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(54) **GRENADE**

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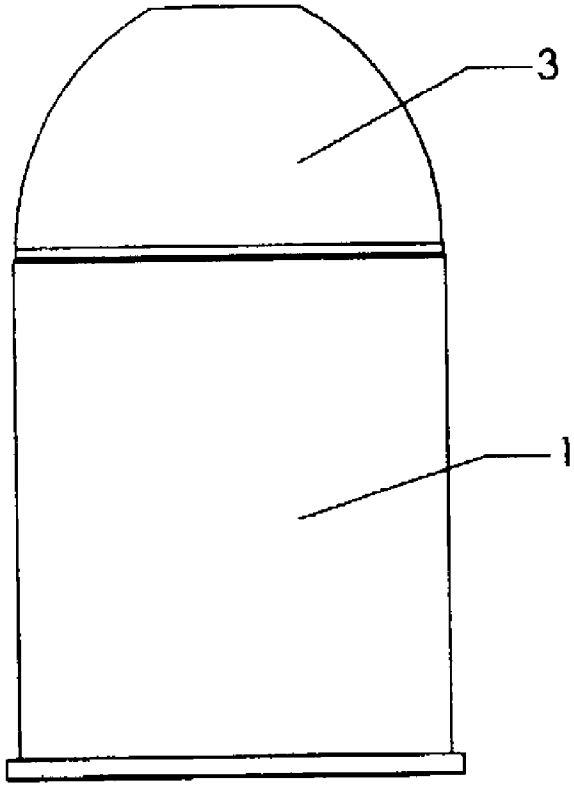
(57) **ABSTRACT**

According to the invention, and with reference to FIG. **5**, there is provided a grenade, having a case **1**, a sabot **2**, and a cover **3**. The sabot has a base part **12**, a space for receiving a projectile or projectiles **18**, and a plurality of petals **14**. The grenade is formed such that when it is arranged for use the sabot **2** is fitted to the case **1**, the projectile or projectiles **18** are within the space, and the cover **3** is fitted around the petals **18** wherein end parts of the petals bend towards one another to substantially encapsulate the projectile or projectiles **18**. The grenade is formed such that when it is in use and is fired from a suitable rifle a charge in the case causes the sabot **2** and the projectile or projectiles **18** to be propelled forward and punch through the cover **3** such that the projectile or projectiles **18** are released from the sabot **2** to a target.



