Feb. 18, 1936. J. W. FITZ GERALD 2,031,155

LOCK

Filed June 7, 1935

Fig. 1.

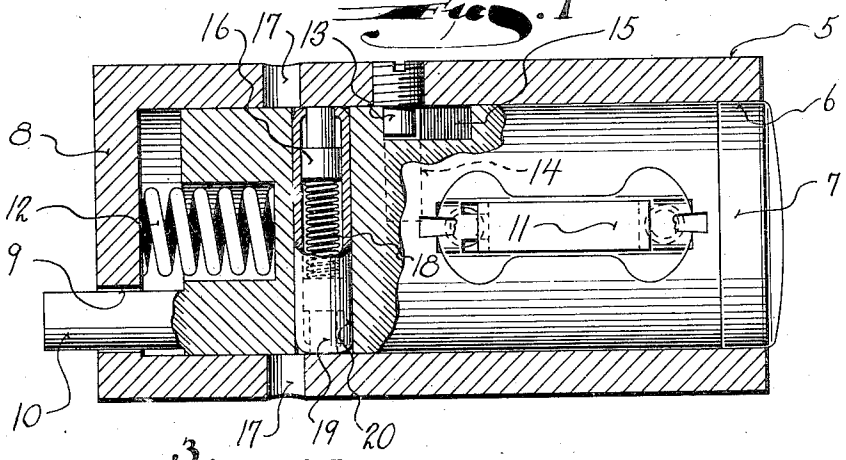


Fig. 2.

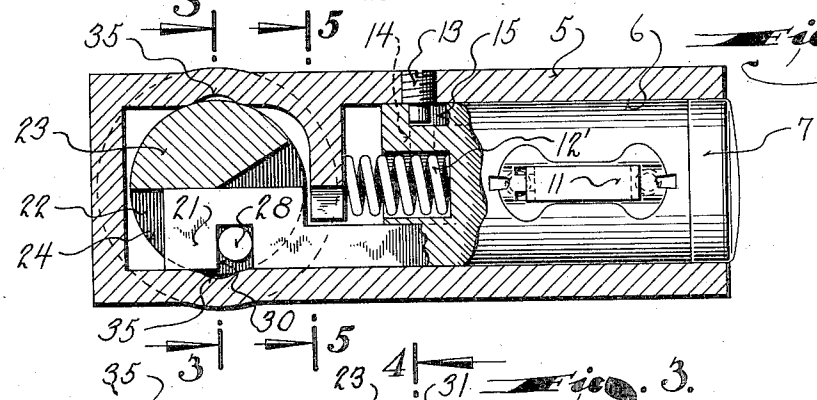
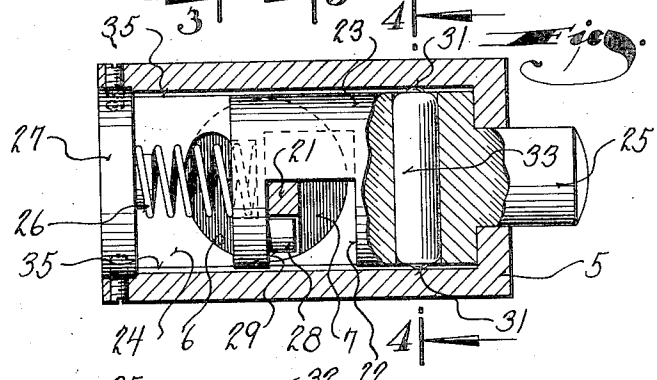


Fig. 3.



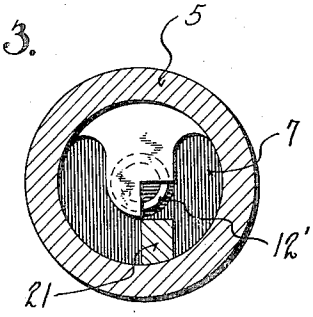
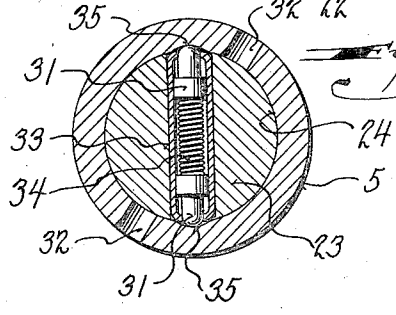


Fig. 5.

Fig. 4.



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LOCK

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Application June 7, 1935, Serial No. 25,448

12 Claims. (Cl. 70—46)

This invention relates to improvements in locks and has as an object to provide means operable upon the application of endwise force on the lock cylinder, as during an attempt at unauthorized manipulation of the lock, for positively rendering the lock inoperative.

Another object of this invention is to provide a lock structure wherein the lock cylinder is held against inward axial movement by a strong spring.

A further object of this invention is to provide automatically operable locking means for destroying the operativeness of a lock, particularly of the type known as steering column locks and shown in the co-pending application of John W. Fitz Gerald, Serial No. 756,630, filed December 8th, 1934, upon the application of endwise movement to the lock cylinder as in an attempt at unauthorized manipulation of the lock.

