Dec. 7, 1937. A. NEIMAN 2,101,446

SAFETY LOCKING DEVICE

Filed Sept. 8, 1936

Fig. 1

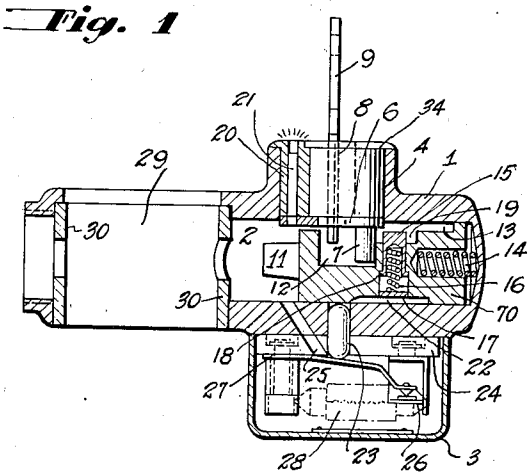


Fig. 6

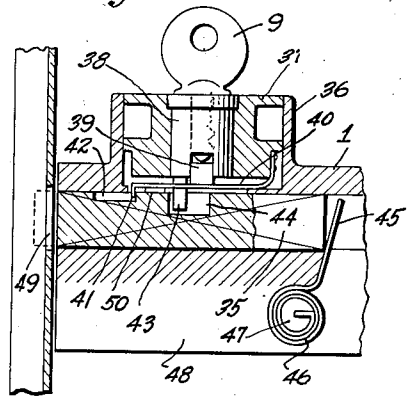


Fig. 2

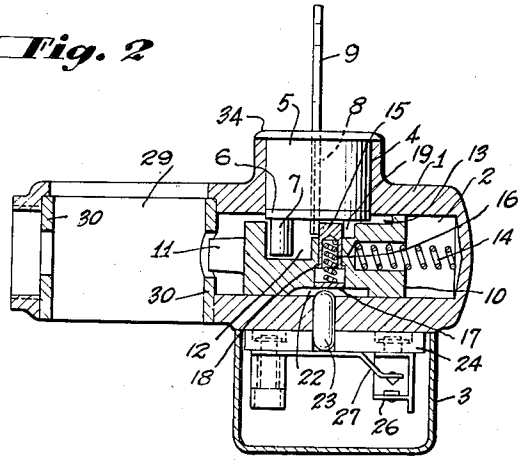
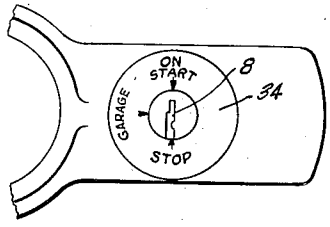


Fig. 5



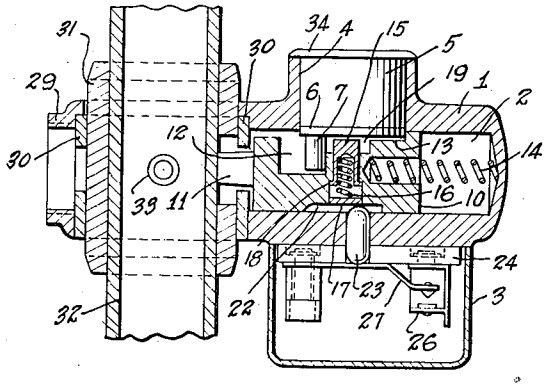


Fig. 3

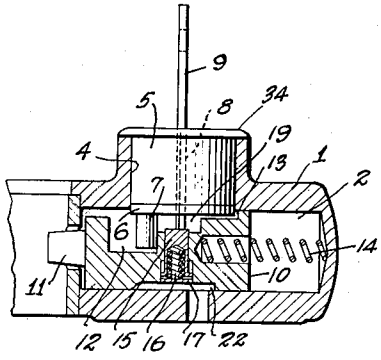


Fig. 4

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SAFETY LOCKING DEVICE

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In Germany November 29, 1934

2 Claims. (Cl. 70—156)

This invention relates to locking mechanism, and has for an object the provision of a locking device, whereby the locking operation cannot be completed until the withdrawal of the key. This arrangement is particularly advantageous in connection with steering posts of motor vehicles and the like.

It frequently happens that, through forgetfulness or inadvertence, a steering post, or safe-door, for example, is locked while the key to said lock is withdrawn and is out of possession, and it is, therefore, an object of my invention to provide a locking device which cannot be effectively operated until the key has been withdrawn therefrom.

