122,900

PATENT SPECIFICATION

Application Date, Feb. 6, 1918. No. 2151/18.
Complete Left, July 11, 1918.
Complete Accepted, Feb. 6, 1919.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Slide Rule for Finding the Value of Goods sold by Weight or Measure.

I, CHARLES HENRY FARLEY COX, 11, Winton Road, Custom House, London, E. 16, Electrical Engineer, do hereby declare the nature of this invention to be as follows:—

That this invention consists of an improvement or alteration of the lines and figures of the ordinary slide rule or circle calculator, whereby the value of goods sold by weight or measure may be simply and quickly ascertained.

Unlike the ordinary calculating slide rule, it does not consist, only of 1 to 10 and divisions of tenths, but is worked out in pounds and ounces on the one scale, and shillings and pence on the other.

The apparatus (in mind) would be suitable for butchers, poulterers, fishmongers, provision merchants and suchlike trades, and could be fixed up in the shop in a convenient position, such as over the scales.

For example: A butcher having weighed a joint say, 4 lbs. 10 ozs. at 1 shilling and 8 pence per lb. He proceeds by moving the index (1) on the slide (weight) to the mark on the money scale indicating 1s. 8d., then over the mark indicating 4 lbs. 10 ozs. he will find the amount 7s. 8½d. and all along the scales, the money will agree with the weights at that price per lb.

In other words: At whatever price per lb. the index is set, so will the two scales agree throughout the length.

It does not finish at "10," but can be carried upward as far as correct readings of the lines will allow. The calculator I have in mind would be about 36 inches long, on which calculations could be made up to about 30 shillings or 30 lbs. and as low as 1 penny or 1 ounce respectively, and the figures and lines would be sufficiently large to be easily read.

The system can be applied to slide rules or calculators of any reasonable size.

The scales are logarithmic.

In comparison with the ordinary slide rule; "one pound," (weight) or "one shilling" will correspond with the left index, and "10 lbs." or "10 shillings" with the right index. Supposing the rule is continued upwards with another rule, then "11 lbs. or shillings" would correspond with (1.1), "20 lbs. or shillings" with (2), and so forth.

On the "weight" scale, the spaces between the figures indicating pounds

are divided into 32 parts, logarithmetically, representing ounces and half-ounces, so far up the scale as clear reading will allow, (say to about 6 lbs.) then into 16ths. representing ounces (to about 12 lbs.) then into 8ths. equal two-ounces (to about 24 lbs.), and the remainder into 4ths, equal four-ounces.

For the ounces below 1 lb. the scale will be in the same proportion as from 1 lb. to 16 lbs. *i.e.* log. 0 equals one-ounce, and log. 1,20412 equals 16 ounces (1 lb.). Starting off again with log. 0 as one-pound, log. .013364 = 1 lb. ½ oz., .026329 = 1 lb. 1 oz., .038918 = 1 lb. 1½ oz., and so forth.

On the "money scale," the shillings agree with the pounds on the weight scale, but the intermediate spaces are divided into 24ths. logarithmetically, representing pence and half-pence, then 12ths. (pence only), then 6ths. (two-pence), carried up in the same proportion as the ounces on the weight scale.

The pence below 1 shilling will equal the scale "1 shilling to 12 shillings" or log. 0 to 1,07918. Then proceeding as with the weight scale, *i.e.* starting off with log. 0 = 1 shilling.

For the purpose of experimenting, I am making my base or unit $^1/_{20}$th. of an inch. This multiplied by the log. equals a 5 inch ordinary slide rule. I then further multiply by 3.3, 3.5, 4, or whatever number appears to be most suitable.

The initial and terminal figures would vary on different calculators as most suitable to the class of trade. The less range, the more open the readings. For instance: 1 ounce (or penny) to 48 lbs. (or shillings) in logs. multiplied by $3.^3/_{20}$ths. of an inch, would equal a slide 47.61 inches, which, with the margin, would be 4 feet in length. 1 ounce (or penny) to 32 lbs. (or shillings) in logs. multiplied by $3.^5/_{20}$ths. of an inch would equal a slide about the same length with more open scale. 2 ounces (or pence) to 30 lbs. (or shillings) in logs. multiplied by $^4/_{20}$ths. of an inch, would equal about the same, but more open still. 4 ounces (or pence) to 30 lbs. (or shillings) in logs. multiplied by $^4/_{20}$ths. would equal 41.5 inches, with margin, = 3 feet 6 inches long.