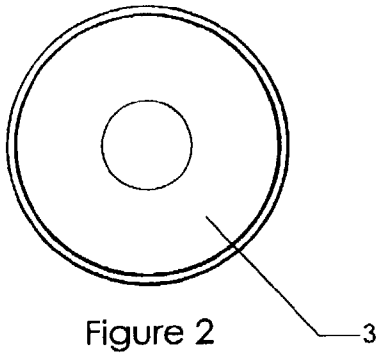


Figure 2

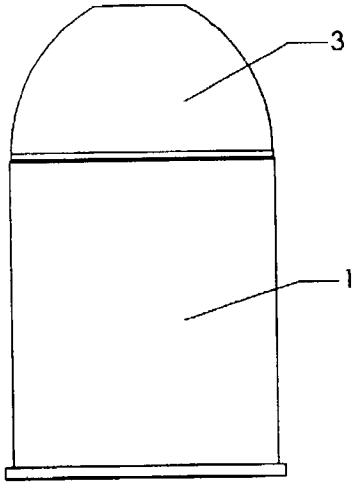


Figure 1

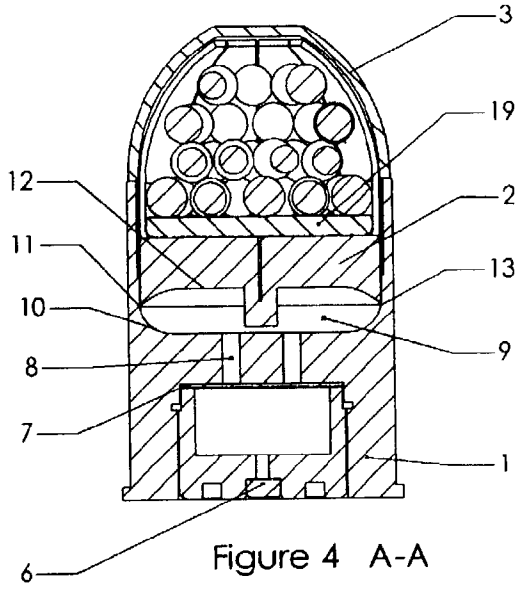


Figure 4 A-A

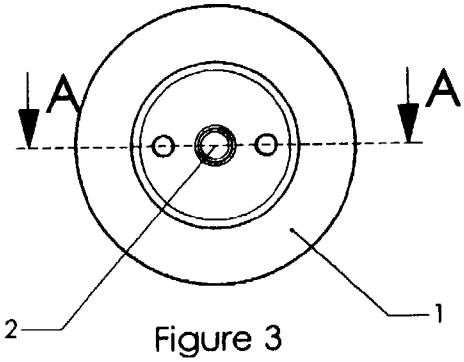


Figure 3

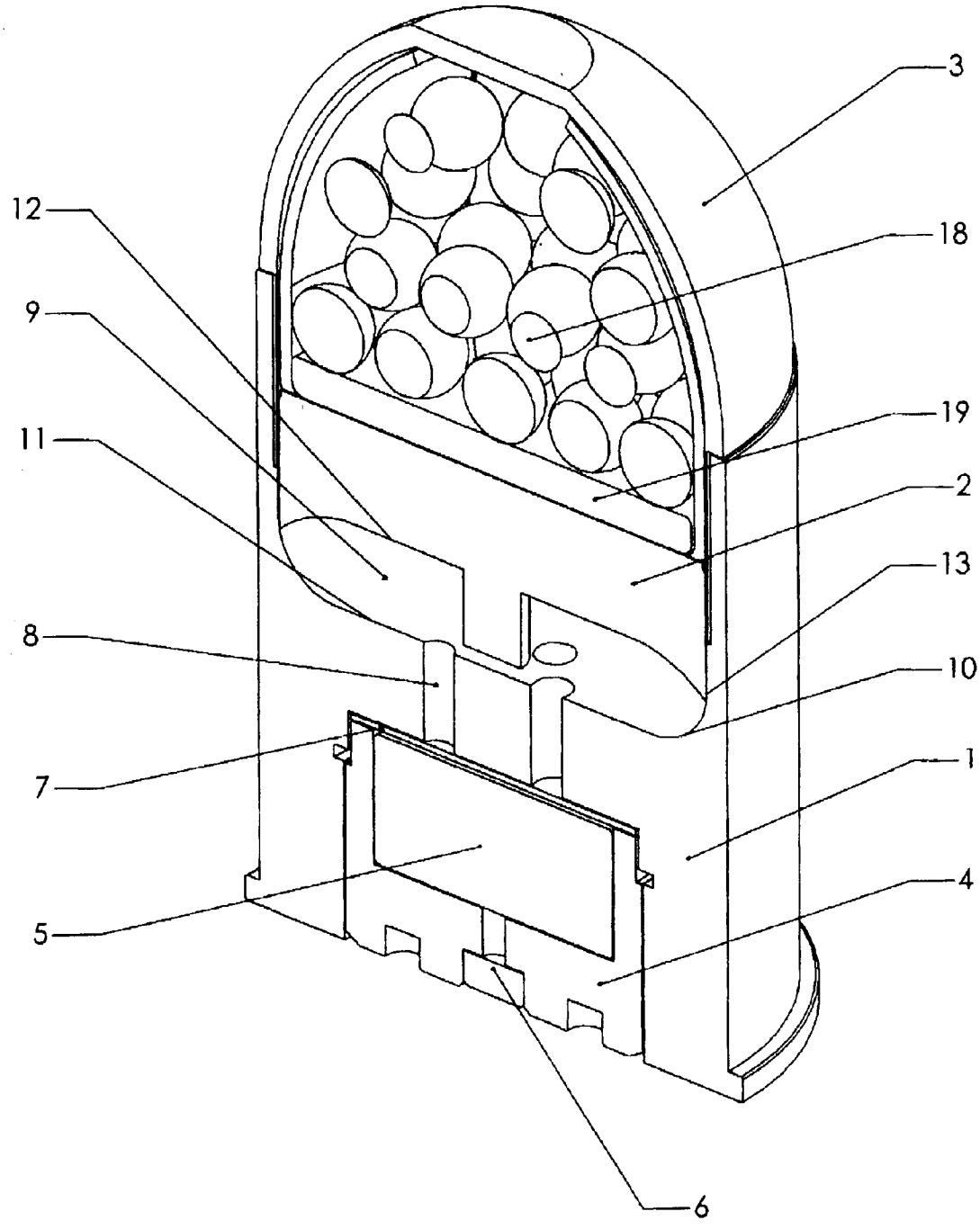


Figure 5

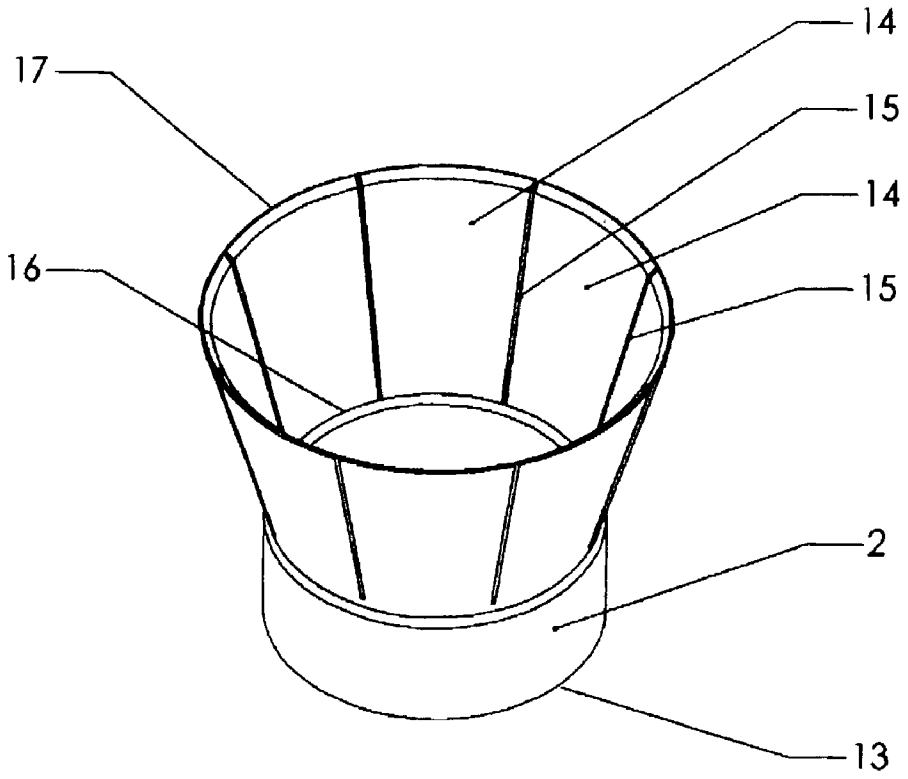


Figure 6

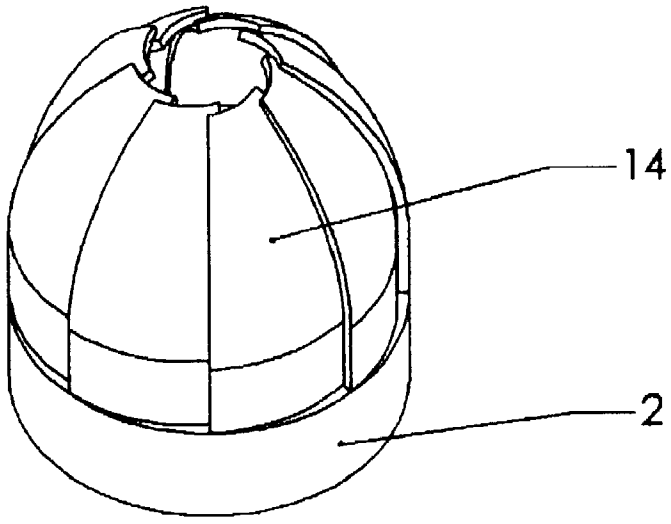


Figure 7

GRENADE

FIELD OF INVENTION

[0001] This invention relates to a grenade. In particular, a preferred form of the invention relations to a grenade capable of being fired from a suitable rifle.

BACKGROUND

[0002] In the context of military operations it is desirable to have a grenade which can be fired with a rifle to deliver a pay load of metallic pellets or similar projectiles to a target. Grenades which release pellets at a high velocity in a dispersed fashion are particularly useful for close quarters combat, especially in a jungle situation. It is accordingly an object of at least one form of the present invention to provide a grenade which can be fired to deliver pellets or other projectiles to a target, or to at least provide the public with a useful choice.

SUMMARY OF THE INVENTION

[0003] According to one aspect of the invention there is provided a grenade, having a case, a sabot, and a cover;

[0004] the sabot having a base part, a space for receiving a projectile or projectiles, and a plurality of petals;

