March 9, 1937. H. R. KIRKWOOD 2,073,109

LOCK

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Fig. 1.

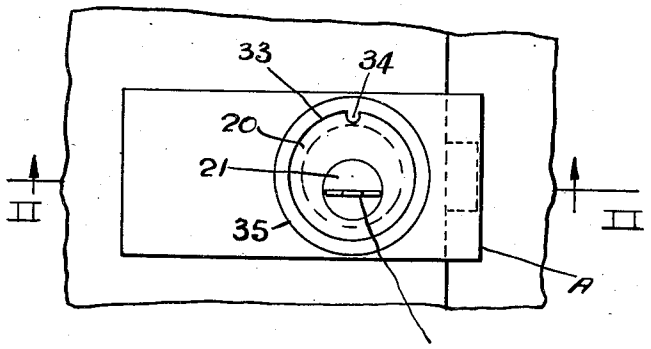


Fig. 2.

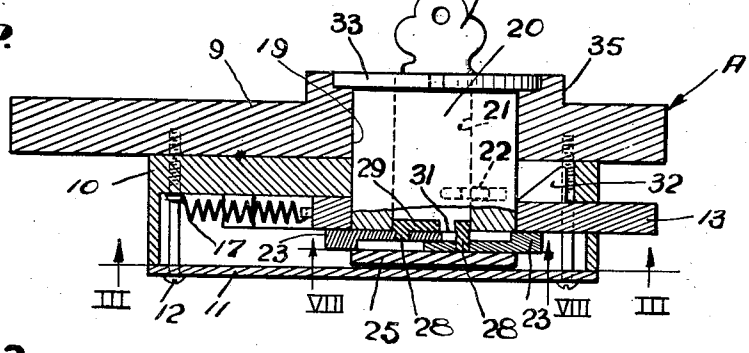


Fig. 3.

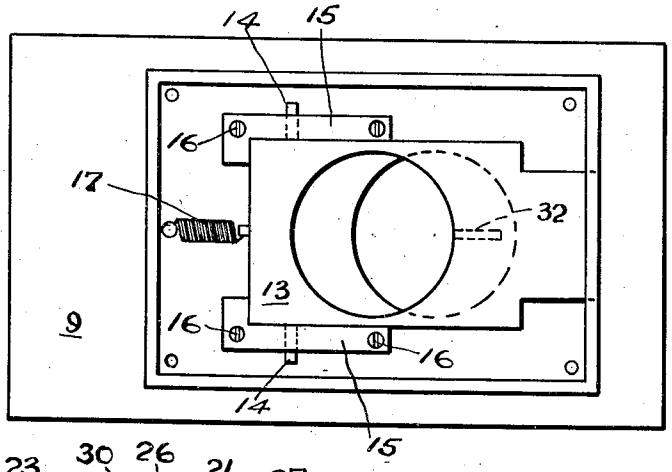
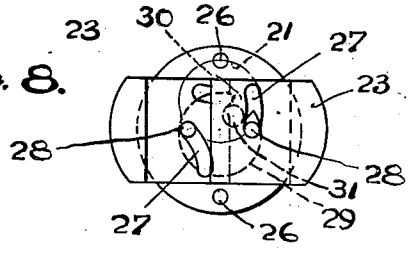


Fig. 8.



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Fig. 4.

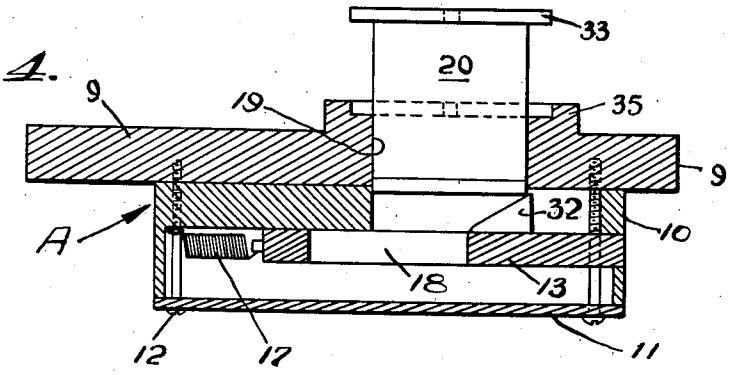


Fig. 5.

