Dec. 27, 1927. 1,653,655

M. L. PIKE

CALCULATOR

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Fig. 1

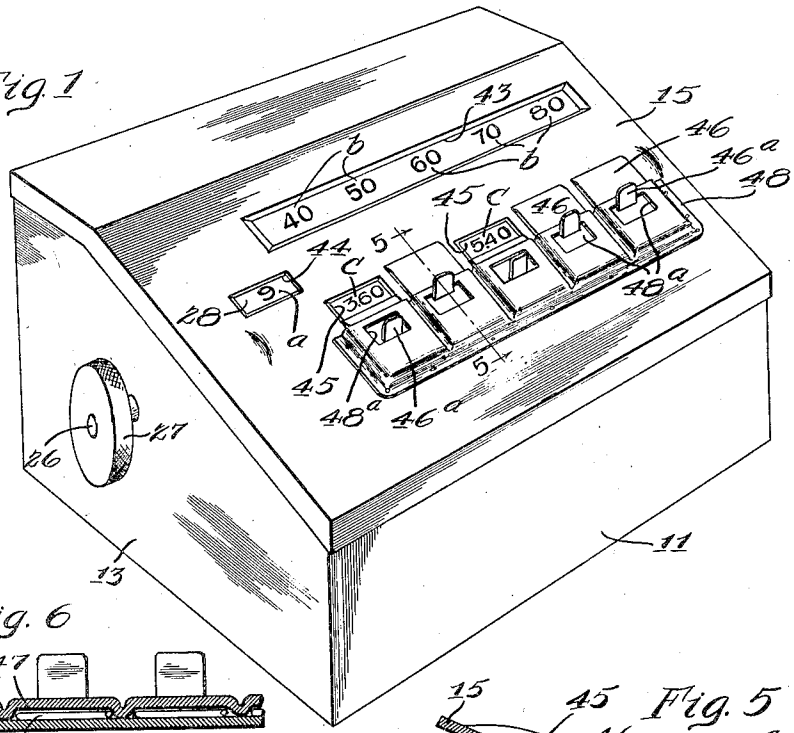



Fig. 6

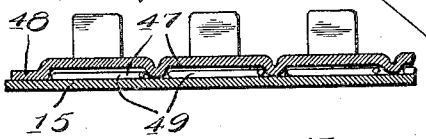



Fig. 5

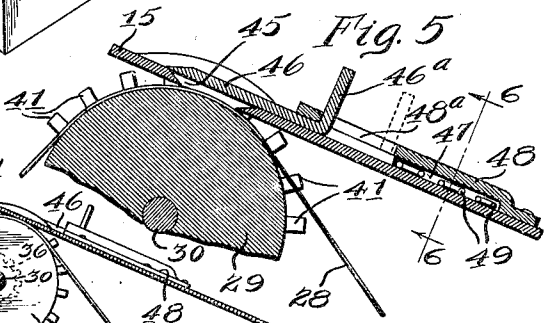



Fig. 2

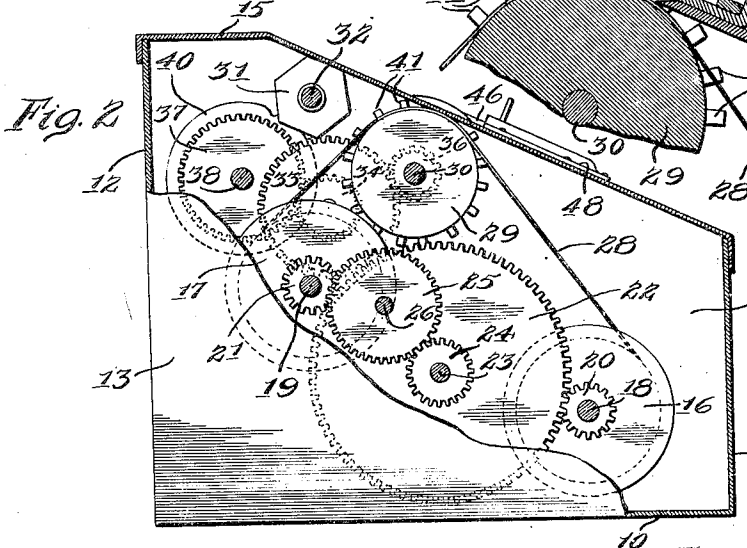
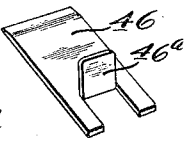



