

PATENT SPECIFICATION



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Complete Left: Dec. 18, 1920.

Complete Accepted: June 1, 1921.

PROVISIONAL SPECIFICATION.

Improvements in Slide Rules.

I, EDWARD JONES, trading as Dring and Fage, Scientific Instrument Maker, 56, Stamford Street, London, S.E. 1, British subject, do hereby declare the nature of this invention to be as follows:—

The invention consists of an improved slide rule for the following purposes.

1. To find the quantity of water required for reducing spirits, the contraction in bulk, which takes place in the operation, being allowed for.

2. To find the amount of contraction in bulk, in reducing spirits.

3. To calculate the change in value, when spirits are reduced from one rate of strength to another.

The rule is composed of three parallel pieces of wood in a frame, each of these is fitted on the internal edge with a groove, so that the slide may move freely between the first and second, as well as between the second and third. The slide is composed of two pieces, each of which has one end protected with brass, the slide being completed when the brass ends are fitted together. It is used for both faces of the rule.

That part of the slide which has the brass end on its left, is graduated on upper and lower edges with a logarithmic scale beginning at 1 and ending with 14, on both faces. The other part of the slide has a similar logarithmic scale on one face beginning with 1 and ending with 10 at the brass end. On the other face a line of strengths is graduated for

pricing purposes. The graduations in all cases are marked on upper and lower edges of the slide. 40

SECOND FACE OF RULE.

When the slide (with the logarithmic line of numbers) is placed in the upper groove, the line above it is marked with strengths required, such strengths not being underproof; and the line below it with strength differences. The line of strengths required includes strengths between 60 overproof and proof, and the line of strength differences begins at 5 on the right and ends at 70 on the left. Both these lines may be considered as "reversed" lines, as the numbers on both increase from right to left. The slide is used with both these lines, to ascertain the total amount of water including contraction, required in an operation of reduction. 45 50 55

When the slide is similarly placed in the lower groove, the line above it is marked with strengths required, all underproof from 1 to 50 underproof. The line below it is marked with differences of strength, beginning at 5 on the right, and ending at 70 on the left. These lines are also "reversed" lines, and are both used with the slide to ascertain the total amount of water, including contraction, required in an operation of reduction of spirits. 60 65 70

Dated the 24th day of February, 1920.

EDWARD JONES.

COMPLETE SPECIFICATION.

Improvements in Slide Rules.

I, ERNEST KING ALLEN, of the Public Trustee Office, Kingsway, W.C. 2, Assistant Public Trustee, on behalf of Oswald Richard Arthur Simpkin, the Public Trustee, Legal Representative of Edward Jones, deceased, late of 56, Stamford Street, S.E. 1, 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:—

The invention consists of an improved slide rule for the following purposes.

1. To find the quantity of water required for reducing spirits, the contraction in bulk, which takes place in the operation, being allowed for.

2. To find the amount of contraction in bulk when spirits are reduced with water.

3. Generally, for calculating purposes, in connection with proofing, blending, and reducing wines and spirits.

Logarithmic slide rules have been proposed previously wherein scales were provided enabling the contraction in volume of spirits upon dilution, to be calculated, by first ascertaining the quantity of water required without the allowance for contraction, and then finding the quantity of water required, with this allowance, and subtracting the results. By means of my invention as subsequently described the amount of contraction in a reducing operation can be found independently of the quantity of water required, and I maintain that greater accuracy can be obtained by using it, than by the use of the older slide rules.

Logarithmic slide rules have also been previously proposed wherein scales were provided for calculating the quantity of water required in a reducing operation, allowing for contraction. By using my invention (as subsequently described) the same object can be obtained; that is, to find the quantity of water required in a reducing operation, allowing for con-

traction. The novelty here consists in the use of the special scales marked M and R. These are larger in radius than the scales on the slide to which they are adjacent; and they are "reversed", that is, the numbers which the graduations represent increase from right to left, and in this way the contraction in bulk is allowed for, in calculating the quantity of water required. With the object of obtaining greater accuracy, the special scale marked M has been constructed to be used when the strength to which the spirit is to be reduced is not under proof strength. The special scale marked R is constructed for use when reducing to strengths which are under proof. I maintain that there is practical, but not absolute agreement in results between the method here referred to, and that referred to in the preceding paragraph both methods being subsequently described.

