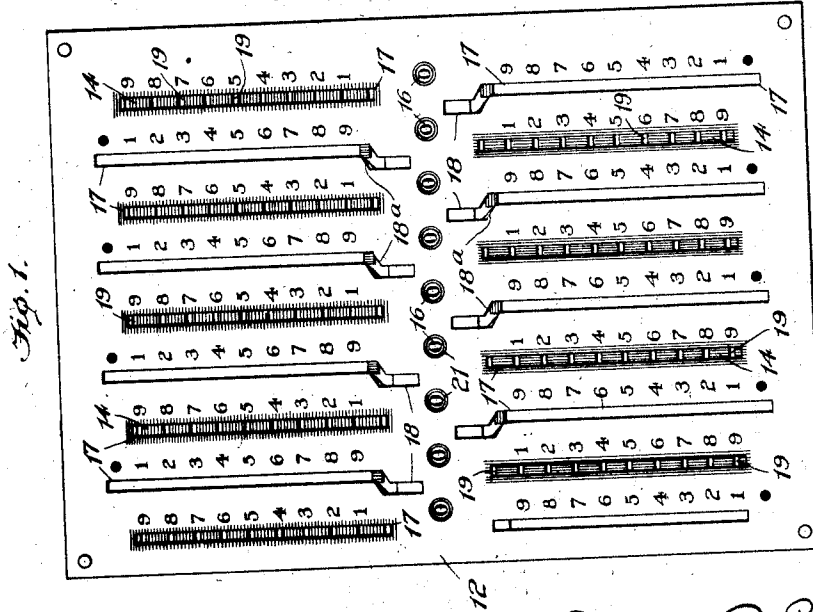
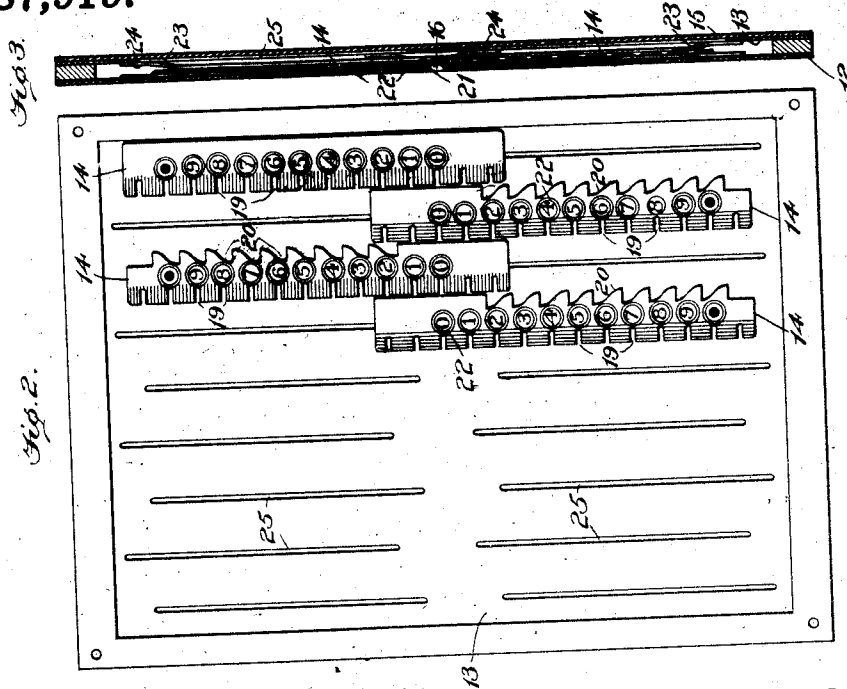


Patented Mar. 28, 1911.

987,919.



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UNITED STATES PATENT OFFICE.

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ADDING DEVICE.

987,919.

Specification of Letters Patent.

Patented Mar. 28, 1911.

Application filed November 15, 1907. Serial No. 402,282.

To all whom it may concern:

Be it known that I, BEVERLEY R. SCOTT, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Adding Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to adding devices, and has for its object to provide a device of this character which will be simple and inexpensive to manufacture, and easy of manipulation, and by which the operation of adding a plurality of columns of figures may be accomplished mechanically and rapidly, and the carrying from one column to the next be done automatically.