[0005] the grenade being formed such that when it is arranged for use the sabot is fitted to the case, the projectile or projectiles are within the space, and the cover is fitted around the petals wherein end parts of the petals bend towards one another to substantially encapsulate the projectile or projectiles;

[0006] the grenade being formed such that when it is in use and is fired from a suitable rifle a charge in the case causes the sabot and the projectile or projectiles to be propelled forward and punch through the cover such that the projectile or projectiles are released from the sabot to a target.

[0007] Preferably the petals are arranged such that they fan outwards to release the projectile or projectiles when the grenade has been fired and the sabot leaves the rifle.

[0008] Preferably the sabot is arranged such that it will spin within a barrel of the rifle when the grenade has been fired, the spin causing the petals to fan outwards when they contact air outside the barrel.

[0009] Preferably the sabot has a resilient packing for receiving the projectile or projectiles. The packing may be a pad formed from a suitable micro-cellular material.

[0010] Preferably the cover is substantially conical and has an open end and a closed end, the open end engaging the case, and the closed end defining an extremity (eg nose) of the grenade, when the grenade is in a ready for use arrangement.

[0011] Preferably the cover has a plurality of lines of weakness to assist the sabot and the projectile or projectiles to punch through the cover when the grenade is fired with the rifle. The lines of weakness may be in the form of fractures and/or grooves in the cover.

[0012] Preferably the cover and the case are fitted to one another by way of screw threads when the grenade is in a ready for use arrangement.

[0013] Preferably the case is arranged with an internal space adapted to act as at least part of a low pressure chamber, the low pressure chamber being defined in part by a wall and a floor, the wall and the floor being part of the case, the wall tapering in towards the floor and arranged such that the base part of the sabot can butt against the wall such that the floor and the base part of the sabot are spaced from one another. Preferably the wall merges into the floor in a substantially curved fashion.

[0014] Preferably the base part of the sabot has an obturating edge where it butts against the wall when the grenade is in a ready for use arrangement. This obturating edge facilitates a sealing contact between the sabot and the wall.

[0015] Preferably the case has a high pressure chamber which, when the grenade is in a ready for use arrangement, houses a charge (eg suitable cellulosic explosive material). When the grenade is ready for use the high pressure chamber may be substantially closed by a plug inserted into the rest of the case, the plug containing the charge. The plug which itself forms part of the case and the high pressure chamber, may be screw fitted to the rest of the case.

