GRANTEE INVENTIONS

Linear Displacement Transducer

The linear displacement transducer is an electromechanical device that will indicate with a relative electrical output the position of a point in reference to a fixed point which is in line with the axis of the device. It is capable of measuring point excursions from 0 to 6.5 cm. with a linearity deviation of ±0.5 percent of full scale.

The device consists of a polystyrene tube 6 inches long with a ⅜-inch outside diameter and a ¼-inch inside diameter. Starting ¼ inch from each end, two single layer coils of No. 26 enamel-covered wire are wound in such a way that there is a 1-wire diameter space between each turn. Each coil is 3⅛ inches long and overlaps ¾ inch at the center. The windings are bifilar (side-by-side) in this area. A ferrite armature, two ferrite tubes cemented together (Ferroxcube Corp. of America No. 56–062–42/3A), and cemented to a fiberglass sensing rod, moves through the axis of the tube.

As the sensing rod is moved through its full excursion, 0 to 6.5 cm., the armature will pass out of one coil, lowering its relative impedance, and into the other, raising its relative impedance. The extreme ends of the coils are connected across a high-frequency voltage source (one V 450KC). The ends at the overlap area are connected together. The output is taken from across either coil. This forms a variable voltage divider, the impedances of which are controlled by the position of the sensing rod.

The impedances of the individual coils do not change linearly with position. A common nonlinear element, deliberately induced by overlapping the coils, is canceled out by the effect of the voltage divider. All "simple" variable coils of this general type have a nonlinear relationship that cannot be canceled out in a voltage divider. There, the coils must be made linear or a controlled nonlinearity must be introduced.

The use of a high-frequency voltage source is made necessary by the low values of inductance involved. The a.c. output variations are converted to d.c. variations by a simple diode detector and r.c. filter.—J. FRENCH and A. A. SIEBENS, M.D., *Rehabilitation Center, University of Wisconsin Medical Center, Madison.* *This invention was developed under Public Health Service research grant No. HE–04036.*

Sequential Roto-Disk Pollen Sampler

The sequential roto-disk pollen sampler is an impaction type device for use in collecting airborne ragweed pollen. It features a new method of automatic advancement of the collecting surface to provide sequential samples according to a preset schedule.

The momentum of particulates, large and heavy relative to air molecules, causes them to lag behind the airflow around an obstacle and to collide with it. With a suitable adhesive on the obstacle, the particulates are retained for microscopic studies.

The obstacle is the edge of an aluminum disk, 4.00 inches in diameter and 0.0937 inch thick. Two of these disks are mounted coplanar with a supporting plate with axes displaced from the center of the plate. The plate, at its center, is attached normal to a revolving shaft which permits impaction sampling because of the relative motion between the edge of the disk and the atmosphere. Discrete sampling surfaces on the edge of each disk are delineated by 3° slots cut into the surrounding shields while a thin coating of silicone grease

retains the impacted pollen. The disks are rotated 6° for each electrical pulse received by a stepping motor which provides a capability of 60 discrete samples per disk. Because the disks advance only upon command, the sophistication of the sampling sequence depends solely on the availability of properly spaced electrical pulses.

Smoke tracer studies show that the rotating mechanism develops local turbulence which probably smooths the small-scale pollen gradients near the sampler. This smoothing makes the pollen catch insensitive to locally anisotropic wind eddies of approximately sampler dimensions and therefore more representative of the true pollen concentration.—ALAN L. COLE, Ph.D., *associate research meteorologist*, and ALBERT W. STOHRER, M.S., *assistant research engineer, department of meteorology and oceanography, College of Engineering, University of Michigan, Ann Arbor. This invention was developed under Public Health Service research grant No. AP-00006.*

Microscope Substage

A microscope substage has been designed to facilitate the manipulation of single plant cells under sterile conditions. The substage can be used with the Bausch & Lomb Stereozoom Dissecting Scope, model SVB–73. The substage consists of an aluminum frame holding a glass plate. On the glass plate a glass tray, as wide but only two-thirds as long, slides back and forth, guided by the aluminum frame. The glass tray is designed to hold two 25 by 100 mm. standard petri dishes. The middle third of the substage is left open for the microscope; the left and right thirds at each end are covered by plexiglas "garages." A petri dish on the glass tray is in one of the garages or under the microscope. The microscope is surrounded by a plexiglas collar with an opening which permits the insertion of needles, pipettes, and other tools used to manipulate cells. The collar and garages maintain a sterile atmosphere over the open petri dishes. Because all components, except the frame, are made of transparent material visibility of the objects remains maximum, lighting optimum, and it is possible to illuminate cells from underneath. The stage is easily assembled and disassembled.—TOM STONIER, Ph.D., *associate professor, department of biology, Manhattan College, Riverdale, N.Y., and* HARRY RYMER, *engineer, Laboratory Concepts, Inc., Bronx, N.Y. This invention was developed under Public Health Service grant No. CA–06957.*

Achilles Reflex Elgon

A special elgon (electrogoniometer) was designed to obtain a record of an Achilles reflex test. It consists of a goniometer in which a potentiometer was substituted for the protractor. The potentiometer has 15,000 ohms of resistance and two metal arms which are 12 cm. and 15 cm. long. This instrument is placed so that the potentiometer is over the center of the ankle joint; the longer arm is taped to the lower leg and the shorter one to the lateral side of the foot pointing to the little toe.

The elgon is connected to a small box containing a 2,200-ohm adapter, a 500-ohm sensitivity, and a 9-volt battery. The box is connected to an electrocardiograph which records the movement of the potentiometer. The record will show an indentation caused by the hammer tap followed by the upstroke of muscular contraction and then by the downstroke of relaxation. The reflex time and the duration of contraction and relaxation phases can be measured easily from the record.—PETER V. KARPOVICH, M.D., *research professor of physiology, Springfield College, Springfield, Mass. This invention was developed under Public Health Service research grant No. AM 06724–03.*