

WORLD
FAMOUS

CURTA

Mfd. in Liechtenstein



the high
precision
calculating
machine

THE KEY TO EVERY
CALCULATING PROBLEM

We have compiled this booklet as an aid to those who, because of their interest or profession, are required to do calculations. We sincerely hope that this booklet will be of genuine value to you.

Regardless of the type of calculations that you are required to do, CURTA will do them for you, faster, more accurately and with less mental strain.

Scientists, technicians, estimators, navigators, research men, contractors, appraisers, businessmen etc. etc. will find CURTA an invaluable aid in the office, in the home, in the field or wherever calculations may be required.

The CURTA Company
Van Nuys, California

$$\begin{array}{r} 46 \\ 8 \overline{) 376} \\ \underline{32} \\ 56 \\ \underline{56} \\ 0 \end{array}$$

$$\begin{array}{r} 1635 \\ 3 \overline{) 5005} \\ \underline{6} \\ 90 \\ \underline{90} \\ 0 \end{array}$$

$$\begin{array}{r} 3275 \\ 13 \overline{) 42575} \\ \underline{39} \\ 37 \\ \underline{39} \\ 0 \end{array}$$

$$\begin{array}{r} 315 \\ 10 \overline{) 3150} \\ \underline{30} \\ 150 \\ \underline{150} \\ 0 \end{array}$$

TABLE OF DECIMAL EQUIVALENTS

	$\frac{1}{64}$	.01563		$3\frac{3}{64}$	.51563
	$\frac{1}{32}$	.03125		$\frac{17}{32}$	.53125
	$\frac{3}{64}$	.04688		$3\frac{5}{64}$	.54688
$\frac{1}{16}$		.0625	$\frac{9}{16}$		.5625
	$\frac{5}{64}$	.07813		$3\frac{7}{64}$	.57813
	$\frac{3}{32}$	.09375		$\frac{19}{32}$	.59375
	$\frac{7}{64}$	.10938		$3\frac{9}{64}$	.60938
$\frac{1}{8}$		.125	$\frac{5}{8}$		.625
	$\frac{9}{64}$	.14063		$4\frac{1}{64}$	.64063
	$\frac{5}{32}$	.15625		$2\frac{1}{32}$	.65625
	$1\frac{1}{64}$	.17188		$4\frac{3}{64}$	.67188
$\frac{3}{16}$		.1875	$\frac{11}{16}$		.6875
	$1\frac{3}{64}$	.20313		$4\frac{5}{64}$	.70313
	$\frac{7}{32}$	.21875		$2\frac{3}{32}$	.71875
	$1\frac{5}{64}$	.23438		$4\frac{7}{64}$	.73438
$\frac{1}{4}$		.250	$\frac{3}{4}$		.750
	$1\frac{7}{64}$	.26563		$4\frac{9}{64}$	.76563
	$\frac{9}{32}$	.28125		$2\frac{5}{32}$	.78125
	$1\frac{9}{64}$	.29688		$5\frac{1}{64}$	.79688
$\frac{5}{16}$		.3125	$\frac{13}{16}$		.8125
	$2\frac{1}{64}$	.32813		$5\frac{3}{64}$	.82813
	$1\frac{1}{32}$	.34375		$2\frac{7}{32}$	.84375
	$2\frac{3}{64}$	.35938		$5\frac{5}{64}$	.85938
$\frac{3}{8}$		.375	$\frac{7}{8}$		.875
	$2\frac{5}{64}$	.39063		$5\frac{7}{64}$	.89063
	$1\frac{3}{32}$	.40625		$2\frac{9}{32}$	.90625
	$2\frac{7}{64}$	.42188		$5\frac{9}{64}$	.92188
$\frac{7}{16}$		.4375	$\frac{15}{16}$		.9375
	$2\frac{9}{64}$	.45313		$6\frac{1}{64}$	.95313
	$1\frac{5}{32}$	.46875		$3\frac{1}{32}$	.96875
	$3\frac{1}{64}$	.48438		$6\frac{3}{64}$	.98438
$\frac{1}{2}$		.500	1		1.00000

Karen Shakrak (201)
 Home Room (106)
~~ALGEBRA~~ Room 208
 Geometry
 A dwarf in size . . .

A giant in calculating efficiency

Curta is a complete pocket size calculating machine for all four arithmetical operations

Like a chronometer or a miniature camera, the CURTA calculator is a precision machine of extremely small proportions.

This amazing new construction, manufactured with up to date production-methods by CONTINA Ltd., is a masterpiece of matchless craftsmanship.

CURTA is held in one hand while operated (see figure 2, page 6) and is easily carried in a pocket or in a briefcase. Thus it fills a long felt gap in available calculating machines and complies with the wishes of a great number of users demanding a small, yet complete and reliable individual instrument.

The businessman on his trips, the professional account at his client's offices, the building contractor on the building site, the technician in the workshop, the draughtsman at his drawing board, professors and students, they all use and prefer CURTA for its handiness and accuracy.

Wherever it is inconvenient to use noisy machines or to transport heavy and bulky instruments, all the outstanding advantages of the CURTA become fully evident. In the offices of private and public enterprises, in bureaus of the administration, in banks, in booking offices, in test-laboratories, to mention a few examples, CURTA is particularly appreciated for its quiet, convenient and fast operation: Unlike other machines, CURTA, held in one hand, is always in the operator's immediate angle of vision, right above his working place (see pages 5 and 6).

Due to these remarkable features, CURTA, ever since its first appearance, has been enthusiastically received both by experts and users and has been in rapidly growing demand all over the world.

With the CURTA a miniature universal calculating machine of an entirely new design has been created. Hand operated, with "safe-grip" setting knobs, visible setting dial and continuous tens transfer in the answering and the indicating dial. CURTA has the features and the perfection normally found only in more expensive modern calculating machines of far heavier weight and much larger size.

LENGTHS OF CIRCULAR ARCS: RADIUS = 1 (Continued)

Sec.	Length	Min.	Length	Deg.	Length	Deg.	Length
41	.0001988	41	.0119264	41	.7155850	101	1.7627825
42	.0002036	42	.0122173	42	.7330383	102	1.7802358
43	.0002085	43	.0125082	43	.7504916	103	1.7976891
44	.0002133	44	.0127991	44	.7679449	104	1.8151424
45	.0002182	45	.0130900	45	.7853982	105	1.8325957
46	.0002230	46	.0133809	46	.8028515	106	1.8500490
47	.0002279	47	.0136717	47	.8203047	107	1.8675023
48	.0002327	48	.0139626	48	.8377580	108	1.8849556
49	.0002376	49	.0142535	49	.8552113	109	1.9024089
50	.0002424	50	.0145444	50	.8726646	110	1.9198622
51	.0002473	51	.0148353	51	.8901179	111	1.9373155
52	.0002521	52	.0151262	52	.9075712	112	1.9547688
53	.0002570	53	.0154171	53	.9250245	113	1.9722221
54	.0002618	54	.0157080	54	.9424778	114	1.9896753
55	.0002666	55	.0159989	55	.9599311	115	2.0071286
56	.0002715	56	.0162897	56	.9773844	116	2.0245819
57	.0002763	57	.0165806	57	.9948377	117	2.0420352
58	.0002812	58	.0168715	58	1.0122910	118	2.0594885
59	.0002860	59	.0171624	59	1.0297443	119	2.0769418
60	.0002909	60	.0174533	60	1.0471976	120	2.0943951

CURTA

has the following features in common with heavy calculating machines:

Performance

It adds, subtracts, multiplies, divides, squares, cubes, extracts, square roots. CURTA is therefore the ideal machine for invoicing, estimates, calculation of interest, currency conversions, figuring out percentages, etc.

Accuracy

CURTA is fool-proof. Automatic devices prevent errors due to wrong handling. Special stops eliminate overspeeding of the axles in fast operation.

Speed

Exceptionally fast operation is possible thanks to the small size of all moving parts, the continuous tens transfer in both dials and the one-way (clockwise) operation of the handle.

Visibility

The neatly engraved figures appear clearly on the non-glare surface of the machine. The set numbers appear automatically in the horizontal setting dial.

Quality

Only rigorously tested materials are selected for all parts of the CURTA. All parts are interchangeable and can easily be replaced.

LENGTHS OF CIRCULAR ARCS: RADIUS = 1 (Continued)

Sec	Length	Min.	Length	Deg.	Length	Deg.	Length
21	.0001018	21	.0061087	21	.3665191	81	1.4137167
22	.0001067	22	.0063995	22	.3839724	82	1.4311700
23	.0001115	23	.0066904	23	.4014257	83	1.4486233
24	.0001164	24	.0069813	24	.4188790	84	1.4660766
25	.0001212	25	.0072722	25	.4363323	85	1.4835299
26	.0001261	26	.0075631	26	.4537856	86	1.5009832
27	.0001309	27	.0078540	27	.4712389	87	1.5184364
28	.0001357	28	.0081449	28	.4886922	88	1.5358897
29	.0001406	29	.0084358	29	.5061455	89	1.5533430
30	.0001454	30	.0087266	30	.5235988	90	1.5707963
31	.0001503	31	.0090175	31	.5410521	91	1.5882496
32	.0001551	32	.0093084	32	.5585054	92	1.6057029
33	.0001600	33	.0095993	33	.5759587	93	1.6231562
34	.0001648	34	.0098902	34	.5934119	94	1.6406095
35	.0001697	35	.0101811	35	.6108652	95	1.6580628
36	.0001745	36	.0104720	36	.6283185	96	1.6755161
37	.0001794	37	.0107629	37	.6457718	97	1.6929694
38	.0001842	38	.0110538	38	.6632251	98	1.7104227
39	.0001891	39	.0113446	39	.6806784	99	1.7278760
40	.0001939	40	.0116355	40	.6981317	100	1.7453293

Durability

Practically no wear can be noticed even after years of use. Tests over a long period have shown that the whole mechanism of the CURTA will stand up to millions of rotations.

Attractive appearance

Fine finish, shock-proof container.

Lower price

Thanks to its modern design and the latest manufacturing methods CURTA is sold at a much lower price than any machine of comparable performance.

Resistance to corrosion

CURTA is rust-proof and tropic-proof.

Silent action

On account of the small size of all moving parts and the use of automatic locking devices.

Convenient and easy operation

Thanks to the small weight, the easy action, the conveniently located "safe-grip" setting knobs, the clearly visible figures and the non-glare surface finish. For desk work the CURTA offers the special advantage that the operator remains in the same position for calculating as for his other work (compare the pictures on the two following pages).

LENGTHS OF CIRCULAR ARCS: RADIUS = 1

Sec.	Length	Min.	Length	Deg.	Length	Deg.	Length
1	.0000048	1	.0002909	1	.0174533	61	1.0646508
2	.0000097	2	.0005818	2	.0349066	62	1.0821041
3	.0000145	3	.0008727	3	.0523599	63	1.0995574
4	.0000194	4	.0011636	4	.0698132	64	1.1170107
5	.0000242	5	.0014544	5	.0872665	65	1.1344640
6	.0000291	6	.0017453	6	.1047198	66	1.1519173
7	.0000339	7	.0020362	7	.1221730	67	1.1693706
8	.0000388	8	.0023271	8	.1396263	68	1.1868239
9	.0000436	9	.0026180	9	.1570796	69	1.2042772
10	.0000485	10	.0029089	10	.1745329	70	1.2217305
11	.0000533	11	.0031998	11	.1919862	71	1.2391838
12	.0000582	12	.0034907	12	.2094395	72	1.2566371
13	.0000630	13	.0037815	13	.2268928	73	1.2740904
14	.0000679	14	.0040724	14	.2443461	74	1.2915436
15	.0000727	15	.0043633	15	.2617994	75	1.3089969
16	.0000776	16	.0046542	16	.2792527	76	1.3264502
17	.0000824	17	.0049451	17	.2967060	77	1.3439035
18	.0000873	18	.0052360	18	.3141593	78	1.3613568
19	.0000921	19	.0055269	19	.3316126	79	1.3788101
20	.0000970	20	.0058178	20	.3490659	80	1.3962634

Five-Place Logarithms (Continued)

N	0	1	2	3	4	5	6	7	8	9
85	92942	92993	93044	93095	93146	93197	93247	93298	93349	93399
86	93450	93500	93551	93601	93651	93702	93752	93802	93852	93902
87	93952	94002	94052	94101	94151	94201	94250	94300	94349	94399
88	94448	94498	94547	94596	94645	94694	94743	94792	94841	94890
89	94939	94988	95036	95085	95134	95182	95231	95279	95328	95376
90	95424	95472	95521	95569	95617	95665	95713	95761	95809	95856
91	95904	95952	95999	96047	96095	96142	96190	96237	96284	96332
92	96379	96426	96473	96520	96567	96614	96661	96708	96755	96802
93	96848	96895	96942	96988	97035	97081	97128	97174	97220	97267
94	97313	97359	97405	97451	97497	97543	97589	97635	97681	97727
95	97772	97818	97864	97909	97955	98000	98046	98091	98137	98182
96	98227	98272	98318	98363	98408	98453	98498	98543	98588	98632
97	98677	98722	98767	98811	98856	98900	98945	98989	99034	99078
98	99123	99167	99211	99255	99300	99344	99388	99432	99476	99520
99	99564	99607	99651	99695	99739	99782	99826	99870	99913	99957

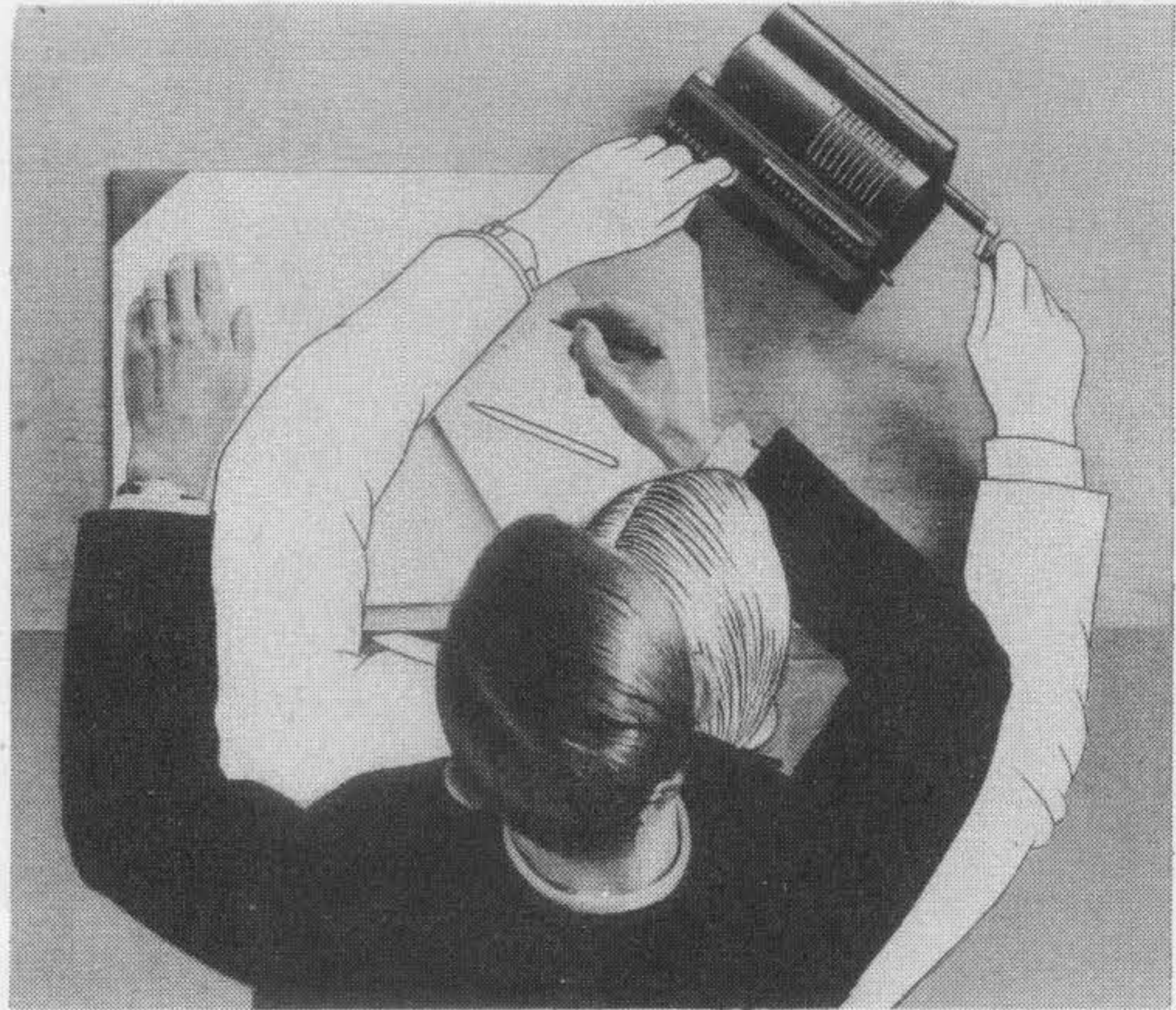


Fig. 1

COMPARE

the usual way . . .

