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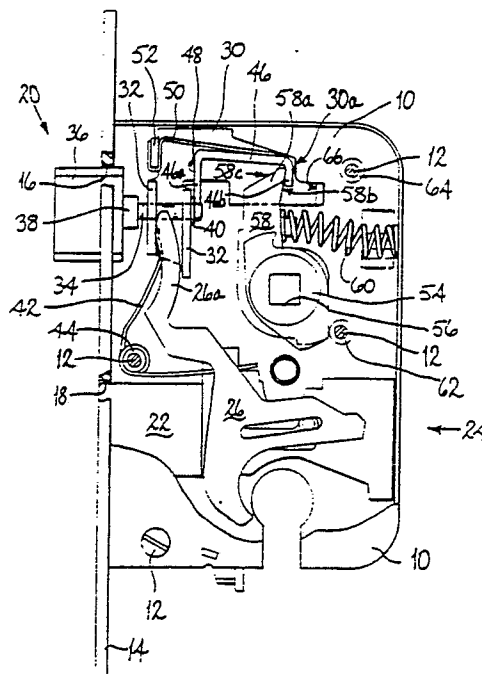
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(54) Latch assembly.

(57) Latch assembly forming part of a lever lock comprises the facility of releasing the latch-bolt (20) to an extended position in which it can be rotated through 180° in order to be accommodated to either a left-or right-opening door. For releasing the latch-bolt to this position, it is merely necessary to rotate the follower (54) beyond a position corresponding to the normally retracted position of the latch-bolt, thereby disengaging a releasable connection between a lever (58) associated with the follower (54) and an abutment member (46) associated with that latch-bolt slide (30). This connection is re-established by pushing the latch-bolt (20) from its extended position back into its normal operative, projecting, position.



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LATCH ASSEMBLY

This invention is concerned with a latch assembly comprising a housing, a latch-bolt slidable in the housing between a projecting position and a retracted position, said latch-bolt having an inclined face and a straight face meeting at an outward edge of the latch-bolt for engagement with a co-operating striker plate, spring means for urging the latch-bolt into its projecting position, and means for effecting retracting movement of the latch-bolt against the action of the spring means, said means comprising a lever which is engageable with an abutment member connected to the latch bolt and which is mounted for pivotal movement between first and second positions corresponding respectively with the projecting and retracted positions of the latch-bolt, the first position of the lever, and thus the projecting position of the latch-bolt, being determined by engagement of the lever with a stop, wherein the stop can be rendered ineffective to determine the projecting position of the latch-bolt and the latter is then movable beyond its projecting position into an extended position in which it is disposed wholly outside the housing, and further wherein the latch-bolt is supported for rotation about an axis extending in the direction of its sliding movement whereby it can be oriented, in its extended position, to accommodate to a left-or right-opening door.

In general, where latch assemblies are provided having this feature of being accommodatable to left-or right-opening doors, it has been necessary to ensure that the latch assembly is correctly set prior to insertion into the door (or alternatively it would be necessary to remove the lock from the door in order to rotate the latch-bolt), or in other cases it is necessary to provide access to the inside of the housing while the lock is in situ in order to release the latch-bolt for rotation.

It is the object of the present invention to provide a latch assembly of the aforementioned type wherein the release of the latch-bolt for rotation to accommodate to a left-or right-opening door is facilitated without the need to dismantle the lock or provide access from outside into the housing.

This object is resolved in accordance with the present invention, in a latch assembly as set out in the first paragraph above, in that further spring means is provided for yieldingly urging the abutment member towards the lever, in that by the application of pressure to the latch-bolt, when in its retracted position, in a direction away from its projecting position, the abutment member, through its connection with the latch-bolt, is moved against the action of said further spring means out of operative engagement with the lever, thus causing

the stop to be rendered ineffective and thereby releasing the latch-bolt for movement under the influence of the spring means into its extended position, and in that return movement of the latch-bolt to its retracted position, by the application of pressure thereto, is effective to cause the operative engagement between the lever and the abutment member to be re-established and to render the stop once more effective to determine the projecting position of the latch-bolt.

