April 6, 1965 E. E. GEBER 3,176,423

REVOLVER FIRING MECHANISM

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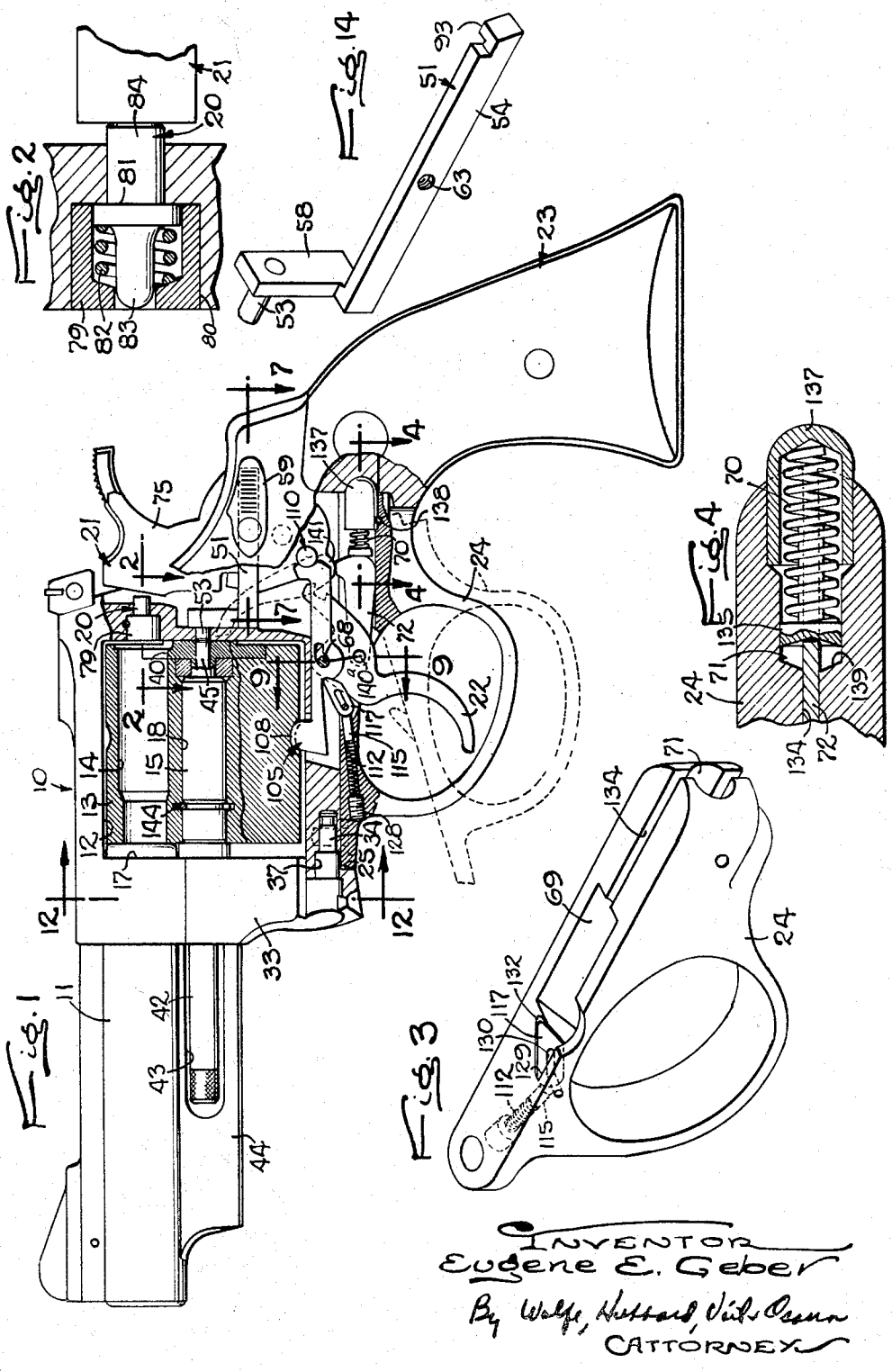


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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REVOLVER FIRING MECHANISM

