July 8, 1958 D. G. MARTENS 2,842,631

SAFETY SPRING LOCKS

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Fig. 1.

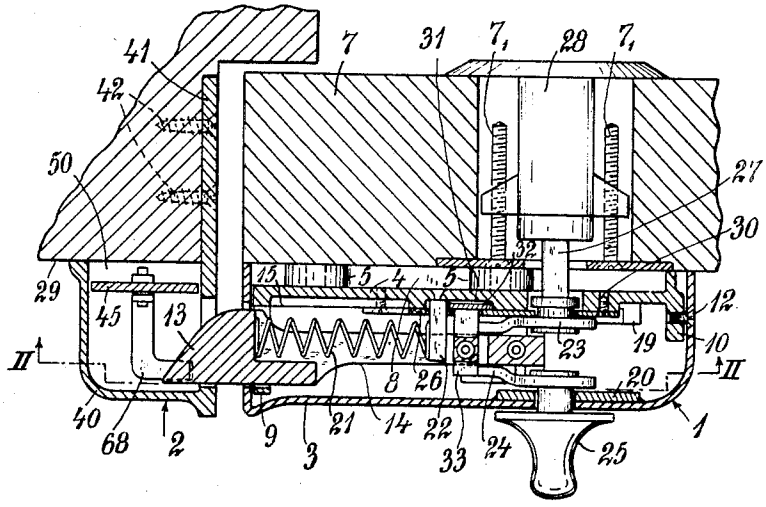
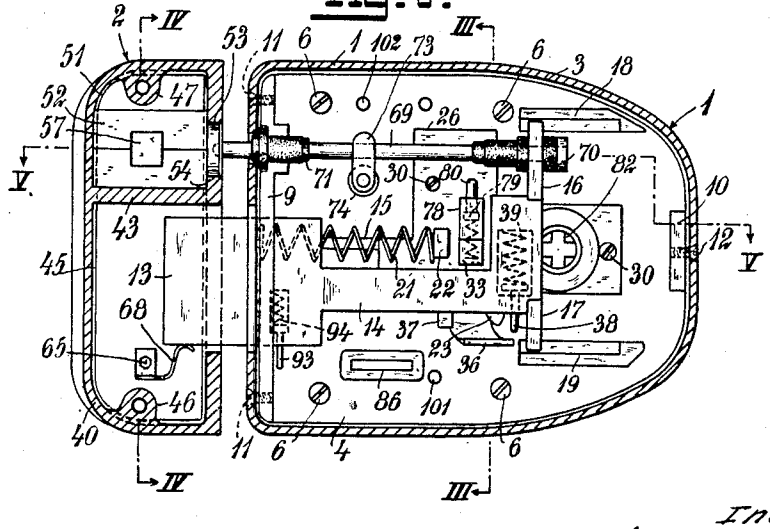


Fig. 2.



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Fig. 3.

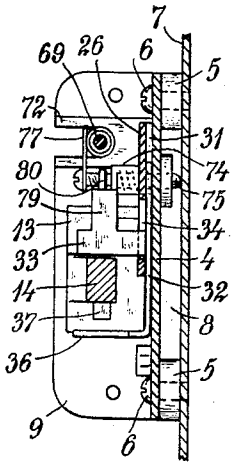


Fig. 4.

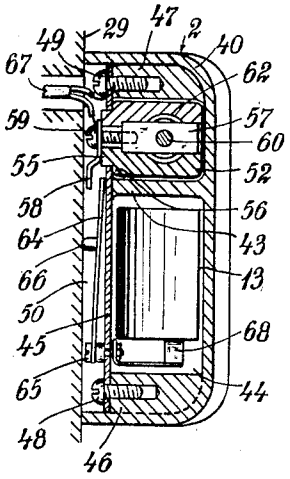
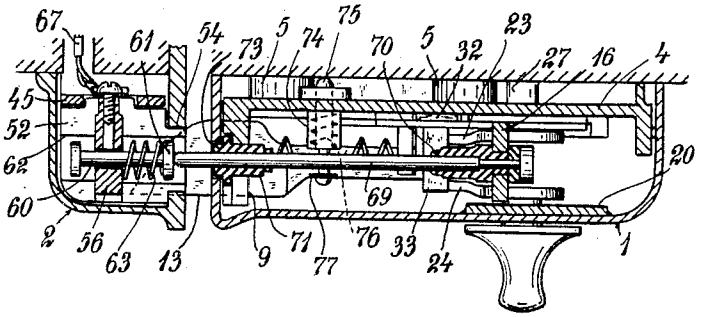


Fig. 5.



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Fig. 6.

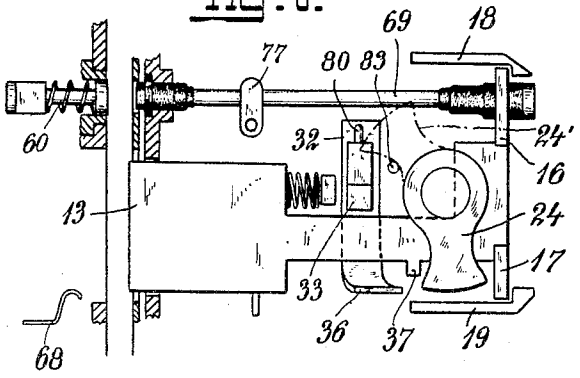


Fig. 8.

