

mately 325 cm. This is a significantly longer collection path than most commercial sampling instruments and offers the added advantages of collecting a wide range of particle sizes at relatively low velocities.

The embodiments of this invention in which an exclusive property or privilege is claimed are defined as follows:

- 1. Apparatus for sampling aerosols comprising:
 - a chamber having an inlet at one end and an outlet at the other end, said chamber including:
 - a plurality of vertically stacked, successive particle collection stages located within said chamber between said chamber inlet and chamber outlet and together with said chamber, defining a flow path from said chamber inlet, through successive collection stages, to said chamber outlet, each of said collection stages including:
 - a separator plate located within and extending across said chamber for separating that stage from the previous stage, said separator plate having an inlet opening extending therethrough, and
 - a channel guide, mounted transverse to said separator plate, defining a labyrinthine flow path from said inlet opening to the inlet opening of the next stage, and
 - a plurality of particle collection means supported by said channel guide and located within said labyrinthine flow path;
 - the particle collection means within the plurality of collection stages of the chamber including a combination of collector plates for gravity separation, fine wire impactors, and

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diffusion battery screens.

- 2. The apparatus of claim 1 wherein said collector plate comprises a frame having an opening positioned transverse to said labyrinthine flow path and a flat plate for collection by gravitational settling connected to said frame and positioned substantially parallel to said labyrinthine flow path.
- 3. The apparatus of claim 2 further comprising one or more metal coupons affixed to said flat plate.
- 4. The apparatus of claim 3 wherein said coupons are formed of a material selected from the group consisting of Zr-2, Ag, Pd, In-625, 316-SST, Ni, Pt, Al₂O₃, Fe, oxidized 316-SST, and oxidized carbon steel.
- 5. The apparatus of claim 1 wherein said fine wire impactor comprises a frame having an opening and one or more fine wires fixedly placed across said opening.
- 6. The apparatus of claim 5 wherein said wires have a diameter of from 0.1 to 10 mils.
- 7. The apparatus of claim 5 wherein said wires are formed of a material selected from the group consisting of Pt, 70% Pt/30% Ir, Ni, Au, Ag, W, Pd, and Ni-chrome.
- 8. The apparatus of claim 1 further comprising means for injecting a stream of aerosols into said chamber inlet.
- 9. The apparatus of claim 8 wherein said means for injecting a stream provide for injection of the stream at a velocity of from approximately 0.1 to 30 cm/s.
- 10. The apparatus of claim 1 further comprising a canister and a manifold tube extending therethrough and a plurality of said chambers vertically stacked within said canister, wherein said manifold tube is connected to the inlet of each chamber.

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