

Aug. 3, 1965

E. ROHACS

3,198,922

HANDLE FOR PILOT'S LEVER

Filed May 22, 1962

2 Sheets-Sheet 1

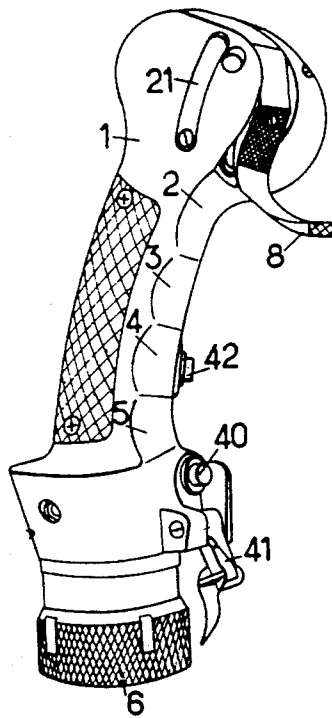


FIG. I

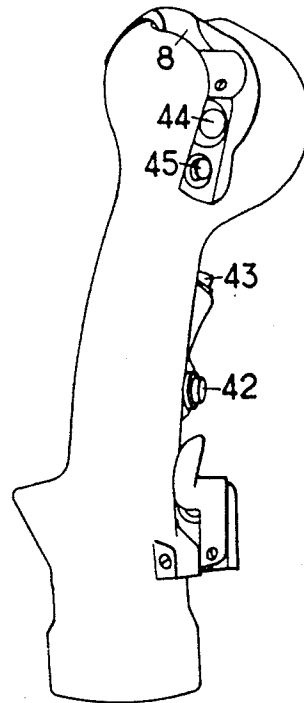


FIG. II

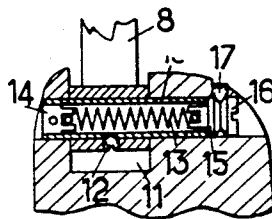


FIG. V

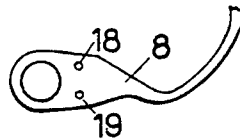


FIG. VI

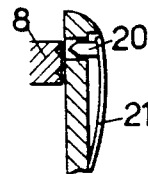


FIG. VII

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2 Sheets-Sheet 2

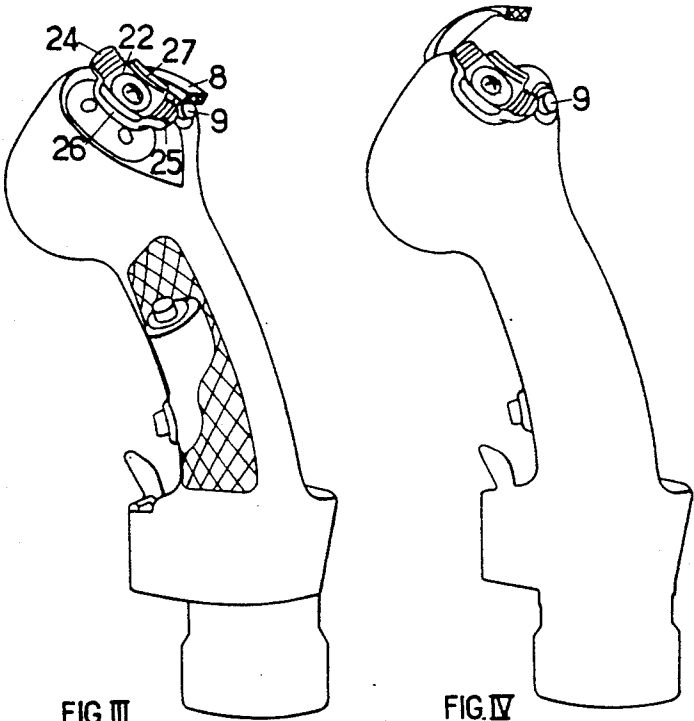


FIG. III

FIG. IV

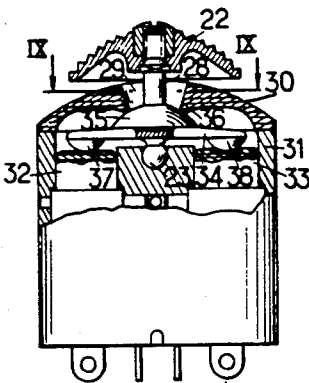


FIG. VII



FIG. IX

1

3,198,922

HANDLE FOR PILOT'S LEVER

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5 Claims. (Cl. 200—157)

This invention relates to pilots' handles, that is to say to aircraft control column handles utilised on fighter or light bomber aircraft equipped with fixed weapons controlled by the pilot.

