Sept. 8, 1970 J. N. DEMETREON 3,527,072

COMBINATION KEY HOLDER AND EJECTOR

Filed April 10, 1968

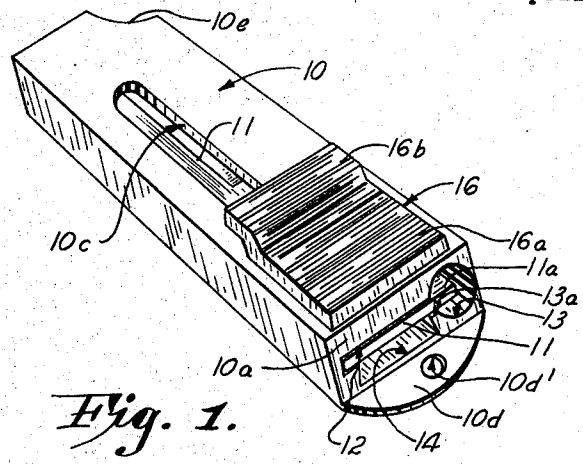


Fig. 1.

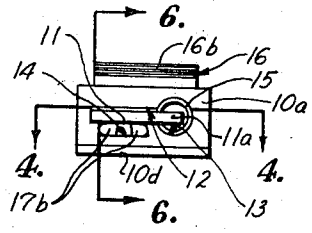


Fig. 3.

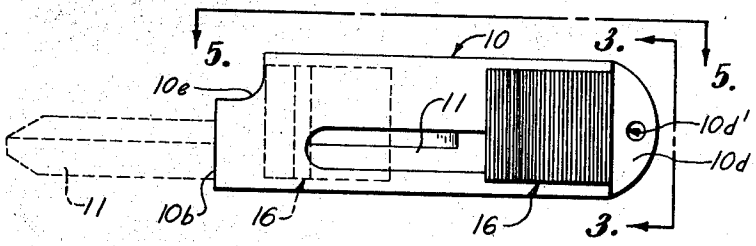


Fig. 2.

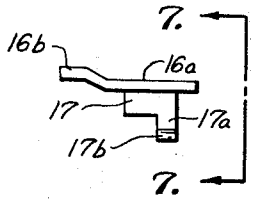


Fig. 6.

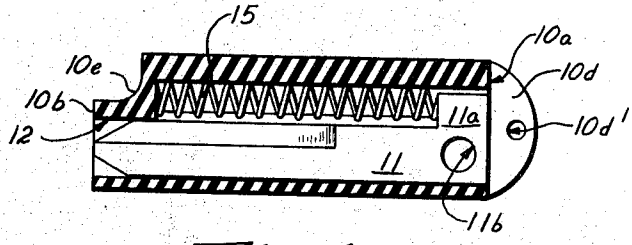


Fig. 4.

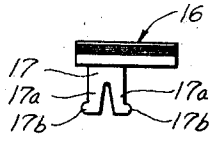


Fig. 7.

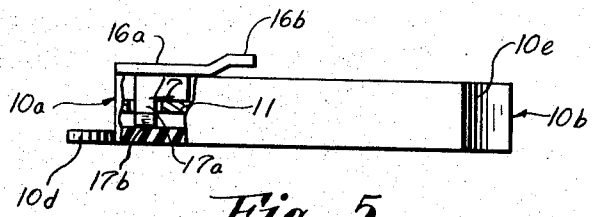


Fig. 5.

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COMBINATION KEY HOLDER AND EJECTOR

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ABSTRACT OF THE DISCLOSURE

A combination key holder and ejector has a housing having an elongate passageway in which an "L"-head key can be inserted for slidable movement within prescribed limits. One side of the housing is slotted substantially along the length of the passageway. A single key ejecting thumb pusher may be inserted through the slot and through an aperture in the key head by manually applying pressure to the pusher. This pusher includes a compressible extension depending therefrom which is securely engaged within the key aperture when inserted therethrough. A longitudinal cylindrical spring chamber which receives a compression spring is located adjacent the longitudinal passage and positioned so that a lug on the "L"-head key contacts one end of the compression spring. They key is ejected by pushing the thumb pusher along the case, the ejection being against the bias of the spring as it is engaged by the lug. When the thumb pusher is released, and if there is no restraining force on the key, it will be returned to the concealed position within the housing.

BRIEF SUMMARY OF THE INVENTION

The concept of automatically removing a key from a lock when it is turned to the "off" or unlocked position has immediate recognizable utility in decreasing car theft and property loss. A related and equally valuable feature of a device which automatically removes a key from an automobile ignition, lies in the advertising value of such a device since it is constantly brought to the attention of the user on a daily basis.

