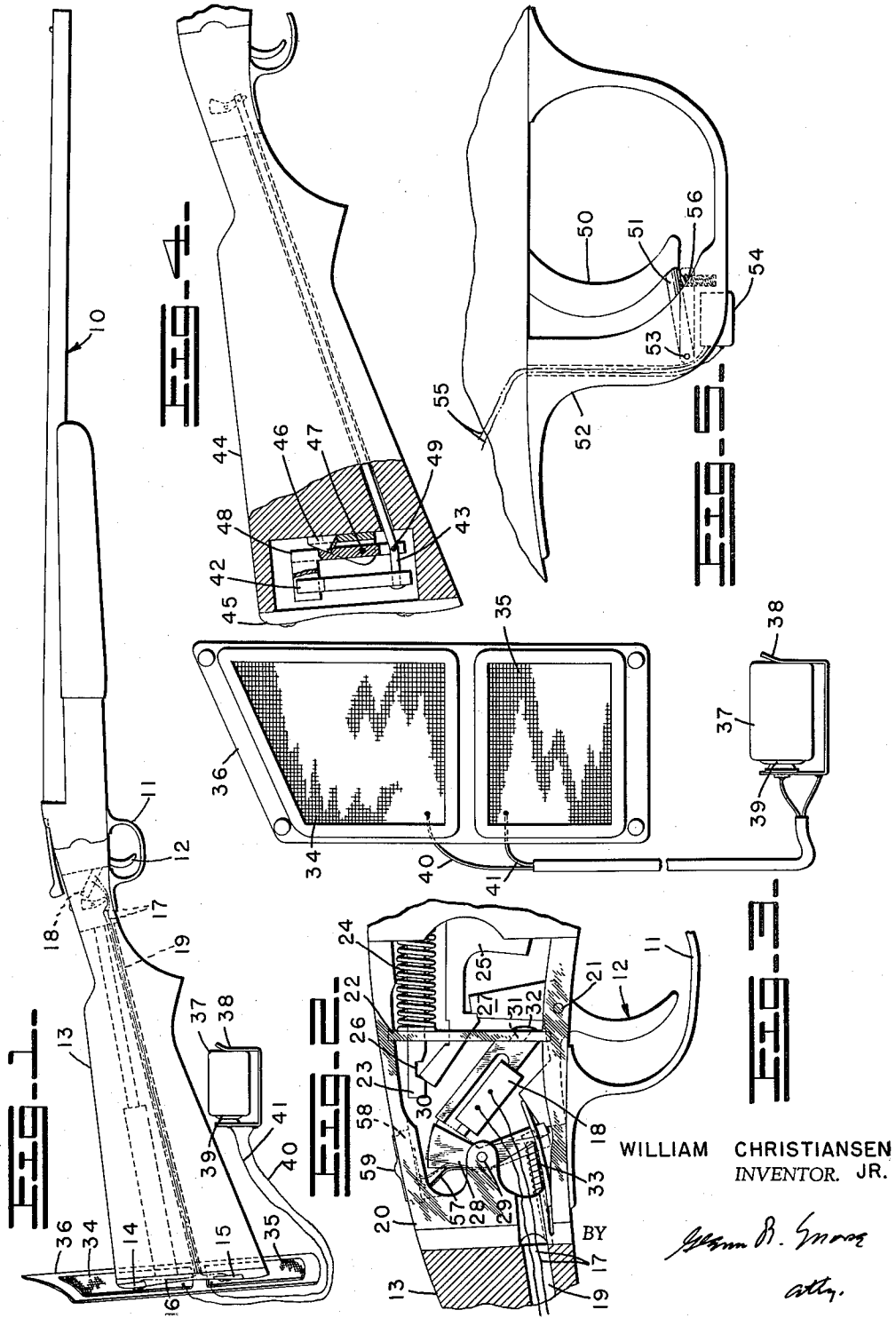
April 18, 1961 W. CHRISTIANSEN, JR 2,979,845

ELECTROMAGNETIC SAFETY SYSTEM FOR FIREARMS

Filed Dec. 31, 1958



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United States Patent Office 2,979,845
Patented Apr. 18, 1961

2,979,845

ELECTROMAGNETIC SAFETY SYSTEM FOR FIREARMS

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Filed Dec. 31, 1958, Ser. No. 784,105

4 Claims. (Cl. 42—70)

This invention provides a safety system for firearms which renders the firing mechanism inoperative at all times except when the gun is in normal shooting position with the butt pressed against the shoulder of the shooter. The number of shooting accidents every year testifies to the inadequacy of manually-operated safety devices. Entirely apart from sheer carelessness, situations frequently arise in the field when a gun is accidentally discharged without any fault whatever on the part of anyone. The arrangement provided by this invention makes it impossible for a firearm to be accidentally discharged in anything other than normal shooting position, with the wearer using a particular form of garment. At one stroke, this system eliminates the source of a large percentage of all of the shooting accidents. This arrangement also decreases the possibility of unauthorized use of a firearm, reducing the danger to young children and also in penal institutions.

