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L. L. ANSART

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2 Sheets-Sheet 1

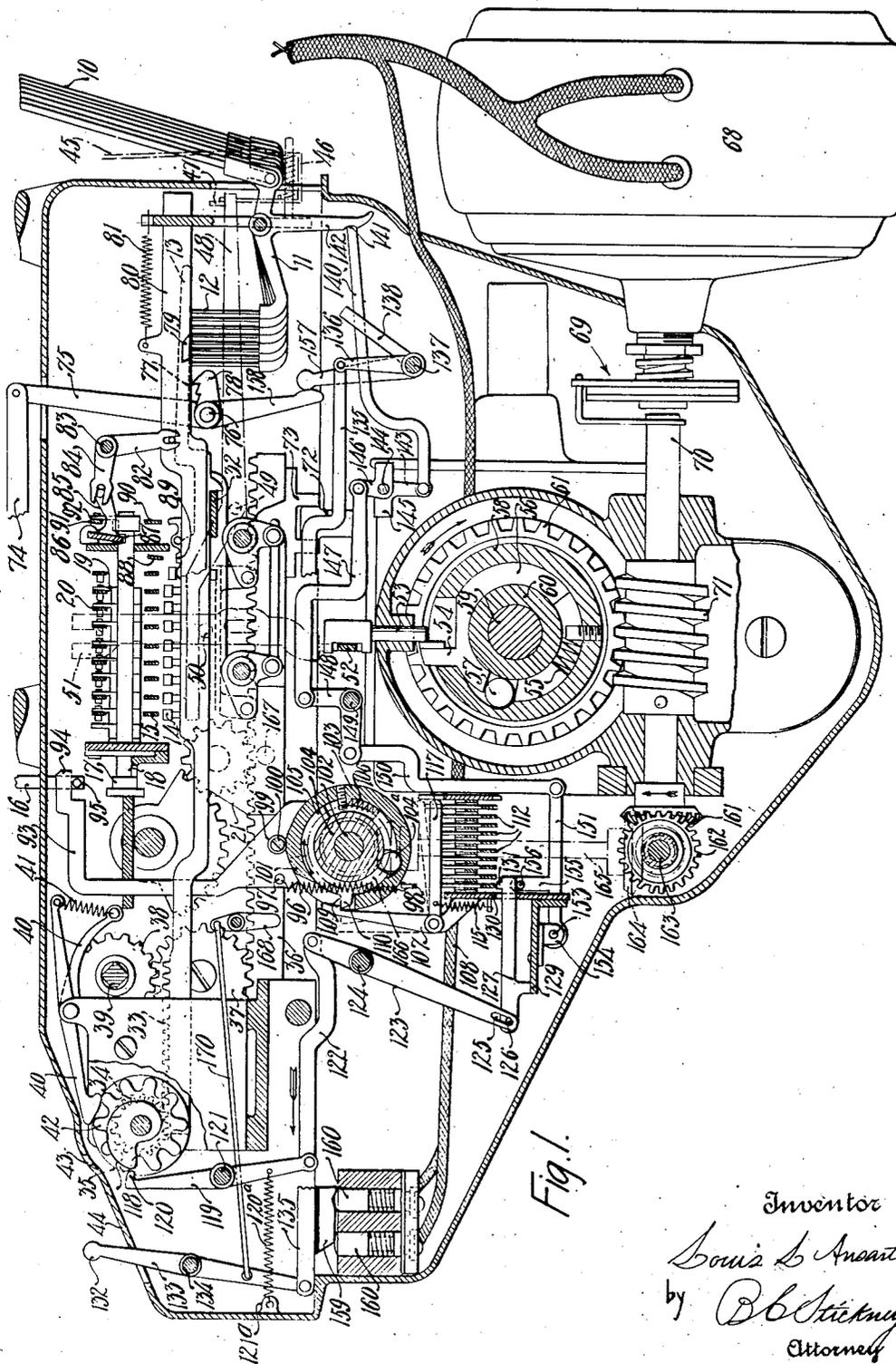


Fig. 1.

