PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements in or connected with Calculating Apparatus.

I, FREDERICK GRISTWOOD, of 64, Gonville Avenue, Croxley Green, in the County of Hertford, British subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to calculating apparatus.

The invention has for its object to provide a simple and inexpensive device for use by manufacturers, merchants, buyers, commercial travellers and others connected with the selling and buying of sheets of paper and to enable them to quickly and easily work out calculations in connection, for instance, with the weights, prices, and so on of different sizes, numbers and quantities of the materials, and to ascertain the equivalent weights and so on of various standard sizes of the materials.

According to the invention, the device comprises two or more discs or other relatively movable members provided with graduated scales, with or without the addition of one or more pointers or the like to assist the carrying out of the calculations required.

In a suitable manner of carrying out the invention, a disc of cardboard, opaque celluloid, wood, mica, ivory, bone, metal or other suitable material has two smaller discs of similar or other convenient material disposed one on each side of same and movably mounted relatively thereto, such as by means of a pivot connecting the centres of the three discs together. A graduated scale is formed on each side of the largest and central disc at the periphery thereof, and the scale on one side is formed in terms of different sizes and weights of paper, such as "small post", "large post", "demy", "medium", "double foolscap", "royal", "double crown", "imperial" and "double demy", the graduations covering a range, say, from 1 or 10 to 80 or more, whilst the scale on the reverse side of the disc is graduated, for instance, from 1 or 10 to 100 or more, and indicates various weights of paper, and percentages, for instance, 5%, 10%, 15%, 20%, 25%, and 30%; the scale on the front side of the disc also enables calculations to be carried out to convert pounds into kilogrammes. The front and rear smaller discs each has its periphery graduated, the graduations on the front disc being in terms of sizes, weights and numbers of sheets of paper and extending, for instance, from 1 or 10 to 80 or more. The small front disc is formed with a window marked along one edge with words such as "per lb.", "cwt." and "ton", and said window is arranged to rotate over a scale provided on the central disc and giving prices corresponding to these different weights. The scale on the rear smaller disc is in two portions, indicating monetary values, an outer portion being in terms of shillings and parts of shillings, say from 2/- to 20/-, and an inner portion representing pence, for instance, from $2^1/_2$d. up to 1/-. Two separate celluloid or other pointers are disposed between the central disc and the front small disc, are mounted on the central pivot and have their ends extending beyond the front small disc, direction lines being formed on the said ends of the pointers to coincide with the graduations on the two discs.

With a device described as above, many calculations can be made rapidly and easily. For instance, to find the weight of "double foolscap" paper (17″ by 27″) equivalent to 18 lbs. of "large post" ($16^1/_2$″ by 21″) a red arrow on the front small disc is arranged under $16^1/_2$ on the large disc, and one pointer is turned to 21 on said front small disc; next, said red arrow is arranged under

[*Price* 1/-]

Price 4s 6d.

17 on the large disc and the second pointer is disposed opposite to 27 on the small disc. By revolving the small disc so that 18 thereon is in line with the first pointer the second pointer indicates on the small disc the required weight of double foolscap paper, namely, in this instance, 24 lbs.

Taking as a basic factor that 500 sheets of double foolscap paper weigh 24 lbs. and to ascertain the weights of 480 sheets and 516 sheets of the same paper, the red arrow on the small disc is arranged against 24 on the large disc, when the weight of 480 sheets will be given on the small disc as approximately 23 lbs. and the weight of 516 sheets as 25 lbs.

To ascertain the price per hundredweight or ton of a certain paper, knowing the price per lb. of same, the front small disc is turned until the window therein is disposed over the portion of the corresponding scale on the large disc bearing the particular price per lb., when the prices per hundredweight and ton will appear through the window and opposite the terms "cwt.", "ton" on the small disc.

If it is desired to reduce lbs. to kilogrammes, the red arrow on the small circle is disposed opposite a red dot arranged on the portion of the scale of the large disc worded "lbs. to kilos"; then the equivalent kilogrammes of any particular number of lbs., which are read off on the large disc, are indicated on the small disc, for instance, 70 lbs. on the large disc coincide with $31^3/_8$ kilos on the small disc.