It will thus be appreciated that, in the latch assembly in accordance with the present invention, merely by the application of pressure to the latch-bolt when in its retracted position, it can be released from operative engagement with the lever and can thus move to its extended position, in which it can be oriented by rotation, according to the hand of door in which it is mounted. This is of course of benefit in the building industry in that in this manner locks can be pre-assembled in doors without any need for ensuring that the latch-bolt is correctly oriented to the way in which the door will be hung, and further of course there is no restraint in hanging a door for left or right opening because of the orientation of the latch-bolt. Thus, using the latch assembly in accordance with the present invention is of significant value not only in itself, but also with regard to its use in the building industry.

In one embodiment of the invention, the latch-bolt is supported by a slide which is mounted for sliding movement in the housing, a rearward position of the slide, and thus the retracted position of the latch-bolt, is determined by a further stop member, which prevents movement of the slide beyond such position in a direction away from its projecting position, and in that the abutment member is mounted on the slide such that the application of pressure to the latch-bolt causes tipping movement of the abutment member to take place thus to move it out of operative engagement with the lever.

In such embodiment, furthermore, preferably the lever has a first surface portion, which engages with the abutment member during movement between the projecting and retracted positions of the latch-bolt (thus providing the operative engagement therebetween), and a second surface portion on to which the abutment member is urged when moved out of operative engagement with the lever as aforesaid. Conveniently the slide comprises a stop surface which engages the lever when the abutment member is moved out of operative engagement therewith, said stop surface being so positioned in relation to the abutment member that the latter is retained in contact with said second sur-

face portion of the lever. In this way, it will be appreciated, the lever is shaped appropriately to its normal operation but, in co-operation with the slide and abutment member, also lends itself to facilitating the movement of the latch-bolt to its extended position. In addition, the arrangement of the slide with the abutment member thereon provides for the releasable connection between the latch-bolt and the lever, while enabling control of the sliding movement to be maintained through the lever at all times.

In a preferred embodiment of the invention, the latch-bolt comprises a head portion, having said inclined face and straight face meeting at its outward edge, and a support rod portion rotatably supported by the slide. Thus, when the latch-bolt is in its extended position, the head portion thereof is freely rotatable in the slide.

Conveniently, additional spring means is provided whereby the lever is urged in a direction towards the stop. In this way, the lever is held against the stop during the retracting movement of the latch-bolt, thereby ensuring the the abutment member will ride up the inclined surface of the lever and return to its position of engagement therewith.

In the latch assembly in accordance with the invention, preferably the lever has a follower associated therewith, whereby a handle can be operatively connected with the lever for operating it. Thus, it will be appreciated, the handle is used not only for normal operation of the latch-bolt, but also to effect its release to its extended position.

As is conventional, the latch assembly may be incorporated in a lever lock wherein one of the levers of the lock comprises an extension through which, upon turning the key in an unlocking direction, the latch-bolt is retracted. In accordance with the invention, furthermore, said extension operatively engages the slide of the latch assembly and the lever with the extension is movable in the housing so as not to restrict the movement of the latch-bolt between its retracted and extended positions.

There now follows a detailed description, to be read with reference to the accompanying drawings, of a lever lock incorporating a latch assembly in accordance with the present invention. It will be appreciated that this lever lock has been selected for description merely by way of non-limiting example of the invention.

In the accompanying drawings:-

Fig. 1 is a side elevation of the lock with a portion of a housing thereof broken away, and with a latch-bolt of the latch assembly thereof in its projecting position;

Fig. 2 is a fragmentary view of parts shown in Fig. 1, but with the latch-bolt in its retracted position;

Fig. 3 is a view similar to Fig. 2, but with the latch-bolt released from its operative connection with an operating lever of the latch assembly; and

Fig. 4 is a view similar to Figs. 2 and 3, but with the latch-bolt in its extended position.

With reference to Fig. 1, the lever lock now to be described comprises a housing 10 which is in two parts secured together by screws 12, and one of which parts incorporates a front plate 14 having two apertures 16, 18 through which respectively a latch-bolt 20 and a lock-bolt 22 can pass. The lever lock also comprises a lever mechanism generally designated 24 of conventional design, including one lever 26 having an extension 26a for operating the latch assembly, as will now be described.

