July 5, 1932. F. E. BEST 1,866,342

LOCK

Filed June 24, 1930 2 Sheets-Sheet 1

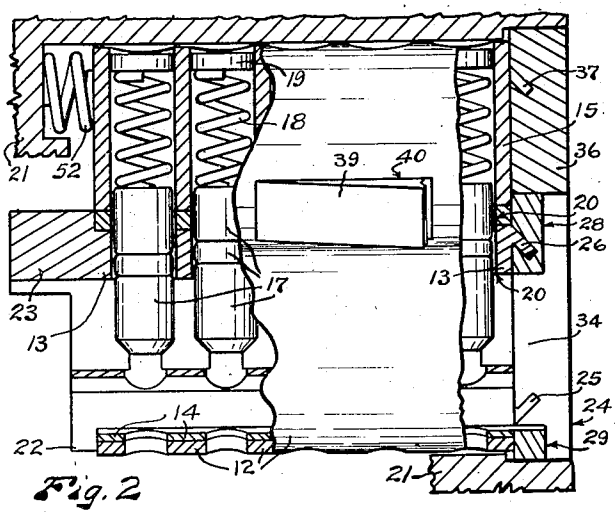


Fig. 2

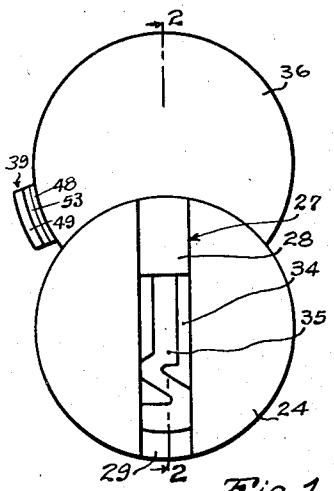


Fig. 1

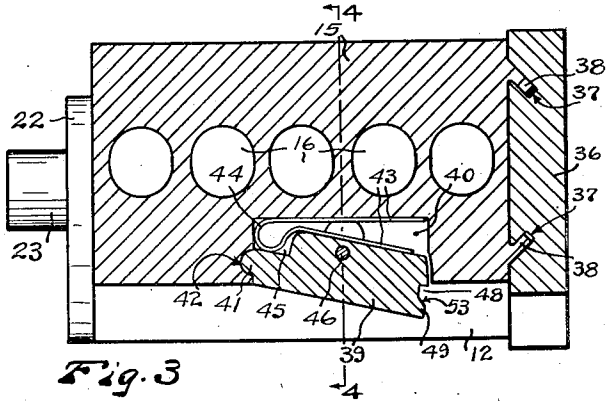


Fig. 3

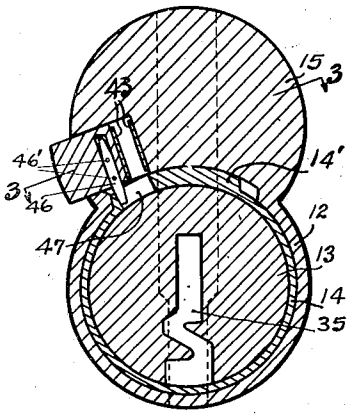


Fig. 4

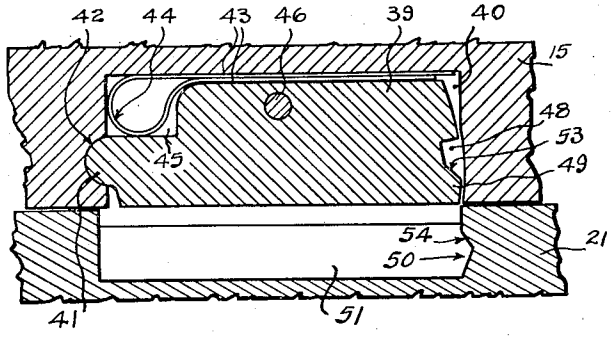


Fig. 5

INVENTOR

Frank Ellison Best

July 5, 1932. F. E. BEST 1.866,342

LOCK

Filed June 24, 1930 2 Sheets-Sheet 2

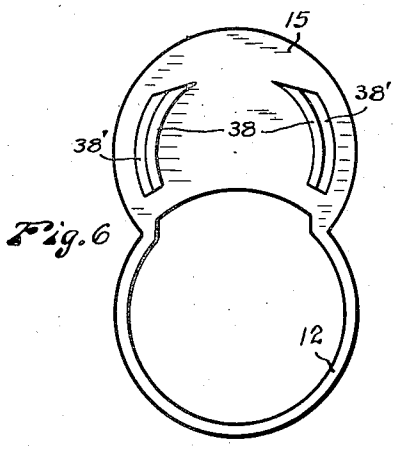


Fig. 6

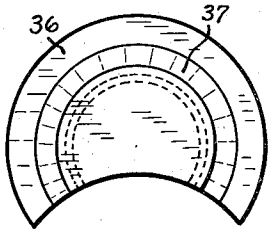


Fig. 7

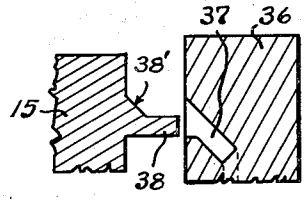


Fig. 8

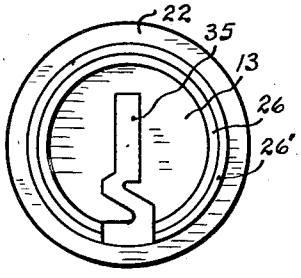


Fig. 9

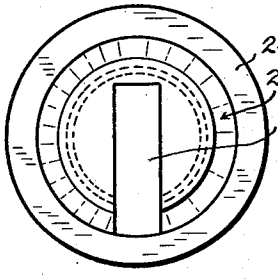


Fig. 10

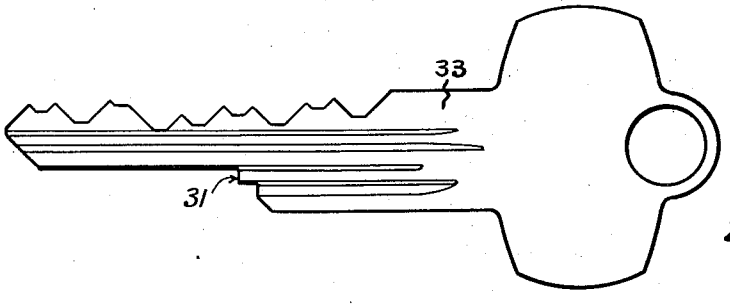


Fig. 11

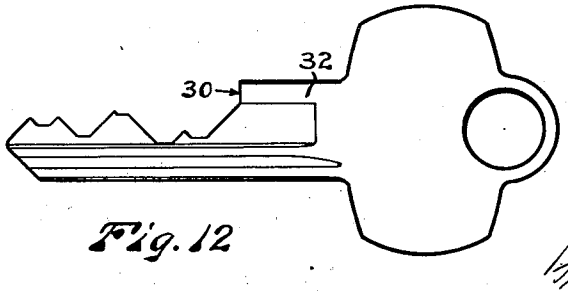


Fig. 12

INVENTOR

Frank Ellison Best

Patented July 5, 1932 1,866,342

UNITED STATES PATENT OFFICE

FRANK ELLISON BEST, OF WILMINGTON, DELAWARE, ASSIGNOR TO FRANK E. BEST, INC., OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON

LOCK

Application filed June 24, 1930. Serial No. 463,383.

My invention relates to improvements in locks of the lock controlled assembly type in which a lock core is secured within a housing or receptacle by key controlled means and my present invention is in the nature of an improvement on the lock disclosed in my prior application Serial Number 339,177, filed Feb. 11, 1929.

The general object of my present invention is to improve and simplify the construction of a lock of this nature and to render the same more reliable and efficient in operation.

A more specific object is to improve and simplify the construction of the snap latch means by which a lock core constructed in accordance with my invention is locked within a housing or receptacle and to render the same less susceptible to being tampered with by the method of lock picking known as rapping.

Another specific object is to provide improved key stop means at the front end of the key plug which permits two different types of keys to be used interchangeably with this lock.

