

[54] **ANTI-FLINCH TRAINING APPARATUS**

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[56] **References Cited**

UNITED STATES PATENTS

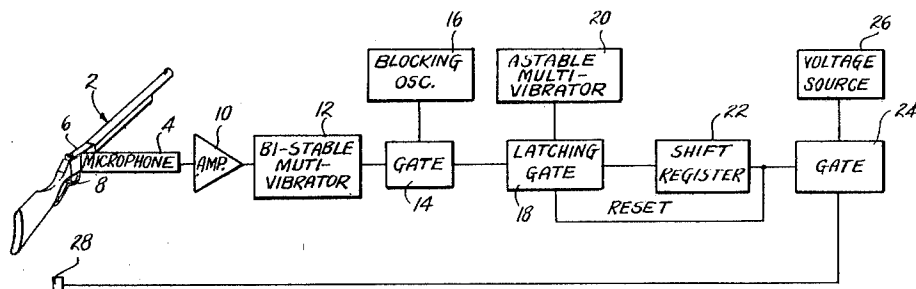
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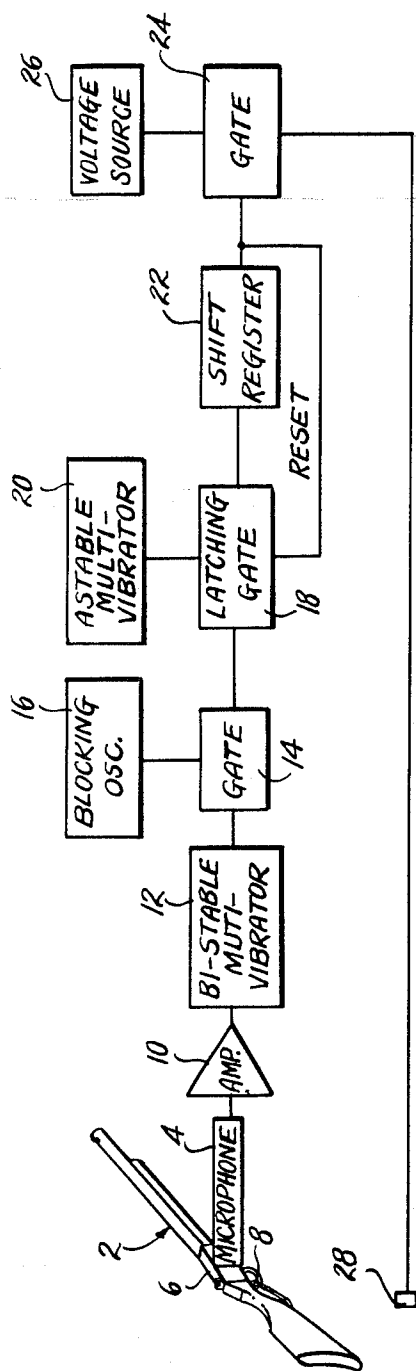
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[57] **ABSTRACT**

A microphone on a firearm detects the fall of the hammer and a pulse output is processed to be passed only as a result of closure of a randomly operated gate. A pulse passing through said gate encounters a selectively variable delay then directs a voltage pulse to a trainee operating the rifle, to provide a stimulus to simulate the recoil of the weapon.

5 Claims, 1 Drawing Figure





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ANTI-FLINCH TRAINING APPARATUS

BACKGROUND OF THE INVENTION

This invention is in the field of training devices and particularly devices for training persons to operate firearms without flinching.

As is known, the shooting of a firearm develops significant amounts of recoil and noise and persons operating the same customarily develop an anticipatory reflex to the shock of firing. This reflex is commonly termed flinching, which initially startles an operator whose reflex reactions include the behavior of pushing or clutching the weapon. Such flinching causes displacement of the weapon at the actual firing and further disturbs the aim of the gun.

Part of the problem of controlling flinching is the masking of the disturbance of the firearm due to the flinching by the actual response to the noise and recoil. The flinch and the recoil and noise occur nearly simultaneously and it is not readily possible to determine when and how much actual flinching and disturbance of the line of aim occurs. It has been proposed to eliminate this uncertainty by having another person load the weapon for the shooter alternating an empty chamber with a loaded chamber in a random manner. Thus, when an empty chamber is in position and the trigger is pulled, the presence of flinching is readily detectible and steps may be taken to correct the shooter's actions. Usually, the mere actuation of trigger and fall of the hammer causes the flinching reaction, in anticipation of and usually prior to the actual firing.