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Fig. 5

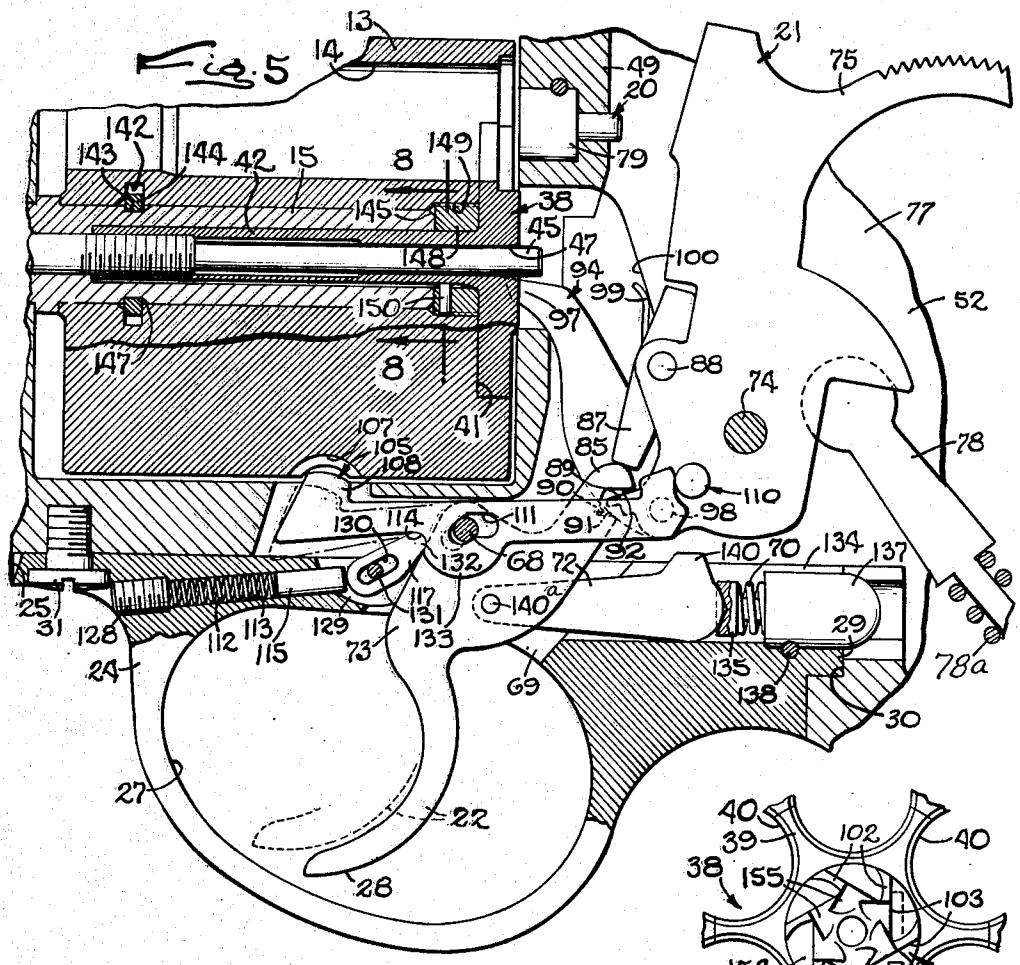


Fig. 6

Fig. 7

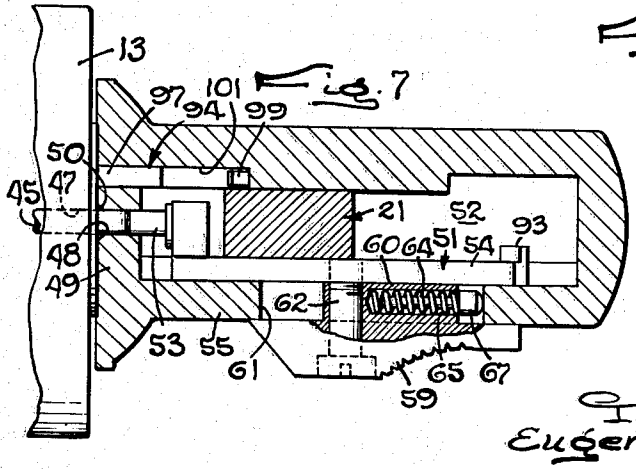
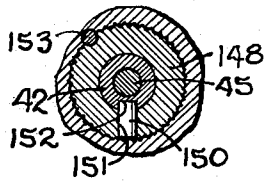


