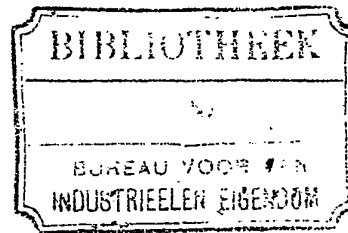


Openbaar gemaakt
den 24. AUG. 1922.



PATENT SPECIFICATION



Application Date: Aug. 20, 1921. No. 22,119/21.

183,723

Complete Accepted: Aug. 3, 1922.

COMPLETE SPECIFICATION.

Improvements in and relating to Calculating Apparatus.

I, OTIS CARTER FORMBY KING, a British subject, of 44, Bray's Lane, Coventry, Warwickshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to calculating apparatus of the kind comprising coaxially mounted members connected by a telescopic joint so as to be relatively movable axially and angularly, each carrying a spirally arranged logarithmic scale adapted mutually to be set and read by means of a slidable and angularly movable cursor having an index mark or the like for use in conjunction with each scale. It is the principal object of the present invention to provide a simple and portable device of this nature which can be closed up into a small form and is readily adapted to make calculations of a specific nature, such for example as the multiplication and division of money and calculations of percentages of money.

According to this invention, the cursor is in the form of a sleeve devoid of projecting parts and is mounted upon the outer member and is adapted to extend over the telescopic joint on to the inner member, means being provided to prevent disconnection of the said joint and over-running of the joint by the cursor.

In the accompanying drawings, Figure 1 is an outside elevation of the complete apparatus when extended, the dotted portion showing the overall length when closed.

Figure 2 is an elevation partly in section
[Price 1/-]

tion of the two principal portions when separated from one another, and

Figure 3 shows, partly in section, the cursor.

The scale carrying members are indicated respectively at A and B, each comprising a tube, the portion B being of slightly small diameter and adapted to telescope within the tube A. Spiral logarithmic scales indicated respectively at A² and B² are provided upon each member either by engraving or by printing them upon paper or the like which is subsequently cemented to the exterior of the tubes.

These scales may be graduated in any desired units according to the nature of the calculations which it is desired to make, and in all cases both scales represent absolute values, the scale A² being numerals extending for example from one to one thousand, and the scale B² representing money values extending from one farthing to one thousand pounds. An arrow or like index mark A³ is marked upon the tube A to define the commencement of the scale.

The members A and B are an easy sliding and rotational fit so that relatively they can be moved axially and angularly to a desired position, and disengagement of the joint is prevented by the employment of resilient tongues B³ conveniently formed by making U shaped incisions in the wall of the tube and bending the free part of the so constituted tongue outwards so that it can engage, when assembled, the inturned lip A⁴ at the mouth of the tube A. A band of velvet or the like B⁴

is fixed around the tube B so that the resilient pressure of the pile on the inner wall of the tube A forms a convenient friction device for holding the tubes, when set, relatively to one another.

The cursor comprises a tube C which slides over the scale-carrying part of the tube A, and at C² is provided with an intumed lip to be engaged by tongues A⁵ similar to those shown at B³ to prevent its over-running the scale A². A band of velvet A⁶ around the tube A, is also provided to hold the cursor frictionally when set, and a collar or the like A⁷ on the tube A limits its movement from the scale B². At the end of the cursor opposite to the lip C² the sleeve is closed in at C³ to lie adjacent the scale B² which is on a tube of smaller diameter than that carrying the scale A². Index marks C⁴ and C⁵ are, provided at the respective ends and conveniently are arranged in the same axial line.

The end A⁸ of the tube A is closed by a cap so formed that the calculator can, if desired, stand upright upon it, and the end of the tube B is closed by a cap B⁵, having a milled edge B⁶ and carrying a pendant B⁷ to which may be attached a ring or loop of metal B⁸ for hanging up the calculator or attaching it to a chain when not in use. An air vent hole is provided to permit the free movement of the tubes A and B, and this conveniently is formed at B⁹ to extend into the pendant B⁷ and to have its outlet at B¹⁰.

It will be understood that by the nature of the logarithmic scales the readings will be very open at the lower values, hence the graduations can be represented by small fractions or decimals in the case of the numbers, and by correspondingly small fractions of the money.

In using the apparatus, the procedure is as follows—

To divide money by money direct, the cursor is set with the arrow C⁴ opposite the arrow A³, the tube B is then drawn out and rotated as necessary to set the smaller sum to the arrow C⁵. The cursor is then moved until the arrow C⁵ is brought against the larger sum, and the answer is then read opposite the arrow C⁴ upon the scale A².

To multiply money by a given number, the arrows C⁴ and A³ as before are set together, the multiplicand upon the scale B² is brought opposite the arrow C⁵, and the cursor is then moved to set the arrow C⁴ to the desired multiplier; the product is then read opposite the arrow C⁵. It will be evident that the division of a

sum of money by a given number will constitute an inverse process.

For percentage, the arrow C⁴ is set against the number one hundred on the scale A², and the capital sum on the scale B² is brought opposite the arrow C⁵, when the instrument is ready to solve any percentage desired of that capital sum. Thus the arrow C⁴ is then brought to the rate *per cent.*, and the interest is read against the arrow C⁵, or conversely the arrow C⁵ is set to a sum representing the interest, and the percentage rate is then read against the arrow C⁴.

The foregoing examples will suffice to show the manner of using the rule, and it will be evident that the broad principles thus acquired will enable other problems to be solved without difficulty.

It will be seen that when not in use the apparatus can be closed up into the compact form illustrated by the dotted lines in Figure 1, in which position the cursor C covers and protects the scale-carrying portions from injury, thus allowing the apparatus to be carried in the user's pocket without risk or injury, and avoiding any necessity for a protecting case or covering.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. Calculating apparatus of the kind referred to, in which the cursor is in the form of a sleeve devoid of projections, which is mounted upon the outer member and extends bodily over the telescopic joint on to the inner member, substantially as described.

