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Bullis et al.

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[54] **FIRING PIN MECHANISM FOR FIREARMS**

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[52] **U.S. Cl.** **42/41**

[51] **Int. Cl.** **F41c 19/00,** F41c 19/18

[58] **Field of Search** ..... 41/41, 42 R, 65

[56] **References Cited**

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[57] **ABSTRACT**

A unique "floating-type" forwardly biased firing pin arrangement for firearms. The system is designed to prevent breakage of the pins resulting from "dry-firing" the gun. The firing pins are striker or hammer initiated. When the gun is loaded, the hammer engageable ends of the pins protrude from a housing within the receiver so that they are capable of being struck. When the firearm is not loaded, the hammer engageable ends of the pins are recessed behind the housing face, where they remain inaccessible to the hammers, causing the housing to absorb the full impact of the hammer blows.

3 Claims, 3 Drawing Figures

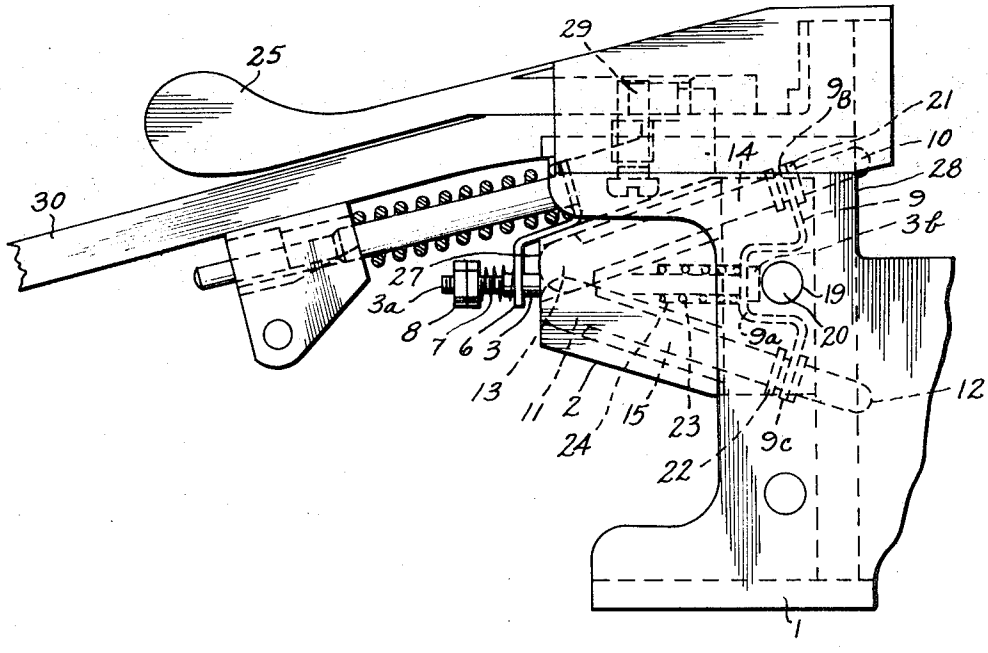


Fig. 1.

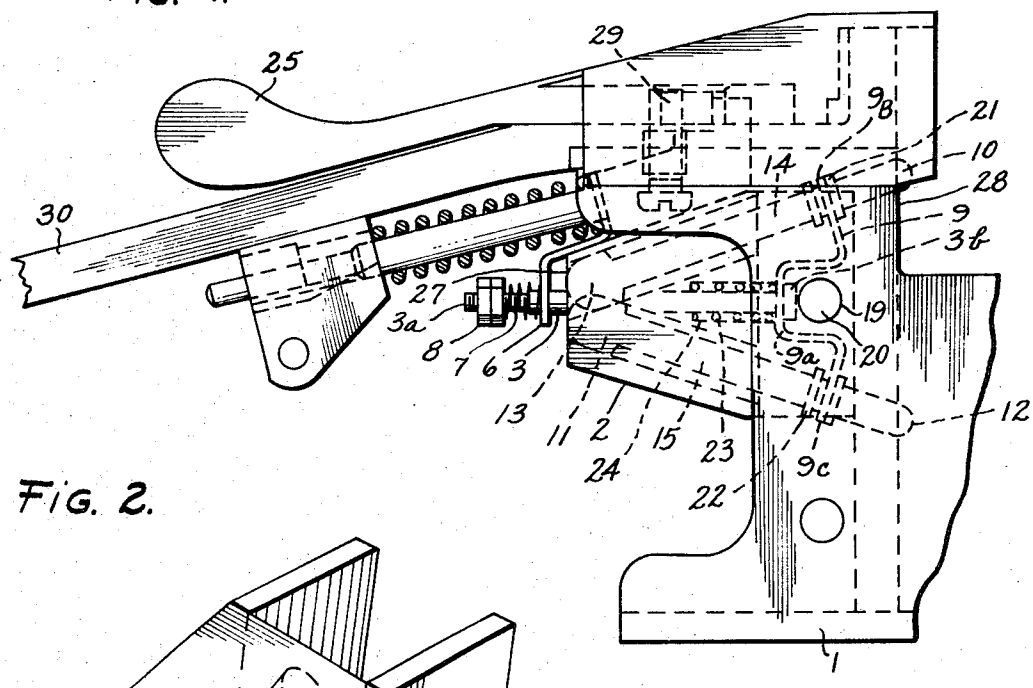


Fig. 2.

