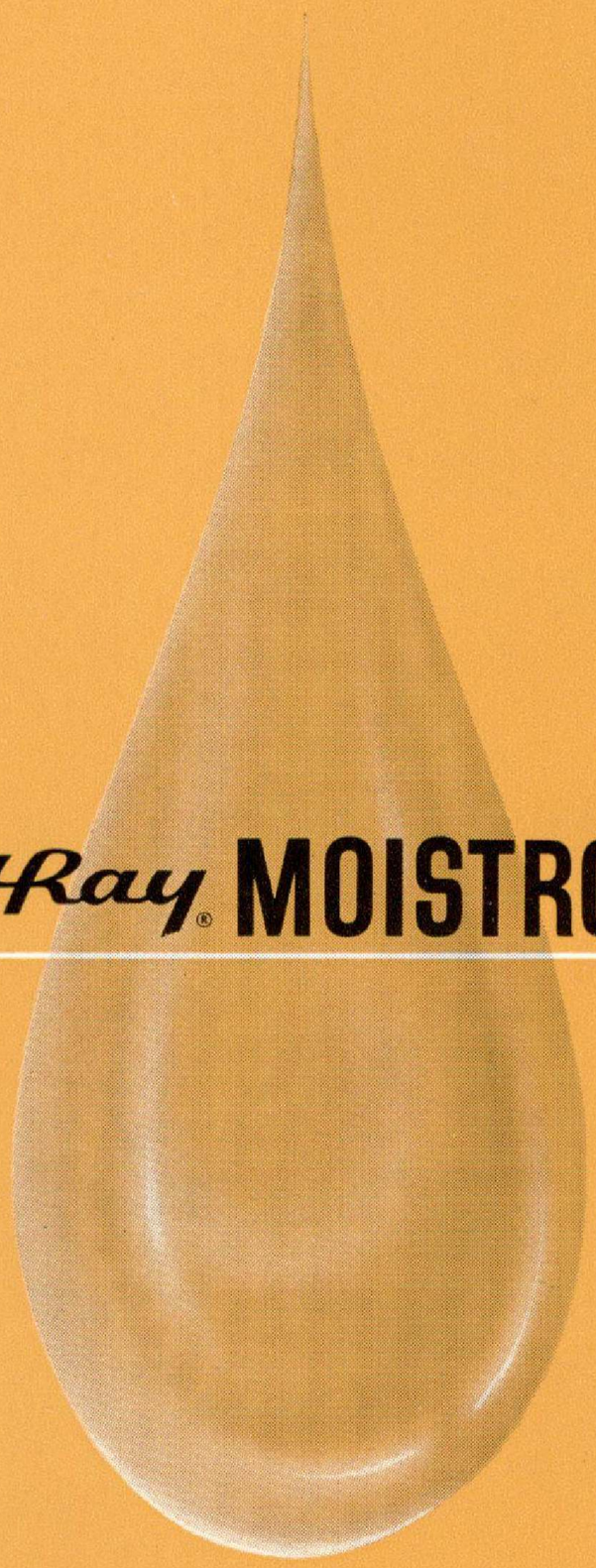
AccuRay® MOISTRON* MOISTURE MEASUREMENT AND CONTROL FOR THE PAPER INDUSTRY



Industrial Nucleonics CORPORATION

*TRADEMARK
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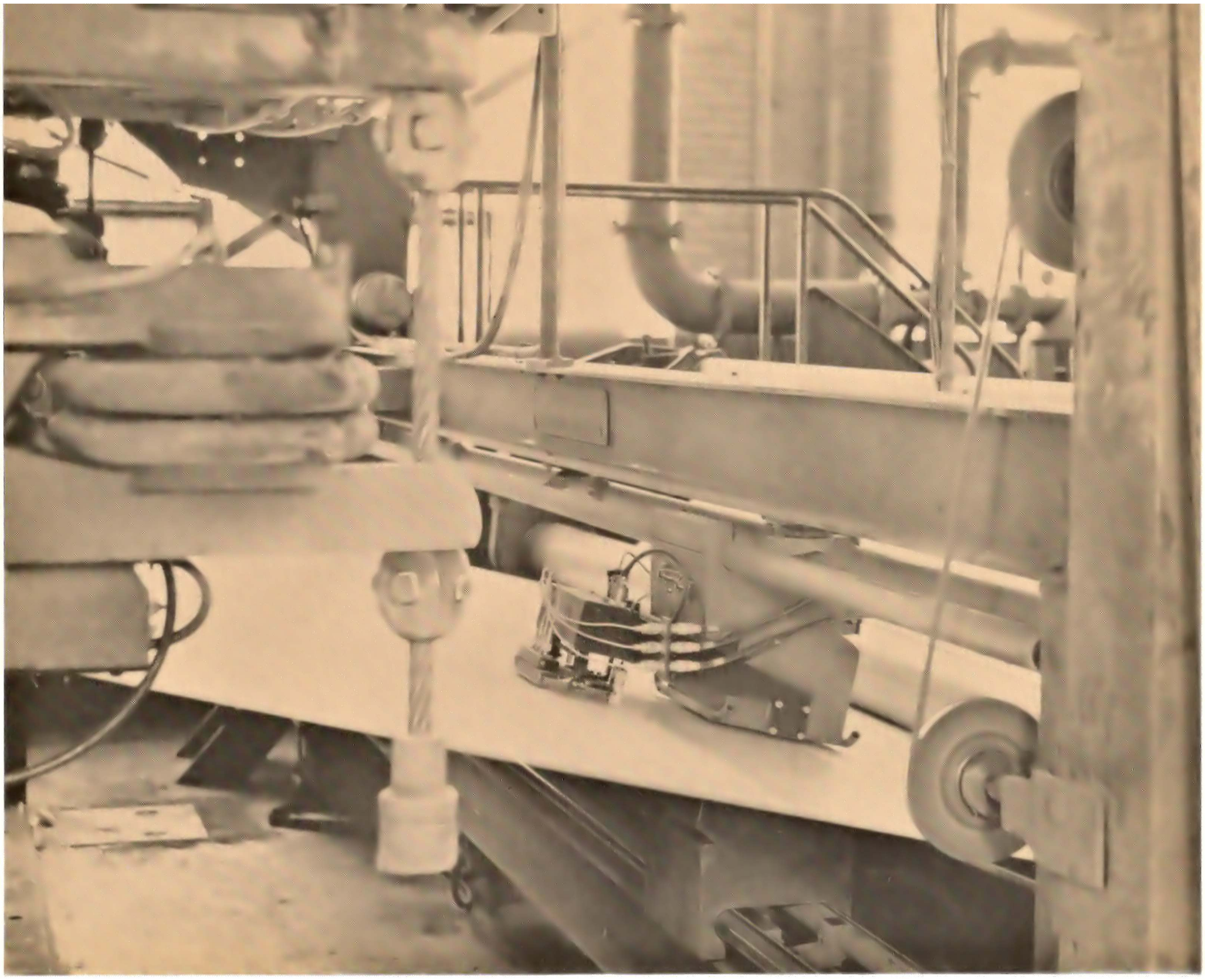

