Oct. 31, 1967 R. W. WALTERS 3,349,585

LOCK ASSEMBLY WITH A REMOVABLE BOLT

Filed May 3, 1965

FIG. 1.

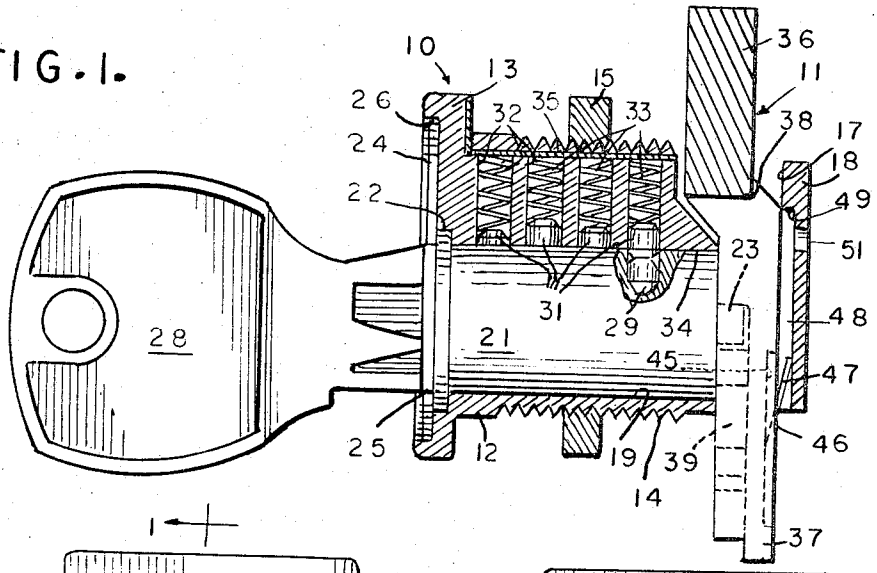



FIG. 2.

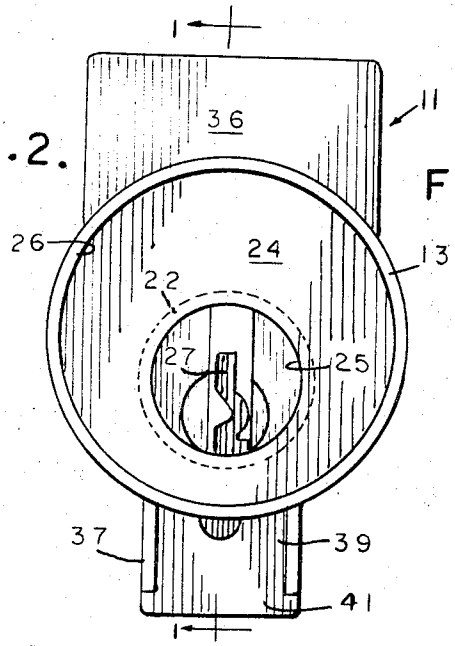



FIG. 3.

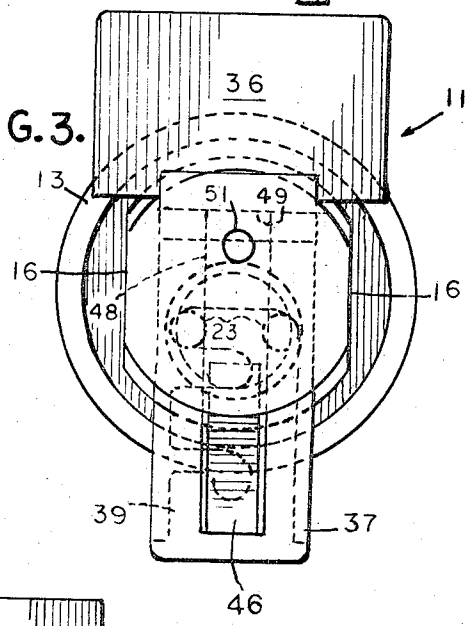



FIG. 4.