[0016] Preferably there is a passage or passages between the high pressure chamber and the low pressure chamber.

[0017] Preferably a sheet member, eg a thin disk, is within the high pressure chamber and covers the passage or passages when the grenade is in a ready for use arrangement.

[0018] Preferably the plug has a primer for igniting the charge.

[0019] According to another aspect of the invention there is provided a grenade for firing from a suitable rifle, the grenade having a case and a sabot, the sabot having an obturating edge for contacting the case to form a substantially water tight seal between the case and the sabot.

[0020] According to a further aspect of the invention there is provided a grenade for firing from a suitable rifle, the grenade having a case and a sabot, the case having a high pressure chamber for receiving a charge, the high pressure chamber being substantially closed by a plug, the plug itself being part of the case, the plug having a primer and engaging the rest of the case by way of a screw thread arrangement.

[0021] According to another aspect of the invention there is provided a grenade adapted to be fired from a suitable rifle, the grenade incorporating a case, a sabot, a plurality of projectiles, and a cover, the sabot having a plurality of flexible petals which substantially encapsulate the projectiles while the cover substantially encapsulates the petals and holds the petals against the projectiles.

[0022] Some preferred aspects and embodiments of the invention will now be described by way of example, and/or with reference to the accompanying drawings, of which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] **FIG. 1** is an external side view of a rifle grenade,

[0024] **FIG. 2** is an over-head view of the grenade,

[0025] **FIG. 3** is an underneath view of the grenade,

[0026] **FIG. 4** is cross sectional view of the grenade taken through the line A-A as represented in **FIG. 3**,

[0027] **FIG. 5** is a three dimensional cross-sectional view of the grenade taken through the line A-A,

[0028] **FIG. 6** is a three dimensional view of a sabot forming part of the grenade, and

[0029] **FIG. 7** is a three dimensional view of the sabot as it would appear when the grenade is in a ready to use arrangement.

DETAILED DESCRIPTION

[0030] Referring to FIGS. **1** to **5**, the grenade has a case **1**, a sabot **2**, and a cover or nose cone **3**. The case **1** and the nose cone **3** are adapted to engage one another by way of a screw thread arrangement wherein the nose cone **3** screws into the case **1**. The case **1** has a cup like plug **4** which can be screwed into place by way of a screw thread arrangement to define a high pressure chamber **5** within the case **1**. The high pressure chamber **5** is adapted to hold a charge of a suitable cellulosic explosive material or similar. As shown, the plug **4** has a primer **6** for igniting the cellulosic explosive material when the grenade is fired from a rifle.

[0031] With reference to **FIGS. 4 and 5**, the plug **4** fits up against a 0.5 mm copper disc **7**, the disk **7** covering passages **8** extending away from the high pressure chamber **5**. As shown, the passages **8** extend to a low pressure chamber **9** defined within an internal space of the case **1**. More specifically, the low pressure chamber **9** is defined by or between a wall **10** and a floor **11** of the case, and the base **12** of the sabot **2**. The base **12** of the sabot has an obturating edge **13** which forms a gas-tight seal between the sabot **2** and the case **1**.

[0032] Referring to **FIG. 6**, the sabot **2** has a plurality of wad petals **14** extending upwards. Each of the petals are separated by slits **15** so that they can move independently of one another. As shown, each petal has a fixed end **16** and a free end **17**. **FIG. 6** shows the sabot **2** prior to it assuming a ready for use orientation.

