May 13, 1958 W. STACKHOUSE 2,834,195

MULTI-BARREL LOCK

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Fig. 12.

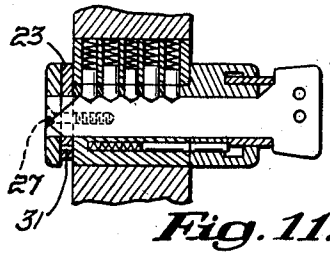


Fig. 1.

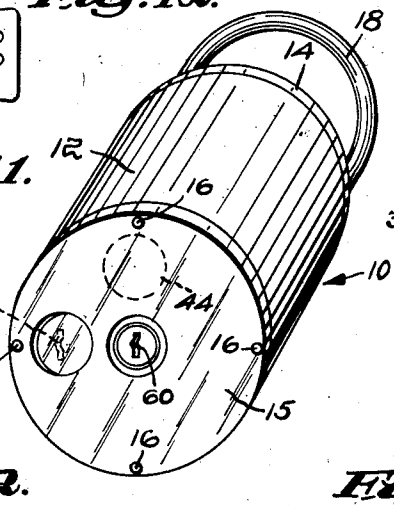


Fig. 11.

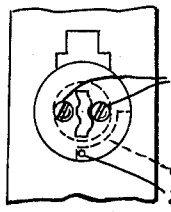


Fig. 13.

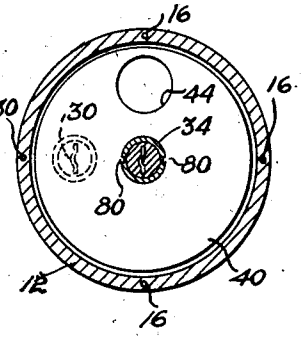


Fig. 2.

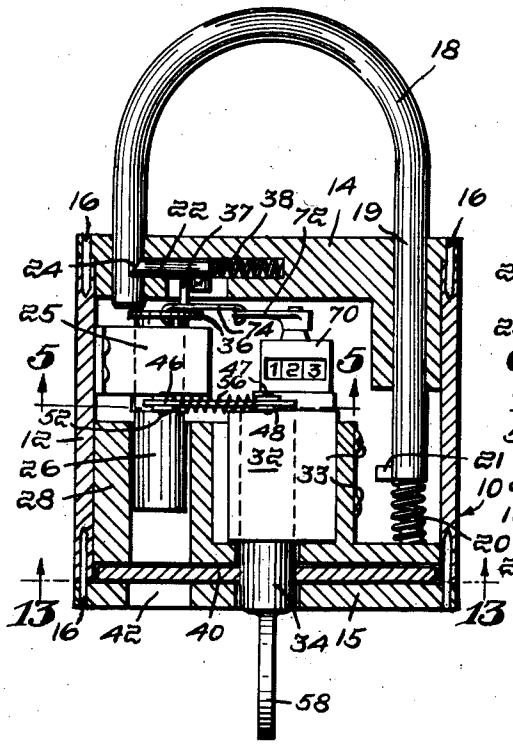
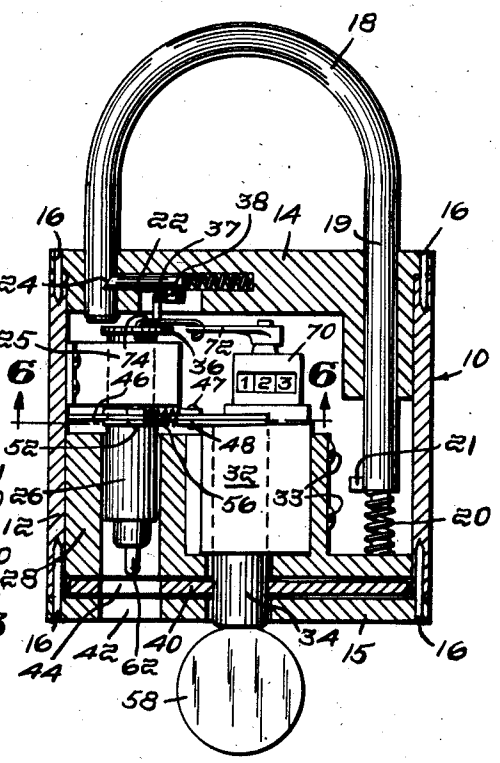


Fig. 3.