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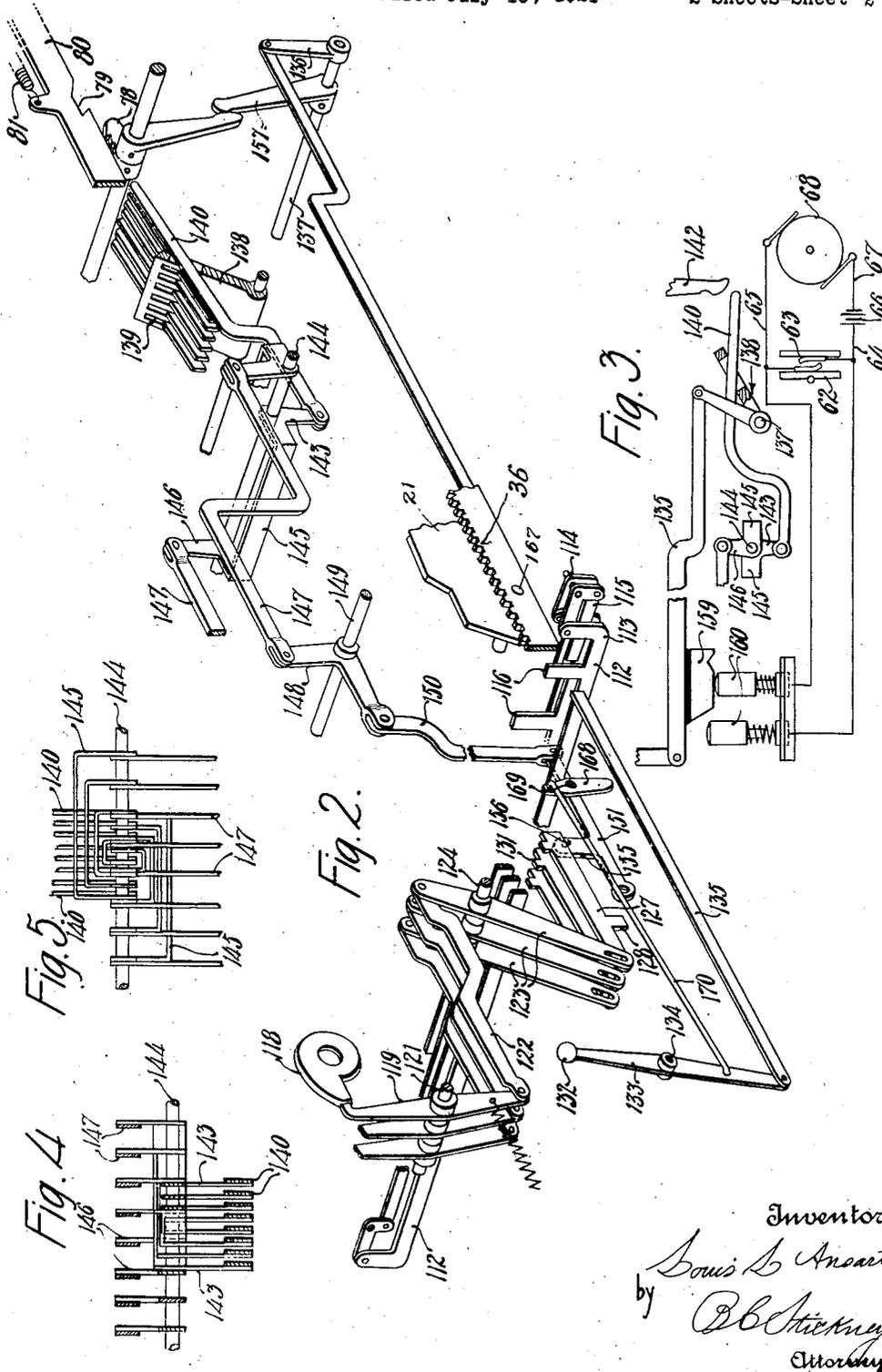
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

LOUIS L. ANSART, OF NEW YORK, N. Y., ASSIGNOR TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## COMBINED TYPEWRITING AND COMPUTING MACHINE.

Application filed July 19, 1921. Serial No. 485,931.

*To all whom it may concern:*

Be it known that I, LOUIS L. ANSART, a citizen of the United States, residing in borough of the Bronx, in the county of the Bronx, city and State of New York, have invented certain new and useful Improvements in Combined Typewriting and Computing Machines, of which the following is a specification.

This invention relates to combined typewriting and computing machines, and is in the nature of an improvement on the application of Frederick A. Hart, Serial No. 665,315, filed December 12, 1911 (now Patent No. 1,388,257, dated August 23, 1921).

In said application, provision is made of means whereby, after typing numbers in different columns and registering the totals obtained from computing the same in a register or totalizer, automatic printing of such a result or total may be effected in a column reserved for the total, the mechanism being rendered effective for such automatic typing by proper setting of a manually operable member. The printing of such total, however, is accompanied by the operation of indexing the same, a result which is not desired, and the indexing mechanism must be restored to normal condition before performing other computations. This may be done by means of the error or elimination key.

According to the present invention, provision is made whereby, upon setting the machine for automatic total-printing, the computing mechanism will be set for subtraction, so that, during said printing or typing, the complement of the total will be indexed. Then, upon operation of the general operator, the complement of the result will be run into the totalizer and the latter cleared.