By my safety mechanism two important things are accomplished: firstly, the bolt cannot be shot or moved to locking position without the use of the key, and its subsequent withdrawal is an indication that the said bolt is fully projected, and the operator or owner or other person will be so advised by a mere glance at the lock. In other forms of locks, not using this safety feature of key-withdrawal to complete the locking operation, it is impossible to tell from a mere glance at the lock, whether the bolt of the same is "shot", and a person can tell only by actually trying the door or the like to determine whether it is locked. In certain instances harm can be done either to the lock or the door or the jam by forcing the door where a lock is used, of the conventional type. Secondly: when the key is in the lock, the information is conveyed that the said bolt is not locked, and if one wishes to lock the same, he must withdraw the key, the latter being a further important consideration because then one cannot, through forgetfulness or inadvertence, leave the key in the lock after the bolt has been "shot". The act of locking, including as it does the necessary withdrawal of the key from the lock, finds the operator, upon the completion of the simple manipulation of the key and withdrawal of the same, with the key in his hand; and, as above stated, when he returns and finds the key missing from the lock, he knows instantly that the same is locked, and will not needlessly try the door or the like to see whether it is locked.

Another feature of my invention is that the key cannot be removed from the lock until the key has been given a predetermined degree of rotation, and that anything short thereof will have only the effect of partially projecting the bolt, without enabling the key to be withdrawn. When the key has been turned the predetermined degree of rotation, the key can be withdrawn and the bolt will then be automatically "shot" into locking position.

A lock having the above features is particularly advantageous in the safety locking of steering posts of automobiles, and with said lock I may combine the ignition mechanism in a novel, efficient and useful manner. And while the invention is described in the following specification as applied to automobile steering posts and ignition switches, it is to be understood that this is done by way of example and illustration and is not intended to impose any limitation upon my invention.

In the accompanying drawing,

Fig. 1 is a view in sectional elevation of one embodiment of my said lock, and ignition housing and means for making and breaking the ignition switch, the locking bolt being fully retracted and the ignition switch closed, and may be considered the "on" or driving position;

Fig. 2 is a view similar to Fig. 1, the key having been turned clockwise through an angle of approximately 200 degrees, whereby the bolt has been partially projected and the ignition switch opened;

Fig. 3 is a view similar to Figs. 1 and 2, with the key removed and the bolt projected to full locking position; and the lock being applied to the steering post of an automobile; the ignition switch being open, and this position may be considered the "off" or locked position;

Fig. 4 is a view similar to Figs. 1, 2 and 3, of the lock only, with the bolt fully projected as in Fig. 3, but with the key-reinserted in the key-cylinder preparatory to retracting the bolt;

Fig. 5 is a partial top plan view of Fig. 3, showing the lock housing with part of a ring for mounting around a steering post, said housing bearing an indicia plate or suitable indicia, indicating the position of the lock and ignition switch; and

Fig. 6 is a view in sectional elevation of another form of my invention, the lock being for use on a door, and the bolt being in the fully projected position.

Referring to Figures 1 to 4 of the drawing, the numeral 1 indicates a casing through the center of which there is a bore 2. The casing carries a frame 3 in any suitable manner, the same being on the bottom thereof. Through the top of the casing there is a bore indicated at 4 in which turns a key-cylinder 5, the inner end of which has fixed thereto a plate 6 which carries a downwardly projecting crank pin 7. The key-cylinder is provided with a transverse slot indi-

cated at 8 through which the key 9 for actuating the bolt is entered. Within the bore 2 and below the key-cylinder 5 there is a bolt 10 provided with a locking projection 11 at one end, and also with a slot 12 in which the crank pin 7 operates. The wall of the slot 12 is provided with a slot 13 into which the end of the key may be projected. The bolt 10 at its outer end opposite the locking projection 11 is bored centrally and contains within the latter a coiled spring 14 one end of which bears against the bottom of the bore and the opposite end of which projects beyond the bore of the bolt and engages the wall of the casing 1, tending thereby to press the bolt into semi-locking position and to locking position. Between the slot 12 and the spring 14 there is a spring-controlled pin 15 provided centrally with a bore containing a coiled spring 16, one end of which rests against the bottom of said bore and the other end of which engages a sustaining bar 17. The pin 15 is also provided at its inner end with an outstanding flange 18 operating against a shoulder formed within the pin-bore. This shoulder operates as a limiting device for the pin 15 preventing the latter from being projected from the bolt 10. The upper surface of the bolt 10 is provided with an elongated groove 19 in which the pin 15 works and which terminates in the groove 12, and in which lies the plate 6 fixed to the key-cylinder 5. The key-cylinder is also provided with a lamp structure indicated at 20, the lamp structure extending through the key-cylinder and the fixed plate 6 and has a longitudinal bore indicated at 21. The bolt 10 is also provided beneath the pin 15 with an elongated groove 22 but upon one side adjacent the casing 1. Cooperating with the groove 22 is a pin 23 loosely sliding through an aperture in the casing and at times projecting into the groove 22. Within the frame 3 there is a contact sustaining plate 24, suitably supported, through which the pin 23 projects and in which it also slides loosely. The plate 24 is provided with an inclined slot 25 formed in continuity with another slot passing through the casing 1 and into the bore 2 adjacent the bolt 10. The plate 24 carries two contact devices 26 and 27, one, 26, being fixed in the frame 3, and the other, 27, of which is a spring, held in place by one of the binding posts. Between the two binding posts there is a charging connection 28 for the lamp member 20 sustained by these posts, the leads from which are passed through the slot 25, its elongated extension, the bore 2, and the lamp member 20.