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Fig. 4.

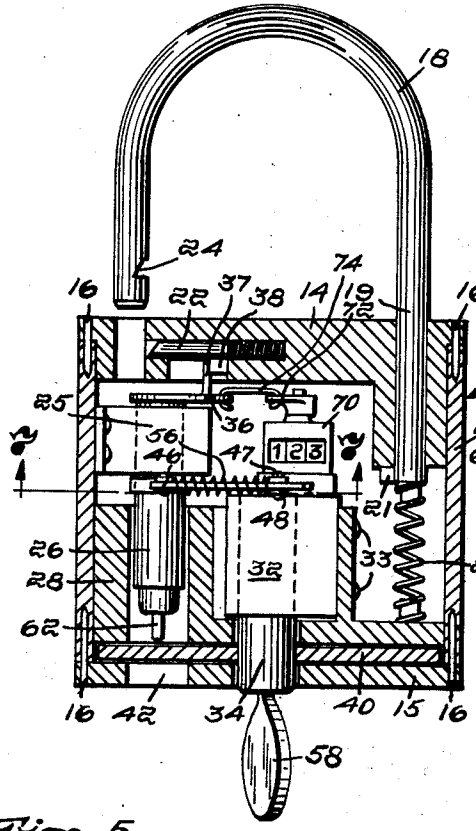


Fig. 10.

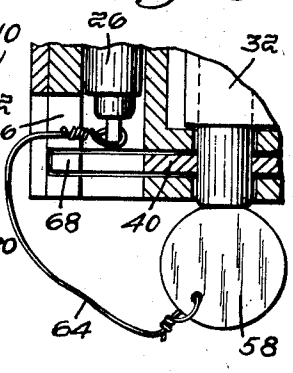


Fig. 5.

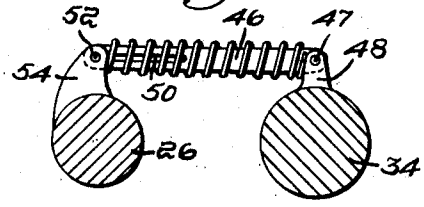


Fig. 6.

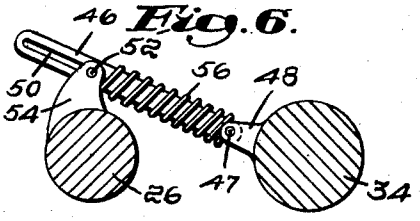


Fig. 8.



Fig. 7.

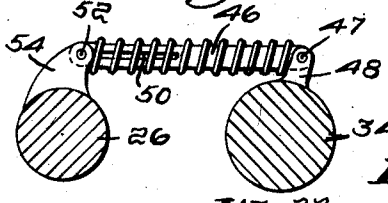
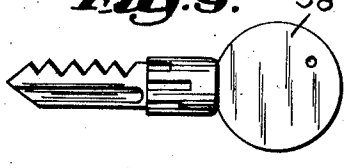


Fig. 9.



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United States Patent Office

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MULTI-BARREL LOCK

Wells Stackhouse, Havertown, Pa., assignor to American Locker Company, Inc., Boston, Mass., a corporation of Delaware