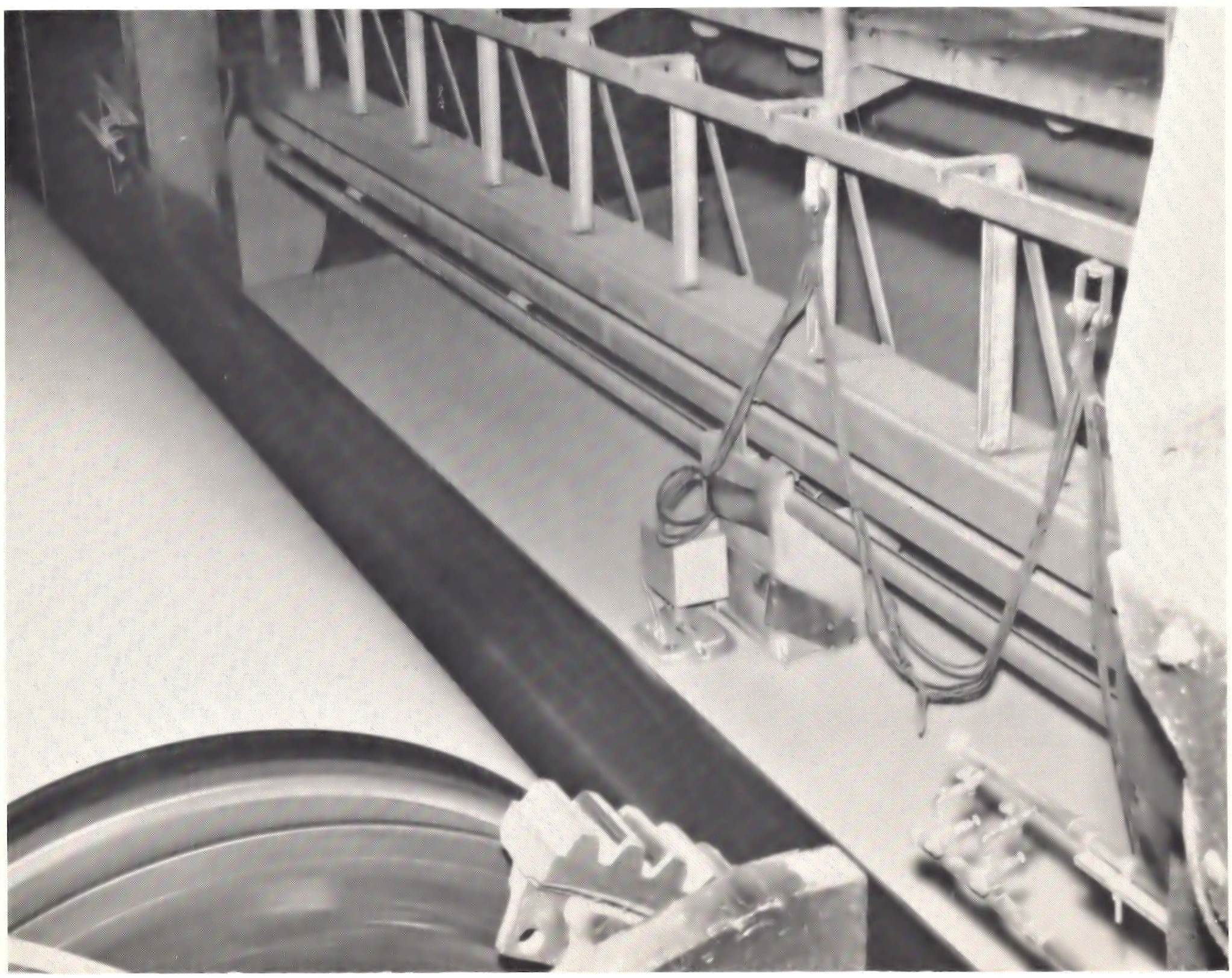

AccuRay®

MOISTRON*

The first new approach to moisture measurement in 40 years

AccuRay MOISTRON'S multi-frequency, computer system provides undistorted moisture measurement. Factors affecting true moisture measurement such as basic weight variations, temperature, composition, and contact pressure are eliminated or minimized. Independent measurements made at two properly selected frequencies provide the elements of the equation; a continuous solution of which, by an analog computer, provides an output signal specifically dependent upon percentage moisture content and independent, for practical purposes, of extraneous variables.