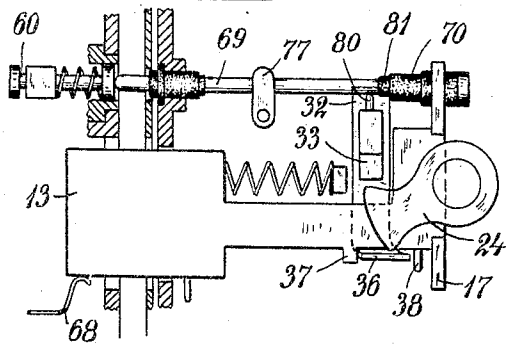
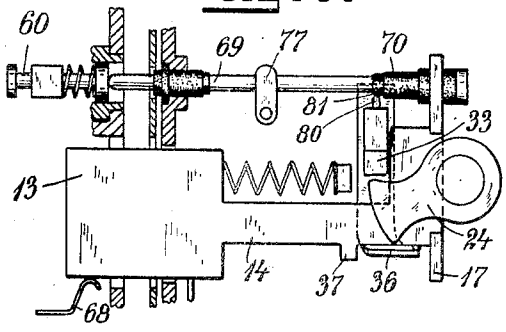


Fig. 7.



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Fig. 9.

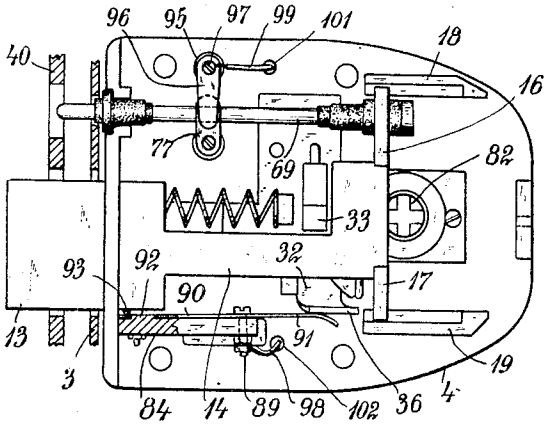


Fig. 10.

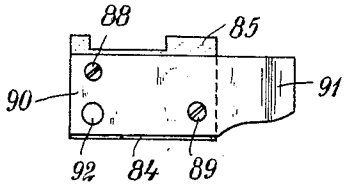
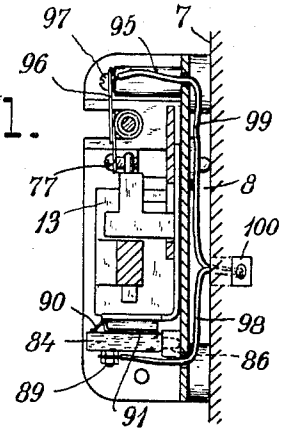


Fig. 11.



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SAFETY SPRING LOCKS

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Application December 8, 1954, Serial No. 473,810

17 Claims. (Cl. 200—61.67)

It is known to provide locks with contacts which are arranged in an electric alarm circuit and, if an effort is made to open the lock irregularly, bring the alarm circuit into alarm condition. When using open circuit operation this is done by closing of the alarm circuit by the contacts of the lock, and in this case the said alarm circuit may itself be an actual signalling circuit or an energizing circuit for a relay having front contacts closing the signalling circuit. When using closed circuit operation the contacts of the lock will open the alarm circuit, which in that case releases a relay having back contacts in the signalling circuit.

In usual key locks the arrangement is mostly such that the contacts are operated either by a pressure on the door, by an effort to open the lock with a picklock or by turning the door-handle when the lock is closed, whereas a regular opening of the door with a key does not cause alarm. In such locks it is known to make the contacts respond on an inward movement of the bar or the latch respectively when the opening of the lock is not caused by the appurtenant key.

In spring locks, in which an inward pushing of the latch is required to be caused by reaction from the keeper when the door is shut, a corresponding arrangement will be desirable, since in this case an inward pushing can easily be caused by inserting some implement into the door fent, and it is of importance that an effort to do this gives a signal. However, this would not only require that a preparation of the alarm condition can be effected and annulled when the door is in locked condition, in order that no signal shall occur under regular conditions, but it will also be incompatible with a mechanical blocking of the lock with mechanisms used hitherto for this purpose, since such mechanical blocking would prevent the inward movement of the latch, on which the alarm system should respond. If, on the other hand, the mechanical protection were omitted, a burglar, for example knowing that nobody is at home, would be able to open the door undisturbed merely by pushing the latch in.

The present invention has for an object to provide a spring lock in which in an alarm-preparing condition of the lock an alarm circuit can be brought into alarm condition on inward movement of the latch from closed position, but in which also a mechanical protection of the lock is cared for in a simple manner and so that both the blocking and the preparation of the alarm can easily be effected and easily be annulled.

