The MULTI-VIDER—an Aid to Modern Mathematics

IN the present day fast moving business and professional world, quick decisions are absolutely essential. When an executive is confronted with a mathematical problem on which he is to base an important decision, he wants to get the answer in the quickest and easiest way possible. This is true of the commercial executive, the engineer, the factory manager or anyone who is called upon to make rapid estimates of costs, power consumption, material requirements, etc.

The auditor and banker must check financial statements, find, say, the ratio of quick assets to current liabilities, and other percentages and proportions. The merchant has prices to "mark up" or "mark down," and the sales representative must make rapid estimates in order to hold the attention of his prospect. The traveler must figure foreign exchange. The broker and investor must find yields of securities, etc., instantly.

In these, and in most of the problems of the modern world, speed is the first essential; decisions will not wait. For all of the above the MULTI-VIDER will be a most agreeable surprise. It is very rapid, accurate, easy to learn, convenient, and always available. At the same time, it provides a means for easy, rapid writing. It is self-contained and is as easy to carry in the pocket as an ordinary pencil.

Anyone can use the MULTI-VIDER. You will be surprised to find that with only a small amount of practice you will be able to locate the numbers, place decimal points, and solve difficult problems, accurately, without mental effort and with incredible speed. You will soon become more confident in the operation of the MULTI-VIDER than you are in the "time-worn" ordinary methods of multiplying and dividing.

How to Use the MULTI-VIDER

In using the MULTI-VIDER there are only two simple rules to follow—one for multiplication; one for division. All problems on the MULTI-VIDER can be done by these two easy methods.

Note Arrow

(Fig. 1)

How to Multiply

Let's take the simplest kind of a problem to illustrate the method of multiplication. Suppose you want to multiply 2 x 3. Hold the MULTI-VIDER with the clip side up (see Fig. 1). Have the point of the pencil in your left hand—the head, or eraser end, in your right hand.

The MULTI-VIDER, as you will see, has two rules or scales, one above the other. At the left hand end of the upper scale you will find an arrow. Taking hold of the metal ends, pull the MULTI-VIDER apart, just enough to place this arrow directly over the figure 2 on the lower scale. Then on the upper scale find the other number, which is 3, and under it is the answer —6. It is simplicity itself.
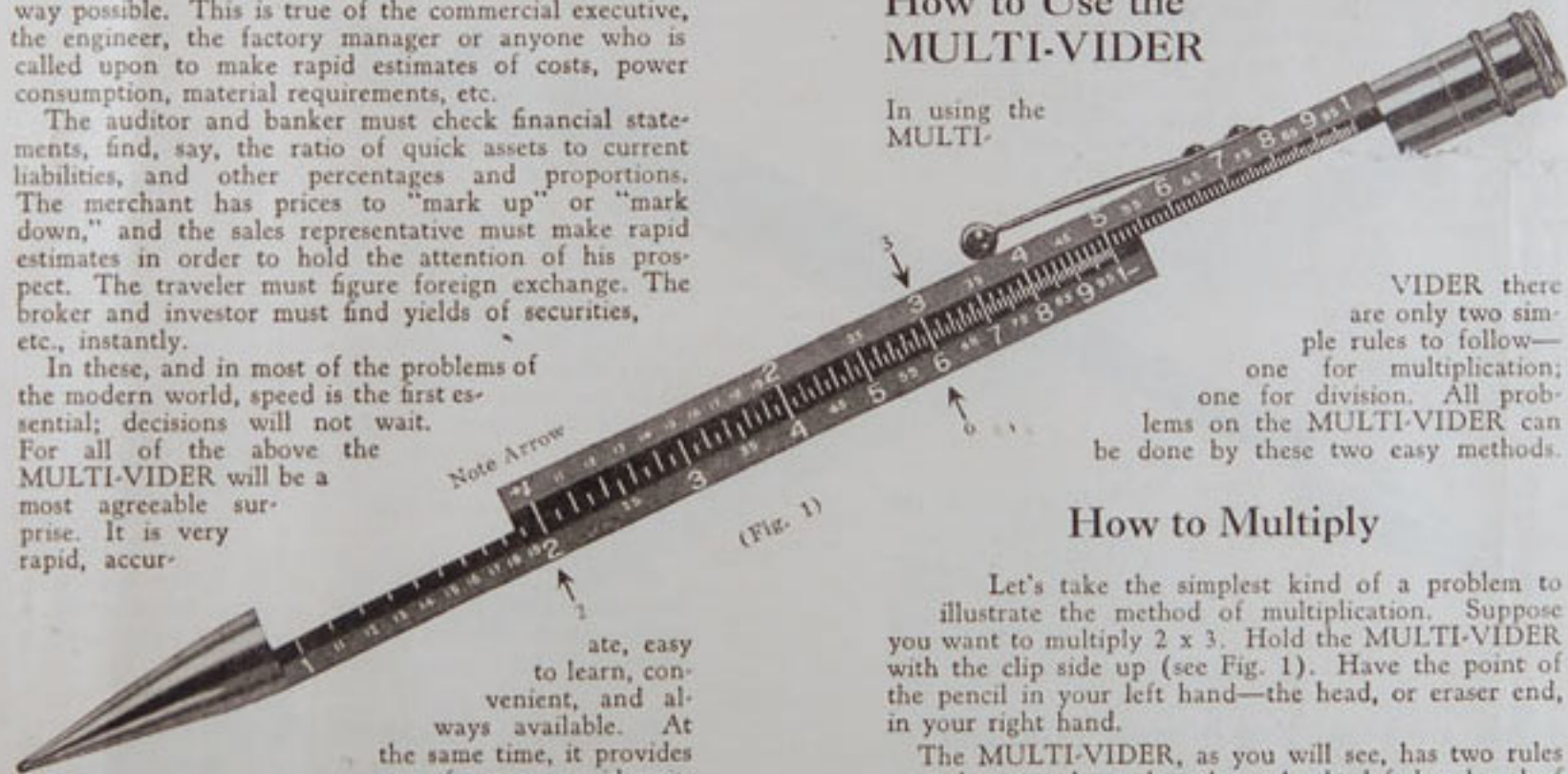
Interpolating
or reading between the lines

