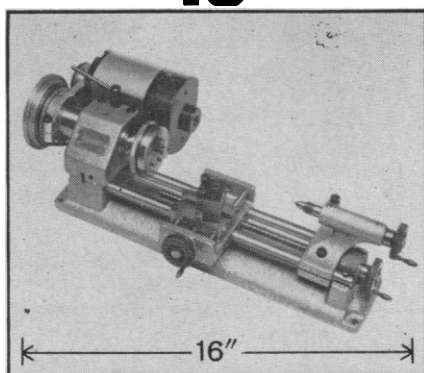


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## New Products

The information reported here is obtained from manufacturers and from other sources considered to be reliable, and it reflects the claims of the manufacturer or other source. Neither Science nor the writer assumes responsibility for the accuracy of the information. A coupon for use in making inquiries concerning the items listed is included in the postcard insert.

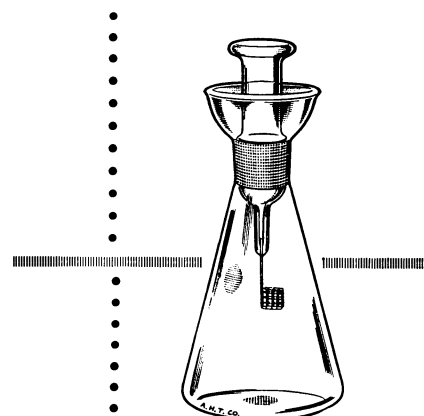
■ **BORANE DETECTOR** monitors airborne borane in concentrations less than 10 parts per billion. The detector cell contained in the instrument's sampling head consists of a pyridine-pyridinium chloride scrubber containing iodide and a small amount of iodine. Iodine is reduced to iodide by the boranes. When the iodine concentration drops to a preset level detected by amperometric electrodes regeneration is initiated by generating electrodes through a meter relay. The number of iodine-forming cycles in unit time is a function of borane concentration. Indication is provided either by a digital counter or by a potentiometer recorder. (Mine Safety Appliances Co., Dept. 40)

■ **ULTRASONIC DELAY LINES** claim 20 percent reduction in diameter and 40 percent reduction in weight of fused quartz required. The center frequency of a 1500-μsec line of the series is 32 Mcy/sec, with bandwidth for 3-db response of 20 Mcy/sec. Maximum secondary level in 5 Mcy/sec about the center frequency is 43 db. Ripple in the pass band is  $\pm 0.25$  db. (Arenberg Ultrasonic Laboratories, Inc., Dept. 43)

■ **GAS AND VAPOR DETECTOR**, Kitagawa Unico model 400, consists of a hand pump and detector tubes for specific gases and vapors. The pump is designed to draw air samples at a reproducible fixed rate that duplicates flow conditions used in calibration. Reagents are adsorbed on fine-grain silica gel hermetically sealed in the glass detector tubes. Average error is said to be less than  $\pm 5$  percent at 68°F. Temperature correction tables are available. Thirty-six types of detectors are available for various gases in various concentration ranges. (Union Industrial Equipment Corp., Dept. 46)

■ **TIME-CODE GENERATOR** is an electronic clock supplying coded output signals. The base carrier signal is a 100 cy/sec sine wave from which interpolation to  $\pm 0.0025$  sec is said to be possible. Intervals of 0.2, 1, 10, and 60 sec are marked uniquely. Time announcements are made in decimal form every minute in 24-hour time. The instrument clock is a crystal oscillator stable to  $\pm 3$  in  $10^7$ /wk. Readout is an in-line, in-plane visual display. Start time may be preset to Greenwich Mean Time or other bases by a series of switches and may be

## Thomas-Schöniger combustion apparatus



for determination of halogens,  
sulfur, traces of metals, etc.,  
in organic materials

A simplified technique for catalytic combustion of organic materials in oxygen. The procedure converts organic materials into soluble combustion products which are then analyzed by usual inorganic gravimetric or volumetric methods.

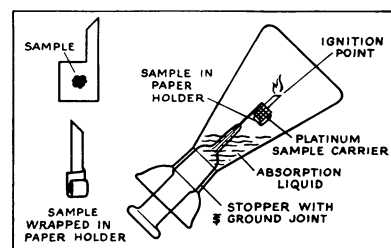
Consisting of a heavy wall flask, of borosilicate glass, with ground glass stopper with attached platinum wire gauze sample carrier and specially cut low ash paper sheets which serve as sample holders.

