

PATENT SPECIFICATION

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- (21) Application No. 24203/77
 (22) Filed 9 Jun 1977
 (23) Complete Specification Filed 22 Mar 1978
 (44) Complete Specification Published 30 Jul 1980
 (51) INT.CL.³ E05C 1/12 //
 E05B 27/00
 (52) Index at Acceptance E2A 106 108 140 142 420 M
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(54) A LATCH DEVICE

(71) We, SCOVILL SECURITY PRODUCTS LIMITED, of Wood Street, Willenhall, West Midlands, a British Company, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a latch device of the kind termed a night latch.

A latch device, according to the invention, includes a casing, a first bolt slidably mounted in a wall of the casing and resiliently urged to an extended position in which it projects from the external surface of said wall to define the latching element of the device, and a bolt actuator assembly slidable within the casing and operable to withdraw the first bolt from its extended position, said actuator assembly including a first part which is connected to said first bolt, a second part which is coupled to an external, manually controlled operating member, means interconnecting said first and second parts such that the parts are capable of limited relative sliding movement in the direction of permitted sliding movement of the actuator assembly, a further bolt which is slidably mounted in said wall and which is resiliently urged to an extended position in which it projects from the external surface of the wall, an abutment surface defined by said first part of the actuator assembly, a blocking member movable towards said actuator assembly and arranged so that, when said first bolt is in its extended position, the blocking member is engageable with said abutment surface to retain said first part against movement in a direction to withdraw said first bolt, means operable, in response to said further bolt being urged into the casing from its extended position, to move said block-

ing member towards said actuator assembly so that, when the first bolt is in its extended position, the blocking member engages said abutment surface to prevent said first bolt being moved into the casing by the application of pressure to the externally projecting end of the first bolt, and a lever carrying said blocking member, the lever being pivotally mounted in the casing and being resiliently urged towards a position in which the blocking member engages the actuator assembly, and the lever being held out of said position by a shoulder on said further bolt when the latter is in its extended position, but being released from said shoulder when the further bolt is urged into the casing.

Preferably said means interconnecting the first and second parts of said actuator assembly includes a post which is provided on one of said parts and which is slidably received in a slot in the other part.

Preferably, said second part of the actuator assembly defines a ramp surface which is located adjacent the abutment surface on the first part and, when the blocking member is engaged with said abutment surface, the second part is capable of limited sliding movement relative to the first part in a direction to move said ramp surface past said abutment surface so as to urge said blocking member out of engagement with the abutment surface and thereby permit withdrawal of said first bolt from its extended position.

Preferably, the device includes a further blocking member which is movable towards said actuator mechanism by means of an external, manually slidable knob so that, when the first bolt has been withdrawn by said actuator mechanism to a first retracted position, said further blocking member can be held between respective spaced abutment

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members defined by the first and second actuator parts respectively to releasably retain the bolt in said first retracted position.

Conveniently, the further blocking member is carried by a further lever pivotally mounted in the casing so as to be movable angularly towards and away from the actuator mechanism, and the actuator mechanism is operable to withdraw the first bolt from said first retracted position to a second fully retracted position, during which operation said parts undergo relative sliding movement to further separate said abutment members and thereby allow said further blocking member to be moved angularly between the abutment members, release of the bolt then allowing the abutment members to be resiliently urged to trap said further blocking member therebetween and so retain the bolt in said first retracted position.

Preferably, the further lever is urged by a spring away from said actuator mechanism so that, by withdrawing said first bolt beyond its first retracted position, the spring can pivot the further lever away from the actuator mechanism and thereby permit the first bolt to return to its extended position.

Preferably, the operating member is a handle which is journaled in the casing for angular movement between a first position, in which the first bolt is in its extended position, and a second position, in which the first bolt is in its second retracted position, and the device includes key-operated means for locking the handle in each of said first and second positions.

In the accompanying drawings, which illustrate one example of the invention;

Figure 1 is a plan view of a latch device with the cover plate removed and with each of the first and further bolts in its extended position;

Figure 2 is a plan view similar to Figure 1 but with the further bolt retracted;

Figures 3 and 4 are plan views of part of Figure 1 showing the first bolt fully retracted and partly retracted respectively;

Figure 5 is a sectional view of Figure 1; and

Figures 6 and 7 are plan view of the handle of the device illustrating operation of the locking means for releasably retaining the handle in its central and rotated positions.

