July 5, 1955 H. W. TREVASKIS ET AL 2,712,272

TRIGGER MECHANISM

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Fig. 1

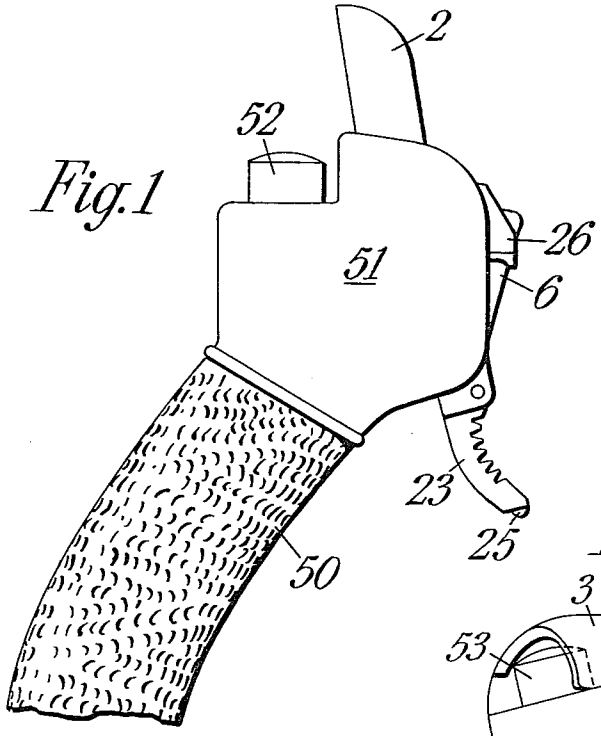


Fig. 2

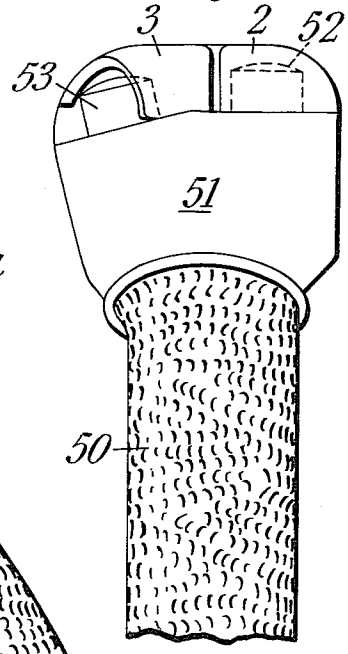
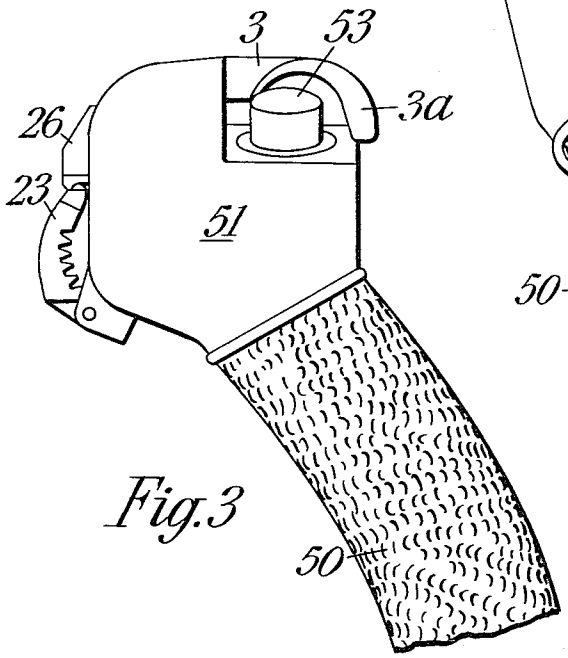


