Nov. 2, 1937. H. H. KISTNER 2,098,048

PIN AND TUMBLER MECHANISM

Filed Nov. 9, 1935

Fig. 1.

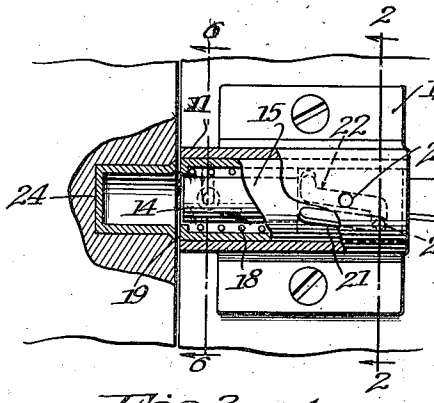


Fig. 2.

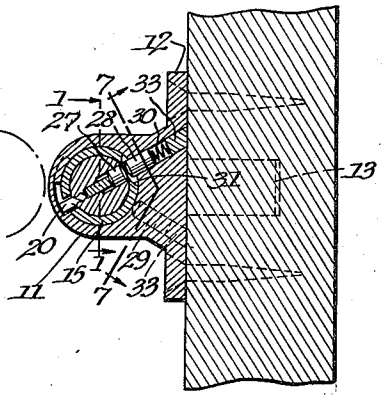


Fig. 3.

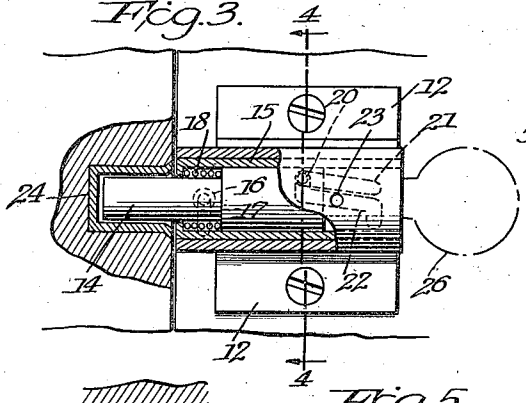


Fig. 4.

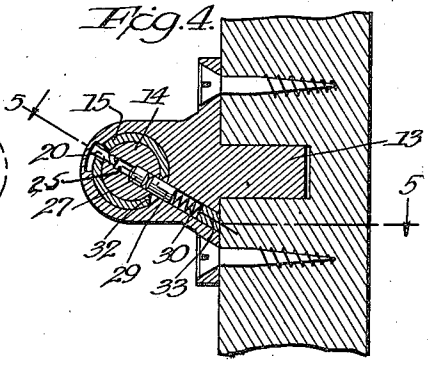


Fig. 5.

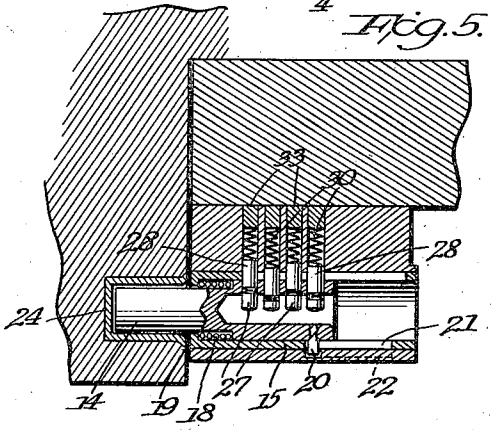


Fig. 6.

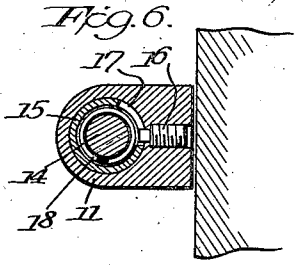
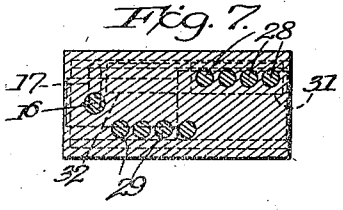


Fig. 7.



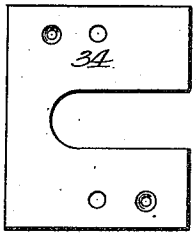


Fig. 8.

Inventor

H. H. Kistner.

By Emery Booth Holcombe & Miller

His Attorneys

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UNITED STATES PATENT OFFICE

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PIN AND TUMBLER MECHANISM

Herman H. Kistner, Baltimore, Md., assignor to Kistner Lock and Appliance Company, Baltimore, Md., a corporation of Maryland

Application November 9, 1935, Serial No. 49,085

10 Claims. (Cl. 70—141)

This invention relates to bolt locks of the push pull type wherein the bolt is pushed in and deadlocked by different movements of the key, and aims to improve the deadlocking mechanism.

