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PROVISIONAL SPECIFICATION.

“ A Slide-rule for all Calculating purposes in connection with Wines and Spirits.”

I, FRANCIS CHARLES FARMAR, of 38, Thorndale Road, Waterloo, Liverpool, in the County of Lancashire, Student, do hereby declare the nature of this invention to be as follows:—

My invention relates to a slide-rule for all calculating purposes in connection with wines and spirits. This invention is essentially characterised by the application of certain new constructive principles, introducing and combining seven separate powers, namely:—

- (1) The power of calculating in a direct manner the quantity of water required to reduce spirits, allowing for contraction in bulk.
- (2) The power of calculating the exact proportion of spirit required to make-up any definite reduced quantity.
- (3) The power of rapidly calculating proof-quantities.
- (4) The power of calculating the contents of casks of spirits from the strength and net-weight alone.
- (5) The power of calculating the ullages of lying or standing casks of wines and spirits from one uniform setting of the slide, whether the dip measurement be over or under an inch.
- (6) The power of showing comparative valuations in popular terms of money.
- (7) The power of regulating the sale price, by exhibiting the percentage profit, or the discount, at any desired stage.

The principles here enunciated are laid down in the accompanying drawings; Fig. 1 representing one face of the rule, and Fig. 2 the other.

- Fig. 1.—A logarithmic line, A, is specially constructed to commence at 2 instead of 1; the space between 1 and 2 being occupied by a subsidiary line, A A, representing strengths overproof, preferably from 0 to 70 o.p. Another logarithmic line, B, is similarly constructed to commence at 2, the space to the left being occupied by a subsidiary line, B B, representing strengths underproof and overproof, preferably from 40 u.p. to 70 o.p. A displaced logarithmic line, C, is specially constructed to commence at 0.5, and continue in proper sequence up to 60, when it preferably terminates. D and E are the ordinary segment lines for lying and standing casks, with which C is intended to operate. A scale of divisions, F, is specially constructed to indicate the number of pounds per gallon that spirits weigh at the different hydro-meter strengths, adjusted preferably at the standard temperature of 62° Fahrenheit: the strengths preferably extending from 75 o.p. to 40 u.p., and the weights from 8 lbs to 9.6 lbs per gallon.

- Fig. 2.—A logarithmic line, G, is so specially constructed, that two portions (*r*) and (*s*) are raised vertically, and in the spaces thus made two subsidiary lines (*n*) and (*o*) are inserted, to serve as setting-points for the automatic calculation of the quantity of water required to reduce spirits, allowing for contraction in bulk: the (*n*) series being intended for all spirits under 30 o.p., and the (*o*) series for rums exceeding 30 o.p. A third setting-point (*p*) is inserted before the commencement of the main line G, to provide for strong spirits only. As an alternative, the two portions referred to, (*r*) and (*s*), may resume their normal positions on the line G, the subsidiary lines (*n*) and (*o*) being placed above instead of below them: the principle remaining the same. A logarithmic line, H, is lengthened by the addition of a section (*m*), extending preferably from 5 to 10, prefixed at the point Q. A double parallel line, I, is specially constructed to indicate money expressions from 1/- to 40/-; the upper line ranging from 1/- to 8/-, and the lower line from 5/- to 40/- A line, J, is specially constructed to represent spirit strengths, preferably from 35 u.p. to 70 o.p. A line of percentages, K, is specially constructed to make profit and discount calculations, the range preferably extending from 15% discount to 80% profit: the dividing line between profit and discount being marked par.

[Price 8d.]



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L (preferably on the edge of the rule) is a scale of equivalents, converting tenths of a gallon to pints.

The rule in question, which may be made in wood, ivory, or other suitable material, consists preferably of two pieces of boxwood, kept at an even distance apart by brasses at each end, to allow of another piece, a trifle longer, sliding freely between them on the tongue and groove principle.

The length of the rule depends upon the length of the radius chosen, and will vary according to the degree of clearness and perfection required.

Dated this Twentieth day of April, Nineteen hundred and one.

FRANCIS C. FARMAR, 10
(Applicant)

COMPLETE SPECIFICATION.

A Slide-rule for all Calculating purposes in connection with Wines and Spirits.

I, FRANCIS CHARLES FARMAR, late of 38 Thorndale Road, Waterloo, Liverpool, in 15 the County of Lancaster, Student, and at present of 15 Hyde Road, Waterloo aforesaid, 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:—

My invention relates to slide-rules for all calculating purposes in connection with 20 wines and spirits.