To this end my invention comprises certain constructions and combinations of parts hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings, which illustrate one construction in which my invention may be embodied, Figure 1 is a plan view of the device complete. Fig. 2 is a similar view with the front plate removed, certain of the slides being omitted. Fig. 3 is a sectional view taken substantially on the line 3-3, Fig. 1.

The principal parts of my machine may be made of sheet metal, celluloid, wood, or other suitable material, and comprise a front or index plate or sheet 12, a back or intermediate guide plate 13, spaced by any suitable means from the plate 12 to provide a suitable recess between said plates for a plurality of slides 14, and a cover plate 15, the plates 12, 13 and 15 being secured together by rivets or in any other suitable manner.

The front plate 12 is provided near its center with a row of total openings or apertures 16, and on either side of said row of apertures with a series of slots 17. As will be seen by reference to Fig. 1 the slots of each series are alternately long and short, the short slot of one series being opposite the long slot of the other, while each of the long slots is prolonged at its end into an offset portion 18 extending toward the center of the plate, said offset portion being connected with the main portion of the slot by an inclined switch part 18^a. Adjacent each of the slots 17 is a series of numerals run-

ning from 1 to 9, the numeral 1 being nearer the center of the plate in the case of the short slots and the numeral 9 nearer the center in the case of the long slots, so that said numerals are arranged in inverse order adjacent alternate slots and, reading from the top, the numerals adjacent alternate slots are arranged in ascending order while those adjacent the remaining slots are arranged in descending order, as shown in Fig. 1.

The slides 14 hereinbefore referred to are arranged to cooperate with the openings 16 and slots 17 in the plate 12, and are constructed as follows, reference being had to Fig. 2. Each slide comprises a strip of suitable material having at one edge a series of notches 19 suitably spaced to correspond to the numerals adjacent the slots 17 hereinbefore referred to, and being provided opposite said notches with a series of numerals running from 0 to 9, said numerals being arranged to be brought successively opposite the corresponding aperture 16 in the plate 12. The numerals on the slides 14, like those adjacent the slots 17, are arranged in inverse order on alternate slides, as shown in Fig. 2. Each of the slides, with the exception of that farthest to the right, as shown in Fig. 2, is provided on its edge opposite to the notches before referred to with a second series of notches, preferably formed as inclined serrations or teeth 20, said serrations or teeth being respectively upwardly and downwardly directed in alternate slides.

The slides 14, when in normal position, lie alternately with their major portions on opposite sides of the center line of the plate 12. For each slide 14 there is a corresponding aperture 16 and a pair of aligned slots 17, said pair comprising a short slot on the side of the center line of the plate upon which the corresponding slide lies when in normal position and a long slot on the opposite side of said center line. The arrangement of the numerals on the slides is such that when any slide is in normal position the numeral 0 will appear opposite the corresponding aperture 16. The teeth or serrations 20, when any particular slide is in normal position, are directed toward that end of the plate 12 which the corresponding slide occupies, and lie in such a position as to pass the offset portion 18 of the long slot corresponding to the slide next to the right.

Adjacent to each of the openings 16, the front plate 12 is dished or recessed, or otherwise constructed to provide at its rear side adjacent each of said openings a slight beveled projection 21, adapted to cooperate with a series of corresponding recesses or depressions 22 formed in each of the slides 14, said recesses 22 surrounding or lying adjacent the numerals on said slides. Suitably attached at its center to the rear of each of the slides 14 is a suitable flat spring 23 provided with studs or other suitable projections 24 adapted to slide in slots 25 formed in the plate 15 by which the movement of the slides 14 is guided. Said springs 23, by engagement with the plate 15, hold the slides 14 in close engagement with the rear of the plate 12, thereby holding the projection 21 in inter-engagement with the corresponding depression in the slide 14 and maintaining the corresponding numeral in position opposite the opening 16. It will be seen moreover that by reason of the beveled form of the projection 21 and recess 22 longitudinal pressure on the slide 14 will cause the spring 23 to yield, thus permitting the slide to be moved to bring a different numeral opposite the opening 16, the beveled edges of the projection 21 and the corresponding recess in connection with the spring 23 tending to center the numerals with respect to the opening.

