No. 778,790. PATENTED DEC. 27, 1904.

A. H. MERRILL.

CALCULATOR.

APPLICATION FILED OCT. 7, 1903.

Fig. I

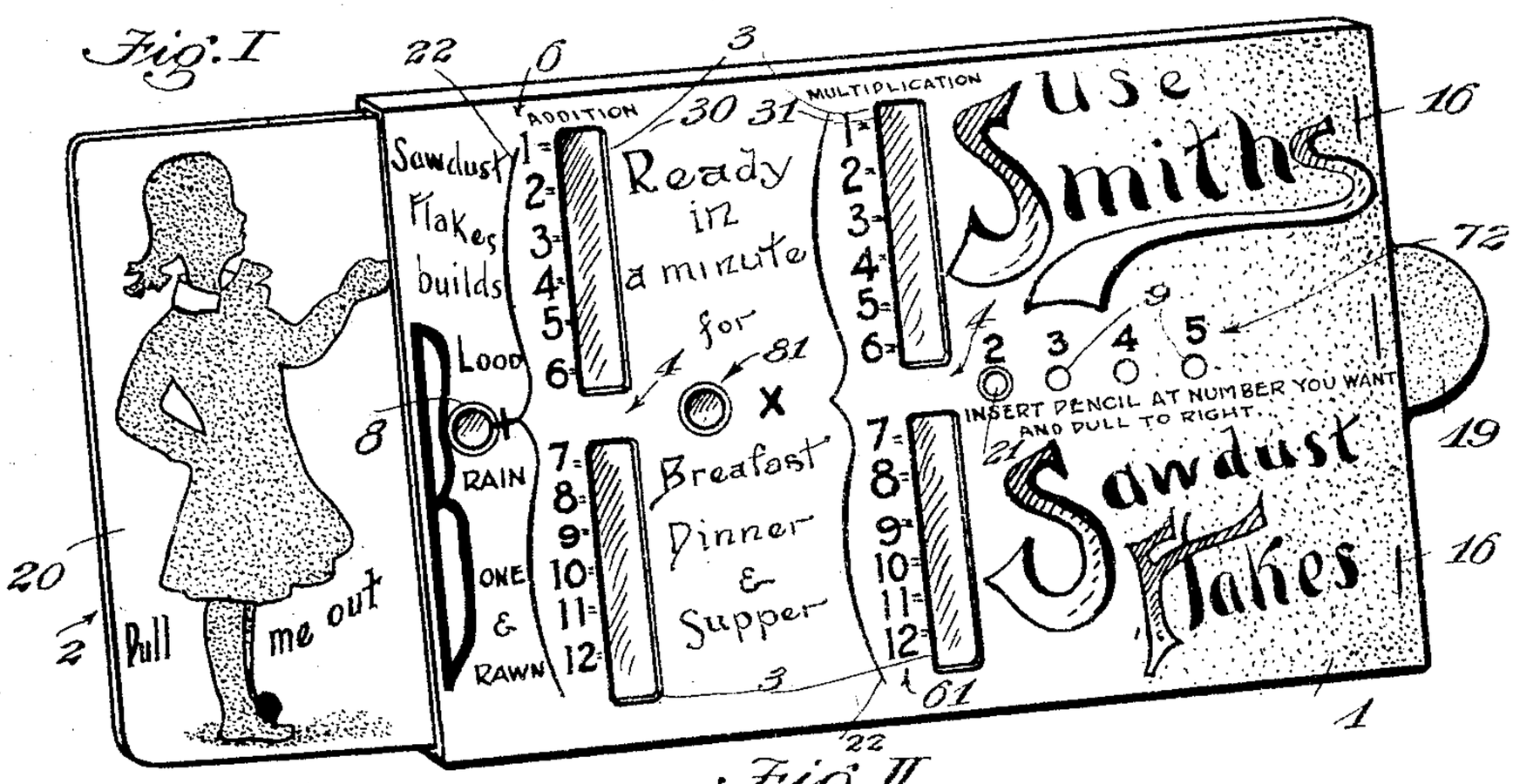


Fig. II

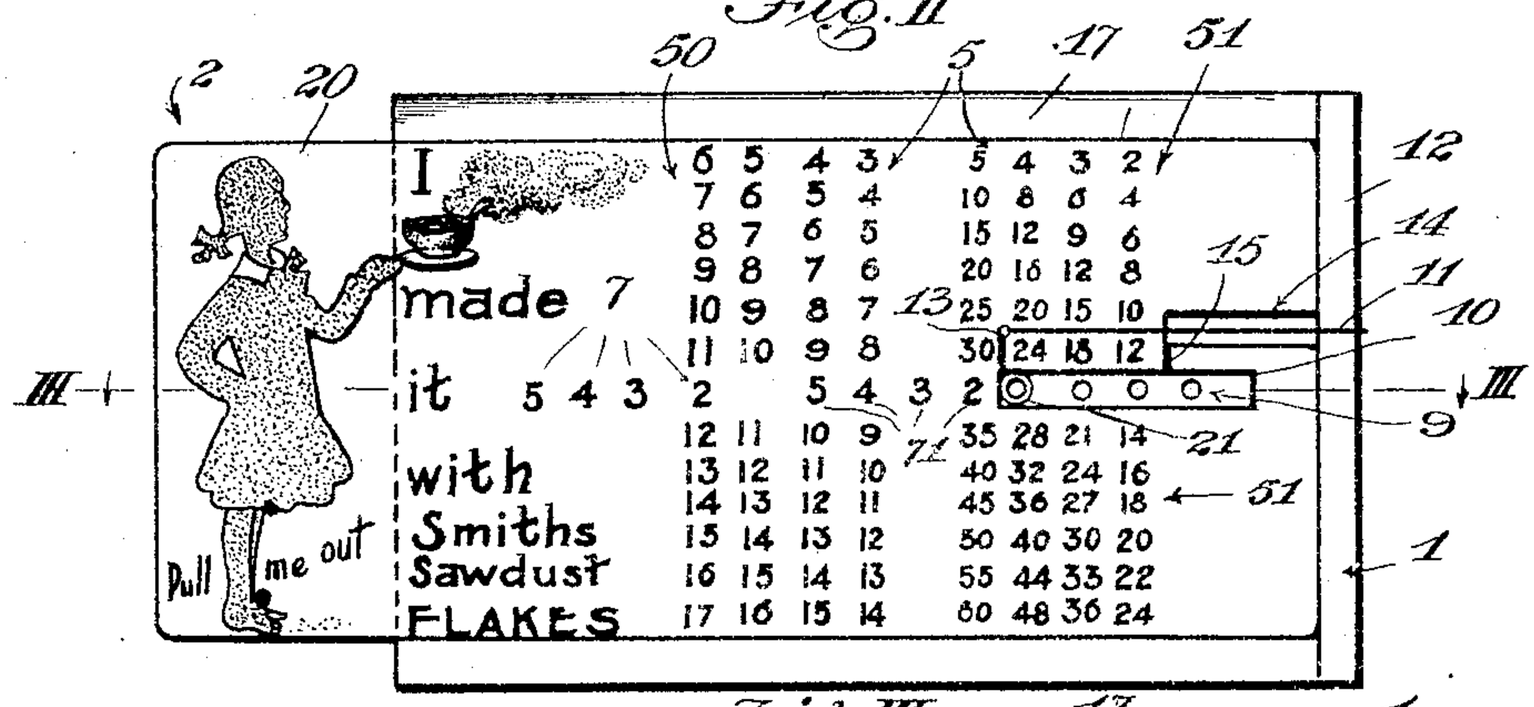


Fig. III

Fig. IV

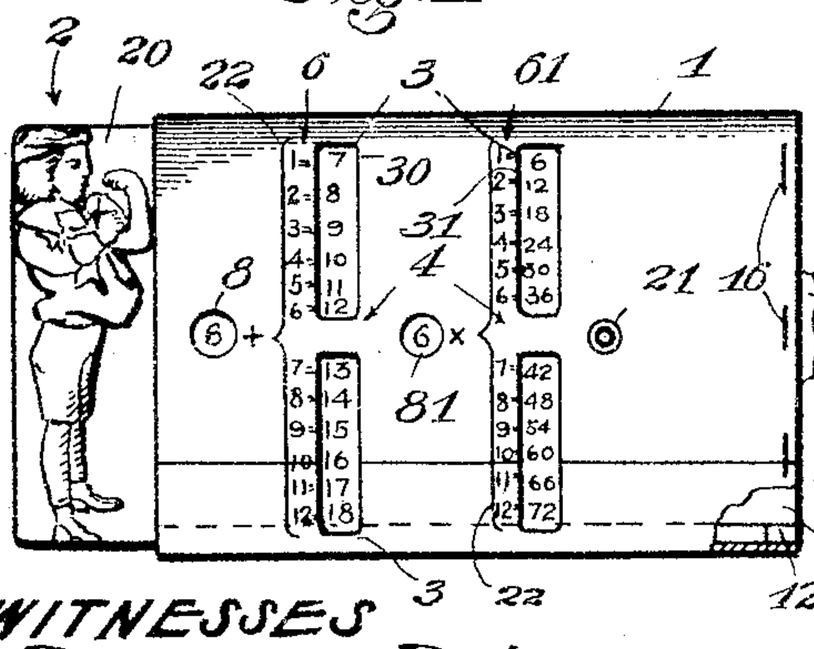
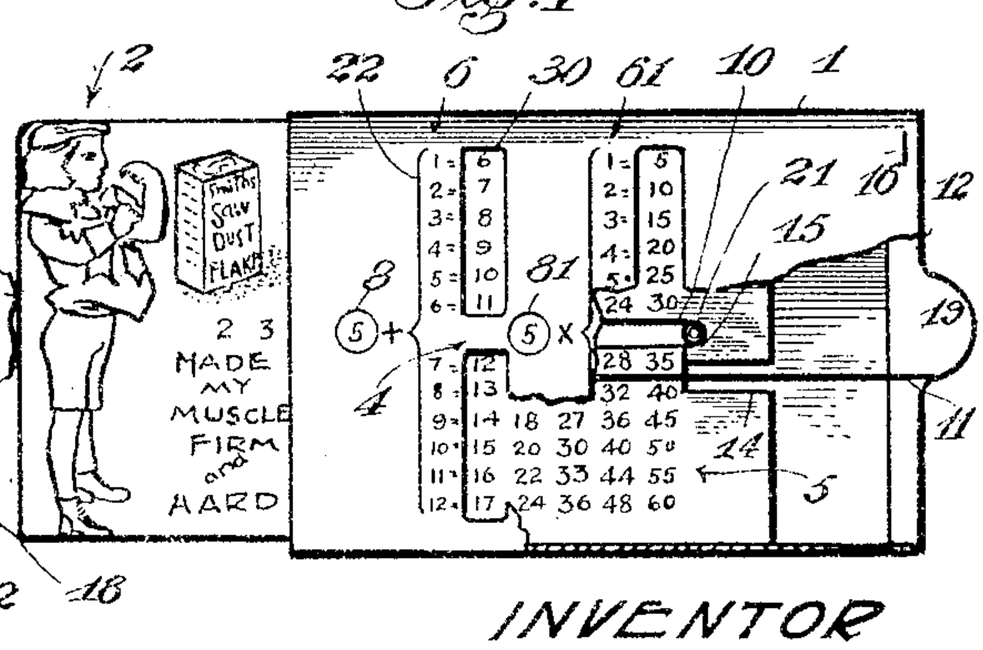


Fig. V



WITNESSES

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No. 778,790. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

ALBERT H. MERRILL, OF COMPTON, CALIFORNIA.

CALCULATOR.

SPECIFICATION forming part of Letters Patent No. 778,790, dated December 27, 1904.

Application filed October 7, 1903. Serial No. 176,046.

To all whom it may concern:

Be it known that I, ALBERT H. MERRILL, a citizen of the United States, residing at Compton, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Calculators, of which the following is a specification.

This invention relates to calculators of the same general nature as that set forth in my application Serial No. 94,544, filed February 17, 1902.

The primary object of the present invention is to provide a calculator of this class of extreme simplicity and cheapness and adapted to more general use than the one set forth in said former application.

Another object of the invention is to construct a calculator in such manner that it may be more readily manipulated without any liability of pinching or binding the parts in handling.

Another object of the invention is to provide a calculator with means for convenient performance of two separate operations, such as addition and multiplication, by a single adjustment of the calculator.

An additional object of the invention is to so construct the device generally that it may be used as an educational device for children. When used for this purpose the invention has the advantage of teaching addition by the memorizing or "sight" method, is adapted to be operated by a child, thereby awakening his interest in the study of arithmetic, is adapted to be inscribed with numerals in large type, and therefore not trying on children's eyes, and saves the wear of text-books occasioned by their use in referring to the addition and multiplication tables.

Another object of the invention is to so construct and arrange the device that it will provide for the display of advertising matter, such display being dependent upon the operation of the calculator means.

A further object of the invention is to construct a calculator of this class which will be sufficiently thin and light to be also used as a book-mark, for example, by bookkeepers.

The accompanying drawings illustrate the invention.

