United States Patent [19]

Best

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[54] **HIGH-SECURITY HASP LOCK**

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[51] **Int. Cl.**... **E05b 63/00,** E05b 65/48, E05b 67/36

[58] **Field of Search** 70/6, 32–34, 70/54–56, 231, 165, 48, 23, 369, 423, 417, 52

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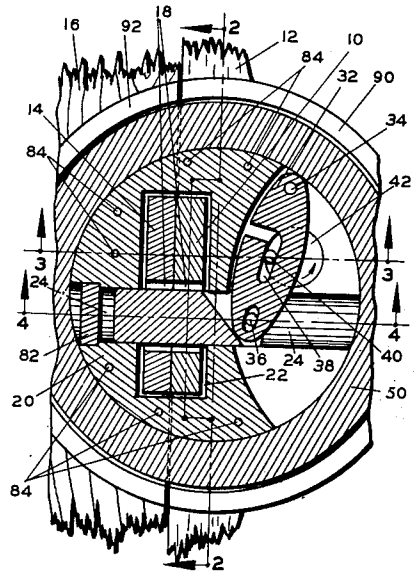
Primary Examiner—Robert L. Wolfe

Attorney, Agent, or Firm—Trask, Jenkins & Hanley

[57] **ABSTRACT**

A high security lock totally encloses the projecting portions of a hasp and keeper. A protective outer cup-shaped housing surrounds, and is rotatable about, a lock body which fits over the projecting face-to-face hasp and keeper. A heavy bolt is movable in the body to a dead-locking position through the hasp and keeper, and is controlled by a key operated lock core mounted in the body and accessible only by an elongated key inserted through a guard plate in a constricted key hole in the outer housing. Hardened steel plates and pins in the lock body protect it from drilling and cutting.

