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[72]	Inventor	Andre Dauban 51 Rue Albert Ier, Arquennes, Belgium
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[33]		Belgium
[31]		708,642 and 708,816

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Primary Examiner—Benjamin A. Borchelt
Assistant Examiner—Charles T. Jordan
Attorney—Diller, Brown, Ramik and Holt

[54] RIFLE GRENADE
4 Claims, 7 Drawing Figs.

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102/76

[51] Int. Cl. F42b 11/42,
F42c 15/02

[50] **Field of Search**..... 102/65.2,
76, 65; 42/(IF)

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ABSTRACT: The present invention relates to a rifle grenade which comprises an explosive head and a fuze. A duct axially extends through both explosive head and fuze for the passage of the bullet of a conventional ball cartridge fired by means of the rifle. Said fuze comprises coaxially disposed around the said duct, two members one of which is provided with a striker and a detonator which are separated from one another by the other member which is provided with a percussion cap and a cap holder. An ejectable means is provided which, before the launching of the grenade, prevents a relative rotation of said both members towards a position wherein the said percussion cap and cap holder are in line with the said striker and detonator.

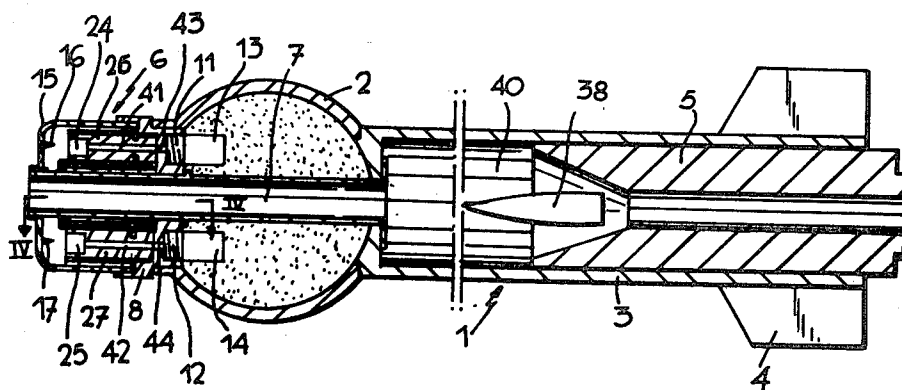


FIG. 1

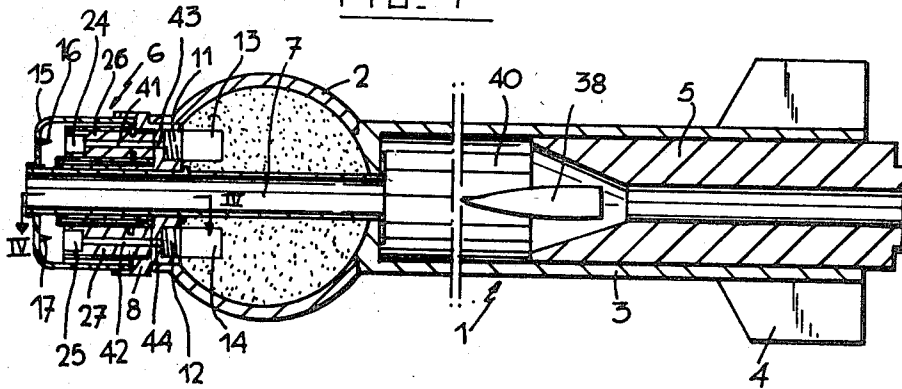


FIG. 6

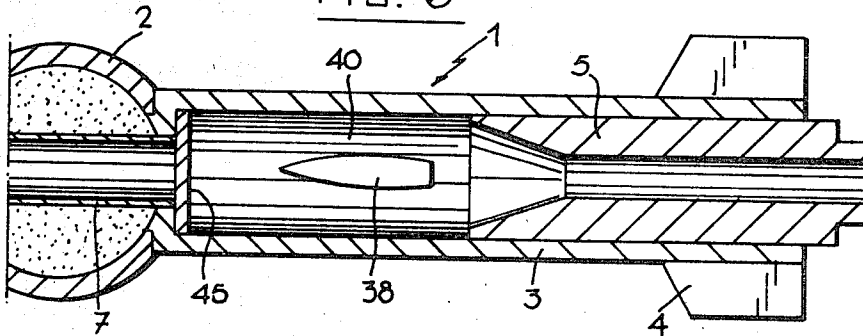
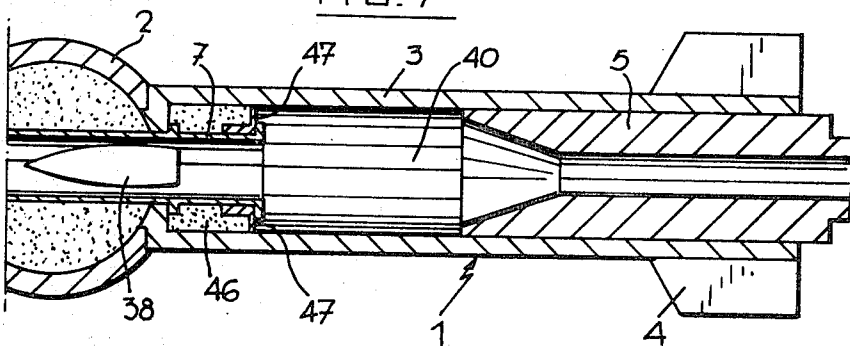


FIG. 7



INVENTOR
André Dauban

BY
Mason, Porter, Miller & Brown
ATTORNEYS

FIG. 2

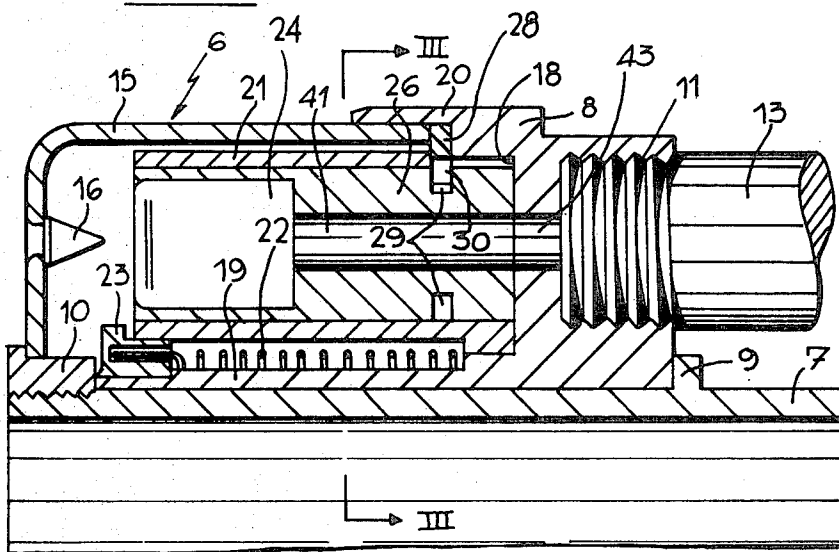
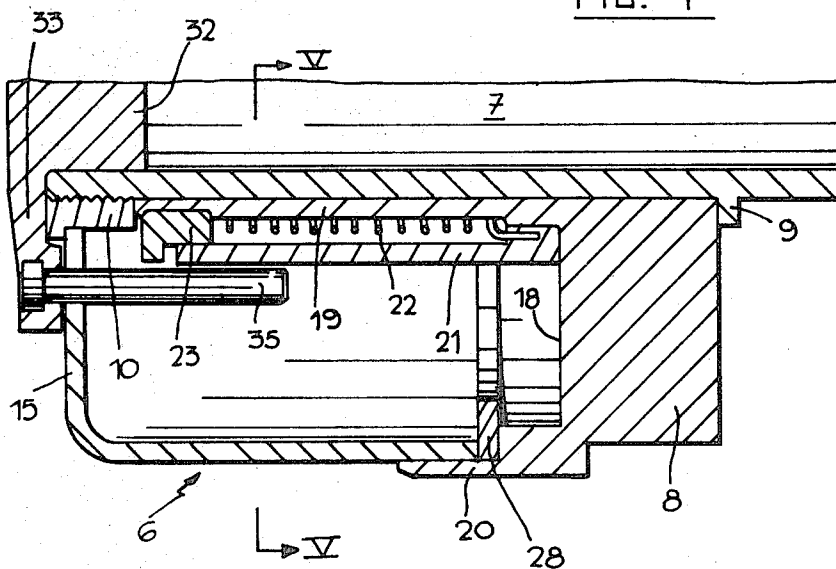