Figure I is a perspective view of the device in normal or in operative position. Fig. II is a view of the device with the front of the cover removed, this form of the invention embodying features not shown in Fig. I. Fig. III is a longitudinal section on line III III, Fig. II. Fig. IV is a face view of a modified form of the invention, which for most purposes will be the preferred form. One part of the case is broken away to contract the view and another part to disclose interior construction. Fig. V is a rear view of Fig. IV. In this view the device is shown operated and part of the cover is broken away to disclose underlying parts.

1 represents a case, cover, or envelop, and 2 a member, preferably a slide or plate, movable longitudinally therein and fitting therein so as to slide easily. The cover 1 is provided with sight-openings 3, extending transversely across its width, said openings being in desirably the form of slots arranged in pairs, the slots of each pair being in alinement and separated by bridge or imperforate portions 4, which serve the double purpose of strengthening the cover and concealing index-numbers hereinafter referred to. The slide 2 is provided, preferably on both sides, with numerical marks or result-indicating numbers 5, arranged in tabular order—that is to say, in columns and rows, for example, as shown in Fig. II—in such manner that when the slide 2 is moved longitudinally within the case or cover 1, successive columns of these numbers will be exposed at the openings or slots 3, as shown. There may be two tables of numbers, 50 51, which coöperate with or exhibit through the respective sets of openings 30 31, in which case there are provided along the edges of the respective openings 30 31 designating-numbers 6 61, arranged columnwise in such position that successive numbers in the column 6 61 are in line with successive rows in the tables of numbers 50 51, and each of such rows of numbers bears a mathematical relation to the corresponding numbers in the columns 6 61, as hereinafter described. This relation is indicated by index-numbers 7 71, arranged in a row on the slide 2 in such manner as to singly and and successively exhibit or

disclose through openings 8 81 on the cover, there being two sets of index-numbers corresponding to the two columns 6 61 of designating-numbers. Such index-numbers as may be between the members of the respective pairs of slots are concealed by the imperforate portions of the cover before mentioned, and are therefore not apt to be confused with the result-indicating numbers. The tables 50 51 are in rectangular sections, spaced apart transversely of the slide to provide room for the index-numbers. The series of index-numbers 7 and 71 overlap longitudinally the tabular series of result-indicating numbers 5, thereby economizing room by reducing the length of the movable member of the device. Similarly and for the same purpose the slot 10 overlaps the result-indicating numbers 5 in a longitudinal direction.

Another set of index-numbers 72 may also be provided on the outside of the case or cover 1, on both sides thereof, perforations 9 being provided in the cover adjacent to such number-marks 72, and said perforations being opposite one another on opposite sides of the cover in pairs to allow an operating device, such as a pencil, to be inserted therethrough and to engage with the slide, as hereinafter set forth. In this form of my invention the slide will be provided with a longitudinally-extending slot 10, one end of which is adapted to be engaged by the pencil or operating means to limit the operation of the slide. One object of spacing the numbers in the tables apart, as hereinbefore described, is to leave a space extending longitudinally of the slide between the separated sections of the table, so that the slot 10 may occupy a portion of said space. Otherwise it might be necessary to considerably lengthen the slide in order to provide room for the slot. Index-numbers 71 being arranged in the unslotted portion of the space referred to, said index-numbers may be associated when the slide is operated with result-indicating numbers 51 transversely opposite slot 10, this construction affording a very compact and convenient arrangement of the numbers on the slide. The slot 10 permits the operating instrument to be inserted through both members of a pair of operating-apertures, thereby equalizing the wear and adapting the device for being operated by a lead-pencil without danger of breaking the lead.

Means are desirably provided for normally maintaining the slide in retracted position within the cover, such means being here shown as an endless elastic band or cord 11, engaging with the slide and cover, substantially as shown in Fig. II, a closure consisting of a strip 12 being secured to and forming a part of the cover, the said band passing around said strip and engaging at its inner end with a slot 13 in the slide 2. Strip 12 may be fastened in place by staples 16. Said slide has a slot 14 in its end in line with the position of the band or endless cord 11, so that said cord will be free and clear of the parts 1 2 for a portion of its length sufficient to provide the requisite elasticity and freedom of movement. To enable convenient insertion of this band, a slit 15 is cut through from slot 14 to the slot 10, so that the inner end of an endless band can be passed from slot 14 through slit 15 into slot 10 and thence into the slit 13.