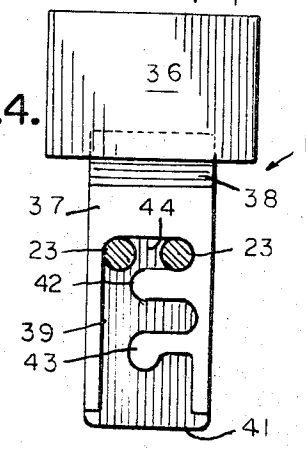
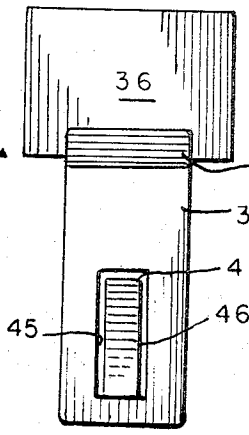



FIG. 5.




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# LOCK ASSEMBLY WITH A REMOVABLE BOLT

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## ABSTRACT OF THE DISCLOSURE

A lock assembly having an easily removable lock bolt actuated by a key-operated cylinder type lock with a locking plug retained in the cylinder by a cylinder disk and having a pair of spaced axially offset pins extending from the rear end of the plug and into a recess in a vertically reciprocable lock bolt which is movable in an irregular transverse slot in the lock cylinder. The bolt recess includes a pair of spaced arms and an open space below the arms, and the bolt includes an elongated recess on the opposite side thereof to house a flat spring having one end extending into a slot in the cylinder. The slot terminates in a shoulder cooperating with the free end of the flat spring to prevent removal of the bolt, and an opening in the rear end of the cylinder adjacent the shoulder allows a small instrument to disengage the end of the spring from the shoulder.

The present invention relates to a novel lock assembly having an easily removable lock bolt and more particularly to a lock assembly adapted for use in desks or other enclosures to secure various members in closed positions and against unauthorized opening.

Lock assemblies of the key-operated cylinder type are commonly utilized in the drawers of desks or other cabinets to secure the drawers or other members in closed position and against unauthorized opening. For example, in mounting a lock assembly in the drawer of a desk or cabinet, it is generally required to provide a cylindrical opening formed in the front panel of the desk and a suitable mortise or recess formed in the interior surface of the panel to house the bolt and bolt actuating means. With metal desks or cabinets, the front panel of the metal drawer must be cut to secure the lock in mounted position, whereas the present invention requires only a cylindrical opening be formed extending through the front panel of the drawer and the bolt is removably mounted in the rearwardly extending portion of the lock cylinder so that additional cutting operations are eliminated.

An important object of the present invention is the provision of a lock assembly having a removable bolt which is easily and quickly assembled or disassembled from the cylinder lock operated by a suitable key. The bolt can be assembled after the cylinder lock has been mounted in operative position within the front panel of a drawer or the like, and which can be easily assembled without the use of special tools and without removing the plug from the cylinder.

Another important object of the present invention is the provision of a lock bolt that can only be removed from the cylinder lock when the bolt is projected to its locked position by use of the proper key which actuates the lock bolt to its projected or locked position before the bolt can be removed from the lock cylinder. When the bolt is in its retracted or unlocked position, the actuating pins of the rotatable plug cooperating with the actuating recess formed in the bolt prevent the bolt from being removed from the cylinder.

A further important object of the present invention is the provision of a novel lock bolt in a cylinder lock, the lock bolt being easily removed and reassembled without



the necessity of any special tools and, when assembled, is positively locked in operative position in the cylinder. The locking means for the bolt includes a bolt spring which normally engages a shoulder in the cylinder when the bolt is advanced to locking position. The spring can be depressed into the bolt by a small or pointed instrument, paper clip, etc. so as to be released from the shoulder and the bolt is easily removed.

The present invention further comprehends the provision of a cylinder lock having a cylinder disk engaging and retaining the plug in operative position. The utilization of the cylinder disk presents an economical method of providing a variety of finishes or configurations for the exposed face of the cylinder.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later appear and are inherently possessed thereby.