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 two complete examples of the physical embodiment of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view partly in longitudinal section and partly in side elevation through a lock embodying one form of this invention;

Figure 2 is a view similar to Figure 1 showing the application of this invention to a steering post lock of the type shown in the aforesaid co-pending application of John W. Fitz Gerald;

Figure 3 is a sectional view through Figure 2 on the plane of the line 3—3;

Figure 4 is a detail section view through Figure 3 on the plane of the line 4—4; and

Figure 5 is a detail sectional view through Figure 4 on the plane of the line 5—5.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts throughout the several views, the numeral 5 designates the casing of a conventional cylinder lock bored as at 6 to receive a lock cylinder. The inner end of the casing is closed by a wall 8 and to permit the transmission of motion from the lock cylinder to mechanism to be actuated (not shown), the rear wall 8 may be provided with an arcuate opening 9 through which an eccentric cam 10 extends. The eccentric driving cam 10 may be formed as an integral part of the cylinder 7.

The lock cylinder is normally held in a locked position of rotation by the projection of a locking bar 11 from its side and into a longitudinal groove (not shown) in the casing. The locking bar 11 is projectible to its operative locking position by key operable tumblers (not shown) and is retractible within the periphery of the cylinder 7 upon the insertion of a proper key (also not shown).

A heavy expansive spring 12 confined between the inner end of the lock cylinder and the rear wall 8 of the casing yieldingly urges the cylinder forwardly in the casing. To limit the forward projection of the cylinder by the spring 12, a stop pin 13 carried by the casing and engaging in an arcuate groove 14 is provided. Communicating with the arcuate groove 14 is a longitudinal recess or groove 15 to accommodate the stop pin 13 upon inward movement of the lock cylinder against the action of the spring 12.

Upon such inward axial movement of the cylinder, two spring pressed locking pins 16 carried by the cylinder are aligned with diametrically opposed openings 17 in the casing, and as the pins 16 align with the openings 17 their spring 18 projects them outwardly into the openings 17 to positively secure the lock cylinder against further actuation. The locking pins 16 are preferably encased within and projectible from the ends of a sheath 19 secured in a transverse bore 20 in the cylinder. Shoulders on the locking pins limit their outward projection by the spring 18.

In the modified embodiment of the invention shown in Figures 2 to 5, inclusive, the lock cylinder carries no locking pins, but as in the embodiment shown in Figure 1, it is yieldingly urged forwardly by a heavy expansive spring 12'. In this embodiment of the invention, which is particularly applicable to steering post locks, the cylinder has a driving cam 21 projecting from its inner end which engages in a recess 22 in a locking bolt 23 slidable transversely to the axis of the cylinder and normally by rotation of the cylinder and its cam 21, the bolt 23 is retracted. Preferably, the bore 24, in which the bolt 23 slides, is formed as an integral part of the casing 5 and in a steering post lock, this casing 5 is shaped to embrace the post, as is well known.

One end 25 of the locking bolt is projectible as best shown in Figure 3, into operative engagement with the part to be locked. A spring 26 confined between the opposite end of the bolt and a plate

27 closing he adjacent end of the bore 24 yieldingly projects the locking bolt to its operative position from which it is retractible by rotation of the lock cylinder through the medium of the driving cam 21.

It will be noted that a pin 28 projects from the end wall 29 of the recess 22 with which the driving cam 21 engages and that the driving cam 21 has a notch 30 hooked over this pin. This provides a connection between the lock cylinder and the locking bolt through which endwise movement of the lock cylinder when in its locked position, as shown in Figures 2 and 3, is translated into rotation on the part of the locking bolt 23. Upon such rotation of the locking bolt, locking pins 31 similar to the pins 16 but carried by the locking bolt will be brought into alignment with openings 32.

The locking pins 31 like the pins 16 are mounted in a sheath 33 which likewise encloses the spring 34 which serves to yieldingly project the pins into the openings 32 upon being brought into alignment therewith.

Inasmuch as the notch 30 in the driving cam 21 disengages the pin 28 during normal manipulation of the lock, it is necessary to hold the locking bolt against possible turning during this period and for this purpose, the bore 24 in which the bolt slides has diametrically opposite longitudinal grooves 35. These grooves 35 are shallow and round bottomed and the ends of the locking pins are likewise rounded so that a slight turning force applied to the locking bolt serves to disengage the pins therefrom.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art, that this invention affords simple means for positively rendering a lock inoperative upon the application of endwise force on the cylinder as in an attempt at unauthorized manipulation of the lock, and that this invention is particularly applicable to steering post locks.

What I claim as my invention is:

1. In a lock, a casing, a lock cylinder mounted therein, yieldable spring means holding the lock cylinder in a normal position of endwise movement, said spring means permitting a degree of inward endwise movement upon the application of inward force on the cylinder, and means for positively rendering the lock inoperative upon inward endwise movement of the cylinder a predetermined distance.

2. In a lock including a casing and a lock cylinder therein, a spring yieldingly urging the lock cylinder outwardly of the casing, and locking means to destroy the operativeness of the lock upon forced inward axial movement of the lock cylinder against the action of the spring as in an attempt at unauthorized manipulation of the lock.