Fig. 3



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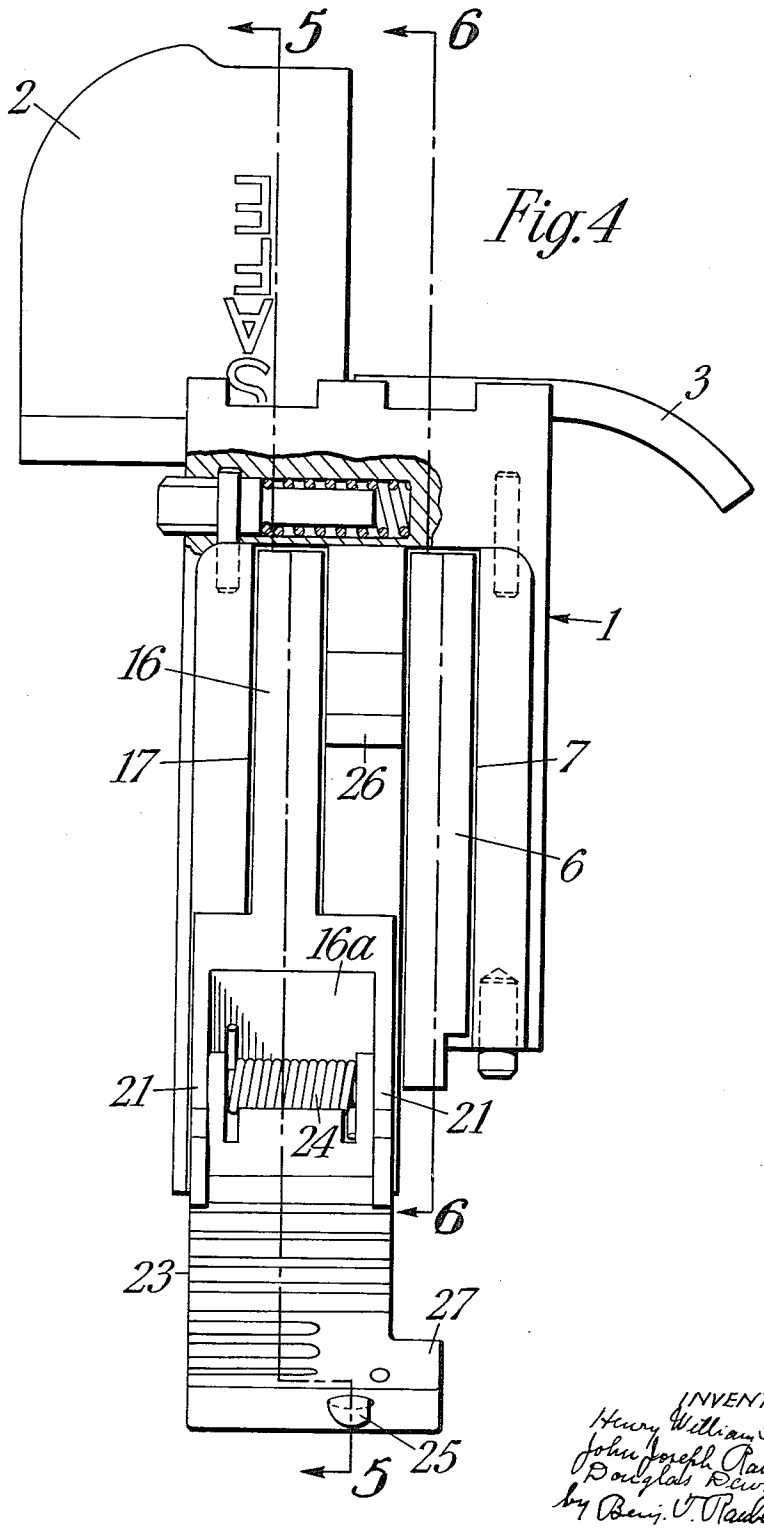