In the drawing:

FIGURE 1 is a vertical cross sectional view taken on the line 1—1 of FIG. 2 and showing the cylindrical lock and the removable bolt in the retracted or unlocked position.

FIG. 2 is a front elevational view of the cylinder lock and bolt assembly.

FIG. 3 is a rear elevational view of the cylinder lock and bolt assembly.

FIG. 4 is a front elevational view of the removable bolt and showing the actuating recess cooperating with the actuating pins of the locking plug.

FIG. 5 is a rear elevational view of the bolt showing the releasable locking spring.

Referring more particularly to the drawing wherein is disclosed an illustrative embodiment of the present invention, FIG. 1 discloses a cylinder lock assembly **10** having a removable bolt **11**, the lock assembly being utilized for drawers of desks, cabinets or other enclosures or other suitable applications. The lock assembly **10** includes a cylinder **12** having a radial flange **13** at the exterior and forming an abutting shoulder to limit movement in inserting the cylinder in a cylindrical opening. The cylinder is externally threaded at **14** intermediate its ends for cooperation with an internally threaded cylinder nut **15** to retain the cylinder in the opening in a front panel of a drawer, etc. The cylinder also includes flattened opposed surfaces **16** so that insertion of the cylinder in a complementary or conforming opening retains the cylinder against rotation.

The cylinder has an irregularly shaped slot or passage **17** extending diametrically or transversely through the cylinder adjacent the rear end **18** to receive the irregular shaped bolt **11**. A cylindrical passage or opening **19** is formed in the cylinder extending from the front of the cylinder to and intersecting the slot **17** to receive a plug **21** rotatably mounted in the opening **19** and includes a a circumferential flange **22** received in a counterbore formed at the front of the opening **19** and a pair of spaced rearwardly extending actuator pins or projections **23** which extend into the slot **16**. A cylinder disk **24** having an opening **25** accommodating the front end of the plug **21** is received in a circular recess **26** in the face of the cylinder **12** and secured therein to retain the plug in the cylinder.

The plug **21** includes a keyway or longitudinal slot **27** adapted to receive a suitable key **28** which actuates pin tumblers **29** in the plug. Drivers **31** for the pin tumblers are positioned in tumbler passages **32** in the cylinder. Tumbler springs **33** yieldably bias the drivers and pin tumblers to an inoperative position with their abutting surfaces out of alignment with the shear line **34** between the

plug and the cylinder. A tumbler retainer **35** secured in the cylinder retains the springs, drivers and pin tumblers in the cylinder.

The bolt **11** has a generally T-shape with a generally horizontal or transverse head **36** connected to a downwardly extending leg or member **37** through an inclined or offset portion **38**. The front surface of the member **37** as seen in FIG. 4, has an irregular or notched recess **39** receiving and cooperating with the spaced rearwardly projecting pins **23** of the plug **21**. The recess is open at the bottom **41** so that the bolt **11** may be inserted into the slot **17** when the pins **23** are horizontally aligned such as seen in FIG. 3. The recess includes a pair of laterally extending vertically spaced arms or projections **42, 43** which cooperate with the pins **23** to reciprocate the bolt between the retracted unlocked position shown in the drawing and the locking position. As seen in FIG. 3, the pins are in the upper horizontally aligned recess **44** with the bolt in retracted position.

The opposite surface of the member **37** (FIG. 5) includes an elongated recess **45** housing a flat spring or bolt retainer **46** which is secured at its lower end in the recess **45** in the bolt and the upper flexed end **47** normally extends outwardly beyond the surface of the bolt. The slot **17** in the cylinder has an elongated vertical channel **48** formed therein, the channel being open at its lower end and with a shoulder **49** at the upper end providing a stop or abutment against which the flexed free end **47** of the spring **46** abuts to limit upward movement of the bolt. A small opening **51** formed in the rear end **18** of the cylinder below the shoulder **49** and aligned with the elongated spring **46** permits depressing the free end **47** of the spring by means of a paper clip or a small tool or rod when the bolt is in its projected position, thus releasing the bolt for removal.

