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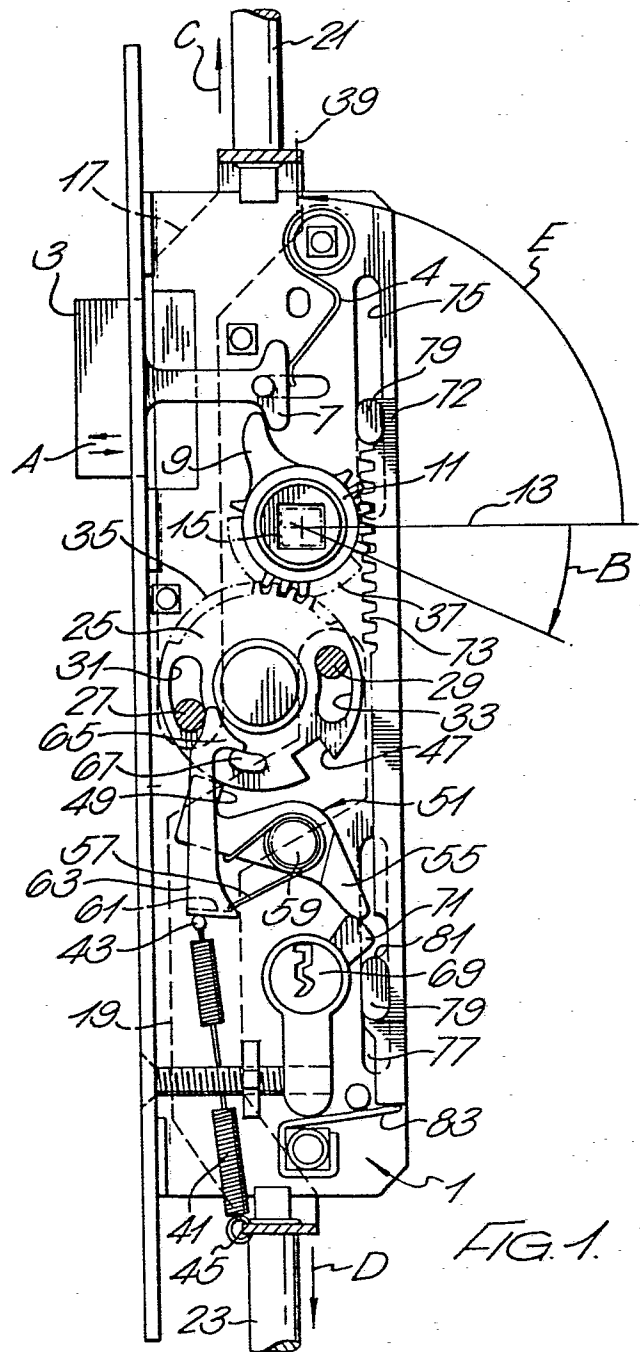
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(54) **Lock.**

(57) A spindle for a handle engages with a first pinion member (11) for operating a latch (3) when the handle is rocked in one sense, and this pinion member (11) engages a second pinion member (25), which is pivotally connected, preferably by two yokes (17,19) and pin (27,29) and arcuate slots (31,33) in the pinion member (25), to head and cill bolts (21,23); to move these to a locking position when the handle is rocked in the opposite sense. When this occurs, a locking pawl (51) preferably in the shape of a bell crank lever, automatically deadlocks the bolts. To unlock the bolts, a key is operated, causing a projection (71) on the key lock barrel to engage the bell crank lever, thus disengaging the locking pawl (51), whereupon one or more springs (41) associated with parts of the lock, automatically withdraw the bolts, and move the handle back to its original position, so that it can subsequently be used to unlock the latch.

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"LOCK"

This invention relates to a three point lock for a side hung door or window (hereinafter referred to as a door). By a three point lock, we mean a lock which, when operated, will cause the door to which it is fitted to be secured to its frame at three points. More specifically, the invention relates to a three point lock with a dead-locking facility.

