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(54) FIN-STABILISED PROJECTILES

(71) We, OY TAMPELLA Ab., a Finnish Company, of Tampere, Finland, 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 invention relates to a fin-stabilised projectile for firing from mortars and like launchers.

In these fin-stabilised projectiles the end of a tail-pipe has a propulsive charge cartridge which can be inserted or screwed into the tailpipe. Further, the tail pipe, outside the region of the propulsive charge cartridge, is provided with apertures or perforations for issue of the explosion gases. In fin-stabilised projectiles it is usual to have the propulsive charge cartridge extend into the tailpipe over the length of the portion of the pipe carrying the fin. The remaining part of the tailpipe, provided with perforations, is free. The propulsive charge cartridge itself contains the detonator and the powder charge, which retains its essential tube shape. The size of the powder charge is thus limited by the charge cartridge, whose length is substantially adapted to that of the pipe portion carrying the fin assembly. Therefore in many cases the powder charge cartridge is not very long, so that the attainment of the projectile's starting speed is limited.

An object of the invention is to provide a fin-stabilised projectile in which substantially larger amounts of power can be accommodated by means of the powder cartridge in the projectile's tailpipe, in order to attain an increased projectile starting speed.

According to the invention there is provided a fin stabilised projectile for firing from mortars and like launchers, comprising a projectile body, a tailpipe screwed at one end on to the projectile body and having a fin assembly attached thereto at its other end, and a propellant powder cartridge screwed in the said other end of the tailpipe, the tailpipe having holes for the issue of propellant gases, the propellant powder cartridge comprising a tubular pro-

pellant powder member extending, with radial clearance, inside the tailpipe, to a point close to the screwed on connection with the projectile body.

Such an arrangement and design of the propellant powder cartridge for a fin-stabilised projectile enables a considerable increase to be made in the amount of propellant powder in the powder charge. The whole powder cartridge occupies a considerably larger volume. Thus there is a considerable increase in starting speed for the discharge projectile. The space available in the tailpipe is practically all used up by the powder cartridge.

The forward end of the tubular propellant powder member advantageously extends at least as far as the most forward perforations in the tailpipe. The amount of powder in the cartridge can be further increased also by enlarging the tailpipe section carrying the fin. The length of this tailpipe section can thus match that of the perforated pipe section. This enables a very long powder cartridge with a large amount of powder to be accommodated.

The powder cartridge itself is advantageously so designed that it is made up of a part which is screwable into the tailpipe, a carrier sleeve pushed into the screwed-in part, and a tubular powder member which can be pushed on to the carrier sleeve. In this case the forward end of the extensive powder member can be provided to project freely. The carrier sleeve is preferably perforated. Further, it can be provided at or near the forward end with a step serving as a stop for the pushed-on tubular powder member. At the rear end of the carrier sleeve, there can be an outwardly-extending angled portion which bears on an annular projection of the screwed sleeve, thus fixing and limiting the position of the carrier sleeve in the screwed sleeve.

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

Fig. 1 shows the tail end of a fin-stabilised

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projectile with a propellant powder charge cartridge, in diagrammatic longitudinal section;

Fig. 2 shows the tail end of a modified fin-stabilised projectile, with the propellant powder charge cartridge, in diagrammatic longitudinal section; and,

Fig. 3 shows a modified embodiment of the propellant powder charge cartridge in Fig. 1 partly in longitudinal section, and partly in side elevation.

A body 1 of a fin-stabilised projectile is provided at an end 1a with a screwed-on tailpipe 2, equipped at its rear with a fin assembly 3. Tailpipe 2 is equipped with rows of holes 4, extending over the longest part of tailpipe 2. A propellant powder cartridge 5 is housed in the hollow space of tailpipe 2. This powder cartridge has at the rear end as screwed portion 6 with thread 7, which can be screwed into tapping 8 in the end of the tailpipe. A detonator 9 is provided in the end of the screwed section 6. Further, the propellant powder cartridge 5 has a tubular propellant powder member 10.

