

July 5, 1960

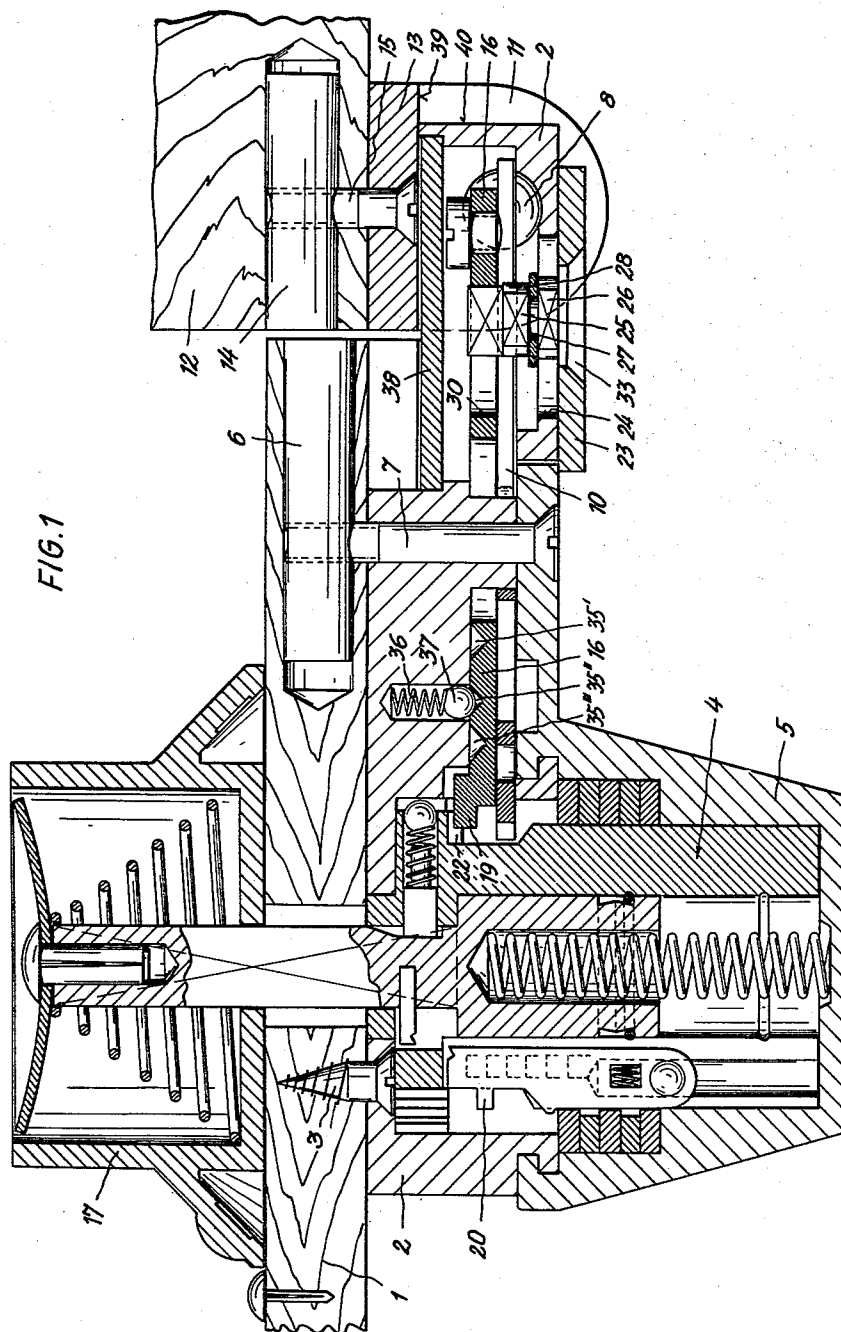
F. PLETERSKI

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LOCKING DEVICE FOR DOORS

Filed April 30, 1957

3 Sheets-Sheet 1



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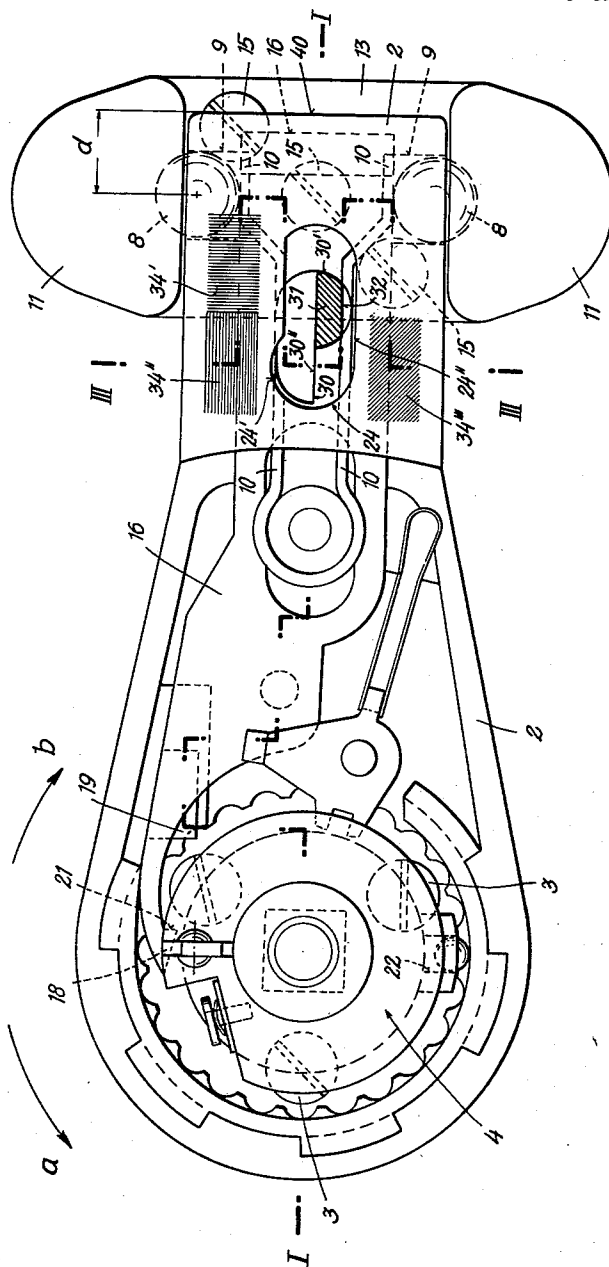
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FIG. 2



