# INSTRUCTIONS.

**CIRCUMFERENCES AND DIAMETERS.**—Move the slide K so that 1 is alongside $\pi$ on J. Slide J then shows circumferences, and K the diameters.

**DIVISION.** Move the slide S T so that the smaller number appears alongside the larger on R U; the answer appears opposite 1. Example: Divide 65 by 13. Move 13 to 65 and the figure 5 appears opposite 1.

**EQUIVALENTS.**—Move the slide S T so that the equivalent is alongside that on R or U; the scales will then read accurately for all numbers on the same basis.

Example: What weight is 91 kilos in pounds? Move 100 alongside 220 (*see* Table) and opposite 91 is 200 = 200 lbs. What length in feet is 16 metres? Move 100 alongside 328 (*see* Table), and opposite 16 is—52½. 16 metres is therefore 52½ feet.

**FRACTIONS TO DECIMALS.**—Move the scale so that the smaller number is on T and the larger is on U, the decimal equivalent will be found opposite 100.

Example: Decimal value of 23/27ths. Move the scale so that 23 is alongside 27: and 85 is found opposite 100. ·85 is therefore the answer.

**DECIMALS TO FRACTIONS**—Move the slide so that the decimal figure is alongside 100, and a glance at 32 exhibits the fraction in 32nds; at 64, in 64ths, etc. If the decimal is ·75, the scale reads 3/4; similarly ·80 is 4/5ths.

**INVERSE RATIO.**—Slide L.M. This table calculates automatically sums where the proportion is reversed; that is, an increased dimension involves a decreased result, and *vice versa*.

Example: 140 feet of 3-inch planking are required to cover a certain area; how many feet are required if the material available is 3½ inch. Move 140 alongside 3, and opposite 3½ is 120: which is the answer.

**LEVERS.**—A lever of 40 inches long has a stroke of 16 inches, what is the movement at a point 7 inches from the fulcrum or fixed point? Move 40 alongside 16, and opposite 7 is—2¾ inches.

**MACHINE SPEEDS.**—A machine running 12½ per minute, driven by a 26-inch pulley on the shafting, is required to be speeded, what speed would be reached by using a 28-inch or 30-inch pulley? Move 26 alongside 12½: and opposite 28 is—13½, and opposite 30—14½.

**MULTIPLICATION.**—Move the slide S T so that the figure "1" is alongside the number to be multiplied, and the answer appears opposite the other number.

Example: To multiply 13×4. Move the figure 1 alongside 4, and opposite 13 is 52, which is the answer.

**OIL CONSUMPT.**—An engine runs on 16 miles to the gallon, how much is needed for 270 miles? Move 16 alongside 1, and opposite 270 is—17—*i.e.*, 17 gallons.

**PROPORTION—REDUCING OR ENLARGING.**—Move the slide so that the size is alongside the proposed size, and the other proportion will be found opposite the second measure.

**PULLEYS.**—With a shaft running at 130 r.p.m., and a machine pulley of 22 inches, what size of driving-pulley is needed to drive at 360 r.p.m.? Move 130 alongside 360, and opposite 22 is 61—the required size.

**SHAFT SPEED — Increased or Decreased Speed.**—A main drive of 130 r.p.m. is to be speeded to 140, what alterations on the pulleys are required to keep present speed on certain machines. As the increased speed means smaller pulleys, use the Inverse scale.

For a 22-inch pulley, move 130 on L alongside 22 on M, and opposite 140 is—20½.

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## The "Flash"
# Engineers' Calculator

*Left Side: Fractions JK.*
*Inverse Ratio LM.*
*Right Side: General Calculating, RSTU.*

*Designed and Tabulated by INGLIS.*

| | Move— |
|---|---|
| **Circumference** (Cir. = 3·14 Diameter) .. | 1 to 3·14 |
| **Grammes to Grains** (6·48 Gm. = 100 Grn.) .. | ·648 to 10 |
| **Grammes to Oz.** (567 Gms. = 20 oz.) .. | 567 to 20 |
| **Inches to Centimetres**—(1 in. = 2·54 c.) .. | 100 to 254 |
| **Kilogrammes to Lb.**—(1 kilo. = 2·201b.) .. | 100 to 220 |
| **Metres to Feet**—(1 metre = 3·28 ft.) .. | 100 to 328 |
| **Miles to Kilometres**—(1 mile = 1·61 ks.) .. | 100 to 161 |
| **Miles**—Irish to English (11 Irish = 14 Eng.) .. | 11 to 14 |

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