

[54] TOP LEVER MECHANISM FOR FIREARMS

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[58] Field of Search..... 42/44, 45, 40

[56] **References Cited**

**UNITED STATES PATENTS**

399,214	3/1889	Smith.....	42/44
528,506	10/1894	Fay.....	42/45
1,137,045	4/1915	Barnes.....	42/44

*Primary Examiner*—Samuel Feinberg

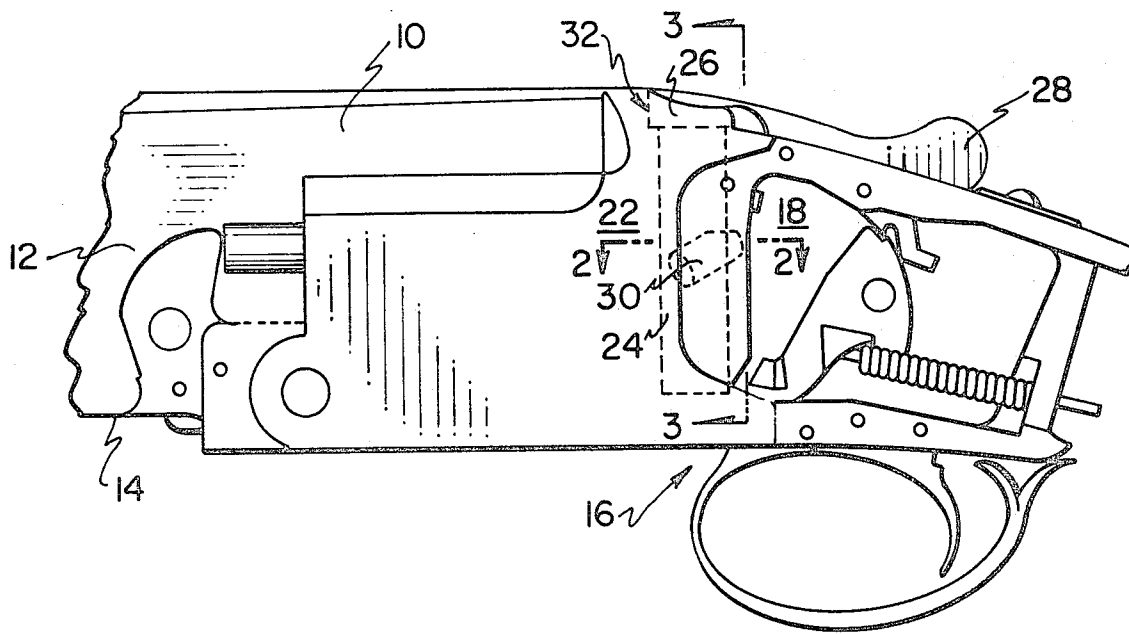
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[57] **ABSTRACT**

A device for overcoming axial play of the top lever of a firearm such as that found on multi-barreled shot-guns. The device includes a receiver having journalled therein a rod or post attached to and extending downward from an operating arm of the top lever. The rod is adapted with a slanted blind opening having an axis which is inclined upwardly towards the operating arm. A spring biased pin is carried within the opening and extends outwardly therefrom a distance sufficient to engage a groove penetrating the wall of the receiver. As wear occurs on the pin, the blind opening in the rod and/or the groove in the receiver, the spring biased pin is automatically and continuously urged outwardly into and against the receiver insuring a continuous precision fit and thereby avoiding axial play of the rod journalled therein.