The invention consists essentially of the application and use of certain new constructive characteristics, introducing and combining several separate powers. For instance, it provides,—

(1). The power of calculating in a direct manner the quantity of water required to 25 reduce spirits, allowing for contraction in bulk: (2) the power of calculating the exact proportion of spirit required to make-up any definite reduced quantity: (3) the power of rapidly calculating proof-quantities: (4) the power of calculating the contents of casks of spirits from the strength and nett-weight alone: (5) the power of calculating the ullages of lying or standing casks of wines and spirits from one uniform 30 setting of the slide, whether the dip measurement be over or under an inch: (6) the power of shewing comparative valuations in popular terms of money: and (7) the power of regulating the sale price, by exhibiting the percentage profit, or the discount, at any desired stage.

The invention having characteristics as above specified is illustrated in Figures 1 and 2, 35 which shew respectively the opposite sides of the rule, illustrating the construction and arrangement of the scales, and the several parts; and it (the invention) will be further described with reference to these drawings.

The rule shewn, which may be made of wood, ivory, or other suitable material, consists of two parallel pieces or bars x x^1 jointed together and kept apart by metal 40 bars x^2 at either end, and a movable piece or slide y slightly longer than the bars x x^1 , and sliding freely between these pieces, a suitable continuous joint between the parts x x^1 and y , such as of the tongue and groove type, being provided to guide the part y when being moved, in the desired manner.

Referring now to the drawings, and in the first instance to Figure 1, the line or 45 scale A on the bar x , represents a logarithmic scale; and on the sliding part y there is another logarithmic line or scale B, used in connection with the scale A. These scales A and B both commence at numeral 2, as shewn, and on the commencement of this scale, on the end of the rule, there is provided on the parts x and y , subsidiary lines or scales A A and B B, representing strengths over-proof—preferably from 50 naught to 70 over proof—and strengths under proof and over proof—preferably from about 40 under proof to 70 over proof—respectively. The logarithmic scales A and B

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operate in connection with each other, and jointly calculate any ordinary question in simple proportion, multiplication, or division; while the subsidiary scales or lines A A and B B are used in co-operation with the main lines or scales A and B for the purposes as hereinafter described.

- 5 The numbers represented on the calculating scale lines A B (or G H hereafter described), may be read either literally, or as if they were supplemented by noughts (0), or by decimal points (.), according to the necessity of each case as it arises.

Referring now to the scales and lines on the lower half of the face of the parts x^1 and y , in Figure 1, the lines D and E are the ordinary segment scales for use in connection with lying and standing casks, and in connection with which the scale C on the moving part y operates; and the scale C is specially constructed to commence at 0.5, and by this part extending from 0.5 to 1, (which represent distances under an inch measurement of vacuity or space in casks), in conjunction with D and E, the segment of a cask can be read directly in one setting of the rule.

- 10 Of the scales or lines, D is the scale or line of segments for lying casks: and E is a scale or line for segments of standing casks; while the main scale or line C represents the bung and wet-inches of lying casks, or the length and wet-inches of standing casks.

The scale F marked on the part x^1 , consisting of comparative lines of hydrometer strength, and lbs. per gallon, is constructed to indicate the number of pounds per gallon, that spirits weigh at the different hydrometer strengths, adjusted preferably, at the standard temperature of 62° Fahr.; the strengths preferably extending from 75 over proof, to 40 under proof, and the weight from 8 lbs. to 9.6 lbs. per gallon.

Referring now to the face of the opposite side of the rule given in Figure 2, G and H are special logarithmic scale lines, which operate jointly, and calculate the exact quantity of water required to reduce spirits; and wherein contraction of bulk is allowed for, automatically. The logarithmic scale line G is constructed with two vertically raised portions r and s , and within the spaces provided by so raising these parts, there are provided two subsidiary scales or lines n and o . These subsidiary scales n and o serve as setting points for the automatic calculation in a direct manner of the quantity of water required to reduce spirits, allowing for contraction in bulk; the n scale or series being intended for all spirits under 30 overproof, and the o scale or series for rums exceeding 30 over proof. Instead of the two separate scales n and o , a single scale on an adjustable slide may be used for both purposes, to meet the difference of position in relation to the scale H.

In front of the commencement of the main line or scale G there is a third setting point p , for use in connection with strong spirits only, to be broken down to proof.

With regard to the scale portions r s , and n o , according to a modification, their relative arrangement may be the converse of that shewn; namely, the two portions r and s may be disposed in the scale line G, whilst the subsidiary lines or portions n and o are placed above them in the positions of r and s of the drawing; the effect remains the same. The logarithmic scale H on the slide y has at its commencement a special or additional section scale m extending preferably from 5 to 10 prefixed at the point q ; and this part is used in connection with the point p .