With a view to this, according to the invention a safety spring lock having an alarm-preparing position in which by inward movement of the latch from the locking position an electric alarm circuit is brought into condition for alarm, is characterized in that a blocking device which in known manner in closed position of the latch can be actuated for mechanical blocking of the latch, is adapted by its movement to blocking position to bring the alarm circuit into an alarm-preparing condition and in the blocking position permits the lock to be moved inwards

a limited distance sufficient to bring the circuit into alarm condition, but insufficient to permit opening of the door.

By using the invention it is possible to effect alarm-preparation and mechanical blocking in one operation, and it is also possible, if desired, to annul both in one operation, and above all it is obtained that when an effort is made to open the door irregularly by pressing the latch inwards, a signal is given while the door is still locked.

A lasting signal may, of course, be obtained without further measures if relays are used, irrespective whether they are connected for open circuit or closed circuit operation, and according to the invention even if open circuit operation is used with the alarm contacts directly connected in the signalling circuit, a lasting signal can be obtained if the blocking device is adapted on inward pushing of the latch in the blocking position to block the latch in both directions in an intermediate position, in which the electric circuit is in alarm condition. In locks of the type having a blocking member movable transversely to the latch slide this can be carried out in the manner that the blocking member by its movement to blocking position loads a resilient stopping member, which in the intermediate position of the latch snaps in on the rear side of the blocking member while at the same time a fixed surface of the slide engages the front side of the latter.

In locks using a pivoted actuating member, which by an additional rotation from its closing position actuates a transversely movable blocking member co-operating with the latch slide, a simple manner of carrying out the invention consists in that the said blocking member is provided with a contact member, which in the blocking position in co-operation with a stationary contact member prepares the alarm circuit, whereas on inward pushing of the latch a contact member provided on the latch slide and a stationary contact member co-operating therewith bring the electric circuit into the condition of alarm.

If, as it is usual, two actuating members are used which can both co-operate with the latch slide, but which are are operated from either side of the door by turning a knob or key respectively, it may be convenient in many cases to let only one actuating member be adapted, when moved in the opening direction in the alarm-preparing condition of the lock, to cause annulling of the alarm-preparation, so that an effort to open the lock with the other actuating member when the lock is in the alarm-preparing position, will cause alarm.

A practical manner of carrying out this feature consists in that an entraining member, which is integral with the blocking member and can be actuated in known manner for moving the blocking member out of the blocking position, is provided within the operating range of only the first mentioned actuating member.

Hereby an annulation of the blocking and of the alarm can be effected from one side of the door only, which is desirable in many cases. If for example it is the question of a lock for which many persons have a key, or if it is desired to prevent persons from getting in by means of a stolen key, it can be desirable to make safe that nobody can get in from outside or try to unlock the door without causing alarm. On the other hand it often happens that the door has a mail slot, a glass pane or other opening, so that intruders can get access to the lock through the door from outside with the hand, a sling or other implement, so that it is desirable that the annulation of the blocking and of the alarm-preparation can only be effected with a key.

For connecting the current path or paths of the lock in an alarm circuit where open circuit operation is used, it is desirable with a view to easiness of mounting and even for the sake of reliability of operation to pro-

vide connection terminals on the keeper and transfer voltage to the alarm contacts within the lock housing through co-operating contacts on the lock housing and the keeper in closed position of the lock. However, in spring locks this involves certain difficulties in view of the fact that it must be possible to slam the door with the latch unblocked in locking position without the said co-operating contacts interfering with the correct shutting of the door. To overcome these difficulties the invention further provides that the terminals of said alarm circuit are provided on the keeper and in the closed position of the lock are connected to said contact means by conducting means, the conducting means connected to one of said terminals in the closed position of the lock comprising a conducting pin which is insulated from the latch and in the closed position of the lock projects outside the lock housing so as to engage an insulated keeper contact facing the lock housing and connected to said terminal, and which is movable with the latch so as not to interfere with the opening and shutting of the door.

To permit voltage to be supplied to the alarm circuits of the lock even in the above mentioned alarm-preparing position, according to the invention resilient means are provided which act in the direction of movement of the latch so as to keep said conducting pin and keeper contact in mutual contact in closed position of the latch and also during movements of the latch within said limited distance.

For closed circuit operation, however, voltage has to be supplied by conductors in the door to terminals on the lock housing, in order that undue alarm shall not be caused by normal opening of the door, without separate switching means being necessary for short-circuiting the alarm circuit outside the lock.

In view of this the invention further provides that the lock is equipped with terminals for connection in two separate alarm circuits, one pair of terminals being provided in the keeper and arranged for open circuit operation and another pair of terminals being provided in the lock housing and arranged for closed circuit operation. Hereby it is possible to connect the lock for closed circuit operation or for open circuit operation according to what is desired in each particular case, for example for incorporating the lock in an existing burglar protection system. Further, it is possible to use both kinds of operation at a time by connecting the lock in two separate circuits, so as to obtain increased safety.

