

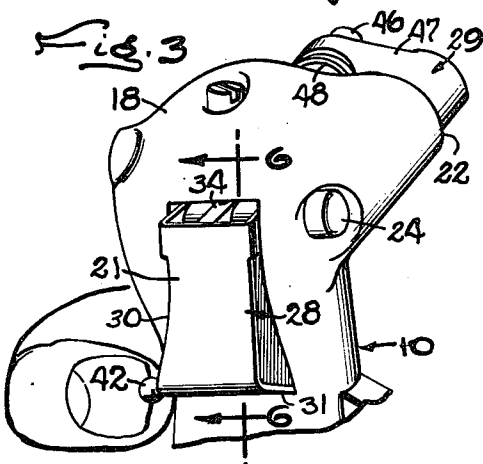
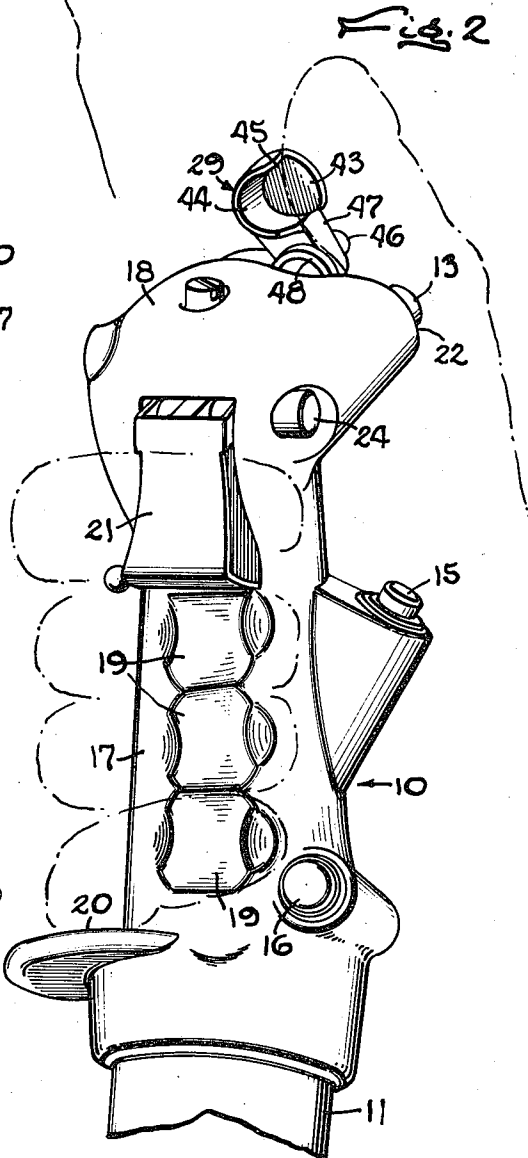
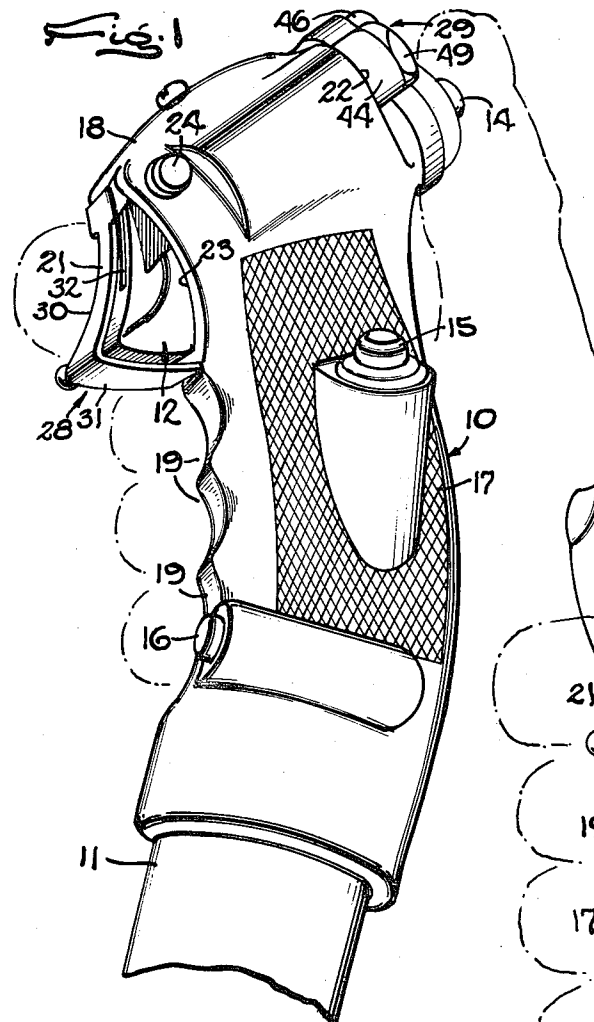
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E. L. STRINGER  
GUARD FOR CONTROL MEMBER