The casing is extended laterally, as shown in Figs. 1 to 4, and indicated by 29, and in this lateral extension there are washers 30 apertured centrally for interchangeability and for the passage of the bolt-extension 11. Between the members 30 there is a bushing 31 fixed to and forming part of a means for fixing the locking structure in the steering post 32 of an automobile, the same being held in position by a screw or other fastening means 33.

On the casing member in which the bore 4 is made and which extends vertically or outwardly from the casing, there is applied an index plate or escutcheon 34 having thereon indicia for "Stop", "Start" and "Storage", see Fig. 5. The escutcheon is provided with the essential opening and slots indicated at 8 for the purpose of inserting the key 9, which when entered to its fullest extent will have its end projecting into the slot 13 of the wall of the slot 12, and also into the latter so as to be engaged by the stop pin 15, as shown in Fig. 2.

The mode of operation of the invention with reference to Figs. 1 to 4 is as follows:

When the key is turned clockwise through an angle of approximately 200 degrees, the pin 7 attached to the key-cylinder 5 will be caused to move in the slot 12 from the Fig. 1 position to the partially projected position indicated in Fig. 2, thereby permitting the spring 14 to expand and hold the bolt 10 partially forward with the pin 15 against the tip of the key 9, which leaves the projection 11 in the body of the casing 1, said pin 15 being provided with a spring having a tendency to push it upwardly. It is only upon withdrawal of the key that the bolt can be fully, and is automatically, projected to locking position as shown in Fig. 3, by the spring 14. When the bolt 10 is locked to the steering post, it is fully projected, Fig. 3, and the pin 15 is in line with the key-slot 8. When the key is inserted in said cylinder to its full extent, it will depress the said pin 15 against the force of its spring, as clearly shown in Fig. 4, and the bolt may be retracted or the lock unlocked by turning the key counter-clockwise. The position of the parts will then be as illustrated in Fig. 1. The retraction of the bolt 10 is accomplished by the pin 7 pushing against the wall of the slot 12, to cause the inward movement of the bolt as the key is turned.

In Figs. 1 to 3 inclusive, there is shown as combined or associated with the locking mechanism above described, a pair of contact members 26 and 27, enclosed in the frame 3, and which will of course be connected to proper leads and electrical instrumentalities. In the said views, the said instrumentalities are contemplated to comprise the ignition switch of an automobile, one member 27 of which is movable, while the other, 26, is fixed. The said switch is opened and closed, as the case may be, by the back and forth movement of the bolt 10, which shifts the pin or plunger 23, passing through an opening in the bottom of the casing 1 and the plate 24, said pin being shifted by engagement of the end wall of the groove 22 and the movable contact spring 27 of the ignition switch.

It will be seen (Fig. 1) that when the bolt 1 is in the retracted position, leaving the steering post free for turning, the end wall of groove 22 of the said bolt depresses the plunger element 23, to close the contact elements 26—27. When the bolt 10 is partially projected, or in the intermediate position indicated in Fig. 2, the end wall of groove 22 of the bolt has been moved forward and the plunger 23 is pushed up into the groove 22 in the bolt 10, by the spring contact 27, whereby the ignition circuit is opened. In this position, while the bolt 1 is partially projected, the steering post is not locked, but the ignition is off, and the key may be removed. Of course, as is to be desired, when the steering post is locked the ignition should be off, and this arrangement is so shown in Fig. 3, the groove 22 in the bolt 1 being sufficiently elongated so that the plunger 23 will be permitted to ride in said slot without being depressed by the bolt as the latter moves from the intermediate or partially projected position, Fig. 2, to the fully projected position, Fig. 3. At or about this time the key can be removed and the bolt automatically "shot". When the bolt is fully retracted to unlock the steering post, Fig. 1, the ignition switch is closed.

