



ORIGINAL-ODHNER

"A machine to count on"

THE GENERAL DIRECTIONS for mechanical calculation are given in our pamphlet, **Directions**, to which we beg to refer for elementary information.

Like all other calculators the **Lusid** has 3 dials: the Quotient Dial (Q), the Setting Dial (S) and the Product Dial (P). They correspond to the 3 sets of figures in every multiplication or division sum.

A number set on the setting dial will be added into the product dial once for every positive turn of the crank, if the decimal marks in both the dials synchronize. If the carriage is spaced one, two or more places to the right from this position it will be added 10-fold, 100-fold and so on. If spaced to the left $1/10$, $1/100$ and so on of the number set will be entered into the product dial.

The quotient dial records the revolutions of the crank.

Consequently if a number is set, and the crank is turned a certain number of times, the product dial will always show the product of the two numbers in the setting dial and quotient dial. Or vice versa, the quotient dial shows the quotient between the number in the product dial and that of the setting dial.

This is the basic rule for all calculations, which should always be kept in mind.

The product dial consists of 10 windows. The 7 ones to the left represent the pounds, the 3 last ones represent decimals of pounds. The last mentioned windows can be covered by means of a double shutter (Sh) which simultaneously opens two windows (W) to the right, showing the equivalent in shillings, pence and farthings.

The Setting Dial has 10 levers. There are two fixed decimal points (D), one marked with a spot o, and the other with a triangle ∇ . The lever (L) shall be shifted towards the same mark which is used as a decimal mark.

Note: When in the following it is said: set 8 ∇ 75 it is to be understood so that 8 shall be set immediately to the left of the triangle and 75 to the right of it, and that the lever (L) shall be brought towards the triangle.

Set 22 o 656 should be understood in a corresponding way.

The Quotient Dial has 3 sections. To the left 6 white windows for pounds, in the middle 2 red windows for shillings and one for pence, and lastly 6 white windows for decimals of a penny. The two groups of arrows (A) (one marked o and one marked ∇) show in which window a revolution will be recorded. If the lever (L) is placed at o you will have to be guided by the o group and if the lever (L) is placed at ∇ you will have to be guided by the ∇ group.

If you are working in the pound windows you have to be guided by the large arrow in each group, otherwise by the small one.

Note: When in the following we say: place carriage in the o 5th pound position, the carriage should be placed so that the large arrow in the o group points to the 5th window from the left in the pound section; and when we say: place carriage in ∇ penny position it shall be placed so that the small arrow in the ∇ group points to the penny window.

Over the quotient dial there is a sliding stud (SS). It can and may be moved only when the carriage is in its extreme right position.

When the stud is to the left, the quotient dial registers in decimals; every turn of the crank is recorded by 1 throughout the dial.

When it is to the right the quotient dial registers in Sterling: in the pound section every turn of the crank is recorded by 1, in the shilling section by 2 (because there are 20 shillings to the pound), and in the pence and decimal of pence section by 24 (because there are 240 pence to the pound).

The Decimal Marks. It will be understood that this machine is always worked over the so called fixed decimal point. In the quotient dial the decimal point is always between the pound and shilling section and in the product dial always between the 7th and 8th window from the left, close up to the shutter.

The setting dial has two fixed decimal marks, ∇ and o, and the lever (L) should be shifted according to which one you use. When the lever is towards you you can only utilize the 3 last figures in the pound section.

Thus, when working over o you can have 6 whole numbers in the quotient dial and 2 in the setting dial; when working over ∇ you can have 3 and 5 respectively.

The top lever (T) shall be placed at Mult. for multiplication and positive division and at Div. for negative division. The last mentioned operation is very seldom practised on this type of machine. In the following examples the lever should always be on Mult., unless specially mentioned.

Note: The quotient dial is provided with transmission for tens. But it does not carry over from the shilling section to the pound section.

After these general directions we give a few examples, typical for the different kinds of calculations for which this machine may be preferably used.

EXAMPLE 1.

898 tons at 12/- per ton.

Sliding stud to right.

Set 898 ▼.

Carriage in ▼ 2nd shilling position.

Give handle 6 positive turns. The quotient dial then shows 12/- and the product dial gives the product £ 538.16.0 or (under shutter) .800.

Six turns.

EXAMPLE 2.

736.56 tons at 11/-.

Sliding stud to right.

Set 736 ▼ 56.