Multiplication and Division

HOW, you now ask, do you read any number when it falls in between the lines and not on an even subdivision? This is very simple.

You will note that the MULTI-VIDER scales are divided into ten large subdivisions which are numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 1. These large figures always give the first figure in any number (reading from the left). Each of these large subdivisions is divided into ten smaller subdivisions. Between the large figures 1

(Fig. 4)

and 2 these smaller subdivisions are also numbered 11 to 19. Between the other large figures only the fifth line is numbered—25, 35, 45, etc. These smaller subdivisions indicate the second figure in any number. For example, the fourth line after the large 2 is 24; the fifth line is 25, and is so marked. Similarly the third line after the 45 is 48, etc.

Now the third figure in any number is determined by dividing these smaller subdivisions by the eye. For example, if the arrow should fall half way between the 25 line and the 26 line it would indicate the number 255, 25.5, or 2.55. Similarly, 573 would be about one-third of the distance between the 57 line and the 58 line. With a little practice, one can become expert at interpolating, or reading between the lines to get the third figure in any number. See Figure 4.

Locating the Decimal Point When Working with Decimal Fraction

FOR those who use decimal fractions, the following instructions will be of value.

In previous instructions we have learned that with whole numbers, only places to the left of the decimal points are counted—regardless of whether these places are occupied by figures or zeros.

In decimal fractions, however, count only the places occupied by *zeros* to the *right* of the decimal point and subtract one for each zero.

The following illustrate the rule for pointing off decimal fractions.

MULTIPLICATION

$$(+2) \quad + \quad (-1) \qquad (+1)$$
$$20 \times .065 \qquad = \qquad 1.3$$

$$(-1) \quad + \quad (-2) \qquad (-3)$$
$$.02 \times .0065 \qquad = \qquad .00013$$

DIVISION

$$(+1) \quad - \quad (+2) \qquad (-1)$$
$$1.3 \quad \div \quad 20 \qquad = \qquad .065$$

$$(-3) \quad - \quad (-1) \qquad (-2)$$
$$.00013 \div \quad .02 \qquad = \qquad .0065$$

Note: In most cases the decimal point may be located by inspection if the operator does not care to use the above rules.

To Find Proportions . . .

GIVEN two numbers to find other numbers in the same proportion. Opposite one of the numbers on the lower scale set the other number on the upper scale. Then directly above all the numbers on the lower scale will be found numbers on the upper scale which will be in the same proportion as the original numbers.

FOR EXAMPLE
Set 9 over 6
Read 8 to 5.33
6 to 4
3 to 2 etc.