BASIC WEIGHT VARIATIONS are eliminated as shown by the graph and chart in Figure A. A series of plots of 45, 70, and 80 pound papers plot as a straight line on the graph. The conventional single frequency instrument is confused by a heavy but dry back side (point #1 on the chart) and shows at point #2 an unchanged moisture reading. The MOISTRON correctly signals the dry edge at point #3.

SHEET COMPOSITION EFFECTS are minimized as can also be seen from the graph in Figure A. Ash contents varying from 14 to 19% have not distorted the AccuRay MOISTRON'S true moisture readings.

AccuRay MOISTRON'S true moisture reading is graphically shown in Figure B. The correlation excellence is clearly shown by this comparison with oven dry (gravimetric) readings.

CONTACT PRESSURE VARIATIONS cause distorted moisture measurement in a single channel instrument as shown by the chart section in Figure C. AccuRay MOISTRON presents an **undistorted measurement** through a range of heavy contact pressures to zero pressure with the probe raised to a position clear of the sheet.

The multi-frequency AccuRay MOISTRON System coupled with an AccuRay Series "E" Mark V Basis Weight Measuring System can provide you with accurate, reliable information (as shown by Figure D) for optimizing control of your paper machine.

This combination of basis weight and moisture scanners is economic in that a common scanning system and programmed recorder readout will serve for both moisture and basis weight. Control of both variables makes possible optimization of paper machine operating costs through substantial savings in fiber usage, improved throughputs, and a higher quality sheet. The MOISTRON is also, of course, available with an independent scanning and readout system.

The MOISTRON Rental Plan permits profit and cash flow improvement on a current basis.

(R) Registered T. M. Industrial Nucleonics

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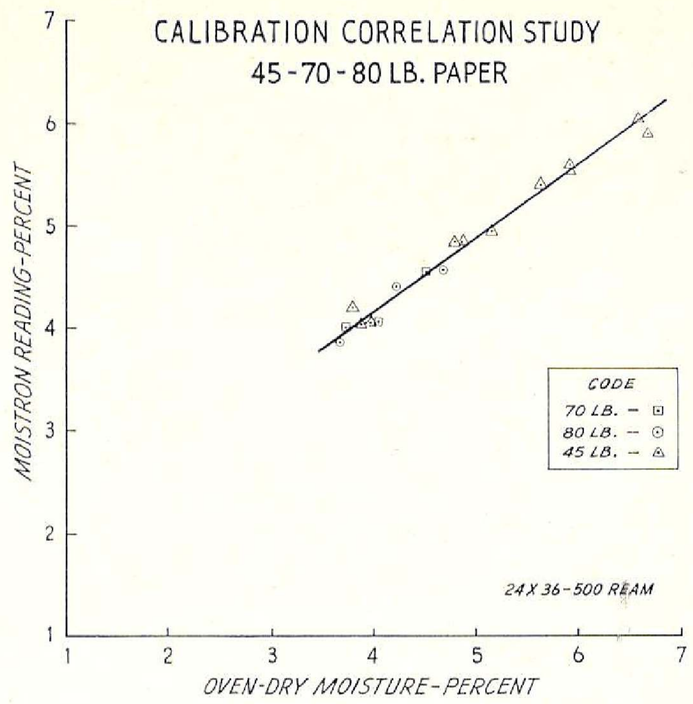


