

[54] **FIRING MECHANISM IN A FIREARM**

[75] Inventor: **Erkki Vesamaa**, Jyvaskyla, Finland

[73] Assignee: **Valmet Oy**, Finland

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42/70 E; 42/70 F

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[58] **Field of Search**..... 42/69 B, 69 R, 41, 70 E,
42/70 F, 70 R

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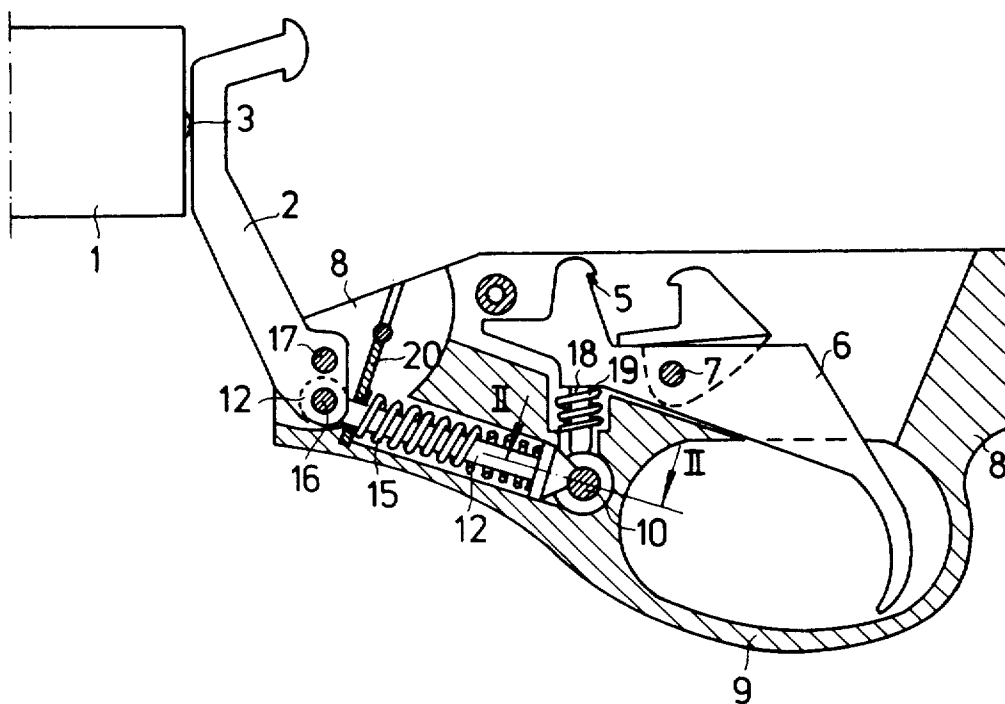
Primary Examiner—Verlin R. Pendegrass

Assistant Examiner—C. T. Jordan

Attorney, Agent, or Firm—Steinberg & Blake

[57] **ABSTRACT**

A firearm firing mechanism which includes a hammer and a support which supports the hammer for swinging movement between a cocked position and a firing position. A drive for driving the hammer from its cocked to its firing position includes a spring which stores a driving force when the hammer is in its cocked position and a rod acted on by the spring to transmit the driving force to the hammer, this rod being pivotally connected with the hammer and having a free end portion distant from the hammer. This free end portion of the rod moves along a given path from a retracted end position, when the hammer is in its cocked position, to an extended end position when the hammer is in its firing position. A safety pin is movable across the latter path of movement of the free end portion of the rod and has a check position where the safety pin occupies the location which otherwise would be occupied by the free end portion of the rod when this free end portion is in its extended end position, so that when the safety pin is in its check position it prevents the hammer from reaching its firing position. The safety pin also has an uncheck position clearing the location of the free end portion of the rod when it is in its extended end position, so that in the uncheck position of the safety pin the hammer is free to be driven to its firing position.