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FIG. 4

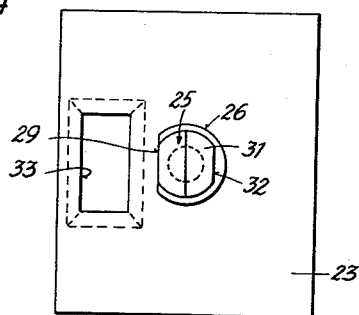
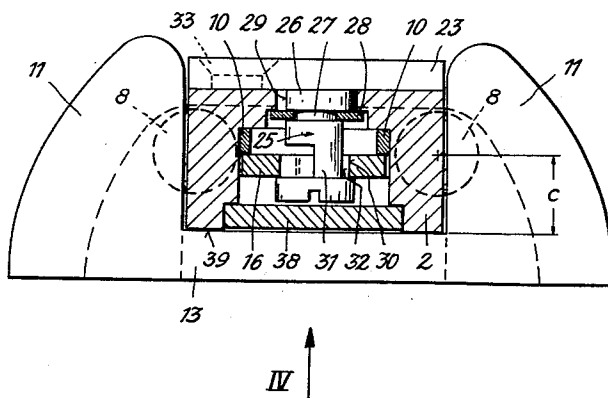


FIG. 3



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LOCKING DEVICE FOR DOORS

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6 Claims. (Cl. 292—23)