The invention further aims to adapt the pin and tumbler type of barrel to the push pull type of lock, so as to enable the advantages of this type of barrel and tumbler mechanism to be secured in the push pull type of sliding bolt lock.

Further objects and advantages of the invention appear hereinafter in the description of the illustrative embodiment thereof shown in the drawing, wherein

Fig. 1 is a part side elevation and part axial cross-section on the line 1—1 in Fig. 2, of a sliding bolt lock shown as applied to an inwardly opening door or window, showing the bolt in unlocked position;

Fig. 2 is a transverse cross-section of the same, on the line 2—2 in Fig. 1, showing the key in place ready to turn preparatory to pushing it in to move the bolt to locking position;

Fig. 3 is a view similar to Fig. 1 showing the bolt deadlocked in locking position;

Fig. 4 is a cross-sectional view of the lock and bolt as shown in Fig. 3, on the line 4—4 in Fig. 3, showing the tumbler mechanism as it appears after the key has been removed;

Fig. 5 is an axial cross-section of the same on the line 5—5 in Fig. 4;

Fig. 6 is a transverse cross-section of the bolt and locking mechanism as shown in unlocked position, on the line 6—6 in Fig. 1;

Fig. 7 is a lengthwise cross-section of the housing on the line 7—7 in Fig. 2, showing the outline of the bolt and sleeve superimposed thereon in dotted lines; and

Fig. 8 is a face view of a bottom plate that may be used for retaining the tumblers and springs in place in the body.

The lock selected for illustration and shown in the drawing comprises a housing body 11 having a base 12 adapted to be held in place by screws on the face of the door, window or other movable or fixed part of a building or other structure which it is desired to secure. A stud 13 projects from the under face of the base and is firmly seated in a hole bored in the support to receive it, as shown in Fig. 4, thereby preventing removal of the housing from its support when the bolt is in projected position even though the screws be forced from place or removed.

The locking bolt 14 is mounted to rotate and slide within a sleeve 15 which may rotate in the housing through a limited angle but which is held against further movement by a screw 16 the inner end of which projects into a slot 17 in the side of the sleeve, as shown in Figs. 1, 3 and 6. A spring 18 encircling the bolt between a shoulder thereon and the flanged end 19 of the sleeve normally holds the bolt in retracted position as shown in Figs. 1, 2 and 7.

The bolt and sleeve are held in place and guided in the housing by a pin 20 mounted in the bolt and projecting through the slot 21 in the sleeve and into a groove 22 in the inner wall of the housing. This groove is Z-shape in plan, the two end branches serving to hold the pin and thereby the bolt in its two deadlocked positions, and the intermediate connecting portion permitting the bolt to be rotated and moved axially from one deadlocked position to the other. This pin 20 may be driven or screwed into place after the bolt, sleeve and pin and tumbler mechanism have been assembled, a hole 23 in the housing being provided for permitting its insertion. A keeper 24 is provided in the frame or sill of the door or window to receive the bolt in locking position.

The bolt has an axial slot or kerf 25 for the key 26 extending from its butt end axially far enough to permit the key to enter until it engages all the pins 27 of the pin and tumbler mechanism to raise them and the tumblers 28, 29 against the pressure of the springs 30 as is common in this type of barrel locking mechanism. The bits on the key are cut to raise their respective pins to position the parting lines between them and the tumblers 28, on the dividing surface between the bolt 14 and sleeve 15, as shown in Fig. 2. The sleeve is provided with two slots 31, 32, which may aline axially and radially with the sets of tumblers 28, 29, respectively, and are displaceable circumferentially just enough to be out of alinement therewith in the mid-position of the sleeve.

Rotation of the key turns the bolt and also the sleeve until the pin 20 reaches the end of the short circumferential portion of the slot 22 in the housing, at which point the key may be pushed in to project the bolt into its locking position, and no movement of the sleeve will occur during the axial movement of the bolt because the pin 20 runs along in the slot 21 in the sleeve. The initial rotation of the sleeve causes the sharp edge of the slot 31 to pick up the tumblers 28 and support them out of contact with the bolt 14 during its movement to and from projected position.

The other set of tumblers 29 ride on the sleeve 15 until it is again rotated at the termination of the axial movement of the bolt when the latter is turned into its deadlocked locking position

by further rotation of the key, whereupon these tumblers 29 drop through the slot 32 in the sleeve (which may be an extension of the slot 31) and engage the pins or bits 27 in the bolt, which are in alinement with the tumblers 29 in the deadlocking position. Upon removal of the key the tumblers 29 will depress the pins 27 and enter the holes in the bolt to lock it securely against axial or rotary movement, thereby deadlocking it in projected position.