SPECIFIC PROBLEMS

For Engineers . . .

ENGINEERS and technical men will find the MULTI-VIDER a great help in figuring quantities, floor loads, stresses, areas, wiring problems, current consumption, boiler efficiency, etc.

Suppose you want to find the number of cubic yards of concrete needed for a footing 8 ft. x 9 ft. x 6 ft.

Place the arrow over the 8 on the lower scale and under 9 on the upper scale read 72 on the lower scale. Then place the arrow over 72 on the lower scale and under 6 on the upper scale read, 432 on the lower scale. This gives the volume of the footing in cubic feet. Since the answer was on the scale without the minus sign we add the number of digits in the two figures we multiplied (72 and 6) and get three, indicating that there are three digits in the answer, that is 432.

To reduce this to cubic yards we divide 432 by 27. Place the 27 on the upper scale over the 432 on the lower scale and under the arrow on the upper scale read 16 on the lower.

To locate the decimal point, subtract the number of digits in 27 (2) from the number in 432 (3) leaving one. But as there is a plus sign next to the arrow under which we read the answer we add one more digit, making two, and therefore 16 cubic yards is the answer.

For Salesmen . . .

SALESMEN, too, can use the MULTI-VIDER to good advantage in figuring prices, discounts, shipping charges and any other mathematical problems that may confront them.

Assume that you want to find the net price of an article, the list price of which is $74.00 and on which there is a discount of 20—10 and 5%.

Place the arrow over 74 on the lower scale and under 80 (100 minus 20) on the upper scale read $59.20 on the lower scale. Then set the arrow over 59.20 and under 90 (100 minus 10) on the upper scale read 53.30 on the lower. Now set the arrow over 53.30 and under 95 (100 minus 5) on the upper scale read 50.60 on the lower scale. $50.60 is the net price.

For Bankers, Brokers and Executives . . .

TO Bankers, Brokers and business executives the MULTI-VIDER will prove invaluable in figuring interest, money rates, bond interest, stock yields, the ratio of current assets to liabilities, sales quotas, percentage of profits, relation of selling expense to total sales, bonuses, allocation of general expenses . . . . and a host of other problems that consume a lot of valuable time when done by old longhand methods.

For example with U. S. Steel selling at, say 175, and paying an annual dividend of $7.00, what is the yield?

This is a problem in division, 7 being the dividend or number to be divided and 175 the divisor.

Set 175 on the upper scale over 7 on the lower scale and under the arrow read .04 or 4% which is the yield.

Therefore to find stock yields, set the price over the dividend and the arrow will point to the yield.

For Insurance Men . . .

INSURANCE men are constantly called upon to make calculations. They, too, can save valuable time by computing percentages, annuities, endowments, premiums with the MULTI-VIDER.

To find the present value of an income of $3,600 a year for 32 years discounted at 6%.

From your compound discount tables the present value of an income of $1.00 a year for 32 years discounted at 6% is $14.08. Then the present value of $3,600 for 32 years is 3,600 times 14.08. Set the arrow over 14.08 on the lower scale and under 3,600 on the upper scale read 50,700 on the lower, or $50,700.

What annual premium or deposit would produce this, starting, say, at the age of 35? Again referring to your tables the rate for $1,000 at the age of 35 is $26.35. Then the rate for $50,700 would be $26.35 multiplied by 50.7. Set the arrow on 26.35 on the lower scale and under 507 on the upper scale read 1330 on the lower. The annual premium required would be $1,330.

Figuring Foreign Exchange

FOREIGN exchange resolves itself into a problem in multiplication. Simply set the arrow over the rate of exchange (United States equivalent of the standard "exchange coin"); then under the amount in foreign money read the amount in U. S. money.

For example, suppose the value of the franc is $0.0392, what is the value of 64 francs in U. S. money? Set the arrow over 392 on the lower scale and under 64 on the upper scale read $2.50 on the lower. As $0.0392 is a decimal fraction find location of decimal point by using rule for decimal fractions.

For Factory Men ...

FOR factory men the MULTI-VIDER will prove a time saver in calculating man-hours, machine speeds, manufacturing costs, material prices, inventories, etc.