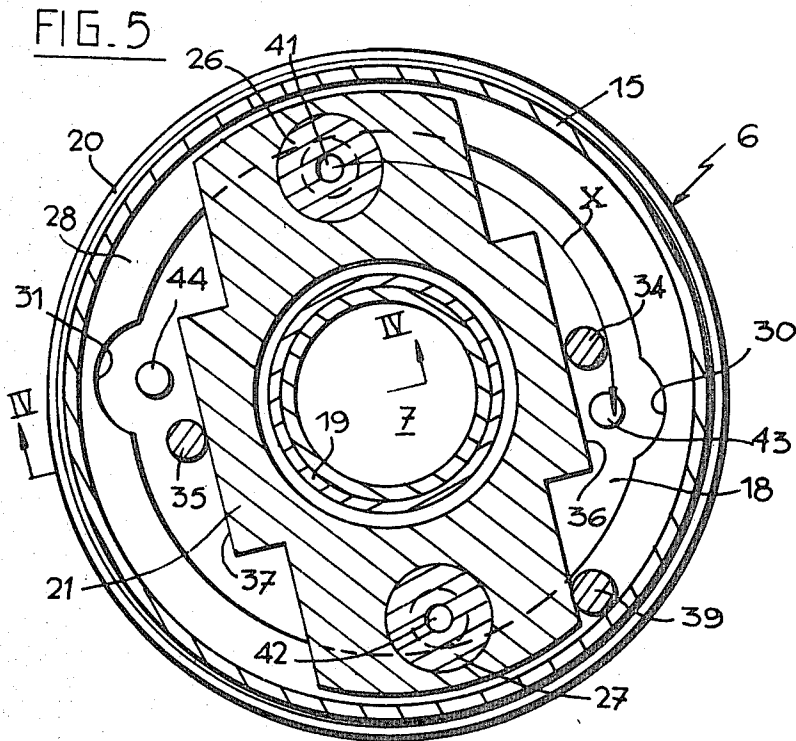
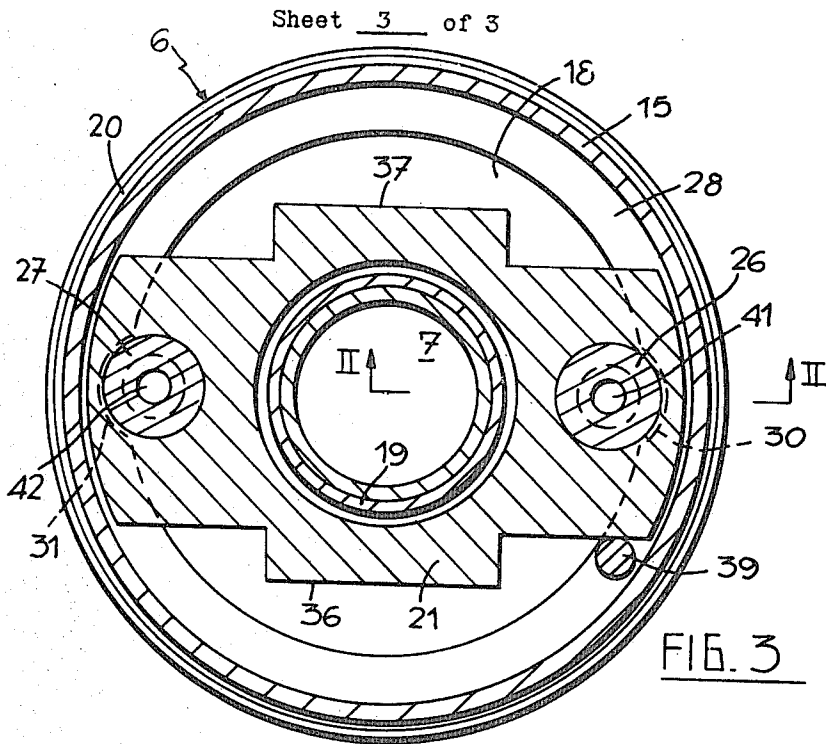
FIG. 4



INVENTOR
Andre' Dauban

BY
Mason, Porter, Miller & Brown
ATTORNEYS

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INVENTOR
Andre' Dauban

BY
Mason, Porter, Wells & Brown
ATTORNEYS

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RIFLE GRENADE

The present invention relates to a rifle grenade which comprises an explosive head and a fuze and through which a duct axially extends for the passage of the bullet of a conventional ball cartridge fired by means of a rifle.

