Jan. 15, 1935. M. FALK 1,987,735

LOCK

Filed Aug. 10, 1928

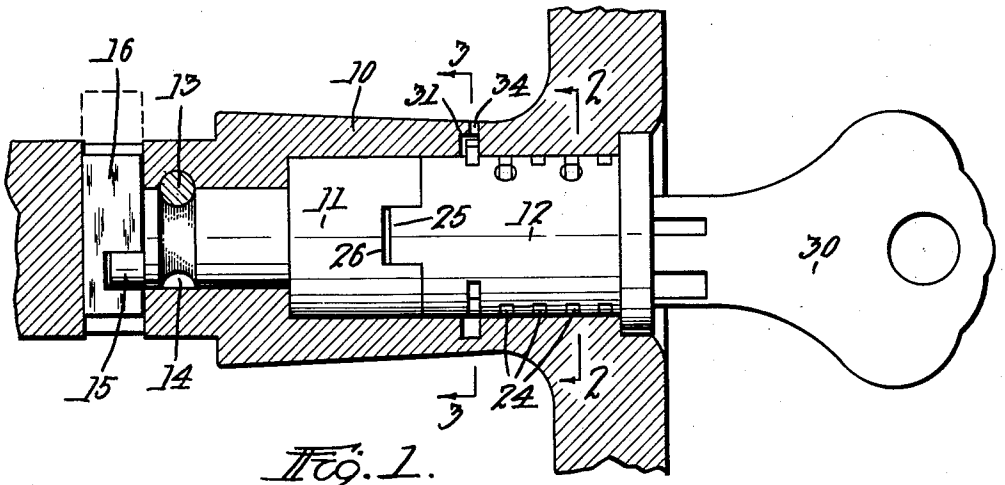


Fig. 1.

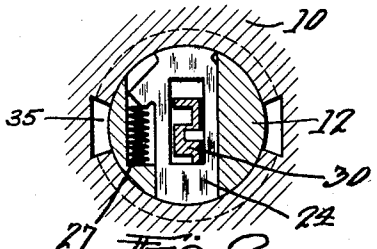


Fig. 2.

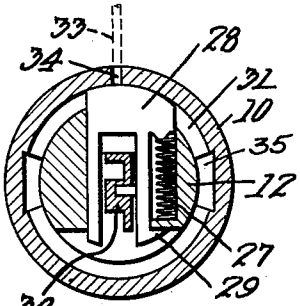


Fig. 3.

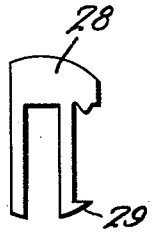


Fig. 4.

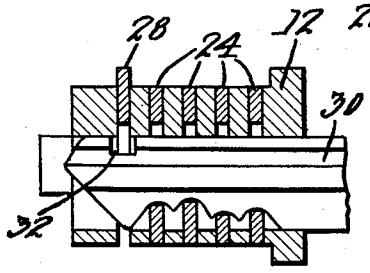


Fig. 5.

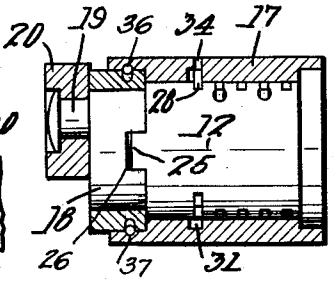


Fig. 6.

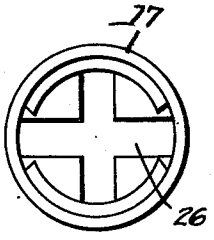


Fig. 7.

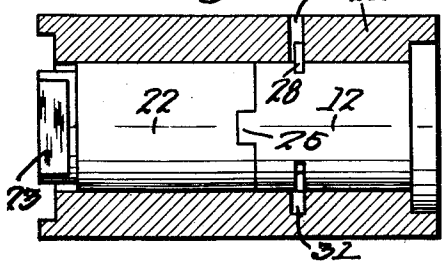


Fig. 8.