The latch assembly in accordance with the present invention comprises a slide 30 mounted for sliding movement in the housing 10 and comprising a plate having two upstanding wall portions 32 between which is accommodated an end portion of the extension 26a of the lever 26 of the lever mechanism. Also held captive by said wall portions 32 is a support rod 34 forming part of the latch-bolt 20, the support rod 34 carrying a head portion 36 of the latch-bolt 20, which head portion has an inclined face and a straight face meeting at an outward edge thereof. The support rod 34 is mounted in said wall portions 32 for free rotation therein and also for lengthwise sliding movement, the latter being restricted by a collar 38 formed beneath the head portion 36 and a circlip 40 at the end of the rod remote from the head portion. (It will be appreciated that other ways of securing the support rod 34 captive in the slide but free to rotate therein may also be contemplated within the scope of the present invention.)

The slide 30, and thus the latch-bolt 20, is urged to the left (viewing the drawings), into a position in which the head portion 36 of the latch-bolt is projecting, by means of a torsion spring 42 secured on a boss 44 formed on one of the parts of the housing 10 for receiving a screw 12.

Also supported by the slide 30 is an abutment member 46 comprising a length of metal strip bent to a generally inverted U-shape. A forward, longer, "leg" 46a of the abutment member has its end cut away so as to be accommodated behind the rearwardly projecting end portion of the support rod 34 and thus form a connection therewith. The leg 46a also is provided, in the region of its base, with a spigot (not shown) which is accommodated in a circular hole 48 in the slide 30, the connection of spigot and hole affording a degree of quasi-pivotal or tipping movement to the abutment member 46.

The abutment member is urged in a clockwise direction (viewing the drawings) about the hole 48 by a leaf spring 50 which is secured to a further wall portion 52 of the slide 30.

Accommodated within the housing 10, between the two parts thereof, is also a follower 54 having a square central aperture 56 for receiving a bar (not shown) to opposite ends of which handles can be attached. Secured to the follower 54, for rotation therewith, is a lever 58 an upper (viewing the drawings) end portion 58a of which engages with the other, shorter "leg" 46b of the abutment member 46. The end portion 58a is so shaped as to provide a first surface portion 58b and a second surface portion 58c meeting at an acute-angled ridge. The follower 54 is urged in an anti-clockwise direction (viewing the drawings) by means of a spring 60 to a limit determined by a stop 62 constituted by a further boss in the housing, which boss receives one of the screws 12. When the follower is in engagement with the stop 62 and the shorter leg 46b of the abutment member is in engagement with the surface portion 58b of the lever, the latch-bolt 20 is in its projecting position.

When the lock is installed, rotation of the follower 54, against the action of the spring 60, is effective, through the first surface portion 58b of the lever 58 acting on the shorter leg 46b of the abutment member 46 (herein referred to as the operative engagement between the lever and the abutment member), to draw the slide rearwardly (i.e. to the right, viewing the drawings) to a limit determined by engagement with a further stop 64, also provided by a screw-accommodating boss of the housing 10, of a stop surface 30a provided by a rearward edge portion of the slide 30. In this position (see Fig. 2), the latch-bolt 20 is in its retracted position. Also in this position, the ridge between the surface portions 58b, 58c of the lever 58 is adjacent the lower end of the shorter leg 46b of the abutment member.

For releasing the operative engagement between the shorter leg 46b of the abutment member 46 and the end portion 58a of the lever 58, pressure is applied to the latch-bolt head portion 36 to urge it to the right (viewing the drawings), while in its retracted position, whereby the abutment member is caused to tip about the "axis" afforded by the hole 48 so that the end of the shorter leg 46b is moved clear of the end portion 58a of the lever, and thus the lever no longer restrains the movement of the slide 30 by its engagement with the abutment member. Thus the slide, under the action of the spring 42, is moved to the left (viewing the drawings), this leftward movement, however, being arrested by the engagement with the lever 58 of a stop face 66 provided on a further wall portion of the slide 30 (see Fig. 3). The end of the shorter leg

46b of the abutment member 46 and the wall portion providing the stop face 66 are so spatially arranged that at all times while the lever and abutment member are out of operative engagement the end of said leg is urged against the second surface portion 58c of the lever; in this way the abutment member, while it can move relative to the lever 58, is restrained from tipping to a position in which it could jam the whole of the latch assembly.

