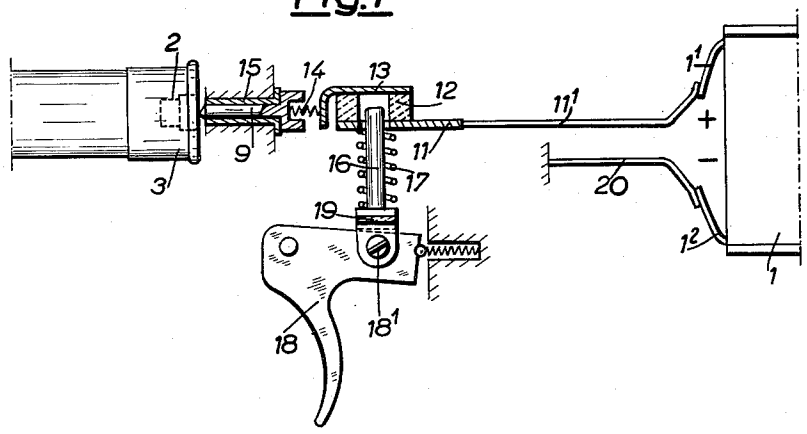
July 25, 1961 C. ROUBY 2,993,291

AUTOMATIC SAFETY MECHANISM FOR ELECTRICALLY CONTROLLED FIRE ARMS

Original Filed June 15, 1956 2 Sheets-Sheet 1

Fig.1



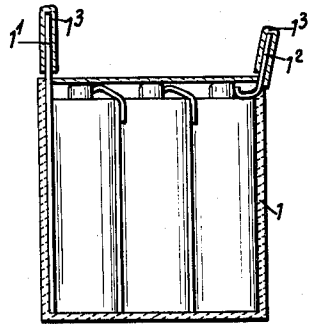
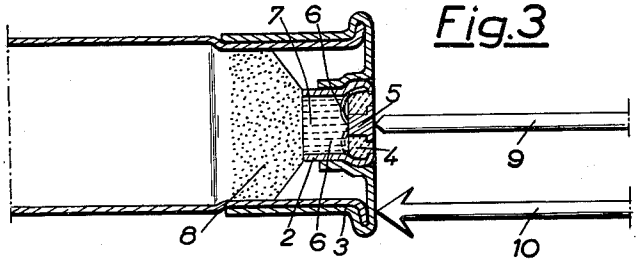


