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LOCK

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Fig. 1.

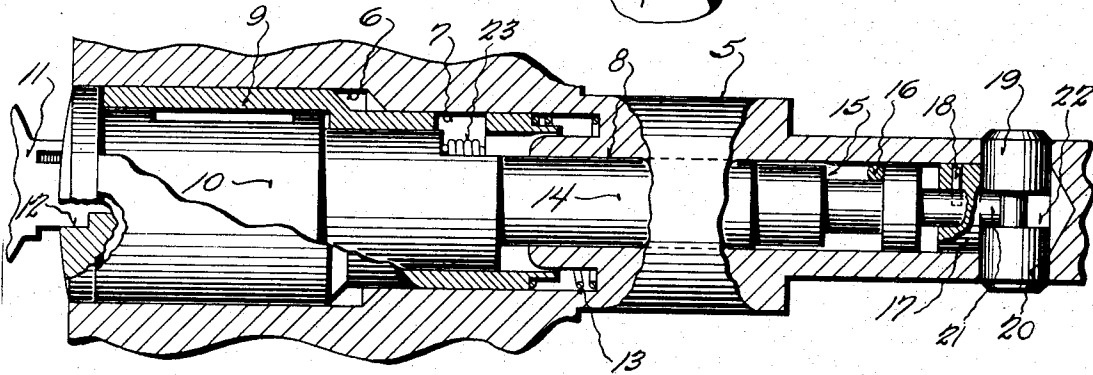


Fig. 2.

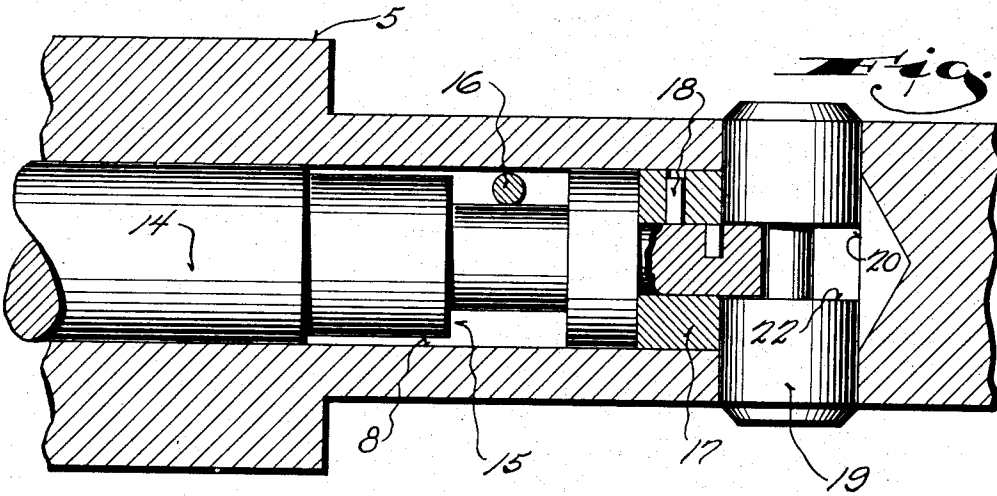


Fig. 3.

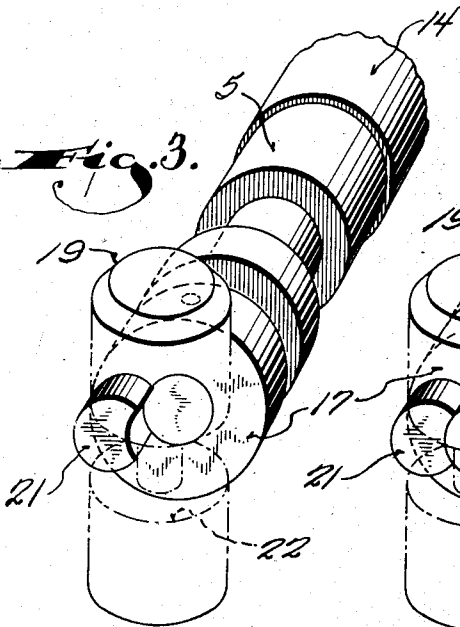
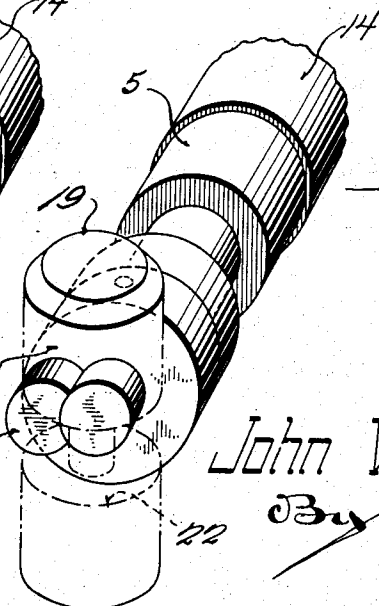