Provision may be made of means whereby actuation of the general operator will reset the machine from a condition for total-printing to a normal condition.

The total-printing mechanism may include an electric motor, the circuit of which

is closed by a suitable switch or circuit-closing device when the machine is set for total-printing. This motor may also be utilized at the completion of such total-printing to actuate the general operator. For this purpose, a clutch device is rendered effective to connect the general operator with the motor, and the circuit is closed through a second switch or circuit-closer in parallel with the first. Upon actuation of the general operator to restore the machine to normal condition, the motor circuit will be broken at the first switch. At this stage of the operation, the movement of the general operator has not been completed, but, inasmuch as the second switch was closed at the time the general operator was clutched to the motor, the latter will be effective to return the general operator to its normal position, at which time the second switch will be opened and the motor circuit broken.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional side elevation of the computing mechanism and its connections.

Figure 2 is a perspective front view of the principal members of the denomination-determining mechanism, and also the mechanism by which each dial or computing wheel selects the digit to be typed upon the work-sheet.

Figure 3 is a diagrammatic side elevation, showing the means whereby the motor circuit is controlled.

Figure 4 is a rear elevation of a set of transposition bails forming part of the mechanism for controlling total-printing.

Figure 5 is a view of the transposition bails as seen from above.

When the carriage of a combined typewriting and computing machine of the Underwood-Hanson type is advanced, step by step through a computing zone, rods or links 10 will be actuated seriatim, to rock pivoted levers 11, and, by means of suitable transposition linkages 12, lift denomination-

al bars 13, so that pins 14 thereon will be positioned to enable setting thereof, by pin-setting bars 15.

Upon depression of any numeral-key, except that connected with the type "0," a pendant 16, attached thereto, will actuate an arm 17, carried at the front end of a shaft 18, the movement of the shaft 18 being transmitted by means of an arm 19 to a bar 20, forming the upper part of a pin-setting linkage, which also includes one of the pin-setting bars 15. Upon completing the indexing of a number on such pins 14, the general operator 21 will be operated and a bar 22 thereof brought into engagement with the pins depressed. The bars 13 will then be advanced in accordance with the digits indexed, such motion being transmitted by racks 33, on the bars 13, to pinions 34 having the usual one-way connections with number-wheels or dial-wheels 35.

During the forward movement of the general operator, a rack 36, forming part thereof, rotates an idle gear 37 and a second gear 38 to actuate, by a suitable one-way connection, a square shaft 39, forming a part of the carry-over mechanism, the number-wheels being normally maintained in position by detent levers 40 urged by springs 41 against suitable toothed wheels 42, secured to the number-wheels 35. Upon completion of the carry-over operation, the result may be read through a suitable sight opening 43 in the computer casing 44.

The reciprocation of the general operator 21 may be effected automatically. To this end, by suitable means, not shown, as the carriage passes out of the computing zone, a link 45 will be depressed to rock a bail 46 and thereby withdraw a latch 47 from a position above the rear end of a lever 48. The lever 48, when released, will be swung in a counter-clockwise direction, by suitable means, such as a spring, not shown, about its pivot 49, so that its forward end, which overlies a pin 50 on a slide 51, will cause depression of the slide. Such depression will rock a lever 52 to lift a trip pin 53 out of the path of a lug 54. A spring 55 will then become effective to shift a ring or member 56, of which lug 54 forms a part, and a ball 57 will be moved into position to clutch a cup 58, fixed on a shaft 59, to a sleeve or hub 60, loosely mounted on said shaft. Said sleeve or hub 60 is secured to or forms a part of a worm-wheel 61, and it will be seen that rotation of the worm-wheel 61 in a clockwise direction will cause actuation of the shaft 59.

The rotation of the ring 56, relative to the hub 60, in addition to rendering the clutching means effective, will cause contacts 62 and 63 of conductors 64 and 65 to be brought into engagement, so as to complete a circuit through a source of power 66, a conductor 67

and a motor 68, substantially as disclosed in the patent to Frederick A. Hart, No. 1,237,900, dated August 21, 1917. The motor 68 will then operate until the circuit is broken, and, by means of a suitable connection, indicated in general by 69, will rotate a shaft 70 and cause a worm 71 thereon to rotate the worm-wheel 61 in a clockwise direction, and, consequently, the shaft 59, as long as the clutching means, previously described, is effective. Such rotation of shaft 59 will effect reciprocation of the general operator 21 by means of a member 72 extending upwardly into a yoke 73, secured to the general operator. At the end of one complete rotation of the wheel 61, the pin 53 will again be engaged by the lug 54 and will cause the ball clutch to become ineffective and the motor circuit to be broken at contacts 62 and 63.