Fig. 8



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REVOLVER FIRING MECHANISM

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Fig. 9

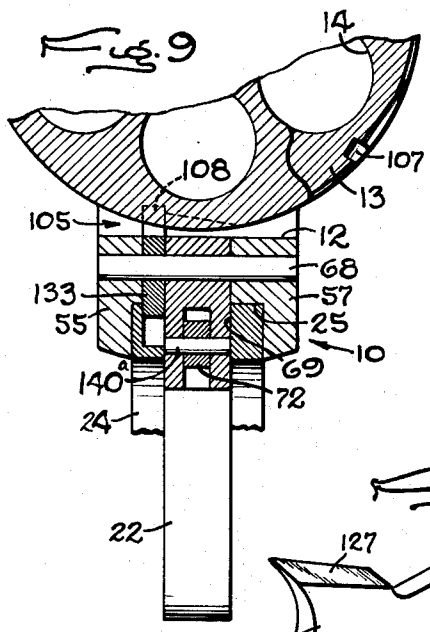


Fig. 10

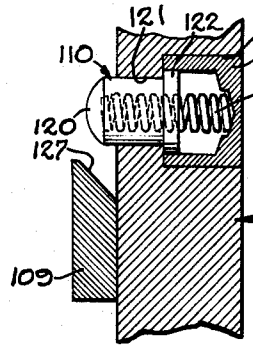


Fig. 11

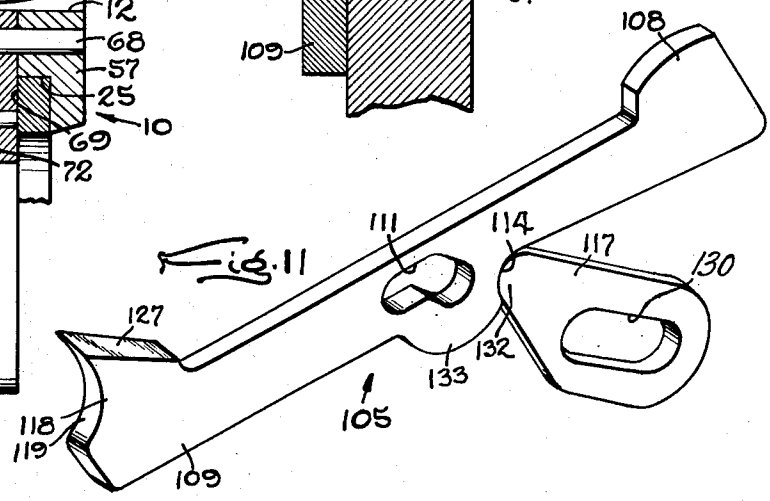
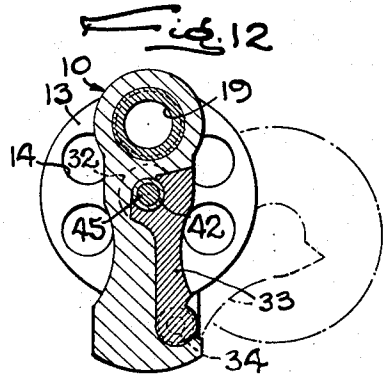


Fig. 12



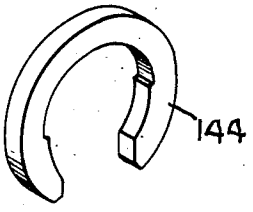


Fig. 13

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3,176,423

REVOLVER FIRING MECHANISM

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Filed June 20, 1962, Ser. No. 203,948
3 Claims. (Cl. 42—65)

This invention relates to a revolver including a cylinder rotatably mounted on a frame, a hammer and a trigger pivoted on the frame in the usual manner and operatively connected so that retraction of the trigger cocks and releases the hammer, and mechanism for indexing the cylinder step by step in response to the trigger movements to bring successive cartridges into alinement with the barrel, the cylinder being latched in place after each step. Such revolvers also include a cartridge extractor for removing spent cartridge from the cylinder, and a trigger guard mounted on the underside of the frame to extend downwardly under the trigger.

The general object of the present invention is to provide a revolver of the above character having an improved firing action and capable of being manufactured at lower cost than prior revolvers of this type.

A more specific object is to mount the trigger spring and cylinder latch spring in a novel manner in the trigger guard such that they are removable from the frame quickly and easily with the trigger guard and are held therein in operative positions for quick reassembly onto the frame.

Still another object is to replace the usual trigger lever and hammer-rebound slide with a single, simple strut operable to connect the trigger spring to the trigger and to effect the rebounding of the hammer after its firing stroke.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a side elevational view of a revolver embodying the novel features of the present invention with parts of the revolver broken away and shown in section.

FIG. 2 is an enlarged fragmentary sectional view taken along the line 2—2 of FIG. 1.

FIG. 3 is an enlarged perspective view of the trigger guard.

FIG. 4 is an enlarged fragmentary sectional view taken along the line 4—4 of FIG. 1.

FIG. 5 is an enlarged view similar to a portion of FIG. 1 with the parts in a different condition.

FIG. 6 is a fragmentary view taken in a vertical plane along the rear end of the cylinder in FIG. 5.

FIG. 7 is an enlarged fragmentary sectional view taken along the line 7—7 of FIG. 1.

FIG. 8 is a fragmentary sectional view taken along the line 8—8 of FIG. 5.

FIG. 9 is an enlarged fragmentary sectional view taken along the line 9—9 of FIG. 1.

FIG. 10 is an enlarged fragmentary sectional view taken in a vertical plane through the hammer and the rear end portion of the cylinder latch during the firing stroke of the hammer.

FIG. 11 is an enlarged perspective view of the latch and the latch link.

FIG. 12 is a fragmentary sectional view taken along the line 12—12 of FIG. 1.

FIG. 13 is an enlarged perspective view of the C-ring for securing the cylinder to its spindle.

FIG. 14 is an enlarged perspective view of the crane release slide.

As shown in the drawings for purposes of illustration, the invention is embodied in a revolver including a frame 10 with a tubular barrel 11 rigidly mounted on the forward end of the frame and opening into a cylinder chamber 12 in the frame. A cylinder 13 having a plurality of

angularly spaced cartridge chambers 14, six in the present instance, longitudinally bored therein is rotatably supported in the cylinder chamber on a spindle 15 extending rearwardly from the front wall 17 of the chamber and into a central bore 18 in the cylinder. The latter is axially fixed on and rotates about the spindle to bring successive cartridge chambers into alinement with the barrel bore 19 (FIG. 12) and with a firing pin 20 guided in the rear portion of the frame for movement toward and away from the rear end of the cylinder to discharge the cartridges in the chambers 14.

The revolver is capable of being fired either double action or single action and includes the usual hammer 21 pivoted on the rear portion of the frame to swing toward and away from the firing pin 20, and the rear end of the cylinder 13 in response to the movements of a trigger 22 pivoted on the frame below the cylinder. Also included on the frame is a hand grip 23 and a trigger guard 24 removably secured in a slot 25 (FIGS. 1 and 5) in the underside of the frame below the cylinder to define an opening 27 into which the lower end 28 of the trigger projects. A lug 29 on the rear end of the guard is seated in a forwardly opening seat 30 at the rear end of the slot with a screw 31 (FIGS. 1 and 5) fastening the front of the guard to the frame and holding the lug 29 in the seat 30.