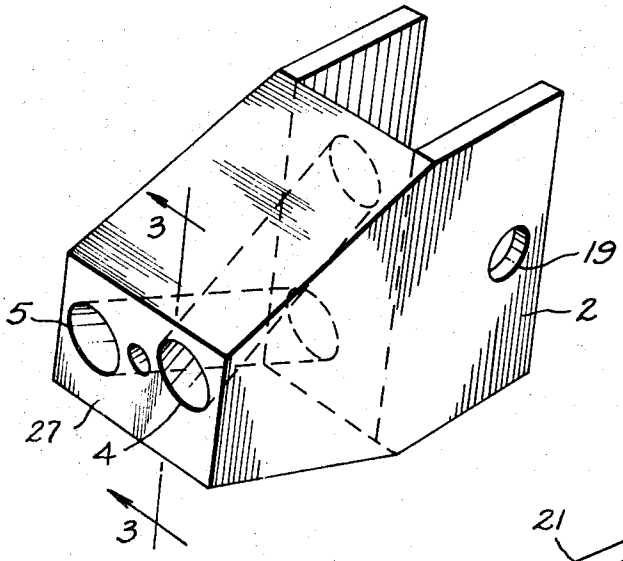
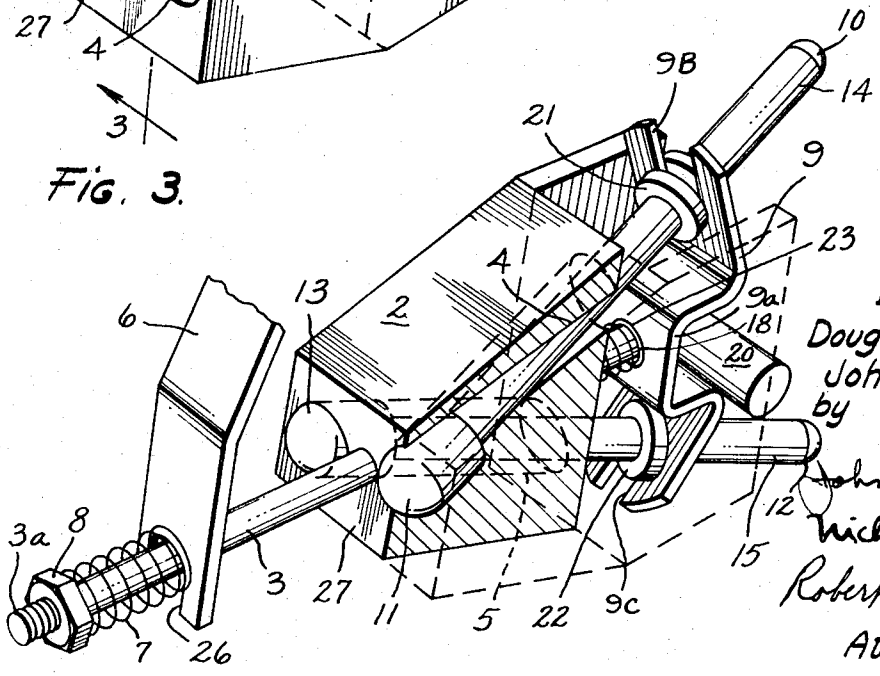


Fig. 3.



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FIRING PIN MECHANISM FOR FIREARMS

This invention pertains to a hammer or striker initiated firing pin system for firearms that will allow the sportsman to "dry-fire" his gun without any risk of damaging the firing pins, and more particularly to a firing pin arrangement having "floating-type" forwardly biased firing pins whose hammer-engageable surfaces remain inaccessible to the hammers when the gun is not loaded.

Heretofore, shotguns and especially double-barrel guns have been susceptible to firing pin breakage when "dry-fired." "Dry-firing" generally refers to the condition where the trigger is pulled in an unloaded weapon, resulting in a sharp hammer blow to the firing pin. Since the gun is in the unloaded state, the firing pin takes the full impact force of the falling hammer. In time, this will cause breakage of the firing pin. It has been observed that some shotguns will even incur this breakage, when "dry-fired" less than one hundred times. This is the reason that "snap caps" are very often sold with double-barrelled shotguns. "Snap caps" are dummy rounds with a nylon insert where the primer is normally located. These dummy rounds when inserted into the chambers will lower the forces on the firing pins caused by the impact of the hammer.

