

The present invention can be battery or solar powered, and the exact dates and times of collections can be recorded digitally. Also, the present invention can be set to collect precipitation samples from one storm, go into a sleep mode, and start collecting again when precipitation from the next storm is sensed. While in a sleep mode, the funnel **12** can be automatically covered with a cap (not shown) to prevent dirt, blowing sand, and debris from falling into the funnel **12**.

In another embodiment of the present invention, the collector **10** can be used to monitor a tipping bucket rain gauge, which then serves as a start and stop signal for the collector **10**. A tipping bucket rain gauge typically tips every 0.01 inch of rain. When it tips, it activates a switch (such as a reed switch) to electronically record both rain rate and accumulation. This embodiment of the present invention provides time-integrated samples of precipitation for analysis, as well as an accurate time record of precipitation, and the controller **10** can be set to collect samples only when the tipping bucket rain gauge rate is greater than a preset amount. Thus, in this embodiment, the sample vials **24** would not be wasted during a period (e.g., 24 hours) when a very light mist was falling.

Advantages of the present invention include the ability to collect a large number of samples (e.g., 96 or more samples) over an extended period of time (e.g., 48 hours or longer). Small samples (e.g., 0.5 mL) can be collected without isotopic fractionation resulting from evaporation of the sample. Also, each sample collected is representative of the entire time interval (i.e., time-integrated) during which water is collected that becomes the source from which the sample is drawn.

Thus, it will be appreciated by those skilled in the art that modifications and variations of the present invention are possible without departing from the principles and spirit of the invention, the scope of which is defined in the appended claims and their equivalents.

What is claimed is:

1. A water collector for collecting multiple sequential, time-integrated water samples over multiple preset time intervals, comprising:

a first reservoir receiving and holding water therein during a preset time interval, the preset time interval having a start time and a stop time;

a first valve connected to the first reservoir, the first valve being closed during the preset time interval so that the first reservoir can hold the water;

a second reservoir, connected to the first valve, receiving a predetermined amount of a water sample from the water in the first reservoir at the end of the preset time interval, the first valve opening when the stop time of the preset time interval is reached to transfer the water sample from the first reservoir to the second reservoir, any excess water being discharged from the second reservoir;

a second valve connected to the second reservoir;

a transfer line having a first end and a second end, the first end being connected to the second valve;

a carousel containing a plurality of vials, the plurality of vials comprising a first vial and a plurality of second vials;

a single sealing plate resting simultaneously on top of the plurality of vials on the carousel, the sealing plate having a first opening under which the first vial is positioned, the second end of the transfer line being positioned above the first opening and the second valve being opened after the second reservoir receives the water sample to transfer the water sample through the transfer line to the first vial, the carousel rotating immediately after the first vial receives the water sample from the

second reservoir to move the first vial away from the first opening and underneath the sealing plate, a top of the first vial contacting a bottom surface of the sealing plate to seal the first vial, while moving one of the second vials underneath the first opening to receive a next water sample over a next preset time interval,

wherein the carousel rotates after each of the second vials has been filled at the end of each successive preset time interval until all of the vials have received a separate water sample and have been sealed by the carousel rotating each vial under the sealing plate after being filled to prevent evaporation of the water sample in each vial.

2. The water collector of claim **1**, further comprising a controller to control opening and closing of the first valve and the second valve and rotation of the carousel, the controller receiving a start signal from one of a timer, a precipitation sensor, a cell phone, and a manually-controlled button on the controller.

3. The water collector of claim **1**, further comprising foam rubber on which each of the plurality of vials rests, wherein a mouth of each of the vials is pressed against the sealing plate by pressure applied to a bottom of each of the vials by the foam rubber.

4. The water collector of claim **1**, wherein:

the carousel further comprises a vial filler;

the sealing plate further comprises one or more additional openings;

the plurality of vials are arranged in one or more concentric rings on the carousel;

the vial filler has an opening to which the transfer line is attached, and the opening of the vial filler is initially positioned over the first opening on the sealing plate;

each one of the first opening and the one or more additional openings corresponds to one of the rings, the first opening corresponding to a first one of the rings;

after one of the vials in the first ring has been filled through the first opening, the carousel rotates the filled vial underneath the sealing plate and rotates a next empty vial in the first ring underneath the first opening; and

after all vials in the first ring have been filled, the vial filler moves over the first opening on the sealing plate, sealing the first opening, and positions the transfer line over a next one of the openings for a next one of the rings, wherein all the vials in each of the rings is successively filled and sealed, with the vial filler successively moving to each one of the rings to fill and seal all the vials in each ring.

5. The collector of claim **1**, wherein the sealing plate comprises an aluminum plate and a sheet having a low-friction surface bonded to a bottom of the aluminum plate, the low-friction surface sheet contacting the plurality of vials.

6. The collector of claim **1**, wherein the first reservoir captures water over a preset time interval of about 30 minutes.

7. The collector of claim **1**, wherein at least 96 vials are placed in the carousel.

8. The collector of claim **1**, where a volume of the first reservoir is about 1,000 mL, a volume of the second reservoir is about 15 mL, and a volume of each of the plurality of vials is about 20 mL.

9. The collector of claim **1**, wherein a volume of the second reservoir is about 75% of a volume of each of the plurality of vials.

10. The collector of claim **1**, wherein a volume of each of the plurality of vials is greater than a volume of the second reservoir.

11. The collector of claim **1**, wherein a volume of each of the water samples is about 0.5 mL.