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(71) Applicant : **DATESTYLE LIMITED**
Davina House, 137-149 Goswell Road
London EC1V 7ET (GB)

(72) Inventor : **Cave, Richard Gale**
54b East Borough
Wimbourne, Dorset BH21 1PL (GB)

(74) Representative : **Jones, Graham H.**
Graham Jones & Company 77 Beaconsfield Road Blackheath
London SE3 7LG (GB)

(54) A vortizes-activated muzzle stabiliser for a gun.

(57) A vortices-activated muzzle stabiliser (2) for a gun that uses pistol cartridges, which muzzle stabiliser (2) comprises a body (6) having :

(i) at least one main vent slot (8) which defines a main gas deflecting area for deflecting gases in the form of vortices and which comprises a first portion (10) which extends inwardly at an angle of 90° to the longitudinal axis of the body (6) from a peripheral portion of the body (6) towards a central portion of the body (6), and a second portion (12) which extends inwardly beyond the first portion (10) towards the central portion at an angle of less than 90° to the longitudinal axis of the body (6) ;

(ii) a barrel connecting bore (14) for affording a connecting passage between the muzzle stabiliser (2) and a barrel (4) of the gun ; and

(iii) an exhaust gas aperture (16) which is positioned at a downstream end of the body (6).

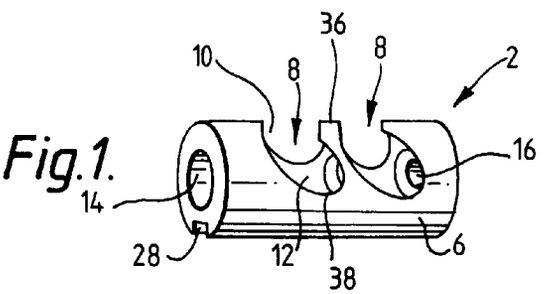

Fig.1.

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This invention relates to a vortices-activated muzzle stabiliser for a gun and, more especially, this invention relates to a vortices-activated muzzle stabiliser for a gun that uses pistol cartridges. Examples of guns that use pistol cartridges are pistols, self-loading carbines, lever-action carbines, single shot rifles, automatic rifles, sub-machine guns and machine pistols.

Muzzle compensators for guns are well known. The muzzle compensators are used on many different types of guns and they tend to act to reduce recoil but they usually give little control on barrel movement. This is because the muzzle compensators deflect the gases, usually sideways, such that the muzzle compensators only control muzzle movement in one direction.

In our international patent application number WO 92/16812 we have described and claimed a vortices-activated muzzle stabiliser which obviates or reduces the above mentioned problem of the muzzle compensators acting to reduce recoil but giving little control on barrel movement. The muzzle compensator of WO 92/16812 may be used on all types of guns and it is especially useful for rifles where firing causes a stream of gases to be generated.

We have now noticed that with guns that use pistol cartridges, firing of the gun tends to produce a puff of gas rather than a stream of gas. With such cartridges, we have found that it is possible to modify the vortices-activated muzzle stabiliser disclosed in WO 92/16812 such that the vortices-activated muzzle stabiliser can be shortened in length. A shortened vortices-activated muzzle stabiliser can be preferred by some users, for example users of pistols.

Accordingly, in one non -limiting embodiment of the present invention there is provided a vortices-activated muzzle stabiliser for a gun that uses pistol cartridges, which muzzle stabiliser comprises a body having:

(i) at least one main vent slot which defines a main gas deflection area for deflecting gases in the form of vortices and which comprises a first portion which extends inwardly at an angle of 90° to the longitudinal axis of the body from a peripheral portion of the body towards a central portion of the body, and a second portion which extends inwardly beyond the first portion towards the central portion at an angle of less than 90° to the longitudinal axis of the body;

(ii) a barrel connecting bore for affording a connecting passage between the muzzle stabiliser and a barrel of the gun; and

(iii) a gas exhaust aperture which is positioned at a downstream end of the body.

The vortices-activated muzzle stabiliser of the present invention is such that the main vent slot is not as long as the main vent slot disclosed in WO 92/16812. This is achieved by having the main vent slot in the muzzle stabiliser of the present invention formed with the first portion and the second portion. The shorter vent slot in turn enables the area in the cylindrical body around the main vent slot to be free from an insert of the type disclosed in WO 92/16812, which insert is employed to cause a low gas pressure between the insert and an inside wall of the body. The absence of the insert enables the inside of the muzzle stabiliser to be kept clear to maximum proportions, which in turn allow a relatively steep angle for the second portion, which in turn is more suitable for lower gas pressures, for example the low pressure low volume gas emissions from pistol cartridges.

If desired, the second portion of the main slot may extend inwardly at an angle of 15 - 60 degrees to the longitudinal axis of the body.