Referring to the drawings, the device includes a generally square section casing 11 closed at one side by an integral base 12 and at its opposite side by a removable cover plate 10 (Figure 5) which, in use, serves to mount the device on a door. Slidably mounted in one wall 13 of the casing is a bolt 14 which is movable linearly between a latching position, in which it projects from the wall 13, and a fully retracted position, in which its outer end lies between the internal and external surfaces of the wall 13. Trapped between the bolt 14 and the casing 11 is a spring 15 which is stressed so as to urge the bolt towards its latching position. In use, the

device is mounted on a door so that the bolt 14 can extend, in its latching position, into a recess in a staple mounted on the door frame to hold the door closed.

Secured to the inner end of the bolt 14 is an actuator plate 16 which forms one part of a two-part actuator mechanism 17, the other part of which is defined by a further plate 18 mounted at the surface of the plate 16 presented to the base 12 by means of an upstanding post 19 rigidly secured to the plate 18 and keyed in a slot 21 in the plate 16. The slot 21 extends in the direction of sliding movement of the bolt 14 and is of dimensions such that the plates 16, 18 are capable of a small amount of relative movement in said direction. A spring 22 acts between the post 19 and the internal surface of the casing so as to urge the plate 18 towards a position in which the post 19 engages the end of the slot 21 adjacent the bolt 14.

At its end remote from the bolt 14, the plate 18 is provided with a cross member 23 having an aperture 20 (Figure 5) which freely receives a tongue 16a integral with the plate 16. In addition, the opposite ends of the cross member 23 extend towards the base 12 so as to lie in the path of movement of a cam 24 which is coupled to an angularly movable operating handle 25. The handle 25 is journaled in the base 12 so as to be capable of angular movement between a stable, central position and first and second rotated positions located on opposite sides respectively of the central position. The arrangement is such that, by moving the handle in either direction from its central position, the cam 24 is urged against the cross member 23 to move the member 23 along a guideway (not shown) defined on the base 12. In this way the plate 18 is drawn away from the wall 13 against the action of the spring 22, so that the post 19 is moved along the slot 21 until it engages the opposite end of the slot. Thereafter, continued angular movement of the handle 25 and the cam 24 causes the plate 16 to move with the plate 18 against the combined action of the springs 22, 15. The bolt 14 is thereby gradually drawn back until it reaches its fully retracted position when the handle 25 reaches one of said rotated positions. This is the position occupied in Figure 3.

Supported by the wall 13 adjacent the bolt 14 is the tapered end of a composite auxiliary bolt 26 which at its opposite end is received in a groove formed in a pillar 27 upstanding from the base 12 so as to be capable of linear sliding movement parallel with the axis of movement of the bolt 14. The bolt 26 is urged towards an extended position in which it projects from the wall 13 by a spring 28 trapped between the pillar 27 and a shoulder integral with the bolt 26. In use, when the device is mounted on a door and the door is held closed by the bolt 14, the auxiliary bolt 26 is urged into the casing 11 against the action of the spring 28 by said staple moun-

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ted in the door frame. As is explained in detail below, this is arranged to "deadlock" the bolt 14, that is to prevent the bolt 14 being pushed into the casing from its latching position by, for example, a person trying to lever open the door.