The invention is shown on the accompanying drawings, on which are represented:—

Figure 1. One face of the rule.

Figure 2. The other face of the rule.

Figure 3. The graduations on one edge of the rule.

Figure 4. The graduations on the other edge of the rule.

The lines B, C, K, L, O, P, being identical with the line A, the graduations in detail for these lines have not been inserted in the sketch.

The rule is composed of three parallel pieces of wood, fixed in a frame; each of these being constructed so as to fit closely to a grooved slide, so that the slide may move freely between the first and second, as well as between the second and third pieces. The slide can be used for both faces of the rule.

On one face of the rule, the lower edge of the upper piece is marked A, the upper and lower edges of the middle piece are marked D and E respectively and the upper edge of the lower piece is marked H.

On the other face of the rule, the pieces

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are marked similarly with the letters I, M, N, and R.

On the first face of the rule the line marked A is a logarithmic scale of numbers marked from 1 to 10. The line D is marked with graduations representing required strengths of spirits. It is a "reversed" logarithmic scale, the strengths increasing towards the left, instead of to the right. Line E and line H are scales of prices.

On the other face of the rule, line I is a scale of required strengths of spirits, such strengths being overproof or proof. Line M is a scale of corresponding strength differences. Line N is a scale of required strengths, such strengths being under proof. Line R is a scale of corresponding strength differences. Lines I, M, N, and R, are "reversed" lines, as line D is.

A subsidiary line is graduated on each of the edges of the rule, marked respectively X^1 and X^2 , showing percentage factors of contraction, corresponding to differences of strength.

The slide is composed of two pieces, each of which has one end protected with brass, the slide being completed when the brass ends are joined together. One of these pieces is marked on one side with the letters B & C, and on the other side with the letters O and P. Each letter marks a line of graduations, which are logarithmic scales. The lines B, C, O, and P are exactly equal and similar to the line A.

The other part of the slide is marked on one side with the letters F and G, and on the other side with the letters K and L. The lines F and G are logarithmic scales representing spirit strengths; and the line K and L are scales which are exactly equal and similar to the line A.

The following is a description of the method of using the rule.

Commencing with the face of the rule which is marked A, D, E, and H, when the slide is placed between A & D, with the letters B and C on the left, and the letters K and L on the right, the lines B and K will form one continuous line when joined together, which will be referred to subsequently as line B; and the lines C and L will similarly form one continuous line which will be referred to subsequently as line C.

With the slide in this position, the lines A & B may be used for multiplication division and proportion.

When the slide is placed in the groove between A and D, the letters B and C

being on the left, and the letters K and L on the right as already described the amount of contraction which occurs in a reducing operation may be found as follows:—

Look for the difference of strength on one of the lines X^1 or X^2 and under it a percentage factor will be found. Set this factor, on C, to the strength required on D; then under the gallons to be reduced, on A, the amount of contraction will be given on B.

If the part of the slide marked F and G be placed in the groove between E and H, the rule can be used for proportionate pricing. Set the strength of the spirit before reduction, on F, to its price on E, then opposite the strength to which it is reduced, on F, the proportional price will be found on E. We can use the lines G and H in the same way, setting the initial strength of the spirits on G, to its price on H; then opposite to the strength on G to which it is reduced, the proportional price will be found on H; and if the spirits should be increased in strength the same method may be applied, in order to find the proportionate increase in price.

If the part of the slide marked F & G be placed between A and D the rule may be used for calculating the proof gallons, when the bulk gallons and strength are given. Set the bulk gallons on A to proof on F, then over the strength on F the proof gallons will be found on A.

On the other face of the rule, when the slide is placed between I and M, the letters B and C being on the left, and the letters K and L on the right, the rule can be used for ascertaining the quantity of water required for reducing spirits from overproof strength to strength not lower than proof strength.