To find the number of man-hours to be charged to a job on which 17 men worked for 39 hours, multiply 39 by 17. Place the arrow over 17 on the lower scale and under 39 on the upper scale, read 663 on the lower scale. Adding the digits in the two numbers multiplied we get four. But on the right end of the lower scale on which we read the answer we find a minus sign next to the figure 1, indicating that from the four digits we are to subtract one digit, leaving three, making the correct answer to our problem 663 man-hours.

For Merchants ...

THE MULTI-VIDER is a great aid to merchants in figuring "mark ups" and "mark downs."

For example—assume that a retail merchant buys a number of articles for resale. The costs of the articles were, let us say, $13.50 each, $17.00 each, $22.25 each, $29.00 each, etc. The merchant wishes to mark them all up 25% based on the costs to him. What will be the selling price of each article? Set the arrow over 125. (This represents the cost plus the 25% mark-up.) Then under $13.50, the cost of the first article, on the upper scale read $16.90, the selling price on the lower scale. Under $17.00, the cost of the second, read 21.25, the selling price, on the lower scale. Under 22.25 read 27.80 on the lower scale. Under 29.00 on the upper scale read 36.25 on the lower. Thus with one setting of the MULTI-VIDER the merchant can quickly arrive at the selling price of each article.

For Sportsmen . .

SPORTSMEN, too, will find the MULTI-VIDER a great pleasure and convenience in quickly calculating batting averages, speeds of boats and automobiles in miles per hour, odds on races, etc.

For example, to find the batting average of a player who has made 160 hits on 410 times at bat. This is a problem in percentage. Set the number of times at bat, 410 (the dividing number) on the upper scale over the number of hits, 160 (the number to be divided) on the lower scale and under the arrow read .390 on the lower scale.

The MULTI-VIDER is useful in finding how many miles your automobile makes on a gallon of gasoline. For example on a 690 mile trip you used 43 gallons of gas. Your average miles per gallon would be equal to 690 divided by 43. Set the 43 over 690 and under the arrow read 16 miles per gallon.

Most of the pari-mutuels give betting odds on $2.00 tickets. If, for example, the odds are placed on the board at $3.50 and you have bet $30.00, set the 2 on the upper scale over 35 on the lower scale. Then under the $30.00 on the upper scale read $52.50 on the lower scale, which is the sum you should receive if your horse wins. In other words, set 2 above the odds placed on the board and under the amount of your bet, read the amount you should receive.

Just set it and read it...
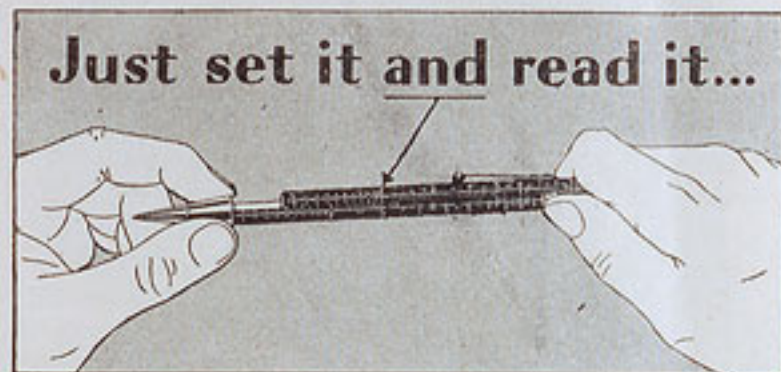
Practice Makes Perfect

THE operation of the MULTI-VIDER is simplicity itself. It will prove most valuable when one becomes proficient in its use through practice.

The graduations on the MULTI-VIDER are correct to one ten-thousandth of an inch. Accuracy in reading depends on accuracy in setting.

Take pains always to set your MULTI-VIDER scales carefully and to read the answer correctly. With a little practice you will find the MULTI-VIDER gives you the correct answer almost instantly.