45 In the lower half of the face of the rule in Figure 2, there is employed on the sliding part y , a double parallel scale I, especially constructed to indicate money expressions from 1^s/₂/- to 40^s/₂/-; whilst on the part x , a scale line J is constructed to represent spirit strengths, preferably from 35 underproof to 70 over proof (this being disposed at one end or portion of the bar x), and along the other portion of the bar, there is a scale line of percentages K, constructed to make profit and discount calculations, the range preferably extending from 15 *per cent* discount at one extreme, to 80 *per cent* profit at the other extreme; the dividing line between profit and discount being marked "par".

55 The scale given in Figure 3 of the drawing, which is preferably on the edge of the rule, is a scale of equivalents, converting tenths of a gallon to pints.

With regard to the powers of the rule, and the uses to which it may be put in connection with wines and spirits, for traders and others' purposes, they are manifold

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it being constructed and adapted to meet all the practical requirements of this trade. As instances of powers and uses, it may be employed, in valuing, to make all manner of comparative valuations: in selling, for shewing how sale prices can be instantly regulated, and modified, to suit any margin of profit or discount, thus enabling a contract or bargain to be made in a customer's presence with facility, and in a business-
 5 like way: in apportioning, to apportion the quantity of spirit required to make up a definite reduced quantity: in reducing, to ascertain in a direct manner the precise quantity of water required to reduce any quantity of a given spirit, allowing for contraction in bulk: in stock-taking, to compute the ullages in lying or standing casks: in proofing, to calculate proof—quantities for stock or duty purposes: in contenting,
 10 to determine the content of a cask of spirits from the weight and strength alone, without recourse to the hydrometer indication.

For valuing, scales I and J are used, the price on I being set to any strength on J; then, over any other strength will appear its corresponding valuation.

For selling, in the case of profit, the cost price on I is set to "par" on K; then
 15 over the desired gain *per cent.* will appear the selling price. In the case of discount, the nominal selling price on I is set to "par" on K; then over the stipulated rate of discount will appear the net selling price. In the case of profit and discount combined, the cost price on I is set to the rate of discount on K; then, over the required
 20 gain *per cent.* will appear the nominal selling price.

For apportioning, the required strength on the scale B B is set to the present strength on A A; then under the total required bulk on the scale line A, will appear the quantity of spirit required. The balance is water, *etcetera.*

For reducing, in the case of ordinary conditions, the sum of the two strengths (*i.e.* the present and the required strength) on H, are set to the required strength
 25 on G, using the 1st., or 2nd., or 3rd., position, namely, the point *p* scale *n*; or the scale *o*, accordingly as to whether the spirit is strong and requires to be broken down to proof, or whether it is under 30 overproof and requires to be broken down to underproof, or whether the spirit is rum exceeding 30 overproof, and requires to be broken
 30 down to underproof, respectively. Then, under the quantity of spirit will appear the exact amount of water required to reduce it. In the case of from underproof to a further degree under-proof, the difference of the two strengths (*i.e.* the present and the required strength) on H is set to the required strength on G, using the second
 35 or middle position. Then, under the quantity of spirit will appear the exact amount of water required to reduce it. In this connection, it should be stated, that a contraction in bulk takes place when spirits and water are mixed together. To meet this
 "contraction", an increased quantity of water is required, the calculation of which must be based on the specific gravity system. This the rule does automatically.

For stock-taking, in the case of lying casks, the bung on C is set to 100 on D. Then, under the wet-inches will appear the segment. This segment is set to 10 on
 40 line A; then under the content will appear the ullage quantity in the cask. In the case of standing casks, the length on C is set to 100 on E; then under the wet-inches will appear the segment. This segment is set to 10 on line A; then under the content will appear the ullage quantity in the cask.

For proofing, in the case of the direct method, the strength on B B is set to proof
 45 on A A; then under the ullage on A, will appear the proof quantity on B. In the case of the indirect method, the strength on B is set to 10 on A, then under the ullage will appear the quantity to add or deduct, according as the spirit is over-proof or under-proof.

For contenting, from the line F the number of lbs. per gallon corresponding to
 50 the hydrometer strength is ascertained. This result is set to 10 on line A; then over the total net lbs. will be found the quantity in the cask.

In addition to the purposes and effects of the several scales and parts above referred to, the following are accomplished:—

By means of the scales A and B, and A A and B B, rapid calculations of proof
 55 quantities can be made; and by them can be ascertained how much proof spirit is in a trader's stock, and tells him how to apportion the quantity of spirit; while at the same time, it gets out the quantity of spirit, first, which is advantageous.

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By the scales C, and D and E, as constructed, with the first portion up to the numeral 1 of scale C starting from 0.5, and representing measurements of under an inch of vacuity or space in casks, the segment can be read directly in one setting.