Fig.2

Fig.3



INVENTOR

Charles ROUBY

BY J. Delattre-Legrand

ATTORNEY

July 25, 1961 C. ROUBY 2,993,291

AUTOMATIC SAFETY MECHANISM FOR ELECTRICALLY CONTROLLED FIRE ARMS

Original Filed June 15, 1956 2 Sheets-Sheet 2

Fig.4

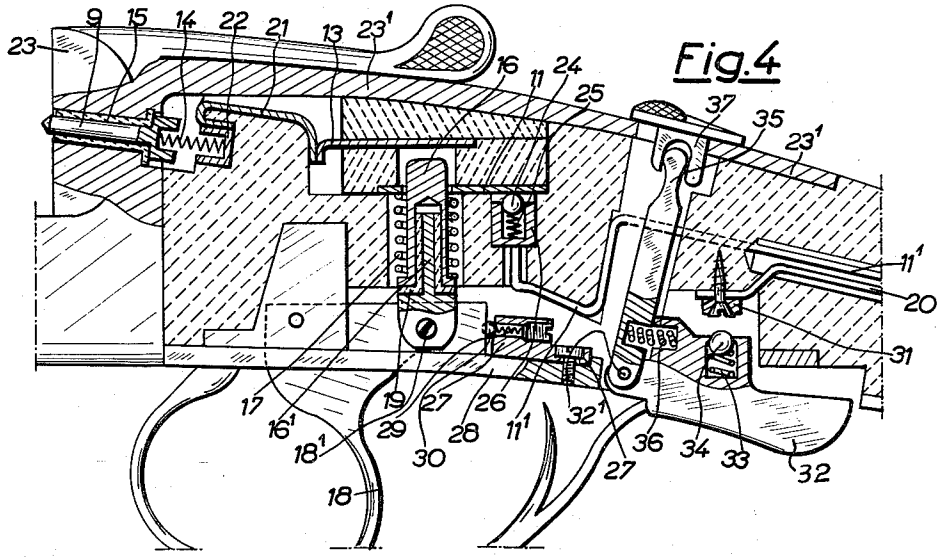


Fig.5

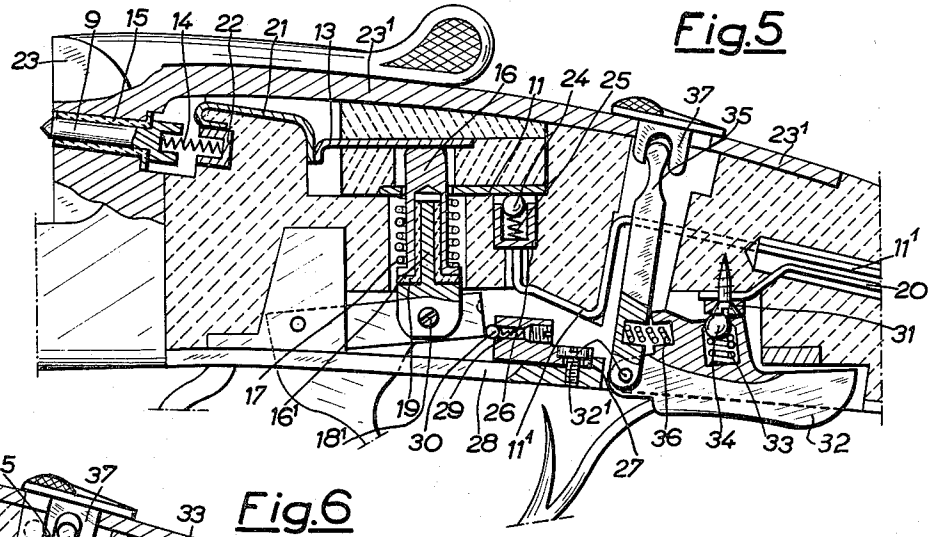
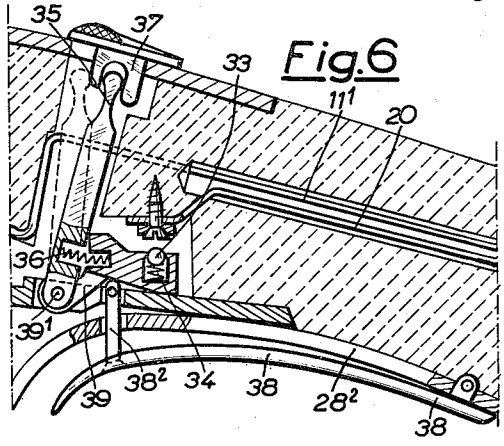


Fig.6



INVENTOR

Charles ROUBY

BY J. Delattre-Legros

ATTORNEY

United States Patent Office 2,993,291 Patented July 25, 1961

2,993,291

AUTOMATIC SAFETY MECHANISM FOR ELECTRICALLY CONTROLLED FIRE ARMS

Charles Rouby, Saint-Etienne, France, assignor to Societe Moderne de Fabrications Mecaniques, Saint-Etienne, France, a French limited-liability company

Original application June 15, 1956, Ser. No. 591,736. Divided and this application July 24, 1959, Ser. No. 829,283

Claims priority, application France Apr. 20, 1956

2 Claims. (Cl. 42—84)

My invention is a division of my co-pending application Serial No. 591,736 filed on June 15, 1956, and entitled "Method and Means for Electrically Firing Guns and Other Fire-Arms."

My present invention has for its object an automatic double acting safety system associated with the electric circuit incorporated in a gun or fire-arm of the type disclosed in my said co-pending application.

In order to clearly disclose the object of the invention, without however limiting its scope, the accompanying drawings are referred to hereinafter, in which drawings:

FIG. 1 is a diagrammatic view of the basic components of an electric firing system incorporating the principle of the invention.

FIG. 2 shows by way of example an electric battery in the form of a primary cell of any suitable type the terminals of which are provided with an insulating sheath which may be readily removed at the moment of use.

FIG. 3 is a sectional view of the end of a cartridge to show a preferred embodiment of a primer adapted to cooperate with said electric firing system.

