(No Model.)

E. F. JEWETT.

ADDING MACHINE.

No. 446,753. Patented Feb. 17, 1891.

Fig. 1.

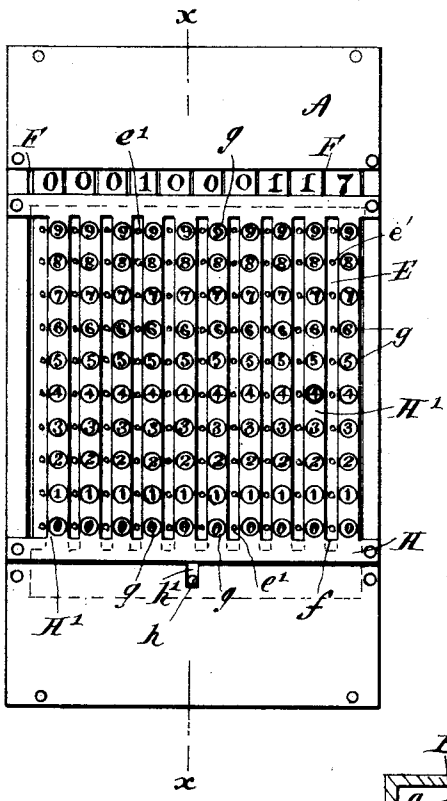


Fig. 2.

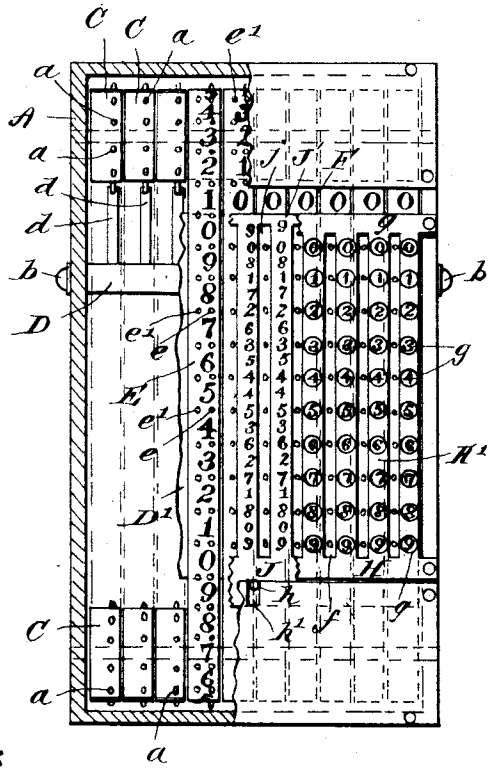
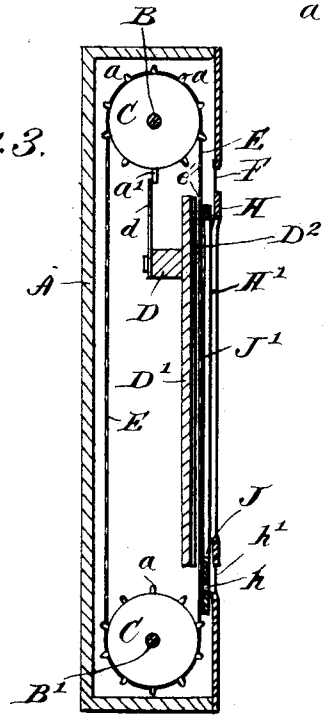


Fig. 3.



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UNITED STATES PATENT OFFICE.

ERI F. JEWETT, OF NEWTOWN, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PERCY L. JEWETT, OF SAME PLACE.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,753, dated February 17, 1891.

Application filed April 23, 1890. Serial No. 349,068. (No model.)

To all whom it may concern:

Be it known that I, ERI F. JEWETT, of Newtown, in the county of Hamilton and State of Ohio, have invented a new and Improved Adding-Machine, of which the following is a full, clear, and exact description.

My invention relates to improvements in adding-machines; and the object of my invention is to produce a machine by means of which numbers may be rapidly and accurately added or subtracted in a mechanical manner requiring little mental process.

To this end my invention consists in certain features of construction and combinations of parts, which will be hereinafter fully described, and pointed out in the claims.

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 is a front elevation of the machine as arranged for adding; Fig. 2, a front elevation, partly in section, with a portion broken away to show the tapes and with the machine arranged for subtracting, and Fig. 3 a vertical cross-section on the line x x of Fig. 1.