The arrangement of the notches in the slides 14 and of the numerals on said slides and on the front plate 12 is such that when any slide is moved to the limit of its motion toward the side of the front plate 12 provided with a corresponding short slot, and with the last notch in such slide 14 opposite the numeral 9 adjacent said short slot, the numeral 0 on the slide will appear opposite the aperture 16 as hereinbefore described, while the movement of the slide toward the opposite side of the plate will cause the other numerals on said slide to appear successively opposite said aperture.

For convenience, I prefer to color the edges of each of the short slots hereinbefore referred to, those of the upper side of the plate 12 being of a different color from those at the lower side thereof, and to color the notched edges of alternate slides to correspond with the coloring of the slots in such a manner that when the slides are moved into their normal positions to bring the numeral 0 opposite the aperture 16, as hereinbefore described, the coloring of the slots and of the notched edges of the slide will correspond.

Upon each of the slides beyond the numeral 9 is placed a dot, star, or other conventional figure, while beyond the numeral 1 adjacent each of the long slots is placed a similar character, whose purpose will be hereinafter described.

The operation of the above device is as follows: Assuming the slides 14 to be in normal position with the numeral 0 appearing at each of the apertures 16, suppose it to be desired to add the numbers 476 and 967. A pencil or other suitable pointer is inserted through the slot 17 which is farthest to the right in the plate 12 and into engagement with the notch in the corresponding slide which appears opposite the numeral 6. Maintaining the pencil or pointer in this notch it is moved toward the center of the plate and the slide is brought down until the pencil or pointer comes into engagement with the lower end of the slot, the arrangement being such that the numeral 6 will now appear in the right hand opening 16. The pencil is now placed in the notch opposite the numeral 7 at the lower side of the plate adjacent the second slot from the right, and the corresponding slide moved upwardly until the pencil or pointer engages the upper end of this slot. The pencil is now placed opposite the numeral 4 in the third column to the right, and the corresponding slide moved downwardly in a similar manner. The number 476 now appears in the three right hand apertures 16. To add to this number the number 967, as desired, the operator now proceeds as follows: It will be observed that the length of the slides 14 is such that whatever the position of each slide there will be a notch opposite each numeral from 1 to 9 in either the upper or lower corresponding slot, but that there will be no notch opposite the same numeral in both the upper and lower slots the length of the slides 14 being considerably less than the combined extent of the upper and lower slots of each pair. The operator now places his pencil in the notch in the right hand slide, opposite the numeral 7, this being now in the lower slot. The slide is now moved upwardly as hereinbefore described, and the pencil or pointer is moved to the limit of its upward movement, being allowed to pass from the notch in the slide through the inclined switch portion 18^a into the offset portion 18 of the slot, and engaging the serration or tooth on the second slide. The numeral 3 will now appear in the first aperture at the right and the numeral 8 in the second, the latter having been moved an additional number by the engagement of the pointer with one of the serrations thereof. Now engaging with the pencil the second slide at the notch opposite the numeral 6, now in the upper slot, this slide is brought down in a similar manner the pencil passing into the offset portion of this slot and moving the third slide down one number, thus again carrying one into the next column. The pencil or pointer is now placed opposite the numeral 9 in the third slot and the corresponding slide is

moved upwardly, the pencil riding into the offset portion and the fourth slide moved one number. The numerals in the apertures 16 now read 1443, the correct sum of the numbers 476 and 967. From the foregoing description it will be clear that the function of the offset portions of the slides 14 is to effect a carrying from one column to another, as is necessary in some cases. In every movement of the slides the pencil or pointer is moved toward the center of the plate 12 or toward the apertures 16, and this movement in all cases is continued until the end of the slot is reached, the pencil, if necessary, passing without attention into the offset portion 18 if the slot in which the operation is taking place be provided with such offset portion. It will thus be seen that the slides are moved sometimes forwardly and sometimes backwardly according to the position of the slide and the digit to be added, and that when any particular slide is moved backwardly the slide to the left is automatically moved forwardly one number.