3,142,227

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2 Sheets-Sheet 1



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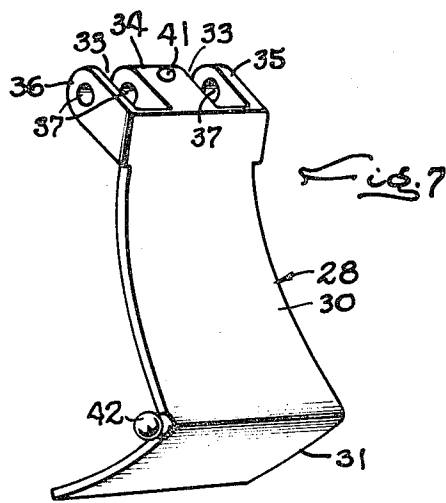
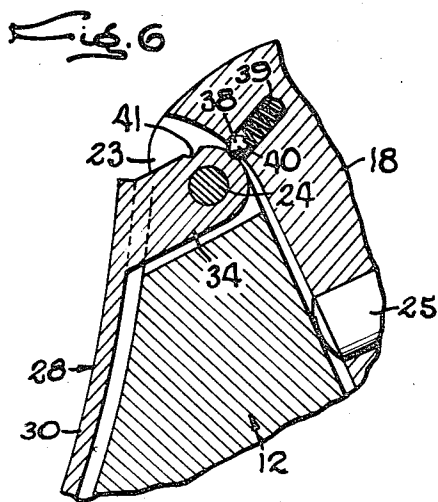
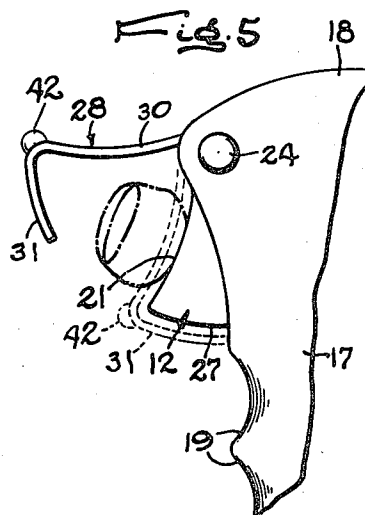
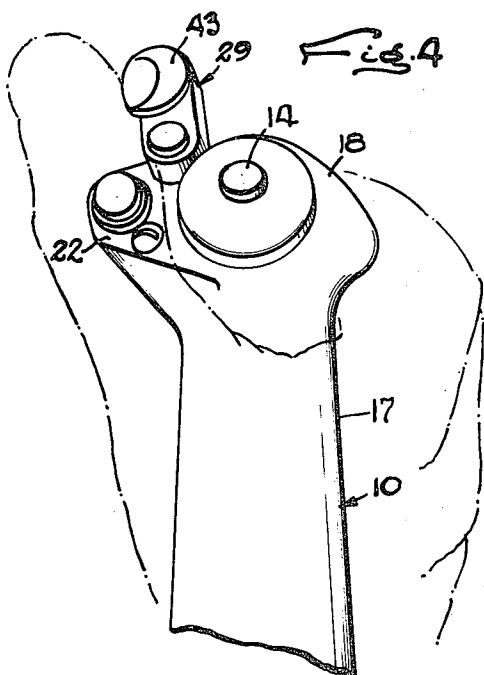
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GUARD FOR CONTROL MEMBER

