

[54] **THREE "D" WEAPONS SIGHT**

[75] Inventor: **William H. Rymes, Arlington, Va.**

[73] Assignee: **The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

[22] Filed: **May 14, 1973**

[21] Appl. No.: **360,282**

[52] U.S. Cl. **356/13, 2/10, 350/96 B, 350/200, 350/293, 350/298, 356/247**

[51] Int. Cl. **G02b 27/22**

[58] Field of Search..... **2/10; 350/96 R, 96 B, 293, 350/298, 200; 356/247, 13**

[56] **References Cited**

UNITED STATES PATENTS

3,059,519	10/1962	Stanton	350/298 X
3,205,303	9/1965	Bradley	350/298 X
3,633,988	1/1972	Farrar	356/247 X
3,787,109	1/1974	Vizenor	350/298 X

Primary Examiner—John K. Corbin

Assistant Examiner—F. L. Evans

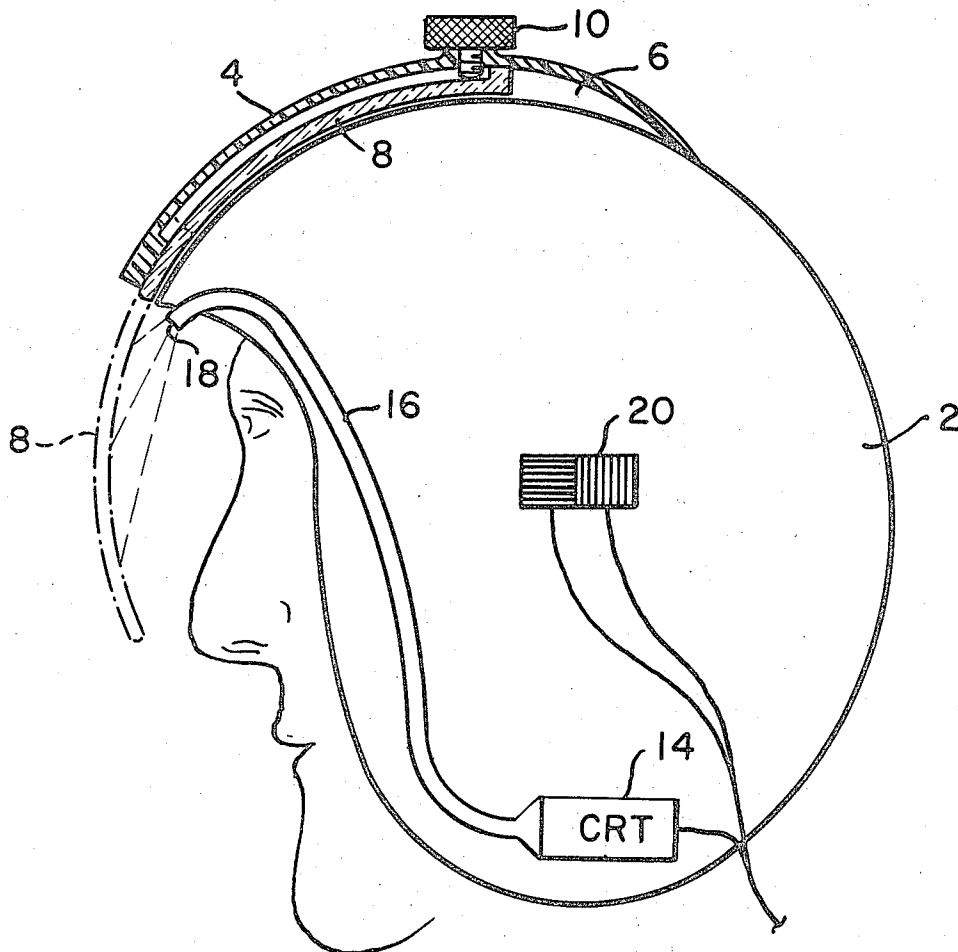
Attorney, Agent, or Firm—R. S. Sciascia; P. Schneider; R. Rothman

