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METHOD OF AND SYSTEM FOR GUIDING A MISSILE

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FIG. 1

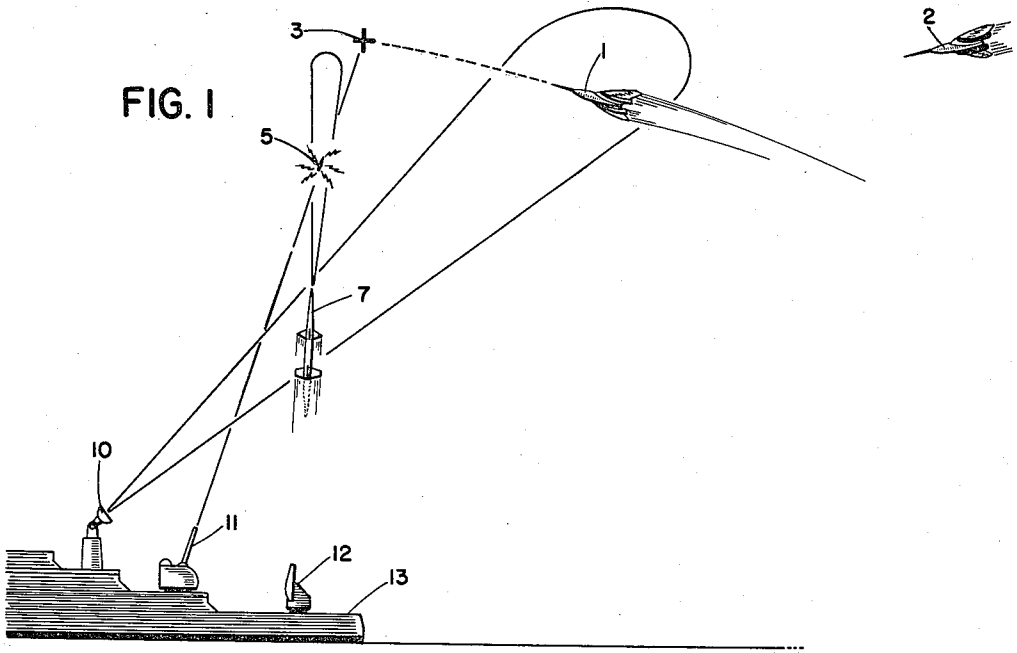
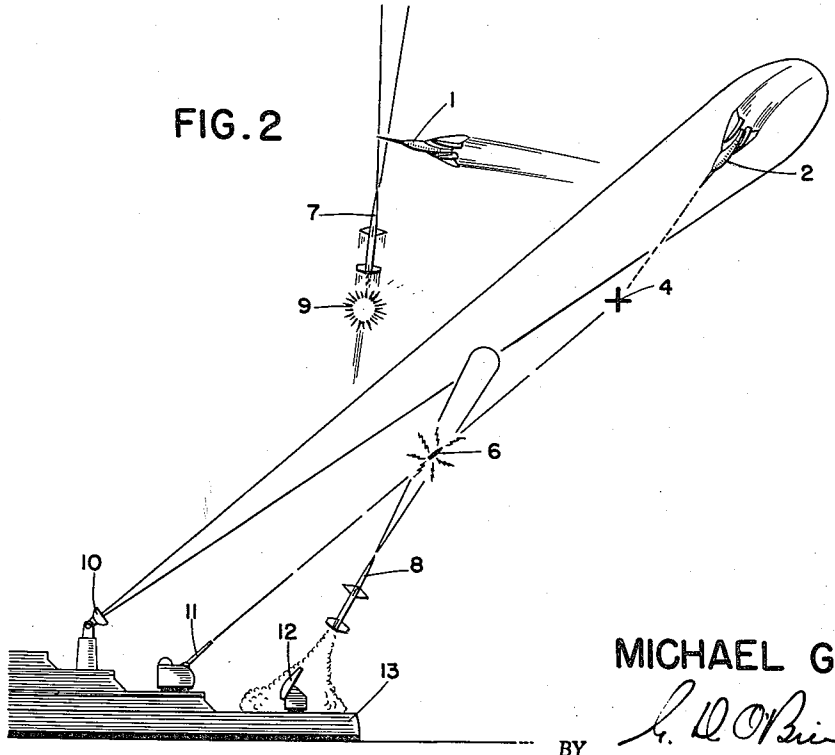


FIG. 2



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METHOD OF AND SYSTEM FOR GUIDING A MISSILE

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The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to a method of guiding a missile to a target.

At the present time, guided missiles are directed toward their targets in various ways. Some missiles are controlled and guided by a radio beam which continually receives information of the path of the target and feeds this information to the missile from the time of the launching of the missile to the end of its flight. Other missiles, which are constrained to a radio beam, have a homing head which contains means for detecting the target and controlling the motion of the missile near the end of its flight. In addition, some missiles are directed to the target without the guidance information of a radio beam. In this case, the homing device in the head of the missile does all the detecting of the target and the control of the flight of the missile.

The disadvantage of using the homing means of a missile as the means for detecting a target from the launching site is that the range of the homing means by itself is too limited to reach effectively many targets. To overcome this, a radio guidance beam has to be employed with the missile to bring it within an effective range of the target. This new arrangement creates the disadvantage of monopolizing a radio guidance beam with a single target and a single missile for the duration of the flight of the missile which makes it impossible to track and detect other targets during the flight time of the missile.