Pivotaly mounted on the pillar 27 is a lever 29 which is of generally V-configuration so as to define first and second arms, 31, 32 respectively. Carried by the arm 31 is an upstanding peg 33 which is urged towards the actuator mechanism 17 by a leaf spring 34 operating between the lever 29 and the casing 11. When, however, the auxiliary bolt 26 is in its extended position, the peg 33 is held out of engagement with the actuator mechanism 17 by means of a shoulder (not shown) formed integrally with the bolt 26 and engaging the arm 32. Thus, when the bolt 26 is in its extended position, the bolt 14 and actuator mechanism 17 are free to move without obstruction by the peg 33. However, the arrangement of the bolt 26 is such that, when the bolt 26 is pressed into the casing 11, said shoulder is moved clear of the arm 32 whereby the lever 29 is pivoted by the spring 34 so as to move the peg 33 into engagement with the adjacent edge surfaces of the plates 16, 18. Formed in said edge surface of the plate 16 is a recess 35 which, when the bolt 14 is in its normal latching position, lies in the path of movement of the peg 33 and presents to the peg an abutment surface 36 curved about the pivot axis of the lever 29. Thus, when the bolt 26 is depressed to allow the lever 29 to be pivoted by the spring 34, the peg 33 will move into the recess 35, provided the bolt 14 is in its latching position. Thereafter, any attempt to push the bolt 14 into the casing 11 will merely urge the peg 33 directly towards the pillar 27 whereby the lever 29 effectively defines a stop which "deadlocks" the bolt 14 in its latching position.

Defined at the edge of the plate 18 presented to the peg 33 is a ramp surface 37 which, when the bolt 14 is in its latching position while the handle 25 is in its central position, is located adjacent the end of the recess 35 defined by the surface 36. If, however, the handle 25 is now moved angularly from its central position, the plate 18 is moved by the cam 24 relative to the plate 16 whereby the ramp surface 37 is moved past the recess 35. Thus, if the peg 33 is received in the recess 35, the surface 37 is then moved into engagement with the peg 33. The shape of the surface 37 is such that the peg 33 is thereby urged in a direction to pivot the lever 29 away from the mechanism 17 so that the peg 33 is moved out of the recess 35. The arrangement is such that the peg 33 is completely clear of the recess by the time the post 19 is moved with the plate 18 into driving engagement with the plate 16, whereby the plate 16 is then free to move into the casing 11 to withdraw the bolt 14. Thus "deadlocking" of the bolt 14 is released when the

handle 25 is rotated.

The pillar 27 also serves as a pivotal mounting for a further lever 38 which extends in opposite directions respectively from the pillar. As shown in Figures 3 and 4, the lever 38 is shaped at one end to define a projecting finger 39 while adjacent the opposite end of the lever there is provided an upstanding post 41, which is slidably received in a slot 42 formed in the base 12. The slot 42 is curved about the pivot axis of the lever 38 and the post 41 extends through the slot so as to be secured at its free end to a manually operable knob 40 exposed on the outer surface of the casing 11. At its opposite end, the lever 38 is also formed with an integral hook 43 which is connected to one end of a light helical tension spring 44, the other end of which is located by a spigot 45 integral with the base 12. The rating of the spring 44 is less than that of the spring 22 but is arranged to be sufficient to normally retain the lever in a central position in which the post 41 abuts against one end of the slot 42 and the finger 39 is held clear of the path of movement of the mechanism 17.

Projecting from the plate 16 is a further peg 46 which is located at the end of the plate 16 adjacent the cross member 23 and at the edge of the plate presented to the levers 29, 38. The arrangement is such that, when the bolt 14 is drawn back by the handle 25 into its fully retracted position, the finger 39 of the lever 38 is disposed between the peg 46 and the cross member 23, but the finger 39 is transversely spaced from the mechanism 17 assuming the lever 38 is in its central position. If, however, the post 41 is now moved by its associated knob 40 to the opposite end of the slot 42 against the action of the spring 44, the lever 38 is pivoted to move the finger 39 into abutment with the peg 46. Thus, if the handle 25 is now released while the post 41 is held against the other end of the slot 42, the spring 22 urges the post 19 to slide along the slot 21 thereby moving the cross member 23 so as to trap the finger 39 against the peg 46. In this position, the lever 38 prevents the actuator mechanism 17 from undergoing further movement towards the wall 13, while the spring 44 is held against returning the lever 38 to its central position by the higher rated spring 22. Thus, the bolt 14 is now held in a further partly retracted position in which the outer end of the bolt lies generally flush with the external surface of the wall 13.

In order to release the bolt 14 from said partly retracted position, it is merely necessary to turn the handle 25 in a direction to return the bolt towards its fully retracted position, whereby the finger 39 is no longer trapped against the peg 46 by the action of the spring 22. The spring 44 is then able to pivot the lever 38 to its central position and return the post 41 to said one end of the slot 42, whereby the finger 39 is moved out of registry

with the mechanism 17 so that the springs 15, 22 can slide the bolt 14 back to its extended position.