Three point locks are known but the majority of these have a single operating member, e.g. a handle, to move the lock between its locking and unlocked positions. This means that the locks cannot be deadlocked and are not suitable for use on outside doors of private houses or on shop front doors. A key-operated three point lock is known, in which all three bolts are thrown by the key, one engaging in the jamb of the door, and the others securing the top and bottom of the door, and engaging respectively in the head and sill of the door frame. Such three point locks suffer from the disadvantage that they do not have sufficient mechanical advantage, in that the user often cannot obtain sufficient leverage with the key to throw the three bolts, especially when the door has warped slightly, and the bolts are not precisely aligned with their apertures in the frame.

A further three point lock has been proposed in which the head and sill bolts are operated with the same actuator as the third bolt or latch and in this construction a locking slide is provided to deadlock the head and sill bolts. This locking slide can be released by operating a release mechanism which may incorporate a key but subsequently the head and sill bolts have to be withdrawn from their locking position meaning that unlocking of the lock is a two-handed operation.

The present invention seeks to overcome the disadvantages of known three point locks, and yet provide a relatively simple and cheap lock.

According to the present invention, we provide a three point lock comprising a casing, a latch, and two

bolts movable in directions transverse to that of the latch, the latch being operated and the bolts being movable to a dead-locked locking position by means of a single operating handle, and there being a further
5 operating device to move the bolts to a released position.

Preferably, by rocking the handle in one sense, the latch is released in traditional manner, and by rocking it in the opposite sense, the two bolts are moved to their locking position and dead-locked, the bolts being movable
10 from their locking position by operation of a key, or alternative means.

Preferably, the handle is mounted on a spindle keyed to a first pinion member having a projecting lug engaging a projection on the rear of the latch, so that rocking
15 movement of the first pinion member through about 30° as a result of rocking the handle in one sense withdraws the latch against a spring bias, which returns the latch to its locking position, and the handle to its position of rest, when the handle is released.

Preferably, the first pinion member engages with a second pinion member for moving the bolts to their locking position. For this purpose, each bolt has a yoke associated with it, the forked ends of which accommodate a part of the second pinion member to which they are
25 pivotally connected by pins. Preferably, the pins run in arcuate slots in the second pinion member, located respectively 180° apart, one for the head bolt and the other for the sill bolt, the arrangement being such that rocking movement of the handle in the other sense will cause
30 rotation of the second pinion member, which will be translated into upward movement of the head bolt and downward movement of the sill bolt.

Preferably, at least one of the bolts, when it moves to its locking position, is moved against the bias of a spring.

35 In order to dead-lock the bolts in their locking position, it is preferred that a locking pawl is provided to engage in a cut-out in the second pinion member when it reaches a position in which the bolts are in their fully

extended locking position. Preferably, the locking pawl is in the form of a spring biased bell crank lever pivotally supported on the casing, there being a projecting lug on one of the arms of the lever which engages said cut-out to prevent rotation of the pinion member, and hence movement of the bolts from their locking position.

When the bolts are to be released from their dead-locked locking position, the key or alternative release means is operated, and a projection on the key lock barrel is preferably moved into engagement with the other arm of the bell crank lever, thus moving it against its spring bias, so that the lug is moved out of said cut-out, whereupon the spring biasing the said at least one locking bolt will cause the bolt to move away from its locking position, thus causing the second pinion member to rotate back to its original position thus withdrawing the other bolt, so that the bolts and handle both move back to their original positions.

In order to be able to release the latch from the exterior of a door without an exterior operating handle, e.g. a front door, a rack is slidably mounted in the casing, the rack having teeth thereon in engagement with teeth on the first pinion member, and wherein a recess is provided in the rack which is engageable by said projection on continued rotation of said key beyond the position for moving the lug out of the cut-out, so that further movement of the key in the same direction will cause unlocking of said latch.

