United States Patent

Kennedy et al.

[15] **3,696,543**

[45] **Oct. 10, 1972**

[54] CYLINDER LOCKING MECHANISM

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[21] Appl. No.: **65,637**

[52] **U.S. Cl.** **42/67**
[51] **Int. Cl.** **F42c 1/00**
[58] **Field of Search** 42/67

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[57] **ABSTRACT**

A revolver has a frame in which a cylinder is rotatably mounted on a shaft removably attached to the frame. The cylinder has ratchet teeth provided at one end of the cylinder. A pawl mounted within the frame is adapted to engage the ratchet teeth to turn the cylinder from one firing position to another firing position. The pawl is connected to a hammer by means of a pin. A plurality of locking notches are disposed around the periphery of the cylinder such that a notch is provided for each cartridge position. Each notch has a sloping entrance cut for progressive entrance of a cylinder lock. The cylinder lock includes an elongated aperture which is mounted on a trigger pin such that rotation of the hammer from the firing position to the cocked position unlocks and then locks the cylinder. A leaf spring secured to the frame contacts the lock for urging it into engagement with a locking notch.

5 Claims, 10 Drawing Figures

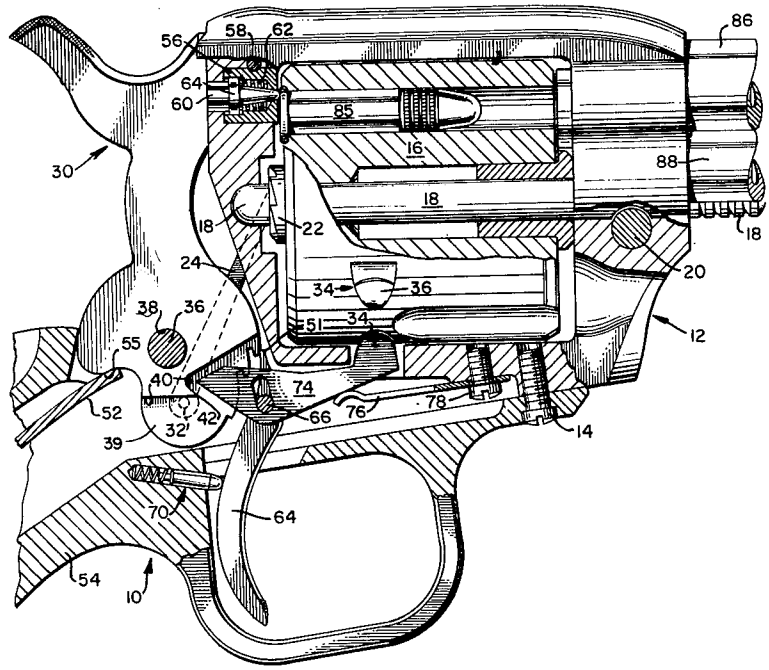

