ABSTRACT: A steering tube for a nonspinning projectile consisting of a tube body that is provided with a number of slits in it which define fins between them. Weakenings are provided in the body and which are arranged so that the fins can swing outwardly on these weakenings to enable the fins to become extended parallel to the flight path of the projectile to thus reduce air drag. The fins fold out under the pressure of the driving gas as the projectile leaves the barrel.
FOLDOUT FINS FORMING STABLE FLIGHT FOR A NONSPINNING PROJECTILE

The invention particularly relates to fins that fold out so that they become parallel to the flight path of the projectile thus reducing head resistance and resulting in a substantial reduction of the air drag.

Currently known steering tubes provided with foldout fins usually have slits directed at right angles to the flight path of the shell, causing the fins to so fold out that their full surfaces form an angle to the flight path with the result that the air friction or drag of the projectile increases considerably. Such an arrangement is shown for example in French Patent No. 1,681,664.

The present invention concerns an open steering tube attached to the tail of a projectile, said tube having a number of H-shaped slits so arranged that fins defined by the slits and parallel to the flight path will fold out due to the difference in pressure between the inside and the outside of the steering tube when it comes out of the muzzle of the barrel.

An embodiment of the invention will now be described with reference to the accompanying drawing in which:

Fig. 1 is a side elevational view, with the projectile shown in a barrel and the barrel and the steering tube being shown in section;

Fig. 2 is a sectional view, taken substantially on the line II-II of Fig. 1;

Fig. 3 is a side elevational view showing the projectile just as it leaves the muzzle of the barrel and with the fins beginning to fold outwardly;

Fig. 4 is a cross-sectional view, taken substantially on the line IV-IV of Fig. 3;

Fig. 5 is a side elevational view of the projectile as it appears when completely outside of the barrel and the fins are fully folded out; and

Fig. 6 is a cross-sectional view, taken substantially on the line VI-VI of Fig. 5.

Referring to the drawing there is shown therein a steering tube 1 attached in a suitable manner, such as by a threaded mount, to the rear end of a projectile 2. The steering tube 1 has four evenly distributed groups of slits. Each group consists of two, equally long transverse slits 3, 4 and a longitudinal slit 5 that connects the midpoints of the slits 3, 4 so that the slits together form an H-pattern. Each group are thus formed two similarly sized tongues 6, 7 and constitute fins and that are intended to be folded out along weakened lines 8 located between the ends of the transverse slits, such weakened lines 8 acting as hinges for the tongues. Two fins belonging to adjacent groups come into contact with each other when they are fully folded out by the gas pressure in the barrel, thus forming four radially directed double fins 13 as seen in Fig. 6. The ends of the transverse fins 3 and 4 are terminated by a number of holes 18 in order to eliminate local stress and possible indications of rupture.

The steering tube 1 is fitted with a short, leading section 11 having full-calibre diameter. The steering tube 1 itself, however, has a smaller diameter so that an annular airgap is formed between the barrel 9 and the steering tube. When the combustion of the powder in the barrel proceeds the gas pressure will increase but will always be the same around the fins up to the moment when a pressure difference develops between the inside and the outside of the steering tube. This happens when the front end of the steering tube just projects out from the muzzle of the barrel. The fins will thereafter quickly and completely fold out due to the rapidly increasing difference between the pressure inside and outside the fins.

Other embodiments of the invention are possible. The slits can, for example, have a U-shape so that only one tongue in each group will be formed. These tongues can then either be adjacent in pairs so that they come together in the described manner or they can be located at a greater distance from each other so that each tongue alone forms a steering fin. A suitable stop means might be arranged in the latter case, for example by simply making the steering tube of thicker material with the hinges or weakenings 8 made more pronounced in V or U form that will act to stop the folding out movement beyond a certain angle. It is also possible to state that the longitudinal slit 5 does not necessarily need to run through the midpoints of the transverse slits 3 and 4. The tongues 6, 7 will then be of different length and the assembly of fins 13 finally formed will jet out further from the projectile body but will still be fairly rigid. The extent to which the tongues actually fold out has been tested by firing shells with the steering tubes through cardboard screens wherein accurately formed diamond-shaped holes developed.

What we claim is:

1. An arrangement of foldout fins forming stable flight for a nonspinning projectile comprising, a steering tube attached to the rear end of a projectile, said tube having a wall provided with a number of slits defining tongues between them, said tongues folding outwardly due to the remaining pressure of the driving gas after the projectile has been launched, the slits being arranged in groups around the periphery of the steering tube, each group of slits consisting of one longitudinal slit terminating at two transverse slits to produce an H-slit pattern, the ends of the transverse slits being connected by radial weakenings defining a number of tongues to constitute the fins that fold out radially under the action of the gas pressure.

2. A steering tube according to claim 1, wherein two arbitrarily chosen adjacent tongues belonging to two adjacent groups have their weakening lines so close to each other that the ends of said tongues can come together into contact and form a substantially radially directed steering fin.

3. A steering tube according to claim 1, wherein the transverse slits are ended by enlarged openings in order to diminish such stress as might damage the tongues or tear them off along the weakenings.