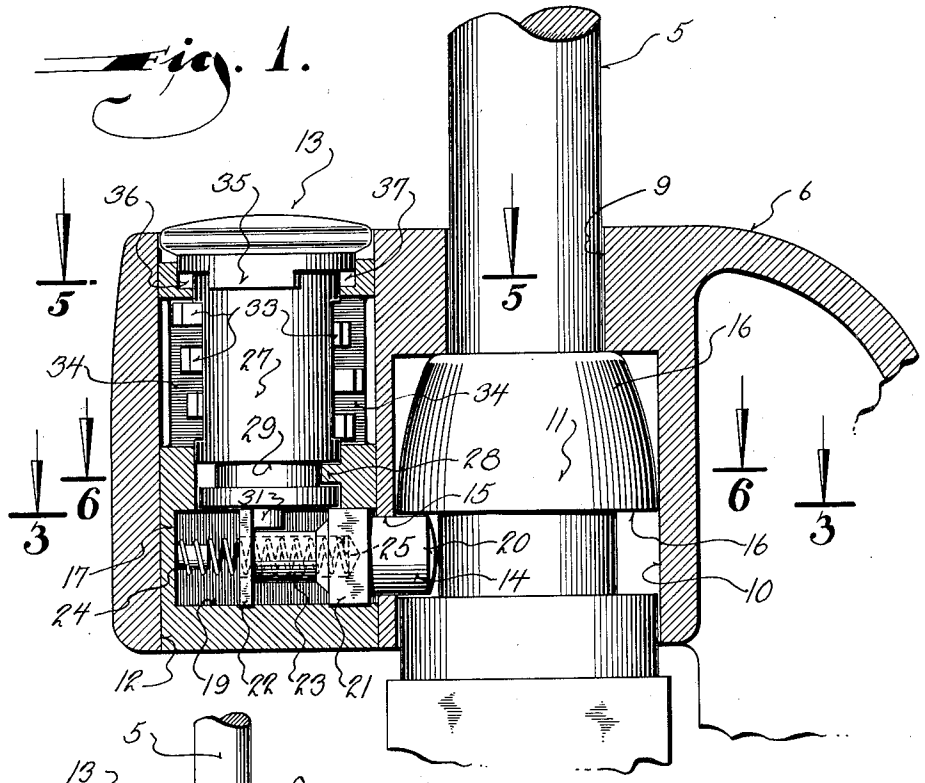
Sept. 8, 1936. E. N. JACOBI 2,053,335

LOCK

Filed Nov. 5, 1934 3 Sheets-Sheet 1

Fig. 1.



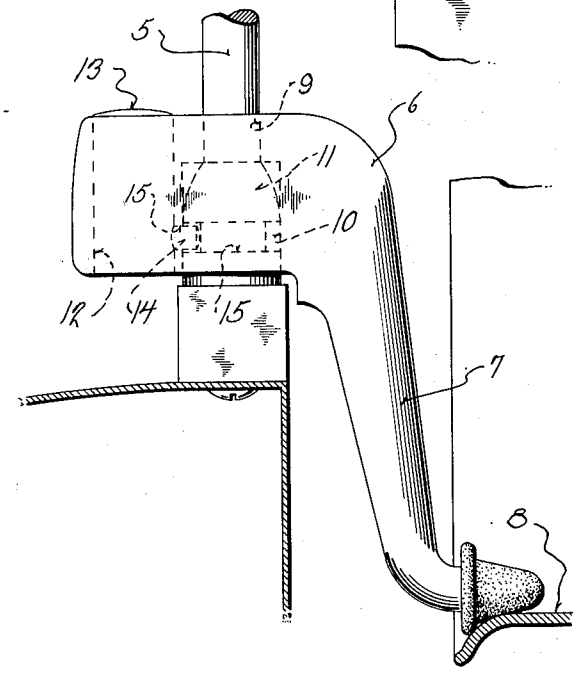


Fig. 2.

Inventor:
Edward N. Jacobi
By Schuyler & Jones
Attorneys

Sept. 8, 1936. E. N. JACOBI 2,053,335

LOCK

Filed Nov. 5, 1934 3 Sheets-Sheet 2

Fig. 3.

