

[54] **DEVICE FOR PRODUCING MISSILE GUIDING SIGNALS**

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[30] **Foreign Application Priority Data**

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[58] Field of Search.....244/3.11-3.14,
244/3.16

[56]

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[57]

ABSTRACT

A device for producing signals for guiding a jet-propelled missile includes a periscope associated with an infrared goniometer, the periscope having an eyepiece and being mounted on a support plate. A hand lever is provided for manual guidance of the missile in the event that infrared guidance is ineffective and is positioned to extend in the direction of the line of sight of the periscope. This handle is positioned above the support plate of the periscope and on the side of the periscope opposite that having the eyepiece, for easy and comfortable operation by an operator.

2 Claims, 2 Drawing Figures

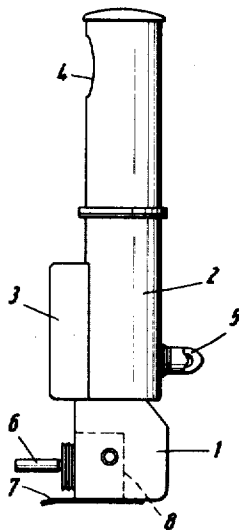


Fig. 1

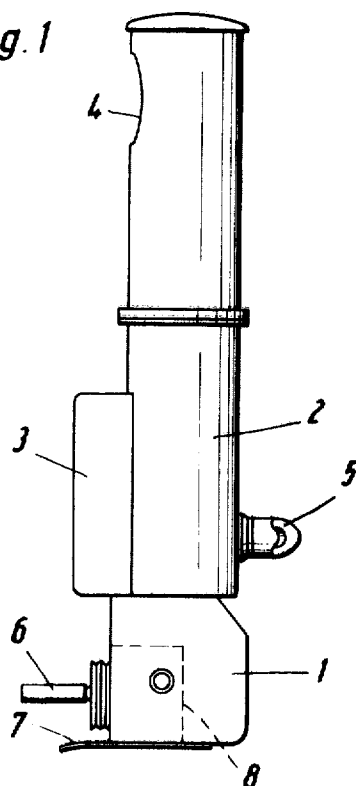
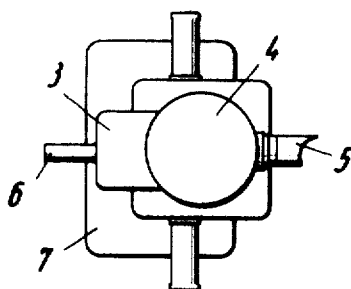


Fig. 2



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DEVICE FOR PRODUCING MISSILE GUIDING SIGNALS

This application is a continuation of application Ser. No. 729,215, filed May 15, 1968, and now abandoned.

BACKGROUND OF THE INVENTION

Jet-propelled missiles, after firing, are guided to the target by guiding signals provided from a target tracking device or the like. The installations for guiding of such missiles are usually automated to such an extent, by the use of an infrared goniometer, that it is not necessary for the gunner or operator to use a hand lever or control stick. The activity of the gunner, after firing or launching of the missile, consists substantially in manipulating a periscope whose movement produces all the signals necessary for guiding the missile. However, if the sensitive parts of the infrared guidance system fail during rough operation of the installation, or if the installation is operated by a gunner not sufficiently familiar with infrared guidance techniques, there arises the necessity of combining such a semi-automatic installation with a manually operated, Cardan-supported hand lever. Combination guiding installations, where the missile can be controlled selectively either semi-automatically or manually, are known. In the known installations, the necessary units are mounted in side-by-side relation on a common support so that the operating handles are arranged side-by-side on one surface.

With these known installations, as soon as it is necessary to switch from semi-automatic guidance to manual guidance, or vice versa, the gunner must turn to the proper handles and adjusting means of the respective apparatus to be operated. Correspondingly, he must change his body position. As a result, his attention is diverted from observation of those processes, such as tracking of a target, on which it is essential that he keep an eye. Moreover, since the operation of guiding signal installations for guided missiles requires, in any event, great skill and concentration of the gunner or operator, any disturbance and diversion is undesirable.

SUMMARY OF THE INVENTION

This invention relates to the production of guiding signals for guided missiles and, more particularly, to an improved guiding installation of the semi-automatic type including a manual adjusting member operable to influence the guiding signals.

In accordance with the invention, the hand lever or control stick is so combined in the overall guiding arrangement, as being combined with the signal block or unit of a periscopic installation, that a favorable arrangement of the control stick or hand lever, and the operation thereof, is adapted to the anatomy of the human body. Thus, the hand lever or control stick is so arranged that it can be easily operated in a comfortable body position of the gunner while, on the other hand, it is also protected against accidental or inadvertent operation.

More particularly, the hand lever is arranged above a support for the periscope and on that side of the periscope remote from the eyepiece, the handle or control stick extending in the viewing direction of the periscope. Thereby there is realized a guiding installation which is arranged for selective operation either with infrared guidance or tracking or with manual guidance or tracking. In addition, the actuation of the hand lever, handle or control stick is adapted, to a great extent, to the physiological movements of the gunner, and particularly the movements of his hand and forearm.

In a preferred embodiment of the invention, the bottom or support plate of the signal block, which represents a part of the periscope structure, is designed as a support for the arm or hand of the gunner during operation of the hand lever or control stick. Also, the manual control means may be provided as a self-contained unit which can be readily installed in the signal block, whereby it can be tested and replaced separately as a unit.

An object of the invention is to provide an improved guiding signal producing installation for guided missiles.

