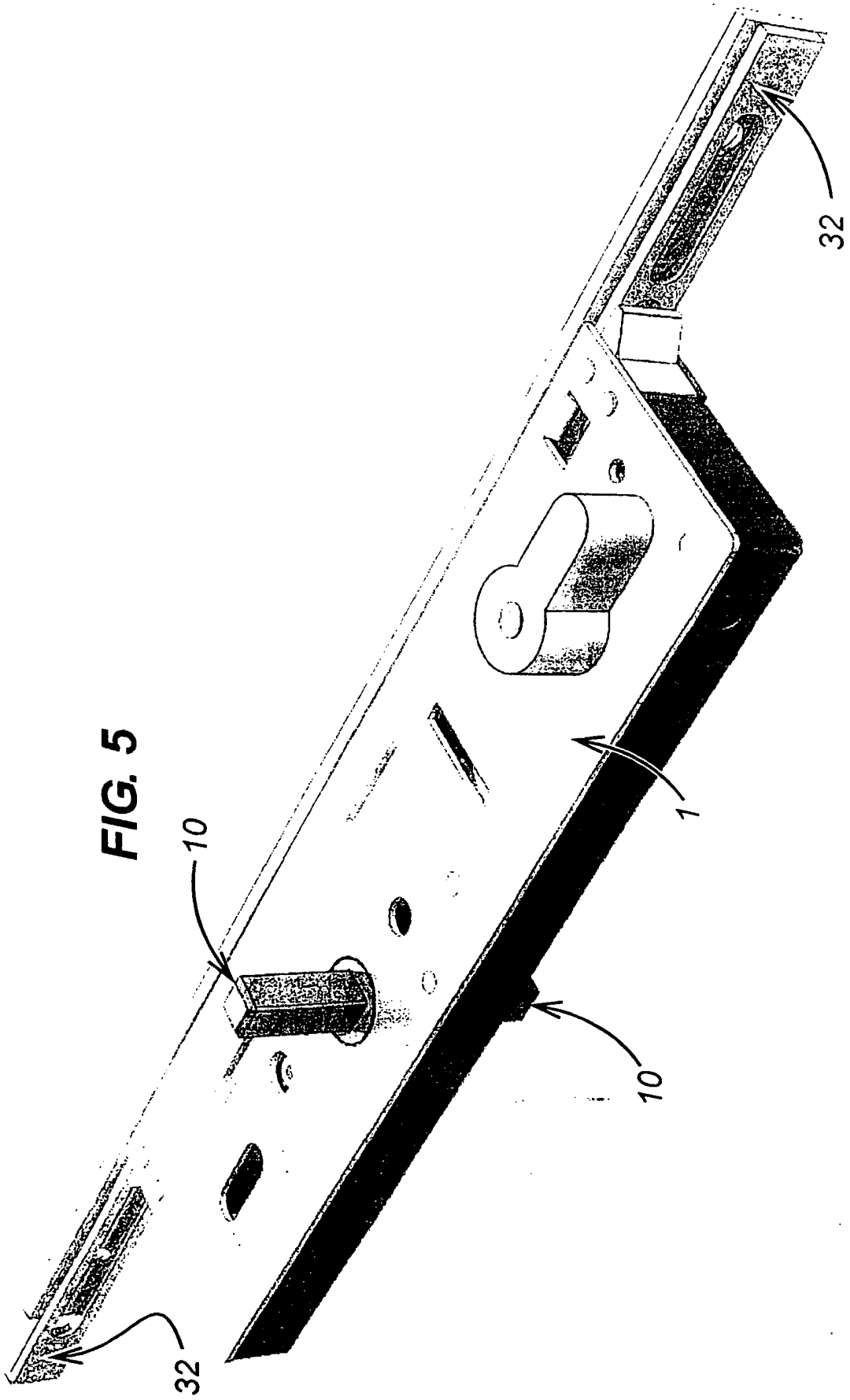


FIG. 5

A LOCK

This invention relates to locks and, in particular, to a lock wherein the side of the lock from which a latch can be engaged is adjustable. This invention is particularly relevant to multipoint locks.