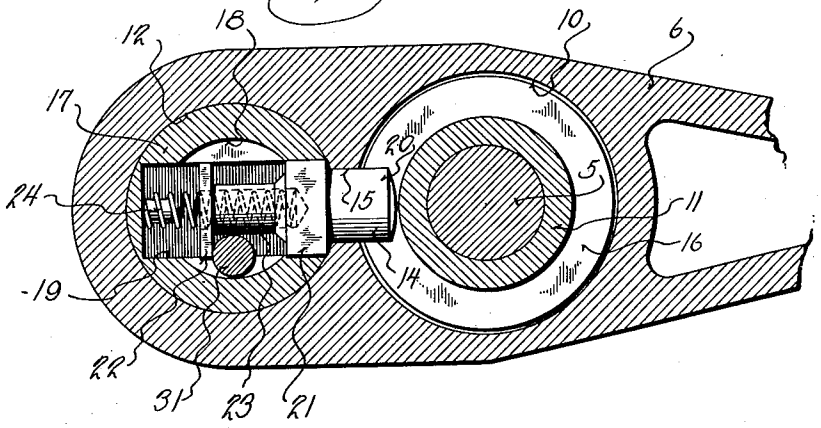


Fig. 4.

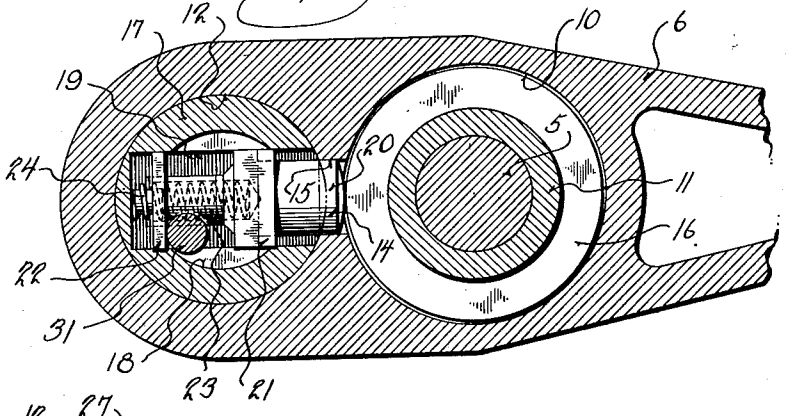
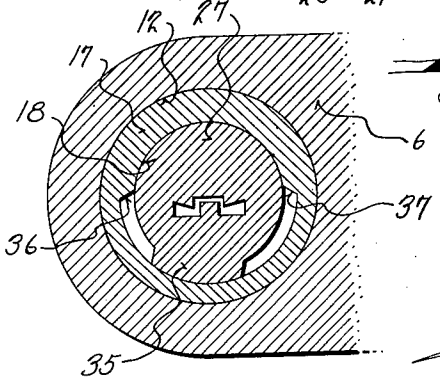


Fig. 5.



Inventor:
Edward N. Jacobi
By Dodge, Smith & Jones
Attorneys

Sept. 8, 1936. E. N. JACOBI 2,053,335

LOCK

Filed Nov. 5, 1934 3 Sheets-Sheet 3

Fig. 6.

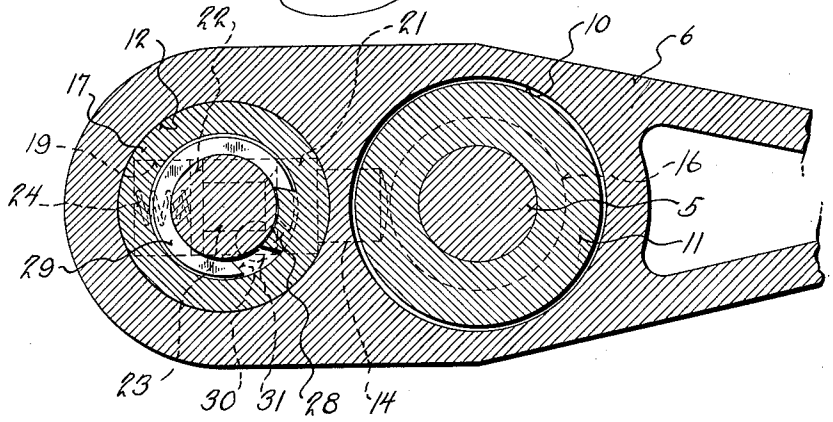


Fig. 7.

