CLAIMS:

1. A device (1) for separating materials from a gas flow, the device (1) comprising:
   - an inlet (2) for incoming air (3) to be purified,
   - a collection chamber (4),
   - an outlet (6) for the purified air (7),
   - a voltage source (8),
   - a fastening column (9) to which ion yield tips (10) have been coupled, wherein the ion yield tips are arranged directly on a surface of the fastening column, and wherein the ion yield tips protrude from the surface of the fastening column into a cavity of the collection chamber,
   - wherein the device (1) is configured to direct high tension to the ion yield tips (10) providing ion beams (11) from the ion yield tips (10) to a collection surface (12),
   - wherein the collection surface (12) conducting electricity is electrically insulated from an outer wall (5) of the collection chamber (4) by an electrical insulation,
   - wherein the device (1) is configured to direct voltage of opposite sign to the ion yield tips (10) than the voltage directed to the collection surface (12),
   - and wherein a diameter of the fastening column is in a range between 40 – 150 mm, a diameter of the collection chamber is in a range between 200 – 1600 mm, the voltage is in a range between 10 – 100 kV, and a current is in a range between 50 – 5000 µA.

2. The device according to claim 1, wherein a diameter (D_{col}) of the fastening column (9) is in a range between 80 – 120 mm, for example 100 mm.

3. The device according to claim 1 or 2, wherein a voltage is in a range between 10 – 60 kV.

4. The device according to any one of claims 1-3, wherein a current is in a range between 400-2300 µA, for example 1500 µA.

5. The device according to any one of claims 1-4, wherein a length of an ion yield tip is in a range between 1-40 mm, preferably between 5-20 mm.

6. The device (1) according to any one of claims 1-5, wherein a velocity of an air flow through the cavity (14) is in a range between 0.5 – 2.5 m/s, for example more than 1.0 m/s.

7. A method of separating materials in the form of particles and/or drops from a gas flow, the method comprising:

- directing the gas flow through a collection chamber (4),
- providing a cavity (14) for the gas flow between a fastening column (9) and a collection surface (12) conducting electricity that is electrically insulated from an outer wall (5) of the collection chamber (4),
- providing ion yield tips (10) on a surface (13) of the fastening column (9) , which ion yield tips (10) protrude from the surface (13) of the fastening column (9) into the cavity (14) of the collection chamber (4), wherein a diameter of the fastening column is in a range

between 40 – 150 mm and a diameter of the collection chamber is in a range between 200 – 1600 mm,

- creating high tension between the ion yield tips (3) and the collection surface (12),
- directing high tension with the opposite sign of direct voltage than the high tension directed to the ion yield tips (10) to the collection surface (12), wherein the voltage is in a range between 10 – 100 kV and a current is in a range between 50 – 5000 µA, and
- separating inside the collection chamber (4) at least a part of the materials from the gas flow.

8. The method according to claim 7, wherein a voltage in a range between 10 – 60 kV is used.

9. The method according to claim 7 or 8, wherein a current in a range between 400-2300 µA, for example 1500 µA, is used.

10. The method according to any one of claims 7-9, wherein the gas flow is guided through the cavity with a velocity in a range between 0.5 – 2.5 m/s, for example more than 1.0 m/s.