Handles of this type are already known; they are generally of light metal or of material moulded to fit the palm and the first finger joints of the pilot's hand and to allow the fingers full liberty to operate the various controls with which the handle is equipped, the principal control being the trigger which controls the firing of the fixed weapons and the filming camera. A handle of this type has already been described in my U.S. Patent No. 2,791,664.

I have now made various improvements to this handle, which relate on the one hand to the distribution and functions of the controls, and on the other hand to the mode of construction of the firing trigger which is now used to render inaccessible the control for the release of bombs or rockets, and further to the position of the trim control, that is to say the dive and lifting controls combined with the warping controls, and finally to the mode of construction of this last-mentioned combined control.

One example of the embodiment of the principles of the invention will be given below, although I do not intend to limit the generic scope of this invention to the details given or the specific features of the example selected by way of illustration.

This embodiment is illustrated by way of example in the accompanying drawings, in which:

FIGURE I is a view in perspective of the front of the pilot handle showing the trigger in the forward position for controlling the firing of the fixed weapons,

FIGURE II is the same view with the trigger in the rear, closed position masking the push-button controlling the release of the bombs or rockets,

FIGURE III is a view in perspective of the same handle, but viewed from the rear side, showing the trim control, the trigger being in the same position as in FIGURE II,

FIGURE IV is the same in perspective as in FIGURE III, with the trigger in the intermediate position,

FIGURE V is a section showing the mode of articulation of the trigger,

FIGURES VI and VII are two sketches showing the locking mechanism of the trigger,

FIGURE VIII shows in an axial section the mode of construction of the trim control device, and

FIGURE IX is a cross-sectional view along line 9—9 of FIG. VIII showing a detail of the device.

Referring to the first four figures, the handle is indicated generally by 1 and is made of light metal or plastic material, with the notches 2, 3, 4 and 5 for the fingers of the hand, excluding the thumb. The handle is fixed on the control column by a knurled nut 6.

The trigger for firing the fixed weapons is designated by 8 and is shown in FIGURE I in the position for firing the fixed weapons, whereas it is folded into the safety position in FIGURES II and III, rendering inaccessible the push-button 9 which controls the release of the bombs or rockets. In FIGURE IV it is in the intermediate position, thus rendering the push-button 9 accessible.

Referring to FIGURE V, it is seen that the trigger 8

2

pivots around a tubular shaft 10 in a channel 11 in the handle, the shaft 10 being housed in bores on each side of the channel. The trigger 8 is keyed on the shaft 10 by the fixing screw 12. The shaft contains in its interior the coil spring 13 fixed at one end on a part 14 riveted to the interior of the shaft and at the other end on a part 15 having a screw head 16 and a circular groove into which a fixing screw 17 penetrates. The tension of the spring can thus be regulated. The spring 13 has the effect of bringing the trigger into the firing position.

In order to hold the trigger either in the safety position or in the intermediate position, there have been provided on one of the faces two positioning depressions 18 and 19 in which the stud 20 can engage, this stud being carried by the flat locking spring 21 which is seen on the outside in FIGURE I. The stud 20 has sufficient length to pass through the thickness of the wall of the channel and penetrate into one of the two positioning depressions.

In FIGURES III and IV the trim control button, designated generally by 22, can be seen in its new position in the immediate proximity and on the left of the button 9, that is to say in the top rear portion of the handle.

In the embodiment illustrated, this control is moved to four positions forming a cross, as can be seen with reference to FIGURE IX, but it may have any other form. This control button 22 can rock around the ball joint 23 and assume four positions at right angles to one another, relating to desired aircraft attitude and corresponding respectively to dive, climb, left-hand turn and right-hand turn, depending on whether it is pressed at 24, 25, 26 or 27.

The rod 28 which carries the control 22 and which at the other end terminates in the ball joint 23 has only a few degrees of liberty in orthogonal directions, as illustrated in FIGURE IX, owing to the shape of the aperture 29 in the cover 30 of the casing 31. The casing 31 contains four push-buttons disposed symmetrically around the axis of the device. Two of these push-buttons 32 and 33 are seen in FIGURE VIII. These push-buttons, which control switches, will not be more fully described because their arrangement is well known. Use may for example be made of the push-buttons described in U. S. Patent No. 2,722,579.