Upon again inserting the key and reversing its movement, the movement of the sleeve in the reverse direction will pick up the tumblers 29 and support both sets of tumblers until the sleeve is again rotated at the end of the retracting movement of the bolt, whereupon the tumblers 28 will be dropped into the slot 31 and upon withdrawing the key, will enter the corresponding holes in the bolt, depress the pins 27, and deadlock the bolt in retracted position. The key will be retained in the kerf 25 during the rotation and axial movement of the bolt by the pins 27 engaging in the bottoms of the bits, as these pins can only project from their holes in the bolt sufficiently to free the key in the two deadlocking positions.

The tumblers and springs 30 are retained in the holes drilled for them in the body by plugs 33, which are driven or screwed into place after these parts have been assembled with the sleeve in its mid-position. The bolt carrying the pins 27 can then be inserted with the key, and the pin 29 driven into place through the hole 23 in the body, thereby securing the bolt, sleeve, pins and tumblers in working position. A flat plate 34 (see Fig. 8) may be secured to the base by small screws to hold the tumblers and springs if desired, thereby dispensing with the plugs 33. The bolt may be removed by reversing the operation; and the sleeve may be removed by withdrawing the screw 16 and pushing it out with a dummy sleeve or tube of the same size, the tube serving to retain the tumblers and springs in their holes in the body while the sleeve is removed.

The invention is advantageous for all rim type bolt locks, as the arrangement of the bolts, body and sleeve is very compact as compared with other multi-tumbler locks of the pin and tumbler type, and the pin and tumbler mechanism is rugged and durable notwithstanding the small size of the body. Any desired number of pins and tumblers may be used, three or four sets being sufficient for most purposes, as these provide a wide variety of key combinations.

The invention is not restricted to the details of construction and dimensions shown in the drawing, this being illustrative only.

What I claim is as follows:

1. A bolt lock comprising a body, a sleeve mounted to turn therein, a bolt slidable through the sleeve, one end of the bolt being projectable from the body to engage a keeper and the other end being slotted lengthwise to receive a key, said bolt having spaced transverse openings intersecting said slot and tumbler pins in said openings, said housing having two sets of axially spaced openings respectively mating with said openings in said bolt in retracted and locking position, spring pressed tumblers in each set of openings in said housing, axially spaced slots in said sleeve, respectively adapted to aline with said sets of openings at opposite positions of said sleeve, and means engaging said sleeve for rotating it simultaneously with said bolt whereby said slots respectively uncover one or the other of said sets of openings in said housing at extreme positions of movement of said bolt.

2. A bolt lock comprising a body, a sleeve mounted to turn therein, means for limiting the turning movement, a bolt slidable through the sleeve, one end of the bolt being projectable from the body to engage a keeper and the other end being slotted lengthwise to receive a key, said bolt having spaced transverse openings intersecting said slot and pins in said openings, said housing having two sets of axially spaced openings respectively mating with said openings in said bolt in retracted and locking position, spring pressed tumblers in each set of openings in said housing, axially spaced slots in said sleeve respectively adapted to aline with said sets of openings at opposite positions of said sleeve, and means engaging said sleeve for rotating it simultaneously with said bolt whereby said slots respectively uncover one or the other of said sets of openings in said housing at extreme positions of movement of said bolt, said last named means permitting axial movement of said bolt in said sleeve.

3. A bolt lock comprising a body having a cylindrical bore, a shell mounted for rotation therein, a sliding bolt mounted in said shell, said bore having a lengthwise and circumferentially extending groove provided with transverse grooves at its ends, a slot in said shell corresponding with the axially extending portion of said groove, a pin carried by said bolt projecting through said slot into said groove for guiding said bolt and positioning said shell, locking means for deadlocking said bolt, said means being disengageable from deadlocking position, whereby turning said bolt and shell positions the latter between said deadlocking means and bolt and permits said bolt to slide axially within said sleeve into and from locking position.

4. A bolt lock comprising a body having a cylindrical bore, a shell mounted for rotation therein, a sliding bolt mounted in said shell, said bore having a lengthwise and circumferentially extending groove provided with transverse grooves at its ends, a slot in said shell corresponding with the axially extending portion of said groove, a pin carried by said bolt projecting through said slot into said groove for guiding said bolt and positioning said shell, locking means for deadlocking said bolt including tumblers normally engaging the bolt and housing, said tumblers being disengageable from deadlocking position, whereby turning said bolt and shell positions the latter between said tumblers and bolt.