In the form of the invention shown in Fig. II the cover 1 is provided with strips 17, extending along each edge, so as to space apart the front and back of the cover sufficiently to permit free movement of the slide 2, staples 16 fastening the parts together. The construction shown in this view is strong and durable and is preferred when the device is to be used by children. For most purposes, however, where a very cheap construction is desired I prefer to construct the cover, as shown in Figs. IV and V, of a single strip or piece of paper or other suitable material bent over or folded over and overlapped and gummed at 18 to form an envelop open at both ends and adapted to receive and fit over the slide. One end of this envelop is closed by a strip 12, which may be fastened therein by staples or fasteners 16, said strip having a lug 19, adapted to serve as a handle for manipulating the cover. The slide 2 is manually accessible, preferably extending or projecting beyond the cover at the open end a sufficient distance to enable its projecting portion 20 to be grasped by the fingers of one hand to manipulate the slide.

Stop means are provided for preventing the withdrawal of the slide from the cover a sufficient distance to injure or break the elastic band. For this purpose a rivet 21 is fastened in the cover and extends through the slot 10 in the slide, so as to engage with one end of the slot when the slide is withdrawn so far as may be desirable. In the construction shown in Figs. I and II this rivet is preferably tubular, its perforations serving as one of the operating-perforations aforesaid and protecting the edge of the perforation used when the longest movement occurs.

The two numeral-tables 50 51 may be desirably arranged for different operations, such as addition and multiplication, upon the same series of designating-numbers, the columnar series 6 61 of such designating-numbers being identical. Means associating the exposed index-number with the designating-numbers, such as brace-marks 22, centering opposite said index-number and including, respectively, the columns of numbers 6 61, may be arranged between the respective columns and the respective index-perforations 8 81 on the cover. Suitable characters, such as "+, ×," denoting arithmetical operations, such as addition and multiplication, may be arranged

between or adjacent to the respective perforations. The sign "=" may be placed to the right of each designating-number, as shown.

In the form shown in Figs. IV and V the left-hand columns of the tables of result-indicating numbers appear through the slots while the slide is in the normal position, it being necessary to extend the slide but three more steps to expose the remaining columns of the tables 50 51. As shown in Fig. V, the tables are not spaced apart longitudinally, as in Fig. II.

In using the device the outer end of the slide 2 will be grasped in one hand and the lug 19 with the other hand, the two hands being then drawn apart so as to pull the slide outwardly until the desired index-number comes opposite or in view through the openings 8 81. The numbers then appearing or exhibited through the respective openings 30 31 will be the sums or products, as the case may be, of the selected index-number and the designating-numbers 6 61 which are in the same horizontal row. In the form of the invention shown in Figs. I and II the device is adapted for operation with a pencil or similar means, which will be inserted in that one of the holes 9 which corresponds to the number to be added or multiplied, and the cover then pulled to the right as far as it will go, the end of the slot forming a stop which arrests the operating instrument when the columns in the tables 50 51 corresponding to such index-number have arrived opposite the openings 30 31. The distance between said stop and the operating-aperture normally farthest therefrom is desirably substantially equal to the length of cover between the reading-slots, so that all the columns of numbers which occupy the portion of the slide between said slots may successively be displayed through the left-hand pair of reading-slots. In order that the index characters 72 for the operating-perforations 9 shall read in the usual manner, from left to right, as shown in Fig. I, it is necessary that the index-numbers 7 on the slide shall read from right to left, as shown in Fig. III. In Figs. IV and V, however, the operating-perforations are dispensed with, and in this case it is most convenient to make the index-numbers 7 on the slide read from left to right.

In the form shown in Fig. I the device may be operated either with or without an operating-instrument.

In using the device for advertising purposes the advertising or display matter may be printed on either the slide or the cover, or both; but I prefer to so arrange it that a part or all of the advertising matter on the slide will be normally concealed by the cover, but exposed to view when the slide is drawn out in the performance of the calculating operation, so that such operation will also result in an advertising operation, this feature being illustrated in Figs. I, II, IV, and V.

It will be noted that in a tabular-calculator constructed according to the principles of this invention the slide may be inclosed in a thin closely-fitting envelop cheaply and easily manufactured, because the slide projects from the cover, so as to be manually accessible at one end, and at the other end the cover may be moved without pinching either by the operating-apertures 9 or the handle 19.

When the device is constructed for bookkeepers' use, the addition-table will preferably be dispensed with and a table of higher products put in its place. In such case index-numbers may begin with "13" or a higher number and the designating-numbers be "15," "25," "35," &c.