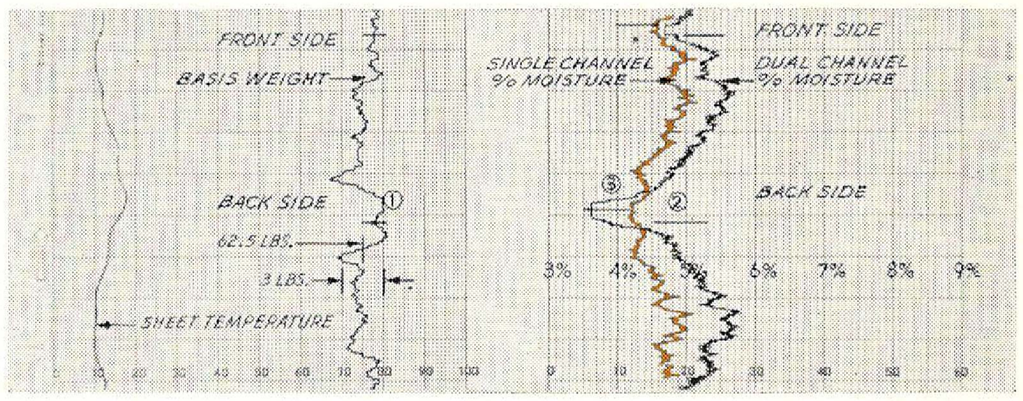


FIGURE A

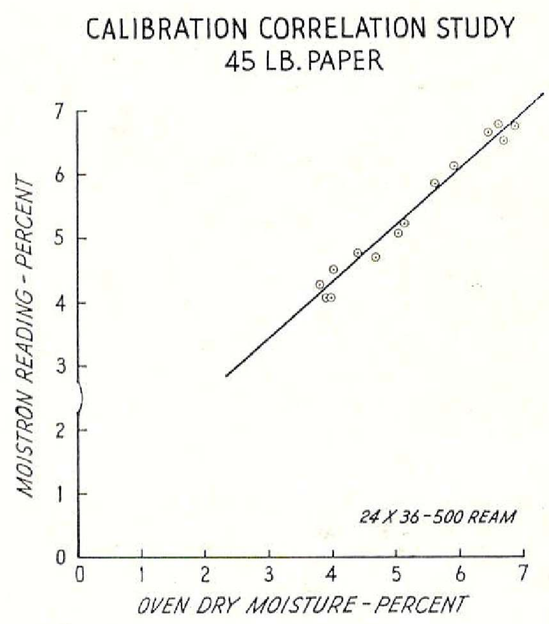


FIGURE B

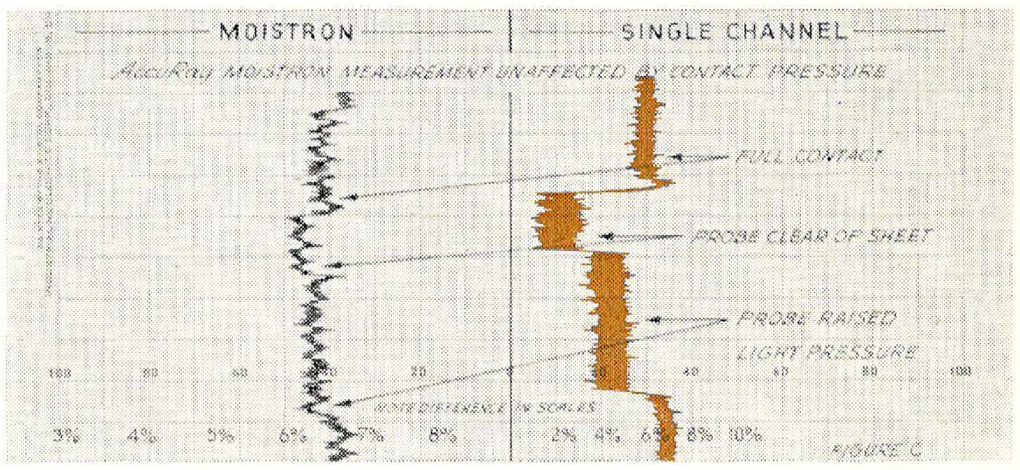


FIGURE C

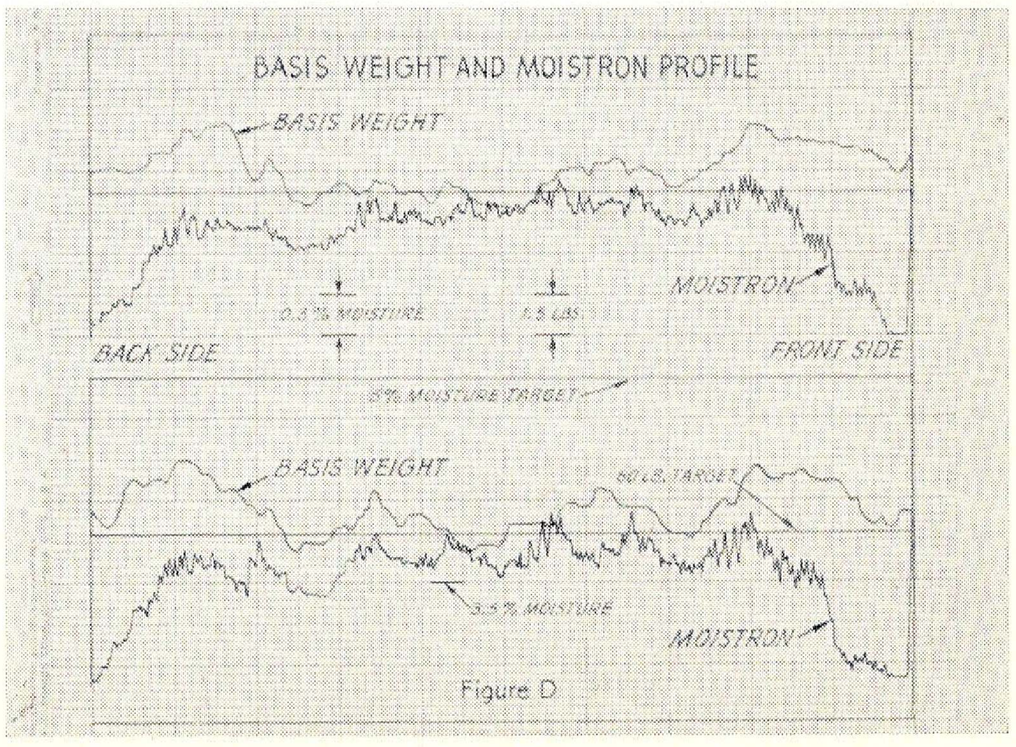
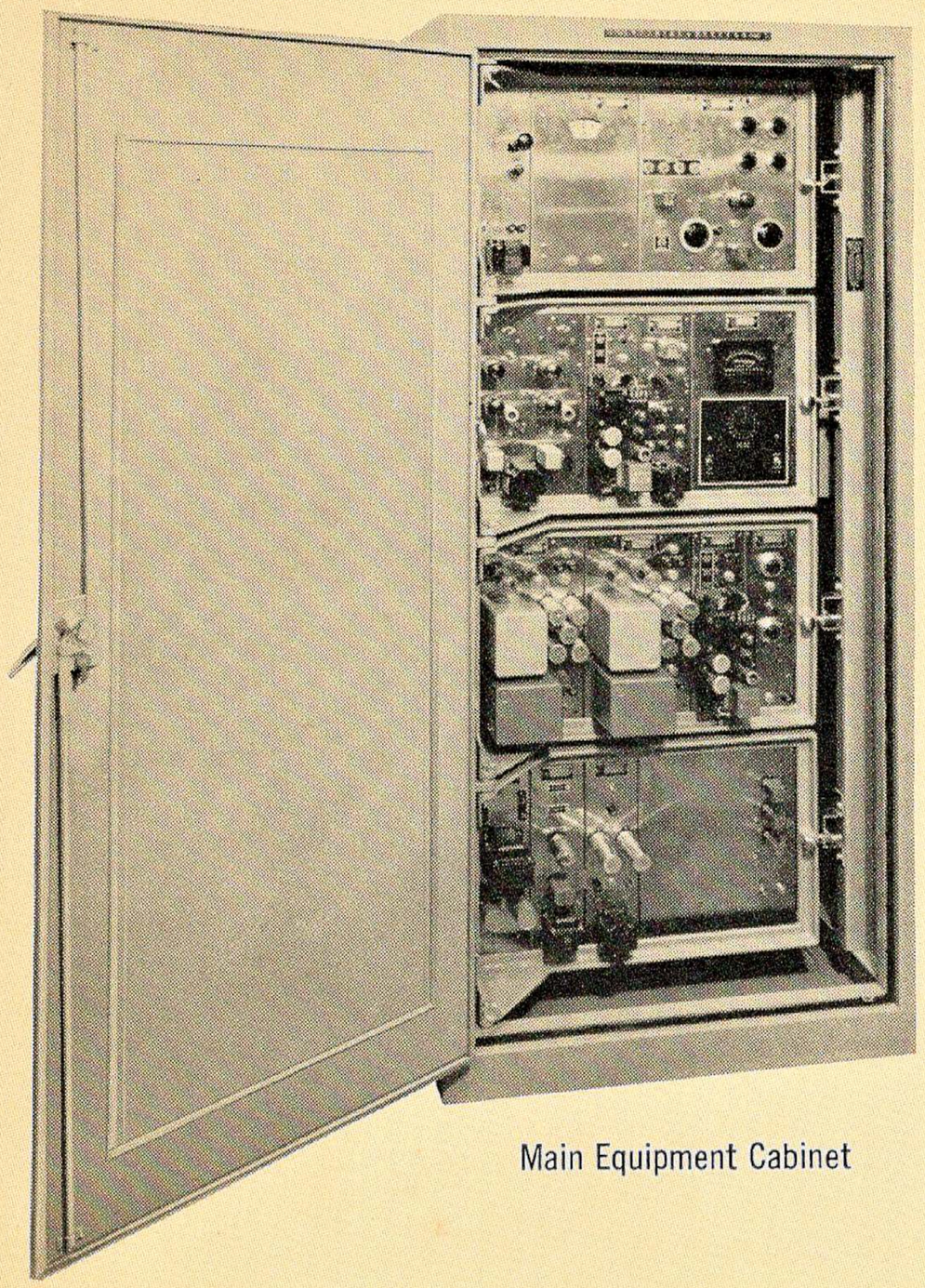
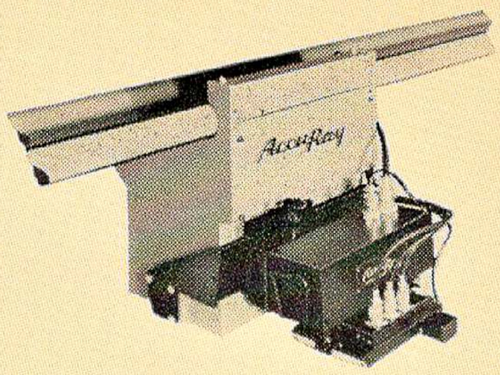