Set the gallons of spirits to be reduced, on C, to the difference of strength on M, then under the required strength on I, the gallons of water required (allowing for contraction) will be found on B.

When the slide is placed between N and R, the letters B and C being on the left and the letters K and L on the right, the quantity of water required for reducing spirits from any given strength, to a strength which is underproof may be found (allowing for contraction).

Set the gallons of spirits on C to be reduced, to the difference of strength on R; then under the required strength on N the gallons of water required may be found on B.

The following table gives the measure-

ments requisite for setting out those scales upon the rule that are novel, the reckoning being from the extreme left graduation on each scale. The measure-

ments on line I which has no graduation on the left, should be reckoned from a point on that line exactly opposite to the graduation marked 70 on line M.

Strength required.	Distance from extreme left graduation.			Difference of strengths	Distance from extreme left graduation.		Difference of strengths	Distance from extreme left graduation.
	Line D ins.	Line I ins.	Line N ins.		Line M ins.	Line R ins.		
70 o.p.	8.46	—	—	70	0	0	10	.92
65 o.p.	8.60	—	—	65	.35	.36	15	1.43
60 o.p.	8.75	7.75	—	60	.75	.75	20	1.98
55 o.p.	8.90	7.86	—	55	1.18	1.17	25	2.59
50 o.p.	9.06	7.99	—	50	1.65	1.63	30	3.22
45 o.p.	9.22	8.12	—	45	2.17	2.14	35	3.88
40 o.p.	9.39	8.26	—	40	2.74	2.71	40	4.64
35 o.p.	9.56	8.40	—	35	3.40	3.36	45	5.46
30 o.p.	9.74	8.56	—	30	4.15	4.10	50	6.40
25 o.p.	9.93	8.71	—	25	5.03	4.98	55	7.40
20 o.p.	10.13	8.88	—	20	6.10	6.06	60	8.47
15 o.p.	10.33	9.06	—	19	6.35	6.30	65	9.60
10 o.p.	10.54	9.24	—	18	6.61	6.56	70	10.80
5 o.p.	10.76	9.44	—	17	6.89	6.84		
Proof	11.00	9.65	—	16	7.18	7.13		X ²
Proof	.0	—	—	15	7.49	7.44	50	.30
5 u.p.	.24	—	9.84	14	7.82	7.77	55	1.05
10 u.p.	.50	—	10.07	13	8.18	8.13	60	1.85
15 u.p.	.77	—	10.32	12	8.56	8.51	65	2.68
20 u.p.	1.06	—	10.59	11	8.98	8.93	70	3.60
25 u.p.	1.37	—	10.88	10	9.44	9.39	75	4.70
30 u.p.	1.70	—	.18	9	9.94	9.89	80	5.85
35 u.p.	2.05	—	.51	8	10.51	10.46	85	7.05
40 u.p.	2.44	—	.87				90	8.37
45 u.p.	2.86	—	1.27				95	9.82
50 u.p.	3.31	—	1.70				100	11.30

10 The lower line for scales X¹ and X² is in equal divisions of .20 inches for X¹ and .15 inches for X².

15 The scales M and R being somewhat larger in radius than the scales on the slide to which they are adjacent, the allowance for contraction is included by this means in the calculation of the water required for a reducing operation. The scale M is adapted to required strengths not underproof, and the scale R is adapted to required strengths which are underproof. The scale D is a reversed logarithmic scale, and the measurements relating to it, and to the lines I and N, M and R, X¹ and X² are attached herewith. When using these scales, one adjustment of the slide in the rule is sufficient.

The lines X¹ and X² on the edge of the

rule are founded on the percentage of contraction which takes place when 30 reducing spirits to proof strength.

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 35 claim is:—

1. In a logarithmic slide rule for calculating purposes the methods of finding the amount of contraction in bulk, when spirits are reduced with water, including 40 the use of specially constructed scales X¹ and X² showing percentage factors of contraction, and the use of a "reversed" line D for required strengths, substantially as described. 45

2. In a logarithmic slide rule for calculating purposes, the method of finding the quantity of water required in a reducing operation when spirits are to be diluted with water, including the use of the specially constructed scales M and R for differences of strengths, substantially

as described in the foregoing specification.