In use, sample is placed in the platinum carrier and the flask is charged with a small amount of absorbing liquid and with free-flowing oxygen. The paper is ignited; stopper with sample is seated in the flask and flask inverted at an angle. Combustion proceeds at high temperatures and combustion products are absorbed in the liquid. *Titrations can then be made directly in the flask.*

Results compare favorably, i.e., within  $\pm 0.3\%$ , with conventional methods. Because of low cost, time and space saving features, the method is finding wide use for many substances which undergo complete combustion.

See Wolfgang Schöniger, *Mikrochimica Acta*, 1956, Heft 1-6, pp. 869-876.

**6470-E. Combustion Apparatus, Thomas-Schöniger (Schöniger Flask)**, as above described, 300 ml capacity, for samples up to 10 mg. . . . **28.35**  
**6470-G. Ditto**, as above but with 500 ml flask, for samples up to 100 mg. . . . **29.00**



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activated manually or automatically by a WWV signal. Connection for a WWV receiver is provided as well as built-in WWV propagation delays from 0 to 99 msec. (Beckman Instruments, Dept. 57)

■ **ANGLE INDICATOR** is a servo system for digital indication of angular position. The instrument is said to be repeatable within 0.6 min in either direction and accurate within  $\pm 6$  min. Rotation is continuous, and slewing speed is 180 deg in 14 sec. Operation is on 400 cy/sec, 115-v power. (Kearfoot Company, Dept. 59)

■ **CIRCUIT ANALYZER** automatically performs three terminal measurements of complex impedances. Additional measurements of insulation resistance, diode forward voltage drop, and diode reverse resistance are also provided. A paper tape is used to program the analyzer, permitting the user to select test points, type of test, and tolerance limits. Print-out is provided when tolerance limits are exceeded. The input accepts a maximum of 300 test points. Test signal frequency is 1591.5 cy/sec. Resistance range is 1.00 ohm to 100 megohm; capacitance 10.0 pf to 1000  $\mu$ f; inductance

10.0  $\mu$ h to 1000 h. Tolerance limits are adjustable from  $\pm 1$  to  $\pm 50$  percent in eight steps. Testing rate depends on the type of measurement; the minimum rate is two tests per second. (Brooks Research Inc., Dept. 53)

■ **GAS CHROMATOGRAPHY COLUMN DETECTOR**, combining a Golay column, an ionization detector, and accompanying amplifier, is available as an integral part of chromatographic equipment or as an accessory for earlier instruments. Two types of detectors are available. In one the column effluent is ionized thermally in a hydrogen flame; in the other, ionization is produced by beta rays from a  $Kr^{85}$  source. The beta-ray unit is said to provide detectability in the range of  $10^{-14}$  mole of sample in carrier gas, the flame detector somewhat greater detectability. Electrical response time is 1 msec for either type. Effective volume of the flame detector is 1 to 3 mm<sup>3</sup>, of the beta-ray device 5 mm<sup>3</sup>. Power supplies are line operated and include 300-v polarizing batteries. (Perkin-Elmer Corp., Dept. 56)

■ **CONTROLLED-ATMOSPHERE CHAMBER** provides atmospheres with contamination less than 1 part per million by evacuation to less than  $1 \times 10^{-4}$  mm-Hg before introduction of the desired gas. Pressure of  $5 \times 10^{-4}$  mm-Hg is reached within 20 min. The unit is made of stainless steel, with a transparent plastic dome. (Scientific Engineering Laboratories, Dept. 48)

■ **HYDROGEN AND CARBON ANALYZER** uses a  $\beta$ -ray absorption system to determine hydrogen or hydrogen-carbon ratios in hydrocarbons. Strontium-90 is the source. Operation depends on the high electron density in hydrogen as compared with that in other elements. Individual determinations can be made in about 15 min with statistical probable error  $\pm 0.03$  weight percent hydrogen. (Central Scientific Co., Dept. 52)

■ **STRAIN-GAGE AMPLIFIER** measures 3.87 by 1.87 by 1.16 in. Operation is from a 28-v (nominal) d-c source. Output is 0 to 5 v d-c. Frequency response is 0 to 2000 cy/sec. Ambient temperature range is  $-65^\circ$  to  $+165^\circ$ F. Vibration of 35 g and shock of 100 g are tolerated. (Statham Instruments, Inc., Dept. 55)