Fig. 4

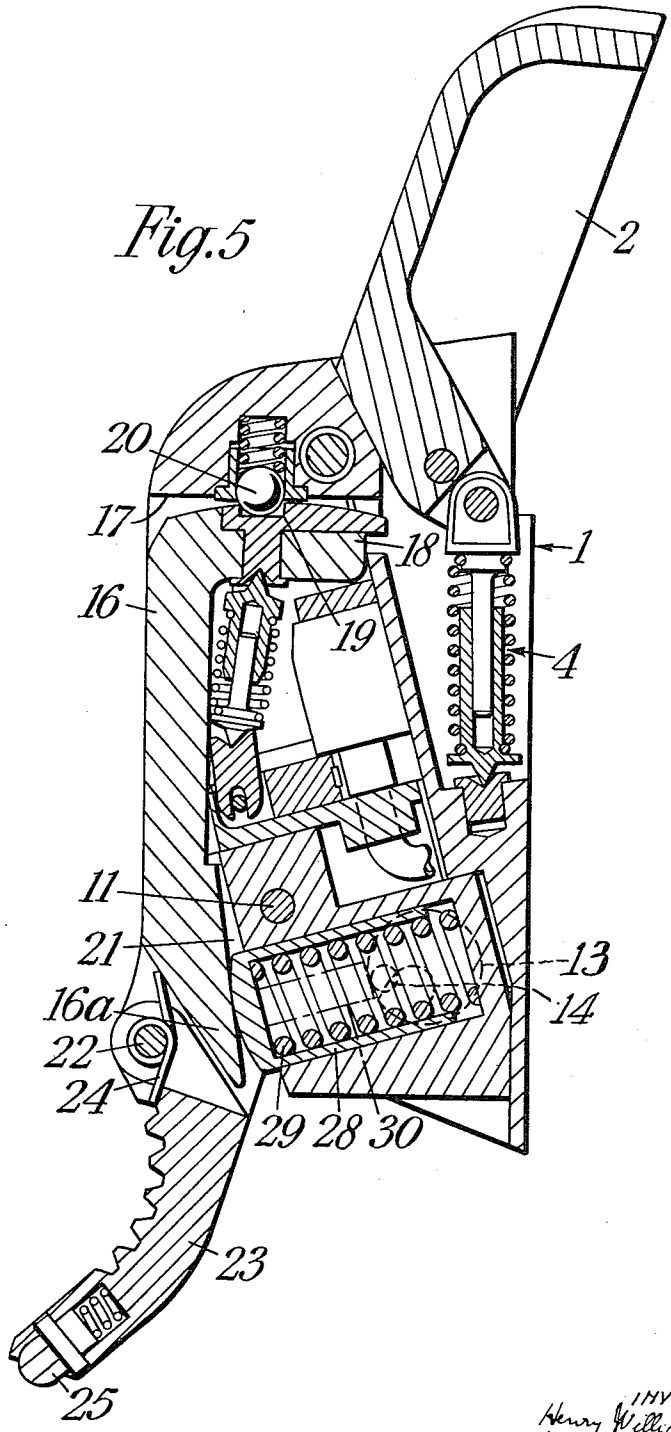
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TRIGGER MECHANISM

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Fig.5



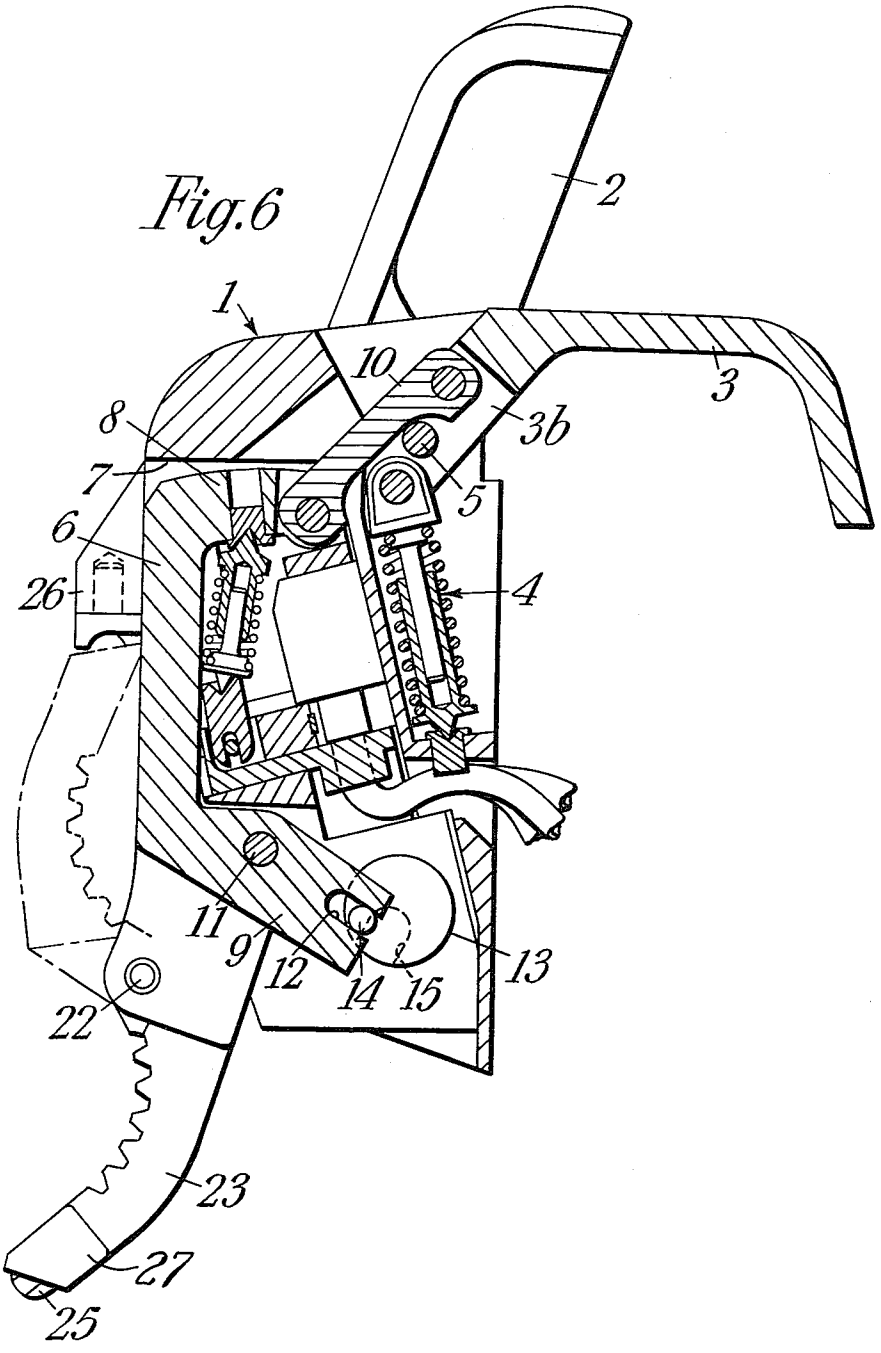
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TRIGGER MECHANISM

