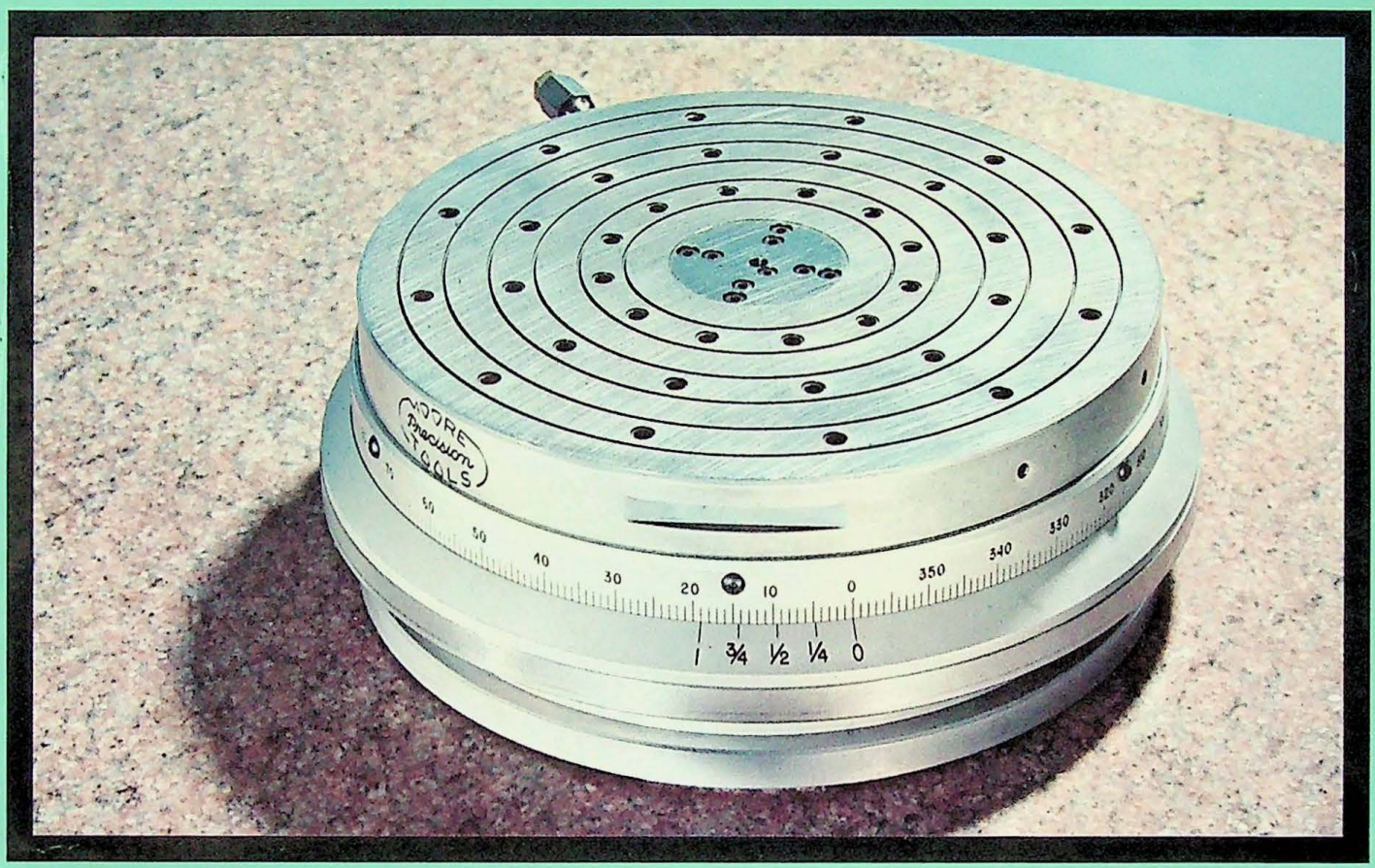
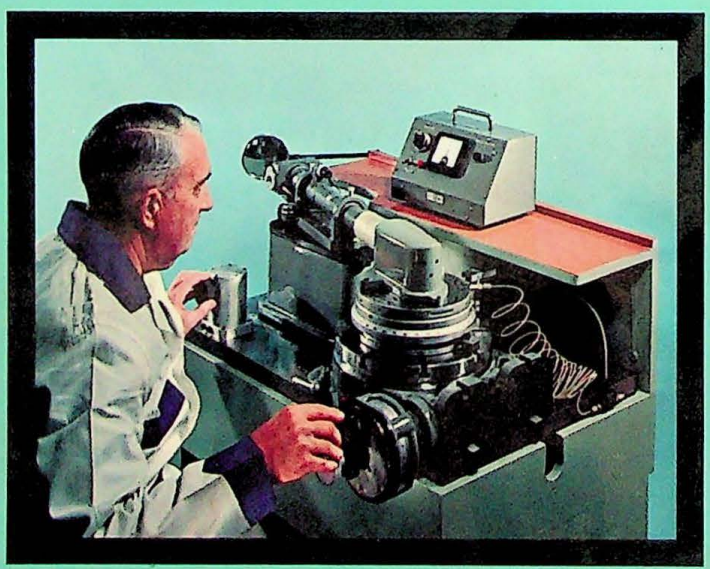
Moore 1440 Precision Index (polygon)