Preferably, the second portion extends inwardly to an angle of 40° to the longitudinal axis of the body.

The second portion of the main vent slot may be formed as an extension of the first portion of the main vent slot. The first and the second portions may have upstream end walls which are joined together at an angled portion formed by the upstream end walls. Alternatively, the first and the second portions may have upstream end walls which are joined together by a radiused portion formed by the upstream end walls.

The second portion of the main vent slot may have a flat downstream wall portion. The flat downstream wall portion may extend at an angle of 40 - 80 degrees to the longitudinal axis of the body.

The vortices-activated muzzle stabiliser of the present invention may include a balancing slot which extends at 90° to the longitudinal axis of the body and which is positioned opposite the main vent slot. The presence of the balancing slot may be preferred when the pistol cartridges are relatively powerful cartridges which generate higher pressures and gas volumes. With less powerful pistol cartridges which generate relatively low pressures and low volume emissions, then the balancing slot will normally not be required.

The vortices-activated muzzle stabiliser may have from 1 - 5 and preferably 1 - 3, for example 2, vent slots.

The vortices-activated muzzle stabiliser may be rotateably adjustable for right or left handed persons.

The vortices-activated muzzle stabiliser may include a gas brake device. The gas brake device may comprise a gas diverting aperture which extends completely through the gas brake device and at 90° to the longitudinal axis of the body.

The present invention also provides a gun that uses pistol cartridges and which is provided with the vortices-activated muzzle stabiliser of the invention.

The gun may be a pistol, a self-loading carbine, a lever-action carbine, a single shot rifle, an automatic rifle, a sub-machine gun, or a machine pistol.

As in the case of WO 92/16812, the muzzle stabiliser of the present invention operates on gas vor-

tices generated during the firing of the gun. The muzzle stabiliser enables the gas vortices to be deflected and directed as required to balance the muzzle. The muzzle stabiliser not only reduces recoil but is able to control the movement of the barrel of the gun in three directions. The guns may be used for military or civilian purposes as may be required. The main vent slot may deflect the gases in the form of two vortices which may extend away from each other at an angle of 45° and which may define between them a substantially solid wall of gas during firing of the gun.

The body will usually be made in one piece.

Embodiments of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a first vortices-activated muzzle stabiliser;

Figure 2 is a side view of the muzzle stabiliser shown in Figure 1 and fitted to a barrel of a pistol;

Figure 3 is a view from above of the muzzle stabiliser and the pistol barrel shown in Figure 2;

Figure 4 is a view from underneath of the muzzle stabiliser and pistol barrel shown in Figure 2; and

Figures 5 and 6 show the end of a second muzzle stabiliser and show the muzzle stabiliser provided with a gas brake device.

Referring to Figures 1 to 4, there is shown a vortices-activated muzzle stabiliser 2 for a gun in the form of a pistol having a pistol barrel 4. The pistol uses pistol cartridges (not shown).

The muzzle stabiliser comprises a body 6 which is substantially cylindrical as shown. The body 6 has two main vent slots 8.

Each main vent slot 8 defines a main gas deflection area for deflecting gases in the form of vortices. Also, each main vent slot 8 comprises a first portion 10 which extends inwardly at an angle of 90° to the longitudinal axis of the body 6 from a peripheral portion of the body 6 towards a central portion of the body 6. Each main vent slot 8 further comprises a second portion 12 which extends inwardly beyond the first portion 10 towards the central portion at an angle of less than 90° to the longitudinal axis of the body 6.

The muzzle stabiliser 2 also comprises a barrel connecting bore 14 for affording a connecting passage between a muzzle stabiliser 2 and the pistol barrel 4. The muzzle stabiliser 2 still further comprises a gas exhaust aperture 16 positioned at a downstream end of the body 6.

The second portion 12 of the main vent slot 8 extends inwardly at an angle of 15°- 60° and preferably 40° to the longitudinal axis of the body 6. As can best be seen from Figures 1 and 2, the second portion 12 of the main vent slot 8 is formed as an extension of the first portion 10 of the main vent slot 8. The first portion 10 has an upstream end wall 18, and the second portion 12 has an upstream end wall 20. These two upstream end walls 18, 20 are joined together by an angled portion 22 as shown. In an alternative embodiment of the invention, this angled portion 22 may be a radiused portion.

The second portion 12 of the main vent slot 8 has a flat downstream wall portion 24. This flat downstream wall portion 24 preferably extends at an angle of 40° - 80° to the longitudinal axis of the body. The upstream end wall 20 and the flat downstream wall portion 24 are connected together by a curved portion 26.