9 Claims, 8 Drawing Figures



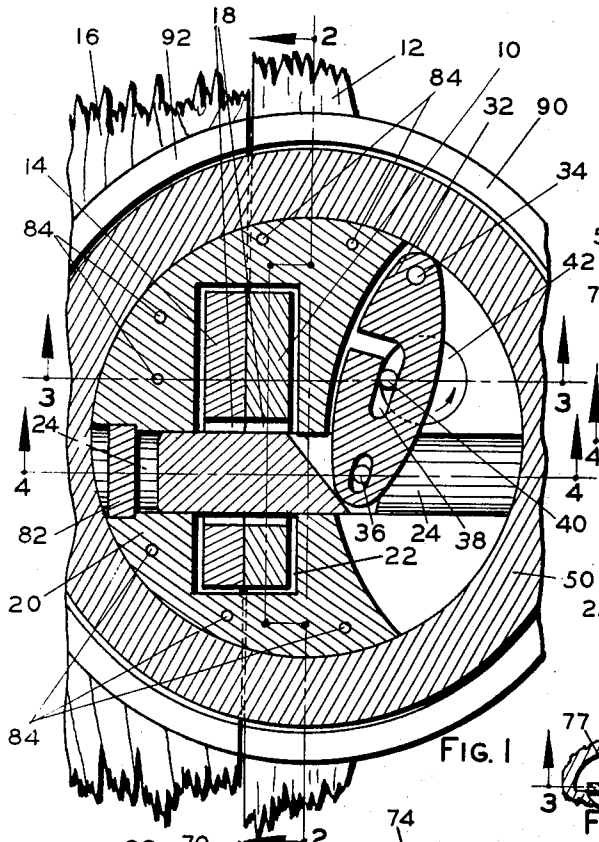


FIG. 1

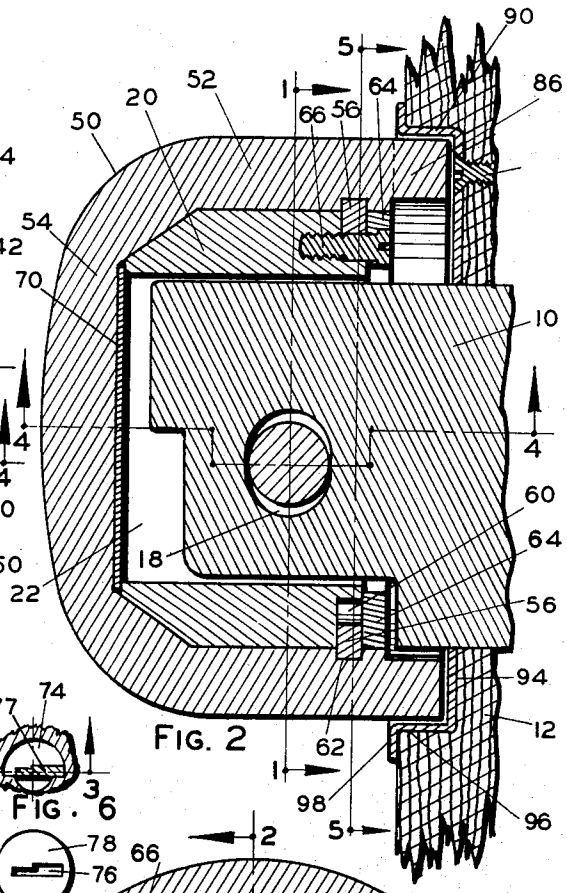


FIG. 2

FIG. 6

FIG. 7

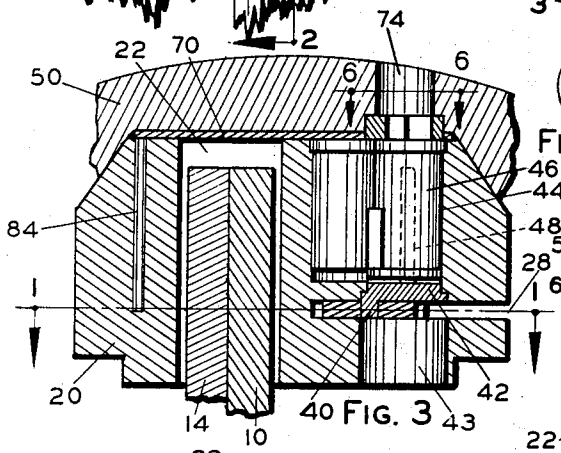


FIG. 3

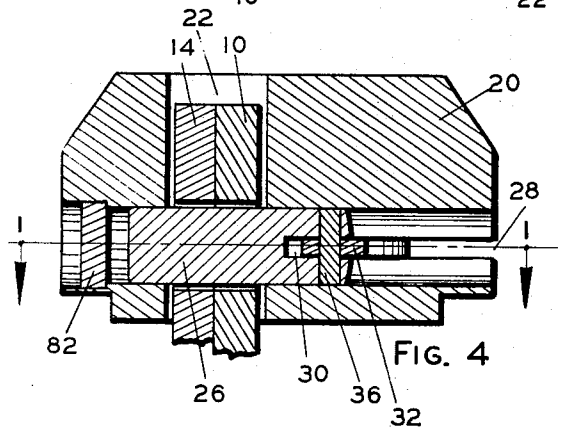


FIG. 4

FIG. 5

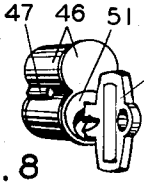


FIG. 8

HIGH-SECURITY HASP LOCK

BACKGROUND OF THE INVENTION

This invention relates to a high security locking means for a hasp and keeper such as those in U.S. government specification MIL-P-43607A. These are used, for example, on ammunition storage sheds and other enclosures requiring high security.

In this present patent specification, the terms "hasp" and "keeper" are used to designate two members or bars used to lock doors and the like, which in locked position lie in face to face relation and are locked against displacement as by the shackle of a padlock. For convenience, the hasp is considered to be the door-mounted or movable bar while the keeper is considered to be the frame-mounted or fixed bar; but such bars are used not only on swinging and sliding simple doors but also on double doors which are both movable, so that these terms are for convenience only and are not to be construed as limiting.

In locked relationship, the hasp and keeper project from the face of the door structure in face to face relation. Heretofore, they have been locked with heavy duty padlocks, but these have not been wholly satisfactory. Despite the use of shrouds as in U.S. Pat. No. 3,572,064, and shields as in U.S. Pat. No. 3,652,114 both the padlocks and the hasp and keeper are exposed to attack by cutting and leverage tools, and the depending disposition of the padlocks permits them to be chilled in a bath of liquid nitrogen or the like until they will sometimes shatter under a sharp hammer blow.