In my opinion the last two would be most suitable for the average butcher's retail trade.

I now propose to set out the weight on the top fixed scale, and the money on the top edge of the slide. I then propose to set out on the bottom edge of the slide, and bottom fixed part, the lines of an ordinary slide-rule, *i.e.* in decimals, set out in the same distance logs. in relation to money and weight. The left index being under 1 lb. and 1 shilling, and the right index 10 lbs. and 10 shillings respectively. But carried above and below the indices throughout the length.

The method which I have adopted for setting out my experimental slides, is by means of a rod screwed with 20 threads to 1 inch, operated by a disc-nut turning on a fixed bracket, and geared into a train of wheels with meter dials. The rod passes through the nut, and has a pen attached to the end.

By this means I can set off each line to the 20,000th. part of an inch.

Dated the Twenty-fifth day of March, 1918.

CHARLES H. F. COX.

COMPLETE SPECIFICATION.

Improvements in or relating to Slide Rule for Finding the Value of Goods sold by Weight or Measure.

I, CHARLES HENRY FARLEY COX, of 11, Winton Road, Custom House, London, E. 16, Electrical Engineer, do hereby declare the nature of this inven-

tion, 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 slide rules for finding the value of goods sold by weight or measure. Slide rules and other calculating devices have already been proposed for facilitating the calculation and indication on a scale of the value of various articles and goods sold by weight.

The object of the present invention is to provide a simplified arrangement of the graduations in slide rules and the like of the kind indicated. The distinguishing feature of the invention consists in the fact that all the minor divisions of the fixed scale coincide with all the minor divisions on the sliding scale when the major division 3 on one part coincides with the major division 4 on the other part.

The slide rule made in accordance with this invention would be suitable for butchers, poulterers, fishmongers, provision mechants, chemists and druggists, oil and colormen, and such like trade, including wholesale and retail and could be fixed up in the shop in a convenient position, such as over the scales, or attached thereto, or on a counter according to circumstances.

For example: A butcher having weighed a joint say, 4 lbs. 10 ozs. at one shilling and eight pence per lb. He proceeds by moving the index (1) on the slide (weight) to the mark on the money scale indicating 1/8d. then over the mark indicating 4 lbs. 10 ozs. he will find the amount 7/8½d. This may be reversed, *i.e.* moving the price per lb. 1/8d. on the slide (money) to the index (1) on the weight scale, and all along the scales, the money will agree with the weights at that price per lb.

In other words, at whatever price per lb. the index is set, so will the two scales agree throughout the length.

It does not finish at "10," but can be carried upward as far as correct readings of the lines will allow. The calculator I have in mind would be about 36 inches long, on which calculations could be made up to about 30 shillings or 30 lbs. and as low as 1 penny or 1 ounce respectively, and the figures and lines would be sufficiently large to be easily read.

The systems can be applied to slide rules or calculators of any reasonable size.

The scales are logarithmic.

In comparison with the ordinary slide rules; "one pound," (weight) or "one shilling" will correspond with the left index, and "10 lbs." or "10 shillings" with the right index. Supposing the rule is continued upwards with another rule, then "11 lbs. or shillings" would correspond with (1.1), "20 lbs. or shillings" with (2), and so forth.

On the "weight" scale, the spaces between the figures indicating pounds are divided into 32 parts, logarithmetically, representing ounces and half-ounces, so far up the scale as clear reading will allow, (say to about 6 lbs.) then into 16ths. representing ounces (to about 12 lbs.) then into 8ths. equal two-ounces (to about 24 lbs.), and the remainder into 4ths. equal four-ounces.

For the ounces below 1 lb. the scale will be in the same proportion as from 1 lb. to 16 lbs. *i.e.* log. 0 equals one-ounce, and log. 1,2041 2 equals 16 ounces (1 lb.). Starting off again with log. 0 as one-pound, log. .013364 = 1 lb. ½ oz.. .026329 = 1 lb. 1 oz., .038918 = 1 lb. 1½oz., and so forth.