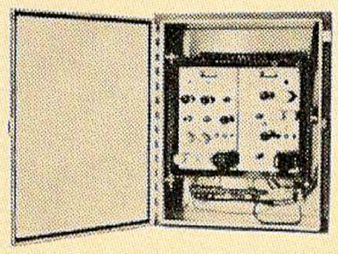
FIGURE D



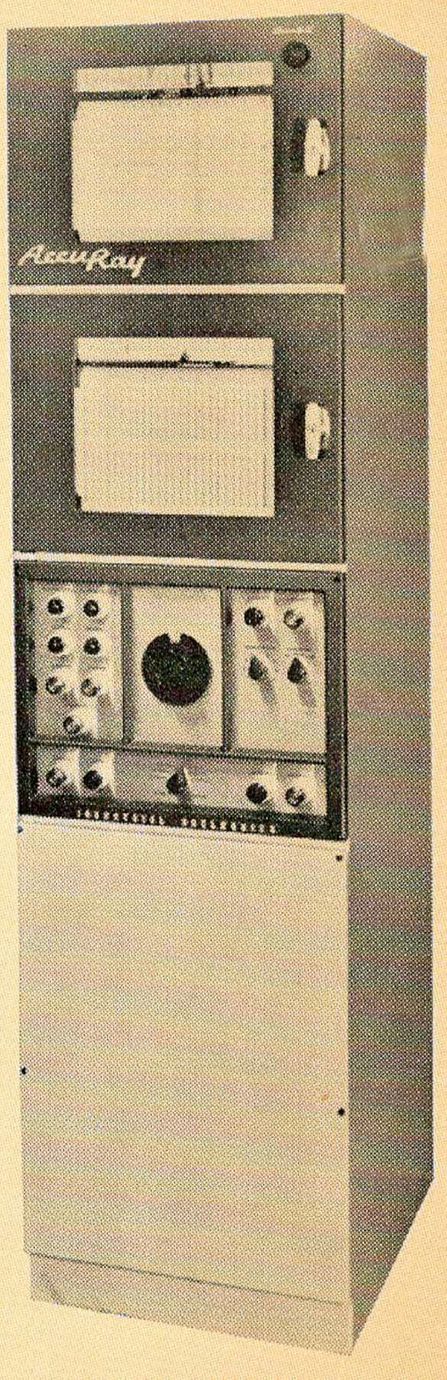
Main Equipment Cabinet



Measuring Probe



Auxiliary Equipment Cabinet



Operator Station

ACCURAY MOISTRON SPECIFICATIONS

PERFORMANCE

1. **Sensitivity to Basis Weight**	Negligible
2. **Sensitivity to Sheet Temperature**	Automatically compensated
3. **Sensitivity to Contact Pressure**	Negligible
4. **Accuracy**	Sensitivity and reproducibility to ±0.1%. Laboratory gravimetric oven dry techniques limit absolute accuracy to ±0.25%.
5. **Measurement Range**	2 to 15% (up to 20% under certain conditions)
6. **Spans**	As low as 1% full scale to 6% full scale
7. **Power Requirement**	115 v.a.c. nominal 60 cycle, single phase 15 amperes branch circuit, 1000 volts amperes maximum.