Preferably, the spring bias for the locking pawl bell crank lever is provided by a coil spring encircling the pivot pin of the pawl, one end of the spring bearing against one arm of the bell crank lever and the other end bearing against a transverse stop in the casing. If desired, this stop may be movable with the handle, so that the load on the spring is increased as the handle is operated to move the bolts to their locking position. This movement of the stop can be achieved by making the stop part of a yoke member which is moved by the second pinion as it is

rocked to its bolt locking position. For this purpose, the free ends of the arms of the yoke member may be hooked, and located on respective sides of the second pinion member, there being a transverse stud on the pinion member with which the hooks engage to lift the yoke as the pinion member is rotated. The yoke member, spring, bell crank lever and its pivot may be in the form of a single assembly to assist in assembly of the mechanism.

10 A three point lock in accordance with the invention is now described by way of example with reference to the accompanying drawings, in which:-

FIGURE 1 is a side elevation of the lock in its normal position, with a side plate removed for the sake of clarity, and

FIGURE 2 is a view similar to Figure 1 but showing the parts in a locking position.

Referring to the drawings, the lock has a casing 1 in which a latch 3 is slidable in the direction of the arrows A, but is biased to the illustrated extended or locking position by a spring 4. The latch is reversible so that the lock can be used either left or right handed. The latch is of traditional shape with a curved leading edge and has an enlarged rear portion 7 with which a lug 9 on a first pinion member 11 engages. The latter is rockable within the casing 1 by means of a handle, the centre line of which is shown at 13 (for the normal position of the handle) and which engages a spindle 15 keyed to the pinion 11. Thus, when the handle is rocked in the direction of the arrow to position B, the latch 3 will be moved to its release position, for opening a door to which the lock is fitted.

Also supported in the casing 1 for sliding movement in the directions of arrows C and D respectively are two kinked bolt actuating yokes 17 and 19, to which a head bolt 21 and a sill bolt 23 are connected. The opposite or forked ends of the yokes (the innermost ends) are located on either side face of a second pinion member 25

rotatably mounted in the casing 1, the yokes being pivotally connected to the member 25 by means of pins 27 and 29, respectively, which engage in arcuate slots 31 and 33 in the pinion member 25. When the mechanism is in its normal position of Figure 1 as distinct from the Figure 2 locking position, the slots 31 and 33, which are 180° apart, are approximately at the 9 o'clock and 3 o'clock positions. (The arcuate slots are necessary to allow the pinion member 25 to move without causing movement of the yokes when the handle is operated in normal manner to release the latch 3).

The pinion member 25 has a toothed portion 35 which meshes with a toothed portion 37 of pinion member 11, and when the handle is moved in the direction of the arrow E, so the member 37 moves anti-clockwise, thus causing clockwise movement of the pinion member 25. This rocking movement is then translated into linear movement of the bolts 21 and 23 which move to their extended locking position, when the handle reaches the position represented by the vertical line 39. This bolt movement is resisted by a spring bias, which is provided by a spring 41, one end of which is anchored to the casing at 43 and the opposite end of which is connected to the yoke 19 at 45.

The second pinion member 25 has a cut-out 47 therein in which a lug 49 engages when the bolts are in their locking position as shown in Figure 2. The lug 49 is part of a locking pawl 51 and is provided on one arm of a bell crank lever, the other arm of which is indicated at 55. When engaged in cut-out 47, the locking pawl acts as a dead-lock, holding the two bolts 21 and 23 in their locking position. The locking pawl is biased into its dead-lock position by means of a spring 57 which encircles a pivot pin 59 for the pawl, one end of the spring bearing against one arm of the bell crank lever and the other end engaging the base 61 of a U-shaped yoke member 63.

Although the other end of the spring 57 could be fixed to the casing 1, it preferably bears against the base 61

of the yoke member 63, the arms of which are hooked at their free ends 65, and are located, one on each side of the pinion member 25. A transverse stud or bar 67 is mounted on the member 25, and as this moves clockwise as a result of the handle being moved to the position 39, so the stud or bar 67 will engage the hooked ends 65 of the yoke member, and lift it, thus increasing the bias of the spring 57 acting on pawl 51, to ensure satisfactory engagement of the lug 49 in cut-out 47. In this position, the handle is also locked in the position represented by the centre line 39, and the lock is dead-locked.

