

Lock

This invention relates to a lock.

IN THE DRAWINGS:

The preferred embodiment of the lock according to this invention and a most pertinent prior-art lock are described with reference to the following drawings in which:

FIG. 1 is an exploded view of the preferred embodiment of the lock according to this invention;

FIG. 2 is a planar view of the lock shown in FIG. 1; and

FIG. 3 is a planar view of the prior-art lock.

Identical numerals are given to like elements in the above-mentioned drawings.

FIG. 3 shows a prior-art lock which includes a box 10, a latch 20, a latch-carrying strip 22, a tumbler-engaging strip 80 and a handle-engaging strip 40. A cover 50 (see FIG. 1) is necessary to conceal and support components of the lock, however, the cover is omitted in FIG. 5, thus the components can be seen.

The box 10 includes a front plate, a side plate, upper and lower plates. A hole 11 is defined through the side plate of the box 10. The latch 20 is insertable into the hole 11. A hole 16 is defined through the front plate of the box 10. Referring to FIG. 1, a tumbler 60 which includes a rotatable block 62 is insertable into the box 10 through the hole 16.

The latch 20 and the latch-carrying strip 22 are joined. The latch-carrying strip 22 includes upper and

lower sections and a central section formed between the upper and lower sections. A tab 28 projects from the lower section of the latch-carrying strip 22. A cylinder 13 projects from the front plate of the box 10 near the side plate of the box 10. A tension spring 70 is connected between the cylinder and the tab 28. Due to the tension spring 70, the latch 20 is apt to move from the box 10. An axle 24 projects from a transient section between the upper and central sections of the latch-carrying strip 22. A hole 26 (more clearly shown in FIG. 1) is defined through the upper section of the latch-carrying strip 22.

A torque spring 72 includes first and second straight sections and a helical section which is formed between the first and second straight sections thereof. The helical section of the torque spring 72 is mounted on the axle 24, the first straight section of the torque spring 72 is inserted into the hole 26.

The tumbler-engaging strip 80 includes a left branch, a right upper branch and a right lower branch. Two holes 88 and 89 are defined through the left branch of the tumbler-engaging strip 80. The hole 88 is to the right of the hole 89. The second straight section of the torque spring 72 is inserted into the hole 88. The tumbler-engaging strip 80 is mounted on the axle 24 via the hole 89. The tumbler-engaging strip 80 is apt to swing clockwise due to the torque spring 72.

The left branch of the tumbler-engaging strip 80 includes concave sections 82 and 83 from left to right along

a lower edge. The block 62 can be brought into engagement with the concave section 82 or the concave section 83 in order to move the latch 20 (via the tumbler-engaging strip 80 and the latch-carrying strip 22). Such engagement will be described later.

The tumbler-engaging strip 80 includes a hook 81 formed at the right upper branch thereof.

The tumbler-engaging strip 80 subsequently includes two separate extensions 85 and 87 from left to right along a lower edge so that a recess is defined between the extensions 85 and 87. The extension 85 includes a square tip 85. A pin 12 projects from the front plate of the box 10. The latch 20 is selectively retained in various positions due to engagement of the pin 12 with the extension 85 or in the recess. Such engagement will be described later.

The handle-engaging strip 40 includes upper and lower sections and a central section formed between the upper and lower sections. Two tabs 42 and 44 project from the upper section of the handle-engaging strip 40. The tab 42 is in engagement with the hook 81. A slot 46 is defined in the upper section of the handle-engaging strip 40. A cylinder 18 projects from the front plate of the box 10. The cylinder 18 is inserted into the slot 46. The handle-engaging strip 40 is allowed a limited motion due to the cylinder 18 and the slot 46.

A torque spring 74 includes first and second straight sections and a helical section which is formed between the

first and second straight sections. The helical section of the torque spring 74 is mounted on an axle 14 which projects from the front plate of the box 10. The first straight section of the torque spring 74 is in engagement with the tab 44. The second straight section of the torque spring 74 is in engagement with a cylinder 15 which projects from the front plate of the box 10. The handle-engaging strip 40 is thus apt to move to the left.

A plurality of cylinders (not numbered) project from appropriate points on the front plate of the box 10 and each include a threaded internal surface. The cover 50 includes a plurality of holes corresponding to the cylinders projecting from the front plate of the box 10. A screw (such as "53" in FIG. 1) is inserted into each of the holes defined through the cover 50 and then brought into engagement with the threaded internal surface of each of the cylinders. Thus, the box 10 and the cover 50 are joined.