Another approach has been to gradually work up to the full blast and recoil of the weapon by using reduced loading or using less powerful weapons during training. In this way the reactions due to noise and recoil is reduced and inhibition of the shooter's reflexes may be developed.

A single instance of shooting a reasonably powerful weapon is often enough to establish a strong flinching behavior and even highly trained shooters will flinch after an elapse of some time after shooting of high-powered weapons. Furthermore, flinching often occurs under stress with well-trained shooters, such as the stress of combat with firearms.

SUMMARY OF THE INVENTION

The present invention proposes to eliminate the actual firing of the weapon but provides training by detecting the trigger pull and fall of the hammer. A signal is developed in response to detecting the hammer fall and randomly operable means serve to either transmit or terminate that signal, in a sequence unknown to the trainee. A signal that is transmitted is delayed for a controllable period of time, then functions to transmit a stimulus, such as a mild electric shock to the trainee to partly simulate the recoil and noise of actual firing. The period of delay is sufficient for an observer or instructor to note whether or not a trainee is flinching and the magnitude of the shock can be regulated in a manner that will eventually develop efficient resistance to flinching by the trainee.

BRIEF DESCRIPTION OF THE DRAWINGS

The single FIGURE of the drawing is a schematic representation of the apparatus of the present invention shown in association with a firearm.

DESCRIPTION OF A PREFERRED EMBODIMENT

In the drawing, numeral 2 designates any suitable firearm, such as the rifle depicted. Numeral 4 designates a microphone that may be mounted on the firearm in any suitable manner adjacent the mechanism portion 6 of the rifle so the microphone will detect the metallic click of the hammer fall after the trigger 8 is pulled by the trainee. The microphone may be secured to the rifle in any suitable manner, such as by means of a suction cup, magnetic holder, screw clamp, or other device.

In using the apparatus, the rifle is employed by the trainee without ammunition and wherein the trainee is taught to "squeeze" the trigger while holding the desired aim of the weapon. This is commonly referred to as "dry firing."

When the trigger is pulled the hammer falls, producing the metallic click, the microphone 4 converts that sound into an electrical impulse which is amplified by amplifier 10 and applied to bistable multivibrator 12. The multivibrator 12 changes state from one rest condition to another, emitting a standard unit pulse of electrical energy. The multivibrator serves to produce more or less uniform output pulse, independent of the minor variations in the pulse signal supplied from amplifier 10. This is important to provide uniform operation of the succeeding devices. The output pulse from multivibrator 12 is directed to a gate 14 capable of assuming either of two states, in which the pulse can either pass through the gate or be terminated thereby. The gate 14 may be compared to a normally closed relay. Blocking oscillator 16 controls the state of gate 14. When the blocking oscillator 16 is in its "off" state, the gate 14 is in its "on" state, that is, conductive. The frequency of operation of blocking oscillator 16 may be readily controlled by adjusting the resistive and capacitive circuitry thereof, all in a well-known manner.

Since the frequency of operation of oscillator 16 may assume any value within its designed range, the trainee is unable to synchronize his operation of the weapon with blocking oscillator 16 and for that reason the blocking oscillator in gate 14 may be considered to be a random control device for either passing or blocking the pulse from multivibrator 12. Let it be assumed that the trainee has just pulled the trigger 8, and that the resulting pulse from multivibrator 12 reaches gate 14 at a time when it is in its closed condition. Under these circumstances that training step is terminated and no recoil or shock simulation is presented to the trainee. An observer can thus readily observe whether or not the trainee flinched as he pulled the trigger. Likewise the trainee realizing that, in some instances, no shock would be received, is more likely to pull the trigger without flinching and can certainly develop his reactions with more confidence.

In many instances, however, the blocking oscillator 16 will have the gate 14 "open" when a pulse from multivibrator 12 is applied to the gate. Normally, the blocking oscillator 16 is in its "off" state for a greater period of time than when it is "on" and holding the gate 14 closed. Thus, the pulse will be transmitted from multivibrator 12 through gate 14 more often than not.

