Dec. 7, 1971 G. H. WORRALL, SR 3,624,947

HAMMER SAFETY FOR FIREARMS

Filed June 25, 1969

FIG. 1.

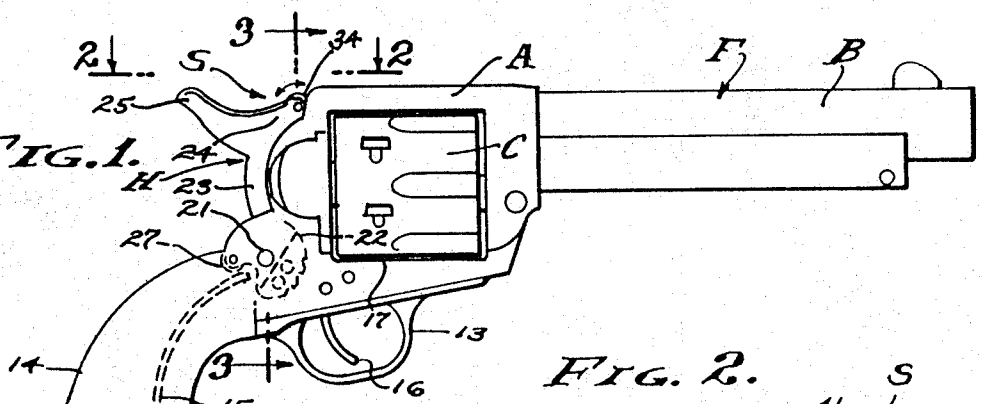


FIG. 2.

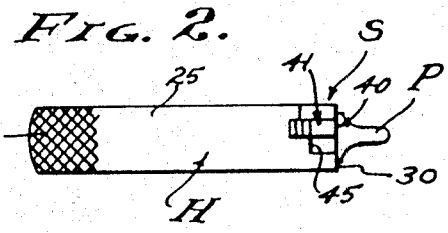


FIG. 3.

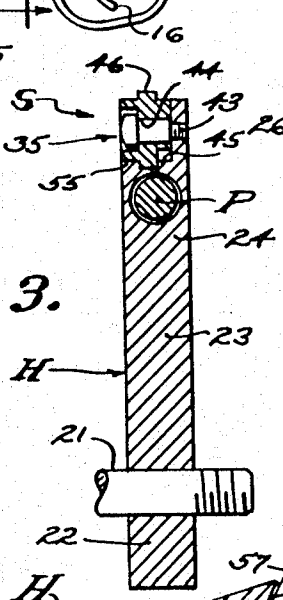


FIG. 4.

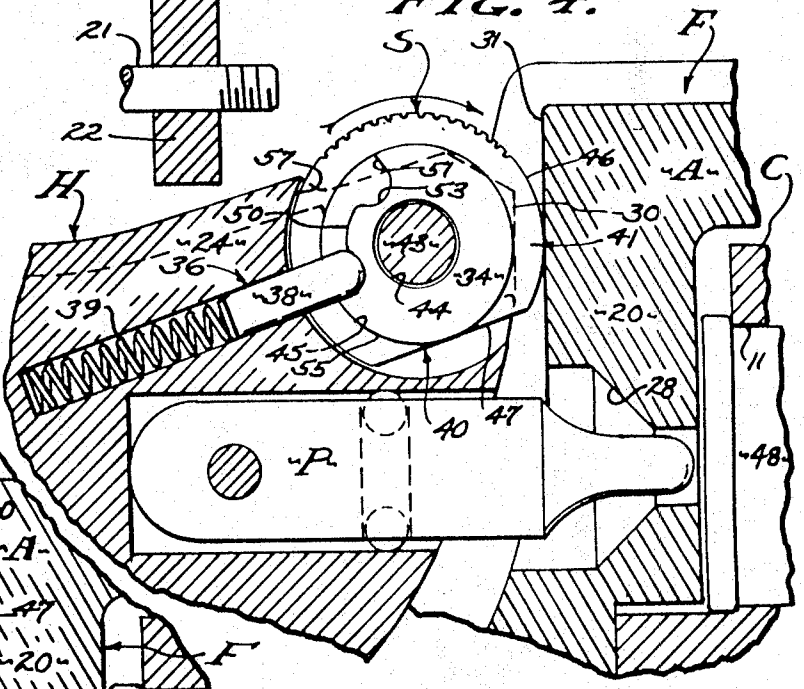
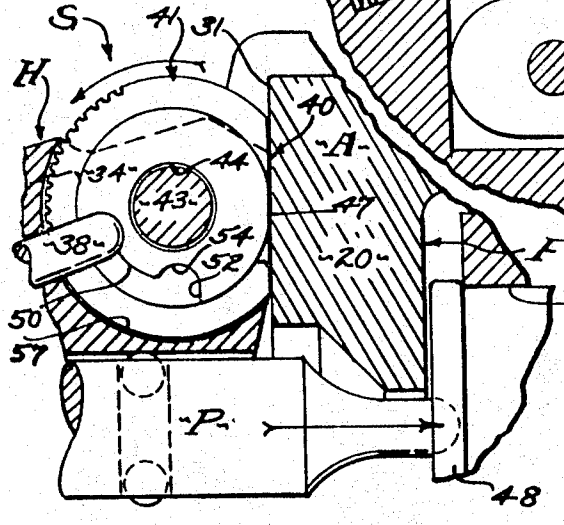


