Nov. 17, 1953 C. GLUBIAK 2,659,231

KEY EJECTING DEVICE

Filed Sept. 23, 1950

Fig_1

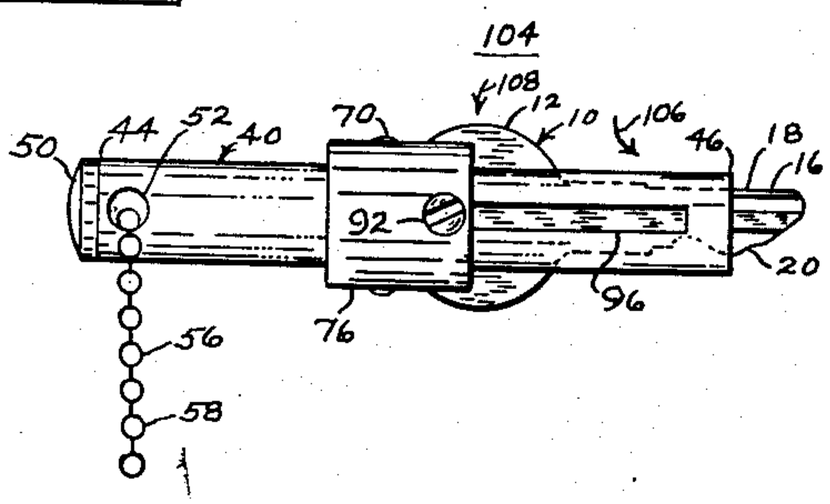


Fig_2

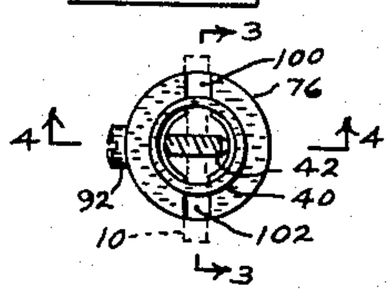


Fig_3

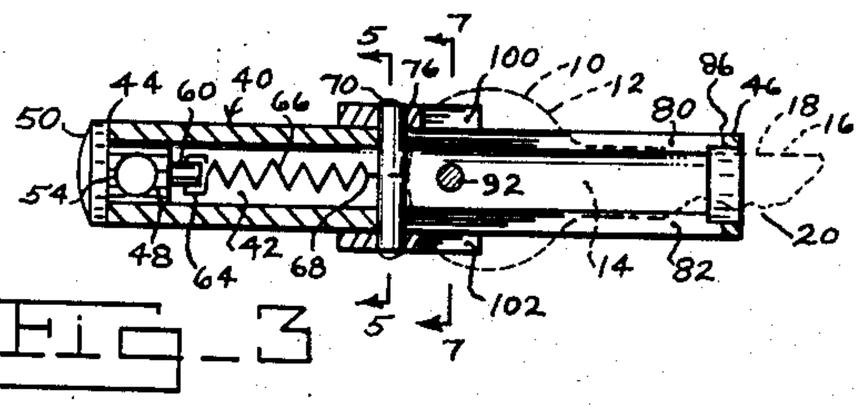


Fig_5

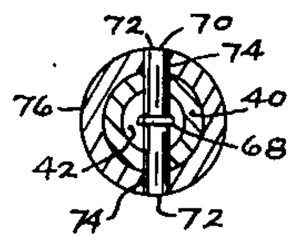
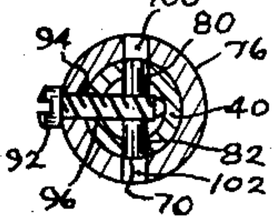