9 Claims, 4 Drawing Figures


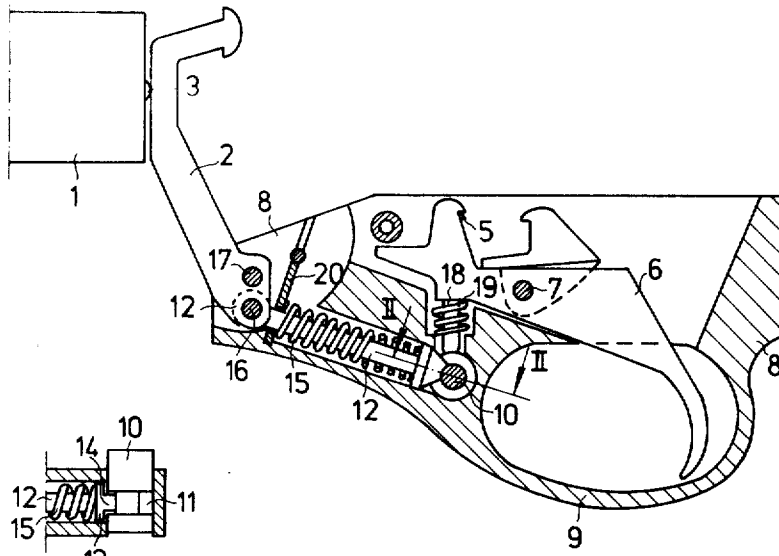


FIG. 2

FIG. 1

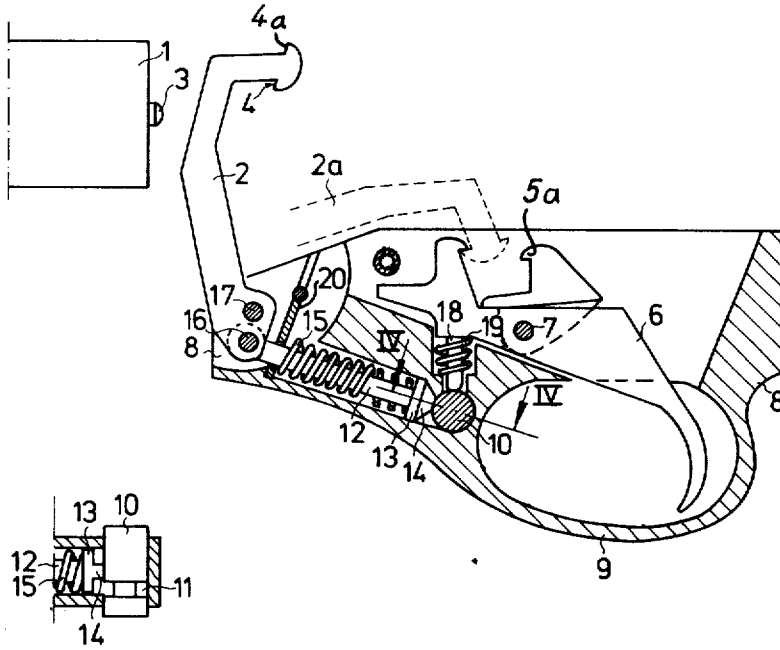


FIG. 4

FIG. 3

FIRING MECHANISM IN A FIREARM

BACKGROUND OF THE INVENTION

The present invention relates to firearms.

In particular, the present invention relates to firearm firing mechanisms of the type which operate by percussion, utilizing a hammer which imparts a blow to a primer striking pin in order to fire a round.

The present invention relates especially to the combination of the structure which drives the hammer from its cocked to its firing position and the safety structure for preventing the hammer from reaching its firing position unless the safety structure has been displaced to an uncheck position.

It is of course known to provide firing mechanisms of the above type with safety devices of the above general type. Such known devices may be constructed in accordance with the Beretta system. With such devices when the hammer is cocked it acts through an arm which is linked to the hammer on a spring to store in the latter the force for driving the hammer to its firing position. This spring acts on a stem for providing the required firing operation and both the spring and its stem are situated to the rear of the firing mechanism behind the pivot axis of the trigger, with reference to the direction in which the gun is fired. With such conventional mechanisms the body of the mechanism is formed with a bore receiving a separate safety rod positioned to become located between the lower end of the hammer and a safety pin so that when the latter is in its check position, the safety rod prevents the hammer reaching its firing position.

SUMMARY OF THE INVENTION

A primary object of the present invention is to provide a construction which will accomplish the results accomplished by the previously known constructions but which is much simpler than previously known constructions.

In particular it is an object of the present invention to provide a construction according to which the spring structure which drives the hammer to its firing position, and in particular the stem thereof, also performs the functions previously performed by the above separate safety rod, with the structure which drives the hammer also performing the functions of the conventional spring and locking structure of the conventional safety devices, so that in this way the structure which drives the hammer also performs the functions previously performed by the safety devices.

In addition it is an object of the present invention to provide a construction of the above type in which when the safety device is in its check position not only is the hammer prevented from reaching its firing position but in addition the trigger is prevented from being turned by the operator.