Fig. 7




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Fig. 3

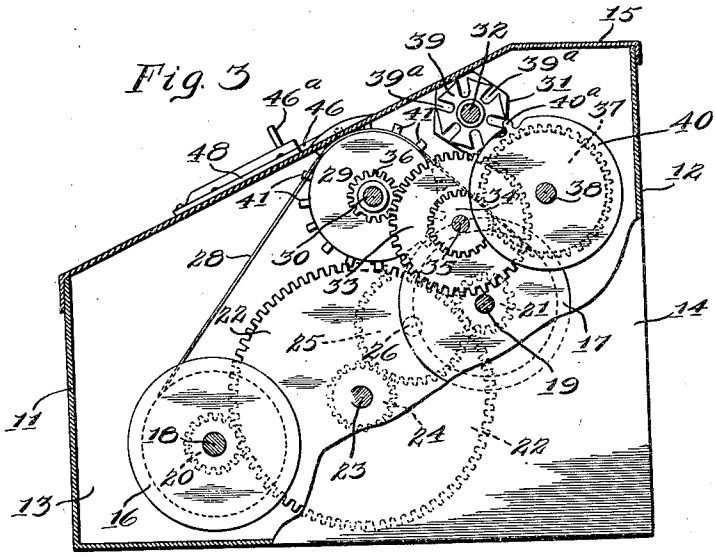
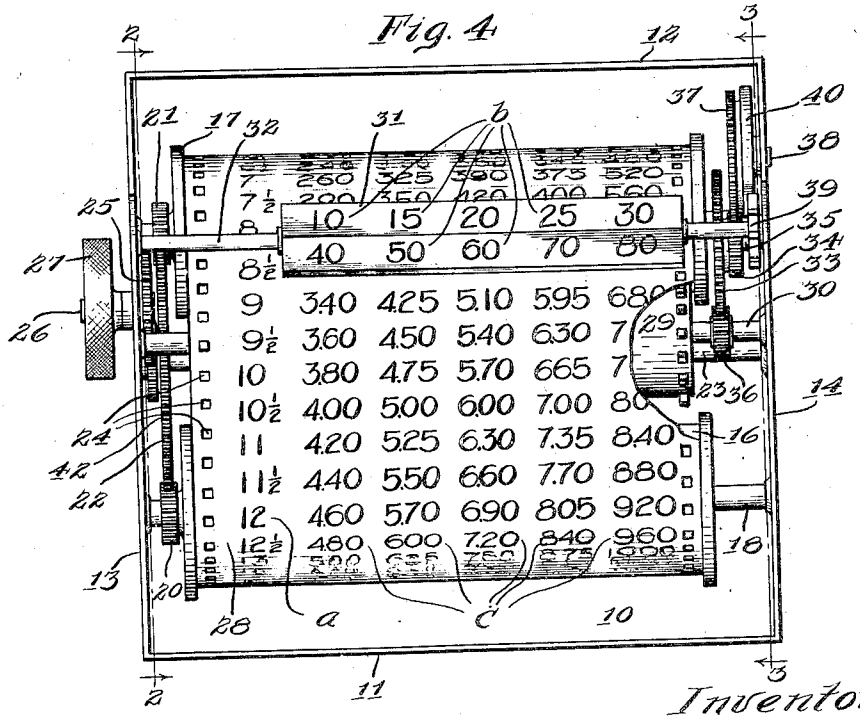