■ **LEAK DETECTOR** uses halogenated gas as the probing gas and detects the inleaking gas by change of color of a flame. The detector flame burns at a small orifice in a red-hot copper block. In the presence of halogen, the otherwise colorless flame becomes bright blue-green. The detecting unit, consisting of the copper-block burner, a flame shield, and a gas probe, screws on to standard blow-

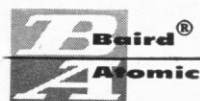


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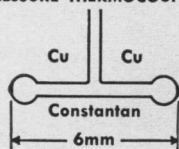
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2. In chemistry to aid in the determination of molecular weight and other characteristics of complex solutes.
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4. In plant physiology and pathology it can be used to determine the characteristics of plant fluids as a function of temperature and gaseous environment.

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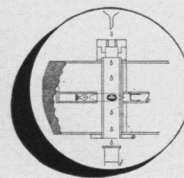


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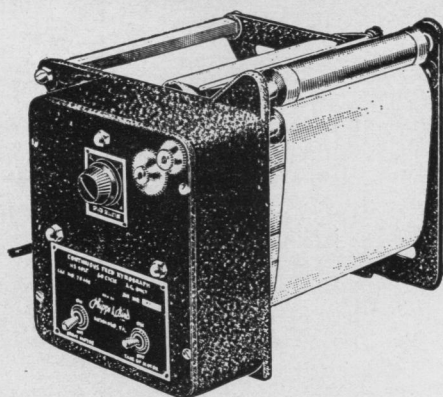
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- Phototube blanking time as short as 0.5 millisecond.
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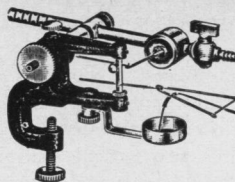


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The outstanding features of modern industrial recorders are retained in this instrument without losing the versatility necessary for kymograph work. Ink writing levers are used exclusively.

The machine feeds an 80 foot roll of paper, 6 inches wide, at any of its eight speeds. Four of these are had with external gears of 40 and 56 teeth in one position, by simply operating a gear-shift knob. By reversing the external gears, four additional speeds become available.

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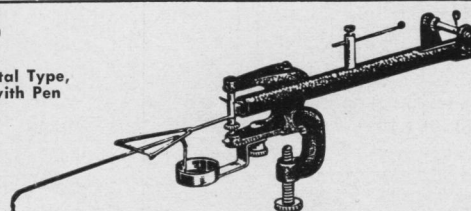


**70-360  
LEVER**

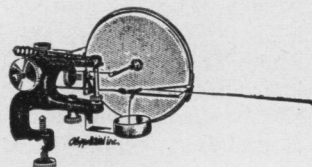
Heart, Horizontal Type,  
Ink Writing with Pen

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Membrane,  
Horizontal



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TAMBOUR**  
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Ink Writing, with Pen



**70-610  
MANOMETER**  
Metallic, Bellows,  
Horizontal Type, Ink  
Writing, with Pen



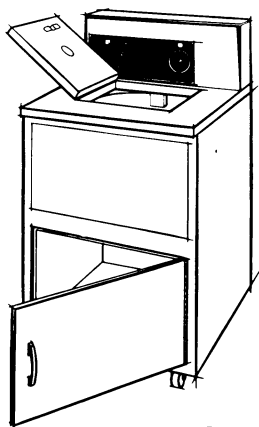
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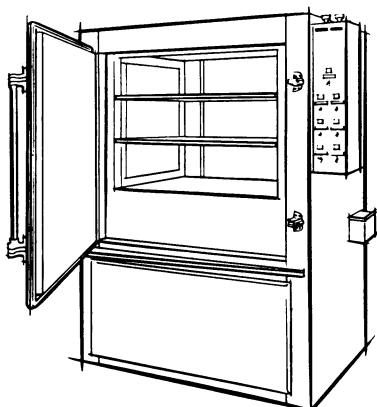
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torch flasks of propane. To hunt leaks in vacuum systems, the probe is connected to the vacuum-pump exhaust, and the system is sprayed with halogen-containing gas or suspected areas are painted with a volatile halogen compound. As little as 5 to 10 parts per million of halogen is said to be detectable. (Fisher Scientific Co., Dept. 63)