Thus, it is an object of the present invention to provide a construction which is characterized by simplicity of its components as well as reliability in the operation thereof and which is in particular characterized by the fact that at least some of the components of the structure of the invention perform a multiplicity of functions which up to the present time have been performed by a multiplicity of structures.

In accordance with the invention a hammer is swingably supported by a support means for swinging movement between a cocked position and a firing position.

A drive means is operatively connected with the hammer for driving the latter from its cocked position to its firing position. This drive means includes a spring means for storing the required driving force and a rod means which is pivotally connected with the hammer and which is acted on by the spring means to transmit the driving force therefrom to the hammer to displace the latter from the cocked position to the firing position thereof. The rod means has a free end portion which is distant from the hammer and which is movable along a predetermined path between a retracted position, occupied by the free end portion of the rod means when the hammer is in its cocked position, and an extended end position occupied by the free end portion of the rod means when the hammer is in its firing position. A safety means is carried by the support means for movement across the above path of movement of the free end portion of the rod means, this safety means having a check position occupying the location which otherwise would be occupied by the free end portion of the rod means when this free end portion is in its extended end position. Thus when the safety means is in its check position the free end portion of the rod means cannot move to its extended end position and thus the hammer cannot reach its firing position. The safety means also has an uncheck position where the safety means is clear of the location to be occupied by the free end portion of the rod means when this free end portion is in its extended end position, so that when the safety means is in its uncheck position the hammer is free to move to its firing position and the free end portion of the rod means moves to its extended end position.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated by way of example in the accompanying drawings which form part of this application and in which:

FIG. 1 is a partly schematic sectional elevation of a mechanism according to the invention, the parts being shown in FIG. 1 with the hammer in its firing position and with the safety means in its uncheck position;

FIG. 2 is a fragmentary sectional elevation of the structure of FIG. 1 taken along line II—II of FIG. 1 in the direction of the arrows;

FIG. 3 shows the position which the parts of FIG. 1 take when the hammer is released for movement from its cocked to its firing position but where the safety means is in its check position so that the hammer cannot reach the firing position, the hammer being shown in phantom lines in FIG. 3 in its cocked position; and

FIG. 4 is a fragmentary sectional elevation taken along line IV—IV of FIG. 3 in the direction of the arrows and in particular illustrating the safety means in its check position.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. 1, there is schematically shown at the upper left portion thereof a gunlock 1 of the firearm which may, for example, be a shotgun, although the structure of the invention can be used with other types of firearms, as pointed out below. The firing mechanism of the invention includes a striking hammer 2 which is cocked as, for example, when the gun is broken. The hammer 2 is supported for swinging movement by a support means 8 in the form of a suitable body of rigid material carrying a pivot pin 17 situated in the position extending across a cavity of the support

means 8 and through an opening in the hammer 2 which also extends into this cavity. Thus the axis of the pivot pin 17 determines the axis around which the hammer 2 swings. Below the pivot 17 hammer 2 is pivotally connected, by way of a pivot pin 16, with one end of an elongated rod means 12 which forms part of a drive means for driving the hammer from its cocked to its firing position. This drive means includes in addition to the rod means 12 a spring means 15 in the form of a coil spring through which the rod means 12 extends, this coil spring 15 being a compression spring. The compression spring 15 engages at one end a wall 20 of the support means 8 and at its opposite end a lateral projection 13 of the rod means 12 which extends through the compression spring 15 in the manner illustrated. This lateral projection 13 is in the form of a flange which is integral with the rod means 12. The wall 20 of the support means 8 is in the form of a plate which is slipped into a pair of grooves which are formed in the surfaces of the sides which define the cavity which receives the hammer 2 and across which the pivot pin 17 extends, the plate 20 being retained in these grooves by a dowel or other pin which extends along and engages the top edge of the plate 20. When the gun is cocked the hammer 2 is turned in a known way to the cocked position 2a shown in phantom lines in FIG. 3, and the result is that the rod means 12 is pulled upwardly toward the left, as viewed in FIGS. 1 and 3, thus causing the flange 13 to approach the wall 20 so as to compress the spring 15 and store therein the driving force required to drive the hammer 2 from its cocked position to its firing position which is illustrated in FIG. 1.