The purpose of the dots, stars, or other conventional figures above referred to will now be explained.

Suppose, for example, the numbers to be added to be 496 and 969. The slides are manipulated as above described to bring the number 496 into the three right hand apertures. The pencil is now inserted in the notch in the first slide opposite the numeral 9 in the lower slot, and moved upwardly through the offset portion to the limit of its movement, as usual. It will now be seen, however, that a black dot or star appears opposite the second aperture. Before proceeding further therefore it is necessary to reverse the second slide, this being done by placing the pencil or pointer opposite the corresponding dot, star, or other character at the top of the second slot and bringing the pencil and slide down to the limit of movement of the pencil causing a movement of one place in the third slide. The pencil is now inserted opposite the numeral 6 in the second slide, and this slide moved up and the operation proceeded with in the usual way. It is thought that the necessity for reversing the slide, as above referred to, will be apparent. Where a slide is so set as to bring the numeral 9 opposite the aperture 16, if this slide be so moved as to add 1 it is obvious that the result should be 10, but as the numerals on the slide do not extend beyond the numeral 9 this slide should now be brought back to 0 and the slide to the left moved to indicate a number one greater. This is accomplished by reversing the slide as above described, the pencil passing into the offset portion, and carrying the necessary figure over to the next column.

While I, in order that my invention may be readily understood, have shown and de-

scribed the same as embodied in a particular construction, I wish it to be distinctly understood that I do not limit myself to the precise construction shown, it being obvious that many changes might be made therein without departing from the spirit and scope of my invention.

Having thus described my invention what I claim as my invention and desire to secure by Letters Patent is:—

1. In a device of the character described, the combination with a plate provided with a plurality of slots, of slides operable through said slots, and numerals on said plate adjacent said slots, the numerals adjacent alternate slots being arranged in ascending order and those adjacent the remaining slots being arranged in descending order.

2. In a device of the character described, the combination with a plate provided with a series of apertures and a plurality of slots, of slides operable through said slots, said slides being provided with numerals adapted to be brought opposite said apertures, and numerals on said plate adjacent said slots, the numerals adjacent alternate slots being arranged in ascending order and those adjacent the remaining slots being arranged in descending order.

3. In a device of the character described, the combination with a plate provided with a series of apertures and a plurality of slots, of slides operable through said slots, said slides being provided with numerals adapted to be brought opposite said apertures, the numerals on alternate slides being arranged in ascending order and those in the remaining slides being arranged in descending order, and numerals on said plate adjacent said slots, the numerals adjacent alternate slots being arranged in ascending order and those adjacent the remaining slots being arranged in descending order.

4. In a device of the character described, a plurality of slides provided with numerals, the numerals on alternate slides being arranged in ascending order and those on the remaining slides being arranged in descending order.

5. In a device of the character described, the combination with a plate provided with a plurality of slots, of a plurality of slides operable through said slots and provided with numerals, the numerals on alternate slides being arranged in ascending order and those on the remaining slides being arranged in descending order.

6. In a device of the character described, the combination with a plate provided with a series of apertures and a plurality of slots, of a plurality of slides operable through said slots and provided with numerals adapted to be brought opposite said apertures, the numerals on alternate slides being arranged

