United States Patent

Cellini et al.

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[54] LOCKING DEVICE INCLUDING CAMMING KEY FOR RELEASING SPRING CATCH MEMBERS

[72] Inventors: **Vito Cellini; Ronald J. Casale,** both of Bronx, N.Y.

[73] Assignee: **said Casale, by said Cellini**

[22] Filed: **Jan. 18, 1971**

[21] Appl. No.: **106,983**

[52] **U.S. Cl.**.....**70/63,** 70/344, 70/403, 292/19

[51] **Int. Cl.**.....**E05b 65/52,** E05c 19/06

[58] **Field of Search**.....70/63, 344, 346, 347, 349, 70/353, 354, 355, 403; 292/19, 20

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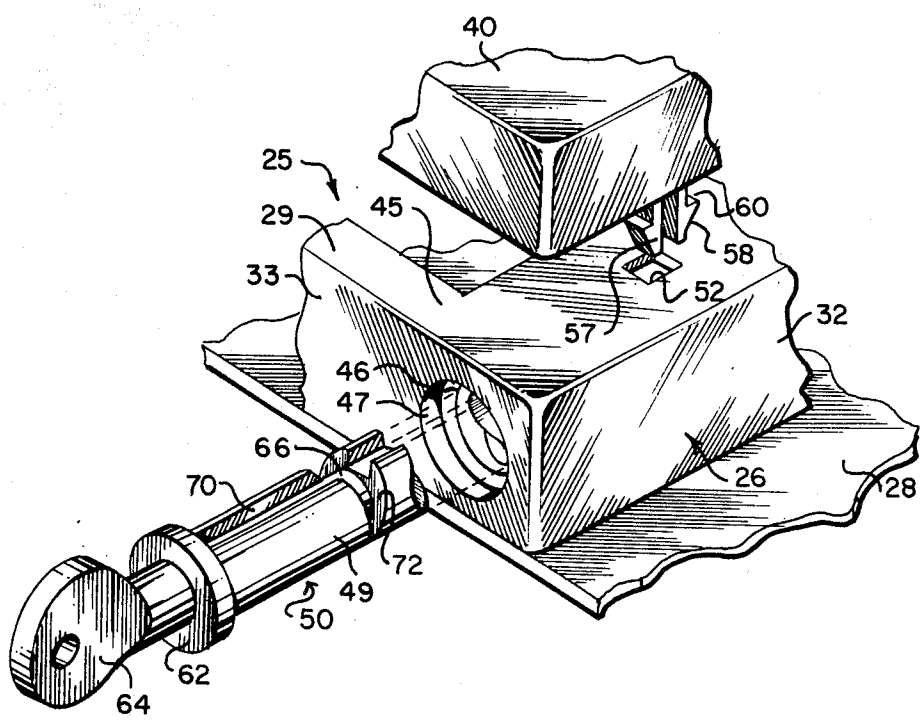
Primary Examiner—Robert L. Wolfe

Attorney—Polachek & Saulsbury

[57] **ABSTRACT**

A locking device includes a lock base, hinged cover and key. The lock base has a key hole extending inwardly of one end parallel to the top of the lock base, and one or more holes in the top opening into the keyhole. The cover has one or more pairs of slightly spaced spring prongs insertable into the holes in the lock base. Shoulders on tips of the prongs engage underneath rims of the holes to keep the cover closed. The key has camming portions defining circumferential grooves with flaring faces for engaging the prongs, squeezing them together and lifting them clear of the bottom rims of the holes in the lock base when the key is rotated. The lock base may have recesses at the underside of its top for receiving and concealing the tips of the prongs. The camming portions may be radially extending camming members engageable with the tips of the prongs in the recesses when the key is turned in the keyhole.