5. A bolt lock having a housing, a shell mounted for rotation therein, a bolt slidably mounted in said shell, one end of said bolt being projectable from said shell to engage a keeper in its locking position and the other end being grooved to receive a key, an abutment on said bolt spaced from its projectable end, a coil spring surrounding said bolt between said abutment and a fixed part of said housing for retracting said bolt from locking position, a transverse abutment in said housing intermediate the ends of said bolt, means passing through said shell for engaging said abutment to retain said bolt in locking position against the pressure of said spring, rotation of said shell serving to disengage said means from said transverse abutment to permit retraction of the bolt, means for deadlocking said bolt in locking position, and means for rendering said dead-

locking means ineffective when the key is inserted in the groove in the bolt.

6. A bolt lock having a housing, a shell mounted for rotation therein, said housing having a flange at one end for retaining said shell, a bolt slidably mounted in said shell, one end of said bolt being projectable from said shell to engage a keeper in its locking position and the other end being grooved to receive a key, an abutment on said bolt spaced from its projectable end, a coil spring surrounding said bolt between said abutment and a flange for retracting said bolt from locking position, a transverse abutment in said housing intermediate the ends of said bolt, means carried by said bolt passing through said shell for engaging said abutment to retain said bolt in locking position against the pressure of said spring, rotation of said shell serving to disengage said means from said transverse abutment to permit retraction of the bolt, means for deadlocking said bolt in locking position, and means for rendering said deadlocking means ineffective when the key is inserted in the groove in the bolt and said bolt and shell are rotated simultaneously.

7. A bolt lock comprising a body provided with a bore having a lengthwise and circumferentially extending groove of Z-shape, a shell rotatably mounted in said bore having a slot corresponding to the intermediate portion of said groove, a bolt slidably mounted in said shell and having a pin passing through the slot in said shell and slidably engaging in said groove, said bolt having axially spaced tumbler openings in its side and a key slot extending from its butt end to intersect the same, tumbler pins in said openings, said body having tumbler openings in radial alinement with said bolt tumbler openings in deadlocked position of said bolt, spring pressed tumblers in said openings in the body, said shell being perforated to pass said tumblers in deadlocked position, the perforation opposite each tumbler having an inclined wall adapted to pass between the adjacent tumbler and its operating pin when the latter are set by the proper key, whereby inserting the key raises the pins and tumblers and permits rotation of the bolt and shell to separate the locking tumblers from the bolt and free the latter for movement endwise in the shell to the extent permitted by the slot therein, whereupon further rotation of the bolt and shell causes the pin in the bolt to engage in the opposite end portion of the Z-groove to retain the bolt against endwise movement.

8. A bolt lock comprising a body provided with a bore having a lengthwise and circumferentially extending groove of Z-shape, a shell rotatably mounted in said bore having a slot corresponding to the intermediate portion of said groove, a bolt slidably mounted in said shell and having a pin passing through the slot in said shell and slidably engaging in said groove, said bolt having axially spaced tumbler pin openings in its side and a key slot extending from its butt end to intersect the same, pins in said openings, said body having tumbler openings in radial alinement with said pin openings in two axially spaced deadlocked positions of said bolt, spring pressed tumblers in said openings in the body, said shell being provided with axially spaced perforations to pass said tumblers in either deadlocked position, the perforation opposite each tumbler having an inclined wall adapted to pass between the adjacent tumbler and its operating pin when the latter are set by the proper key, whereby inserting the key raises the pins and tumblers and permits rotation of the bolt and shell to separate the locking tumblers from the bolt and free the latter for movement endwise in the shell to the extent permitted by the slot therein, whereupon further rotation of the bolt and shell causes the pin in the bolt to engage in the opposite end portion of the Z-groove to retain the bolt against endwise movement, and releases the locking tumblers for deadlocking the bolt in its moved position.

9. In a bolt lock having the body provided with a bore for a sliding and rotating bolt, means for deadlocking said bolt comprising pin and tumbler mechanism, the tumblers being disposed in radial holes in said body, alining holes in the bolt to receive the tumbler pins, a sleeve surrounding said bolt having an opening adapted to aline with said alined holes in deadlocking position to allow passage of said pins and tumblers, an axial kerf in said bolt intersecting the holes for the pins and adapted to receive a bitted key, and means associated with said bolt for guiding it in said body and for turning said sleeve in said housing to prevent cooperation of said tumblers and pins, the pins in such turned position of the sleeve being adapted to prevent withdrawal of the key.

10. In a bolt lock having the body provided with a bore for a sliding and rotating bolt, means for deadlocking said bolt comprising pin and tumbler mechanism, the tumblers being disposed in radial holes in said body, alining holes in the bolt to receive the pins, a sleeve surrounding said bolt having an opening adapted to aline with said alined holes in deadlocking position to pass said pins and tumblers, an axial kerf in said bolt intersecting the holes for the pins and adapted to receive a bitted key, and means for guiding said bolt in its movement in said housing, said means permitting turning movement of said bolt and sleeve relative to the housing, and thereby preventing withdrawal of the key.

HERMAN H. KISTNER.