The present invention relates to a locking device for doors or the like, comprising detent means adapted to be received by notches of the holding block. Such doors are usually provided with a locking member which is adapted to hold the detent means in said notches and is movable by means of actuating members arranged on both sides of the door. It has also been disclosed to arrange the actuating members so that either of them can be uncoupled from the locking member so that when the locking member is actuated from one side of the door the actuating member disposed on the other side of the door will remain at rest. In such doors the problem arises often to lock the door from one side in such a manner that it cannot be opened from the other side even if the proper key or, in the case of a code lock, the correct code word is used. This situation may arise, e.g., when small children are in an apartment and the person watching them is desirous or compelled to leave the apartment for a shorter or longer time. In that case it is desired to lock the door from the outside in such a manner that it cannot be opened from the inside so that the children cannot leave the apartment. On the other hand, it is often desirable to lock a door from the inside against being opened from the outside in order to prevent other persons from entering the room. This situation arises frequently with testing and laboratory rooms, such as X-ray laboratories, high-voltage installations or the like, where the entrance of unprotected or uninformed persons into a room may lead to accidents.

It is an object of the invention to provide a device whereby a door can be locked from either side in such a manner that it cannot be unlocked from the respective other side. The invention is essentially characterized in that the actuation of the locking device can be prevented from the inside or outside of the door by a movement of the locking member to an uncoupled position and/or by blocking an actuating member in the open position of the locking member. Now the door can be locked from the inside so as to prevent an entrance to the room from the outside and on the other hand the door may also be locked from the outside in such a manner that the door cannot be opened from the inside and the room cannot be left. In this connection the arrangement is suitably such that, in accordance with the invention, the actuation of the locking device by the actuating member disposed on the outside of the door can be prevented by a displacement of the actuating member which is disposed on the inside of the door and coupled to the locking member whereas the actuation of the locking device by the actuating member disposed on the inside of the door can be prevented by blocking the actuating member disposed on that side of the door. This gives a particularly simple, inexpensive and reliable construction.

According to the invention the actuating member on the inside of the door can be blocked by the casing which encloses the device and/or by apertured portions of the locking member which coast with that actuating member

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and/or, when the door is closed, by guide members provided on the door frame. This affords the advantage that separate elements of construction are not required for blocking the actuating member because parts which are in any case provided may be used for blocking the actuating member. This leads to special advantages if, according to the invention, the guide members are formed by the locking claws of the holding block.

To enable a simple operation of the device, at least part of the uncoupling movement of an actuating member may be utilized according to the invention for blocking the same. In this connection the arrangement is suitably such that according to the invention the locking member is displaceable by the actuating member on the inside of the door beyond the locking position to its uncoupled position and at least part of that displacement of the locking member is utilized for uncoupling the actuating member disposed on the outside of the door.

According to a preferred embodiment of the invention the actuating member disposed on the inside of the door is slidable in a guide of the casing which encloses the device and is pivotally movable at one point of that guide. Such a construction provides for a safe guidance of the actuating member and enables the provision of marks, suitably on the casing, for indicating the position of the actuating member relative to the casing and the functional position of the device corresponding to the respective position of the locking member. This arrangement enables also the utilization of the pivotal movement of the actuating member disposed on the inside of the door for blocking that actuating member. If, in an advantageous manner, the actuating member disposed on the inside of the door consists, according to the invention, of a slide and is guided between the locking claws of the holding block, this enables a turning of the slide only when the door is open so that the blocking of the inside actuating member and the complete locking of the door towards the inside can be initiated only when the door is opened. This has the additional advantage that persons can only fully intentionally be locked up in the room to be locked and only by persons who have access to the room to be locked. An abuse of the lock by unauthorized persons is thus precluded.

In a preferred embodiment of the invention the arrangement is such that the actuating member disposed on the outside of the door has stops, which cooperate with counterstops of the locking member to displace the same, and the displacement of the locking member beyond its locking position to the uncoupled position will move the counterstops of the locking member out of the path of the stops of the actuating member. This represents a particularly simple construction because it is sufficient to displace the locking member, which consists preferably of a bolt, in order to uncouple the bolt from the actuating member disposed on the outside of the door. According to the invention the bolt can be displaced in a simple and suitable manner by the slide coupled thereto.

