thickness towards a front end of the gun barrel. In the preferred implementation illustrated here, metallic liner **22** is formed with a plurality of radially projecting ridges **23** circumscribing the gun barrel and subdividing its length into regions, each of which is provided with composite material reinforcement **24**. The rear end of the barrel is preferably enclosed by a metallic pressure vessel **26**, typically spherical and formed from steel, attached to, or integrally formed with, the rear end of the gun barrel, within which at least part of the black powder or other low-explosive **20** is initially stored. A piston **28** is preferably deployed within gun barrel **14**, between the black powder and shell **16**, so as to propel the shell along the barrel while protecting the shell from damage. A sabot **32** preferably supports shell **16** during motion along barrel **14** and is discarded thereafter.

The reaction against which the high-pressure gases fire the shell is provided primarily by the inertial mass of the gun barrel. Most preferably, a total mass of the gun barrel (including the pressure vessel) is between one and ten times the mass of shell **14**.

As mentioned, shell **14** is preferably fired at a given predefined stand-off distance from the intended target. To this end, projectile **10** preferably also includes a proximity fuze (not shown) or other suitable fuzing system with an associated initiating device configured to ignite the black powder or other low-explosive **20** when projectile **10** reaches the given distance from the target. Ignition of the explosive charge **18** of shell **16** is typically performed by a separate fuze **30** within shell **16**.

thickness towards a front end of the gun barrel. The rear end of the barrel is preferably enclosed by a metallic pressure vessel **26**, typically spherical and formed from steel, attached to, or integrally formed with, the rear end of the gun barrel, within which at least part of the black powder or other low-explosive **20** is initially stored. A piston **28** is preferably deployed within gun barrel **14**, between the black powder and shell **16**, so as to propel the shell along the barrel while protecting the shell from damage. A sabot **32** preferably supports shell **16** during motion along barrel **14** and is discarded thereafter.

The reaction against which the high-pressure gases fire the shell is provided primarily by the inertial mass of the gun barrel. Most preferably, a total mass of the gun barrel (including the pressure vessel) is between one and ten times the mass of shell **14**.

As mentioned, shell **14** is preferably fired at a given predefined stand-off distance from the intended target. To this end, projectile **10** preferably also includes a proximity fuze (not shown) or other suitable fuzing system with an associated initiating device configured to ignite the black powder or other low-explosive **20** when projectile **10** reaches the given distance from the target. Ignition of the explosive charge **18** of shell **16** is typically performed by a separate fuze **30** within shell **16**.

WHAT IS CLAIMED IS:

1. A projectile selected from the group comprising: a bomb and a missile, the projectile comprising:

(a) a housing configured to travel stably through the air;

(b) a gun barrel deployed within said housing, said gun barrel comprising:

(i) a metallic liner having a plurality of radially projecting ridges circumscribing said gun barrel and subdividing a length of said gun barrel into regions, and

(ii) composite material reinforcement deployed around said metallic liner within each of said regions;

(c) a shell deployed within said gun barrel, said shell containing an explosive charge; and

(d) a quantity of black powder or other low-explosive deployed for firing said shell at a muzzle velocity from said gun barrel.

2. The projectile of claim 1, wherein said housing has a central axis, and wherein said gun barrel is aligned with, or parallel to, said central axis.

3. The projectile of claim 1, wherein said housing has an outer diameter, and wherein said gun barrel has an inner diameter at least half of said housing outer diameter.

4. The projectile of claim 1, wherein said black powder or other low-explosive is configured to have a burn-time of not more than 10 milliseconds.

5. The projectile of claim 1, wherein said black powder or other low-explosive is configured to generate a pressure within said gun barrel of several thousands of atmospheres.

6. The projectile of claim 1, wherein at least one of said metallic liner and said composite material reinforcement is formed with a graduated thickness, having a maximum thickness at a rear end of said gun barrel and a reduced thickness towards a front end of said gun barrel.

7. The projectile of claim 1, wherein at least part of said black powder or other low-explosive is initially stored within a metallic pressure vessel attached to, or integrally formed with, a rear end of said gun barrel.

8. The projectile of claim 7, wherein said metallic pressure vessel is a generally spherical pressure vessel.

9. The projectile of claim 1, wherein a total mass of said gun barrel is between one and ten times a mass of said shell.

10. The projectile of claim 1, further comprising a piston deployed within said gun barrel between said black powder or other low-explosive and said shell.

11. The projectile of claim 1, further comprising a fuzing system associated with the projectile and configured to ignite said black powder or other low-explosive when the projectile is a given distance from a target thereby firing said shell towards the target.

12. The projectile of claim 1, wherein the projectile is a bomb.

13. A projectile selected from the group comprising: a bomb and a missile, the projectile comprising:

(a) a housing configured to travel stably through the air;

(b) a gun barrel deployed within said housing, said gun barrel comprising:

(i) a metallic liner having a plurality of radially projecting ridges circumscribing said gun barrel and subdividing a length of said gun barrel into regions, and

(ii) composite material reinforcement deployed around said metallic liner within each of said regions; and

(c) a shell deployed within said gun barrel, for firing from said gun barrel.

14. The projectile of claim 13, further comprising a generally spherical metallic pressure vessel attached to, or integrally formed with, a rear end of said gun barrel.

WHAT IS CLAIMED IS:

1. A projectile selected from the group comprising: a bomb and a missile, the projectile comprising:

(a) a housing configured to travel stably through the air;

(b) a gun barrel deployed within said housing;

(c) a shell deployed within said gun barrel, said shell containing an explosive charge; and

(d) a quantity of black powder or other low-explosive deployed for firing said shell from said gun barrel.

2. The projectile of claim 1, wherein said housing has a central axis, and wherein said gun barrel is aligned with, or parallel to, said central axis.

3. The projectile of claim 1, wherein said housing has an outer diameter, and wherein said gun barrel has an inner diameter at least half of said housing outer diameter.

4. The projectile of claim 1, wherein said black powder or other low-explosive is configured to have a burn-time of not more than 10 milliseconds.

5. The projectile of claim 1, wherein said black powder or other low-explosive is configured to generate a pressure within said gun barrel of at least 1000 atmospheres.

6. The projectile of claim 1, wherein said gun barrel comprises:

(a) a metallic liner; and

(b) composite material reinforcement deployed around said metallic liner.

7. The projectile of claim 6, wherein at least one of said metallic liner and said composite material reinforcement is formed with a graduated thickness, having a maximum thickness at a rear end of said gun barrel and a reduced thickness towards a front end of said gun barrel.

8. The projectile of claim 6, wherein at least part of said black powder or other low-explosive is initially stored within a metallic pressure vessel attached to, or integrally formed with, a rear end of said gun barrel.

9. The projectile of claim 6, wherein a total mass of said gun barrel is between one and ten times a mass of said shell.

10. The projectile of claim 1, further comprising a piston deployed within said gun barrel between said black powder or other low-explosive and said shell.

11. The projectile of claim 1, further comprising a fuzing system associated with the projectile and configured to ignite said black powder or

other low-explosive when the projectile is a given distance from a target thereby firing said shell towards the target.

12. The projectile of claim 1, wherein the projectile is a bomb.

13. A projectile selected from the group comprising: a bomb and a missile, the projectile comprising:

(a) a housing configured to travel stably through the air;

(b) a gun barrel deployed within said housing; and

(c) a shell deployed within said gun barrel, for firing from said gun barrel.