Application August 31, 1955, Serial No. 531,732

10 Claims. (Cl. 70—339)

This invention relates to a new and improved multi-barrel lock requiring the employment of two or more independent keys and including primary and secondary key receiving barrels connected for simultaneous rotation in the lock releasing direction. Both barrels illustrated in the drawings are locked against rotation by tumbler mechanisms adapted to be released upon the insertion of the keys and, while the key slot of the secondary lock is fully exposed to key reception, the primary key slot is normally inaccessible but is automatically rendered accessible upon reverse rotation of the secondary lock barrel. This rotary movement also functions thereupon to lock the primary barrel against rotation, thus preventing any picking or rotary movement of the primary lock while its key slot is exposed. The two barrels are furthermore so connected that forward rotation of the secondary lock, after insertion of the primary key in its barrel, first closes a shutter rendering the primary key slot inaccessible and then rotates the primary lock forwardly to latch releasing position. The production of a novel lock of this nature requiring the simultaneous use of two keys as by two persons for high safety measures and which reduces the possibility of unauthorized picking and tampering to a minimum comprises the primary object of the invention.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings in which—

Fig. 1 is a perspective view of a lock embodying my invention,

Fig. 2 is a longitudinal sectional view through the lock in locked position,

Fig. 3 is a like view showing certain parts in another position,

Fig. 4 is a like view showing the lock in unlocked position,

Fig. 5 is an enlarged fragmentary view taken on line 5—5 of Fig. 2,

Fig. 6 is a like view taken on line 6—6 of Fig. 3,

Fig. 7 is a like view taken on line 7—7 of Fig. 4,

Fig. 8 is an elevation of the primary lock key,

Fig. 9 is an elevation of the secondary lock key, and

Fig. 10 is a fragmentary view of the lock illustrating a modified construction,

Fig. 11 is an inner end view of a barrel lock employed in the invention,

Fig. 12 is a longitudinal sectional view therethrough and illustrating radial and longitudinal locking tumblers employed,

Fig. 13 is a sectional view taken on line 13—13 of Fig. 2.

While in the drawings I have illustrated my invention as embodied in a padlock and employing two locking barrels it will be understood that such features are shown by way of example only and may be modified within the scope of the invention as required.

The lock comprises a casing 10 herein illustrated as embodying a cylindrical wall 12 within end walls 14 and 15 secured by pins 16 or such other means as is found desirable. A shackle 18 has one leg 19 slidably mounted in the end wall 14 and normally held in the outward position of Fig. 4 by a spring 20. A stop 21 limits outward movement of the shackle. A spring pressed latch 22 in the wall 14 normally engages a notch 24 in the shackle and holds the shackle in the locked position of Figs. 2 and 3.

Supported on the cylindrical wall 12 within the casing is a primary lock 25 having a cylindrical barrel 26 extending partially into a block 28 secured to and within the cylindrical wall, the barrel having a key receiving slot 30. A secondary lock 32 is supported on and within the block 28 as by screws 33 and has a rotary key receiving barrel 34 extending forwardly through and centrally of the end wall 15. The locks 25 and 32 illustrated are of the type shown and described in Hofmann Patent 2,298,698, each being normally locked against rotation by longitudinal and radial key releasable tumblers. These tumblers are illustrated in Fig. 12 and each rotary lock barrel has a plate 23 affixed to its inner end by screws 27 and recessed at 29 through a small arc to receive a fixed pin 31, the shoulders at the ends of the recess being adapted to engage the pin and thus limit the rotation of the barrel.

The function of the primary lock 25 is to release the latch 22 and the function of the secondary lock 32 is to cooperate with the primary lock in a manner reducing the possibility of unauthorized picking and tampering to a minimum and to rotate the primary lock in the latch releasing direction. The rotary barrel 26 carries a disk 36 having an eccentrically mounted pin 37 disposed to engage a lug 38 on the latch 22 and withdraw the latch to the released position of Fig. 4 when the primary lock is rotated forwardly (clockwise).

Mounted on and fixed to the barrel 34 of the secondary lock by keys 80 on the shutter engaging in keyways in the barrel is a disk-like shutter 40 disposed between the end wall 15 and the block 28. The wall 15 is provided with an opening 42 therethrough in alignment with the barrel 26 and the shutter is provided with a like opening 44 adapted to align with the opening 42 and expose the key slot 30 when the barrel 34 is rotated reversely to the position of Fig. 3. When the barrel 34 is in the normally locked position of Fig. 2 the shutter covers the opening 42 and renders the key slot 30 inaccessible.