2. Calculating apparatus as claimed in Claim 1, in which the telescopic joint has its extension limited by the agency of tongues upon one member, such as the resiliently acting tongues B³, which engage an intumed lip or the like, around the edge of the other member, substantially as described.

3. Calculating apparatus as claimed in Claim 1, in which the cursor has its travel towards the inner member limited by forming at its end an intumed lip adapted to be engaged by tongues, such as A⁵, provided upon the outer member, substantially as described.

4. Calculating apparatus as claimed in Claim 1, in which a band of velvet or like resilient material is provided between the sliding surfaces of the inner and outer members, and between the

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latter and the cursor, substantially as and for the purpose described.

5 5. Calculating apparatus as claimed in Claim 1, in which the scale-carrying members are closed at their outer ends and an air vent is provided for their interior spaces, preferably extending through a pendant such as B⁷, to which is attached a ring or the like, substantially
10 as and for the purpose described.

6. The complete calculating apparatus substantially as described or illustrated in the accompanying drawings.

Dated this 19th day of August, 1921.

ERIC W. WALFORD, 15
Fellow of the Chartered Institute of
Patent Agents,
18, Hertford Street, Coventry,
Agents for the Applicant.

[This Drawing is a reproduction of the Original on a reduced scale]

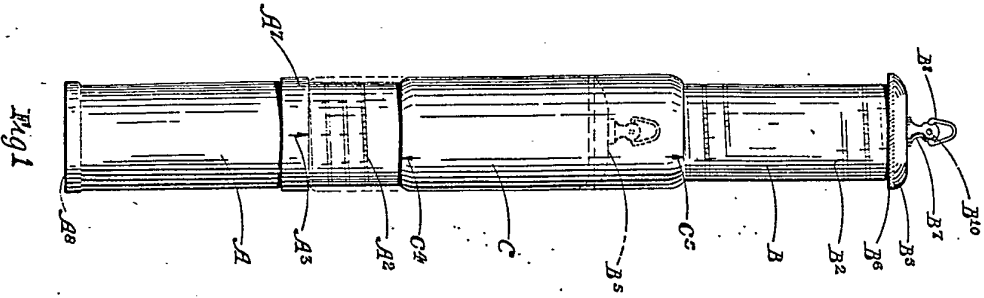


Fig. 1

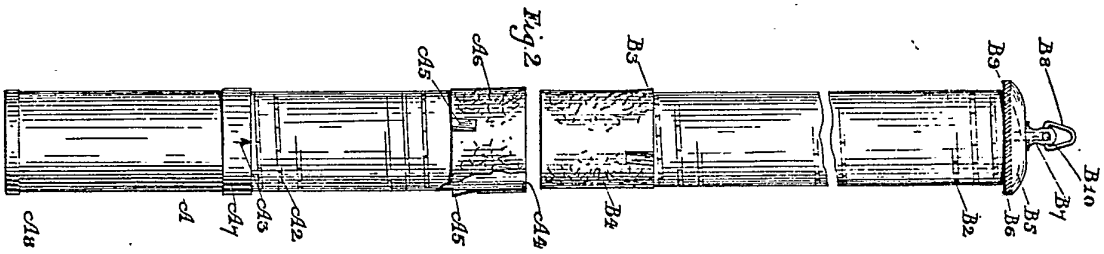


Fig. 2

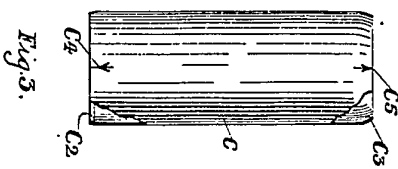


Fig. 3.

[This Drawing is a reproduction of the Original on a reduced scale.]

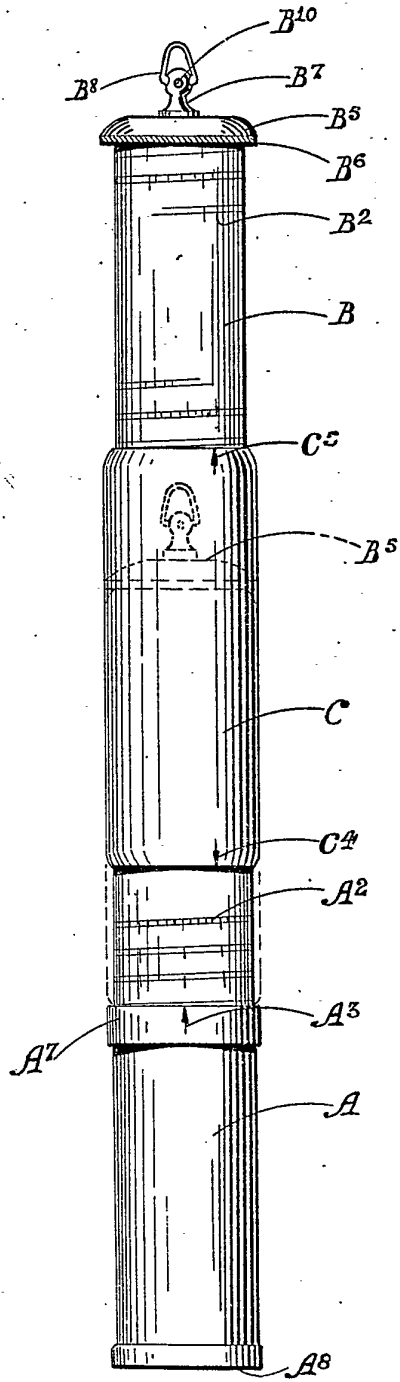


Fig 1