With a heavy calculating machine:

- concentration focused alternately on TWO points
- many movements
- additional strain

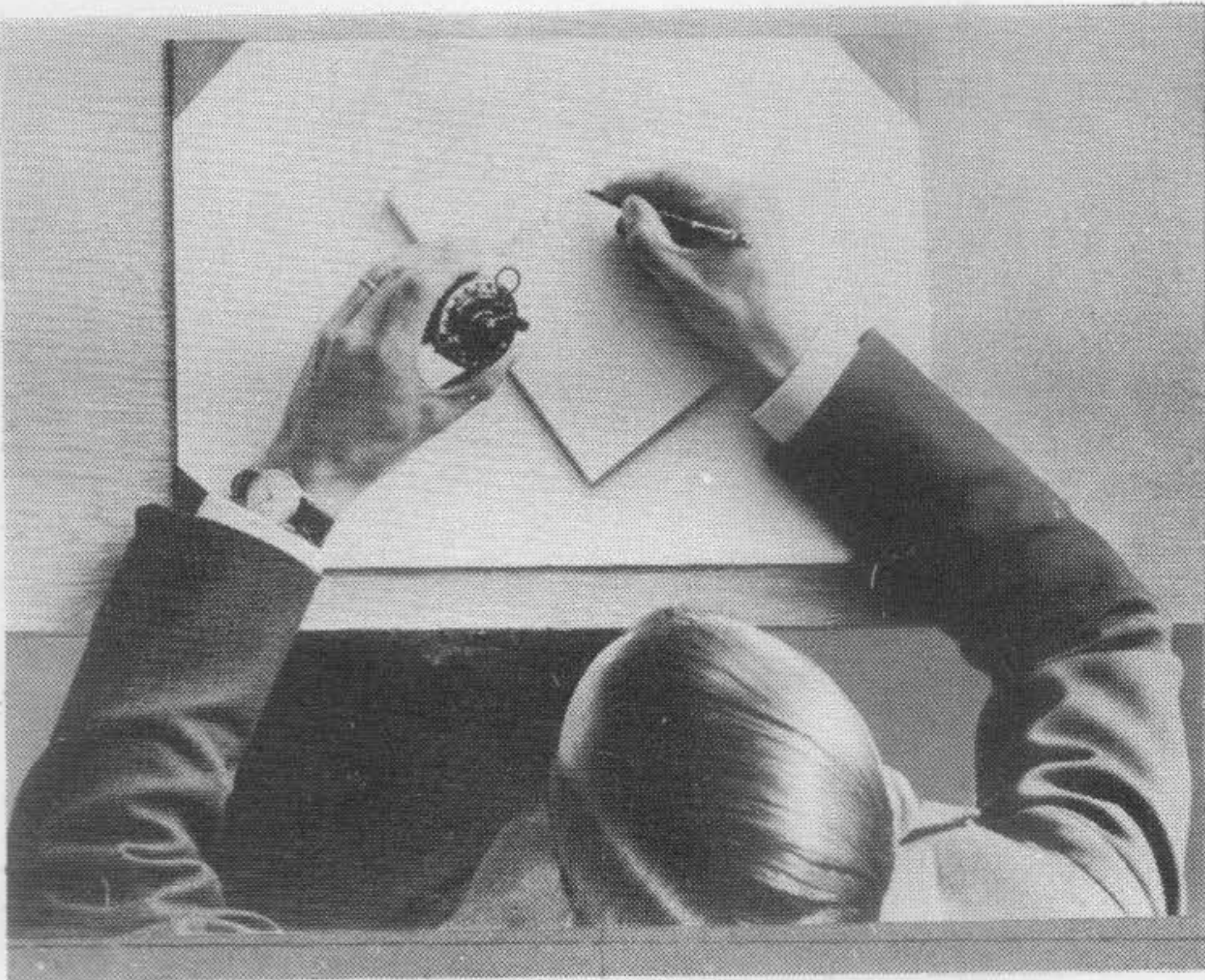


Fig. 2

... and the "CURTA" way

With the CURTA-Calculator

- concentration focused on ONE point only
- no unnecessary movements
- less strain

Five-Place Logarithms (Continued)

N	0	1	2	3	4	5	6	7	8	9
70	84510	84572	84634	84696	84757	84819	84880	84942	85003	85065
71	85126	85187	85248	85309	85370	85431	85491	85552	85612	85673
72	85733	85794	85854	85914	85974	86034	86094	86153	86213	86273
73	86332	86392	86451	86510	86570	86629	86688	86747	86806	86864
74	86923	86982	87040	87099	87157	87216	87274	87332	87390	87448
75	87506	87564	87622	87679	87737	87795	87852	87910	87967	88024
76	88081	88138	88195	88252	88309	88366	88423	88480	88536	88593
77	88649	88705	88762	88818	88874	88930	88986	89042	89098	89154
78	89209	89265	89321	89376	89432	89487	89542	89597	89653	89708
79	89763	89818	89873	89927	89982	90037	90091	90146	90200	90255
80	90309	90363	90417	90472	90526	90580	90634	90687	90741	90795
81	90849	90902	90956	91009	91062	91116	91169	91222	91275	91328
82	91381	91434	91487	91540	91593	91645	91698	91751	91803	91855
83	91908	91960	92012	92065	92117	92169	92221	92273	92324	92376
84	92428	92480	92531	92583	92634	92686	92737	92788	92840	92891

Five-Place Logarithms (Continued)

N	0	1	2	3	4	5	6	7	8	9
55	74036	74115	74194	74273	74351	74429	74507	74586	74663	74741
56	74819	74896	74974	75051	75128	75205	75282	75358	75435	75511
57	75587	75664	75740	75815	75891	75967	76042	76118	76193	76268
58	76343	76418	76492	76567	76641	76716	76790	76864	76938	77012
59	77085	77159	77232	77305	77379	77452	77525	77597	77670	77743
60	77815	77887	77960	78032	78104	78176	78247	78319	78390	78462
61	78533	78604	78675	78746	78817	78888	78958	79029	79099	79169
62	79239	79309	79379	79449	79518	79588	79657	79727	79796	79865
63	79934	80003	80072	80140	80209	80277	80346	80414	80482	80550
64	80618	80686	80754	80821	80889	80956	81023	81090	81158	81224
65	81291	81358	81425	81491	81558	81624	81690	81757	81823	81889
66	81954	82020	82086	82151	82217	82282	82347	82413	82478	82543
67	82607	82672	82737	82802	82866	82930	82995	83059	83123	83187
68	83251	83315	83378	83442	83506	83569	83632	83696	83759	83822
69	83885	83948	84011	84073	84136	84198	84261	84323	84386	84448

Short Description

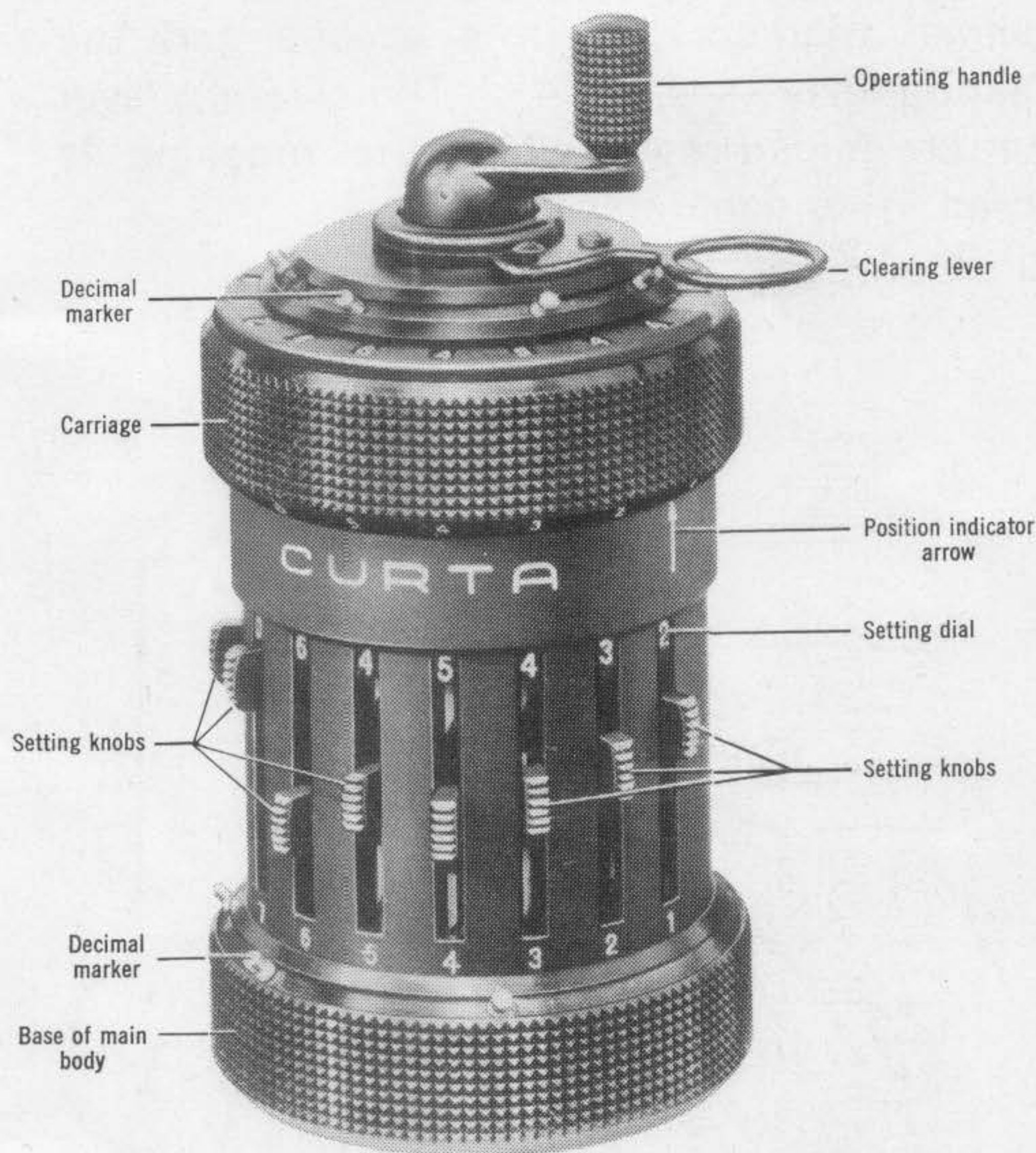


Fig. 3

The machine consists of the main body which bears at its top the revolving carriage (see fig. 3)

The main body contains the keyboard with the **setting knobs** protruding from slots, the adjustable white **decimal markers** at the base and the **setting dial** on top of the slots. The main axle, driven by the **operating handle**, passes through the center of the main body.

The carriage contains the **indicating dial** (white) and the **answering dial** (black), the **decimal markers** set in a groove and the **clearing lever** (see fig. 4). The clearing lever can be folded over when the machine is stored in its container.

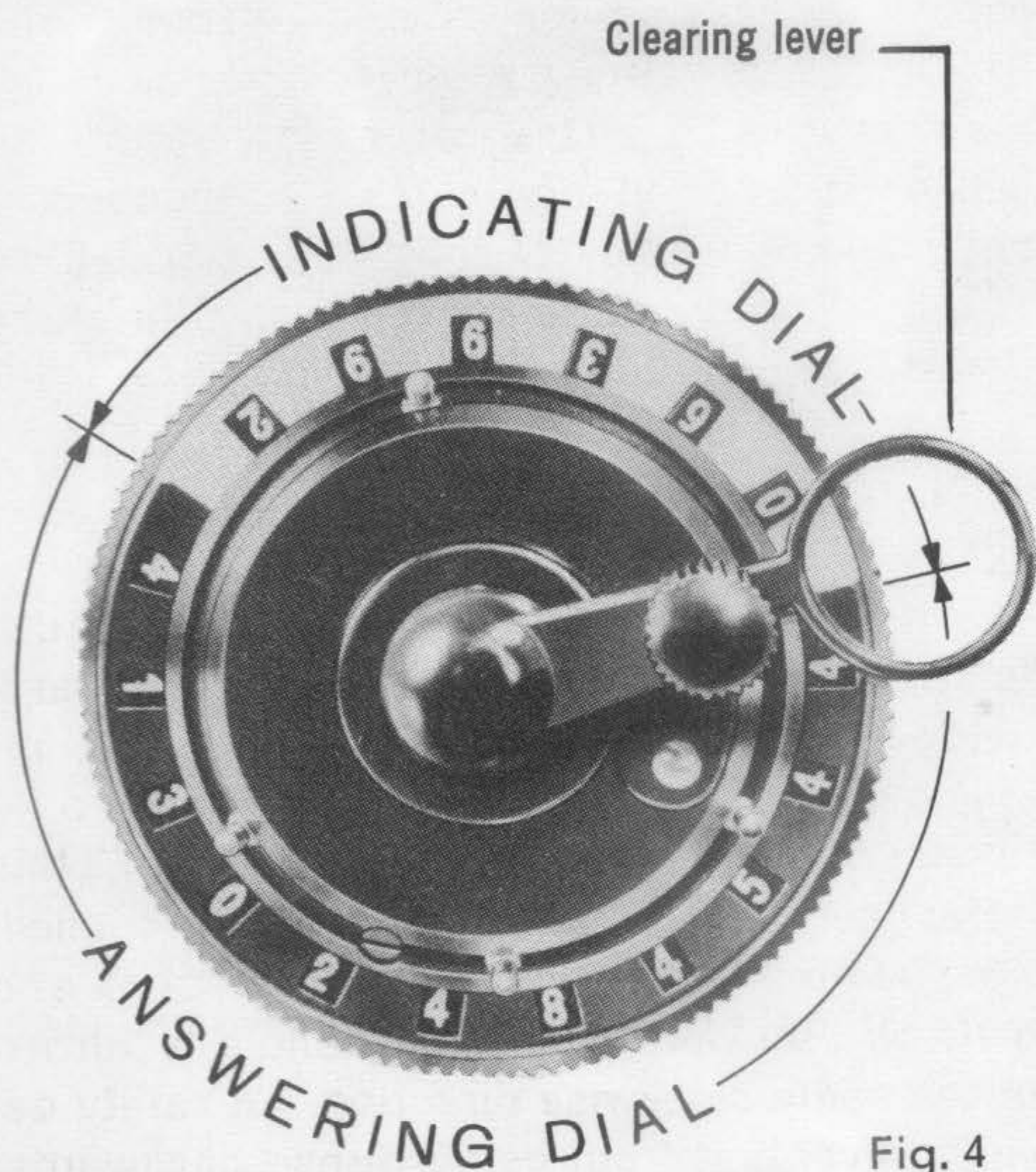


Fig. 4

Five-Place Logarithms (continued)

