F. C. FARMAR.

SLIDE RULE.

APPLICATION FILED MAY 26, 1913.

1,123,507.

Patented Jan. 5, 1915.

2 SHEETS—SHEET 1.

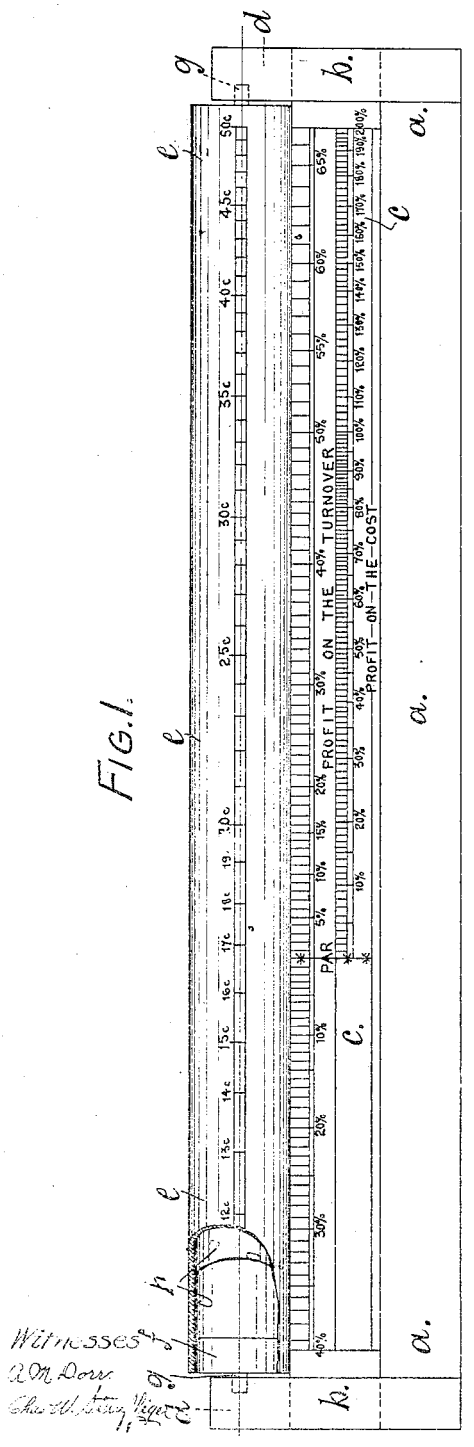

FIG. 1.

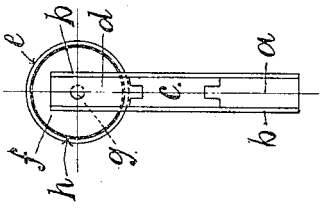

FIG. 2.

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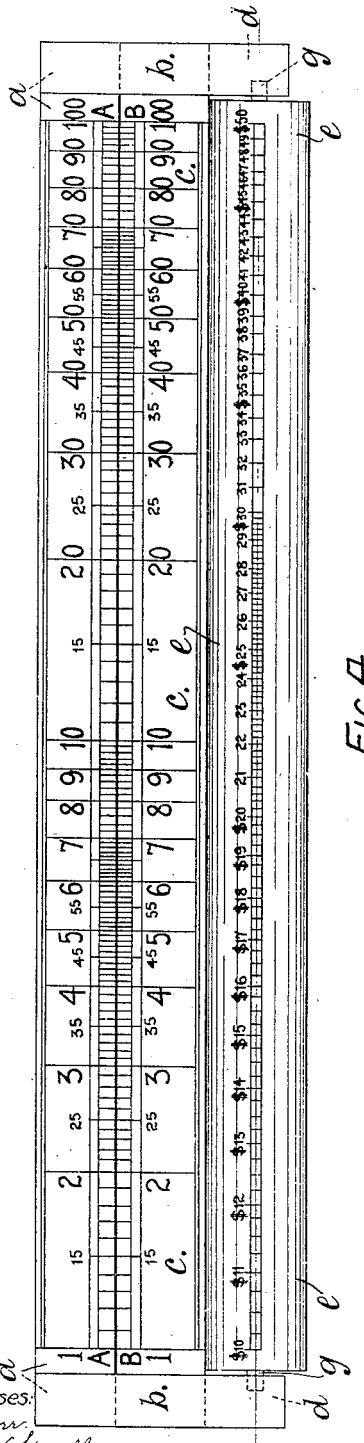

FIG. 3.

