

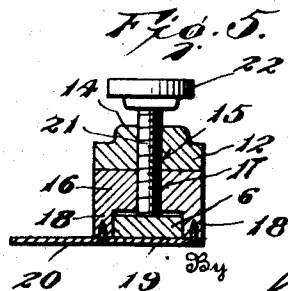
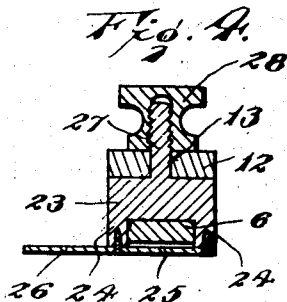
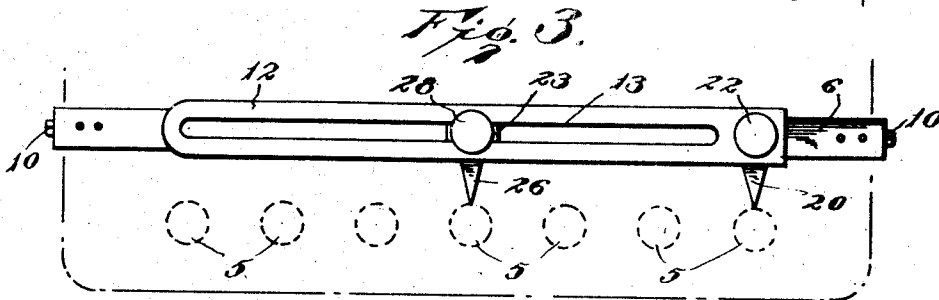
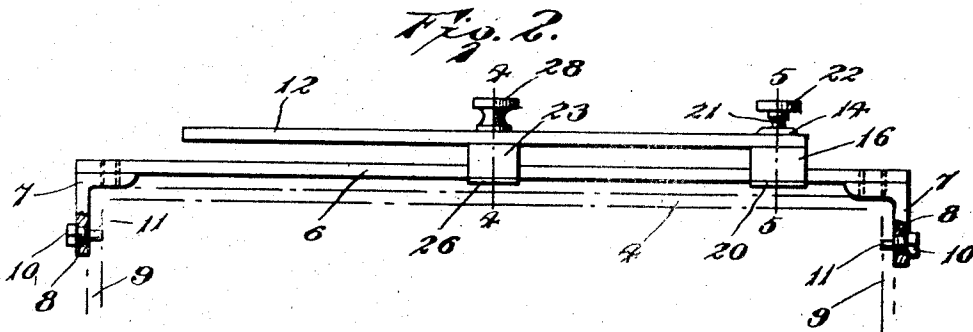
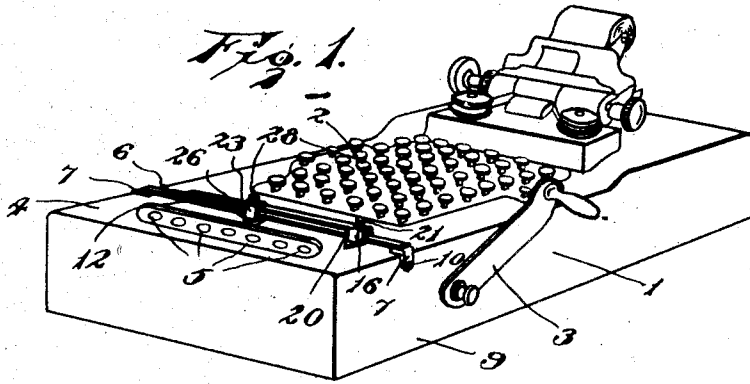
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CALCULATING MACHINE ATTACHMENT

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CALCULATING MACHINE ATTACHMENT

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This invention relates to an attachment for use upon a calculating machine and more particularly to a device adapted to be applied to an adding machine of a conventional construction in operative relation to windows or openings through which totals are disclosed and through the use of which subtraction, multiplication, division, and other mathematical problems may be very easily solved by use of an adding machine of a conventional type.

Another object of the invention is to so form the attachment that a main bar constituting part of the attachment may be firmly secured across the upper wall of an adding machine and pointers adjusted longitudinally of the bar and secured in such position in which they extend toward selected total windows of the adding machine.

Another object of the invention is to so mount the pointers that both may be moved longitudinally of the bar at the same time or adjusted independently of each other.

Another object of the invention is to provide an attachment of this character wherein a strip above the main bar is held in proper position above the bar by clamps which carry the pointers.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a perspective view of an adding machine with the attachment applied thereto.