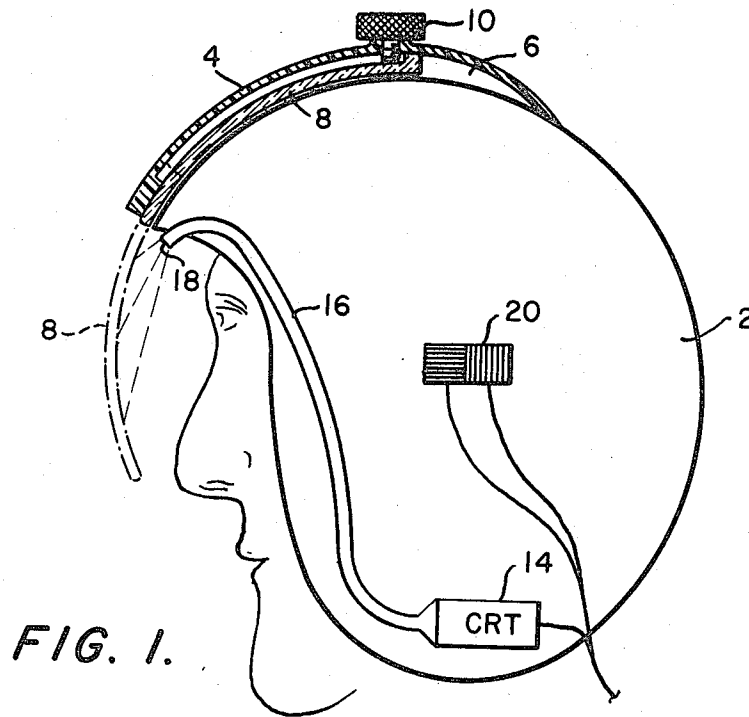
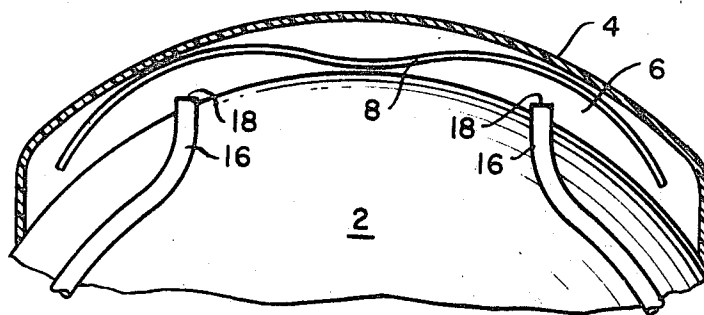
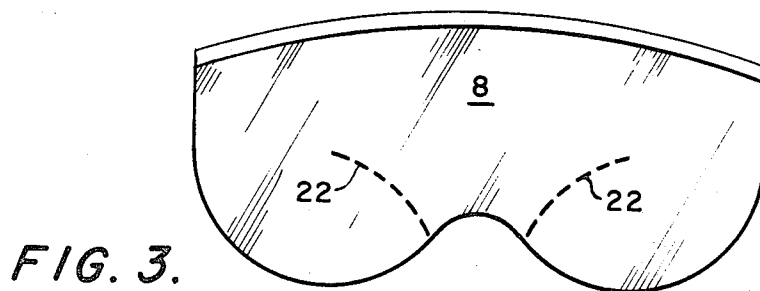
[57]

ABSTRACT

An improved sighting device for projectile launchers that are mounted on a moving vehicle includes a dual parabolic visor slidably positioned on a helmet. The visor is in the form of two parabolas; and when locked in position, one parabola is in front of each eye of the wearer. The focal point of each parabola is at a prescribed point on the upper leading edge of the helmet opening. Fiber optic bundles, located at each focal point are connected to cathode-ray tubes and project a series of dots on to the visor in front of each eye of the wearer to simulate, in three dimensions, the trajectory of a projectile, if the projectile were fired at any given time.