The block 62 can be brought into engagement with the concave section 83 by turning a key (not shown) which is inserted in the tumbler 60. The tumbler-engaging strip 80 is pivoted counterclockwise on the latch-carrying strip 22, thus the extension 85 is disengaged from the pin 12. The tumbler-engaging strip 80, the latch-carrying strip 22 and the latch 20 are immediately moved to the left by means of the springs 70 and 74 on departure of the extension 85 from the pin 12. The recess will be moved to a position above the pin 12 as the moving and pivoting of the tumbler-engaging strip 80 terminates. Due to the torque spring 72,

the tumbler-engaging strip 80 will be pivoted clockwise when the block 62 is disengaged from the concave section 83. The recess 86 is thus brought into engagement with the pin 12. The latch 20 is locked as the tumbler-engaging strip 80 is trapped by means of the pin 12.

If a thief puts a peg in a latch-receiving recess (not shown) which is defined in a jamb, the insertion of the latch 20 will not be finished however the rotation of the rotatable block 62 will not be hindered. The tumbler-engaging strip 80 will not be moved to the left but will be pivoted counterclockwise. Thus, what is brought into engagement with the pin 12 is the square tip of the extension 85 instead of the recess 86. On the disengagement of the rotatable block 62 from the concave section 83, the torque spring 72 biases the tumbler-engaging strip 80 clockwise so as to bring the extension 85 back into engagement with the pin 12, thus producing a click sound. The latch 20 is not locked, however this fact will not be learned as the pivoting of the key has been finished and the click has been produced.

It is the primary objective of this invention to provide a lock which will not be easily picked.

The lock includes a box including a front plate and a side plate projecting from the front plate, a hole defined through the side plate, a pin projecting from a center of the front plate and first and second cylinders projecting from the front plate. A latch is insertable through the hole. A latch-carrying strip is received in the box and

joined with the latch and includes an axle projecting therefrom and a hole defined therein. A tension spring is connected between the front plate and the latch-carrying strip, biasing the latch from the box. A handle-engaging strip is received in the box and includes first and second tabs projecting therefrom and a slot defined therein between the first and second tabs. The first cylinder is insertable into the slot. A first torque spring includes first and second straight portions and a helical portion formed between the first and second straight portions. The helical portion of the first torque spring is mounted on the axle. The first straight portion of the first torque spring is inserted into the hole. A second torque spring includes first and second straight portions and a helical portion formed between the first and second straight portions. The helical portion of the second torque spring is mounted on the first cylinder. The first straight portion of the second torque spring abuts against the second cylinder. The second straight portion of the second torque spring abuts against the second tab. A tumbler-engaging strip is received in the box and includes a left branch with a first hole into which the axle is inserted and a second hole into which the second straight portion of the first torque spring is inserted, a right upper branch formed as a hook for engagement with the first tab, a right lower branch including a pointed protrusion, an inclined edge, a recess and a protrusion. A concave edge is formed between the left and right lower branches. The pointed protrusion does not

stay on the pin during operation of the lock.

FIGS 1 and 2 show a novel lock which includes a box 10, a latch 20, a latch-carrying strip 22, a tumbler-engaging strip 30, a handle-engaging strip 40 and a cover 50.

The box 10 includes a front plate, a side plate, upper and lower plates. A hole 11 is defined through the side plate of the box 10. The latch 20 is insertable into the hole 11. A hole 16 is defined through the front plate of the box 10. A tumbler 60 with a rotatable block 62 is insertable into the box 10 through the hole 16.

The latch 20 and the latch-carrying strip 22 are joined by appropriate means. The latch-carrying strip 22 includes upper and lower sections and a central section formed between the upper and lower sections. A tab 28 projects from the lower section of the latch-carrying strip 22. A cylinder 13 projects from the front plate of the box 10 near the side plate of the box 10. A tension spring 70 is connected between the cylinder and the tab 28. Due to the tension spring 70, the latch 20 is apt to move from the box 10. An axle 24 projects from a transient section between the upper and central sections of the latch-carrying strip 22. A hole 26 is defined through the upper section of the latch-carrying strip 22.

A torque spring 72 includes a helical section and first and second straight sections projecting from the helical section. The helical section of the torque spring 72 is mounted on the axle 24, the first straight section of the torque spring 72 is inserted into the hole 26.

The tumbler-engaging strip 30 includes a left branch, a right upper branch and a right lower branch. Two holes 31 and 32 are defined through the left branch of the tumbler-engaging strip 30. The hole 31 is to the left of the hole 32. The tumbler-engaging strip 30 is mounted on the axle 24 due to the hole 31. The second straight section of the torque spring 72 is inserted into the hole 32. The tumbler-engaging strip 30 is apt to swing clockwise due to the torque spring 72.

The left branch of the tumbler-engaging strip 30 includes concave sections 33 and 34 from left to right along a lower edge. The block 62 can be brought into engagement with the concave section 33 or the concave section 34 in order to move the latch 20 (via the tumbler-engaging strip 30 and the latch-carrying strip 22). Such engagement will be described later.