—the ultimate reference for angular spacing





1/10th Second Accuracy

The Moore 1440 Precision Index provides the most authoritative method for the inspection of mechanical and optical rotary tables.

Moore has standardized on the 1440 Precision Index for the calibration of its line of Rotary Tables—"Standard" (±12 seconds), "Precise" (±6 seconds), and "Ultra-Precise" (±2 seconds). A close-up of the calibration technique is shown on the front cover. Moore Rotary Tables have a 180-tooth lapped master gear; one revolution of the hand wheel and worm rotates the table 2 degrees.

The 1440 Precision Index can make a complete check on: 1. Each full turn of the hand wheel 2. ½ turn (1 degree) 3. Eight points of the hand-wheel worm.

This means that the 1440 Index is able to detect the double error of both gear and worm.

This is accomplished with one indexing unit and one mirror. Mirror is mounted enclosed in the center of the table, with no air gap between it and the photo-electric autocollimator.

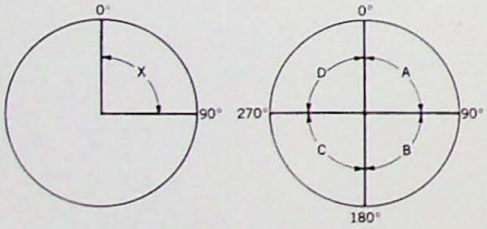
How Moore Verifies 1/10th Second Accuracy

How is an indexing device of 1/10th-second accuracy inspected? Moore uses two 1440's. **Each inspects and calibrates the other.** The method employed is shown in the photograph lower right.

This **self-check** follows a simple principle which is illustrated as follows:

Using the two circles as examples, assume that initially we have no means of directly measuring the absolute values of quadrants "X" and "A", "B", "C", and "D".

Suppose, however, that we know each quadrant to be nominally 90°, and are able to measure small differences between the quadrants when compared.



Quadrant "X" of the first circle is compared to each of the four quadrants of the second circle ("A", "B", "C", and "D"). Putting the comparison and the hypothetical readings in algebraic form:

$$X - A = -3°$$
$$X - B = -1°$$
$$X - C = -4°$$
$$X - D = 0°$$

Adding: $4X - (A+B+C+D) = -8°$

But, $A+B+C+D = 360°$.

By substituting: $4X - 360° = -8°$

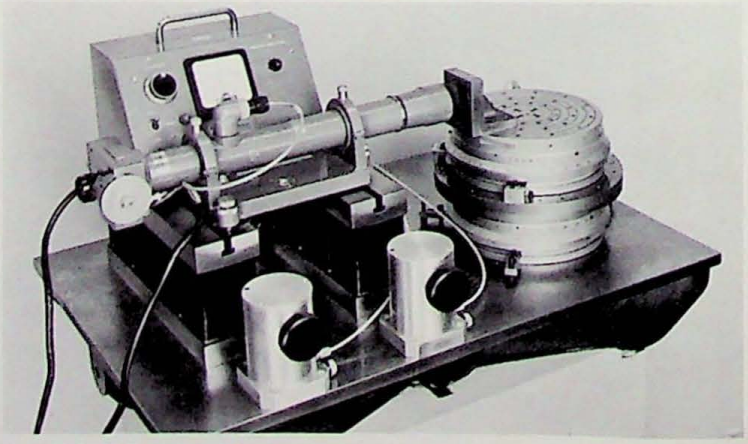
$$4X = 352°$$
$$X = 88° \text{ (or } \underline{-2°}\text{, from } 90°)$$