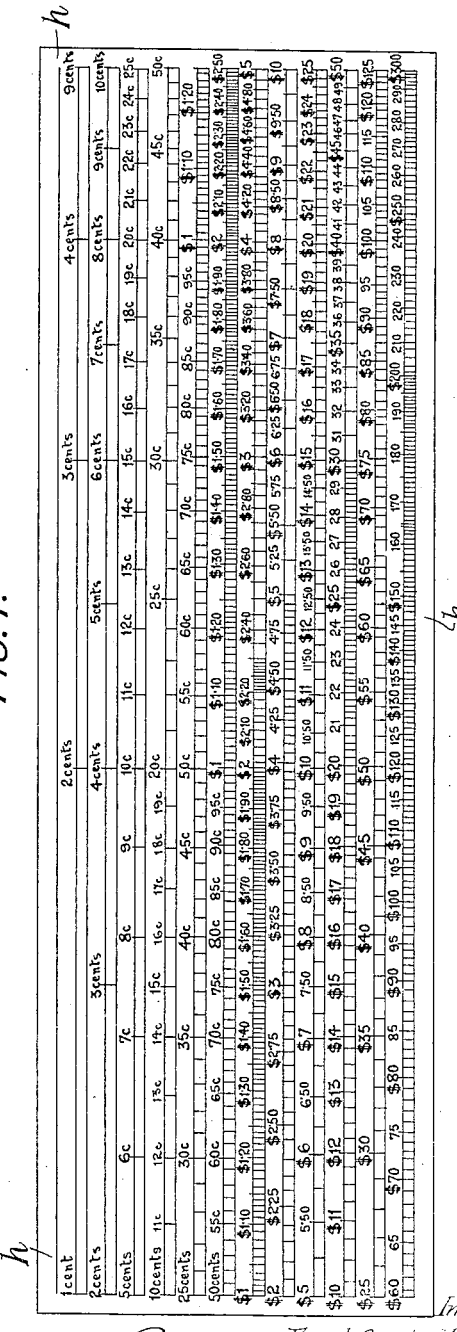

FIG. 4.

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UNITED STATES PATENT OFFICE.

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SLIDE-RULE.

1,123,507. Specification of Letters Patent. Patented Jan. 5, 1915.

Application filed May 26, 1913. Serial No. 769,793.

To all whom it may concern:

Be it known that I, FRANK CHARLES FARMAR, a subject of the King of England, residing at 2 Neville road, Waterloo, near Liverpool, in the county of Lancaster, England, have invented certain new and useful Improvements in or Relating to Slide-Rules, of which the following is a specification.

This invention relates to flat slide rules, and has for its object to provide a rule for commercial calculations, which, for a given size, shall have large calculating capacity, and which may be easily read.

A slide rule, according to my invention, essentially comprises a flat slide and a revoluble roller (or rollers) tube, cylinder, or the like, fitted or mounted in the rule, and arranged to operate with said flat slide, on one of which, preferably the roller, are arranged a plurality of logarithmic graduations of money expressions, and on the other of which are arranged logarithmic graduations of discount, profit on turnover, or profit on cost, or any two or all of such graduations. Particular features or characteristics are hereinafter described and pointed out in the claiming clauses concluding this specification.

In the accompanying sheet of explanatory drawings there is illustrated a rule according to this invention.

Figure 1 is a front view, Fig. 2 an end elevation, and Fig. 3 a rear view, of the rule. Fig. 4 shows the complete expressions which appear around the circumference of the roller or cylinder.

a represents a frame rod, or bar, the respective ends whereof are firmly secured to and between the respective pairs of sheet metal end clamps *b*. *c* indicates a slide which is positioned between said rod *a* and two wooden or like filling pieces or blocks *d* disposed and secured between clamps *b* on the principle of the tongue and groove—see Fig. 2.

e designates a tube or cylinder constructed of transparent celluloid, within each end whereof is fitted a closing piece or plug *f* of wood, cork, metal, or other suitable material, provided with a pin *g* which is adapted to revolubly fit in a socket provided for it within the adjacent filling piece or block *d*; alternatively, a metal rod may be passed through said tube or cylinder *e* and through apertures provided in the closing or filling pieces or blocks *d*, so that the protruding ends, by projecting into sockets provided in the rule frame, form pivots for roller *e*: or pivot pins may project from the ends of the rule frame into sockets in said filling pieces *f*. The end or edge of slide *c* which is adjacent to said roller *e* is grooved or recessed somewhat (Fig. 2) for the purpose of accommodating the latter. The logarithmic graduations of money expressions are printed preferably from a copper plate on a sheet *h* of paper, and this after being suitably bent or mounted around a thin cardboard tube is fitted within said transparent celluloid cylinder *e*, so that the expressions or graduations may be viewed from the outside thereof: the ends of said sheet *h* are firmly held by a friction fit between the inner wall of cylinder *e* and the closing or end pieces or plugs *f* (see Fig. 1); thus said cylinder and sheet will revolve as one, the sheet being thoroughly protected by the celluloid casing. Alternatively, said sheet may be mounted around a hollow or solid roller of wood, or other suitable material, and varnished or otherwise treated to render it washable; or the graduations and figures may be engraved or inscribed on a roller of wood or other suitable material. In order, however, to provide an accurate rule at a low cost of production, I prefer to employ said tube or cylinder of transparent celluloid and a printed paper fitted within same. On the roller, which is rotated by the finger and thumb of the user, are arranged logarithmic graduations of money expressions extending from and to any desired amount and in any system of coinage. As illustrated in Fig. 4 the expressions range from 1 cent to 300 dollars arranged in parallel lines in the following order:—1 cent to 5 cents; 2 cents to 10 cents; 5 cents to 25 cents; 10 cents to 50 cents; 25 cents to 1 dollar 25 cents; 50 cents to 2 dollars 50 cents; 1 dollar to 5 dollars; 2 dollars to 10 dollars; 5 dollars to 25 dollars; 10 dollars to 50 dollars; 25 dollars to 125 dollars; 60