The mode of control of these push-buttons is on the other hand one of the features of the invention. To this end, the rod 28 supports a rocking part 34 having a spherical zone 35 which is concentric with the ball joint 23. The part 35 is guided in its displacement by the crown 36 which forms part of the cover 30. This rocking part 34 carries four keys, two of which are visible in FIGURE VIII and are designated by 37 and 38; they bear respectively on the heads of push-buttons 32 and 33, while the other two keys (not visible) bear on the heads of two other push-buttons, which are not visible in the figure.

The arrangement is such that the contact points of the keys 37 and 38 on the heads of the push-buttons are practically in the plane of the center of the ball joint 23, which completes the determination of the pivoting axis, which is already determined to a certain extent by the arrangement illustrated in FIGURE IX.

The same applies to the pivoting axis determined by the other two keys which are not visible.

The utilisation of the two spherical surfaces 23 and 35 having different radii permits a considerable saving of space. Both surface 35 and surface 23 cooperate to support the button 22, the use of the small spherical surface 23 as the lower support element, making it possible to use a smaller assembly than would be necessary if one large spherical surface having the radius of spherical surface 35 were used.

At the bottom part of the handle a push-button 40 is provided which permits the locking of the automatic pilot.

3

This push-button is controlled by a trigger 41 held in position by similar means to those of the trigger 8 shown in FIGURE V, but adapted to occupy the folded-over position illustrated in FIGURE II, in which position it is locked for example by a ball. The button 40 is in a position such that it can be controlled by the small finger.

A little higher, and in a position such that it can be controlled by the ring finger or the middle finger, is situated the push-button 42 controlling the radio.

Finally, in a position which was occupied previously by the trim control there is situated the push-button 43 which controls the roll stabiliser and which consequently is controlled by the middle finger.

The index finger is therefore reserved for the operation of the trigger 8 which controls the push-button 44 firing the fixed weapons (cannons or machine-guns), while the push-button 45 controls the aiming film camera. These two buttons are so disposed, in a known manner, that the camera is operated before firing and is not stopped until firing has ceased.

For the push-button 45 use will preferably be made of a muscular sensation push-button indicating the firing position by a threshold; a button of this type has been described in U.S. Patent No. 2,791,664 in the name of the applicant.

What I claim is:

1. An aircraft pilot's handle unit having control buttons thereon, comprising:

- (a) a vertically disposed pilot's handle shaped to impose a fixed position to the pilot's hand when grasped;
- (b) a pair of control buttons on the top rear surface of said handle and disposed adjacent to each other so that either may be actuated by the pilot's thumb;
- (c) one of said buttons being an ordinary push type unit;
- (d) the second of said buttons controlling the trim system of the aircraft;
- (e) a third control button on the front surface of said handle adjacent to the top thereof and in line with said one button;
- (f) a trigger pivotally mounted on said handle between said first and third buttons and of sufficient length so that when in the inoperative position it extends over and covers said one electric control button to prevent accidental depression thereof;

4

- (g) the trigger when in the operative position extending down over said third control button so that it may be pressed by the forefinger of the pilot to thereby activate said third control button; and
- (h) said second control button having four positions for dive, climb, left turn, and right turn.

2. An aircraft pilot's handle as set forth in claim 1 wherein:

- (a) said second button is supported by a movable spherical ball section mounted within said handle unit; and
- (b) means integral with said second button are provided which will separately activate one of four control switches.

3. An aircraft pilot's handle as set forth in claim 1, wherein:

- (a) said second button is supported by a ball joint movably mounted in said handle;
- (b) a plate member is integrally connected to said second button;
- (c) engaging members are mounted on said plate member in spaced relation; and
- (d) switch means are associated with each of said engaging members which are connected to a trim control circuit.

4. A handle as set forth in claim 1, including an intermediate position for said trigger between said operative and said inoperative positions, and means to positively locate said trigger in said intermediate position.

5. A handle as set forth in claim 4, wherein said trigger is keyed on a tubular shaft, a return spring being disposed inside said tubular shaft, said spring having one end fixed to said tubular shaft and the other end connected to an end of a regulating screw which is mounted on said handle and has said end projecting within said other end of said tubular shaft.

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