However, a burglar may force his way through a door closed by a spring lock, not only by forcing the latch back, but also by using a crowbar for breaking the lock off the door or breaking the keeper off the door frame. In order even to account for this danger the invention further provides that the alarm circuit includes resilient alarm contact means responsive to a movement of the lock housing and/or of the keeper away from its base.

In order that the invention may easily be carried into effect, it will now be described in more detail, reference being had to the drawings, which illustrate a convenient embodiment of the lock device according to the invention, and in which:

Fig. 1 shows the lock device in horizontal longitudinal section as mounted on a door, in closed position and adapted for open circuit operation.

Fig. 2 is a sectional view taken along the line II—II in Fig. 1.

Fig. 3 is a sectional view taken along the line III—III in Fig. 2 of the lock with the cover removed.

Fig. 4 is a sectional view of the keeper shown in the Figures 1 and 2 taken along the line IV—IV in Fig. 2.

Fig. 5 is a sectional view taken along the line V—V in Fig. 2 with part of the lock cover broken away.

Figures 6 to 8 are diagrammatic views showing the lock and keeper mechanisms in elevation and with the latch in open unblocked position, in closed and blocked position, and in an intermediate position in which a signal is given, respectively.

Fig. 9 shows the lock in elevation adapted for closed circuit operation and with the cover removed.

Fig. 10 is a plan view of an element to be used for closed circuit operation, and

Fig. 11 is a sectional view corresponding to Fig. 3 of the lock equipped in the manner shown in Fig. 9.

Identical parts have the same reference numerals in all the figures.

Referring to the drawings the lock device shown comprises a lock 1 adapted to be mounted on the inner side of a door in the usual manner, and a keeper 2 adapted to be mounted on the corresponding door frame for co-operation therewith. The lock 1 has a housing comprising a cover or case 3 and a bottom plate 4. The plate 4 has inward projections 5 through which screws 6 are passed for attaching the plate to the door 7 while leaving an open space 8 between the plate and the door surface. The plate 4 also has outward projections in the form of a flange 9 at the front edge and a lug 10 at the rear edge, to which the cover 3 is attached by screws 11 and 12 respectively. 13 is the latch, which is formed on the front end of a slide 14, guided at the front in an opening in the flange 9 and adapted to slide along ribs 15 on the bottom plate 4. The slide 14 is formed at its rear end with lugs 16 and 17, slidably guided by rails 18 and 19 respectively, formed on the plate 4 and by a reinforcement plate 20 welded to the inner side of the cover 3. The latch slide 14 is urged into the closed position shown in Fig. 1 by a spring 21 engaging a stud 22 projecting outwardly from the plate 4. The lugs 16 and 17 are capable of being engaged from the front side for withdrawing of the latch against the action of the spring 21 by actuating arms 23 and 24, which may be of identical shape. The arm 24 is rotatably mounted in the cover 3 and the reinforcing plate 20 and attached to a knob 25 in front of the cover, and the arm 23 is mounted in alignment therewith in an opening in the plate 4 and an overlying covering plate 26 and adapted to be engaged in the usual manner by a flat shaft 27 projecting from a conventional cylinder lock 28 operated by a key from outside the door.

In the case illustrated the door 7 is assumed to open inwards from the door frame 29 and the latch 13 is formed in the conventional manner so as to yield to the reaction from the keeper 2 when the door is shut.

The covering plate 26 is attached to the plate 4 by screws 30 and overlies a shallow groove 31 formed in the plane 4 and extending transversely to the latch slide 14. A blocking member 32 is guided in the groove 31 and carries a stud 33 which projects through a slot 34 in the plate 26, and which extends above the slide 14 and in the closed position of the latch is engaged by an upward projection of the latter. The stud 33 is adapted to be engaged from its bottom side by either of the actuating arms 23 or 24 for moving the member 32 upwards. The member 32 also has a lug 36 projecting underneath the slide 14 and adapted to be engaged by the arms 23, 24 for moving the member 32 downwards. In the lower position of the blocking member 32 the lug 36 is outside the range of movement of a downward projection 37 on the slide 14, whereas in the upper position of the member 32 the lug 36 projects behind or in front of the projection 37 according to whether the latch is in the closed or in the open position respectively. Behind the projection 37 and spaced therefrom by a distance substantially equal to the width of the lug 36 a stopping pin 38 is mounted in the slide 14, which pin is urged into a lower position by a spring 39. The pin 38 is so located that it is pushed back into the slide 14 by the lug 36 when the member 32 is moved into the blocking position in closed position of the latch, in which position the lug 36 is spaced by a short distance from the projection 37, but if

an effort is then made to move the latch inwards, the pin 38 will be released and adopt a blocking position behind the lug 36 so that by means of the elements 36, 37 and 38 the latch 13 will be blocked against inward as well as against outward movement in an intermediate position in which the latch still projects into the keeper 2 and hence prevents opening of the door.