Inventor
Morris Falk
By Attorneys
Southgate Fay & Hanley

Patented Jan. 15, 1935 1,987,735

UNITED STATES PATENT OFFICE

1,987,735

LOCK

Morris Falk, Fitchburg, Mass., assignor to Independent Lock Company, Fitchburg, Mass., a corporation of Massachusetts

Application August 10, 1928, Serial No. 298,691

40 Claims. (Cl. 70—46)

This invention relates to locks, especially to a series of locks for an automobile or other purposes.

The principal objects of the invention are to provide locks for the different parts of an automobile or the like and for general use in which, although the keys of the different locks may be different or the same, as desired, the plugs of the several locks will be identical and interchangeable; to provide a construction in which in the setting up of a car or other device which is provided with several locks, the assemblers may finish the locks by inserting a series of identical plugs, one in each lock, from which the plugs cannot thereafter be removed in any convenient manner except by the use of an implement; to provide a plug as indicated above adapted for each of the several locks of a car or house and having means for connecting it with an element which is usually a part of said plug, but is different for each lock and with means coming into operation by the insertion of a plug, which will prevent the removal of the plug without the use of such implement, and even then will prevent its removal except when the lock is unlocked.

Reference is to be had to the accompanying drawing in which

Fig. 1 is a sectional view of a lock constructed in accordance with this invention showing the plug in elevation;

Figs. 2 and 3 are sectional views on the transverse lines 2—2 and 3—3 respectively of Fig. 1;

Fig. 4 is a side view on enlarged scale of the connecting tumblers;

Fig. 5 is a central longitudinal sectional view of the detachable part of the plug with a special key therein;

Fig. 6 is a side view of the same plug showing it connected with a form of lock different from that shown in Fig. 1 and with the casing and locking parts in section;

Fig. 7 is an end view of the same; and

Fig. 8 is a view similar to Fig. 6 with the plug removed but showing a third form of lock.

A good deal of trouble has been experienced in the automobile trade and other places owing to the fact that there are four or five locks on most cars and it is a difficult matter to dismantle them or to furnish a key for one of them if the key is lost and as a matter of fact the thing that is usually done is to take the plug out by drilling into the lock somewhere and thus mutilate the lock and prevent the reuse of the same combination. Thus the owner is given a different key which in some cases is very unsatisfactory, especially where the owner has a single key for all the locks. This necessitates his carrying around one extra key which under present conditions is undesirable.

By means of this invention the various kinds of plugs which are now employed in several locks on a car are formed in two parts and the end part which contains the cam or equivalent device for the actual operation of the bolt or control of the ignition, instead of being part of the plug, is part of the lock and is not removable. The part of the plug which involves the tumblers preferably is made separate with a projection or the like fitting the inner part of the plug left in the lock and thus performing the same functions as has been the case before. The outer part of the plug, for each lock, is the same, so that they can be interchanged at will. The object is to provide for convenience in assembling, as the several plugs can all be inserted in the locks without regard to their relationship one to the other and when inserted a tumbler, retaining device, holder or detent, similar to the combination tumblers, automatically projects from the plug and prevents the removal of the plug at that time by any ordinary means.

This invention is designed particularly for automobile locks but can be used with house locks and locks for various other purposes.

One difficulty with the assembling of automobile locks is that it requires special handling for the insertion of the right plugs in each lock and that they are not interchangeable but it is absolutely necessary to get exactly the right plug for each lock and then manipulate it in an unhandy way in order to get it assembled. When assembled, it is put in permanently and something has to be destroyed or injured in order to get it out. It has occurred to me that the inner ends of the plugs of the several different locks, of an automobile for example, can be made a permanent part of the lock and split from the outer ends of the plugs and these outer ends, which constitute the plug proper, can be all made alike, interchangeable and readily insertable without necessitating the assembler bothering to supply the right one in each place.

I also find that with this construction we have the advantage that this outer end plug can be removed very readily by employing a special key, designed to be retained by the manufacturer or his authorized agent, without destroying anything or performing any operation materially different from unlocking an ordinary lock and then it can be replaced by itself or by another plug like it. This reduces very materially the immense stock of plugs which manufacturers and dealers have to keep on hand and constitutes a very important saving in this respect, as well as in the other respects above mentioned.