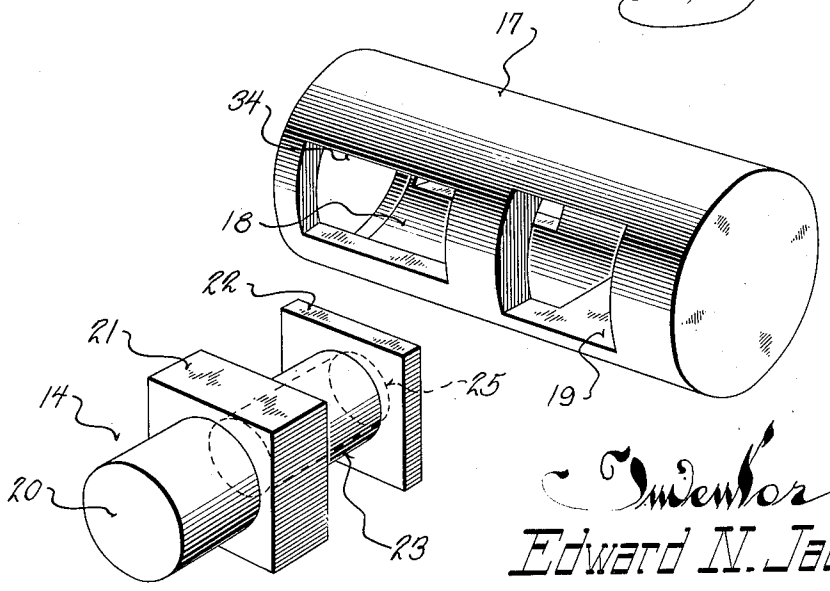


Fig. 8.

Inventor:
Edward N. Jacobi
By Schmeltzer Jones
Attorneys

Patented Sept. 8, 1936 2,053,335

UNITED STATES PATENT OFFICE

2,053,335

LOCK

Edward N. Jacobi, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Milwaukee, Wis., a corporation of Delaware

Application November 5, 1934, Serial No. 751,534

15 Claims. (Cl. 70—46)

This invention relates to locks and refers more particularly to cylinder locks.

For purposes of illustration, the invention has been shown in conjunction with a locking device for side tire carriers in which a holding member is slidably mounted on a fixed rod and provided with a locking bolt adapted to snap into a keeper recess to secure the device in an operative position at which it prevents unauthorized removal of the tire.

However, as will be readily apparent as the description proceeds, the invention is not restricted to lock units for tire carriers, but is equally applicable to many other uses.

It is a particular object of this invention to provide a lock construction wherein the locking bolt not only serves in its regular capacity as a means to effect a locking function, but also retains the various units of the lock structure properly assembled.

More specifically, it is an object of this invention to provide a lock of the character described wherein a transversely slidable locking bolt provides means for preventing withdrawal of the lock cylinder from its sleeve and holds the sleeve with the cylinder therein, assembled in the lock housing, and provides a snap bolt to secure the housing in an operative position at which it has a holding or locking function.

Another object of this invention is to provide a lock structure so constructed that the various units thereof are secured in properly assembled relationship automatically upon assembly.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view partly in section and partly in elevation showing the invention as applied to side tire carriers;

Figure 2 is a view drawn on a smaller scale and with the lock unit in elevation, to show the manner in which the tire is held against removal;

Figure 3 is a cross section view through Figure 1 on the plane of the line 3—3;

Figure 4 is a view similar to Figure 2 but showing the locking bolt retracted by operation of the cylinder;

Figure 5 is a cross section view through Figure 1 on the plane of the line 5—5;

Figure 6 is a cross section view through Figure 1 on the plane of the line 6—6;

Figure 7 is a perspective view of the sleeve of the locking unit; and

Figure 8 is a perspective view of the locking bolt.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 represents the usual vertical rod which forms part of a conventional side tire carrier. As is well known, the upper end of this rod, not shown, is threaded to receive a clamping screw which serves to hold a clamp down onto the upper periphery of the tire.