The keeper 2 comprises a hollow body 40 open on the side facing the door frame 29 and having an inward extension 41 attached to the frame 29 by screws 42 on the side facing the door opening. A horizontal transverse wall 43 divides the interior space of the keeper body 40 into two compartments, of which the lower compartment 44 is adapted to receive the latch 13. Both compartments are closed on the inner side by a common mounting plate 45 attached to the inward projections 46 and 47 of the keeper body 40 by screws 48 and 49 respectively and spaced by a short distance from the face of the frame 29 so as to leave an open space 50. The upper compartment 51 of the keeper body accommodates a body 52 of electrically insulating material having a cylindrical extension 53 projecting into an opening 54 in the front wall of the body 40 and another cylindrical extension 55 projecting through an opening 56 in the plate 45. The body 52, which is preferably made of two symmetric parts, accommodates a conducting terminal member 57, to which an electric contact member 58 is attached within the space 50 by means of a terminal screw 59. Through a bore in the terminal member 57 there is passed a contact member 60 moldable in a direction normal to the front face of the keeper and having an enlarged head 61 accommodated within a bore 62 in the body 52 and urged by a weak metal spring 63 into a position in the extension 53 substantially flush with the front face of the keeper. Within the space 50 a contact spring 64 is attached to the plate 45 in conducting relationship by means of a screw 65. The free extremity of the spring 64 extends in front of the member 58, but is normally held out of contact therewith by a pin 66 carried by the spring 64 and engaging the face of the frame 29.

Electric voltage can be supplied to the keeper by a pair of electric conductors 67 passed through the door frame 29, one conductor being connected to the terminal member 57 and hence to the contact members 58 and 60 by means of the terminal screw 59, and the other conductor being connected to the keeper body 40 and hence to the plate 45 and the contact spring 64 by means of either of the screws 48 or 49.

It will be understood that in closed position of the lock electric potential will be transferred from the keeper body 40 to the latch and hence to the lock housing 1 by conducting contact of the latch with the keeper body, but in order to be quite safe in this respect additional resilient contact means may be provided for this purpose, for example a contact spring 68 attached to the plate 45 by means of the screw 65 as shown in the Figures 2 and 4.

For transferring voltage from the contact member 60 to the lock a movable contact pin or rod 69 extending in the direction of movement of the latch slide 14 is attached to the lug 16 of the slide, but insulated therefrom by means of an insulating sleeve 70. The rod 69 has a sliding fit in an insulating supporting sleeve 71 inserted in a notch or recess 72 in the flange 9 and withheld therein by the front wall of the lock case 3 behind an opening 73 in this wall as shown in Fig. 5. The rod 69 is substantially in alignment with the contact member 60 and of such a length that it engages the contact head 61 in the closed position of the latch and also in the intermediate position referred to above and shown in Fig. 8, but on the other hand in horizontal projection as viewed in Fig. 5 the forward extremity of the rod falls within the contour of the latch 13, so that the rod will by no means interfere with the shutting of the door.

Guided in a spring box 74 projecting outwards from the plate 4 is a conducting pin 75, which is urged into contact with the face of the door by a spring 76. Within the lock housing the pin 75 projects outside the box 74 and carries a plate spring 77 extending outside the rod 69 and normally spaced therefrom.

An extension or spring box 78 projects upwards from the stud 33 and accommodates a contact spring 79 normally urging a contact pin 80 into an upper position. The pin 80 extends in the same vertical plane as the rod 69, but is outside the path of the rod when the blocking member 32 is in its lower position. In the upper position of the blocking member 32 the pin 80 engages the rod 69 with resilient pressure, except that in the locked position of the latch the pin 80 will engage the insulating sleeve 70 close to the front end thereof and thus be out of contact with the rod 69 as shown in Fig. 7. If, however, the latch is moved inwardly from this position to the intermediate position referred to above, the pin 80 will ride down a bevelled surface 81 at the front end of the sleeve 70 and hence engage the rod 69 as shown in Fig. 8.

Turning now to a description of the operation of the lock device as described so far, it will be assumed for the present that both actuating arms 23 and 24 extend below the stud 33 as shown for the arm 24 in the Figures 6 to 8, so that they can only co-operate with the lug 17 on the slide 14 and not with the lug 16. Further it is assumed that the conductors 67 are connected in a circuit for open circuit operation, i. e. they form part of an alarm circuit causing an audible or other signal when the circuit is closed by contact members of the lock device. For this purpose the said alarm circuit may itself include an electrically operated signalling device or a relay having front contacts which upon closing of the alarm circuit will close a separate signalling circuit.

It will be understood that in normal operation the contact spring 64 will remain out of contact with the member 58 and the contact spring 77 will remain out of contact with the rod 69. As regards the contact pin 80 it will remain out of contact with the rod 69 so long as the blocking member 32 is in its lower position. Hence, in this position of the blocking member 32 the lock can be opened by either of the members 23 or 24 and the door can be opened and shut without any signal occurring.

If in the open position of the latch 13 as shown in Fig. 6 the blocking member 32 is moved to the upper position so as to place the lug 36 in front of the projection 37 and hence block the latch 13, the pin 80 will engage the rod 69, but still no signal will occur, since the rod 69 is out of contact with the member 60 and the latch is out of contact with the keeper.

