March 6, 1962 G. C. NOVARINO 3,024,055

LOCK FOR DOORS, WITH A HANDLE DISENGAGEABLE FROM THE CONTROL MEMBER

Filed March 16, 1959 2 Sheets-Sheet 1

Fig. 1

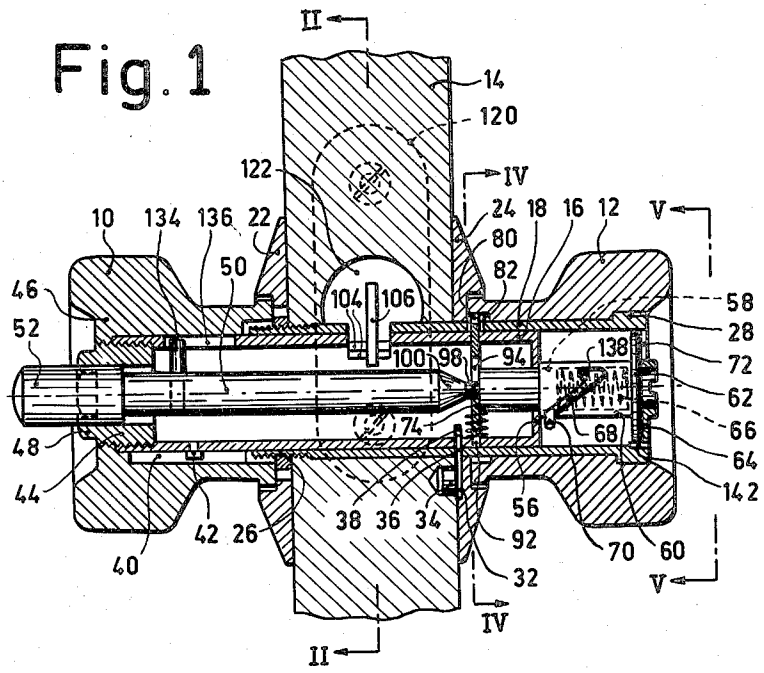
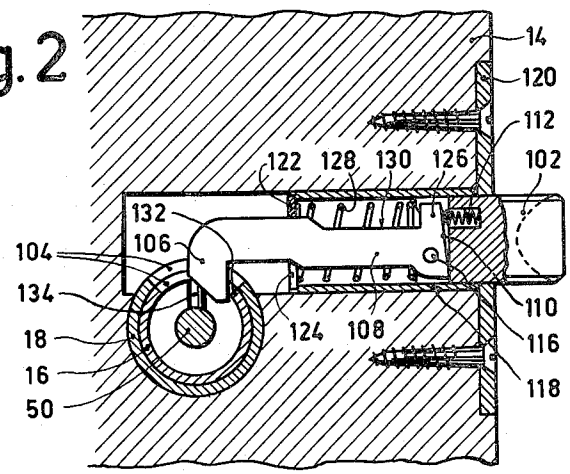


Fig. 2



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Filed March 16, 1959 2 Sheets-Sheet 2