Although this invention is adaptable for houses, stores, offices and the like, I have shown it as applied particularly to a set of automobile locks. Referring first to Fig. 1, it will be seen

that this shows a lock for the handle of a door of an automobile and that the casing 10 is provided with a long passage in which is the ordinary plug, split into two parts 11 and 12. The part 11 is secured in the casing 10 by a pin 13 and circumferential groove 14 so that it remains in place permanently after assembling. It is provided with a crank 15 operating the locking bolt 16, by means of part 12 through a cross groove 26, as is well understood in this art.

Heretofore the parts 11 and 12 have been in one piece and in order to remove this piece it was necessary to drive out the pin 13 or otherwise mutilate the door handle. Referring now to Fig. 6 it will be seen that there is a plug 12 in the casing 17 identical with the plug 12 in Fig. 1 and that there is a part 18 at the end of this plug having a crank 19 for operating a roller 20 for controlling the ignition or any other mechanism. This is the lock for the transmission of the car. Similarly in Fig. 8 is shown the plug 12 in the casing 21 and a piece 22 constituting a continuation of the plug 12 and operating a projection 23 for reciprocating a locking bolt.

I have shown these three forms for illustrative purposes, the invention being applicable to a considerably larger series in the same way. In each case the plug 12 is provided with a projection 25 which fits into a corresponding slot 26 in the plug 11, 18 or 22. When these parts are assembled, the two parts of the plug work together as one piece, but obviously the plug 12 can be drawn out without interfering with the interior part or end of the plug which is a permanent part of the lock as stated above.

This plug 12 is provided with the usual slots and so-called "tumblers" 24, each normally pressed outwardly by a spring 27 and adapted to be held in place as shown in Fig. 2 by the cylindrical surface of the lock casing 10, 17 or 21 as the case may be. Each tumbler 24 is provided with an opening for the key 30. This key may be made in various shapes as usual and I have shown in the drawing a case in which there are only four of these tumblers 24, the space for the fifth one being utilized in another way. This of course reduces the number of combinations and the lock may be made with the full five tumblers 24 and another slot provided for the holding tumbler 28 without reducing the number of combinations. The usual locking grooves 35 are employed to receive the ends of the tumblers.

The tumbler, holder, retaining device or detent 28 is different from the tumblers 24 in the following particulars: At the bottom it is entirely cut out and there is no metal across it from one side to the other so that this tumbler is free to move outwardly regardless of the presence of the key. Furthermore, it is provided with a hook 29 which limits its outward motion to the position shown in Fig. 3, in which it is projecting into an internal circumferential groove 31 in the barrel of the lock casing 10, its walls providing an abutment for the retainer 28. The hook prevents its being pushed out by the spring 27.

In the assembly of the device, the tumblers, 24, four in number in the present case, are assembled in the lock and held down against their springs 27 and the tumbler 28 also is pushed down in the same way. The plug 12 is inserted and turned until the projection 25 enters the slot 26 and is then pushed entirely in.

When the tumbler 28 registers with the circumferential groove 31, its spring 27 will force it out as shown in Figs. 1 and 3, and then, this groove being a straight sided one, its wall will prevent the removal of the plug 12. Now an ordinary key will lock and unlock this device in the usual way and the user will never appreciate that there is any special provision in the lock until he has trouble. The two part plug shown herein is not claimed in this case because it is claimed in applicant's copending application Serial No. 313,116, filed October 17, 1928.

If the other locks on the car are arranged to be operated by the same key, as is possible with this invention, the user will employ them in the ordinary way. They can be arranged so that each one has a separate key if desired. Now if anything happens, as for instance, the loss of the key, the manufacturer or his agent can remove the plug in a very simple manner without injuring anything and without destroying the lock or any part of the device.

For this purpose a special key 30 is shown which may be a master key in the ordinary sense of the word, but is provided with a notch 32 in the back. This key unlocks the lock and at the same time this notch registers with the tumbler 28 and permits pushing it down into the notch so that its periphery will be within the circumference of the plug 12. With an ordinary key, this action is prevented, as will be obvious, but with this notch in position and the lock unlocked, a pin 33 can be introduced through a passage 34 in the casing 10, located slightly off from the locked position of the lock, and the tumbler 28 forced down out of the groove 31 so that the plug 12 can be drawn out axially. The wall of the notch 32 acting on the tumbler 28 forms a positive means for pulling it out after the tumbler is forced down in the manner stated. It will be seen that this leaves the part of the plug 11, 18 or 22 in place and does not interfere with it in any way. In Fig. 6 an expansion ring 36 and a circumferential groove 37, into which the ring enters to hold the parts together, are shown.

