CLAIMS

1. A **self-resetting pest control apparatus** to incapacitate a target pest species and reset itself after such incapacitation, comprising or including,

A kill engine to at least in part deliver incapacitating energy to the target species, whereby the kill engine does not require electricity, the kill engine using an non-flammable gas charge, the kill engine when triggered, will actuate and then reset itself,

a source of compressed non-flammable gas, connected to and supplying the kill engine,

a force delivery hammer, driven by the kill engine, that when actuated, linearly delivers the incapacitating energy to the target pest species by impacting thereon,

A trap enclosure from which the kill engine is at least in part mounted, the trap enclosure having an entry point for the target pest species into an interior of the trap enclosure, a bait station, and trigger mechanism to trigger the kill engine, the trap enclosure includes, at least in part, an exit aperture from the interior of the trap enclosure, and the target pest species is ejected, at least in part by the incapacitating energy, out the exit aperture, and, A species adapter to connect at least in part to the trap enclosure to adapt the trap enclosure to the target pest species, the species adapter based on the size, habits or travel nature of the target pest species,

such that when a target pest species enters the apparatus it triggers the trigger mechanism, causing the kill engine to actuate and deliver incapacitating energy to the target pest species.

2. Apparatus as claimed in claim 1 wherein there is a force delivery portion to at least in part co-operate with the force delivery hammer in delivering the incapacitating energy, and wherein the force delivery portion acts from the opposing side the force delivery hammer acts from.

3. Apparatus as claimed in claim 1 wherein the force delivery portion includes a latchable door that co-operates with the force delivery hammer in ejecting the pest from trap and/or delivering the incapacitating energy by initially resisting the force delivery hammer, wherein the latchable door at least in part further obscures the exit aperture.

~~2.~~4. Apparatus as claimed in claim 1 wherein the force delivery hammer impacts the target pest species at a first location, and then, after the first location, at a second location, and wherein the first location is the skull region and the second location is the body region.

~~3. Apparatus as claimed in claim 2 wherein the first location is the skull region and the second location is the body region.~~

~~4.~~5. Apparatus as claimed in ~~any one of claims 1 to 3~~claim 1 wherein the force delivery hammer is contoured to reduce the area of delivery to the target pest species, to increase the impact stress/energy delivered to effect a humane kill.

~~5. Apparatus as claimed in any one of claims 1 to 3 wherein there is a force delivery portion to at least in part co-operate with the force delivery hammer in delivering the incapacitating energy.~~

~~6. Apparatus as claimed in any one of claims 1 to 4 wherein the force delivery portion acts from the opposing side the force delivery hammer acts from.~~

~~7.~~6. Apparatus as claimed in ~~any one of claims 1 to 6~~claim 1 wherein the kill engine is triggered by compressed gas via the trigger mechanism triggered by the target pest species, and wherein the kill engine re-sets itself using a portion of the air charge, and wherein the portion of the air charge is used after the air charge has done a majority of the work in delivering the incapacitating energy.

~~8. Apparatus as claimed in any one of claims 1 to 7 wherein the kill engine re-sets itself using a portion of the air charge.~~

~~9. Apparatus as claimed in any one of claims 1 to 8 wherein the portion of the air charge is used after the air charge has done a majority of the work in delivering the incapacitating energy.~~

~~10. Apparatus as claimed in any one of claims 1 to 9 wherein the pest control apparatus includes a fluidly connected refillable gas reservoir to hold a store of gas for the gas charge.~~

~~11.~~7. Apparatus as claimed in any one of claims 1 to 10 wherein the gas is stored in the refillable reservoir at a pressure between 600 pounds per square inch and 6000 pounds per square inch, the gas is regulated to operate the piston at between 125 pounds per square inch and 600 pounds per square inch and preferably wherein the

gas is stored at 800 pounds per square inch, and wherein the gas is regulated to operate the piston at 175 pounds per square inch.

~~12. Apparatus as claimed in any one of claims 1 to 11 wherein the gas is regulated to operate the piston at between 125 pounds per square inch and 600 pounds per square inch.~~

~~13. Apparatus as claimed in any one of claims 1 to 12 wherein the gas is stored at 800 pounds per square inch.~~

~~14. Apparatus as claimed in any one of claims 1 to 13 wherein the gas is regulated to operate the piston at 175 pounds per square inch.~~

~~15. Apparatus as claimed in any one of claims 1 to 14 wherein the refillable reservoir remains connected when being refilled.~~

~~16.~~8. Apparatus as claimed in ~~any one of claims 1 to 15~~claim 1 wherein the kill engine drives a piston linearly within a working chamber of the kill engine.