9 Claims, 19 Drawing Figures



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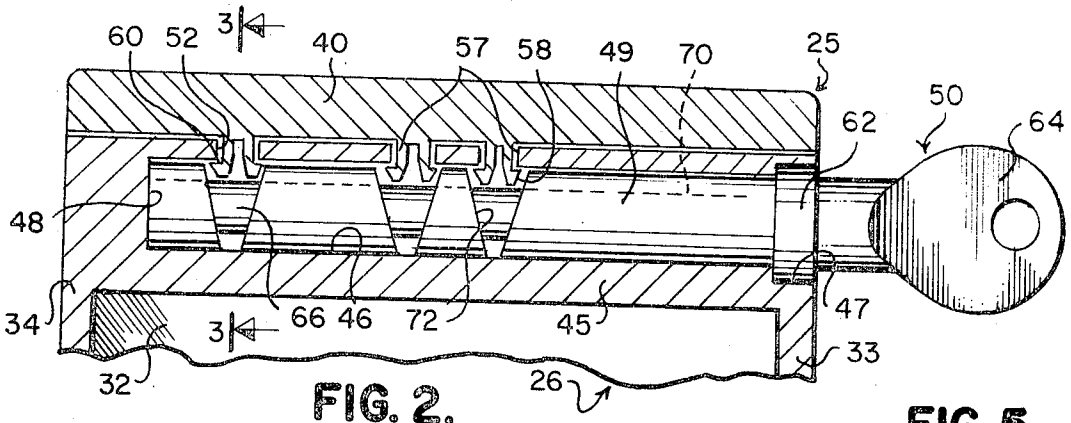


FIG. 2.

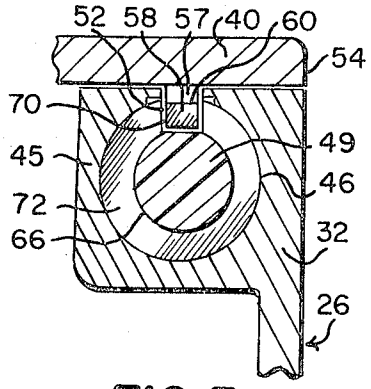


FIG. 3.

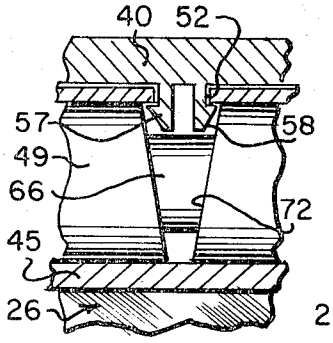


FIG. 4.

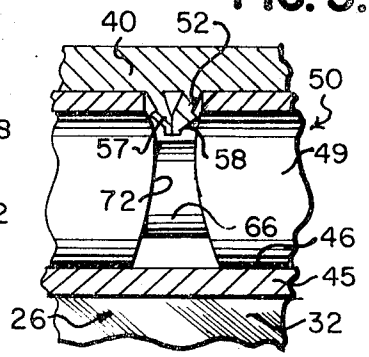


FIG. 5.

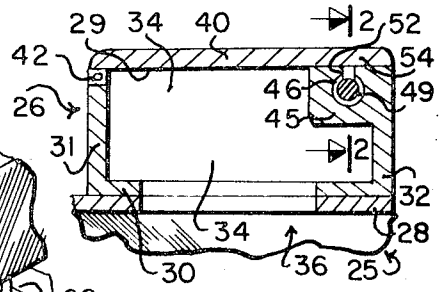


FIG. 1.

