July 2, 1963 E. M. TRAMMELL, JR 3,096,114

SAFETY DOOR LOCK

Filed Aug. 16, 1961

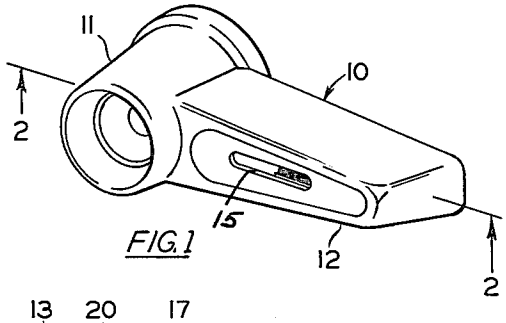


FIG. 1

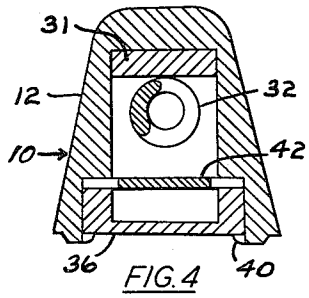


FIG. 4

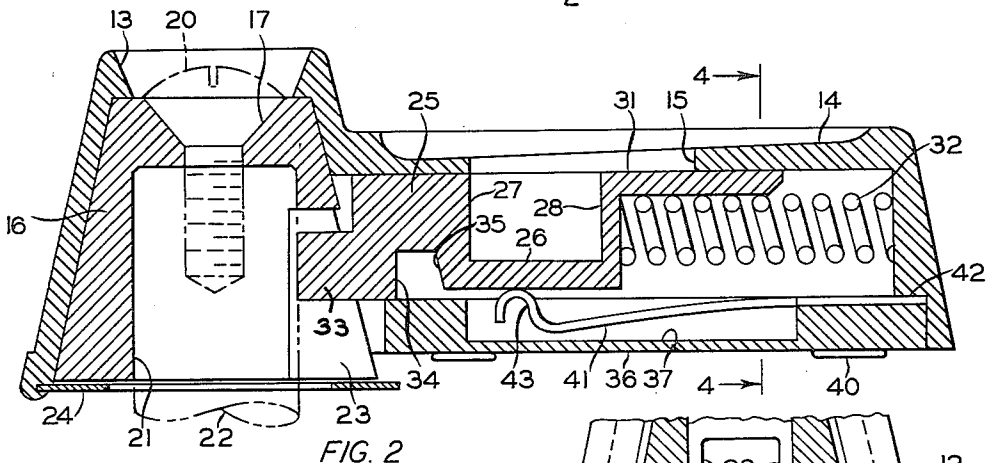


FIG. 2

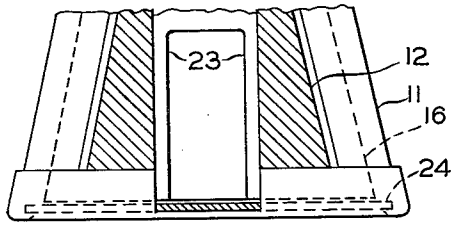


FIG. 5

FIG. 3

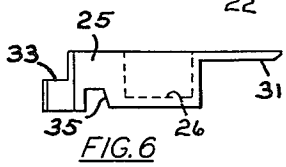


FIG. 6

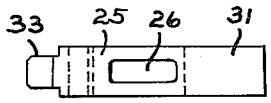


FIG. 7

INVENTOR.
EARL M. TRAMMELL, JR.
BY Cohn and Powell
ATTORNEY.

United States Patent Office 3,096,114 Patented July 2, 1963

3,096,114

SAFETY DOOR LOCK

Earl M. Trammell, Jr., The Gatesworth Apts., 245 Union Blvd., St. Louis 8, Mo.

Filed Aug. 16, 1961, Ser. No. 131,795
8 Claims. (Cl. 292—336.3)

This invention relates generally to improvements in a safety door lock, and more particularly to improvements in a device for selectively conditioning the latch mechanism of an automobile door.