To unlock the lock, i.e. to move the bolts 21 and 23 from their locking position, and to release the dead-lock, a key is located in a keyhole 69. When the key is twisted, the barrel of the keylock will rotate, this rotational movement being transferred to a projection 71 on the barrel, which is so located as to be moved into engagement with the other arm 55 of the bell crank. Continued twisting movement of the key will cause the bell crank lever to be rocked anti-clockwise from the Figure 2 position to that of Figure 1, against the bias of the spring 57. Once the lug 49 moves out of the cut-out 47, so the spring 41 will pull on yoke 19, which in turn will cause the pinion member 25 (the spring 57 will also assist) to move anti-clockwise, thereby withdrawing the two bolts 21 and 23 from their locking position shown in Figure 2 to their unlocked position shown in Figure 1, and preventing re-engagement of the lug 49 in cut-out 47. The handle will of course also move back to the position represented by the line 13.

It will thus be appreciated that merely by rocking the handle in one sense, normal operation of the latch 3 will be achieved, but when the handle is rocked 90° in the opposite sense, the two yokes 17 and 19, and hence bolts 21 and 23, will move to their locking position, and automatically be dead-locked by operation of the bell crank locking pawl 51. (The latch 3 will also be in a locking position). Unlocking of the bolts can then only

be achieved by means of the key operated release mechanism 69, 71, 55, etc. which must be followed by subsequent unlatching of the latch 3, to open the door to which the lock is fitted.

5 If the three point lock is being fitted to a back door, then it is likely that that back door will have internal and external handles mounted on the spindle 15. In that case, of course, once the key has been operated to release the head and sill bolts, the latch 3 can be released
10 either from the exterior or the interior of the building by operating the handle. However, the three point lock can also be fitted to front doors or doors of shop premises and traditionally these doors do not have an exterior operating handle but only one on the inside. This means
15 that it must be possible to move the latch 3 to its unlocked position by means of a key located in the keyhole 69. Accordingly, a rack 72 is slidably supported in the rear of the casing 1, the rack having at its upper end a plurality of gear teeth 73 which mesh with the teeth 37
20 on the first pinion member 11. The rack is located between the side plates of the casing 1, each of which is provided with an upper slot 75 and a lower slot 77 in which projections 79 on the rack slidably engage. Towards its lower end, a recess 81 is formed in the rack which
25 can be engaged by the projection 71 on the key lock barrel. Hence, after operating the key located in the keyhole 69, to release the locking pawl 51 and allow the head and sill bolts to be moved to their unlocked position, continued clockwise movement of the key as shown in Figure 1 will
30 cause the projection 71 to engage the recess 81 in the rack 72 and further turning of the key will cause this projection 71 to move the rack downwardly beyond the position shown in Figure 1. Because of the meshing of the gear teeth 73 with the gear teeth 37 on the first
35 pinion member 11, the first pinion member will be caused to rotate clockwise beyond the position shown in Figure 1 whereupon the lug 9 thereon will cause the latch 3 to move to its withdrawn unlocked position. A spring 83 is

provided to bias the rack 72 to its Figure 1 position and to provide a resistance force against which the key must be moved.

5 Although the drawing shows a cylinder lock which is operated from either side of the door by a key which is inserted in the keyhole 69, it will be appreciated that in some instances the cylinder lock may be altered, so that the interior keyhole (that on the interior face of the door) is replaced or supplemented by alternative
10 means, e.g. a thumb turn, i.e. a supplementary operating handle for turning the barrel to release the dead-lock.

 It should be noted that if the ends of the bolts 21 and 23 which project beyond the top and bottom of the door are tapered, or the holes in the head and sill of
15 the door frame are tapered, then when the bolts are moved to their locking position, they will help to draw the top and bottom of the door tightly against the frame, thus improving the weathering characteristics of the door.

 The three point lock of this invention is designed
20 particularly for side hung doors and windows and can considerably increase security, e.g. for front and back doors of private houses, and can also be used for shop front doors. It is especially suited for use with
aluminium doors.