- in ascending order and those on the remaining slides being arranged in descending order.
7. In a device of the character described, the combination with a plate, of a plurality of slides normally lying with their major portions alternately on opposite sides of the center line of said plate and movable thereacross.
8. In a device of the character described, the combination with a plate, of a plurality of slides normally lying with their major portions alternately on opposite sides of the center line of said plate and movable thereacross, and a front plate provided with slots through which said slides are operated.
9. In a device of the character described, the combination with a plate, of a plurality of slides normally lying with their major portions alternately on opposite sides of the center line of said plate and movable thereacross, and a front plate provided with slots through which said slides are operated, said slots being arranged in aligned pairs at opposite sides of said center line.
10. In a device of the character described, the combination with a plate, of a plurality of slides normally lying with their major portions alternately on opposite sides of the center line of said plate and movable thereacross, said alternate slides being differently colored, and a front plate provided with slots through which said slides are operated, said slots being arranged in aligned pairs at opposite sides of said center line, and the slot of each pair lying on the side of said center line corresponding to the normal position of the corresponding slide having its edges colored to correspond with said slide.
11. In a device of the character described, the combination with a plate having a series of slots, one or more of said slots having an inclined switch part and an offset portion into which said switch part leads, of a slide provided with a series of notches extending substantially throughout the length of one of its edges and accessible through one of said slots, said slide being further provided with a series of inclined teeth extending for a portion of the opposite edge and accessible through the offset portion of another of said slots.
12. In a device of the character described, the combination with a plate having a slot, of a slide, a spring carried by said slide, and bearing on said plate, and a projection on said spring entering said slot.
13. In a device of the character described, the combination with a front plate having an aperture and a projection on the back thereof adjacent said aperture, of a slide having a plurality of recesses adapted successively to engage said projection.
14. In a device of the character described, the combination with a front plate having an aperture and a beveled projection on the back thereof adjacent said aperture, of a slide having a plurality of beveled recesses adapted successively to engage said projection.
15. In a device of the character described, the combination with a front plate having an aperture and a projection on the back thereof adjacent said aperture, of a numeral bearing slide having a plurality of recesses adjacent said numerals adapted successively to engage said projection.
16. In a device of the character described, the combination with a front plate having an aperture and a projection on the back thereof adjacent said aperture, of a slide having a plurality of recesses adapted successively to engage said projection, and means for yieldingly pressing said slide toward said front plate.
17. In a device of the character described, the combination with a front plate having an aperture and a projection on the back thereof adjacent said aperture, of a slide having a plurality of recesses adapted successively to engage said projection, an intermediate plate having a slot, a spring interposed between said slide and said intermediate plate, and a projection on said plate entering said slot.
18. In a device of the character described, the combination with a plate having a slot, of a slide, a flat spring attached at its center to said slide, and projections on the ends of said spring entering said slot.
19. An adding device comprising a front or index plate or sheet having two series of slots aligned in pairs, one slot of each pair being straight and the other slot of the pair having a switch part and an offset portion into which said switch part leads, a series of numerals adjacent each slot, and a set of total openings in the middle part of the sheet between the two series of slots, a back-plate having a series of guideways corresponding in number to the numbers of the pairs of slots in the front of the index plate, and a series of slides movable in said guideway and provided on opposite sides with open notches.
20. An adding device comprising a front or index plate or sheet having two series of slots aligned in pairs, one slot of each pair being straight and the other slot of the pair having an inclined switch part and an offset portion into which said switch part leads, a series of numerals adjacent each slot, and a set of total openings in the middle part of the sheet between the two series of slots, a back-plate having a series of guideways corresponding in number to the numbers of the pairs of slots in the front of the index plate, and a series of slides movable in said guideways and provided on opposite sides with open notches.

21. An adding device comprising a front or index plate or sheet having two series of slots alined in pairs, one slot of each pair being straight and the other slot of the pair having a switch part and an offset portion into which said switch part leads, a series of numerals adjacent each slot, said numerals being arranged in inverse order adjacent alternate slots, and a set of total openings in the middle part of the sheet between the two series of guideways corresponding in number to the numbers of the pairs of slots in the front or index plate, and a series of slides movable in said guideways and provided on opposite sides with open notches.
22. An adding device comprising a front or index plate or sheet having two series of slots alined in pairs, one slot of each pair being straight and the other slot of the pair having a switch part and an offset portion

into which said switch part leads, a series of numerals adjacent each slot, said numerals being arranged in inverse order adjacent alternate slots, and a set of total openings in the middle part of the sheet between the two series of guideways corresponding in number to the numbers of the pairs of slots in the front or index plate, and a series of slides movable in said guideways and provided on opposite sides with open notches, and on their faces with numerals, said numerals being arranged in inverse order on alternate slides.

In testimony whereof I affix my signature, in presence of two witnesses.

BEVERLEY R. SCOTT.

Witnesses:

RICHARD C. LONG,
D. I. SHAW.