It will be appreciated that if the bolt 14 is pushed by hand into the casing 11 from its extended position, the bolt will normally only be moved as far as said partly retracted position. In this position, the distance between the cross member 23 and the peg 46 is substantially equal to the thickness of the finger 39 to be moved angularly therebetween. Thus, if the bolt 14 is pushed by hand into the casing 11 it will normally not be possible to lock the bolt in said partly retracted position by operation of the knob 40. Similarly it will be seen that the bolt 14 cannot be locked in its extended position by operation of the knob 40.

Conveniently, the wall of the casing 11 opposite the wall 13 is formed with a tapering rib 57 which lies in the path of movement of the tongue 16a so that, when the bolt 14 is withdrawn by the handle 25 to its fully retracted position the tongue 16a is held by the rib 57 against movement in a direction away from the lever 38. Thus, if the lever 38 is now pivoted by the knob 40 to bring the finger 39 into abutment with the post 46, any tendency for the plate 16 to be urged by the finger 39 in said direction is prevented by the rib 57. In this way, it is possible to avoid the cross member 23 being urged by the plate 16 into frictional contact with the guideway on the base 12. Thus if the handle 25 is now released while the finger 39 is held against the post 46 by the knob 40, the cross member 23 is free to move along the guideway and hence is urged by the spring 22 to trap the finger 39 against the post 46 and thereby retain the bolt 14 in its partly retracted position.

Referring particularly to Figures 5 to 7, the handle is mounted in the base 12 by means of a hollow spigot 47 which projects through a thickened portion 12a of the base to engage the cam 24, the latter being secured to the spigot 47 by means of a circlip. Mounted for angular movement in the spigot 47 is a bush 48 which is coupled to the plug 50 of a key-operated cylinder lock, with the portion of the handle 25 located outside the casing 11 defining the hollow lock body in which the plug is received. The plug 50 is coupled to the bush 48 by means of a lost motion connection so that by rotation of the plug through 360°, the bush can be moved between first and second operative positions spaced 270° apart.

Formed in the region of the spigot 47 extending within the base portion 12a are a pair of diametrically opposed apertures 19 which when the handle 25 is in its central position are aligned with part-spherical recess 51 in the base portion 12a. In addition, the base portion 12a is formed with first and second further pairs of diametrically opposed recesses 51a which are arranged so as to be aligned in turn with the apertures 49 respectively when the handle 25

is moved into its first and second rotated positions. The bush 48 is also provided with a pair of diametrically opposed, part-spherical recesses which are indicated at 52 and which are arranged so that, when the plug 50 is in its first operative position, they are aligned with the apertures 49 and receive respective steel balls 53 mounted in, and projecting from, the apertures 49 respectively. In this position, the balls 53 lie generally flush with the external surface of the spigot 47 and hence the handle 25 is free to undergo angular movement relative to the base 12. If, however, the handle 25 is held so that the apertures 49 are aligned with a respective pair of recesses 51 or 51a in the base portion 12a and the plug 50 is now rotated by its associated key, to its second operative position, the balls 53 will be urged by the bush 48 into the recesses 51 or 51a respectively. The balls 53 then serve to secure the spigot 47 to the base portion 12a until the plug is returned to its first operative position. It will therefore be appreciated that the handle 25 can be locked against rotation in each of its central and rotated positions.

As shown in Figure 5, a bush 54 is rotatably mounted in the cover plate 10 and carries a further cam 55 which engages the cross member 23 and is operable in the same way as the cam 24 to withdraw the bolt 14 from its extended position. The bush 54 is formed with a non-circular blind bore 56 and in use when the device is mounted on one surface of a door, the bore 56 receives a complementary drive member coupled to the movable plug of a further key-operated cylinder lock (not shown) located in an aperture in the door so as to be exposed at the opposite surface of the door.

