

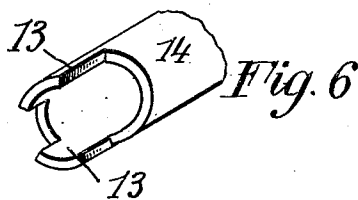
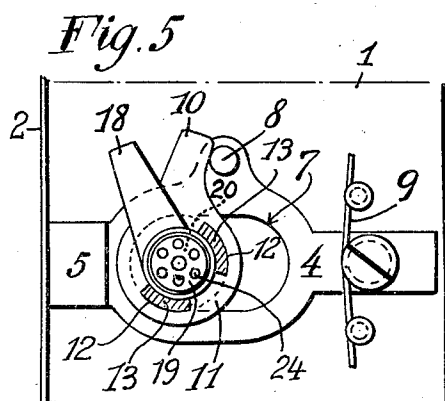
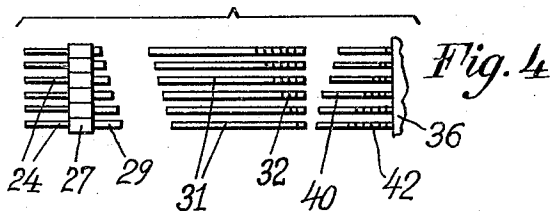
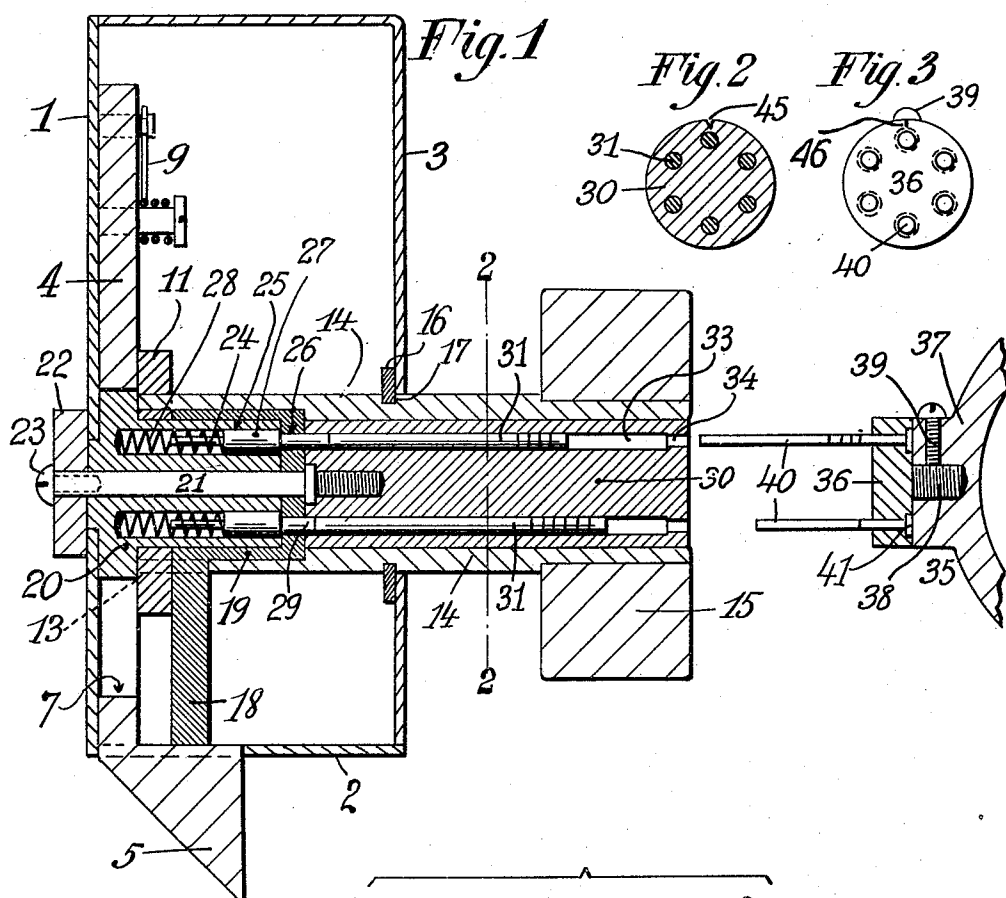
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CYLINDER LOCK

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CYLINDER LOCK

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The object of this invention is to provide a cylinder combination lock and key so arranged that the user is enabled to make his own combination and to alter it at will for the sake of greater safety. Another object is to provide a lock of the character described which shall be simple in construction, efficient in operation and whereby a practically unlimited number of different combinations may be made in a very simple manner and without requiring any special tool.