The general principle of operation of this invention involves the use of a source of energy which is connected to the safety mechanism only when the gun is in normal shooting position. In this position, a connection is made which enables the energy source to activate a mechanism which removes the safety from "safe" position. The safety system does not involve any projecting external mechanical actuating members which could be accidentally moved by contact of the gun with some solid object. The internal mechanical components of the mechanism are preferably so balanced that the effect of inertia forces will not be sufficient to accidentally place the mechanism in firing condition.

The several features of the invention will be analyzed in detail through a discussion of the particular embodiments illustrated in the accompanying drawing. In the drawing:

Figure 1 presents a side elevation of a single-barrel shotgun embodying the preferred form of the invention.

Figure 2 presents a partial section on an enlarged scale from that of Figure 1, and showing the internal action mechanism of the gun illustrated in Figure 1.

Figure 3 presents a view of the equipment attached to the garment of the shooter, according to the preferred form of the invention.

Figure 4 presents a modified form of the invention involving permanent magnetic forces.

Figure 5 presents a further modified form of the invention.

Referring to Figure 1, the shotgun indicated generally at **10** is of standard construction, except for the modification necessary for the installation of the safety mechanism described herein. The trigger guard **11** protects the trigger **12**, and the stock **13** extends to the rear in the usual fashion where it terminates at the butt where the contacts **14** and **15** are located. These contacts are separated by the insulated butt plate **16**, and wires shown in dotted lines at **17** extend from the contacts **14** and **15**, respectively, to the solenoid **18**. A long hole **19** provides

for the passage for the wires **17** through the length of the stock **13**.

Referring to Figure 2, the frame **20** provides for the pivotal mounting of the trigger **12** on the pin **21**, and the frame also includes the transverse plate **22**. The firing pin **23** operates through an opening in the plate **22**, and is projected toward the cartridge (not shown) by the spring **24**. The sear member **25** restrains the firing pin **23** as long as it is engaged with the notch **26**, where it is held by the portion **27** of the trigger **12** until firing takes place. Rotation of the trigger in a clockwise direction disengages the portion **27** from the sear member **25**, which permits the sear to move downwardly under the action of the conventional biasing (not shown) to disengage the sear from the notch **26**.

A safety member **28** of magnetic material is pivotally mounted on the frame **20** on the pin **29**, and prevents clockwise rotation of the trigger when in the full line position shown in Figure 2. When the solenoid **18** is energized, a field of magnetic flux is created which tends to draw the upper portion of the safety member **28** toward it to create a closed magnetic circuit across the ends of the horseshoe-shaped core **30**. This attraction draws the safety member **28** into the dotted line position shown in Figure 2, and releases the trigger. A convenient method for mounting the solenoid and core assembly is possible because of the presence of the transverse plate **22**. A suitable aperture is provided in the plate **22** for the passage of the reduced portion **31**, and this is riveted over as shown at **32** to complete the attachment.

When the solenoid **18** is not energized, the light spring **33** returns the safety member **28** to the position shown in full lines. The un-energized position is normal, and persists until the gun is placed in the normal shooting position illustrated in Figure 1, in which the butt of the gun is pressed against the shoulder of the shooter. Under these conditions, contact is made between the contacts **14** and **15** and the conductive patches of screen **34** and **35** on the surface of the garment **36**, and the screen patches are connected to the opposite poles of the battery **37** through the terminals **38** and **39**. Under these conditions, the voltage established by the battery between the screen patches **34** and **35** is applied to the wires **17**, which are received under the contact points **14** and **15**, respectively, and to the solenoid **18**. The gun is then placed in firing position.

It is preferable that the garment **36** be either an auxiliary piece attached to a hunting jacket, or a part of the hunting jacket itself. The wires **40** and **41** extending from the battery terminal clip can be conveniently concealed in the garment, with the battery placed in a pocket where it is convenient for changing.

The modification illustrated in Figure 4 involves a somewhat different source of energy. In this situation, the safety mechanism is adapted to respond to a field of magnetic flux. A conventional horseshoe magnet can be placed in the position of the patches **34** and **35**, which serves to attract the block **42** of magnetic material and thereby move the actuating rod **43**. This stock **44** and the remainder of the gun can be of similar construction to that illustrated in Figure 1, with the butt plate **45** being conventional. The weight of the block **42** creates the possibility that inertia forces resulting from jostling the gun might accidentally place the gun in unsafe condition. To avoid this situation, a counterbalance assembly is provided which is mounted on the bracket **46**. This bracket is essentially U-shaped in cross section, and provides bearings for the pivot pin **47**. The arm **48** is pivotally mounted at this point, and is also pivotally connected to the actuating rod **43** at **49**. The opposite end of the counterbalance is turned to form a U-shaped section embracing the block **42**, for the dual purpose of creating

weight and for stabilizing the end of the block 42. The weight of the counterbalance and the pivot position can be established such that it exactly counterbalances the inertia forces effective on the block 42.