The present specification discloses subject matter described and claimed in our co-pending Application No. 24204/77 (Serial No. 1572367)

WHAT WE CLAIM IS:—

1. A latch device including a casing, a first bolt slidably mounted in a wall of the casing and resiliently urged to an extended position in which it projects from the external surface of said wall to define the latching element of the device, and a bolt actuator assembly slidable within the casing and operable to withdraw the first bolt from its extended position, said actuator assembly including a first part which is connected to said first bolt, a second part which is coupled to an external, manually controlled operating member, means interconnecting said first and second parts such that the parts are capable of limited relative sliding movement in the direction of permitted sliding movement of the actuator assembly, a further bolt which is slidably mounted in said wall and which is resiliently urged to an extended position in which it projects from the external surface of the wall, an abutment surface defined by said first part of the actuator assembly, a blocking member movable towards said actua-



with the mechanism 17 so that the springs 15, 22 can slide the bolt 14 back to its extended position.

It will be appreciated that if the bolt 14 is pushed by hand into the casing 11 from its extended position, the bolt will normally only be moved as far as said partly retracted position. In this position, the distance between the cross member 23 and the peg 46 is substantially equal to the thickness of the finger 39 to be moved angularly therebetween. Thus, if the bolt 14 is pushed by hand into the casing 11 it will normally not be possible to lock the bolt in said partly retracted position by operation of the knob 40. Similarly it will be seen that the bolt 14 cannot be locked in its extended position by operation of the knob 40.

Conveniently, the wall of the casing 11 opposite the wall 13 is formed with a tapering rib 57 which lies in the path of movement of the tongue 16a so that, when the bolt 14 is withdrawn by the handle 25 to its fully retracted position the tongue 16a is held by the rib 57 against movement in a direction away from the lever 38. Thus, if the lever 38 is now pivoted by the knob 40 to bring the finger 39 into abutment with the post 46, any tendency for the plate 16 to be urged by the finger 39 in said direction is prevented by the rib 57. In this way, it is possible to avoid the cross member 23 being urged by the plate 16 into frictional contact with the guideway on the base 12. Thus if the handle 25 is now released while the finger 39 is held against the post 46 by the knob 40, the cross member 23 is free to move along the guideway and hence is urged by the spring 22 to trap the finger 39 against the post 46 and thereby retain the bolt 14 in its partly retracted position.

Referring particularly to Figures 5 to 7, the handle is mounted in the base 12 by means of a hollow spigot 47 which projects through a thickened portion 12a of the base to engage the cam 24, the latter being secured to the spigot 47 by means of a circlip. Mounted for angular movement in the spigot 47 is a bush 48 which is coupled to the plug 50 of a key-operated cylinder lock, with the portion of the handle 25 located outside the casing 11 defining the hollow lock body in which the plug is received. The plug 50 is coupled to the bush 48 by means of a lost motion connection so that by rotation of the plug through 360°, the bush can be moved between first and second operative positions spaced 270° apart.

Formed in the region of the spigot 47 extending within the base portion 12a are a pair of diametrically opposed apertures 19 which when the handle 25 is in its central position are aligned with part-spherical recess 51 in the base portion 12a. In addition, the base portion 12a is formed with first and second further pairs of diametrically opposed recesses 51a which are arranged so as to be aligned in turn with the apertures 49 respectively when the handle 25

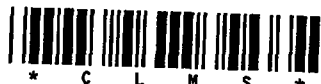
is moved into its first and second rotated positions. The bush 48 is also provided with a pair of diametrically opposed, part-spherical recesses which are indicated at 52 and which are arranged so that, when the plug 50 is in its first operative position, they are aligned with the apertures 49 and receive respective steel balls 53 mounted in, and projecting from, the apertures 49 respectively. In this position, the balls 53 lie generally flush with the external surface of the spigot 47 and hence the handle 25 is free to undergo angular movement relative to the base 12. If, however, the handle 25 is held so that the apertures 49 are aligned with a respective pair of recesses 51 or 51a in the base portion 12a and the plug 50 is now rotated by its associated key, to its second operative position, the balls 53 will be urged by the bush 48 into the recesses 51 or 51a respectively. The balls 53 then serve to secure the spigot 47 to the base portion 12a until the plug is returned to its first operative position. It will therefore be appreciated that the handle 25 can be locked against rotation in each of its central and rotated positions.

