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PATENT SPECIFICATION

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(54) IMPROVEMENTS RELATING TO PROJECTILES

(71) We, A/S RAUFOSS AMMUNISJONSFABRIKKER, a Norwegian Company, of 2831 Raufoss, Norway, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an arrangement in projectiles particularly, but not exclusively, for subcalibre training systems for an anti-tank weapon.

Projectiles for this purpose comprise a cylindrical head, a rod extending rearwardly from said head, a stabilizing fin in the form of a nozzle secured to the rear end of said rod, a number of propellant sticks arranged evenly spaced around said rod, and means at the rear end of the head anchoring the front ends of said sticks to the head.

When a projectile of the above mentioned type is to be fired from a launcher, provided in the well known manner with an inner subcalibre launching tube, it is necessary to secure on the stabilizing fin of the projectile, preferably by means of shear pins, a stepped support member which together with usual igniter means had to be secured against a shoulder in the breech end of the launcher tube by means of a threaded lock ring.

This arrangement not only increases the production cost of the projectile but also makes the charging operation more complicated and time consuming, at the same time as it involves an igniting programme which is not always safe.

The object of the present invention is to provide a projectile of the type referred to in which the igniter means is assembled together with the stabilizing fin of the projectile in such manner that the whole forms a unit which can be inserted directly into the rear end of the subcalibre launching tube without any locking means, so that said rear end of the subcalibre tube may be secured in the tubular section of the launcher proper by means of a single breech.

According to the present invention, a projectile comprises a head, a rod extending rearwardly from said head, a number of propellant sticks evenly spaced around said rod and anchored at their front ends to the rear end of said head or to a member attached thereto, a stabilizing fin in the form of a nozzle secured to the rear end of said rod, said nozzle comprising a tubular cylindrical ring, a central hub in said ring joined therewith by an apertured web, a rearwardly-extending rear portion of said ring forming at the back of said web an elongated cylindrical space, and igniter means mounted in said space.

The arrangement according to the present invention provides also an increased guidance effect and at the same time the igniter may constitute an obturator or baffle member which in the firing is disengaged and detained in the launching tube.

The invention may be carried into practice in various ways, but one specific embodiment will now be described by way of example only and with reference to the accompanying drawings, in which:

Figure 1 is a side view partly in section of a projectile embodying the invention, and

Figure 2 is a diagrammatical partly sectioned side view of a subcalibre launcher in its extended position with the projectile of Figure 1 positioned therein.

In the drawing the projectile comprises a head 1, made from steel or other suitable metal, provided at its rear end with

a central rearwardly extending steel rod 2 the rear end of which carries a stabilizing fin in the form of a nozzle generally denoted 3. The propellant of the projectile positioned between the fin 3 and the head 1 consists of a number of sticks 4 of propellant evenly spaced around the rod 2 and having their front ends secured to the head 1 or to a disc 5 secured at the rear end thereof. Thus the propellant is not placed in a particular motor tube as the tubular member of the launcher serves as a burning chamber.

The nozzle 3 comprises an outer tubular cylindrical ring 6, a hub 7 screw-threaded on the rear end of the rod 2 and joined with said ring 6 by a web 8 positioned near to the front end of the ring 6. Said web 8 is provided with a number of circumferentially spaced bores 9 through which combustion gases can escape.

The length of the cylindrical ring 6 is so selected that the part thereof at the back of the hub 7 forms an elongated cylindrical space adapted to receive igniter means generally denoted 10. The igniter means comprises a container 11 shaped to fit in the cylindrical space and which is inserted through the rear open end of the ring 6 and is provided with an end flange 12 having a greater diameter than that of the ring 6 so that said flange abuts against the end of the ring. The plug 11 is provided with a forwardly open cavity 13, preferably with a hemispherical rear end, which cavity is filled with igniting powder 16 and has its open end closed by means of a thin disc 18 of a material adapted to be readily disintegrated under the influence of the powder gas on firing. The cavity 13 of the member 11 is connected by means of a flexible tube 14, also filled with igniting powder 16, to a member 15 containing a primer and adapted to be inserted in an active position into the firing pin housing of a rocket launcher.

In order to fasten the container 11 in the cylindrical ring 6 said container adjacent the flange 12 is provided with a circumferential groove 19 into which the rear, preferably thinned, rim portion of the ring 6 is pinched or bent.

Figure 2 shows a conventional projectile launcher 20 in which is mounted a subcalibre launching tube 21 for use in firing subcalibre projectiles of the type above described. Such subcalibre launching tube 21 has its rear end secured in a breech shaped member 22 detachably secured in the rear end of the launcher 20.

In charging the launcher it is only necessary to insert the projectile provided with the igniter 10 directly into the subcalibre launching tube 21 until the flange 12 abuts the rear end of said tube and thereafter the primer member 15 is positioned in active position in the primer chamber of the firing pin housing 23 in conventional manner.

In firing the projectile the container 11, resting with the flange 12 against the rear end of the tube 21, serves as an obturator or baffle to receive the rearwardly directed forces of the explosive pressure until the cylindrical ring is disengaged and thereby ensures that the igniter means 10 is detained.

Due to the extension of the cylindrical ring behind the bores 9 of the nozzle the projectile during its flight obtains an increased stability at the same time as the speed of the projectile may be adapted according to desire with respect to the efficiency of the propellant.

The central hub 7 of the nozzle 3 at the rear end thereof may be provided with a bore adapted to receive a tracer with burning time sufficient for all required ranges.

WHAT WE CLAIM IS:—

1. A projectile comprising a head, a rod extending rearwardly from said head, a number of propellant sticks evenly spaced around said rod and anchored at their front ends to the rear end of said head or to a memebr attached thereto, a stabilizing fin in the form of a nozzle secured to the rear end of said rod, said nozzle comprising a tubular cylindrical ring, a central hub in said ring joined therewith by an apertured web, a rearwardly-extending rear portion of said ring forming at the back of said web an elongated cylindrical space, and igniter means mounted in said space.

2. A projectile as claimed in Claim 1 in which the web is a plate formed with a ring of circumferentially-spaced holes therethrough.

3. A projectile according to Claim 1 or Claim 2, in which said igniter means consists of a container shaped to fit in said space, an ignition charge in said container, an end flange at the rear end of said container having greater diameter than that of said ring, a circumferential groove in said container adjacent said flange, a rim portion of said ring pinched into said groove, and a flexible tube connecting said ignition charge to a primer means adapted to be inserted into the firing pin house of a rocket launcher.

4. A projectile for subcalibre training systems, as specifically described herein with reference to the accompanying drawings.

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The nozzle 3 comprises an outer tubular cylindrical ring 6, a hub 7 screw-threaded on the rear end of the rod 2 and joined with said ring 6 by a web 8 positioned near to the front end of the ring 6. Said web 8 is provided with a number of circumferentially spaced bores 9 through which combustion gases can escape.

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2. A projectile as claimed in Claim 1 in which the web is a plate formed with a ring of circumferentially-spaced holes therethrough.

3. A projectile according to Claim 1 or Claim 2, in which said igniter means consists of a container shaped to fit in said space, an ignition charge in said container, an end flange at the rear end of said container having greater diameter than that of said ring, a circumferential groove in said container adjacent said flange, a rim portion of said ring pinched into said groove, and a flexible tube connecting said ignition charge to a primer means adapted to be inserted into the firing pin house of a rocket launcher.

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