It is the purpose of the present invention to provide a locking means of less vulnerability and greater security than such prior padlocks.

SUMMARY OF THE INVENTION

In accordance with the present invention the projecting hasp and keeper are received within a lock body which closely surrounds them and is enclosed by a massive protective cup-shaped outer housing, and the hasp and keeper are locked therein and to each other by a deadlocking bolt within the lock body. The bolt is a straight bar of thick cross section. It is controlled and actuated by a key-operated lock core mounted in the lock body, inside the outer protective housing, and removable only after first removing the outer housing. The outer housing is of a tough hard material such as a hardened stainless steel. Its rounded shape tends to prevent attack by gripping and leverage tools, and it is desirably rotatably mounted on the lock body to further protect the enclosed lock body from such attack. Its massiveness, shape, and mounting, tend to resist boring and cutting either by sawing or with a torch. The lock core is accessible only by a long key inserted through a key opening in the outer housing, and such opening is of a non-circular, constricted shape, which provides a minimum key-entrance opening and limits key rotation. The key-entrance opening is closed at its inner end by a rotatable hardened-steel disk having a minimum key slot.

Hardened steel plates and pins are desirably inserted in the lock body or between it and the outer housing to obstruct drilling.

Preferably, the rounded cup-shaped lock housing includes a skirt which extends into a recess formed at the base of the projecting hasp and keeper, but the skirt may be omitted to permit the lock to be used on existing hasp installations which do not have such a recess.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing illustrates the invention and shows an exemplifying embodiment. In such drawing:

FIG. **1** is a transverse vertical cross section of a lock embodying the invention, taken on the line **1—1** of FIG. **2,** showing the bolt in locked position through a hasp and keeper;

FIG. **2** is a longitudinal vertical and partially offset cross section taken on the line **2—2** of FIG. **1,** showing the lock installed over the hasp and keeper;

FIG. **3** is a longitudinal horizontal cross section taken on the line **3—3** of FIG. **1**;

FIG. **4** is a longitudinal horizontal cross section taken on the line **4—4** of FIG. **1**;

FIG. **5** is a transverse vertical cross section taken on the line **5—5** of FIG. **2**;

FIG. **6** is a fragmental cross section taken on the line **6—6** of FIG. **3,** showing the key insertion entrance opening in the outer housing, and which is the minimum orifice to encompass the sweep area of 180° key rotation;

FIG. **7** is an end view of the free turning armored disc containing a minimum orifice for key passage; and

FIG. **8** is a perspective view of a key-removable lock core.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The lock in the drawing is shown in locked position on a hasp **10** mounted on a door **12** and a keeper **14** mounted on the door frame **16,** with the hasp and keeper in door-closed position, projecting forward from the door and frame in face to face relation, with their apertures **18** aligned.

The lock comprises an inner lock body **20** of generally cylindrical external shape, provided with a laterally-offset, rectangular cavity **22** open to the rear to permit the body to slide onto the projecting hasp and keeper in closely embracing relation therewith. The body also has a transverse bore **24** in which a bolt **26** is mounted for movement between a dead-locking position, as shown, and a retracted position at the right end of the bore **24.** At the right, the bore **24** is intersected by a narrow kerf or slot **28,** in a plane containing the axis of the bolt bore **24** and perpendicular to the axis of the lock body **20.** The rear (right) end of the bolt also contains a slot **30,** and a bolt actuating lever **32** is mounted in the slots with its upper end pivoted on a pin **34** in the lock body and its lower end slotted and engaged on a pin **36** in the bolt **26.**

The mid portion of the lever **32** contains an L-shaped slot **38** which engages over the crank pin **40** of a rotatable throw member **42** rotatably mounted in a peripheral groove at the inner end of a rear bore **43.** The bore **43** is coaxial with one of a pair of intersecting bores **44–45** cut from the front of the lock body and forming an eight-shaped opening for the reception of a key-removable lock core **46** of corresponding shape, of the type shown for example in U.S. Pat. No. 3,404,549. The core **46** is adapted to be secured in place in the eight-shaped opening by a projecting lug **47** engaged in a notch and behind a shoulder in that opening. The lug

is carried by an internal sleeve which provides a secondary or control shear line for the pin tumblers of the lock and is rotatable through a limited small angle. The sleeve is turned to retract the lug **47** by use of a special control key **49** in the key plug **51** of the core. The throw member **42** has forwardly extending legs **48** received in spaced holes in the rear of the key plug **51,** so that key rotation of the plug by an operating key will rotate the throw member **42** through 180° to carry the crank pin **40** counterclockwise from the full-line position shown, and thereby swing the lever **32** to the right to retract the bolt **26** from its dead-locking position shown to a rightward retracted position.