When it is desired to set the machine for subtraction, a subtraction key, not shown, may be actuated to move a thrust link or bar 74 rearwardly, and, by means of an arm 75, rock a shaft 76, on which said arm is fixed. By this movement of the shaft 76, a tooth 77 of a hook-like latch-member 78 will be withdrawn from engagement with a shoulder formed at the forward end of a notch 79 in a subtraction bar 80, thereby releasing the latter.

Upon such release, the subtraction bar 80 will be moved rearwardly by a spring 81; and, by means of a pin-and-slot connection with an arm 82 on a shaft 83, will rock the latter. An arm 84, fixed on the shaft, will actuate, by a pin-and-slot connection, an arm 85, mounted on a universal bar 86, and rock the latter about an axis near its upper edge. The lower edge of the universal bar 86 extends into notches 87 in the shafts 18, and, as a result of this movement of the universal bar 86, the shafts will be advanced to the position shown in Figure 1. At the same time, by suitable means, not shown, a bar 88 will be actuated to depress the forward ends of levers 89, and thereby depress the "9" pins. As will be understood by those skilled in the art, such movement of the shafts 18 will change the connections between the arms 19 and the pin-setting linkages, of which the bars 20 form parts, so that, upon depression of a key, the pin-setting linkage connected therewith will depress, on the selected bar, the pin corresponding to the complement, to the base nine, of the digit printed, the "9" pin on the selected bar being reset to normal position at the time the other pin is set. In order to obtain such resetting of the "9" pins, provision is made of a restoring linkage, having a lower bar 90 and an upper bar 91, and means whereby, upon advance movement of the shafts 18 to the position shown in Figure 1, arms 92 on the

rear ends of shafts 18 will be brought into position to actuate the upper bar 91 and therefore depress the lower bar 90, the position of the lower bar 90 being such that it will not be effective for resetting purposes unless a pin-bar has been selected and raised to pin-setting position. The subtraction-setting mechanism is, in general, similar to that shown in the patent to Minton, No. 1,280,065, dated September 24, 1918.

For automatic total-printing, provision is made of a special operator 93 for each key-lever operated by a numeral-key. Each operator 93 has a finger 94 overlying a pin 95 on the pendant 16 attached to the corresponding key-lever, and is normally urged downward by means of a spring 96, connected at its upper end to a pin 97 on the operator 93, and at its lower end to a lug 98 on a fixed part of the frame. Each spring 96 is of sufficient strength to actuate the corresponding key-lever, and each operator 93 is normally held in raised or ineffective position by suitable means, which may comprise a roll 99 mounted by means of a screw-stud 100 on the operator, and a suitable cam, such as a snail cam 101, normally positioned with its high point in engagement with the roll 99, as shown in Figure 1.

Each cam 101 is loosely mounted on a shaft 102, and may be actuated thereby through a suitable clutch or clutching device, including a shell 103 connected with the cam; a sleeve 104 fixed on the shaft, a ball 104<sup>a</sup> whereby the shell and sleeve may be operatively connected, a ring or member 105 for controlling the position of the ball, and a spring 106 urging the ring 105 in the direction to make the clutching device effective. Normally, the controlling ring 105 is held in position to render the clutching device ineffective by means of a bell-crank 107, mounted on a fixed pivot 108, and having a hook 109 overlying a lug 110 on the ring 105, the bell-crank 107 being normally urged to effective position by means of a spring 111.

There are ten of the clutching devices, and, taken in order from left to right, they control the key-levers corresponding to the digits from "1" to "9", inclusive and "0". To actuate the bell-cranks 107 to release the rings 105 in the corresponding clutching devices, linkages are provided, one for each bell-crank, each of said linkages comprising a lower bar 112 having at each end an upright arm 113, pivoted to a horizontal arm of a bell-crank 114, of which the downwardly-extending arm is pivoted to a bar 115, which serves to make the bell-cranks at the two ends move simultaneously. Each bar 112 is provided with a tooth 116 lying beneath the rearwardly-extending arm 117 of the corresponding bell-crank 107. As

herein disclosed, the rear bar 112 has a tooth beneath the left-hand bell-crank, which controls a clutch for the "1" key, and the other bars 112, taken in order from back to front, have teeth under the rearwardly-extending arms of the bell-cranks 107 which control the actuation of the numeral types "2" to "9", inclusive and "0".