3. In a lock including a casing and a lock cylinder therein, a spring yieldingly urging the lock cylinder outwardly of the casing, and means to positively render the lock inoperative upon forced inward axial movement of the lock cylinder against the action of the spring, said means comprising a part movable to a predetermined position with repect to the casing upon inward endwise movement of the lock cylinder against the action of the spring, and means for projecting said part into interlocking engagement with the casing upon being moved to said predetermined position.

4. In a lock including a casing and a lock cylinder therein, a spring yieldingly urging the lock cylinder outwardly of the casing, and means operable to positively render the lock inoperative comprising a spring pressed locking pin movable bodily from an inactive position to an active position projecting into a locking recess upon inward axial movement of the cylinder.

5. In a lock including a casing and a lock cylinder therein, a spring yieldingly urging the lock cylinder outwardly of the casing, and means to render the lock inoperative upon forced inward movement of the lock cylinder against the action of the spring comprising a spring pressed locking pin carried by the cylinder and projectible into a locking recess in the casing upon inward endwise movement of the cylinder a predetermined distance.

6. In a lock including a casing and a lock cylinder therein, spring means yieldingly holding the cylinder in a predetermined position of endwise movement, and means to positively render the lock inoperable comprising a spring pressed locking pin carried by the lock cylinder and projectible into a locking recess in the casing upon endwise movement of the cylinder out of its normal position against the action of said spring means.

7. In a lock including a casing and a lock cylinder therein, spring means yieldingly maintaining the lock cylinder in a predetermined position of endwise movement in the casing, and means to positively render the lock inoperable comprising a spring pressed uocking pin bodily movable with the lock cylinder into engagement with a locking recess upon endwise movement of the cylinder against the action of said spring means as in an attempt at unauthorized manipulation of the lock.

8. In a lock, a casing, a locking bolt slidable and rotatable in the casing, a lock cylinder rotatable and slidable in the casing, a connection between the cylinder and locking bolt for sliding the bolt axially upon rotation of the cylinder and for turning the bolt upon endwise movement of the cylinder, means for holding the cylinder against endwise movement, said means being of insufficient strength to hold the cylinder against endwise movement in the event of the application of excessive force thereto as in an unauthorized attempt to manipulate the lock, and means operable upon turning of the locking bolt as a result of such forced endwise movement of the cylinder for positively rendering the lock inoperative.

9. In a lock, a casing, a locking bolt mounted in the casin, a lock cylinder mounted in the casing a driving connection between the lock cylinder and the locking bolt whereby rotation of the cylinder actuates the bolt in the performance of its normal locking function, means for holding the lock cylinder in a normal position of endwise movement, a connection between the cylinder and locking bolt whereby endwise movement of the lock cylinder turns the locking bolt, and cooperating locking means carried by the bolt and casing operable to secure the bolt against further actuation upon a predetermined rotation of the bolt as a result of endwise movement of the lock cylinder as in an attempt at forced manipulation of the lock.

10. In a lock, a casing having intersecting bores, a lock cylinder slidable and rotatable in one bore, a locking bolt slidable and rotatable in the other bore, a connection between the lock cylinder and the locking bolt whereby rotation of the cylinder transmits sliding movement to the lock-

ing bolt to effect the normal locking function of the bolt and axial sliding of the cylinder turns the locking bolt, spring means yieldingly maintaining the lock cylinder in a predetermined position of endwise movement, said spring means being of sufficient strength to normally hold the cylinder in said predetermined position of endwise movement but having insufficient strength to withstand an excessive force on the lock cylinder in an endwise direction, and cooperating means carried by the locking bolt and the casing operable upon turning of the bolt as a result of endwise movement of the lock cylinder for positively securing the locking bolt against actuation in any direction.

11. In a lock, a casing having intersecting bores, a locking bolt rotatable and slidable in one bore, a lock cylinder rotatable and slidable in the other bore, a connection between the cylinder and bolt whereby rotation of the cylinder is translated into sliding movement of the bolt and endwise movement of the cylinder is translated into rotation of the bolt, a spring yieldingly urging the lock cylinder outwardly of the casing, and a spring pressed locking pin carried by the locking bolt and projectible into a locking recess in the casing upon rotation of the bolt a predetermined degree as a result of inward endwise movement of the lock cylinder as in an unauthorized attempt at manipulation of the lock.

12. In a lock, casing having intersecting bores, a locking bolt rotatable and slidable in one bore, a lock cylinder rotatable and slidable in the other bore, a connection between the cylinder and bolt whereby rotation of the cylinder is translated into sliding movement of the bolt, another connection between the cylinder and bolt whereby endwise movement of the cylinder is translated into rotation of the bolt, said latter connection being broken upon rotation of the cylinder to effect sliding movement of the bolt, means for yieldingly holding the bolt in a predetermined position of rotation to insure re-establishment of said second connection, means for yieldingly maintaining the cylinder against endwise movement, and means operable upon rotation of the bolt caused by endwise movement of the cylinder for positively locking the bolt against further actuation.

JOHN W. FITZ GERALD.