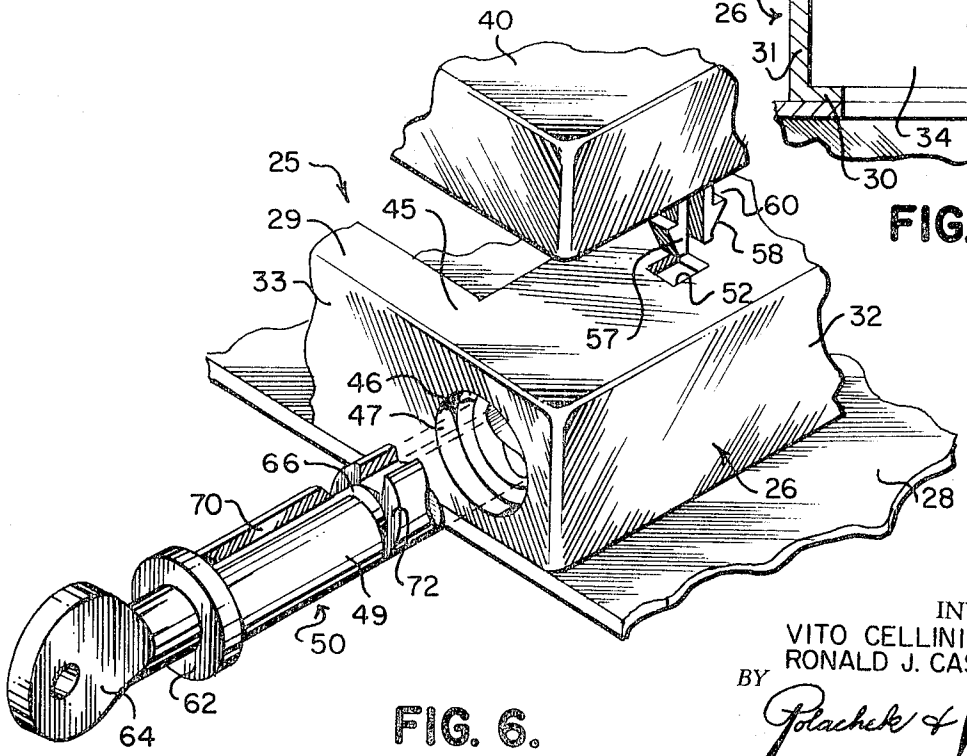


FIG. 6.

INVENTOR.
VITO CELLINI
RONALD J. CASALE
BY Polachek & Saulsbury
ATTORNEYS

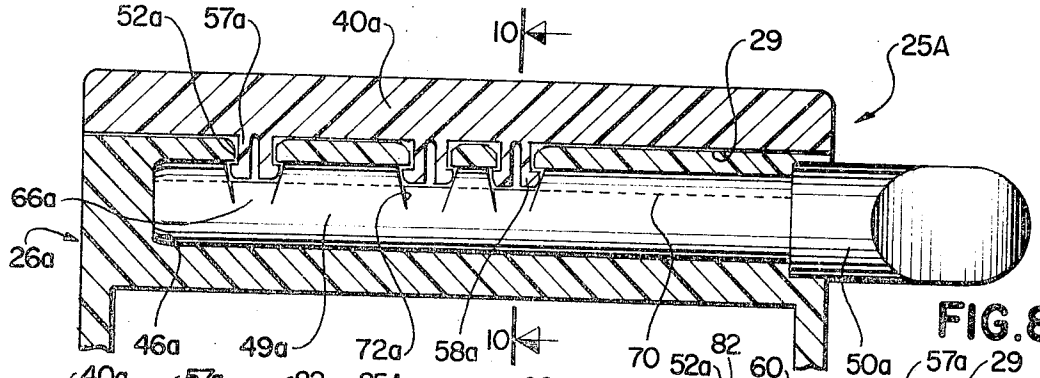


FIG. 8.

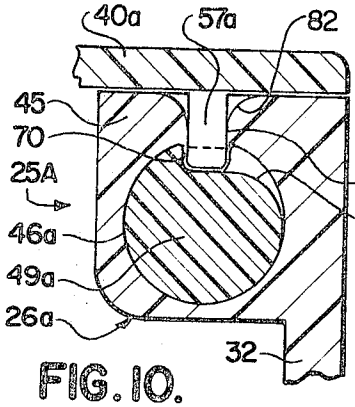


FIG. 10.

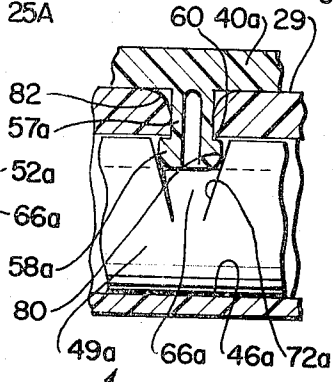


FIG. 9.

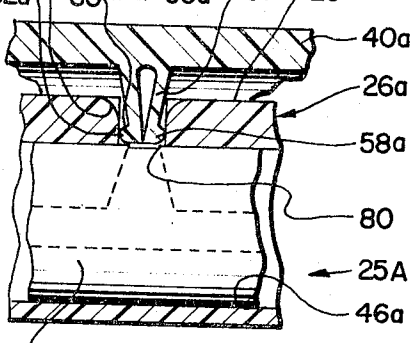


FIG. 12.