Assuming that it is desired to ascertain the cost of one ream of 40 lbs. of paper at 3d. per lb. the 3d. on the small rear disc is placed under the 10 on the large disc, when the price of a ream of 40 lbs. on the large disc will be indicated on the small disc as 10/-. If it is required to know the price less, say, 5%, the 3d. on the small disc is disposed under the 5% on the large disc and the reduced price is read off as before on the small disc, that is, 40 lbs. priced at 9/6.

All or any particular number of the scales are divided logarithmically.

Dated this 5th day of March, 1924.

J. S. WITHERS & SPOONER,
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Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in or connected with Calculating Apparatus.

I, FREDERICK GRISTWOOD, British subject, of 64, Gonville Avenue, Croxley Green, in the County of Hertford, 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 improvements in or connected with calculating apparatus for use in the paper trade.

Heretofore it has been proposed to provide calculating devices of the slide-rule type and comprising two or more logarithmically graduated and relatively movable pivotally connected members. Some devices have one or more rotatable pointers associated therewith and in one construction one disc is formed with three windows through which appear scales marked on another disc disposed underneath.

According to the present invention the calculating apparatus is provided for use with the paper trade and comprises two or more logarithmically graduated discs or plates relatively movable by a pivot connecting the centres of the discs or plates to one another, terms of different sizes of paper provided on one of the discs or plates, such as "large post", "demy", "double foolscap", "royal", and so on and representing the superficial areas of the sheets, for example, "royal" = 25×20, area = 500, position on scale 50, and so on, and two separate pointers pivoted on the centre of the discs or plates and having their ends extending beyond the front disc or plate, the said ends having direction lines formed on them to coincide with the graduations on the discs or plates.

The invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a front view,

Figure 2 is a rear view, and

Figure 3 is a vertical section of the device.

Thus, in a suitable manner of carrying out the invention, a disc *a* of cardboard, opaque celluloid, wood, mica, ivory, bone, metal or other suitable material has two smaller discs *b* and *c*, of similar or other convenient material, disposed one on each side of same and

movably mounted relatively thereto, and this by means of a pivot *d* connecting the centres of the three discs together. Ordinary logarithmic scales *e* and *f* are formed on each side of the largest and central disc at the periphery thereof, and the terms of different sizes of paper on the scale *e*, such as "large post", "demy", "double foolscap", "royal", "double crown", "imperial" and "double demy", represent the superficial area of the sheet, for example, "royal" = 25 × 20, area = 500, position on scale 50, and so on, the graduations covering a range, say, from 1 or 10 to 140 or more. The scale *f* on the reverse side of the disc is graduated, for instance, from 1 or 10 to 120 or more, and indicates various weights of paper, and percentages, for instance, 5%, 10%, 15%, 20%, 25%, and 30%; the scale on the front side of the disc also enables calculations to be carried out to convert pounds into kilogrammes at e^1. The front and rear smaller discs *b* and *c* each has its periphery graduated at *g* and *k* like an ordinary logarithmic scale, the graduations *g* on the front disc being in terms of sizes, weights and numbers of sheets of paper and extending, for instance, from 1 or 10 to 140 or more. The rear small disc is formed with a window *h* marked along one edge with words *i* such as "cwt.", "lb." and "per ton", and said window is arranged to rotate over a scale *j* provided on the central disc and giving prices corresponding to these different weights. The scale *k* on the rear smaller disc *c* is in two portions, indicating monetary values, an outer portion c^1 being in terms of shillings and parts of shillings, say from 2/- to 24/-, and an inner portion c^2 representing pence, for instance, from $2^1/_2$d. up to 1/-. Two separate celluloid or other pointers *l* and *m* are disposed between the central disc *a* and the front small disc *b*, are mounted on the central pivot *d* and have their ends extending beyond the front small disc, direction lines being formed on the said ends of the pointers to coincide with the graduations on the two discs.