Special advantages will be obtained if the holding block is U-shaped and the bottom of the U is affixed to the door frame whereas the detent means consist in a manner known per se by two balls mounted in the casing of the device symmetrically with respect to the bolt, the width of which exceeds the difference of the clearance between locking claws and twice the ball diameter. This arrangement enables a general use of the device for wing doors, revolving doors, swing doors, sliding doors and the like, and for right-hand and left-hand doors. It is sufficient to make, according to the invention, the distance between the centers of the balls and the bottom surface of the locking claws at least substantially equal to the distance between

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the centers of the ball and the outside surface of the casing.

An illustrative embodiment of the locking device according to the invention is shown in the accompanying drawing, in which

Fig. 1 is a sectional view taken on line I—I of Fig. 2,

Fig. 2 is an elevation showing the device as viewed from the inside of the door with the slide removed, the slide cross-section cooperating with the bolt being shown in section only for the sake of clarity.

Fig. 3 is a sectional view taken on line III—III of Fig. 2 and

Fig. 4 is an elevation showing the slide viewed in the direction of the arrow IV of Fig. 3.

A casing 2 is screwed with screws 3 on the door leaf 1 to be locked and receives the device according to the invention and a code lock 4. It is obvious that the device according to the invention may also be used in the same or analogous manner for any other type of lock. The casing 2 is covered adjacent to the code lock 4 by a cover 5, which is affixed by a screw 7, which is secured by a transverse bolt 6 lying in the door leaf 1. The casing part shown on the right in Figs. 1 and 2 carries the detent means, which consist of balls 8 guided in bores 9 of the casing. The balls 8 are urged outwardly by a leaf spring 10 and fall into locking claws 11 of the holding block 13, which is affixed to the door frame 12 of the door to be locked. The holding block 13 is affixed in the door frame 12 by screws 15 also secured by transverse bolts 14.

The locking member consisting of a bolt 16 is slidably arranged in the casing 2. The bolt 16 is provided with two stops 18 and 19, which cooperate with the actuating member 17 disposed on the outside of the door. The stop 18 consists of a tooth and cooperates with a resiliently mounted stop 20 of the code lock. A rotation of the actuating member 17 in the sense of the arrow *a* of Fig. 2 will cause the stop 20 to engage the side 21 of the bolt stop 18 and to draw the bolt 16 downwardly to its open position so that the balls 8 are no longer blocked by the bolt 16 disposed between them and can give way inwardly against the action of the spring 10 and enable the opening of the door.

As is shown in Fig. 1 the second stop 19 provided on the bolt protrudes to some extent out of the plane of the bolt and cooperates with another stop 22 of the code lock 4. Like the stop 20 of the code lock the stop 22 of the code lock is non-rotatably connected to the actuating member 17 disposed on the outside of the door. A rotation of the actuating member 17 in the sense of the arrow *b* in Fig. 2 will cause the stop 22 to engage the stop 19 and push the bolt 16 to the right, into its locking position, in which the right-hand end of the bolt 16 lies between the balls 8 and locks the door.

The inside actuating member consisting of a slide 23 is slidably arranged on the casing 2. The mounting is effected by a sliding portion 26 of a pin 25 connected to the slide; that sliding portion slides in a guide 24 of the casing. A split locking ring 28 (Fig. 3), which enters a groove 27 of the pin and is supported on the casing 2, prevents the slide from falling out. As is shown in Fig. 2 the guide 24 of the casing 2 has a portion 24' shaped according to an arc of a circle and is continued by an elongated portion 24''. The pin portion 26 cooperating with this guide 24 (Figs. 3 and 4) has a semicircular cross-section with a flat 29.

The bolt 16 has an aperture 30, which comprises a portion 30' shaped according to an arc of a circle and continued by an elongated portion 30''. A portion 31 of the pin 25 cooperates with that aperture 30. As is apparent from Fig. 2 that portion is of semicircular cross-sectional shape and has a flat 32, which is parallel to the base of the semicircle. The limbs of the leaf spring 10 bear upon said flat 32 to form a resilient retaining means which prevents an undesired turning of the pin 25.