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2 Sheets-Sheet 2



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3,142,227

## GUARD FOR CONTROL MEMBER

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8 Claims. (Cl. 89-136)

This invention relates to guards for control members or devices such as the trigger for the machine gun of an aircraft and the firing button for the rocket-firing mechanism. Such devices are mounted on the hand grip of the aircraft control lever which is shaped to be grasped in the pilot's hand with each digit of the hand in a predetermined position and with the various firing devices closely adjacent the normal position of the digit used to operate the device. Accordingly, each device is within the range of independent mobility of the associated digit so that the respective weapons can be fired by the same hand used to guide the aircraft and without any movement of the remainder of the hand.

The present military practice is to mount the trigger of the machine gun between the forefinger and the grip in fully exposed and operative condition, and to provide a rocket-firing push button beside the normal position of the thumb, this also being exposed and in operative condition. With this arrangement, the weapons are ready for immediate operation. As a result of the close proximity of the fingers to the control devices during normal operation of the aircraft, however, the danger of unintentional firing of one or the other of the weapons is substantial.

The primary object of the present invention is to provide guards that normally are disposed in positions covering the firing devices and are movable quickly and easily into out-of-the-way positions by the same digits of the hand used to operate the device, the motion required to uncover each device being within the range of independent mobility of the associated digit.

A more specific object is to provide a trigger guard which normally is disposed in a covering position between the trigger and the pilot's forefinger to prevent unintentional pulling of the trigger, and is mounted to be shifted into an out-of-the-way position and back to the covering position by simple motions of the forefinger alone.

Another object is to provide a guard normally covering the rocket-firing button and movable into an out-of-the-way position by a quick and simple motion of the pilot's thumb which coincides with the motion necessary to bring the thumb into position to press the button.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which—

FIGURE 1 is a fragmentary side perspective view of a hand grip provided with guards embodying the novel features of the present invention, the normal position of the pilot's hand being shown in broken lines.

FIG. 2 is a fragmentary front perspective view of the grip with the rocket-firing button uncovered.

FIG. 3 is a fragmentary perspective view of the upper end of the grip illustrating the position of the pilot's forefinger just prior to uncovering the trigger.

FIG. 4 is a fragmentary view taken from the rear of FIG. 2.

FIG. 5 is a fragmentary side elevational view of the upper end of the grip with the trigger uncovered.

FIG. 6 is an enlarged fragmentary sectional view taken along the line 6-6 of FIG. 3.

FIG. 7 is an enlarged perspective view of the trigger guard.

As shown in the drawings for purposes of illustration, the invention is incorporated in a hand grip 10 of the type presently used on the control levers 11 of military

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aircraft to be grasped by the pilot and used to swing the control lever in appropriate directions to guide the aircraft. In addition, the hand grip includes a plurality of control devices 12 through 16 for controlling different mechanisms on the aircraft.

The grip 10 comprises an elongated body 17 of generally oval cross-section with a head 18 on the upper end and a fitting (not shown) on the lower end adapted to be screwed into the control lever 11. On the front side of the body, that is, the left-hand side as viewed in FIG. 1, are three vertically spaced recesses 19 shaped and positioned to receive the index, ring and little fingers of the pilot's hand. A platform 20 (FIG. 2) projects laterally from the left side (FIG. 2) of the body to lie beneath and support the little finger and the hand. In the forward side of the head 18 is a fourth recess 21 positioned to receive the forefinger. With the fingers wrapped around the grip and disposed in the respective recesses, the thumb normally extends upwardly along the rear side of the head as shown in FIG. 1.

