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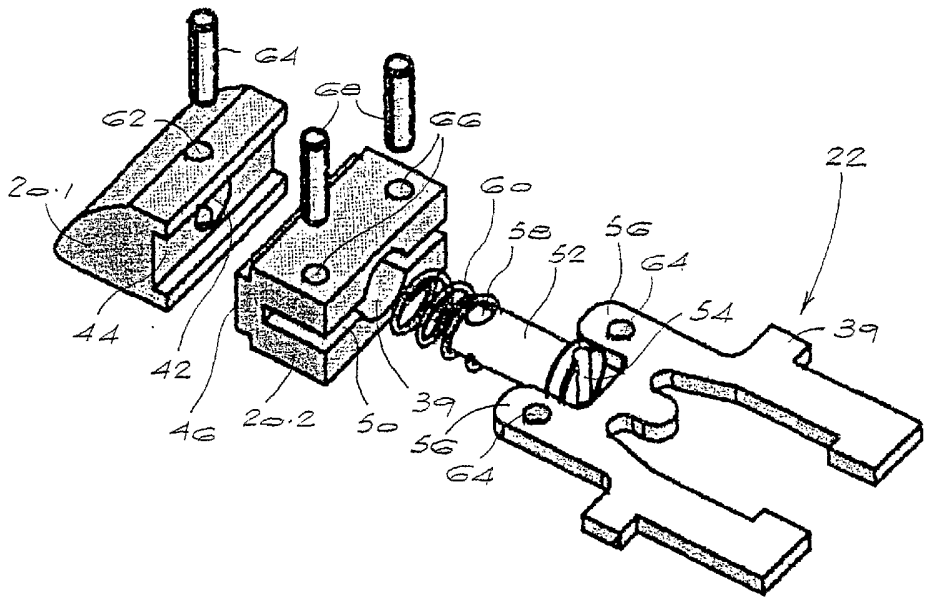
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(54) **Title:** MORTISE LOCK WITH REVERSIBLE LATCH BOLT



(57) **Abstract:** The invention concerns a mortise lock (10). It includes a latch bolt (20) having a head and a latch bolt spring (24) urging the head to project outwardly through an opening (30) in the casing of the lock. The head has respective outer and inner parts (20.1 and 20.2) and a head spring (60) which draws the parts into engagement with one another. The outer part (20.1) is disengagable from the inner part (20.2) against the action of the head spring, and can then be rotated to a reversed position relative to the inner part. This allows the same lock to be used in both right and left hand closures.

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"MORTISE LOCK WITH REVERSIBLE LATCH BOLT"

BACKGROUND TO THE INVENTION

THIS invention relates to a mortise lock with a reversible latch bolt.

The latch bolt head of a mortise lock has a chamfered surface which cooperates, on closure of a door to which the mortise lock is fitted, with a striker plate mounted on the door frame. This presses the bolt head to retract into the casing of the mortise lock. When the bolt head aligns with an opening in the striker plate, an internal spring urges the bolt head out of the casing and into the opening and an aligned opening in the door frame.

Conventionally, the latch bolt head is chamfered on one side and so is suitable for either left-hand or right hand operation only. It is possible to open the lock casing in order to reverse the bolt head for operation in a door of opposite hand, but this is a time-consuming and intricate procedure.

As a solution to the problem it has been proposed in WO 02/070845 to provide an opening in the casing through which a special tool can be inserted to act against a spindle on which the bolt head is mounted. The tool has a cam surface which acts on the spindle in such a manner as to push the latch bolt head out of the casing, allowing it to be rotated about the axis of the spindle to a reversed position. Reversal of the latch bolt head can accordingly take place without any need to open the casing.

Problems with the arrangement proposed in WO 02/070845 are the relative complication of the procedure and the fact that it requires a separate, specially shaped tool to achieve reversal of the latch bolt head. The present invention seeks to provide a mortise lock in which the latch bolt can be reversed by a simple and quick procedure without any need to open the lock casing or to use a special tool.

SUMMARY OF THE INVENTION

According to the invention there is provided a mortise lock having a casing, a latch bolt having a head and a latch bolt spring urging the head to project outwardly through an opening in the casing, the head having respective outer and inner parts and a head spring which draws the parts into engagement with one another, the outer part being disengagable from the inner part against the action of the head spring and then rotatable to a reversed position relative to the inner part.