FIG. 5.



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HAMMER SAFETY FOR FIREARMS

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ABSTRACT OF THE DISCLOSURE

An accessible "safety" is provided in a hammer of a firearm wherein said hammer is exposed for manipulation, whereby alternate blocking and firing positions of the safety are readily accomplished as circumstances require. In the safetied condition, the safety is positioned to block entry of the firing pin through the frame by establishing an abutment at or about the place of entry of said pin through said frame. In the firing condition, the safety is positioned to permit entry of the firing pin through the frame, by removing said abutment from said place of entry. The safety is manually movable between alternate positions, being held in alternate "safe" and "fire" positions by detent means. A feature is durability which involves a hardened safety element that is movable and that seats directly in the hammer.

Firearms with exposed hammers are unique with respect to adaptability to manual control. That is, the hammers are adapted to be cocked by hand and they are also adapted to be released by hand without firing of a cartridge in the firearm chamber. Although the present invention is applicable to all types of exposed firearm hammers, it is especially adapted to those hammers which revolve upon an axis through an arc to carry or to strike a firing pin carried through an opening in a frame and into impact engagement upon a cartridge. Hammers of the type under consideration vary widely in configuration and are characterized by a front face that stops against the frame so as to limit the maximum travel of the firing pin, and are also characterized by a rearwardly projecting horn, usually knurled, that is manually engageable as by a person's thumb to be pulled backward for cocking (also releasing). Thus, it is the upper extremity of the hammer which is naturally engaged by the person handling the firearm, and it is an object of this invention to provide the "safety" in this naturally engageable area of the said hammer. Therefore, the safety of the present invention is provided in the hammer, is carried thereby, and operates as directly as it is possible in perfecting a reliable abutment that virtually prevents firing when in its "safe" position.

Another object of this invention is to provide a safety positioned on and carried by and with the hammer of the firearm and movable relative thereto into two alternate positions where it is releasably held by substantial friction that is manually overcome as desired, to move the same into said alternate positions.

It is another object of this invention to provide a safety of the character above referred to and wherein there is a movable safety element, preferably rotatable and in the nature of a cam, that is directly shifted by manipulation and which seats directly in the hammer at and independent of the firing pin.

It is still another object of this invention to provide a safety to be positioned "safe" for preventing impact of the firing pin with the primer of a cartridge, that is not subject to deflections in the parts involved. Safeties have been devised wherein elongated parts and levers are involved and which can deflect when subject to forces as may be caused by abuse and/or by dropping or by impacts with other objects. With the present invention there is no part subject to bending moments to adversely affect the "safe" condition.

It is also an object of this invention to provide a safety having all of the features hereinabove and to be described, which does not encumber the firearm and whereby conventional and replica firearms can be manufactured without destroying their authenticity except for meeting the requirement that a firearm shall have a safety. Further, with the present invention it is an object to make it feasible to replace or modify any existing hammer of a firearm, so as to include therein the safety herein disclosed.

The various objects and features of this invention will be fully understood from the following detailed description of the typical preferred form and application thereof, throughout which description reference is made to the accompanying drawings, in which:

FIG. 1 is a side view of a typical firearm incorporating the hammer safety. FIGS. 2 and 3 are enlarged detailed views (actual size as printed) showing the safety installation in the hammer and taken as indicated by lines 2—2 and 3—3 on FIG. 1. FIG. 4 is an enlarged sectional view of a portion of the firearm shown in FIG. 1, illustrating the safety in the hammer and in the "safe" position. FIG. 5 is a view similar to FIG. 4 showing the safety in the "fire" position.

