United States Patent

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[45] Patented **Dec. 22, 1970**
[73] Assignee **the United States of America as represented by the Secretary of the Army**

[54] **MISSILE ROLL COMPENSATION DEVICE**
1 Claim, 2 Drawing Figs.

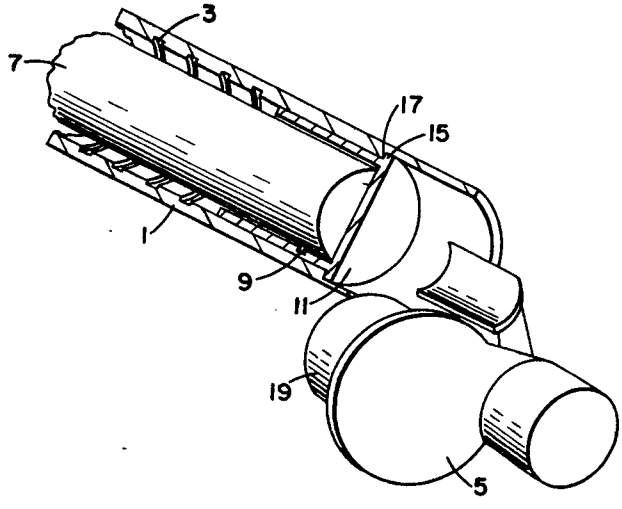
[52] **U.S. Cl.** **89/1.8;** 102/34.3, 102/38; 89/1.816
[51] **Int. Cl.** **F41f 3/04**
[50] **Field of Search** 89/1, 1.8, 1.813, 1.816; 102/38, 34.3

[56] **References Cited**
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ABSTRACT: A missile roll-compensating apparatus for imparting a roll correction to a missile fired from a rifled gun tube launcher having a device for closing the breech of the launcher. This apparatus imparts the roll correction at the initial phase of missile launching and the correction is applied in a direction opposite to the spin developed by the missile during the remainder of the missile's travel in the rifled launcher. The apparatus includes a missile cap telescoped over the aft shroud of a missile. A helical groove is located in one of these members and a protuberance is located on the other member for engagement with the helical groove, thus materially diminishing the roll of the missile as it leaves the tube.



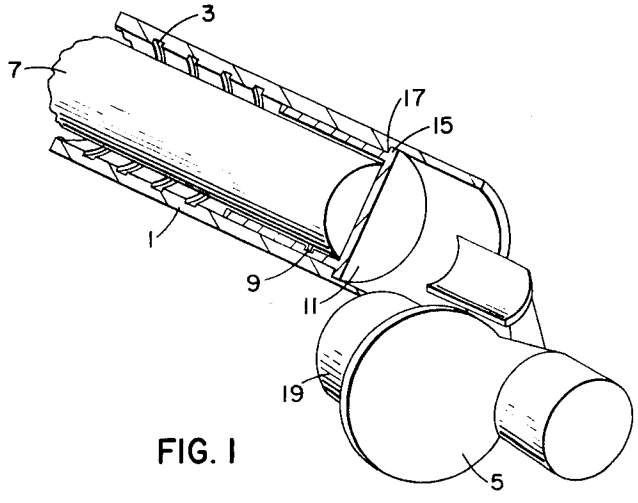


FIG. 1

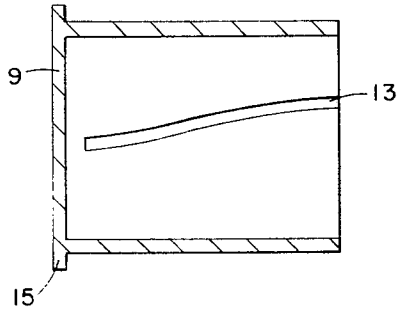


FIG. 2

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MISSILE ROLL COMPENSATION DEVICE

This is a continuation-in-part of Pat. application Ser. No. 787,411, filed Dec. 27, 1968, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to the field of missile launchers. In firing missiles from a rifled gun tube launcher, the missile develops a roll far in excess of that which the missile can functionally overcome during the flight of the missile to a target. This roll is developed by escape of pressurized gases of combustion through the rifling grooves of tube launcher. The gases engage the skin of the missile and by friction impart rotation to the missile in the direction of the rifling helix. Contact with the gases escaping in the grooves occurs along the entire cylindrical length of the missile. The gyrostabilizer of the missile is inadequate to cope with the rate of rotation imparted to the missiles by the escaping gases.

SUMMARY OF THE INVENTION

This invention provides a solution to the problem by the inclusion of a counter roll compensating apparatus located between the missile and the missile cap. The apparatus will impart an 8° to 12° roll to the missile in the direction opposite to compensated roll developed due to the gun tube rifling during the rest of the missile travel in the tube. At the time the missile exits the tube launcher, the now compensated missile roll will be within the limits that can be functionally controlled by the gyrostabilizer. The use of the invention will eliminate fatigue cracking of the gun tube launcher.

This invention may be better understood from the following detailed description taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows the apparatus on a missile in a rifled gun tube.
FIG. 2 shows the helical groove located in the missile cap.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference numeral 1 indicates a rifled gun tube launcher having rifling grooves 3 therein. The launcher includes a device 5 for closing the breech of the launcher. A missile aft shroud 7 is shown having a protuberance 9 on the outer surface thereof. A missile cap 11 encloses the shroud and includes a helical groove 13 for engagement with said protuberance for imparting a counterroll correction to the missile when fired. The missile cap also includes a flange 15 for engaging a shoulder 17 of the gun tube launcher. When device 5 is closed, member 19 will cause the cap to be secured to shoulder 17.

As the missile in initially launched, protuberance 9 is in engagement with groove 13 and follows the groove to its end. The cooperation between the protuberance and the groove will impart to the missile an 8° to 12° roll. This imparted roll will offset the rotation imparted to the missile by the frictional contact of the combustion gases escaping forwardly through the rifling grooves. Therefore the compensating apparatus allows the missile to exit the rifled gun tube launcher with a roll that is functionally controlled during the flight of the missile to its target.

While only one groove and protuberance is shown, a plurality of grooves and protuberances may be used if desired.

I claim:

1. A roll-compensating apparatus comprising a rifled gun tube launcher having a device for closing the breech of the launcher, a missile engaging the lands of the rifling whereby the gases of combustion escape forwardly through the rifling grooves and by frictional engagement with the skin of the missile impart a rotation to the missile in the direction of the rifling helix, a shroud located on the aft end of the missile including a protuberance and a cap disposed for secured engagement between the breech device and the launcher tube, said cap enclosing the shroud and including a helical groove for engagement with said protuberance for imparting a counter rotation to the missile when fired.