FIGS. 4 and 5 are two similar views illustrating partly in cross-section a shotgun including by way of example an electric firing system with double safety means; in FIG. 4, said arrangement is illustrated when inoperative with the safety system engaged; in FIG. 5, the same arrangement is shown at the moment of operation of the electric firing system while the safety system is obviously released.

FIG. 6 illustrates a second embodiment together with an alternative manner of mounting the double acting automatic safety means incorporated in the electric firing arrangement.

The essential parts of the electric firing system according to the invention are, as illustrated in a non-limiting sense in FIG. 1, in the first place, a source of electric current which may be constituted advantageously but not necessarily by a battery having a primary cell 1. Said cell battery or the like source of electric current may be incorporated removably in the fire arm for instance inside a suitably designed and recessed butt of said fire-arm, or in any other suitable manner. The cell battery or its substitute may be fitted on any other suitable part of the fire arm or even be independent of the latter and be connected with it only through electric leads. It should be noted that the possibility of removing the cell and disconnecting it from the fire arm provides absolute and complete safety.

In the case where a cell serves as a source of electric current, its terminals 1^1 and 1^2 are insulated by means of an insulating sheath 1^3 of any suitable known type (FIG. 2). This insulating sheath 1^3 is removed or torn off according to the case at the moment at which the cell is set in position for use. This insulation prevents any fortuitous ignition when the cartridges lie in bulk, for instance, with a battery.

The battery may also be of the type provided with hollow embedded terminals adapted to receive the male jacks. A fortuitous contact with the primer of the cartridges is thus made impossible. It is also feasible to enclose the cell or cells inside a casing of insulating material.

The battery or the like source of electric current is associated with cartridges or missiles provided with a special primer 2 (FIG. 3) relying on the principle of the heating of an incandescent filament through which flows the current produced by the battery or the like source. Said filament is in contacting relationship with a composition of any desired nature which may be ignited very easily so as to ignite in its turn the gunpowder inside the cartridge.

An interesting embodiment, which is by no means limitative, of such a cartridge is illustrated in FIG. 3 which shows the casing 2 of the primer which is fitted removably with a force fit inside the case 3 of the cartridge. An annulus 4 of insulating material is set or otherwise secured inside the casing 2. A central contact piece 5 is fitted inside said insulating annulus 4. One or more electrically conductive wires 6 extend inside the casing 2 and connect the latter with the central insulated contact piece 5. The use of a plurality of wires ensures reliable operation of the system even in the case of a breakage of a wire. A special composition 7 which is readily inflammable and of any suitable known type is inserted in the casing 2 in contacting relationship with the wire or wires 6. Said composition is so positioned that it may produce a very easy ignition of the gunpowder 8 inside the cartridge. The reference numbers 9 and 10 designate diagrammatically the elements of the circuit described hereinafter, which allow the current to be fed from the battery or the like source of current to the primer.

Obviously, when the circuit is closed, the electric current heats the leads 6 up to incandescence which causes the burning of the composition 7 in the primer and of the gunpowder 8 in the cartridge.

As far as small gauge ammunition is concerned, the casing 2 of the primer may constitute also the case of the cartridge and be in one piece therewith.

The electric circuit connecting the battery with the primer of the cartridge or cartridges includes a switch actuated by the control mechanism provided with one or more triggers adapted to open or close the circuit for firing or shooting.

Referring again to FIG. 1 showing in a rough manner the electric circuit which includes a lead 11^1 connecting the positive terminal 1^1 of the battery 1 with a small conductive plate 11, the latter is electrically insulated through the part 12 with reference to a further small conductive plate 13. The latter is in permanent contacting relationship with the conductive rod 9 with the interposition of a spring 14, said rod 9 engaging the central contact-piece 5 of the cartridge primer. The rod 9 is electrically insulated from the remainder of the fire arm by a sheath 15 of insulating material.

A contact-making stud 16 has its free end projecting through the plate 11 up to a small distance from the plate 13 away from which it is held by a spring 17 fitted between a shoulder on said stud 16 and the plate 11 connected with the lead 11^1.

The opposite end of the stud 16 is pivotally secured at 18^1 to the trigger 18. However, the stud 16 is electrically insulated with reference to the trigger through the agency of an insulating layer 19 suitably inserted across the end of the stud 16, secured to the trigger and above the latter.