As can best be seen from Figures 2 and 3, the muzzle stabiliser 2 has two of the main vent slots 8 and the downstream vent slot 8 is slightly narrower than the upstream main vent slot 8. If desired, the two main vent slots 8 may be the same size or the downstream main vent slot 8 may be larger than the upstream main vent slot 8.

As shown in Figures 1 and 4, the body 6 is provided with a longitudinal groove 28. The groove 28 terminates in a shallower grooved portion 30 at its downstream end. The groove 28 is used in the assembly and dis-assembly of the pistol, the groove 28 allowing a recoil spring bushing assembly to slide in it and past the muzzle stabiliser 2.

Referring now to Figures 5 and 6, there is shown the end part of the body 6 provided with a gas brake device 32. The gas brake device 32 is preferred for use with guns firing pistol cartridges which are relatively powerful. The gas brake device 32 can be separately formed and screwed or otherwise secured to the body 6. The gas brake device 32 has a central gas exhaust aperture 34 through which the fired bullets and non-deflected gas pass. The gas brake device 32 also has a gas diverting aperture 36 which extends completely through the gas brake device 32 at 90° to the longitudinal axis of the body 6. If desired, the gas brake device 32 may be integrally formed with the body 6.

During use of the muzzle stabiliser 2, when the pistol is fired, the generated gas is passed along a bore in the pistol barrel 4 and then enters the muzzle stabiliser 2 through the barrel connecting bore 14. In the muzzle stabiliser 2, the gases are deflected as vortices through the main vent slots 8. The main vent slots 8 are separated by a dividing wall 36 and this wall 36 is provided with a gas exhaust aperture 38 for allowing non-deflected gases to pass along the upstream main vent slot 8 to the downstream main vent slot 8. The fired bullet or bullets pass out of the muzzle stabiliser 2 through the gas exhaust apertures 38, 16, together with any non-deflected gases.

It is to be appreciated that the embodiments of the invention described above with reference to the accompanying drawings have been given by way of example only and that modifications may be effected. Thus, for example, the muzzle stabiliser 2 may be provided with a balancing slot (not shown) which extends at 90° to the longitudinal axis of the body and which

is positioned opposite the main vent slot 8. The muzzle stabiliser 2 may be rotateably adjustable for right or left handed persons. The muzzle stabilser 2 may be fitted to a wide variety of guns including those mentioned above.

Claims

1. A vortices-activated muzzle stabiliser for a gun that uses pistol cartridges, which muzzle stabiliser comprises a body having:
   (i) at least one main vent slot which devines a main gas deflection area for deflecting gases in the form of vortices and which comprises a first portion which extends inwardly at an angle of 90° to the longitudinal axis of the body from a peripheral portion of the body towards a central portion of the body, and a second portion which extends inwardly beyond the first portion towards the central portion at an angle of less than 90° to the longitudinal axis of the body;
   (ii) a barrel connecting bore for affording a connecting passage between the muzzle stabiliser and the barrel of the gun; and
   (iii) a gas exhaust aperture which is positioned at a downstream end of the body.

2. A vortices-activated muzzle stabiliser according to claim 1 in which the second portion of the main vent slot extends inwardly at an angle of 15° - 60° to the longitudinal axis of the body.

3. A vortices-activated muzzle stabiliser according to claim 1 or claim 2 in which the second portion of the main vent slot is formed as an extension of the first portion of the main vent slot.

4. A vortices-activated muzzle stabiliser according to claim 3 in which the first and the second portions have upstream end walls which are joined together by an angled portion formed by the upstream end walls.

5. A vortices-activated muzzle stabiliser according to claim 3 in which the first and the second portions have upstream end walls which are joined together by a radiused portion formed by the upstream end walls.

6. A vortices-activated muzzle stabiliser according to any one of the preceding claims in which the second portion of the main vent slot has a flat downstream wall portion.

7. A vortices-activate muzzle stabiliser according to any one of the preceding claims in which there are two of the main vent slots.

8. A vortices-activated muzzle stabiliser according to any one of the preceding claims and including a balancing slot which extends at 90° to the longitudinal axis of the body and which is positioned opposite the main vent slot.

9. A vortices-activated muzzle stabiliser according to any one of the preceding claims and which is rotateably adjustable for right or left handed persons.

10. A vortices-activated muzzle stabiliser according to any one of the preceding claims and including a gas brake device, which gas brake device comprises a gas diverting aperture which extends completely through the gas brake device and at 90° to the longitudinal axis of the body.