N	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
0	60206	61278	62325	63347	64345	65321	66276	67210	68124	69020	69897	70757	71600	72428	73239
1	60314	61384	62428	63448	64444	65418	66370	67302	68215	69108	69984	70842	71684	72509	73320
2	60423	61490	62531	63548	64542	65514	66464	67394	68305	69197	70070	70927	71767	72591	73400
3	60531	61595	62634	63649	64640	65610	66558	67486	68395	69285	70157	71012	71850	72673	73480
4	60638	61700	62737	63749	64738	65706	66652	67578	68485	69373	70243	71096	71933	72754	73560
5	60746	61805	62839	63849	64836	65801	66745	67669	68574	69461	70329	71181	72016	72835	73640
6	60853	61909	62941	63949	64933	65896	66839	67761	68664	69548	70415	71265	72099	72916	73719
7	60959	62014	63043	64048	65031	65992	66932	67852	68753	69636	70501	71349	72181	72997	73799
8	61066	62118	63144	64147	65128	66087	67025	67943	68842	69723	70586	71433	72263	73078	73878
9	61172	62221	63246	64246	65225	66181	67117	68034	68931	69810	70672	71517	72346	73159	73957

Five-Place Logarithms (Continued)

N	0	1	2	3	4	5	6	7	8	9
25	39794	39967	40140	40312	40483	40654	40824	40993	41162	41330
26	41497	41664	41830	41996	42160	42325	42488	42651	42813	42975
27	43136	43297	43457	43616	43775	43933	44091	44248	44404	44560
28	44716	44871	45025	45179	45332	45484	45637	45788	45939	46090
29	46240	46389	46538	46687	46835	46982	47129	47276	47422	47567
30	47712	47857	48001	48144	48287	48430	48572	48714	48855	48996
31	49136	49276	49415	49554	49693	49831	49969	50106	50243	50379
32	50515	50651	50786	50920	51055	51188	51322	51455	51587	51720
33	51851	51983	52114	52244	52375	52504	52634	52763	52892	53020
34	53148	53275	53403	53529	53656	53782	53908	54033	54158	54283
35	54407	54531	54654	54777	54900	55023	55145	55267	55388	55509
36	55630	55751	55871	55991	56110	56229	56348	56467	56585	56703
37	56820	56937	57054	57171	57287	57403	57519	57634	57749	57864
38	57978	58092	58206	58320	58433	58546	58659	58771	58883	58995
39	59106	59218	59329	59439	59550	59660	59770	59879	59988	60097

The **handling of the machine** is similar to that of ordinary large machines, except that it is held in one hand, preferably in the left, with thumb and forefinger gripping the knurled edge of the carriage. The carriage, when lifted, can easily be rotated in either direction within the number of positions of the indicating dial; it is correctly fixed by stops, each of which is determined by the **position indicator arrow** being even with one of the numbers on the lower edge of the carriage.

The setting of numbers (for example the terms of addition, one of the two multiplication factors, or the divisor) is done with the knobs projecting from the slots. Their zero position is at the top of the slots. To set a determined figure, the corresponding setting knob is moved down until the desired figure appears on the setting dial. The number set can thus be readily checked.

The **operating handle** is provided with a distinctly felt stop which enables the operator to count each turn. With a gentle pull, respectively pressure, it can be brought into its upper or back into its lower position, this latter serving for addition and multiplication, whereas the upper is for subtraction and division. In both cases the handle is turned in the same clockwise direction. A safety device prevents it from being turned backwards.

The **indicating dial** (white dial) counts the turns of the handle and indicates the number of items of an addition, the multiplier of a multiplication, the quotient of a division and the root when extracting square-roots.

The white dial will register the number of turns of the handle in the place corresponding to the number on the carriage edge indicated by the position indicator arrow.

The **answering dial** (black dial) shows the result of additions, subtractions and multiplications and in division the dividend or remainder (according to the method of division selected).

The tens transfer mechanism in both these dials saves considerable time for many operations by reducing the number of turns of the handle (viz. in shortcut-multiplication).

Among other advantages it permits the addition of multipliers which is important in cubing and percentage calculations.

The answering and the indicating dial are cleared with the **clearing lever** (see figs. 3 and 4.) It can be turned in both directions; two stops are provided between the black and the white dial. With one full turn in either direction both dials are cleared; however each dial can be cleared separately by merely sliding the clearing lever over it from one stop to the other.

Five-Place Logarithms

N		1	2	3	4	5	6	7	8	9
10	•	00000	30103	47712	60206	69897	77815	84510	90309	95424
11		00432	00860	01284	01703	02119	02531	02938	03342	03743
12		04532	04922	05308	05690	06070	06446	06819	07188	07555
13		08279	08636	08991	09342	09691	10037	10380	10721	11059
14		11727	12057	12385	12710	13033	13354	13672	13988	14301
15		14922	15229	15534	15836	16137	16435	16732	17026	17319
16		17898	18184	18469	18752	19033	19312	19590	19866	20140
17		20683	20952	21219	21484	21748	22011	22272	22531	22789
18		23300	23553	23805	24055	24304	24551	24797	25042	25285
19		25768	26007	26245	26482	26717	26951	27184	27416	27646
20		28103	28330	28556	28780	29003	29226	29447	29667	29885
21		30320	30535	30750	30963	31175	31387	31597	31806	32015
22		32428	32634	32838	33041	33244	33445	33646	33846	34044
23		34439	34635	34830	35025	35218	35411	35603	35793	35984
24		36361	36549	36737	36922	37107	37291	37475	37658	37840
		38202	38382	38561	38739	38917	39094	39270	39445	39620

Powers and Roots (Continued)

n	n ²	n ³	\sqrt{n}	$\sqrt[3]{n}$
71	5041	357911	8.4261498	4.1408177
72	5184	373248	8.4852814	4.1601676
73	5329	389017	8.5440037	4.1793392
74	5476	405224	8.6023253	4.1983365
75	5625	421875	8.6602540	4.2171633
76	5776	438976	8.7177979	4.2358236
77	5929	456533	8.7749644	4.2543209
78	6084	474552	8.8317609	4.2726587
79	6241	493039	8.8881944	4.2908404
80	6400	512000	8.9442719	4.3088694
81	6561	531441	9.0000000	4.3267487
82	6724	551368	9.0553851	4.3444815
83	6889	571787	9.1104336	4.3620707
84	7056	592704	9.1651514	4.3795191
85	7225	614125	9.2195445	4.3968297
86	7396	636056	9.2736185	4.4140050
87	7569	658503	9.3273791	4.4310476
88	7744	681472	9.3808315	4.4479602
89	7921	704969	9.4339811	4.4647451
90	8100	729000	9.4868330	4.4814047
91	8281	753571	9.5393920	4.4979414
92	8464	778688	9.5916630	4.5143574
93	8649	804357	9.6436508	4.5306549
94	8836	830584	9.6953597	4.5468359
95	9025	857375	9.7467943	4.5629026
96	9216	884736	9.7979590	4.5788570
97	9409	912673	9.8488578	4.5947009
98	9604	941192	9.8994949	4.6104363
99	9801	970299	9.9498744	4.6260650
100	10000	1000000	10.0000000	4.6415888

The reversing lever at the back of the machine acts on the indicating dial. This latter will operate in opposite sense to the answering dial when the reversing lever is brought into its lower position.

Calculating example. The numbers visible in figs. 3 and 4 illustrate the multiplication:

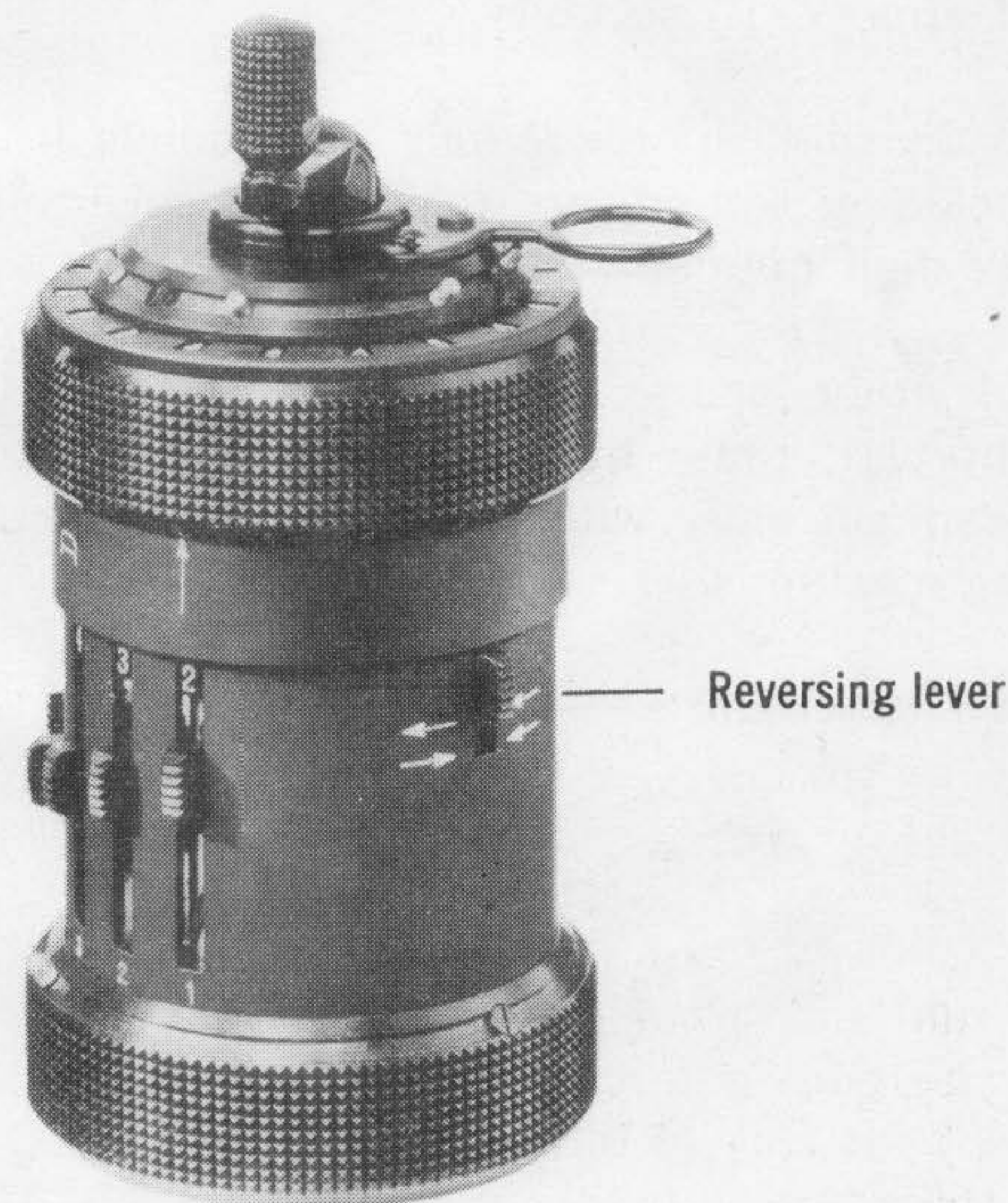


Fig. 5

Back view of the machine

645432 X 63992. The multiplicand appears in the setting dial (see fig. 3), the multiplier in the white dial and the product in the black dial (see fig. 4).

The total time required for this operation, including setting, is approx. 15 seconds when operating with 29 turns. In shortcut-multiplication, which is made possible by the tens transfer mechanism, only 13 turns are necessary, which corresponds to a calculating time of approx. 10 seconds.

In division, approximately 30 seconds in all, including setting, are required to ascertain a six digit quotient.

All other operations are performed in the shortest time by the same methods as used currently with large universal calculating machines.



The dust and shock proof container of the CURTA.

Fig. 6

Powers and Roots (Continued)

n	n ²	n ³	\sqrt{n}	$\sqrt[3]{n}$
36	1296	466 56	6.0000000	3.3019272
37	1369	506 53	6.0827625	3.3322219
38	1444	54872	6.1644140	3.3619754
39	1521	59319	6.2449980	3.3912114
40	1600	64000	6.3245553	3.4199519
41	1681	68921	6.4031242	3.4482172
42	1764	74088	6.4807407	3.4760266
43	1849	79507	6.5574385	3.5033981
44	1936	85184	6.6332496	3.5303483
45	2025	91125	6.7082039	3.5568933
46	2116	97336	6.7823300	3.5830479
47	2209	103823	6.8556546	3.6088261
48	2304	110592	6.9282032	3.6342412
49	2401	117649	7.0000000	3.6593057
50	2500	125000	7.0710678	3.6840315
51	2601	132651	7.1414284	3.7084298
52	2704	140608	7.2111026	3.7325112
53	2809	148877	7.2801099	3.7562858
54	2916	157464	7.3484692	3.7797631
55	3025	166375	7.4161985	3.8029525
56	3136	175616	7.4833148	3.8258624
57	3249	185193	7.5498344	3.8485011
58	3364	195112	7.6157731	3.8708766
59	3481	205379	7.6811457	3.8929964
60	3600	216000	7.7459667	3.9148676
61	3721	226981	7.8102497	3.9364972
62	3844	238328	7.8740079	3.9578916
63	3969	250047	7.9372539	3.9790572
64	4096	262144	8.0000000	4.0000000
65	4225	274625	8.0622577	4.0207258
66	4356	287496	8.1240384	4.0412400
67	4489	300763	8.1853528	4.0615481
68	4624	314432	8.2462113	4.0816551
69	4761	328509	8.3066239	4.1015659
70	4900	343000	8.3666003	4.1212853