Fig. 4.



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LOCK

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13 Claims. (Cl. 70-91)

This invention relates to new and useful improvements in locks and particularly to that type of cylinder lock now commonly used in door handles of automobiles wherein the driving member or handle has no connection with the latching mechanism in the locked condition.

Previous to the present invention, by driving a suitable implement into the keyway and applying torsion to the cylinder, the locking effect of the lock could be overcome and a sufficient connection between the driving member and latching mechanism could be obtained to enable actuation of the latter.

It is therefore a broad object of this invention to provide a locking unit of the character described which is so constructed that the percussion force on the end of the lock cylinder incidental to an attempt at unauthorized manipulation of the lock positively secures its bolt against actuation and thereby effectively precludes the establishment of a driving connection between the driving member and the latch mechanism.

More specifically it is an object of this invention to provide a lock wherein any attempted unauthorized manipulation of the lock cylinder which entails driving an implement into the lock keyway, shears a frangible pin and effects a connection between the stem of the lock cylinder and its bolt to positively secure the bolt against actuation by a driving member.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view substantially in longitudinal section through an automobile door handle illustrating the application of this invention thereto;

Figure 2 is an enlarged longitudinal section view of the inner end of the handle showing the bolt locked against actuation;

Figure 3 is a perspective view of the inner end of the lock stem showing its driving connection with the bolt; and

Figure 4 is a perspective view similar to Figure 3 but showing the bolt locked against actuation

as by an unauthorized attempt to manipulate the lock.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts throughout the several views, the numeral 5 designates part of an automobile door handle which is provided with a series of axially aligned and communicating bores 6, 7 and 8, of successively smaller diameter.

Mounted in the outer bores 6 and 7 is the shell or casing 9 of a conventional cylinder lock including a cylinder 10 disposed within the shell or casing, and tumblers (not shown) adapted to lock the cylinder against rotation in the shell, the tumblers being retractible by a proper key insertable into a keyway 12 to free the cylinder for rotation.

The shell or casing 9 is suitably held against rotation in the bores 6 and 7 of the door handle, but is free to shift longitudinally for a purpose to be hereinafter described. Normally the shell, and consequently the entire cylinder lock structure, is yieldingly maintained in its outermost position with the outer end of the cylinder flush with the outer face of the door handle by a spring 13 confined between the inner end of the shell and the bottom of the bore 7.

The lock cylinder 10 has a stem 14 projecting from its inner end to be received in the innermost bore 8. The inner end of this stem has an annular groove 15 in which a pin 16 fixed in the adjacent portion of the door handle is received. The pin 16 through engagement with the inner wall of the groove 15 limits the outward longitudinal projection of the lock unit by the spring 13 and is of sufficient width to permit a degree of inward longitudinal shifting of the assembled lock unit for a purpose to be hereinafter described.

The innermost end of the stem is reduced in diameter and has a collar 17 fixed thereto by a frangible shear pin 18 in a position at which the end of the stem is flush with the adjacent inner face of the collar. This inner face of the collar bears against the cylindrical surface of a locking bolt 19 slidable in a transverse bore 20 in the adjacent handle part.