Dated this 26th day of May, 1921.

10

E. K. ALLEN,
Assistant Public Trustee,
Legal Representative of
Edward Jones, deceased.

Fig 1

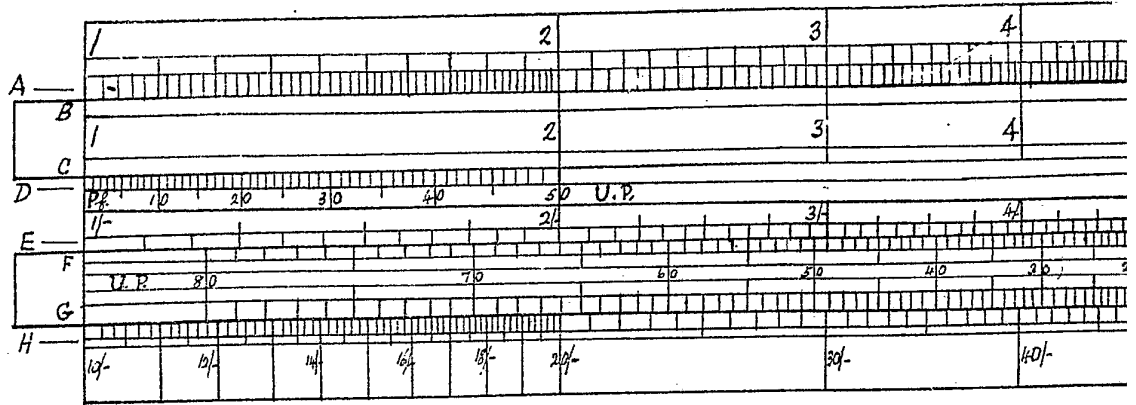


Fig 2

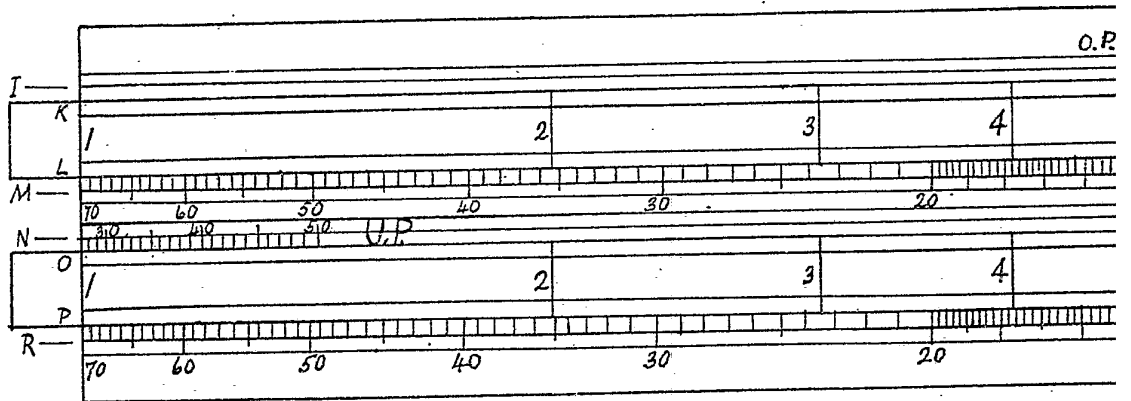


Fig 3

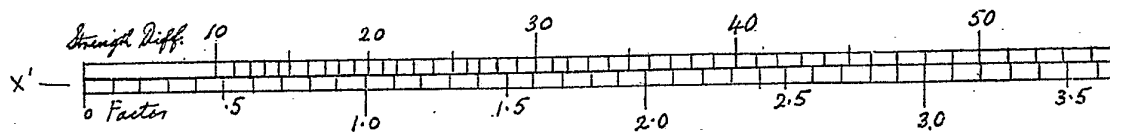
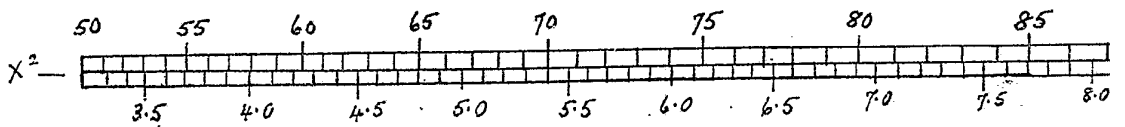