Figure 2 is a view showing the attachment in front elevation and shown applied to the casing of the adding machine.

Figure 3 is a top plan view of the attachment and illustrating its relation to the total windows of the adding machine.

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a similar view taken on the line 5—5 of Figure 2.

This improved attachment is adapted for use in connection with an adding machine of a conventional construction such as shown in Figure 1 of the drawing and indicated in general by the numeral 1. The machine includes the usual keyboard 2 and operating handle 3 and has the upper wall 4 of its cas-

ing formed with the usual openings or windows 5 through which totals are disclosed.

The main bar 6 of this attachment is formed of metal and is of such length that it extends across the upper wall of the adding machine for the full width thereof. Brackets 7 are riveted or otherwise firmly secured at the ends of the bar 6 in depending relation thereto and adjacent their lower ends are formed with threaded openings 8 so that when the attachment is in place with the brackets bearing against the side walls 9 of the adding machine casing, bolts 10 which are threaded through the openings 8, may have their reduced ends 11 engaged in openings formed in the side walls of the adding machine casing and firmly hold the attachment in position. It will thus be seen that the attachment may be easily applied to an adding machine and firmly held in place, but allowed to be easily removed and transferred to another machine.

A strip 12, which is also formed of metal, extends longitudinally above the main bar 6 and is formed with a longitudinally extending slot 13 which terminates in spaced relation to one end of the strip and between this end of the strip and the slot there has been formed a boss 14 and threaded opening or passage 15. Beneath the boss 14 a clamp 16 is riveted or otherwise firmly secured against the under face of the strip 12 and this clamp is formed with an opening 17 registering with the opening 15. Side portions of the clamp are extended downwardly to form arms 18 so that the clamp straddles the main bar 6, as shown clearly in Figure 5, and against the lower ends of the arms 18 is secured a metal plate 19 having a tapered end portion projecting from a side of the clamp to form a pointer 20 which extends toward the total windows of the adding machine, as shown in Figure 3. In order to securely but releasably hold the clamp in a set position upon the main bar there has been provided a set screw 21 which passes through the openings 15 and 17 and has a head 22 at its upper end so that it may be easily turned until its lower end bears against the upper face of the bar and thereby exerts pressure to bind the clamp

against the bar. Therefore, the clamp, together with the strip 12, may be shifted longitudinally of the main bar and secured in a set position with the pointer 20 extending
 5 toward a selected total window of the adding machine.

A second clamp 23 which is also adjustable longitudinally of the main bar is disposed between the main bar and the strip 12. This
 10 clamp has depending arms 24 which extend downwardly at opposite sides of the main bar and to these arms is secured a plate 25 having a tapered end portion projecting from the clamp to form a pointer 26, which also
 15 extends toward the total windows of the adding machine. A threaded stem 27 projects upwardly from the clamp 23 through the slot 13 in the strip 12 and upon the upper end of this stem is screwed a nut 28 which,
 20 when tightened, draws the clamp upwardly into binding engagement with the under surface of the strip 12 and causes the clamp to be firmly but releasably secured in a set position. It will thus be seen that the clamp
 25 23 can be loosened and slid longitudinally of the bar and strip for adjustment of its pointer independently of the pointer 20 and that by releasing the set screw 21 the pointer
 30 20, together with the strip 12 and pointer 26, may be slid longitudinally of the main bar as a unit.

This attachment is applied to an adding machine of a conventional type and when the attachment is not in use the pointer 20 may
 35 be set opposite the first total window at the right of the machine and the pointer 26 at the last total window or both pointers may be shifted to a position at the right of the adding machine beyond the total windows. An
 40 adding machine equipped with this attachment may be employed to easily and quickly solve any mathematical problem and in the following there has been set forth preferred methods which will be followed when solving
 45 problems.

The examples illustrating this improved method of calculation are supposed to be worked on an adding machine of a capacity of 7 figures as shown by this row of seven
 50 dots:—

Addition is necessarily passed by since the only available short cut to it is to perform the operation on the machine in the usual way.

Subtraction is instantly performed on any
 55 ordinary type of adding machine. In this unique way of subtracting the difference between any of the 10 numerals and 9 is called its complement: For instance, the difference between 4 and 9 being 5 it follows that 5 is
 60 the complement of 4, and inversely 4 is the complement of 5. Thus considering any number as, for example, 738, the complements of its figures are consecutively 2, 6 and 1, hence 261 is the complement of 738.