Each of the control devices 12 through 16 is disposed adjacent the normal position of one of the digits of the hand grasping the grip 10 in position to be actuated quickly and easily by the pilot after only a small amount of movement of the digit from the normal position. The present invention is directly concerned with the devices 13 and 12 which are the rocket-firing push button and the trigger for the aircraft machine gun.

The push button 13 is mounted on the head 18 on a laterally extending shoulder 22 thereon and is offset somewhat to the left (FIG. 4) of the normal thumb position. The button projects outwardly from the head and is spring-urged outwardly into an inactive position, and is movable toward the head, downwardly and forwardly in this instance, into an active position to actuate the rocket-firing mechanism by completing suitable electrical circuits (not shown). Thus, the pilot is able to fire the rockets simply by swinging his thumb to the left and pressing the button.

To form the trigger 12, a generally triangular piece projects forwardly out of a notch 23 (FIG. 6) in the forward side of the head 18 with the outer face of the piece spaced outwardly from the grip and concavely curved to form the recess 21 for the pilot's forefinger. At its upper end, the trigger piece is hinged on the grip by means of a pin 24 extending through aligned holes in the sidewalls of the notch and also through a hole adjacent the vertex of the trigger. The lower end portion of the trigger is urged outwardly into an inactive position by a spring (not shown) and is swingable inwardly to depress a firing button 25 (FIG. 6) in the bottom of the notch thereby to complete the circuits which fire the machine gun. The lower side 27 of the trigger piece is curved to swing closely along the upwardly facing lower wall of the notch 23.

According to the present military practice, the trigger 12 and the rocket-firing button 13 are left exposed and in operative condition ready for immediate use. As a result of the proximity of these devices to the normal positions of the pilot's fingers, there have been serious accidents resulting from unintentional pulling of the trigger or pushing of the rocket button.

The present invention contemplates the provision of relatively simple guards 28 and 29 for normally covering the two firing devices 12 and 13 and preventing accidental discharge of the weapons while being hinged on the grip 10 for movement quickly and easily to out-of-the-way positions by simple motions of the same digits used to operate the devices, such motions being within the range of independent mobility of the respective digits. Accordingly, the danger of accidental discharge during normal operation is eliminated and, at the same time, the

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trigger or firing button may be conditioned for operation, when needed by a quick and simple motion of the forefinger or the thumb alone.

In this instance, the trigger guard 28 is a generally L-shaped plate (see FIG. 7) formed by two legs 30 and 31. The leg 30 extends along the outer face of the trigger and preferably is coextensive therewith, the upper end of the leg being hinged on the grip 10 adjacent the vertex of the trigger piece 12 whereby the lower portion of the guard swings outwardly away from the trigger. The lower end portion of the leg 30 is concavely curved to follow the curvature of the trigger face and, when the guard is in its covering position, forms the recess 21 for the pilot's forefinger.

The second leg 31 extends inwardly from the lower end of the upright leg 30 and preferably is curved to follow the lower side 27 of the trigger piece. To prevent swinging of the guard inwardly past its normal covering position, the rear or inner end of the lower leg 31 abuts against the grip in the covering position and limits inward swinging of the guard in the position shown in broken lines in FIG. 5 where the leg 30 is spaced slightly from the released position of the trigger.