With X being −2°, then we must **add** 2° to the above readings to determine their true values:

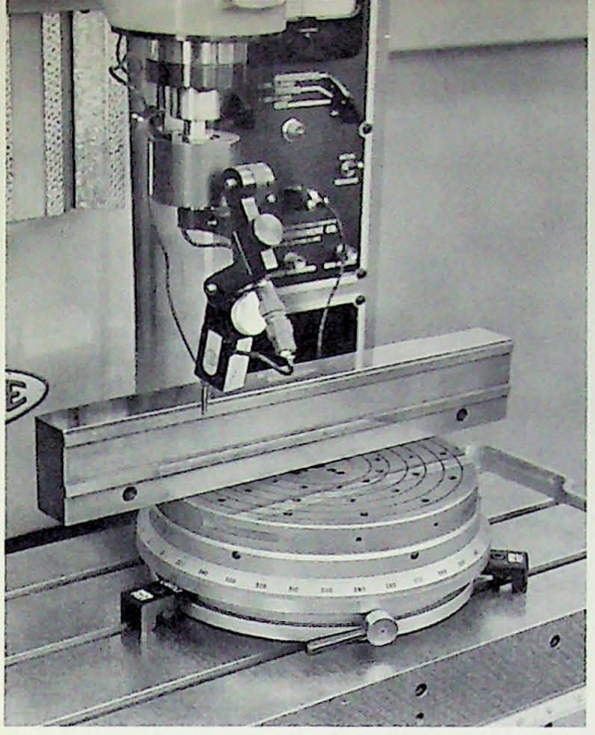
$$A = -3°+2° = -1°$$
$$B = -1°+2° = +1°$$
$$C = -4°+2° = -2°$$
$$D = 0°+2° = \underline{+2°}$$

And their sum must equal: $0°$

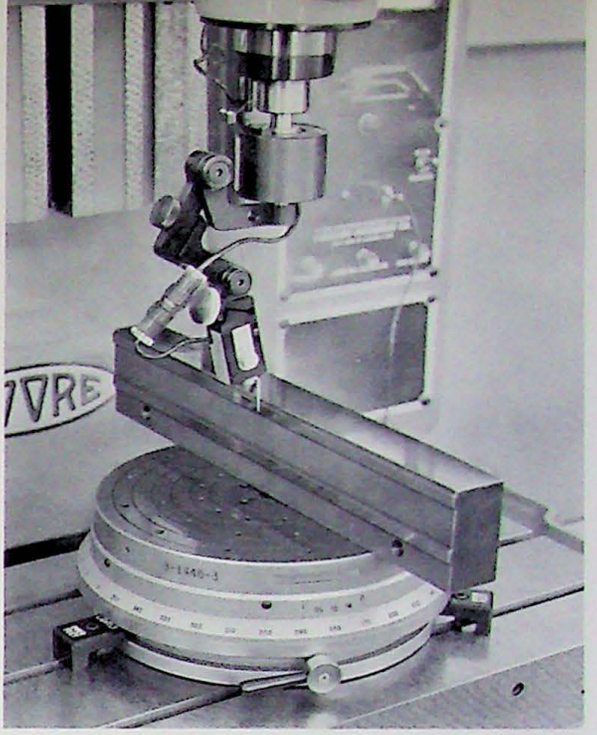
This is the method (in simplified form) used by the National Bureau of Standards and by Moore to calibrate the 1440 Precision Index. A photo-electric autocollimator records minute differences between the quadrants. **Repeatability** of readings is estimated to be about 1/20th second—or 0.000001 in. on an 8-in. diameter. Two 1440's are compared to one another for as many quadrants as considered feasible. By a systematic columnar arrangement of the many readings obtained, true error can be calculated.