Carriage in ▼ 2nd shilling position.

Give handle 5 positive turns, space carriage once to the left and give further 5 positive turns.

The quotient dial shows 11/- and the product dial the result £ 405.2.2 or (under shutter) .108.

Ten turns.

EXAMPLE 3.

765 articles cost £ 1.16.9 $\frac{3}{4}$ d. each.

Total cost?

Sliding stud to right.

Set 756 ▼.

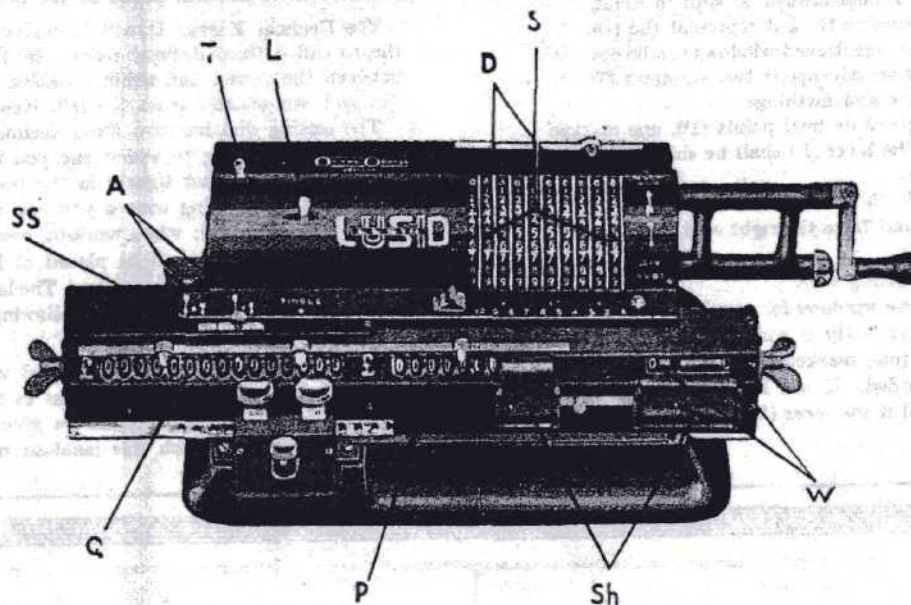
Carriage in ▼ 6th pound position.

Work to known factor (cost per unit) on (quotient dial), adding or subtracting until unit cost £ 1.16.9.75 is recorded. You will have to make the following number of positive turns in the subsequent positions of the carriage, starting in the 6th pound position: 1,8,4,0,6,2,5. Read answer in product dial: £ 1391.10.3.

26 turns.

EXAMPLE 4.

736.56 tons at 11/- per ton.



EXAMPLE 6.

Division. 963,56 articles cost £ 576.8.6.

How much does each cost?

Sliding stud to right.

Set 963 ▼ 56 on levers.

Space register so that 96 on setting dial synchronizes with first two units of £s in product dial. — (Not decimals places which should always be covered!) Build up to the nearest figure of £s namely 578 through 6 turns.

Space two to left, subtract until 576 appears.

Space one to left, add until 8/- is recorded.

Space one to left, add until 5d appears.

Space one to left, add until 6d appears.

Read answer in quotient dial.

Cost 11/11.57376 each.

16 turns.

Note: When cost per unit extends to £s it is necessary always to leave figure on right register Below when spacing from pounds to shilling in unit cost. There is no carry over between pounds and shillings in quotient dial.

EXAMPLE 7.

Pro-rating. Total expenses of £ 2365.12.0 shall be pro-rated to the following amounts:

£ 15 629. 5.0.

£ 25 398. 2.0.

£ 35 169.11.0.

EXAMPLE 9.

115 $\frac{11}{12}$ yards at $1/7\frac{1}{2}$.

115 $\frac{11}{12}$ yards equals 115,9167.

You can make this calculation in two ways (compare examples 2 and 4).

Either:

Sliding stud to right.

Set 115 ▼ 9167.

Carriage in ▼ 2nd shilling position.

Work up $1/7\frac{1}{2}$ in the following way:

First turn: 2 equals £ 11.11.10 in quotient.

Space one to left, subtract until $1/7.2$ appears.

Space to left, add until 0.44 appears.

Space to left, add until 0.512 appears.

Space to left, subtract until .5 is left.