EQUIPMENT

1. **Two Independent Sensing Channels**	Each channel including separate signal generators, filters, detectors and power supplies.
2. **Analog Ratio Computer**	With Blind Servo Output
3. **Automatic Standardization**	With Servo Balance
4. **Automatic Temperature Compensator**	Servo Coupled
5. **Trouble Locator System**	Multi-Point Signal Checking
6. **Measuring Probe**	Fringe Field Type, arranged for mounting on traversing structure, approximately 2.5″ x 5″ measuring area
7. **Probe Lift-Off Mechanism**	Automatic Sensor-electrically actuated
8. **Main Equipment Cabinet**	Floor Mounted, 35″ wide x 76″ long x 24″ deep. Weight 880 lbs.
9. **Auxiliary Equipment Cabinet**	Wall Mounted, 24″ wide x 30″ high x 10″ deep. Weight 110 lbs.
10. **Readout**	Available with X-Y, average and single point recorders either with basis weight or independently
11. **Scanning**	Compatible with AccuRay Basis Weight Scanners or may use independent scanner
12. **Automatic Control**	Available

Industrial Nucleonics CORPORATION / AccuRay® MEASUREMENT AND CONTROL SYSTEMS • 650 ACKERMAN ROAD, COLUMBUS 2, OHIO

FORM NO. MO 2263

PRINTED IN U.S.A.

MOISTRON equipment was designed as a multifrequency system and with a complete family of probes. This unique design allows selection of the frequencies and proper probe to provide optimum measurement of sheet moisture for each of the paper industry's many products. Also assuring optimum performance is the practice of factory calibrating MOISTRON systems to TAPPI standards.

Trouble-free traversing on and off sheet is provided by an automatic probe lift-off and repositioning mechanism. The light contact pressure is uniform, counterbalanced and adjustable. In addition, a non-contacting infrared sensor determines sheet temperature and compensates so that the moisture measurement remains accurate.

MOISTRON systems provide absolute calibration in percent moisture. This linearized, direct-reading scale is in units the operator understands, and it is easily and accurately read at all moisture levels. Its permanent calibration is not affected by replacement of electronic modules, probe, cables or other system components.

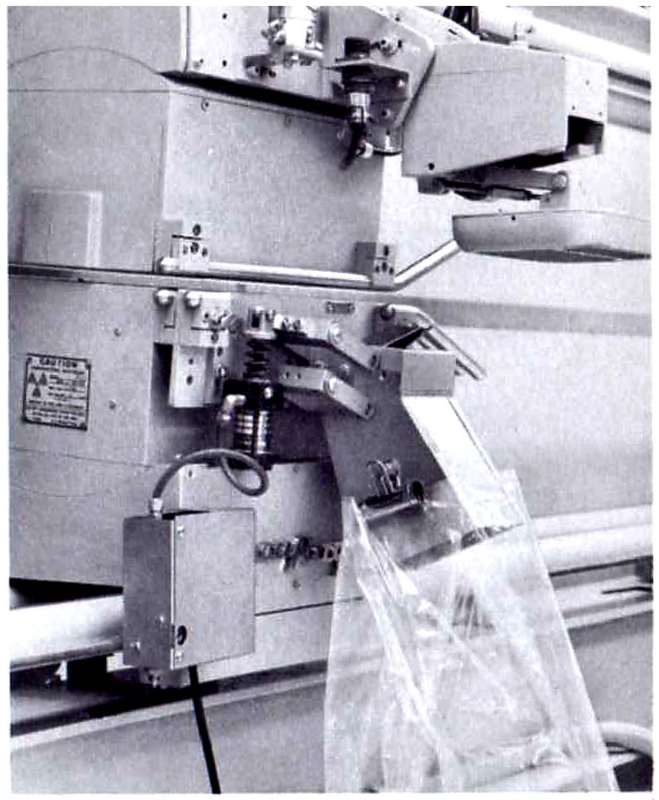
Another plus feature of MOISTRON systems is automatic standardization which checks all electronic functions of the moisture system. This occurs concurrently with standardization of the basis weight system, assuring continuing high accuracy of measurement. Any improper reading, in fact, will shut off that particular system and actuate a service light to alert operators and prevent production of out-of-spec paper.

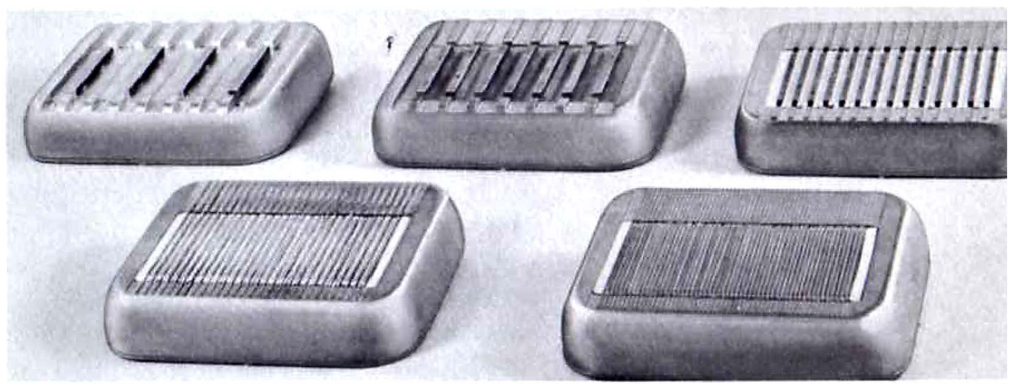
On-machine accuracy of MOISTRON systems is ±0.1% moisture (average deviation of gauge reading from oven-dry gravimetric measurement of dynamic samples). Statistical variation (3 sigma) of individual on-machine samples is 0.2% to 1.0%, including sampling errors. So MOISTRON systems accurately measure water content of products . . . tissue to linerboard . . . and even on sheets with stratified moisture. Range of these systems: from 0.5% to 15% moisture depending on grade; up to 20% on pulp. Spans: normally 5% to 10% moisture full scale. Response: to 0.1 seconds, adjustable time constant.