This constitutes a very simple way of providing for the assembly of the locks in the factory, reduces the time required in selecting the right plug, and inserting it very materially, avoids the necessity of mutilating either the lock or the plug in order to get the plug out for making a new key when the key is lost, and is of particular convenience where the owner desires one key to fit a plurality of locks.

Although I have illustrated and described only a single form of the invention, I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to all the details of construction herein shown and described, but what I do claim is:—

1. In a lock of the character described, the combination of a casing having a circumferential groove and a plug, of a series of spring-pressed locking tumblers carried by the plug, an additional tumbler of a similar character spring-pressed to force it out beyond the circumference of the plug into the groove upon the plug being inserted far enough for the groove to register with the additional tumbler and mechanical means independent of the locking key for moving the additional tumbler out of the groove to permit removal of the plug.

2. In a lock of the character described, the combination with a casing having a circumferential groove and a plug, of a series of spring-pressed locking tumblers carried by the plug and

an additional tumbler spring-pressed to force it out beyond the circumference of the plug into the groove upon the plug being inserted far enough for the groove to register with the additional tumbler, said additional tumbler having means to prevent its being discharged from the plug when the plug is removed from the casing.

3. In a lock of the character described, the combination with a casing having a circumferential groove and a plug, a series of spring-pressed locking tumblers carried by the plug and an additional tumbler of a similar character spring-pressed to force it out beyond the circumference of the plug into the groove upon the plug being inserted far enough for the groove to register with the additional tumbler, said plug having a slot to receive a key which is fitted to operate the locking tumblers for locking and unlocking the plug in the lock and having a notch adapted to receive the additional tumbler, whereby said tumbler can be forced into the area of the plug and out of the groove to permit the plug to be removed as a whole when the key is inserted fully and turned to unlock the lock.

4. In a lock of the character described, the combination with a casing having a circumferential groove and a plug, of a series of spring-pressed locking tumblers carried by the plug and an additional tumbler adapted to extend into the groove upon the plug being inserted far enough for the groove to register with the additional tumbler, said plug having a slot to receive a key which is bitted to operate the locking tumblers and which has in the back a notch adapted to receive the additional tumbler, whereby said tumbler can be forced out of the groove to permit the plug to be removed as a whole when the key is inserted fully and turned to unlock the lock.

5. The combination of a lock having a plug provided with locking tumblers and an additional tumbler open at the bottom and adapted to be projected beyond the circumference of the plug, the lock having a groove for receiving the end of said additional tumbler, said plug having a slot to receive a key for unlocking the lock having a notch in the back for receiving the additional tumbler when pressed inwardly and by which notch and tumbler the plug can be removed in an axial direction.

6. In a lock of the character described, the combination of a casing having a circumferential groove and a plug, of a series of spring-pressed locking tumblers carried by the plug, an additional tumbler spring-pressed to force it out beyond the circumference of the plug into the groove upon the plug being inserted far enough for the groove to register with the additional tumbler, and external means for mechanically moving the additional tumbler out of the groove for the purpose described.

7. In a lock of the character described, the combination of a casing having a circumferential groove and a plug, of a series of spring-pressed locking tumblers carried by the plug, an additional tumbler of a similar character spring-pressed to force it out beyond the circumference of the plug into the groove, upon the plug being inserted far enough for the groove to register with the additional tumbler, and means movable through the casing into contact with said additional tumbler for moving it inwardly out of said groove.

8. In a lock of the character described, the combination of a casing having a circumferential groove and a plug, of a series of spring-pressed locking tumblers carried by the plug, an additional tumbler spring-pressed to force it out beyond the circumference of the plug into the groove, upon the plug being inserted far enough for the groove to register with the additional tumbler, and mechanical means for engaging said additional tumbler and pushing it inwardly out of the groove to release the plug.

