Thus, for example, a conventional Duoplasmatron which produces low energy protons or low energy electrons, or both, may be employed for simulating the particulate portion of solar radiation. Other particle generators for production of neutral particles, high energy charged particles, (X-rays) and the like may be provided if desired.

An opaque shutter **22** is arranged in the housing **12** to be movable between a position in front of the aperture **17** and a position remote from the aperture **17** as illustrated in FIG. **1.** The shutter **22** is on the end of a shaft **23** mounted on a pivot **24** as seen in FIG. **2.** The end of the shaft **23** opposite from the shutter **22** is connected to a slidable rod **25** in a tube **26.** A magnetic portion on the movable shaft **25** in the portion of the tube **26** external to the housing **11** permits pivoting of the shutter about the pivot **24** by manipulation with a magnet from outside the vacuum system so that the shutter can be moved to obscure or reveal the aperture **17** as desired. A bellows and screw arrangement can be employed in lieu of the tube and magnet arrangement. Thus a specimen in the aperture **17** can be exposed to simulated solar radiation for a precise time interval after the ultraviolet intensity, particle flux, and specimen temperature have been stabilized.

In operation of the simulator a plurality of samples **27** are mounted for motion between the exposure aperture **17** and a measuring aperture **28** in an optical integrating sphere **29** described in greater detail hereinafter. A transport mechanism is provided for moving the specimens between the measuring aperture **28** and the exposure aperture **17.**

The transport mechanism comprises a cruciform support wheel **31** seen in place in FIG. **2** and in detail in FIG. **3.** The support wheel **31** is centrally mounted on a rotatable shaft **32** which is connected to a conventional rotary motion hermetic feed-through **33** so that the shaft **32,** and hence the support wheel **31,** can be rotated from outside the vacuum system. At the end of each of the arms of the cruciform support wheel **31** there is a circular loop **34** for supporting a specimen mounting plate **36.** Four specimen plates of the preferred embodiment are seen from the rear in FIG. **2** and portions of three such plates can also be seen from the front in FIG. **1.** A detailed cross-section of a typical specimen mounting plate **36** is illustrated in FIG. **4.**

In the typical specimen mounting plate arrangement illustrated in FIG. **4,** a conventional ball bearing **37** is mounted peripherally within the loop **34** so as to provide rotatable support for a circular metal disk **38** which has a conventional spur gear **39** mounted at the periphery thereof and extending beyond the outer edge of the loop **34.** An insert plate **41** is bolted to the disk **38** and four circular grooves **42** are provided in the front surface of the insert plate **41** to define four circular specimen stations **43** substantially flush with the front surface of the insert plate. A spring clip **44** is provided in each of the circular grooves **42** for securing a specimen or sample **27** on each of the specimen stations **43.** The specimens **27** in one embodiment may, for example, be flat aluminum disks having a thermal control coating on one side thereof. It will be apparent that other types of samples may be employed if desired, and other specimen station arrangements may be provided.

Behind each specimen **27** is a thermocouple **46** slidably mounted in the insert plate **41** and urged toward the specimen by a spring **47** the other end of which bears against a hollow set screw **48** in a passage through the disk **38.** Thermocouple lead wires **49** pass through the helical spring **47** and the center of the hollow set screw **48** and then outwardly pass through a transverse or radial hole **51** in the disk **38** leading out to the periphery thereof.

A series of upstanding ears **52** on the reverse side of the disk **38** engage upstanding ears **53** on a sheet metal ring **54** to form an enclosure for a coil of thermocouple wires **49.** The thermocouple wires pass radially outwardly from one of the transverse holes **51** and back between sets of ears **52** and **53** into the enclosure between the disk **38** and the ring **54.** Within the enclosure the wires are collected in a loose spiral bundle. Individual wires in the bundle proceed around the periphery in the enclosure several times and then pass between a pair of ears **53** as seen in FIG. **2** to be wrapped around the shaft **32** and finally passed to a vacuum feed-through **55** on the lower housing **10.** The thermocouple lead wires are thus continuous from the thermocouple **46** through the vacuum feed-through **55** thereby avoiding any problems due to slip rings or unknown temperatures of the cold junction of the thermocouple.

The tortuous path of the thermocouple wires within the enclosure and around the shaft **32** is provided to accommodate rotary motion of various components without binding the thermocouple wires. Thus when one of the disks **38** at one of the specimen mounting stations is rotated within the loop **34** on the support wheel **31** the bundle of thermocouple wires within that station's enclosure either tightens or loosens depending on the direction of rotation. Since several turns of thermocouple wire are accommodated within the enclosure, it is possible to make nearly three full turns of the disk **38** and the samples **27** supported thereon in one direction without any binding of the thermocouple wires. In practice the disks are rotated from one position to another during operation in first a clockwise and then a counter-clockwise direction for only one or two full turns so that binding is never a problem. The reason for rotating the sample mounting disks is for positioning a specimen in front of the measuring aperture **28** and it is of no consequence whether rotation to that position is clockwise or counter-clockwise.

In a similar manner the coils of thermocouple wires about the shaft **32** upon which the support wheel **31** is pivoted permits rotation of the support wheel for approximately two full revolutions in either direction without any binding of the thermocouple wires. Again, it is of no consequence whether the support wheel is rotated clockwise or counter-clockwise for positioning samples between the measuring aperture and the exposure aperture. It should be recognized that in the illustration of FIGS. **2** and **4** only a small portion of the numerous thermocouple wires **49** are illustrated for clarity and that in practice sixteen pairs of thermocouple wires are involved.

As has been mentioned, hereinabove it is often desirable to rotate the disk **38** upon which the specimens are mounted and a spur gear **39** is provided on the periphery of the disk for such rotation. In each the measuring position and the exposure position of the wheel **31,** worm gears **56** are mated with the spur gear **39** on a station for rotation of the spur gear. Each of the worm gears is shaft mounted and is rotated by way of a con-