In the closed position of the latch as shown in Fig. 2 voltage is supplied from the keeper to the lock housing through the latch 13 and from the member 60 to the rod 69 due to the engagement of these members, but even if the blocking member 32 is moved from the unblocking position shown in Fig. 2 into the blocking position shown in Fig. 7 by a short additional rotation of member 23 or 24 in the "closing" or clockwise direction as viewed in Fig. 2 and in Figures 7 and 8, no signal is given, since the pin 80 will be out of contact with the rod 69 as explained above. And even if the lock is now opened by manipulating the knob 25 or the key lock 28 so as to turn the arm 24 or the arm 23 anti-clockwise, still no signal will be given, since the engagement of the arm 23 or 24 with the lug 36 causing unblocking of the latch by downward movement of the member 32 thereby also moves the pin 80 out of the range of movement of the rod 69 before the arm 23 or 24 engages the lug 17 so as to move the latch slide 14 and hence the sleeve 70 and the rod 69 rearwards.

However, if an irregular effort is made to open the lock in the blocked locking position thereof shown in Fig. 7 by pushing the latch 13 inwards by means of some implement inserted into the door fent, the pin 80 will ride down the bevelled surface 81 and engage the rod 69 so

that a circuit is closed and a signal will sound. Yet, due to the stopping projection 37 engaging the lug 36 the latch will be stopped in the intermediate position shown in Fig. 8, so that it will still be impossible for the intruder to open the door. Further, due to the stopping pin 38 being released so as to project behind the lug 36 as shown in Fig. 8, a lasting contact of the members 80 and 69 is achieved, so that the signal will be a lasting one even if no relay is used, that is, if the conductors 67 are connected directly in a signalling circuit.

If instead of pushing the latch inwards the intruder should try to break the door open or to break the keeper 2 away from the door frame 29 the forward pull on the keeper body 40 will cause the contact member 58 to engage the spring 64 so that a signal will be given even in this case. If, on the other hand, the intruder should try to break the lock off the door, the outward pull on the lock will cause the rod 69 to engage the contact spring 77 and likewise close the circuit and hence cause sounding of a signal.

Till now it has been assumed that an effort to open the lock by means of any of the members 23 or 24 is desired to be successful and not to cause any signal. However, as explained previously, in many cases it may be desirable that when the lock is in the blocked alarm-preparing position, it shall only be possible to open the door from one side, for example in order to prevent opening of the door with a false key or a picklock, or to prevent opening from the inside if access can be had through a mail slot or window in the door.

With a view to this, one or the other of the actuating arms 23, 24 can be placed above the stud 33 as indicated in dash and dot lines by 24' in Fig. 6. In order to make this possible for the arm 23 without having to place the cylinder lock 28 in an abnormal position, the member 23 may have an opening in the form of a cross as shown at 82 in Fig. 2, so that it can be engaged by the flat shaft 27 of the key lock along one diameter or the other. Further, a stopping pin 83 projecting from the lock case 3 or the plate 4 may be provided for preventing the actuating arm concerned from moving the blocking member 32 downwards from its upper position. It will easily be understood that in the unblocking position of the member 32 the arm 24' can be used for opening the lock by engaging the lug 16 without causing any signal, but that when in the closed position of the lock the blocking member 32 has been moved upwards into the blocking or alarm-preparing position by the other actuating arm, the arm 24' cannot unblock the latch or annul the alarm-preparation, and that an effort to open the lock by turning the arm 24' clockwise so as to engage the lug 16 will cause the latch to be locked in the position shown in Fig. 8 and cause a signal to be given by engagement of the contact members 69 and 80.

Should it be desired to permit the lock to be blocked and prepared for alarm from both sides of the door, but only to permit unblocking and annulling of the alarm-preparation from one side of the door, this can be achieved in various ways. For example both actuating arms 23 or 24 may be placed in the position shown for the arm 24 in the Figures 7 and 8 and the shape of the lug 36 be modified so that it can only be engaged by one of the actuating arms.

If it is desired to connect the lock in an alarm circuit adapted for closed circuit operation the current cannot be supplied to the lock from the keeper without using additional switching means to prevent the alarm circuit from responding on regular opening of the lock, and since such switching means would have to be accessible and hence would involve the risk of undesired annulment of the alarm-preparation by an intruder, it is desired in this case to abstain from supplying the current through the keeper and instead to pass the conductors through the door.

Reference is now made to the Figures 9 to 11, which illustrate additional terminal and contact means, which may be used in the case of closed circuit operation and which for the sake of clearness were not shown in the Figures 1 to 8.