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CLAIMS:

1. A three point lock comprising a casing, a latch, and two bolts movable in directions transverse to that of the latch, the latch being operated and the bolts being
5 movable to a dead-locked position by means of a single operating handle, and there being a further operating device to move the bolts to a released position.
2. A lock according to claim 1 wherein at least one of the bolts is spring biased away from its locking position
10 to its released position, said spring bias being operative to move the bolts to the released position when said further operating device is operated.
3. A lock according to claim 1 or 2 wherein, by rocking the handle in one sense, the latch is released in
15 traditional manner, and by rocking it in the opposite sense, the two bolts are moved to their locking position and dead-locked, the bolts being movable from their locking position by operation of a key, or alternative means.
4. A lock according to claim 1, 2 or 3 wherein the handle
20 is mounted on a spindle keyed to a first pinion member having a projecting lug engaging a projection on the rear of the latch, so that rocking movement of the first pinion member through about 30° as a result of rocking the handle in one sense withdraws the latch against a
25 spring bias, which returns the latch to its locking position, and the handle to its position of rest, when the handle is released.
5. A lock according to claim 4 wherein the first pinion member engages with a second pinion member for moving
30 the bolts to their locking position.
6. A lock according to claim 5 wherein each bolt has a yoke associated with it, the forked ends of which accommodate a part of the second pinion member to which they are pivotally connected by pins.
- 35 7. A lock according to claim 6 wherein the pins run in arcuate slots in the second pinion member, located respectively 180° apart, one for a head bolt and the other for a sill bolt, the arrangement being such that rocking

movement of the handle in the other sense will cause rotation of the second pinion member, which will be translated into upward movement of the head bolt and downward movement of the sill bolt.

5 8. A lock according to any one of claims 4-7 wherein, in order to dead-lock the bolts in their locking position, a locking pawl is provided to engage in a cut-out in the second pinion member when it reaches a position in which the bolts are in their fully extended locking
10 position.

9. A lock according to claim 8 wherein the locking pawl is in the form of a spring biased bell crank lever pivotally supported on the casing, there being a projecting
15 lug on one of the arms of the lever which engages said cut-out to prevent rotation of the pinion member, and hence movement of the bolts from their locking position.

10. A lock according to claim 9 wherein, when the bolts are to be released from their dead-locked locking position, the further operating device is operated, wherein a
20 projection movable on movement of the further operating device is moved into engagement with the other arm of the bell crank lever, thus moving it against its spring bias, so that the lug is moved out of said cut-out, whereupon the spring biasing the said at least one locking bolt will
25 cause the bolt to move away from its locking position, thus causing the second pinion member to rotate back to its original position thus withdrawing the other bolt, so that the bolts and handle both move back to their original positions.

30 11. A lock according to claim 9 wherein the further operating device is a key insertable into a key lock barrel on which said projection is located, and wherein a rack is slidably mounted in the casing, the rack having teeth thereon in engagement with teeth on the first
35 pinion member, and wherein a recess is provided in the rack which is engageable by said projection on continued rotation of said key beyond the position for moving the lug out of the cut-out, so that further movement of the