Projecting from the inner face of the collar 17 is an eccentric driving cam 21 which projects into an annular groove 22 in the locking bolt so that upon rotation of the stem 14 effected by manipulation of the key, the bolt is actuated longitudinally to and from an operative position projecting one end thereof from the adjacent end of the bore 20 for engagement with a latch-

ing mechanism, not shown, to effect a driving connection between the handle and the latching mechanism.

Normally the lock cylinder is yieldingly held in a position of rotation holding the locking bolt in its inoperative position with its ends substantially flush with the ends of the bore in which it operates, by a torsion spring 23. The spring 23 is coiled about the stem 14 adjacent its attachment to the cylinder and has its ends hooked over abutments on the lock cylinder and the sleeve or casing 9. Inasmuch as this manner of holding the lock cylinder in its normal locked position of rotation forms no part of this invention and is in accordance with conventional practice, it has not been shown in detail.

In operation, the latching mechanism to be actuated is operable to its released or unlocked position by the application of turning force thereon through the medium of the handle when the locking bolt is projected to its operative position by rotation of the lock unit. Ordinarily, such rotation of the cylinder is effected by the use of a proper key.

If an unauthorized attempt is made to manipulate the lock as by the insertion of an implement into the outer end of the keyway and the application of torsional force thereon, the connection between such implement and the keyway to be adequate to enable the transmission of the requisite turning force to the cylinder, requires that the implement be forcibly driven into the keyway.

During the application of the percussion force incidental to the driving of an implement into the keyway, the frangible shear pin shears off, thus freeing the collar 17 for rotation with respect to the stem, and permitting the projection of the inner end of the stem into the annular groove 22 in the locking bolt as shown in Figure 2.

This results from the fact that the percussion force acting to drive the lock unit and consequently the stem 14 inwardly is taken up solely by the abutment of the collar 17 against the locking bolt 19, the annular groove 21 in the bolt being of sufficient width to receive the inner end of the stem.

Hence, upon shearing of the pin 18 and inward endwise movement of the stem, actuation of the locking bolt to its operative position becomes utterly impossible.

The projection of the locking bolt to operative position being thus precluded, it follows that driving connection between the handle and the latching mechanism cannot be effected.

What I claim as my invention is:

1. In a lock of the character described, a locking bolt, a key operable lock cylinder, and a driving connection between the cylinder and the locking bolt for translating rotation of the cylinder into linear movement on the part of the locking bolt, said connection including a frangible part adapted to give way under a percussive force applied to the cylinder so as to render the locking bolt inoperable by subsequent rotation of the cylinder.

2. In a lock of the character described, an endwise movable locking bolt, a key operable lock cylinder, a connection between the lock cylinder and the locking bolt whereby the bolt is movable endwise by rotation of the cylinder, said connection including a frangible part adapted to give way under a percussive force applied to the cylinder which results in an endwise movement of the

cylinder, and means operable upon endwise shifting of the cylinder to secure the bolt against actuation.

3. In a lock of the character described, an endwise movable locking bolt, a lock cylinder, a connection between the lock cylinder and the locking bolt for moving the bolt endwise upon rotation of the cylinder, said connection comprising an eccentric driving member having a connection with the locking bolt, and frangible means securing said eccentric driving member to a cylinder part, said frangible means being adapted to give way under the influence of a percussive force applied to the cylinder so as to free the eccentric driving member from the cylinder and render the bolt inoperable by the cylinder.

4. In a lock of the character described, a mounting member, a locking bolt mounted for endwise movement in the mounting member, operating means for the bolt, and a connection between the operating means and the bolt for translating rotation of the operating means into endwise movement on the part of the bolt, said connection including a frangible part adapted to give way under a percussive force so as to render the bolt inoperable by said operating means.

5. In a lock of the character described, a manually operable driving member for transmitting motion to mechanism to be actuated, a locking bolt carried by the driving member and projectable endwise to a position affording a connection between the driving member and mechanism to be actuated thereby, operating means mounted in the driving member for projecting the locking bolt to its operative position, and a connection between the operating means and the locking bolt adapted to give way under a percussive force so as to render the locking bolt subsequently inoperable.