FIG. 1

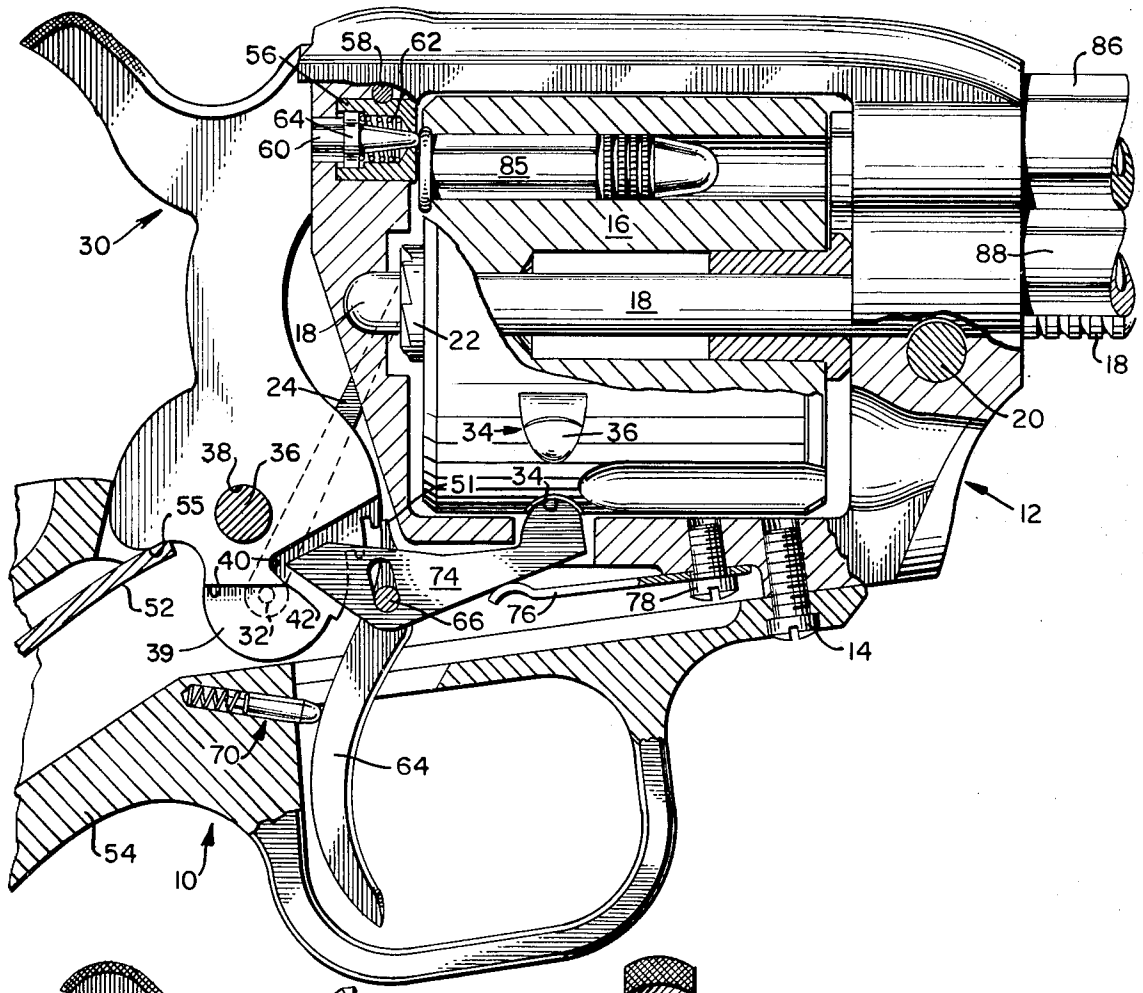

FIG. 7

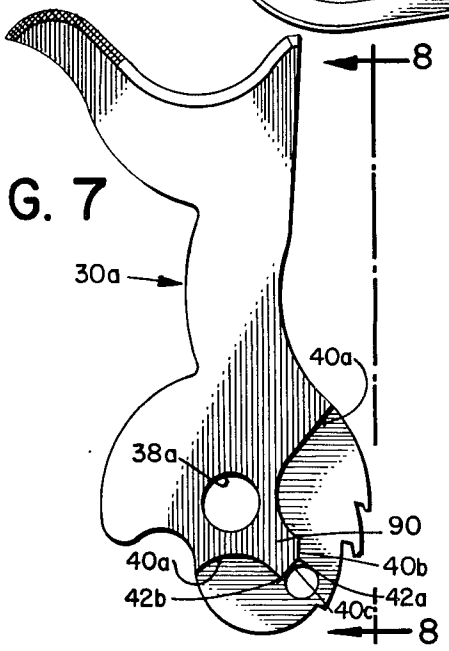

FIG. 8

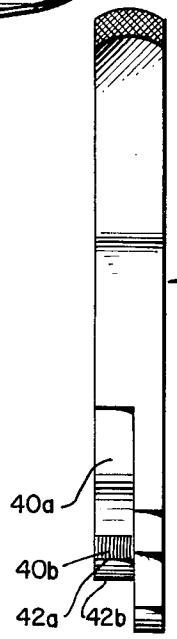

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FIG. 2

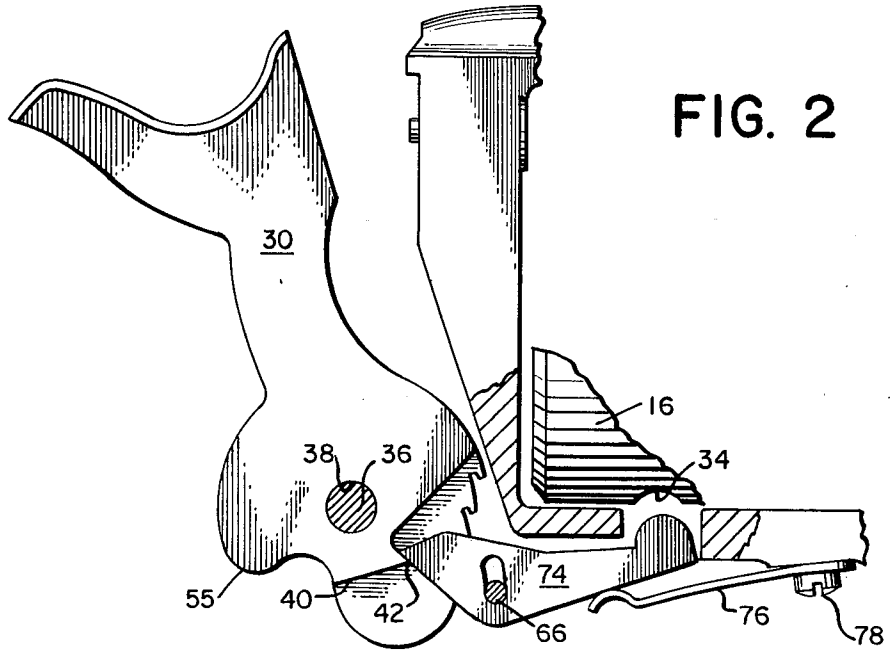

FIG. 5

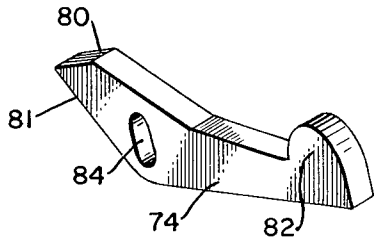

FIG. 6

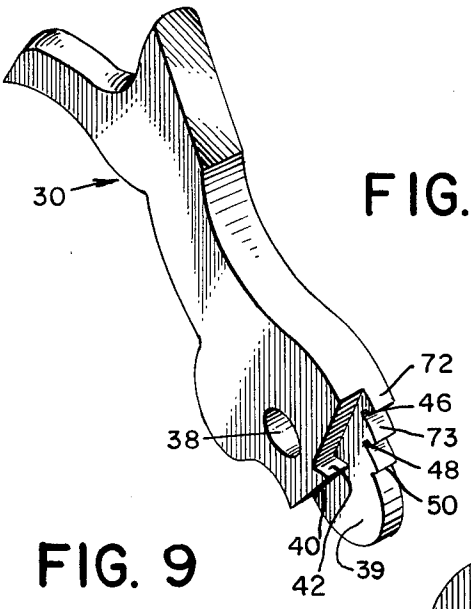

FIG. 10

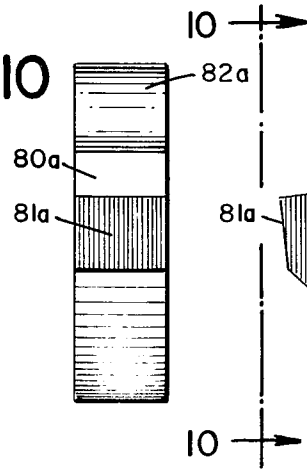

FIG. 9

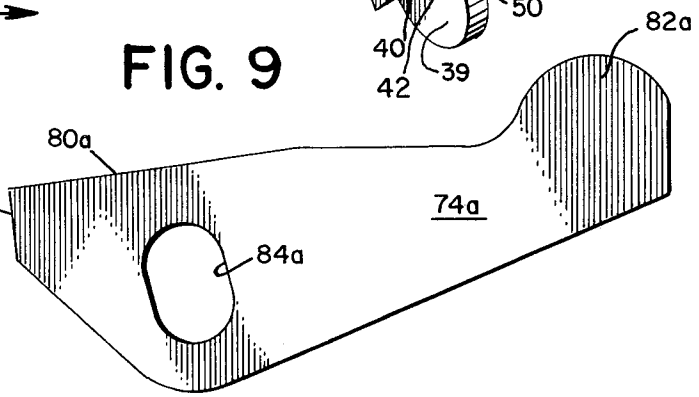

FIG. 3

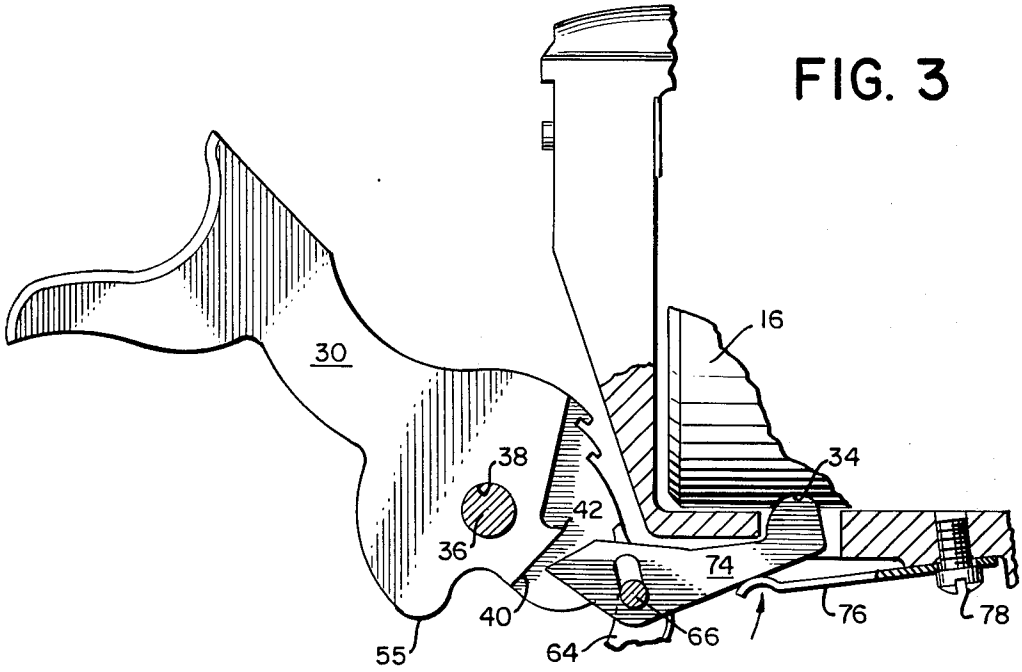
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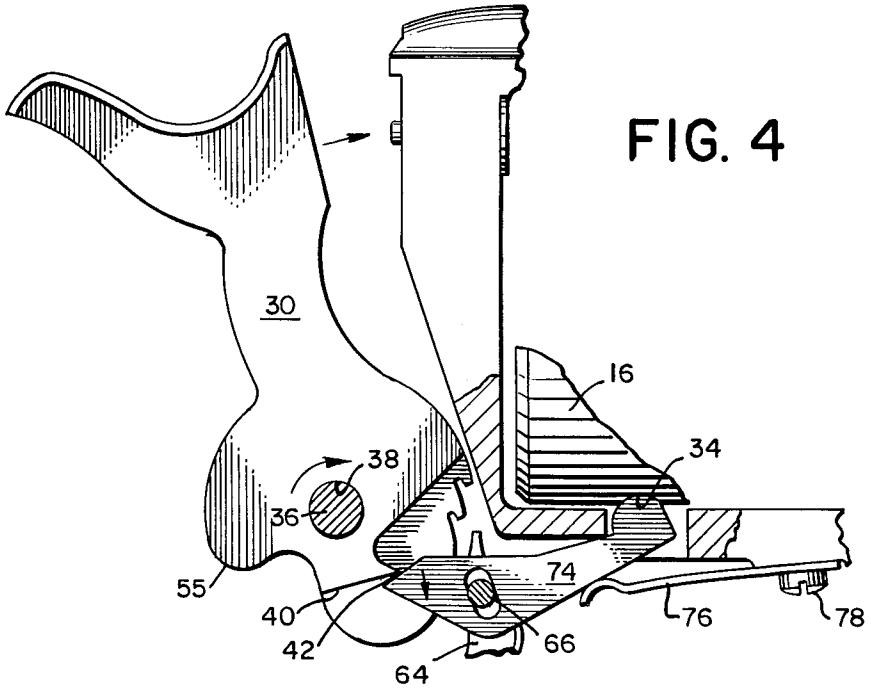
FIG. 4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CYLINDER LOCKING MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to firearms and more particularly to a cylinder locking device for a revolver.

A typical prior art revolver is characterized by a cylinder which is adapted to be rotated by a pawl. The pawl is usually operatively connected to a hammer, which in turn is functionally associated with a cylinder lock to lock the cylinder in a plurality of discrete firing positions. Typically, some sort of spring or the equivalent is associated with the hammer and the cylinder lock for positioning the lock in its locked position for firing and releasing the lock for loading and rotation of the cylinder.