Fig. 4




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Fig. 8

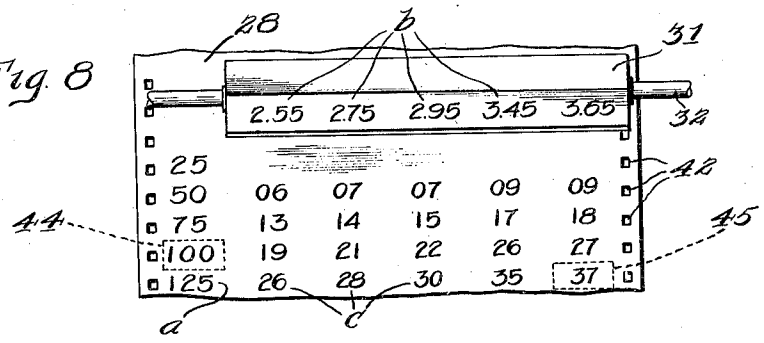



Fig. 9

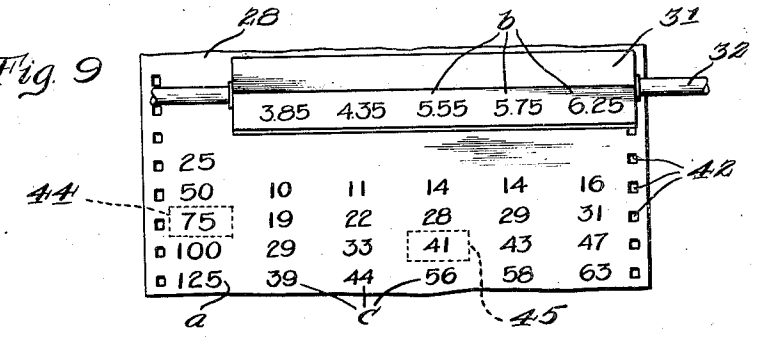



Fig. 10

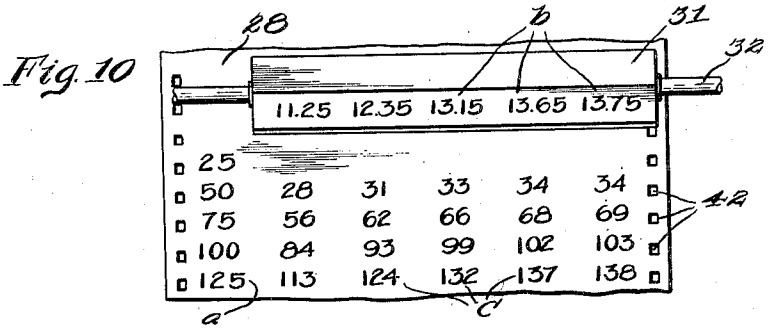
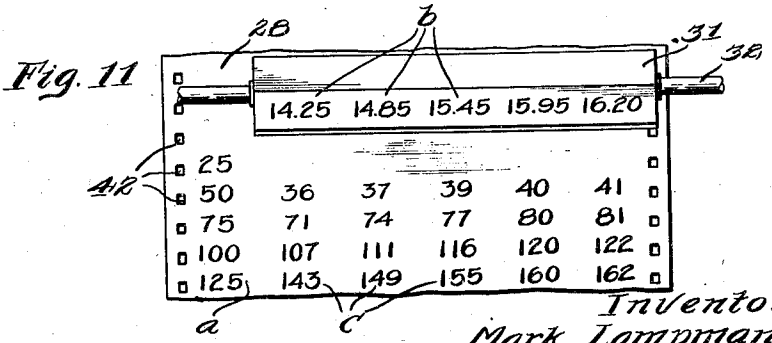



Fig. 11




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Patented Dec. 27, 1927. 1,653,655

# UNITED STATES PATENT OFFICE.

MARK LAMPMAN PIKE, OF ST. PAUL, MINNESOTA.