[0033] The ready for use orientation of the sabot **2** is shown at **FIGS. 4, 5** and **7**, where a plurality of projectiles or pellets **18** are packed between the petals on a resilient foam packing or pad **19**. As shown, when ready for use the petals **14** overlap one another to assume a substantially conical shape, and are held in that orientation by way of the nose cone **3**. More specifically, the petals **14** bend inwards under pressure from the nose cone **3**, and substantially encapsulate the pellets. The petals may not completely enclose the pellets as the apex of the conical shape may remain slightly open. However, even in this situation, and for the purposes of this document, the petals should be interpreted as substantially encapsulating the pellets. The nose cone **3** thus enshrouds both the petals **2** and the pellets **18** to maintain the petals in the desired orientation. The pellets are held tight and are substantially prevented from rattling within the sabot due to the pressure of the nose cone, and also due to the compressive effect of the resilient pad **19** on the pellets.

[0034] The nose cone **3** is formed with grooves, fracture lines, or other lines of weakness so that it can be readily ruptured when desired. The nose cone **3** may be formed from a suitable plastics material, for example a suitable polyethylene material. The sabot **2** is preferably formed from a suitable urethane material, and the case **1** is primarily formed from a suitable metallic substance.

[0035] When the grenade is in use it is loaded into a grenade firing rifle and fired. The charge in the high pressure chamber **5** detonates, blows through the copper disc **7**, and sends gases through the passages **8** and into the low pressure chamber **9**. This causes the sabot **2**, including the pellets **18**, to blast through the nose cone **3** and move down the barrel of the rifle. The case **1** is left within the rifle. The sabot is arranged such that as it moves down the barrel it is caused to spin. When the sabot **2** passes out of the end of the barrel, the force of the outside air on the spinning sabot **2**, and in particular on the petals **14**, causes the petals **14** to open or flare outwards thus releasing the pellets **18** at high velocity. The pellets **18** proceed to a desired target, leaving the sabot **2** behind due to the slowing effect of the outside air on the flared petals **14**.

[0036] The pellets **18** are preferably lead balls coated with copper, and when fired as above spray outwards making it difficult for a fleeing target to avoid them. In some embodiments of the invention the pellets **18** may be capable of blowing a door off its hinges.

[0037] When a grenade is fired as above it will be evident to those skilled in the art that there is a need to protect the barrel of the rifle from damage by the pellets **18**. This protection is achieved by way of the petals **14**, which only open to release the pellets **18** when the sabot has passed out of the end of the barrel. In the embodiment of the invention described above the case **1** is substantially 40 mm in diameter, although it should be understood that this is not a restriction on the scope of the invention.

[0038] While some preferred aspects and embodiments of the invention have been described by way of example, it should be appreciated that modifications and improvements can occur without departing from the scope of the appended claims.

1. A grenade, having a case, a sabot, and a cover;

the sabot having a base part, a space for receiving a projectile or projectiles, and a plurality of petals;

the grenade being formed such that when it is arranged for use the sabot is fitted to the case, the projectile or projectiles are within the space, and the cover is fitted around the petals wherein end parts of the petals bend towards one another to substantially encapsulate the projectile or projectiles;

the grenade being formed such that when it is in use and is fired from a suitable rifle a charge in the case causes the sabot and the projectile or projectiles to be propelled forward and punch through the cover such that the projectile or projectiles are released from the sabot to a target.

2. A grenade according to claim 1, wherein the petals are arranged such that they fan outwards to release the projectile or projectiles when the grenade has been fired and the sabot leaves the rifle.

3. A grenade according to claim 1, wherein the sabot is arranged such that it will spin within a barrel of the rifle

when the grenade has been fired, the spin causing the petals to fan outwards when they contact air outside the barrel.

4. A grenade according to claim 1, wherein the sabot has a resilient packing for receiving the projectile or projectiles.

5. A grenade according to claim 1, wherein the cover is substantially conical and has an open end and a closed end, the open end engaging the case, and the closed end defining an extremity of the grenade, when the grenade is in a ready for use arrangement.

6. A grenade according to claim 1, wherein the cover has a plurality of lines of weakness to assist the sabot and the projectile or projectiles to punch through the cover when the grenade is fired with the rifle.

7. A grenade according to claim 1, wherein the cover and the case are fitted to one another by way of screw threads when the grenade is in a ready for use arrangement.