My invention relates to the unique construction of a combination key holder and ejector and to its more efficient operation and use. The subject combination key holder and ejector has a housing having an alongate passageway in which an "L"-head key may be inserted for slidable movement within prescribed limits. The housing is slotted on one side substantially the length of the passageway. Immediately adjacent the key passageway is a tapered longitudinal cylindrical spring chamber which receives a compression spring therein. A lug on the "L"-head key contacts the open end of the spring, there being a communicating opening between the passageway and the spring chamber.

A thumb pusher or button having a compressible depending extension is mounted for slidable movement within the slot so that the compressible depending extension of the thumb pusher extends down through the slot and through a communicating aperture in the key head. The key may be ejected from the housing by pushing the thumb pusher along the case against the force of the spring as the lug on the "L"-head key engages the end of the spring. Once the key is engaged within the lock and turned to the lock operating position, the lock tumblers retain the key in its extended position. When the key is rotated to the "off" or the unlocked position and the thumb pusher is released, the key will be returned by the spring action to its concealed position within the housing.

The construction of the compressible extension from the thumb pusher permits the pusher to be easily removed or positioned by a simple snap-on action. As a corollary thereto, the key may be easily removed and substituted as the need may be.

An object of the invention is to provide a uniquely constructed combination key holder and ejector which will automatically eject a key from its lock when turned to the "off" or unlocked position and will return same to a concealed position within the holder.

Another object of the invention is to provide in a key holder and ejector of the character described a simple and easy means for removing the key in which no tools of any kind are required. It is a feature of the invention that one of the principal operating elements of the device, the thumb pusher, has a compressible key securing extension depending therefrom. This compressible extension allows the thumb pusher to be "snapped" in operating position, thereby locking the key within the holder, or "unsnapped" by merely lifting up on the thumb pusher, thereby unlocking the key and allowing an easy removal of same from the holder.

Another object of the invention is to provide a uniquely constructed key holder and ejector which is efficiently operated, inexpensive to manufacture, compact in size and which economizes on working parts necessary for optimal operation. It is a particular feature of the invention that the working parts are so interrelated that the key may be ejected from the housing by a simple movement of the thumb when held in one hand. The unique construction further simplifies the identifying of the proper key and orienting same relative to the lock even in the dark or with packages and boxes in one hand.

A still further object of the invention is to provide a uniquely constructed thumb pusher for a key holder and ejector of the character described. The construction of the thumb pusher stabilizes the movement of the key into and out of the holder and eliminates the need for a plurality of knobs, sleeve extensions or other unsightly ridges and appendages. In this regard, the subject key holder is light weight, more compact and attractive for advertising or trademark indicia to be printed or etched thereon.

DETAILED DESCRIPTION OF THE INVENTION

In the accompanying drawing which forms a part of the specification and is to be read in conjunction therewith, and in which like reference numerals indicate like parts in the various views;

FIG. 1 is a perspective view of the combination key holder and ejector showing the slotted slide, the thumb pusher, and the rear or key loading end of the device;

FIG. 2 is a top plan view of the subject key holder and ejector with the key and thumb pusher shown in broken lines when in their respective extended positions;

FIG. 3 is a right-hand end side elevational view of the device shown in FIG. 2;

FIG. 4 is a sectional view taken substantially along the line 4—4 of FIG. 3 in the direction of the arrows;

FIG. 5 is a rear elevational view taken substantially along the line 5—5 of FIG. 2 in the direction of the arrows, with a portion of the casing broken away to show the thumb pusher securing the key within the housing;

FIG. 6 is a left-hand side elevational view of the thumb pusher only and taken generally along the line 6—6 of FIG. 3 in the direction of the arrows; and

FIG. 7 is a rear elevation view of the thumb pusher taken generally along the line 7—7 of FIG. 6 in the direction of the arrows.

Turning now more specifically to the drawing, reference numeral 10 designates the housing or casing for the key blank 11 and related operational components. I have found that this housing may be conveniently made of a

molded plastic material. In its operative embodiment, the hollow plastic housing or casing **10** has a longitudinal passageway **12** therethrough which opens both ends of the casing. The passageway is of sufficient width and thickness to receive the key blank for reciprocating movement with casing **10**. A longitudinal cylindrical spring chamber **13** is also located interiorly of the casing **10** and lies parallel to passageway **12**. A slot **13***a* is interposed between passageway **12** and chamber **13** so that the latter two have their adjacent sides in communicating relationship.