The subject of this invention constitutes improvements over the subjects of other patents issued to this applicant, namely U.S. Patent No. 2,694,917 issued November 23, 1954, and entitled Locking Plunger Assembly for Automobile Door Latches, U.S. Patent No. 2,708,845 issued May 24, 1955, and entitled Lock-Plunger Guarding Devices, U.S. Patent No. 2,735,288 issued February 21, 1956, and entitled Lock, Patent No. 2,735,289 issued February 21, 1956, and entitled Plunger-Guard Assembly for Automobile Doors, U.S. Patent No. 2,939,307 issued June 7, 1960, and entitled Protective Device for Latch-Conditioning Elements, U.S. Patent No. 2,939,308 issued June 7, 1960, and entitled Safety Door Locks, and U.S. Patent No. 2,955,858 issued October 11, 1960, and entitled Devices for Guarding Latch-Conditioning Elements.

These safety door locks are particularly useful on the doors of automobiles, and serve selectively to prevent a latch-conditioning element located on the inside of such a door from being manually moved to a door-unlocking position, and hence prevent the door from opening while the vehicle is in motion. Thus, it becomes impossible for children occupying the automobile to open the door, and the hazard of a child falling from a moving vehicle is eliminated.

It is a major objective of the present invention to provide a protective arrangement for a pivoted door-latch element utilized on an automobile door, the device selectively preventing the unintended, casual or otherwise unwanted actuation of the latch mechanism from door-locking position to door-unlocking position.

Other important advantages are realized in that the guarding device permits the usual normal operation and use of the pivoted door-latch element when desired in conditioning the latch mechanism, and yet is capable of being selectively utilized when the specific need arises to avoid the hazards discussed above.

An important object is realized by the provision of a hub operatively connected to the latch mechanism, and by the provision of a lock lever swivelly mounted on the hub, the locked lever being provided with a plunger selectively connected to the hub for normal conditioning of the latch mechanism and selectively disconnected from the hub to enable unrestricted swivel movement of the lock arm relative to the hub, whereby to preclude conditioning of the latch mechanism.

Other important advantages are realized by providing the locked lever with an aperture through which any thin instrument such as a key may be inserted for access to an abutment on the plunger for plunger actuation between limits to connect or disconnect the plunger selectively with the hub, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture.

Another important object is achieved by the provision of resilient means in the lock lever engaging the plunger, such resilient means tending to urge the plunger toward the swivelly mounted hub, and by the provision of means in the lever engaging the plunger and tending to hold the plunger in its retracted position against the loading of the above mentioned resilient means until the plunger is released by actuation of the plunger by a thin instrument through the small aperture in the lever.

The structural arrangement of the hub and plunger in the lock lever enables the plunger to ride on the hub periphery when the plunger is released from the retaining means under the loading of the resilient means until the plunger is aligned with a socket provided in the hub, at which time the plunger is automatically snapped into the socket to connect the lock lever selectively with such hub for conventional usage.

Still another important objective is achieved by providing a lock lever of substantially the same size and shape as the lock lever presently being utilized on an automobile door, and which can be conveniently substituted for such conventional lock lever. The present safety lock lever incorporates a swivelly mounted hub and a reciprocatively mounted plunger, all within the housing of such lever to provide a compact unit utilizing a minimum of component parts.

It is an important object to provide a safety lock lever that is simple and durable in construction, economical to manufacture and assemble, efficient in operation, and which can be used as standard equipment on new automobiles, which can be readily substituted for the usual lock lever furnished on present day automobiles as standard equipment, and which can be easily installed and operated by anyone with only a minimum of instruction.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment, particularly when considered in connection with the accompanying drawing, in which:

FIG. 1 is a perspective view of the locking device;

FIG. 2 is an enlarged cross-sectional view as seen along line 2—2 of FIG. 1, illustrating the mechanism in position for normal latch operation;

FIG. 3 is a cross-sectional view similar to FIG. 2, but illustrating the mechanism in position to preclude conditioning of the door latch by movement of the lock lever;

FIG. 4 is a cross-sectional view as seen along line 4—4 of FIG. 2;

FIG. 5 is a cross-sectional view as seen along line 5—5 of FIG. 3;

FIG. 6 is a side elevational view of the plunger, and

FIG. 7 is a top plan view of the plunger.

Referring now by characters of reference to the drawing, and first to FIG. 1, it will be seen that the present lock lever is very similar in outward appearance to the lock levers presently being utilized on automobile doors. The heretofore conventional lock lever is mounted on the inside of an automobile door and operatively connected to the internal door latch mechanism so as to condition such latch mechanism selectively from the inside, whereby the usual door handles either on the inside or outside of the door can be used to unlatch the door and whereby such handles are operatively precluded from unlatching the door. The present lock lever can be substituted for the heretofore conventional lock lever in order to provide an additional safety feature to protect children riding in automobiles wherever such protection is desired.