With a device described as above, many calculations can be made rapidly and easily. For instance, to find the weight of "double foolscap" paper (17″ by 27″) equivalent to 18 lbs. of "large post" ($16^1/_2$″ by 21″), a red arrow *n*, which coincides with 10 on the front small disc *b*, is arranged under $16^1/_2$ on the large disc *a*, and one pointer *l* is turned to 21 on said front small disc; next, said red arrow or 10 on the small disc is arranged under 17 on the large disc and the second pointer *m* is disposed opposite to 27 on the small disc. By revolving the small disc *b* so that 18 thereon is in line with the first pointer *l* the second pointer *m* indicates on the small disc the required weight of double foolscap paper, namely, in this instance, 24 lbs.

Taking as a basic factor that 500 sheets of double foolscap paper weigh 24 lbs. and to ascertain the weights of 480 sheets or 516 sheets of the same paper, the red arrow *n* on the small disc *b*, 500 sheets, is arranged against 24 on the large disc *a*, when the weight of 480 sheets, arrow n^1, on the small disc, will be shown on the large disc as approximately 23 lbs. and the weight of 516 sheets, arrow n^2, as 25 lbs.

To ascertain the price per hundredweight or ton of a certain paper, knowing the price per lb. of same, the rear small disc *c* is turned until the window *h* therein is disposed over the portion of the corresponding scale *j* on the large disc bearing the particular price per lb.; when the prices per hundredweight and ton will appear through the window and opposite the terms "cwt.", "per ton" on the small disc. Further, if it is desired to know the price per ton "net" less 5% off, this can be read on the extreme right of the scale *j*.

If it is desired to reduce lbs. to kilogrammes, the red arrow *n* on the small disc *b* is disposed opposite a red dot *o* arranged on the portion of the scale *e* of the large disc *a* worded "lbs. to kilos" at e^1; then the equivalent kilogrammes of any particular number of lbs., which are read off on the large disc, are indicated on the small disc; for instance, 70 lbs. on the large disc coincide with $31^3/_4$ kilos on the small disc.

Assuming that it is desired to ascertain the cost of one ream of 40 lbs. of paper at 3d. per lb.; the 3d. on the small rear disc *c* is placed under the 10 on the large disc *a*, when the price of a ream of 40 lbs. on the large disc will be indicated on the small disc as 10/-. If it is required to know the price less, say, 5%, the 3d. on the small disc *c* is disposed under the 5% on the large disc *a* and the reduced price is read off as before on the small disc, that is, 40 lbs. priced at 9/6.

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 device for use with the paper trade and comprising two or more logarithmically graduated discs or plates

relatively movable by a pivot connecting the centres of the discs or plates to one another, terms of different sizes of paper provided on one of the discs or plates, such as "large post", "demy", "double foolscap", "royal", and so on and representing the superficial areas of the sheets, for example, "royal" = 25 × 20, area = 500, position on scale 50, and so on, and two separate pointers pivoted on the centre of the discs or plates and having their ends extending beyond the front disc or plate, the said ends having direction lines formed on them to coincide with the graduations on the discs or plates.

2. In a calculating device as claimed above, the provision of arrows on one of the discs or plates adapted to be used with a scale on the other disc or plate mounted underneath for ascertaining the weights of various numbers of sheets of paper, substantially in the manner described.

3. A calculating device as claimed in Claim 1, in which one of the discs or plates is formed with a window marked with words such as cwt., lb., per ton, and net 5%, and said window is movable over a scale provided on the other disc or plate mounted underneath and giving the prices of paper relating to these different weights.

4. A calculating device as claimed in Claim 1, in which a coloured arrow on one of the discs is arranged to be moved opposite a coloured dot provided on another disc or plate so that lbs. can be reduced to kilogrammes.

5. A calculating device as claimed in Claim 1, in which one of the discs or plates is divided in two portions indicating monetary values, one portion being in terms of shillings and parts of shillings, and another part representing pence, whilst another disc or plate is formed with an ordinary logarithmic scale and is adapted to be used with the first mentioned disc or plate, substantially as described.

6. The improved calculating apparatus for use with the paper trade and constructed substantially as described with reference to the accompanying drawings.

Dated this 5th day of January, 1925.