Locks are well known in the art. For example, EP 0 535 497 discloses a multipoint lock wherein a spring-latch and a bolt can be simultaneously withdrawn by operation of a handle. This lock is said to be useful in emergency situations when a door needs to be unlocked rapidly without a key.

An alternative lock is described in EP 0 987 391, which discloses a multipoint lock that comprises a nut and a mandrel wherein the mandrel is split in the centre of the nut. As the length of the mandrel is adjusted, the side of the door from which the latch can be withdrawn is changed.

There is a need to further develop locks so that the latch can be withdrawn by a handle from one side only and by a key from either side of the lock. Further, it would be desirable for such a lock to incorporate a deadlock that could be activated from either side of the lock.

A lock that can be opened off the latch by a handle from one side only would confer a greater degree of personal safety when compared with a lock that can be opened off the latch by a handle from both sides. Such a lock would allow the door to be secured in a closed position without the need to engage a bolt, for example.

According to one aspect of the present invention, a lock having a first side and a second side is provided, wherein the lock comprises:

a) a latch;

b) a drive; and

c) a control device;

wherein the side of the lock from which the latch can be engaged by the drive is determined by the position of the control device in relation to the latch.

Although it is preferable for the control device to be mounted on the latch, it will be understood that it is possible to mount the control device on the drive. It is particularly advantageous for the control device to be releasably mounted on the latch.

Preferably, the control device is a control lug or screw. A person skilled in the art will, however, appreciate that means other than a control screw could be used in the

device disclosed herein. Examples of alternative control devices include, but are not limited to, control pins and rods for example.

Typically, the drive comprises a shaft and a drive arm, wherein the drive arm engages the control device. Advantageously, the shaft is square in section and the drive arm is adapted such that it receives the shaft, which allows both the shaft and the drive arm to rotate in unison.

Although a square sectioned shaft has been exemplified above, a person skilled in the art will understand that alternative shapes are capable of performing a similar function. Examples of alternative shaped shafts include triangular, pentagonal and hexagonal shafts for example.

It is preferred for a drive to protrude from each side of the lock.

Preferably, the latch is sprung biased. More preferably, the latch is sprung biased by a coil spring.

Preferably, a drive is sprung biased. More preferably, a drive is sprung biased by at least one coil spring.

In another aspect of the present invention, a drive further comprises an activation arm that is engaged by an activation bar, such that activation of the activation arm by the activation bar activates the latch.

Advantageously, the activation bar comprises pins, such that the pins drive the activating arm.

Typically, when rotated in a first direction, a lock cylinder engages the activation bar such that the activation bar activates the latch. Conversely, when rotated in a second direction, the lock cylinder engages a saddle.

The saddle, typically, activates a bolt upon rotation with the lock cylinder in a second direction and upon rotation with the lock cylinder in a first direction, the saddle deactivates the bolt.

In another aspect of the present invention, the drive further comprises a rod drive. Advantageously, the rod drive is sprung biased.

Typically, the rod drive is driven in unison with the drive. Preferably, the rod drive is adapted to receive a drive in a manner similar to the drive arm as outlined above.

In another preferred aspect of the present invention, the rod drive includes a finger that drives the rods in a first and a second direction.

Advantageously, the rod drive further comprises a rod plate. Typically, the rod plate carries at least one rod.

Preferably, the rod plate carries two rods. Advantageously, the rods comprise an aperture that is shaped such that, once the rods and rod plate are in an active position, the position of the aperture corresponds to the position of the bolt, which enables the bolt to be activated and protrude out of the body of the lock.

In a further aspect of the present invention, the rod plate further comprises a first flange which, when activated by a finger, drives the at least one rod into an active position. Advantageously, the rod plate further comprises a second flange which, when activated by the finger, retracts the at least one rod from the active position.

Typically, the rod plate further comprises a latch activation prevention arm.

Once the rod plate is in an active position, the latch activation prevention arm prevents the latch from being deactivated.

Advantageously, a drive carries a handle.

In the drawings:

Figure 1 shows a perspective view illustrating the parts of a lock according to the present invention.

Figure 2 shows a plan view illustrating the parts of a lock according to the present invention.

Figure 3 shows a perspective view from the opposite side to Figure 1 illustrating the parts of a lock according to the present invention.

