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Subcaliber munition.

A subcaliber munition comprises a penetrator (11) surrounded by a pusher (20) and a sabot (17). In order to prevent premature separation of the sabot from the penetrator a peripheral groove (30) is provided in the forward end of said penetrator (20), and a peripheral tongue (32) extends coaxially from the rearward end of said sabot (17) to be received in said groove (30).

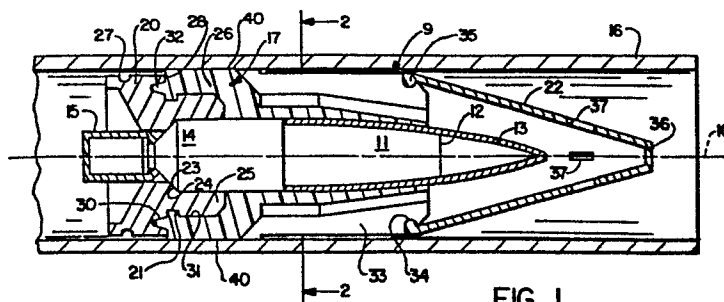


FIG. 1

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SUBCALIBER MUNITION

The present invention relates to subcaliber munition according to the preamble of claim 1.

- 5 In the use of armor piercing munitions it is customary to fire a subcaliber projectile from a gun of larger caliber, by use of a construction in which a small but massive penetrator of material such as tungsten is surrounded by a larger sabot of light plastic such as nylon. The sabot includes a base or pusher against which the propellant
- 10 charge acts to propel the munition from the muzzle of a gun, and a rotating band is formed on the sabot to give the projectile the spin about its axis necessary for stable flight.
- 15 It is intended that the sabot separates from the penetrator after leaving the gun, and the plastic is configured for fracture by centrifugal force to ensure this. However, it has been found that propellant gas sometimes leaks between the pusher and the sabot, and prematurely separates
- 20 the sabot from the penetrator while the projectile is still in the gun.

It is, therefore, the object of the present invention to provide a subcaliber munition at which premature separation of the sabot from the penetrator is prevented. This object is achieved according to the characterizing features of claim 1. Further advantageous embodiments of the present invention may be taken from the sub-claims.

With respect to the figures of the attached drawing an embodiment of the present invention shall be further explained. It shows:

Figure 1 a somewhat schematic view and longitudinal sectional of a projectile according to the invention while still in the barrel of a gun; and

Figure 2 a transverse sectional view of the invention of Figure 1 along the line 2-2 of that figure.

A subcaliber munition 9 according to the invention has a longitudinal axis 10 and is shown to comprise a massive penetrator 11 having a flat forward end 12 with a wind screen 13 and a rearward end 14 to which there is crimped a tracer cup 15. Penetrator 11 is of smaller diameter than the barrel 16 of the gun firing the projectile. Accordingly, the penetrator is made part of an assembly including a base or pusher 20 of aluminum, a sabot 17 of nylon, and a protective plastic cup 22.

Pusher 20 has a forward conical cavity 23 to engage a rearward conical convexity 24 of penetrator 11, and a forward cylinder 25 of pusher 20 has an outer surface 26 on which a diamond or straight knurling 31 is applied for better sealing, axial securement, and for better torque transmission. Pusher 20 has a groove 21 into which the sabot material 17 flows during moulding. Also pusher 20 has a groove 27 for crimping connection to a cartridge case not shown, and a shoulder 28 with a peripheral groove 30 extending rearwardly, and located quite close to the periphery of the pusher.

Sabot 17 engages the knurling 31 and forms a peripheral tongue 32 to engage pusher groove 30 during moulding. As shown in Figure 2, sabot 17 has four deep longitudinal forward slots 33 with tapering bottoms. At its forward end sabot 17 has a peripheral groove 34 to

receive a lip 35 of cap 22, which tapers forwardly to a blunt tip 36 and may have a plurality of slots 37.