The barrels 26 and 34 are connected by the following mechanism particularly illustrated in Figs. 5–7. A link 46 pivoted at one end 47 to an arm 48 extending outwardly from the barrel 34 has its other end slotted at 50 to receive the pivot pin 52 of an arm 54 extending outwardly of the barrel 26. A compression spring 56 is disposed on the link between the two pivots. Each barrel is adapted to function through the relatively small arc permitted by the pin 31 in the recess 29 shown in Fig. 11. The recess 29 in the lock 25 is relatively shorter than the recess 29 in the lock 32, thus permitting the barrel 34 a relatively greater arcuate rotation. Both barrels 26 and 34 are shown in their anticlockwise stop positions in Fig. 6 and both are shown in their clockwise stop positions in Fig. 7.

Fig. 5 represents the normal locked position of the barrels with no keys inserted. Fig. 6 represents the stop position with the secondary key 58 inserted and rotated to its full counterclockwise position to permit the insertion of the primary key 62. Fig. 7 represents the stop position after the primary key has been inserted and the secondary key rotated clockwise to position where it unlocks the primary barrel latch 22.

The barrels 26 and 34 are normally locked by their key releasable tumbler mechanisms (Fig. 12) and the

parts are shown in this position in Figs. 1 and 5. To move the lock to latch releasing position, the secondary lock key **58** is inserted in the key slot **60**, such insertion releasing the tumbler locking mechanism. The barrel **34**, which is connected by the link **46** to the barrel **26** and cannot be rotated forwardly (clockwise) while the barrel **26** is locked, is reversely rotated rearwardly to the stop position of Figs. 3 and 6, the slot **50** permitting this movement. In this position the shutter opening **44** is in alignment with the opening **42**, thereby exposing the key slot **30**. Also, as illustrated in Fig. 6, such movement compresses the spring **56** and disposes the pivot **47** beyond dead center, thereby further locking the barrel **26** against forward rotation. The primary lock key **62** is now inserted in the key slot **30**. Such insertion releases the lock tumblers but the barrel **26** cannot be rotated forwardly since it is locked by the link **46**. The key **58** and barrel **34** are now rotated forwardly, thereby immediately obstructing the opening **42** and rendering the key **62** inaccessible. As illustrated in Fig. 8, the head of key **62** is relatively small to permit movement of the shutter **40** thereover. Since both keys are inserted and their lock tumblers released the barrel **34** can be rotated from the position of Fig. 6 forwardly. Such rotation, assisted by the spring **56**, closes the aperture to keyway **30** while the barrel **34** is being rotated forwardly to the position of Figs. 2 and 5. During further forward rotation to the positions of Figs. 4 and 7 the link connection **46** positively rotates the barrel **26** forwardly and releases the latch **22**, as illustrated in Fig. 4.

It will now be apparent that I have produced a multi-barrel lock providing maximum security and reducing possibility of unauthorized picking and tampering to a minimum. When the lock is in the normally locked position (Fig. 1) the primary barrel **26** is rendered inaccessible by its key or otherwise and when the secondary barrel **34** is rotated reversely to the position of Fig. 3, exposing the key slot **30**, the barrel **26** is automatically locked by the link **46** against forward rotation by means of the key or otherwise. Rotation of the barrel **34** forwardly from this position functions to release this lock relation only when the shutter **40** has again covered the opening **42** and thus rendered the barrel **26** inaccessible. The primary key must be inserted in its primary key barrel within its recess in the lock and the shutter over the primary key must be closed before any movement can take place in the primary cylinder, thus making it impossible to actuate the primary barrel to latch releasing position unless the primary key has been inserted and the shutter closed over it.

While the two keys **58** and **62** may be kept in the custody of two persons for security purposes, in some cases it may be desirable to place them with a single individual and to tie them together on a lanyard. In Fig. 10 I have illustrated a modified construction permitting this procedure. As illustrated, the two keys are attached to the ends of a lanyard **64** and the parts **12**, **15** and **28** and the shutter **40** of the lock are slotted at **66** and **68** to permit passage of the lanyard to the position shown in Fig. 10. Otherwise Fig. 10 corresponds to Fig. 3 and the shutter is free to rotate therefrom to the positions of Figs. 2 and 4, the key **62** and lanyard **64** being freely removable when the shutter is in the Fig. 10 position.

