March 29, 1927. 1,622,489

B. J. CARNES

COMBINATION LOCK

Filed Feb. 23, 1926 2 Sheets-Sheet 1

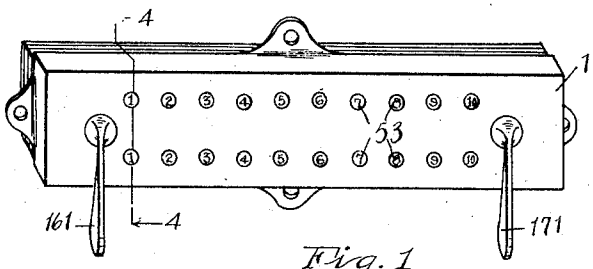


Fig. 1

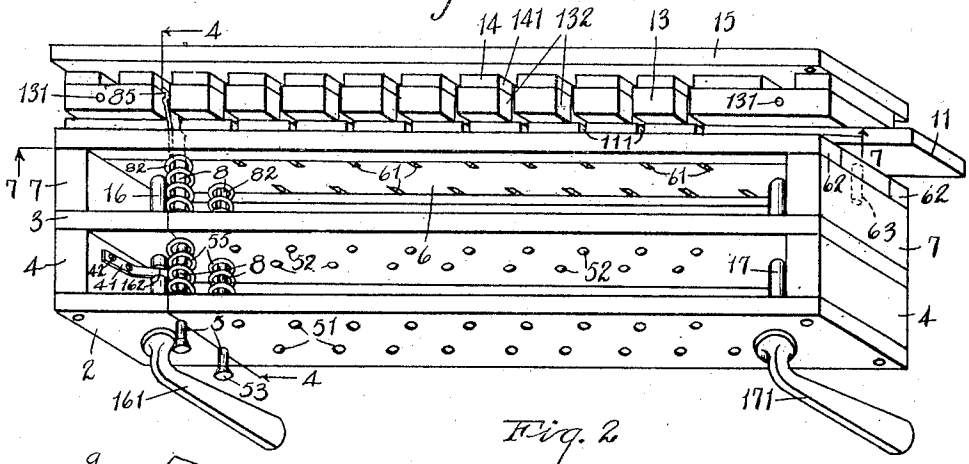


Fig. 2

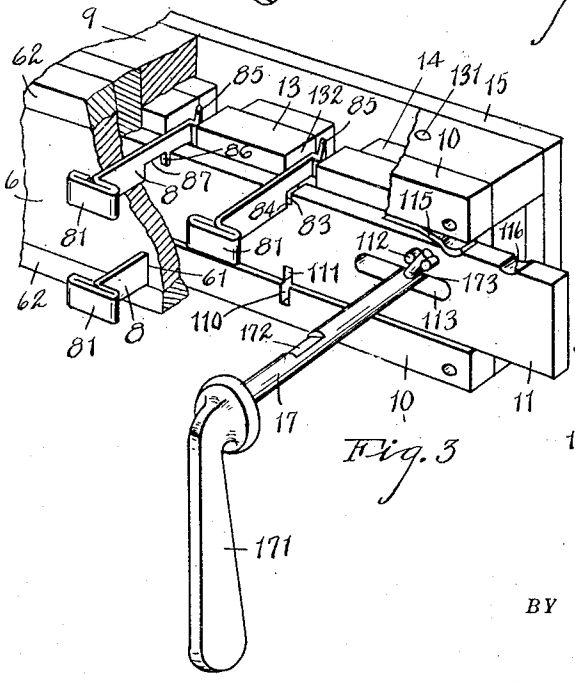


Fig. 3

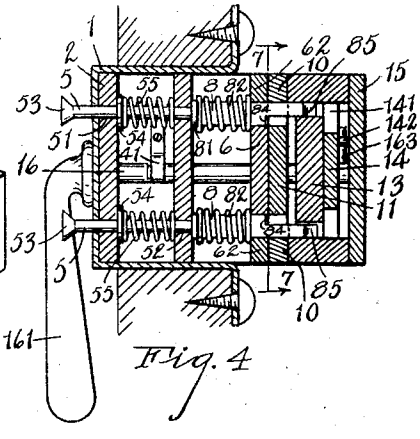


Fig. 4

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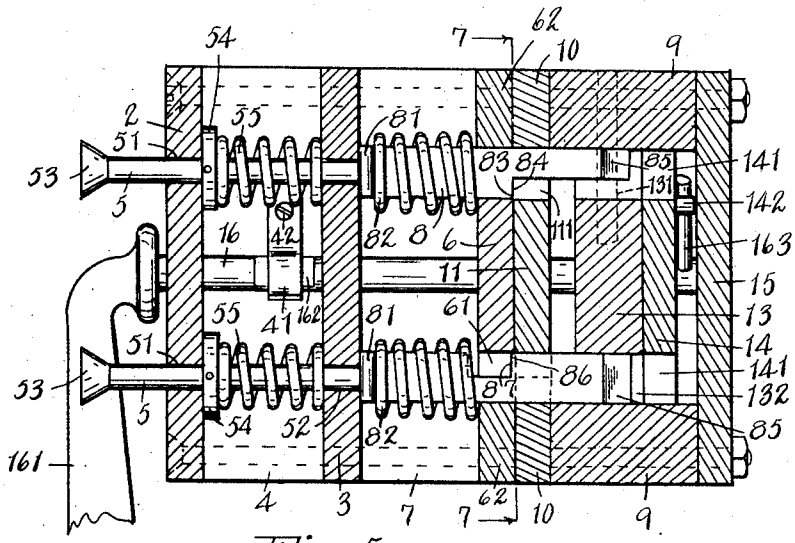


Fig. 5

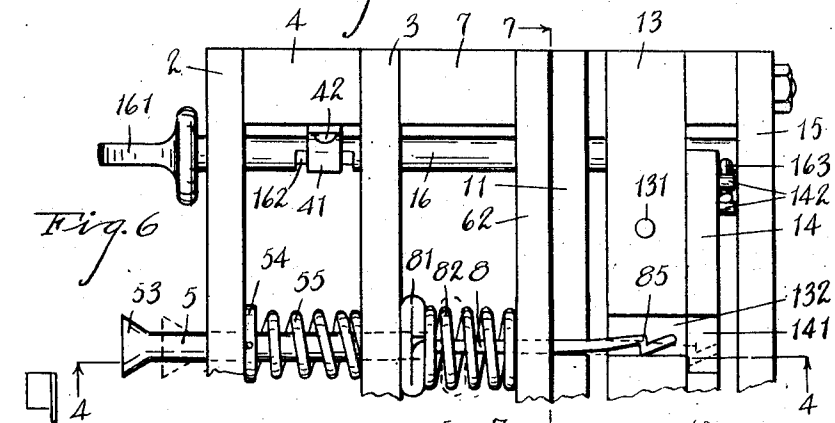


Fig. 6

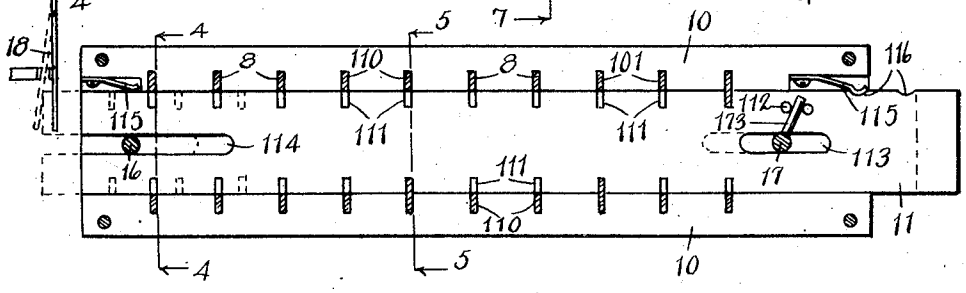


Fig. 7

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UNITED STATES PATENT OFFICE.

BYRON J. CARNES, OF CHARLOTTE, MICHIGAN.

COMBINATION LOCK.

Application filed February 23, 1926. Serial No. 90,074.

The lock is especially adapted for use on automobiles but is available generally.

The object of the invention is to provide a simple and efficient lock in which push pins will be operated in place of dials, which greatly facilitates operation.

Objects pertaining to details and economies of construction and operation will appear from the detailed description to follow. The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of the invention is illustrated in the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a perspective view, substantially full size, of my improved lock detached but ready for insertion in the door or framework of an automobile or other device.

Fig. 2 is an enlarged detail isometric perspective view of the structure appearing in Fig. 1, the outer casing being removed and a part of the structural frame or case being omitted to show details of construction.

Fig. 3 is an enlarged detail perspective view of the right-hand end of the structure appearing in Fig. 2, portions being broken away to show details.

Fig. 4 is a detail transverse sectional elevation view taken on line 4—4 of Figs. 2, 6 and 7, showing the relation of the parts and the method of securing the outer shell.

Fig. 5 is an enlarged detail sectional elevation view on line 5—5 of Figs. 2 and 7, going more completely into details than Fig. 4.

Fig. 6 is an enlarged detail elevation view of the left end of the structure appearing in Fig. 2.

Fig. 7 is an enlarged detail longitudinal sectional elevation view taken on line 7—7 of Figs. 2, 4, 5 and 6.

The parts of the drawings will be referred to by their numerals of reference which identify like parts in all the views.