It is essential that penetrator 11 be given a rapid spin about its axis 10 for stable flight. This is accomplished by providing sabot 17 with a rotating band 40 for engaging the rifling lands of barrel 16 as the projectile moves in the gun. The resulting torque is transferred to penetrator 20 through the knurlings of surface 26. Also, sabot 17 is moulded around pusher 20, penetrator 11, and wind screen 13 so that a very good coefficient of friction exists between them, and conical surfaces 23 and 24 may be roughened so that under the many thousand g's acting on the munition when it is fired, high friction also exists between the penetrator and the pusher. The result is that as it leaves the gun barrel the entire projectile, including the penetrator, has acquired the necessary spin to maintain stable flight.

The spin performs another function. By reason of slots 33, sabot 17 is so weakened against centrifugal force that when the projectile attains its projected spin rate, many thousands of revolutions per minute, the sabot yields along the weakened lines. As long as the projectile is in the gun barrel the sabot is prevented from completing its longitudinal disintegration by contact of the barrel lands with rotating band 40, and the forward

diameter of the sabot is only a few thousands of an inch less than the barrel diameter, so the sabot remains substantially intact while in the gun. Cap 22 is not so protected, and simply disintegrates under the set-back forces involved and is pushed out the gun in fragments ahead of the sabot and penetrator.

As soon as the projectile leaves the gun the forces holding the sabot together at band 40 disappear, and the sabot flies apart, moving away from the penetrator and pusher. The latter is now subjected to wind drag forces, which pull it off the rearward end of the penetrator, and the latter is now free to follow its intended trajectory, its course being marked by a path of fire from tracer cup 15.

The operation thus far explained is knownⁿ, and the function of the invention's contribution here will now be explained. In the firing of the gun tremendous gas pressures build up behind and around pusher 20, and this pressure acts radially on the periphery of pusher 20 to push the outer wall of groove 30 against tongue 32, thus sealing the junction between pusher 20 and sabot 17 against flow of gas inward toward penetrator 11 to cause premature separation of the sabot from the penetrator. After the munition leaves the gun barrel this radial pressure is removed, and the tongue and groove offer no impediment to the separation of the sabot.

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From the above it will be evident that the invention comprises an improved construction for subcaliber munitions in which premature separation of the sabot from the penetrator due to propulsion gas leakage is obviated.

Claims:

1. Subcaliber munition including an inner penetrator (11) and an outer assembly separable therefrom and coaxial therewith with said outer assembly comprising a sabot (17) and a pusher (20), c h a r a c t e r i z e d
5 b y a peripheral groove (30) in the forward end of said pusher (20) and a peripheral tongue (32) extending coaxially from the rearward end of said sabot (17) to be received in said groove (30).

- 10 2. Munition according to claim 1, c h a r a c t e r - i z e d i n t h a t said peripheral groove (30) has a first wall extending close to the periphery of said pusher (20), so that pressure of propulsion gas on said first wall forces said first wall against said tongue
15 (32) to seal the joint between said pusher (20) and said sabot (17).

3. Munition according to claim 1, c h a r a c t e r - i z e d b y means (21) opposing axial movement of said
20 sabot (17) away from said pusher (20).

4. Munition according to claim 3, c h a r a c t e r - i z e d i n t h a t said means includes a recess (21) in said sabot (17), a cylinder (25) on said pusher
25 (20), and knurling (31) on said cylinder in engagement with said recess.

5. Munition according to one of claims 1 to 4, c h a r a c - t e r i z e d i n t h a t said sabot (17) includes
30 a rearward rotating band (40).