dollars to 300 dollars. On slide *c* which co-operates with said cylinder *e* are arranged divisions indicating discount, profit on turnover, and profit on cost, respectively: these divisions cover a range extending preferably—as illustrated—from 40% discount to 66⅔% profit on turnover and 200% profit on cost; they may be printed or inscribed on paper, celuloid, or other suitable material which is secured to the slide, or may be engraved or inscribed on the material thereof.

As a modification, the scales may be reversed, the money expressions appearing on the slide and the profit and discount graduations on the roller.

On the reverse side of the rule are two scales marked A and B respectively on frame *a* and slide *c*: these scales facilitate calculations beyond the limits of roller *e*: these may also be used for general calculating purposes when desired.

If found necessary or desirable, I may employ a pawl and ratchet arrangement in connection with the roller *e* for the purpose of positively maintaining it in any one position until wilfully moved therefrom. Further, an end of said roller *e* may protrude beyond the rule frame *a* and a wheel-handle or finger and thumb piece be fitted thereon. Or, if the rule be constructed of wood, the ends may be reduced and fitted in a revoluble manner within metal end clamps.

I may employ two or more revoluble rollers on a single rule, with the object of increasing the calculating capacity thereof.

Examples of the uses of a rule scaled as illustrated in the drawing annexed hereto.

Profit.—Set "Par" on slide to 4 dollars on roller (turning the roller, if necessary, until the line containing 4 dollars is in close proximity with the upper edge of slide *c*). This single setting answers each of the three following questions, viz:—

1. An article costs 4 dollars and is sold for 5 dollars. What is the percentage profit on the cost and turnover, respectively? Answer 25% on the cost, 20% on the turnover.

2. An article costs 4 dollars. What must be the selling price to gain 20% on the turnover? Answer 5 dollars.

3. An article sells at 5 dollars. What must be the buying price to gain 20% on the turnover? Answer 4 dollars.

N. B.—In the first two examples "Par" on slide has been set to the cost price on roller; then the selling price and percentage profit simultaneously appear. In the third case the percentage profit has been set to the selling price and the roller looked at over "Par" for the buying price.

Discount.—Set "Par" on slide to 5 dollars on roller. The rule as now set answers simultaneously each of the following questions, viz:—

1. An article is bought (or sold) at 5 dollars, less 5% discount. What is the net buying (or selling) price? Answer 4 dollars 75 cents.

2. An article is sold nominally at 5 dollars, but actually at 4 dollars 75 cents. What rate of discount is that? Answer 5%.

3. What is 5% off 5 dollars? Answer 25 cents (viz. the difference between 4 dollars 75 cents and 5 dollars).

N. B.—In all of the three foregoing examples "Par" has been set to the buying or selling price; and the net price and rate of discount simultaneously appear.

Profit and discount combined.—Set "5% discount" on slide to 6 dollars on roller. The rule as now set answers simultaneously each of the three following questions viz:—

(1). An article costs 6 dollars. At what price must this be sold in order that 5% discount may be allowed off the selling price and 20% profit made on the turnover? Answer 7 dollars 90 cents.

(2). An article costs 6 dollars and is sold for 7 dollars 90 cents less 5% discount. What is the net percentage profit on the turnover? Answer 20%.

(3). An article sells at 7 dollars 90 cents less 5% discount. What must it be bought for in order to realize 20% net profit on the turnover? Answer 6 dollars.

N. B.—In the first two cases the rate of discount has been set to the cost price; then the gross selling price and net percentage profit simultaneously appear. In the third example the required net percentage profit has been set to the gross selling price, and the roller looked over at the rate of discount for the buying price.

A cursor may be used—if necesary—with the rule to facilitate reading.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

In a slide rule, an oblong frame constituting a handle, said frame having the upper edges thereof provided with a tongue extending from one end of said frame to the other, a set of parallel clamps carried by the sides of said frames at each end thereof and extending at right angles to the tongue edge of said frame, blocks mounted between the clamps of each set and having tongues at the lower edges thereof confronting the tongue of said frame, said blocks having sockets in the confronting faces thereof, a cylinder between said blocks in parallelism with said frame and having pins at the ends thereof extending into the sockets of said blocks for revolubly supporting said cylinder, and a slide movable lengthwise between said frame and said cylinder

and having the upper and lower edges thereof provided with grooves extending throughout the length of said slide, one of which normally receives the tongue of said frame, and the other groove adapted to receive the tongue of one of said blocks when shifted in either direction.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK CHARLES FARMAR.

Witnesses:
JOHN H. WALKER,
H. WILLIAMS.