In cases where a pulse is transmitted through gate 14, the same is applied to latching gate 18. The latching gate 18 is the equivalent of a switch for directing the output of a stable multivibrator 20 to a shift register 22.

Thus, arrival of a pulse at the latching gate 18 will connect the output of cyclic pulses from multivibrator 20 to shift register 22. Each pulse cycle of multivibrator 20 advances the shift register 20 one stage and an output pulse is finally delivered from the shift register. That pulse is applied to reset the latching gate 18 to return it to its "off" condition and at the same time opens the gating device 24, for a brief period dependent on the values of its R/C components, which directs the output from voltage source 26 to a contact 28. The multivibrator 20 and shift register 22 thus constitute a time delay dependent upon the frequency of 20 and the number of flip-flop stages in 22. The contact 28 will be in engagement with some portion of the trainee to apply a minor voltage shock to his person. The voltage source 26 may be any suitable device, such as a battery with a resistive voltage dividing network, a charged capacitor, a variable frequency oscillator, or other device of preferably controllable output amplitude whereby the magnitude of the shock applied to the trainee can be varied greatly.

All of the components illustrated in the drawings by blocks, namely devices 4 through 26, are conventional and well-known in the art. More detailed descriptions of each device will be found in:

"RCA Transistor Thyristor & Diode Manual,"
Technical Series SC-14, 1969.

It will be apparent that to operate the device in the manner intended, the trainee "cocks" an empty weapon and takes aim at the target. The trigger is squeezed normally, releasing the hammer. The fall of the hammer produces a sound which is converted into an electric impulse by a microphone and then amplified. The impulse is either terminated, producing no other event, or after a variable and adjustable interval of time produces a shock to the trainee. The production of the shock each time is not a certain event and occurs in proportion to all training cycles, dependent upon the adjustment of the blocking oscillator. However, it should be noted that the production of the shock is a more frequent occurrence than not, after the falling of the hammer. It will be apparent that the training sequence provided by the present apparatus compares to the prior practice of randomly presenting live and dummy rounds of ammunition in the chamber of the weapon. The time delay feature allows the development of controlled behavior to control any tendency the trainee may have to flinch. One of the greatest problems in controlling flinching was the immediacy of the shock of firing after release of the hammer. There was in effect no time to learn control. Obviously, the present invention has many advantages over prior

proposals, in part due to the selective control of all conditions, especially the variable delay between the fall of the hammer and the shock of firing and thus all conditions are fully adaptable to the needs of the individual trainee.

Aside from the first cost of the apparatus, the cost of operating this device is negligible since it involves only the use of a small amount of electrical power in contrast to the considerable cost of firearm ammunition consumed in traditional training. Furthermore, the trainee does not require a target range and does not need to practice any special safety precautions. Spare time may be utilized for training at a location selected by the trainee.

While a single specific embodiment of the invention has been shown and described herein, the same is merely illustrative of the principles involved and the invention may be embodied in other modifications falling within the scope of the appended claims.

I claim:

1. Anti-flinch training apparatus comprising:

microphone means adapted to be mounted on a firearm to detect the impact of a firearm hammer and means to generate a first pulse in response thereto;

gate means connected to receive said pulse;

randomly operable means for sequentially and cyclically rendering said gate means and conductive and nonconductive; and

further means operable in response to a first pulse passed by said gate means for applying a voltage pulse to a trainee operating said firearm.

2. Apparatus as defined in claim 1 wherein said randomly operable means comprises a blocking oscillator having means for selectively varying its frequency of operation.

3. Apparatus as defined in claim 1 wherein said further means includes selectively variable delay means for delaying the application of said voltage pulse to a trainee, after passage of said first pulse through said gate means.

4. Apparatus as defined in claim 3 wherein said delay means includes a latching gate arranged to be rendered conductive by a first pulse passing said gate means, an astable multivibrator for feeding timing pulses through said latching gate and a shift register, arranged to receive timing pulses from said astable multivibrator, and means responsive to the output of said shift register for directing said voltage pulse to said trainee.

5. Apparatus as defined in claim 4 wherein the frequency of operation of astable multivibrator is selectively variable.

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