Answer: £ 9.8.4 $\frac{1}{4}$

or:

Sliding stud to left.

Set 0 o 08125 (decimal equivalent of $1/7\frac{1}{2}$).

Carriage in o 4th pound position.

Work up in the quotient dial 115.9167 (916 red).

Read answer 9.8.4 $\frac{1}{4}$.

EXAMPLE 10.

Chain Work.

After having obtained the product £ 1391.10.3 in example 3 you may have wanted to deduct $12\frac{1}{2}$ %. It is done in the following way:

of normal position on the setting dial. Proceed then as follows:

Sliding stud to right.

Set 1750 ▼.

Carriage in ▼ 1st penny position.

Build up 3256 in quotient (3 red) you will have to make the following number of turns:

1 positive, 4 positive, 4 negative, 3 negative and 3 negative.

15 turns.

Result: £ 23.14.10.

EXAMPLE 12.

13 doz. 8 pieces at $3/9$ per dz.

In this case — it will be easy for you to find the explanation — you can use the shillings and pence section in the quotient for dozens and pieces respectively and set the price in shillings and decimals of shilling.

Sliding stud to right.

Set 3 ▼ 75.

Carriage in ▼ 2nd shilling position.

Work up 13.8 in the quotient (as 13 shillings and 8 pence).

Read answer in product: £ 2.11.3.

If there are more dozens you can easily use the £s section, remembering that every £ corresponds to 20 doz.

EXAMPLE 13.

8,462,279 lbs value £ 129166.17.11; find price per lb.

These figures exceed the capacity of the machine when working over fixed decimal points. We, therefore, have to go over to decimals in order to arrive at absolutely accurate results. Bring shutter so that decimals are uncovered. Lever (L) on o.

Sliding stud to the left.

Set 8462279 as far to the left as possible.

Build up in the product dial 1291668958, starting from the extreme left.

The quotient dial shows 01526384273.

As no fixed decimal marks have been used, we have to apply the following rule:

The product dial has as many whole numbers as the setting and quotient dials together less one, when all places, irrespectively of there

26 turns.

EXAMPLE 4.

736.56 tons at 11/- per ton.

Same as example 2.

Whereas in this case the conversion of the unit cost to decimals is very simple, you can as well set it on the levers and make the calculation in the following way.

Sliding stud to left.

Set 0 o 55.

Carriage in o 3rd pound position.

Make one positive turn, space once, make 3 negative, 3, 6, 5 and 6 positive turns.

The quotient dial shows 736.56 (56 in red figures) and the product dial £ 405.2.2.

EXAMPLE 5.

3123 articles }
4165 " } at $1/7\frac{3}{4}$ each.
1289 " }

These three calculations can be made consecutively in the same way as described in example 3. In order to avoid resetting however, it can be advantageous to set the unit cost as decimal equivalent, 0.0822917, on the setting dial and use the quotient dial for the quantity.

Sliding stud to left (not strictly necessary, because there are no decimals in the quantities).

Set 0 o 0822917 (in order to get correct result you will have to take 7 decimals). Carriage in o 3rd pound position.

Work up to 3123 units in quotient dial, real result £ 256.19.11 $\frac{1}{4}$.

Without clearing, work up to 4165, read result £ 342.14.10 $\frac{3}{4}$, and to 1289, result £ 106.1.5 $\frac{3}{4}$.

You can check these calculations by making them in the reverse way, setting 3123 ▼ and so on and multiplying by $1.7\frac{3}{4}$.

The result will be the same.

EXAMPLE 7.

Pro-rating. Total expenses of £ 2365.12.0 shall be pro-rated to the following amounts:

£ 15 629. 5.0.
£ 25 398. 2.0.
£ 35 169.11.0.

Total £ 76 196.18.0.

Sliding stud to left.

Set 76196 ▼ 9.

Carriage in such position that 761 synchronizes with three first units of £s in product dial.

Work up till known figure, £ 2365.12 in product dial (compare note under example 6).

Read in quotient dial 0.03104588 which is the decimal ratio between expenses and total.

Sliding stud to right.

Set 0 o 03104588.

Carriage in o 2nd pound position.

Work up quotient dial to

£ 15.629. 5 read product £ 485. 4.5 $\frac{3}{4}$,
and to £ 25.398. 2 read product £ 788.10.1 $\frac{1}{2}$
and to £ 35.169.11 read product £ 1091.17.4 $\frac{3}{4}$

Total £ 76.196.18 £2365.12.—

EXAMPLE 8.