85 The new method of subtraction being based

mainly upon the use of these figure complements attention is therefore directed to the following series of 5 numbers which will be found to be a great help in learning how to
 70 keep these complements constantly in mind— 09—18—27—36—45.

Note the close mathematical relationship between these numbers and their figures. The numbers are the consecutive multiples of 9,
 75 and either one of the two figures of any of these multiples is the complement of the other, for instance, in 27, 2 is the complement of 7 and vice versa. Therefore it is obvious that these 5 numbers can be readily remembered,
 80 and, in fact, a short practice will be sufficient to bring about result so that, by merely glancing at a figure, as, for example, 6, it will recall at once the multiple 36, and thus the complement 3 will be instantly present in the mind
 85 and this will insure a rapidity in performing subtraction that cannot be had in any other way. In the examples illustrating use of the system, the clamp 23 and pointer 26 carried thereby have been designated pointer A and
 90 the clamp 16 and its pointer 20 referred to as pointer B.

Example:—From 9547 subtract 4719. In this case, both numbers have the same number of figures. If 1 is added to the initial
 95 figure 4 of subtrahend it makes 5, and 5 deducted from the initial figure 9 of minuend leaves 4, so, by glancing over the two numbers, it is seen at once that the remaining
 100 minuend is 4547, while the remaining subtrahend is 719. Therefore, register 4547 plus 1 on the machine— . . . 4 5 4 8
 Then add 280 complement of 719— . . . 2 8 0
 The answer being the total— . . . 4 8 2 8
 105

Example:—From 8627 subtract 483. The minuend has one figure more than the subtrahend hence deduct 1 from its initial figure 8 and add it to its unit figure 7 by
 110 registering— . . . 7 6 2 8
 Then add 516 complement of 483— . . . 5 1 6
 Answer— . . . 8 1 4 4
 115

Example:—From 170634 subtract 908. The minuend has 3 figures more than the subtrahend. These 3 figures make up the part
 120 170—hence deduct 1 from 170 and add it to part 634 by registering 169635 on the machine— . . 1 6 9 6 3 5
 Then add 91 complement of 908— . . . 9 1
 Answer— . . . 1 6 9 7 2 6
 125

To subtract directly from a number in the machine.

Suppose the following number in the machine . . 2 9 6 3 7 and that 248 is to be
 130 subtracted from it (a) 248 having 3 figures

set pointer A of the indicator to the fourth figure 9 of the number and

	A
add 1-----	. . . 2 9 6 3 8
(b) add 751 complement of 248----- 7 5 1

(c) then register 9 in every place in the machine from pointer A to the left thus... 9 9 9 9 . . . and the answer will be the total----- . . . 2 9 3 8 9

Combined addition and subtraction

15 In business calculations it is often necessary to add several numbers and to subtract the sum of them from another. The following example will show how this can be done in one operation. Suppose that you have a balance in the bank to your credit of \$573.87 and the following checks were drawn against it: \$4.90—\$27.65—\$23.16—\$138.47—and that you want to know what the new balance is after the amounts of these checks have been deducted.

20 As the original balance of \$573.87 is a five-figure number, each check item complement to be added must be also represented by the same number of figures therefore register 57387 and set pointer A on the machine next

	A
to its initial figure 5 thus-----	. . . 5 7 3 8 7
Then add successively each check item complement, thus:	
Complement of 490 or 00490-----	. . . 9 9 5 0 9
Complement of 2765 or 02765-----	. . . 9 7 2 3 4
Complement of 2316 or 02316-----	. . . 9 7 6 8 3
Complement of 13847-----	. . . 8 6 1 5 2

40 Total----- . 4 3 7 9 6 5

Note that the figure 4 shown at the left of the total by the pointer A tallies with the numbers of check items registered. This is an effective way to check the work for ascertaining that no item has been overlooked in the addition. Now cancel this figure 4 by adding 96 to it, and at the same time add it to the

	A
total-----	. 4 3 7 9 6 5
Thus-----	9 6 4
Result-----	. . 3 7 9 6 9

This result shows that the new balance is \$379.69.

55 In balancing a ledger account it is only necessary to add up the debit column on the adding machine leaving the total thereon and proceed to add successively the complement of each item in the credit column to that total by following the same rules as above and the result will be the correct answer.

Multiplication

65 In using the improved system of multiplication, it is, of course, necessary to be familiar

with the multiplication table, also to know instantly the sum of any two figures below 10 and to be able to mentally add at once a single figure to a two-figure number, as, for instance, 7 to 45—or 8 to 56. The sums of such combinations should be known the instant they are seen without the slightest hesitancy or thought.