In order that the cylinder may be swung out of the chamber 12 for insertion and removal of cartridges, the forward end of the spindle 15 is pressed into a bore 32 (FIG. 12) in the upper portion of a yoke or crane 33 recessed into the right-hand side of the frame as viewed in FIG. 12 and fulcrumed adjacent its lower edge on the frame by means of a pin 34 (FIG. 1) projecting rearwardly from the crane and journaled in a bore 37 in the frame. Thus, the crane supports the cylinder on the frame and pivots about the pin 34 to swing the cylinder clockwise and to the right into the open position shown in broken lines in FIG. 12 in which the rear ends of the cartridge chambers 14 are clear of the frame.

An extractor 38 (see FIG. 6) comprising a disc 39 formed with a plurality of arcuate recesses 40 in its periphery is disposed in a counterbore 41 in the rear end of the cylinder, the recesses being alined with and partially encircling the rear ends of the cartridge chambers 14. The extractor disc is fast on the rear end of a rod 42 which passes forwardly through the spindle 15 and the upper end of the crane as shown in FIG. 12 and is guided in the spindle for back and forth endwise sliding. The front end portion of the rod is disposed in a slot 43 in the barrel tang 44 and forms a plunger for sliding the rod manually back and forth relative to the cylinder. A suitable spring (not shown) urges the rod forwardly to seat the extractor disc in the counterbore 41.

When the rod is shifted rearwardly, the extractor engages the rims of cartridges in the chambers 14 and draws the cartridges out of the chambers. In a manner to be described, the extractor is angularly fixed relative to the cylinder to maintain the alinement of the recesses 40 with the chambers.

To latch the cylinder in its normal position in the frame, a center pin 45 is guided for back and forth endwise sliding in the extractor rod 42 and is spring-urged rearwardly into a position in which the rear end of the center pin projects through a hole 47 in the center of the extractor disc and into an alined hole 48 (FIG. 7) in the adjacent wall 49 of the frame. Thus, the center pin 45 latches the cylinder in place in the frame. A beveled groove (not shown) in the front of the wall 49 leads into the hole 48 from the side of the wall and cams the center pin into a retracted position as the cylinder is swung inwardly. When the center pin is alined with the hole, its spring

(not shown) snaps it rearwardly into the hole to latch the cylinder.

To release the cylinder, a bolt or crane release slide 51 (FIGS. 1, 7 and 14) disposed in a cavity 52 (FIG. 7) in the rear portion of the frame behind the wall 49 is guided for back and forth sliding toward and away from the wall to carry a pin 54 into and out of the hole 48. When the slide is forward, the forward end of the slide pin is substantially flush with the front side of the wall 49 so that the center pin 45 is disengaged and the cylinder may be swung outwardly as shown in FIG. 1.

Herein, the slide 51 comprises an elongated bar 54 slidable endwise along a side wall 55 (FIG. 7) of the cavity 52 with an upright bar 58 fast on its front end and projecting upwardly along the wall 49. The slide pin 53 is pressed into the upright bar 58 and extends forwardly therefrom at the level of the hole 48. Slidable along the outside of the wall 55 is a thumbpiece 59 having a neck 60 (FIG. 7) disposed in a slot 61 opening through the wall 55, the thumbpiece being fastened to the bar 54 by a screw 62 passed through the neck and threaded into a tapped hole 63 (FIG. 14) in the bar. The neck is made shorter than the length of the slot 61 to accommodate the back and forth motion of the slide, and the latter is urged forwardly by a coiled compression spring 64 (FIG. 7) disposed in a bore 65 opening rearwardly from the neck, the spring being compressed between the closed end of the bore and a plunger 67 abutting against the rear end of the slot 61. The center pin spring exerts a force sufficient to overcome the slide spring 64 so that the center pin presses the slide pin 53 rearwardly when the thumbpiece is released.

The trigger 22 is pivoted intermediate its ends on a horizontal pin 68 (FIGS. 1, 5 and 9) fast at opposite ends in the lower portions of the side walls 55, 57 of the cavity 52 below the rear end of the cylinder 13. The lower end of the trigger extends through the underside of the frame and into the trigger guard 24 through a slot 69 therein. Normally, the trigger is held in the released position shown in FIG. 1 by a trigger spring 70 (FIGS. 1, 4 and 5) disposed in a bore 71 in the guard 24 and acting against the rear side of the trigger through a strut 72 to urge the trigger forwardly. A knee 73 on the trigger abuts against the front end of the slot 69 to limit forward swinging and determine the released position of the trigger.

As shown most clearly in FIG. 5, the hammer 21 is disposed in the upper portion of the cavity 52 and is fulcrumed intermediate its ends on a horizontal pin 74 spanning the side walls of the cavity. The upper end portion 75 of the hammer projects out of the frame through an upwardly opening slot 77 and swings back and forth in a vertical plane toward and away from the wall 49 and the firing pin 20 in the firing and cocking strokes. A main spring 78*a* in the hand grip 23 acts against a strut 78 (FIG. 5) abutting at one end against the rear edge of the hammer to urge the latter counterclockwise (FIGS. 1 and 5) about its pivot and the upper end portion 75 forwardly toward the firing pin 20.

The latter is disposed in a hardened metal cup 79 (FIGS. 1, 2 and 5) fitted in a recess 80 in the front of the wall 49 with an annular shoulder 81 on the pin urged rearwardly against the bottom of the recess by a coiled spring 82. The front end 83 of the pin is movable forwardly toward the cylinder through a hole in the bottom of the cup. The rear end 84 of the pin normally projects through the wall 49 for engagement with the hammer.