9. In a lock device having a mounting member provided with a bore having an abutment and a lock cylinder movable within the bore in the performance of its locking function, the cylinder having a slot in one side, a flat detent movable in the slot, spring means normally urging the detent into the path of the abutment to prevent detachment of the cylinder from the mounting member, and means whereby the detent may be freed of the abutment when the cylinder is in a predetermined position.

10. In a cylinder lock, a plug, a retaining device adapted to retain the plug within said cylinder, means to permit operation of said retaining device from the outside of the cylinder, said retaining device being inaccessible for operation until the plug is key operated.

11. In a cylinder lock, a plug, a retaining device for said plug adapted to enter a portion of the cylinder to retain the plug within said cylinder, an opening in the cylinder to permit operation of said retaining device from the outside of the cylinder, said retaining device being inaccessible for operation until the plug is partially rotated by key operation.

12. In a lock, the combination of a casing adapted to be secured in an element, of a plug rotatable in and insertable endwise into the casing, key-operable tumblers for locking the plug in the casing, said casing and plug having contiguous grooves therein, a holder having arms to engage the plug, and a spring for pressing the holder into the groove in the casing.

13. In a lock, the combination of a casing adapted to be secured in an element, of a plug rotatable in and insertable endwise into the casing, key-operable tumblers for locking the plug in the casing, said casing and plug having contiguous grooves therein, a holder in the groove in the plug and having rigid arms to engage the plug and hold it in connected relation thereto when the plug is removed from the casing, and means for permitting the holder to be shifted into the plug to permit its withdrawal from the casing.

14. In a lock, a bored casing having a circumferential groove, a key plug movable in the casing bore to and from a locked position, a series of spring pressed key operable locking tumblers carried by the plug for holding the plug in locked position, a plug retaining member carried by the plug and spring pressed to project beyond its circumference into the groove upon insertion of the plug into the casing bore far enough to register said plug retaining member with the groove, and means for preventing disengagement of the plug retaining member from the plug when the plug is removed from the casing bore.

15. In a lock, a bored casing having a circumferential groove communicating with its bore, a key plug movable in the bore to and from a locked position, a series of spring pressed key operable locking tumblers carried by the plug for holding the plug in locked position, a member carried by the plug and spring pressed to project beyond the circumference of the plug into the groove upon the insertion of the plug far enough into the casing bore to register said member with

the groove, and means whereby said spring pressed member may be moved out of the groove by external mechanical means to release the plug for removal from the casing.

16. In a lock having a casing provided with a circumferential groove, and a key plug, a series of spring pressed tumblers carried by the plug, an additional tumbler spring pressed to force it out beyond the circumference of the plug into the groove upon the insertion of the plug far enough into the casing for the additional tumbler to register with the groove, and means whereby an external element may be engaged with the additional tumbler to push it inwardly out of the groove and release the plug for withdrawal from the casing.

17. In a lock, a mounting member provided with a bore having an abutment, a lock cylinder movable within the bore in the performance of its locking function, the cylinder having a slot, a detent movable in the slot, spring means normally urging the detent into the path of the abutment to prevent detachment of the cylinder from the mounting member, and means whereby the detent may be freed of the abutment only when the cylinder is in a predetermined position.

18. In a lock, a cylinder, a key plug movable within the cylinder in the performance of its normal locking function upon the insertion of a proper key, a retaining device for said plug adapted to enter a portion of the cylinder to retain the plug in the cylinder, said cylinder having an opening to permit operation of the retaining device from the outside of the cylinder and the retaining device being inaccessible for operation until the plug is key actuated.

19. In a lock, a cylinder member, a key plug member movable in the cylinder member in the performance of its normal locking functions upon the insertion of a proper key, a plug retaining element carried by one of the members and engageable with the other to releasably hold the members assembled, and means whereby said element may be rendered inoperative from the exterior of the cylinder member to release the plug member for withdrawal from the cylinder member, and said means being so disposed as to require key actuated movement of the plug member to permit the element to be rendered inoperative.