Powers and Roots

n	n ²	n ³	\sqrt{n}	$\sqrt[3]{n}$
1	1	1	1.0000000	1.0000000
2	4	8	1.4142136	1.2599210
3	9	27	1.7320508	1.4422496
4	16	64	2.0000000	1.5874011
5	25	125	2.2360680	1.7099759
6	36	216	2.4494897	1.8171206
7	49	343	2.6457513	1.9129312
8	64	512	2.8284271	2.0000000
9	81	729	3.0000000	2.0800838
10	100	1000	3.1622777	2.1544347
11	121	1331	3.3166248	2.2239801
12	144	1728	3.4641016	2.2894285
13	169	2197	3.6055513	2.3513347
14	196	2744	3.7416574	2.4101423
15	225	3375	3.8729833	2.4662121
16	256	4096	4.0000000	2.5198421
17	289	4913	4.1231056	2.5712816
18	324	5832	4.2426407	2.6207414
19	361	6859	4.3588989	2.6684016
20	400	8000	4.4721360	2.7144176
21	441	9261	4.5825757	2.7589242
22	484	10648	4.6904158	2.8020393
23	529	12167	4.7958315	2.8438670
24	576	13824	4.8989795	2.8844991
25	625	15625	5.0000000	2.9240177
26	676	17576	5.0990195	2.9624961
27	729	19683	5.1961524	3.0000000
28	784	21952	5.2915026	3.0365890
29	841	24389	5.3851648	3.0723168
30	900	27000	5.4772256	3.1072325
31	961	29791	5.5677644	3.1413807
32	1024	32768	5.6568542	3.1748021
33	1089	35937	5.7445626	3.2075343
34	1156	39304	5.8309519	3.2396118
35	1225	42875	5.9160798	3.2710663

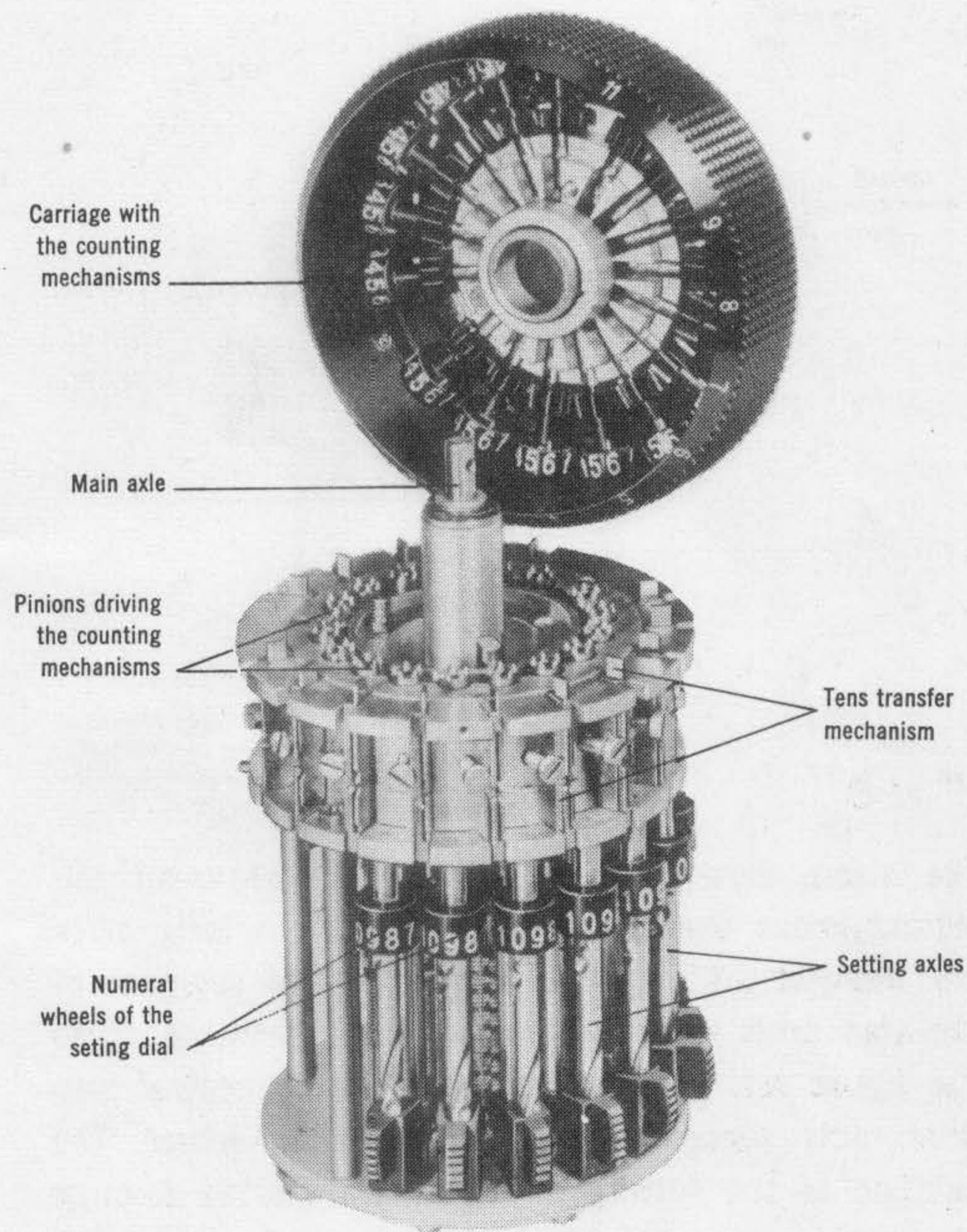


Fig. 7

View of the stripped main assemble with the carriage above.

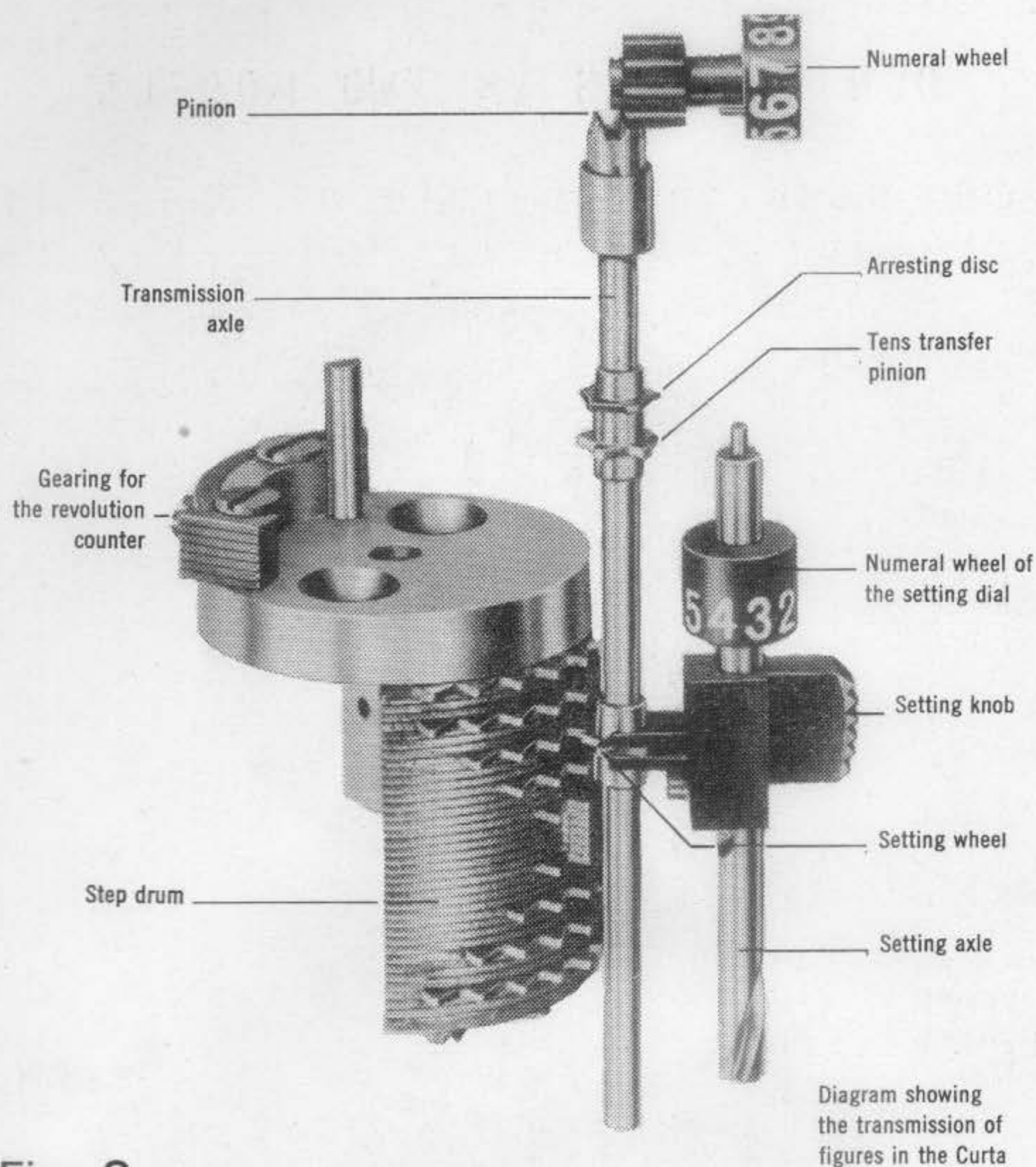
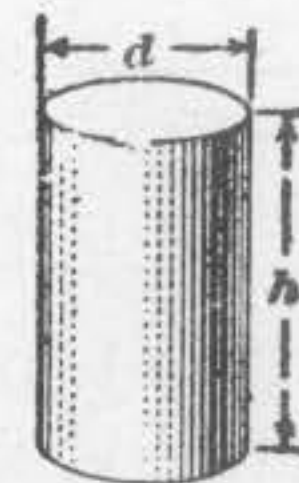


Fig. 8

The above illustration shows that by means of the setting knobs the setting wheels on the setting axles are brought within range of the toothed segment of the step drum whose number of teeth corresponds to the figure set. When rotating, the single central step drum acts successively on each setting wheel. The rotation of the setting wheels is transmitted through the pinions directly to the numeral wheels of the counting mechanisms. For clarity's sake the above illustration is confined to one single digit.

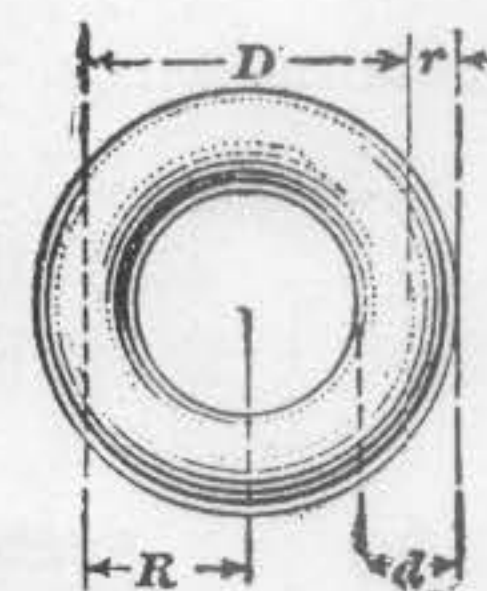
In the Curta, subtraction is converted to mere addition, the step drum acting automatically with its complementary teething when it is placed in its upper position. These simple construction principles result in a considerable economy of parts and are responsible for the robust design to which the Curta owes its high dependability.



Cylinder

Area of surface of cylinder = circumference multiplied by the height plus the area of both ends.

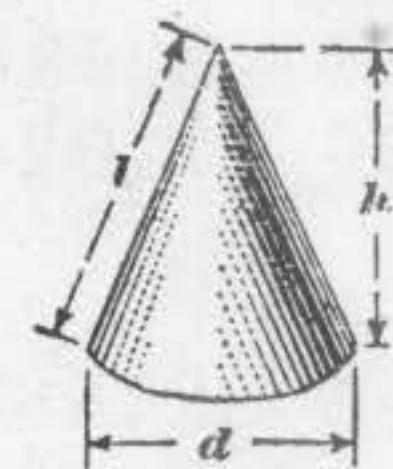
Volume of cylinder = area of base times the height or length; .7854 times square of diameter times height; 3.1416 times square of radius times height.



Circular Ring

Area of surface of circular link = 9.8696 times the mean diameter D times d .

Volume of circular link = 2.4674 times D times square of d .



Cone

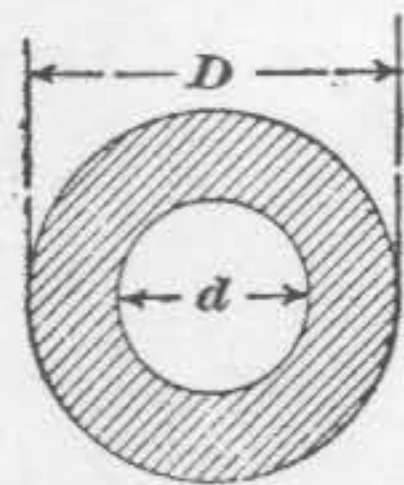
Area of convex surface of cone = 1.5708 times diameter of base times slant height.

Total surface = convex surface plus .7854 times square of diameter.

Volume of cone = square of the diameter of the base multiplied by .7854 times one-third of the height.

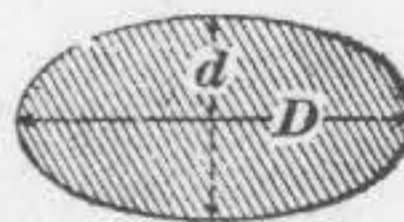
(Note: When either the angle E or the chord c is known the other may be found from a table of sines.)

Height h of segment of a circle =
 $= r - \sqrt{r^2 - \frac{1}{4}c^2}$



Ring

Area of ring = area of the large circle D minus the area of the small circle d
 $= \frac{\pi}{4}(D^2 - d^2)$



Ellipse

Area of ellipse = product of long diameter D and short diameter d multiplied by .7854.



Sphere

Area of surface of sphere = square of diameter multiplied by 3.1416.

Volume of sphere = cube of the diameter multiplied by .5236; or the cube of the radius multiplied by 4.1888.

CURTA COMES IN TWO MODELS

Both machines operate on the same principle, however Model # 2 is slightly larger to give you greater capacity.

Specifications

	MODEL # 1	MODEL # 2
	8 X 6 X 11	11 X 8 X 15
Keyboard	8 columns	11 columns
Result Dial	11 columns	15 columns
Counting Dial	6 columns	8 columns
Add or Multiply to	11 places	15 places
Divide to	6 places	8 places
Diameter	2 ¹ / ₁₆ in. (53 mm)	2 ⁹ / ₁₆ in. (65 mm)
Height	3 ³ / ₈ in. (85 mm)	3 ⁵ / ₈ in. (90 mm)
Weight	8 ozs. (230 g)	12 ¹ / ₂ ozs. (360 g)

Our machines give the accuracy of a desk calculator plus the portability of a slide rule.

SERVICE

Curta is made entirely of high quality metals, with the same manufacturing precision as a fine watch, therefore service required is kept at a minimum. We recommend, however, that once every two years, machines be sent in for cleaning and lubrication.

When machine does require service, you may return it to the dealer from which it was purchased. If you are some distance away, you may send it via ordinary parcel post, in its metal shock-proof container. Place the entire machine in its container into a small carton or wrap with several layers of newspaper or corrugated paper. Prices for servicing our machine are comparable to that of a watch rather than of a desk calculating machine.