Another object is to provide improved means for securing the face plates to the body of the lock core and to the end of the key plug.

Further objects are to provide a lock of this nature which is strong and substantial in construction, durable and efficient in operation, cheap to manufacture, easy to install within any suitable lock receptacle without the use of a key, and readily removable from the receptacle by the use of a proper key to allow the combination to be changed.

Other and more specific objects will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings Figure 1 is a front elevation of a lock core constructed in accordance with my invention.

Fig. 2 is a view of the same partly in side elevation and partly in vertical section substantially on broken line 2—2 of Fig. 1, a fragment of a lock housing being shown.

Fig. 3 is a cross sectional view substantially on broken line 3—3 of Fig. 4.

Fig. 4 is a cross section on broken line 4—4 of Fig. 3.

Fig. 5 is a detached fragmentary sectional view on a larger scale showing the anti-rapping notch and tongue used in connection with the latch member to prevent the lock from being picked by the method known as rapping, the latch member being shown retracted in this view.

Fig. 6 is a detached view in end elevation of the front end of the core body as it may appear before the face plate is applied.

Fig. 7 is a detached elevation showing the inside of the core body face plate.

Fig. 8 is an enlarged fragmentary sectional view showing the construction of the flange on the front end of the core body and the inclined groove in the face plate within which said flange is seated when the parts are assembled.

Fig. 9 is a detached elevation of the front end of the key plug.

Fig. 10, is a detached elevation showing the inside of the key plug face plate.

Figs. 11 and 12 are elevations on a reduced scale of two different forms of keys which may be used in connection with this invention.

Referring to the drawings, throughout which like reference numerals designate like parts, I show a lock core including a core body of substantially figure 8 cross sectional shape, having a tubular portion 12 for the reception of a key plug 13 and sleeve 14, and having a non-tubular portion 15 which is provided with transverse holes 16 for the reception of tumbler pins 17 and springs 18 which are held in place by caps 19.

The key plug 13 is surrounded by the sleeve 14 which fits snugly within the bore of the tubular body portion 12 and is rotatable relative to both the plug 13 and body portion 12 and said sleeve and key plug are both drilled transversely as at 20 for the reception of the tumbler pins 17. The sleeve 14 has a thickened portion 14′ at the location of these tumbler pin holes. In this way I provide a double shear line pin tumbler lock in which the key plug 13 may be turned within the sleeve 14 when cuts in all of the tumbler pins 17 reg-

ister with the shear line formed at the outer circumference of the key plug and inner circumference of the sleeve, or in which the sleeve together with the key plug may be turned within the core body 12 when cuts in all of the tumbler pins register with the shear line formed at the outer circumferential wall of the sleeve part 14'. This outer or secondary shear line is thus used to control the rotary movement of the sleeve and the rotary movement of this sleeve is used to unlock the core from the housing 21 in which it is disposed, to permit the combination of the lock to be quickly and easily changed.

The key plug 13 has an enlarged head 22 formed on its inner end, said head having throw means, as a pin 23, provided thereon for engaging with and operating secondary lock mechanism, not shown. A face plate 24, see Fig. 9, is secured to the forward end of the key plug 13 by providing within the face plate 24 an inwardly inclined annular groove 25 and providing on the end of the key plug 13 an annular flange 26 adapted to enter the groove 25 and be bent inwardly in such a manner as to rigidly stake the face plate and the key plug together when pressure is exerted on these parts in assembling. The base of the flange 26 is preferably made larger as at 26' to more completely fill the groove 25. The face plate 24 has a straight groove 27 provided in the outer surface thereof, said groove 27 forming a stop surface 28 at the upper edge of the face plate and another stop surface 29 at the lower edge of said face plate, said two stop surfaces being arranged to be engaged by stop shoulders 30 and 31 on keys 32 and 33 respectively as shown in Figs. 12 and 11. An opening 34 is formed in the grooved portion of the face plate 24 between the stop surfaces 28 and 29 and in alignment with a keyway 35 in the key plug 13. A body face 36 is secured to the end of the non-tubular portion of the core body by means of an inclined circular groove 37 in the inner side of the body face which is arranged to receive segmental flanges 38 on the end of the body whereby the body face and core body are rigidly and immovably secured to each other when they are pressed together. The base portions of the flanges 38 are made angular as shown at 38' in Fig. 8, to conform to the incline of the groove 37 and to give greater strength and more fully fill said groove. The lower portion of the body face 36 is cut away on arcuate lines to afford room for the rotary key plug face 24.