In order to cause printing in a given denomination of a digit exposed on the corresponding number-wheel, each number-wheel is provided with suitable means, such as a snail cam 118, which controls the position of a lever 119 having a lug 120 normally held in engagement with the cam by means of a spring 120<sup>a</sup>, attached at one end to the lever 119 at a point beneath its pivot 121 and connected at the front of the computer casing 44 to a lug 121<sup>a</sup>. The lower end of the lever 119 is connected by means of a link 122 with the upper end of a lever 123 pivoted at 124, and having at its lower end a slot 125, into which projects a pin 126 on a rearwardly-extending link or digit selector 127. Each link 127 is guided for rectilinear movement by means of a lug 128 extending downwardly therefrom to rest on the upper surface of a shelf 129 and by means of a slotted plate 130, the link normally resting on the bottom wall of the slot through which it passes.

Each of the links 127 is provided with a tooth 131, the upper end of which lies immediately below the plane of the lower edges of the bars 112, so that it may be moved back and forth under said bars as the link 127 is moved rearwardly and forwardly. In Figure 2, the snail cam 118, there shown, is in the position corresponding to a showing of "0" on the attached number-wheel, and the corresponding tooth 131 is shown in position under the front bar 112, which, by means of its upwardly-extending tooth 116, is adapted to release the clutch corresponding to the "0" key-lever to enable operation of the latter by means of the corresponding operator 93. It will be evident from the foregoing that the mechanism just described serves merely as digit-selecting mechanism, in that the teeth corresponding to the different number-wheels will be positioned respectively under the links corresponding to the digits shown on the number-wheels. In an ordinary operation of the machine, the movement of these parts will be idle.

When it is desired to have the total shown on the number-wheels printed automatically, a handle 132 on a lever 133 is moved rearwardly to swing the lever about its pivot 134, and, by means of a link 135 pivoted to the lower end of the latter and to an arm 136 fixed on a shaft 137 at the rear of the machine, to rock the shaft to swing a plate or bar 138 in counter-clockwise direction

from the position shown in Figure 3 to that shown in Figure 1. Through slots 139 in the plate 138 extend denominational links 140 which are swung by the plate 138 from the positions shown in Figure 3 to those in Figure 1, in which their rear ends engage in notches 141 in arms 142 extending downwardly from the levers 11.

At their forward ends, the denominational links 140 are pivoted to downwardly-extending arms 143 loosely mounted on a shaft 144. In order that the arms 143, which are connected directly with the arms 142, may be associated with the number-wheels in the reverse order, suitable transposition means must be provided. To this end, the right-hand arm 143 is connected by means of a bail 145 with an upwardly-extending arm 146 pivotally mounted on the shaft 144. The second arm 142, from the right, is connected with an arm 146 by a bail 145 lying within the first bail 145. It will be evident that, by providing a bail for each of the arms 142, connected thereto at one end and at the other end to an upright arm 146, the arrangement of the arms 146 will be reversed with reference to the arms 142. The arrangement of the transposition bails is clearly shown in Figures 4 and 5.

The upwardly-extending arms 146 are connected by suitably-shaped links 147 to the upright arms of bell-cranks 148 pivoted on a shaft 149, the horizontally-extending arms of the bell-cranks 148 being connected by suitable links 150 with the rear ends of normally horizontal levers 151, pivoted at their forward ends at 153 in brackets or ears 154 secured to the lower side of the shelf 129. Each of said levers 151 is provided with an upwardly-extending finger 155 immediately to the rear of the slotted plate 130, and each of said fingers 155 is provided with a laterally-extending pin 156 to engage the lower edge of one of the links 127.

At the same time that the plate 138 is shifted to bring the links 140 into operative connection with the arms 142, an arm 157 on the shaft 137 is swung forwardly, and, by means of an arm 158 fixed on the shaft 76, withdraws the latch 78 from the notch 79 in subtraction bar 80, permitting the latter to be drawn to the rear by the spring 81. The computing mechanism will then be set for subtraction. Shifting of the handle 132 to the rear will also cause a member 159 carried by the link 135, but insulated therefrom, to be shifted from its Figure 3 position to its Figure 1 position, in which it closes a circuit through the spring-pressed pins 160 and starts the motor 68. The motor will then actuate the shaft 70 and by means of the beveled gears 161 and 162 rotate the horizontal shaft 163. At its right-hand end, the shaft 163 is connected

by a beveled gear (not shown) with a beveled gear 164 on the lower end of a vertical shaft 165. The shaft 165 is geared at its upper end to the shaft 102 by means of a beveled gear 166 at the upper end of the shaft meshing with a beveled gear (not shown) on the shaft 102. As brought out more fully in said application, No. 665,315, the rotation of the shaft 102, when actuated, will be in a clockwise direction, as indicated by the arrow in Figure 1.