1 is the outer front casing for the structure provided with suitable ears for engaging the inside of a mortise and perforated in front for the passage of the push pins and manipulating levers. 2 is the front plate and 3 is a plate parallel thereto. 5 are push pins disposed in holes 51, 52, and reciprocating therein. The push pins 5 are each provided with a head 53 constituting a finger button and with a collar 54 adapted to engage the inner side of the plate 2. A coil spring 55 disposed on each pin reacts against the collar and the outer side of the plate 3, so that the push pins are each returned by their respective springs to the initial position. These pins each act upon the head of a catch slide, which will be explained hereafter.

6 is a central plate parallel with the front plate 2 and spaced therefrom by spacer blocks 7. Plate 6 is notched top and bottom at 61 and retainer bars 62 extend longitudinally thereof. Catch slides 8 are disposed in the slots 61 formed at top and bottom of the plate 6 and these are provided with heads 81 which heads are held normally against the plates 3 by coiled springs 82 acting against the same and reacting on the front side of the plate 6, so that said slides are in position to be pushed by the push pins. Part of the slides are notched at 83 and have shoulders 84 and are extended into spring latches 85 adapted to hold the said slides in a manner hereafter to be explained. Others of the slides are notched at 87 and provided with engaging portions 86 out of line with said engaging portions of the other slides, so that certain of the slides act as locks when others are disengaged. As these catches are all concealed within the structure, it is only possible to operate them to release the bolt by knowing which pins to push.

A bolt 11 with cross notches 111 top and bottom is provided which plays between the notched longitudinal bars 10 10 above and below the same, the bars 10 having cross notches 101 corresponding to the notches 111, as seen in Fig. 7. When the catch slides 8 are in proper position to bring the notches therein opposite the bolt 11, it is possible to manipulate said bolt 11, and until the catch slides are in correct position the bolt is locked against manipulation. The bolt 11 is held against rattling by springs 115. It is slotted at 113, 114 and is manipulated by rock shaft 17 which is controlled by lever arm 171, hereafter to be described.

A latch plate 13 is provided parallel to plate 6 and retained in position by pins 131 to side plates 9. It is provided with cross notches 132 of such dimension as to permit the passing of the hooked latch portions of catch slides 8. A release bar or plate 14 is supported to be manipulated substantially the same as bolt 11. It is provided with enlarged cross slots 141 top and bottom and is

controlled by rock shaft 16 and release lever 161 so that when it is moved upwardly as indicated in Fig. 6 it forces the engaging latch 85 of slide 8 into disengaging position, permitting the coiled springs 82 to withdraw the same. As the notches on the different catch slides 8 are in different positions, it will be seen that the correct ones must be depressed in order to release the bolt 11, and if by any chance the wrong one is depressed the bolt is locked thereby until released and further correct manipulation has occurred. It will not serve the purpose to depress all the push pins because then the bolt is locked. It is only possible to release it by depressing those having the engaging portions 86 and notches 87 as indicated, and whenever any others are depressed the engaging portion 83 is forced into the locking position and the bolt is not released.

All push buttons operate with the same pressure because their springs are the same and the springs upon the catch slides are the same, and therefore it is not possible to determine the action taking place by a study of the action when the push pins are depressed. It is not possible by any such manipulation to determine which pins to push.

The lock bolt 11 is manipulated by the pin 17 which is in effect a rock shaft disposed in suitable bearings through all of the plates from front to back except the back plate 15. This pin 17 is rocked by the handle 171. It is notched at 172 for the action of a retaining anti-rattle spring, identical with that illustrated at 41, and has an upwardly projecting finger 173 engaging between pins 112 on the bolt 11. The bolt 11 is held against rattling by a spring 115, as stated, which is adapted to engage in depressions 116 to hold the bolt yieldingly in locked or unlocked position.

An exactly similar pin or rock shaft 16 is provided to actuate the release slide. It has a handle 161 that is notched at 162 to receive the anti-rattle spring 41 held in place by screws 42 (see Fig. 5), and has an upwardly projecting finger 163 engaging between pins 142 on the release slide 14, so that when this lever is manipulated it moves the latches 85 out of engagement, as indicated by dotted line in Fig. 6. The shaft 16 is disposed in the slot 114 in the bolt 11 and similar slots are in the plate 14 to permit the manipulation of the same.

From this description it will be observed that the bolt 11 can only be manipulated when all of the latch plates having engaging portions 86 have been depressed so that their notches 87 are in alignment with said bolt. If by any chance any of the other catch slides are manipulated, the bolt will be locked. I preferably provide three of the slide catches with the engaging portions 86 and the structure can only be manipulated by knowing the three keys to depress. The combinations possible are very large and therefore the device shown makes a very safe combination lock. Two or four of the push pins might be made use of in this way.