Fig. 3

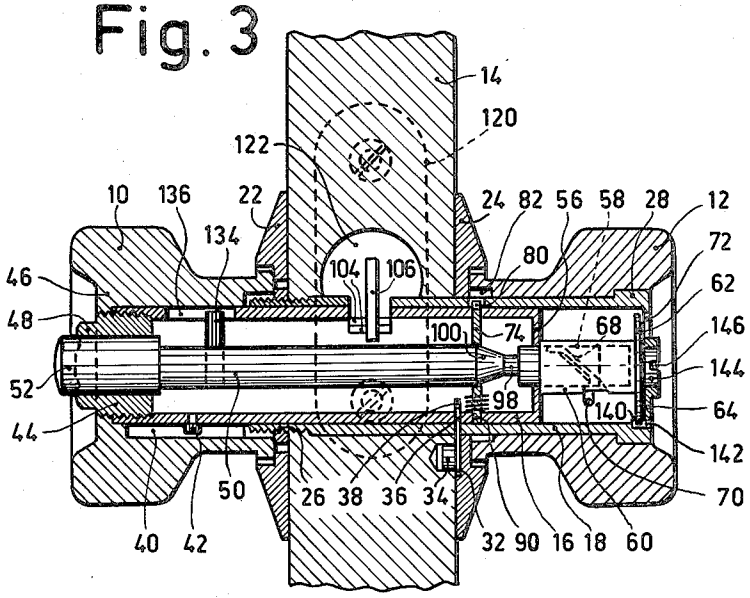


Fig. 4

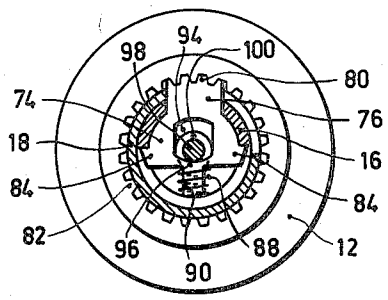
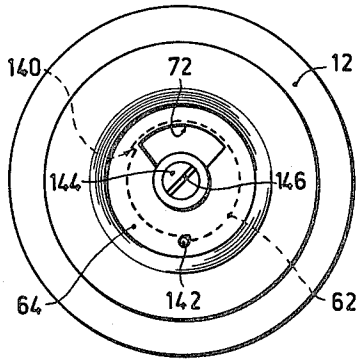


Fig. 5



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United States Patent Office 3,024,055 Patented Mar. 6, 1962

3,024,055

LOCK FOR DOORS, WITH A HANDLE DISENGAGEABLE FROM THE CONTROL MEMBER

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Filed Mar. 16, 1959, Ser. No. 799,651
Claims priority, application Sweden Mar. 22, 1958
5 Claims. (Cl. 292—169)

This invention relates to a device for door locks, more particularly for bathroom doors, comprising a rotatable body provided with two handles actuating a latch. The invention has the object of providing a lock such as to comprise a device chiefly intended for operating the latch in a simple way and at the same time a member indicating, in a manner easily observable from the outside, whether the door is locked or not. According to the invention, this is obtained essentially by the fact that one of said handles can be made to revolve with the rotatable body by means of a coupling member which can be brought in or out of the coupling position by the action of an element built in the lock, and which can be operated from the side of the other handle, so that under these conditions the first handle will remain fully disengaged instead of being locked as in other known devices, and therefore it cannot be forced. In addition, the handle thus released can be instantaneously coupled again whatever may be the position taken by it in revolution relative to the rotatable body.

According to the invention, the element built in the lock is the form of a non-revolving rod, which however can be axially displaced with respect to the other handle and the rotatable body, and this element is adapted to be operated from the side of the lock where the second handle is mounted and extends in the region of the first handle, where it is covered by a revolving piece, in such a way that the axial movement of said element will impart to the revolving piece a limited movement of revolution.

The invention will be described in detail hereinbelow, with reference to the embodiment shown in the accompanying drawings by way of example, while illustrating at the same time also other main features of my invention.

In the drawings:

FIG. 1 is a vertical sectional view of a lock according to the invention, mounted on a door, with its parts in the position in which the door can be opened from both sides;

FIG. 2 is a fragmentary sectional view taken along line II—II of FIG. 1;

FIG. 3 is a view similar to FIG. 1, but with the lock parts in the position in which the door can be opened from one side only;

FIG. 4 is a sectional view taken along line IV—IV FIG. 1, and FIG. 5 shows an end elevational view of the lock as seen from the plane V—V of FIG. 1.

In the drawings, 10 and 12 indicate two handles having the form of sleeve knobs, co-operating with a rotatable body 16 through a door 14. This rotatable body has in this case the form of a tube, which is rotatably supported in another outer tube 18, the latter being in turn held in a fixed position in a hole formed in the door 14. This fixed position is attained in part by means of two ring washers 22, 24, of which the washer 22 is interiorly threaded so that it can be screwed on the portion 26 of the outer tube which is provided with a corresponding outer thread, while the other washer (24) is held close thereto by means of handle 12, which is prevented from outward axial movement by means of an annular flange 28 provided on the outer tube but can revolve on the end of said tube. A further fastening of tube 18 is also accomplished by means of a radially extending, plate-like

tongue 32 carrying at one end thereof a plug 34 which is held pressed into a hole provided in the door by washer 24 in which said tongue is incorporated, the other end 36 of the tongue extending through an opening 38 having a shape corresponding to that of said tongue, this opening being formed in the wall of tube 18.

This tongue 32 has the further function of determining the position of tube 18 relative to that of the rotatable body 16, this being due to the fact that the end 36 of the tongue extends at its inner end portion through a groove 38 formed peripherally in the rotatable body 16, which prevents any axial movement but permits a rotary movement of the rotatable body 16 relative to the tube 18.