In the normal locking position of the lock mechanism, the lock core **46** has its key slot presented toward the front, upward in FIG. **3,** for insertion of a key. The lock contains pin tumblers which block rotation of the key plug except in the presence of a proper operating key, and the lock operable by that key to rotate the throw member and thereby move the bolt between locked and unlocked positions. In locked position, as shown, the bolt extends through the aligned apertures of the hasp and keeper and is engaged at both ends in the lock body, and it thus deadlocks the hasp and keeper together and the lock body on the hasp and keeper. It is held positively in such position by the lever **32** which in turn is held by the crank pin **40** of the throw member. In unlocked position, the bolt is retracted from the hasp and keeper, so that the lock can be removed therefrom to leave the hasp **10** free to move away from the keeper **14** as the door **12** is opened away from the frame **16.**

For protection, the entire lock mechanism described above is surrounded by a rounded cup-shaped housing **50** having a generally cylindrical side wall **52** fitting about the periphery of the lock body **20,** and an end wall **54** which overlies the front end of the lock body. The housing **50** is rotatably secured over the lock body **20** by means of a series of four long locking ring segments **56** and one short segment **58.** These lie in a rabbet groove **60** at the rear periphery of the lock body and project into a groove **62** in the side wall **52** of the housing. They are held in place by a heavy retaining plate **64** and by the series of cap screws **66** which extend through that plate and are threaded into the lock body. One of such screws is engaged in a concave notch **68** in the small segment **58** of the locking ring, and serves to prevent rotation of the segments about the groove **60** of the lock body. The groove **60** is of sufficient radial width to permit the long segments **56** to be laid therein and then moved radially outward into the housing groove **62.** When the long segments are in place in that groove, they are then moved circumferentially to form a gap for the reception of the short segment **58.** The retaining plate and the screws are then mounted in place.

To further protect the front end of the assembly, a hardened steel plate **70** is mounted between the front end of the lock body **20** and the front wall **54** of the housing. The removable lock core **46** lies behind this plate and is removable only when the housing and the plate have first been removed.

Key insertion to the lock core **46** is through a shaped opening **74** in the front wall **54** of the housing, and through a narrow key slot **76** in a rotatable guard disk **78.** The guard disk is mounted in a counter bore **80** at the rear end of the shaped opening **74,** and in a registering circular hole in the plate **70.** The disk **78** is free to rotate about the axis of the counter bore, and its engagement with both the plate **70** and the housing front wall **54** holds them against relative rotation.

The shaped opening **74** desirably has the configuration shown in FIG. **6,** which provides a minimum opening to permit insertion of an operating key **77** in one position and to permit the key to rotate 180° and return. Its periphery defines a large arc of somewhat more than 180° terminating at two generally radial shoulders, and a smaller arc of less than 180° joining the inner ends of the shoulders. By comparison with FIG. **7,** it will be seen that a key **77** inserted in the key slot **76** of the guard disk will lie with its thick edge overlying the righthand shoulder and with its cut edge at the left end of the small arc. From this position, the key can be rotated in the shaped opening 180° counterclockwise and back to the original position. The lock core provides for insertion and removal of the key in only one position, in which the lock bolt is in locking position.

Further protection of the lock mechanism is provided by a steel plug **82,** inserted in a counter bore at the end of the bolt bore **24.** This will obstruct drilling endwise toward or into the bolt as for insertion of a punch against the forward end of the bolt, and will also block forward movement of the bolt if driven from the rear. Still further protection is desirably provided by inserting freely rotatable steel pins **84** in bores at several places in the lock body, to obstruct drilling and sawing operations.