The parts are preferably shaped to make non-rotatable engagement with one another when drawn together by the head spring. For instance, one part may include a projection, typically a rib, which is received non-rotatably in a recess, typically a groove, in the other part when the parts are drawn together by the head spring.

In the preferred embodiment, the mortise lock includes a pin having inner and outer ends, the outer end being connected to the outer part of the latch bolt head with the pin extending rotatably through a passage in the inner part of the latch bolt head, whereby the outer part can rotate relative to the inner part about the axis of the pin.

Advantageously the pin has an enlarged head at its inner end and the head spring is located about the pin and acts between the enlarged head and a shoulder in the passage in the inner part of the latch bolt head, thereby drawing the outer and inner parts together. This allows the outer part of the latch bolt head to be disengaged from the inner part thereof by moving the outer part relative to the inner part along the axis of the pin, thereby compressing the head spring.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows an elevation view illustrating the internal components of a mortise lock according to the invention;

Figure 2 shows a perspective view of the mortise lock with the latch bolt head set at an orientation for right hand closure;

Figure 3 shows a perspective view of the mortise lock with the latch bolt head set at an orientation for left hand closure;

Figure 4 shows a perspective view of the mortise lock with the latch bolt head at an intermediate orientation between the right and left hand settings;

Figure 5 shows an exploded perspective view of the latch bolt head and associated components;

Figure 6 shows a perspective view of the assembled latch bolt head; and

Figure 7 shows a cross-sectional view at the line 7-7 in Figure 6.

DESCRIPTION OF A PREFERRED EMBODIMENT

The mortise lock 10 seen in Figures 1 to 4 has a casing 12 including casing parts 12.1 and a front plate 14. Only a rear one of the casing parts 12.1 is shown in the Figures, the other casing part having been removed to allow the interior components to be seen.

Located within the casing 12 is a lever-type key-operated dead bolt mechanism 16. This is entirely conventional and will be familiar to persons skilled in the art.

Also located within the casing 12 is a latch bolt mechanism 18. This includes a latch bolt head 20, a latch bolt tail 22 of bifurcated form and a latch bolt spring 24. The head 20 is attached to a front end of the tail 22, which includes spaced apart, rearwardly extending legs 22.1 and a rearwardly extending projection 22.2 between the legs. The spring 24 is located over the projection 22.2 and acts in compression against a transverse member 26 in the casing. The spring 24 urges the latch bolt head structure, to the left in Figure 1, so that it projects outwardly through an opening 30 in the front plate 14.

The latch bolt mechanism 18 also includes a rotary member 32 which is in use acted upon, via a square section spindle (not shown) passing through an opening 34 in the member, by the handle (not shown) of a door to which the lock 10 is fitted. When the handle is rotated in a manner to cause rotation of the member 32 in the direction 36, a projection 32.1 on the member causes a follower 38 to move in the direction of the arrow 40 against the action of a spring 41. The follower has a cranked end 37 which acts on a lug 39 on the tail 22, with the result that the tail 22 is pulled in the same direction 40, thereby withdrawing the latch bolt head 20 into the casing.

As described above, the mortise lock 10 is largely conventional and those skilled in the art will be familiar with the general structure and operation of such locks.

The latch bolt head 20 and tail 22 are not conventional. Whereas a conventional mortise lock has a latch bolt head which is of one-piece construction, the illustrated latch bolt head includes an outer part 20.1 and an inner part 20.2. A passage 39 (Figure 5) extends through the inner part 20.2 and aligns with a blind socket 42 in the outer part 20.1.

The rear end of the outer part 20.1 is formed with a transverse groove 44. The front end of the inner part 20.2 carries a transverse projection in the form of a rib 46 and the rear end of this part is formed with a transverse slot 50.

The latch bolt head structure also includes a pin 52 having an enlarged head 54 which locates between forwardly extending arms 56 of the tail 22. A forward end of the pin 52 is formed with a transverse through hole 58. A head spring 60 is located on the pin 52.