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Fig.6



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TRIGGER MECHANISM

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Application July 27, 1951, Serial No. 238,804

4 Claims. (Cl. 89—136)

This invention relates to firing mechanisms, and more particularly relates to a trigger mechanism and a safety device for a trigger mechanism.

Control handles are known which are fitted to the top of certain types of aircraft control sticks and which comprise a partially curved, serrated grip part shaped to fit the pilot's hand. A brake lever is secured to the control stick adjacent the bottom of the grip part and a trigger to operate the gunfiring mechanism projects from the bottom forward edge of a substantially cubical housing integral with the top of the control stick, i. e. above the grip part. The end of the trigger is spaced a short distance away from the end of the brake lever, and the trigger and lever are so situated, relative to the grip part, that they may be operated without the pilot relinquishing his grip on the handle.

Whilst this position of the trigger is most convenient for firing the guns, it is most inconvenient for normal usage of the control handle. Our invention provides a control handle incorporating a trigger which is retractable when not in use and an improved type of safety catch for a trigger mechanism.

According to the invention a trigger mechanism comprises a pivotally mounted trigger lever angularly movable in one direction to operate an associated firing mechanism, a retractable trigger grip pivotally secured to one end thereof, spring means to urge said trigger grip towards the extended position and means to maintain said grip in the retracted position.

Preferably the trigger mechanism is also provided with a safety device comprising an angularly movable safety lever, a trigger locking member rotatable by angular movement of said lever into a predetermined position and means to prevent the operative movement of said trigger mechanism when the locking member is in said predetermined position.

According to the preferred construction the trigger mechanism comprises a pivotally mounted trigger lever angularly movable in one direction to operate a gun firing mechanism, a retractable trigger grip pivotally secured to one end thereof, spring means to urge said grip towards the extended position, means to maintain said grip in the retracted position, an angularly movable safety lever, a trigger locking member rotatable by angular movement of said lever into a predetermined position, means to prevent operative movement of the trigger mechanism when the locking member is in said position and a pivoted safety cover co-operating with the safety lever whereby angular movement of the cover in one direction releases the trigger grip from the retracted position and rotates the locking member from the predetermined position to render the trigger mechanism operative.

In order that the invention may be more fully described, reference is made to the accompanying drawings, of which:

Figs. 1, 2 and 3 are three views of a part of an aircraft control handle incorporating the trigger mechanism of the present invention.

Fig. 4 is an enlarged view of the trigger mechanism.

Fig. 5 is a section through 5—5 of Fig. 4 looking in the direction of the arrows.

Fig. 6 is a section through 6—6 of Fig. 4 looking in the direction of the arrows.

In the embodiment of the invention shown in the drawings a control handle for aircraft comprises a curved, serrated grip part 50 (Figs. 1, 2 and 3) secured to the top of an aircraft control stick and a housing 51 (the forward end part 1 of which is illustrated in Figures 4, 5 and 6), secured to the upper end of said grip part. The rear upper surface of the housing part 1 is made up of two safety flaps 2 and 3 which are hinged about their forward edges and can be swung from a horizontal to a substantially vertical position. A pivoting spring mechanism 4 is provided for each of said flaps to ensure that it will not inadvertently move from one extreme angular position to the other.