The invention is disclosed in the form of a lock particularly well suited for use on automobiles, safe cabinets and the like where it is not required that the door be locked except from one side only. The novel features however, are not limited for use in locking a door from one side only, but may be embodied in a lock operated from both sides of the door.

The inventive thought is embodied in a cylinder lock in which the bolt is prevented from being operated by a combination operated or actuated latch. That is to say, the door is locked by turning a latch down in front of the door bolt and only by using the particular combination can the latch be turned away from the bolt and the latter operated.

The latch is held in non-turnable position by a plurality of tumbler pins which are seated in a non-turnable member. The tumbler pins are pushed inward away from the latch by means of a number of push pins and these latter are operated by key pins fixed in the key. The arrangement is such that when the key pins and the push pins correspond in combination, i. e. arrangement and setting, the insertion of the key will cause the push pins to depress the tumbler pins, so that they will be disengaged from the latch and the latter may then be turned by the push pins. In addition, certain anti-lockpicking features are provided as a greater precaution.

With the foregoing and other objects the invention is embodied in a lock arranged and constructed as hereinafter set forth and as illustrated in the accompanying drawings in which

Fig. 1 is a central horizontal sectional view

through a lock and key embodying the invention with parts omitted and parts broken away.

Fig. 2 is a sectional view of the push pins and barrel taken on line 2—2 of Figure 1.

Fig. 3 is a face view of the key.

Fig. 4 is a composite diagrammatic view of the three sets of pins used in the lock.

Fig. 5 is a view in elevation showing the latch and bolt in open positions.

Fig. 6 is a perspective view of the end of the hollow door knob stem with parts broken away.

The lock comprises a casing adapted to be fastened to a door in the manner of ordinary locks. The casing preferably has a back portion 1, a side 2 and a cover 3. The bolt 4 is in the usual form with a head 5 adapted to engage a recess in the door frame, not shown. The bolt, Figure 5, slides horizontally by means of a cut out portion 7 which fits over the central part of the lock mechanism as shown. 8 is a pin in the bolt for moving the latter against the tension of a suitable spring 9 which normally keeps the bolt in locked position projecting from the door into the door frame.

The bolt is operated, that is withdrawn or opened, by a cam 10 adapted to engage the aforesaid bolt pin 8. The cam has a hub 11 provided with two cut outs 12, 12 adapted to be engaged by two fingers 13, 13 formed on the inner end of the hollow door knob stem 14 to which the door knob 15 is secured in any suitable manner.

The door knob is held fixedly against axial movement by any suitable means such for instance as a U-formed plate 16 which is inserted after the lock has been assembled and engages a groove 17 in the stem.

The bolt 4 is held in locked position as in Figure 1 by means of a latch 18 having a hollow cup shaped hub 19, which fits over a fixed lock hub 20. A bolt 21 passes through both the hubs 19 and 20 securing them together laterally and to the casing 1 by means of a nut 22 and a screw 23. However, the latch hub 19 is free to turn on the lock hub 20, but is normally held in non-turnable po-

sition as in Figure 1 by a plurality of tumbler pins 24, six in number.

The tumbler pins are seated in recesses 25 in the lock hub 20 and are normally projected from said hub into and through openings 26 in the latch hub 19 thereby preventing the latter from turning. Each tumbler pin has a collar 27 to position it and a spring 28 which forces the tumbler pin outward as shown. 10 The tumbler pins have operating shanks 29 of unequal length, see Figure 4.