Figure 4 shows an exploded perspective view illustrating the parts of a lock according to the present invention wherein the outer casing and the latch are not shown.

Figure 5 shows a perspective view of an assembled lock according to the present invention.

The lock of the present invention has various modes of operation and, for this reason, each mode of operation will be discussed in turn.

The lock as herein described can be advantageously opened off the latch by a handle from one side only. It will be understood that a lock of this type would not be limited to use on doors, but could be used on other vents and similar openings.

In order for the latch to be withdrawn by a handle, the lock of the present invention requires the following components: a latch 2; a drive 4; and a control device 6.

The side of the lock from which the latch 2 can be withdrawn is determined by the position of the control device 6 in relation to the latch 2.

Figure 1 shows the latch 2 in an extended position. The latch 2 is held in an extended position by a coil spring 8, which is shown in Figures 1 and 2.

Figure 1 also shows the latch 2 carrying a control screw 6, which can be mounted on either side of the latch 2 and is releasably mounted.

The drive 4 comprises a shaft 10, which is of a square cross section, and a drive arm 12. The shaft 10 passes through a corresponding aperture in the drive arm 12, as shown in Figure 1. The aforementioned configuration allows the shaft 10 and the drive arm 12 to rotate in unison.

Although it is not clearly shown in the Figures, separate shafts 10 with associated drive arms 12 are positioned in either side of the lock casing 1, and handles are to be mounted to the protruding end of each shaft 10. Additionally, it is not apparent from the Figures that only one control screw 6 is present in the lock and it is located on one side of the latch 2. Thus, the side from which a door can be opened by a handle is determined by the position of the control screw 6.

The drive arm 12 abuts the control screw 6, such that when a torsional force is applied to the drive 4, the shaft 10 and the drive arm 12 rotate in a first direction and the rotational movement of the drive 4 is transferred into translational movement of the latch 2. Thus, the latch 2 is withdrawn into the lock casing (not shown).

As the latch 2 is sprung biased, once the torsional force applied to the drive 4 has been released, the spring 8 causes the latch 2 to return to an extended position, as shown in Figures 1 and 2. As the latch 2 returns to an extended position, the control screw 6 that is carried on the latch 2 transfers the translational movement of the latch 2 into rotational movement of the drive 4 such that the drive 4 is forced to rotate in a second direction and return to the rest position shown in Figures 1 and 2.

In order for the latch 2 to be withdrawn by a key, which can be done from either side of the lock, the lock further comprises: a lock cylinder 14; an activation bar 16; and an activation arm 18, wherein the activation arm 18 is part of the drive 4. As shown in Figure 3, the activation arm 18 and the drive arm 12 are connected such that they rotate in unison.

The activation bar 16, shown in Figures 2 and 3, has two ends. The first end of the activation bar 16 comprises two sets of pins 20 and 22. The first set of pins 20 is

located in a groove in the body of the lock (not shown) and these pins restrict the movement of the activation bar 16 in the lock casing 1 to the path of the groove. The second set of pins 22 abuts the activation arm 18, such that translational movement of the activation bar 16 can be instantly transferred into rotational movement of the activation arm 18. The second end of the activation bar 16 is in close proximity to the lock cylinder 14, such that rotation of the lock cylinder 14 in a first direction results in the lock cylinder 14 initially abutting and subsequently driving the activation bar 16.

Figure 2 shows the second end of the activation bar 16 that is in close proximity to the lock cylinder 14. As outlined above, when a torsional force is applied to the lock cylinder 14 and the lock cylinder 14 initially rotates in a first direction, the lock cylinder 14 abuts the second end of the activation bar 16. Further rotation of the lock cylinder 14 drives the activation bar 16 such that the rotational movement of the lock cylinder 14 is transferred into translational movement of the activation bar 16. Due to the presence of the first set of pins 20, the translational movement of the activation bar 16 is restricted to the path of the groove in the lock casing 1.