For the purpose of locking this lock core within a receptacle or housing 21, I provide a latch member 39 which is movably disposed within a recess 40 in the side of the core body 15. The rear end of this latch member is rounded as at 41 and said rounded part 41 seats within a correspondingly shaped receptacle 42 in the end of the recess 40 and forms a pivot which allows the front end of the latch member to be swung in and out. A flat spring 43 bent substantially double and having a rolled or enlarged portion 44 at its rear end is placed back of the latch member 39 to exert an outward pressure on the same and hold said latch member in an extended or locked position. The enlarged portion 44 of the spring 43 fits within a notch 45 in the rear end of the latch member 39 and serves the double function of holding the spring in place and affording a portion which may be bent repeatedly without danger of breaking.

For limiting the outward movement of the latch member 39 and for retracting said latch member I provide a pin 46 which is pressed into a suitable hole in the latch member after said latch member has been inserted in the recess 40 and which extends down into a hole 47 in the sleeve part 14'. The pin 46 limits the outward movement of the latch member to substantially the position shown in Figs. 3 and 4. When said sleeve 14 is turned clockwise from the position shown in Fig. 4, it will retract the latch member into the recess 42 and permit the lock core to be withdrawn from the housing 21. The pin 46 is preferably roughened by punch marks 46' before it is pressed into the latch member and will not be easily displaced from said latch member.

With a lock of this type it might be possible for a person skilled in picking locks and who has no key to remove the core from the housing 21 by exerting a light but constant pull on the lock core and rapping or striking the exterior of the housing sharply over or near the location of the latch member 39 in such a manner as to drive the latch member inwardly against the pressure of the spring 43 and make it possible to withdraw said core from the housing. This would make it possible to gain access through the lock. To prevent this opening of the lock by rapping I provide in the end of the latch member 39 a transverse groove 48 which forms a tongue 49 on the end of said latch member. This tongue 49 fits into a groove 50 in the end wall of a notch 51 in the housing 21 within which the latch member engages and makes it impossible to retract the latch member and remove the lock core by mere rapping. Spring means 52 is provided at the rear end of the lock core to exert an outward pressure on said lock core and keep the tongue 49 pushed forward into the groove at all times. The inner side of the tongue 49 is inclined as at 53 and the cooperating wall 54 of the housing groove 50 is correspondingly inclined so that when the sleeve is turned to retract and release the latch member 39 these inclined surfaces will slide upon each other and the core will first be moved inwardly enough to per-

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mit the latch member to release after which said core may be withdrawn.

The form of the spring 52 which is used at the rear end of the lock core to urge the same outwardly may be varied in different forms of locks. I have shown an ordinary helical compression spring but in padlocks and other types of lock where lack of space necessities I may use a flat spring.

This lock is especially intended for small size construction and is especially well adapted for motor vehicle use. The drawings essentially show the lock on an enlarged scale.

The operation of this lock is similar to that of the usual pin tumbler lock in so far as its bolt operating function is concerned, the usual operating key aligning breaks of the tumbler pins on the shear line at the periphery of the key plug and permitting rotation of the key plug within the sleeve 12 while said sleeve is locked against rotation. The lock core may be quickly and easily slipped into a housing without the use of any key, the latch member 39 being pressed into the recess 40 by contact with the housing, allowing the core to be fully inserted, whereupon said latch member will snap out into the housing recess 51 and lock the core within the housing 21 so that it can only be removed by the use of a key. To retract the latch member 39 clear of the housing recess 51 it is necessary to insert a proper control key which will align breaks in the tumbler pins 17 at the outer periphery of the sleeve portion 14' and to then turn said key to the right far enough to retract the latch member 39 from engagement within the housing recess 51. The core may then be withdrawn.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that such changes in the invention may be made as are fairly within the scope and spirit of the following claims.