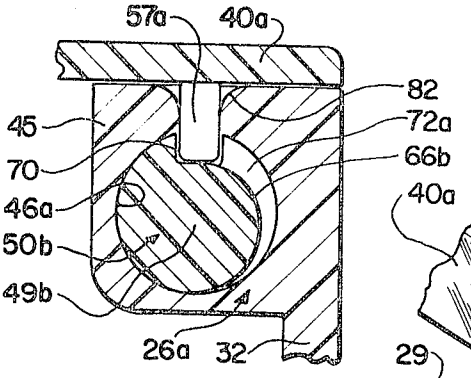


FIG. 13.

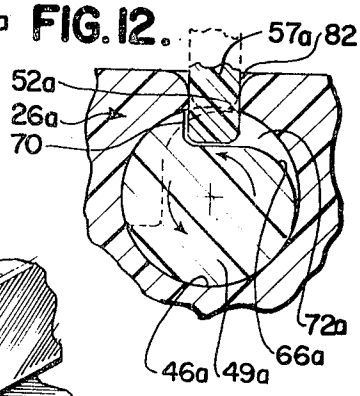


FIG. 11.

FIG. 7.

INVENTOR.
VITO CELLINI
BY RONALD J. CASALE
Polachek & Saulsbury
ATTORNEYS

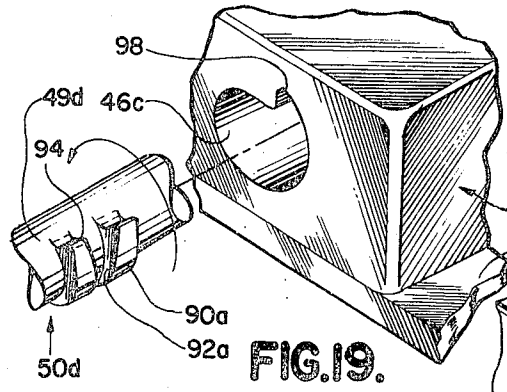


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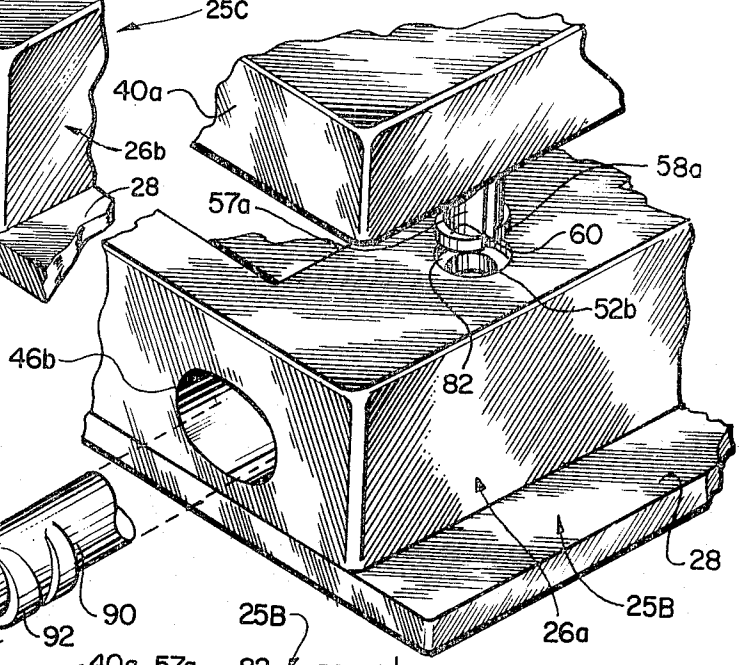


FIG. 14.