The tubular propellant powder member 10 of the powder cartridge 5 is made of such a length that the forward end of the powder member 10 or of the whole powder cartridge extends close to the end 1a of the projectile body 1. In this case, the tubular powder member 10 is advantageously long enough for the forward end of powder member 10 to reach at least to the forward holes 4, or even further, penetrating into tailpipe 2. At the same time, tube section 2a of tailpipe 2 carrying the fin assembly 3 can be much longer than in normal constructions, so that the chamber for accommodating the powder cartridge is enlarged. Tube section 2a can be of such a length that it approximately corresponds to the length of the section of tailpipe 2 provided with holes 4.

The propellant powder cartridge is preferably so constructed that screwed section 6 is connected to a carrier sleeve 11, which projects forward a considerable distance. The tubular powder member 10 is pushed on to the carrier sleeve, which may be equipped with perforations 12 (Fig. 3); the powder member projects freely forward when pushed on to the carrier sleeve. A stop 13 in the carrier sleeve 11 serves as a stop for the pushed-on tubular powder member 10. At the rear, carrier sleeve 11 has an outwardly-extending angled portion 14, which bears on an annular seat 15 of the screwed portion 6, and is thus limited in a forward direction. Powder member 10 can be enclosed by an outer and an inner sleeve 16, 17. It is designed with the forward end 10c closed. Between the end of tubular powder member 10 and the screwed sleeve

6, a free annular space 18 is preferably left, which can be partly covered over by a sleeve 19 at the forward end of carrier sleeve 11 there is preferably a powder plug 20. The projecting powder member 10 has a long internal hollow space in order better to reinforce the combustion of the powder charge. Additional charges, which may be located on the tailpipe 2, are indicated at 22.

In the embodiment in Fig. 2 the same parts are provided with the same reference numbers as in the first embodiment. Tubular powder member 10a of powder cartridge 5a is likewise pushed on to the carrier sleeve 11 and limited by stop 13. The tubular powder member 10a is not closed at the front by the powder itself, but is defined by a cover 23 of thin foil, paper or the like. Further, the inner circumference of the hollow space in the tailpipe 2 is provided with a sleeve 24 made of combustible material. Sleeve 24 covers off the rows of holes 4 from the outside, so that the freely-projecting powder member 10a is protected from accidental outside interference.

WHAT WE CLAIM IS:—

1. A fin-stabilised projectile for firing from mortars and like launchers, comprising a projectile body, a tailpipe screwed at one end onto the projectile body and having a fin assembly attached there at its other end, and a propellant powder cartridge screwed in the said other end of the tailpipe, the tailpipe having holes for the issue of propellant gases, the propellant powder cartridge comprising a tubular propellant powder member extending, with radial clearance, inside the tailpipe to a point close to the screwed-on connection with the projectile body.

2. A projectile according to claim 1, wherein the front end of the tubular powder member of the powder cartridge extends at least as far as the most forward holes in the tailpipe.

3. A projectile according to claim 1 or 2, wherein a section of the tailpipe carrying the fin assembly substantially corresponds in length to the length of the section of the tailpipe provided with the holes.

4. A projectile according to any one of claims 1 to 3, wherein the holes in the tailpipe are covered off on their inside by a sleeve.

5. A projectile according to any one of claims 1 to 4, wherein the powder cartridge is made up of a part screwable into the tailpipe, a carrier sleeve pushed into the screwed part, and the tubular powder member which is pushed on to the carrier sleeve.

6. A projectile according to claim 5, wherein the carrier sleeve of the powder cartridge is perforated.



projectile with a propellant powder charge cartridge, in diagrammatic longitudinal section;

Fig. 2 shows the tail end of a modified fin-stabilised projectile, with the propellant powder charge cartridge, in diagrammatic longitudinal section; and,

Fig. 3 shows a modified embodiment of the propellant powder charge cartridge in Fig. 1 partly in longitudinal section, and partly in side elevation.

A body 1 of a fin-stabilised projectile is provided at an end 1a with a screwed-on tailpipe 2, equipped at its rear with a fin assembly 3. Tailpipe 2 is equipped with rows of holes 4, extending over the longest part of tailpipe 2. A propellant powder cartridge 5 is housed in the hollow space of tailpipe 2. This powder cartridge has at the rear end as screwed portion 6 with thread 7, which can be screwed into tapping 8 in the end of the tailpipe. A detonator 9 is provided in the end of the screwed section 6. Further, the propellant powder cartridge 5 has a tubular propellant powder member 10.