To prevent theft, a holding member 6 is secured to the rod 5 in a position at which a downwardly and outwardly extending finger 7 on the holding member engages the rim 8 of the tire to prevent lifting the tire out of the well in which it sets.

The holding member has a bore 9 in which the rod 5 is slidably received and a counterbore 10 for the reception of an enlarged collar 11 fixed to the lower end portion of the rod 5. Another bore 12 in the holding member parallel with the bore 9, houses a locking unit indicated generally by the numeral 13.

The locking unit includes a radially projectible locking bolt 14 adapted to extend through a hole 15 communicating the bores 9 and 12, and to snap into a keeper recess provided by an annular groove 16 in the collar 11, when the holding member is moved to its operative position. To enable the placing of the holding member in its operative position without requiring actuation of the locking unit to retract the bolt, the upper end of the collar 11 is tapered as shown.

The locking unit 13 comprises a sleeve 17 having a bore 18 open at one end, the opposite end of the sleeve being closed. Communicated with the inner end of the bore 18 is a transverse slot or recess 19 in which the locking bolt 14 is slidably mounted, the slot 19 being open at only one end and preferably square in cross section.

The locking bolt 14 has an outer end portion 20 which engages the keeper recess afforded by the annular groove 16, and two spaced square

flanges 21 and 22 connected by a round shank 23. The flanges 21 and 22 slidably fit in the slot or recess 19.

An expansive spring 24 having one end bearing against the closed end of the slot or recess 19 and its other end entering a drilled well 25 in the inner end of the locking bolt, yieldably urges the bolt outwardly of the sleeve to its operative position.

When the locking unit is assembled in the housing provided by the holding member 6, as shown in Figure 1, outward projection of the bolt by the spring 24 is prevented by the engagement of the flange 21 with the inner wall of the bore 12 adjacent the hole 15 through which the outer end 20 of the bolt projects for engagement with the keeper recess.

To retract the bolt from the keeper recess, a lock cylinder 27 is provided. The cylinder 27 is rotatably received in the bore 18 of the sleeve where it is held against endwise withdrawal by an abutment 28 formed as part of the sleeve and projecting from the wall of its bore 18 into an annular groove 29 in the inner end portion of the cylinder. An opening or gate 30 leading from the extreme inner end of the cylinder to the annular groove 29 provides means through which the abutment 28 may pass for entrance into the annular channel or removal therefrom when the cylinder is in a predetermined position of rotation at which the gate aligns with the abutment.

The cylinder is thus held in the sleeve by a bayonet slot connection which is disengageable only in one position of rotation of the cylinder. As long as the locking unit remains assembled with its housing provided by the holding member 6, the lock cylinder is prevented from being turned to the position at which it may be withdrawn by the flange 21 engaging an eccentric cam 31 projecting from the inner end of the cylinder.

This is clearly illustrated in dotted lines in Figure 6 wherein the cam 31 is shown in its position engaging the flange 21 holding the cylinder against rotation to its position at which the gate 30 aligns with the abutment 28.

The eccentric cam 31 is received in the space between flanges 21 and 22 and in the locked position of rotation of the cylinder defined by the engagement of key operable tumblers 33 carried by the cylinder in longitudinal grooves 34 in the wall of the sleeve, the eccentric cam engages the flange 22. Hence, upon retraction of the tumblers by the insertion of a proper key and rotation of the cylinder in one direction, the turning motion of the cylinder through its eccentric cam 31 retracts the locking bolt to its position shown in Figure 4 at which its outer end 20 is withdrawn from the keeper recess provided by the annular groove 16. However, in this position, the end 20 of the locking bolt is still in the hole 15 so that disassembly of the locking unit from the housing is prevented.