With regard to the scale F, by this can be determined the quantity of spirit in a cask from a net weight, and hydrometer strength, alone, without recourse to "hydrometer indication".

The scales I and J, arranged and marked as described, provide and introduce a means by which any non-technical person can use the rule to show the money value of the spirit or wine, directly. And, in the same way, a person can use the scales I and K of the rule for calculating the sale price of a spirit without technical knowledge of the rule. Also, by these scales, the money commercial calculations can be made in one place and line.

The logarithmic scales A, B, in addition to the purposes more particularly mentioned above, can be used for "pricing", "cheapening", "proofing" by indirect method, "raising" and "lowering", "blending", "averaging", "dutying", etcetera.

The relative radius, and starting point, of each logarithmic scale shewn, are as follows:—

	Fig. 1			Fig. 2		
20	Scale Line	Radius	Starting-point	Scale Line	Radius	Starting-point.
	A A	10-inch	Proof	G	10-inch	1
	A	10-inch	2	H	10-inch	5
	B B	10-inch	40 u.p.	I	26-inch	1/- and 5/- respectively.
			.			
25	B	10-inch	2	J	26-inch	35 u.p.
	C	11-inch	0.5	K	26-inch	15% discount
	D	11-inch	1			
	E	11-inch	1			

The gauge-points are placed relatively as follows:—

	Fig. 2 (Line G)		
30	1st. Position	2nd. Position	3rd Position.
	"Strong spirits only"	"All-spirits under 30 u.p."	"Rums exceeding 30 o.p."
35	"Proof" at 0.32 inch to the left of the starting point "1"	"30" at 8.32 inches from starting point. "20" at 8.86 inches from the starting point "10" at 9.34 inches from the starting point "0" at 9.77 inches from the starting point	"30" at 18.28 inches from the starting point. "20" at 18.82 inches from the starting point "10" at 19.30 inches from the starting point. "0" at 19.73 inches from the starting point.

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The starting-point and relative value of the arithmetic scale to be used in conjunction with empirical line F, denoting the weights of spirits in pounds-per-gallon, are as follows:—

Starting-point "75 o.p." Relative value of divisions— $\frac{1}{2}$ inch apart.

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

1. In a slide-rule, for calculating purposes in connection with wines and spirits, the herein described improvement, consisting of the employment in connection with stationary and movable logarithmic scales, of proof quantity scales; for the purposes set forth. 10

2. In a slide-rule, for calculating purposes in connection with wines and spirits, the herein described improvement, consisting of the employment in connection with a logarithmic scale, of a scale representing distances under an inch measurement of vacuity or space; for the purposes set forth. 15

3. In a slide-rule, for calculating purposes in connection with wines and spirits, the herein described improvement, consisting of a rule having a scale comprising comparative lines representing "hydrometer strength" and "lbs. per gallon"; substantially as and for the purposes set forth.

4. In a slide-rule for calculating purposes in connection with wines and spirits, the herein described improvement, consisting of the employment in a logarithmic scale, of a subsidiary or supplemental scale or scales, representing required reduced strengths; for the purposes set forth. 20

5. In a slide-rule for calculating purposes in connection with wines and spirits, the herein described improvement, consisting of the employment in connection with a logarithmic scale for calculating required reduced strengths, of a setting point for use in connection with "strong" spirits; for the purposes set forth. 25

6. In a slide-rule for calculation purposes in connection with wines and spirits, the herein described improvement, consisting of the employment in conjunction with a proof scale, and a discount and profit scale, or both, of a money expression scale, whereby the money value of a spirit is directly indicated and ascertained; substantially as set forth. 30

7. In a slide-rule having characteristics as specified and referred to in the next preceding claim, the arrangement of the money expression scale I in two rows; substantially as set forth with reference to and shewn in the drawings. 35

8. A slide-rule for calculating purposes in connection with wines and spirits, having the stationary and movable scales A, A A, and B, B B, substantially as set forth and shewn in the drawings, for the purposes specified.

9. A slide-rule for calculating purposes in connection with wines and spirits, having the stationary and movable scales D, E, and C, arranged substantially as set forth and shewn in the drawings, for the purposes specified. 40

10. A slide-rule for calculating purposes in connection with wines and spirits, having the stationary and movable scales G and H; substantially as set forth and shewn in the drawings, for the purposes specified.

11. A slide-rule for calculating purposes in connection with wines and spirits, having the movable and stationary scales I and J, K; substantially as set forth and shewn in the drawings. 45

12. The slide-rule for calculating purposes in connection with wines and spirits, having the scales or lines and parts arranged, constructed, and adapted to operate substantially as shewn in and set forth with reference to the drawings. 50

Dated this 22nd., day of January, 1902.