With the lever now engaging the stop face 66, release of the handles allows the slide 30 to be urged to the left (viewing the drawings) under the action of the spring 42, and at the same time the follower 54 can rotate under the action of both the spring 42 and the spring 60 until it engages the stop 62. In this position, by engagement between the lever 58 and the stop surface 66, the latch-bolt 20 is held in its extended position (see Fig. 4). In this position the latch-bolt head portion 36 can be rotated about the axis of the support rod 34 according to whether it is to be used for a left-or right-opening door.

When the latch-bolt has been oriented as desired, by the application of pressure to the head portion 36 the slide 30 is caused to move rearwardly (to the right, viewing the drawings), and during such rearward movement the shorter leg 46b of the abutment member 46 is caused to ride up the second surface portion 58c of the lever pivoting about the spigot-and-hole connection. After the leg has reached the position shown in chain-dot line in Fig. 4, the leg snaps over the ridge formed between the surface portions 58b, 58c of the lever, thereby re-establishing operative engagement between the shorter leg 46b and the end portion 58a of the lever. In this position, the latch-bolt 20 has been restored to its position shown in Fig. 1. It will be appreciated that, during this rearward movement of the slide 30 under manual pressure applied to the latch-bolt, the follower 54 is held against pivotal movement by means of the spring 60 acting on the lever 58.

Claims

1. A latch assembly comprising a housing, a latch-bolt (20) slidable in the housing between a projecting position and a retracted position, said latch-bolt having an inclined face and a straight face meeting at an outward edge of the latch-bolt for engagement with a co-operating striker plate, spring means (42) for urging the latch-bolt into its projecting position, and means for effecting retracting movement of the latch-bolt against the action of the spring means, said means comprising a lever (58) which is en-

gageable with an abutment member (46) connected to the latch bolt and which is mounted for pivotal movement between first and second positions corresponding respectively with the projecting and retracted positions of the latch-bolt, the first position of the lever, and thus the projecting position of the latch-bolt, being determined by engagement of the lever with a stop (62),

wherein the stop can be rendered ineffective to determine the projecting position of the latch-bolt and the latter is then movable beyond its projecting position into an extended position in which it is disposed wholly outside the housing,

and further wherein the latch-bolt is supported for rotation about an axis extending in the direction of its sliding movement whereby it can be oriented, in its extended position, to accommodate to a left-or right-opening door,

characterised in that further spring means (50) is provided for yieldingly urging the abutment member (46) towards the lever (58), in that by the application of pressure to the latch-bolt, when in its retracted position, in a direction away from its projecting position, the abutment member (46), through its connection with the latch-bolt, is moved against the action of said further spring means out of operative engagement with the lever, thus causing the stop to be rendered ineffective and thereby releasing the latch-bolt for movement under the influence of the spring means into its extended position,

and in that return movement of the latch-bolt to its retracted position, by the application of pressure thereto, is effective to cause the operative engagement between the lever (58) and the abutment member (46) to be re-established and to render the stop once more effective to determine the projecting position of the latch-bolt.

2. A latch assembly according to Claim 1 wherein the latch-bolt (20) is supported by a slide (30) which is mounted for sliding movement in the housing, characterised in that a rearward position of the slide, and thus the retracted position of the latch-bolt, is determined by a further stop member (64), which prevents movement of the slide beyond such position in a direction away from its projecting position,

and in that the abutment member (46) is mounted on the slide (30) such that the application of pressure to the latch-bolt (20) causes tipping movement of the abutment member to take place thus to move it out of operative engagement with the lever (58).

3. A latch assembly according to Claim 2 characterised in that the lever (58) has a first surface portion (58b), which engages with the abutment member during movement between the projecting and retracted positions of the latch-bolt

(thus providing the operative engagement therebetween), and a second surface portion (58c) on to which the abutment member is urged when moved out of operative engagement with the lever as aforesaid.

4. A latch assembly according to Claim 3 characterised in that the slide comprises a stop surface (66) which engages the lever (58) when the abutment member (46) is moved out of operative engagement therewith, said stop surface being so positioned in relation to the abutment member that the latter is retained in contact with said second surface portion of the lever.