Fig_7



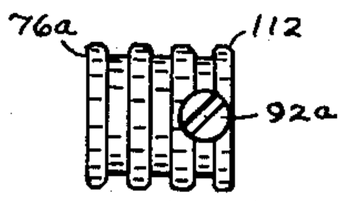


Fig_4

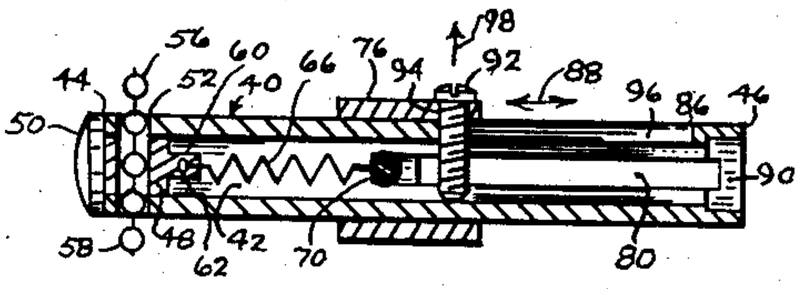


Fig_8

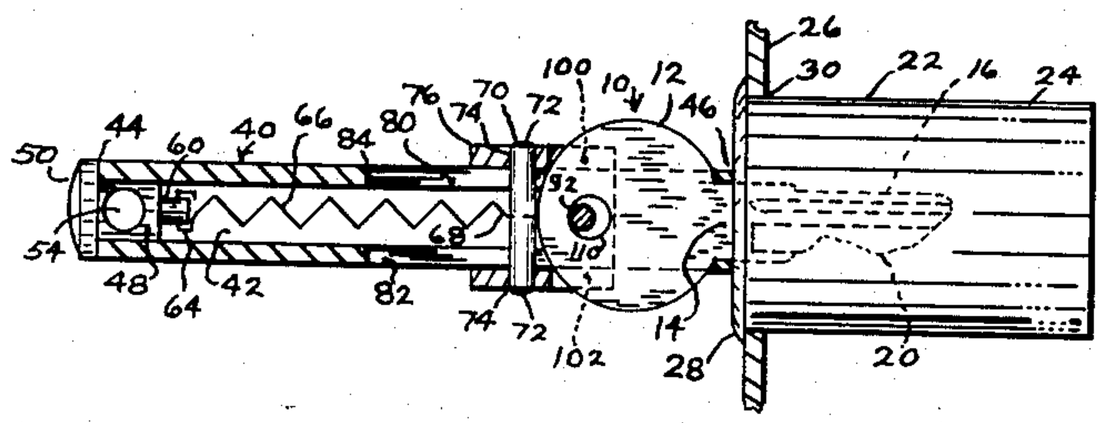


Fig_6

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KEY EJECTING DEVICE

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3 Claims. (Cl. 70—414)

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This invention relates to locking devices and to keys used in connection therewith.

An object of the invention is to provide a novel and improved key ejecting device and key therefor, in which means is provided for automatically ejecting the key from the lock whenever the key is turned to such a position that the lock no longer engages the key prehensilely.

Another object of the invention is to provide a novel and improved key ejecting device which may be employed with existing locking devices and locks, and which is so constructed and arranged as to function, whenever the key is turned to a preselected or predetermined angular position in the lock, the key is forcibly disengaged from the lock, and moved into a position out of contact therewith.

A further object of the invention is to provide a novel and improved key ejecting device which is adapted to receive and engage with a key insertable in said lock to be protected, one portion of the key ejecting device being relatively stationary with respect to the key secured thereto, and the other portion of the key ejecting device being movable relative to the relatively stationary portion, with resilient means normally maintaining said portions mutually spaced, the arrangement being such that upon insertion of the key shank into the lock, the resilient means is overcome and the portions moved toward each other, so that, upon the retention of the key shank in the lock by turning the shank therein, the two portions are thus maintained in adjacent positions, wherein however, upon turning the key shank in the lock to such angular position that the lock no longer holds the key shank therein, the resilient means is free to forcibly separate the two portions of the key ejecting device, ejecting the key shank from the lock.

Still a further object of the invention is to provide a novel and improved key biasing and ejecting device which will engage with many types of automobile keys, to make the key into a self-ejecting key, whereby the key will be automatically ejected from engagement with a lock upon turning the same to any predetermined position.

Still another object of the invention is to provide a novel and improved self-ejecting key, and means for making any key self-ejecting, which is simple in operation, inexpensive to manufacture, automatic and foolproof in use, and which will fit any lock, regardless of the design or size of the lock itself, being carried solely by the key and ejected from the lock at the same time and with the key, when the key is turned to any predetermined position in the lock.

Another object of the invention is to provide a novel and improved self-ejecting key device which is light in weight, and not bulky in size,

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so that it may be employed with any key, with the utmost in convenience.

