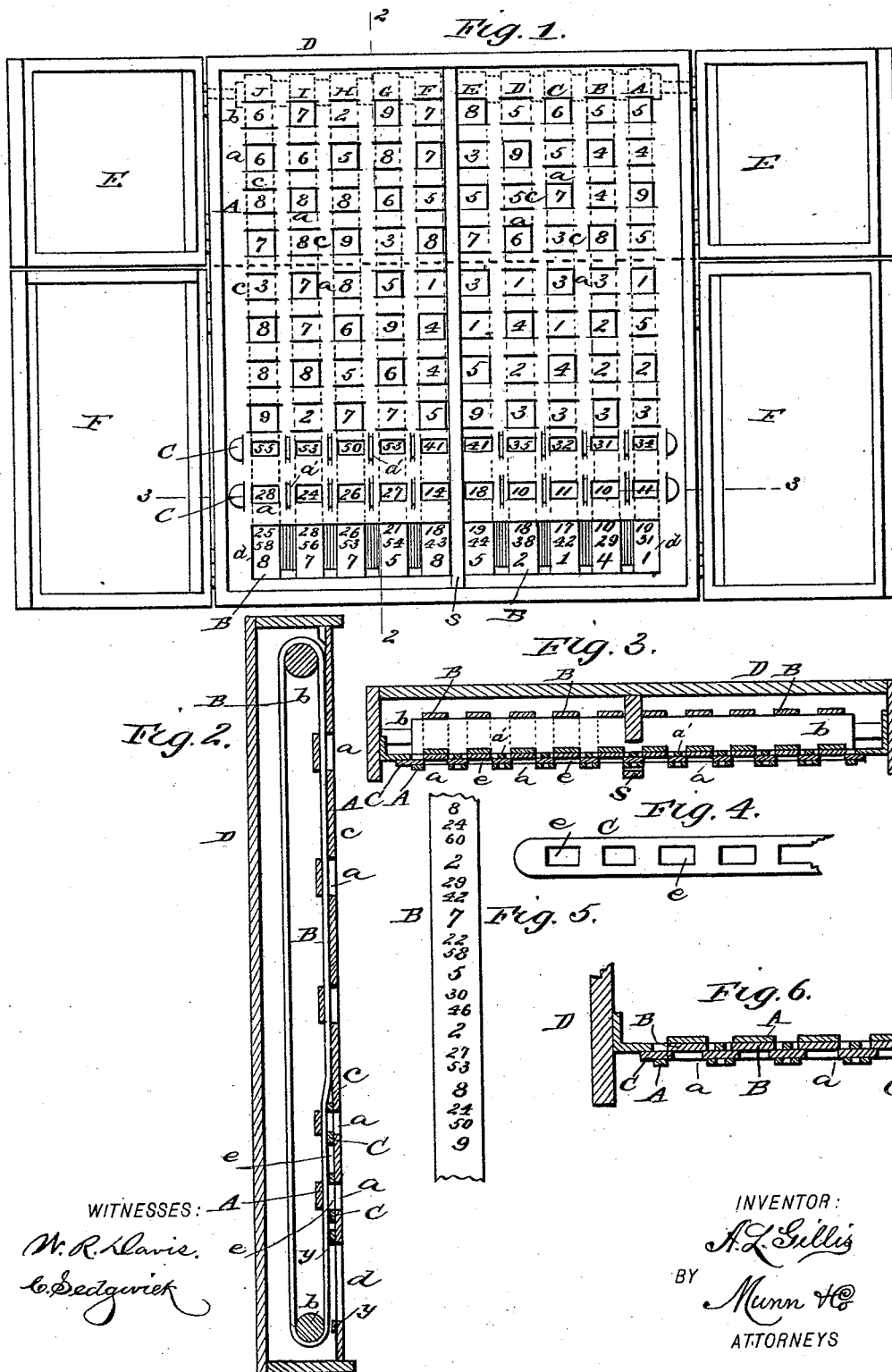


(No Model.)

A. L. GILLIS.
CHART FOR TEACHING ADDITION.

No. 454,729.

Patented June 23, 1891.



UNITED STATES PATENT OFFICE.

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CHART FOR TEACHING ADDITION.

SPECIFICATION forming part of Letters Patent No. 454,729, dated June 23, 1891.