As stated above, the handle 12 is adapted to revolve on the outer tube 18. On the contrary, the other handle 10 is mounted, constrained against revolution, on the rotatable body 16, and to this end it is provided—on its inner surface—with an axially extending groove 40, which engages with a projection 42 on the outer surface of the rotatable body. Due to assembling reasons, the groove 40 extends up to the edge of the inner surface facing the washer 22. In order to constrain the handle 10 against axial movement relative to the rotatable body 16, the outer end portion of the latter is interiorly threaded to receive an exteriorly threaded bushing 44 having a hexagonal head 48 easily accessible from the outside by means of a wrench, and which is further threadably connected with a central opening in the middle portion 46 of the handle 10. This screw-thread union, involving both the rotatable body 16 and the handle 10, affords the possibility of compensating, with a reduced working time, any difference of thickness existing on the door 14. The inside of bushing 44 provides one of the guides for a control member 50 in the form of a rod, which passes centrally through the rotatable body and is provided at one end thereof—at the outside of handle 10—with a control button 52; said member 50, after passing through a guide hole provided in an inner end wall 56 of the rotatable body 16, extends into the interior of the handle 12. This end portion 58 of the rod 50 supports one end of a rotatable sleeve 60 which rests on one end against the wall 56 while at the opposite end it carries a circular plate 62 resting against an end wall 64 of the tube 18, whereby the sleeve 60 will remain axially fixed. At the inside of the sleeve 60, between the disk or plate 62 and the end portion 58 of the rod 50, there is placed a helical spring 66 under compression. The sleeve is further provided with a helical groove 68 in which a lug 70 fixed on rod 50 is adapted to slide, so that during the axial movement of said rod the sleeve 60 will be constrained to perform a limited rotary movement. The circular plate 62, disposed on sleeve 60, is painted in different sections with suitable indicative colors, so that upon revolution of said sleeve a surface, e.g. white or red, will appear through an opening 72 provided in the end wall 64 of the tube 18. The displacement just mentioned of rod 50 has the further function of actuating a coupling member which has roughly the shape of a partially circular disk 74 which is guided, radially movable, into the rotatable body 16.

As can be best seen in FIG. 4, the disk is provided, for this guide, with a lug 76 which can slide in a peripheral groove formed in the rotatable body 16. This lug is further provided, on its outer periphery, with a number of teeth 80 disposed along an arc of a circle, which teeth are adapted to mesh with a ring gear 82 formed in the inner side of the handle 12. In addition, beneath the lug 76, the disk is provided on one side with two side projections 84 entering into a further groove formed peripherally in the rotatable body, and on the other side—in a direction opposite to the lug 76—with a ribbon-like

tongue 90 extending radially, which is surrounded by a helical spring 88 under tension. This spring causes engagement of the disk 74 between its protruding teeth 80 and the ring gear 82. In order to further improve the guide of the disk 74, the free end of the tongue 90 extends through a hole 92 formed in the rotatable body 16. Finally, the coupling disk 74 is provided with an opening 94 through which the rod 50 passes and that portion of the disk 74 indicated at 96 which surrounds the opening 94 co-operates with two portions of the rod during axial displacement of the latter. One of these portions 98, is of reduced diameter, so that—when it is into the opening—it will be possible for spring 88 to lift the coupling member 74 in the position shown in FIGS. 1 and 4, that is to say in the position wherein the rotatable body is coupled with the handle 12. The other portion, indicated at 100, is of conical shape, so that upon pushing the rod 50 towards the right in FIG. 1, the coupling member 74 will be displaced inwardly, thereby causing disengagement of the teeth 80 from the ring gear 82, which—as will be readily understood—will render the handle 12 freely rotatable in both directions on the outer tube 18.

In order to ensure co-operation with a latch 102 shown in FIG. 2, both the outer tube and the rotatable body are provided with peripheral grooves 104 engaging with a hook-shaped portion 106 of an element 108 which co-operates with the latch. This element 108, having approximately the form of a ribbon, has one of its ends 106 shaped like a hook as stated above, while its other end terminates with a sloping-corner surface 110, which is urged—at some distance above the middle line of the latch—by a helical spring 112, which is partially inserted into a hole extending in an axial direction of said latch. On the opposite side of the middle line just mentioned, and at the inside of the edge surface 110, the element 108 is pivoted on a pin 116 fixed in the side walls of a slot formed in the inner end portion of the latch, which forms an end guide for the element 108. The latch is slidably mounted in a sleeve 118, which is likewise provided with a plate 120 for fastening it to the door 14. This sleeve, which partially contains the element 108, is provided—at the inner end thereof—with an inner wall 122 formed with a slot 124 for guided passage of element 108. Between this wall 122 and a lug 126 in said element 108 there acts a helical spring 128 under compression, which holds the latch 102 in closed position. The projection 126 is obtained by removing a longitudinal portion from the upper side of the element 108 forming the recess 130.