From the description so far it will be seen that the tumbler pins 24 which project from the fixed hub 20 into the turnable hub 19 prevent the latter from turning so long as they are in the projected position shown in Figure 1 and the latch 18 therefore remains down in front of the head 5 of the bolt 4 and the latter cannot be operated. At this time 20 therefore the bolt is held in projected position by the latch 18 and of course the cam 10 is moved correspondingly closer toward the side 2 of the lock and the stem 14 is also held in non-turnable position.

We come now to that part of the lock mechanism which enables the user to depress the latch pins 24 within the fixed hub 20 and away from the latch hub 19 so that the latter may be turned with the latch after which the 30 knob is turned to operate the cam 10 to open the bolt.

Referring to Figure 1 the numeral 30 denotes a push pin barrel which is screwed onto the bolt 21. The barrel contains six 35 push pins 31 which are of unequal lengths and numbered by marks 32 as shown in Figure 4. The pins 31 lie loosely in apertures 33 in the barrel. The outer ends of the apertures are restricted as at 34 so that the 40 pins 31 cannot fall out. 35 is a key comprising a pin body 36 and a head 37 screwed together on a bolt 38 and secured with a set screw 39. The body 36 holds six key pins 40 projecting from the key and secured by means of heads 41. The key pins are also 45 numbered by marks 42 and are of unequal length corresponding to the push pins. 45 indicates a mark on the pin barrel 30, Figure 2.

In assembling the lock the bolt 4 and the 50 cam 10 are laid against the casing 1 being fitted over the lock hub 20, the latter containing the latch pins 24. Thereafter the latch 18 is placed over the hub 20, the bolt 21 passed 55 through the two hubs and secured in place. Then the spring 9 is mounted. The user then decides upon the combination he wishes to use. Assuming that he desires to use the pins in their numerical order. He then puts 60 push pin number one in the barrel aperture 33 which is directly under the mark 45. Then the other pins proceeding clockwise or anticlockwise. Thereafter the barrel 30 is screwed onto the bolt 21 and the casing cover 65 3 is put in place.

Next he takes the knob and stem and slips the latter through the cover 3 over the barrel 30 and pushes it home by fitting the fingers 13 on the stem 14 into the recesses 12 in the cam hub 11. Then the plate 16 is pushed into place and the lock is assembled.

The key is taken apart by removing the set screw 39 and unscrewing the head 37 after which the key pins 40 are arranged in the same numerical order as the push pins 31. The key may conveniently have a starting mark 46 made thereon to correspond with the position of the set screw so that the user will know that when the key is to be inserted in the lock the set screw must be uppermost.

When now the key is inserted in proper position and pushed all the way in until the face of the key touches the face of the barrel 30, the key pins will move the push pins inwardly and the latter in turn will depress the tumbler pins 24 disengaging them from the latch hub 19. The push pins 31 will now occupy the holes 26 in the latch hub so that when the key is now turned clockwise, the barrel 30 and the latch will also be turned clockwise and the latch moved upwards into the position shown in Figure 5. The key may now be withdrawn and the latch remains in open position because as soon as the key is withdrawn, the tumbler pins 24 will again be pushed outward by their springs 28 and engage the holes in the latch hub, pushing the push pins back into the barrel. The lock 70 bolt may now be operated by simply turning the knob 15 and the door is open.

The door is locked by first again inserting the key to disengage the latch hub 19 from the lock hub 20, then turning the latch 18 down and withdrawing the key.

From the foregoing it will be clear that the door bolt 4 cannot be operated except when the latch 18 is in its upper open position. That the latch is normally held in latched-horizontal-position by the tumbler pins, but is disengaged from the lock hub 20 by pushing the pins 24 inward by means of the push pins 31, after which the latch is turnable by the push pins which now are in engagement with the latch hub.

It will further be clear that by rearranging the push pins and the key pins to correspond, a practically unlimited number of combinations may be made so that each user can make his own combination lock and key with practically no chance of duplicating another one. It will also be noted that it is not essential that the latch pins 24 are of unequal length. All that is required is, that they be long enough to engage the latch hub. When the push pins are pushed inwardly, their inner ends or faces lie in a single plane which coincides with the dividing line or opposed circular faces of the hubs 19 and 20, the lengths of the key pins and the push pins being dimensioned accordingly.