~~17. Apparatus as claimed in any one of claims 1 to 16 wherein the piston is connected, directly or indirectly, to a striking rod, which is turn is connected, directly or indirectly to the force delivery hammer.~~

~~18. Apparatus as claimed in any one of claims 1 to 17 wherein the piston is directly connected to the striking rod which in turn is directly connected to the force delivery hammer.~~

~~19.~~9. Apparatus as claimed in ~~any one of claims 1 to 17~~claim 1 wherein the piston is connected to the force delivery hammer by a force transmission mechanism, and the force transmission mechanism can amplify or reduce the force delivered by, or the travel of, the force delivery hammer.

~~20. Apparatus as claimed in any one of claims 1 to 19 wherein the force transmission mechanism can amplify or reduce the force delivered by, or the travel of, the force delivery hammer.~~

~~21.~~10. Apparatus as claimed in ~~any one of claims 1 to 20~~claim 1 wherein the path of the force delivery hammer defines a kill zone at least in part within an interior of the trap enclosure, wherein inwardly from the kill zone is the bait station and trigger mechanism, wherein the bait station is accessible from an exterior of the trap enclosure for removal and or checking and refreshing of the bait.

~~22. Apparatus as claimed in any one of claims 1 to 20 wherein inwardly from the kill zone is the bait station and trigger mechanism.~~

~~23. Apparatus as claimed in any one of claims 1 to 21 wherein the bait station is accessible from an exterior of the trap enclosure for removal and or checking and refreshing of the bait.~~

~~24. Apparatus as claimed in any one of claims 1 to 23 wherein the bait container is partially permeable and partially or fully transparent in some implementations to facilitate line of sight through the apparatus.~~

~~25.~~11. Apparatus as claimed in ~~any one of claims 1 to 24~~claim 1 wherein incapacitated target pest species can be ejected from the interior to the exterior.

~~26.~~12. Apparatus as claimed in ~~any one of claims 1 to 24~~claim 1 wherein the force delivery portion at least in part obscures the exit aperture.

~~27. Apparatus as claimed in any one of claims 1 to 26 wherein the force delivery portion includes a latchable door that co-operates with the force delivery hammer in ejecting the pest from trap and/or delivering the incapacitating energy by initially resisting the force delivery hammer.~~

~~28.~~13. Apparatus as claimed in claim ~~27~~ 1 wherein the force delivery hammer delivers a primary incapacitating energy and the force delivery portion co-operates to deliver a secondary incapacitating energy, one or more or both together sufficient to incapacitate the target pest species.

~~29. Apparatus as claimed in any either of claims 27 or 28 wherein the latchable door at least in part further obscures the exit aperture.~~

~~30.~~14. Apparatus as claimed in ~~any one of claims 27 to 29~~claim 3 wherein the latchable door is on a time or energy delay to increase the energy delivery to the target pest species, wherein the energy delay uses a magnet, mechanical latch, timing or similar mechanism that is overcome by the energy to then release the door, or that releases the door a certain period of time after triggering of the kill engine, or movement of the force delivery hammer.

~~31.~~15. Apparatus as claimed in ~~any one of claims 27 to 30~~claim 14 wherein after the time or energy delay the latchable door opens to expel the target pest species via the exit aperture.

~~32.~~16. Apparatus as claimed in ~~any one of claims 27 to 31~~claim 3 wherein the latchable door opens in a direction parallel to the motion of the force delivery hammer.

~~33.~~17. Apparatus as claimed in ~~any one of claims 27 to 32~~claim 3 wherein the latchable door is pivoted on an axis above the kill zone such that when it opens it swings out of the way, the energy imparted to the target pest species then expels it from the kill zone.

~~34. Apparatus as claimed in any one of claims 27 to 33 wherein latchable door uses a magnet, mechanical latch, timing or similar mechanism that is overcome by the energy to then release the door, or that releases the door a certain period of time after triggering of the kill engine, or movement of the force delivery hammer.~~

~~35.~~18. Apparatus as claimed in ~~any one of claims 27 to 34~~claim 3 wherein the latchable door is biased to return to the closed latched state by gravity or a biasing mechanism.

~~36.~~19. Apparatus as claimed in ~~any one of claims 1 to 35~~ claim 1wherein the exit aperture is in a plane substantially perpendicular to the linear action of the force delivery hammer, and wherein the entry point is in a plane substantially parallel to the linear action of the force delivery hammer.

~~37. Apparatus as claimed in any one of claims 1 to 36 wherein the entry point is in a plane substantially parallel to the linear action of the force delivery hammer.~~

~~38. Apparatus as claimed in any one of claims 1 to 37 wherein the linear action of the force delivery hammer is substantially perpendicular to the line of sight.~~

~~39.~~20. Apparatus as claimed in ~~any one of claims 1 to 38~~claim 2 wherein the force delivery portion is a fixed portion of the trap enclosure which the target pest species will be forced against by the force delivery hammer, to deliver further energy to the target pest species.

