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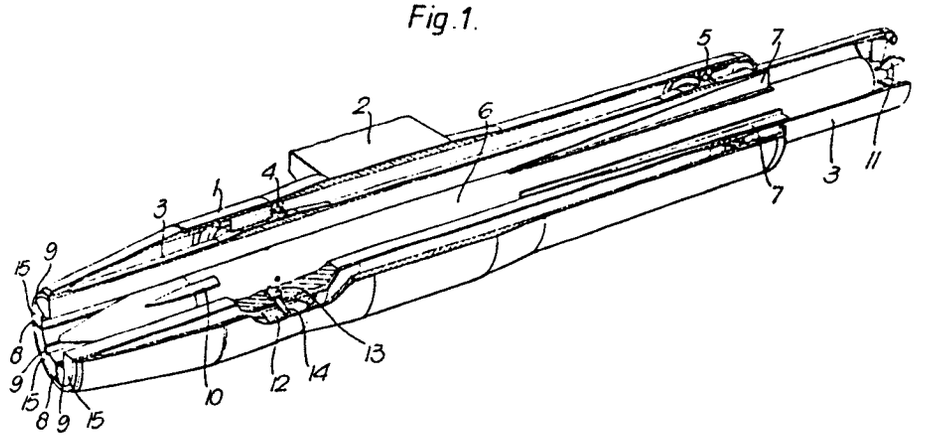
(54) **Missile launcher.**

(57) Missile launcher comprising an outer tubular support structure (1) and an inner launch tube (3) mounted by means of bearings (4,5) within the outer structure (3). The inner tube (3) supports at its aft end a multi-bladed impeller (11). The missile boost motor is ignited and the propellant gases pass through the impeller (11) and cause the inner launch tube (3) to rotate on its bearings (4,5). This rotation gives spin to the missile.

Fig.1.



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MISSILE LAUNCHER

0222569

This invention relates to a missile launcher for imparting spin to a missile during launch, and in particular, but not exclusively, to such a launcher for use on a helicopter.

It is often desirable to spin a missile during launch in order to improve the directional accuracy and stability of the missile and reduce thrust misalignment. Established methods of achieving missile spin have involved adding extra rockets to the missile or devices which deflect the thrust of the missile during launch to cause the missile to spin. When the missile has achieved a predetermined spin rate the device is jettisoned and the missile continues its flight. However, these arrangements cause debris and are not admissable for use on a helicopter because launch debris may be ingested in the rotor or engines of the helicopter.

According to one aspect of this invention, there is provided a missile launcher for imparting spin to a missile during launch and including a missile having a propulsion motor for generating propulsion efflux, structural support means, longitudinal guide means extending along a portion of the length of the missile for supporting and guiding the missile during launch and being rotatably mounted with respect to said structural support means, and efflux deflection means coupled to said longitudinal guide means whereby impingement of efflux from said propulsion means imparts spin to said missile.

Preferably, said missile launcher includes releasable locking means operable to effect locking of said missile against longitudinal movement with respect to said longitudinal guide means and to effect

locking of said longitudinal guide means against rotational movement with respect to said structural support means.

By way of example only, one specific embodiment of this invention will now be described with reference to the accompanying drawing which is a general perspective view of a missile launcher with parts cut away for clarity.

The arrangement illustrated is intended to be used to impart spin to a missile of the type containing a boost motor as it is launched from a helicopter.

Referring to the Figure, a tubular outer support structure 1 is secured to a helicopter (not shown) by pylon 2. An inner launch tube 3 is rotatably mounted by means of bearings 4 and 5 within the tubular outer support structure. The inner launch tube 3 contains four equispaced guide blocks 15 (only three of which are shown) defining between each a longitudinal groove 8. The missile 6 is seated within the inner tube 3 with each of its four fins 7 slotted into one of the longitudinal grooves 8. A shallow groove 9 extends longitudinally along each guide block 15 to engage with command link receivers 10 on the missile. The two sets of grooves 8 and 9 in the inner launch tube 3 rotate the missile while at the same time allowing the missile to slide freely along the longitudinal axis of the inner launch tube 3. The guide blocks thus allow the missile to be fully supported by inner tube 3. The inner launch tube 3 extends beyond the rear end of tubular support structure 1 and supports at its end a multi-bladed impeller 11. A locking mechanism 12 locks the missile 6 and the tube 3 in position inside support structure 1 to prevent both