Two push-buttons 52 and 53 are set side by side in the rear part of the housing. The starboard button 52 is adapted to be electrically connected to a bomb-dropping mechanism by leads which extend through the handle and associated control stick. The port button 33 is similarly adapted to be connected to a camera.

The starboard safety flap 2 completely covers the starboard button when the flap is down, and hence the button cannot be depressed to actuate the bomb-dropping mechanism until the flap has been lifted. Such a safety device is not essential for the port button, i. e. the camera button, and hence a cut-out portion 3*a* is provided in the port safety flap 3 so that the port button may be depressed without raising the safety flap. The port safety flap 3 constitutes a safety device for the gun firing trigger mechanism.

The trigger safety flap 3 is provided on its forward edge with a portion 3*b*, Fig. 6, inclined at an angle inwardly of the housing. A pin 5, extending transversely across the housing, passes through a hole in said inclined portion intermediate its ends, the flap thus pivoting about the pin. The end of the inclined portion 3*b* remote from the flap 3 is associated with one end of said pivoting spring mechanism to prevent inadvertent movement of the flap.

A safety lever 6 is fitted in a vertical slot 7 on the port side of the forward face of the housing and has two arms 8 and 9, one at each end, which extend into the housing. The arm 8 at the upper end of the lever is at right angles to the lever and the end of this arm is adjacent the end of the inclined portion of the flap. One end of a link 10 is pivotally secured to this end of the arm 8 and the other end of the link is pivotally secured to the inclined portion 3*b* of the flap 3, between the pin 5 on which it pivots and the flap proper.

The other arm 9 of the safety lever extends downwardly into the housing at an angle of about 120° from the top arm. A pin 11, extending transversely across the housing, passes through a hole in said inclined arm intermediate its ends, the safety lever thus being pivotable about said pin. The end of said arm is provided with a slot 12 extending into said arm and parallel thereto. A cylindrical trigger lock member 13 is rotatably mounted in the bottom of the housing and one face of said member, adjacent its periphery, is provided with a peg 14 which fits in the slot in the end of the inclined arm of the safety lever. The trigger lock member is likewise provided at one location with a slot 15 which extends inwardly from its outer periphery to its centre.

A trigger lever 16 is fitted in a vertical slot 17 on the starboard side of the forward face of the housing. The top end of the trigger lever has an arm 18 extending

substantially at right angles thereto into the housing and a recess 19 is provided in the upper face of said arm to receive part of a spring-loaded ball 20 held within the upper part of the housing 1. The end 16a of the trigger lever remote from the arm, i. e. at the lower end of the housing, is tapered.

A bifurcated flange 21 integral with the lower end 16a of the trigger lever has two portions extending inwardly into the housing and two portions extending outwardly therefrom. The inwardly-extending portions of the bifurcated flange are each provided with a hole through which passes the pin 11, hereinabove mentioned, which extends transversely across the bottom part of the housing and on which the safety lever 6 is pivotable. The trigger lever 16 is likewise pivotable on this pin. The outwardly-extending portions of the bifurcated flange are each also provided with a hole through which passes a pin 22.

One end of a curved and serrated trigger grip 23 is pivotally secured to the pin 22 extending between the two parts of the bifurcated flange 21. When extended in the firing position one end of the grip abuts the tapered end 16a of the trigger lever, so that pressure in one direction will cause the trigger lever to pivot about its pin 11. This in turn will cause an electrical circuit to be completed and operate a gun firing mechanism. The trigger grip may be folded back so that it lies adjacent the trigger lever. A helical spring 24, co-axial with the pin extending between the two arms of the trigger lever, causes the trigger grip to remain in the firing position unless positively located in the retracted position (shown in Fig. 3).

A spring-loaded plunger 25 is secured in a hole in the end of the trigger grip and when the grip is folded back said plunger is adapted to be engaged by a lipped projection 26 solid with the forward face of the housing, between the two slots 7 and 17. A small lug 27 extends sideways from the end of the trigger grip, and said lug is adapted to abut the upper end of the safety lever 6 when the grip is in the retracted position. An angular movement of said lever 6 forces the trigger grip 23 out of engagement with the lipped projection 26 into an extended position.