Firearms including rifles and hand guns, employ hammers that are biased and then released by a trigger mechanism to move a firing pin into impact engagement upon a primer or cap in a cartridge. The cartridge is loaded with explosive that is ignited by the detonation of the primer when subject to impact, and due to the refined design of the firing pin and cartridge relationship, including all the related parts and mechanisms, firing of the cartridge is almost an absolute certainty when the firing pin strikes the cartridge, whether deliberate or by accident as for example by jarring or by dropping of the gun etc. In order to preclude acidental firing, whether caused by deliberate pulling of the trigger or by any involuntary act or occurrence, firearms are provided with a safety which is customarily incorporated in the frame and which of course requires accommodating features in said frame. Frame modification is not always practical, especially with guns that are already fabricated and/or in use, and the redesign of frame features is not always feasible. Therefore, it is the hammer per se and only the hammer which is made or modified to incorporate the features of the present invention, the remaining gun elements including the frame remaining intact and unaltered as they are presently or will be manufactured. Accordingly, the present invention involves, generally, a safety S incorporated in and carried by the hammer H of the firearm F.

A typical firearm F is illustrated in the drawings, a hand gun in the form of a revolver wherein the hammer H carries the safety S. Guns of the type and form shown involve, fundamentally, a frame A carrying a barrel B, and a cylinder C is journaled on a pin (not shown) to sequentially revolve its chambers **11** into alignment with said barrel. The grip **12** supports the frame through a trigger guard **13** and back strap **14** which assemble and combine with the frame to accommodate a main spring **15**, the trigger **16** and its mechanisms, and the cylinder stop **17** and its mechanisms. The assembly and operation of the firearm F can follow the usual practices, it being the hammer H which is the characteristic feature that is now employed to advantage, said hammer being pivotally carried in the frame A on a transverse axis located at or below the lowermost periphery of the cylinder C and projecting from the back wall **20** and back strap **14** to carry a firing pin P at or near its upper portion. The firing pin P can be integral with or a separate part secured

in the hammer as shown, and the pin P projects forwardly in alignment with the active chamber **11** and barrel B when the hammer is brought into the striking or impact position. The firearm F or gun remains normal and conventional in every respect, there being no change in its construction and little or no change in the design or configuration of the hammer H, except as follows:

The hammer H remains intact and of the same over-all configuration corresponding to the gun design in which this safety S is incorporated as shown, the hammer is pivotally carried on a screw **21** fixed through the frame and comprises a body **22** surrounding the screw, an arm **23** projecting radially and generally upwardly from the body, and a head **24** at the outer and upper end of the arm. The parts **22**, **23** and **24** are integral and a horn thumb-piece **25** projects rearwardly from the head **24** and with a convex upper contour terminating in a knurled tip **26** suitable for manual thumb engagement. The body **22** has a rearwardly disposed lever with a roller **27** that rides on the main spring **15** to bias the hammer H so that it revolves its head **24** in a forward direction toward the back wall **20** of the frame. An opening **28** extends through the wall **20** on an axis to receive and pass the firing pin P, so that the tip of the pin can enter the chamber **11** and strike the primer of the cartridge (see FIG. 5). The body **22** also includes other features such as steps operable to hold and release the hammer as governed by the trigger **16** and its mechanisms, and such as a cam to actuate the cylinder stop **17** and associated cylinder advancing and positioning mechanisms.

In accordance with the present invention, the safety S is incorporated in and carried by the head **24** radially outward of and adjacent to the firing pin P. The safety involves a single movable safety element **34** that shifts between alternate positions, a "safe" position as shown in FIG. 4 and a "fire" position as shown in FIG. 5. Broadly, the said single safety element **34** moves between said alternate positions, as for example through a rectilinear path (not shown) or through a rotary path as it is shown. That is, said safety element shifts an abutment into and out of position between the front face **30** of the hammer head **24** and rear face **31** of the frame wall **20**. Accordingly, the safety includes mounting means **35** shiftably securing the primary element **34** to the hammer head **24**, and positioning means **36** releasably retaining the safety element **34** in said alternate positions. In the event that the shifting of the element **34** is reciprocal, the direction of movement will be transverse of the axis of the firing pin P, chamber **11** and barrel B. In the preferred form the shifting of the safety element **34** is rotative and wherein the periphery of the element **34** moves transversely of and at the front face **30** of the hammer head **24**. In practice, the axis of rotation is horizontal as well as transverse, in which case the periphery of the element **34** moves upwardly or downwardly at the front face **30** of the head **24**. The safety element **34** is in the form of a manually engageable wheel having a cam-shaped periphery with a depressed portion **40** for positioning at or behind the front face **30** of head **24**, and with a raised portion **41** for positioning substantially ahead of the front face **30** of head **24**.