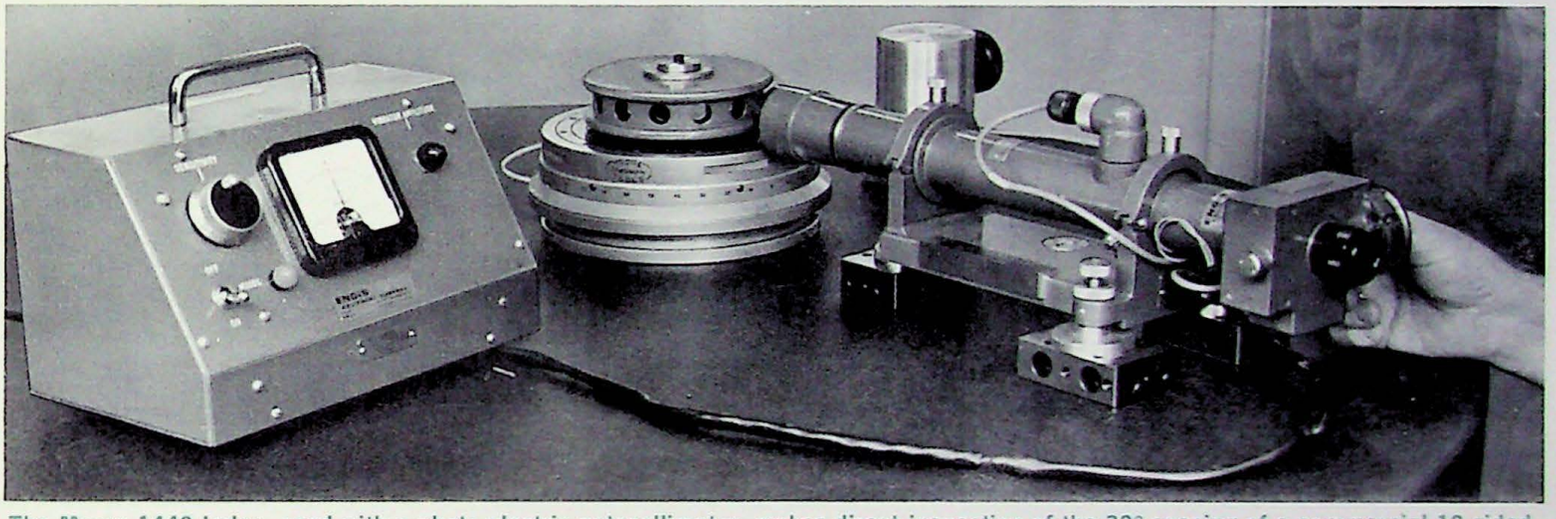


One 1440 Precision Index is compared against another, to verify spacing accuracy.

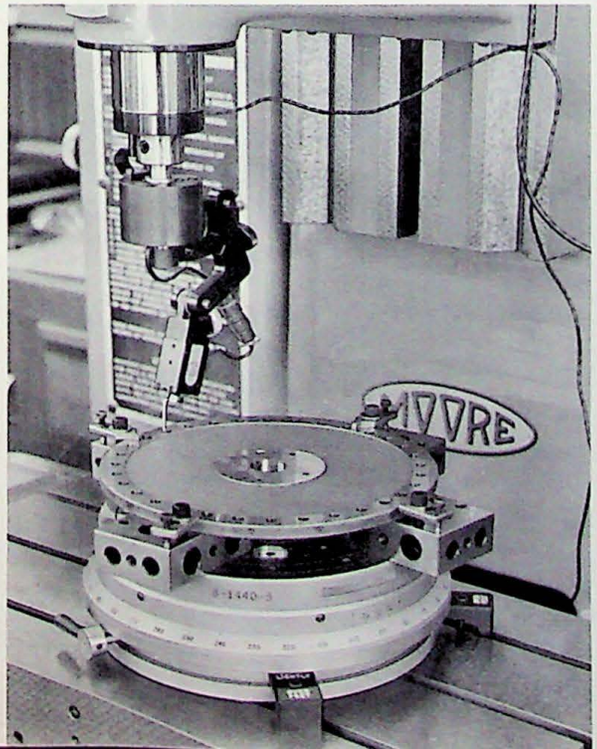


The 1440 Precision Index, used with an accurate straightedge, can inspect squareness of compound travel in a precision machine tool. In this example, a Moore Universal Measuring Machine is being inspected. The straightedge is first aligned with the X-axis of the machine (left). Then, the 1440 Index is indexed 90°, with the Y-axis traversed to discover error of compound squareness (right).