As shown in Figure 5, a bush 54 is rotatably mounted in the cover plate 10 and carries a further cam 55 which engages the cross member 23 and is operable in the same way as the cam 24 to withdraw the bolt 14 from its extended position. The bush 54 is formed with a non-circular blind bore 56 and in use when the device is mounted on one surface of a door, the bore 56 receives a complementary drive member coupled to the movable plug of a further key-operated cylinder lock (not shown) located in an aperture in the door so as to be exposed at the opposite surface of the door.

The present specification discloses subject matter described and claimed in our co-pending Application No. 24204/77 (Serial No. 1572367)

WHAT WE CLAIM IS:—

1. A latch device including a casing, a first bolt slidably mounted in a wall of the casing and resiliently urged to an extended position in which it projects from the external surface of said wall to define the latching element of the device, and a bolt actuator assembly slidable within the casing and operable to withdraw the first bolt from its extended position, said actuator assembly including a first part which is connected to said first bolt, a second part which is coupled to an external, manually controlled operating member, means interconnecting said first and second parts such that the parts are capable of limited relative sliding movement in the direction of permitted sliding movement of the actuator assembly, a further bolt which is slidably mounted in said wall and which is resiliently urged to an extended position in which it projects from the external surface of the wall, an abutment surface defined by said first part of the actuator assembly, a blocking member movable towards said actuator



tor assembly and arranged so that, when said first bolt is in its extended position, the blocking member is engageable with said abutment surface to retain said first part against movement in a direction to withdraw said first bolt, means operable, in response to said further bolt being urged into the casing from its extended position, to move said blocking member towards said actuator assembly so that, when the first bolt is in its extended position, the blocking member engages said abutment surface to prevent said first bolt being moved into the casing by the application of pressure to the externally projecting end of the first bolt, and a lever carrying said blocking member, the lever being pivotally mounted in the casing and being resiliently urged towards a position in which the blocking member engages the actuator assembly, and the lever being held out of said position by a shoulder on said further bolt when the latter is in its extended position, but being released from said shoulder when the further bolt is urged into the casing.

2. A device as claimed in Claim 1, wherein said means interconnecting the first and second parts of said actuator assembly includes a post which is provided on one of said parts and which is slidably received in a slot in the other part.

3. A device as claimed in Claim 1 or Claim 2, wherein said part of the actuator assembly defines a ramp surface which is located adjacent the abutment surface on the first part, and when the blocking member is engaged with said abutment surface, the second part is capable of limited sliding movement relative to the first part in a direction to move said ramp surface past said abutment surface so as to urge said blocking member out of engagement with the abutment surface and thereby permit withdrawal of said first bolt from its extended position.

4. A device as claimed in any one of Claims 1 to 3, and also including a further blocking member which is movable towards said actuator mechanism by means of an external, manually slidable knob so that, when the first bolt has been withdrawn by said actuator mechanism to a first retracted position, said further blocking member can be held between

respective spaced abutment members defined by the first and second actuator parts respectively to releasably retain the bolt in said retracted position.

5. A device as claimed in Claim 4, wherein the further blocking member is carried by a further lever pivotally mounted in the casing so as to be movable angularly towards and away from the actuator mechanism, and the actuator mechanism is operable to withdraw the first bolt from said first retracted position to a second fully retracted position, during which operation said parts undergo relative sliding movement to further separate said abutment members and thereby allow said further blocking member to be moved angularly between the abutment members, release of the bolt then allowing the abutment members to be resiliently urged to trap said further blocking member therebetween and so retain the bolt in said first retracted position.

6. A device as claimed in Claim 5, wherein the further lever is urged by a spring away from said actuator mechanism so that, by withdrawing said first bolt beyond its first retracted position, the spring can pivot the further lever away from the actuator mechanism and thereby permit the first bolt to return to its extended position.

7. A device as claimed in any one of the preceding Claims, wherein the operating member is a handle which is journaled in the casing for angular movement between a first position, in which the first bolt is in its extended position, and a second position, in which the first bolt is in its second retracted position, and the device includes key-operated means for locking the handle in each of said first and second positions.

8. A latch device comprising the combination and arrangement of parts substantially as hereinbefore described with reference to, and as shown, in the accompanying drawings.

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