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To all whom it may concern:

Be it known that I, ARTHUR L. GILLIS, of Mount Pleasant, in the county of Henry and State of Iowa, have invented a new and useful Improvement in Charts for Teaching Addition, of which the following is a full, clear, and exact description.

This invention is designed as an improvement upon the addition-chart for which Letters Patent No. 416,593 were granted to me December 3, 1889, and in which a main section having a number of vertical openings and dead-spaces intermediate of the same provided with numerals was used in connection with a series of vertical strips looped through said section and provided with numerals of alternating greater and less value to expose the same through the openings in the section and indicate at the bottom opening in the section the sum of the total number of figures in the openings and dead-spaces above. In such construction the vertical strips were made terminal or single and looped in a sliding manner through the main section, and these were further combined with a single transverse slide adapted to conceal the figures of greater value exposed through the bottom series of openings. In the use of this chart, which was an open or exposed one, and only admitted of a limited range of addition-teaching, the vertical strips were slid up or down to expose different columns of figures to be added and to show the total amounts through the lower openings in the main section, except when the latter were concealed by the adjustment of the transverse slide to bring the openings in it out of range with such totals.

The invention consists in a novel construction and combinations of parts in a chart of this description, substantially as hereinafter described, and more particularly pointed out in the claims, and whereby several advantages are obtained.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a front elevation of an addition-chart embodying my invention. Fig. 2 is a vertical section of the same mainly upon the line 2 2 in Fig. 1. Fig. 3 is a horizontal

section thereof in part mainly upon the line 3 3 in Fig. 1. Fig. 4 is a broken face view of one of the transverse slides. Fig. 5 is a broken face view of one of the vertical strips or slides; and Fig. 6 is a view similar to Fig. 3 upon a larger scale, but of the left-hand side only of the chart in part.

The body of the chart is similar to that of the chart described in my former patent, hereinafter referred to, the same consisting of a main rectangular section A, provided with a series of openings *a*, and intermediate dead-spaces *c*, provided with certain numerals, as indicated in the drawings; but the vertical strips B, which operate in connection with the said main section, are differently constructed, and the chart is made to present two independent sets of examples, and is furnished with two, instead of one, transverse slides C, all as will be hereinafter described.

The chart shown in the drawings is inclosed in a case D, which protects it from exposure, the front of which is composed of two pairs of doors—that is to say, one upper pair E E and one lower pair F F—both sets of doors when closed shutting against a central bar or strip *s*, and said two pairs of doors forming an upper and lower shutter.

The vertical strips B, which operate in connection with the fixed main section A, and are adjustable vertically so that each of a series of numerals on each strip may be displayed through one of the openings *a* in the section A, are in this my improvement arranged back of said section, and are flexible continuous or endless belt-like ones, the same being made to pass around rollers *b b* at the top and bottom of the chart. They may be worked vertically up or down over the rollers *b b* on their face side next to the main section A to shift or change the display of their numerals through the openings *a* in the section by applying the fingers to them through lower openings *d* in the section A, or in any other suitable manner. By thus using adjustable vertical endless strips instead of terminal sliding ones, there is no necessity to provide for projecting them below the bottom of the chart, and they have a greater freedom of movement. The section A, usually made of paper, may be stiffened or supported at its back by re-enforcing wooden strips *y y*.

As in the case of my former patented chart, the openings *a* in each horizontal series alternate with those in the next series above and below; but this alternating feature of the openings *a* does not occur as regards the two bottom series of openings, which are in like lines or planes, so that a passage is provided for each vertical endless strip B in rear of them back of the front of the chart, and slide-ways are formed at *a'* for the perforated transverse slides C C between the endless strips. The several openings *a* may be made by horizontal incisions in the section A, and bending the cut portions back, as clearly shown in Fig. 2, except in the case of the two lower rows of openings, which are formed by perforations in the main section A to correspond with the perforations in the transverse slides C C.

The two transverse strips or slides C C, accordingly as they are drawn back and forth, expose through the lower series of openings *a* the answers to the sums on the vertical strips B—that is, when the apertures *e* in said slides come back of said openings *a*—and conceal the answers when the blank spaces between the apertures *e* cover or close said openings *a*. The upper one of these slides C covers and exposes the answers when the whole chart is exposed—that is, when the upper and lower shutters or doors E F are thrown back or open—and the lower slide C covers and exposes the answers when the upper shutter or pair of doors E are closed over the chart and only the lower part of the chart is exposed or used. These transverse slides are slipped back and forth, so that the answers to the different examples may be concealed or exposed at will of the teacher. The number of examples is by means of these two transverse slides and the upper and lower shutters very largely increased.