In the known rifle grenades like this, the fuze is generally disposed along one side of the said duct, while the main explosive charge is disposed along the other side of the duct. The fuze of these known grenades includes a percussion cap which is intended to initiate a detonator by way of a delay device such as a lanyard cord, by example a Bickford fuse. The percussion of the cap is made by the bullet passing through said duct, eventually by means of a striker which is displaced by the bullet.

These known grenades present many disadvantages. Notably, in these grenades it is very difficult, even impossible, to regularly distribute the weight of the projectile around its longitudinal axis. It results a lack of balance of the projectile, which is harmful to the precision of its ballistic trajectory.

Further, in these known grenades, the main explosive charge in not regularly distributed around the detonator, which seriously limits the explosive power of the grenade, particularly in fragmentation warheads.

The present invention eliminates these disadvantages. According to the invention, the said duct axially extends through both explosive head and fuze. The said fuze comprises, coaxially disposed around the said duct, two members one of which is provided with at least one striker and one detonator which are separated from one another by the other member which is provided with at least one percussion cap and one cap holder. The said fuze comprises further an ejectable means which, before the launching of the grenade, prevents a relative rotation of said both members under the action of a spring or similar, from a position wherein the said percussion cap and cap holder are out-of-line with the said striker and detonator and wherein a retaining means prevents a relative displacement, parallel to the said duct, of the said striker, on the one hand, and of the said percussion cap and cap holder, on the other hand, towards a position wherein the said percussion cap and cap holder are in line with the said striker and detonator and wherein the said retaining means is unlocked.

According to a particular embodiment of the invention, the said member provided with the said percussion cap and cap holder is rotatable within the said member provided with the said striker and detonator, this last member being stationary; the said striker is stationary on its member, while the said cap holder can slide within its member, in a direction parallel to the said duct. The retaining means is integral with the stationary member provided with the said striker and retains axially the said cap holder before launching of the grenade. This retaining means is by example a ring which is disposed within the stationary member provided with the striker and the detonator and which is engaged in a groove of the said cap holder, said ring being provided, along its inner periphery with a recess for allowing the said cap holder to axially disengage oneself from the said ring, when said both members are in position wherein the said striker, cap and detonator are in line with one another.

The rifle grenade according to the invention prevents several advantages. It is well balanced, the main explosive charge being regularly distributed around the said duct, and the fuze having a symmetry plane passing by the axis of said duct. It is thus possible to accurately predetermine the ballistic trajectory of the grenade, which reinforces the precision of launching the grenade.

On the other hand the grenade according to the invention is provided with a "transport safety device" and a "muzzle safety device". The "transport safety device" is constituted by the abovementioned ejectable means. This ejectable means is advantageously a plug which is tightened or cotted within the said duct of the grenade and which is provided with spindles preventing the relative rotation of said both members. As long as the plug has not been ejected out of the duct by a bul-

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let passing through this duct, the spindles prevent a relative rotation of said both member; simultaneously, the said retaining means is locked and prevents thus a relative displacement of the said striker and percussion cap towards one another.

This "transport safety device" notably allows the grenade according to the invention to be dropped by parachute.

The "muzzle safety device" is ensured by the duration of the relative rotation of said both members, from the time where the said ejectable means is pulled away by a bullet passing through the duct, until the time where the striker, the percussion cap and the detonator are in line with one another. This duration depends on the tension of the said spring and can be so regulated that, at the time where the striker, the percussion cap and the detonator are in line with one another, the grenade has left the rifle barrel and is at a sufficient distance from the firer for the latter being out of the dangerous zone.

The invention will now be described with reference to the accompanying drawings which show some embodiments of the rifle grenade according to the invention, but in no restrictive sense.

FIG. 1 is, in axial section, a first embodiment of the rifle grenade according to the invention, mounted on a rifle barrel;

FIG. 2 is, at a larger scale, a detail of FIG. 1;

FIG. 3 is a cross section along plane III-III of FIG. 2;

FIG. 4 is, at a larger scale, a partial axial section along plane IV-IV of FIG. 1;

FIG. 5 is a cross section along plane V-V of FIG. 4;

FIG. 6 is, in partial axial section, a second embodiment of the rifle grenade according to the invention, mounted on a rifle barrel;

FIG. 7 is, in partial axial section, a third embodiment of the rifle grenade according to the invention, mounted on a rifle barrel.