It is to be understood that this invention is not limited to the precise construction shown and described. When a numerical table suitable for bookkeepers' use is employed, different index means may be provided—such, for example, as index-numbers appearing through the ends of the transverse result-indicating openings or slots 3. When the device is to be used by young children, however, it is important that the operations be completely indicated, and this can be done only by a construction which will provide a space between the point where the index-numbers successively appear and the location of the stationary designating-numbers, so that printed matter indicating arithmetical operations involving said index-numbers and designating-numbers may be arranged in said space.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a device of the class described, a cover having a result-indicating sight-opening and provided with designating-numbers along said opening, a movable member within said cover, result-indicating numbers on said member exposable through said sight-opening, a series of index-numbers on said movable member, the index-numbers and the result-indicating numbers occupying longitudinal overlapping portions of the movable member, said cover having an opening exposing said index-numbers one at a time, at a point separated from said sight-opening by an intervening portion of the cover, and marks on said portion of the cover indicating arithmetical operations involving said index-numbers and designating-numbers and associating a single exposed index-number with a plurality of the designating-numbers.

2. In a device of the class described, a cover having a result-indicating sight-opening and provided with designating-numbers along said sight-opening, a movable member within said cover provided with result-indicating numbers exposable through said sight-opening and with a series of index-numbers, the index-numbers and the result-indicating numbers occupying longitudinally-overlapping portions of the movable member, said cover

having an index sight-opening separated from said result-indicating sight-opening by an intervening portion of the cover and adapted to expose the index portions singly, a single mark on said cover adjacent to said index sight-opening indicating an arithmetical operation, and a mark on said cover associating said single mark with a plurality of designating-numbers.

3. In a device of the class described, a cover having a pair of transverse slots, the members of said pair alining with each other and separated by an imperforate portion of the cover, there being an opening in the cover longitudinally in line with said imperforate portion thereof, a character indicating an arithmetical operation adjacent said opening, a longitudinally-slidable plate beneath said cover, result-indicating numbers on said plate and adapted to be displayed through said slots, designating-numbers on the cover along the slots, and index-numbers on the slide adapted to be singly displayed through the aforementioned opening in the cover.

4. In a device of the class described, a cover having a pair of transverse slots, the members of said pair alining with each other and separated by an imperforate portion of the cover, there being an opening in the cover longitudinally in line with said imperforate portion thereof, a column of numbers along each member of said pair of slots, a longitudinally-slidable plate beneath said cover, result-indicating numbers on said plate and adapted to be displayed through said slots, index-numbers on said plate adapted to be singly displayed through said opening, a character indicating an arithmetical operation adjacent said opening, and a brace-mark including the aforementioned columns of numbers.

5. In a device of the class described, a cover having a slot and an opening independent said slot, a slide beneath said cover, numbers on said slide adapted to be displayed through said slot and opening, a column of numbers along said slot, a character indicating an arithmetical operation adjacent said opening, and a brace-mark including said column and centering opposite said character, said character and brace-mark being located between said slot and opening.

6. In a device of the class described, a slotted case, a slide therein, and an automatic retractor for said slide fastened to the slide and case, said slide having a cut-away portion embracing the retractor between the points at which it is attached to the slide and case and within which said retractor operates.

7. In a device of the class described, a case having sight-openings, a slide therein, and an elastic cord fastened to the slide and case, said slide having a cut-away portion embracing said cord between its points of attachment.

8. In a device of the class described, a slotted case, a slide therein, said slide having a cut-away portion opening at the rear end thereof, and a cut leading from said cut-away portion to a point longitudinally in line therewith, and an endless elastic cord adapted to be led through said cut and secured to the case.

9. In a device of the class described, a case having sight-openings, a slide therein provided with a longitudinal slot, and a stop for said slide extending through said slot, said slide being cut to allow an endless cord to be looped into the slot and having also a cut leading from said slot and adapted to receive said cord.

10. In a device of the class described, a case having sight-openings, a slide therein provided with a longitudinal slot, a stop for said slide extending through said slot, and a resilient retractor for said slide.

11. In a device of the class described, a cover having sight-openings, a slide therein provided with a longitudinal slot, and a stop for said slide extending through said slot, said slide being cut to allow an endless cord to be looped into the slot and having a cut leading from said slot and adapted to receive said cord, said slide having also a cut-away portion opening at the end thereof and in line with the cord.