The structure and arrangement of the latch and its respective parts, as described above, has the purpose of permitting application of said latch after the other components of the lock have been assembled on the door. This possibility is created, as it appears from FIG. 2, owing to the fact that the element 108, after introduction of the latch 102 into the sleeve 118, can be swung upwards around the pin 116, inasmuch as the recess 130 is at that time in the region of the wall 122. This upward oscillation is of sufficient amplitude by virtue of a suitable adaptation of the depth of said recess—so that the hook-shaped portion 106 can enter into the groove 104 by sliding past the end edge 132 of the groove 104 in the rotatable body 16 which actuates the latch. When the hook-shaped portion 106 is engaged as mentioned above, the helical spring 112 will counteract—as it will be readily understood—the upward swinging movement of element 108.

Summing up, the operation of the lock described above is as follows: with the lock components in the position shown in FIG. 1, the lock can be opened from both sides of door 14, since the handle 10 is permanently coupled with the rotatable body 16, and the handle 12—in such position—is also coupled with said rotatable body by means of the coupling member 74 whose teeth are in mesh with the ring gear 82 of said handle. In this position, the circular plate 62 will exhibit, for example, a white colour in the window 72. If now it is desired to prevent anyone from opening the door from the right hand side in FIGS. 1 and 3, it is sufficient to press the button 52 inwardly, so that the rod 50 will be displaced to the right. By virtue of this displacement, the tapered portion 100 of the rod will be also displaced thereby entering into the opening 94, so that said portion, by co-operating with the edge 96 of this opening 94, will displace downwards the coupling member 74, thereby causing disengagement of the teeth 80 of the latter from the ring gear 82 disposed at the inside of handle 12. As it will be readily understood, the handle 12 will therefore be able to rotate on the outer tube 18 in both directions of operation, without acting on the rotatable body 16. The aforesaid axial displacement of rod 50 takes place without any revolution of the latter, due to the fact that said rod is provided with a pin 134 which enters into a groove 136 in rotatable body 16 extending axially along the inner hole of handle 10. Due to this displacement of the rod without revolution, besides the disengagement of the handle already mentioned above, the sleeve 60 will thus be caused to rotate by the displacement of lug 70 in the helical slot 68, as shown in FIG. 3. The circular plate 62, secured on the sleeve, will therefore then exhibit, for example, a section of red color in the window 72. In order that the control rod 50 may be arrested in the position taken upon inward movement, the helical slot 68 is provided with an enlargement 138 at one of its ends, into which the pin 70 will enter by virtue of the spring 66 acting axially on the rod, thereby locking the latter. When this arrested position is no longer required, and the lock components must be restored to the position shown in FIG. 1, it will be sufficient to rotate the handle 10 clockwise, from the left in FIG. 3, that is to say to act upon the lock so as to bring back the latch 102 in the closing position. By thus operating, the pin 134 cooperating with the groove 136 compels the rod 50 to follow the rotation of the handle 10, so that the pin 70 acting upon the sleeve 60 will slide upwards, out of the enlargment 138, due to the fact that a lug 140 on the circular plate 62 and a detent 142, provided at the inside of the stationary tube 18, will prevent said sleeve from revolving in that direction together with the rod 50. Since subsequently handle 10 will be restored to the angular position shown in FIG. 1 by the action of the spring 128 of the latch, the circular plate 62—in co-operation with the helical slot 68 and pin 70—will also return to the position shown in FIG. 1, and this of course implies that the circular plate will again exhibit the white color in the window 72. If the necessity should arise to open the door 14 from the outside, that is to say from the side where the free rotatable handle 12 is placed, there is provided outwardly of the circular plate 62, protruding from the wall 64 of the tube 18, a head 144 provided with a slot 146 for inserting therein a screwdriver, a coin or the like. In this manner, the sleeve 60 may be directly rotated by the screwdriver to the position of FIG. 1, the pin 70 slides out of the enlargement 138, the rod 50 moves axially to the position of FIG. 1 under action of the spring 66, and the disk 74 engages with its teeth 80 the ring gear 82, so that the handle 12 is coupled to the rotatable body 16 and the opening of the door 14 is made possible from the outside by acting on said handle 12.