■ **COUNT AND TIME SCALER** combines a decimal count scaler with an electronic time scaler. Preset time to 1000 sec, or preset count to  $10^7$ , is measured. Resolving time is 1  $\mu$ sec. The instrument includes a full-range discriminator fixed mercury pulse generator, and an electrically reset four-digit register. Positive or negative input is accepted. (Radiation Instrument Development Laboratory, Inc., Dept. 62)

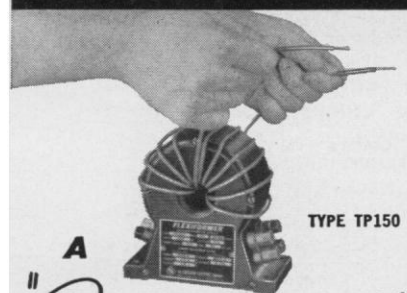
■ **VACUUM-TUBE VOLTMETER** measures voltage between 100  $\mu$ v and 1000 v, 1 mv full-scale, with accuracy  $\pm 1$  percent of full scale. Current is measured from 0.1  $\mu$ a to 1 amp with accuracy  $\pm 2$  percent of full scale. Resistance can be measured from 0.02 ohm to 5000 megohm. Voltage gain of the meter amplifier is 1000. Input is floating, with input resistance ranging from 10 megohm on the 1 mv range to 200 megohm on ranges above 100 v. The ohmmeter is a modified Kelvin bridge. (Hewlett-Packard Co., Dept. 58)

■ **OSCILLOGRAPH** is a two-channel, direct-writing recording millimeter that uses electric or ink writing in rectilinear coordinates. Acoustic damping of the recorder movement is 50 percent of critical from current source drive. Source impedance for critical damping is 200 ohm. Constant-current response characteristic is flat from d-c to 60 cy/sec, falling off at the rate of 12 db/octave from 60 to 200 cy/sec. Current sensitivity is approximately 2.5 ma/mm. Linearity is 2 percent of 20 mm full-scale. (Cohu Electronics, Inc., Dept. 61)

■ **CONDUCTIVITY CELL** is designed for use at temperatures up to 200°C and pressures up to 300 lb/in.<sup>2</sup> (gage). Cell constant can be changed  $\pm 10$  percent, permitting calibration while the cell is at working temperature and pressure. A removable shield protects the electrodes from direct impingement of flowing liquid. Trapping of gas bubbles is prevented by design of the cell; the cell may be operated in any position. (Industrial Instruments, Inc., Dept. 60)

■ **MULTIPLIER PHOTOTUBE** is designed for high resolution in scintillation counting and nuclear-radiation spectrography. Transit-time differences under typical operating conditions are kept down to 0.3  $\mu$ sec. Width of the output pulse can

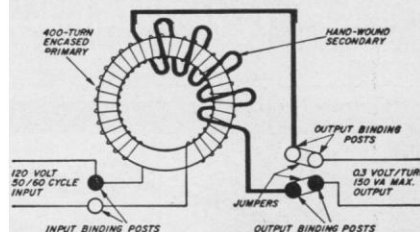
## FLEXIFORMER PACKAGED TRANSFORMER PRIMARY



## "Do-it-yourself" TRANSFORMER

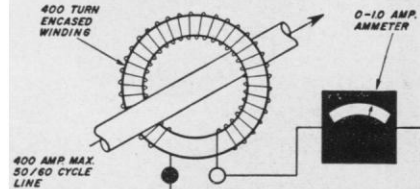
Here is the original "do-it-yourself" transformer. This portable, self-contained toroidal primary coil eliminates the task of obtaining the right transformer for each new job . . . simply wind your own! Especially useful when high amperage at low voltage is required. Used to demonstrate basic transformer principles . . . serve as working lab equipment. The primary consists of a silicon steel core having a coil of 400 turns of copper wire. Completely enclosed in durable, high-impact plastic with integral SUPERIOR 5-WAY binding posts for making connections. Versatile laboratory, shop, classroom and inspection aid.

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FLEXIFORMER type TP150 has an input rating of 120 volts, 50/60 cycles single phase and an output rating of 150 VA. The voltage of the secondary is proportional to the number of turns hand wound through the center opening. The correct number of turns is determined by dividing the desired output voltage (plus approximately 25%) by 0.3 which is the volt/turn ratio of the FLEXIFORMER.

### A CURRENT TRANSFORMER



FLEXIFORMER type TP150 becomes the secondary winding when used as a current transformer. A current-carrying conductor passing through the center opening serves as the primary. When used with a 0-1 ampere ammeter, currents up to 400 amperes can be measured with an accuracy of 1% at 60 cycles. Can be used as portable units or fastened permanently in place.