In the interest of simplicity of construction, the trigger guard 28 is hinged on the trigger hinge pin 24 to swing about the trigger axis. For this purpose, the trigger piece is made narrower than the notch 23 and is formed with a vertical notch 32 (FIG. 1) in its upper end. The two upwardly extending legs formed by this notch are fitted into spaces 33 between three lugs 34, 35 and 36 (see FIG. 7) fast on the upper end of the guard and the hinge pin passes through aligned holes 37 in the lugs as well as the holes in the grip 10 and the trigger piece. With this arrangement, the trigger guard normally hangs in its covering position with the rear end of the leg 31 abutting against the hand grip beneath the trigger. Inwardly directed pressure exerted on the guard by the pilot's forefinger merely presses the leg against the grip. It will be seen, therefore, that the trigger cannot be pulled unintentionally.

Herein, the trigger guard is held positively but releasably in place by a latch (FIG. 6) formed by a spring-loaded ball detent 38 mounted in a bore 39 in the hand grip 10 and seated in a recess 40 (FIG. 6) in the middle guard lug 34 when the guard is in the covering position. In response to an outward force on the guard, the ball is cammed out of the recess to release the guard for outward swinging. In addition, a second recess 41 (FIGS. 6 and 7) is formed in the lug in position to receive the detent when the guard is in the out-of-the-way position shown in FIG. 5 thereby to hold the guard out of the way. A downwardly directed force on the guard then cams the ball out of the recess to release the guard for return to the covering position.

To facilitate the uncovering of the trigger 12 preparatory to operation of the machine gun, a tab 42 projects laterally from the side of the guard closest to the pilot's palm, the left side in FIGS. 2 and 3, and preferably at the juncture of the two guard legs 30 and 31 so as to lie just below the normal position of the forefinger. With this arrangement, the pilot is able to shift the guard upwardly and outwardly for access to the trigger simply by moving the end of his forefinger behind the tab as shown in FIG. 3 and then extending his finger to swing the tab outwardly. To return the guard to the covering position, he extends his finger beyond the tab and then pulls it downwardly. In both positions of the guard, the tab is within the range of motion of the forefinger independently of the rest of the hand so that no movement of the rest of the hand is required to cover or uncover the trigger.

The guard 29 for the rocket-firing button 13 includes a cup-like cover portion formed by a top wall 43 normally disposed over the top of the button and a depending arcuate skirt 44 partially encircling and preferably concentric

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with the button. On one side of the button, the skirt is formed with an opening 45 (FIG. 2) large enough to pass freely over the button.

In this instance, the guard 29 is hinged on the hand grip 10 by a pivot pin 46 projecting upwardly and rearwardly from the shoulder 22 to define a pivotal axis offset to one side of the cup and paralleling the axis of the firing button. An arm 47 projects laterally from one side of the cup and is journaled on the pin. To hold the guard in the covering position during routine operation of the aircraft, a spring 48 (FIGS. 2 and 3) coiled around the pivot pin acts between the guard and the grip to urge the guard clockwise as viewed in FIG. 2. Of course, the opening 45 faces in the direction opposite the direction the guard swings in moving toward the out-of-the-way position (FIGS. 2 and 4) so that the button passes freely through the opening. Preferably, the cup opens generally downwardly and rearwardly, and swings upwardly to the right (FIG. 4) in uncovering the button.

With this arrangement, the guard 29 normally covers the rocket-firing button 13 to prevent accidental discharge of the rockets. The skirt 44 abuts against the side of the button to position the cup over the button. To fire the rockets, the pilot merely swings his thumb from the normal position shown in FIG. 1 over and slightly past the cup, and then swings his thumb back to swing the cup to the right (FIG. 4) against the action of the spring 48. These motions serve to position the thumb over the button 13 as well as to uncover the latter. Preferably, the upper left-hand edge portion of the top wall 43 is beveled at 49 to form an inclined surface for engagement with the thumb.

The guard is held in its out-of-the-way position by the thumb while the latter is over the firing button 13. When the thumb is lifted away from the button and returned to the normal position, the spring 48 snaps the guard back to its covering position.

From the foregoing, it will be seen that both embodiments of the present invention positively prevent unintentional firing of the aircraft weapons while being movable quickly and easily into out-of-the-way positions by simple motions of the digits used to actuate the respective firing devices. Thus, the two guards 28 and 29 eliminate the danger of accidents without unduly complicating the operation of the aircraft or its weapons.