9 Claims, 3 Drawing Figures





THREE "D" WEAPONS SIGHT

BACKGROUND OF THE INVENTION

The present invention relates generally to aiming systems and especially to an improved sight for projectile launchers.

The ability of an observer to appreciate distance and the three-dimensional properties of objects depends upon a phenomenon known as stereoscopic vision. Stereoscopic vision is physiological in origin and depends on the brain to fuse two images, formed on the individual retinas of a person's eyes. The two eyes view an object from slightly different angles, and the two images are combined in the brain to give a sensation of shape or form and a capability to resolve differences in range or spacing.

At present there are two primary ways of determining the correct point in time to fire guns, rockets, or high velocity projectiles. The first is by means of a servoed sight; and the second is by means of a simulated bullet, projectile or rocket path as displayed on a headup, see-through sight. Both systems are limited to lead angle only and depend on either range bars or radar tracking for firing range criteria. Certain drawbacks are associated with these systems such as the necessity to have prior knowledge of target size to set the range bars, the settling time of the radar, and the settling time of a servoed sight.

SUMMARY OF THE INVENTION

The present invention eliminates the need to have prior knowledge of target size, settling time of the radar, and settling time of a servoed sight, by projecting a series of dots on to the visor of a helmet in front of each eye of the wearer to simulate in three dimensions the trajectory of a projectile at any instantaneous firing. A computer system of known design calculates and controls the projection of the dots. The wearer will perceive a line or series of dots, because of his stereoscopic vision, that appears to extend out in front of his launcher. The system may also be employed to properly align radar or other sensing devices.

An object of the present invention is to provide firing criteria for guns and launch criteria for missiles, rockets, and high velocity projectiles.

Another object is to provide a method of positioning radar antennas for early target acquisition and other sensors of various types.

Other objects, advantages, and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic of a helmet employing the present invention;

FIG. 2 is a schematic of a top of the helmet depicting the shape of the visor; and

FIG. 3 is a schematic view of the paths projected on the visor in front of each eye.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1, which illustrates a preferred embodiment of the sight, shows a helmet 2 having a visor guard 4

mounted thereon. The visor guard 4 may be connected with any suitable adhesive to the top of the helmet 2 and forms a hollow chamber 6 therewith. Within the chamber 6 is a dual parabolic visor 8 slidably connected to the visor guard 4 by a lock nut 10. The lock nut 10 may, for example, pass through a slot (not shown) in visor guard 4. When the nut 10 is loosened, visor 8 may be moved to the position indicated by the broken line in front of the wearer's eyes. The lock nut 10 may then be tightened to rigidly position the visor.

The visor 8 is shaped in the form of two parabolas which, when in the position indicated by the broken line, are positioned in front of each eye. The focal point of each parabola is at a prescribed point on the upper leading edge of the helmet opening. A pair of cathode-ray tubes 14, only one of which is shown in the side view of FIG. 1, are located at the lower edges of the helmet 2 to lower the center of gravity. A pair of coherent, fiber optic bundles 16, only one of which is shown in FIG. 1, are connected at one of their ends to the cathode-ray tubes 14, and their other ends terminate at the focal points 18 of each parabola defined by the visor 8. The actual shape of the visor 8 can better be seen in FIG. 2, which depicts the two parabolas formed by the visor 8 and the fiber optic bundles 16 each of which have one of their ends located at a focal point of one of the parabolas.