WRITE FOR FLEXIFORMER BULLETIN

**THE  
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572 Tripp Avenue, Bristol, Connecticut



be as little as 2  $\mu\text{sec}$  at half height with rise time of the same duration. Peak anode current is 1 amp, which is sufficient for direct use without amplification. At values up to 300 ma, anode current varies linearly with incident light flux. Fourteen multiplier stages provide gain of  $10^8$  or more, corresponding to an average cathode sensitivity of  $50 \mu\text{a}/\text{lu}$ . Maximum useful diameter is 42 mm. Peak spectral response is  $4200 \pm 300 \text{ \AA}$ . (Mullard Ltd., Dept. 64)

■ **ULTRAVIOLET ANALYZER**, for automatic location of protein and nucleic-acid fractions eluted by column chromatography, monitors continuously during fraction collecting and records the ultraviolet absorbing qualities of each collection tube. Transfer from one sample tube to the next is indicated by a pip on the strip-chart record. The system is electrically stabilized by a servo-driven self-nulling circuit that balances out line and light fluctuations and compensates for baseline changes resulting from the solvents used. Optical densities as small as 0.03 are recorded. Cuvettes are optical quartz of capacity 1.1 ml. (Canal Industrial Corp., Dept. 65)

■ **DELAY LINES** of magnetostrictive design are said to have temperature coefficients of  $5 \times 10^{-6}/^\circ\text{C}$  for fixed lines and for some adjustable models, and  $25 \times 10^{-6}/^\circ\text{C}$  for other adjustable models. Delay stability  $\pm 0.05$  percent from  $-60^\circ$  to  $+90^\circ\text{C}$  can be provided. Output amplitude is constant over the entire operating range. (Deltone Inc., Dept. 66)

■ **SCANNING PRINTER** has 12-digit decoding and printing capacity for electronically controlled data from decimal or binary-coded decimal sources. A 12-column input keyboard provides for manual insertion of data. Input resistance of the data-input circuits is greater than 1 megohm, so that power drawn from data-originating circuits is small. (Clary Corporation, Dept. 68)

■ **SPEECH COMPRESSOR-EXPANDER** speeds speech to twice normal rate in nine steps or slows speech to one-third normal rate in nine steps while retaining intelligibility. Sensitivity for full-scale operation is 0.1 v r.m.s. Input signal recommended is 0.2 v r.m.s. Input impedance is 600 ohm. Frequency response is  $\pm 2.0 \text{ db}$ , 500 to 8000 cy/sec. Power supply is self-contained. (Kay Electric Co., Dept. 71)

■ **ANALOG-TO-DIGITAL RECORDER** records analog values of shaft rotation input in binary-decimal, punched-tape form. The tape accommodates 16 binary digits, equivalent to four decimal digits. The tape can be read directly or can be translated automatically into standard computer tape or punched cards. In addition,

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For complete information, write for Bulletin 458.

Model	Price	Chamber Size		Watts	Volts	Overall Dimensions			Shipping Weight
		Diameter	Depth			Width	Depth	Height	
HK	\$169.	15	13	600	115/230	20	18	23	80
HL	\$265.	20	18	1000	115	25	23	28	100

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tion to the punched-tape output, the device supplies digital information in the form of electrical contact closures that may be used for telemetering. (Fischer & Porter Co., Dept. 72)

■ **INDICATOR AND RECORDER** is a servo-operated device that provides digital read-out of electrical signals produced by transducers while simultaneously recording on a 3-in. strip chart. Chart drive is synchronous. Digital read-out accuracy is said to be  $\pm 0.1$  percent, chart accuracy  $\pm 1$  percent. (Gilmore Industries, Inc., Dept. 67)

■ **INERTIA SWITCH** is sensitive to acceleration axially, radially, or omnidirectionally from 0.01 to 500 g. Accuracy is said to be  $\pm 0.1$  percent, repeatability  $\pm 0.003$  percent. Automatic reset is optional with closure time variable, and adjustable acceleration setting can be provided. Weight is about 1 oz. (Safe Lighting, Inc., Dept. 73)

■ **SUB-AUDIO TUNED AMPLIFIER** is continuously adjustable from 0.3 to 3000 cy/sec. Attenuation of second harmonic is greater than 35 db, of third harmonic greater than 45 db, of higher harmonics,