The lock lever includes a hollow housing generally indicated at 10 consisting of a hub housing portion 11 of frusto-conical shape and an integral plunger housing portion 12 extending radially outwardly from one side of the hub housing portion 11. In the preferred embodiment, the plunger housing portion 12 tapers outwardly. When viewed from the rear, the door lock housing 10 is open to enable the installation of the operating mechanism, as will be later described in detail.

The front or top portion of the frusto-conical housing portion 11 is provided with a beveled center opening 13. The front wall of the plunger housing portion 12 is pro-

vided with a longitudinal depression 14 that tapers outwardly to conform with the general configuration of such housing portion 12. Formed in the bottom of depression 14 is an elongate narrow slot 15 extending along the longitudinal axis of the plunger housing portion 12. Slot 15 is of a size to preclude digital access through such slot into the interior of the housing 10, yet will permit the insertion of a thin instrument such as an automobile door key incident to the actuation of the operating mechanism contained within the lever housing 10.

Rotatively mounted within the housing portion 11 is a frusto-conical hub 16, the hub 16 closely interfitting the internal dimension of such housing portion 11. An aperture 17 having a beveled seat is formed in the top of hub 16. As is best seen in FIG. 2, the aperture 17 is aligned with the housing opening 13 and is adapted to receive a screw 20.

The hub 16 is provided with a rearwardly opening socket 21 adapted to fit the lock stud 22 of the automobile door lock mechanism. In the preferred embodiment, the hub socket 21 is provided with longitudinal splines (not shown) adapted to grip the lock stud 22 when the hub 16 is pressed onto such stud 22 incident to installation of the safety door lock. After the lock stud 22 is located in the hub socket 21, the screw 20 is inserted through the housing opening 13, through the hub aperture 17 and is threadedly attached to the end of lock stud 22, thereby securely and drivingly attaching the hub 16 to stud 22.

For reasons which will later appear, the hub 16 is provided with a socket 23 at its side which is selectively alignable with the plunger housing 12 upon relative rotation of the hub 16 within its housing portion 11. The socket 23 is narrow and extends inwardly from the rear end of hub 16.

A washer 24 is disposed behind the hub 16 and is secured to the housing portion 11 by bending the rearmost peripheral margin of housing portion 11 over the washer 24. The washer 24 retains the hub 16 in assembly and permits the insertion of the lock stud 22 into the hub socket 21.

Reciprocatively mounted within the housing portion 12 is a plunger 25. A recess 26 is formed in the body of plunger 25, the recess 26 being partially defined by opposed abutments 27 and 28. It will be importantly noted that the recess 26 is located immediately below and aligned with the housing slot 15 and is adapted to receive the thin actuating instrument when inserted through slot 15. The actuating instrument engages either of the abutments 27 or 28 depending upon whether the plunger 25 is being moved in its "normal" position or its "safety" position.

The plunger 25 includes a body portion 30 forwardly of the recess 26 adapted to close off the housing slot 15 when the plunger 25 is moved or retracted to its "safety" position as is shown in FIG. 3. A similar body portion 31 rearwardly of the recess 26 closes the slot 15 when the plunger 25 is moved forwardly to its "normal" position as is best seen in FIG. 2. The body portion 31 extends rearwardly and cooperates with the housing portion 12 to provide a compartment adapted to receive a compression spring 32 constituting a resilient means tending to urge the plunger 25 forwardly toward its "normal" position. One end of spring 32 engages the end of housing portion 12 while the opposite end of spring 32 abuts the rear of plunger 25.

Formed on plunger 25 at its front end is a head 33 of a size to interfit the hub socket 23 when the hub socket 23 and plunger head 33 are relatively aligned and when the plunger 25 is released and urged to its forward "normal" position. When the plunger head 33 interfits the hub socket 23, the hub 16 and plunger 25 are operatively connected so that pivotal movement of the lock lever housing 10 will cause a corresponding pivotal movement of the hub 16. In other words, the hub 16 is drivingly connected to the lever housing 10 by the plunger 25.

A transverse notch 34 is formed in plunger 25 between the head 33 and the recess 26. The rear margin 35 partially defining the transverse notch 34 is inclined outwardly and rearwardly to provide a cam shoulder, the purpose and function of which will become clear upon later description of parts.