~~40.~~21. Apparatus as claimed in ~~any one of claims 1 to 39~~claim 1 wherein expulsion of the incapacitated target pest species is at least in part aided by gravity.

~~41.~~22. Apparatus as claimed in ~~any one of claims 1 to 40~~claim 1 wherein the exit aperture can serve as an entry point for the target pest species.

~~42. Apparatus as claimed in any one of claims 1 to 41 wherein the species adapter also provides at least in part a mounting portion to mount the pest control apparatus on a mounting surface.~~

~~43. Apparatus as claimed in any one of claims 1 to 42 wherein the mounting surface is a ground or similar surface.~~

~~44. Apparatus as claimed in any one of claims 1 to 42 wherein, the mounting surface is an angled surface which requires a fastening or similar through the mounting portion to the mounting surface.~~

~~45.~~23. Apparatus as claimed in ~~any one of claims 1 to 44~~claim 1 wherein the kill engine can be removed from the trap enclosure should it need repair, maintenance or replacement, and the trap enclosure can be left in place.

~~46.~~24. Apparatus as claimed in ~~any one of claims 1 to 45~~claim 1 wherein the species adapter includes a guide portion to the entry point, and wherein the guide portion is a guide surface or surfaces for the target pest species to move along from the mounting surface to the entry point, and wherein the species adapter at least in part defines the entry point and the exit aperture.

~~47. Apparatus as claimed claim 46 wherein the guide portion is a guide surface or surfaces for the target pest species to move along from the mounting surface to the entry point.~~

~~48. Apparatus as claimed in any one of claims 1 to 47 wherein the species adapter at least in part defines the entry point.~~

~~49. Apparatus as claimed in any one of claims 1 to 48 wherein the species adapter at least in part defines the exit aperture.~~

~~50.~~25. Apparatus as claimed in ~~any one of claims 1 to 49~~claim 1 wherein the species adapter for predominantly ground dwelling target pest species, such as, but not limited to, rats, mice, rodents, stoats, ferrets, weasels and similar consists of a flat guide surface from the mounting surface to the entry point, and is inclined if the entry point is above the level of the mounting surface, and the species adapter forms a lower floor for movement along by the target pest species for some or all of the interior of the trap enclosure.

~~51. Apparatus as claimed in any one of claims 1 to 50 wherein for predominantly ground dwelling target pest species the species adapter forms a lower floor for movement along by the target pest species for some or all of the interior of the trap enclosure.~~

~~52.~~26. Apparatus as claimed in ~~any one of claims 1 to 51~~claim 1 wherein the species adapter for vertically curious or moving target pest species, such as, but not limited to possums or stoats, includes a guide surface into the entry point, and facilitates the target pest species to reach the trigger mechanism and kill zone.

~~53. Apparatus as claimed in any one of claims 1 to 52 wherein the guide surface facilitates grip for the target pest species, or allows the target pest species to grip and move along the mounting surface, for example a tree or log.~~

~~54.~~27. Apparatus as claimed in ~~any one of claims 1 to 53~~claim 1 wherein the species adapter is removably connectable to the trap enclosure.

~~55.~~28. Apparatus as claimed in ~~any one of claims 1 to 54~~claim 1 wherein the force delivery hammer is contoured to amplify the incapacitating energy over certain, or smaller areas.

~~56.~~29. Apparatus as claimed in ~~any one of claims 1 to 55~~claim 1 wherein the species adapter, or the trap enclosure, provides a closable entry to a carcass retention space to store the carcass of the target pest species once incapacitated.

~~57.~~30. Apparatus as claimed in ~~any one of claims 1 to 56~~claim 1 wherein the kill engine operates to deliver the incapacitating energy via the force delivery hammer orthogonal to ~~the~~ a line of sight through the trap.

~~58.~~31. Apparatus as claimed in ~~any one of claims 1 to 57~~claim 1 wherein a specific target species apparatus can be assembled from the kill engine, trap enclosure and specific target species adapter.

~~59.~~32. Apparatus as claimed in ~~any one of claims 1 to 58~~claim 1 wherein the trigger mechanism is activated by a body part of the pest, such as the head, body or feet, or may be operated when the pest bites a portion of the trigger mechanism.