A further lead 20 connects the negative terminal 1^2 of the battery with the mass constituted by the metal sections of the fire arm so as to close the circuit over the case 3 of the cartridge and the casing 2 of the primer through said mass.

The operation of the electric firing system is obvious: when the trigger 18 is shifted upwardly, the stud 16 is necessarily also shifted upwardly against the pressure of the spring 17. As soon as the free end of the stud 16

engages the conductive plate 13, the electric circuit is closed and is energized so that the current may bring to incandescence the wire or wires 6 of the cartridge primer. This incandescence provides for the ignition of the latter and of the gunpowder.

There is illustrated in FIGS. 4 and 5, relating by way of exemplification to a shotgun, a particularly interesting embodiment of the above described electric firing system.

This embodiment incorporates the main parts described with reference to FIG. 1 and illustrated in the latter. In the first place, the lead 21 connects the small conductive plate 13 with the spring 14 with the interposition of a bearing cup 22 for the spring 14. The rod 9 is electrically insulated with reference to the rocker member 23 of the fire arm by an insulating sheath 15.

The contact-making stud 16 includes two sections 16—16^1 of which the lower section 16^1 is pivotally secured to the trigger 18. The parts 16 and 16^1 are electrically insulated from each other by the layer 19 of insulating material.

To produce a clean permanent contact and to obtain an easier fitting of the lead 11^1 with reference to the conductive plate 11, said contact is produced through a ball 24 urged outwardly against said plate 11 by a spring 25, said ball and said spring being housed inside a cup or case 26 to which the lead 11^1 is welded or otherwise secured.

A small block 27 is secured to the plate 28 forming a trigger guard for the fire arm, immediately to the rear of the trigger 18. Inside said block 27 is housed a spring 29 urging a ball 30 into partial engagement with a small depression formed in the rear of the trigger 18. The ball 30 forms a stop positioning said trigger in a non-operative position so that the trigger cannot be shifted except when a sufficient pressure of the operator's finger is exerted on said trigger. The small resistance thus arising from the ball 30 defines for the operator the moment of the firing and corresponds to the resistance met with in conventional fire arms operating through percussion. However, the mounting of such an arrangement including a spring-urged ball engaging the trigger is optional. The shooting of clay pigeons for instance may be performed with greater accuracy without said arrangement.

It is important to remark that by connecting the conductive plate 13 with a plurality of electrically conductive firing rods such as 9 which are carried by the same gun or by a plurality of separate guns, it is possible to obtain the simultaneous control of the firing of a plurality of shots.

By way of modifications falling within the scope of the invention as defined in the accompanying claims, I may mention:

The successive control through a single trigger of several shots through the provision of one or more contact-making studs 16 associated with a single trigger 18.

Also, the control of the firing through the closing of the circuit in the section of the latter which provides for the connection with the mass. In such a case, the current is fed directly to the conductive rod 9 which is in contacting relationship with the cartridge primer, while the trigger engages the mass or an extension thereof.

The electric firing arrangement illustrated in FIGS. 4, and 5, is of further considerable interest through its double acting automatic safety system. Said safety system provides for an automatic interruption of the current flowing through the mass when no firing is being contemplated while the continuity of the mass and of the passage provided therein for the current is automatically restored through the mere grasping of the gun prior to firing. The second action of the safety system is provided by an arrangement adapted to lock, as desired, in its circuit-interrupting position, the member controlling the passage provided for the current through the mass.

This is illustrated in FIGS. 4 and 5, wherein the lead 20 connected with the negative terminal of the battery connects at its other end with a stationary contact-piece 31 attached to the stock. A safety lever 32 is connected pivotally for instance at 32^1 with the trigger guard 28 of the gun or in any other manner so that the safety lever 32 is automatically actuated as soon as the gun is grasped for firing.

Inside the lever 32 is housed a yielding contact-piece constituted by a ball 34 which is urged by its spring 33 towards and eventually against the contact-piece 31 so as to provide for the connection of the lead 20 with the mass.