While the present invention has been described with reference to the specific details of the embodiment illustrated herein, it is not intended that such details shall be regarded as limitations on the scope of the invention, except insofar as included in the accompanying claims.

Having thus described by invention, what I claim and desire to protect by Letters Patent is:

1. A door lock comprising a fixed tube mounted in the door, a rotatable body mounted in said fixed tube, a latch connected to said rotatable body, two handles dis-

posed one at each side of said door, the first of said handles being permanently fixed with said rotatable body, the second of said handles being rotatably mounted on said fixed tube, a ring gear integral with said second handle, coupling means in the form of a disc with peripheral teeth and fixed thereto for rotation with said rotatable body and adapted to engage said ring gear, said disk having an opening, a spring urging said disk into engagement with said ring gear, and control means in the form of an axially displaceable rod protruding from said first handle and having a portion with reduced diameter and a conical portion, said portions passing through the opening of said disk and acting upon it against said spring, whereby the inward displacement of said control means causes said disk to disengage said ring gear, and consequently causes said second handle to be rendered free from said rotatable body, and the outward displacement of said control means allows said disk to engage said ring gear and said second handle for rigid connection with said rotatable body.

2. A door lock, as set forth in claim 1, further comprising a sleeve rotatably mounted in said fixed tube and axially fixed thereto, said sleeve having a helical groove with an end enlargement, said control means being in the form of a rod protruding into said sleeve and having a first pin which engages said helical groove, said rotatable body having a longitudinal groove, said rod having a second pin which engages said longitudinal groove, and a spring mounted in said sleeve acting upon the end of said rod, whereby the inward displacement of said control means causes said sleeve to rotate and said first pin to engage said enlargement and to retain said rod, and the rotation of said rotatable body causes said first pin to be disengaged from said enlargement and said second mentioned spring to push the rod outwardly.

3. A door lock, as set forth in claim 1 further comprising a sleeve rotatably mounted in said fixed tube and axially fixed therein, said sleeve having a helical groove with an end enlargement, said control means being in the form of a rod protruding into said sleeve and having a first pin which engages said helical groove, said rotatable body having a longitudinal groove, said rod having a second pin which engages said longitudinal groove, a spring mounted in said sleeve acting upon the end of said rod, and end wall integral with said fixed tube, said end wall having a window, and a circular plate with two differently colored sections, integral with said sleeve and visible through said window, whereby the rotation of said sleeve causes differently colored sections of said circular plate to be rendered visible through said window.

4. A door lock as set forth in claim 1, further comprising a sleeve rotatably mounted in said fixed tube and

axially fixed therein, said sleeve having a helical groove with an end enlargement, said control means being in the form of a rod protruding into said sleeve and having a first pin which engages said helical groove, said rotatable body having a longitudinal groove, said rod having a second pin which engages said longitudinal groove, a spring mounted in said sleeve acting upon the end of said rod, an end wall integral with said fixed tube, said end wall having an axial hole, and a head integral with said sleeve and protruding from the axial hole of said end wall, said head having a slot for inserting a screwdriver, whereby said sleeve may be rotated from the outside by actuating said head with a screwdriver.

5. A door lock comprising a fixed tube adapted to be mounted in a door, said fixed tube having an end wall with a window and an axial hole, a rotatable body mounted in said fixed tube, said rotatable body having a longitudinal groove, a latch connected to said rotatable body, two handles disposed one at each side of said door, the first of said handles being permanently fixed to said rotatable body, the second of said handles being rotatably mounted on said fixed tube, a ring gear integral with said second handle, coupling means in the form of a disk with peripheral teeth and fixed thereto for rotation with said rotatable body and adapted to engage said ring gear, said disk having an opening, a first spring urging said disk into engagement with said ring gear, a sleeve rotatably mounted in said fixed tube and axially fixed thereto and having a helical groove with an end enlargement, control means in the form of an axially displaceable rod protruding outwardly from said first handle and inwardly into said sleeve and having a portion of reduced diameter and a conical portion passing through the opening of said disk and acting upon it against said first spring and having further a first pin which engages the helical groove of said sleeve and a second pin which engages the longitudinal groove of said rotatable body, a second spring mounted in said sleeve acting upon the end of said rod, a circular plate with two differently colored sections integral with said sleeve and visible through the window of said end wall of the fixed tube, and a head integral with said sleeve and protruding from the axial hole of said end wall, said head having a slot for inserting a screwdriver.

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