**9 Claims, 5 Drawing Figures**



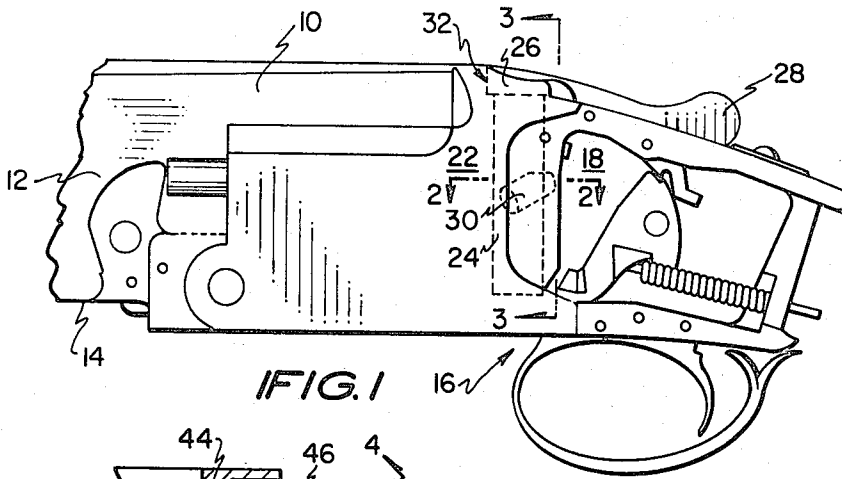


FIG. 1

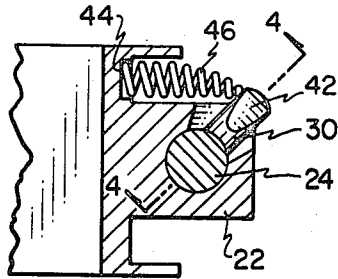


FIG. 2

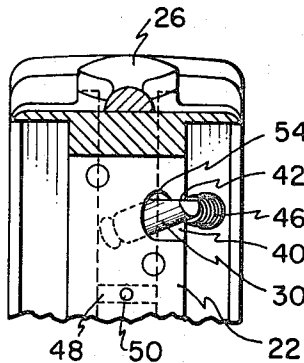


FIG. 3

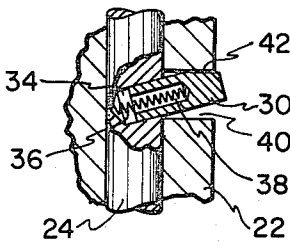


FIG. 4

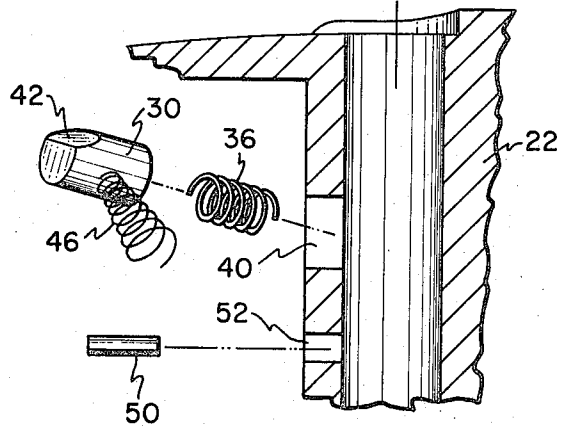
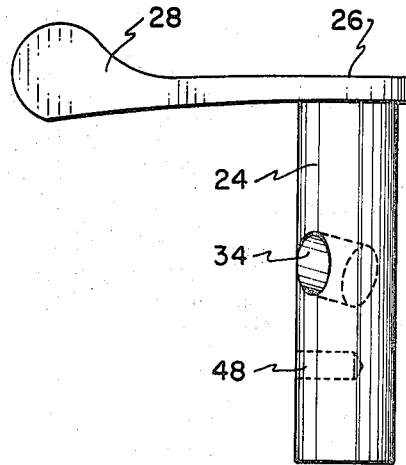


FIG. 5

## TOP LEVER MECHANISM FOR FIREARMS

## BACKGROUND OF THE INVENTION

## 1. Field

This invention is directed to an improved locking mechanism for use on firearms and particularly to a means for automatically taking up any axial slack or play which may develop in the top lever of firearms having pivotally joined receiver and barrel sections.

## 2. State of the Art

In pivotally joined firearms which can be "broken" for the purpose of inserting or extracting shells from the cartridge chamber, certain strains and shocks are exerted on the locking mechanism which maintains the barrel and receiver sections in a locked position during firing. As a result of such strains, wear occurs on the locking parts and on those areas which are in communication with the locking parts causing a certain amount of axial slack or play to develop in the gun's top lever which operatively controls the locking mechanism.

Since such play is not compatible with quality guns or craftsmanship, considerable cost and effort have been expended by manufacturers to alleviate this problem. In one instance a hand fitting procedure was developed to insure a precision fit of the retaining means which holds the rod of the top lever to the receiver. Although precision fitting has minimized the degree and/or rate of wear and thus minimized undesirable play, it has also increased manufacturing costs.

To overcome the problem of axial play and to avoid the need for the handfitting procedures referred to above, a means has been found which will automatically take up the axial slack or play as it develops but will not adversely affect that precision "feel" desirable in quality guns.

Other and more specific advantages of this development will be readily apparent from the disclosure which will subsequently follow.

## SUMMARY OF INVENTION

This invention, in its broadest aspects, covers a device for automatically taking up slack or play in a top lever which comprises a receiver having a hole vertically bored therein and a rod journaled for rotation within the bored hole. The rod is characterized by having an upwardly slanted blind opening for receiving and engaging an outwardly biased retaining means whereby the biased retaining means is being continuously urged outwardly so that it will enter and engage another opening in the receiver. With this arrangement, a continuous retaining engagement is achieved between the retaining pin, the rod and the receiver even though the pin and the openings may subsequently become worn. Another advantage associated with this automatic take-up arrangement is that precision boring of the openings in the rod and the receiver and/or precision fitting of the retaining pin in these openings are not required as minor variations in manufacturing can be adequately compensated for by the take-up device.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial cut-away side view of a portion of a pivotally joined firearm showing the location of the inventive concept in phantom.

FIG. 2 is a top sectional along line 2—2 of FIG. 1.

FIG. 3 is a sectional view taken along line 3—3 of FIG. 1.

FIG. 4 is a part sectional view along line 4—4 of FIG. 2.