84 is a plate of electrically insulating material having an inward extension 85 fitting into a recess 86 (Figs. 2 and 11) on the outer side of the plate 4. Attached to the plate 84 by screws 88 and 89 is a conducting metal sheet 90, which in the mounted position of the plate 84 extends in a horizontal plane just below the bottom face of the latch 13. The sheet 90 has a rearward extension 91 which engages the lug 36 from below in the lower, but not in the upper position of the member 32. The plate 84 has an upward projection 92, which extends through the sheet 90 and is flush with the upper surface thereof. A contact pin 93 accommodated in the latch 13 is urged into contact with the sheet 90 by a spring 94 (Fig. 2) and is positioned so that both in closed and in open position of the latch it will contact the sheet 90, but in the intermediate position referred to above will face the projection 92 and hence be out of contact with the conducting sheet.

Another insulating member in the form of a stud 95 is mounted on the plate 4 so as to project outwards therefrom above the rod 69 and carries a downwardly projecting contact member 96 attached thereto by a terminal screw 97 and engaging the contact spring 77 from the outside.

Electric conductors 98 and 99 are passed through a passage 100 in the door 7 into the space 8 behind the plate 4 and further through holes 101 and 102 respectively in the plate 4 and connected to the terminal screws 89 and 97 respectively.

The operation is as follows:

When the blocking member 32 is in the lower position a current path will exist from the conductor 99 through the contact members 96 and 77 to the lock housing and therefrom through the blocking member 32 with the lug 36, the metal sheet 90 with contact spring 91 and the terminal screw 89 to the conductor 98. Further, the part of this path extending from the lock housing to the sheet 90 is shunted by a path extending through the latch and the contact pin 93 except when this pin faces the insulating projection 92. Thus, assuming the conductors 98 and 99 to be connected in an electric alarm circuit including a relay having back contacts adapted to close a signalling circuit upon opening of the alarm circuit, no signal will sound so long as the member 32 is in the unblocking position due to the contact of the spring 91 with the lug 36. When the member 32 is moved upwards to the blocking position by means of one or the other of the actuating arms 23 or 24 so as to block the latch in open or in closed position, the circuit will still be closed by the contact pin 93 engaging the sheet 90, and still no signal will sound. If now the arm 23 or 24 is turned into engagement with the lug 17 in order to open the lock, the downward unblocking movement of the member 32 caused by the arm concerned will restore the contact between the lug 36 and the spring 91 before the latch starts moving inwards, so that the circuit will remain closed. If, however, when the latch is in the locking position and the blocking member 32 is in its upper or alarm-preparing position, an effort is made to move the latch 13 inwards by means of an implement inserted in the door fent or by turning an actuating arm placed above the stud 33 into engagement with the lug 16 as the case may be, the circuit will be interrupted by the pin 93 sliding onto the projection 92, and a signal will sound, whereas opening of the door will still be impossible due to the locking of the latch slide 14 to the lug by means of the projection 37 and the pin 38 as described before.

If an effort is made to break the lock housing off the door, the pull on the housing will move the contact

member **96** away from the spring **77** and open the alarm circuit so that a signal will occur.

From the above description it will be apparent that a lock device according to the invention in the embodiment shown and described can be connected for open circuit operation or closed circuit operation according to what is desired in individual cases. However, it is also possible, if desired, in order to ensure an increased safety to use both these measures at a time, that is to pass conductors connected for open circuit operation onto the terminals **57**, **59** of the keeper and to pass conductors connected for closed circuit operation onto the terminals **89** and **97** of the lock, provided there is no galvanic connection between the two circuits other than that established by their connection with the lock housing. If desired, the two circuits may include relays acting on the same signalling circuit or, if the circuit for open circuit operation constitutes the actual signalling circuit, the circuit for closed circuit operation may include a relay which, when released, short-circuits the path of the signalling circuit connected to the lock.

It will be understood that the invention is in no way limited to the particular embodiment shown and described and that various modifications will readily occur to people skilled in the art.

I claim:

1. A safety spring lock device having an alarm-preparing position in which an electric alarm circuit is brought into alarm condition on inward movement of the latch from a closed position, comprising a blocking device movable to a position for mechanical blocking of the lock, means carried by the blocking device and adapted by its movement to the blocking position to bring the alarm circuit into an alarm-preparing condition, said device when in blocking position being operative to permit inward pushing of the latch a limited distance sufficient to bring the circuit into alarm condition, but insufficient to permit complete inward movement of the latch.

2. A safety spring lock device according to claim 1, comprising cooperating means carried by the latch and the blocking device and operative responsive to said inward pushing of the latch in the blocked position to block the latch in both directions in an intermediate position in which the circuit is in the condition of alarm.

3. A safety spring lock device as claimed in claim 2, wherein said blocking device is movable transversely to the latch slide, a resilient stopping member being carried by said latch the blocking member by its movement to the blocking position loading said stopping member, which is released in the intermediate position of the latch so as to prevent the same from returning to normal locking position.

4. A safety spring lock device according to claim 1 having a rotatable actuating member which by an additional rotation from closed position actuates said blocking member co-operating with the latch slide, the said blocking member being provided with a contact member which in the blocking position in co-operation with a stationary contact member prepares the alarm circuit, whereas a contact member provided on the latch and a stationary contact member co-operating therewith brings the circuit into alarm condition on inward pushing of the latch.