Exchange £ 12.265.6.3 at 4.8325
U. S. Dollars?

Sliding stud to right.

Move the shutter so that decimals of £s in product dial open.

Set 4 o 8325.

Carriage in o 2nd pound position.

Work up £ 12.265.6.3 in quotient dial.

Read result in product dial doll. 59.272.12. (The third decimal, 3, to be discarded).

Examples 1—10 are typical for calculations which can be made after the general directions previously given. There are, however, many cases where small modifications, particularly concerning the decimal mark can and should be made. Examples 11—13 may be sufficient.

EXAMPLE 10.

Chain Work.

After having obtained the product £ 1391.10.3 in example 3 you may have wanted to deduct 12 $\frac{1}{2}$ %. It is done in the following way:

Move the shutter so that you see the decimal equivalent of $\frac{1}{10}$.

Set 1391 ▼ 513.

Sliding stud to left.

Top lever on Div.

Carriage in ▼ 2nd shilling position.

Subtract 1 turn, space to left, subtract 2 turn, space to left and subtract 5 turns.

Quotient dial shows 0.125 and product dial the net amount £ 1217.11.5 $\frac{3}{4}$.

EXAMPLE 11.

3256 articles at $1\frac{3}{4}$ d.

This calculation can of course be made in either of the ways described in examples 2 and 4. Because the unit price is expressed in pence only, you have still another method through which you need not change the unit price to decimals even if it — being a fixed factor — preferably has to be set on the setting dial.

For the quantity you use the pence and decimals of a penny section in the quotient dial. In order to get enough space for the whole numbers you have to use the movable decimal point and mark off the three first windows of decimals of a penny, thus placing it three steps to the right of normal position. But now you will also have to space three steps to the left

build up in the product dial 1291668958, starting from the extreme left.

The quotient dial shows 01526384273.

As no fixed decimal marks have been used, we have to apply the following rule:

The product dial has as many whole numbers as the setting and quotient dials together less one, when all places, irrespectively of there being figures or not, are counted, and vice versa.

In this case:

Product dial has 6 whole numbers
Plus one 1
..... 7

Setting dial has 7 whole numbers

Quotient dial 0

This means that the unit price is £ 0.01526384273.

To find the price in pence, set this number as far to the left as possible, thus 15 o 26384273.

Multiply by 240 as far to the left as possible.

Product dial shows 3663322255.

Quotient dial has 3 whole numbers

Setting dial has 1 " "

..... 2 " "

Less one 1 " "

Product has 1 " "

The absolutely accurate result is thus 3d. 663322255.

This example shows how the Lusid can be used for regular decimal calculations.

It must, however, be understood that in this particular instance a result of sufficient accuracy for practical purpose can be obtained in a simpler way by rounding off the initial figures: Sliding stud to right.

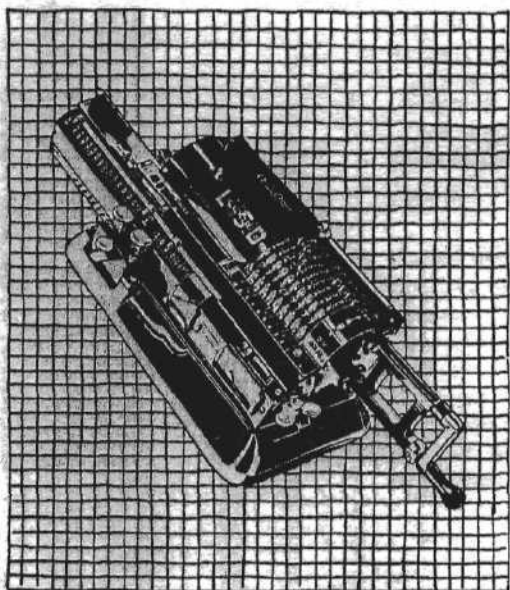
Lever (L) on ▼.

Set 8462279 on the levers as far to the left as possible. Observe that it comes two spaces to the right or normal position.

Build up the value in the product, but also two spaces to the right, i. e. the product dial — with decimals uncovered — should show 0001291669.

Quotient dial shows 3 d. 66332.

Conversion tables are supplied on request.



A MATTER of £.s.d.

the

LUSID

**CALCULATING
MACHINE**