This being taken for granted, we will consider the mental multiplication of a two-figure number by a single figure.

For example, in multiplying 78 by 4, the two partial products of 8 x 4—or 32 units and of 7 x 4—or 28 tens are clearly seen in the mind's eye at a glance, and by mentally adding at once the 3 tens of 32 to 28 the product 312 of 78 x 4 is thus instantly formed and simultaneously registered on the machine.

Now in multiplying a three-figure number by a single figure, as, for instance, 836 by 7; since in 836 we have 8 hundreds and 36 units the product of 36 x 7 is registered as units thus----- 2 5 2

Then the product of 8 x 7 is added as hundreds----- 5 6 . . The product of 836 x 7 being the total----- 5 8 5 2

In the two following Examples (a) and (b) and all subsequent multiplications use should be made of the pointer system AB to prevent any possibility of misplacing your figures, especially when figuring out and adding these products to numbers already registered on the machine.

To multiply a three-figure number by another of two figures.

Example (a)----- 457
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Set double pointer AB to include 3 figures with pointer B opposite the first or unit place

	A B
on the machine thus-----

Then multiply 457 by 8. By registering product of

	A B
57 x 8 from pointer B----- 4 5 6
and product of 4 x 8 from pointer A----- 3 2 . .
Total----- 3 6 5 6

Now shift double pointer to bring pointer B to the tens figure 5 of this first total

	A B
thus----- 3 6 5 6

and multiply 457 by 6

	A B
By registering product of 57 x 6 from pointer B----- 3 4 2 .
and product of 4 x 6 from pointer A----- 2 4 . .
Answer----- 3 1 0 7 6

To multiply two numbers of three figures. Example (b)----- 573
648

70

75

80

85

90

95

100

105

110

115

120

125

120

Proceed as in foregoing example in multiplying 573 by 8, and then by 4 and the result

shown on the machine will be . . . 2 7 5 0 4

5 Shift double pointer to bring pointer B to the hundreds figure 5 of this total:

Thus . . . 2 7 5 0 4

10 Then multiply 573 by 6.
By registering the product of

73 x 6 from pointer B . . . 4 3 8 . .

15 and product of 5 x 6 from pointer A . . . 3 0 . . .

Answer . . . 3 7 1 3 0 4

Now in performing long multiplications the following rules must be observed:

20 Division—when the divisor is a single figure.

Example:—Divide 958 by 4.

Register the dividend thus 9 5 8

25 The divisor being a single figure set the double pointer AB to include 1+2, that is 3 figures, and 9 being the first part to be divided,

30 shift the double pointer to bring pointer B to that

figure, thus 9 5 8

9 ÷ 4 is 2—1 (2 being the quotient and 1 the remainder)

35 (a) add 2 to 9 to get remainder 1 1 1

(b) Cancel first 1 of 11 by adding 9 to it 1 . 1

40 (c) Add 1 to 1 at left to get

quotient 2 2 . 1 5 8

Shift double pointer to include next figure 5 2 . 1 5 8

45 15 ÷ 4 is 3—3—

(a) add 8 to 5 to get remainder 3 2 3

50 (b) cancel 2 by adding 8 to it 1 . 3

(c) add 2 to 1 to get quotient 3 2 3 . 3 8

Shift the double pointer to

55 include last figure 8 2 3 . 3 8

38 ÷ 4 is 9—2—

(a) add 4 to 8 to get remainder 2 4 2

60 (b) cancel 4 by adding 6 to it 1 . 2

(c) add 8 to 1 to get quotient 9 2 3 9 . 2

65 Answer:—Quotient 239—remainder 2.

To divide numbers when the divisor has 2 or more figures use is made of the multiples of 10 for two figure divisors of 100 for three-figure divisors of 1000 for four-figure divisors, and so on.

Lightning method for computing lumber.—In estimating lumber the board foot unit

is 12, a number with which we are especially familiar, and its multiples below 100 are generally well known so that, with little practice,

any one can learn very soon to tell offhand how many times 12 is contained in any two-figure number. For instance, it will be an

easy matter to tell at a glance that 38 is 3 times 12—plus 2 or that 64 is 5 times 12—

plus 4—and to briefly express the same by merely saying that 38 is 3—2, meaning 3

twelves—plus 2

64 is 5—4 . . . etc. and also that

100 is 8—4

200 is 16—8

300 is 24—12 or 25 twelves and so on.