As the lock cylinder 14 is rotated further in a first direction the action of the second set of pins 22 drives the activation arm 18 causing it, and the drive 4, to rotate in a first direction (*i.e.* the direction required to withdraw the latch 2 as outlined above). Thus, rotational movement of the lock cylinder 14 is transferred into rotational movement of the drive 4 *via* translational movement of the activation bar 16. The translational movement of the activation bar 16 causes the drive arm 12, which abuts the control screw 6 on the latch 2, to withdraw the latch 2.

As the latch 2 is sprung biased, once the torsional force applied to the lock cylinder 14 has been released, the spring 8 causes the latch 2 to return to an extended position, as shown in Figures 1 and 2. As the latch 2 returns to an extended position, the control screw 6 carried on the latch 2 transfers the translational movement of the latch 2 into rotational movement of the drive 4, such that the drive 4 is forced to rotate in a second direction and return to the rest position shown in Figures 1 and 2. The second set of pins 22 of the activation bar 16 abut the activation arm 18, therefore the activation arm 18 and the activation bar 16 also return to the rest position along with the latch 2, as shown in Figure 2.

The lock further comprises a deadlock mechanism 26 for additional security. The deadlock mechanism 26 is activated by a handle and, to achieve this, the lock

further comprises: a rod plate 28; a rod drive 30, wherein the rod drive 30 is associated with the drive 4; and rods 32. The shaft 10 of the drive 4 passes through a corresponding aperture in the rod drive 30, as shown in Figure 4, such that the rod drive 30 and the drive rotate in unison.

The rod plate 28 has a first and a second end and it carries two rods 32, one rod at either end of the rod plate 28, as shown in Figure 2. Each rod 32 is connected to the rod plate 28 so that the rods 32 and the rod plate 28 are able to move in unison within the lock casing 1. The rod plate 28 also carries a first 34 and a second 36 flange and a finger 38, which is an integral part of the rod drive 30, wherein the finger 38 abuts the first flange 34 of the rod plate 28, as shown in Figure 2.

If a torsional force is applied to the shaft 10 of the drive 4, such that the shaft 10 rotates in a second direction (*i.e.* the opposite direction needed to withdraw the latch 2), the finger 38 of the rod drive 30 engages the first flange 34 of the rod plate 28. Thus, the rotational movement of the finger 38 of the rod drive 30 is transferred into translational movement of the rod plate 28. Translational movement of the rod plate 28 into an activated position also causes the rods 32 to move into an activated position locking onto a frame of a vent.

As the drive 4 is sprung biased by springs 40, as seen in Figures 1 and 3, once the torsional force applied to the shaft 10 has been released, the shaft 10 and the drive 4, including the rod drive 30, return to the rest position, shown in Figure 2. The springs 40 are encased in housings 41 and each spring 40 acts upon the drive 4 by an abutment member 43, as seen in Figures 1, 2 and 3.

Unlike the drive 4, the rod plate 28 is not sprung biased, so when the drive 4 returns to the rest position shown in the Figures, the rod plate 28 and the rods 32 remain in an activated position.

When the drive 4 is in the rest position, shown in Figure 2, and the rod plate 28 is an activated position (not shown), the finger 38 of the rod drive 30 abuts the second flange 36 of the rod plate 28. Furthermore, when the rod plate 28 is in an activated position, a latch activation prevention arm 42 abuts the latch 2 (not shown) and prevents the latch 2 from being withdrawn.

The latch activation prevention arm 42 provides an additional level of security, because once the deadlock has been activated the latch 2 cannot be withdrawn until the deadlock has been deactivated.

To deactivate the deadlock, a torsional force must be applied to the shaft 10 in a first direction (*i.e.* the direction required to withdraw the latch 2).

If a torsional force is applied to the drive 4 in a second direction, the finger 38 of the rod drive 30 that abuts the second flange 36 of the rod plate 28 drives the rod plate 28 and the rods 32 into a deactivated position.

As shown in Figure 2, once the rod plate 28 is in a deactivated position and the drive 4 has returned to its rest position, the finger 38 of the rod drive 30 abuts the first flange 34 of the rod plate 28.

Again, as the drive 4 is sprung biased, once the torsional force that is applied to the drive 4 has been released, the drive 4 returns to the rest position shown in the Figure 2. As mentioned above, the rod plate 28 is not sprung biased, so it remains in a deactivated position until the finger 38 of the drive 4 further acts upon it.