On the "money scale," the shillings agree with the pounds on the weight scale, but the intermediate spaces are divided into 24ths. logarithmetically, representing pence and half-pence, then 12ths. (pence only), then 6ths. (two-pence), carried up in the same proportion as the ounces on the weight scale.

The pence below 1 shilling will equal the scale "1 shilling to 12 shillings" or log. 0 to 1,07918. Then proceeding as with the weight scale, *i.e.* starting off with log. 0 = 1 shilling.

For the purpose of experimenting, I am making my base or unit $^1/_{20}$th. of an inch. This multiplied by the log. equals a 5 inch ordinary slide rule. I

then further multiply by 3, 3, 3, 5, 4, or whatever number appears to be most suitable.

The initial and terminal figures would vary on different calculators as most suitable to the class of trade. The less range, the more open the readings. For instance: 1 ounce (or penny) to 48 lbs. (or shillings) in logs. multiplied by $3.^{3}/_{20}$ths. of an inch, would equal a slide 47.61 inches, which, with the margin, would be 4 feet in length. 1 ounce (or penny) to 32 lbs. (or shillings) in logs. multiplied by $3.^{5}/_{20}$ths. of an inch would equal a slide about the same length with more open scale. 2 ounces (or pence) to 30 lbs. (or shillings) in logs. multiplied by $^{4}/_{20}$ths. of an inch, would equal about the same, but more open still, 4 ounces (or pence) to 30 lbs. (or shillings) in logs. multiplied by $^{4}/_{20}$ths. would equal 41.5 inches, with margin, = 3 feet 6 inches long.

In my opinion the last two would be most suitable for the average butcher's retail trade, but is by no means restricted thereto.

I now propose to set out the weight on the top fixed scale, and the money on the top edge of the slide. I then propose to set out on the bottom edge of the slide, and bottom fixed part, the lines of an ordinary slide-rule, *i.e.* in decimals, set out in the same distance logs. in relation to money and weight. The left index being under 1 lb. and 1 shilling, and the right index 10 lbs. and 10 shillings respectively. But carried above and below the indices throughout the length.

Referring to the drawings filed herewith.

Fig. 1 shown in three parts, is a plan of one form of slide rule made in accordance with this invention, showing the two scales in their normal or closed position, in which the major divisions on the two scales coincide.

Fig. 2, shown in three parts, is a view showing one scale moved in relation to another, in which 3 on one scale of the major division coincides with 4 on the other scale, in which position all the minor divisions coincide.

On this rule, the main figures (or values), divisions and sub-divisions are set out logarithmic throughout.

a is the bottom or fixed part, and *b* the slide part. The major divisions on the bottom part *a* are divided into 16 parts to represent lbs. and ozs. and major divisions of the slide part are divided into 12 parts to represent shillings and pence.

Referring to the scale *a*, starting from the index (1) the main figures (or values) are extended to the right; 2, 3, 4, and so forth up to any number that may be most suitable, such as 30, 36, 48, *etc.*, according to the length of the rule.

The spaces between the lines of the main figure are then divided into 16ths. so far to the right as clear reading will allow; then into 8ths., then 4ths., and so forth.

The 16th. divisions are again subdivided into halves and quarters as far to the right as clear reading will allow, then into halves only as far as clear reading will allow.

On the left of the index (1), the division (16th.) and subdivisions (halves and quarters) are carried back to the left end of the rule. The rule may start at the left end from $^{1}/_{16}$th, $^{2}/_{16}$ths, or $^{4}/_{16}$ths, as may be found most suitable according to the length of the rule.

Referring to the scale *b*, with the slide in the normal position, the main figures (or values) 1, 2, 3, *etc.*, coincide with the main figures on the "A" scale, but the spaces between the main figures are divided into 12ths, as far to the right as clear reading will allow, then into 6ths, then into 3rds, or 4ths, and so forth. The 12ths. divisions are also carried back on the left of the main figure (1) to the left end of the rule, similar to the 16ths, on the "A" scale.