12. In a device of the class described, an envelop having sight-openings, a closure for one end of said envelop, a manually-accessible slide within said envelop, said slide having a cut-away portion opening at the rear end thereof, and an elastic cord connecting said slide and closure and extending across said cut-away portion of the slide.

13. In a device of the class described, an envelop having sight-openings, a transverse strip within one end of said envelop and closing the same, a manually-accessible slide within said envelop, there being a cut leading into said slide and an endless elastic cord led into said cut and looped around said transverse strip.

14. In a device of the class described, an envelop having sight-openings, a transverse strip within one end of said envelop and closing the same, a manually-accessible slide within said envelop, there being a cut leading into said slide, and an endless elastic cord led into said cut and looped around said transverse strip, there being a cut-away portion of said slide embraced by said cord.

15. In a device of the class described, an envelop having sight-openings, a closure for one end of said envelop, a slide within said envelop and projecting from the open end thereof, said slide having a cut-away portion opening at the rear end thereof, and an elastic cord connecting said slide and closure and extending across said cut-away portion of the slide.

16. In a device of the class described, an envelop having sight-openings, a transverse strip within one end of said envelop and closing the same, a slide within said envelop, and projecting from the open end thereof, there be-

ing a cut leading into said slide, and an endless elastic cord led into said cut and looped around said transverse strip.

17. In a device of the class described, an envelop having sight-openings, a transverse strip within one end of said envelop and closing the same, a slide within said envelop, and projecting from the open end thereof, there being a cut leading into said slide, and an endless elastic cord led into said cut and looped around said transverse strip, there being a cut-away portion of said slide embraced by said cord.

18. In a device of the class described, a cover having a pair of transverse slots, the members of said pair alining with each other and separated by an imperforate portion of the cover, there being a sight-opening in the cover longitudinally in line with said imperforate portion thereof and to the left of said pair of transverse slots, a character indicating an arithmetical operation adjacent said opening, designating-numbers along the aforementioned pair of slots, a brace-mark including said designating-numbers and centering opposite said character, a slide beneath said cover and projecting from the left end thereof, a table of result-indicating numbers on said slide adapted to be displayed through said slots and arranged in transverse columns and longitudinal rows, each row alining with a designating-number, the numbers of said table being arranged in rectangular sections spaced apart transversely of the slide, a longitudinal row of index-numbers on said slide between said sections, said index-numbers being so arranged with respect to the columns of the table that when a column of the table appears through the slot the index-number pertaining thereto appears in the aforementioned sight-opening.

19. In a device of the class described, a cover having a pair of sight-openings alined transversely thereon, a slide beneath said cover, a table of result-indicating numbers on said slide adapted to be exposed through said pair of openings, exposable index-numbers on said slide longitudinally in line with the portion of the cover between the aforementioned sight-openings, designating-numbers on the cover and alining with the result-indicating numbers, and means associating an exposed index-number with a plurality of said designating-numbers.

20. In a device of the class described, a case having sight-openings provided with designating-numbers, a slide movable longitudinally within and projecting from said case, said slide provided with a numerical table and index means for determining when the appropriate numbers of the table are exposed through the sight-openings, the sides of said case being composed of thin material and closely fitting said slide, and an operating-handle for said case.

21. In a device of the class described, a case having sight-openings provided with designating-numbers, a slide movable longitudinally within and projecting from said case, said slide provided with a numerical table and index means for determining when the appropriate numbers of the table are exposed through the sight-openings, the sides of said case being composed of thin material and closely fitting said slide, said case having a series of numbered operating-apertures.

22. In a device of the class described, a cover having a plurality of transversely-arranged sight-openings provided with designating-numbers at said openings and also having an index sight-opening, and a rectangular slide movable longitudinally within said cover and provided with a plurality of numerical tables adapted to be exhibited columnwise through the respective transverse slots in the cover, and with index-numbers adapted to be disclosed singly and successively through the index sight-opening, the numbers in the respective tables which are simultaneously disclosed at the respective transverse slots being the result of different mathematical operations upon the index-number which is at that time disclosed and the designating-number alined with the tabular number.

23. In a device of the class described, an envelop formed of a single folded piece and having a closure for one end of said piece, said closure comprising a strip having a protruding portion forming a handle, a slide within said envelop and projecting from one end thereof and an endless cord adapted to retract said slide and looped around said closure.

24. In a device of the class described, an envelop having sight-openings and composed of a single folded piece having a closing-strip within one end thereof, and a slide within said envelop and projecting from the open end thereof.