5. A latch assembly according to any one of Claims 2 to 4 characterised in that the abutment member (46) is generally in the shape of an inverted U one of the "legs" of which is longer than the other and in that it is mounted on the slide at a location at or adjacent the base of its longer leg, said longer leg being connected to the latch-bolt and the shorter leg engaging the lever (58).

6. A latch assembly according to any one of Claims 2 to 5 characterised in that said further spring means (50) acting on the abutment member is also supported by the slide.

7. A latch assembly according to any one of Claims 2 to 6 characterised in that the latch-bolt comprises a head portion, having said inclined face and straight face meeting at its outward edge, and a support rod portion (34) rotatably supported by the slide.

8. A latch assembly according to any one of the preceding Claims characterised in that additional spring means (60) is provided whereby the lever is urged in a direction towards the stop (62).

9. A latch assembly according to any one of the preceding Claims characterised in that the lever (58) has a follower (54) associated therewith, whereby a handle can be operatively connected with the lever for operating it.

10. A lever lock incorporating a latch assembly according to any one of the preceding Claims, wherein one of the levers (26) of the lock comprises an extension (26a) through which, upon turning the key in an unlocking direction, the latch-bolt is retracted, characterised in that said extension (26a) operatively engages the slide (30) of the latch assembly and further in that the lever with the extension is movable in the housing so as not to restrict the movement of the latch-bolt between its retracted and extended positions.

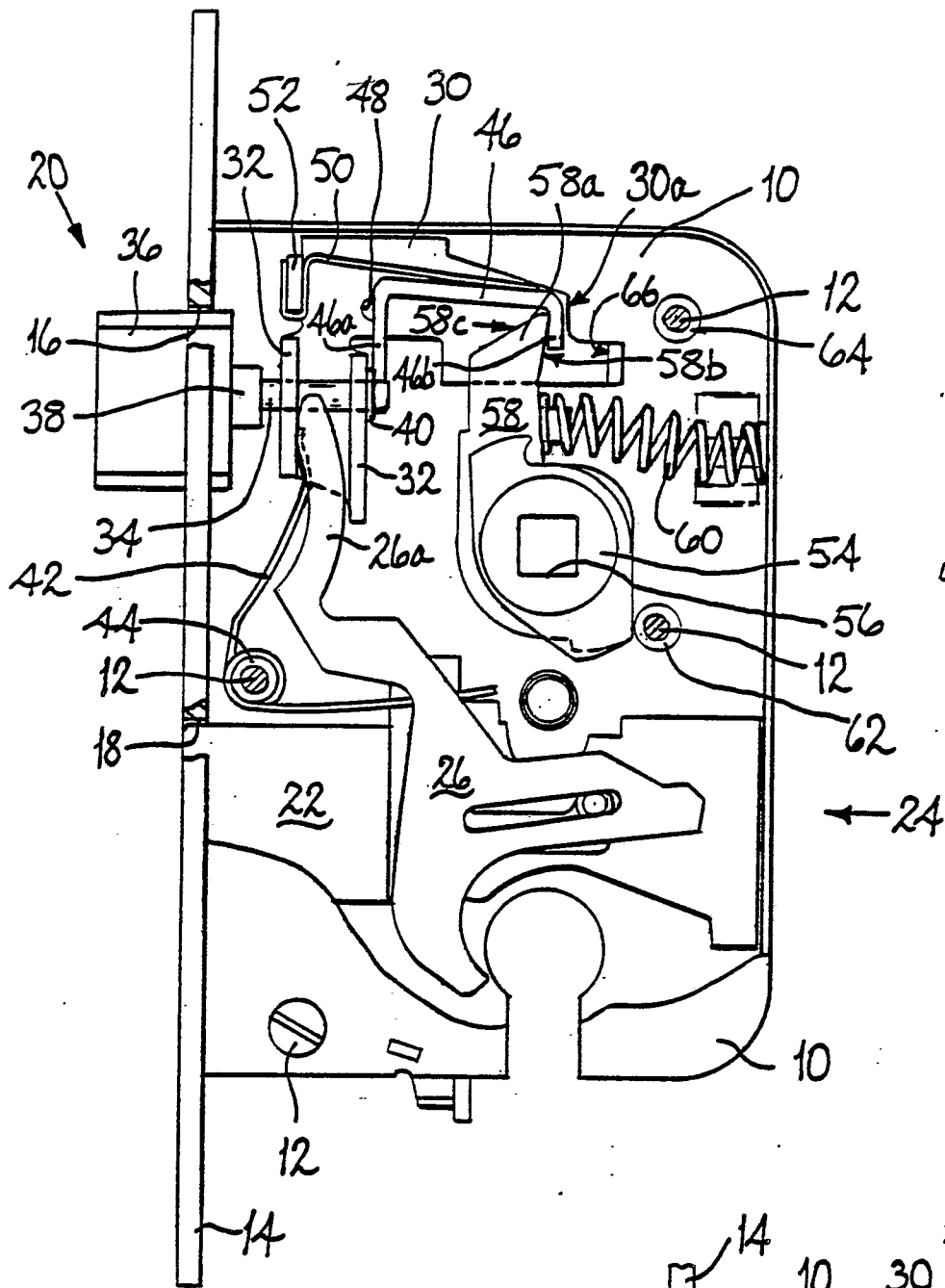
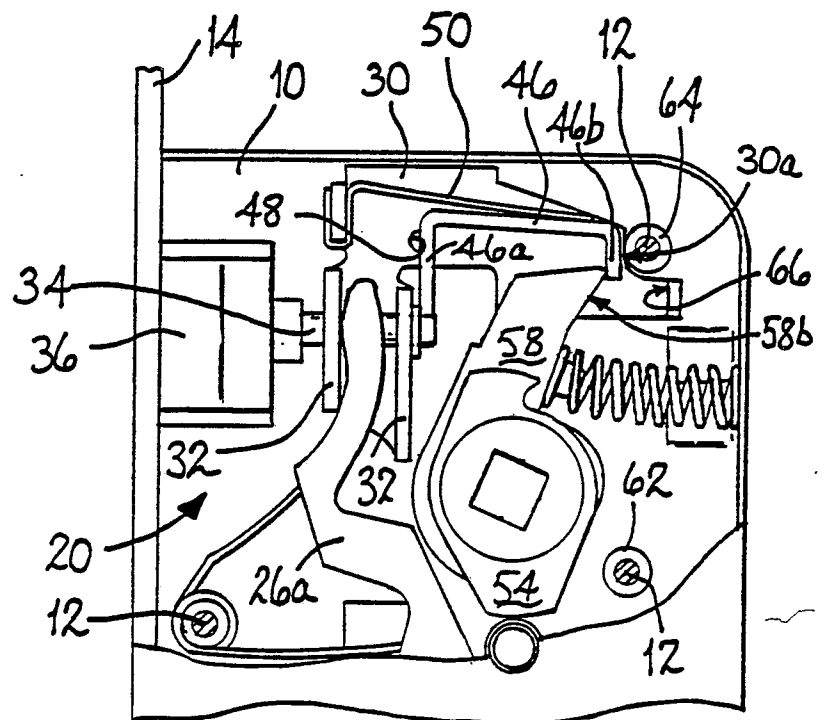


FIG. 1

FIG. 2



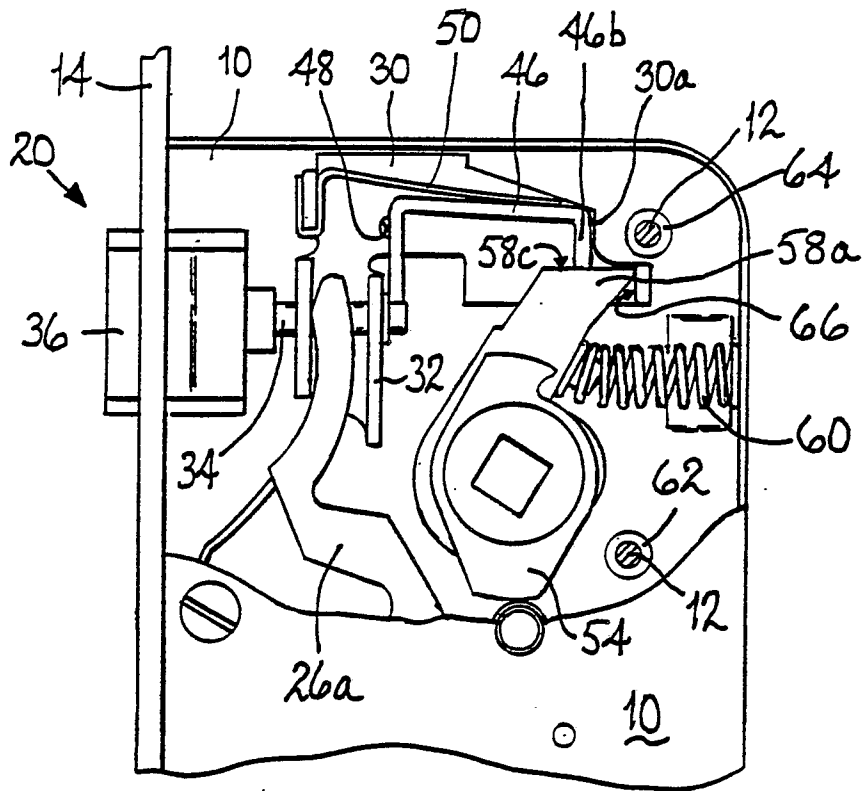


FIG. 3

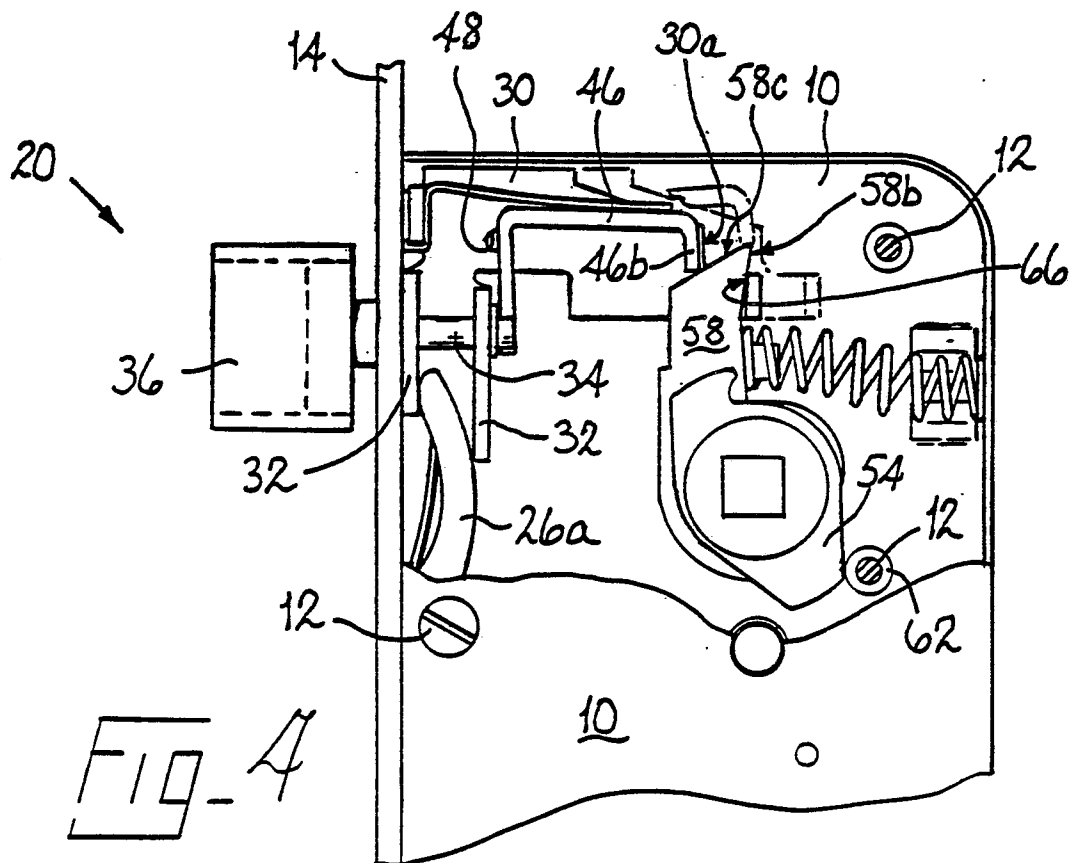


FIG. 4