Either or both lock barrels **26** and **34** may be provided with meter recording mechanism for registering the rotations of the barrels. In Figs. 2–4 I have illustrated a meter **70** carrying an arm **72** connected by a link **74** to the barrel **26** and adapted to register on the meter each rotation of the barrel. It will be apparent that such recording mechanism provides additional means for indicating unauthorized tampering with the lock and adds additional security thereto.

Having thus disclosed my invention what I claim as new and desire to secure by Letters Patent is—

1. A lock comprising a casing, a primary rotary key receiving barrel in the casing normally locked against rotation, a secondary rotary barrel in the casing normally locked against rotation, a shutter disposed to cover the key slot of the primary barrel when the secondary barrel is in locked position, and means associated with the secondary barrel for moving the shutter to a position exposing the primary barrel key slot in key receiving position and locking the primary barrel against forward rotation when the secondary barrel is rotated through a predetermined arc in reverse direction from its normally locked position, said means including mechanism for moving the shutter from said key slot exposing position to a position covering the key slot together with the key therein when the secondary barrel is rotated forwardly and for thereafter rotating the primary barrel forwardly upon rotation of the secondary barrel further forwardly from its normally locked position.

2. The lock defined in claim 1 plus a latch, and means associated with the primary barrel for moving the latch to released position upon said forward rotation of the primary barrel.

3. The lock defined in claim 1 in which said means includes a link pivotally connected to one barrel and having lost motion connection to the other barrel permitting said reverse rotation of the secondary barrel independently of the primary barrel but not independent forward rotation of the secondary barrel from its normally locked position.

4. The lock defined in claim 3 in which said lost motion connection permits said reverse rotation to a position disposing said pivoted connection beyond dead center, thus locking the primary barrel against rotation, and a compression spring on the link for holding the link and connected parts beyond the dead center position.

5. The lock defined in claim 1 in which said means is connected to rotate the shutter synchronously with the secondary barrel and on an axis coaxial therewith.

6. The lock defined in claim 1 in which said mechanism fixes the shutter to the secondary barrel to rotate therewith.

7. A lock comprising a casing, a primary rotary key receiving barrel in the casing normally locked against rotation, a secondary rotary barrel in the casing normally locked against rotation, a shutter disposed to render the key slot of the primary barrel inaccessible to key reception when the secondary barrel is in locked position, and means associated with the shutter and both barrels for rendering said key slot accessible to key reception and locking the primary barrel against forward rotation when the secondary barrel is rotated through a predetermined arc in reverse direction from its normally locked position, said means including mechanism for rotating the primary barrel forwardly upon rotation of the secondary barrel forwardly from its normally locked position when the primary barrel key is disposed in its barrel.

8. A lock comprising two rotary key-receiving barrels, key releasable tumblers normally locking the barrels against rotation, one barrel having a normally open key-receiving slot, a shutter normally blocking the key slot of the other barrel, a latch associated with said other barrel and in latched position when said other barrel is in tumbler locked position, and means associated with said one barrel and the shutter for automatically locking the other barrel against forward rotation and unblocking its key slot when said one barrel is key-rotated rearwardly through a predetermined arc from its normally locked position and for rotating said other barrel forwardly to release said latch when the key is disposed in said other barrel and said one barrel is key-rotated forwardly from its normally locked position.

9. The lock defined in claim 8 in which said means includes mechanism disposed automatically to maintain said other barrel against rotation in the latch releasing direction when the shutter is in non-blocking position.

10. The lock defined in claim 9 in which the shutter is mounted for movement to key slot exposing and covering positions, said means including mechanism for moving the shutter over and covering the key inserted in said other barrel when said one barrel is rotated forwardly from the position locking said other barrel.

No references cited.