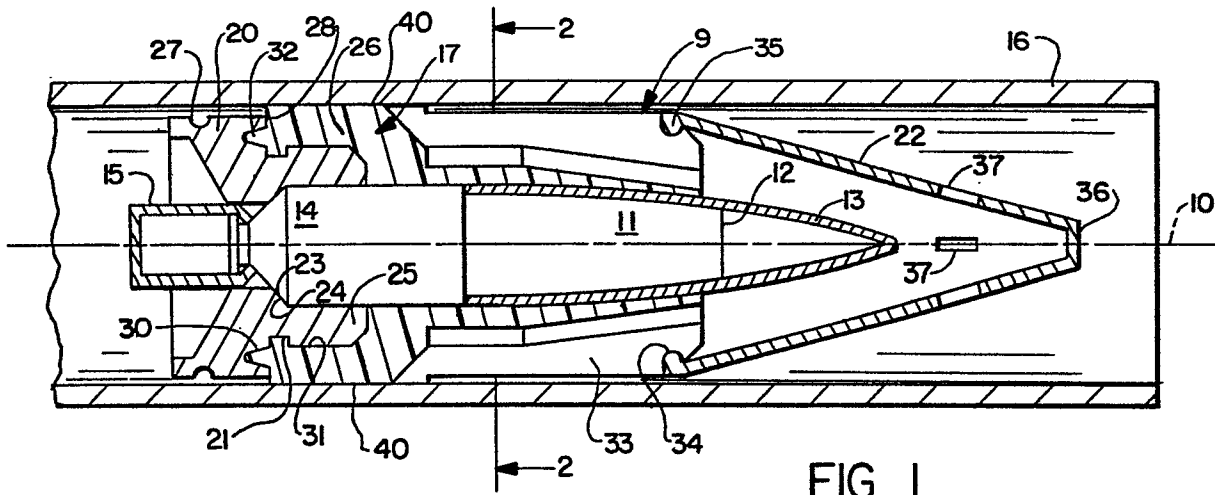


FIG. 1

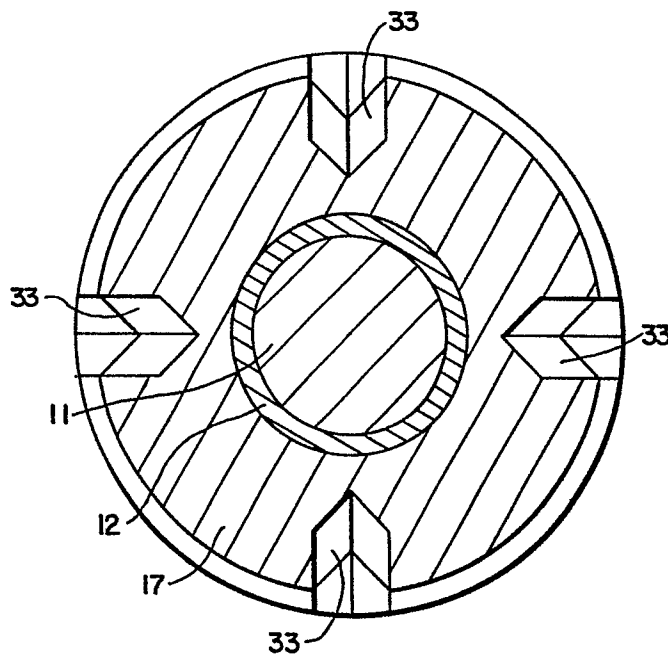


FIG. 2



EP 83109301.8

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 7)
X	DE - A2 - 1 703 816 (WERKZEUG-MASCHINENFABRIK OERLIKON-BÜHRLE AG) * Totality *	1-5	F 42 B 13/16
X,P	EP - A1 - 0 072 584 (WERKZEUG-MASCHINENFABRIK OERLIKON-BÜHRLE AG) * Page 4, lines 1-25; fig. 1,2 *	1-5	
Y	CH - A - 536 481 (WERKZEUG-MASCHINENFABRIK OERLIKON-BÜHRLE AG) * Fig. 1,2; column 1, line 64 - column 2, line 50 *	2-5	
A	CH - A5 - 627 550 (WERKZEUG-MASCHINENFABRIK OERLIKON-BÜHRLE AG) * Fig. 1,5 *	2-5	F 42 B 13/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 07-12-1983	Examiner KALANDRA

TECHNICAL FIELDS
SEARCHED (Int. Cl. 7)

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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