A List of Useful
CONVERSION FACTORS

| MULTIPLY	BY	TO OBTAIN
British thermal units	0.2520	kilogram-calories
British thermal units	777.5	foot-pounds
British thermal units per minute	12.96	foot-pounds per sec.
bushels	1.244	cubic feet
bushels	0.03524	cubic meters
centimeters	0.3937	inches
cord-feet	4 ft. x 4 ft. x 1ft.	cubic feet
cubic feet	1728	cubic inches
cubic feet	0.02832	cubic meters
cubic feet	28.32	liters
cubic yards	27	cubic feet
cubic yards	0.7646	cubic meters
feet	0.3048	meters
feet per minute	0.3048	meters per minute
feet per minute	0.01136	miles per hour
feet per second	1.097	kilometers per hour
feet per second	0.5921	knots per hour
feet per second	0.6818	miles per hour
horse-power	550	foot-pounds per second
kilograms	2.205	pounds
kilowatts	737.6	foot-pounds per second
knots per hour	1.689	feet per second
knots per hour	1.853	kilometers per hour
knots per hour	1.152	miles per hour
liters	61.02	cubic inches
liters	2.113	pints (liq.)
liters	1.057	quarts (liq.)
meters per minute	3.281	feet per minute
miles	5280	feet
miles	1.609	kilometers
miles	1760	yards
Temp. (Degs. Cent.) + 273	1	abs. temp. (degs. Cent.)
Temp. (Degs. Cent.) + 17.8	1.8	temp. (degs. Fahr.)
Temp. (Degs. Fahr.) + 460	1	abs. temp. (degs. Fahr.)
Temp. (Degs. Fahr.) − 32	5/9	temp. (degs. Cent.)
tons (long)	2240	pounds

A High Quality
MECHANICAL PENCIL

With These 10 Important Features

THE pencil of the MULTI-VIDER is of the finest quality throughout—made according to the highest standards of design, workmanship and materials.

1. The MULTI-VIDER is made in two models—the Standard Model, with all outside metal parts sterling silver filled, inside nickle plated spring brass; and the Executive Model, with outside metal parts 14 karat gold filled and inside gold plated spring brass.
2. Bakelite Barrel—light—strong —moisture proof.
3. The pencil movement is the most efficient made and is of spring brass construction.
4. Triple action — propels, repels and expels the lead.
5. Solid bronze clutch which grasps the lead firmly and keeps it from turning so that you have a fresh, sharp writing point always.
6. The MULTI-VIDER is of a generous size—fits the hand perfectly—does not tire the muscles even when writing all day long.
7. Takes any standard thin lead.
8. Has a large spare lead chamber.
9. Carries an oversized, long-lasting eraser.
10. Has a strong ball clip which holds it securely in the pocket.
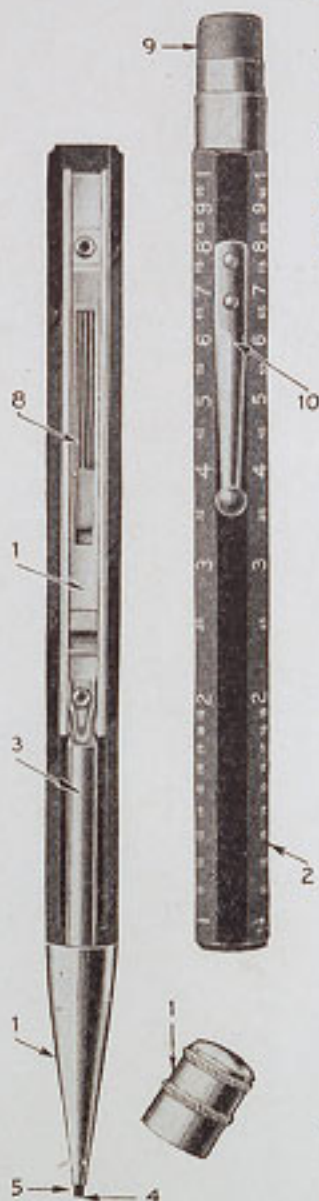
RUXTON

MULTI-VIDER

Reg. U. S. PAT. OFF.

PENCIL

multiplies - - divides

for

Instant Calculations and   *Rapid Easy Writing*

Read how easy it is to
do your figuring this
simple, automatic way

RUXTON MULTI-VIDER CORP.
GRAYBAR BUILDING, NEW YORK CITY

IMPORTANT

IN inserting new leads in the MULTI-VIDER, be sure to press the lead back into the point until it engages the clutch. The lead will then be held firmly under control. Use any standard thin lead.

Directions for Inserting New Leads:

Expel the old lead by holding the metal point in the left hand and twisting the pencil until the little brass plunger appears. Then reverse the mechanism five or six turns. Insert the lead, pushing it down into the pencil with a slight twist (or turn) to engage the clutch. Then continue reversing the mechanism until the lead protrudes only the proper writing distance.

To Remove Cap:

Hold the MULTI-VIDER in left hand. Grasp cap in right hand, turning indentation toward you. Then pull cap straight off.