To prevent accidental withdrawal of the bolt beyond the degree necessary to retract the same from the keeper recess as shown in Figure 4, the rotation of the cylinder is positively limited by the engagement of one side of a stop lug 35 on the cylinder with a stop abutment 36 on the sleeve as shown in Figure 5. Engagement of the other side of the lug 35 with a second stop abutment 37 defines the opposite limit of rotation of the cylinder at which the gate 30 aligns with an abutment 28 to permit relative longitudinal shifting of the cylinder with respect to the sleeve.

Disassembly of the locking unit from its housing provided by the holding member may be effected by pressing the locking bolt inwardly beyond the position at which it is retracted by the cylinder during the normal operation of the lock, a distance sufficient to bring its extreme outer end within the periphery of the sleeve; but this may be done only when the housing member has been moved from its operative position at which access may be had to the inner end of the bolt to apply the necessary pressure thereon. Hence, when the structure is locked such disassembly is impossible.

Upon removal of the locking unit from the housing, the locking bolt is no longer held against outward projection, except by the cam on the cylinder. Consequently, if it is desired to withdraw the cylinder from the sleeve, it is only necessary to turn the cylinder by its proper key to the position defined by the engagement of the stop lug 35 with the stop 37 so that the gate 30 aligns with the abutment 28.

Assembly of the locking unit with the holding member 6 is effected by pressing the bolt flush with the outer surface of the sleeve and pushing the same into the bore of the housing. Upon alignment of the bolt with the hole 15, the bolt snaps out and automatically secures the locking unit in the housing against endwise and rotational motion. No other retaining means are required, and as will be readily apparent, the securement of the parts in properly assembled relationship is effected entirely automatically.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which this invention appertains that this invention affords a novel lock structure wherein the component parts are automatically secured together upon assembly and retained properly assembled by the locking bolt, and while described as providing a lock for side tire carriers, it will be readily apparent that the invention is susceptible to other modes of application and is not restricted to this particular use.

What I claim as my invention is:

1. In a lock structure, a bored lock housing, a locking unit removably mounted in said bore and including a rotatable lock cylinder, means for preventing removal of the locking unit except when its cylinder is in a predetermined position of rotation, a locking bolt operable by the locking unit and projecting through a hole in the housing communicating with its bore exteriorly of the housing for engagement with a keeper, and means on the bolt engageable with the cylinder of the locking unit for normally preventing rotation thereof to its position permitting removal of the locking unit.

2. In a lock structure, cooperating members to be secured together to effect a locking function, one of said members having a keeper recess, the other of said members having a bore and forming a lock housing, a locking unit disposed in said bore and including a lock cylinder having key operable tumblers, and a sleeve surrounding the cylinder and in which the cylinder is securable against rotation by the tumblers, said sleeve fitting in the bore of said housing member, and a locking bolt yieldably projected from the sleeve through a hole in the housing member communicating with said bore for engagement with the keeper recess, the engagement of said bolt in said hole maintaining the locking unit assembled with the housing member.

3. A lock structure of the character described comprising a housing member adapted for interengagment with a member with which it is securable, said housing member having a bore and a hole communicating with said bore, a sleeve removably mounted in said bore, said sleeve having a transverse passage adapted to align with the hole in the housing member, a locking bolt slidable in said transverse passage and having a reduced end portion projectible through said hole in the housing member for engagement with the member with which the housing member interengages to secure said members together, the shoulder at the base of the reduced end portion of the locking bolt being engageable with the wall of the bore to limit outward projection of the locking bolt, a spring to yieldably project the locking bolt outwardly, and a lock cylinder mounted in the sleeve and having a driving connection with the locking bolt so that actuation of the lock cylinder by a proper key retracts the locking bolt to disengage its outer end from said member and free the housing member for movement with respect to said member.

4. In a lock structure, a bored housing member, a locking unit removably mounted in the bore of the housing member and including a sleeve and a lock cylinder rotatable in the sleeve and having key operable tumblers to secure the cylinder against rotation in the sleeve, and a spring pressed locking bolt transversely slidable in the sleeve and normally projecting through a hole in the housing member to simultaneously secure the locking unit in the bore of the housing member against longitudinal and rotational movements and to provide means for effecting a locking function, and means on the lock cylinder engaging the locking bolt for retracting the bolt a predetermined distance insufficient to withdraw it from said hole.