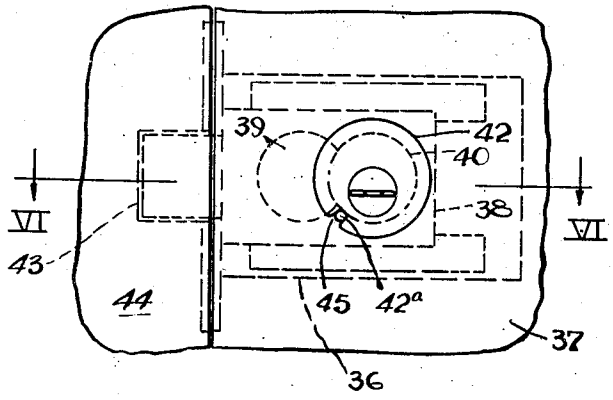


Fig. 7.

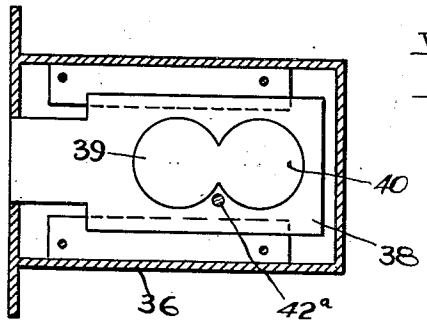
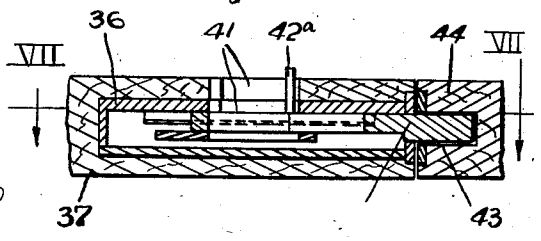


Fig. 6.



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2,073,109

LOCK

Harry R. Kirkwood, Pittsburgh, Pa.

Application August 12, 1936, Serial No. 95,554

4 Claims. (Cl. 70—134)

The invention relates to locks involving the use of a pin tumbler lock unit for application to safety deposit boxes, drawers and the like where an unusual degree of security against the possible forcing of the lock is desired. The invention has for its objects the provision of a construction of the type set forth in which the locking bar which is under the control of the locking unit is very securely held against forcing and in which it is impossible to withdraw the locking unit without destruction of the parts surrounding the unit or the unit itself. More specifically, the invention has for its object the provision of an improved construction of the type specified, in which the cylinder of the pin tumbler unit acts as the detent for the locking bar when such bar is in locking position and in which it is necessary to remove the unit bodily before the locking bar can be moved to release position. Certain embodiments of the invention are illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view. Fig. 2 is a section on the line II—II of Fig. 1. Fig. 3 is a bottom view on the line III—III of Fig. 2 with the bottom plate removed to show the parts in the casing thereabove, and with the locking bar in retracted or release position. Fig. 4 is a view similar to that of Fig. 2, but with the cylinder of the pin tumbler unit withdrawn so that the locking bar is in release position. Fig. 5 is a plan view showing a modification. Fig. 6 is a horizontal section on the line VI—VI of Fig. 5. Fig. 7 is a vertical section on the line VII—VII of Fig. 6. And Fig. 8 is an end view of the lock cylinder with the cover plate removed.

Referring to the drawings, A is the casing of the lock with the parts **9**, **10** and **11** thereof secured together by four screws **12**, and **13** is the locking bar mounted for sliding movement in the casing and having its front end extended through a slot in the end wall of the casing when the bar is in locking position, as indicated in Fig. 2. The rear end of the bar is provided with a pair of guide pins **14**, **14** (Fig. 3) which lie above the guide bars **15**, **15**, such bars being secured to the top wall of the casing by the four screws **16**. The bar is normally pulled to retracted position by a spring **17**, and is provided with a perforation **18** of circular cross section to fit the cylinder of the pin tumbler locking unit, later described. The top member **11** of the casing is also provided with a perforation **19**, similar to the perforation **18**, and also adapted to receive the cylinder of the pin and tumbler unit.