6. In a lock of the character described, a driving member affording a lock housing and adapted for imparting predetermined motion to mechanism to be actuated, a locking bolt carried by said driving member and movable to and from a position affording a driving connection between said driving member and the mechanism to be actuated thereby, a key operable lock cylinder in the driving member, and a connection between the lock cylinder and the locking bolt for moving the locking bolt to and from its operative position by rotation of the cylinder, said connection including a frangible part adapted to give way under a percussive force so that said connection is rendered incapable of transmitting movement to the locking bolt.

7. In a lock of the character described, a key operable lock cylinder, a locking bolt, a connection between the cylinder and the bolt comprising a stem rigidly connected with the cylinder, a collar on the stem having an eccentric cam engaged with the bolt and operable to move the bolt endwise upon rotation of the cylinder, and a frangible part for securing the collar on the stem, said frangible part being adapted to give way under forced endwise movement of the cylinder and stem so as to render the connection incapable of transmitting motion from the cylinder to the bolt.

8. In a lock of the character described, a member bored to provide a lock housing, a locking bolt movably mounted in said member, a lock cylinder rotatable and longitudinally movable in said bore, and a connection between the lock cylinder and the bolt comprising a stem rigidly connected with the cylinder, a part mounted on the stem

and having an eccentric cam engaged with the locking bolt so that rotation of the cylinder and stem transmits axial motion to the locking bolt, a frangible connection between said part and the stem, and said part being held against inward endwise movement with respect to the housing member independently of the stem so that upon the application of a percussive force on the end of the cylinder said frangible connection is broken and the connection between the cylinder and locking bolt is rendered incapable of transmitting motion from the former to the latter.

9. In combination, a lock housing, a locking bolt slidable in the housing, a key operable lock cylinder in the housing for actuating the bolt, a part carried by the cylinder and operable upon inward endwise motion of the cylinder to secure the locking bolt against actuation, and means to normally prevent such inward endwise motion of the cylinder comprising a collar on said cylinder part firmly held against movement in an inward axial direction with respect to the cylinder, and frangible means securing said collar to the cylinder part, said frangible means being adapted to give way under a percussive force applied to the cylinder whereupon said cylinder part is shifted inwardly into operative engagement with the locking bolt.

10. In combination, a lock housing, a locking bolt slidable in the housing, a key operable lock cylinder in the housing for actuating the bolt, a part carried by the cylinder and operable upon inward endwise motion of the cylinder to secure the locking bolt against actuation, and means to normally prevent such inward endwise motion of the cylinder comprising a collar on said cylinder part firmly held against movement in an inward axial direction with respect to the cylinder, frangible means securing said collar to the cylinder part, said frangible means being adapted to give way under a percussive force applied to the cylinder whereupon said cylinder

part is shifted inwardly into operative engagement with the locking bolt, and means on the collar and engaged with the locking bolt for translating rotation of the cylinder into sliding movement of the locking bolt.

11. In a lock, a member forming a lock housing, a key operable lock cylinder mounted therein, a locking bolt movable in said member and operable by the cylinder, said locking bolt having a recess, cam means driven by the cylinder and engaged in said recess for actuating the bolt, and a part rigidly connected with the cylinder and projectable into said locking bolt recess upon inward endwise movement of the cylinder to secure the bolt against actuation.

12. In a lock, a member forming a lock housing, a key operable lock cylinder mounted therein, a locking bolt movable in said member and operable by the cylinder, said locking bolt having a recess, cam means driven by the cylinder and engaged in said recess for actuating the bolt, and a part rigidly connected with the cylinder and projectable into said locking bolt recess upon inward endwise movement of the cylinder to secure the bolt against actuation, and means to prevent inward endwise motion of the cylinder including a frangible part adapted to give way under a percussive force applied to the cylinder.

13. In combination with a door handle for actuating a door latching mechanism, a locking bolt slidably mounted in the handle and projectable to a position affording a driving connection between the handle and the mechanism to be actuated, a key operable lock cylinder mounted in the handle, and a driving connection between said cylinder and bolt whereby rotation of the cylinder moves the locking bolt to and from its operative position, said connection including a frangible part adapted to give way and disable said connection between the cylinder and the bolt.

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