CLAIMS

What is claimed is:

1. A dry powder cartridge device for use in an inhaler, comprising:

an elongate body having an anterior end and a posterior end;

a delivery lumen positioned at the anterior end of the body;

a powder reservoir positioned at the posterior end of the body;

a powder metering drum assembly positioned anterior to the powder reservoir, the powder metering drum assembly comprising a cylindrical outer drum and a cylindrical inner drum insert having a curved exterior, wherein the cylindrical outer drum is rotatable along the curved exterior of the inner drum insert; and

an actuating cap positioned at the anterior end of the body mechanically engaged to the powder metering drum;

wherein an amount of powder within the powder reservoir is advanced towards the powder metering drum assembly by a piston.

2. The device of claim 1, wherein the elongate body comprises at least one air inlet fluidly connected to the powder metering drum assembly.

3. The device of claim 1, wherein the delivery lumen comprises a side air inlet to introduce a vortex airflow into the delivery lumen.

4. The device of claim 1, wherein the delivery lumen comprises a mesh to break apart powder agglomerates and vortex airflow.

5. The device of claim 4, wherein a flow of air introduced through the delivery lumen at a rate of 20 to 40 L/min is sufficient to break apart powder agglomerates and vortex airflow.

6. The device of claim 1, wherein the cylindrical outer drum comprises a powder dose aperture and an air aperture positioned opposite from the powder dose aperture.

7. The device of claim 6, wherein the inner drum insert has a delivery air inlet on the curved exterior facing upwards, a delivery air outlet on the curved exterior facing downwards opposite from the delivery air inlet, and a lumen passing through the inner drum insert connecting the delivery air inlet and the delivery air outlet.

8. The device of claim 7, wherein the actuating cap rotates the outer drum about the curved exterior of the inner drum insert.

9. The device of claim 8, wherein rotating the outer drum to face the powder dose aperture towards the powder reservoir deposits a dose of dry powder from the powder reservoir into a space bordered by the powder dose aperture and the curved exterior of the inner drum insert.

10. The device of claim 8, wherein rotating the outer drum to align the powder dose aperture with the delivery air outlet simultaneously aligns the air aperture with the delivery air inlet.

11. The device of claim 10, wherein the air aperture does not begin to overlap with the delivery air inlet until the powder dose aperture completely disengages from the powder reservoir.

12. The device of claim 10, wherein the alignment of the powder dose aperture with the delivery air outlet and the air aperture with the delivery air inlet creates a fluid communication between the at least one air inlet of the elongate body, the lumen of the inner drum insert, and the delivery lumen.

13. A dry powder inhaler casing device, comprising:

a casing having a lumen throughout, an open anterior end, and a closed posterior end;

a plunger within the casing lumen; and

a plunger spring within the casing lumen positioned between the plunger and the closed posterior end of the casing;

wherein the open anterior end of the casing is sized to accept the dry powder cartridge device of claim 1.

14. The device of claim 13, wherein the plunger spring presses the plunger against the piston of the cartridge, such that the piston is advanced in an anterior direction as the powder reservoir is depleted.

15. The device of claim 13, wherein the casing comprises a window through which a portion of the plunger is visible, such that the advancement and position of the plunger can be determined through the window.

16. A dry powder inhalation system, comprising:
a dry powder inhaler casing device;
at least one dry powder cartridge device according to claim 1; and
at least one amount of powder.

17. The system of claim 16, wherein the at least one amount of powder is preloaded into the at least one cartridge powder reservoir.

18. The system of claim 16, wherein the at least one amount of powder is manually loaded into the at least one cartridge powder reservoir.

19. The system of claim 16, wherein the at least one powder inhaler casing and the at least one cartridge are interchangeable.

20. The system of claim 16, wherein the at least one cartridge is disposable.