In carrying out the invention the mounting means **35** secures the safety element **34** in the head **24** at or adjacent to the firing pin P and radially outside thereof at the upper portion of said head. The head is cylindrically recessed and/or truncated so as to open at the front face **30** and so as to present a forwardly faced seat **45** machined to the radius of the raised portion **41** of the safety element **34**. A feature of the invention is that the mounting means **35** comprises a shoulder screw **43**, or the like, that remains clear of the bore **44** through the element **34** when the periphery **55** of the element engages upon the seat **45**.

In the particular gun illustrated the front face **30** of the hammer head **24** strikes and is arrested by the rear face **31** of the frame wall **20**, thereby limiting the depth of penetration of the firing pin P into the primer of the cartridge **48**. It is this depth of penetration which must be limited or restricted in order to safety the gun, and to this end the safety element **34** is flattened on a chord line extending between the extremities of the raised portion **41** in order to establish the depressed portion **40**, the depth of the depressed portion being such as to bring the plane **47** thereof into coincidence with the front face **30** when the element **34** is in the "fire" position. In practice, the chord plane **47** of portion **40** extends through about 90° while the periphery **46** of portion **41** extends through about 270°. Consequently, the safety element **34** is rotatable to two alternate positions, a "safe" position shown in FIG. 4 where the front face **30** of the hammer head **24** is held positively separated from the frame face **31**, and where the firing pin P is retracted out of the chamber **11**, and a "fire" position shown in FIG. 5 where the face **30** is permitted to strike the face **31** to be arrested thereby and to permit the firing pin P to impact upon, indent into and fire a cartridge **48** in the chamber **11**.

The positioning means **36** is provided to limit the rotative motion of the safety element **34** to the two extreme alternate positions above described. Means **36** is a cam or like means and preferably a detent means that permits limited rotative movement of the element **34**, it being found that less than 90° motion is advantageous and for example about 70° motion is found to be most practical, as shown, there is a single detent pin **38** biased by a compression spring **39** carried in the head **24** of the hammer and operable against a concentric surface **50** in the element **34**. The surface **50** extends between apposed radially disposed shoulders **51** and **52** that limit the rotative motion, there being detented recesses **53** and **54** in surface **50** at each shoulder, respectively, to receive the detent pin **38** and thereby retain the element **34** in either of the two alternate positions that may be manually selected as circumstances require.

From the foregoing it will be seen that it is not only feasible but extremely practical to mount the safety element **34** in the upper portion of the hammer head **24**, at or adjacent to the firing pin P. The cam-shaped element **34** is basically cylindrical in configuration, having an outer diameter wall **55** that seats onto an inner diameter wall of the seat **45**. The raised portion **41** is preferably a flange that projects radially from the outer diameter wall **55** and with its periphery concentric and adapted to be accommodated in and/or seated in a semi-annular chamber **57** in the seat **45**. When the safety element **34** is stopped by the shoulder **52**, the foremost extremity of the periphery **46** is well below the point of impact and/or engagement with the rear face **31** of the wall **20** (see FIG. 4), said periphery **46** remaining smooth through a substantial portion of its circumference for this engagement. In practice, the remaining and rearmost portion of the periphery **46** is knurled in order to facilitate manual revolvement of the safety element. In carrying out the invention, the said safety element **34** is made from a tough material such as tool-steel which can be hardened and which will not be deformed when subjected to the sharp and relatively severe impacts which can be expected through the ordinary handling of the firearm, including dry-firing and the like.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any modifications or variations that may appear to those skilled in the art:

Having described my invention, I claim:

1. A safety for a firearm having an exposed hammer and wherein there is a frame carrying the hammer from a cocked position to a position engaged and arrested by the frame and normally engaging and shifting a firing pin to indent and thereby detonate a primer chambered in the

frame, and including a manually accessible cylinder element rotatably carried on the hammer by mounting means and to be moved from a "safe" position with its periphery interposed between the hammer and frame to a "fire" position with its periphery removed from between the hammer and frame, and positioning means releasably securing said cylinder element in either position, and said cylinder element arresting the hammer and thereby preventing indention of the firing pin into the primer when the said cylinder element is in the said "safe" position.

2. The hammer safety as set forth in claim 1 and wherein the said manually accessible cylinder element is positioned in the hammer adjacent to the firing pin.

3. The hammer safety as set forth in claim 1, wherein the mounting means comprises a seat in the hammer, and wherein said manually accessible cylinder element is complementary to and shiftably engaged upon said seat.

4. The hammer safety as set forth in claim 1, wherein the manually accessible cylinder element is rotatably shiftable and held onto the hammer by means of a pin.