The present invention and application is a continuation of my copending patent applications (1) Locking Device and Key Ejector, Serial Number 126,470, filed November 10, 1949, and (2) Self Ejecting Key, Serial Number 140,836, filed January 27, 1950, now Patent No. 2,587,037.

These and other objects and advantages of the invention will become apparent from the following description of a preferred embodiment thereof, as illustrated in the accompanying drawings, forming a part hereof, in which,

Figure 1 is a longitudinal side elevational view of a device according to the invention, showing a key disposed therein, and in retracted position.

Figure 2 is a right end elevational view of the device shown in Figure 1, dotted lines indicating the key.

Figure 3 is a sectional elevational view taken on plane 3—3 of Figure 2, the key itself being indicated in broken lines.

Figure 4 is a sectional plan view taken on plane 4—4 of Figure 2, omitting the key.

Figure 5 is a sectional elevational view taken transversely on plane 5—5 of Figure 3.

Figure 6 is a sectional elevational view similar to that of Figure 3, but showing the key in the device, the key shank being inserted into a lock and the movable portions of the device being in rightwardly extended position.

Figure 7 is a transverse sectional elevation taken on plane 7—7 of Figure 3.

Figure 8 is an elevational view showing a modified form of the slidable collar shown in Figure 1.

Where locks are used, it has been found to be quite common an occurrence to discover that the key has been inadvertently left in the lock. For example, the ignition locking key on an automobile is frequently left inserted in the ignition lock, so that a prospective thief has no trouble whatever in starting the automobile engine, and quickly driving off with the owner's car.

The same thing happens in the locking of doors on buildings and dwellings, so that the owner has found that a thief can gain easy access to the building, by merely watching the door lock, and when the key is left inserted therein by the careless owner or employee, just waiting until he leaves, before readily unlocking the door and entering the building. The present invention provides means whereby the key cannot be left inserted in the lock at any time it shouldn't be As a result, a self-ejecting key is formed, with resilient means carried right on the key, which is stressed upon insertion of the key into the lock, and, is thus available for automatically and instantly pushing the key out of the lock whenever the key is turned to a position at which the

lock does not hold the key in engagement therein.

In order to understand clearly the nature of the invention, and the best means for carrying it out, reference may now be had to the drawings, in which like numerals denote similar parts throughout the several views.

As shown, there is a key 10 having a head or body portion 12, a neck portion 14, and a shank portion 16. The key shank may be relatively straight on its upper edge portion 18, and provided with serrations or teeth 20 on its lower edge portion. As is well known in the key and lock art, the insertion of the key shank into the lock 22, that is to say, into the cylinder portion of the lock, which is rotatable in the lock body 24, will cause the teeth 20 to move the lock pins to predetermined radial positions at which they unblock the cylinder and the lock body, and turning of the key about the axis provided in the cylinder, will turn the cylinder therewith, in the lock body. This of course depends upon the proper selection of the key and its teeth, and their arrangement, to fit the particular cylinder and its particular pins, as is well known in the lock art.

As is also well known, the coaction between the lock and key is such that upon insertion of the key shank into the lock, as in Figure 6, and the turning of the key therein, the key shank is prehensilely engaged by the lock in such fashion that it may not be pulled out of the lock until the key is re-turned back to the original position, or, in some types of locks, to the original position or some other predetermined position, angularly.

The lock 22 may, for example, be the ignition lock of an automobile or other motor vehicle, set in the dashboard 26 of the car, with a bezel 28 on the outside of the opening 30 formed in the dashboard 26. The key being inserted in a vertical plane, as seen in Figure 6, into the lock 22, it is then turned in an angular direction about the axis of the lock, to some predetermined position lying in a plane forming an angle with the vertical plane of key entry, at which position, the ignition circuit of the engine is completed by means of a switch blade carried within the lock body and turning with the cylinder and key. At this new position of the key, it is held securely in the lock and cannot ordinarily be withdrawn. When the engine is to be turned off, the key is returned to the original vertical position of entry, opening the switch, and the key may then be pulled out of the lock.