## CALCULATOR.

Application filed January 16, 1925. Serial No. 2,900.

My invention relates to improvements in calculators.

An object of the invention is to provide a simple, durable, inexpensive and compact device of the present nature by which accurate calculations over a relatively wide range may be made with facility and dispatch.

More specifically it is my object to supply a calculator for figuring payrolls, viz: Multiplying a given rate per hour, or rate per piece of work, by the number of hours employed, or the number of pieces handled, to give the product thereof representing the amount in wages to which the workman is entitled.

A further object is to provide a device of this nature adapted to be operated by the simple turning of a knob, said device including an apron tabulated with numerals indicative of multipliers and numerals indicative of products, said numerals being arranged in successive groups, indicators arranged to designate related numerals in the same group, and a rate guide including numerals indicative of multiplicands for said groups of numerals, each rate numeral corresponding with and serving to identify a certain of said groups of numerals when the same is actively related with said indicators.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings, Fig. 1 is a perspective view of a calculator embodying my invention; Fig. 2 is a view taken from the left end of the device, a portion of said end being broken away as on the line 2—2 of Fig. 4; Fig. 3 is a view taken from the right end of the structure, said end being broken away as on the line 3—3 of Fig. 4; Fig. 4 is a plan view of the device with the cover removed; Fig. 5 is an enlarged detail view taken on the line 5—5 of Fig. 1; Fig. 6 is a detail sectional view taken on the line 6—6 of Fig. 5; Fig. 7 is a perspective view, in detail, of one of the shutter slides and Figs. 8, 9, 10 and 11 are diagrammatical representations of portions of different groups of symbols in a table designed for calculating payrolls figured on the "piece" basis, a diagram of the rate guide being illustrated in connection with each portion of the table.

Referring to the drawings, it will be seen that my improvement includes a box-like frame comprising a bottom 10, front panel 11, back panel 12, (left) side panel 13, (right) side panel 14 and cover 15. The forward portion of the cover 15 slopes as shown (Fig. 1) to enhance visibility of symbols to which the user refers in operating the device. Spools 16, 17 are mounted on parallel shafts 18, 19 respectively journaled at their ends on the side panels 13, 14. Said shafts 18, 19 are respectively fitted with small gears 20, 21, which mesh with a large gear 22 fixed on a shaft 23 journaled at its ends on said side panels 13, 14. Said shaft 23 also has a small gear 24 thereon, the same meshing with a gear 25 on a stub-shaft 26 journaled in and extending through the side panel 13. On the outer end of said stub-shaft 26 is a knob 27. An apron 28, secured at one end to the spool 16 and at its other end to the spool 17, is wound from one spool to the other upon the turning of the knob 27. Such movement of said apron will be understood when it is remembered that the large gear 22 meshes with the gears 20, 21 on said spools 16, 17 and that said gear 22 is driven through the gears 24 and 25 when said knob 27 is turned. The upper reach of the apron 28 passes over a roller 29 located near the top of the frame and mounted on a shaft 30 journaled at its ends on the side panels 13, 14. Forwardly of said roller 29 and in parallelism with the same and with the spools 16, 17 is an elongated, multi-sided member 31, which, as shown, is in the form of a hexagonal prism. This member 31 is carried axially on a shaft 32 journaled at its ends on the side panels 13, 14. Reduction gears 33, 34, journaled on a stud 35 extending inwardly from the side panel 14, are respectively intermeshed with a gear 36 on the roller shaft 30 and with a gear 37 journaled on a second stud 38 extending inwardly from the side panel 14. Step-by-step rotation is imparted to the hexagonal member 31 from the gear 37 through a Geneva stop mechanism including a hexagonal star-wheel 39 on the shaft 32 and a disc 40 fixed to the gear 37. The six equally spaced radial slots $39^a$ in the star-wheel 39 receive, one after the other, the single tooth $40^a$ on the disc 40, said star-wheel being turned a step (one-sixth of a revolution) upon each rotation of the disc 40, and held between such turns through the engagement of the periphery of said disc with the con-

caves in the ends of the segments at the perimeter of said star-wheel 39.