A base plate 36 of an elongate, substantially cup-shaped configuration is used to enclose the rear of the plunger housing portion 12. The base plate 36 includes an elongate, internal recess 37. The base plate 36 is held in place by bending tabs 40 forming an integral part of the housing portion 12 over the base plate 36.

A leaf spring 41 is held at one end 42 between the base plate 36 and the housing portion 12, the major portion of the leaf spring extending behind the plunger 25 and over the plate recess 37. The opposite end of leaf spring 41 is provided with a reversed hook formation 43 adapted to ride on the body of plunger 25 and adapted to interfit selectively the transverse notch 34 when the plunger 25 is disposed in its retracted "safety" position. When the hook formation 43 of the leaf spring 41 is located within the transverse notch 34, the leaf spring 41 acts to retain the plunger 25 in its retracted position, subject to releasing the plunger 25 readily by movement of the plunger to its forward position under the action of a thin actuating instrument inserted through the housing slot 15 and into operative engagement with the plunger abutment 27.

It is thought that the purpose and functional advantages of the door lock lever has become fully apparent from the foregoing detailed description of parts, but for completeness of disclosure, the installation and operation of the lock lever will be briefly described.

It will be assumed that the component parts of the lock lever have been assembled to provide an operative unit as described in detail above. If the present door lock lever is to be substituted for the heretofore conventional lock lever, it will be assumed that such lock lever has been removed from the lock stud 22. Of course, it will be readily realized and understood that the present door lock lever can be assembled as standard equipment on automobiles, and not merely serve as an accessory or replacement part.

First, the lock stud 22 is conditioned by placing it in its door lock position and then the lock lever is conditioned so that the plunger 25 is moved forwardly into operative engagement with the hub 16. The lock lever is conditioned my aligning the hub socket 23 with the plunger head 33, and by placing a thin actuating instrument such as an automobile ignition key through the housing slot 15 and into the plunger recess 26, and then moving the key against the abutment 27 to urge the plunger 25 forwardly until the plunger head 33 operatively interfits the hub socket 23 as is shown in FIG. 2.

The hub 16 is then connected to the lock stud 22 by inserting the end of the lock stud 22 into the hub socket 21 and by inserting and threadedly attaching a screw 20 in the manner shown and described. When attached to the lock stud 22, the lock lever 10 is placed in an angular position normally assumed by the lock lever in its locked position.

Upon attachment in the manner described, the lock lever can be manipulated in the usual way to condition the door latch mechanism from its locked condition to its unlocked condition merely by pivoting the lock lever. Because the hub 16 is drivingly connected to the housing 10, pivotal movement of the lock lever is transmitted through the plunger 25 to the hub 16, and thence directly to the lock stud 22.

If it is desired to condition the door latch to prevent a child from opening the door intentionally or accidentally, the safety features of the door lock can be utilized. For example, the lock lever is pivotally moved to its locked position. As stated previously, in this position the latch mechanism of the door cannot be actuated from the inside or from the outside upon actuation of the usual door lock

handles. Then, a thin actuating instrument is inserted through the plunger slot **15** and into the plunger recess **26**. The instrument is brought into contact with the abutment **28** and the plunger **25** is retracted against the loading of compression spring **32** until the plunger head **33** is withdrawn operatively from the hub socket **23**, as is best seen in FIG. 3. When fully retracted by the actuating instrument, the hook formation **43** of the leaf spring **41** will automatically snap into the notch **34** of plunger **25**, thereby holding the plunger **25** in its retracted position against the loading of compression spring **32**.

It will now be readily apparent that the hub **16** is not now drivingly attached to the housing **10**, but on the contrary is free to rotate relative to such housing. The housing **10** will rotate freely about the hub **16** and will not cause any operative rotation of either the housing **16** or the lock stud **22**. Thus it is seen that the door latch mechanism will remain in its latch condition and cannot be affected by pivotal movement of the lever housing **10**. The major advantage of this safety feature is that a child cannot condition the door latch mechanism by manipulation of the lock lever.

Moreover, a person, and particularly a child, cannot gain digital access to the plunger **25** to recondition the lock lever for its "normal" operation. The housing slot **15** is narrow and precludes digital access therethrough to the plunger **25**. A thin actuating instrument such as an automobile ignition key is required to recondition the lock lever.