When the device is used on an automobile, it is desirable when the structure is locked that it cut out the ignition, and I indicate by dotted lines a switch 18 which can be operated to close by the bolt when in unlocked position and opens when the bolt is locked.

I have shown my improved combination lock in the form preferred by me. It is possible, however, to vary the details without departing from my invention, and I desire to claim the same specifically as well as broadly, as pointed out in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a combination lock, a casing, parallel plates at the front of the casing, a sliding lock bolt with transverse slots, yielding push pins disposed through the said plates, each provided with a collar and spring reacting against the same to hold it in the outer initial position, plates with transverse guides, a plurality of catch slides with transverse notches and catches at different locations, disposed in said guides with heads opposite the said push pins and movable into and out of engagement with said bolt, certain of the said slide catches being notched to engage the said bolt when in depressed position and others to engage said bolt when in initial position, whereby special manipulation of the push pins is required to release the lock bolt, coiled springs for holding said slides with their heads yieldingly in position whereby the said slides may be depressed by said push pins, a latch on each slide, a perforated latch plate adapted to be engaged by said latches when the slides are depressed, a release plate with apertures to receive said slide latches, a rock lever to manipulate the release plate with a handle at the front of said casing whereby the lock can be reset for manipulation and the bolt can be engaged and locked against movement when in the locking position, and a rock lever for manipulating the lock bolt, with handle at the front of said casing, coacting as described.

2. In a combination lock, a casing, parallel plates at the front of the casing, a sliding lock bolt with transverse slots, yielding push pins disposed through the said plates, each provided with a collar and spring reacting against the same to hold it in the outer initial position, plates with transverse guides, a plurality of catch slides with transverse notches and catches at different locations, disposed in said guides with heads opposite the said push pins and movable into and

out of engagement with said bolt, certain of the said slide catches being notched to engage the said bolt when in depressed position and others to engage said bolt when in initial position, whereby special manipulation of the push pins is required to release the lock bolt, coiled springs for holding said slides with their heads yieldingly in position whereby the said slides may be depressed by said push pins, a latch on each slide, a perforated latch plate adapted to be engaged by said latches when the slides are depressed, a release plate with apertures to receive said slide latches, means for forcing said release plate to one side for releasing the said catch slides, and a rock lever for manipulating the lock bolt, with handle at the front of said casing, coacting as described

3. In a combination lock, a casing, parallel plates at the front of the casing, a sliding lock bolt with transverse slots, yielding push pins disposed through the said plates, each provided with a collar and spring reacting against the same to hold it in the outer initial position, plates with transverse guides, a plurality of catch slides with transverse notches and catches at different locations, disposed in said guides with heads opposite the said push pins and movable into and out of engagement with said bolt, certain of the said slide catches being notched to engage the said bolt when in depressed position and others to engage said bolt when in initial postion, whereby special manipulation of the push pins is required to release the lock bolt, coiled springs for holding said slides with their heads yieldingly in position whereby the said slides may be depressed by said push pins, a latch on each slide, a perforated latch plate adapted to be engaged by said latches when the slides are depressed, a release plate with apertures to receive said slide latches, means for forcing said release plate to one side for releasing the catch slides, and means to manipulate said lock bolt, coacting as described.

4. In a combination lock, a casing, parallel plates at the front of the casing, a sliding lock bolt with transverse slots, yielding push pins disposed through said plates, each provided with a collar and spring reacting against the same to hold it in the outer initial position, plates with transverse guides, a plurality of catch slides with transverse notches and catches at different locations, disposed in said guides with heads opposite the said push pins and movable into and out of engagement with said bolt, certain of the said slide catches being notched to engage the said bolt when in depressed position and others to engage said bolt when in initial position, whereby special manipulation of the push pins is required to release the lock bolt, and means to return said slides to initial position, coacting as described.

5. In a combination lock, the combination of a casing, a lock bolt with a plurality of transverse slots thereacross at spaced intervals, transversely disposed notched catch slides adapted to pass through said slots, engaging portions on said catch slides, some of said slides disposed to engage said lock bolt and others disposed out of engagement with said lock bolt to engage the same when depressed, springs for holding said notched slides in normal position, yielding latches for holding them depressed, and a release means for releasing the said latches, coacting as specified.

6. In a combination lock, the combination of a casing, a lock bolt with transverse slots thereacross at intervals, catch slides with transverse notches adapted to pass through said slots, engaging portions in different alignment to lock the same, disposed so that some of said slides engage said lock bolt and others engage only when depressed, and springs for holding said transversely notched slides in normal position, coacting as specified.

In witness whereof I have hereunto set my hand.

BYRON J. CARNES.