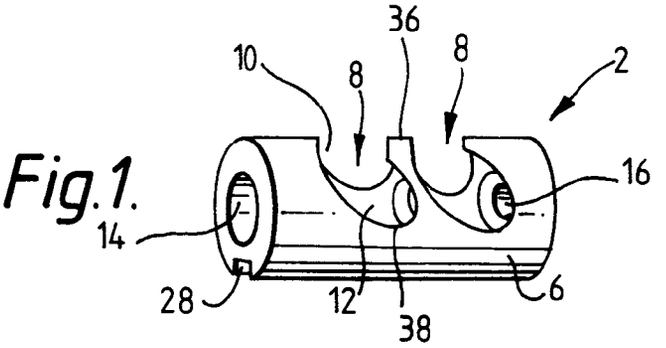

Fig.1.

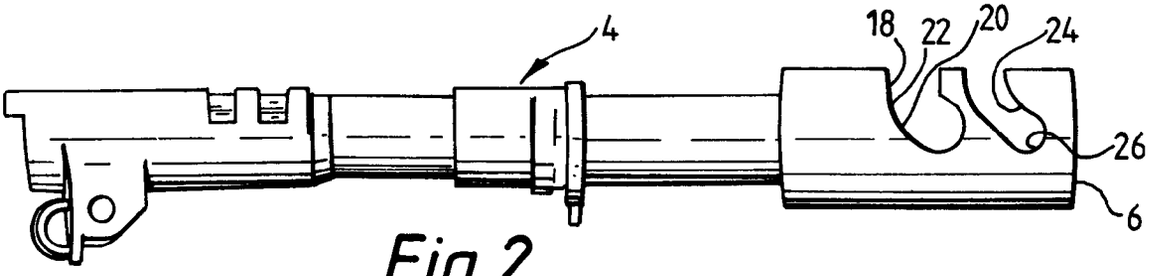

Fig.2.

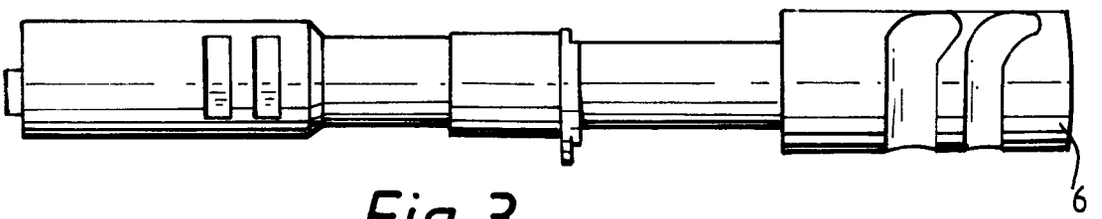

Fig.3.

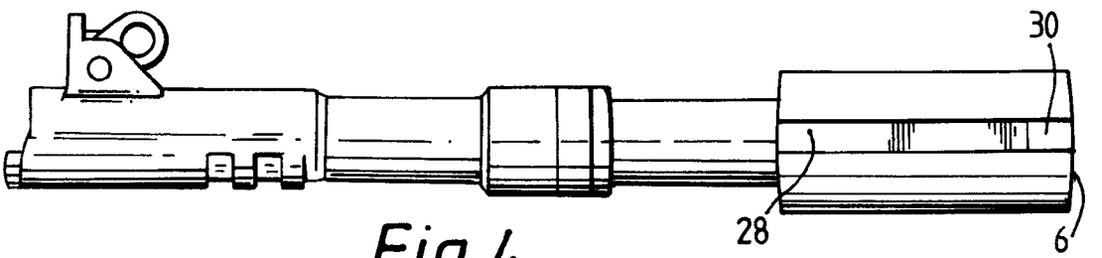

Fig.4.

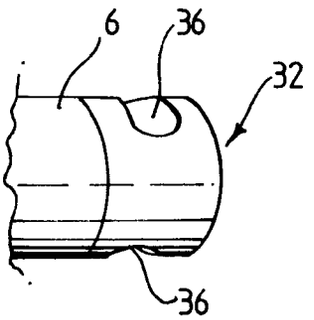

Fig.5.

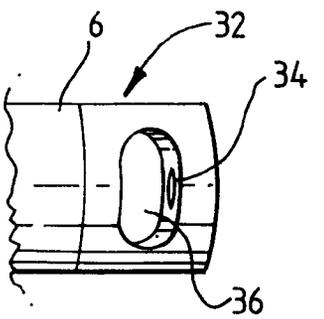

Fig.6.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 30 8448

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.5)
Y	US-A-4 392 413 (GWINN) * Column 2, lines 61-65; column 3, lines 28-60; figures 2,3 *	1-3	F 41 A 21/36
Y,D	WO-A-9 216 812 (DATESTYLE) * Abstract; claims; figures *	1-3	
A	DE-A-2 518 253 (BRUNSWICK) * Figure 15 *	1	
A	US-A-1 636 357 (CUTTS)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

F 41 A

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16-02-1994	RODOLAUSSE P E C

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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