Considering the operation of the lock assembly, FIGS. 1 to 3 show the bolt **11** in its retracted position with the pins **23** in the upper horizontal portion **44** of the recess **39** (see FIG. 4). With the drawer open to provide access to the opening **51**, the key **28** is inserted into the keyway **27** and the plug **21** is rotated in a clockwise direction as seen in FIG. 3. The right or first pin **23** seen in FIG. 3 moves in an arcuate path downward and into the recess between the two projections **42, 43** and abuts and urges the projection **42** upward to initiate movement of the bolt. The left or second pin **23** then moves in a generally circular path out of recess portion **44** and downward past both projections **42, 43**, and moves under the projection **43** while the first pin moves out from between the projections to a position of horizontal alignment with the second pin. At this point, the plug **21** has rotated through 360° and the free end **47** of the spring **46** has moved upward in the slot **48** to engage the shoulder **49**.

To retract the bolt, the key **28** and plug **21** are rotated in the opposite direction. If the bolt is to be removed from the cylinder, with the drawer open to expose the lock assembly the bolt is advanced to its locking position and a pointed instrument or tool is inserted through the opening **51** to depress the free end **47** of the spring **46** into the recess **45** so as to disengage this end from the shoulder **49**, and the bolt is bodily lifted out of the slot **17**. The open end **41** of the recess **39** allows removal of the bolt without interference from the horizontally aligned pins **23** which in the bolt locking position are disposed below the projection **43**. Also the bolt is easily inserted into the slot **17** until the projection **43** engages the pin **23** and the spring **46** snaps into the channel **48** with the free end **47** of the spring disposed below the shoulder **49**. Then rotation of the plug **21** by turning of the proper key will retract the bolt **11** to its unlocked position.



Having disclosed the invention, I claim:

**1.** A lock assembly comprising a lock cylinder having a recess in the forward end and a transverse passage adjacent the rear end, a tumbler means in the lock cylinder, a cylindrical plug rotatably mounted in the cylinder and hvaing a keyway for a required key to actuate the tumbler means and rotate said plug, a pair of spaced axially offset pins extending rearwardly from the plug, a generally T-shaped removable bolt received in said passage and having an actuating camming recess on the front side receiving said spaced pins and an elongated longitudinally extending recess on the opposite side of the bolt, a flat spring received in said last mentioned recess with the lower end of the spring anchored in the recess and the upper end free and biased outwardly of the bolt, said passage having an open longitudinal channel facing said plug receiving the upper end of the spring and terminating in a shoulder at the upper end of the channel to engage the upper end of the spring and limit movement of the bolt, said cylinder having an opening in the rear end thereof adjacent and below said shoulder and in alignment with the upper end of the channel to receive the end of a small instrument for depressing the spring and releasing the bolt.

**2.** A lock assembly as set forth in claim **1**, in which said camming recess terminates in a lower open end of a width for ready disengagement of said spaced pins from said recess when said pins are disposed in horizontal alignment and the bolts is disposed in projected locking position.

**3.** A lock assembly as set forth in claim **1**, including a cylinder disk received in the recess in the forward end of the lock cylinder and retaining the plug in said cylinder.

**4.** A lock assembly as set forth in claim **1**, in which said T-shaped bolt has a horizontally disposed head offset from a vertically disposed body, and said camming recess and said elongated longitudinally extending recess are both formed in said vertically disposed body portion.

**5.** A lock assembly as set forth in claim **1**, in which said camming recess is closed at one end and terminates in an opposite open end extending to the end of the bolt and of a width substantially equal to the maximum distance between the peripheries of the spaced pins, said recess having a pair of spaced laterally extending arms adjacent but spaced from the closed end of the recess and cooperating with said pins to reciprocate the bolt upon rotation of said plug.


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