5. In a lock structure of the character described, two members adapted to be locked together, one of said members having a bore and a hole through the wall of the bore, a locking unit readily insertable into and removable from said bore and comprising a sleeve fitted in the bore, a lock cylinder rotatable in the sleeve and having key operable tumblers to secure the same against rotation in the sleeve, a locking bolt slidable transversely within the sleeve and yieldably urged to project an end portion thereof outwardly of the sleeve and through the hole in the wall of the bore to provide means for locking the members together, an abutment on the locking bolt engageable with the wall of the bore to limit the outward projection thereof, interengaging means on the sleeve and lock cylinder to hold the cylinder against endwise displacement said means being disengageable to enable endwise removal of the cylinder from the sleeve upon rotation of the cylinder to a predetermined position with respect to the sleeve, and a connection between the cylinder and the locking bolt whereby rotation of the cylinder retracts the locking bolt and said connection between the cylinder and locking bolt being such that the cylinder is prevented by the locking bolt through the engagement of its abutment with the wall of the bore from being turned to its position at which the cylinder is removable from the sleeve.

6. In a lock structure, a bored housing member having a hole through the wall of its bore and having interengagement with a fixed member, the fixed member having a keeper recess, a locking unit in the bore of the housing member and including a bored sleeve slidably received in said bore, a lock cylinder in the bore of the sleeve and having key operable tumblers to secure the same against rotation in the sleeve, interengaging means on the cylinder and sleeve to hold the cylinder against endwise motion, said interengaging means being disengageable to free the cylinder for removal in one position of rotation of the cylinder with respect to the sleeve, a locking bolt slidable transversely in the sleeve and yieldably urged to project an end portion thereof outwardly of the sleeve and through the hole in the bored housing member for engagement with said recess to simultaneously secure the sleeve against endwise and rotational movements in the housing member and also hold the housing member connected with the member having the recess, a connection between the cylinder and the locking bolt whereby rotation of the cylinder retracts the locking bolt out of the recess, and means on the locking bolt to limit outward projection of the bolt and normally prevent rotation of the cylinder to its position at which it is removable from the sleeve.

7. In a lock structure, a housing member having a bore and a hole in the wall of its bore, a locking unit removably mounted in the bore and comprising a bored sleeve slidably received in said bore, a lock cylinder rotatable in the bore of the sleeve and having key operable tumblers to secure the cylinder against rotation in the sleeve, interengaging means on the cylinder and sleeve to hold the cylinder against endwise motion with respect to the sleeve, said interengaging means being disengageable upon rotation of the cylinder to a predetermined position with respect to the sleeve, a locking bolt slidable transversely in the sleeve across the inner end of the cylinder and having an end portion projectible through the hole in the wall of the bore of the housing member, spring means to yieldably urge the bolt outwardly of the sleeve, a connection between the cylinder and the bolt including a cam on the cylinder by which rotation of the cylinder retracts the bolt a predetermined degree insufficient to disengage its outer end from the hole in the wall of the bore so that the reception of said outer end of the bolt in said hole at all times retains the sleeve against endwise and rotational motion with respect to the housing member, and means on the bolt operable to limit outward projection thereof by its spring means and engageable with the cam on the cylinder to normally prevent rotation of the cylinder to its position at which it is removable from the sleeve.

8. In a lock structure, a housing member having a bore and a hole through the wall of the bore, a locking unit removably received in the bore and comprising a sleeve having a sliding fit in the bore, a locking bolt slidable transversely in the sleeve and having an end portion projectible through the hole in the wall of the bore, the engagement of the bolt in said hole securing the sleeve against longitudinal and rotational movements with respect to the housing member, spring means to yieldably urge the locking bolt outwardly of the sleeve and projected through said hole, means on said bolt adapted to abut the wall of the bore to limit outward projection of the bolt by said spring means, and a lock cylinder rotatable in the sleeve and operable to retract the bolt a predetermined distance insufficient to retract the bolt from said hole.