In these FIGS., the same reference numbers designate identical elements.

The rifle grenade designated in drawings by numeral 1, comprises an explosive head 2 the shape of which is determined by the purpose for which the grenade is intended, a tubular direction tail-sleeve 3 which is eventually provided with fins 4 or with another stabilizer and a fuze 6 disposed in front of the said explosive head 2, with respect of the tail-sleeve 3. This tail-sleeve 3 can be mounted on the end 5 of a rifle barrel.

A duct 7 extends axially through both explosive head 2 and fuze 6; when the grenade 1 is mounted onto the end 5 of the rifle barrel, this duct 7 is in prolongation of this rifle barrel.

The fuze 6 comprises a stationary member 8 which is coaxially disposed around the duct 7 and which is integral with the latter, by tightening against annular shoulder 9 by a screw 10. The stationary member 8 is provided with two threaded cavities 11 and 12 symmetrical with one another about duct 7 and intended to receive two detonators 13 and 14 of the main explosive charge contained in the head 2. An outer envelope 15, applied against the stationary member 8 by the screw 10, is provided with two strikers 16 and 17 respectively in line with the axis of detonators 13 and 14.

The stationary member 8 is shaped for forming an annular cup, coaxially disposed around duct 7 and delimited by a base 18, an inner wall 19 and an outer rim 20 (FIGS. 2 and 4). This annular cup is intended to receive a movable member 21 which is incited to rotate around duct 7, by example in sense of the arrow X (FIG. 5), by a spring 22. A check 23 is provided for preventing an axial displacement of said movable member 21, in said cup of the stationary member 8.

The movable member 21 is provided with two cylindrical housings intended to receive respectively two percussions caps 24 and 25 and their cap holders 26 and 27; the position of these cylindrical housings within member 21 is arranged so that, by rotating said member 21 in said cup of member 8, the caps 24 and 25 can be placed simultaneously, the one between the striker 16 and detonator 13, and the other between the striker 17 and detonator 14. The cap holders 26 and 27 act as inertia blocks able to axially move within their respective housings.

A ring 28 is maintained on the stationary member 8, between a shoulder of its outer rim 20, and the outer envelope 15.

When the movable member 21 is, in the said cup of stationary member 8, in a position similar to the position represented in FIG. 5, for which the caps 24 and 25 are not in line with the strikers 16 and 17 and the detonators 13 and 14, said ring 28 is engaged in a circular groove 29 provided in each of the cap holders 26 and 27, for retaining the latter in their respective housings. When, after rotation of the movable member 21 in the said cup, the caps 24 and 25 are in line with the strikers 16 and 17 and the detonators 13 and 14, the cap holders 26 and 27 are disengaged from said ring 28 which presents, for this purpose, two recesses 30 and 31 in the vicinity of the detonators 13 and 14 (FIGS. 3 and 5).

A plug 32 is tightened within duct 7, with eventually a supplemental fixing pin. In the head 33 of said plug 32, spindles 34 and 35 are attached, which, by contact against faces 36 and 37 of the movable member 21, prevent the latter to rotate under the action of the compressed spring 22, from the position represented in FIG. 5, as far as the position represented in FIG. 3, wherein the caps 24 and 25 are in line with the strikers 16 and 17 and the detonators 13 and 14.

At the moment of the grenade 1 is launched by means of a conventional ball cartridge, the bullet 38 is propelled out of the rifle barrel by gases generated by the combustion of the powder of the cartridge, passes through the duct 7 of the grenade and ejects the plug 32 and its spindles 34 and 35. The rotatable member 21 rotates then freely, under the action of spring 22, in sense of the arrow X, as far as contact with a check 39, the caps 24 and 25 being then in line with the strikers 16 and 17 and the detonators 13 and 14, and the cap holders 26 and 27 being disengaged from the ring 28 (FIG. 3).

Simultaneously with the passage of the bullet 38 through the duct 7 and with the subsequent rotation of the rotatable member 21, the grenade 1 is launched ahead, under the action of pressure generated by the abovementioned gases within the space 40 delimited by the tail 3 of the grenade and the end 5 of the rifle barrel (FIG. 1).