Accordingly, an object of the present invention is to guide a missile closer to a target before the homing device begins to track the target.

Another object of the present invention is to provide a more selective manner of picking up a single target.

A further object of the present invention is the ability to overcome the limitation of locking a guidance beam on a target and missile until the end of the missile flight.

Still another object of the present invention is to increase the assurance of the missile hitting a target by eliminating deflecting interference from the launching site and from defensive countermeasure decoys.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIGS. 1 and 2 show a diagrammatic representation of the sequence of operation in one illustrative embodiment of the inventive method and apparatus.

Referring now to the figures, wherein like reference characters designate like or corresponding parts, there is shown at a firing site **13**, a gun director **10** detecting the first target **1**. The detected information of the target is evaluated and fed to a gun **11** which is directed to fire a projectile **5** toward the expected collision point **3** of a subsequent fired missile **7** and the target **1**. The projectile carries a radio beacon, a flare or other guiding means for a missile. Immediately after the projectile **5** is fired, a missile **7** is launched from the launcher **12**. The missile has homing or sensing means in the head thereof to home on the projectile to effect deflection of the missile control surfaces causing the missile **7** to follow the projectile **5** on a path to an intercept point **3** with the target **1**. Since the signature of the projectile is greater than any other signals in the neighborhood one of the reasons being the proximity of the missile and the projectile to one another, the missile will home on the signature of the projectile and will not be deflected by interfering signals. As soon as the missile is near enough to the target to acquire the target in the cone of the homing detecting means in the missile head, the projectile **5** is set to detonate or to extinguish its beacon. After the beacon is suppressed or the projectile destroyed as indicated at **9**, the missile will home on the acquired target **1**.

One of the advantages of the present invention is that the missile is led out to the neighborhood or vicinity of the target by the projectile without the necessity of having the missile equipped to receive guidance information from the launching site. Thus, the particular invention can be used on ships or from other launching sites that do not have the space or are not furnished with electronic guidance means but which have gun directors or target detection means. As soon as the projectile has been fired by the gun, the gun director **3** is free to search for other targets which increases the maneuverability of the guns in the case of a multiple attack. This has been shown in FIG. 2 by the representation of the gun **11** firing a second projectile **6** at a second target **2** toward a second intercept point **4** with a second missile **8** homing on the second projectile until the second target is acquired in the cone of the homing detecting means of the second missile.

Since the missile does not home on or detect a target until it has traveled some distance from the launching site, homing means in the missile having a more selective homing cone can be used thereby increasing target acquisition and following without being deflected from the designated target by interference from other nearby targets or decoys. Since the missile, as soon as it is launched, homes on the projectile which is the object exhibiting the largest signal to the missile homing means, the effect of any deflecting interference from the launching site arrangement or conditions will be decreased. Accordingly, the missile can be advantageously provided with a homing detection means whose power is concentrated in a narrower and longer cone of detection giving the missile a longer homing range, a greater selectivity of picking up a designated target and an increase in its accuracy of performing its task.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What it claimed is:

1. A system for guiding a missile to a target comprising a projectile fired from a gun on a collision path to a target according to the ballistics of a self-propelled guided missile, a self-propelled guided missile launched immediately after the projectile is fired having homing means for detecting the projectile, said homing means causing the missile to home on the projectile, means located on the projectile for eliminating the projectile at the time the homing means of the missile detects the target.

2. A system for destroying a target including a ballistic firing device and a guided missile launcher, a self-propelled guided missile adapted to be ejected from said missile launcher, a projectile adapted to be fired from said ballistic firing device on a predetermined line of fire to an intercept point of the missile with the target beyond

the range of the projectile, a transmitting means associated with said projectile to radiate a relatively strong detectable radio signal, homing means associated with said missile responsive to projectile emitted radio signals to cause the missile to follow the projectile on a path to the intercept point with the target, means disposed in said projectile to extinguish said projectile emitted signals after a predetermined time interval, said homing means causing said missile to home on said target.

3. A system for destroying a target including a ballistic firing device and a guided missile launcher, a self-propelled guided missile adapted to be ejected from said missile launcher, a projectile adapted to be fired from said ballistic firing device on a predetermined line of fire to an intercept of the missile with the target beyond the range of the projectile, homing means associated with said missile to cause the missile to follow the projectile on a path to the intercept point with the target, said projectile being the object at the time of launching of the missile of exhibiting the largest signal to the homing means, means disposed in said projectile to suppress the exhibiting signal of the projectile after a predetermined time interval, said homing means causing said missile to home on said target.

4. A system for destroying a target including a ballistic firing device and a guided missile launcher, a self-propelled guided missile adapted to be ejected from said missile launcher, a projectile adapted to be fired from said ballistic firing device on a predetermined line of fire to an intercept point of the missile with the target beyond the range of the projectile, an illuminating means associated with said projectile to radiate a relatively strong light signal, homing means associated with said missile responsive to projectile emitted light signals to cause the missile to follow the projectile on a path to the intercept point with the target, means disposed in said projectile to extinguish said projectile emitted signals after a predetermined time interval, said homing means causing said missile to home on said target.

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