The lock of the present invention further comprises a bolt 44 that again provides a further additional level of security to the lock. It will become apparent from what follows that the bolt 44 not only provides another point of attachment of the vent to a frame, but it also prevents the lock from being opened by a handle.

In order to activate the bolt 44 and make it protrude out of the body of the lock, the lock further comprises a saddle 46. The saddle 46 is sprung biased and it is mounted to the lock casing 1 by a fixed pivot point 48 about which it is free to rotate. The fixed pivot point 48 is offset from the axis of rotation of the lock cylinder 14 such that the axis of rotation of the saddle 46 is not the same as that of the lock cylinder 14.

Additionally, before the bolt can be activated, the rod plate 28 and rods 32 (*i.e.* the deadlock) must be activated. The rods 32 comprise an aperture that is shaped such that it receives the bolt 44. When the deadlock is in an activated position, the position of the aperture in the rods 32 corresponds to the position of the bolt 44, which allows the bolt 44 to be activated and protrude out of the body of the lock 1. Conversely, when the deadlock is in a deactivated position, the position of the aperture in the rods 32 does not correspond with the position of the bolt 44. Thus, the rods 32 prevent the bolt 44 from being activated and from protruding out of the body of the lock.

The saddle 46 of the lock further comprises a shoulder 50 and a recess 52, wherein the recess 52 is shaped in order to accommodate the lock cylinder 14.

The bolt 44 of the lock further comprises a ledge 54 and a deadlock deactivation prevention element 56. The ledge 54 and the deadlock deactivation prevention element

56 are integral parts of the bolt 44, as shown in Figure 2. The ledge 54 of the bolt 44 is curved such that it can receive the saddle 46.

Initial rotation of the lock cylinder 14 in a second direction (*i.e.* the opposite direction required to withdraw the latch 2), causes the lock cylinder 14 to abut the shoulder 50 of the saddle 46. Further rotation of the lock cylinder 14 in a second direction drives the saddle 46, about the fixed pivot point 48, into the curved ledge 54 of the bolt 44. This further rotation also allows a pin 47 of the saddle 46 to be travel within a groove 45 of the bolt 44.

As mentioned above, the fixed pivot point 48 of the saddle 46 is offset from the axis of rotation of the lock cylinder 14 such that further rotation of the lock cylinder 14 in a second direction causes the lock cylinder 14 to move into the recess 52 of the saddle 46. The recess 52 of the saddle 46 is shaped to accommodate the lock cylinder 14 such that the lock cylinder 14 is able to drive the saddle 46 about its fixed pivot point 48.

As the saddle 46 is driven about its fixed pivot point 48, the pin 47 of the saddle 46 engages a sidewall of the groove 45 such that the rotational movement of the saddle 46 is transferred into translational movement of the bolt 44 by the pin 45. Thus, rotation of the lock cylinder 14, and saddle 46, in a second direction drives the bolt 44 into an active position.

Once the bolt 44 is in an activated position, further rotation of the lock cylinder 14 in a second direction causes it to disengage the saddle 46, because the fixed pivot point 48 is offset from the axis of rotation of the lock cylinder 14. The lock cylinder 14 can then return to the rest position, shown in Figure 2, whereas the saddle 46 and the bolt 44 remain in an activated position (not shown).

As the rod plate 28 is in an activated position when the bolt 44 is activated, the square shaped deadlock deactivation prevention element 56 is able to locate in a corresponding square shaped conduit 58 in the rod plate 28. The square shape of the conduit 58 in the rod plate 28 is such that when the deadlock deactivation prevention element is located in the conduit 58, the rod plate 28 can no longer move into a deactivated position. Thus, once the bolt 44 is in an activated position, the handle cannot deactivate the deadlock and, as described above, the latch deactivation prevention arm 42 prevents the handle from deactivating the latch 2. The bolt 44 must, therefore, be deactivated before the deadlock can be deactivated and the latch 2 can be withdrawn.