On the other hand, to the front of the lever 32, a link 35 is secured pivotally at 32^1 through one of its ends while its other end engages and is controlled by a push member 37 carried slidingly on the tail end of the rocker 23^1. A spring 36 is fitted between the link 35 and the lever 32 so as to act as a spacing member between said parts.

With said safety system, the risks of a fortuitous undesired firing are cut out since if the trigger 18 is untimely actuated, this cannot lead to any firing as the connection of the circuit with the mass has been interrupted by the lever 32 lying in the normal inoperative position illustrated in FIG. 4. On the other hand, the pivoting of the lever 32 against the action of the spring 36 when the gun is taken hold of for firing is only possible if the link 35 and push member 37 have been previously shifted forwardly (FIG. 5). When the operator's hand is no longer in its operative position on the gun, the lever 32 is released and pivots automatically downwardly into its safety position under the action of the spring 36. The push member 37, and the link 35 can then be returned to the safety position shown in FIG. 4. It is true that the safety system is a double acting automatic system.

In FIG. 6 is illustrated a second embodiment with a different mounting and execution of the above described automatic double acting safety system. There is provided a safety lever 38 which is comparatively long and is pivotally secured at its rear end 38^1 to the tail piece of the trigger guard 28^2. The front end of the lever 38 carries a push member 38^2 which may act against a pivoting lever 39 pivotally secured at 39^1, and subjected to the pressure of a spring 36 urging it away from the link 35 while said lever 39 also carries a yielding contact system including a ball 34 and its spring 33. The elongated safety lever 38 allows producing easily and conveniently a contact with the mass when the marksman grasps the gun for firing. This arrangement accomplishes the substitution for the link 35 and for the push member 7 of a simpled manually operated safety system providing for the locking of the lever 38 so as to prevent any pivoting thereof.

I have also provided within the scope of the accompanying claims, for the application of the electric firing system and of the associated arrangements to pistols, borers or to the so-called sealing guns which serve in particular for securing nails, bolts and the like missiles in hard materials through an explosive projection similar to that obtained in fire arms.

Obviously and as already apparent from the preceding disclosure, my invention is by no means limited to those applications and embodiments of its different parts which have been more particularly described and it covers all the modifications thereof falling within the scope of the accompanying claims.

What I claim is:

1. In an electrically fired fire arm: a trigger controlling the firing of the fire arm; two metal sections forming the mass of the fire arm and insulated with reference to each other; a cartridge and a cartridge case housed in a first one of said sections; a primer within said cartridge; a source of electric current enclosed in said fire arm and having two terminals; a first lead electrically connecting one of said terminals with the location of said cartridge case inside said first section and through said primer with said first section; a second lead electrically connecting

the second of said sections with the second terminal; a lever pivotally secured to said first section and electrically connected therewith; a spring-urged ball carried by said lever and electrically connected therewith; a contact piece rigid with said second section and connected with said second terminal; a spring urging said lever into its inoperative position away from said contact piece; said spring-urged ball engaging said contact piece upon and through the grasping, by the user, of said lever and fire arm against the action of said spring; the engagement of said spring-urged ball with said contact piece allowing current to pass to and through and ignite said primer; a shiftable link normally locking said lever in its inoperative position; and a hand-operable push member for shifting said shiftable link from its lever locking position to its lever unlocking and releasing position.

2. In an electrically fired fire arm: a trigger controlling the firing of the fire arm; two metal sections forming the mass of the fire arm and insulated with reference to each other; a cartridge and a cartridge case housed in a first one of said sections; a primer within said cartridge; a source of electric current enclosed in said fire arm and

having two terminals; a first lead electrically connecting one of said terminals with the location of said cartridge case inside said first section and through said primer with said first section; a second lead electrically connecting the second of said sections with the second terminal; a first lever pivotally secured to said first section and electrically connected therewith; a spring-urged ball carried by said first lever and electrically connected therewith; a contact piece rigid with said second section and connected with said second terminal; a spring urging said first lever into its inoperative position away from said contact piece; an auxiliary shiftable link secured to the fire arm; a manually operated push member connected to said auxiliary link; said auxiliary link, upon grasping of the fire arm by the user, being shifted into its position urging said first lever into its operative position for contact between said spring-urged ball and said contact piece; said push member and said auxiliary link being means for alternatively locking and unlocking said first lever to and from its inoperative and operative position.

No references cited.