To convert the swinging of the trigger 22 about its pivot into swinging of the hammer 21 through the cocking and firing strokes, during double action operation of the revolver, a cocking finger 85 (FIG. 5) is formed on the upper end of the trigger to engage the lower end of a hammer pawl 87 fulcrumed at 88 intermediate its ends on the front edge of the hammer in a manner well known in the art. The lower end of the pawl is urged counterclockwise about its fulcrum by a spring (not shown) seated in a bore drilled into the front edge of the hammer so that the spring bears against the lower end portion of the pawl to swing the upper end of the latter into abutting engagement with the hammer.

As the trigger is retracted, the cocking finger 85 swings upwardly and forwardly to raise the pawl 87 and thereby swings the hammer rearwardly into the position shown in FIG. 5. At the same time, a foot 89 on the lower end of the hammer swings forwardly into a rearwardly opening notch 90 (FIG. 5) below the finger 85 until the lower wall 91 of the notch engages the underside of the foot 89. Then, during continued retraction of the trigger, the notch wall 91, acting against the underside of the foot, swings the hammer still further in the cocking direction. During this portion of the cocking stroke, the cocking finger swings out of the path of the pawl and the notch wall 91 slides along the foot until it slides free of the foot at a predetermined point along the trigger's path thereby releasing the hammer to the action of the main spring.

When this occurs, the hammer snaps forwardly in a rapid firing stroke and strikes the rear end of the pin 20 to drive the latter into the rear end of the cartridge then alined with the firing pin thereby discharging the revolver. Upon release of the trigger, the spring 70 swings the trigger forwardly until the knee 73 engages the end of the slot 69. It will be seen that the cocking finger engages the front side of the lower end portion of the pawl 87 during this return stroke of the trigger and presses the pawl toward the hammer in passing. Then the pawl spring snaps the pawl back into its normal position.

During single action operation, that is, when the revolver is cocked by pulling rearwardly on the hammer 21, the foot 89 acts against the upper wall 92 of the notch to swing the trigger rearwardy until the foot swings out of the notch. Then the trigger spring 70 swings the cocking finger 85 rearwardly so that the cocking finger locks against a shoulder on the hammer to hold the hammer cocked until the trigger is pulled. A laterally projecting tang 93 (FIG. 4) on the slide bar 55 abuts against the rear edge of the hammer to prevent cocking of the latter when the cylinder is open and the slide 51 is forward.

To bring successive cartridge chambers 14 into alinement with the barrel bore 19 and the firing pin 20 after each shot, a cylinder pawl or hand 94 is mounted in the cavity 52 to engage a ratchet 95 (FIG. 6) on the rear end of the cylinder, in this instance on the extractor disc 39, and turn the cylinder one step during each cocking stroke of the hammer. For this purpose, the hand comprises an elongated upright plate having a forwardly projecting finger 97 (FIGS. 5 and 6) at its upper end and pivoted adjacent its lower end on a stud 98 (FIG. 5) projecting laterally from one side of the hammer adjacent the lower end of the latter, the hand thus being offset to one side of the cylinder axis as shown in FIG. 6. A bowed spring 99 fulcrumed on a pin (not shown) somewhat above the stud 98 rides along an upwardly and forwardly inclined ledge 100 (FIG. 5) in the cavity 52 to press the hand forwardly into a vertical slot 101 (FIG. 7) opening through the wall 49 as the lower end of the hammer swings the hand upwardly during the cocking stroke. Thus, the hand reciprocates back and forth in the slot 101 across the end of the cylinder in a vertical plane spaced from the cylinder axis.

The ratchet 95 comprises a plurality of teeth 102, herein six, each formed with a trailing side 103 disposed at an angle of sixty degrees with the corresponding side of the adjacent tooth on each side and disposed in a predetermined relation with the associated extractor disc recess 40 such that the recess and the alined cartridge cylinder are disposed in a firing position exactly centered at the top of the cylinder when the trailing side of the tooth is vertical and on the right-hand side of the cylinder as viewed in FIG. 6.

With this arrangement, the upward and forward mo-

tion of the hand brings the finger 97 into engagement with a corner 104 of the tooth 102 and turns the extractor and cylinder counterclockwise (FIG. 6) until the side 103 parallels the side of the hand. During the final portion of the cocking stroke, the hand slides along the side 103 as indicated in broken lines in FIG. 6 and then is shifted downwardly toward the released position (FIG. 1) as the hammer snaps forwardly.

A latch 105 is provided to lock the cylinder 13 in place during the firing stroke thereby to maintain precise alinement of the cartridge chambers during firing. For this purpose, six stop notches 107 are angularly spaced around the periphery of the cylinder to open downwardly when disposed on the underside of the cylinder, and the latch 105 is mounted below the cylinder to rock toward and away from the cylinder in timed relation with the hammer movements. The latch includes an upwardly extending lug 108 forming a stop engageable with the notch then alined with the stop and operable when engaged to lock the cylinder in a predetermined angular relation in the frame.

The latch 105 is mounted on the frame 10 for sliding along a downwardly inclined path and simultaneous rocking away from the cylinder, and the forward motion of the lower end of the hammer 21 at the start of the cocking stroke is utilized to effect the simultaneous sliding and rocking motion of the latch thereby to disengage the stop with a small amount of trigger movement. For this purpose, the latch is guided for sliding downwardly along its pivot and the rear end portion 109 of the latch is disposed adjacent the lower end of the hammer when the latter is in the released position (FIG. 1) so that a member 110 carried on the lower end of the hammer engages the latch and shifts it forwardly and downwardly as the hammer begins to move.