However, due to forgetfulness, preoccupation with other thoughts, or even willfully, the operator may not pull the key out of the lock. It he leaves the motor vehicle for a period of time, with the key in the lock, it is apparent that unauthorized persons, or thieves, may take the car away by merely turning the key, starting the engine, and driving off. The present invention provides means whereby, upon turning the key back to "ignition-off" position, or to some other predetermined position at which the lock no longer prehensilely engages the key shank against withdrawal, the key is automatically ejected from the lock.

For this purpose, I provide an elongated ejector body 40, which may be conveniently in the form of a cylinder, with an axial bore 42 extending through the ejector body 40 from one end 44 to the other end 46. A plug 48 preferably cylindrical in shape, though other shapes will also be suitable, is inserted into the left end 44 of the bore 42 of the ejector barrel 40, and has an enlarged head 50 on the outside, the diameter of the head 50 being greater than the inside diameter of the bore 42. An axially aligned set of bores extends diametrically through the ejector barrel wall as at 52 and through the intervening plug 48 as at 54, and a flexible chain 56 may extend therethrough. The chain 56 may be formed of any suitable material, such as a series of interconnected spheres 58, or links, or a piece of cord, and should preferably be interconnected at its ends, so as to be continuous.

An integral extension 60 of the plug 48, has an opening or diametral bore 62 formed therethrough to receive one end 64 of a tension spring 66 extending through the barrel bore 42. The other end 68 of the spring 66 is hooked around the central portion of the transverse diametral pin 70, so that upon movement of the pin 70, the spring 66 is stretched, as seen in Figure 6, the pin 70 moving to the right. The outer ends 72 of the pin 70 extend through and are seated securely in the axially aligned radial bores 74 in the opposite sides of the walls of the movable collar or sleeve member 76, either being pressed into the bores, or with the outer ends of the pin 70 peined over to retain the parts in assembled relationship.

The pin 70 also extends through guide slots 80 and 82, which are formed through opposite walls of the barrel 40, between locations substantially as shown at 84 and 86, so that the motion of the collar or sleeve 76 is limited to the directions indicated by the arrow 88, that is, from left to right and vice versa, and limited in extent by the extent of the slots 80 and 82. Thus, as seen, the collar 76 has an inside diameter only sufficiently greater than the outside diameter of the barrel 40, to permit it to slide freely therealong when pushed against the tension of the spring 66. The collar 76 cannot turn about the axis of the barrel relative to the barrel, since their positions are fixed in this respect by the pin 70, and the collar limited to movement along the axis.

At the right hand end 46 of the barrel, the inside diameter is enlarged slightly as shown at 90 in Figure 4, and as seen well in the endwise view in Figure 2, to allow the shank and neck portions of the key to extend therethrough when the key is moved to the right as seen in Figure 6. A retaining screw 92 is threaded through a radial bore 94 in the rightward portion of the sleeve 76, and extends through the elongated slot 96 formed in the wall of the barrel 40 halfway between the other two guide slots 80 and 82. When the key 10 is to be inserted into the device, the screw 92 is retracted threadedly outwardly in the direction of arrow 98 in Figure 4, so that its shank does not extend all the way across the bore 42 of the barrel 40.

The key is then to be inserted into the device. For this purpose, I form two recesses 100 and 102 in opposite walls of the sleeve 76, so that when the body or head 12 of the key is inserted through the slots 80 and 82 in the manner shown, it also extends through the two recesses 100 and 102 in the sleeve. This is also seen clearly in Figure 6. With the head 12 of the key in position substantially as at 104 in Figure 1, the right end 16 of the key shank is inserted in the direction of the arrow 106 substantially, downwards through slot 80 and inserted in a rightward direction through the enlarged end 90 of the bore

42 of the barrel, so that the right end of the key shank extends partly out of the right end of the barrel 40, in the manner shown in Figures 1 and 2. At the same time, the head 12 of the key is swung downwardly from position substantially at 104, in the direction of arrow 108 in Figure 1, to bring it into the position shown, and it will then be seen that the hole 110 of the key head 12, shown in Figure 6, is brought into registry with the axis of the retaining screw 92. Screw 92 is then turned inwardly so that its shank extends through the key hole 110, back to the position shown in Figure 4, the relationship of key and screw 92 being then as shown in Figures 1, 3 and 6.