WHERE AND HOW TO BUY CURTA

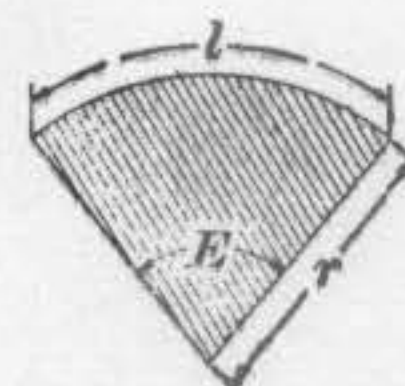
You may purchase our machines from the dealer or distributor whose name appears on the back of this book. Our guarantee, our terms of sale, are the same regardless of which dealer your machine is purchased from: i.e. purchase may be made on a money back guarantee. Check with your dealer regarding local taxes, cash discount, open account, time payments, if desired, etc.

(written πd); 6.2832 times the radius, or $2\pi r$; 4 times the area divided by the diameter.

Area of circle = half the diameter multiplied by half the circumference; .7854 times the square of the diameter; 3.1416 times the square of half the diameter; (square of the radius multiplied by 3.1416) circumference times the diameter divided by 4

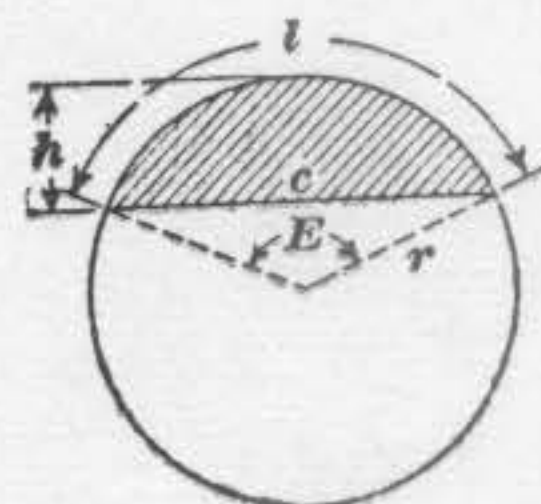
Radius of circle = half the diameter; circumference multiplied by .159155; circumference divided by 6.2832; .564189 times the square root of the area.

Diameter of circle = twice the radius; circumference divided by 3.1416; circumference multiplied by .3183; 1.128 times the square root of the area.



Sector

Area of sector of circle = length of arc l times half its radius r ; area of whole circle divided by 360 and multiplied by the number of degrees in the angle E . Square of the radius multiplied by the number of degrees in the angle E and by .00873.

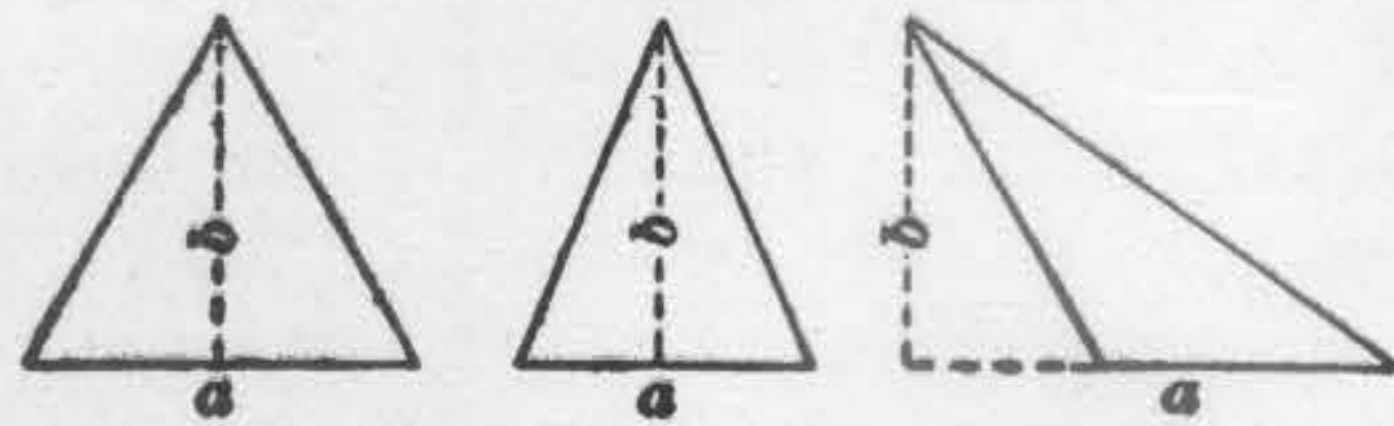


Segment

Area of segment of circle = area of sector minus the area of the triangle formed by the chord and the two radii = $\frac{1}{2} lr - [c(r-h)]$.

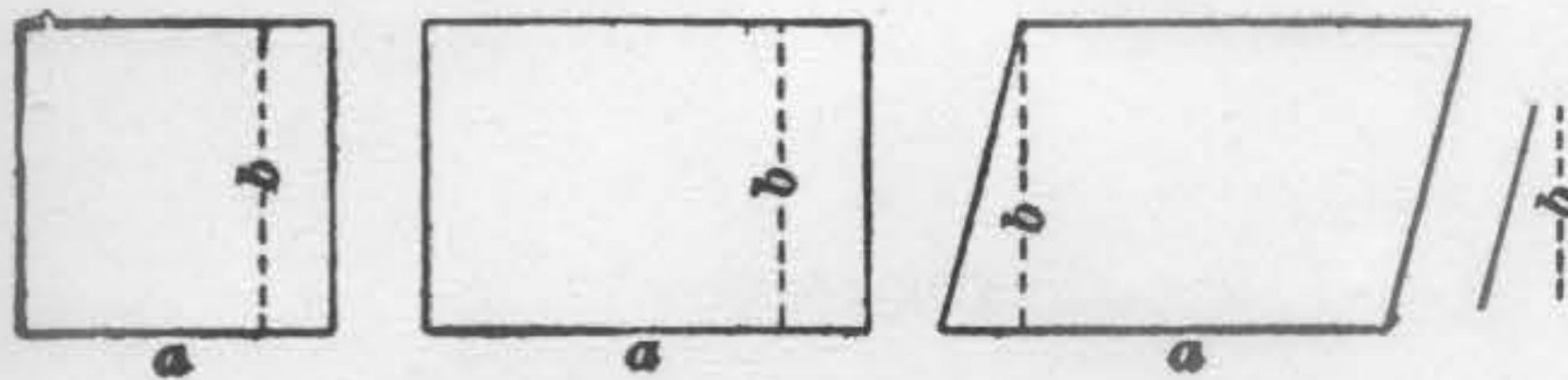
MENSURATION

TRIANGLES

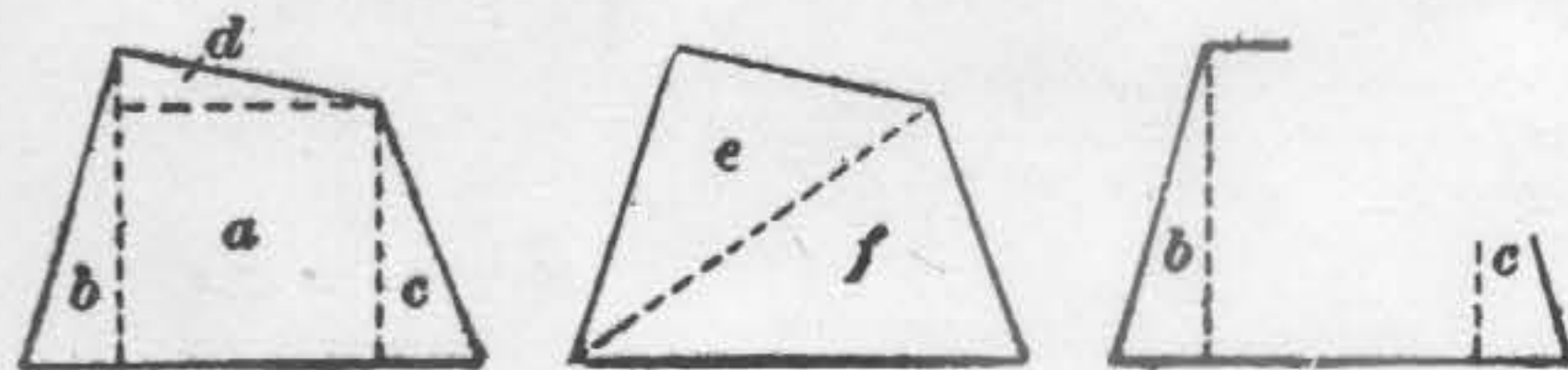


Area = base a times $\frac{1}{2}$ altitude b .

QUADRILATERALS



Area = base a times altitude b .



Area = area of rectangle a plus area of triangles b , c , and d .

Area = triangle e + area of triangle f .

Area = area of rectangle a plus area of triangles b and c .



CIRCLE

(Circumference of circle = 3.1416 times the diameter, $3 \frac{1}{7}$ times the diameter, approximately; π times the diameter)

ACCESSORY

For those who wish to use Curta in the field, we have a leather shoulder strap carrying case.

Leather case for Small Machine:
No. 1 (holds calculator without metal case)

Leather case for Large Machine:
No. 2 (holds calculator without metal case)

Leather case for Large Machine Only:
No. S 2 (holds calculator in metal case)
Also has belt loop

Every CURTA-machine is supplied with detailed operating instructions giving the elementary rules for addition, subtraction, multiplication and division.

In addition, a booklet containing the following computing examples for the CURTA calculating machines is included:

General

Division by breaking down (subtractive method)

Division by multiplying by a reciprocal
The rule of three

The rule of three in a single calculation (only CURTA Model # 2)

Extended rule of three $\frac{a \times b \times c}{d \times e \times f}$

Calculation of roots

Continued multiplication $a \times b \times c \times d \dots$, etc.

Cubes without intermediate notes

Commerce and Industry

Checking of invoices and goods

Percentage calculations

A) Percentage increase

B) Percentage decrease

(Continued on next page)

(Continued from preceding page)

- C) Profit margin
 - D) Compound percentages
 - E) Profit and loss
 - F) Capital and interest
- Costing
 Costing with simultaneous control (only CURTA Model # 2)
 Calculations with nines transfer
 Exchange calculations
 Calculations with English currency

STATISTICS

- Simultaneous accumulation of a sum and a sum of squares (only CURTA Model # 2)
- Computation of arithmetic mean and standard deviation

Technical and Survey Calculations

- Division into a negative number (complementary number)
- Calculation of co-ordinates
- Determination of the amount of silver in an alloy (only CURTA Model # 2)
- Determination of the angles in an acute-angled triangle, given three sides (only CURTA Model # 2)
- Determination of a side of an obtuse-angled triangle (given the two other sides and their included angle)
- Calculation of area from co-ordinates
- Calculation of the distance between two points, given their co-ordinates (using Pythagoras' theorem)
- Calculation of distance and azimuth (only CURTA Model # 2)
- Linear interpolation

MEASURES OF VOLUME AND CAPACITY

1 liter	{	= 1 cu. dm.
		= 61.023 cu. in.
		= .0353 cu. ft.
		= 2.202 lb. water at 62° F.
		= 1.0567 U. S. qt.
		= .2642 U. S. gal.
1 cubic centimeter		= .061 cu. in.
1 cubic meter	{	= 264.2 U. S. gal
		= 1.308 cu. yd.
		= 35.314 cu. ft.
1 cubic inch		= 16.387 cu. cm.
		= 28.317 cu. dm.
1 cubic foot	{	= 28.317 l.
		= .02832 cu. m.
1 cubic yard		= .7645 cu. m.
1 U. S. gallon		= 3.785 l.
1 British gallon		= 4.543 l.
1 U. S. quart		= .946 l.

MEASURES OF WEIGHT

1 gram		= 15.432 gr.
1 kilogram	{	= 2.2046 lb. (av.)
		= 35.274 oz. (av.)
1 metric ton	{	= 2204.6 lb. (av.)
		= .9842 long ton
		= 1.1023 short ton
1 grain		= .0648 g.
1 ounce (av.)		= 28.35 g.
1 pound (av.)		= .4536 kg.
1 short ton		= .907 M. T.
1 long ton	{	= 1.016 M. T.
		= 1016 kg.

MISCELLANEOUS CONVERSION FACTORS

1 horsepower	{	= 33,000 ft.-lb. per min.
		= 550 ft.-lb. per sec.
		= 2,546 B. t. u. per hr.
		= 42.4 B. t. u. per min.
		= .71 B. t. u. per sec.
		= 746 watts
		= 1,000 watts
1 kilowatt	{	= 1.34 hp
		= 44,250 ft.-lb. per min.
		= 57 B. t. u. per min.
1 watt	{	= Unit of electrical power
		= .00134 hp.
		= 44.25 ft.-lb. per min.
		= .74 ft.-lb. per sec.
		= 3.42 B. t. u. per hr.
a degree Fahrenheit		= .555°C.
1 degree centigrade		= 1.8°F.
1 B. t. u.		= 777.5 ft.-lb.
1 calorie		= 3.968 B. t. u.
1 pound per square inch		= .0703 kg. per sq. cm.
1 gram per square millimeter		= 1.422 lb. per sq. in.
1 pound per square foot		= 4.882 kg. per sq. m.
1 inch mercury	{	= 1.133 ft. water
		= .4912 lb. per sq. in.

MEASURES OF CAPACITY

10 milliliters (ml.)	=	1 centiliter	cl.
10 centiliters	=	1 deciliter	dl.
10 deciliters	=	1 liter	l.
10 liters	=	1 decaliter	Dl.
10 decaliters	=	1 hectoliters	Hl.
10 hectoliters	=	1 kiloliters	Kl.

The liter is equal to the volume that is occupied by 1 cubic decimeter.

MEASURES OF WEIGHT

10 milligrams (mg.)	=	1 centigram	cg.
10 centigrams	=	1 decigram	dg.
10 decigrams	=	1 gram	g.
10 grams	=	1 decagram	Dg.
10 decagrams	=	1 hectogram	Hg.
10 hectograms	=	1 kilogram	Kg.
1,000 kilograms	=	1 ton (metric)	M.T.

The gram is the weight of 1 cubic centimeter of pure distilled water at a temperature of 39.2° F.; the kilogram is the weight of 1 liter of water; the ton is the weight of 1 cubic meter of water.

METRIC CONVERSION FACTORS

MEASURES OF LENGTH

1 millimeter	=	.03937 in.
1 centimeter	=	.3937 in.
1 meter	=	39.37 in.
1 kilometer	=	3,280.83 ft.
	=	1,093.61 yd.
1 inch	=	25.4 mm.
	=	2.54 cm.
1 foot	=	.0254 m.
	=	304.8 mm.
1 yard	=	.9144 m.
1 mile	=	1.609 km.

MEASURES OF AREA

1 square millimeter	=	.00155 sq. in.
1 square centimeter	=	.155 sq. in.
1 square meter	=	10.764 sq. ft.
	=	1.196 sq. yd.
1 are	=	.0247 acre
	=	1076.4 sq. ft.
1 hectare	=	2.471 acres
	=	107,640 sq. ft.
1 square kilometer	=	.3861 sq. mi.
	=	247.1 acres
1 square inch	=	645.2 sq. mm.
	=	6.452 sq. cm.
1 square foot	=	929 sq. cm.
	=	.0929 sq. m.
1 square yard	=	.836 sq. m.
1 acre	=	40.47 ares
	=	.4047 hec.
1 square mile	=	2.5899 sq. km.

ARITHMETICAL COMPUTATION

FRACTIONS

To Reduce Common Fractions: Divide the numerator and denominator by common divisors until further reduction is impossible: $63/81 = 21/27 = 7/9$.