CHEESBROUGH & ROYSTON,
Applicant's Patent Agents, 15 Water Street, Liverpool.

Fig. 1.

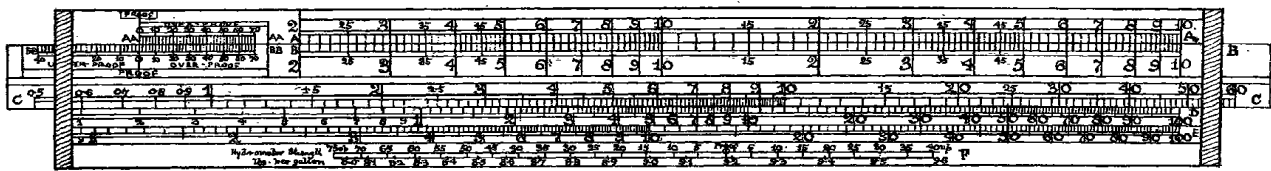
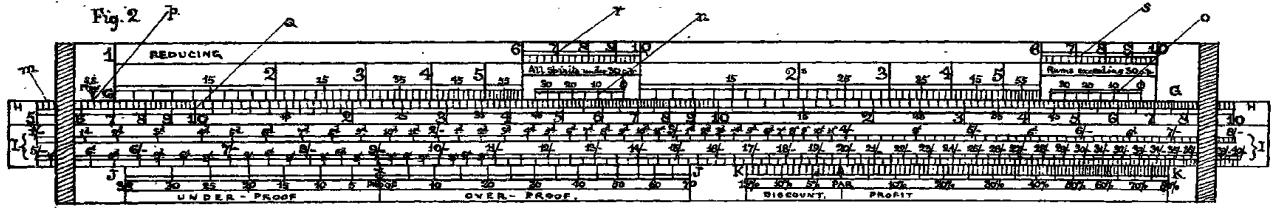


Fig. 2.



1	2	3	4	5	6	7	8	9	10	L
1/2	1 1/4	2 1/4	3 1/4	4 1/4	5 1/4	6 1/4	7 1/4	8 1/4	9 1/4	

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FARMER'S PROVISIONAL SPECIFICATION.

Fig. 1.