Prior art cylinder locks have been characterized by their relatively complex construction. Also, these previous locks have not been noted for their reliability and the components thereof have frequently failed.

SUMMARY OF THE INVENTION

The invention provides an improved cylinder locking mechanism which is extremely reliable and uninvolved in construction. In brief, a cylinder is rotatably mounted on a frame for movement between a plurality of discrete firing positions. The cylinder has a plurality of locking notches provided on its periphery for each firing position. At the base of the cylinder a lock, including a locking portion, is mounted upon a pin. The lock includes an elongated cavity which envelops the pin such that the lock may pivot and translate thereabout. A leaf spring secured to the frame urges the locking portion of the lock towards the cylinder so that the locking portion may engage a locking notch to prevent the cylinder from rotating. The other end of the lock is adjacent a hammer, upon which is fashioned a cam surface for engaging the lock. Rotation of the hammer to a half-cocked position displaces the lock about its pin so that the cylinder is free to rotate. In the full cocked position, the cam surface on the hammer is free from the lock, thereby permitting the locking portion thereof to engage a locking notch on the cylinder. During a rotational falling movement of the hammer from the cocked position toward the firing position, the lock retains the cylinder in a locked configuration, but is downwardly displaced slightly by the cam surface with respect to its pivot pin. In the firing position, the cam surface on the hammer is free of the lock, thereby allowing the spring to upwardly displace the lock, while maintaining the locked relationship between the lock and the cylinder. Thus, as the hammer is being cocked, the cylinder moving means can turn the cylinder to another position. As the hammer moves into its cocked position, the cam surface of the hammer is disengaged from the rear end of the lock, thereby causing the spring to snap the locking portion of the lock into locking position in the next locking notch of the cylinder.

Accordingly, it is an object of this invention to provide a simple, yet reliable, cylinder locking arrangement for a revolver.

Another object is to provide a cylinder lock which essentially incorporates a pivotally-mounted lock, a spring to urge the lock into a locked position, and a cam surface on a hammer to displace the lock from its locked position.

These and other objects of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary side elevational view with parts in section of a revolver according to a first embodiment of the invention, with the hammer thereof in firing position and the cylinder lock thereof in locking position.

FIG. **2** is a fragmentary elevational view of the revolver of FIG. **1** illustrating the half-cocked position of the hammer with the cylinder lock in an unlocked position.

FIG. **3** is another fragmentary elevational view of the revolver of FIG. **1** with the hammer moved rearward to a cocked position, wherein the cylinder lock is in a locked position.

FIG. **4** is yet another fragmentary elevational view of the revolver of FIG. **1** showing the hammer falling from the cocked position to the firing position.

FIG. **5** is a perspective view of the cylinder lock of FIG. **1**.

FIG. **6** is a perspective view of the hammer of FIG. **1**.

FIGS. **7** and **8** are side elevation and front elevation views, respectively, of a hammer according to a second embodiment of the invention.

FIGS. **9** and **10** are side elevation and front elevational views, respectively, of a cylinder lock according to the second embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to the drawings, and more particularly to FIG. **1**, there is shown a single-action revolver of generally conventional construction. The frame member of the revolver comprises a grip-frame **10** and a cylinder frame **12** interconnected by a screw **14** and other fastening means (not shown). A cylinder **16** is rotatably mounted within the frame **12** on a cylinder pin **18**, which is removably positioned in the frame within axially aligned bores respectively located in the front and rear portions of frame **12**. A spring catch **20** retains the cylinder pin **18** locked in the frame and is displaceable to permit removal of the pin **18** in a manner well known to those skilled in the art.

A plurality of ratchet teeth **22** are centrally disposed on the left or rear end of the cylinder **16**. A conventional drive-pawl or hand **24** (shown partially in broken lines in FIG. **1**) engages the ratchet teeth to turn the cylinder from one firing position to another firing position. The pawl is spring-urged against the ratchet teeth by means of a leaf spring (not shown). The pawl **24** is connected at its lower end to a hammer **30** by means of a pin **32**. A plurality of circumferentially spaced locking notches **34** are disposed on the periphery of the cylinder **16**. The notches **34** each have a sloping entrance cut **36** to allow for progressive entrance of a cylinder lock into the notch.