To Reduce Improper Fractions: Divide the numerator by the denominator, the quotient being a whole number and the remainder the new numerator: $43/6 = 43 \div 6 = 7 \frac{1}{6}$.

To Express a Fraction as a Decimal: Divide the numerator by the denominator: $3/4 = 3.00 \div 4 = 0.75$.

To Reduce Complex Fractions: First express both numerator and denominator as simple fractions then multiply the upper numerator by the lower denominator for the new numerator and the lower numerator by the upper denominator

for the new denominator: $\frac{1\frac{3}{4}}{5/6} = \frac{7/4}{5/6} = \frac{42}{20} = \frac{21}{10} = 2 \frac{1}{10}$.

To Reduce Fractions to a Common Denominator: Multiply the numerator of each fraction by the product of all of the denominators except its own for the new numerators and multiply all denominators together for the new common denominator: $2/3, 1/4, 3/5 = 40/60, 15/60, 36/60$.

To Add Fractions: Reduce to a common denominator and add the numerators: $3/4 + 2/3 = 9/12 + 8/12 = 17/12 = 1 \frac{5}{12}$.

To Subtract Fractions: Reduce to a common denominator and subtract numerators: $3/4 - 2/3 = 9/12 - 8/12 = 1/12$.

To Multiply Fractions: Multiply the numerators for a new numerator and the denominators for a new denominator: $3/4 \times 5/8 = 15/32$.

To Divide Fractions: Invert the divisor and multiply: $3/4 \div 7/8 = 3/4 \times 8/7 = 24/28 = 6/7$.

DECIMALS

To Express a Decimal as a Fraction: Ignore the decimal point and write the figures as the numerator of the fraction. For the denominator write a figure 1 with as many ciphers after it as there were figures following the

decimal point in the original decimal: $.0125 = \frac{125}{10000}$

To Add or Subtract Decimals: Set down the figures so that the decimal points are one above the other and proceed as in simple addition or subtraction.

To Multiply Decimals: Proceed as in simple multiplication pointing off as many decimal places in the result as there are in the multiplier and multiplicand together.

To Divide Decimals: Proceed as in simple division pointing off as many decimal places in the quotient as there are decimal places in the dividend in excess of the divisor.

RATIO AND PROPORTION

Ratio: The relation of one figure to another is termed the ratio and is sometimes expressed as a fraction with the first quantity as the numerator: the ratio of 1 to 2 = $1:2 = \frac{1}{2}$.

Proportion: When ratios are equal to each other they are said to be in proportion. The ratio of 3 to 6 = $3:6 = \frac{1}{2}$, therefore it is equal to and in proportion to the ratio of 1 to 2 and the proportion would be written $3:6 = 1:2$ and read '3 is to 6 as 1 is to 2.'

The first and last terms in a statement of proportion are called the extremes and the middle terms the means. A rule of proportion is that 'the product of the extremes is equal to the product of the means'. Thus, in the example given above: $3 \times 2 = 6$ and $6 \times 1 = 6$.

Mean Proportional: When the middle terms are identical this quantity is called the mean proportional of the first and last terms. In $1:2 = 2:4$, 2 is the mean proportional between 1 and 4. To find the mean proportional of any two terms multiply them and extract the square root of their product: Thus the mean proportional of 2 and 50 is

$\sqrt{2 \times 50} = \sqrt{100} = 10$ and therefore $2:10 = 10:50$.

Formulas Based on Proportion: If proportion is expressed algebraically as $a:b=c:d$, then $ad = bc$ $\frac{a}{b} = \frac{c}{d}$

$a = \frac{bc}{d}$ $b = \frac{ad}{c}$ $c = \frac{ad}{b}$, and $d = \frac{bc}{a}$: thus having

given any three terms the fourth can be determined.

UNITED STATES LIQUID MEASURE

4 gills (gi.)	= 1 pint	pt.
2 pints	= 1 quart	qt.
4 quarts	= 1 gallon	gal.
31 1/2 gallons	= 1 barrel	bbl.

The U. S. gallon contains 231 cu. in.; hence, there are 7.481 gal. in a cu. ft.

MEASURES OF TIME

60 seconds (sec.)	= 1 minute	min.
60 minutes	= 1 hour	hr.
24 hours	= 1 day	da.
7 days	= 1 week	wk.
365 days	= 1 year	yr.

MISCELLANEOUS MEASURES

12 articles	= 1 dozen	1 league	= 3 miles
12 dozen	= 1 gross	1 fathom	= 6 feet
12 gross	= 1 great gross	1 hand	= 4 inches
20 articles	= 1 score	1 palm	= 3 inches
24 sheets	= 1 quire	1 span	= 9 inches
20 quires	= 1 ream		

METRIC SYSTEM

MEASURES OF LENGTH

1,000 microns	= 1 millimeter	mm.
10 millimeters	= 1 centimeter	cm.
10 centimeters	= 1 decimeter	dm.
10 decimeters	= 1 meter	m.
10 meters	= 1 decameter	Dm.
10 decameters	= 1 hectometer	Hm.
10 hectometers	= 1 kilometer	Km.

MEASURES OF SURFACE (NOT LAND)

100 square millimeters (mm. ²)	= 1 square centimeter	cm. ² .
100 square centimeters	= 1 square decimeter	dm. ² .
100 square decimeters	= 1 square meter	m. ² .

MEASURES OF VOLUME

1,000 cubic millimeters (mm. ³)	= 1 cubic centimeter	cm. ³ .
1,000 cubic centimeters	= 1 cubic decimeter	dm. ³ .
1,000 cubic decimeters	= 1 cubic meter	m. ³ .

UNITED STATES DRY MEASURE

2 pints (pt.)	= 1 quart	qt.
8 quarts	= 1 peck	pk.
4 pecks	= 1 bushel	bu.

The U. S. struck bushel (level full) contains 2,150.42 cu. in.; a heaped bushel contains 1 1/4 struck bushels.

BRITISH IMPERIAL MEASURE

4 gills	= 1 pint	= 34.683 cu. in.
2 pints	= 1 quart	= 69.366 cu. in.
4 quarts	= 1 gallon	= 277.463 cu. in.
2 gallons	= 1 peck	= 554.926 cu. in.
4 pecks	= 1 bushel	= 2,219.704 cu. in.

One imperial gallon contains approximately 1.2 U. S. gal.; and one imperial bushel contains approximately 1.03 U. S. bu.

CIRCULAR MEASURE

60 seconds (")	= 1 minute	'
60 minutes	= 1 degree	°
90 degrees	= 1 quadrant	□
360 degrees	= 1 circle	⊙

USEFUL TABLES AND RULES

WEIGHTS AND MEASURES

MEASURES OF LENGTH

12	inches (in.)	=	1 foot	ft.
3	feet	=	1 yard	yd.
5 1/2	yards	=	1 rod	rd.
5,280	feet	=	1 statute mile	mi.
6,080	feet	=	1 nautical mile	mi.
6	feet	=	1 fathom	f.
7.92	inches	=	1 link	li.
100	links	=	1 chain	ch.
80	chains	=	1 statute mile	mi.
1	mil	=	.001 inch	
1	microinch	=	.000001 inch	

MEASURES OF AREA

144	square inches (sq. in.)	=	1 square foot	sq. ft.
9	square feet	=	1 square yard	sq. yd.
30 1/4	square yards	=	1 square rod	sq. rd.
272 1/4	square feet	=	1 square rod	
160	square rods	=	1 acre	A.
640	acres	=	1 square mile	sq. mi.
1	circular inch	=	.7854 square inch	
1	square inch	=	1.2732 circular inches	
1	circular mil	=	area of a circle .001 inch in diameter	
1	square inch	=	1,273,239 circular mils	
A square 208.71 ft. on a side contains 1 A., or 43,560 sq. ft.				
A square mile, or 640 A., is known as a section.				

AVOIRDUPOIS WEIGHT

437.5	grains (gr.)	=	1 ounce	oz.
16	ounces (7,000 grains)	=	1 pound	lb.
2,000	pounds	=	1 short ton	T.
2,240	pounds	=	1 long ton	T.

TROY WEIGHT

24	grains (gr.)	=	1 pennyweight	dwt.
20	pennyweights	=	1 ounce	oz.
12	ounces (5,760 grains)	=	1 pound	lb.

APOTHECARIES' (DRUGGISTS') WEIGHT

20	grains (gr.)	=	1 scruple	sc.
3	scruples	=	1 dram	dr.
8	drams	=	1 ounce	oz.
12	ounces (5,760 grains)	=	1 pound	lb.
The grain has the same value in all three of these systems of weight.				

CUBIC MEASURE

1,728	cubic inches (cu. in.)	=	1 cubic foot	cu. ft.
27	cubic feet	=	1 cubic yard	cu. yd.
128	cubic feet	=	1 cord (of wood)	cd.
16 1/2 to 25	cubic feet	=	1 perch (of masonry)	P.
100	cubic feet	=	1 register ton	
= 40 cubic feet				
1	U. S. shipping ton.	=	31.16 imperial bushels	
		=	32.143 U. S. bushels	
= 42 cubic feet				
1	British shipping ton.	=	32.719 imperial bushels	
		=	33.75 U. S. bushels	

BUSINESS FORMULA

DISCOUNT

To find the amount of a discount, multiply the list price, or base, by the rate of discount.

Formula: $P = B \times R$, indicating the first type of percentage problem.

To find the net price, subtract the amount of the discount from the original or list price.

Formula:

$$\text{Difference} = \text{Base} - \text{Percentage}$$

$$D = B - P$$

COMMISSION OR BROKERAGE

To find the commission, multiply the principal amount, or the base, by the rate of commission.

Formula:

$$\text{Commission (P)} = \text{Base (B)} \times \text{Rate (R)},$$

or

$$P = B \times R$$

INTEREST

Interest problems employ the rules of percentage problems but include the additional factor of time.

The **interest** (I) is the amount of money paid for the use of money.

The **principal** (P) is the base, or the money for the use of which interest is paid.

The **rate** (R) is the percent charged on the basis of one year's use of the money.

The **time** (T) is the number of years, months and days over which the money is used. Note especially that 30 days are considered a month and 360 days are considered a year.

The **amount** (A) is the sum of the principal and the interest.

To find the interest for any given period of time, multiply the principal by the rate by the time.

Formula: $I = P \times R \times T$

To find the amount, add the interest (I) to the principal (P).

Formula: $A = P + I$

To find the rate when the principal, interest and time are given, divide the total interest by the time to get the amount of the interest for one year; then divide this quotient by the principal.

To find the time when the principal, interest and rate percent are given, multiply the principal by the rate to obtain the amount of interest for one year; then divide the total interest by the interest for one year.

To find the principal when the interest, the rate percent and the time are given, divide the interest by the time to get the interest for one year, then divide this by the rate.

To find the principal when the amount, rate percent and time are given, divide the given amount by the amount of \$1 for the given time at the given rate.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.49865	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
4.0	.4999683									

Illustration: For $z = 1.93$, shaded area is .4732 out of total area of 1.

COMPOUND INTEREST

Compound interest is interest which for each successive interest period is figured on a base that represents the original principal plus all the interest that has accrued in previous interest periods.

To compute compound interest, add the interest for each period to the principal before figuring the interest for the next period.

PROFIT AND LOSS

PROFIT AND LOSS BASED ON COST

To find the percent gain or loss, divide the amount gained or lost by the cost.

To find the gain and the selling price when the cost and the percent gain are given, multiply the cost by the percent gain and add the result to the cost.

To find the loss and the selling price when the cost and the percent loss are given, multiply the cost by the percent loss and subtract the product from the cost.

To find the cost when the profit and the percent profit are given or to find the cost when the loss and the percent loss are given, divide the profit or loss by the percent profit or loss.

To find the cost when the selling price and the percent profit are given, divide the selling price by 1 plus the percent profit.

Table of Areas from Mean to Distance z from Mean for Normal Probability Distribution



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
0.7	.2580	.2612	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319

To find the cost when the selling price and the percent loss are given, divide the selling price by 1 minus the percent loss.

PROFIT AND LOSS BASED ON SELLING PRICE

To find the percent profit or loss, divide the amount gained or lost by the selling price.

To find the profit and the cost when the selling price and the percent profit are given, multiply the selling price by the percent profit and subtract the result from the selling price.

To find the loss and the cost when the selling price and the percent loss are given, multiply the selling price by the percent loss and add the result to the selling price.

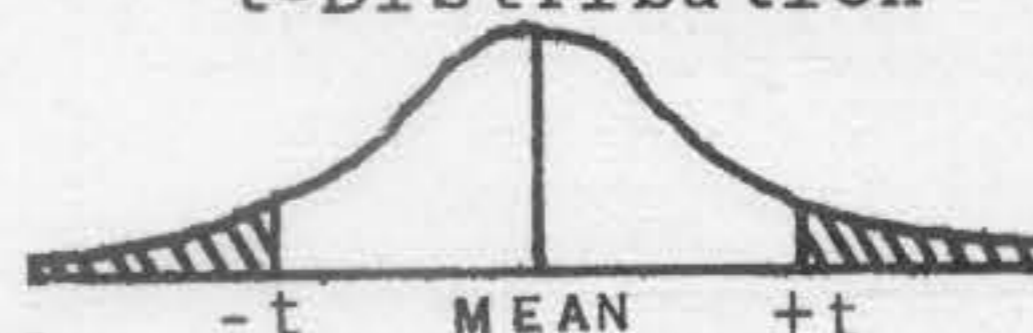
To find the selling price when the profit and the percent profit are given, or to find the selling price when the loss and the percent loss are given, divide the profit or loss by the percent profit or loss.

To find the selling price when the cost and the percent profit are given, subtract the percent profit from 100% and divide the cost by the remainder.

To reduce percent profit on selling price to percent mark-up (percent profit on cost), divide profit on selling price by 100% minus percent profit on selling price.

To find the selling price when the cost and the percent loss are given, add the percent loss to 100% and divide the cost by this sum.

Table of t-Values Corresponding to Various Areas in Both Tails of t-Distribution



Degrees of Confidence	.90	.95	.98	.99
Degrees of Freedom	Total Area in Both Tails			
1	6.314	12.706	31.821	63.657
2	2.920	4.303	6.965	9.925
3	2.353	3.182	4.541	5.841
4	2.132	2.776	3.747	4.604
5	2.015	2.571	3.365	4.032
6	1.943	2.447	3.143	3.707
7	1.895	2.365	2.998	3.499
8	1.860	2.306	2.896	3.355
9	1.833	2.262	2.821	3.250
10	1.812	2.228	2.764	3.169
11	1.796	2.201	2.718	3.106
12	1.782	2.179	2.681	3.055
13	1.771	2.160	2.650	3.012
14	1.761	2.145	2.624	2.977
15	1.753	2.131	2.602	2.947
16	1.746	2.120	2.583	2.921
17	1.740	2.110	2.567	2.898
18	1.734	2.101	2.552	2.878
19	1.729	2.093	2.539	2.861
20	1.725	2.086	2.528	2.845
21	1.721	2.080	2.518	2.831
22	1.717	2.074	2.508	2.819
23	1.714	2.069	2.500	2.807
24	1.711	2.064	2.492	2.797
25	1.708	2.060	2.485	2.787
26	1.706	2.056	2.479	2.779
27	1.703	2.052	2.473	2.771
28	1.701	2.048	2.467	2.763
29	1.699	2.045	2.462	2.756
30	1.697	2.042	2.457	2.750
Normal Distribution	1.645	1.960	2.326	2.576

Illustration: The t-value for 9 degrees of freedom corresponding to area of .05 in both tails is 2.262.