Fig 4



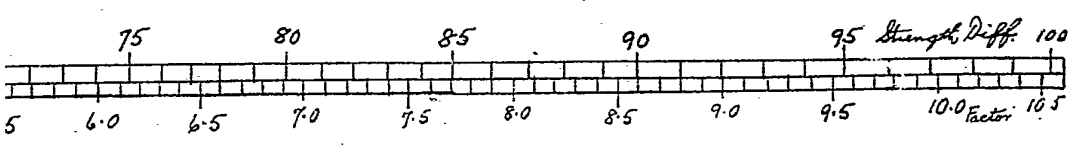
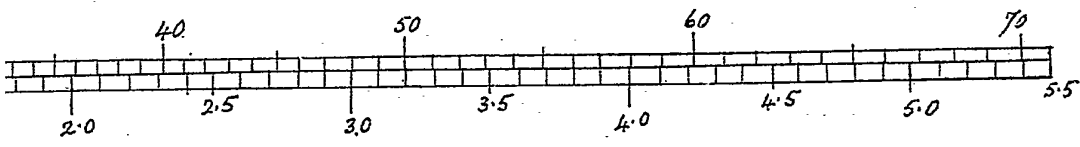
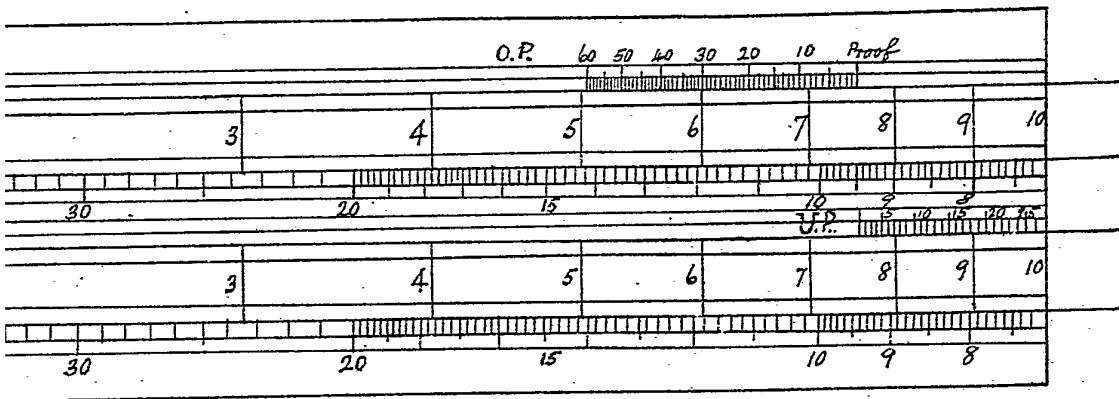
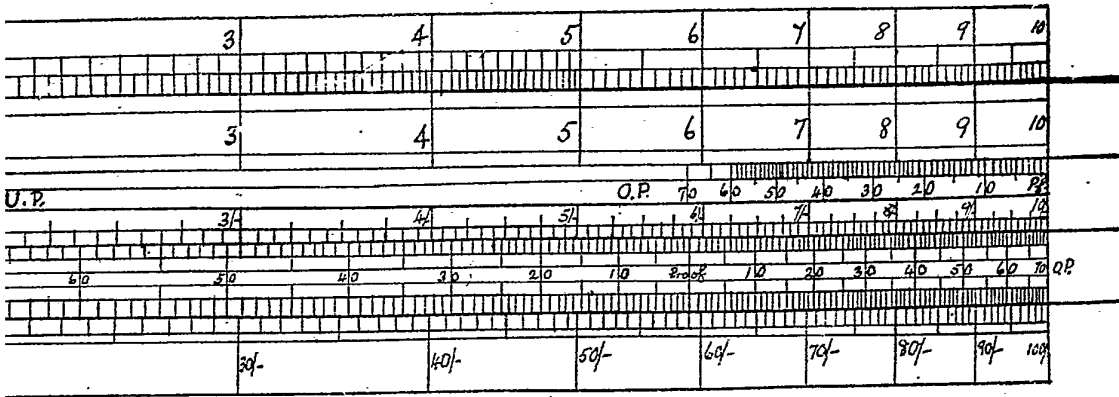