To disengage the bolt 44, the lock cylinder 14 is rotated in a first direction (*i.e.* the same direction required to withdraw the latch 2). Initially, the lock cylinder 14 relocates in the recess 52 of the saddle 46 and the pin 47 of the saddle 46 engages the groove 45 of the bolt 44. The action of the pin 47 on the sidewall of the groove 45 drives the bolt 44 into a deactivated position, as shown in Figures 1 and 2. Further rotation of the lock cylinder 14 causes it to move out of the recess 52 of the saddle 46 and onto the shoulder 50 before completing a full 360 degree rotation and disengaging the saddle 46. As outlined above, the saddle 46 is sprung biased and, once disengaged by the lock cylinder 14, it returns to the rest position shown in Figure 2.

It will of course be understood that the present invention has been described above purely by way of example, and that modifications of detail can be made within the scope of the invention.

CLAIMS

1. A lock having a first side and a second side, wherein the lock comprises:

d) a latch;

e) a drive; and

f) a control device;

wherein the side of the lock from which the latch can be engaged by the drive is determined by the position of the control device in relation to the latch.

2. The lock of claim 1, wherein the control device is mounted on the latch.

3. The lock of any one of the claims 1 and 2, wherein the control device is releasably mounted on the latch.

4. The lock of any one of the claims 1 to 3, wherein the control device is a control screw.

5. The lock of any one of the claims 1 to 4, wherein the drive comprises a shaft and a drive arm, wherein the drive arm engages the control device.

6. The lock of any one of the claims 1 to 5, wherein a drive protrudes from each side of the lock.

7. The lock of any one of the claims 1 to 6, wherein a drive is sprung biased.

8. The lock of any one of the claims 1 to 7, wherein a drive further comprises an activation arm that is engaged by an activation bar, such that activation of the activation arm by the activation bar activates the latch.

9. The lock of claim 8, wherein the activation bar comprises pins, such that the pins drive the activating arm.

10. The lock of any one of the claims 8 and 9, wherein, when rotated in a first direction, a lock cylinder engages the activation bar such that the activation bar activates the latch.

11. The lock of claim 10, wherein, when rotated in a second direction, the lock cylinder engages a saddle.

12. The lock of claim 11, wherein the saddle activates a bolt upon rotation with the lock cylinder in a second direction.

13. The lock of any one of the claims 11 and 12, wherein the saddle deactivates the bolt upon rotation with the lock cylinder in a first direction.

14. The lock of any one of the claims 1 to 13, wherein the drive further comprises a rod drive.

15. The lock of claim 14, wherein the rod drive is sprung biased.

16. The lock of any one of the claims 14 and 15, wherein the rod drive is driven in unison with a drive.

17. The lock of any one of the claims 14 to 16, wherein the rod drive includes a finger that drives the rods in a first and a second direction.

18. The lock of any one of the claims 14 to 17, wherein the rod drive further comprises a rod plate.

19. The lock of claim 18, wherein the rod plate carries at least one rod.

20. The lock of any one of the claims 18 and 19, wherein the rod plate carries two rods.

21. The lock of any one of the claims 19 and 20, wherein the rod comprises an aperture that is shaped to receive the bolt.

22. The lock of claim 21, wherein, once the rod plate is in an active position, the aperture enables the bolt to be activated.

23. The lock of any one of the claims 18 to 22, wherein the rod plate further comprises a first flange which, when activated by a finger, drives the rod into an active position.

24. The lock of claim 23, wherein the rod plate further comprises a second flange which, when activated by the finger, retracts the rod from the active position.

25. The lock of any one of the claims 18 to 24, wherein the rod plate further comprises a latch activation prevention arm.

26. The lock of claim 25, wherein once the rod plate is in an active position, the latch activation prevention arm prevents the latch from being deactivated.

27. The lock of any preceding claim, wherein a drive carries a handle.

28. A lock substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

For Innovation

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Application No:	GB0625080.7	**Examiner:**	Philip Silvie
Claims searched:	1-27	**Date of search:**	9 February 2007

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-3, 5-8, 10-14, 27 at least	GB 2364545 A (ERA) see figs. 3, 4
X	1 at least	EP 987391 A2 (FUHR) see figs. 12, 13 and WPI Abstract Accession No. 2000-273078[24]

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[X] :

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Worldwide search of patent documents classified in the following areas of the IPC

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The following online and other databases have been used in the preparation of this search report

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