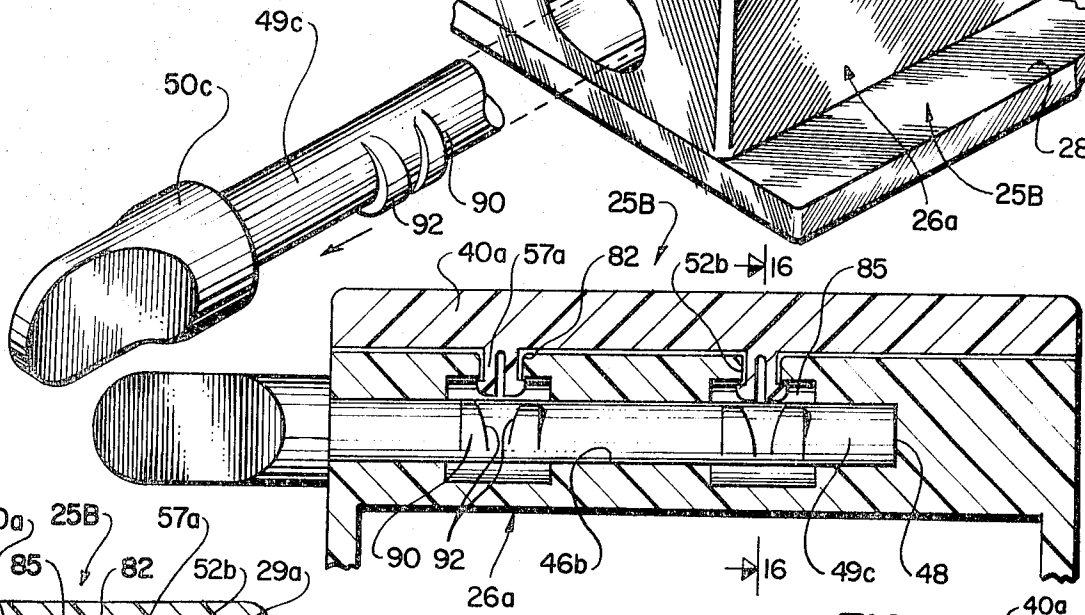


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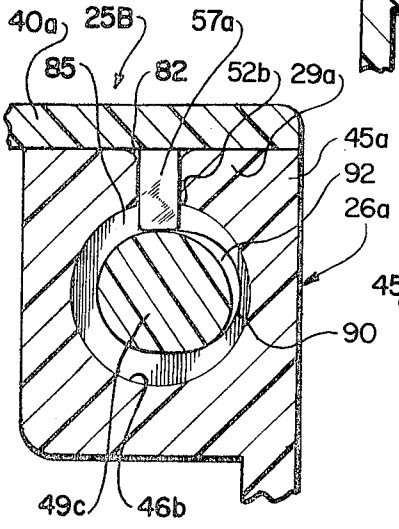


FIG. 16.

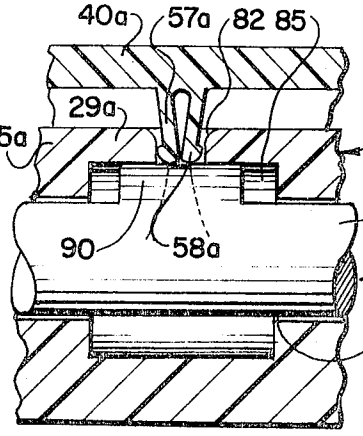


FIG. 17.

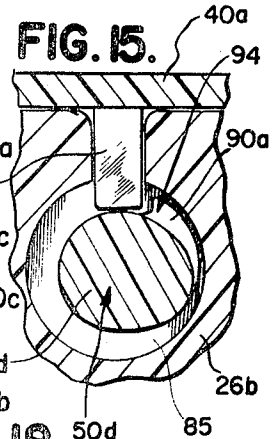


FIG. 18.

INVENTOR.
VITO CELLINI
RONALD J. CASALE
BY Polachek & Saulsbury
ATTORNEYS

LOCKING DEVICE INCLUDING CAMMING KEY FOR RELEASING SPRING CATCH MEMBERS

This invention relates to a key operated locking device having spring catch members and more particularly concerns such a locking device wherein the key has camming portions arranged for squeezing flexible prongs together and for lifting them clear of a lock base when the key is turned.

The locking device is of general application. It may be mounted on cabinets, door frames, appliances, or wherever a locking device is required having a door or cover which can be closed simply by snapping spring catch members into engagement with a lock base.