FIG. 5 is an exploded view of the inventive concept which includes the top lever, receiver (in cross-section) and retaining pin.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings and particularly to FIG. 1, a portion of a pivoted type shot gun is shown having superimposed barrels 10 and 12; a forearm bracket 14 and the receiver shown generally by 16. The firing mechanism, which is shown generally by numeral 18, is contained within the receiver as is the mechanism for locking the receiver and barrel sections prior to firing. Although these mechanisms are not shown in detail, they are of the type conventionally used in commercially available pivoted type shot guns. Located in about the center of the receiver is a breech enclosing area 22. A hole adapted for accepting and holding a stem or rod 24 for rotation is vertically bored in the breech enclosing area. The upper end of the vertical rod terminates in a head section 26 to which is attached an operating arm 28. A retaining pin 30 penetrates the rod and the breech enclosing area, positions and operatively holds the rod within the breech enclosing areas. The above components (breech enclosing area, rod, operating arm and retaining means) are the main components which in this invention are identified generally as the top lever mechanism 32.

Although rod 24 is designed for partial rotary movement within the breech enclosing area to permit locking and unlocking of the pivoted sections, a certain amount of unwanted axial play will develop between the rod 24 and the breech enclosing area 22 after extensive use. To alleviate this problem of axial play, the rod 24 is further provided with a blind opening 34 bored at an angle of between 45° and 90° to the axis of the rod and preferably at an angle approximating 75°. Normally the opening will be positioned approximately midway between the two ends of the rod. A retaining pin 30 is slidably fitted within the opening in the rod and continuously urged outwardly from the opening by action of a biasing means such as spring 36. The retaining pin 30 possesses a blind hole 38 or an indentation for holding the spring 36 in a biasing position. The closed end of the locking pin 30 projects outwardly beyond the vertical wall limits of rod 24 and engages a grooved or slotted opening 40 in the side wall of the breech enclosing area 22.

Since the retaining pin 30 is angularly positioned in rod 24, the upper extended portion of the retaining pin which is in communication with the grooved opening 40 is planed or leveled to provide a substantially flat surface or face 42. The flat face 42 is in contact with the upper side of the grooved opening 40 which has a correspondingly flat walled surface to insure maximum surface contact between the two surfaces. To further insure that the biasing means 36 is continuously exerting a maximum force against the locking pin (thus preventing axial movement of rod 24 journaled within the breech enclosing area) the planed face on the retaining pin possesses an angle no greater than an angle complementary to the angle of the opening bored in rod 24. For example, if the opening in the rod is bored at an

angle of 75° to its axis, the face of the locking pin 30 possesses an angle of 15° or less with its axis. With the above arrangement all vertical or axial play which may develop can be compensated for by a corresponding axial displacement of the biased retaining pin within the openings and against the breech enclosing area.

It is normally desirable that the top lever be continuously urged toward its locked position. To achieve this effect, a groove or slot 44 is provided in the breech enclosing area 22 to receive a second biasing means such as a pigtailed compression spring 46. The small end of the spring 46 is attached to the retaining pin 30 at a point just below the retaining pins flat face 42.

It is further desirable to provide a stop means for limiting the amplitude of rotation of the top lever. Although most any type of stop means may be employed, the stop means herein disclosed comprises an extended groove or channel 48 located in rod 24 just below the blind hole 34. A corresponding retractable stud 50 having a diameter slightly smaller than the height of the extended groove extends out from an opening 52 in the breech block and engages groove 48. The top lever is thereby limited in its rotation by the length of extended groove 48. Normally the groove is of such length that only that amount of movement which would be required for unlocking and locking the firearm achieved.

In order to permit the top lever to be disassembled, the slotted opening 40 in the breech block is enlarged to provide an expanded opening 54. After stud 50 has been removed, rod 24 can then be rotated beyond the limits or ends of extended groove 48. This permits retaining pin 30 to be rotated and brought to register with the expanded opening 54 from whence it can be removed. The top lever can then be lifted and removed from the breech enclosing area.

While the invention has been described with reference to specific embodiments, it should be understood that certain changes in construction may be made by one skilled in the art and would not thereby depart

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from the spirit and scope of this invention, which is limited only by the claims appended hereto.

I claim:

1. A device for automatically taking up axial slack in a top lever comprising a receiver having a hole vertically bored therein and a rod journaled for rotation within said bored hole, said rod having an upwardly slanted blind opening for receiving and engaging an outwardly biased retaining means which is being continuously urged outwardly so that the retaining means also enters and engages an opening in said receiver.

2. The device of claim 1 wherein the biased retaining means comprises a retaining pin for contacting the walled surface of said opening in said receiver and a spring for urging said retaining pin into said opening in said receiver and against said walled surface.

3. The device of claim 2 wherein said retaining pin has a flat face for contacting the upper walled surface of said opening in said receiver.

4. The device of claim 3 wherein the opening in said receiver has an expanded opening in communication therewith for facilitating the removal of said retaining pin.

5. The device of claim 4 further including a stop means for limiting rotation of said rod within said bored hole.

6. The device of claim 5 wherein the slanted blind opening is bored at an angle between 45° and 90° to the axis of said rod.

7. The device of claim 6 wherein said flat face of said retaining pin forms an angle complimentary to the angle of said slanted blind opening.

8. The device of claim 1 further including a second biasing means for continuously urging said top lever to a preselected position.

9. The device of claim 8 wherein said second biasing means is a spring having one end connected to said retaining means.

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