The frame 3 may be provided with a charging

control 28 connected in electrical parallel with the ignition switch, and said frame is preferably provided with an aperture (not shown) through which the lamp is visible.

The casing 1 of the lock may be provided with a card or dial 34 on which is embossed suitable indicia. In the center of said dial is disposed the key-cylinder of the lock, the key slot 8 in said cylinder being utilized to point to the various indicia on said card or dial. The indicia, which may consist of words and arrows, are preferably covered with a phosphorescent material in order to facilitate the finding of the key-slot 8 in darkness.

In Fig. 6 I have shown another form of my invention and therein it will be seen that the structure is adapted for application to a door or safe and comprises the casing 1 in which a bolt 35 freely slides laterally. The bolt 35 is mounted in the upper portion of the casing 1 which latter is provided with a hollow flanged extension 36 in which is mounted a block 37 carrying the key cylinder 38 provided with the escutcheon through which is entered the key 9. Within the key cylinder 38 there is an aperture at the bottom in which slides a pin 39 resting on a bent spring 40, one end of which is fixed to the block 37 and the other end of which is free and is bent as at 41 so as to extend into the slot 42 of the bolt 35. The inner end of the key cylinder 38 is provided with a crank pin 43 which operates in a short continuation 44 of the slot, and which pin functions to shift the bolt 35 longitudinally against the free end 45 of a coiled spring 46, the other end of the spring being fixed in any suitable manner as at 47 to a fixture of the enclosing casing 48. Normally the spring end 45 engages the inner end of the bolt 35 and tends to force the latter into an aperture made for the reception thereof in the door as indicated at 49.

The mode of operation of this form of my invention shown in Fig. 6, is as follows:

In view shown in Fig. 6, the key has been turned through a predetermined angle, say 200 degrees, by which action the bolt 35 has been partially projected and corresponds to the position of the bolt shown in Fig. 2. The bolt 35 is provided with the groove 42 in which is disposed the tip 41 of the leaf spring 40 which is anchored or attached at its other end to a fixed body member 37. The said tip of the leaf spring blocks the further or complete projection of the bolt which would otherwise occur under the pressure of the spring 45; and such projection of the bolt cannot occur until the key 9 is removed or withdrawn from the lock. Upon such removal of the key, the spring 40 springs back out of the path of the bolt and the bolt is shot forward to locking position by the spring 45.

To take up the hiatus between the tip of the key in the cylinder and the leaf spring 40, the said spring is provided with a lug or pin 39 which is disposed in a bore in the cylinder 38. When the bolt 35 is in the locking or fully projected position, the spring 40 will be in the raised position with the tip of the spring resting on the shoulder 50 of the bolt 35. When it is desired to unlock said lock or retract the bolt, the key is inserted in the cylinder 38 and the same is turned in a direction reverse of that which was employed to project the bolt. In the fully projected position, the pin 43 is in contact with the right-side wall of the groove 44 of the bolt 35, so that as the key is turned the pin 43 will push the bolt 35 inwardly against the pressure of the spring 45, and the tip 41 of the spring 40 will ride, relatively speaking, from the shoulder 50 into the groove 42 of the bolt 35. Upon the full reverse turn of the key which fully retracts the bolt the tip of the spring 41 will be at the other end of the groove 42 from that shown in Fig. 6, so that when subsequently it is desired to project the bolt 35, the latter will be free to move, upon the proper turning of the key, to the partially projected position shown in Fig. 6, before meeting and being interfered with by the tip of the spring 41. The bolt is then automatically fully projected upon withdrawal of the key from the cylinder.

Having described my invention, what I claim is:

1. In a key-operated lock, a spring-projectible bolt, key-operated means for partially projecting said bolt, said key projecting into the path of said bolt, and means carried by said bolt whereby, in cooperation with said key, said bolt is prevented from travelling to the fully projected position and whereby upon removal of said key from said lock the bolt will be automatically fully projected.

2. In combination with a lock casing, a lock, a bolt, a spring for projecting the same, a key cylinder having a pin disposed in a slot in said bolt whereby said bolt may be actuated, a key for operating said cylinder and having a part projecting therethrough, and means carried by said bolt adapted to come into engagement with the tip of said key when said bolt has been partially projected to prevent said bolt from being fully projected while said key is in said lock, and means whereby said bolt may be fully projected under the action of said spring upon withdrawal of said key from the lock.

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