A hole is provided in the bottom part of the housing and a hollow plunger 28 is slidable therein. The closed end of said plunger abuts the lower end 16a of the trigger lever and a helical spring 29 tends to force the plunger outwardly of its hole and maintain it in contact with the trigger lever. The plunger is provided with a stem 30 which extends parallel therewith away from the trigger lever, and the end of the stem contacts the periphery of the trigger lock member 13 hereinabove described when the lock member 13 is in one angular position and enters the slot 15 when the lock member is in another angular position.

The operation of the safety device and retractable trigger is as follows. For normal usage the safety flaps 2 and 3 are down and the trigger grip 23 is folded back out of the way of the pilot's hand and is held in the retracted position by the spring-loaded ball 25 engaging behind the lipped projection 26. When it is required to fire the guns the pilot raises the trigger safety flap 3. Angular movement of the flap from the horizontal to the near vertical, acting through the linkage 10, pivots the safety lever 6 about its pivoting point 11 intermediate the ends of the inclined arm. The top of the safety lever 6 will thus move outwardly of the housing 1 and will force the lug 27 integral with the end of the trigger grip away from the housing. This in turn will force the spring-loaded plunger 25 at the end of the grip out of engagement with the lipped projection 26 and the grip, under the action of its spring 24, will move to the extended or firing position, Fig. 5.

Simultaneously with the outward movement of the upper part of the safety arm 6, the end of the inclined

arm 9 of said lever makes a corresponding angular movement substantially upwardly. The slot in the end of this arm engages with the peg 14 extending from one face of the trigger lock member 13, thus angular movement of said arm rotates said member, and when the flap is fully raised the member 13 has rotated sufficiently for the slot 15 in the periphery of the member to be in line with and receive the stem 30 extending from the plunger 28 associated with the trigger lever 16. Thus on firing pressure being applied to the trigger grip 23 the stem moves into the slot in the trigger lock and allows the trigger lever to move sufficiently for the necessary electrical contacts to be made to fire the guns.

On the safety flap 3 being lowered the safety lever 6 moves back until it is flush with the forward face of the housing and the trigger grip 23 may then be folded back and snapped into position behind the lipped projection 26. Even if the trigger grip is not folded back there is no possibility of the guns being inadvertently fired as the trigger lock member 13 will have been rotated, by the movement of the flap acting through the safety lever, to its original position wherein the stem on the plunger is no longer in line with the slot in said member. On squeezing the trigger the stem will merely abut the periphery of the trigger lock member and further movement of the trigger lever will be impossible.

Having described our invention, what we claim is:

1. A trigger mechanism comprising a housing containing a pivotally mounted trigger lever angularly movable in one direction to operate a gun firing mechanism, a retractable trigger grip pivotally secured to one end of the lever, a spring to urge the grip into an extended position, means to maintain the grip in a retracted position, a safety lever movable alternatively to safety and firing positions, a trigger locking member rotatable by angular movement of the safety lever to safety position to obstruct and prevent operative movement of the trigger lever and rotatable movement of the safety lever to firing position to permit operative movement of the trigger lever and a pivoted safety flap co-operating with the safety lever whereby angular movement of the flap in one direction releases the trigger grip from the retracted position and moves the safety lever to firing position to permit operative movement of the trigger lever.

2. A trigger mechanism comprising a housing containing a pivotally mounted trigger lever angularly movable in one direction to operate a gun firing mechanism, a retractable trigger grip pivotally secured at one end of the lever, a spring to urge the grip into an extended position, a lipped projection secured to the housing, a spring-loaded plunger associated with one end of the grip adapted to be retained by the projection in a retracted position of the grip, an angularly movable safety lever movable alternatively to safety and to firing positions, a trigger locking member rotatable by angular movement of the safety lever to safety position to prevent operative movement of the trigger lever and movable by the movement of the safety lever to firing position to permit movement of said trigger lever and a pivoted safety flap co-operating with the safety lever whereby angular movement of the flap in one direction releases the trigger grip from the retracted position and rotates the locking member to the other position to permit operative movement of the trigger lever.

3. A trigger mechanism according to claim 2 in which the safety lever is provided with a slot and the locking member is of cylindrical form having a peg provided on one face thereof engaging with the slot, whereby angular movement of the safety lever rotates said locking member from one angular position to another.

4. A trigger mechanism according to claim 3 which comprises a spring-loaded hollow plunger slidable in a hole in the housing having one end abutting said trigger lever and a parallel stem portion extending away from said lever to abut the outer periphery of the locking

member when said locking member is in one position and prevent movement of the trigger lever, and to enter an inwardly-extending slot formed in the locking member when the locking member is in the other angular position to permit movement of the trigger lever.

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