In the present instance, the latch comprises an elongated one-piece stamping disposed alongside the upper end of the trigger with the stop lug 108 at the forward end of its body formed with an upper edge which is convexly curved to complement the curvature of the bottoms of the stop notches 107 when the latch is in its uppermost position as shown in FIG. 1. The latch is guided on the frame by means herein comprising an elongated slot 111 formed intermediate the ends of the latch to receive the trigger pivot pin 68. The forward portion of the slot is inclined forwardly and downwardly at an angle preferably of approximately forty-five degrees and the rear portion of the slot is generally horizontal.

A latch spring 112 compressed in a bore 113 in the front portion of the trigger guard 24 acts against a seat 114 in the underside of the latch through a pin 115 slidable in the bore 113 and a link 117 abutting at one end against the seat and at the other end against the pin 115 to urge the latch both upwardly and rearwardly. Thus, the latch normally is positioned as shown in FIG. 1 with the pin 115 abutting against the front end of the slot 111 and with the stop 108 engaging one of the stop notches 107.

The rear end of the latch is formed with a toe 118 turned upwardly from the latch body and having a rear surface defining a concave, rearwardly facing seat 119 disposed alongside the lower end portion of the hammer. The member 110 for shifting the latch forwardly herein takes the form of a spring-loaded plunger (see FIG. 10) comprising a cylindrical pin having a rounded end 120 projecting laterally from the side of the hammer through a hole 121 to abut against the seat 119 when the hammer is at rest. On the other end of the pin is an annular head 122 disposed in a cup 123 pressed into a counterbore 124 around the hole 121 in the other side of the hammer and guided in the cup 123 for back and forth lateral sliding. The plunger is pressed toward the extended position shown in FIG. 10 by a coiled spring 125 compressed between the pin and the closed end of the cup 123, the head 122 abutting against a shoulder defined between the counterbore and the hole to limit the extent of its projection from the side of the hammer.

It will be seen that the initial retraction of the trigger 22 from the broken line position in FIG. 5 to the full line position begins to rotate the hammer clockwise and, therefore, swings the plunger 110 forwardly to the position shown in FIG. 5. This motion of the plunger shifts the latch 105 forwardly along the trigger pin 68 which coacts with the inclined sides of the slot 111 to cam the latch downwardly as it moves forwardly to the full line position in FIG. 5. Simultaneously, the upward movement of the plunger swings the latch counterclockwise about the pin 68 thereby increasing the downward movement of the stop 108. Thus, these sliding and rocking motions cooperate to release the cylinder early in the trigger stroke as will be evident from relatively small amount of trigger motion required to swing the plunger to the position shown in FIG. 5.

The length and motion of the hand 94 are correlated with the motion of the latch 105 so that the hand engages the ratchet 95 as soon as the cylinder 13 is released and therefore immediately begins to turn the cylinder. As continued retraction of the trigger 22 swings the hammer 21 further in the cocking direction, the plunger 110 moves forwardly and upwardly out of the seat 119 and over the end of the toe 118 thereby shifting the latch endwise toward the broken line position (FIG. 5) in which the pin 68 is adjacent the rear end of the slot 111. When the plunger clears the toe end and releases the latch, the latter is snapped rearwardly and upwardly by the latch spring 112 so that the stop 108 enters the next stop notch 107 when the indexing step is complete.

During the firing stroke of the hammer 21, the plunger 110 swings from a position above the latch back to the normal position in which the pin bears against the seat 119. To facilitate swinging of the pin back past the toe 118, coacting surfaces are formed on the pin and the upper edge of the toe to cam the pin into a recessed position in the hammer. Herein, these surfaces comprise the rounded end 120 of the pin and an upper edge 127 (FIGS. 10 and 11) of the toe, the edge 127 being inclined upwardly and away from the adjacent side of the hammer as shown in FIGS. 10 and 11. Thus, as the pin swings downwardly and rearwardly, it engages the surface 127 and is pressed thereby into the hole 121 against the action of the spring 125. When the hammer reaches the position shown in FIG. 1, the pin snaps endwise into alinement with the seat 119 in position to actuate the latch during the next cocking stroke of the hammer.

The present invention contemplates mounting the latch spring 112, the link 117 and the trigger spring 70 and strut 72 in a novel manner to facilitate the assembly and disassembly of the revolver for cleaning and service and to reduce the number of loose parts. For these purposes, the latch link 117 is coupled to the trigger guard 24 with a lost motion connection and projects at one end into the bore 113 housing the latch spring 112. The other end of the link abuts against the seat 114 in the underside of the latch. With this arrangement, the link is held on the trigger guard and confines the spring 112 in the bore even when the trigger guard is removed (FIG. 3) while at the same time being slidable back and forth relative to the trigger guard through a range sufficient to accommodate the cylinder locking and unlocking movements of the latch 105.

Herein, the bore 113 is formed by drilling a hole almost through the upper front portion of the trigger guard on an axis extending rearwardly and inclined slightly upwardly toward the underside of the latch. The forward end of the bore is closed by a screw 128 (FIGS. 1 and 5) against which the coiled compression spring 112 abuts and the other end opens into a slot 129 narrower than the diameter of the hole and milled into the top edge of the trigger

guard. The link 117 is guided in this slot for back and forth endwise sliding and abuts at its forward end against the pin 115 which is urged rearwardly by the spring.

