B. C. STICKNEY.

COMBINED TYPEWRITING AND COMPUTING MACHINE.

APPLICATION FILED MAY 2, 1918.

1,370,238.

Patented Mar. 1, 1921.

4 SHEETS—SHEET 1.

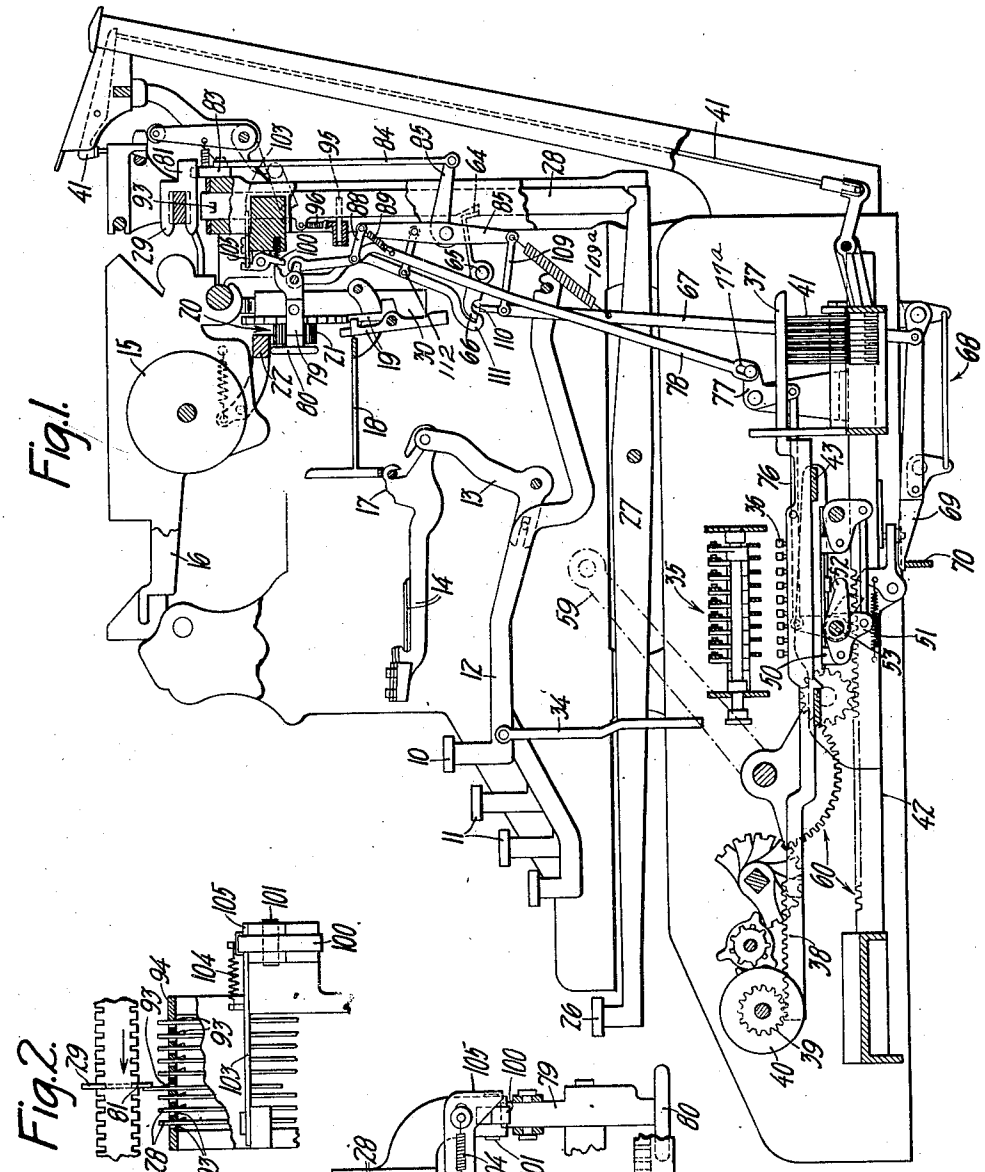


Fig. 1.

Fig. 2.