The pin and tumbler unit which acts to hold the locking bar in the locked position shown in Fig. 3, comprises the usual cylinder **20**, a plug **21** mounted for rotation in the cylinder, pins and tumblers, one set of which is shown at **22** in Fig. 2, and a pair of detents **23**, **23** mounted for sliding movement in the cylinder transversely thereof and movable into and out of the cylinder by the rotation of the plug when the key **24** is in position in the plug. The detents are held in place by a cover plate **25** secured to the lower end of the cylinder by a pair of screws which enter the threaded holes **26** (Fig. 8) in the end of the cylinder. The ends of the detents overlap as indicated in Fig. 2, and are provided with a pair of cam slots **27**, **27** (Fig. 8) engaged by a pair of pins **28**, **28** secured to a disc **29** concentric with the cylinder **20**. The disc **29** has a cam slot **30** which is engaged by a pin **31** on the lower end of the plug **21**. The rotation of the plug causes the rotation of the disc **29** by reason of the pin and cam slot connection **30**, **31**, and the rotation of the disc in turn rotates the detents **23**, **23** by reason of the pin and cam slot connections **27**, **27**, **28**, **28**, above described. This type of connection is required because the plug **21** is off center with respect to the cylinder. If the plug were concentric with the cylinder, the two pins **28**, **28** might be carried directly on the end of the plug in engagement with the cam slots **27**, **27**, thus dispensing with the disc **29** and the pin and slot connection **30**, **31**.

The locking bar carries on its upper side an upright cam plate **32** whose inclined edge is adapted to be engaged by the end of the cylinder **20**, so that when the cylinder is pushed down into the casing from the position of Fig. 4 to the position of Fig. 2, the locking bar is moved to the right against the tension of the spring **17** to the locking position shown in Fig. 2. The insertion of the lock unit thus performs the function of causing the end of the locking bar to enter its locking socket (not shown). After the parts are so positioned, the rotation of the plug **21** by its key **24**, moves the detents **23**, **23** to locking position beneath the bar (Fig. 2). To unlock the device, the key is rotated in the reverse direction to move the detents into the cylinder after which the unit is pulled outward to the position of Fig. 4, permitting the spring **17** to move the bar to the left to unlocked position. In order to prevent the cylinder from rotating with the plug when the key is turned, its flange **33** is provided with a recess which receives a lug **34** (Fig. 1) projecting inward on the collar **35** which is integral with the plate **9**.

It will be apparent that the lock, as shown and described, is of a very secure character. The cylinder **20** is of such strength that only the destruction of the casing or locking bar will cause the release of such bar, so that it is practically impossible to force the lock. Further the cylinder itself is very securely held against removal by the detents **23**, **23** which lie beneath the lock-

ing bar and form very positive holding means, since they must be sheared off in order to remove the cylinder by an endwise movement thereof. Because of its security against release, either by force applied to the bar or to the barrel, the structure is especially adapted for safety deposit boxes.