Locking devices of the general type described have heretofore generally had a keyhole of a lock exposed at the outer side of a door or cover held closed by a lock carried by the door or cover. The present invention avoids this by providing a keyhole in the base or support to which the door or cover is hinged. Spring prongs extending inwardly or depending from the door or cover are engaged in the lock base when the door or cover is snapped closed. A key having a cylindrical shaft insertable in the keyhole is provided with camming portions for disengaging the spring prongs from the lock base. By this arrangement the door or cover is not marred by the appearance of a keyhole, and the base of the lock is separate from the door or cover.

Other features, objects and advantages of the invention will become apparent from the following detailed description taken together with the accompanying drawings, wherein:

FIG. 1 is a cross sectional view of a first lock and key assembly embodying the invention, including lock base, cover and key.

FIG. 2 is an enlarged fragmentary transverse sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is an enlarged fragmentary cross sectional view similar to a portion of FIG. 1, taken on line 3—3 of FIG. 2.

FIG. 4 is a further enlarged view similar to a portion of FIG. 2 showing catch prongs in locked position with key in place and ready to unlock the prongs.

FIG. 5 is a view similar to FIG. 4, showing the key in rotated position and prongs in unlocked, compressed position.

FIG. 6 is an exploded perspective view of parts of the lock and key assembly showing the key being removed from the lock base after unlocking the cover.

FIG. 7 is an exploded perspective view similar to FIG. 6 of parts of a second lock and key assembly.

FIG. 8 is a transverse sectional view similar to FIG. 2, showing the assembly of FIG. 7, with key fully inserted in the lock base and cover closed.

FIG. 9 is an enlarged fragmentary cross sectional view similar to a portion of FIG. 8.

FIG. 10 is an enlarged, fragmentary cross sectional view taken on line 10—10 of FIG. 8.

FIG. 11 is a fragmentary further enlarged cross sectional view similar to a portion of FIG. 10.

FIG. 12 is a cross sectional view similar to FIG. 9, showing the key in a rotated position with prongs squeezed together for releasing the cover.

FIG. 13 is a cross sectional view similar to FIG. 10 showing another key construction.

FIG. 14 is an exploded perspective view similar to FIGS. 6 and 7, showing parts of a third lock assembly including lock base, cover and key.

FIG. 15 is a cross sectional view similar to FIGS. 2 and 8, showing the assembly of FIG. 14 with key fully inserted in the lock base and cover closed.

FIG. 16 is an enlarged fragmentary cross sectional view taken on line 16—16 of FIG. 15.

FIG. 17 is an enlarged fragmentary longitudinal sectional view similar to a portion of FIG. 15, but showing the key in rotated position with prongs squeezed together for releasing the cover.

FIG. 18 is a cross sectional view similar to FIG. 16, illustrating another key construction.

FIG. 19 is a fragmentary exploded perspective view showing parts of a fourth lock assembly employing the key of FIG. 18.

Referring first to FIGS. 1–6, there is shown a lock and key assembly 25. The assembly includes a lock base 26 secured upon a support 28 which can be a box, stand, wall or the like. The lock base has an open top 29, a bottom 30, side walls 31, 32 and end walls 33, 34. The bottom 30 can be apertured providing communication with compartment 36 in support 28. Alternatively the bottom 30 can be imperforate, and the lock base 26 and its cover 40 can serve as a lockable box on support 28. The cover 40 is pivotally secured to base 26 at the top of one side wall 31 provided with a hinge 42. The lock base has an opposite side wall 32 formed with a thickened portion 45. This thickened side wall portion has a cylindrical keyhole 46 extending therethrough from end wall 33 to receive cylindrical shank or shaft 49 of key 50. The keyhole has a closed inner end 48. Spaced holes 52 are formed in the top of thickened wall portion 45 and open into the upper side of keyhole 46. These holes receive pairs of flexible spring catch prongs 57 depending in spaced positions from cover 40 adjacent to edge 54 opposite from hinge 42. The prongs are rather hook shaped with wedge shaped tips 58 to facilitate sliding into holes 52 and with flat oppositely extending shoulders 60 to engage under rims of the holes. These spring catch prongs can be located at different spaced positions along edge 54 of the cover in different lock assemblies for opening by differently coded keys. Closing of the cover is simply effected by pressing the catch prongs down through holes 52. The prongs will be flexed inwardly toward each other as the tips 58 pass the holes and then in a detent action, the tips will snap passed the holes while the prongs spring apart to their normal parallel, spaced position to engage the shoulders under the edges of holes 52.