The 12ths. divisions are then subdivided into halves and fourths from the left end of the rule, as far to the right as clear reading will allow, then halves only, as far as clear reading will allow.

It is understood that the particular construction above described is given by way of example only, and that the constructions can be varied to suit different classes of trades without departing from the spirit of the invention.

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:—

A logarithmic slide rule of the kind showing weight and/or measure units on one part and money units on the other part, characterized in that all the minor divisions of the scale on the fixed part coincide with all the minor divisions on the sliding part, when the major division 3 on one part coincides with the major division 4 on the other part.

Dated this 27th day of June, 1918.

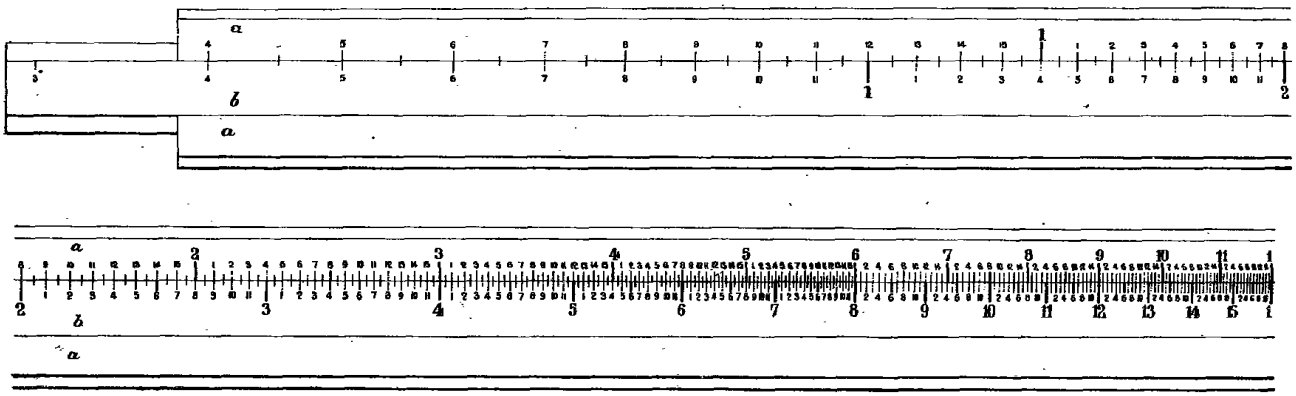
MEWBURN, ELLIS & PRYOR,
70 & 72, Chancery Lane, London, W.C. 2,
Chartered Patent Agents.

Reference has been directed, in pursuance of Section 7, Sub-section 4, of the Patents & Designs Act, 1907, to Specifications No. 16,198 of 1911 & No. 12,966 of 1915.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1919.

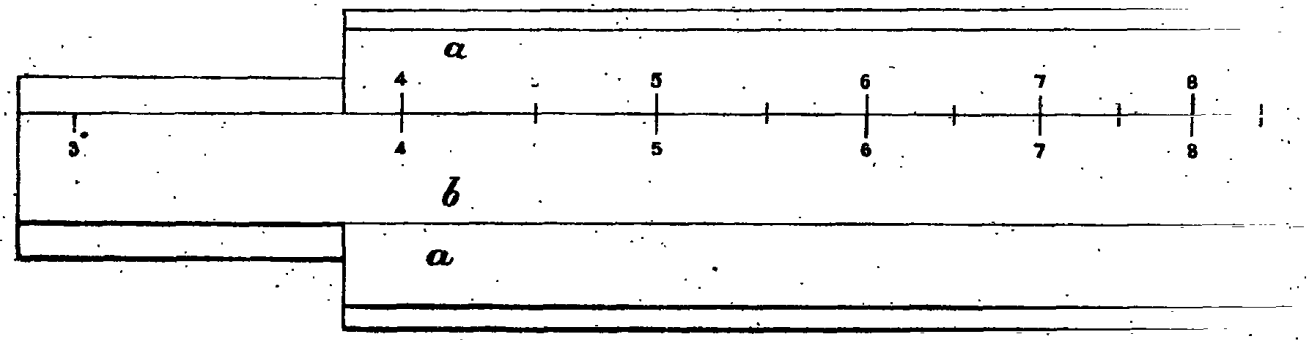
[This Drawing is a reproduction of the Original on a reduced scale.]