20. In a lock, a cylinder, a key plug in the cylinder, a plug retaining element carried by the plug and normally cooperable with a groove in the cylinder to releasably hold the plug in the cylinder, said cylinder having an aperture through which the retaining element may be operated from the outside of the cylinder, and said retaining element being maintained inaccessible for outside operation when the plug is in locked position.

21. In a lock, a cylinder, a key plug in the cylinder, a retainer carried by the plug and cooperable with a groove in the cylinder to releasably hold the plug in the cylinder, said cylinder having an aperture in its wall through which the retainer may be operated, said retainer being maintained out of alignment with the aperture when the plug is in locked position and the plug being key operable to align the retainer with the aperture.

22. In a lock, the combination with a bored casing, of a key plug movable in the casing bore in the performance of its normal locking functions, key operable tumblers for locking the plug in the casing against such movement, said casing and plug having aligned recesses, a holder normally engaged with both recesses to releasably secure the plug in the casing, the casing being provided with means through which the holder may be disengaged from one of the recesses when the plug is moved out of locked position.

23. In a lock, the combination with a casing, of a key plug movable in the casing to and from locked position, key operable tumblers for holding the plug in said locked position, said casing and plug having contiguous recesses, a plug retaining element having a portion normally engaged in both recesses, means for maintaining said element assembled with the plug, and spring means for maintaining the element in its normal position engaging both recesses, the casing having an aperture leading to its exterior through which the element is operable when the plug is key actuated out of locked position to disengage it from the casing recess and release the plug for withdrawal from the casing.

24. In a lock, the combination with a casing, of a key plug movable in the casing to and from a locked position, key operable tumblers for holding the plug in locked position, the casing and plug having contiguous recesses, and a holding device held in the plug recess and adapted to extend into the casing recess to secure the plug against withdrawal from the casing, said device being movable into the plug from the exterior of the casing to release the plug for withdrawal.

25. In a lock mechanism, a housing member, a tubular barrel member rotatably mounted in said housing member, a shoulder on one of said members, a retractable detent on the other of said members for engaging said shoulder when said barrel is assembled in said housing, a bolt movable to locked and unlocked positions by said barrel, and means operable only when said bolt is in unlocked position for retracting said detent so as to permit the removal of said barrel from said housing.

26. In a lock mechanism, a housing, a tumbler barrel rotatably mounted in said housing, a shoulder on said housing, a retractable detent on said barrel for engaging said shoulder when said barrel is assembled in said housing, a bolt movable to locked and unlocked positions by said barrel, and means operable only when said bolt is in unlocked position for retracting said detent so as to permit the removal of said barrel from said housing.

27. In a cylinder lock, a plug, a spring operated retainer carried by said plug and cooperable with a groove in the cylinder, a bore in the cylinder whereby said retainer may be operated from the outside of the cylinder, said retainer being maintained inaccessible for outside operation when the plug is in locked condition.

28. In a cylinder lock, a plug, a retainer carried by said plug and cooperable with a groove in the cylinder to maintain the plug within said cylinder, a bore in the cylinder wall whereby said retainer may be operated, said retainer being maintained out of registration with the bore when the plug is in locked position, said plug being key operable to bring said retainer opposite said bore.

29. In a lock, the combination of a casing adapted to be secured in an element, of a plug rotatable in and insertable endwise into the casing, key-operable tumblers for locking the plug in the casing, said casing having a groove in its inner periphery, a spring-pressed holder for securing the plug against withdrawal from the casing, held in the plug and adapted to extend

into the groove, and provided with means for retaining it in connected relation to the plug when it is removed from the casing, and means to permit the device to be shifted to release the plug.

30. A lock device, comprising a mounting head having a bore and an annular channel in communication with the bore, a lock cylinder rotatable in the bore, a member carried by the lock cylinder and normally engaged in said annular channel to secure the lock cylinder against removal from the mounting head, and means whereby said member may be moved out of the annular channel when the lock cylinder has been rotated.

31. A lock device, comprising a mounting member having a bore, a lock cylinder member movable in the mounting member in the performance of its locking functions, an abutment within the mounting member and carried thereby, an abutment carried by the lock cylinder member and engageable with the mounting member abutment to releasably secure the lock cylinder member against removal from the mounting member without interference with its movement in the performance of its normal locking functions, and means whereby upon the insertion of an instrument in the path of one of said abutments after the movement of one of said members, the abutments are disengaged and the cylinder member freed for removal from the mounting member.