-11-

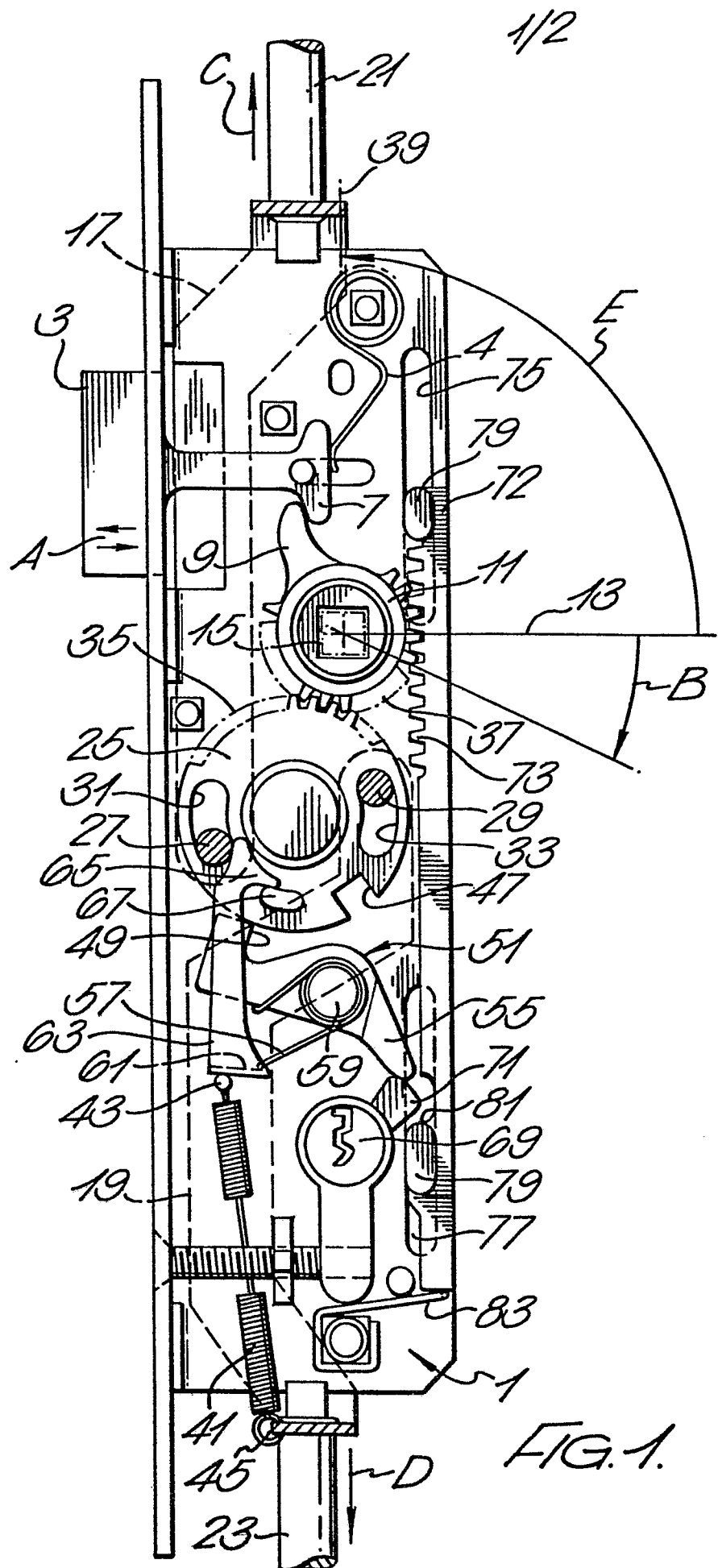
key in the same direction will cause unlocking of said latch.