The rear edge of the protective housing **50** may carry a skirt **86** which in the locked position of the lock on the hasp and keeper will project into a close-fitting recess **88** formed in the door and door frame. The recess is desirably lined with a metal escutcheon plate formed in two pieces **90** and **92** respectively mounted in formed cavities in the door **12** and door frame **16.** Each has a rear wall **94,** a cylindrical side wall **96** and a peripheral flange **98,** and is secured in place with screws or bolts through its rear wall. The escutcheon **90–92** closely surrounds the skirt **86** on the housing and blocks access to the space between the rear edge of the lock housing **50** and the door. If the recess is not desired or available, as on existing hasp installations, the skirt **86** may be omitted.

In use, to apply the lock to the projecting hasp **10** and keeper **14** of a closed door **12,** the bolt **26** of the lock is retracted by a key. This requires the protective housing **50** to be rotated about the lock body until the key slot **76** of the guard disk **78** is aligned with the key slot of the lock core **46.** The long key **77** is then inserted and turned to rotate the key plug and the throw member **42** through 180° and thereby retract the bolt from its locked position shown in FIG. **1.** The lock is then mounted over the projecting hasp **10** and keeper **14,** to the position shown in the drawings. The key is then rotated 180° to advance the bolt **26** to its locked position shown. This places the bolt in dead locking position through the apertures **18** of the hasp and keeper and secures them to each other and in the lock mechanism. The key is then removed. This leaves the entire projecting portions of the hasp and keeper totally enclosed within the opening **22** of the lock body **20** and protected by the surrounding housing **50.** It disposes the rear face of the lock against the face of the door structure **12, 16,** and in the recess **88** if such a recess is pres-

ent, so as to conceal and prevent access to the retaining mechanism **62–66** which locks the housing **50** about the body **20.**

The lock when in place is highly resistant to tampering or attack, and protects the enclosed hasp and keeper from such attack. Its rounded outer surface resists gripping, and the freedom of the housing to rotate prevents application of twist and torque. Its hardened steel front plate **70** and key guard disk **78** resist drilling from the front, its bolt-bore plug **82** resists access to the bolt by drilling and punching, and its other hardened inserts resist drilling in other areas. The shape and mass of the outer protective housing **50** tends to resist heating and cutting. Access to the key slot and picking of the lock core is impeded by the shape and length of the key opening **74** in the housing and by the key guard. Such shape and length also prevents access by ordinary key blanks, and limits key rotation. The presence of the control shear line for core removal which permits insufficient rotation for lock operation, tends further to defeat picking. The shape and position of the lock resists chilling with liquified gas. These and other features provide exceptionally high security against unauthorized opening of the locked door.

I claim:

1. A lock adapted for locking a hasp and keeper projecting in adjacent parallel relation from the face of door structure and having aligned transverse shackle-receiving apertures, comprising

a lock body having a rearwardly-opening, laterally-offset internal cavity adapted to receive the projecting hasp and keeper so that the body may be slidable mounted over the hasp and keeper to enclose the same,

a bolt slideway extending transversely of said cavity,

a bolt slidable in said slideway between a retracted position in which it clears said cavity for entry and removal of the hasp and keeper into and from the same, and a locking position in which it extends across said cavity to engage in the apertures of the hasp and keeper to lock the same together and in the lock body,

a lock chamber in spaced parallel relation with said rearwardly-open cavity and having a forward portion shaped to receive a lock core,

a transverse slot intersecting said lock chamber behind said forward portion and extending to said bolt slideway,

a key-actuated lock core mounted in said forward portion of said lock chamber and having a forwardly-open rotatable key plug and a rear throw member operable thereby

a throw lever mounted in said slot, pivoted to said lock body, and extending across said lock chamber and into said bolt slideway, said lever being operatively engaged with said throw member for pivotal movement thereby and connected to move the bolt between its said two positions in response to operation of said throw member by the key-actuated plug of said lock core,

an outer protective housing in the form of an integral cup-shaped mass received over said lock body from the front and extending rearward substantially the full length of the projecting portions of the hasp and keeper, and

means securing the housing in place on the lock body,

said housing extending across the key entrance end of said key plug and having a key-entrance passage for insertion of a key therethrough for operating the lock core,

said lock body and protective housing forming a massive enclosure which has a locked position on a hasp and keeper in which it totally encloses the projecting portions thereof and locks the same to each other and within itself.