Keyhole 46 may have an enlarged outer end portion 47 to receive enlarged radial flange 62 on the shank of the key for properly locating the key in the keyhole and for guiding the key in rotation. The key has a turning handle 64. The shank of the key is provided with wedge shaped camming slots or grooves 66 which will align with the prongs 55 radially of the cylindrical keyhole 46 and key shank 49. FIG. 2 shows the assembly provided with three pairs of prongs 57 and key 50 is provided with three corresponding camming slots 66. A longitudinal groove 70 in the top of shank 49 receives the downwardly projecting tips of the prongs as the key is inserted in the keyhole.

It will be noted that the shoulders 60 of the catch prongs abut the underside of the rims of holes 52 when the cover is closed. When the key is fully inserted in the keyhole and is turned clockwise or counterclockwise, the mutually inclined camming faces 72 of grooves 66 will engage the outer faces of the spaced prong tips 58 and will press them together to a point where they touch each other and clear the ring of hole 52 as clearly shown in FIG. 5. This permits the cover to be opened manually since the prongs are then clear of the holes. The camming faces can be curved in a conves manner such that after pressing the prong tips 58 together, further turning of the key will result in lifting of the prong tips by the camming faces until shoulders 58 clear the upper edges of holes 52. The cover will then be free to be opened as shown in FIG. 6.

The open cover can of course be closed and locked without the key. The key is only required for unlocking the cover. After unlocking the cover the key can be moved longitudinally out of the lock base. To relock the cover, it is only necessary to press down the cover until the spring catch prongs engage under the rims of the holes 52 in the cover.

In FIGS. 7–12 is shown another lock and key assembly 25A in which parts corresponding to those of assembly 25 are identically numbered. In assembly 25A the spring catch prongs 57*a* have depending from cover 40*a* tips 58*a* formed with beveled or curved edges 80 to snap passed beveled top edges 82 of round holes 52*a* formed in lock base 26*a*. Shank or shaft 49*a* of key 50*a* is formed with grooves 66*a* having curved camming faces 72*a* arranged to press the spaced prongs of

each pair together when the key is turned in keyhole **46***a* of the lock base, as best shown in FIG. **12**. As the key is turned the prongs are raised until tips **58***a* clear the bottoms of holes **52***a* so that the cover **40***a* can be opened and the key can be removed. Closing of the cover is effected by pressing the cover down until shoulders **60** and the prong tips reengage under the bottom edges of holes **52**.

The grooves **66***a* extend substantially 90° circumferentially of shank or shaft **49** as clearly shown in FIGS. **10** and **11**. By this construction the cover is released on turning the key a quarter turn or 90°. The camming grooves can extend 180° as shown by groove **66***b* in keyshaft **49***b* of key **50***b*, shown in FIG. **13**, so that the key must be turned a half turn or 180° to release the cover. If desired the camming groove can extend circumferentially as much as 300°. However it should not extend to close to the longitudinal groove **70** in the key shaft.

In FIGS. **14–17** is shown a further lock and key assembly **25B** in which parts corresponding to those of assemblies **25** and **25A** are identically numbered. It will be noted that in both assemblies **25** and **25A** the tips of the spring prongs are exposed in the keyholes **46**, **46***a* opening at end wall **33** of the lock base, and extend radially into the keyholes, where they might be subject to tampering. To avoid this situation, the construction of assembly **25B** may be employed. Here as shown in FIGS. **14–17**, the upper part **29***a* of wall portion **45***a* of lock base **26***a* is thickened and recesses **85** are formed therein opening into keyhole **46***b* at holes **52***b*. Normally the spring prong tips **58***a* are disposed within the recesses as best shown in FIGS. **15** and **16**. The shank or shaft **49***c* of key **50***c* is formed with radially projecting pairs of camming members **90** having curved flaring spaced faces **92** which engage the tips of the spaced prongs **57***a* therebetween as the key is rotated in keyhole **46***c*. As the camming members engage the tips they press them together and lift them until the tips clear the bottoms of holes **52***a* in lock base **26***b* and the cover **40***a* can be opened; see FIG. **17**. The key can then be turned until the camming members **90** clear the recesses **85** as shown in FIGS. **15** and **16**. The key can then be withdrawn from the lock base as shown in FIG. **14**.