Chamber **13** is slightly tapered from right to left as seen in FIG. 4 for the purpose of retaining a compression spring. The compressing of a suitably sized spring within chamber **13** has a tendency to lodge one end of same in the tapered end. A second, more narrow passageway **14** is located directly under passageway **12** and extends from the loading end of the casing **10***a* approximately the same longitudinal distance as spring chamber **13**, (see FIG. 4). It may be clearly seen in the same figure that the lock abutting end **10***b* of the casing **10** has passageway **12** opening therethrough for the purpose of extending key **11**.

As mentioned above, key **11** is designed to be ejected through the lock abutting end **10***b* of casing **10**. To further facilitate the insertion of the key within a conventional lock or ignition which may be recessed from a protective rim or the like, the lock abutting end is necked down as seen in FIGS. 1, 2, 4 and 5 and then contoured outwardly at **10***c* thereby increasing the width of the over-all casing to the loading end **10***a*. The upper flat surface of casing **10** has a slot **10***c* defined therein which extends substantially the length of the casing from the loading end to near contour **10***e* of the casing. This slot is in communicating relationship with passage **12**. The loading end **10***a* of casing **10** has a rearwardly extending oval shaped lip **10***d* with aperture **10***d'* located therein to facilitate the attachment of a conventional key chain or ring.

As mentioned above, key blank **11** is designed to be received within passageway **12**. The key has an L-head with lug **11***a* projecting at a right angle to the longitudinal center line of the key. When positioned within casing **10**, lug **11***a* extends through a slot **13***a* transversely into chamber **13**. In assembling, a conventional compression spring **15** is slidably positioned within chamber **13**, prior to the positioning of key **11** within casing **10**. When the key **11** is slidably located within the housing **10** through loading end **10***a*, the L-head of the key (lug **11***a*) comes into contact with the rear extremity of compression spring **15**. Accordingly, any forward movement of key **11** is against compression spring **15**. It should be noted that this key may have either a single or double bite even though the key blank shown in the various figures has a double bite. As a result, passageway **13** is sized to at least accommodate the larger double bite key.

A thumb pusher, generally designated by the numeral **16**, provides a dual function in that it acts as a means for extending the key exteriorly of the casing and into an operative lock inserting position. At the same time, thumb pusher **16** acts as a means for securing the key and spring in their operative positions within the casing.

Thumb pusher **16**, as seen in FIGS. 1, 2 and 5–7, has a wide flat upper surface **16***a* with a thumb engaging ridge **16***b*raised upwardly from the substantially horizontal plane of surface **16***a* shown in the various views. Both the ridge **16***b* and surface **16***a* are knurled to insure better frictional contact between the thumb and the thumb pusher.

A substantially rectangular lug **17** depends from the underside of thumb pusher surface **16***a*. This lug is selectively sized so that its width is slightly less than the width of slot **10***c* and that the height of same is slightly more than the depth of slot **10***c*. In this manner, the lug is engageable within slot **10***c* and provides a means to prevent the thumb pusher from skewing as it moves on the upper surface of casing **10**. Since the height of lug **17** slightly exceeds the depth of slot **10***c*, the lower surface of the lug comes in contact with the upper surface of key **11** near the L-head of same. The rearward portion or right-hand portion (FIG. 6) of lug **17** has a bifurcated extension depending therefrom forming two spaced apart legs **17***a*. The lower end side portion of each leg has a rounded outwardly extending rim **17***b* for the purposes of facilitating the securing of the key within the casing as will be discussed later.

The entire thumb pusher assembly, including the locating lug and legs, may be manufactured of a plastic material. The legs may therefore be resiliently forced together or inwardly in such a manner so that the circumferential distance around the legs at their ridged end extremity is made smaller, but expandable to its original size absent the necessary compressible force.

As mentioned above, the compression spring **15** is first inserted within chamber **13** and then the key blank **11** is slidably positioned within passageway **12**. The key blank has an aperture **11***b* located in the head portion immediately opposite the spring contacting lug **11***a*. This aperture allows slot **10***c*, passageway **12** and lower passageway **14** to all be registerably aligned through the aperture in a communicating relation. When assembly is desired, the thumb pusher may be located on the upper surface of casing **10** with the compressible legs **17***b* directed through slot **10***c* toward aperture **11***b*. By applying downward force on thumb pusher surface **16***a*, the rims **17***b* on legs **17***a* contact the upper edge of aperture **11***b*. The rounded lower surface of the rims direct the two legs together, thereby allowing the rims of the legs to pass through the aperture and to locate within lower passageway **14**. Once the rims **17***b* have passed through the aperture, the resilient plastic returns the legs to near the original position snugly against the edge of aperture **11***b*. The lower portion of the lug **17** rides forwardly of aperture **11***b* on the upper surface of key blank **11**. The width of the lug **17** enables the thumb pusher to be slidably moved within slot **10***c*; however, this movemeit is stabilized and inadvertent wobbling or skewing is successfully negated.