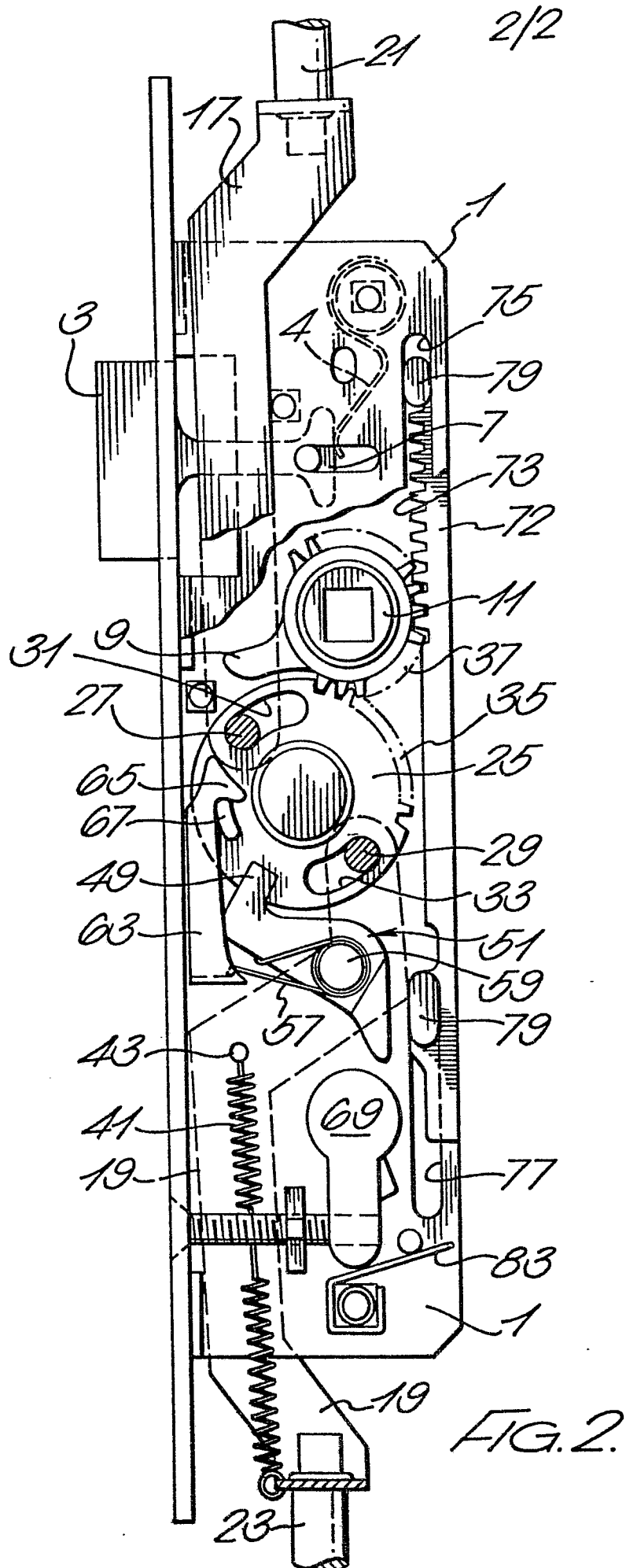
5 12. A lock according to any one of claims 9-11 wherein the spring bias for the locking pawl bell crank lever is provided by a coil spring encircling a pivot pin of the pawl, one end of the spring bearing against one area of the bell crank lever and the other end bearing against a stop.

10 13. A lock according to claim 12 wherein the stop is part of a yoke member which is moved by the second pinion as it is rocked to its bolt locking position so that the load on the spring is increased as the handle is operated to move the bolts to their locking position.

15 14. A lock according to claim 13 wherein the free ends of the arms of the yoke member are hooked, and located on respective sides of the second pinion member, there being a transverse stud on the pinion member with which the hooks engage to lift the yoke as the pinion member is rotated.

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European Patent
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EUROPEAN SEARCH REPORT

Application number

EP 80 30 2114.6

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. CL ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	FR - A - 2 177 238 (ETS DREVET & CIE) * page 1, lines 6 to 16 *	1,3, 4,11	E 05 B 63/14 E 05 C 9/10
	FR - A5 - 2 253 384 (ETS J. MASSARD S.A.) * page 1, lines 18 to 27 *	1,3-5, 11	
	DE - C - 359 856 (J.B. DANDOIS & CIE) * page 3, line 102 to page 4, line 13 *	1,3,11	
	DE - A1 - 2 814 417 (GILLET-ROQUIGNY S.A.) * claim 1 *	1,4,11	TECHNICAL FIELDS SEARCHED (Int. CL ³)
	FR - A - 789 747 (M.B. HAASE) * claim 1 *	1,3,7	E 05 B 55/00 E 05 B 57/00 E 05 B 59/00 E 05 B 61/00 E 05 B 63/00 E 05 C 9/00
	US - A - 3 477 753 (W.L. SCHLICHTER) * column 2, line 69 to column 4, line 27 *	1,8 -	
CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons			
&: member of the same patent family, corresponding document			
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
Berlin	30-09-1980	WUNDERLICH	