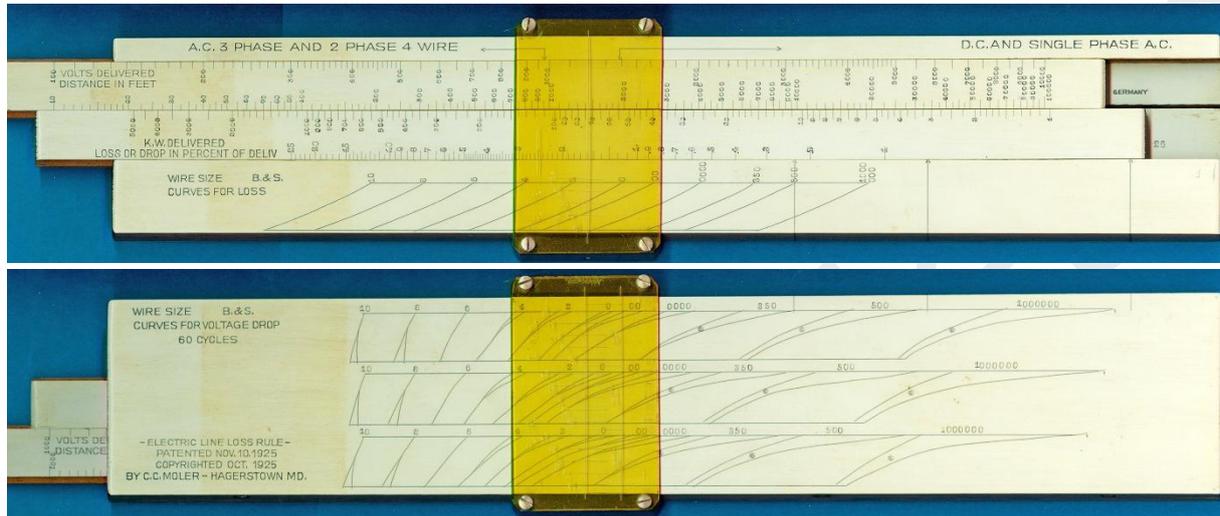


# C.C. Moler Line Loss and Voltage Drop Calculator

Owner: **David Rance**



A special purpose mahogany and ivorine veneered (28 x 5.1 x 1.1 cm) poly-slide duplex slide rule.

## Purpose of rule:

Invented by Distribution Engineer Charles C. Moler the calculator makes it simple and quick to work out the line loss and voltage drop on electrical distribution lines. Besides preventing voltage flicker it could save money by stopping companies overcompensating and using a higher grade of cable than really needed. Designed for American:

- 1, 2 and 3 phase D.C. and A.C. 60 power cycle
- Volts from 100 to 100,000 (by reversing the top slide)
- Distances from 10 feet to 200 miles (by reversing the top slide)
- K.W. from 1 to 10,000
- Power Factor ratio
- Brown & Sharp wire sizes No. 10 to 1,000,000 circular mill (C.M.)
- 6, 24 and 6 inch spacing
- 0.1 to 25 (30 in later versions) per cent power loss or voltage drop

## Copyright & Patent details:

Moler secured a copyright for his rule a month before the American patent, **US732935A**, was granted on 10<sup>th</sup> November, 1925.

### Material and construction:

- **Stock and slides:** mahogany solid frame duplex construction with two horizontally adjacent duplex mahogany interlocked slides.
- **Cursor:** celluloid sprung translucent yellow and black ended with single hairline (based on a resistance of 10.8 ohms/mil), one peripheral hairline and many gauge marks inscribed on each side.
- **Finishing:** incised ivorine veneered<sup>1</sup> scales and nomograms.

### Layout and scales:

The scales (voltage delivered/distance in feet, K.W. delivered and % loss or drop) and a single nomogram on the front are for calculating power loss. Three nomograms on the back are for calculating voltage drop.

### Maker:

Given the quality and its American provenance *Keuffel & Esser* (K&E) would be the favourite. But stamped in the well of the rule is "GERMANY", the entwined **DP** logo underneath the **DUPA** logo and a "26" for 1926. This apparent contradiction is explainable. At the end of the 19<sup>th</sup> and start of the 20<sup>th</sup> century *Dennert & Pape* (D&P) was making slide rules for K&E. But D&P never shared any information or equipment with K&E. So for such an early specialist rule Moler and his employers, *The Potomac Edison Company* of Maryland, had to turn to D&P. Ironically the early date is also why the Moler rule does not appear in any list of D&P/DUPA/Aristo specialist slide rules – such lists only date from the 1940s.

### Distinguishing features:

The top edge has 4 screws for adjusting the tension on the slides - one of many quality features on this beautifully made and in its day, expensive rule. The retail price in 1926 was USD 17.50 or the equivalent of about USD 220 in 2012. The rule came with a large instruction sheet and two smaller promotional flyers. The accompanying black linen covered stiff cardboard box carries no maker's name, just "Germany" and two J. Davis & Sons-looking 8-spoke box marks blind stamped onto the front.

### Other remarks:

Intuitively it feels "wrong" to propose a slide rule from one of the manufacturing greats as a one-off. But I suspect very few DUPA C.C. Moler rules were ever made and I believe even fewer have survived.

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<sup>1</sup> On a later, cheaper version the incised veneers were replaced by Velox paper.