rotation and sliding of the missile inside the launch tube. The locking device 12 comprises an actuator mechanism 13 secured to the inner launch tube 3 and pins 14 projecting into bores provided in the missile body and the outer support structure 1. The actuator mechanism may be a solenoid or an explosive cutter for example that known as a 'Metron' cutter.

In operation, the locking mechanism 12 is released to allow axial movement of the missile relative to the inner tube 3 and allow rotation of the tube 3 with respect to the outer support structure 1. The boost motor is ignited and the efflux exhausting rearwardly passes through the multi-bladed impeller 11 and is deflected. The reaction torque developed by the deflected thrust causes the inner launch tube 3 to rotate on bearings 4 and 5 and the inner tube 3 spins the missile around with it as it rotates. During rotation the missile 6 travels axially along tube 3 guided by the sets of grooves as shown at 8 and 9 until it emerges from the end of the tube. The missile leaves the launch tube smoothly and continues its flight with the spin imparted to it by the inner launch tube 3.

Because the inner launch tube is mounted on bearings, torque reactions on the launch tube, which would normally occur as a consequence of spinning a missile, are considerably reduced.

The invention need not be limited to missiles of the type shown in the drawing. Missiles of other configurations could also be launched from the device, by making appropriate changes, without departing from the scope of this invention. For example, the launcher may be used with missiles in which the longitudinal launch acceleration is imparted by an integral rocket motor.

Containerised missiles may also be launched from the device. The missile container, complete with missile, could be slotted inside the inner launch tube 3 and the whole assembly rotated.

CLAIMS

1. A missile launcher for imparting spin to a missile during launch and including a missile having a propulsion motor for generating propulsion efflux, structural support means, longitudinal guide means extending along a portion of the length of the missile for supporting and guiding the missile during launch and being rotatably mounted with respect to said structural support means, and efflux deflection means coupled to said longitudinal guide means whereby impingement of efflux from said propulsion means imparts spin to said missile.

2. A launcher according to claim 1, wherein the longitudinal guide means comprises a tube containing a plurality of equi-spaced guide blocks attached to its inner wall, the space between a pair of guide blocks defining a groove in which the fins of the missile are slotted.

3. A launcher according to claim 2, wherein the efflux deflection means is a multi-bladed impeller supported by the tube at its rear end.

4. A launcher according to any one of the claims 1 to 3, wherein the structural support means comprises a tubular member.

5. A launcher according to any one of claims 1 to 4, wherein releasable locking means are provided to effect locking of said missile against longitudinal movement with respect to said longitudinal guide means and to effect locking of said longitudinal guide means against rotational movement with respect to said structural support means.

6. A launcher according to claim 5, wherein the releasable locking means comprises an actuator mechanism secured to the longitudinal guide means and having pins projecting into bores provided in the missile body and the structural support means.