A trigger means 6 is also carried by the support means 8. Thus the trigger means 6 is supported for swinging movement on a pin 7 which is carried by the support means 8. The trigger means 6 carries a sear 5 which engages a tooth 4 of the hammer 2 in order to retain the latter in its cocked position. In the particular example illustrated there is a double sear so that the illustrated mechanism can also be used with guns capable of automatically firing a plurality of rounds, the hammer in this case being automatically cocked after firing one round with a second tooth 4a of the hammer engaging the second sear 5a for releasably retaining the hammer in its cocked position if the operator still exerts a pull on the trigger means 6, the trigger means 6 when released in this event permitting the second sear 5a to move away from the tooth 4a so that the tooth 4 can then be engaged by the front sear 5.

A spring means 19 acts on the trigger means 6 for yieldably retaining the latter in its rest position so that the trigger means 6 is turned by the operator in opposition to the spring means 19. As is shown in the drawings the spring means 19 is accommodated in a suitable bore of the support means 8, the latter having the illustrated trigger guard 9. Also, as is well known, an unillustrated spring acts on the second sear 5a.

The safety means 10 of the mechanism of the invention is in the form of a cylindrical safety pin capable of being moved in a bore which is formed in the support means 8. It will be noted that the bore which accommodates the safety pin 10 extends perpendicularly with respect to the pair of bores which respectively accommodate the springs 15 and 19, the latter pair of bores being situated in a common plane which is perpendicular to the pin 10. The pin 10 can be displaced by the operator

between the check position illustrated in FIG. 4 and the uncheck position illustrated in FIG. 2. For the purpose of retaining the safety pin 10 in the positions shown in FIGS. 2 and 4 an unillustrated known detent mechanism is provided, such a mechanism including, for example, a spring-pressed ball capable of being received in one groove formed in the exterior surface of the pin 10 when the latter is in its check position and in another groove formed in the exterior surface of the pin 10 when the latter is in its uncheck position, so that in this way a click stop arrangement is provided for permitting the operator to retain the pin 10 either in its check position or in its uncheck position.

The safety pin 10 is formed with a recess which in the illustrated example takes the form of an annular groove 11 which is formed in the pin 10. The rod means 12 is provided with a free end portion 14 extending beyond the lateral projection 13, this free end portion 14 being in the form of a fin which forms an extension of the rod means 12 situated beyond the spring means 15 and the lateral projection 13. When the hammer 2 is in its cocked position 2a, the spring means 15 is compressed and the free end portion 14 of the rod means 12 is situated in a retracted end position beyond the bore which accommodates the safety means 10. During swinging of the hammer 2 from its cocked position to its firing position the free end portion 14 moves along a predetermined path from its retracted end position to an extended end position. The free end portion 14 of the rod means 12 is shown in its extended end position in FIGS. 1 and 2. Also, the safety means 10 is shown in FIGS. 1 and 2 in its uncheck position where the groove 11 is situated in the path of movement of the free end portion 14 so that the safety means 10 when in its uncheck position is clear of the extended end position of the free end portion 14 of the rod means 12 permitting the free end portion 14 to be displaced to its extended end position. Also, it will be seen that the trigger means 6 is connected with a projection 18 in the form of a stem which extends through the spring means 19. This projection 18 is situated in the same plane as the rod means 12. This is the plane which is occupied by the recess 11 when the safety means 10 is in its uncheck position. Therefore when the operator turns the trigger means 6 with the safety means 10 in its uncheck position, the stem 18 can also move into the recess 11 during displacement of the sear 5 beyond the tooth 4 so as to release the hammer 2 for movement to its firing position.

In FIGS. 3 and 4 the safety means 10 is illustrated in its check or safety position. In this case the pin 10 occupies the space into which the free end portion 14 and the projection 18 must move in order to enable firing to take place. Thus in its check position the safety means 10 extends across the path of movement of the projection 18 as well as across the path of movement of the free end portion 14 when the latter moves from its retracted end position toward its extended end position. Thus, the operator cannot turn the trigger means 6 when the safety means 10 is in its check position illustrated in FIGS. 3 and 4. In addition, if because of accidental jarring or the like the tooth 4 is released from the sear 5, the free end portion 14 can only move into engagement with the exterior surface of the pin 10 and cannot reach its extended end position so that the hammer 2 under these conditions can only move up to the solid line position shown in FIG. 3. Thus the hammer

2 under these conditions cannot be driven up to the firing position shown in FIG. 1. Therefore, the free end portion 14 engages the exterior cylindrical surface of the pin 10 so that the hammer 2 cannot move into engagement with the primer striking pin 3.