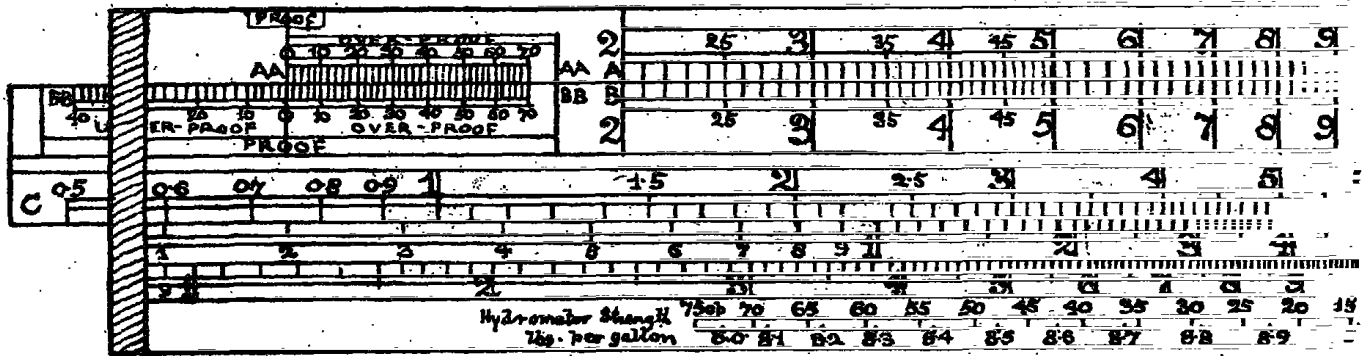
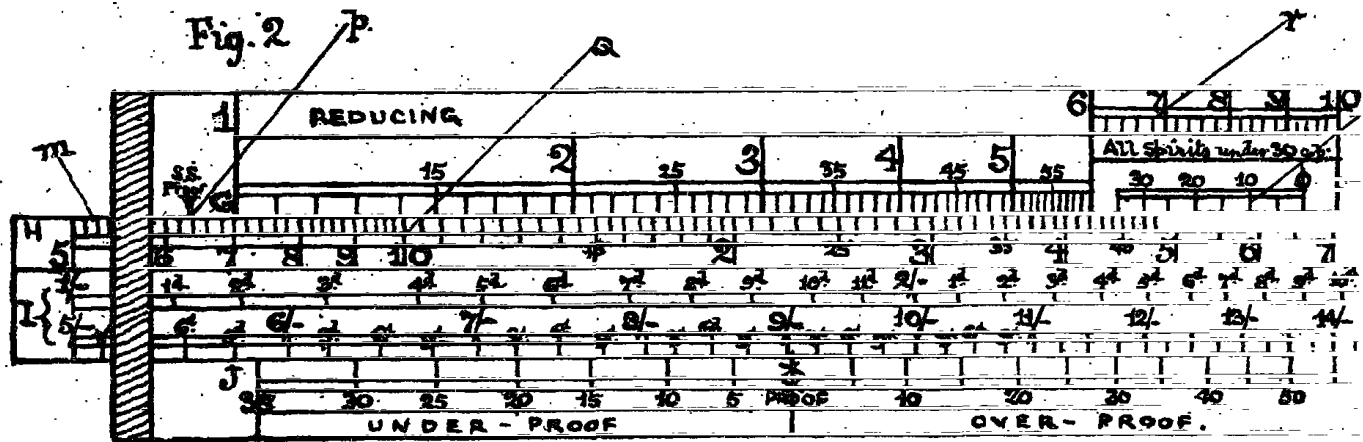
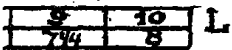
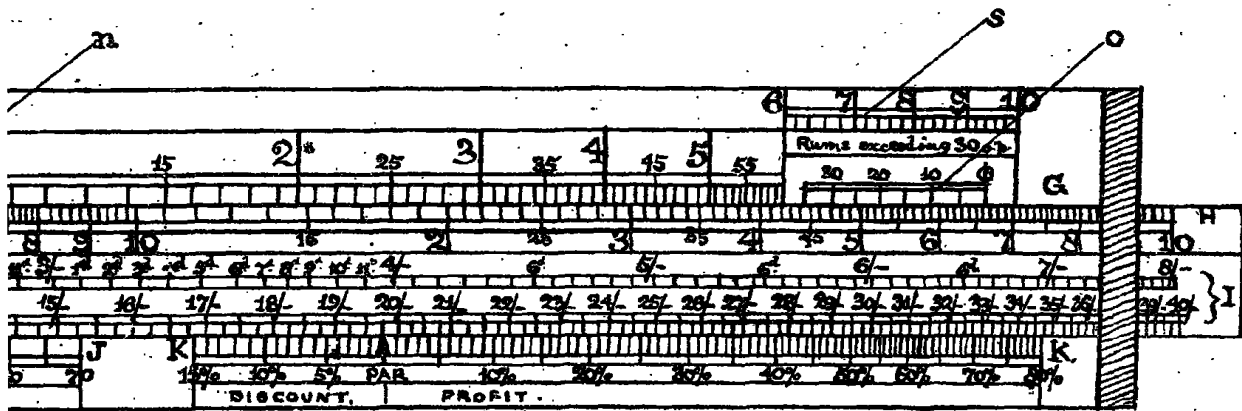
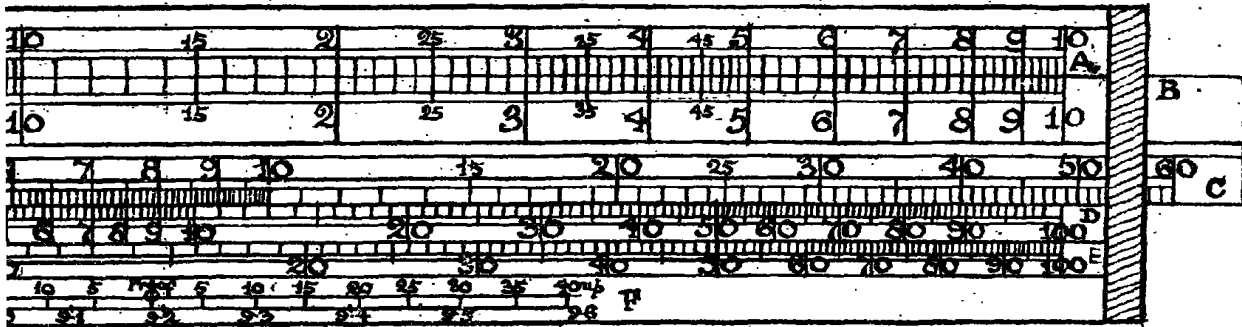


Fig. 2.





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Fig. 1.