The key blank may be easily removed from the device by manually grasping the forward edge of thumb pusher **16** under ridge **16***b* and lifting upwardly. The upward lift again results in legs **17***a* being compressed together so that the rims **17***b* may pass through aperture **11***b*. Key blank **11** is then easily removable from the loading end **10***a* of casing **10**. A different key may be substituted and the thumb pusher once again replaced to securely enclose same within the casing without the use of any tools whatsoever.

The combination key holder and ejector is easily operated with one hand. By resting the underside (as seen in the various views) of the key holder on the index and middle finger, the thumb of the same hand may come in contact with the upper surface of thumb pusher **16**. A simple forward sliding motion moves the thumb pusher and key blank **11** against compression spring **15** and extends the left-hand end of the key blank (see FIG. 4) exteriorly of casing **10**. It should be noted that the sliding motion is both forwardly and downwardly thusly causing the lower surface of lug **17***a* to bear against the upper surface of the key for added stability. The key may now be inserted into a conventional lock or ignition and rotated to the "locked" or the "on" position. The action of the lock's tumblers retain the key in its extended position exteriorly of the casing even though compression spring **15** is biasing lug **11***a* and the key to the rear of the casing. When the key is rotated to the "off" or the "unlocked" position, the tumblers no longer retain the key within the lock and the force of compression spring **15** against L-head **11***a* return the key to the concealed position within case **10**, absent any restraining force on the key or on thumb pusher **16**. In this manner, it is impossible to inadvertently

leave the key in the ignition of an automobile or in an office or home door, as the key is automatically ejected into the hand of the user when turned to the "unlocked" or "off" position.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. In a combination key holder and ejector of the type that permits a key to be held within a lock when in the "locked" or "on" position and to be automatically withdrawn from the lock when in the "unlocked" or "off" position, the improvement comprising,

a housing, said housing defining the shape of a hollow interior and having a longitudinal slot defined in the housing parallel with the longitudinal axis of said housing and in communicating relationship with said interior with the surface of said housing opposite said slot closed,

a key, said key occupying a portion of said interior and movable longitudinally to either extend a portion of said key exteriorly of said housing or to withdraw said extended portion substantially within said housing,

a compression spring disposed in spatial relation with said key within said housing, and

a pusher, said pusher having a portion thereof mounted upon said longitudinal slot and located at least partially exteriorly of said housing, said pusher operable to move said key outwardly of said housing against said spring for operation with said lock, said pusher including a compressible securing means which interconnects said pusher with said key, said securing means maintaining said key and spring for slidable movement within said housing, said spring operable to withdraw said key within said housing when not otherwise restrained means for guiding said pusher as same is slidably moved on said housing,

2. The invention as in claim 1 wherein said pusher has a thumb engaging surface with a lug depending therefrom, said lug being engageable within said slot, said securing means extending from said lug, said key being movable with said pusher and said lug stabilizing the movement of said pusher within said slot.

3. The invention as in claim 2 wherein said securing means includes a compressible extension depending from said pusher, an aperture in said key, said extension extending through said aperture and operable to secure said pusher to said key.

4. The invention as in claim 3 wherein said extension includes two separated legs, an outwardly extending rim around the end portion of each leg, said legs operable to be compressed together when said extension is forced through said aperture and to expand securely against said key, said key being located in an operable position intermediate said pusher and said rim.

5. The invention as in claim 1 wherein said securing means includes a compressible extension depending from said pusher, an aperture in said key, said extension extending through said aperture and operable to secure said pusher to said key, said aperture being of sufficient diameter to provide a shear point for said key thereby preventing said key from shearing at a key notch therein.

6. The invention as in claim 5 wherein said extension includes two separated legs, an outwardly extending rim around the end portion of each leg, said legs operable to be compressed together when said extension is forced through said aperture and to expand securely against said key, said key being located in an operable position intermediate said pusher and said rims.

7. The invention as in claim 1 wherein said pusher is contourned to accommodate the thumb of the user of same, said pusher having its outer surface with respect to the housing inclined so that the edge of same nearest the portion of said housing where said key moves outwardly therefrom during normal operation lies in a plane more distant from said housing than any other planes through said outer surface.

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