I claim as my invention:

1. The combination of, a hand grip mountable on the upper end of an aircraft control lever and shaped to be grasped in a predetermined manner with the pilot's thumb overlying a portion of said grip, a firing button positioned on said grip beside the normal position of the thumb, said button being movable toward the grip into a firing position and away from the grip into an inactive position, means urging said button yieldably toward said inactive position, a guard including a wall normally overlying said button in said inactive position to prevent unintentional movement thereof and a skirt depending from said wall and partially surrounding said button, said skirt being formed with an opening on the side of the button adjacent said normal thumb position and sized to pass freely over the button, and a hinge between said guard and grip spaced from said button and pivoting the guard on the grip for swinging laterally away from said normal thumb position and the button into an out-of-the way position on the other side of the button, both the normal position of the guard and said out-of-the-way position being within the range of independent mobility of the pilot's thumb.

2. The combination defined in claim 1 further including spring means yieldably holding said guard in its normal position overlying said button.

3. The combination of, an elongated grip mountable on the upper end of an aircraft control lever and shaped to be grasped in a predetermined manner with the palm of the pilot's hand on one side of the grip and his fore-

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finger normally extending around the forward side of the grip, a trigger disposed on said forward side between the grip and the normal position of the forefinger, said trigger having a forward face of concave curvature engageable with the forefinger, a first hinge pivoting the upper end of said trigger on said grip for swinging of the lower end portion of the trigger rearwardly toward the grip into an active position and forwardly into an inactive position, means yieldably urging said trigger toward said inactive position, an L-shaped guard, and a second hinge spaced above said first hinge and pivoting said guard on said grip, said guard having a first leg normally extending downwardly from said second hinge and along said forward trigger face to cover the latter, said first leg being curved to follow the curvature of said face closely adjacent the latter when the trigger is in said inactive position and provide a support for the forefinger, and a second leg extending rearwardly under the trigger from the lower end of said first leg, the rear end of said second leg being spaced from said lower end to abut against said grip and prevent movement of said first leg toward said trigger from its normal position.

4. The combination defined in claim 3 further including a tab projecting laterally from said guard on said one side of the grip at a point spaced from said second hinge and the forward side of the grip whereby said guard may be flipped forwardly and upwardly into an out-of-the-way position, and a latch for holding said guard releasably in said out-of-the-way position.

5. The combination of, a hand grip mountable on the upper end of an aircraft control lever and shaped to be grasped in a predetermined manner with the pilot's forefinger extending around one side of the grip, a trigger disposed on said one side between said forefinger and said grip and having an outer face for engagement with the forefinger, said trigger being movable inwardly toward said grip into a firing position and away from the grip into an inactive position, means urging said trigger yield-

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ably toward said inactive position, and a guard normally covering said face and preventing unintentional movement of said trigger to said firing position, said guard including a first leg disposed in a normal position between the trigger and the usual forefinger position and extending along and overlying said outer face closely adjacent the latter when the trigger is in said inactive position, said first leg being shaped to provide a rest for the pilot's forefinger when said face is covered, a hinge between said leg and said grip pivoting the leg at one end on the grip for swinging of the free end portion thereof outwardly away from said outer face into an out-of-the-way position, and a second leg extending inwardly toward said grip from the free end of said first leg to abut against the grip when said first leg is in its normal position and prevent swinging of said first leg toward said trigger from said normal position.

6. The combination defined in claim 5 further including a tab on said guard projecting laterally from the guard at a point spaced from said hinge and said grip for moving the guard into said out-of-the-way position.

7. The combination defined in claim 6 further including a latch for holding said guard releasably in said out-of-the-way position.

8. The combination defined in claim 6 in which said tab is mounted on said guard adjacent the free end of said first leg.

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