$\sigma \bar{x}$ = standard deviation of the population being sampled

N = finite population size

n = sample size

$\frac{N - n}{N - 1}$ = finite correction factor

SAMPLING

Standard Deviation of the Sample Mean

Infinite Populations

$$s_{\bar{x}} = \frac{s_x}{\sqrt{n}}$$

Finite Populations

$$s_{\bar{x}} = \sqrt{\frac{N - n}{N - 1} \cdot \frac{s_x}{\sqrt{n}}}$$

s_x = sample deviation

Confidence Interval for Population Mean Simple Large Random Sample

$$\bar{X} = \pm z s_{\bar{x}}$$

z = normal deviate

Small Sample

$$\bar{X} \pm t_{n-1} s_{\bar{x}}$$

t = t multiple

To reduce percent mark-up (percent profit on cost) to percent profit on selling price, divide percent mark-up by 100% plus percent mark-up.

To reduce percent loss on selling price to percent loss on cost, divide percent loss on selling price by 100% plus percent loss on selling price.

To reduce percent loss on cost to percent loss on selling price, divide percent loss on cost by 100% minus percent loss on cost.

MULTIPLICATION OF DECIMALS

To multiply decimals, proceed as in multiplication of whole numbers. But in the product, beginning at the right, point off as many places as there are in the multiplier and in the multiplicand.

To multiply a decimal by any multiple of ten, move the decimal point as many places to the right as there are zeros in the multiplier.

DIVISION OF DECIMALS

Law of division: A quotient is not changed when the dividend and divisor are both multiplied by the same number.

To divide a decimal by a whole number, proceed as with whole numbers, but place the decimal point in the quotient directly above the decimal point in the dividend.

To divide a decimal by a decimal, move the decimal point of the divisor to the right until it becomes a whole number (i.e. multiply it by ten or a multiple of ten). Next move the decimal point of the dividend the same number of places to the right, adding zeros if necessary.

STANDARD DEVIATION
Short Form Group Data (Small Sample)

$$s_x = i \sqrt{\frac{\sum Fd^2 - \left(\frac{\sum Fd}{n}\right)^2}{N - 1}}$$

Large Sample Group Data

$$s_x = i \sqrt{\frac{\sum Fd^2}{N} - \left(\frac{\sum Fd}{N}\right)^2}$$

Ungrouped Small Sample

$$s_x = \sqrt{\frac{\sum X^2}{N-1} - \frac{(\sum X)^2}{N(N-1)}}$$

s_x = standard deviation

\sum = sum

d = deviations

F = frequency

N = number of items

i = class width

X = value of item

SAMPLING

For Infinite Populations

$$\sigma_{\bar{x}} = \frac{\sigma_x}{\sqrt{n}}$$

For Finite Populations

$$\sigma_{\bar{x}} = \sqrt{\frac{N-n}{N-1} \cdot \frac{\sigma_x}{\sqrt{n}}}$$

COMPOUND INTEREST - Showing the amount of \$1.00 at various rates

Yr.	2%	2½%	3%	3½%	4%	4½%	5%	5½%	6%	7%
1	1.02000	1.02500	1.03000	1.03500	1.04000	1.04500	1.05000	1.05500	1.06000	1.07000
2	1.04040	1.05063	1.06090	1.07123	1.08160	1.09203	1.10250	1.11303	1.12360	1.14490
3	1.06121	1.07689	1.09273	1.10872	1.12486	1.14117	1.15763	1.17424	1.19102	1.22504
4	1.08243	1.10381	1.12551	1.14752	1.16986	1.19252	1.21551	1.23882	1.26248	1.31080
5	1.10408	1.13141	1.15927	1.18769	1.21665	1.24618	1.27628	1.30696	1.33823	1.40255
6	1.12616	1.15969	1.19405	1.22926	1.26532	1.30226	1.34010	1.37884	1.41852	1.50073
7	1.14869	1.18869	1.22987	1.27228	1.31593	1.36086	1.40710	1.45468	1.50363	1.60578
8	1.17166	1.21840	1.26677	1.31681	1.36857	1.42210	1.47746	1.53469	1.59385	1.71819
9	1.19509	1.24886	1.30477	1.36290	1.42331	1.48610	1.55133	1.61909	1.68948	1.83846
10	1.21899	1.28009	1.34392	1.41060	1.48024	1.55297	1.62889	1.70814	1.79085	1.96715
11	1.24337	1.31209	1.38423	1.45997	1.53945	1.62285	1.71034	1.80209	1.89830	2.10485
12	1.26824	1.34489	1.42576	1.51107	1.60103	1.69588	1.79586	1.90121	2.01220	2.25219
13	1.29361	1.37851	1.46853	1.56396	1.66507	1.77220	1.88565	2.00577	2.13293	2.40985
14	1.31948	1.41297	1.51259	1.61870	1.73168	1.85194	1.97993	2.11609	2.26090	2.57853
15	1.34587	1.44830	1.55797	1.67535	1.80094	1.93528	2.07893	2.23248	2.39656	2.75903
16	1.37279	1.48451	1.60471	1.73399	1.87298	2.02237	2.18287	2.35526	2.54035	2.95216
17	1.40024	1.52162	1.65285	1.79468	1.94790	2.11338	2.29202	2.48480	2.69277	3.15882
18	1.42825	1.55966	1.70243	1.85749	2.02582	2.20848	2.40662	2.62147	2.85434	3.37993
19	1.45681	1.59865	1.75351	1.92250	2.10685	2.30786	2.52695	2.76565	3.02560	3.61653
20	1.48595	1.63862	1.80611	1.98979	2.19112	2.41171	2.65330	2.91776	3.20714	3.86968

MEDIAN (SHORT METHOD) GROUPED DATA

$$\text{MED} = L + \left(\frac{\frac{N}{2} - \sum F_P}{F_{\text{Med}}} \right) \cdot i$$

L = lower limit of median class

$\frac{N}{2}$ = number of frequencies $\div 2$

$\sum F_P$ = sum of the frequencies prior to the median class

F_{med} = frequencies in median class

i = width of the class

MODE - GROUPED DATA

$$\text{MODE} = L_1 + \left(\frac{d_1}{d_1 + d_2} \right) \cdot i$$

L_1 = lower limit of modal class

d_1 = absolute difference between modal class frequency and class frequency prior to it.

d_2 = absolute difference between modal class frequency and frequency subsequent to it.

SIMPLE INTEREST - Showing the interest on \$1,000 at various rates;
based on a 30-day month and a 360-day year.

Time	2½%	3%	3½%	4%	4½%	5%	5½%	6%
1 day	0.069	0.083	0.097	0.111	0.125	0.139	0.153	0.167
2 days	0.139	0.167	0.194	0.222	0.250	0.278	0.306	0.333
3 days	0.208	0.250	0.292	0.333	0.375	0.417	0.458	0.500
4 days	0.278	0.333	0.389	0.444	0.500	0.556	0.611	0.667
5 days	0.347	0.417	0.486	0.556	0.625	0.694	0.764	0.833
6 days	0.417	0.500	0.583	0.667	0.750	0.833	0.917	1.000
1 month	2.083	2.500	2.917	3.333	3.750	4.167	4.583	5.000
2 months	4.167	5.000	5.833	6.667	7.500	8.333	9.167	10.000
3 months	6.250	7.500	8.750	10.000	11.250	12.500	13.750	15.000
6 months	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000
1 year	25.000	30.000	35.000	40.000	45.000	50.000	55.000	60.000

STATISTICAL FORMULA
MEASURES OF CENTRAL TENDENCY

Arithmetic Mean = \bar{X}
when X refers to the values of the individual items, Σ (sigma) means that these values are to be summed, and n refers to the number of items.

UNGROUPED DATA

$$\bar{X} = \frac{\Sigma X}{n}$$

GROUPED DATA

The mean of a frequency distribution with equal class intervals:

Where

X_b = the mid point of any class

n = total frequencies

i = class width

For any class:

F = class frequency

d = unit deviation of class mid point from X_b

$$\bar{X} = X_b + \frac{\Sigma Fd}{n} \cdot i$$

TABLE OF CUMULATIVE DISCOUNTS AND NET PRICE FACTORS

To find the net price, multiply the base price by the number that is shown under the principal discount and opposite the desired additional discounts. To compute the net price on a \$10.50 article with discounts of 40-20-5: under 40 and opposite 20-5 we find the number .456. The product of .456 and \$10.50 is \$4.79 net.

To determine the conversion factor on any chain of cumulative discounts not shown in the table, multiply their complementary numbers. Example: What is the conversion factor of 40-10-2? Solution: .60 X .90 X .98 = .5920.

Additional Discounts	PRINCIPAL DISCOUNT (%)									
	10	20	25	30	35	40	42½	45	47½	
2½	.8775	.78	.73125	.6825	.63375	.585	.56063	.53625	.51188	
5	.855	.76	.7125	.665	.6175	.57	.54625	.5225	.49875	
5-2½	.8336	.741	.69469	.64838	.60206	.55575	.53259	.50944	.48628	
5-5	.8123	.722	.67688	.63175	.58663	.5415	.51894	.49638	.47381	
5-5-2½	.79199	.70395	.65995	.61596	.57196	.52796	.50596	.48397	.46197	
7½	.81169	.74	.69375	.6475	.60125	.555	.53188	.50875	.48563	
7½-2½	.7914	.7215	.67641	.63131	.58622	.54113	.51858	.49603	.47348	
7½-5	.77111	.703	.65906	.61513	.57119	.52725	.50528	.48331	.46134	
7½-5-2½	.67933	.68542	.64259	.59975	.55961	.51407	.49265	.47123	.44981	

(%) LNNOC SID TYPICNIRP

1/4	5	2	0	5	0	5	0	5	0	5	0	1	stunocsid tpuoitippy
5274	594	5115	45	58	59	58	69	60	68	69	71	81	1/2-5-1/2-01
69094	39284	95705	5925	86075	52719	61855	6985	68	70	78	88	687	5-1/2-01
8884	52047	39164	315	5555	5865	5217	789	5667	667	667	667	667	5-01
59434	67857	33647	81005	98175	75385	72529	6999	3057	3057	3057	3057	3057	1/2-5-01
9670	45788	47869	4999	5175	5825	62728	666	4977	4977	4977	4977	4977	1/2-5-01
41924	37974	27997	10747	5276	81895	77309	53679	30377	30377	30377	30377	30377	5-1/2-01
11514	86434	54754	35747	40715	79355	91395	53679	61177	61177	61177	61177	61177	5-1/2-01
38404	11727	83377	99297	22105	46335	33875	1809	86369	86369	86369	86369	86369	1/2-5-1/2-01
52524	5574	46574	486	526	567	609	68	729	729	729	729	729	10-01
22524	3336	4574	43874	5315	3855	5725	8129	8129	8129	8129	8129	8129	10-01
40399	42323	44246	46197	81005	53855	71775	9519	6925	6925	6925	6925	6925	10-01
68363	49217	4137	91057	89787	81525	7295	2009	2579	2579	2579	2579	2579	10-01
39336	11209	43082	55977	88747	87225	66195	499	6633	6633	6633	6633	6633	10-01
55333	40719	2005	3381	47847	1136	4789	585	7799	7799	7799	7799	7799	10-01
37369	39149	40928	42707	46266	49825	33384	5693	6311	6311	6311	6311	6311	10-01
36435	3817	39905	4164	45109	4887	22049	555	6133	6133	6133	6133	6133	10-01
38273	56004	81918	437	58374	6105	54675	5832	6561	6561	6561	6561	6561	10-01

PRINCIPAL DISCOUNT (%)

Additional Discounts	PRINCIPAL DISCOUNT (%)									
	7 1/2	7 5	7 7 1/2	8 0	8 2 1/2	8 5	8 7 1/2	9 0		
10-10-10-10	.18043	.16403	.14762	.13122	.11482	.09842	.08201	.06561		
10-10-10-10-5	.17141	.15582	.14024	.12466	.10908	.09349	.07791	.06233		
15	.23205	.2125	.19125	.17	.14875	.1275	.10625	.0765		
15-2 1/2	.22625	.20719	.18647	.1658	.14503	.12431	.10359	.07459		
15-5	.22045	.20188	.18169	.1615	.13731	.12112	.10094	.07268		
15-10	.20885	.19125	.17213	.153	.13388	.11475	.09563	.06541		
20	.22	.2	.18	.16	.14	.12	.1	.08		
20-5	.209	.19	.171	.152	.133	.114	.095	.076		
20-10	.198	.18	.162	.144	.126	.108	.09	.072		
20-10-5	.1881	.171	.1539	.1368	.1197	.1026	.0855	.0684		
25	.20625	.1875	.16875	.15	.13125	.1125	.09375	.075		
25-5	.19594	.17813	.16031	.1425	.12469	.10688	.08906	.07125		
25-10	.18563	.16875	.15188	.135	.11813	.10125	.08438	.0675		
25-10-5	.17635	.16031	.14429	.1283	.11222	.09629	.08016	.06413		

		PRINCIPAL DISCOUNT (%)													
		10	20	25	30	35	35	40	40	42½	45	47½			
25-10-5	5771	513	48094	4488	4488	41681	3848	3848	36872	3527	33666	33666	½-5-01-01-01	5	
25-10	6075	54	50625	4725	4488	43875	405	405	38813	38813	37125	35438	½-5-01-01-01	5	
25-5	6413	57	53438	4987	4875	4875	45	45	43125	43125	4125	39375	½-5-01-01-01	5	
20-10-5	6156	5472	513	4788	4446	4446	4104	4104	3933	3762	3591	3591	½-5-½-01-01-01	5	
20-5	684	608	57	532	494	494	456	456	437	418	399	399	5-½-01-01-01	5	
20-10	648	576	54	504	468	468	432	432	414	396	378	378	½-01-01-01-01	5	
15-2½	7459	663	62156	5801	5525	53869	4973	4973	47653	4675	44625	44625	½-01-01-01-01	5	
15-5	7268	646	60563	5653	52488	52488	4845	4845	46431	44413	42384	42384	½-01-01-01-01	5	
15-10	6885	612	57375	5355	49725	49725	459	459	43988	42075	40163	40163	01-01-01-01	5	
10-10-10-10-10	5905	5248	4921	4593	4265	4265	3937	3937	37725	3609	34445	34445			
10-10-10-10-5	561	4986	4675	4363	40518	40518	374	374	35839	34286	32723	32723			
10-10-10-10-2½	6397	56862	53308	49854	462	45016	42647	42647	4087	39093	37316	37316			
10-10-10-5	6233	55403	51941	48479	45016	45016	41553	41553	39822	3809	36359	36359			
10-10-10-5-2½	60771	54018	49344	47257	4389	4389	40514	40514	38807	37138	3545	3545			
06	98860	8831	81851	56641	53308	48479	42647	42647	4087	39093	37316	37316	½-5-½-01-01		
06	98860	8831	81851	56641	53308	48479	42647	42647	4087	39093	37316	37316	½-5-½-01-01		
06	98860	8831	81851	56641	53308	48479	42647	42647	4087	39093	37316	37316	5-½-01-01		