The slide 23 has a window 33, in which one or several

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marks 34', 34'', 34''' are visible, depending on the position of the slide 23, which are marks provided on the casing 2 and have suitably different colors. For instance, the mark 34' may be red, the mark 34'' may be green and the mark 34''' may be white. The green mark corresponds to the open position of the bolt, the red mark to the uncoupled position of the bolt, in which the actuation of the locking device by the actuating member disposed on the outside of the door is entirely prevented, and the white mark indicates that the bolt is in its open position and the actuating member disposed on the inside of the door has been blocked.

The bolt 16 is formed with notches 35', 35'' and 35''' (Fig. 1) which receive, depending on the position of the bolt, a ball 37, which is biased by a spring 36 and prevents slipping of the bolt 16. The notch 35' corresponds to the open position of the bolt, the notch 35'' to the locking position and the notch 35''' to the uncoupled position.

The device is covered adjacent to the slide by a hardened steel plate 38 mounted in the casing to prevent an intervention from the outside. Special advantages will be obtained if the arrangement is such that the distance *c* (Fig. 3) of the ball centers from the base surface of the locking claws 39 is equal to the distance *d* (Fig. 2) of the ball centers from the outside surface 40 of the casing. In that case the device according to the invention may be used for folding and revolving doors, swing doors, sliding doors and for right-hand and left-hand doors.

The function of the device is as follows:

(1) *Opening the door from the outside.*—The actuating member 17 in the sense of the arrow *a* of Fig. 2 causes the stop 20 of the lock to engage the side 21 of the stop 18 of the bolt 16 and draws the bolt to the left into its open position. Being no longer blocked by the bolt 16 the balls 8 can now give way inwardly against the action of the spring 10 and the door can be opened.

(2) *Opening of the door from the inside.*—The slide 23 is pushed to the left until the green mark 34'' appears in its window 33. During that movement the pin portion 31 received in the recess 30 of the bolt 16 moves the bolt 16 along to the left into its open position, in which the detent ball 37 falls into the notch 35' of the bolt 16. Now the door is unlocked and may readily be opened from the inside and outside. On the other hand, if the slide is pushed to the left only to such an extent that one half of each of the green and red marks 34'' and 34' appear in its window 33, then the ball 37 will fall into the notch 35'' of the bolt 16, which notch corresponds to the locking position of the bolt 16. In that position the bolt 16 prevents an opening movement of the balls 8 and can be moved into the open position from the inside by pushing the slide 23 to the left, or from the outside by turning the actuating member 17 in the sense of the arrow *a* of Fig. 2 (as has been described sub. 1).

(3) *Locking from the inside.*—The slide 23 is pushed to the right until only the red mark 34' appears in its window 33. The bolt 16 is carried along due to the coupling between the pin portion 31 and the portion 30' of the aperture in the bolt. In that position the bolt 16 prevents also the balls 8 from giving way inwardly so that the door cannot be opened. The ball 37 is then received in the notch 35''' of the bolt 16, which notch corresponds to the uncoupled position of the bolt 16. In this uncoupled position the bolt 16 is pushed to the right to such an extent that its stops 18, 19 are moved out of the path of the stops 20, 22 of the actuating member 17 or of the code lock 4, whereby the coupling between the stops 18 and 19, on the one hand, and 20 and 22, on the other hand, is eliminated. Thus, the bolt 16 can no longer be displaced from the outside and the door is locked towards the outside. Only after the bolt 16 has been displaced to the left, which operation can be effected only by the actuating member disposed on the inside of the door, will the stops 18, 19 and 20, 22

again be effective to enable the door to be opened from the outside.