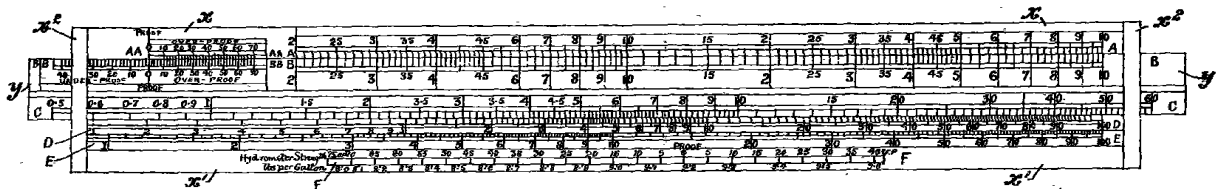


Fig. 2.

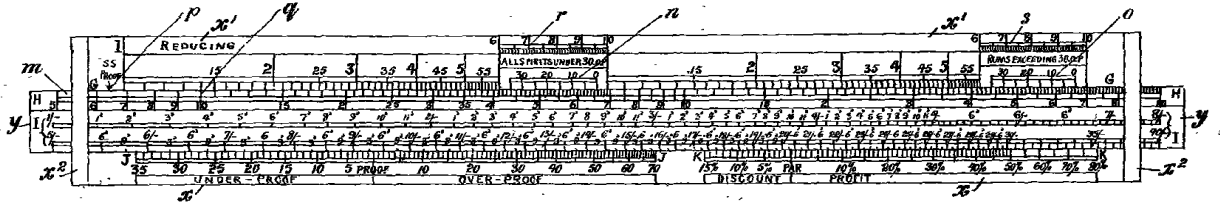
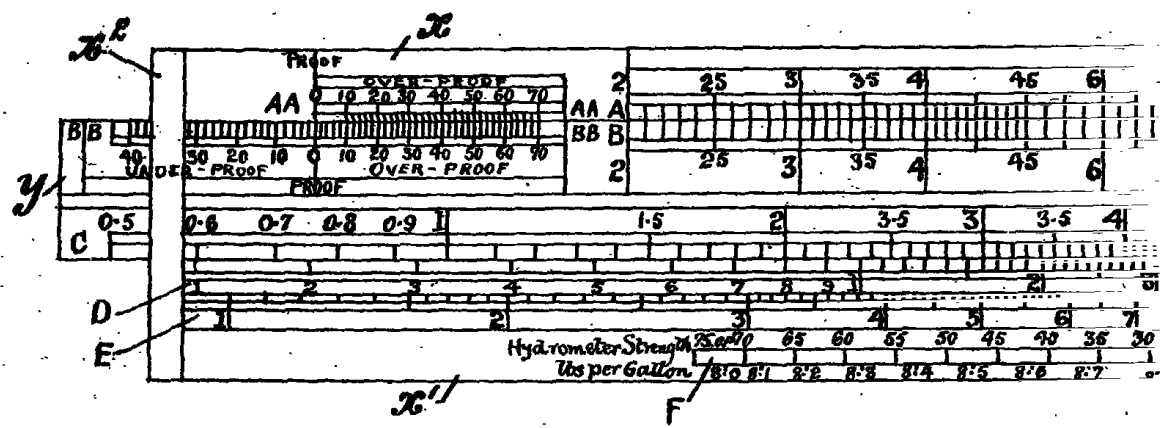


Fig. 3.

1/2	1	2	3	4	5	6	7	8	9	10	L
1/2	1 1/2	2 1/2	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2	9 1/2	10 1/2	