7. A launcher according to claim 6, wherein the actuator mechanism is a solenoid.

8. A launcher according to claim 6, wherein the actuator mechanism is an explosive cutter.

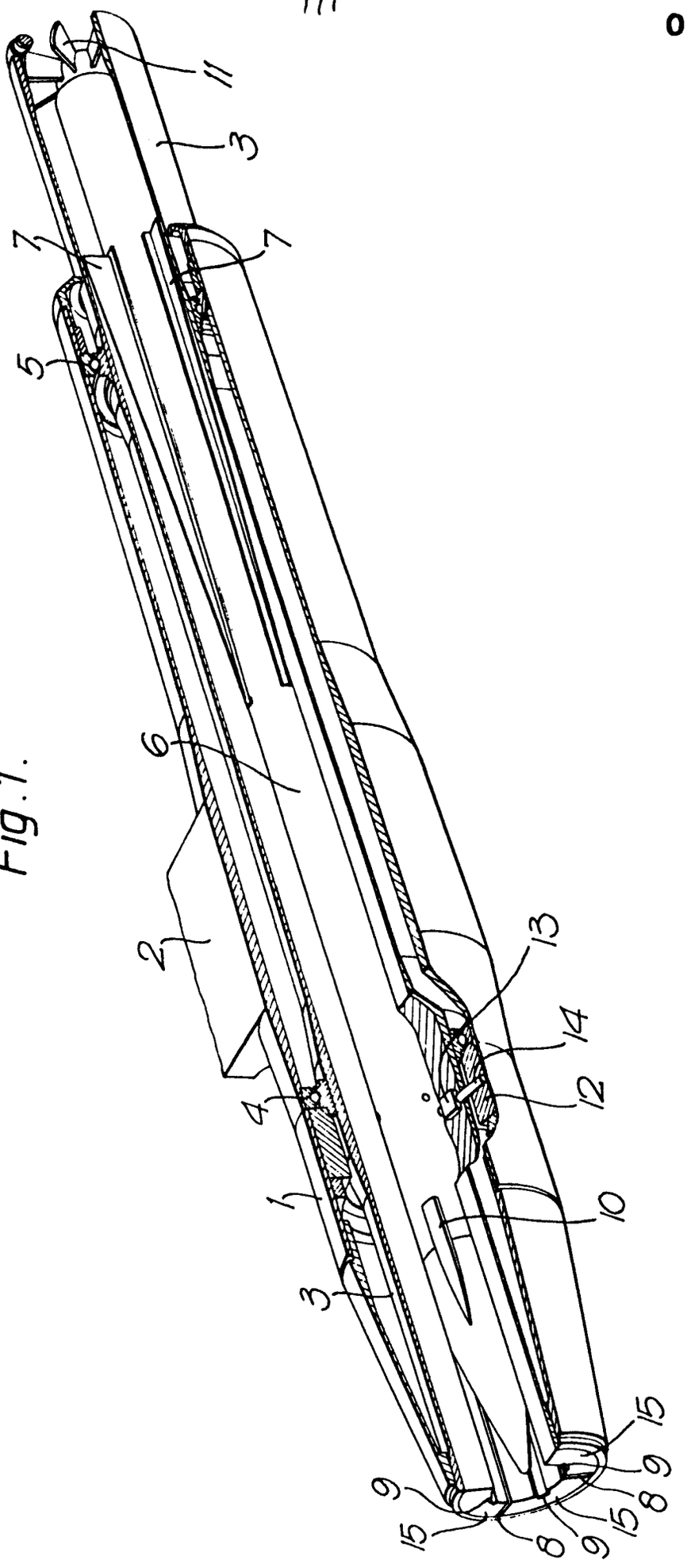

Fig.1.

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EUROPEAN SEARCH REPORT

0222569
Application number

EP 86 30 8527

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 4)
X	US-A-3 427 921 (BODE) * Column 3, lines 47-74; figures 1,2 *	1	F 41 F 3/048 F 41 F 3/052
A		2,3	
X	US-A-3 009 393 (LYNCH) * Column 1, lines 21-25,46-72; column 2, lines 1-70; figures 1-3 *	1-4	
X	FR-A-1 011 653 (SERAM) * Page 2, left-hand column, paragraphs 4-10, right-hand column, paragraphs 1,6; page 3, left-hand column, paragraphs 1,2; figures 1,7,8 *	1,5	
Y		6-8	F 41 F
Y	US-A-4 416 183 (ADAMS) * Column 6, lines 40-68; column 7, lines 1-20; figure 1 *	6,7	
Y	US-A-3 530 759 (FRANCIS) * Column 1, lines 1-37; figures 1-4 *	6,8	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14-01-1987	VAN DER PLAS J.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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