Referring to Figure 5, a further modification is shown in which the trigger 50 is intercepted by the safety catch 51, which is pivotally mounted on the trigger guard 52 at the pin 53. The catch 51 is of magnetic material, and is acted upon by the magnetic flux created by the solenoid 54. When the solenoid 54 is energized through the wires 55, the catch 51 is drawn downward against the action of the spring 56 to the point that the trigger 50 is released.

It is preferable to incorporate a system for visually indicating the "safe" condition of the action, particularly when the concealed safety mechanism of Figures 1, 2, and 4 is used. Referring to Figure 2, a signal 57 is preferably secured to the safety member 28, and is visible through an aperture in the frame 22 covered by a window 58. A prism member 59 is positioned to deviate the light rays to render the position of the signal 57 visible from the normal sighting position of the eye.

The particular embodiments of the present invention which have been illustrated and discussed herein are for illustrative purposes only and are not to be considered as a limitation upon the scope of the appended claims. In these claims, it is my intent to claim the entire invention disclosed herein, except as I am limited by the prior art.

I claim:

1. In a safety system for a firearm having a frame and an action including a trigger and a firing pin, and also having a stock, a safety mechanism comprising: a safety member movably mounted in said frame, and having a portion disposed, in a certain position of said safety member, to intercept said action to prevent firing thereof, said safety member being movable out of said position to permit firing of said action; biasing means urging said safety member to said certain position; electromagnetic actuating means mounted on said frame and adapted, when energized, to move said safety member from said certain position against the effect of said biasing means; spaced contact means exposed on the butt of said stock; electrically conductive wires connecting said spaced contact means to said electromagnetic actuating means, respectively, to establish a closed circuit between said spaced contact means including said electromagnetic actuating means; and a garment having spaced contact means normally in closed-circuit relationship and disposed to engage respectively said spaced contact means on the butt of said stock when said firearm is in normal shooting position; battery means disposed in said garment connected to establish a voltage between said spaced contact means on said garment; and visual indicating means for registering the position of said safety member, including prism means rendering a portion of said safety member visible to the eye through an aperture in said firearm from normal shooting eye position.

2. In a safety system for a firearm having a frame and an action including a trigger and a firing pin, and also having a stock, a safety mechanism comprising: a safety member movably mounted in said frame, and having a portion disposed, in a certain position of said safety member, to intercept said action to prevent firing thereof, said

safety member being movable out of said position to permit firing of said action; biasing means urging said safety member to said certain position; electromagnetic actuating means mounted on said frame and adapted, when energized, to move said safety member from said certain position against the effect of said biasing means; spaced contact means exposed on the butt of said stock; electrically conductive wires connecting said spaced contact means to said electromagnetic actuating means, respectively, to establish a closed circuit between said spaced contact means including said electromagnetic actuating means; and a garment having spaced contact means normally in closed-circuit relationship and disposed to engage respectively said spaced contact means on the butt of said stock when said firearm is in normal shooting position; and battery means disposed in said garment connected to establish a voltage between said spaced contact means on said garment.

3. In a safety system for a firearm having a frame and an action including a trigger and a firing pin, and also having a stock, a safety mechanism comprising: a safety member movably mounted in said frame, and having a portion disposed, in a certain position of said safety member, to intercept said action to prevent firing thereof, said safety member being movable out of said position to permit firing of said action; biasing means urging said safety member to said certain position; electromagnetic actuating means mounted on said frame and adapted, when energized, to move said safety member from said certain position against the effect of said biasing means; spaced contact means on the butt of said stock; electrically conductive wires connecting said spaced contact means to said electromagnetic actuating means, respectively, to establish a closed circuit between said spaced contact means including said electromagnetic actuating means; and a garment having contact means normally in closed-circuit relationship and disposed to engage said spaced contact means on the butt of said stock when said firearm is in normal shooting position; and battery means connected to supply energy to the closed circuit including all of said contact means when engaged.

4. In a safety system for a firearm having a frame and an action including a trigger and a firing pin, and also having a stock, a safety mechanism comprising: a safety member movably mounted in said frame, and having a portion disposed, in a certain position of said safety member, to intercept said action to prevent firing thereof, said safety member being movable out of said position to permit firing of said action; biasing means urging said safety member to said certain position; a garment having magnetic means located in the area normally occupied by the butt of a gunstock when in shooting position; and means mounted within said stock responsive to the presence of a field magnetic flux generated by said magnetic means to move said safety member from said certain position against the effect of said biasing means.

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