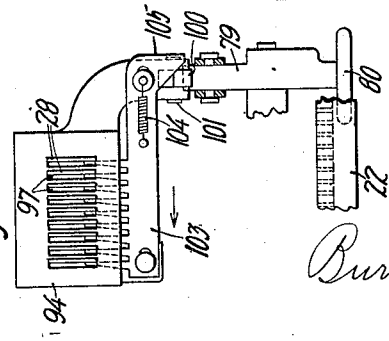


Fig. 3.

Witnesses:

Arthur A. Thomas

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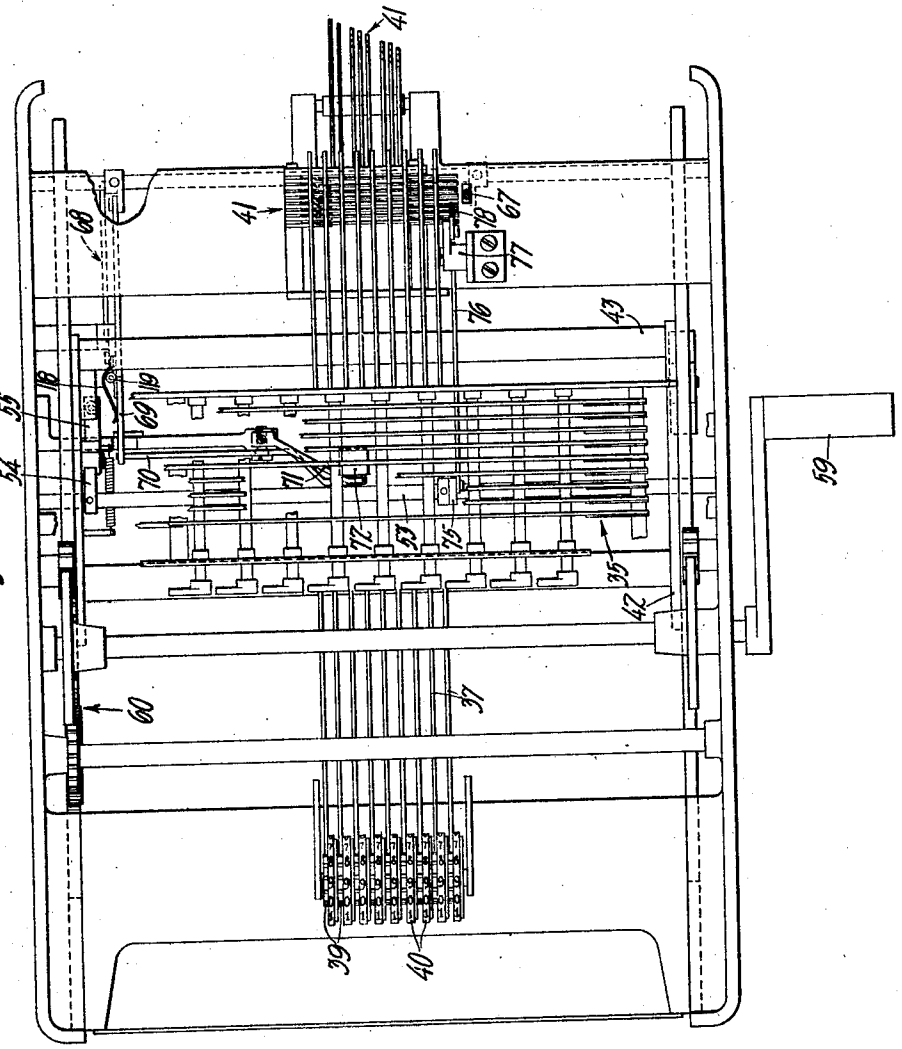