Preferably, the link 117 is a flat and somewhat elongated plate having a slot 130 therein extending longitudinally of the plate and receiving a pin 131 spanning the upright side walls of the slot 129. With the link 117 pressed rearwardly and upwardly by the spring 112, the pin 131 normally abuts against the forward end of the slot 130 as shown in FIG. 1, this being the position in which the cylinder is locked. The slot 130, which cooperates with the pin 131 to form the lost motion connection between the trigger guard and the link, is long enough to accommodate the full forward and downward motion of the latch during the cocking of the hammer.

The upper end or nose 132 of the link 117 is arcuate in contour and complements the curvature of the seat 114 in the underside of the latch, the seat being formed in the side of a lug 133 integral with and extending downwardly from the latch body. As the latch is guided downwardly, and forwardly along the trigger pivot pin 68, the link is correspondingly shifted downwardly and forwardly along the pin 131 while simultaneously pivoting about the pin. Then, as the trigger pin slides along the rear portion of the latch slot 111, the link pivots counterclockwise about the pin 131 and slides further downwardly along the pin, the arcuate end 132 of the link rotating about the pin 131 and sliding relative to the pin and the seat 114 during the motion of the latch to accommodate the changing angular relation of the link with the pin 131 and the latch.

Similarly, the trigger spring bore 71 is drilled into the rear portion of the trigger guard 24 as shown most clearly in FIGS. 3 and 4 and opens into a slot 134 extending forwardly through the guard and alined with the rear edge of the trigger, the slot 134 being narrower than the diameter of the bore. A plunger 135 is inserted into the bore 71 through the open rear end thereof and a spring 70 is compressed between the plunger head and a cap 137 pressed into the end of the bore and held in place by a pin 138 (FIGS. 1 and 5). Thus, the spring 70 and plunger 135 are retained in the trigger guard for removal therewith from the frame by stops in the bore comprising the cap 137 and the forward end 139 (FIG. 4) of the bore.

The trigger strut 72 comprises an elongated flat stamping pinned at 140a to the trigger and extending rearwardly through the slot 134 into the bore 71 to abut against the plunger 135. Mounted in this manner, the strut is guided in the slot for back and forth endwise sliding in response to retraction and release of the trigger and transmits the spring force to the trigger.

When the trigger guard is removed, the latch spring 112 holds the link 117 in the position shown in FIGS. 1 and 3 and the pin 131 and the link, in turn, hold the spring in the bore. The strut 72, being secured to the trigger, slides out of the slot 134 so that the plunger 135 abuts against the forward end 139 of the bore 71 which thus prevents accidental separation of the trigger spring from the guard. It will be seen, therefore, that the trigger spring assembly and the latch spring assembly form a unitary group of parts removable in one simple operation, that is, by removing the screw 31 and pulling the guard away from the frame, and maintained in proper relation even after the guard is removed.

To reassemble the guard on the frame, the link 117 is guided into the seat 114 and the slot 134 is alined with the strut 72 as the guard is positioned against the underside of the frame. When the guard is seated against and fastened to the frame, the parts automatically assume their proper positions relative to the strut and the latch.

Advantage is taken of the position and movement of the strut 72 to effect the so-called rebound of the hammer after it completes its firing stroke. The rebound is the shifting of the hammer rearwardly a short distance from its forward position and into an intermediate position (FIG. 1) in which the upper end of the hammer is spaced from the firing pin 20. This is accomplished by means of a lug 140 integral with the strut 72 and projecting upwardly from the rear end of the strut out of the slot 134 and into the cavity 52. When the hammer is at rest, the lug 140 bears against the underside of a rounded abutment 141 (FIG. 1) on the lower end of the hammer. As the trigger is retracted and the strut and lug slide rearwardly, the hammer abutment first moves forwardly and then, during the firing stroke, swings rearwardly past the position shown in FIG. 1. The lug 140, however, is positioned even further rearwardly before the trigger is released and, therefore, slides forwardly into contact with the abutment 141 to swing the hammer into the intermediate position shown in FIG. 1 as the trigger spring returns the trigger to its released position. Thus, the strut 72 replaces both the rebound slides and the trigger levers found on prior revolvers having actions of this type.

The cylinder 13 and the spindle 15 are formed with alined internal and external grooves 142 and 143 respectively, and a radially expandable and contractible ring 144 (FIGS. 1, 5 and 8) having a larger normal outer diameter than the diameter of the cylinder bore 18 is pressed into the bore and seated in the internal groove 142 prior to assembly of the cylinder on the spindle. The ring 144, which herein is a split C-ring, is radially compressed to fit into the cylinder bore and then snaps outwardly into the groove 142. Thus, the C-ring is permanently mounted in the cylinder.

The normal inner diameter of the C-ring is somewhat smaller than the spindle diameter (see FIG. 5) to contract into the groove 143 when alined therewith. Thus, when the cylinder is telescoped onto the spindle, the C-ring 144 first is expanded as permitted by clearance in the cylinder groove 142 and then snaps back inwardly into the spindle groove 143. The free end of the spindle is beveled at 145 to spread the C-ring as it is passed onto the spindle. To facilitate removal of the cylinder, coacting cam surfaces are formed on the rear face of the C-ring and on the adjacent wall of the groove 143 to cam the ring radially outwardly in response to a greater than normal axial force on the cylinder thereby to release the cylinder from the spindle. In this instance, the rear wall of the groove 143 is chamfered at 147 for this purpose.