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Fig



Fig

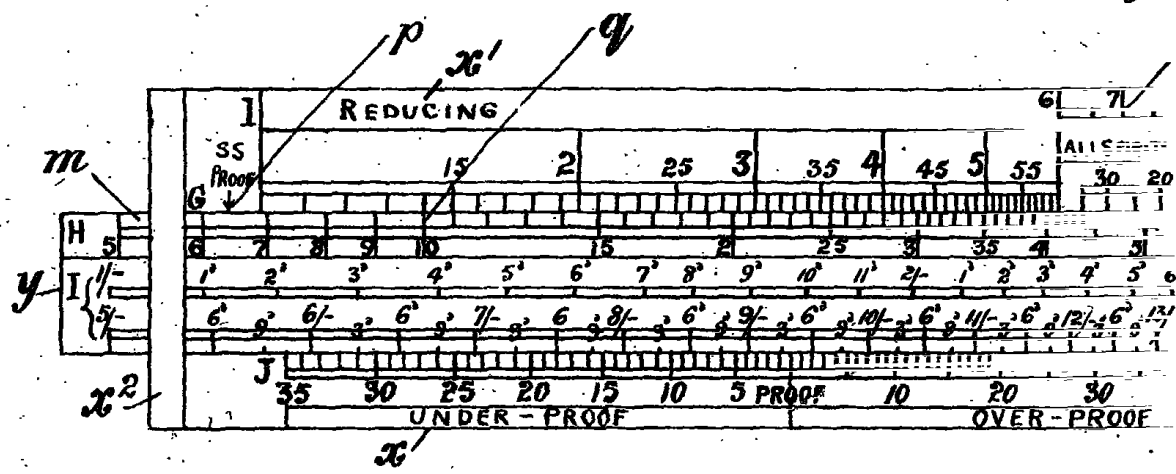
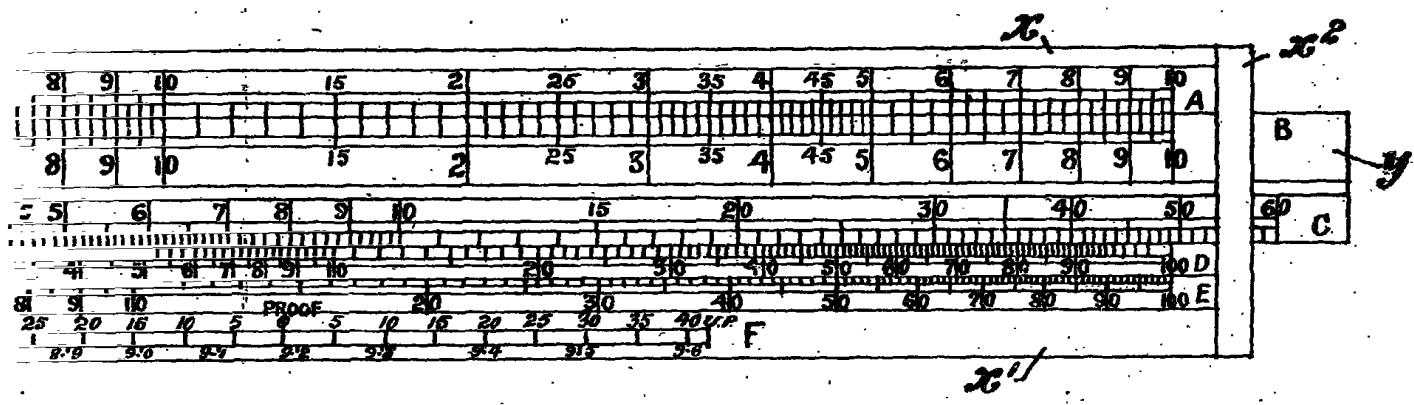


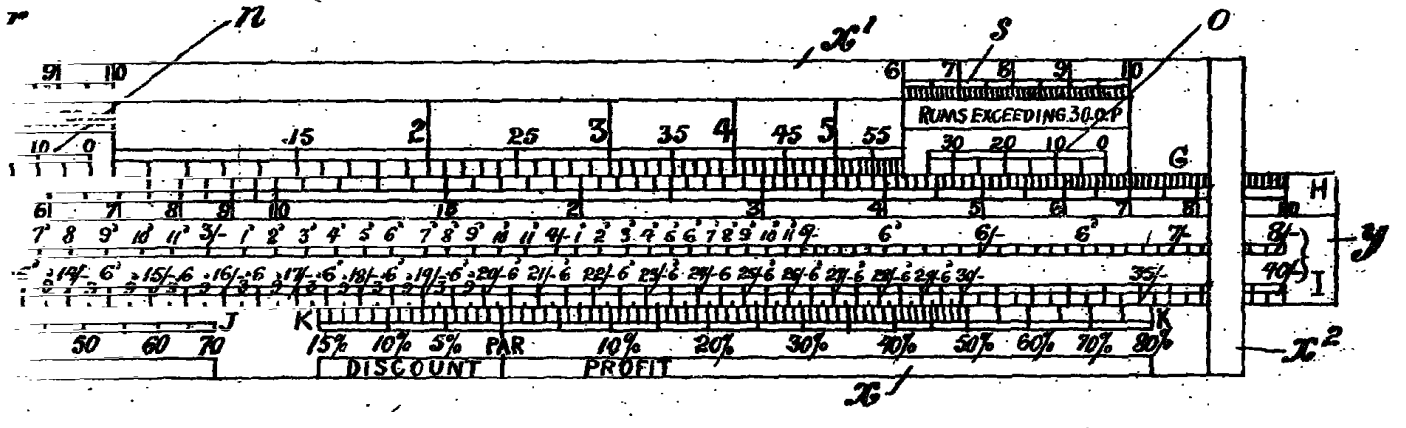
Fig. 3.

<i>Tenths</i>	1	2	3	4	5	6	7	8	9	10
<i>Pints</i>	3/4	1 1/2	2 1/2	3 1/2	4	4 3/4	5 1/2	6 1/2	7 1/4	8

1.



2.



1L