To recondition the lock lever from its "safety" condition to its initial condition for "normal" usage a responsible person, presumably an adult, inserts a thin actuating instrument such as an automobile ignition key through the housing slot **15** and into the recess **26**. A translatory movement of the key along slot **15**, while maintaining engagement of the key with the plunger abutment **27**, causes the plunger **25** to move forwardly. Upon exertion of initial pressure of the key against the plunger abutment **27**, the cam shoulder **35** moves the hook formation **43** downwardly out of the notch **34** and into the recess **37** of the base plate **36**. As the plunger **25** is released by the leaf spring **41**, the resilient action of the compression spring **32** tends to urge the plunger **25** forwardly.

In the event that the plunger head **33** is not aligned with the hub socket **23**, the plunger head **33** will bear against the side periphery of hub **16**. The housing **10** of the lock lever is rotated relative to the hub **16** until the plunger head **33** is aligned with the hub socket **23**. During this relative rotative movement, the plunger head **33** rides on hub **16**. Immediately upon alignment, the loading of the compression spring **32** snaps the plunger head **33** automatically into the hub socket **23**, and thereby operatively and drivingly connects the housing **10** with hub **16**. The lock lever is now conditioned for "normal" usage whereby the lock lever can be pivotally moved to its locked or unlocked positions incident to conditioning the door latch mechanism.

Although the invention has been described by making detailed reference to a single preferred embodiment, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a device for conditioning the latch mechanism of a door, a lock lever including a hub housing and a radially extending integral plunger housing, a hub carried by and swivelly mounted in said hub housing, said hub being operatively connected to the latch mechanism, said hub including a socket, a plunger reciprocatively mounted in said plunger housing, said plunger being provided with an abutment, resilient means carried in said plunger housing and tending to urge said plunger toward said hub, the plunger housing being provided with an aperture through which any thin instrument may be inserted for access to said abutment for plunger actuation, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger selectively interfitting said socket in one relative swivelled position of the lever and hub whereby to connect the lever to said hub, and the plunger selectively retracting from said socket to enable unrestricted swivel movement of the lever relative to the hub, the resilient means tending to snap said plunger into said socket when the plunger and socket are aligned in said one position.

2. In a device for conditioning the latch mechanism of a door, a lock lever including a hub housing and a radially extending plunger housing, a hub carried by and swivelly mounted in said hub housing, said hub being operatively connected to said latch mechanism, said hub including a socket, a plunger reciprocatively mounted in said plunger housing, said plunger being provided with an abutment, the plunger housing being provided with an aperture through which any thin instrument may be inserted for access to said abutment for plunger actuation, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger selectively interfitting said socket to connect the lever to said hub, and the plunger selectively retracting from said socket to enable unrestricted swivel movement of the lever relative to the hub, and a resilient retaining means carried in said plunger housing and engaging the plunger, said retaining means tending to hold the plunger in its retracted position until released upon plunger actuation.

3. In a device for conditioning the latch mechanism of a door, a lock lever, a hub carried by and swivelly mounted in said lever, said hub being operatively connected to said latch mechanism, the hub including a socket, a plunger reciprocatively mounted in said lever, said plunger being provided with an abutment, the lever being provided with an aperture through which any thin instrument may be inserted for access to said abutment for plunger actuation, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger interfitting said socket to connect the lever to said hub, resilient means carried in said lever and engaging said plunger, the resilient means tending to urge said plunger toward said hub, the plunger selectively retracting from said socket to enable unrestricted swivel movement of the lever relative to the hub, and a resilient retaining means carried in said lever and engaging the plunger, said retaining means tending to hold the plunger in its retracted position against the loading of said resilient means until the plunger is released by actuation of the plunger by an instrument through said aperture.

4. In a device for conditioning the latch mechanism of a door, a lock lever, a hub swivelled in said lever and operatively connected to said latch mechanism, said hub including a socket, a plunger reciprocatively mounted in said lever, said plunger being provided with an abutment, the lever being provided with an aperture through which any thin instrument may be inserted for access to said abutment for plunger actuation, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger interfitting said socket to connect the lever to said arm, a compression spring carried in said lever and engaging said plunger, the compression spring tending to urge said plunger toward said hub, the plunger selectively retracting from said socket to enable unrestricted swivel movement of the lever relative to the hub, and a leaf spring carried in said lever engaging the plunger, the leaf spring tending to hold the plunger in its retracted position against the loading of said compression spring until released by actuation of the plunger through said aperture.