The extractor 38 is held in axial alinement with the cartridge chambers 14 by a ring 148 pressed into the enlarged rearwardly opening end 149 of the cylinder bore 18, keyed to the extractor, and secured both axially and angularly to the cylinder. As shown most clearly in FIGS. 5 and 8, the ring 148 is keyed to the extractor by means comprising a pin 150 pressed into a radial hole 151 in the ring and projecting radially inwardly into a longitudinal groove 152 in the extractor rod 42, the groove 152 being long enough to accommodate the full stroke of the extractor in removing the cartridges. To fix the ring 148 in the cylinder, both the ring periphery and the enlarged bore end 149 are knurled to prevent turning of the ring and a set screw 153 (FIG. 8) is threaded into the rear end of the cylinder in position to interlock with the ring and the cylinder. The screw reinforces the knurls and also fixes the ring against axial shifting relative to the cylinder.

The ratchet teeth 102 are formed in at least partially recessed positions in the rear end of the cylinder, in this instance in the extractor disc 39, so that the rear ends of the teeth lie closely adjacent the front of the wall 49. Each tooth is produced by two simple milling cuts in the disc 39, one forming a recess 154 having an end defining the trailing tooth side 103 and the other forming a recess 155 intersecting the recess 154 to define the corner 104.

Each of the recesses 154 is formed by advancing the side of a half-round ball cutter (not shown) radially into the disc along a path paralleling the cylinder axis with the flat end of the cutter in a plane spaced from and paralleling the axis at a distance equal to the offset of the hand

94 from the axis. Thus, the rounded side of the cutter shapes the bottom of the recess to an arcuate cross-section and the flat end of the cutter shapes the flat trailing side 103 of the tooth. Successive recesses are formed by rotating the disc sixty degrees between cuts. Then, the cutter is advanced into the disc in a series of cuts with its flat end intersecting the recesses 154 intermediate the ends of the sides 103 and preferably perpendicular thereto to form the recesses 155 and the corners 104 of the sides 103.

With these two simple operations, each tooth is formed with a corner 104 positioned to be engaged by the hand 94 and moved as previously described, until the hand passes alongside the tooth. With the hand bearing against one of the sides 103 until the stop lug 108 is seated in one of the notches 107, the cylinder is positively held in proper alinement. The force of the hand is applied against the corners 104 rather than against the flat sides 103 during turning thereby avoiding the application of reactive forces against the hand tending to cam it sidewise and cause binding of the hand against the side of the hammer.

I claim as my invention:

1. In a revolver, the combination of, a frame, a cylinder rotatably mounted on said frame, a trigger disposed beneath said frame and pivoted thereon to swing rearwardly from a released position toward a firing position, a trigger guard removably mounted on the underside of said frame around said trigger and having a rearwardly extending bore therein behind the trigger and a slot extending through said guard from the forward end of the bore toward said trigger, a strut guided for back and forth sliding along said slot and fulcrumed at its forward end on said trigger, the rear end of said strut projecting into said bore, a coiled compression spring in said bore acting between said guard and said other end to urge said strut and said trigger forwardly toward said released position, said slot being narrower than said bore and the diameter of said spring being greater than the width of the slot whereby said spring abuts against the forward end of the bore and is retained in place thereby when said guard is removed from said frame and said strut is pulled from the slot.

2. In a revolver, the combination of, a frame, a cylinder rotatably mounted on said frame, a trigger disposed beneath said frame and pivoted thereon to swing rearwardly from a released position toward a firing position, a trigger guard removably mounted on the underside of said frame around said trigger and having a rearwardly extending bore therein behind the trigger and a slot extending through said guard from the forward end of the bore toward said trigger, a strut guided for back and forth

sliding along said slot and fulcrumed at its forward end on said trigger, the other end of said strut projecting into said bore, a spring in said bore urging said strut and said trigger forwardly toward said released position, and stops at opposite ends of said bore retaining said spring therein when said guard is removed from said frame and said strut is pulled from the slot.

3. In a revolver, the combination of, a frame, a cylinder rotatably mounted on said frame, a hammer pivoted intermediate its ends on said frame with its upper end swingable forwardly toward one end of said cylinder in a firing stroke and rearwardly away from the cylinder through an intermediate position in a cocking stroke, a trigger pivoted on said frame beneath said cylinder for swinging rearwardly from a released position, means connecting said trigger to said hammer during such swinging thereby to swing the hammer through said cocking stroke and release the hammer for said firing stroke, a hammer spring urging said hammer forwardly to effect said firing stroke, a trigger guard mounted on the underside of said frame around said trigger, the portion of said guard behind said trigger having a slot therein opening both forwardly toward the trigger and upwardly toward said hammer, a rigid strut guided in said slot for forward and rearward sliding and connected to said trigger, a spring acting between said strut and said guard to urge the trigger toward said released position, and a lug on said strut projecting upwardly into said frame and positioned slightly behind the lower end of said hammer when the trigger has been moved rearwardly and the hammer has completed said firing stroke, said lug being engageable with the lower end of said hammer as the trigger is returned by the trigger spring to said released position thereby to shift said hammer upper end portion rearwardly into said intermediate position, the strengths of said springs being correlated whereby said trigger spring overcomes said hammer spring.

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