The manifold **326** has a first port **328** for connecting to a ventilator and a second port **330** for connecting to a proximal end of a extension catheter **332**. (As shown in FIG. **26**, the extension catheter **332** includes a sterile sheath **334** which is similar to the sheath included on the suction catheter **324**. In the embodiment of FIG. **26**, the suction catheter **324** and the extension catheter **332** are positioned alternately inside the ventilation lumen of the endotracheal tube **320**. The suction catheter or the extension catheter can be withdrawn temporarily and maintained in its sterile sheath while the other is being used.

Referring to FIG. **27** there is another arrangement for connecting a suction catheter and extension catheter to an endotracheal tube. In this embodiment, a manifold **340** connects to the proximal end of the endotracheal tube **320**. The manifold **340** port **342** for receiving the extension catheter **332** and a second port **344**. A distal manifold **346** of a suction catheter **348** connects to the second port **344**. The suction catheter manifold **346** has a port **350** for connecting to the ventilator. This arrangement can be used similarly to the arrangement of FIG. **26**.

FIG. **28** shows still another arrangement for connecting a suction catheter and a extension catheter to an endotracheal tube. In this embodiment, the endotracheal tube **320** is provided with a proximal end that includes dual ports. A first port **352** receives the extension catheter **354**. The second port **356** may be connected to either directly to a ventilator or may be connected to a distal end of a suction catheter (not shown) in a conventional manner.

Regarding the embodiments described above, certain of the embodiments may be preferable from the standpoint of versatility, i.e. they may be able to deliver a variety of medications having different viscosities, suspensions, surface tensions, etc. Others of the embodiments may be more suitable for the delivery of specific types of medications or the delivery of particles of certain sizes.

It is intended that the foregoing detailed description be regarded as illustrative rather than limiting and that it is understood that the following claims including all equivalents are intended to define the scope of the invention.

I claim:

1. An improved system for the delivery of an aerosolized medical agent to a patient's respiratory system comprising:

a pressurized canister that contains a mixture of fine particles of a medical agent and a propellant in a liquid state and further that has an outlet from which the medicine and liquid propellant can exit the canister;

an endotracheal tube having a ventilation lumen for ventilating the patient and a secondary lumen that terminates distally in a distal opening that communicates with said main lumen;

an extension catheter having a proximal end and a distal end and a lumen extending from the proximal end to a distal orifice located at said distal end, said extension catheter located in said secondary lumen of said endotracheal tube, and extending distally of a distal end of said distal opening so that a distal portion of said extension catheter extends into said ventilation lumen of said endotracheal tube; and

a connection between said proximal end of said extension catheter and said outlet of said pressurized canister to provide a fluid connection between said canister and said lumen of said extension catheter to permit medicine and propellant to be conveyed from said canister through said lumen of said extension catheter and out said distal orifice of said extension catheter where the propellant evaporates and an aerosol of the medical agent is generated.

2. The system of claim **1** further comprising:

a centering device associated with said distal portion of said extension catheter to align said distal portion of said extension catheter with respect to said ventilation lumen of said endotracheal tube.

3. The system of claim **2** further comprising:

a second centering device associated with said distal portion of said extension catheter to align said distal end of said extension catheter with respect the patient's air flow passage.

4. The system of claim **1** in which said extension catheter is removable with respect to said endotracheal tube.

5. The system of claim **1** in which said extension catheter is non-removable with respect to said endotracheal tube.

6. The system of claim **1** in which said distal portion of said extension catheter also extends distally of a distal end of said endotracheal tube.

7. The system of claim **1** in which said distal portion of said extension catheter aligns with a distal end of said endotracheal tube.

8. The improved system of claim **1** in which said extension catheter has a plurality of distal orifices located at the distal end.

9. An apparatus for the delivery to a patient's respiratory tract of an aerosolized medicine from a canister that contains a mixture of a medicine and a pressurizing propellant, comprising:

a catheter having a proximal end and a distal end;

the distal end positionable in an air flow passage in the patient's respiratory tract, the proximal end adapted to connect to a canister to permit the mixture from the canister to be transmitted into a lumen of the catheter; and

the catheter having a distal orifice communicating with the lumen, the distal orifice oriented to expel the mixture in a reverse direction back towards the proximal end.

10. A system for the delivery to a patient's respiratory tract of an aerosolized medicine from a pressurized canister containing a medicine and a propellant and that generates a dose of the aerosolized medicine upon being expelled to ambient pressure, the system comprising:

an endotracheal tube;

a catheter, the catheter having a proximal end and a distal end;

the distal end of the catheter positionable in an air flow passage in the patient's respiratory tract, the proximal end adapted to connect to a canister to permit the mixture from the canister to be transmitted into a lumen of the catheter; and

the catheter having a distal orifice communicating with the lumen, the distal orifice oriented to expel the mixture in a reverse direction back towards the proximal end, the catheter located in a lumen of the endotracheal tube.

11. The system of claim **10** in which the catheter is located in a side wall of the endotracheal tube.

* * * * *