To designate the several vertical columns or series, the section A at or beneath the top of the case D has a number of alphabetical characters, which, as shown, extend from A to J, inclusive, and each individually designates one of the several columns. It will be noted by reference to Figs. 1 and 5 that the vertical endless strips B in their several divisions throughout are each provided on their faces with consecutive sets of numerals of greater value in two rows, each set, one below the other, alternated between each of said sets with a numeral of less value, the arrangement being such that when any one of said strips is so adjusted in its column that its numerals of less value are displayed through the openings *a* of that column above the transverse slides C C in connection with the figures in the dead-spaces *c* of the section, there will be represented a total indicated by the number on said strip exhibited through one of the lower openings *a* in the same column, accordingly as the whole chart is exposed or only the lower part of it is used. Thus it will be seen in Fig. 1, under the column J, that when

the whole chart is exposed by throwing open both the upper and lower shutters E F the figures 6, 8, 3, and 8 appear on the respective dead spaces *c* of the section, while the figures 6, 7, 8, and 9 appear through the openings *a* above the transverse slides C C, which collectively amount to 55, exposed through the upper one of the two lower openings *a*, controlled by the upper transverse slide C. On the other hand, if the upper pair of doors or shutter E be closed and only the lower portion of the chart is used, then the same column J will only show on its dead-spaces *c* the figures 3 and 8, and the figures on the endless strip B of said column will exhibit through the openings *a* above the transverse slides the figures 8 and 9, which collectively amount to 28, exposed through the lower one of the two openings *a* controlled by the lower transverse slide C. The same principle of action is carried out in my patented chart hereinbefore referred to, but only under a full exposure of the chart and with a single answer-slide C. Consequently the chart which is the subject of this specification has a greatly enlarged range of examples and provides for both long and short columns of addition. This is in addition to the teacher adjusting the several endless strips to obtain a different total in each column, and before exposing the same to the pupils or scholars shifting either transverse slide C so that the totals are all concealed, and different scholars may be required to compute the total amount of the individual columns by selecting said columns with reference to their alphabetical designation. Thus two or more columns may be used for a single example, and the sum can be ascertained by simply adding the two amounts of each column, which are indicated together—for instance, the sum of column A is 34, the sum of column B is 31, the sum of the two columns is 344—this is found by adding the tens-column A to the units of B, which can be done at a glance, and this applies to any number of columns used as a single example. My improved addition-chart, in fact, affords an almost unlimited amount of drill, and when a teacher wishes to use the chart for primary drill, he has only to close the upper shutter or doors.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A chart for teaching addition, comprising a casing provided with upper and lower shutters, a main section having a number of openings and dead-spaces intermediate of the openings, said dead-spaces being provided with numerals, and a series of vertically-adjustable strips provided with numbers of greater value in double rows alternated by numbers of less value for exposure through the openings in the main section, substantially as and for the purpose specified.

2. A chart for teaching addition, comprising a casing provided with upper and lower shutters, a main section provided with a num-

ber of openings arranged in vertical series, and relatively alternating as described, and having numerals or figures in the dead-spaces of the section between the openings, and a series of endless belt-like strips in rear of the main section, said belt-like strips being provided with numbers of greater value in double rows alternated by numbers of less value for exposure through the openings in the main section, substantially as described, and for the purpose set forth.

3. In charts for teaching addition, the combination of a case carrying the chart, provided with upper and lower shutters, the main section of the chart provided with a number of openings arranged in vertical series, having numbered dead-spaces in between them, and, with the exception of the two lower rows of said openings, relatively alternating as described,

a series of adjustable vertical strips provided with numbers of greater value in double rows alternated by numbers of less value to be exposed through the openings in the main section, and two transverse slides adapted to conceal the number of greater value exposed through the two lower rows of openings in the main section, substantially as described.

4. The combination of the case D, having upper and lower doors E F, the apertured main section A of the chart having dead-spaces numbered as described, the rollers b b, the series of numbered vertical endless belt-like strips B, and the apertured transverse slides C C, essentially as shown and described.

ARTHUR L. GILLIS.

Witnesses:

AUGUSTA D. GILLIS,
JAMES R. GILLIS.