~~60. Apparatus as claimed in any one of claims 1 to 59 wherein the entry point has a line of sight from the entry, through the trap enclosure, to exterior of the trap enclosure.~~

~~61.~~33. A **kill engine for a self-resetting pest control apparatus** the kill engine can co-operate with a trap enclosure to deliver incapacitating energy to a target pest species and reset itself after such incapacitation, comprising or including,

A trigger receiving mechanism to receive input from a trigger mechanism from the trap enclosure,

A dose chamber to hold a charge of high pressure air which can be supplied from a source of compressed air,

A working chamber valved via a dose valve at a proximal end thereof, where in resting state the dose valve prevents the charge from entering the working chamber,

A piston contained within the working chamber and able to translate along the working chamber,

A striking rod, connected to, or from, the piston, to translate there with,

Wherein the trigger receiving mechanism when triggered will rapidly open the dose valve to allow the charge of air to enter the working chamber to a first side of the piston, and drive the piston and striking rod along the working chamber, and wherein the striking rod, or part thereof will extend to then drive a force delivery hammer to the target pest species and deliver the incapacitating energy to the target pest species, the dose valve closing to then receive a further charge of air into the dose chamber, and wherein a first biasing on a second side, opposite to the first, of the piston, within the working chamber will act to slow the piston at or towards a distal end of the working chamber, and then return the piston toward the proximal end, and wherein an exhaust valve is opened in communication with the first side to allow the piston to return to a pre-triggered, reset position, the exhaust valve closing, and the trigger receiving mechanism ready to re-trigger the kill engine.

~~62.~~34. A kill engine as claimed in claim ~~61~~ 33 wherein the first biasing is a spring or air compressed by the second side of the piston within the working chamber.

~~63.~~35. A kill engine as claimed in ~~either of claims 61 or 62~~claim 33 wherein the force delivery hammer and striking rod are retracted when the piston returns to the proximal position.

~~64.~~36. A kill engine as claimed ~~in any one of claims 61 to 63~~claim 33 wherein the source of compressed air is attached and retained to the kill engine and is refillable to enable recharging of the kill engine.

~~65. A kill engine as claimed in any one of claims 61 to 64 wherein the source of compressed air is refillable to enable recharging of the kill engine.~~

~~66. A kill engine as claimed in any one of claims 61 to 65 wherein the kill engine, with the trap enclosure, is light weight and portable.~~

~~67. A kill engine as claimed in any one of claims 61 to 66 wherein the kill engine is at least in part mounted from the trap enclosure.~~

~~68.~~37. A kill engine as claimed in ~~any one of claims 61 to 67~~claim 33 wherein the trap enclosure has an entry point for the target pest species into an interior of the trap enclosure, the entry point having a line of sight from the entry, through the trap

enclosure, to exterior of the trap enclosure.

~~69. A kill engine as claimed in any one of claims 61 to 68 wherein the bait station entices the target pest species to the interior and into a kill zone of the kill engine.~~

~~70. A kill engine as claimed in any one of claims 61 to 69 wherein the trap enclose houses a bait station, and trigger mechanism to trigger the trigger receiving mechanism.~~

~~71.~~38. A kill engine as claimed in ~~any one of claims 61 to 70~~claim 33 wherein there is a species adapter to connect at least in part to the trap enclosure to adapt the trap enclosure to the target species, the species adapter based on the size, habits or travel nature of the target pest species.

~~72.~~39. A **method of incapacitating a target pest species**, comprising or including the steps of,

i. Arming an air powered kill engine from a source of compressed air to at least in part deliver incapacitating energy to the target species, whereby the kill engine does not require electricity, the kill engine can be triggered, then actuate and then reset itself, the kill engine driving a force delivery hammer, which when actuated will linearly deliver the incapacitating energy to the target pest species,

ii. Providing a trap enclosure from which the kill engine is at least in part mounted, the trap enclosure having an entry point for the target pest species into an interior of the trap enclosure, a bait station, and trigger mechanism to trigger the kill engine, the trap enclosure including an exit aperture from the interior of the trap enclosure,

iii. Providing a species adapter to connect at least in part to the trap enclosure to adapt the trap enclosure to the target species, the species adapter based on the size, habits or travel nature of the target pest species, and

iv. Ejecting the target pest species out the exit aperture at least in part by the delivered incapacitating energy.

~~73. A method as claimed in claim 72 wherein the entry point has a line of sight from the entry, through the trap enclosure, to exterior of the trap enclosure.~~

74. A method of providing a **self-resetting pest control apparatus** to incapacitate a target pest species and reset itself after such incapacitation comprising or including the steps of assembling the apparatus from a kill engine, trap enclosure and specific target species adapter to form the species specific self-resetting pest control apparatus.

75. A **self-resetting pest control apparatus** as described herein with reference to any one or more of the accompanying drawings.

76. A **method of incapacitating a target pest species** as described herein with reference to any one or more of the accompanying drawings.

77. A method of providing a **self-resetting pest control apparatus** as described herein with reference to any one or more of the accompanying drawings.

78. A **kill engine for a self-resetting pest control apparatus** as described herein with reference to any one or more of the accompanying drawings.