5. A safety spring lock according to claim 1 in which the alarm circuit includes a pair of co-operating contact members one of which is movable with the latch and the other of which is stationary during movements of the latch, and one of which has a sliding surface having a conductive and a non-conducting part, and the other of which engages said surface resiliently in the alarm-preparing condition of the lock, the arrangement being such that by a relative sliding movement of said contact caused by an inward movement of the latch in the alarm-preparing condition of the lock, the point of engagement of said contact members is shifted from one of said surface parts to the other whereby the alarm circuit is brought into alarm condition.

6. A safety spring lock device according to claim 1 including two actuating members operated from either side of the door and co-operating with the latch slide, characterized in that only one actuating member is adapted by a movement in the opening direction in the alarm-preparing position of the lock to cause annulment of the alarm-preparation, so that an effort to open the lock with the other actuating member when the lock is in alarm-preparing position, will cause alarm.

7. A safety spring lock device according to claim 6, wherein an entraining member formed on the blocking member and adapted to be engaged for moving the blocking member out of the blocking position, is arranged within the range of movement of the first mentioned actuating member only.

8. A safety spring lock device having contact means within the lock housing adapted to bring an electric alarm circuit into alarm condition in response to irregular manipulation of the lock, comprising terminals of said alarm circuit provided on the keeper and in the closed position of the lock being connected to said contact means by conducting means, the conducting means connected to one of said terminals in the closed position of the lock comprising a conducting pin which is insulated from the latch and in the closed position of the lock projects outside the lock housing so as to engage an insulated keeper contact facing the lock housing and connected to said terminal, and which is movable with the latch so as not to interfere with the opening and shutting of the door.

9. A safety spring lock device according to claim 8, including resilient means acting in the direction of movement of the latch so as to keep said conducting pin and keeper contact in mutual contact in closed position of the latch and also during movement of the latch within the said limited distance.

10. A safety spring lock device according to claim 8 wherein the other terminal of said alarm circuit is connected to the keeper body and in closed position of the latch supplies voltage to the body of the lock housing through the latch.

11. A safety lock device as defined in claim 1, including a keeper and comprising contact means adapted to bring an alarm circuit into alarm condition in response to irregular manipulation of the lock, characterized in that the alarm circuit includes resilient alarm contact means responsive to a movement of the lock housing and/or of the keeper away from its base.

12. A safety spring lock device comprising a housing, a latch movable forwardly and rearwardly in said housing between projected and retracted positions respectively, spring means normally maintaining the latch in projected position, a blocking member movable transversely to said latch to and from an operative blocking position relative to the latch, wherein it permits a limited retraction less than a complete retraction of said latch, in combination with an electrical alarm circuit, including cooperating contacts, one of said contacts being connected to and movable with said latch into and out of engagement with the other said contact to control said circuit response to said limited retraction of the latch.

13. A safety spring lock device comprising a housing, a latch movable forwardly and rearwardly in said housing between projected and retracted positions respectively, spring means normally maintaining the latch in projected position, a blocking member movable transversely to said latch to and from an operative blocking position relative to the latch, wherein it permits a limited retraction less than a complete retraction of said latch, including an electrical alarm circuit having cooperating electrical contacts carried by said latch and said blocking member respectively, said contacts normally being dis-

engaged to open the circuit when said latch is in its fully projected position, but being engageable with each other to close said circuit incident to said limited retraction of the latch with the blocking member in its operative blocking position.

14. A safety spring lock device comprising a housing, a latch movable forwardly and rearwardly in said housing between projected and retracted positions respectively, spring means normally maintaining the latch in projected position, a blocking member movable transversely to said latch to and from an operative blocking position relative to the latch wherein it permits a limited retraction less than a complete retraction of said latch, in combination with locking detent means carried by said latch for automatically interlocking with said blocking member incident to such limited retraction to prevent subsequent projection of the latch.

15. The combination of claim 14, including an electrical alarm circuit having cooperating contacts, one of said contacts being connected to and movable with said latch into and out of engagement with the other said contact to control said circuit responsive to said limited retraction of the latch.

16. The combination of claim 14, including an electrical alarm circuit having cooperating electrical contacts carried by said latch and said blocking member respectively, said contacts normally being disengaged to open the circuit but being engageable to close said circuit incident to such limited retraction of the latch when the blocking member is in blocking position.

17. A safety spring lock device comprising a housing,

a latch movable forwardly and rearwardly in said housing between projected and retracted positions, spring means urging said latch toward projected position, a blocking means movable transversely to said latch into and from blocking relation therewith, a fixed stop element carried by said latch normally in forwardly spaced relation to said blocking means to permit a limited degree of retraction less than complete retraction of said latch in the blocking position of said blocking means, a resiliently projected stopping pin carried by said latch in a position normally overlying said blocking means to be retracted by transverse movement of said blocking means to blocking position, said pin being so spaced rearwardly from the stop element that said limited retraction of the latch will move said pin rearwardly off of the element and permit it to project rearwardly thereof to maintain the latch in its partly retracted position.

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