It is highly undesirable to break a firing pin, since replacement is usually very difficult. In addition, the broken firing pin condition is very often dangerous. It was for this reason that the invention was developed.

In the present system, the hammer-strikable ends of the firing pins lie forward of the end face of the receiver housing when the barrel chambers are empty, so that they become inaccessible to a falling hammer. The energy of a falling hammer is completely absorbed by the housing. The firing pins remain unscathed. Thus, the guns may be repeatedly "dry-fired" without any possibility of breaking the firing pins.

The strikable ends of the pins are accessible to the hammers only when the chambers are loaded. The firing pins are spring-urged forward so that the initiating tips of the pins protrude into the empty chambers. When the chambers are filled with ammunition, the pins are forced backward against the force of the spring by the ammunition, allowing the hammer-engageable end of the pins to protrude beyond the housing face where they may be struck by the falling hammers.

Heretofore, it has been a rule of thumb in the design of a gun to refrain from having the firing pins rest upon the ammunition primers. This has been thought to present a dangerous condition. Being aware of this, an extensive test program was conducted to determine whether or not the present system was safe. Drop tests revealed that the invention was as safe as most of the other well-known systems, and within the considered safety limits for primer indentation. The invention is safer than other devices in view of the fact that the present system does away with the unsafe condition of broken firing pins, while maintaining its integrity and safety in drop testing.

As far as it is known, only two other firearm designs have utilized a forwardly urged firing pin system. They are:

A. J. Arsenault, U.S. Pat. No. 3,131,499, Issued: May 5, 1964; and

O. D. Bills et al., U.S. Pat. No. 3,283,436, Issued: Nov. 8, 1966.

The above devices, although illustrative of forwardly spring-biased firing pins, are not like the present system because:

a. the firing pins are not hammer or striker initiated, and b. the firing pins do not have the "floating-type" construction of the present system, but rather are locked against forward movement until initiation is desired.

In addition, the other guns are of the lever-action variety, where our system is currently designed for top-tang break-action release.

Because the firing pins of the present invention are of "floating-type" construction, they act independently of each other.

It is an object of this invention to provide a hammer or striker initiated firing-pin mechanism which allows the gun to be "dry-fired" without breaking the firing pins.

It is another object of this invention to provide a hammer or striker initiated firing pin system with forwardly urged "floating-type" firing pins.

It is still another object of this invention to provide a forwardly-urged firing pin mechanism that is safe and reliable.

These and other objects of this invention will become apparent and will be better understood with reference to the detailed description and the drawings in which:

FIG. 1 is a side view of the receiver of a break-action firearm containing the firing pin mechanism of this invention;

FIG. 2 is an isometric view of the housing of the firing pin mechanism of this invention; and

FIG. 3 is a cutaway view taken along Lines 3—3 of FIG. 2, showing the housing containing the firing pins and yoke of the invention.

Generally speaking, the invention is for a "dry-firing" non-breakable firing pin mechanism for firearms that is hammer or striker initiated. The mechanism comprises a receiver having a firing pin housing disposed therein. A barrel is attached to the receiver at its breech end. A firing pin is disposed in the housing.

The firing pin has a rearward strikable end and a forward initiating end. The firing pin is biased forward so that the strikable end of the pin lies forwad of the end face of the housing when the barrel does not contain ammunition. In this position, the striker or hammer will never contact the firing pin and the initiating end of the pin will protrude into the barrel chamber.

When the chamber is loaded, the ammunition will force the firing pin rearward so that the strikable end now protrudes beyond the end face of the housing where it may be struck by a falling hammer.

For a double-barrel gun, two firing pins are connected within the housing by means of a convoluted yoke member. The pins act independently of each other by allowing the yoke to slightly pivot about its central portion between the two pins. The yoke is biased forward which in turn urges the pins toward the barrels.

Now referring to FIG. 1, a receiver 1 of a firearm is shown containing the firing pin mechanism of this invention.

As illustrated, the mechanism is shown for use in a break-action, double-barrelled gun--hence, there are

two firing pins, 14 and 15, respectively. These pins are disposed within slots 4 and 5 in housing 2, as shown in FIGS. 2 and 3.

Firing pin 14 is slidable in slot 4, and pin 15 is slidable in slot 5.

The firing pin 14 has an initiating end 10 and a strikable end 11. Pin 15 has an initiating end 12 and a strikable end 13. The strikable ends 11 and 13, respectively, lie below the end face 27 of the housing 2, when the barrels (not shown) are empty. When the barrels are loaded, the strikable ends of the firing pins protrude past end face 27, as depicted in FIG. 3, where they can be struck by a falling hammer (not shown).

