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(54) SLIDE RULE

(71) I, LESLIE WHITFIELD, a British Subject of 5a, Westwood Avenue, Nunthorpe, Middlesborough, Teeside, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be perfromed, to be particularly described in and by the following statement:—

This invention relates to a slide rule primarily for use by steel buyers, structural engineers, architects, general engineers, quantity surveyors, or other persons dealing in or needing calculations for metal or other pieces, for example steel bars, sections, or plates.

According to the invention, there is provided a slide rule for making calculations about a material in piece form, comprising a holder and a slide movable with respect to the holder, one of the members consisting of the holder and the slide carrying a logarithmic scale indicating length or area of a piece and a logarithmic scale indicating total weight of a number of pieces and the other of said members carrying a logarithmic scale indicating weight per unit length or per unit area and a logarithmic scale indicating number of pieces, the scale indicating length or area being arranged for cross-reading with the scale indicating weight per unit length or per unit area and the scale indicating weight being arranged for cross-reading with the scale indicating number of bars.

In order to enable the invention to be more readily understood, reference will now be made to the accompanying drawing, which illustrates diagrammatically and by way of example an embodiment thereof and which is a plan view of a slide rule, numerals on the scales of which have been omitted for the sake of clarity.

Referring now to the drawing, a slide rule comprises a holder 1 having a central groove 2 in which is a slide 3. The slide 3 has opposed longitudinal flanges 4 which are received in complementary undercut channels 5 which open into the central groove 2 in the holder. Adjacent one edge of the central groove 2, the holder carries a logarithmic scale 6 indicating length in metres, and adjacent the other edge of the central groove 2 a logarithmic scale 7 indicating weight in kilograms. The edge of the slide adjacent the scale 6 carries a logarithmic scale 8 indicating kilograms per metre and the edge of the slide adjacent the scale 7 a logarithmic scale 9 representing number of bars. The calibrations on the scales are chosen to suit the particular piece on which calculations are to be carried out, but within the limits of metric sizes envisaged to be used in the future, the scales may advantageously be as follows:—

Length of metres

Scale 6 From 0.3 to 100 metres.
Scale 8 Kilograms per metre from 0.2 to 700 Kilograms per metre.
Scale 9 Number of bars from 1 to 1000.
Scale 7 Kilograms from 10 to 50,000.

It will be appreciated that the scales can be more or less finely and accurately calibrated than in the illustrated slide rule, and that the above ranges are given by way of example only.

Various uses of the present slide rule are illustrated by the following examples:—

a) With one movement of the slide the total weight in kilograms can be given of any number of bars or similar pieces providing the length and kilograms per metre of the bars is known.

EXAMPLE 1

Required — the total weight of 32 pieces 7 metres long weighing 21 kgs/m.
Instructions — move the slide so that 21 kgs/m on scale 8 coincides with 7 metres on scale 6, read along scale 9 to 32 and underneath on scale 7 the total weight can be read (4704 kgs).

EXAMPLE 2

Required — the total weight of 200 pieces, 6 metres long weighing 4.2 kgs/m.
Instructions — proceed as in Example 1

by placing 4.2 kgs/m on scale 8 in coincidence with 6 metres on scale 6, and read under 200 bars on scale 9 the answer on scale 7 (5040 kgs).

EXAMPLE 3

Required — the total weight of 10 pieces, 13 metres long weighing 6.3 kgs/m.

Instructions — as in Exampes 1 and 2, place the 6.3 kgs/m on scale 8 in coincidence with 13 metres on scale 6, read under 10 bars on scale 9 the weight on scale 7 (819 kgs).

It will be seen from the foregoing examples that if the kilogrammes per metre and length in metres be known, then the weight of any number of bars from 1 to 1,000 (with the scale range shown) may be ascertained with only the one movement of the slide. For instance, in Example 1 the weight of 32 pieces 7 metres long at 21 kgs/m was given as 4704 kgs, but it can immediately be seen that 20 pieces weigh 2940 kgs, 40 bars weigh 5880 kgs, and so on, merely by looking along scale 9 to 20 or 40 instead of 32, i.e. that no further slide movement is required.

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b) Given the kilogrammes per metre, the weight of any number of metres can be calculated.

EXAMPLE 4

Required — the weight of 180 metres weighing 35 kgs/m.

Instructions — 180 metres is the same as 10 pieces 18 metres long, therefore place 35 kgs/m on scale 8 in coincidence with 18 metres on scale 6. One bar on scale 9 will represent 18 metres, therefore 10 bars represent 180 metres. The weight can then be obtained by reading on scale 7 the weight corresponding to 10 bars on scale 9.

* * * *

c) The slide rule can also be used for ascertaining the total weight of sheets, providing the kgs per square metre is known.

EXAMPLE 5

Required — the weight of 160 sheets 2.5 metres long by 1.25 metres wide by 8 kgs, per square metre.

Instructions — the total area of each sheet is equal to 2.5 metres by 1.25 metres, which equals 3.125 square metres. It will be appreciated that the scales for kgs/m and length in metres can equally well be used when kgs/m^2 and area in square metres are concerned. Therefore, place 8 kgs/m on scale 8 in coincidence with 3.125 metres on scale 6, and read off the total weight on scale 7 underneath 160 bars on scale 9 (4,00 kgs).

* * * *

d) It is often required to find how many bars of a certain length would be required to make up specified weight. This can be done in the following manner:—

EXAMPLE 6

Required — the number of bars 12.5 metres long weighing 110 kgs/m to make a total weight of 10,000 kgs.

Instructions — Place the 110 kgs/m on scale 8 in coincidence with 12.5 metres on scale 6, read on scale 7 10,000 kgs and directly above on scale 9 will be found the number of bars required (7.27 bars precisely, but 8 bars in practice).

* * * *

The reverse side of the slide rule may carry printed matter for example showing the weights of popular sizes of steel bars.

Although the slide rule has been particularly described as having the length and weight scales on the holder and the kilograms per metre and number of bars scales on the slide, it will be appreciated that this arrangement can be reversed, i.e. with the length and weight scales on the slide and the kilogrammes per metre and number of bars scales on the holder.

Although the present slide rule is particularly intended for use with steel pieces, it can of course be used for calculations on pieces of other metal or alloys, for example aluminium or brass, or pieces of engineering or building materials, such as plastics, wood, bricks or concrete. Sometimes the limits of accuracy required for calculations for such other metals are more stringent than those for steel, and it is possible therefore that the present slide rule would not provide sufficient accuracy for some purposes.

WHAT I CLAIM IS:—

1. A slide rule for making calculations about a material in piece form, comprising a holder and a slide movable with respect to the holder, one of the members consisting of the holder and the slide carrying a logarithmic scale indicating length or area of a piece and a logarithmic scale indicating total weight of a number of pieces and the other of said members carrying a logarithmic scale indicating weight per unit length or per unit area and a logarithmic scale indicating number of pieces, the scale indicating length or area being arranged for cross-reading with the scale indicating weight per unit length or per unit area, and the scale

indicating weight being arranged for cross-reading with the scale indicating number of pieces.

2. A slide rule for making calculations about metal pieces substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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1450933 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale