With attention to FIGS. **8** and **9**, the operational procedure of the accelerated weathering apparatus shown in FIGS. **4–5** will be discussed. In particular, in FIG. **8** an operator enters a set-point value **120**. This set-point value is displayed on a display device **122**. The set-point value is also transferred to, and stored in the controller **124**. Detectors detect irradiance existing in the test chamber due to output of the ultraviolet lamps, and a detected irradiance signal proportional to irradiance in the chamber is transferred to the controller **126**. Control circuitry of the controller calculates an irradiance value which is representative of the detected irradiance **128** This calculation operation includes the use of a calibration ratio which is stored in the controller. Thereafter, the irradiance value is displayed on the selected channel display **130**. This irradiance value is compared to the previously entered set-point value **132** and it is determined whether or not these values are equal **134**. If the values are equal the above process is cycled beginning with detection of irradiance existing in the test chambers **126–134**.

If, on the other hand, the irradiance value and the set-point value are not equal a determination is made as to whether or not the set-point value is greater than the irradiance value **136**. When the set-point value is greater than the irradiance value the controller develops a ballast control signal to increase the power which is sent to the lamps **138**. If the set-point value is less than the irradiance value the controller develops a ballast control signal which decreases the power sent to the lamps **140**. This ballast control signal is transmitted to the ballast **142**. Responsive to this signal the ballast output readjusts so the output of the ultraviolet lamps are increased or decreased depending on the requirements necessary to maintain the set-point value **144**. It is to be appreciated that the above discussion is similar for all four control channels and that the control channels are each concurrently monitoring the lamps **50** associated with each particular channel.

By having four individually adjustable control channels, it is possible to provide uniformity of irradiation to the specimens over both time and space. In particular, the detectors **56***c*–**62***c* are capable of detecting when the irradiance is not of a desired value and the device can automatically readjust the power to the fluorescent lamps **50** in order to bring the output of the lamps **50** associated with a particular control channel to a desired level. Thus, each pair of fluorescent lamps, controlled by the control channels, are capable of outputting a consistent irradiance over an extended time period. When either of the lamps of the pair vary, the ballast output is adjusted to compensate for such deviation. Thus, a consistency in uniformity over time is accomplished.

Further, since there are a plurality of detectors arranged spatially in the apparatus, it is possible to provide for a uniformity over the area of the specimen wall **46**. With particular reference to FIG. **4**, if detector **56***c* detects an irradiance of too high a value or too low a value the output of the associated ultraviolet lamps **50** are adjusted to come within a desired set-point range. This adjustment will be made for all the lamp pairs of the respective control channels. Thus as shown in FIG. **4**, control displays **56***b*–**62***b* will show equal irradiance being detected. Thus, ultraviolet detectors **56***c*–**62***c* are detecting the same irradiance values along the height of the specimen walls **46**. If only a single detector were used in the present system there would be no uniformity over space, as the detector would be detecting only the light which existed at a single location which may or may not be representative of other locations in the test chamber.

With reference to FIG. **9**, a discussion will now be had concerning the calibration of the apparatus shown in FIGS. **4** and **5**. In particular, a reference detector is inserted into one of the openings or covered ports which are immediately adjacent to the ultraviolet detectors **150**. The operator selects the mode of desired testing (i.e. UV-A or UV-B) **152**. The reference detector detects the irradiance associated With the channel being calibrated **154** and a detected reference irradiance signal, representing the detected irradiance is transmitted to the calibration meter **156**.

A calibration signal is generated from the detected reference signal by the irradiance measurement processor **158** and a calibration value representing the calibration signal is displayed. Next, the operator selects one of the four independent control channels **160** to be calibrated. The selected channel will correspond to the channel being monitored by the reference detector. The calibration signal is transmitted to the controller **162**, and replaces the calibration ratio previously stored in the controller, which is used to adjust the irradiance signal detected by the ultraviolet detector of the selected channel. After this new calibration ratio has been transferred, the operation of the apparatus is transferred to step **126** of FIG. **8**.

The irradiance value will then be equal to the set-point value indicating the channel is properly calibrated. When calibration of one channel is accomplished, the reference detector can be moved by the operator to another opening and another channel can then be tested, or the testing can be ended.

FIG. **10** shows an additional embodiment to the present invention wherein the specimens are placed within a specimen drawer **180** rather than in a specimen holding rack **46**. The drawer is substantially horizontal. The lamps **50** are arranged above the specimen drawer.

It is to be appreciated that the preferred embodiment can be altered to have more or less than eight ultraviolet lamps, have more or less than two lamps controlled by each control channel, and more than the four control channels. It is also possible to operate the device with only two or three control channels, however, refinement of the uniformity of time and space would degenerate somewhat, while increasing the number of lamps and control channels add to the space constraint problems.

It is to be further appreciated that the present invention can be used in systems using xenon and other discharge lamps. Elements of the invention such as the automatic calibration can be useful in single lamp systems and the lamp select button allows use of lamps of different spectrum distributions.

The invention has been described with reference to the preferred embodiment. Obviously, modifications and alterations will occur to others upon reading and understanding the proceeding detailed description of the preferred embodiment. It is intended that the invention be construed as including all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalent thereof.

Having thus described the preferred embodiment, the invention is now claimed to be:

1. An accelerated weathering apparatus comprising:

a test chamber;