Additional Discounts	PRINCIPAL DISCOUNT (%)												
	10	20	25	30	35	35	40	40	42½	45	47½		
10-10-10-10-2½	6397	56862	53308	49854	462	45016	42647	42647	4087	39093	37316	37316	
10-10-10-5	6233	55403	51941	48479	45016	45016	41553	41553	39822	3809	36359	36359	
10-10-10-5-2½	60771	54018	49344	47257	4389	4389	40514	40514	38807	37138	3545	3545	
10-10-10-10-10	5905	5248	4921	4593	4265	4265	3937	3937	37725	3609	34445	34445	
10-10-10-10-5	561	4986	4675	4363	40518	40518	374	374	35839	34286	32723	32723	
15	765	68	6375	595	5525	53869	4973	4973	47653	4675	44625	44625	
15-2½	7459	663	62156	5801	5525	53869	4973	4973	47653	4675	44625	44625	
15-5	7268	646	60563	5653	52488	52488	4845	4845	46431	44413	42384	42384	
15-10	6885	612	57375	5355	49725	49725	459	459	43988	42075	40163	40163	
20	72	64	6	56	52	52	48	48	46	44	42	42	
20-5	684	608	57	532	494	494	456	456	437	418	399	399	
20-10	648	576	54	504	468	468	432	432	414	396	378	378	
20-10-5	6156	5472	513	4788	4446	4446	4104	4104	3933	3762	3591	3591	
25	675	6	5625	525	4875	4875	45	45	43125	4125	39375	39375	
25-5	6413	57	53438	4987	4875	4875	4275	4275	4097	39198	37406	37406	
25-10	6075	54	50625	4725	4488	43875	405	405	38813	37125	35438	35438	
25-10-5	5771	513	48094	4488	41681	41681	3848	3848	36872	3527	33666	33666	

(%) INNOCSID TADICNIRP

0L	1/2L9	59	2/29	60	2/25	55	2/25	50	stunocsid tpuoitippy
.2925	.31688	.34125	.36563	.39	.4143	.43875	.46317	.4875	2/2
.285	.30875	.33225	.35625	.38	.4037	.4277	.4517	.475	5
.272	.30103	.32419	.34743	.370	.39363	.41697	.44031	.46365	5-2/2
.26392	.28597	.30813	.33029	.361	.38343	.40557	.42771	.44985	2/2-5-5
.2775	.30063	.32375	.34688	.37	.39313	.41627	.43941	.46255	1/2
.27056	.29311	.31566	.3382	.36075	.3833	.40587	.42841	.45095	2/2-2/2
.26363	.28559	.30766	.32973	.35153	.37407	.39661	.41915	.44169	5-1/2
.25703	.27875	.29987	.32129	.34273	.36527	.38781	.41035	.43289	2/2-5-2/2
.27	.2925	.315	.33733	.36	.3828	.40507	.42731	.44955	10
.26325	.28519	.30713	.32906	.351	.37297	.39488	.41679	.4387	2/2
.2565	.27788	.29925	.32063	.342	.36338	.38475	.40613	.4275	5-10
.25009	.27093	.29177	.31261	.33335	.35429	.37513	.39597	.41681	2/2-5-10
.24975	.27056	.29138	.31219	.333	.35381	.37463	.39545	.41627	10-1/2
.24351	.2638	.28409	.30438	.32468	.34497	.36526	.38555	.40584	10-2/2

PRINCIPAL DISCOUNT (%)

Additional Discounts	7 2/2	7 5	7 7 1/2	8 0	8 2 1/2	8 5	8 7 1/2	9 0
2 1/2	.26813	.24375	.21938	.195	.17063	.14625	.12188	.0975
5	.26125	.2375	.21375	.19	.16625	.1425	.11875	.095
5-2 1/2	.25472	.23156	.20841	.18525	.16209	.13894	.11578	.09263
5-5	.24819	.22563	.20306	.1805	.15794	.13538	.11281	.09205
5-5-2 1/2	.24198	.21998	.19799	.17599	.15399	.13199	.10999	.08799
7 1/2	.25438	.23125	.20813	.185	.16188	.13875	.11563	.0925
7 1/2-2 1/2	.24802	.22547	.20292	.18038	.15783	.13528	.11273	.09019
7 1/2-5	.24166	.21969	.19772	.17575	.15378	.13181	.10984	.08788
7 1/2-5-2 1/2	.23561	.2142	.19278	.17136	.14994	.12852	.1071	.08568
10	.2475	.225	.2025	.18	.1575	.135	.1125	.09
10-2 1/2	.24131	.21938	.19774	.1755	.15356	.13163	.10969	.08755
10-5	.23513	.21375	.19238	.171	.14963	.12825	.10688	.0855
10-5-2 1/2	.22925	.20841	.18757	.16673	.14588	.12504	.1042	.08336
10-7 1/2	.22894	.20813	.18731	.1665	.14569	.12488	.10406	.08325
10-7 1/2-2 1/2	.22321	.20292	.18263	.16234	.14205	.12175	.10146	.08117

		PRINCIPAL DISCOUNT (%)											
		50	52½	55	57½	60	62½	65	67½	70			
6698T	6896T	45202	42812	51812	44332	40942	36472	6492	44082	90962	9112	1822	5-01-01-01-01
5622	5227	39842	47292	29282	18202	29282	322	2342	83292	95382	8304	8304	01-51
5227	5227	43692	43692	90062	87012	5132	5132	22252	46242	99362	4114	4114	½-51
552	552	52942	52942	5462	5462	5462	5462	52192	52192	5462	5462	5462	51
912	912	432	432	252	252	252	252	882	422	242	242	242	5-01-02
228	228	472	472	992	582	402	402	322	322	242	192	192	01-20
42	42	26	26	82	3	22	22	42	42	32	32	32	5-20
5202	5202	3222	3222	4622	5952	9342	9342	4062	8402	6422	242	242	5-01-02
5202	5202	432	432	252	252	252	252	902	422	242	32	32	01-10
54312	54312	432	432	252	252	252	252	902	422	242	32	32	5-52
522	522	54342	54342	5292	52182	582	582	3	54342	5292	5292	5292	52
5202	5202	22222	22222	52922	31352	272	272	8842	54342	22022	332	332	5-10-52
5202	5202	22222	22222	52922	31352	272	272	8842	54342	22022	332	332	5-10-52
5202	5202	22222	22222	52922	31352	272	272	8842	54342	22022	332	332	5-10-52

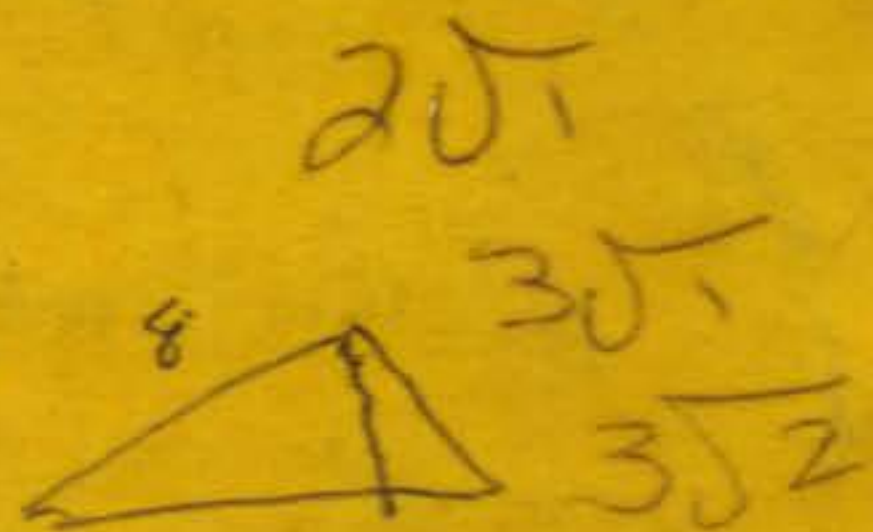
(%) LNOOSID TADICNIRD

stunoosid
lpuoitippy

Additional Discounts	PRINCIPAL DISCOUNT (%)									
	50	52½	55	57½	60	62½	65	67½	70	
10-7½-5	39544	37567	35589	33612	31635	29658	27681	25703	23726	
10-7½-5-2½	38555	36627	347	32772	30844	28916	26989	25061	23133	
10-10	405	38475	3645	34425	324	30375	2835	26325	243	
10-10-2½	39488	37513	35539	33564	3159	29616	27641	25667	23693	
10-10-5	38475	36551	34628	32704	3078	28856	26933	25099	23085	
10-10-5-2½	37513	35637	33762	31886	30011	28135	26259	24384	22508	
10-10-7½	37463	35589	33716	31843	2997	28097	27224	24351	22478	
10-10-7½-2½	36526	347	32873	31047	29221	27394	25568	23742	21916	
10-10-7½-5	35589	3381	3203	30251	28472	26692	24913	23133	21354	
10-10-7½-5-2½	347	32965	3123	29495	2776	26025	2429	22555	2082	
10-10-10	3645	34628	32805	30983	2916	27338	25515	23693	2187	
10-10-10-2½	35539	33762	31985	30208	28431	26654	24877	231	21323	
10-10-10-5	34628	32897	31165	29434	27702	25971	24239	22508	20777	
10-10-10-5-2½	33762	32074	30386	28698	27009	25321	23633	21945	20257	

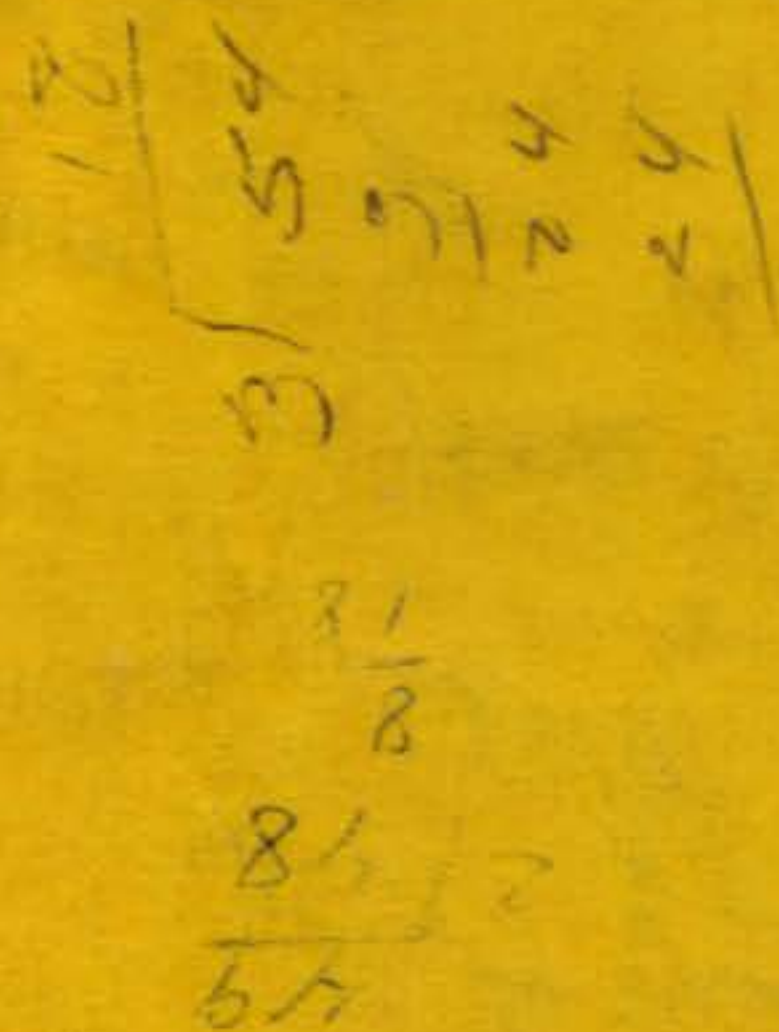
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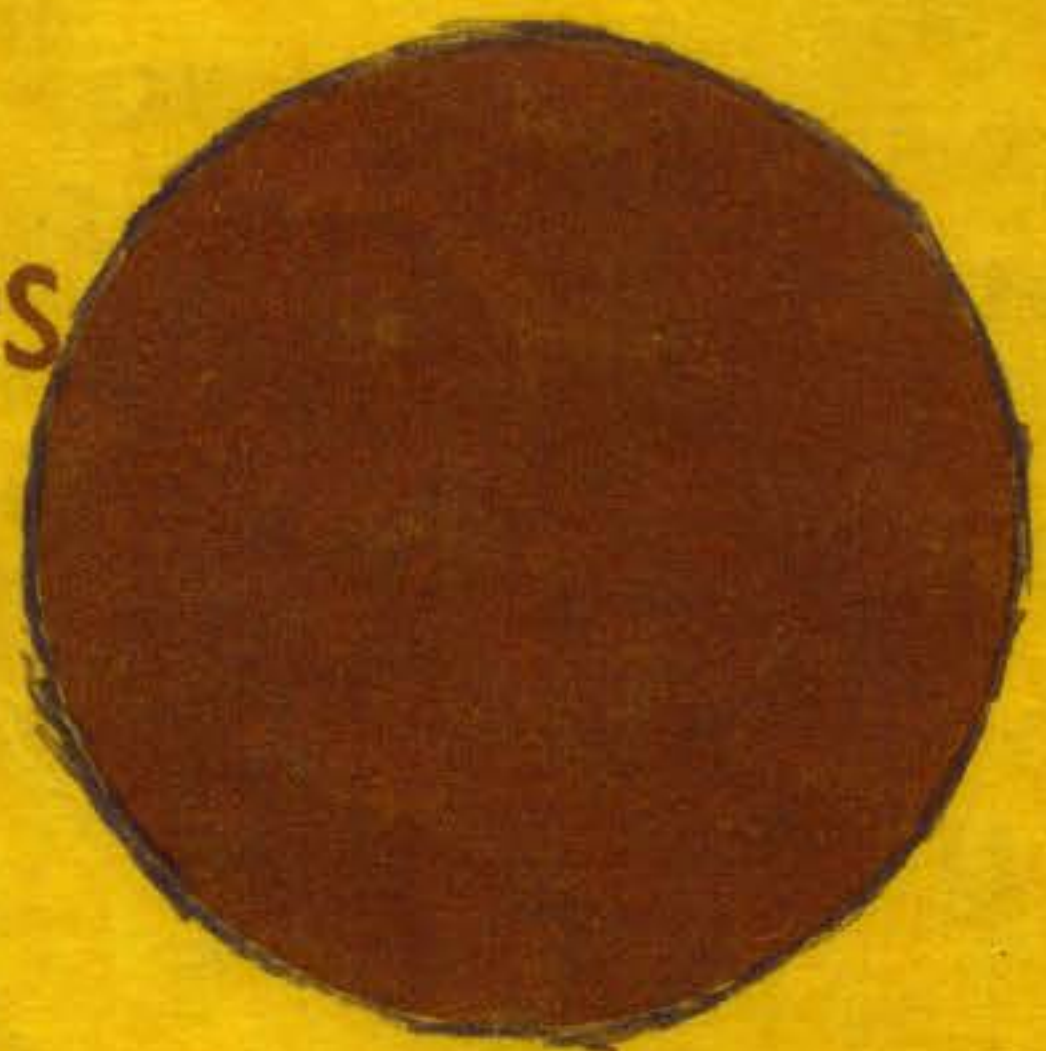
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