Another object of the invention is to provide such an installation of the semi-automatic-type, and incorporating a manual guidance hand lever or control stick particularly positioned for easy and comfortable operation by a gunner or operator.

A further object of the invention is to provide such an installation in which the hand lever or control stick is combined with a signal block of a periscopic tracking plant.

Yet, another object of the invention is to provide such an installation in which the hand lever or control stick is so positioned that it can be easily operated by the gunner, in a comfortable body position, while the hand lever or control stick is protected against accidental operation.

A further object of the invention is to provide such an installation in which the hand lever is arranged above a periscope support and on that side of the periscope opposite the eyepiece, with the hand lever or control stick extending in the viewing direction of the periscope.

Still another object of the invention is to provide such an installation wherein actuation of the hand lever is adapted to a great extent to the physiological movements of the gunner, particularly the gunner's hand and forearm.

Another object of the invention is to provide such an installation in which a bottom or support plate of the signal block, forming part of the periscope structure, is designed as a body support for the operation of the hand lever or control stick.

A further object of the invention is to provide such an installation in which the manual control, influenced by the control handle or stick, is designed as a self-contained unit which can be installed in or removed from the signal block readily so that it can be tested and replaced separately as a compact unit.

BRIEF DESCRIPTION OF THE DRAWINGS

For an understanding of the principles of the invention, reference is made to the following description of a typical embodiment thereof as illustrated in the accompany drawings.

In the drawings:

FIG. 1 is a side elevation view of a periscopic guiding installation for guided missiles, and embodying the invention; and FIG. 2 is a top plan view corresponding to FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The missile guiding installation or device shown in FIGS. 1 and 2 can work selectively either with infrared guidance or with manual guidance. The device comprises substantially a signal block 1, a position-finding or tracking block 2, with attached control electronics 3, and the aiming mechanism or periscope 4. In the housing of position-finding block 2, there is arranged, at the eye level of a gunner (not represented), the periscope eyepiece 5. On the opposite side of signal block 1, there is arranged the hand lever or control stick 6 for manual guidance, and this hand lever or control stick extends in the viewing direction of the periscope.

The bottom plate 7 of signal block 1 is a part of the periscopic guiding installation, and is, in accordance with the invention, designed as a support for the hand and forearm of a gunner sitting behind the eyepiece, in the case of manual guidance. The guiding operation is carried out, both in semi-automatic guidance and in manual guidance, by the gunner in the same perfectly relaxed body position. Thus, the gunner can give his undivided attention to observation and guidance or tracking of the missile.

Preferably, the manual guidance unit operated by hand lever 6 is arranged as a self-contained unit which can be installed in signal block 1 as represented by the separating line 8. Thereby, this unit can be readily removed from signal block 1, for inspection, repair or replacement.

With the arrangement of components as described above, the gunner manipulates periscope 4 using the two handles extending laterally to opposite sides of the unit and perpendicularly to the neutral position of control handle 6, to manipulate telescope 4 to follow the target. The position-finding block 2, with its attached control electronics 3, transmits guiding

signals to the missile in accordance with the viewing direction of periscope 4, so that the guided missile will tend to follow the line of sight from periscope 4 to the target.

Should the semi-automatic or automatic guidance system contained in position-finding block 2 fail, or become defective for any reason, the operator simply grasps control handle 6, which is located in a common vertical plane with eyepiece 5 and which extends directly opposite to eyepiece 5, and adjusts control handle 6 to point in the direction of the target. As a result, the manual guidance arrangement in signal block 1 transmits appropriate guiding signals to the missile to guide the missile toward the target. The manual guidance means 1,6,8 thus "takes over" in the event of failure of the automatic or semi-automatic infrared guidance means 2, 3.

When guidance is to be effected by operation of handle 6, periscope 4 serves only as a means for observation, and the gunner must form, by himself, the guiding signals as a function of the visually perceived deviation of the missile from the likewise only visually perceived line of sight, by moving control stick 6 about two perpendicular axes. The mechanical movements of control stick 6 are transformed, in signal box 1, into electrical signals which are transmitted to the missile. Periscope 4 is not moved unless the missile has moved out of the field of view thereof. The manually operated guiding arrangement thus is an aid so that the gunner is not defenseless against an attacking enemy in case the semi-automatic guiding arrangement fails, and is thus available for emergency use.

Since the manual guiding arrangement is connected with

the periscope, it follows movement of the periscope in azimuth, so that control stick 6 is always parallel to the optical axis of the periscope. The periscope is not moved in elevation.

I claim:

1. In missile guiding apparatus, of the type including first semi-automatic guiding device, a second manual guiding device and a guiding signal block, with the semi-automatic guiding device including a periscope having an eyepiece and a viewing direction, and having an optical axis adjustable in azimuth and in elevation by laterally projecting handle means, the semi-automatic guiding device further including an infrared goniometer operatively associated with the periscope and the signal block: the improvement comprising said manual guiding device being positioned beneath said periscope to form a unit therewith and being operatively associated with said signal block; said manual guiding device including a forwardly extending control stick in a common vertical plane with said eyepiece rigidly movable in azimuth with said periscope, said control stick being adjustable in azimuth and in elevation, and extending laterally from said unit at the side opposite said eyepiece and in said viewing direction.

2. In missile guiding apparatus, the improvement claimed in claim 1, including a bottom plate secured to said signal block to support said unit, said bottom plate extending laterally beyond either side of said unit to serve as a support for the hands or forearms of an operator during manipulation of said apparatus.

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