Now it is seen that when the collar 76 is pushed to the right on barrel 40, it carries the key 10 with it, and the shank of the key will be caused to protrude rightwardly out of the right end of the barrel bore 42, the key being movable rightwardly to the position shown in Figure 6. This tensions the spring 66 which exerts bias to tend to return the key and sleeve 76 to their leftwardmost position shown in Figures 1 to 4.

In use, the device is brought near the lock 22, and due to the protruding end of the key shank as seen in Figure 1, it is simple to guide the protruding end of the key shank into the keyhole of the lock 22 in the middle area of the bezel 28. This brings the right hand end 46 of the barrel 40 right against the lock bezel or face 23 as seen in Figure 6. The operator then pushes to the right against the sleeve 76, pushing the key shank all the way inside the lock 22, as seen in Figure 6, and then turns the sleeve 76 out of the angular position shown in Figure 6, so as to engage the key shank in the lock, and at the same time actuating the ignition switch inside the lock 22 as explained above, the key shank being now firmly held by the lock against disengagement therefrom by mere pulling of the key. This has turned the entire assembly of barrel, sleeve and key, and stretched the spring 66.

Now it is seen that when the ignition is to be turned off, the operator turns the key 10 or, as follows, the entire assembly of barrel, sleeve and key, back to the original position of insertion as shown in Figure 6, and upon reaching that position, the lock no longer holding the key shank, the spring 66 pulls the sleeve 76 and key 10 in a leftward direction and out of the lock. There being no further engagement with the lock, the ejection has been completed, the small protruding right tip of the key shank being too small to retain the key in the lock. Additionally, the shock force of the spring 66 will tend to jerk the key out of the lock as described, the impulse being normally sufficient to project it into the hand of the operator.

Figure 8 shows a modified form of the sleeve or collar 76, which is characterized as shown at 76*a* by having a series of ribs 112, annular in shape, formed in the sleeve surface, thus providing enhanced frictional grip for the fingers. The head of the screw 92 may be countersunk if desired in all embodiments shown.

Although I have described my invention in specific terms, it will be understood that various changes may be made in size, shape, materials and arrangement without departing from the spirit and scope of the invention as claimed.

I claim:

1. A key ejection device comprising an elongated tubular main housing having a bore extending therethrough and having first and second bore openings at opposite ends of said bore, a plug engaging said second bore opening with a diametral bore extending through said plug and said main housing, elongated flexible cable means extending through said diametral bore and maintaining said plug in engagement with said second bore opening, said main housing having a pair of diametrically opposed longitudinal key receiving slots each closed at both ends and adapted for receiving a key body extending into said key receiving slots, with the shank of said key body extending through said main housing bore, sleeve means carried by said tubular main housing and slidable thereon longitudinally, transverse pin means carried by said sleeve means and penetrating into said main housing bore, resilient means disposed in said main housing bore and connected at one end to said transverse pin means and at the other end to said plug, whereby said sleeve means is resiliently biased toward said plug, said tubular main housing having a third longitudinal slot parallel to said key receiving slots and spaced therefrom, fastening means carried by said sleeve means for movement therewith and extending through said third longitudinal slot and into said main housing bore and adapted for engagement with a key when disposed therein for movement with said key and said sleeve means, whereby, when said sleeve means is moved toward said first bore opening, said key shank is extended through said first bore opening in position for insertion into a lock, and whereby, upon release of the force moving said sleeve means said sleeve means is retracted under said resilient bias, carrying said key shank out of engagement with said lock and inside said main housing bore.

2. The construction according to claim 1, wherein said sleeve means comprises a cylinder having an axial bore greater in diameter than the outside diameter of said main housing so as to slide thereon, and having slots formed in opposite sides of said sleeve means cylinder in overlying relation to said pair of key receiving slots in said main housing, for receiving portions of the shoulder of the body of the key.

3. The construction according to claim 1, wherein said sleeve means comprises a cylinder having an axial bore greater in inside diameter than the outside diameter of the said main housing so as to be slidable thereon, and having slots formed in opposite sides of said sleeve means cylinder in overlying relation to said pair of key receiving slots in said main housing, for receiving portions of the shoulder of the body of the key when inserted therein, and wherein there is a plurality of annular ribs formed in the outer surfaces of said sleeve cylinder for enhancing the frictional engagement of the fingers of the user's hand when actuating the same, and for minimizing slippage.

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