The firing pins are joined by yoke 9 which has a U-shaped center 9*a* with two extending arms 9b and 9c, respectively. The extending arms are slotted at their respective ends where they engage the firing pins through two pairs of guide discs 21 and 22, respectively.

A yoke rod 3 slidably extends through housing 2 and is attached at its forward end 3*b* to the yoke 9. A spring 23 fits over rod 3 and is disposed in slot 24 of the housing. Spring 23 urges the yoke forward and consequently the firing pins as well. The yoke and firing pins are limited in their forward direction by rod 20 which laterally extends across the housing 2 through slot 19.

In the unload condition the firing pins are allowed to come forward a sufficient distance so that their initiating tips 10 and 12, respectively, extend past the breech face 28 of receiver 1, as shown in FIG. 1. The pins act independently of each other because yoke 9 is free to slightly pivot about yoke rod 3 at the rod's forward end 3*b* and also because the thickness of the yoke is less than the distance between the two pairs of guide discs 21 and 22, respectively, on the firing pins. Hole 18, through which rod 3 extends into yoke section 9*a*, is made oversized, allowing yoke 9 to move with respect to rod 3. This movement, although slight, is enough to produce a "floating" effect for the firing pins. Each pin may move longitudinally forward or backward within the housing without influencing the other pin.

In the loaded condition, the ammunition will force the pins backward against the forward urging of spring 23. The spring force is not very strong so that the initiating tips of the pins will not tend to mark the ammunition primers.

Receiver 1 has a top tang portion 30 upon which the locking lever 25 is situated. In breaking the action, the lever 25 is made to pivot about pin 29. In so pivoting, the lever will force the retainer 6 backward (not shown). The retainer 6 has a slot 26 at its lower end (FIG. 3) which fits over rod 3. A spring 7 is positioned between the retainer 6 and a lock nut 8 screwed onto rod 3 at its rearward end 3*a*. When the action is broken, the retainer 6 will move backward, compressing spring 7. This, in turn, will cause rod 3 to move rearward from the housing. Consequently, the tips of the firing pins, 10 and 12, will be retracted below the breech face 28 of the receiver. The retainer 6 may be constructed to act directly upon the lock nut 8, if so desired, thus eliminating spring 8. Spring 8 is used herein for tolerance adjustment.

Thus, when the action is broken, the firing pins are safely pulled behind the breech face. The pins cannot be damaged as the barrels swing open. A latch extending from the breech face (not shown) may be provided to release the pins when the barrels are rotated to their closed position, allowing the pins to come forward again.

Although the present firing pin system has been shown for a double-barrelled, break-action shotgun, the scope of the invention is considered to be much broader than that, since the present design can be employed in single or multiple barrelled guns of all types using hammer or striker initiation. In this regard, the figures are deemed to be merely exemplary, and are presented for the purpose of showing the basic concept of a "forwardly-biased" firing pin of the "dry firing" type.

All changes, variations, and modifications that are obvious to those skilled in the art are likewise deemed to fall within the purview and scope of the invention.

The present invention should be interpreted with respect to the appended claims.

What is claimed is:

1. A hammer or striker-initiated firing pin mechanism for a double-barreled firearm comprising:

a receiver having a breech face at its forward breech end;

a firing pin housing disposed in the receiver and having a rearward end face;

a pair of barrels attached to the breech end of said receiver having chambers for receiving and supporting ammunition;

two firing pins slidably mounted in said housing, each of said pins having a rearward strikable end and a forward initiating end;

a yoke disposed within the housing operatively connected to said two firing pins;

a yoke rod attached to said yoke between the firing pins and extending rearwardly past the rearward end face of said housing;

biasing means positioned in said housing in abutting relationship with the yoke to urge the yoke and the connected firing pins forwardly toward said barrels so that the forward initiating ends of said firing pins protrude past the breech face of said receiver into said barrel chambers when said chambers are without ammunition, thus positioning the strikable rear ends of said firing pins forwardly of the rearward end of said housing; and

means mounted in said housing forwardly of said yoke to limit forward movement of said yoke and connected firing pins.

2. A firing pin mechanism as recited in claim 1 in which said firing pins are angularly mounted relative to one another so that the forward initiating ends are diverging laterally as well as vertically, said yoke being a convoluted member having a U-shaped central portion to which said yoke rod is loosely attached and a pair of arms extending in opposite directions to which said firing pins are loosely connected.

3. A firing mechanism as recited in claim 2 wherein the firearm is of the break-action type, and further comprising means connected to the rear end of said yoke rod to withdraw the yoke and the connected firing pins rearwardly so that the firing pins are positioned to the rear of the receiver breech face when the gun action is broken.

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