The camming members **90** have maximum spacing and minimum radius at the points of initial contact with the prong tips, and have maximum radius and minimum spacing at points where the prong tips are fully elevated as shown in FIG. **17**.

In the construction of key **50***d* shown in FIGS. **18** and **19**, camming members **90***a* on shaft **49***d* are slightly modified. Their radii as substantially equal from points **94** where spacing of cam faces **90***a* are maximum up to points where cam spacing is minimum. Keyhole **46***c* in lock base **26***d* of assembly **25***c* is provided with an indentation or groove **98** to pass the extended points **94** of cam members **90***a*.

Key **50***d* operates like key **50***c* to press the prongs **57***a* and to lift them when the key is turned.

The various locking devices and assemblies described herein can be made entirely of plastic material, partially plastic and partially metal or of all metal. The locks are of general application and can be used whenever a snap locking cover or door is required to be openable by a key insertable into a lock base parallel to the cover and perpendicular to depending spring prongs engageable by the camming faces of the key. If desired the lock bases can be inserted partially or entirely into door frames or cabinet walls.

While a limited number of embodiments of the invention have been described in detail it will be understood that many modifications and variations are possible without departing from the invention.

What is claimed is:

1. A locking device comprising a box-like lock base having top, side and end walls, said base having a cylindrical keyhole extending inwardly from one end wall axially parallel to the top of the lock base, and at least one hole extending inwardly from said top adjacent one side wall and opening laterally into said keyhole; a cover hinged to the top of the lock base, said cover having at least one pair of slightly spaced, depending, flexible prongs insertable into said hole and engageable with the top of the lock base when the cover is closed on the lock base; and a key having a cylindrical shaft insertable into said key hole for rotation therein, said shaft being formed with camming portions arranged to engage and squeeze said prongs together and to lift the prongs sufficiently clear of said hole so that the closed cover can be opened.

2. A locking device as defined in claim **1**, wherein said lock base has at least one other hole in its top spaced from the first named hole and opening into the keyhole; said cover having at least one other pair of slightly spaced, depending flexible prongs insertable into said other hole and engageable with the top of the lock base when the cover is closed; said shaft of the key having other camming portions arranged to engage and squeeze said other prongs together and to lift the same sufficiently clear of said other hole when so that the closed cover can be opened, both pairs of prongs cooperating when the cover is closed on the lock base to hold the cover closed.

3. A locking device as defined in claim **1**, wherein said prongs are formed with tips having shoulders formed thereon for engaging underneath the rim of said hole when the cover is closed.

4. A locking device as defined in claim **3**, wherein said shaft has a longitudinal slot arranged to receive said tips of the prongs when the key is inserted in to the keyhole, said camming portions being defined by flaring spaced sides of a circumferential groove formed in said shaft of the key.

5. A locking device as defined in claim **4**, wherein said hole is rectangular, the shoulders of the pring tips have straight edges for engaging straight edges of said hole.

6. A locking device as defined in claim **4**, wherein said hole has a curved rim, and wherein said shoulders of the prong tips have curved edges for engaging the curved rim of the hole.

7. A locking device as defined in claim **4**, wherein the inside of said circumferential groove extends radially progressively lesser distances into the shaft so that the prongs are lifted while being squeezed together by the sides of the groove.

8. A locking device as defined in claim **3**, wherein said lock base is formed with a recess at the underside of the top of the lock base to receive the tips of the prongs which remain clear of the keyhole when the cover is closed.

9. A locking device as defined in claim **8**, wherein said camming portions are axially spaced camming members extending radially and circumferentially on the shaft of the key, said camming members having flaring spaced sides defining a circumferential groove on the shaft to receive the tips of the prongs in said recess when the key is turned in the keyhole.

* * * * *