The hollow case A, which is preferably rectangular in form, constitutes the frame of the machine, and fixed in the upper and lower portions of the case, respectively, are the horizontal shafts B and B′, having loosely mounted thereon a series of similar independent pulleys C, with ten pins a projecting from the faces thereof, and with every tenth pin a' upon the upper pulleys longer than the rest. The pins are spaced regularly upon the pulleys C, and each pulley on the shaft B aligns with a corresponding pulley on the shaft B′.

Fixed in the case A below the shaft B is a horizontal bar D, extending across the case, being fixed in position by the screws b, which project through the sides of the case and into the ends of the bar. Fixed to the front side of the bar D is a plate D′, which fills the front central portion of the case A, and in the front surface of which are cut ten shallow grooves D^2, corresponding in their position and direction with the slots in the plates H and card J. The grooves guide the point of the pencil or instrument for moving said parts. The plate D′ serves as a table to prevent the numbered tapes from being pressed too far inward when the device is operated. Attached to the back side of the bar D are the upwardly-extending tongues d, there being as many tongues less one as there are pulleys C on the shaft B. The tongues align with the pulleys and extend just near enough thereto to permit the pins a to pass and to engage the longer pins a', which will strike the tongues when the pulleys are revolved, thus producing a ringing sound and warning the operator that there is one to carry, as described below.

Extending over the pulleys C are the endless tapes E, having perforations e to fit the pins of the pulleys, and perforations e', by means of which the tapes are moved, and having spaced regularly thereon three or more consecutive series of numerals from 0 to 9. The numerals on the tapes E are only visible one at a time as they appear in the transverse slot F in the face of the case A. A plate H, having longitudinal slots f therein, is fixed in the front of the case A, and the slots are arranged to be opposite the perforations e' in the tapes E, so that a pointed instrument may be inserted in said perforations and the tapes moved. In the vertical bars H′ of the plate H are a series of holes g, spaced regularly and arranged one above the other, there being ten holes in each bar. The bars H′ are in line with the tapes E, and between the tapes and the plate H is a card J, having a perforation h in the lower part thereof opposite the slot h' in the face of the case A, and by means of which the card may be moved vertically. The card has longitudinal slots j therein, corresponding to the slots f in the plate H, and vertical bars J′, between the slots, corresponding to the vertical bars H′ of the plate H. The bars J′ will thus be concealed by the bars F′, except the parts which show through the holes g of the bars H′. The bars J′ have printed thereon two series of numerals from 0 to 9, as shown in Fig. 2, the numbers alternating and one series reading from top to bottom and the other from bottom to top, and two numerals, one of each series, corresponding in position with a numeral on the

tapes E, so that by moving the card J either series may be brought opposite the holes *g*. The numerals reading from bottom to top are displayed when the machine is used for adding and the opposite series when the machine is used for subtracting. The different series of numerals should be printed in different-colored ink to make the distinction more noticeable. The right-hand column of numerals represents units, the next tens, the next hundreds, and so on, as in ordinary notation.

The machine is operated as follows: If the machine is to be used for adding, a pointed instrumement—such, for instance, as a lead-pencil—is inserted in the perforation *h* and the card J moved to bring the numerals opposite the holes *g* in the bars H′ in such a manner that they will read from bottom to top, and the tapes E are turned by inserting the pencil in the perforations *e′*, so that a row of ciphers will appear in the slot F. We will suppose that the three numbers 223, 179, and 845 are to be added. Beginning with the figure in the units-column of the last number 5 the operator places his pencil in a perforation *e′* of the tape E opposite the numeral 5, as displayed in the right-hand or units column on the machine, and moves the pencil and tape to the bottom of the slot *f*. This causes the numeral 5 to appear in the units-column of the slot F. The pencil is then placed in a perforation of the tape opposite the numeral 9, that being the next numeral to be added, and the tape drawn to the bottom of the slot *f*, as before, and this causes the numeral 4 to appear in the units-column of the slot F; but the right-hand pulley will have completed a revolution during this last movement and the pin *a′* will have struck a tongue *d*, warning the operator that there is one to carry. The pencil is therefore inserted in a perforation of the tape opposite the Fig. 1 in the tens-column and the tape and pencil moved to the bottom of the slot *f*, and this causes the numeral 1 to appear in the tens-column of the slot F. The operator then inserts the pencil opposite the numeral 3 in the units-column of the machine, and the tape and pencil are again carried to the bottom of the slot *f*, thus causing the numeral 7 to appear in the units-column of the slot F. The numerals 4, 7, and 2 being the numerals in the tens-column of the numbers to be added, are then added in the tens-column of the machine in the manner described, the amount to carry transferred to the hundreds-column of the machine, and the hundreds are added in the same way, and the final result 1,247 will appear in the slot F. It will be readily seen that as each tape and set of pulleys are independent from the others the operation may be carried on indefinitely, being only limited by the number of tapes and corresponding parts in the machine. To subtract, the above process is reversed, the card J is moved upwardly, so that the numerals in the holes *g* will read from top to bottom, and instead of the row of ciphers in the slot F the minuend is made to appear in the right-hand side of the slot. The operator then places his pencil in the perforations of the tapes opposite the numerals of the units, tens, &c., corresponding to the numerals in similar columns of the subtrahend, and moves the tapes upwardly, carrying as in addition, but upwardly, and the remainder appears in the slot F.