The pin 52 passes through the passage 39 and its outer end locates in the socket 42 with the hole 58 aligned with an intersecting through bore 62 in the outer part 20.1. A transverse roll pin 64 passes through the bore 62 and the hole 58 to lock the end of the pin relative to the part 20.1.

In a slightly modified version, not illustrated, the through hole 58 is replaced by an annular groove near the end of the pin 52, and the bore 62 is laterally displaced so as to align with the groove when the end of the pin is located in the socket 42. The roll pin 64 passes through the bore 62 and locates in the groove to lock the pin relative to the part 20.1.

The arms 56 of the tail 22 are inserted into the slot 50 such that holes 64 at the outer ends of the arms align with through bores 66 in the inner part 20.2. Further roll pins 68 are inserted into the bores 66 and holes 64 to lock the tail relative to the part 20.2. In the assembled head, seen in Figures 6 and 7, the head spring is located between the head 54 of the pin 52 and an internal shoulder 69 in the passage 39 in the inner part 20.2.

The head spring 60 draws the outer and inner parts 20.1 and 20.2 together such that the rib 46 locates in the groove 44 and prevents rotation of the parts 20.1 and 20.2 relative to one another.

Figure 2 shows the mortise lock 10 with the head 20 set up for a right hand door or other closure. This is illustrated by the fact that the conventional

chamfered face 70 is arranged to cooperate with a striker plate (not shown), when the door is swung in the direction 72, such that the striker plate presses the head into the casing against the action of the spring 24.

Figure 3 shows the same mortise lock 10 with the head 20 set for left hand operation, as illustrated by the fact that the face 70 is arranged to cooperate with a striker plate, to achieve the same motion of the head, when the door is swung in the opposite direction 74.

It is a simple matter to reset the head 20 from the right hand setting of Figure 2 to the left hand setting of Figure 3, or *vice versa*. This is achieved by manually gripping the outer part 20.1 and pulling it outwardly relative to the inner part 20.2, against the action of the head spring 60, such that the groove 44 is moved clear of the rib 46. As the outer part 20.1 is pulled outwardly the pin 52 moves outwardly with it, thereby compressing the head spring 60.

As soon as the groove 44 is clear of the rib 46, it is possible to rotate the outer part 20.1 relative to the inner part 20.2 about the axis of the pin 52. In this way it is possible to reorientate the outer part 20.1 through an angle of 180°, thereby setting the head for use with a door of opposite hand.
Once the outer part 20.1 has been rotated to the appropriate setting, it is merely released so that the spring 60 re-engages the outer and inner parts 20.1 and 20.2 in the non-rotatable relationship seen in, for instance, Figures 6 and 7.

The above procedure can be carried out simply and rapidly on site in order to set the lock to suit the hand of the door or other closure which is being installed. It is not necessary for a person hanging doors to have a stock of both left and right hand locks or to open the lock casing.

When compared to the prior proposal in WO02/070845, the invention as exemplified above has the major advantage that there is no requirement for

a separate tool to achieve reversal of the latch bolt head. It is also believed that the reversal procedure can be carried out more quickly and simply with the mortise lock 10 described above.

CLAIMS

1.
A mortise lock having a casing, a latch bolt having a head and a latch bolt spring urging the head to project outwardly through an opening in the casing, the head having respective outer and inner parts and a head spring which draws the parts into engagement with one another, the outer part being disengagable from the inner part against the action of the head spring and then rotatable to a reversed position relative to the inner part.

2.
A mortise lock according to claim 1 wherein the parts are shaped to make non-rotatable engagement with one another when drawn together by the head spring.

3.
A mortise lock according to claim 2 wherein one part includes a projection which is received non-rotatably in a recess in the other part when the parts are drawn together by the head spring.

4.
A mortise lock according to claim 3 wherein the outer part has a recess in the form of a groove therein and the inner part has a projection in the form of a rib thereon, the rib being received non-rotatably by the groove when the parts are drawn together by the head spring.

5.
A mortise lock according to any one of the preceding claims and including a latch bolt tail, in the casing, which is connected to the inner part of the latch bolt head and extends inwardly therefrom, the latch bolt spring acting on the latch bolt tail.

6.