The hammer **30**, shown in perspective in FIG. **6**, is pivotally connected to the frame **12** by means of a pin **36** inserted through an aperture **38** in the base of the hammer. The hammer is capable of being rotated from the firing position of FIG. **1** to a half-cocked position and a fully-cocked position, as shown in FIGS. **2** and **3**,

respectively. The base of the hammer **30** is machined on one side thereof to provide a recess **39** which defines a cam surface **40** which includes a break-away edge **42**, the function of the cam surface being described hereinafter. Formed on the base portion of the hammer are three notches **46**, **48** and **50** for engaging the sear end **51** of the trigger. The notch **46** functions as a safety notch for holding the hammer off the firing pin. The notch **48** functions as an unlocking notch to hold the cylinder lock (discussed hereinafter) out of contact with the notches **34** on the periphery of the cylinder. The rear notch **50** serves to hold the hammer in firing position. It will be appreciated that the structure of the hammer per se is highly conventional, save for the provision of the cam surface.

In order to bias the hammer **30** toward the firing position thereof, a leaf spring **52** is mounted on the grip frame **10** in the lower portion (not shown) of the grip **54**. The upper extremity of the leaf spring contacts a contoured rear surface **55** of the hammer **30** to bias it toward the firing position of FIG. **1**.

The firing pin assembly comprises a cylinder **56** which is held in a cylindrical bore of the frame **12** by a cross-pin **58**. The cylinder **56** is bored out to receive the firing pin **60** and the rebound spring **62** which normally bears on the collar **64** and holds the firing pin rearward of the cartridge base, but can be moved easily under the impact of the hammer to ignite the cartridge.

The trigger **64** is pivotally mounted on a pivot structure constituted by a trigger pin **66** which is secured to the frame **12** and extends transversely thereof. The trigger **64** is mounted upon the pin **66** in such a manner that the sear **51** thereof is adapted to engage the notches **46**, **48**, and **50** of the hammer **30**. The rear face of the trigger **64** is in contact with a spring assembly **70** which spring urges the trigger **64** to rotate in a counterclockwise direction about trigger pin **66**. In order to release the sear **51** on the trigger from the notch **50**, it is, of course, necessary to depress the trigger against the bias of the spring assembly **70**, thereby pivoting the trigger **64** in a clockwise manner about trigger pin **66**. This clockwise pivoting will eventually disengage the trigger sear **51** from the notch **50**, thereby permitting the hammer to move from a cocked position to a firing position. In this regard, it will be noted that the other notches **46** and **48** are provided with lips **72** and **73** which overhang the trigger sear **51** to prevent clockwise pivotal movement of the trigger **64**. Thus, when the sear **51** is engaged in notches **46** and **48**, it is impossible to fire the revolver.

The cylinder locking mechanism of the first embodiment of the invention comprises a cylinder lock member shown as a cylinder lock **74**, which is despicted in perspective in FIG. **5**, and a leaf spring **76** secured to the underside of the frame **12** by a fastener **78**. The lock **74** includes a surface **80** machined on an upper rearward portion and a projection **82** formed on a forward portion. Centrally disposed in the lock **74**, intermediate the surface **80** and the projection **82**, is an elongated cavity **84** which extends from one side of the lock to the other. The lock **74** is mounted on the trigger pin **66** adjacent the trigger **64** in a manner which permits the lock to pivot about the trigger pin and slide thereover, the trigger pin being partially contained within the cavity. As can be seen in FIGS. **1** through **3**, the extremity of the leaf spring **76** contacts the bolt lock on its underside intermediate the projection **82** and the elongated aperture **84** to urge the projection **82** into one of the notches **34**.

In order to fully comprehend the operation of the above described revolver, assume that a cartridge **85** has just been fired and the hammer is in the firing position, as shown in FIG. **1**. It will be noted that in this position, the trigger **64** is so disposed about its trigger pin **66** that the sear **51** thereof rests on the forward facing surface of the lip **72** by virtue of the urging of the spring assembly **70**. Also, in this position, the projection **82** on the bolt lock **74** is in locking contact with one of the notches **34**, this contact being maintained by the urging of the leaf spring **76**. It will also be noted that when the hammer is in the firing position, illustrated in FIG. **1**, the lower wall of the cavity **84** bears against the trigger pin.