Figs. 5, 6 and 7 show a modification in which the casing **36** is set into a wood mounting **37**, such as would be the case in applying the structure to a door or drawer. This construction, while similar in principle with the device of Figs. 1 to 4, departs therefrom in the particulars that (1) no spring is used for moving the locking bar **38**, (2) two perforations **39**, **40** are employed in the locking bar, instead of only the one perforation, and (3) no cam means are provided corresponding to the part **32** of the Figs. 1 to 4 device. The top walls of the casing **36** and wood mounting **37** are provided with circular perforations **41** of the same diameter as the perforations **39** and **40** in the locking bar for receiving the cylinder of the lock unit **42** which is the same as described in connection with Figs. 1 to 4. The locking bar is also provided with a pin **42a** for reciprocating the locking bar **38** manually, such pin projecting slightly above the upper face of the wood casing (Fig. 6). When the locking bar is in locking position with its end in the socket **43** of the member **44**, as shown in Figs. 5 and 6, the insertion of the lock unit through the perforations **41** and **40** secures the locking bar **38** in locked position. When the unit is removed, the locking bar may be moved by the pin **42** to the release position shown in Fig. 7. The lock unit may now be inserted through the perforations **41** and **39**, thus locking the bar **38** in release position. This arrangement provides a place for storing the lock unit when the lock is in release position and restores the appearance of the face of the wood casing, which would otherwise be left with an unsightly opening. The construction thus provides an advantage as to appearance when in unlocked position over that of Figs. 1 to 4, making it more suitable for doors and drawers which may be left unlocked for considerable periods. The construction of Figs. 1 to 4 is preferred, however, for use in safe deposit boxes and other locations in which the container guarded is to be kept locked except for short intervals. The pin **42**, in addition to acting as a means for moving the bar **38**, serves to lock the cylinder of the lock unit against rotation when the plug is being turned by the key, as the pin fits into a recess **45** (Fig. 5) at the periphery of the cylinder when the parts are in assembled position, thus performing the function of the lug **34** of Fig. 1.

What I claim is:

1. In combination in a lock, a casing having a slot through one wall for a lock bar and a perforation through another wall at right angles thereto for the cylinder of a pin tumbler lock, a lock bar mounted for sliding movement in the casing and adapted in locking position to project through said slot, said bar being provided with a perforation adapted to align with said perforation in the wall of the casing when the bar is in locking position, means operable through said perforation in the wall of the casing for moving the lock bar to locking position and a pin tumbler unit having a cylinder adapted to fit removably in said perforations in the casing and bar and provided at its inner end with a detent movable transversely of the cylinder operable by the rotation of the plug of the lock and adapted when the cylinder is in locking position in the casing to lie inward of said bar.

2. In combination in a lock, a casing having a slot through one wall for a lock bar and a perforation through another wall at right angles thereto for the cylinder of a pin tumbler lock, a lock bar mounted for sliding movement in the casing and adapted in locking position to project through said slot, said bar being provided with a perforation adapted to align with said perforation in the wall of the casing when the bar is in locking position, a spring normally holding the bar in retracted position, a cam member on the bar, and a pin tumbler lock having a cylinder adapted to fit removably in said perforations in the casing and bar and provided at its inner end with a detent movable transversely of the cylinder operable by the rotation of the plug of the lock and adapted when the cylinder is in locking position in the casing to lie inward of said bar, said cam being positioned so that it is engaged by the end of the cylinder when such cylinder is inserted into the casing and being adapted to move the bar to locking position when the cylinder is so inserted.

3. In combination in a lock, a casing having a slot through one wall for a lock bar and a perforation through another wall at right angles thereto for the cylinder of a pin tumbler lock, a lock bar mounted for sliding movement in the casing and adapted in locking position to project through said slot, said bar being provided with one perforation adapted to align with said perforation in the wall of the casing when the bar is in locking position and with a second perforation adapted to align with the perforation in the wall of the casing when the bar is in retracted position, and a pin tumbler lock having a cylinder adapted to fit removably in said perforations in the casing and bar and provided at its inner end with a detent movable transversely of the cylinder operable by the rotation of the plug of the lock and adapted when the barrel is in locking position in the casing to lie inward of said bar.

4. In combination in a lock, a casing having a slot through one wall for a lock bar and a perforation through another wall at right angles thereto for the cylinder of a pin tumbler lock, a lock bar mounted for sliding movement in the casing and adapted in locking position to project through said slot, said bar being provided with a perforation adapted to align with said perforation in the wall of the casing when the bar is in locking position, a pin tumbler unit having a cylinder adapted to fit removably in said perforations in the casing and bar and provided at its inner end with a pair of detents slidably mounted in the end of the cylinder for movement transversely thereof into and out of the cylinder operable by the rotation of the plug of the lock and adapted when the cylinder is in locking position in the casing to lie inward of said bar, and means attached to the lock bar for moving it into the casing to its unlocked position when the pin tumbler unit is removed from said perforation.

HARRY R. KIRKWOOD.