Upon movement of the typewriter carriage into the computing zone selected for total-printing, the links 10 will be operated seriatim from right to left and will select the pin bars 13 seriatim from left to right. Actuation of links 10 will also serve to actuate the levers 151 seriatim from left to right to lift the corresponding links 127. Since the reading on each number-wheel 35 determines the bar 112, which is to be operated, actuation of each one of the levers 151 will actuate the proper bar 112 and thereby withdraw the hook 109 of the proper latching member or bell-crank 107 from engagement with a lug 110. The corresponding cam 101 will then be clutched to the shaft 102 in a manner hereinbefore described, and, as the high portion of the cam is moved to the right from engagement with the corresponding roll 99, the proper actuator 93 will be released to the action of the spring 96 to cause typing of the proper digit. At the same time the digit is typed, the corresponding pendant 16 will engage the corresponding arm 17 to depress one of the pins 14. Since the machine has been set for subtraction, the depression of the pins on the various pin or rack-bars 13 will serve to index the complement of the number printed on the work-sheet, and, consequently, of the number appearing on the number-wheels of the register.

Each actuation of a numeral-key will also operate the typewriter escapement mechanism (not shown), and cause another link 10 to be actuated, so that, after moving the machine into the computing zone, the various digits will be printed automatically and the complementary number set up on the pin bars. At the end of such total-printing, the link 45 of the motor-trip mechanism will be depressed, and, by means hereinbefore described, lift the trip-pin 53 out of the path of the lug 54.

The worm gear 61 will then be clutched to the shaft 59 and the general operator advanced to run the number indexed on the pin bars into the number-wheels 35, and, since the complement of the total has been indexed on the pin bars, such actuation of the pin bars will subtract the total from the total as shown in the register, thereby clearing the latter.

As the general operator 21 approaches

the forward end of its movement, a pin 167 thereon will strike the lower end of a lever 168 and swing the latter about its pivot 169, so that a link 170 connecting the upper end of said lever 168 with the lever 133 at a point below its pivot 134 will swing the handle 132 to its normal position, thereby disconnecting the links 140 from the arms 142 and breaking the motor circuit at the pins 160.

The breaking of the circuit at the contact pins 160 will not, however, stop the motor, since, at the time the trip-pin 53 was lifted, the motor circuit was also closed by contacts 62 and 63 forming part of a branch in parallel with that containing the contact pins 160. The motor 68 will, therefore, be actuated until the lug 54 on the ring 56 is brought into engagement with the trip-pin 53, thereby unclutching the worm gear 61 from the shaft 59 and breaking the circuit by separating the contacts 62 and 63, thereby stopping the motor.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a totalizer, denominational elements in which digits are indexed, one by one, in accordance with the numeral-keys depressed, and a general operator to run into said totalizer a number when completely indexed, and means whereby the numeral-keys may be actuated automatically to effect typing, digit by digit, of the total shown in the totalizer, and the denominational elements restored to normal condition preparatory to indexing another number.

2. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a totalizer, denominational elements in which digits are indexed, one by one, in accordance with the numeral-keys depressed, and a general operator to run into said totalizer a number when completely indexed, and means, rendered effective at will, whereby the total shown in the totalizer will be typed, digit by digit, in successive denominations, and, after the completion of such action, the totalizer will be cleared.

3. In combination, typewriting mechanism, computing mechanism controlled by said typewriting mechanism, including a totalizer, denominational elements in which digits are indexed as typed, subtraction-setting mechanism to cause the complement of a number typed to be indexed, and a general operator to actuate the denominational elements in accordance with the digits indexed total-printing means rendered effective at

will to actuate said typewriting mechanism to type, digit by digit, the number registered in the totalizer, and means whereby said subtraction-setting mechanism will be actuated when said total-printing mechanism is thrown into action, so that the printing of the total will be accompanied by indexing of the complement thereof, and subsequent action of the general operator will clear the totalizer.

4. In a combined typewriting and computing machine, means to type numbers, digit by digit, and to index said digits as typed, a totalizer, a general operator to run a number so indexed into the totalizer, a motor mechanism, a manually-operable member, means whereby said member, when shifted to effective position, will render said motor mechanism effective and cause typing of the total shown in the totalizer and indexing of the complement thereof, and means whereby said member will be shifted to normal position as soon as the last digit of the total is printed.

5. In a combined typewriting and computing machine, means to type numbers, digit by digit, and to index said digits as typed, a totalizer, a general operator to run a number so indexed into the totalizer, motor mechanism, a manually-operable member, means whereby said member, when shifted to effective position, will render said motor mechanism effective to cause the total shown in the totalizer to be typed and the complement thereof indexed, and means effective upon printing the digit of lowest denomination in the total to cause said motor mechanism to actuate said general operator.