(4) *Locking from the outside.*—The slide 23 is pushed to the extreme left into its open position, in which the green mark 34'' appears in its window 33. The bolt 16 is again moved along by the pin portion received in the lower part of the arcuate portion 30' of the aperture 30 of the bolt 16. When the door is open and the bolt is in this position the slide 23, which is otherwise held against rotation because it is guided between the locking claws 11, can be turned through 180 deg. so that the white mark 34''' appears in its window 33. During that rotation of the slide 23 the pin portion 31 slides out of the lower part of the arcuate portion 30' of the guide 30 of the bolt 16 into the upper part of the arcuate guide portion 30' and the arcuate pin portion 26 is turned in the arcuate portion 24' of the guide 24 of the casing 2, which movement is otherwise prevented by the flat 29 formed on the pin portion 26 and sliding on the top edge of the elongated guide portion 24'' of the casing 2. When the door is closed in that position of the slide and the bolt 16 is pushed by the stops 22 and 19 to the right, into its locking position, from the outside by turning the actuating member 17 in the sense of the arrow *b* of Fig. 2, the pin portion 31 will slide during that movement of the bolt 16 into the elongated portion 30''' of the aperture 30 of the bolt. Thus, the door is locked towards the inside because the slide 23 can neither be turned nor displaced. A rotation of the slide 23 is prevented by the locking claws 11 on the sides of the slide whereas a displacement of the slide 23 is prevented by the arcuate pin portion 26 of the slide lying in the arcuate guide portion 24' of the casing.

It is apparent that this uncoupling between the inside actuating member and the locking member can be effected only by persons inside the room so that a misuse by persons outside the room is impossible.

If the locking device according to the invention is to be used only for folding doors the balls forming the detent means may be omitted and the device may be constructed in such a manner that instead of the locked detent means the bolt forming the locking member engages appropriate notches in the holding block to lock the door. In that case the detent means and the bolt are combined in a single locking and detent member, whereby the number of parts is reduced. In practice, however, the construction described hereinbefore has proved more satisfactory owing to its universal application.

I claim:

1. A locking device for doors, comprising a holding block formed with notches, detent means adapted to enter said notches, a locking member movable to a locking position, in which it holds said detent means in said notches, first and second actuating members disposed on opposite sides of said locking member, and means for coupling each of said actuating members independently from each other to said locking member to move the same from an open position to said locking position, said first actuating member being operable to move said locking member beyond said locking position

to an uncoupled position, in which the locking member holds said detent means in said notches and in which means on said locking member is uncoupled from means on said second actuating member, so that the locking member is then movable to its open position only by means on said first actuating member, said first actuating member being adapted to be uncoupled from said locking member when said second actuating member is coupled to said locking member.

2. A device as set forth in claim 1, in which said coupling means comprise stops carried by said second actuating member and counterstops carried by said locking member, said stops and counterstops including means to cooperate to cause a displacement of the locking member responsive to actuation of said second actuating member, said counterstops being disposed outside the path of said stops in said uncoupled position of the locking member.

3. A device as set forth in claim 1, in which said locking member comprises a bolt formed with three notches, a ball mounted to be received by each of said notches when disposed in register therewith, one of said notches being arranged to be in register with said ball in said open position of the bolt, another of said notches being arranged to be in register with said ball in said locking position of the bolt, and the third one of said notches being arranged to be in register with said ball in said uncoupled position of said bolt.

4. A locking device for doors, comprising a U-shaped holding block carrying spaced locking claws formed with notches, said holding block including means to be affixed to a door frame with the bottom of the U, a casing including means to be affixed to a door leaf, a bolt movably enclosed in said casing, two balls mounted in said casing symmetrically with respect to said bolt and means for said balls to enter said notches, said bolt being movable to a locking position, in which it holds said balls in said notches, the width of said bolt exceeding the difference between the clearance between said locking claws and twice the ball diameter.

5. A locking device as set forth in claim 4, in which said locking claws have a bottom surface and a distance between the center of such of said balls and said bottom surface substantially equal to the distance between the center of said ball and the outside surface of said casing.

6. A locking device as set forth in claim 4, which comprises a slide movably carried by said casing and provided with a pin for coupling said slide to said locking member to move the same to and from said locking position, said pin being formed with two flats, said device comprising a forked leaf spring having two prongs arranged to urge said balls into said notches, each of said prongs engaging one of said flats.

References Cited in the file of this patent

UNITED STATES PATENTS

438,505	Tate	Oct. 14, 1890
785,228	Phelps	Mar. 21, 1905
1,585,105	Overdick	May 18, 1926
1,758,203	Segal	May 13, 1930
1,964,157	Holtzman	June 26, 1934