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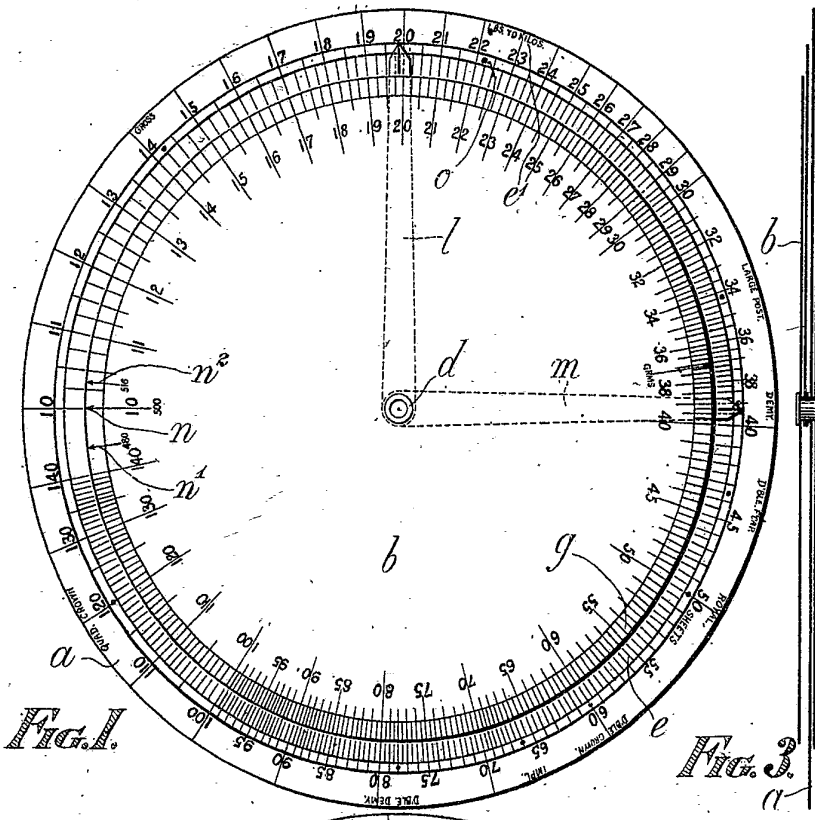
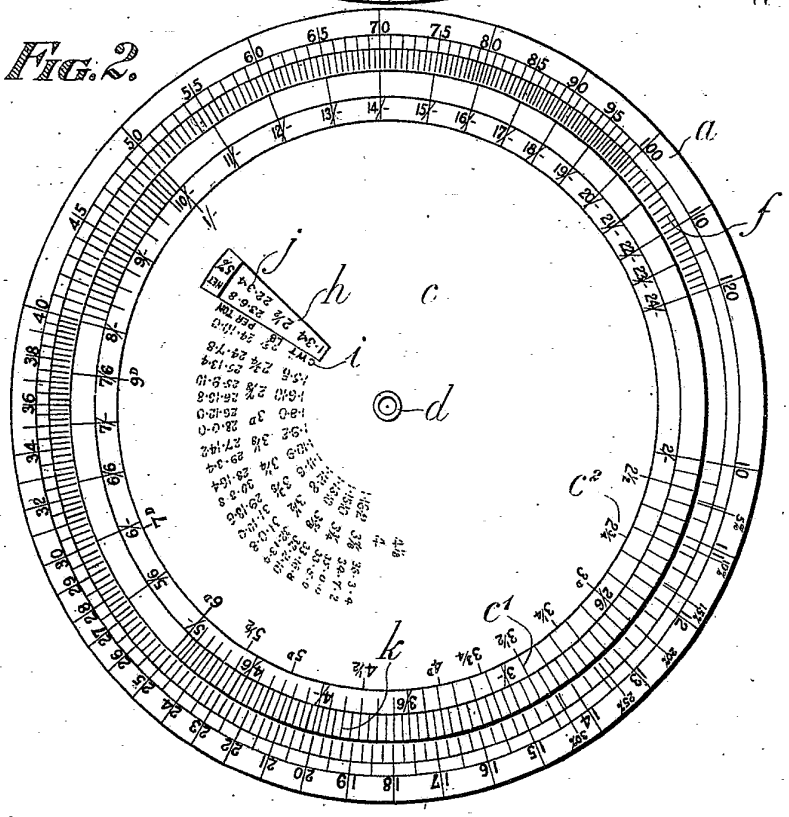


Fig. 1.

Fig. 3.

Fig. 2.



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