limit switch **99**. When the cover is raised, air switch **29** is opened and causes air to flow through four-way solenoid valve **30B** which causes rotation cylinder **31** to retract thus closing cover **4** and the cover close-rotation-limit switch **33**. When cover close-rotation-limit switch **33** and the bottle-close limit switch **99** are closed, the controller de-energizes solenoid valves **26** and **30B** causing the cover to drop and the turret rotation cylinder to retract. A mechanical means is provided to prevent rotation of the cover while it descends over the collection funnel.

Each time the controller engergizes solenoid valve **26**, it also signals the clock circuit to store the accumulated time and turret index number in memory circuit **41**. This action is followed by an incrementing of the index number and a continuation of time accumulation in the clock register circuit. (The stored results may be retrieved at any time by selecting "Read" on the Read/-Write switch **34** which causes a visual display **98** to be activated. The index numbers and associated stored activation times are then sequentially displayed at 9 second intervals.) The index position number and accumulated time can be reset to zero by closing switches **37** and **38** respectively.

The automatic precipitation sampler is designed to collect one sample from each precipitation event; however, by closing continuous sampling switch **35**, it is possible to collect as many as eight separate samples from a single precipitation event. Closing the continuous switch brings into action overflow pressure switch **36** which closes shortly after a sample bottle fills. The controller **23** senses this as a cessation of precipitation and proceeds to cover the funnel and rotate the full bottle to the next position. A drain tube moves into the collection position causing accumulated water in the turret and funnel to run out quickly. The overflow pressure switch soon opens again since the supply of water has ceased. If precipitation is continuing, pressure switch **16** is still closed causing the controller to initiate action to uncover the funnel again and to move another sample bottle into a collection position. This action will repeat until all bottles are filled if precipitation is heavy and continuous for sufficient time. Each time the turret moves, the clock results are stored as in the case of the non-continuous mode of sampling. The controller prohibits further movement of the turret or other action of the sampler when index position **16** is reached.

When temperatures are low enough that precipitation falls as snow, in order to utilize the present invention both the open cylinder precipitation detector **3** and the sample collection funnel **5** must contain heating elements, located so that the precipitation is converted to and remains water at least until its enters the sample storage means. Preferably, these heating elements are affixed to the under surface of both the precipitation detector and the collection surface and are automatically energized through the use of a pre-set thermal switch when the outside air temperature falls to a level low enough to cause precipitation to fall as snow or freezing rain.

As shown in FIG. **11**, if desired a vent system can be installed in the collection funnel opening **6** to aid in preventing air locking of the system especially during heavy precipitation events. A Teflon stopper **95**, equipped with air outlet tubes **97** and precipitation inlet tube **96** allows air to flow out of bottle **40** as the bottle fills.

It will be appreciated that many variations for mechanisms required to produce the required movements exist (such as commonly available precipitation detectors) and could be substituted for the system described. It will also be appreciated that many kinds of electronic logic systems can be designed to carry out the control function and that a larger system containing more sampling stations could be obtained by a simple scale-up of the automatic precipitation sampler as described.

While the wetted surfaces of the device have been described as comprising Teflon, a polyfluorocarbon, the wetted surfaces can be formed from or coated with any otherwise suitable material which is relatively inert, that is does not contaminate the precipitation collected and stored in a manner which affects the validity of the analysis intended to be conducted.

While the preferred embodiment of the invention has been illustrated and described, it will be understood that various modifications may be made without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

**1**. An automatic precipitation sampling device comprising:

(a) a precipitation collection surface having a removable cover means thereon,

(b) a precipitation detection means which detects precipitation, operably associated with said removable cover means to cause said cover means to be removed from precipitation collection surface during precipitation, and to cause said cover means to recover said precipitation collection surface upon the cessation of precipitation, or when a predetermined amount of precipitation is collected,

(c) a plurality of precipitation sample storage means,

(d) precipitation sample distribution means in fluid communication with said collection surface and one of said sample storage means for transporting a precipitation sample from said collection surface to said one sample storage means,

(e) means for sequentially positioning each of said sample storage means in fluid communication with said distribution means,

(f) means operably associated with said means for sequentially positioning said sample storage means whereby the positioning of said sample storage means is regulated in relation to separate precipitation events or to predetermined segments of the same precipitation event,

(g) means for sealing the sample storage means when not in fluid communication with said distribution means,

(h) means for measuring and recording the chronological time and lapsed time for one or more of the operations conducted by the apparatus,

(i) all the precipitation wetted collection distribution and storage surfaces being formed from a relatively inert material.

**2**. A precipitation sampling device, as in claim **1**, in which the precipitation detection means comprises:

(a) a precipitation collection means containing a flow restrictive element which restricts the gravity flow of precipitation collected, and

(b) sensing means which senses a predetermined amount of precipitation retained by said flow restrictive elements,