8. A grenade according to claim 1, wherein the case is arranged with an internal space adapted to act as at least part of a low pressure chamber, the low pressure chamber being defined in part by a wall and a floor, the wall and the floor being part of the case, the wall tapering in towards the floor and arranged such that the base part of the sabot butts against the wall such that the floor and the base part of the sabot are spaced from one another.

9. A grenade according to claim 1, wherein the case is arranged with an internal space adapted to act as at least part of a low pressure chamber, the low pressure chamber being defined in part by a wall and a floor, the wall and the floor being part of the case, the wall tapering in towards the floor and arranged such that the base part of the sabot butts against the wall such that the floor and the base part of the sabot are spaced from one another, and wherein the wall merges into the floor in a substantially curved fashion.

10. A grenade according to claim 1, wherein the case is arranged with an internal space adapted to act as at least part of a low pressure chamber, the low pressure chamber being defined in part by a wall and a floor, the wall and the floor being part of the case, the wall tapering in towards the floor and arranged such that the base part of the sabot butts against the wall such that the floor and the base part of the sabot are spaced from one another, and wherein the base part of the sabot has an obturating edge where it butts against the wall when the grenade is in a ready for use arrangement.

11. A grenade according to claim 1, wherein the case has a high pressure chamber which, when the grenade is in a ready for use arrangement, houses the charge.

12. A grenade according to claim 1, wherein when the grenade is ready for use the high pressure chamber is substantially closed by a plug inserted into the rest of the case.

13. A grenade according to claim 1, wherein the case has a high pressure chamber which, when the grenade is in a ready for use arrangement, houses a charge, and wherein there is one of a passage and passages between the high pressure chamber and the low pressure chamber.

14. A grenade according to claim 1, wherein the case has a high pressure chamber which, when the grenade is in a ready for use arrangement, houses a charge, and wherein there is one of a passage and passages between the high pressure chamber and the low pressure chamber, and wherein there is a sheet member within the high pressure chamber which is against the passage or passages when the grenade is in a ready for use arrangement.

15. A grenade, having a case, a sabot, and a cover;

the sabot having a base part, a space for receiving projectiles, and a plurality of petals;

the grenade being formed such that when it is arranged for use the sabot is fitted to the case, the projectiles are within the space, and the cover is fitted around the petals wherein end parts of the petals bend towards one another to substantially encapsulate the projectiles;

the grenade being formed such that when it is in use and is fired from a suitable rifle a charge in the case causes the sabot and the projectiles to be propelled forward and punch through the cover such that the projectiles are released from the sabot to a target;

the grenade being formed such that the case is arranged with an internal space adapted to function as at least part of a low pressure chamber, the low pressure chamber being defined in part by a wall and a floor, the wall and the floor being part of the case, the wall tapering in towards the floor and arranged such that the base part of the sabot butts against the wall such that the floor and the base part of the sabot are spaced from one another;

the case having a high pressure chamber which, when the grenade is in a ready for use arrangement, houses the charge, and the high pressure chamber is substantially closed by a plug inserted into the rest of the case, and wherein there is a primer adapted for igniting the charge,

and wherein there are passages between the high pressure chamber and the low pressure chamber.

16. A grenade according to claim 15, wherein the petals are arranged to fan outwards when they leave the rifle, and wherein the cover has a plurality of lines of weakness to assist the sabot and the projectiles to punch through the cover when the grenade is fired with the rifle, and wherein there is a sheet member within the high pressure chamber which is against the passages.

17. A grenade according to claim 15, wherein the petals are arranged to fan outwards when they leave the rifle, and wherein the cover has a plurality of lines of weakness to assist the sabot and the projectiles to punch through the cover when the grenade is fired with the rifle, there being a sheet member within the high pressure chamber which is against the passages, the wall merging with the floor in a substantially curved fashion, and wherein the base part of the sabot has an obturating edge where it butts against the wall.

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