Example:—How many square feet are there in 38 pieces each 14 feet long of 2 by 4 inches scantling? Set pointer A on the machine to

the third place thus:— 2 × 4 = 8—

and since 14 = 2 × 7 it follows that 2 times 8 is 16 or (1—4)—and 7 times (1—4) is

(7—28) or (9—4). This preliminary figuring being easily done mentally at a glance.

Now register product of 38 × 9 from pointer

A thus:— . . 3 4 2 . . Product of 38 × 4 is 152—or 100 + 52

100 is (8—4)—add 8 to 342 and register 4 as

units 3 5 0 . 4

52 is (4—4)—add 4 to 350—

and 4 to 4 3 5 4 . 8

Answer:—354 $\frac{2}{3}$ sq. ft.

Example:—How many square feet are there in 26 pieces, each 18 feet long, of 2 x 8" lumber?

2 × 8 = 16—or (1—4)—and since 18 = 2 × 9 it follows

that 2 times (1—4) is (2—8)—and 9 times (2—8) is (18—72) or 24 twelves.

Hence register 24 thus:— 2 4

and multiply 26 by 24 from

pointer A thus 6 2 4 2 4

Then 24 being cancelled, the answer will be 624 sq. ft.

The same method can be applied in performing similar operations in which 12 is the main factor, for example, in figuring out

the cost of 7 eggs at 42 cents a dozen—42 is (3—6) and 7 times (3—6) is (21—42) or (24—6)—answer:—24½ cents.

Having thus described the invention, I claim:

1. A calculating machine attachment comprising a bar adapted to be secured across a calculating machine adjacent and substantially parallel to total windows thereof, a strip extending parallel to said bar, a clamp carried by said strip for releasably securing the strip in an adjusted position longitudinally of said bar and including a pointer projecting from a side of the bar to extend towards a selected total window of the calculating machine, and a second clamp adjustable longitudinally of the strip and bar and having a pointer projecting from the said side of the bar.

2. A calculating machine attachment comprising a bar adapted to be secured across a calculating machine adjacent and substantially parallel to total windows thereof, a strip extending longitudinally above said bar, a clamp carried by said strip for releasably securing the strip in an adjusted position longitudinally of said bar and including a pointer projecting from a side of the bar to extend towards a selected total window of the calculating machine, and a second clamp adjustable longitudinally upon said strip and including a pointer projecting from the said side of the bar and adapted to be spaced from the first pointer to a determined distance by adjustment of its clamp upon the strip.

3. A calculating machine attachment comprising a bar adapted to be secured across a calculating machine adjacent and substantially parallel to total windows thereof, a strip extending longitudinally above said bar, a clamp carried by said strip and including a lower plate extending beneath said bar and projecting transversely therefrom to form a pointer and a set screw to bear against the upper face of the bar and exert pressure to bind the bar against the plate and releasably secure the strip in a set position with the pointer extending in determined relation to total windows of the calculating machine, a second clamp carried by said strip and adapted to be adjusted longitudinally thereof and secured in a set position, and a pointer carried by the second clamp and projecting transversely from the strip and bar.

4. A calculating machine attachment comprising a bar adapted to be secured across a calculating machine adjacent and substantially parallel to total windows thereof, a strip extending longitudinally above said bar, a clamp adjacent one end of said strip to releasably secure the strip in a set position and including a pointer projecting transversely from the strip and bar, and a second clamp adjustable longitudinally of the strip and bar and including a pointer projecting

from the strip and bar and adapted to be spaced a determined distance from the first pointer by shifting its clamp longitudinally of the strip and bar.

5. A calculating machine attachment comprising a bar adapted to be secured across a calculating machine adjacent and substantially parallel to total windows thereof, a strip extending longitudinally above said bar and formed with a longitudinally extending slot and with an opening between the slot and one end of the strip, clamp bodies fitting between said bar and strip and straddling said bar, pointers secured to the lower ends of said clamps and extending beneath the bar and projecting from one side thereof to extend towards total windows of the calculating machine, one clamp body having a passage formed therethrough to register with the opening in said strip, a set screw passed through the registering opening and passage to bear against the bar and releasably secure the strip in a set position, a threaded stem extending upwardly from the other clamp body through the slot in said strip, and a nut upon said stem to bear against the strip and secure the clamp body in a set position with its pointer spaced from the pointer of the other clamp a determined distance.

In testimony whereof I affix my signature.
HENRY L. BERGER. [L. s.]

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