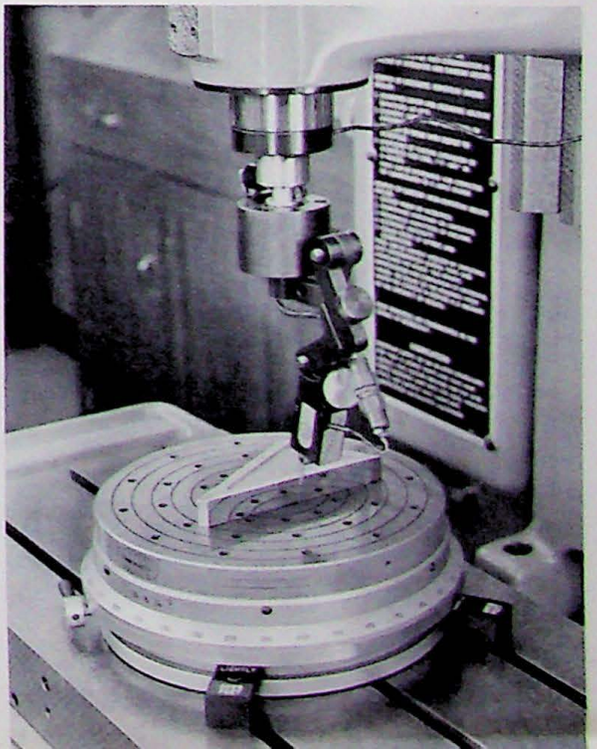




The Moore 1440 Index, used with a photo-electric autocollimator, makes direct inspection of the 30° spacing of a commercial 12-sided optical polygon. Polygon is shown centered on 1440 Index.

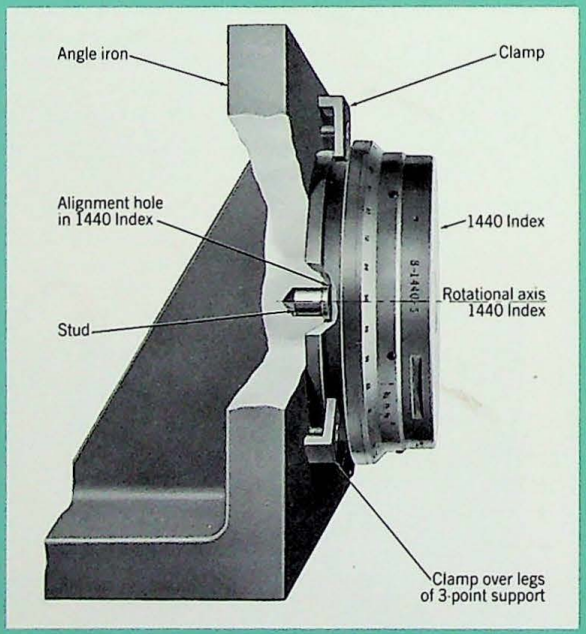


This 32-hole index plate has been jig ground using a Moore Ultra-Precise Rotary Table. The 1440 Index is used with a Moore Universal Measuring Machine to obtain the closest possible determination of angular spacing.



Calibration of 30°-angle gage block is made with the 1440 Index, using the travel of Moore Measuring Machine only for datum straight line. As a double check, the 30° block is inspected by the co-ordinate movement of the Measuring Machine.

Moore 1440 Precision Index is stored in specially designed mahogany box. Convenient nesting is provided for the 1440, graduated ring, mirror housing, and clamps and screws.



Line-up hole in base plate is true to rotational axis of 1440 Precision Index. Use of stud facilitates alignment when 1440 is used vertically. Use of stud is also convenient for alignment of 1440 when mounted horizontally. Vertical mounting requires 1440 Precision Index with mechanical lift.

Specifications

Accuracy of 1440 spaces	±0.1 second
Table diameter	8 in.
Overall diameter	9 in.
Height	3 in.
Weight	30 lbs.
Shipping weight	50 lbs.

Standard Equipment

3 Clamps
3 10-32 x ¾ in. socket head screws and washers
1 Allen wrench for 10-32 screws
1 Extra ring with graduations and vernier reversed for opposite direction indexing

Optional Equipment

Mirror and Housing (mirror is recessed in housing) for use with autocollimator. Includes three special spring-loaded torque-limiting 10-32 screws.
Hydraulic Lifter (for horizontal mounting of 1440 only)

All prices are net F.O.B. our factory in Bridgeport, Connecticut, and are subject to change without notice. These prices are subject to the addition thereto and payment by the buyer of any costs due to Federal, State or Municipal Legislation covering sales, retailers and similar taxes.

We reserve the right to improve, change, or modify the construction of Moore 1440 Precision Indexes or their attachments or any part thereof. This does not incur any obligation to make like changes on Moore 1440 Precision Indexes or their attachments previously sold.

The Moore 1440 Precision Index is manufactured by Moore Special Tool Company under license, using patent owned by AA Gage Co., Detroit, Michigan.

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