25. In a device of the character described, an envelop having sight-openings and composed of a single folded piece having a closing-strip within one end thereof, said strip provided with a projection forming a handle, and a slide within said envelop and projecting from the open end thereof.

26. In a device of the class described, a case having sight-openings and a series of longitudinally-extending pairs of oppositely-disposed operating-apertures, a slide within said case and provided with an opening normally opposite said operating-apertures, and an open-ended rivet connecting the members of a pair of said operating-apertures, said rivet extending through the opening in the slide to limit the movement of said slide.

27. In a device of the class described, a case having sight-openings, and a slide within said case provided with numbers exposable through said sight-openings, the sides of said case being provided with pairs of oppositely-disposed operating-apertures, there being an opening through said slide to permit an operating in-

strument to be inserted through both members of a pair of said operating-apertures.

28. In a device of the class described, a cover having transversely-extending sight-openings and a longitudinally-extending series of operating-apertures, and a slide within said cover provided with numbers exposable through said sight-openings, said slide also provided with a stop for said operating-apertures, the distance between said stop and the operating-aperture normally farthest therefrom substantially equaling the length of cover between the aforementioned sight-openings.

29. In a device of the class described, a case having sight-openings provided with designating-numbers, a slide movable longitudinally within and projecting from one end of said case, said slide provided with a numerical table and index means for determining when the appropriate numbers of the table are exposed through the sight-openings, the sides of said case being composed of thin material and closely fitting said slide, said case having an end closure adapted to serve as an operating-handle.

30. In a device of the class described, a case having sight-openings provided with designating-numbers, and a slide movable longitudinally within and projecting from one end of said case, said slide provided with a numerical table and index means for determining when the appropriate numbers of the table are exposed through the sight-openings, said case having a plurality of numbered operating-apertures, there being an opening through the slide normally opposite said operating-apertures in the case.

31. In a device of the class described, a cover having a pair of transverse slots, the members of said pair being separated by an imperforate portion of the cover, there being an index sight-opening in the cover longitudinally in line with said imperforate portion thereof, a longitudinally-slidable plate beneath said cover, result-indicating numbers on said plate and adapted to be displayed through said slots, designating-numbers on the cover along the slots, and index-numbers on the slide, said index-numbers being concealed by the aforementioned imperforate portion of the cover during operation of the slide and adapted to be displayed through the aforementioned index sight-opening.

32. In a device of the class described, a case, a member movable longitudinally of said case, a table of numbers on said member arranged in sections spaced apart to leave a longitudinally-extending space between said sections, and a row of index-numbers occupying said space, there being a pair of transverse slots in the case, said slots separated by an imperforate portion of the case for strengthening the case and concealing the aforementioned index-numbers, said index-numbers being exposable at a point longitudinally in line with said imperforate portion of the case.

33. In a device of the class described, a case, a slide within said case, a table of numbers on said slide arranged in sections spaced apart to leave a space extending between said sections longitudinally of the slide, said slide having a slot occupying a portion of said space, and a stop adapted to operate against an end of said slot to limit the withdrawal of the slide.

34. In a device of the class described, a case having sight-openings, a slide within said case, a table of result-indicating numbers on said slide arranged in sections spaced apart to leave a space extending between said sections longitudinally of the slide, said slide being provided with a slot occupying a portion of said space, and index-numbers occupying the unslotted portion of said space, there being marks on said cover whereby said index-numbers are associated with the result-indicating numbers transversely opposite the slot, and a stop operating against an end of said slot to limit the withdrawal of the slide.

35. In a device of the class described, a case having a pair of slots and an index-opening independent of said slots, a slide beneath said cover, a table of result-indicating numbers on said slide exposable through said slots, said table being composed of two sections spaced apart to leave a space extending longitudinally of the slide, index-numbers occupying said space and singly exposable through the index-opening, there being a mark on the cover associating a single exposed index-number with both sections of the table of result-indicating numbers as said numbers appear through the aforementioned slots.

36. In a device of the class described, a case having a sight-opening, and a slide therein provided with a series of index-numbers and a table of result-indicating numbers and with a longitudinal slot overlapping longitudinally with said result-indicating numbers, the case being provided with designating-numbers adjacent the sight-opening and with a series of operating-openings normally over said slot in the slide.

In testimony whereof I have hereunto signed my name, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 30th day of September, 1903.

ALBERT H. MERRILL.

Witnesses:
A. P. KNIGHT,
JULIA TOWNSEND.