I claim:

1. In a lock, a housing, a lock core insertable in said housing, a snap latch for locking said core within said housing, and means for preventing the displacement of said snap latch by rapping on the exterior of said housing.

2. In a lock, a lock core, a housing for receiving said lock core, a snap latch carried by said lock core for locking said lock core within said housing and means on the end of said snap latch for preventing the retraction of the same by rapping the exterior of said housing.

3. In a lock, a lock core, a snap latch on said lock core and a housing for slidably receiving said lock core, said housing having a shoulder behind which said snap latch engages, said shoulder and said snap latch having cooperating means for preventing retraction of said snap latch by rapping the exterior of said housing.

4. In a lock, a lock core, a snap latch on said lock core and a housing for slidably receiving said lock core, said housing having a shoulder behind which said snap latch engages, said shoulder and said snap latch having cooperating tongue and groove means for preventing retraction of said snap latch by rapping the exterior of said housing.

5. In a lock, a lock core, a snap latch on said lock core, a housing for slidably receiving said lock core, said housing having a shoulder behind which said snap latch engages, said shoulder and said snap latch having cooperating tongue and groove means for preventing release of said snap latch by rapping the exterior of said housing, and a spring urging said lock core outwardly in said housing.

6. The apparatus as described in claim 5 in which abutting surfaces of the tongue and groove means are inclined whereby they may be caused to slide over each other and allow retraction of the latch member when retractile effort is exerted by the use of a proper key in the lock.

7. In a lock, a lock core, a snap latch member on said lock core, a spring urging said snap latch member outwardly, a housing for slidably receiving said lock core, said housing having a shoulder behind which said snap latch member engages, said shoulder having a groove formed therein, a tongue on said snap latch member arranged to engage within the groove on said shoulder, an inclined face in said groove, an inclined face on said snap latch tongue arranged to engage the inclined wall of said groove during the retractile movement of said snap latch member, spring means yieldingly urging said core outwardly in said housing, and key operated means for retracting said snap latch member.

8. In a lock, a lock core having a recess in one side, a snap latch member operable within said recess and having one end pivotally supported in the wall at the end of said recess, a spring disposed behind said snap latch member for urging the non-pivoted end of said member outwardly, means for limiting the outward movement of said snap latch member, a housing for receiving said lock core, said housing having a shoulder behind which the movable end of said snap latch member may engage, said shoulder and the end of said snap latch member having interfitting tongue and groove means for preventing retraction of said snap latch member by rapping on the exterior of said housing, and lock controlled means for retracting said snap latch member.

9. In a lock, a lock core having a recess in one side, a snap latch member having one

end pivotally retained in said recess and the other end arranged to swing into and out of said recess, a spring behind said snap latch member for urging the same outwardly, a key plug rotatable within said lock core, a sleeve surrounding said key plug and having a hole therein adjacent the location of said snap latch member, a pin pressed into said snap latch member and extending into said hole in said sleeve whereby rotation of said sleeve may retract said snap latch member, key operated tumbler pin means controlling the rotation of said sleeve, and a housing for the reception of said lock core, said housing having a shoulder means with which said snap latch member may engage.

10. In a lock of the class described, a lock core, a key plug in said lock core, a face plate on said key plug, said face plate having a diametrical groove in its front side and having a slot in the bottom of the groove extending through the plate, and a key stop formed in the bottom of said groove at each end of said slot.

11. In a lock of the class described, a core body, a key plug rotatable in said core body, a face plate for said key plug, said face plate having an annular inclined groove in its inner side, and an annular flange on the end of said key plug arranged to be pressed into said inclined groove in said face plate and bent to conform to the incline of said groove for securing said face plate to said key plug.

12. In a lock of the class described, a core body having a tubular portion and a non-tubular portion, a body face for the end of said non-tubular portion, said body face having annular inclined grooves in its inner side, and annular flange segments on the end of said body portion for entrance into said grooves, said flange segments being bent to conform to the incline of said grooves for rigidly securing said face to said core body.

The foregoing specification signed at Wilmington, Delaware, this 23rd day of June, 1930.

FRANK ELLISON BEST.