By having the parts arranged as described the machine will be perfectly accurate in its work, and with a little practice a person may operate it with great facility.

I have shown the machine as arranged for a small device; but in larger machines, for school use, projecting buttons may be substituted for the perforations *e′* and *h*, and the tongues *d* may be substituted by levers and made to strike a gong or bell.

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

1. An adding-machine consisting, essentially, of a case having a transverse slot therein and having two horizontal shafts fixed therein, pin-pulleys mounted on said shafts so that the pulleys on the upper and lower shafts will align, endless tapes extending over said pulleys, having series of digits and ciphers thereon, a vertically-movable card having longitudinal slots therein, said card being arranged between the tapes and the front plate of the case and having a double series of digits arranged oppositely thereon between each of the slots in the card, and a longitudinally-slotted plate fixed to the front of the case, so as to cover the card, said plate having ten holes between each pair of slots, through which the digits on the card may be seen, substantially as described.

2. In an adding-machine, the combination, with a case having a slot and a series of tapes having numerals consecutively produced thereon, of a card having two series of numerals oppositely and alternately produced thereon, and an apertured plate, all arranged for operation substantially as set forth.

3. In an adding-machine, the combination, with a case having a slot, a series of endless tapes having numerals produced consecutively thereon, and a slotted and apertured plate, of a slotted card having two series of oppositely and alternately arranged numerals produced thereon, all arranged for operation substantially as set forth.

4. In an adding-machine, the combination, with a case having a slot, a series of endless tapes having numerals produced consecutively thereon and provided with a series of apertures, and pulleys having projecting pins adapted to engage the tape-apertures, of an adjustable slotted card having two series of oppositely and alternately arranged numerals produced thereon, and a slotted and apertured plate, all arranged for operation substantially as set forth.

5. In an adding-machine, the combination,

with a case having a slot, a series of endless tapes having numerals produced consecutively thereon and provided with a series of apertures, and sets of pulleys having projecting pins, one of which on one pulley of each set is longer than the others, of an adjustable slotted card having two series of oppositely and alternately arranged numerals produced thereon, a slotted and apertured plate, and an alarm in the path of said long pin, all arranged for operation substantially as set forth.

6. In an adding-machine, the combination, with a case having a slot, a series of endless tapes having numerals produced consecutively thereon and provided with a series of apertures, and means for operating the tapes, and sets of pulleys having projecting pins, one of which on one pulley of each set is longer than the others, of an adjustable slotted card having two series of oppositely and alternately arranged numerals produced thereon, two of which—one of each series—occupy the space of a numeral on the tapes, and the slots of which are in line with the operating means of the tapes, a slotted and apertured plate the apertures of which align transversely the operating means of the tapes and the slots of which align the slots in the card, and an alarm in the path of the long pin aforesaid, all arranged for operation substantially as set forth.

7. In an adding-machine, the combination, with the tape-carrying pulleys having projecting pins in their faces, with one pin in one pulley longer than the rest, of metal tongues arranged to engage said long pin at each revolution of the pulleys, substantially as set forth.

8. The combination, with a longitudinally-movable slotted card having the nine digits and cipher arranged oppositely thereon between the slots, of a slotted plate to cover the card, said plate having holes between the slots, in which each series of digits on the card may be made to appear, substantially as described, and for the purpose specified.

9. An adding-machine consisting, essentially, of a case A, having a slot F and shafts B B′ therein, the pulleys C, mounted on the shafts and having pins a a', the tapes E, having perforations e and e' and having three or more series of digits and ciphers thereon, the card J, having slots j and having opposite series of digits and ciphers, as shown, and the plate H, having slots f and holes g therein, substantially as described.

10. The combination, with the case A, having slots F and h', the shafts B and B′, the pulleys C thereon, and the tapes E upon said pulleys, of the card J, having the slots j and oppositely-arranged digits and ciphers, as shown, and having a perforation h, by means of which it is moved, and the plate H, having slots f and holes g therein, substantially as described.

11. The combination, with the case A and tapes E, arranged within the case as shown, of the bar D and grooved table or plate D′, substantially as described.

ERI F. JEWETT.

Witnesses:
ISAAC DEAL,
S. B. DEAL.