The tubular propellant powder member 10 of the powder cartridge 5 is made of such a length that the forward end of the powder member 10 or of the whole powder cartridge extends close to the end 1a of the projectile body 1. In this case, the tubular powder member 10 is advantageously long enough for the forward end of powder member 10 to reach at least to the forward holes 4, or even further, penetrating into tailpipe 2. At the same time, tube section 2a of tailpipe 2 carrying the fin assembly 3 can be much longer than in normal constructions, so that the chamber for accommodating the powder cartridge is enlarged. Tube section 2a can be of such a length that it approximately corresponds to the length of the section of tailpipe 2 provided with holes 4.

The propellant powder cartridge is preferably so constructed that screwed section 6 is connected to a carrier sleeve 11, which projects forward a considerable distance. The tubular powder member 10 is pushed on to the carrier sleeve, which may be equipped with perforations 12 (Fig. 3); the powder member projects freely forward when pushed on to the carrier sleeve. A stop 13 in the carrier sleeve 11 serves as a stop for the pushed-on tubular powder member 10. At the rear, carrier sleeve 11 has an outwardly-extending angled portion 14, which bears on an annular seat 15 of the screwed portion 6, and is thus limited in a forward direction. Powder member 10 can be enclosed by an outer and an inner sleeve 16, 17. It is designed with the forward end 10c closed. Between the end of tubular powder member 10 and the screwed sleeve

6, a free annular space 18 is preferably left, which can be partly covered over by a sleeve 19 at the forward end of carrier sleeve 11 there is preferably a powder plug 20. The projecting powder member 10 has a long internal hollow space in order better to reinforce the combustion of the powder charge. Additional charges, which may be located on the tailpipe 2, are indicated at 22.

In the embodiment in Fig. 2 the same parts are provided with the same reference numbers as in the first embodiment. Tubular powder member 10a of powder cartridge 5a is likewise pushed on to the carrier sleeve 11 and limited by stop 13. The tubular powder member 10a is not closed at the front by the powder itself, but is defined by a cover 23 of thin foil, paper or the like. Further, the inner circumference of the hollow space in the tailpipe 2 is provided with a sleeve 24 made of combustible material. Sleeve 24 covers off the rows of holes 4 from the outside, so that the freely-projecting powder member 10a is protected from accidental outside interference.

WHAT WE CLAIM IS:—

1. A fin-stabilised projectile for firing from mortars and like launchers, comprising a projectile body, a tailpipe screwed at one end onto the projectile body and having a fin assembly attached there at its other end, and a propellant powder cartridge screwed in the said other end of the tailpipe, the tailpipe having holes for the issue of propellant gases, the propellant powder cartridge comprising a tubular propellant powder member extending, with radial clearance, inside the tailpipe to a point close to the screwed-on connection with the projectile body.

2. A projectile according to claim 1, wherein the front end of the tubular powder member of the powder cartridge extends at least as far as the most forward holes in the tailpipe.

3. A projectile according to claim 1 or 2, wherein a section of the tailpipe carrying the fin assembly substantially corresponds in length to the length of the section of the tailpipe provided with the holes.

4. A projectile according to any one of claims 1 to 3, wherein the holes in the tailpipe are covered off on their inside by a sleeve.

5. A projectile according to any one of claims 1 to 4, wherein the powder cartridge is made up of a part screwable into the tailpipe, a carrier sleeve pushed into the screwed part, and the tubular powder member which is pushed on to the carrier sleeve.

6. A projectile according to claim 5, wherein the carrier sleeve of the powder cartridge is perforated.



7. A projectile according to claim 5 or
6, wherein the carrier sleeve has, at or near
the forward end, a step and, at the rear end,
an outwardly-angled portion as a limiting
5 stop.
8. A projectile according to claim 5, 6,
or 7, wherein a powder plug is arranged at
the forward end of the carrier sleeve.
9. A fin-stabilised projectile for firing
10 from mortars and like launchers, substan-

tially as hereinbefore described with re-
ference to the accompanying drawings.

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