50 db. Input impedance is 10 megohm shunted by 25  $\mu$ f. Output impedance is approximately 300 ohm. Amplification at the center frequency is approximately unity. (Electronics Lab., Inc., Dept. 74)

■ **ULTRAMICROTOME** produces automatically sections 75 to 400 Å for study with electron microscopes. Single sections 1 to 10  $\mu$  thick for optical microscopy can also be prepared. Specimen advance, actuated by thermal expansion of two nickel cores, is controlled by varying current through the coils surrounding the cores. Current is applied only during the return stroke of the mechanism. The effect of the current, in addition to heating, is to produce magnetostriction of the cores. The magnetostrictive contraction of the cores retracts the specimen so that it does not contact the knife on the return stroke. Cutting rate is approximately 30 sections per minute. (Philips Electronics, Inc., Dept. 84)

■ **OSCILLOGRAM AMPLITUDE TABULATOR** consists of a stationery unit, a printing counter, and a hand-held rectangular frame with two hairlines. One hairline is fixed; the other can be moved in either direction at fast or slow speed with a control knob. The instrument reads oscillogram and strip-chart amplitudes up to 6.5 in. and prints this information on adding-machine tape. A sequential count is recorded for each reading. Amplitude reading and timing count are directly visible on the counter. (Gerber Scientific Instrument Co., Dept. 76)

■ **POWER SUPPLY** for driving tape-recorder motors is available for operation from either 24 to 28 v d-c or 105 to 125 v, 48 to 62 cy/sec a-c. Output is 100 w with frequency regulation  $\pm 0.02$  percent. Third harmonic content is said to be negligible. (Precision Instrument Co., Dept. 80)

■ **MECHANICAL FORCE AMPLIFIER** is a mechanical servomechanism for amplification of small forces. Actuation requires less than 1 g; and output force can be as much as 500 g. The device uses a ring friction-driven by a roller. Input motion is applied to a control yoke that tilts the ring. The tilt causes the ring rotated by the roller to move laterally along the roller. Lateral motion of the ring is imparted to a follower which transmits the output force. Maximum force is developed at the null position. Time for full-scale travel of 2 in. depends on the angle of tilt and the rotational speed of the driver. At 300 rev/min the time ranges from 0.8 sec for 15-deg (max) tilt to 6.1 sec for 2-deg tilt. (American Meter Co., Dept. 81)