In operation, each cathode-ray tube 14 will project on to the termination of the respective fiber optic bundle 16, a simulated, two-dimensional path that the bullets, rockets projectiles, or sensor beams would follow should they be activated by the wearer at any moment of time. Those paths 22 will be projected from the focal point of each parabola on the visor as shown in FIG. 3 and reflected from the visor's surface. The display will be a computer-generated, two-dimensional path and will be a function of platform motion along with the bullet's, rocket's or projectile's ballistic characteristics or sensor characteristics. To compensate for movement of the wearer's head from boresight, sensors 20, connected to the helmet and known in the art, will provide helmet position, so that the display as viewed by the pilot will always coincide with the actual projected path of the projectile or sensor beam. The pilot will perceive a line or series of dots, because of his stereoscopic vision, that appear to extend out in front of his aircraft. He will visualize a stream, not unlike a stream of water from a garden hose, extending out toward the target. When the stream coincides with the target the system is properly aimed for actuation.

On those systems employing missiles the cathode-ray tubes can be selected by logic to display an optimum launch envelope or sighting reticle as the situation demands. As those skilled in the art would recognize, the system as shown has wide flexibility and could also be used to position radar antennas for early target acquisition and sensors of various types. In the case of sensors or radar, the computer would simply use the directional characteristics of the radar or sensor to project a two-dimensional, optimum acquisition path on the visor 8.

A reflective coating may be placed on the visor 8 to enhance the reflection of the paths projected from the fiber optic bundles. In addition, the visor may be smoked to cut down on glare. The system may be used

with aircraft or other movable projectile launchers or sensor systems.

Obviously many modification and variations of the present invention are possible in 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 is claimed is:

1. A sight comprising:
 - a support;
 - a dual parabolic visor mounted on the support;
 - a pair of fiber optic bundles, each bundle having one end located at a focal point of one of the parabolas defined by the visor; and
 - a pair of cathode-ray tubes connected to the other ends of the fiber optic bundles for projecting on each part of the dual visor a two-dimensional path representing the flight path of a projectile if it were simultaneously launched, so that a viewer looking through the visor would see the two paths stereoscopically as a single path extending outward from the visor.
2. The sight of claim 1 wherein said support is a helmet and the cathode-ray tubes are mounted on the helmet.
3. The sight of claim 2 wherein said helmet has a visor guard mounted thereon and said visor is slidably connected to said visor guard.
4. The sight of claim 3 wherein said visor is smoked to partially attenuate the light passing therethrough.
5. A method of aiming a weapon system, employing a dual, parabolic visor, comprising the steps of:
 - projecting on each parabola defined by said visor, from the focal point of each parabola, a two-dimensional path representing the flight path of a projectile if it were instantaneously launched, the two paths when viewed by an observer who is wearing the visor forming a stereoscopic line which appears to extend in front of him;
 - peering through the visor to determine if the stereo-

scopic line defined by the projected paths intersects a target; and
 adjusting the aim of the weapon system until the stereoscopic line intersects the target.

6. In combination with a weapons system and connected computer for deriving a representative, two-dimensional path of a projectile fired instantaneously from the weapons system and a pair of cathode-ray tubes for displaying that path, the improvement comprising:

a helmet

a dual parabolic visor mounted on the helmet; and means for projecting the path displayed on the cathode-ray tubes from the focal point of each parabola defined by said visor on to each parabolic section of said visor.

7. The combination of claim 6 wherein said helmet includes a visor guard and said visor is slidably mounted on said visor guard.

8. The combination of claim 6 wherein said projection means comprises a pair of fiber optic bundles, each bundle having one end located at the focal point of one of said parabolas and the other end connected to one of said cathode-ray tubes.

9. A method of aiming a sensor system, employing a dual parabolic visor, comprising the steps of:

projecting on each parabola defined by said visor, from the focal point of each parabola, a two-dimensional path representing the optimum acquisition path of the sensor, the two paths when viewed by an observer who is wearing the visor forming a stereoscopic line which appears to extend in front of him;

peering through the visor to determine if the stereoscopic line defined by the projected paths intersects a predetermined area; and
 adjusting the orientation of the sensor system until the stereoscopic path intersects the area.

* * * * *

45

50

55

60

65