From the foregoing it will be understood that the winding of the apron 28 from one of the spools 16, 17 to the other by means of the knob 27 will result in turning the roller 29 through the medium of the upper reach of said apron, and that such rotation of said roller will result in intermittently turning the rate guide member 31 through the media of the shaft 30, gears 36, 33, 34 and 37, the toothed disc 40 and star-wheel 39. Since a definite amount of slack must be given to the apron 28 to permit of the full winding thereof on either of the spools 16, 17 and since the angular position of the rate guide member 31 must be definitely fixed with respect to that portion of the apron 28 on the roller 29, I have geared said apron 28 to said roller 29 to prevent the former from slipping upon the latter. Such gearing of the apron 28 with the roller 29 is accomplished by providing teeth 41 near the ends of the roller 29 and apertures 42, in the margins of the apron 28, with which said teeth 41 intermesh.

Each of the six sides of the rate guide member 31 is provided with a row of numerals *b*, each indicative of a rate of pay per hour or per piece of work and immediately above the uppermost side of said member is a slot 43 formed in the cover 15 and through which the numerals *b* on said uppermost side are visible. On the apron 28, columns of numerals are tabulated, the same being divided into groups longitudinally of the apron, a part of one group being shown in Fig. 4. Each of said groups in the table, formed by such tabulations on said apron, includes a series of numerals *a* indicative of hours employed or number of pieces handled and also includes other series of numerals *c* indicative of amounts payable for employment. One series of said numerals *c* is provided for each rate numeral *b* indicated on one side of the rate guide member 31, and said member 31 is appropriately turned, as above explained, to afford timely presentation of the rate numerals *b* with the particular group of numerals *c* to which said rate numerals relate.

Formed in the cover 15 is an opening or indicator 44 through which the numerals *a* are severally visible. Indicators 45 comprising aligned openings, formed in the cover 15, render the numerals *c* visible, one at a time, each series of said numerals *c* having one of said indicators 45 therefor.

In use, and assuming that an employee, employed at the rate of 40 cents per hour has worked 9 hours, the operator turns the knob 27 until the rate guiding number "40" (Fig. 1) is presented to view through the slot 43. This presentation of the number "40" apprises the user that the appropriate group of numerals *a*, *c* is actively related with the indicators 44 and 45. Now, adjusting the knob 27 to bring the number "9" into view through the indicator 44, the user sees the number "3.60" through the indicator 45 and, by that number, is shown that the amount payable to the employee is three dollars and sixty cents. For convenience, I arrange each indicator 45 directly beneath its respective rate numerals *b* on the member 31. Thus, when the appropriate rate symbol *b* is displayed the indicator 45 directly therebeneath is referred to for designation of the amount due for the hours of work designated by the indicator 44.

From the foregoing description, it will be understood that the numerals *a* constitute multipliers, the numerals *b* multiplicands and the numerals *c* products. With such an arrangement, a user may carry out the multiplication of numbers for any purpose within the relatively wide range afforded by the different groups of numerals *a*, *c* on the apron 28 and the different numerals *b* on the member 31. Conversely, and with the simple substitution of divisors for multipliers, dividends for multiplicands and quotients for products, a user of the device, so tabulated, may carry out the division of numbers for any purpose.

To lead the user to refer to the proper indicator 45 and to conceal all of the numerals *c* except that one designated by such indicator, yielding shutter slides 46 may be used in connection with said indicators 45, as shown. Said shutter slides 46 are movable in guideways 47 formed between the cover 15 and a guide plate 48 fixed thereon. Backed by springs 49 in said guide ways 47, the shutter slides 46 are yieldingly shifted into positions covering their respective indicator openings 45. Finger pieces $46^a$, turned up from said shutter slides 46 and working in slots $48^a$ in the guide plate 48 serve as means for retracting the slides 46 against the action of the springs 49 and as stops to limit the throws of said slides. When it is required that a shutter slide 46 be opened to obtain a reading designated by its respective indicator 45, it is fairly certain that the user properly will open the shutter slide directly beneath the rate numeral *b* with which he is concerned.