The tumbler-engaging strip 30 includes a hook 35 formed at the right upper branch thereof.

From left to right, a pointed extension 36, an inclined section 37, a recess 38 and an extension 39 project from a lower edge of the lower right section of the tumbler-engaging strip 30. A pin 12 projects from the front plate of the box 10. The latch 20 is selectively retained in various positions due to engagement of the pin 12 with the pointed extension 36 or in the recess 38. Such engagement will be described later.

The handle-engaging strip 40 includes upper and lower sections and a central section formed between the upper and

lower sections. Two tabs 42 and 44 project from the upper section of the handle-engaging strip 40. The tab 42 is in engagement with the hook 81. A slot 46 is defined in the upper section of the handle-engaging strip 40. A cylinder 18 projects from the front plate of the box 10. The cylinder 18 is inserted into the slot 46. The handle-engaging strip 40 allowed a limited motion of due to the cylinder 18 and the slot 46.

A torque spring 74 includes a helical section and first and second straight sections which project from the helical section. The helical section of the torque spring 74 is mounted on an axle 14 which projects from the front plate of the box 10. The first straight section of the torque spring 74 is in engagement with the tab 44. The second straight section of the torque spring 74 is in engagement with a cylinder 15 which projects from the front plate of the box 10. The handle-engaging strip 40 is thus apt to move to the left.

A plurality of cylinders (not numbered) project from appropriate points on the front plate of the box 10 and each include a threaded internal surface. The cover 50 includes a plurality of holes corresponding to the cylinders projecting from the front plate of the box 10. A screw (such as "53" in FIG. 1) is inserted into each of the holes defined through the cover 50 and then brought into engagement with the threaded internal surface of each of the cylinders. Thus, the box 10 and the cover 50 are joined.

The block 62 can be brought into engagement with the

concave section 34 by turning a key (not shown) which is inserted in the tumbler 60. The tumbler-engaging strip 30 is pivoted counterclockwise on the latch-carrying strip 22, thus the pointed extension 36 is disengaged from the pin 12. The tumbler-engaging strip 30, the latch-carrying strip 22 and the latch 20 are immediately moved to the left by means of the springs 70 and 74 on the departure of the pointed extension 36 from the pin 12. The inclined section 37 will be moved to a position above the pin 12 as the moving and pivoting of the tumbler-engaging strip 30 terminates. Due to the torque spring 72, the tumbler-engaging strip 30 will be pivoted clockwise when the block 62 is disengaged from the concave section 34. Thus, the inclined section 37 is brought into engagement with the pin 12. Due to the springs 70, 72 and 74, the inclined section 37 slides on the pin 12 so as to bring the recess 38 into engagement with pin 12. The latch 20 is locked as the tumbler-engaging strip 30 is trapped by means of the pin 12.

The insertion of the latch 20 will not be finished if a thief puts a peg in a latch-receiving recess (not shown) which is defined in a jamb. The pointed extension 36 will not be retained on the pin 12. In fact, the recess 38 will soon be brought into engagement with the pin 12. Therefore, the lock will not be picked.

CLAIMS

1. A lock comprising:

a box (10) including a front plate and a side plate projecting from the front plate, a hole (11) defined through the side plate, a pin (12) projecting from a center of the front plate and two cylinders (15, 18) projecting from the front plate near a portion opposite to the side plate;

a latch (20) insertable through the hole (11);

a latch-carrying strip (22) received in the box (10) and joined with the latch (20) and including an axle (24) projecting therefrom and a hole (26) defined therein;

a tension spring (70) connected between the front plate and the latch-carrying strip (22), biasing the latch (20) from the box (10);

a handle-engaging strip (40) received in the box (10) and including first and second tabs (42, 44) projecting from two opposite ends and a slot (46) defined therein between the first and second tabs (42, 44), the cylinder (18) being insertable into the slot (46);

a first torque spring (72) including first and second straight portions and a helical portion formed between the first and second straight portions, wherein the helical portion of the first torque spring (72) is mounted on the axle (24) and the first straight portion of the first torque spring (72) is inserted into the hole (26);

a second torque spring (74) including first and second straight portions and a helical portion formed between the first and second straight portions, wherein the helical



portion of the second torque spring (74) is mounted on the cylinder (18) and the first straight portion of the second torque spring (74) abuts against the cylinder (15) and the second straight portion of the second torque spring (74) abuts against the second tab (44);

a tumbler-engaging strip (30) received in the box (10) and including a left branch including a hole (31) into which the axle (24) is inserted and a hole (32) into which the second straight portion of the first torque spring (72) is inserted, a right upper branch formed as a hook (35) for engagement with the first tab (42), a right lower branch including a pointed protrusion (36), an inclined edge (37), a recess (38) and a protrusion (39) and a concave edge (34) formed between the left and right lower branches.