JOSHUA STERN

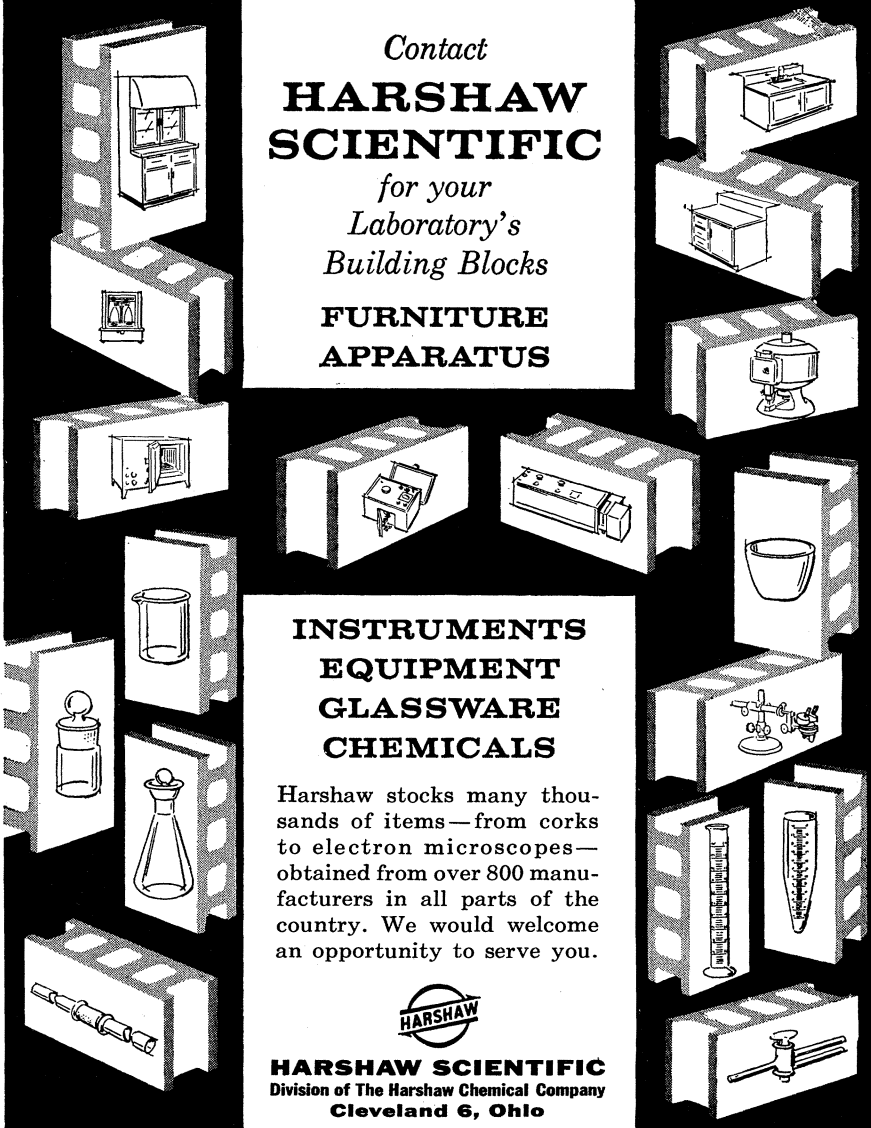
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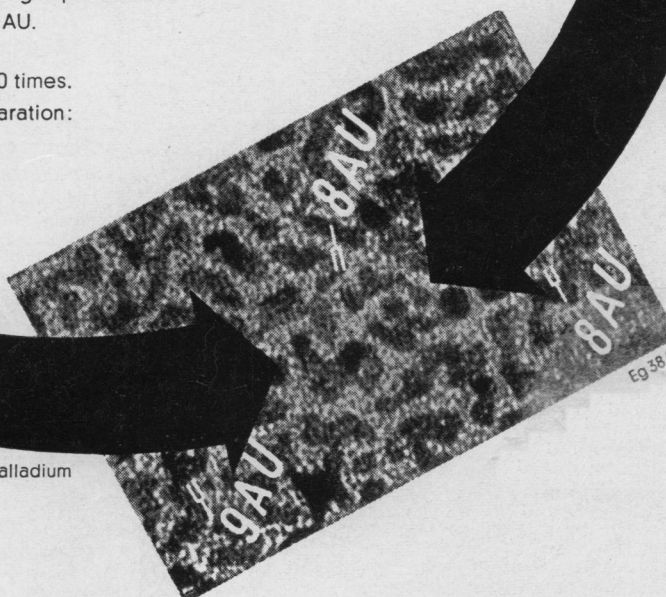
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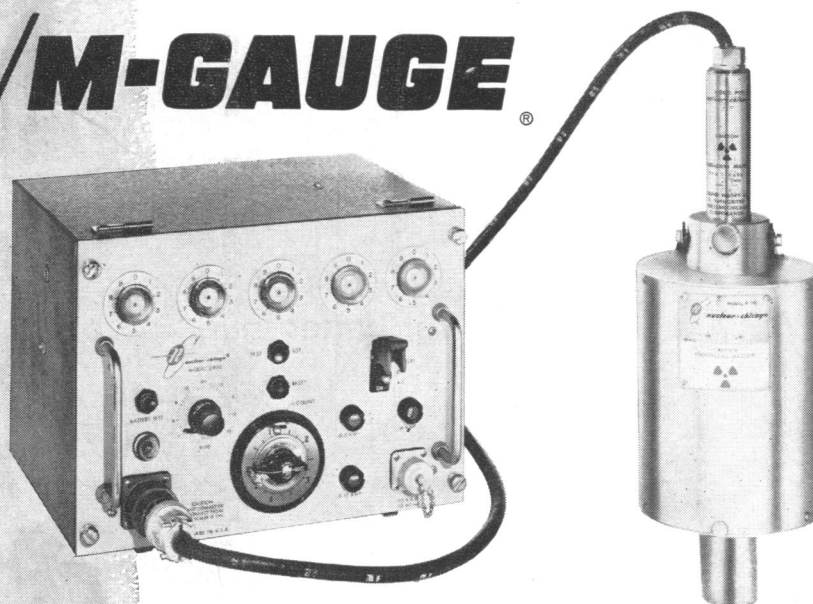
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