To displace the hammer to the safety position (not shown) OR either the half-cocked position or fully-cocked position, shown in FIGS. **2** and **3**, respectively, it is necessary to move the hammer rearwardly to cause pivoting thereof about its hammer pin **36**. In the safety position (not shown), the trigger sear **51** is inserted in the notch **46** and the lip **72** prevents the trigger **64** from being depressed or rotated in a clockwise fashion about trigger pin **66**. In the safety position, the lock **74** and the spring **76** remain in their respective positions shown in FIG. **1** since the lock is not displaced by the cam surface **40** during movement of the hammer **30** from the firing position to the safety position.

During movement of the hammer from the safety position to the position of FIG. **2**, lock **74** is pivoted in a clockwise direction about pin **66** by cam surface **40**. In FIG. **2**, the hammer **30** is in a half-cocked position and the cylinder **16** is freely rotatable. In this position, the trigger sear **51** is retained in notch **48** and cannot be moved out of this position due to the overhanging lip **73** which blocks pivotal movement of the trigger **64**. Also, in this position, cam surface **40** retains the lock **74** in the unlocked configuration, wherein the projection **82** lies without the periphery of the cylinder **16**. Moreover, it will be observed that the leaf spring **76** exerts a counterclockwise moment on the lock, which is balanced by the clockwise moment exerted thereon by cam surface **40**. When the hammer is in the position shown in FIG. **2**, the cylinder may be loaded or the expended cartridges therein ejected by means such as a rod (not shown) slideably mounted along one side of the barrel **86** in a guide housing **88**, the rod serving to push the cartridge cases out of the cylinder.

During movement of the hammer from the half-cocked position of FIG. **2** to the fully-cocked position of FIG. **3**, the cam surface **40** and the lower surface **81** move out of contact, thereby permitting the lock **74** to snap back to a position as shown in FIG. **1** in which projection **82** lockingly engages a notch on the periphery of the cylinder. During the rearward movement of the hammer into the fully-cocked position, the drive pawl engages the ratchet in a manner well known to those skilled in the art to rotate the cylinder to another cartridge position. In the fully-cocked position, it will be noted that the trigger sear engages notch **50** and the lock **74** is in a locked position similar to that of FIG. **1**, where it engages another locking notch on the

periphery of the cylinder. The revolver is accordingly ready to fire a cartridge.

Depression of the trigger **64** engenders a clockwise pivotal movement about the trigger pin **66** which frees the trigger sear **51** from notch **50**, thereby causing the hammer to rotate under the bias of the hammer spring **52** from the position shown in FIG. **3** to the position shown in FIG. **1**. During this movement of the hammer from the fully-cocked position of FIG. **3** to the firing position of FIG. **1**, the cam projection, defined by surface **40** and the break-away edge **42**, clears the cylinder lock **74** by contacting the surface **80** and depressing the left or rear end of the cylinder lock **74**. This displacement of the cylinder lock is illustrated in FIG. **4**, where it can be seen that this hammer movement causes the cylinder lock to pivot about its projection **82** such that the cavity **84** slides over the trigger pin **66**. This pivoting of the cylinder lock **74** is opposed by the bias of leaf spring **76** and when the break-away edge **42** of the cam projection clears the surface **80**, the cylinder lock is snapped back to its FIG. **1** configuration by the leaf spring. It will be appreciated, that during movement of the hammer from the fully-cocked position to the firing position, the projection **82** on the cylinder lock **74** is in constant engagement with a notch on the periphery of the cylinder. Thus, the cylinder lock is pivotal about two locations, viz.: the trigger pin and its projection **82**.

Turning now to FIGS. **7–10**, an alternative embodiment of the invention is shown which embodies a cam projection and bolt lock differing in form from those of the previously described embodiment. The surface **40*a*** defines a cam projection **90** which is adapted to co-act with surfaces **80*a*** and **81*a*** of cylinder lock **74*a***, shown in FIGS. **9** and **10**, to displace lock **74*a*** in a manner similar to that explained with reference to the previously described embodiment. At the extremity of the cam projection **90** the surface **40*a*** comprises intersecting surfaces **40*b*** and **40*c***. As can be seen in FIGS. **7** and **8**, surface **40*c*** is bounded by edges **42*a*** and **42*b***.