However, by making the latch pins 24 of unequal lengths it is practically impossible for anyone to find the proper combination, for instance by inserting wires into the barrel and against the barrel pins because the depths to which such wires can be inserted will be different not only because of the unequal lengths of the pins 31 but also because of the unequal lengths of the pins 24. Again, the lock cannot be picked by a mere try-out method unless one accidentally happens upon the correct combination of which there is only the remotest possibility. Again, a slight inaccuracy in the lengths of the key pins and the push pins will result in one of two things.

In the one case a push pin will not be completely depressed and then the latch hub cannot turn. In the other case a push pin will not only displace a latch pin in the latch hub, but will go in deeper and engage the fixed lock hub 20 in which case the barrel cannot be turned.

The foregoing is thought to clearly describe the invention, its operation and advantages. While I have shown a preferred form, nevertheless it will be understood that many details and shapes may be altered and changed and I do not desire to limit myself otherwise than is required by the legitimate and intended scope of the appended claims.

I claim:—

1. In a locking device in combination, a casing, a nonrotatable hub secured thereto, a locking bolt operable through an opening in the casing, a movable latch member for normally maintaining the bolt in locked position, a cam rotatably mounted on the hub for retracting the bolt, a plurality of locking pins in said hub in engagement with the latch member to normally prevent operation thereof, a pin cylinder rotatably mounted on the hub, push pins in said cylinder adapted to be operated by a key to displace the locking pins in the latch member and to rotate the latter with the key to release the bolt and means for operating the said cam to retract the bolt.

2. In a locking device in combination, a casing, a cylindrical hub secured thereto in nonrotatable position, a locking bolt mounted to slide on said hub transversely thereof through an opening in the casing, a latch member mounted to rotate on said hub and adapted to normally engage said bolt to hold the same in normally locked position, a cam on said hub for retracting the bolt when the latter is released from the latch, a plurality of longitudinally movable locking pins in said hub held in normal engagement with the said latch member to prevent operation thereof, a plurality of push pins, a member for supporting the latter, said push pins being adapted to be moved in said member longitudinally by a key to displace the said locking pins and to engage the said latch mem-

ber, said push pins being adapted to be rotated together by the key to release the said latch member from the said bolt and means for operating said cam to retract the bolt.

3. In a locking device in combination, a casing, a nonrotatable hub secured thereto, a locking bolt operable through an opening in the casing, a latch member mounted to rotate on said hub and normally positioned for maintaining the bolt in locked position, a cam also mounted to rotate on said hub and adapted to engage the bolt to retract the same, a plurality of locking pins of unequal lengths positioned in said hub and projecting therefrom into engagement with the said latch member to normally prevent operation thereof, a plurality of push pins of unequal lengths positioned in predetermined order and adapted to engage said locking pins by operation of a key to displace said locking pins in said latch member and engage the latter, said push pins being further adapted to be rotated by the operation of the key to rotate the latch member to release the bolt, a knob operated sleeve in engagement with said cam to actuate the latter to operate the bolt and indicating means for positioning the said push pins at will selectively for operation by the key.

4. In a locking device in combination, a casing, a bolt mounted therein to operate through an opening in the casing, a latch member for normally preventing retracting of the bolt, a cam member for retracting the bolt, a plurality of slidably mounted locking pins, means for supporting the same in nonrotatable position and in engagement with the said latch member to prevent operation thereof, push pins supported within said locking device in alignment with the said locking pins, said push pins being key operated to displace said locking pins from engagement with the latch member and to operate the latter to release the bolt, a freely rotatable sleeve in engagement with the said cam to retract the said bolt and a knob for operating the said sleeve.

5. The combination with a locking device comprising a bolt, a latch normally preventing the operating thereof, a cam for operating the bolt, a plurality of locking pins for normally preventing operation of the latch, a like number of push pins adapted to move the locking pins to permit the latch to be operated and for operating the latch, all of said pins being of unequal lengths and arranged in a predetermined order to form a selected combination, said locking device being adapted to be operated by a key comprising a number of pins arranged to correspond with the arrangement of the push pins to operate the latter.

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