Earlier in the specification, I have indicated that my device may be employed in figuring payrolls based on given rates per piece or on rates for given numbers of pieces. Figs. 8, 9, 10 and 11 diagrammatically illustrate fragments of a table adapted for such purpose. The different fragments of said table comprise portions of separate and distinct groups of numerals *a*, *c* on the apron 28. With each portion of each group, I have illustrated the corresponding side of the rate guide member 31. As previously

explained, the member 31, geared to the apron 28, presents its appropriate side, when its respective group of numerals on said apron 28 is brought into active relation with the indicators 44, 45. Thus presented, the visible rate numerals *b* on said member 31 guide the operator in shifting the apron 28 to bring the proper group of numerals *a*, *c* into active relationship. For example, in figuring a cigar maker's pay, the user, knowing that the rate per thousand pieces handled by the employee is $3.65, turns the knob 27 until the rate guide member *b* presents the number "3.65" (Fig. 8). Being advised that one hundred pieces had been handled by the employee, the user adjusts the knob 27 to bring the number "100" of the then active portion of the table into registration with the indicator 44. Then, glancing downward from said rate guide number "3.65" to the indicator 45 directly beneath said number, the user takes the reading "37," which represents, in cents, the amount to which the employee is entitled for his services. Passing to another employee who has worked on pieces at the rate of $5.55 per thousand, the user turns the knob 27 to rotate the rate guide member 31 and thus bring into view the number "5.55" (Fig. 9), which appears on a side of said member other than that bearing the last used guide number. The second employee having credit for seventy-five pieces, the user adjusts the knob 27 to bring into registration with the indicator 44 the number "75" of the new active section of the apron, which bears numerals *a*, *c* corresponding with that of the displayed side of the member 31. Reading down, as before, from the number "5.55," the user takes from the indicator 45 therebeneath the reading "41," which represents, in cents, the amount to which the second workman is entitled. It will be understood that the table just described is figured in the customary way in respect to fractions of cents. Further, it will be seen that a user is only obliged to shift the apron 28 to present a new group of numerals in the table when one of the five guide numbers displayed by the member 31 will not answer the then particular requirement.

Changes in the specific form of my invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a calculator, a frame, an apron movably supported on the frame and tabulated with successive groups of characters, indicators on the frame for reference in connection with the characters of a given group on said apron, means for moving the apron selectively to bring said groups of characters into active relation with said indicators, a revoluble member bearing characters thereon, each character having calculatory relationship to a certain group of characters on said apron, an indicator on the frame for reference in connection with each character on said revoluble member, and means driven by said apron to rotate said member, step by step, intermittently to shift the same and severally bring the characters thereon into active relation with their respective indicator in accord with the presentation severally of the groups of characters on the apron in active relation with their respective indicators.

2. In a calculator, two movably supported tables, the first bearing groups of characters, the second bearing characters, each relating to a certain group of characters on the first table, means for moving the first table severally to present for reference the respective groups of characters thereon, and means for shifting the second table severally to present for reference the respective characters thereon, said latter means being operated through said first means and co-ordinated therewith to shift the second table intermittently and thereby maintain the appropriate relation for calculatory reference between said tables.

3. In a calculator, a frame, and a table, one movable with respect to the other, said table bearing characters in groups for reference severally, a rate guide movably supported on the frame and bearing characters for reference severally, each rate character relating to a certain group of symbols on said table, and means for intermittently shifting the guide upon relative movement of frame and table to accord with the group of characters presented for reference on the latter.

In testimony whereof, I have signed my name to this specification.

MARK LAMPMAN PIKE.