9. In a lock structure of the character described, a bored housing having a hole in the wall

of its bore, a locking unit mounted in the bore and comprising a sleeve having a sliding fit in the bore, a locking bolt slidable transversely within the sleeve and having an end portion projectible through the hole in the wall of the bore to provide means for securing the housing to an associated member, spring means to yieldably urge the bolt outwardly of the sleeve to project its outer end through the hole in the wall of the bore, a lock cylinder rotatable in the sleeve and having key operable tumblers to secure the cylinder against rotation in the sleeve, interengaging means carried by the cylinder and sleeve to hold the cylinder in the sleeve, said interengaging means being disengageable to free the cylinder for withdrawal upon rotation of the cylinder to a predetermined position with respect to the sleeve, an eccentric cam on the cylinder, and spaced abutments on the locking bolt engageable with the eccentric cam, said abutments being so located that motion of the eccentric cam produced by rotation of the cylinder in one direction through engagement of the eccentric cam with one of the abutments retracts the locking bolt within the hole in the wall of the bore and engagement of the other abutment with the cam upon a reverse direction of rotation of the cylinder limits the rotation of the cylinder to prevent movement thereof to its position of rotation at which it is removable from the sleeve.

10. In a lock structure, a lock housing, a locking unit in the housing comprising a bored sleeve, a lock cylinder in the sleeve having key operable tumblers to engage the sleeve and normally hold the cylinder against rotation, interengaging means on the cylinder and sleeve to hold the cylinder in the sleeve, said interengaging means being disengageable when the cylinder is in a predetermined position of rotation with respect to the sleeve, a locking bolt slidable transversely in the sleeve and having one end projecting therefrom to have a locking function, cooperating means on the locking bolt and the cylinder to translate rotation of the cylinder into sliding motion on the part of the bolt, and means engageable with the housing and a part on the cylinder to prevent rotation of the cylinder to its position enabling disengagement of said interengaging means whereby detachment of the cylinder from the sleeve is prevented as long as the locking unit is in the housing.

11. In a lock structure, a bored lock housing having a hole communicating with its bore, a locking unit in said bore, a locking bolt operable by the locking unit and projectible through said hole in the housing to effect a locking function, a connection between the locking unit and the bolt whereby manipulation of the locking unit actuates the bolt to draw the same into said hole and disable the same for exercising its locking function, and said connection allowing for over-travel on the part of the bolt with respect to the locking unit so as to allow further actuation of the bolt by extraneous means to completely disengage the bolt from said hole in the housing and enable removal of the locking unit from the housing.

12. In a cylinder lock, a shell, a lock cylinder in the shell and removable therefrom in a predetermined position of rotation with respect to the shell, a locking member operable by the cylinder, and a cam carried by the cylinder and having a part adapted for retracting the locking member and a part adapted to abut a portion of the locking member to limit rotation of the cylinder in one direction and prevent movement of the cylinder to its position of rotation at which it is removable from the shell.

13. In a cylinder lock, a bored mounting member, a lock cylinder in the mounting member bore adapted to be assembled and disassembled from the mounting member in a predetermined position of rotation, and a cam carried by the cylinder adapted for retracting a locking member and having a part adapted to act as an abutment against the locking member to limit movement of the cylinder toward its assembling and disassembling position.

14. In a cylinder lock including a lock cylinder operating in a housing, a sliding locking bolt operable by the cylinder, said locking bolt having a portion of polygonal cross section with a reduced cylindrical locking end and a groove spaced from the locking end, said groove affording means with which a lock cylinder part engages to effect actuation of the bolt and the shoulder between the polygonal and cylindrical portions of the bolt providing an abutment for limiting sliding movement of the bolt in one direction.

15. In a lock structure, a lock shell, a locking unit in the shell and removable therefrom in a predetermined position of rotation with respect to the shell, a locking bolt operable by said unit and projectible from the shell to effect a locking function, a connection between the locking unit and the bolt whereby rotation of the locking unit actuates the bolt and whereby the bolt serves to define one of the normal limits of rotation of the locking unit to prevent rotation of the locking unit to its position permitting removal thereof from the shell, said rotation limiting effect of the locking bolt being disabled upon projection of the bolt outwardly of the shell beyond a predetermined distance, and means to normally limit outward projection of the locking bolt to said predetermined distance.

EDWARD N. JACOBI.