5. In a device for conditioning the latch mechanism of a door, a lock lever, a hub carried by and swivelly mounted in said lever, the hub being operatively connected to said latch mechanism, said hub including a socket, a plunger reciprocatively mounted in said lever,

said plunger being provided with a recess having opposed abutments, the lever being provided with an aperture adjacent said plunger recess through which any thin instrument may be inserted for access to said abutments for plunger actuation between limits, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger interfitting said socket to connect the lever to said hub, a compression spring in said lever behind said plunger, said compression spring engaging the plunger and tending to urge said plunger toward said hub, the plunger selectively retracting from said socket to enable unrestricted swivel movement of the lever relative to the hub, the plunger being provided with a notch in one side, and a leaf spring carried in said lever and selectively engaging the plunger in said notch to hold the plunger in its retracted position against the loading of said compression spring until the plunger is released from said leaf spring by actuation of the plunger by an instrument through said aperture, said compression spring snapping the plunger into said socket upon alignment of the socket with said plunger.

6. In a device for conditioning the latch mechanism of a door, a lock lever including a hub housing and an elongate plunger housing communicating with said hub housing, a hub swivelly mounted in said hub housing and operatively connected to said latch mechanism, said hub being provided with a laterally opening socket in its periphery selectively alignable with said plunger housing in one relatively swivelled position in said hub housing, a plunger reciprocatively mounted in said plunger housing, said plunger being provided with an abutment, said plunger housing being provided with an aperture through which any thin instrument may be inserted for access to said abutment for plunger actuation between limits, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger in one limit selectively interfitting said socket to connect the locked lever operatively to said hub for normal conditioning of the latch mechanism by pivoting the locked lever, a first spring carried in said plunger housing and engaging said plunger, said first spring tending to urge said plunger toward said hub, the plunger in the other limit being selectively retractable from said socket to enable unrestricted swivel movement of the locked lever relative to said hub to preclude conditioning of the latch mechanism by pivoting of the lock lever, and a second spring carried in said plunger housing and engaging said plunger, said second spring tending to retain the plunger in its retracted position against the loading of said first spring until the plunger is released by actuation of the plunger through said aperture.

7. In a device for conditioning the latch mechanism of a door, a lock lever including a hub housing and an elongate plunger housing communicating with said hub housing, a hub swivelly mounted in said hub housing and operatively connected to said latch mechanism, said hub being provided with a laterally opening peripheral socket selectively alignable with said plunger housing in one relatively swivelled position, a plunger reciprocatively mounted in said plunger housing, said plunger being provided with an abutment, said plunger housing being provided with an aperture through which any thin instrument may be inserted for access to said abutment for plunger actuation between limits, the plunger being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger in one limit selectively interfitting said socket to connect the locked lever operatively to said hub for normal conditioning of the latch mechanism by pivoting the locked lever, a compression spring carried in said plunger housing behind said plunger, said compression spring engaging the plunger and tending to urge the plunger toward said hub, the plunger in the other limit being selectively retractable from said socket to enable unrestricted swivel movement of the locked lever relative to the hub to preclude conditioning of the latch mechanism, the plunger being provided with a notch in one side, and a leaf spring carried by said plunger housing and selectively engageable in said plunger notch to retain the plunger in its retracted position against the loading of said compression spring until release of the plunger from said leaf spring upon actuation of the plunger through said aperture, the plunger riding on the hub periphery when released from said leaf spring under the loading of said compression spring until the plunger is aligned with said socket at which time the plunger is snapped into said socket.

8. In a device for conditioning a latch mechanism, a hub operatively connected to the latch mechanism, a lock lever including a hub housing and a radially extending plunger housing, the hub being swivelly mounted in said hub housing, a plunger mounted in said plunger housing for movement between limits, means interconnecting said hub and plunger in one limit, the plunger housing being provided with an aperture for access to said plunger for plunger actuation, the aperture being of reduced size so as to preclude digital actuation of the plunger through the aperture, the plunger being operatively disengageable from said hub in its other limit to enable unrestricted swivel movement of the lever relative to the hub.

References Cited in the file of this patent

UNITED STATES PATENTS

1,826,472	Keeler	Oct. 6, 1931
1,827,979	Floraday	Oct. 20, 1931
1,828,468	Keeler et al.	Oct. 20, 1931
2,511,522	Williams	June 13, 1950
2,676,050	Nichols	Apr. 20, 1954
2,939,308	Trammell	June 7, 1960