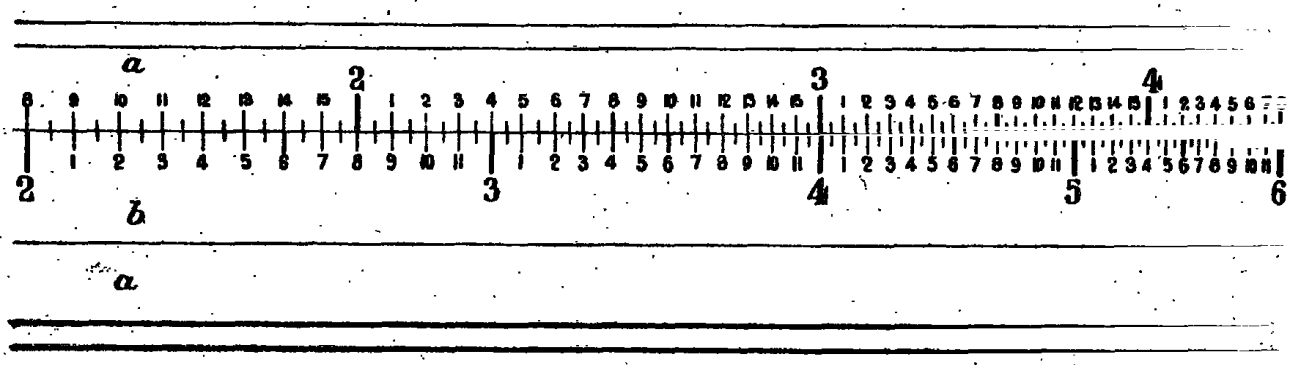
FIG 2.

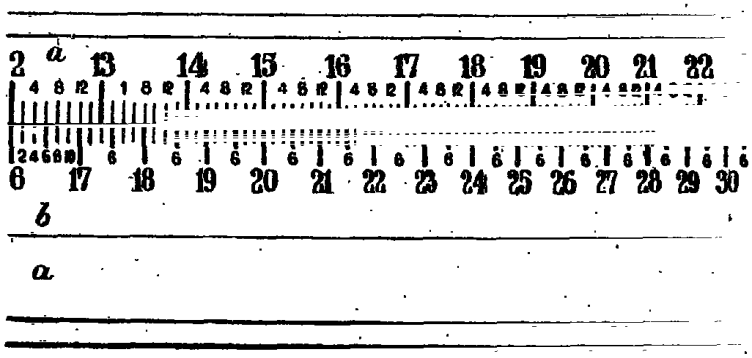


Malby & Sons, Photo-Litho

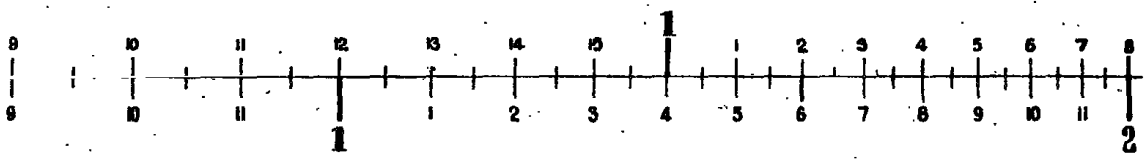
[This Drawing is a reproduction of the Original on a reduced scale.]

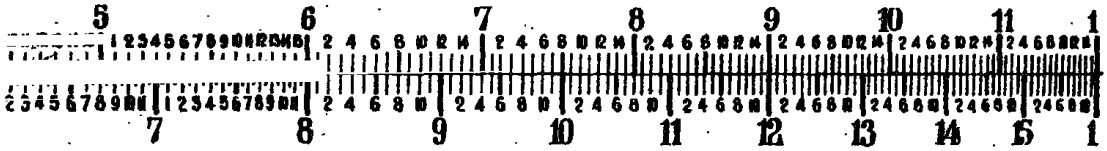


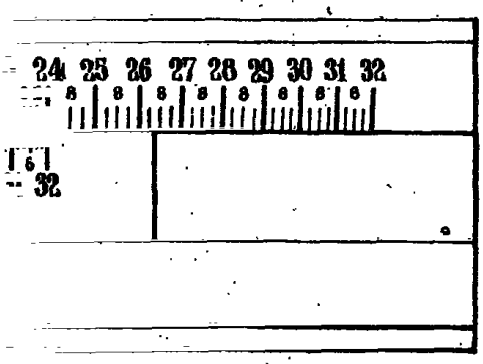




No 2.