When hammer **30*a*** is pivoted to the rear in a counterclockwise fashion, edge **42*a*** contacts surface **81*a*** of lock **74*a*** and then slides therealong until surfaces **40*c*** and **81*a*** contact one another. Continued pivoting of the hammer **30*a*** causes sliding contact between surfaces **40*c*** and **81*a*** until edge **42*b*** clears the rear edge of lock **74**, the rear edge being the intersection of surfaces **80*a*** and **81*a***. When the surfaces **40*c*** and **81*a*** initially contact each other in an abutting relationship, lock **74*a*** occupies a position wherein projection **82*a*** lies without a locking notch **34** in cylinder **16**; and when edge **42*b*** clears the rear edge of lock **74*a***, projection **82*a*** snaps back into locking position.

When the hammer **30*a*** pivots from the cocked to the fired position, edge **42*b*** slides along the rear of surface **80*a*** pivoting the lock **74*a*** about the projection **82*a*** while it remains in locking engagement with a locking notch **34** on cylinder **16**. Subsequently, edge **42*b*** clears surface **80*a*** and then the rear edge of lock **74*a*** slidingly contacts surface **40*c***. When surface **40*c*** has cleared the rear edge of lock **74*a***, the lock snaps back to its original position.

To summarize, with respect to the embodiment of FIGS. **7–10**, movement of the hammer **30*a*** to a cocked position causes a clockwise and then a counterclockwise pivoting of lock **74*a*** about pin **66**, whereas movement of the hammer from the cocked toward the fired position causes a counterclockwise and then a clockwise pivoting of the lock **74*a*** about projection **82*a***. It will thus be apprehended that the embodiment of FIGS. **7–10** operates in a manner similar to that of the embodiment of FIG. **1**.

It should be apparent that the simplified construction of a cylinder lock according to the invention will contribute to the performance and reliability of a revolver in which it is incorporated. Also, while only two preferred embodiments of the invention have been shown and described, various modifications and substitutions thereof may be made without departing from the spirit and scope of the invention as defined by the appended claims. For example, the leaf spring **76** of the cylinder locking mechanism could be replaced by a torsion spring such as that shown in U.S. Pat. No. 2,733,529. Further, the locks **74** and **74*a*** need not be mounted on the trigger pin **66**, but could be mounted on a separate structure. Also, the cam surfaces and the surfaces **80**, **80*a*** and **81**, **81*a*** could assume varying shapes.

It should also be noted that either cylinder lock could be provided with an integral pin extending transversely thereof and the frame provided with an elongated cavity. This would be equivalent to the illustrated structure.

What we claim is:

1. In a revolver, the combination comprising:

a frame member,

a cylinder, having a plurality of locking notches on the periphery thereof, mounted for rotation within the frame member;

a hammer movably mounted on the frame member for rearward movement from a firing position to a cocked position, and forward movement from the cocked position to the firing position;

a cylinder lock member, having a projection thereupon to successively engage the locking notches and lock the cylinder in a plurality of discrete positions, mounted on the frame member;

a pivot structure on one of the members adapted to bear against the other of the members during rearward movement of the hammer such that the cylinder lock member may pivot thereabout to disengage the projection from one of the locking notches;

a resilient device connected to the frame member and in contact with the cylinder lock member to urge the projection towards the cylinder so that it may engage one of the locking notches and thereby lock the cylinder; and

cam means to pivot the cylinder lock member about the pivot structure during rearward movement of the hammer for unlocking the cylinder, and to pivot the cylinder lock member about the projection during forward movement of the hammer such that the projection remains engaged with one of the locking notches.

2. The combination, as defined in claim **1**, wherein the resilient device comprises:

a leaf spring in contact with the cylinder lock member intermediate the projection and the pivot structure; and

means to secure the spring to the frame member.

3. The combination, as defined in claim **1**, wherein the pivot structure comprises:

a secured to the frame member and extending transversely thereof; and wherein there is further provided:

a trigger mounted on the pin such that it is adapted to be engaged with the hammer for retaining the hammer in its cocked position, and to be disengaged from the hammer for releasing it from the cocked position.

4. The combination, as defined in claim 3, wherein the cylinder lock member has a cavity therein at least partially receiving the pin, the pin being adapted to bear against a wall of the cavity during rearward movement of the hammer, and the cavity being sized to permit relative movement thereof with respect to the pin during forward movement of the hammer.

5. The combination, as defined in claim 1, wherein the cam means comprises:

a cam surface upon the hammer;

a first surface on the cylinder lock member for engagement by the cam surface during rearward movement of the hammer; and

a second surface on the cylinder lock member for engagement by the cam surface during forward movement of the hammer.

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