Fig 1

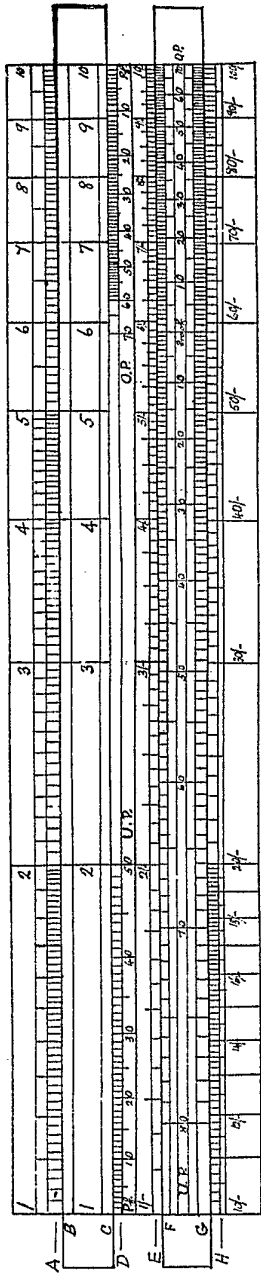


Fig 2

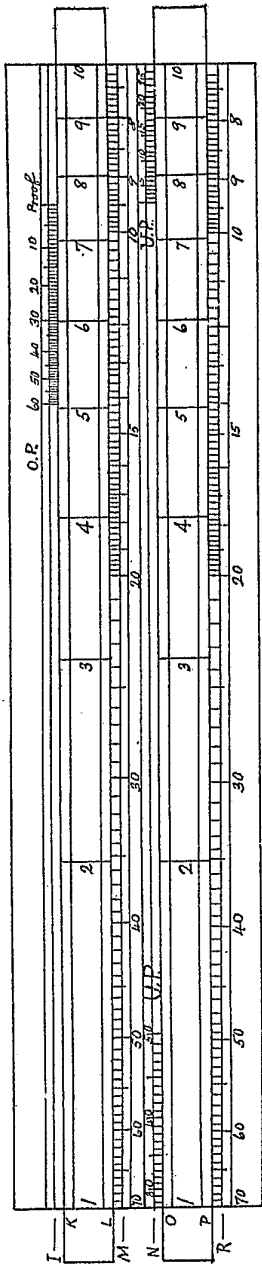


Fig 3

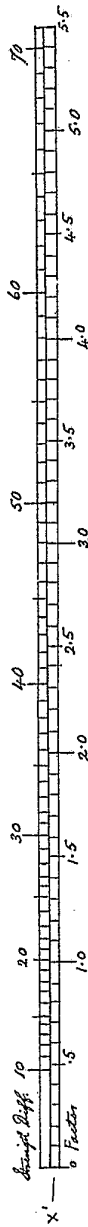
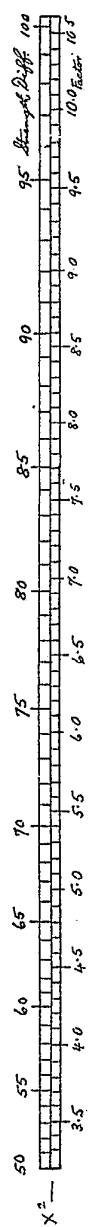


Fig 4



[This drawing is a reproduction of the original on a reduced scale]