At the moment of the fuze 6 reaches a target, after the grenade 1 has left the rifle barrel, the cap holders 26 and 27 are projected ahead under the action of vis inertiae and the caps 24 and 25 explode in contact with the strikers 16 and 17; the shock waves resulting from these explosions, are transmitted, by conduits 41 and 42 on the one hand, 43 and 44 on the other hand, provided respectively within the cap holders 26 and 27 and within the stationary member 8, to the detonators 13 and 14 which detonate for exploding the main explosive charge contained within head 2 (FIGS. 1 and 2).

In the embodiment of FIG. 6, the rifle grenade 1 is provided with a metallic sheet 45 which obturates the said duct 7. This sheet is intended to be perforated by the bullet 38 so as to reduce at the minimum value, the opening between said tail 3 and duct 7 of the grenade 1 and also to reduce at the minimum value, the loss of pressure in space 40, due to the passage through duct 7, of a partial bulk of the abovementioned gases.

Grenades equipped with such a sheet 45 are advantageous in that they can be used on rifles of various bores, but having the same external diameter at the end 5.

Further, a grenade provided with this sheet 45 can eventually be launched by means of a blank cartridge; in this case, it is clearly necessary to manually remove the plug 32 before launching the grenade.

In FIG. 7, there is shown a particularly interesting embodiment of the grenade according to the invention. In this embodiment, the grenade 1 is provided with a supplemental propellant charge 46 lodged within an annular cavity provided

between the wall of said tail 3 and an extension of duct 7, projecting in tail 3. This cavity is closed by a closing 47, made by example of cardboard. The said propellant charge 46 is intended to furnish supplemental propellant energy to the grenade, after it has been fired by the abovementioned gases leaving the rifle barrel.

Eventually, a sheet 45 can be provided for closing the duct 7, as in the embodiment of FIG. 6.

In the above described embodiments of the invention, the said member 8 provided with detonators 13 and 14 and strikers 16 and 17 is stationary with regard to the body of the grenade 1, while the said member 21 provided with percussion caps 24 and 25 is movable with regard to this stationary member 8.

It is evident that members 8 and 21 could be so arranged that the member provided with caps would be stationary with regard to the body of the grenade, and that the member provided with detonators and strikers would be movable with regard to this stationary member.

Members 8 and 21 could also be so arranged that strikers 16 and 17 would be axially slidable towards caps 24 and 25. Such an embodiment could notably be used in case of fuze 6 would be mounted at the rearward part of the explosive head 2, between the latter and the tail 3 of the grenade 1.

I claim:

1. A rifle grenade which comprises an explosive head and a fuse through both of which extends an axial duct for the passage of a bullet of a conventional ball cartridge fired by a rifle, said fuse comprising two members coaxially disposed around said duct which are each structurally symmetrically balanced with respect to said duct, one of said members being provided with at least one striker and one detonator which are separated from one another by said other member which is provided with at least one percussion cap and one cap holder, said fuze further including ejectable means operative before the launching of the grenade for preventing relative rotation of said two members from a position wherein said percussion cap and cap holder are out of alignment with said striker and said detonator, retaining means for preventing relative displacement of said striker parallel to the axis of said duct, on one hand, and of said percussion cap and said cap holder, on the other hand, toward a position wherein said percussion cap and cap holder are in alignment with said striker and said detonator and wherein said retaining means is unlocked.

2. The rifle grenade as defined in claim 1 wherein the member which is provided with said percussion cap and said cap holder is rotatable within the other member provided with said striker and said detonator, and said last-mentioned member being stationary wherein said striker is stationary on its member while said cap holder can slide within its member in a parallel direction to the axis of said duct, and said retaining means being integral with said stationary member provided with said striker and retaining axially said cap holder.

3. A rifle grenade as claimed in claim 1, wherein the said ejectable means is a plug which is tightened or cottered within the said duct of the grenade and which is provided with spindles preventing the relative rotation of said both members, these spindles being pulled away by the said plug when the latter is ejected by the said ball, out of the said duct.

4. A rifle grenade as claimed in claim 2, wherein the said retaining means is a ring which is disposed within the stationary member provided with the striker and the detonator and which is engaged in a groove of the said cap holder, said ring being provided, along its inner periphery, with a recess for allowing the said cap holder to axially disengage itself from the said ring, when said both members are in position wherein the said striker, cap and detonator are in line with one another.