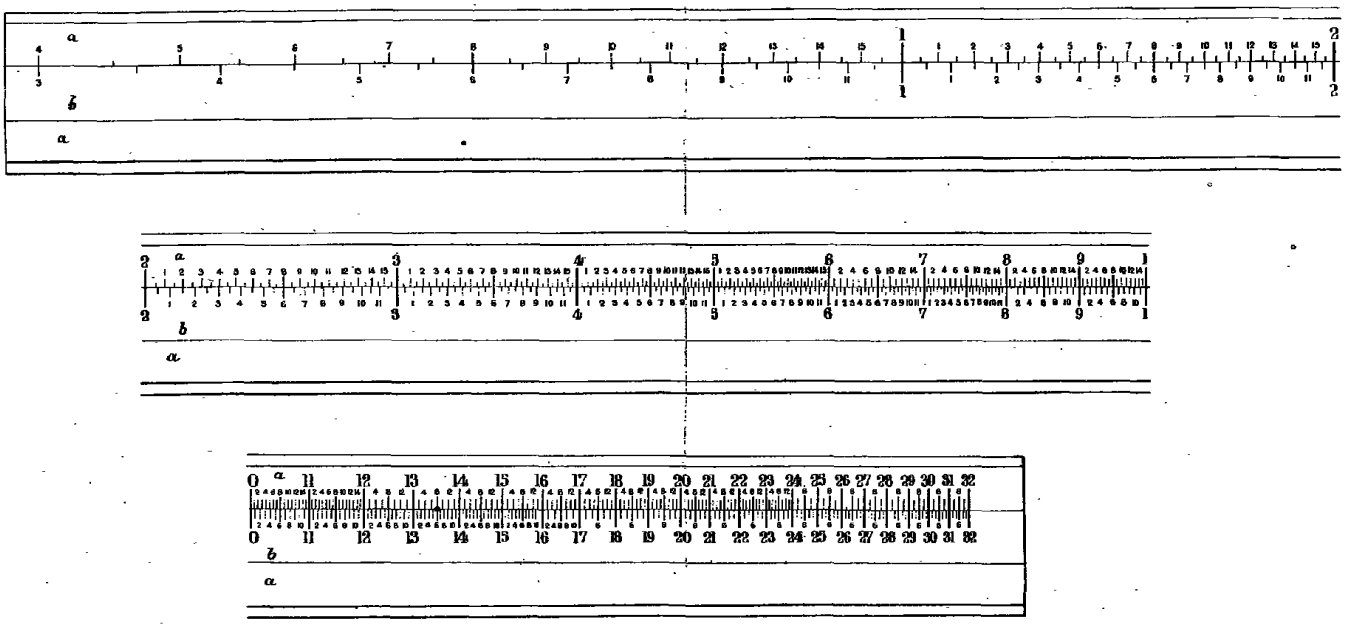




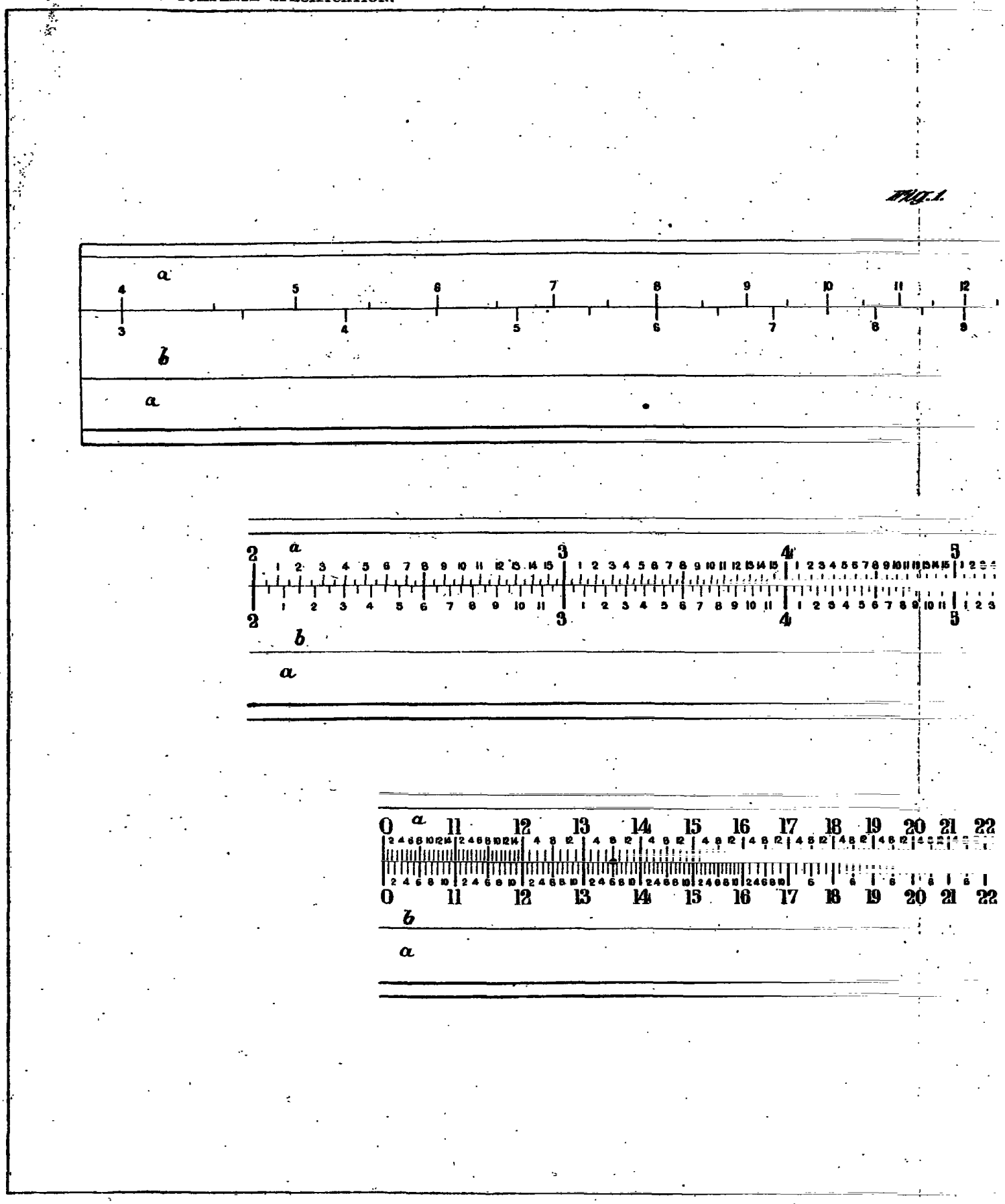


Malby & Sons, Photo-Litho

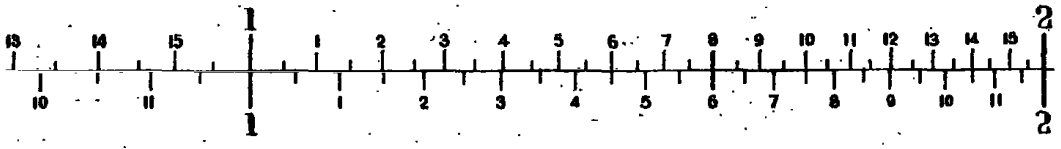
FIG. 1.

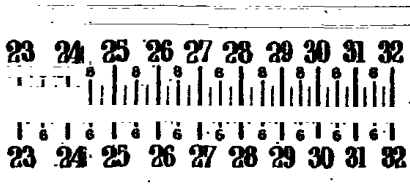


Malby & Sons, Photo-Litho



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





Malby&Sons, Photo-Litho