The automatic sample cutter . . .

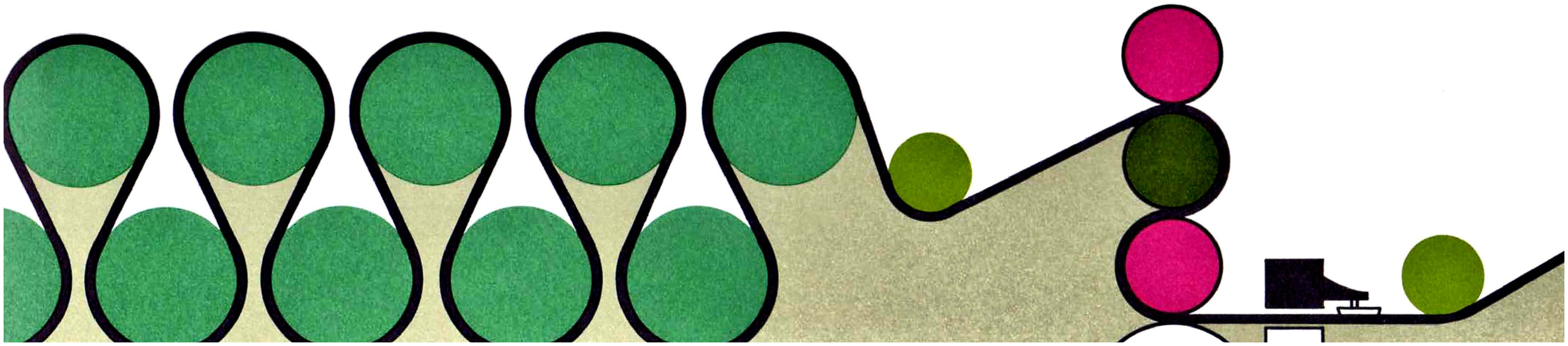
. . . developed by Industrial Nucleonics . . . takes a sample from the moving sheet, deposits it in a plastic bag, permits dynamic correlation of MOISTRON system accuracy by oven-dry comparison. As pictured above, the cutter can be easily attached and removed from the source and detector heads of an AccuRay system.

A portable cutter-control unit provides the following functions: pre-programmed cutting time varying from zero to sixty seconds, optional manual control over cutting time, manual override of the automatically timed signal, optional automatic withdrawal whereby the source-detector and probe retract to the off-sheet position at the end of each sample cut, and automatic chart marking which identifies the portion of the recorder trace corresponding to the sample.