A mortise lock according to any one of the preceding claims and including a pin having inner and outer ends, the outer end being connected to the outer part of the latch bolt head with the pin extending rotatably through a passage in the inner part of the latch bolt head, whereby the outer part can rotate relative to the inner part about the axis of the pin.

7.

A mortise lock according to claim 6 wherein the pin has an enlarged head at its inner end and the head spring is located about the pin and acts between the enlarged head and a shoulder in the passage in the inner part of the latch bolt head, thereby drawing the outer and inner parts together.

8.

A mortise lock according to claim 7 wherein the outer part of the latch bolt head can be disengaged from the inner part of the latch bolt head by moving relative to the inner part along the axis of the pin, thereby compressing the head spring.

Fig. 1

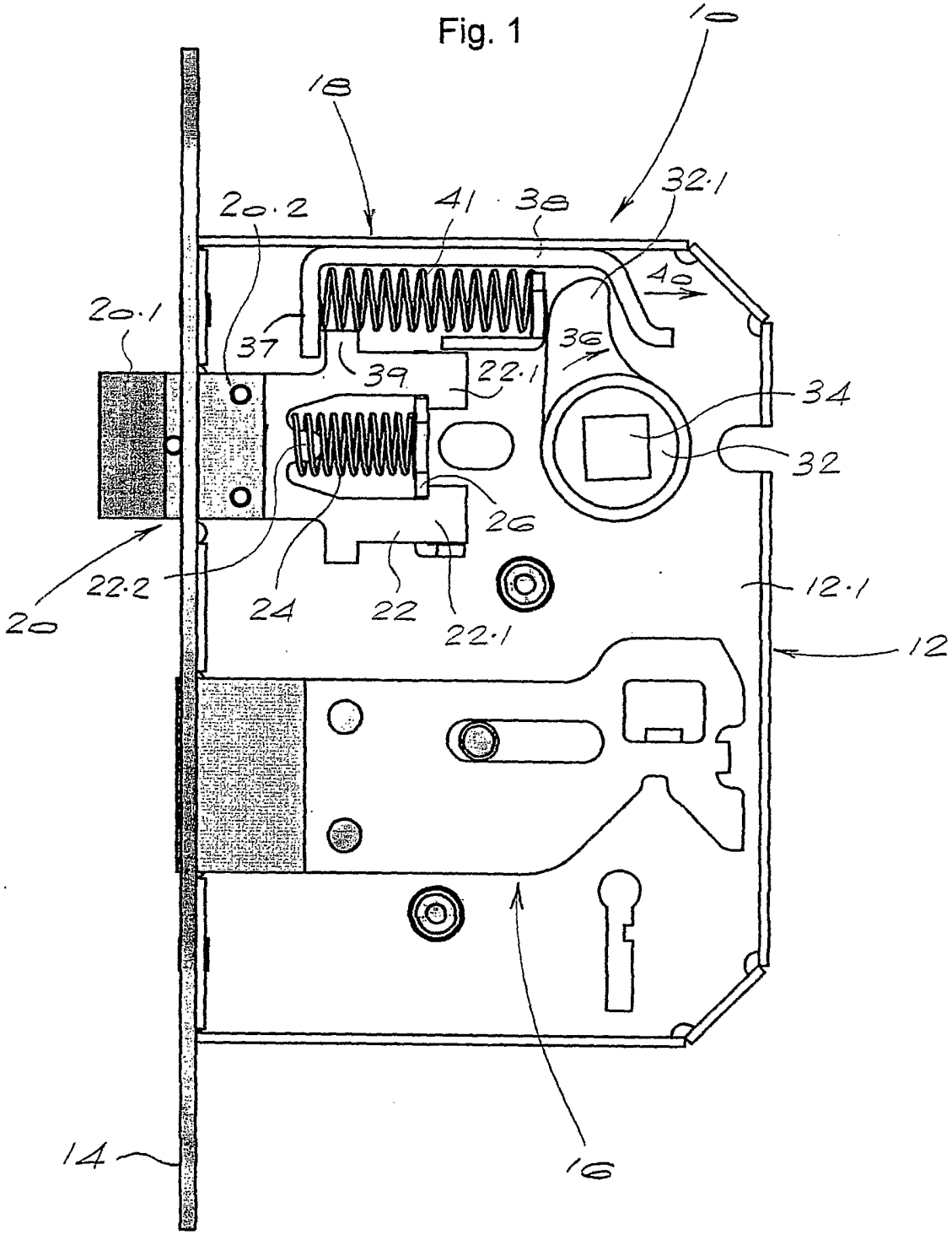

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Fig.2

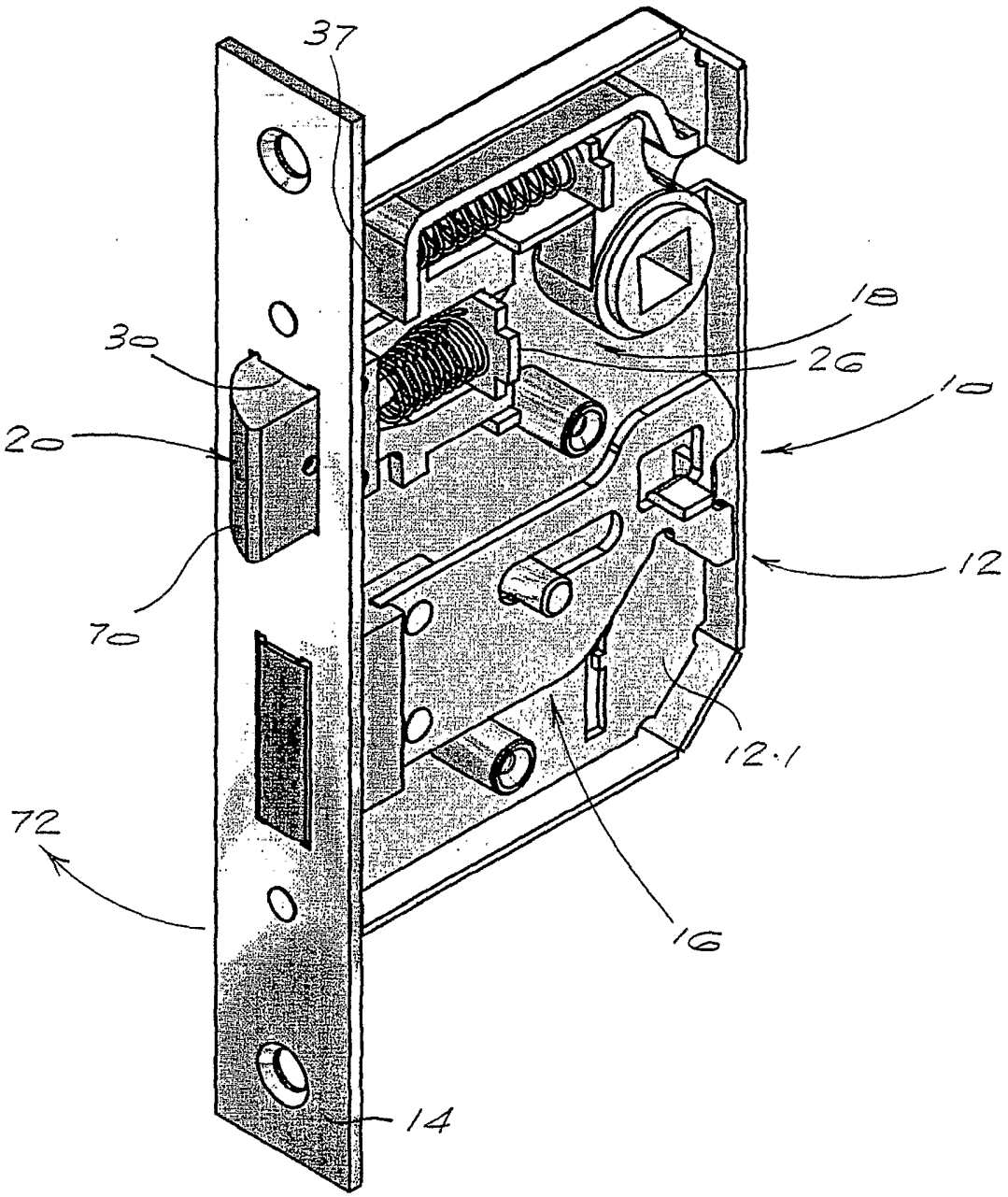


Fig.3

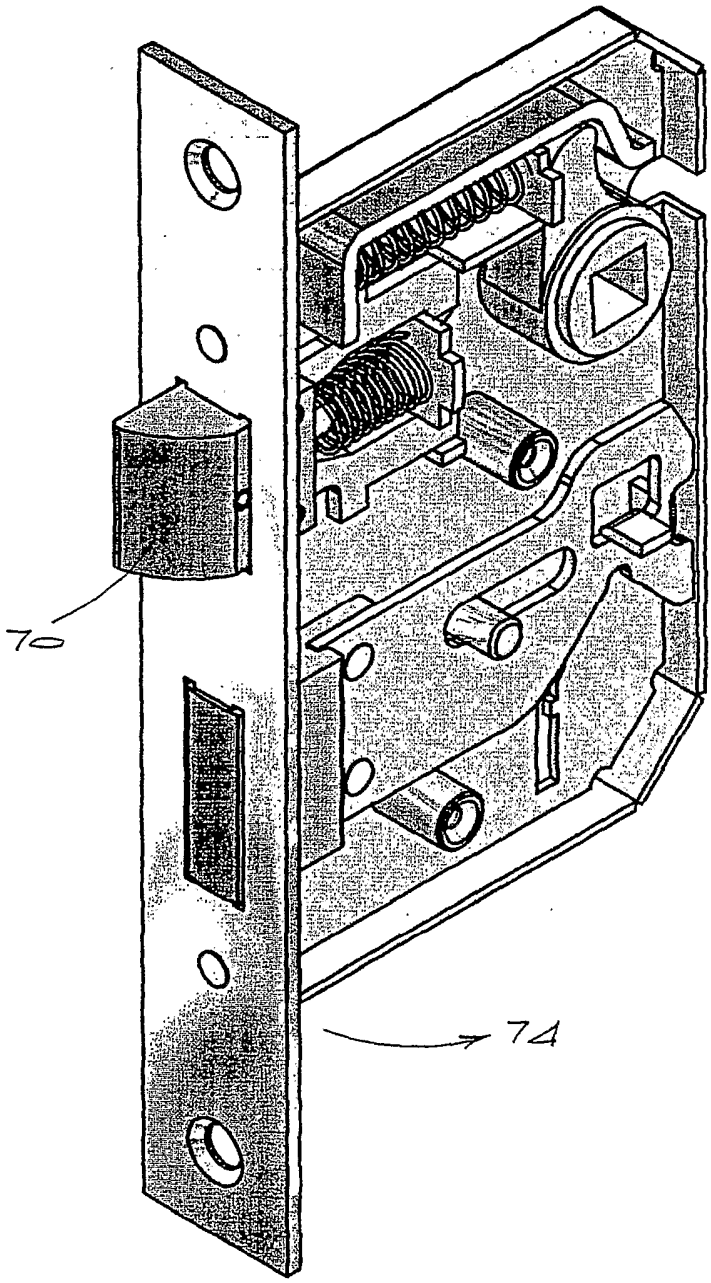


Fig.4

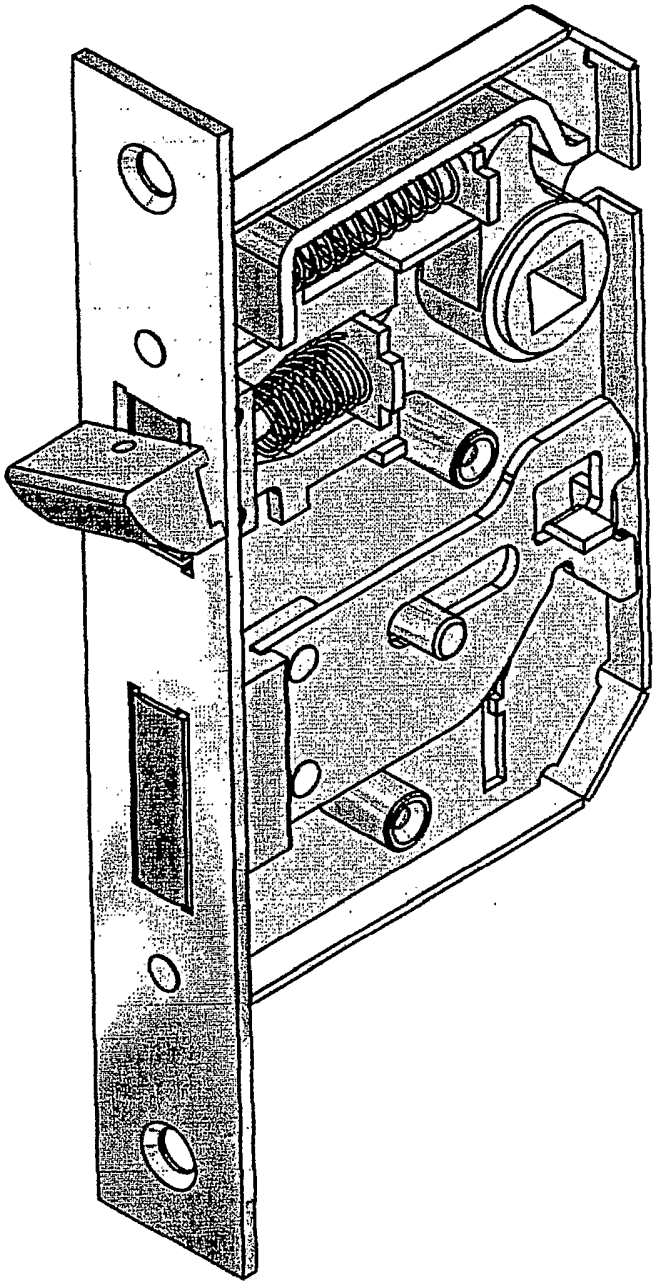


Fig.5

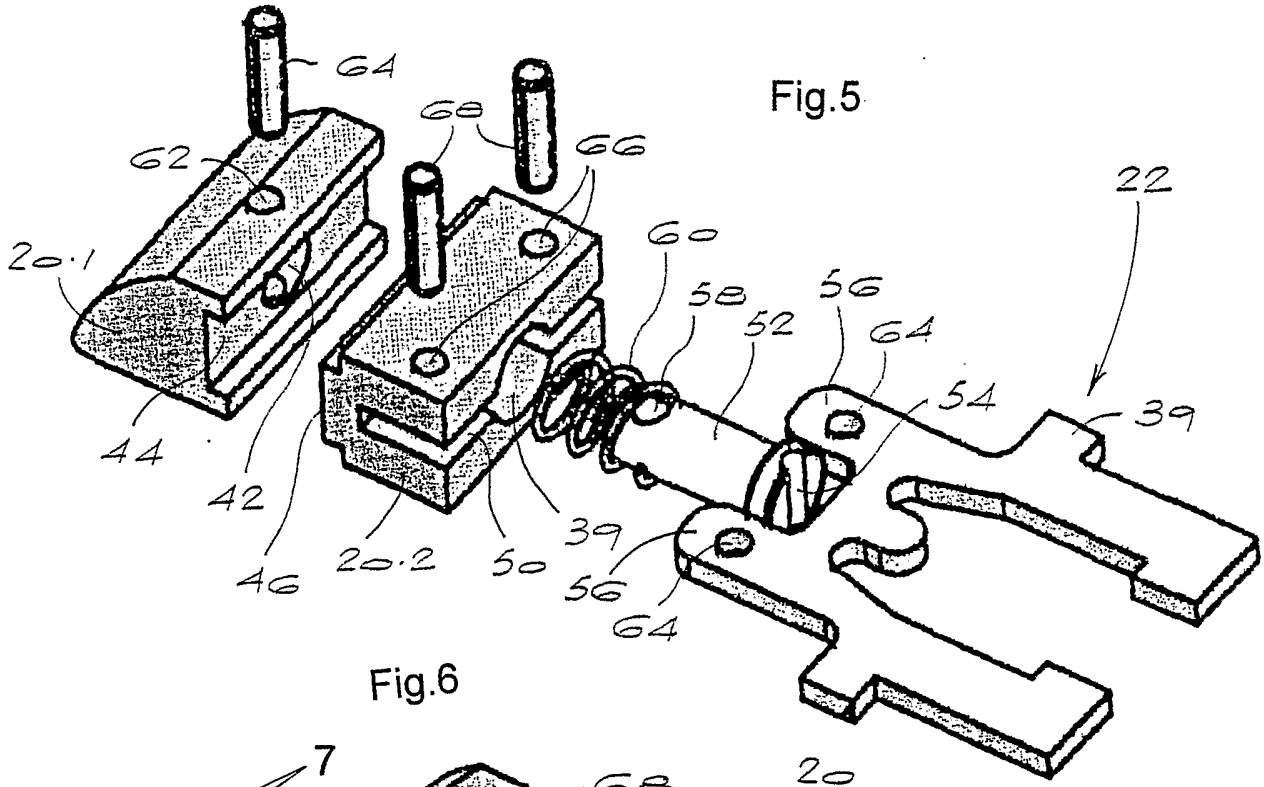


Fig.6

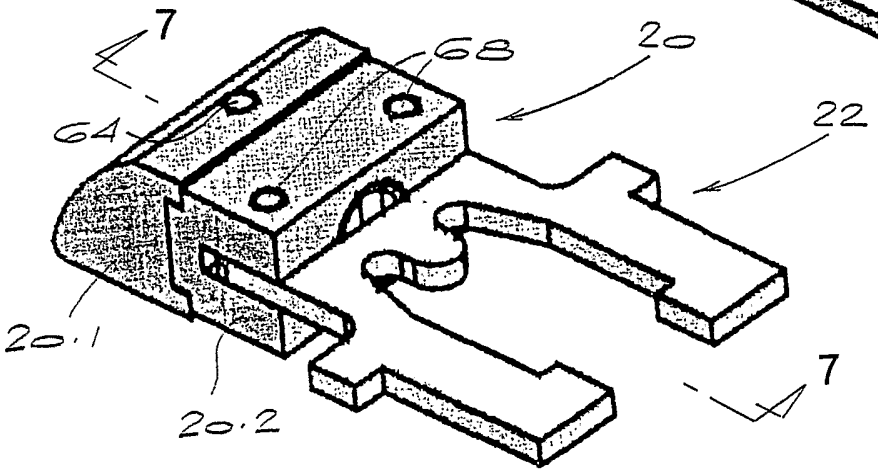
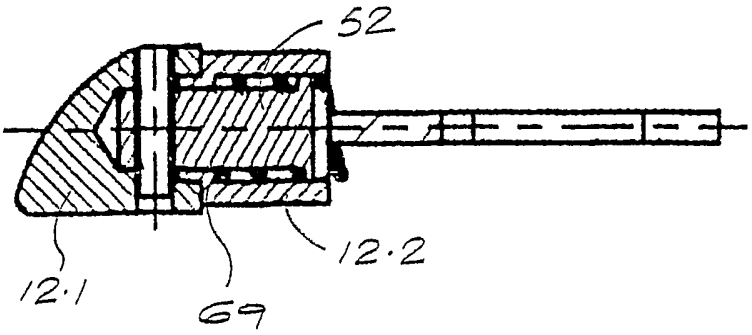


Fig.7



INTERNATIONAL SEARCH REPORT

Intel ·· nal application No
PC17 1B2005/002790

A. CLASSIFICATION OF SUBJECT MATTER
E05B63/04 E05B15/10 E05B15/04

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 310 685 A (* N.T.LEGGE LIMITED) 3 September 1997 (1997-09-03) the whole document	1,5-8
X	BE 537 728 A (COGEVIL S.A.) 5 June 1959 (1959-06-05) page 1, last paragraph - page 2, paragraph 2; figure 3	1,5-8
X	CH 622 310 A (GLUTZ AG) 31 March 1981 (1981-03-31) the whole document	1,5-8
X	DE 400 956 C (ERDBRINK & CO., G.M.B.H) 23 August 1924 (1924-08-23) the whole document	1-8

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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
31 January 2006	08/02/2006

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

International application No
PCT/IB2005/002790

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

ıation on patent family members

Inter application No
PCT/EP2005/002790

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