It is thus apparent that with the structure described above a simple firing mechanism is provided. In this firing mechanism of the invention not only does the rod means 12 form part of a drive means for driving the hammer to its firing position but in addition the rod means 12 together with the spring 15 perform the functions which up to the present time have been performed by a separate safety rod and spring.

What is claimed is:

1. In a firearm, a hammer and support means supporting said hammer for swinging movement about a given axis between a cocked position and a firing position, and drive means operatively connected with said hammer for driving the latter from said cocked to said firing position, said drive means including an elongated rod means pivotally connected with and extending from said hammer and a spring means operatively connected with said rod means for storing a driving force when said hammer is placed in said cocked position thereof and for applying said driving force through said rod means to said hammer for driving the latter from said cocked to said firing position, said rod means having a free end portion distant from said hammer and said rod means being displaced by said spring means during movement of said hammer from said cocked to said firing position with said free end portion of said rod means moving during displacement of said rod means by said spring means along a predetermined path between a retracted end position occupied by said free end portion when said hammer is in said cocked position thereof and an extended end position occupied by said free end portion when said hammer is in said firing position thereof, and safety means carried by said support means for movement across said path of movement of said free end portion of said rod means, said safety means having a check position situated in the path of movement of said free end portion of said rod means and occupying the location which otherwise would be occupied by said free end portion of said rod means when said free end portion is in said extended end position thereof for preventing said free end portion of said rod means from reaching said extended end position thereof so as to prevent said hammer from reaching said firing position thereof, said safety means also being carried by said support means for movement across said path of movement of said free end portion of said rod means to an uncheck position where said safety means is clear of the location to be occupied by said free end portion of said rod means when said free end portion is in said extended end position thereof, whereby when said safety means is in said uncheck position thereof said hammer can be driven all the way up to its firing position.

2. The combination of claim 1 and wherein said spring means is a coil spring one end of which engages part of said support means, said rod means being in the form of an elongated rod extending from said hammer through said coil spring and having a lateral projection engaging an opposite end of said coil spring for compressing the latter when said hammer is displaced to said cocked position thereof, said free end portion of said rod means forming an extension of said rod which

extends beyond said coil spring and said lateral projection of said rod.

3. The combination of claim 2 and wherein said safety means is in the form of a pin extending across said path of movement of said free end portion of said rod means and having an outer surface situated in the path of movement of said free end portion of said rod means as said free end portion approaches said extended position to prevent said free end portion from reaching said extended position when said pin is in said check position thereof, said pin being formed with a recess which receives said free end portion of said rod means when said pin is in said uncheck position thereof.

4. The combination of claim 3 and wherein said recess is in the form of an annular groove which is formed in said pin of said safety means.

5. The combination of claim 2 and wherein said lateral projection of said rod means is in the form of a flange projecting laterally from said rod, and said free end portion of said rod means being fixed to and projecting from said flange.

6. The combination of claim 1 and wherein said rod means is pivotally connected to said hammer at an elevation lower than the axis around which said hammer turns when moving between said cocked and firing positions thereof.

7. The combination of claim 1 and wherein a trigger means is swingably carried by said support means and carries a sear, said hammer having a tooth engaged by said sear when said hammer is in said cocked position thereof, spring means operatively connected with said trigger means for releasably retaining the latter in a rest position, said trigger means being turned in opposition to the latter spring means to displace said sear away from said tooth of said hammer for releasing the latter for movement from said cocked to said firing position, and said trigger means carrying a projection which turns with said trigger means along a given path when said trigger means is turned in opposition to said spring means, said safety means when in said check position thereof also extending across the latter path of movement of said projection of said trigger means for preventing turning of said trigger means to release said hammer when said safety means is in said check position thereof, and said safety means when in said uncheck position thereof being clear of the path of movement of said projection of said trigger means for releasing said trigger means for turning movement to release said hammer.

8. The combination of claim 7 and wherein said projection of said trigger means and said free end portion of said rod means are located in a common plane, and said safety means being in the form of a pin formed with a recess situated in said common plane when said safety means is in said uncheck position thereof so that in the latter position of said safety means said recess of said pin will receive both said free end portion of said rod means and said projection of said trigger means.

9. The combination of claim 8 and wherein said support means includes a body formed with a pair of bores which are situated in said common plane and which are angularly arranged one with respect to the other, said projection of said trigger means being situated in one of said bores and said rod means being situated in the other of said bores, and said body being formed with a third bore extending perpendicularly across said plane and intersecting said pair of bores, said safety means being situated in said third bore for movement therein.

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