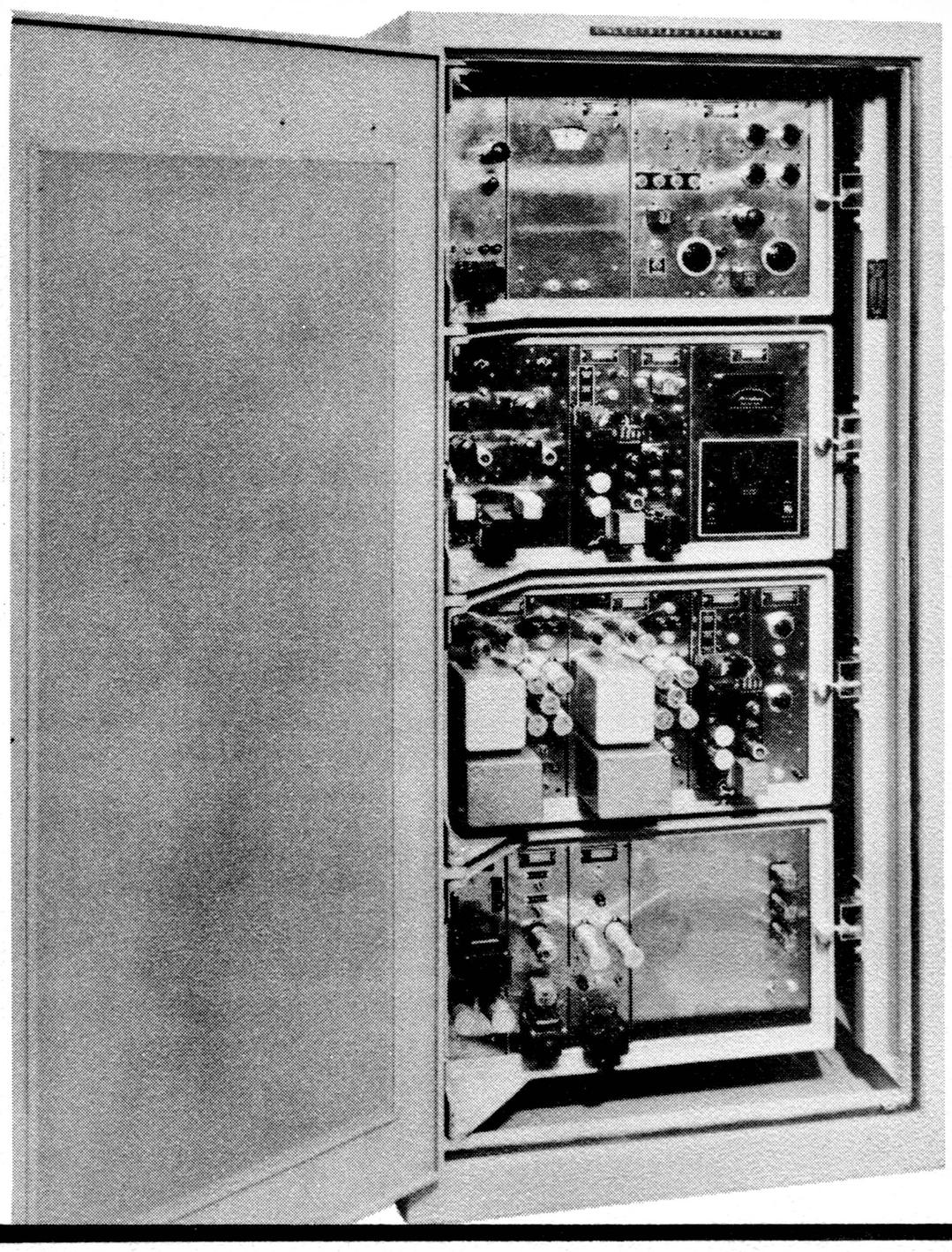


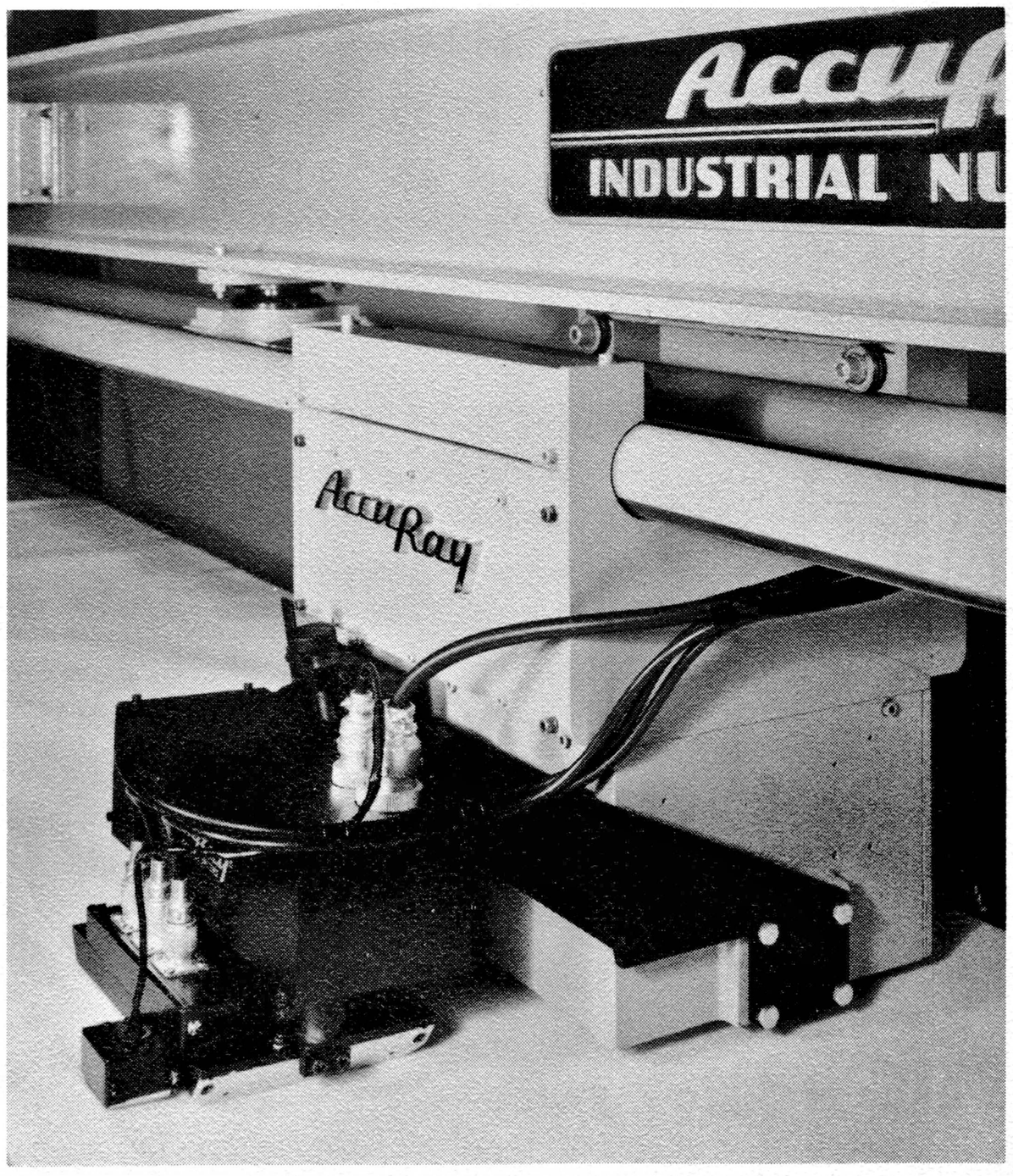
The cutter normally delivers 98% reliability (two sheet breaks per 100 samples taken) on paper with basis weights from 24#/3,000 ft.^{2} to 69#/1,000 ft.^{2}. Lighter and heavier weights can be cut with a slight reduction in reliability.



MOISTURE MEASUREMENT SYSTEMS

After a development period of (9) nine years, the company introduced the AccuRay MOISTRON System in 1961. Based on a dual frequency design and employing computer techniques, this system is capable of making continuous, non-destructive, on-machine moisture measurement of paper, tobacco, and other products.





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