2. A lock as in claim **1** in which the key plug of the key actuated lock has a predetermined rotative throw, such as 180°, to move the bolt between its said two positions, and said housing entrance passage is a restricted passage shaped to limit key rotation therein to such rotative throw.

3. A lock as in claim **1** with the addition of a guard disk rotatably mounted in the key passage between the face of the key plug and the overlying housing and containing a restricted opening to pass the key therethrough into the key plug.

4. A lock as in claim **3** with the addition of an armor plate between the front wall of the housing and the front face of the lock body and the key plug of the key-actuated lock, said guard disk being mounted in a bore in the front wall of said protective housing and engaged in said armor plate.

5. A lock as in claim **1** in which said outer protective housing has a rear circumferential side wall portion, an inwardly open circumferential groove in the inner face of said side wall portion, an outwardly open groove in said lock body coplanar with said first groove, and locking ring means in said grooves to lock the housing against forward movement with respect to the lock body.

6. A lock adapted for locking a hasp and keeper projecting in adjacent parallel relation from the face of door structure and having aligned transverse shackle-receiving apertures, comprising

a lock body having a rearwardly-opening internal cavity adapted to receive the projecting hasp and keeper so that the body may be slidably mounted over the hasp and keeper to enclose the same,

a bolt slidable transversely in the body between a retracted position in which it clears said cavity for entry and removal of the hasp and keeper into and from the same, and a locking position in which it extends across said cavity to engage in the apertures of the hasp and keeper to lock the same together and in the lock body,

a key-actuated lock core mounted in said lock body and having a rotatable key plug and a throw member operable thereby and connected to move the bolt between its said two positions,

an outer protective housing in the form of an integral cup-shaped mass received over said lock body from the front and extending rearward substantially the full length of the projecting portions of the hasp and keeper, and

means securing the housing in place on the lock body,

said housing extending across the key entrance end of said key plug and having a key-entrance passage for insertion of a key therethrough for operating said lock core,

said lock body and protective housing forming a massive enclosure which has a locked position on a hasp and keeper in which it totally encloses the projecting portions thereof and locks the same to each other and within itself, said lock body being formed with a forwardly-open lock core-receiving opening, said lock core being mounted therein, and said housing overlying the face of the lock core to prevent removal thereof in the presence of the said housing.

7. A lock as in claim **6** in which said lock core is a key-removable lock core which has an operating shear line at which its locking tumblers will separate to permit unlocking rotation of the key plug and which has a control shear line at which its tumblers will separate to permit only limited rotation of the key plug for releasing the core from its mounting and insufficient to retract the said lock bolt from deadlocking engagement of the hasp and keeper.

8. A lock as in claim **1** in which said bolt is slidable in a bolt-receiving bore extending transversely through the lock body, the forward end of said bore containing an armor plug seated against a shoulder in said lock body and both ends of said bore being covered by said protective housing, thereby to retain said armor plug and obstruct attack on the lock by drilling through the housing and operation of a punch to drive the bolt out of locking position.

9. A lock adapted for locking a hasp and keeper projecting in spaced parallel relation from the face of door structure and having aligned shackle-receiving apertures, comprising

a lock casing having a generally flat rear face and a rounded front configuration,

a cavity opening through said rear face, offset in a first direction from the center thereof and adapted to receive the projecting hasp and keeper so that the casing may be slidably mounted over the hasp and keeper to enclose the same,

a bolt slideway extending transversely of said cavity and having a long length extending oppositely from said first direction to provide a long bolt travel distance therein,

a bolt slidable therein between a retracted position in which it lies in said long length and clears said cavity, and a locking position in which it projects transversely of said cavity,

a lock core chamber in said casing in spaced parallel relation with said cavity and spaced from said slideways, having a key-entrance passage opening through the front of the casing for insertion of a key,

a lock core mounted in said chamber having a rotatable key plug having an axial key slot open at the front for the reception of a key inserted through said passage, and having a rear throw member,

a throw lever pivoted in said casing extending into operative engagement with said throw member and therebeyond into operative relation with said bolt, said lever being pivotally movable about its pivot point by said throw member and acting on said bolt to move the same between its said two positions in response to key-acutation of the lock core.

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