6. In a combined typewriting and computing machine, means to type numbers, digit by digit, and to index said digits as typed, a totalizer, a general operator to run a number so indexed into the totalizer, motor mechanism, a manually-operable member, means whereby said member, when shifted to effective position, will render said motor mechanism effective to cause the total shown in the totalizer to be typed and the complement thereof indexed, means effective upon printing the digit of lowest denomination in the total to cause said motor mechanism to actuate said general operator, and means whereby the general operator, when actuated, will restore said member to normal position.

7. In combination, typewriting mechanism including numeral-keys and numeral-types actuable, one by one, in accordance with the keys depressed, computing mechanism including a totalizer, denominational elements in which digits are indexed in accordance with the keys depressed, numeral-key-actuated means for indexing digits in said elements, a general operator for run-

- ning a number so indexed into the totalizer, and subtraction-setting mechanism to cause the indexing of the complement of the number typed, automatic means rendered effective at will to actuate the numeral-keys, one by one, in accordance with the total shown in the totalizer, and means whereby rendering said numeral-key-actuating means effective will cause said subtraction-setting mechanism to be actuated, so that automatic printing of the total will cause the complement thereof to be indexed and subsequent actuation of the general operator will clear the totalizer.
- 15 8. In combination, typewriting mechanism including numeral-keys, computing mechanism including a totalizer and actuating means therefor, comprising denominational devices in which digits are indexed, one by one, in accordance with numeral-keys depressed, and a general operator to run into the totalizer a number when completely indexed, a manually-operable member, means rendered effective by said member in insure printing of the correct total, and subtracting-setting means controlled by said member, so that, while typing the total, the complement thereof will be indexed, and, upon actuation of the general operator, the totalizer will be cleared.
- 20 9. In combination, typewriting mechanism including numeral-keys, computing mechanism including a totalizer and actuating means therefor, comprising denominational devices in which digits are indexed, one by one, in accordance with numeral-keys depressed, and a general operator to run into the totalizer a number when completely indexed, a manually-operable member, means rendered effective by said member to insure printing of the correct total, and means whereby, upon completion of the printing of the total, the manually-operable member will be returned to normal position.
- 25 10. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism comprising a totalizer, preliminary representation mechanism including denomination-selecting mechanism and a general operator, a motor-circuit, two circuit-closers arranged in parallel, a total-printing device comprising numeral-key-selecting means controlled by said totalizer and numeral-key-operating means controllable by the denomination-selecting mechanism and said motor, but normally disconnected therefrom, a manually-operable member, means rendered effective by said member to close said circuit at one of the circuit-closers and to connect said total-printing device with said denomination-selecting mechanism, means whereby, upon completion of total-printing, said circuit will be closed at the second circuit-closer and connection effected between
- said motor and said general operator, and means whereby said general operator will act to open the circuit at the first-mentioned circuit-closer and disconnect the numeral-key-operating means from said denomination-selecting mechanism, said circuit being broken at the second-mentioned circuit-closer and the connection between the motor and general operator broken when the general operator completes its movement.
- 70 11. In combination, typewriting mechanism including a carriage and numeral-keys, numeral-key-controlled computing mechanism including a totalizer having number-wheels, automatic total-printing means comprising numeral-key selectors controlled by said number-wheels and normally ineffective denomination-selecting mechanism controllable by said carriage, subtraction-setting means for said computing mechanism, a manually-operable member, and means whereby actuation of said member will render said denomination-selecting mechanism effective on said total-printing means and will actuate said subtraction-setting means.
- 75 12. In a combined typewriting and computing mechanism in which numbers are indexed, digit by digit, and then computed, a traveling carriage to determine computing zones, numeral-keys, denomination-selecting means controlled by said carriage, indexing mechanism settable in accordance with the numeral-keys depressed, a totalizer including number-wheels, a general operator to run an indexed number into the totalizer, motor mechanism, and means whereby the machine may be concomitantly set for subtraction and for total-printing whereby, upon movement of the carriage into a computing zone, the motor mechanism will automatically print the total, index the complement thereof and then clear the totalizer.
- 80 13. In combination, typewriting mechanism including a set of numeral-types and a letter-feeding carriage, computing mechanism controlled in accordance with the numeral-types actuated and including a set of dials, power-driven means under the control of the carriage for effecting operation of said types and computing mechanism, means under the control of said dials to select the types to be operated, subtraction-setting mechanism, and means for concomitantly throwing into operation said subtraction-setting mechanism and said power-driven means to cause the number typed by said power-driven means to be subtracted to clear the dials.
- 85 14. In combination, typewriting mechanism including numeral-keys, computing mechanism including a totalizer and actuating means therefor, comprising denominational devices in which digits are indexed, one by one, in accordance with numeral-keys depressed, and a general operator to
- 90 95 100 105 110 115 120 125 130

run into the totalizer a number when completely indexed, a manually-operable member, total-printing means made effective by said member to actuate said numeral-keys in accordance with the reading of the totalizer, and means whereby operation of the general operator will return said member to its normal position and thereby render said total-printing means ineffective.

15. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism comprising a totalizer, preliminary representation mechanism including denomination-selecting mechanism, subtraction-setting mechanism effective on said preliminary representation mechanism, and a general operator, a motor, a motor-circuit, two circuit-closers arranged in parallel, a total-printing device comprising numeral-key-selecting means controlled by said totalizer and numeral-key-operating means controllable by the denomination-selecting mechanism and said motor, but normally disconnected therefrom, a manually-operable member, means rendered effective by said member to close the circuit at one of said circuit-closers, to connect said total-printing device with said denomination-selecting mechanism and to actuate said subtraction-setting mechanism, means whereby, upon completion of total-printing, said circuit will be closed at the second circuit-closer and connection effected between said motor and said general operator, and means whereby said general operator will act to open the circuit at the first-mentioned circuit-closer and to disconnect the numeral-key-operating means from said denomination-selecting mechanism, said circuit being broken at the second-mentioned circuit-closer and the connection between the motor and the general operator broken when the general operator completes its movement.

16. In combination, typewriting mechanism including a carriage and numeral-keys, numeral-key-controlled computing mechanism including a totalizer having number-wheels, automatic total-printing means comprising numeral-key selectors controlled by the number-wheels and normally ineffective denomination-selecting mechanism controlled by said carriage for operating the selected keys, subtraction-setting means for said computing mechanism rendered effective by said total-printing means, a manually-operable member, and means whereby actuation of said member will render the denomination-selecting mechanism effective and thereby render said subtraction-setting means effective.

17. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism comprising a totalizer, preliminary representation mechanism including denomination-select-

ing mechanism and a general operator, a motor, a motor-circuit, two circuit-closers arranged in parallel, a total-printing device comprising numeral-key-selecting means controlled by said totalizer and numeral-key-operating means controllable by the denomination-selecting mechanism and said motor, but normally disconnected therefrom, a manually-operable member, means rendered effective by said member to close said circuit at one of the circuit-closers and to connect the total-printing device with said denomination-selecting mechanism, means whereby, upon completion of total-printing, said circuit will be closed at the second circuit closer and connection effected between said motor and said general operator, and means whereby the general operator will open the first-mentioned circuit-closer in its forward movement.

18. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a series of denominational dials, a control member, and power-driven means settable by said member for typing, digit by digit, a total shown on the dials and subsequently clearing the dials.

19. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a series of denominational dials, a control member, and power-driven means settable by said member for typing, digit by digit, a total shown on the dials, subsequently clearing the dials, and restoring said member to normal position.

20. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a series of denominational dials, a control member, and power-driven means settable by said member for typing, digit by digit, a total shown on the dials and subsequently subtracting said total to clear the dials.

21. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a series of denominational dials, a control member, and power-driven means settable by said member for typing, digit by digit, a total shown on the dials, subsequently subtracting said total to clear the dials, and restoring said member to normal position.

22. In combination, typewriting mechanism including numeral-keys, numeral-key-controlled computing mechanism including a series of denominational dials, and means for automatically typing, digit by digit, a total shown on the dials, and subsequently clearing the dials.

23. In combination, typewriting mechanism including numeral-keys and a traveling carriage, computing means settable to subtraction and comprising numeral-key-

controlled means for determining the digits to be computed and carriage-controlled denomination-selecting means including arms actuable seriatim, automatic total-printing means including links actuable seriatim by said arms to determine the denominations in which digits are to be printed, means for shifting said links into and out of the path of said arms, and means, actuable by said shifting means in placing said links in the paths of said arms, to set the machine for subtraction.

24. In combination, typewriting mechanism including numeral-keys, computing mechanism operated thereby including a series of denominational dials, and register-clearing mechanism comprising a clearing

key, and means under the control of the dials and set into operation by the clearing key to restore all of the dials to "0".

25. In combination, typewriting mechanism including numeral-keys, computing mechanism operated thereby including a series of denominational dials, a register-clearing key, and mechanism set into operation by the register-clearing key and controlled by the operator solely through actuation of said key to return all the dials to "0".

LOUIS L. ANSART.

Witnesses:

CATHERINE A. NEWELL,  
EDITH B. LIBBEY.