32. In a lock device having a mounting member provided with a recess having an aperture leading therefrom to its exterior, a lock cylinder movable in the mounting member, a spring pressed detent carried by the lock cylinder and having a portion yieldingly retained in the mounting member recess, and said detent registering with said aperture when the cylinder is in a predetermined position whereby a tool may be inserted to free the detent from the recess and permit the ready removal of the cylinder from the mounting member.

33. In a lock device having a mounting member provided with a bore having an abutment communicating therewith and an aperture leading therefrom, a lock cylinder movable in the mounting member, a spring pressed detent carried by the lock cylinder and engageable with the abutment to prevent detachment of the cylinder from the mounting member but permitting locking movement thereof within the mounting member, said detent registering with the aperture when the cylinder is in a predetermined position, whereby the same may be freed of the abutment by a tool inserted through said aperture to permit the removal of the cylinder from the mounting member.

34. In a lock assembly, a lock housing, a key operated locking device, an outwardly spring pressed retaining detent carried by said locking device, said device and retainer being insertible as a unit into said lock housing, said housing having means with which said retainer cooperates as said device is inserted for thereafter retaining the device in said housing, and said housing having an opening running from the outside surface thereof into a position relatively to said retainer whereby a tool inserted through said opening may operate said retainer.

35. In a lock assembly, a lock housing, a key operated locking device, a retaining detent carried by said locking device, said device and retainer being insertible as a unit into said lock housing, said housing having means with which said retainer cooperates as said device is inserted for thereafter retaining the device in said housing, and said housing having an opening running from the outside surface thereof into a position relative to said retainer whereby a tool inserted through said opening may operate said retainer.

36. In a lock assembly, a lock housing, a key operated locking device, an outwardly spring pressed retaining detent carried by said locking device, said device and retainer being insertible as a unit into said lock housing, said housing having means with which said retainer cooperates as said device is inserted for thereafter retaining the device in said housing, and said housing having an opening running from the outside surface thereof into a position relative to said retainer whereby a tool inserted through said opening may operate said retainer, the operation of said retainer by a tool inserted through said opening being controlled by key operation of said locking device.

37. In a lock assembly, a lock housing, a key operated locking device, an outwardly spring pressed retaining detent carried by said locking device, said device and retainer being insertible as a unit into said lock housing, said housing having means with which said retainer cooperates as said device is inserted for thereafter retaining the device in said housing, and said housing having an opening running from the outside surface thereof into a position relatively to said retainer whereby a tool inserted through said opening may operate said retainer, and means whereby the operation of said retainer by a tool inserted through said opening will be prevented until said locking device is key operated.

38. In a lock housing, a key operated locking device, a retainer carried by said locking device and protruding therefrom into the housing to maintain the locking device in the housing, said retainer being depressible forcefully into said locking device to permit removal of said locking device from the housing, said housing having a hole therein so disposed that a tool may be inserted therein to depress said retainer, said retainer being maintained inoperable by a tool so inserted until said locking device is operated in a predetermined manner by a proper key.

39. In a lock housing, a key operated locking device, a retainer carried by said locking device and protruding therefrom into the housing to maintain the locking device in the housing, said retainer being depressible forcefully into said locking device to permit removal of said locking device from the housing, said housing having a hole therein so disposed that a tool may be inserted therein to depress said retainer, said retainer being maintained inoperable by a tool so inserted until said locking device is key operated to place a predetermined portion thereof under the hole in said housing.

40. In a lock housing, a key operated locking device, a retainer carried by said locking device and protruding therefrom into the housing to maintain the locking device in the housing, said retainer being depressible forcefully into said locking device to permit removal of said locking device from the housing, said housing having a hole therein so disposed that a tool may be inserted therein to depress said retainer, said retaining device being operable by said tool upon coordinated manipulation of said tool and of the locking device, the manipulation of said key operated locking device being possible only by key operation thereof.

MORRIS FALK.