5. The hammer safety as set forth in claim 1, wherein the mounting means comprises a semi-cylindrical seat in the hammer and opposing the frame and engageably receiving the said cylinder element.

6. The hammer safety as set forth in claim 1, wherein the manually accessible cylinder element is rotatably shiftable and held onto the hammer by means of a concentric pin, and wherein the mounting means comprises a semi-cylindrical seat in the hammer and opposing the frame and engageably receiving the said cylinder element independent of said pin.

7. The hammer safety as set forth in claim 1, wherein the positioning means alternately positioning the manually accessible cylinder element comprises a detent carried in the hammer and engaging into spaced recesses in the said cylinder element to alternately position the same.

8. The hammer safety as set forth in claim 1, wherein the manually accessible cylinder element is rotatably held onto the hammer by means of a concentric pin, wherein the mounting means comprises a semi-cylindrical seat in the hammer and opposing the frame and engageably receiving the said cylinder element independent of said pin, and wherein the positioning means alternately positioning the manually accessible cylinder element comprises a detent carried in the hammer and engaging into rotatably spaced recesses in the said cylinder element to alternately position the same.

9. A safety for a firearm having an exposed hammer and wherein there is a frame carrying the hammer from a cocked position to a position engaged and arrested by the frame and normally engaging and shifting a firing pin to indent and thereby detonate a primer chambered in the frame, and including a semi-cylindrical recess in the hammer adjacent to the firing pin and opening toward the frame, a manually accessible cylindrical element rotatably carried by mounting means in said recess and having a raised peripheral portion to be rotated from a "safe" position extended from said recess and interposed between the hammer and frame to a "fire" position retracted into said recess and removed from between the hammer and frame, and positioning means releasably securing said element in alternate rotative positions, and said raised peripheral portion of the element arresting the hammer and thereby preventing indention of the firing pin into the primer when the said element is in the said "safe" position.

10. The hammer safety as set forth in claim 9 and wherein the said manually accessible cylindrical element is disposed on an axis transverse of the hammer motion.

11. The hammer safety as set forth in claim 9, wherein the mounting means rotatably holds the manually accessible cylindrical element to the hammer with radial clearance therebetween, and wherein the manually accessible cylindrical element is independently seated in said recess.

12. The hammer safety as set forth in claim 9, wherein the manually accessible cylindrical element comprises a radial flange forming said raised portion, the radial flange having a chord section removed and thereby forming a depressed portion, and said depressed portion permitting normal indention of the firing pin when the said cylindrical element is in the said "fire" position.

13. The hammer safety as set forth in claim 9, wherein the positioning means alternately positioning the manually accessible cylindrical element comprises a detent carried in the hammer and engaging into spaced recesses in the said element to alternately position the same.

14. The hammer safety as set forth in claim 9, wherein the manually accessible cylindrical element is rotatable, and wherein the positioning means alternately positioning the manually accessible cylindrical element comprises a detent carried in the hammer and engaging into rotatably spaced recesses in the said cylindrical element to alternately position the same.

15. The hammer safety as set forth in claim 9, wherein the manually accessible cylindrical element is rotatably held onto the hammer by means of a concentric pin, and wherein the mounting means comprises a semi-cylindrical seat in the hammer and opposing the frame and engageably receiving the said cylindrical element independent of said pin, and wherein the positioning means alternately positioning the manually accessible cylindrical element comprises a detent carried in the hammer and engaging into rotatably spaced recesses in the said cylindrical element to alternately position the same.

16. The hammer safety as set forth in claim 9, wherein the positioning means alternately positioning the manually accessible cylindrical element comprises a detent carried in the hammer and operable in a semi-annular opening in said element to engage circumferentially spaced and opposed shoulders therein and engaging into spaced recesses at each shoulder respectively to alternately position said cylindrical element.

17. The hammer safety as set forth in claim 9, wherein the manually accessible cylindrical element is rotatable, and wherein the positioning means alternately positioning the manually accessible cylindrical element comprises a detent carried in the hammer and operable in a semi-annular opening in said element to engage circumferentially spaced and opposed shoulders therein and engaging into rotatably spaced recesses in the said cylindrical element to alternately position the same.

18. The hammer safety as set forth in claim 9, wherein the manually accessible cylindrical element is rotatably held onto the hammer by means of a concentric pin having radial clearance therewith and wherein said positioning means alternately positioning the manually accessible cylindrical element comprises a detent carried in the hammer and operable in a semi-annular opening in said cylindrical element to engage circumferentially spaced and opposed shoulders therein and engaging into rotatably spaced recesses in the said cylindrical element to alternately position the same.

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