Fig. 4

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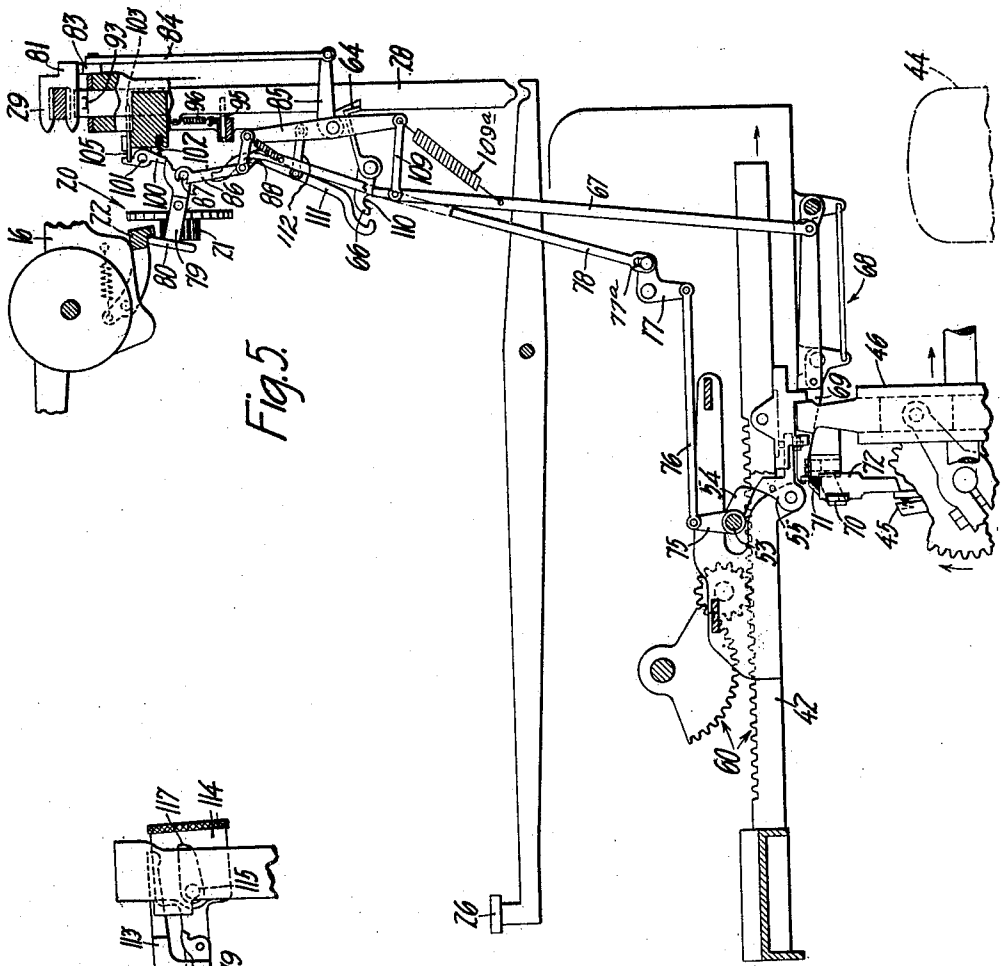


Fig. 5.

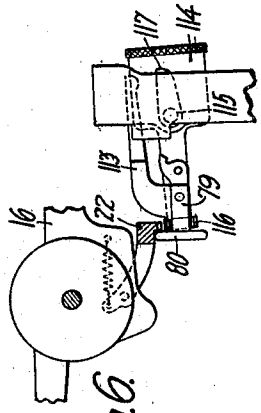


Fig. 6.

Witnesses:

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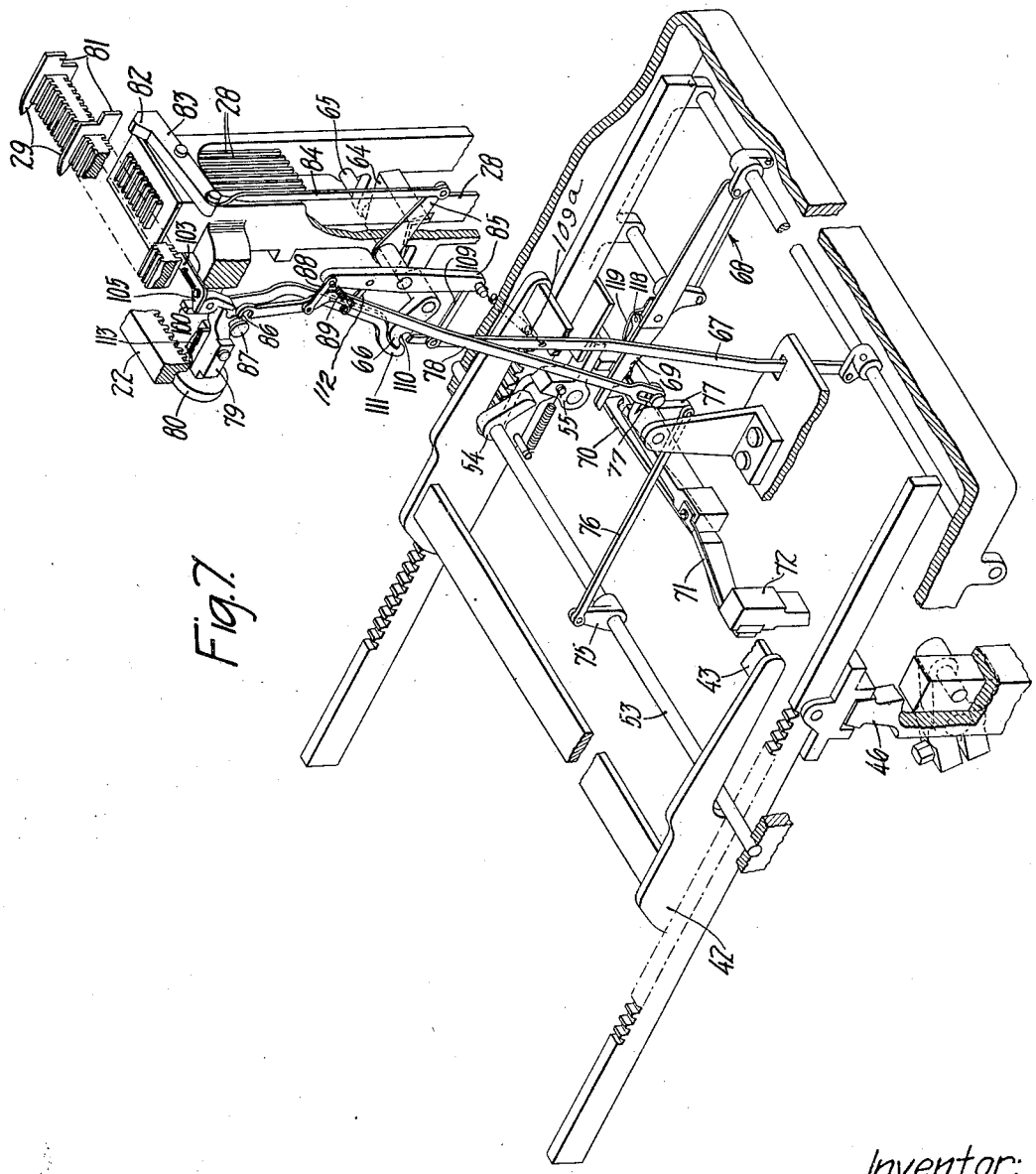


Fig. 7.

Witnesses:

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UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COMBINED TYPEWRITING AND COMPUTING MACHINE.

1,370,238. Specification of Letters Patent. Patented Mar. 1, 1921.

Application filed May 2, 1913. Serial No. 232,066.

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, 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 herein applied to a machine of the Underwood-Hanson type, in which the numbers to be computed are set up on index pins by the numeral keys and are subsequently run into dial wheels by mechanism actuated by an electric or other motor substantially as shown in Patent No. 1,237,900, issued to Frederick A. Hart August 21, 1917. The tabulating mechanism includes a series of keys, at the depression of which the motor is started and a carriage stop is raised and latched in effective position until struck by a column stop on the carriage.

A feature of my invention consists in making it possible to control the tabulating movements of the carriage by the general operator. According to one form of my invention as herein illustrated, when a tabulating key is depressed, after a number is written and indexed, to position the carriage for a succeeding computation, the motor will be started to run the indexed number into the number wheels, but the typewriter carriage will be held until the end of the computing action; then the carriage will be released by the computing mechanism to complete the tabulating. By this mode of operation, the operative is enabled to manipulate the typewriter in the ordinary manner, paying no attention to the computing mechanism or to the tabulating mechanism, and need only make sure to employ a tabulating key to position the carriage for a computation.

Another feature is that the tabulating key may be ineffective to start the motor before a number is set up on the pins so that the carriage may be tabulated into the first computing zone without idly actuating the computing mechanism.

Another feature is that the computing mechanism may be automatically put under control of the tabulating keys by the typewriter carriage after a number is set up on the index pins.

Another feature is that the typewriter carriage may automatically disconnect the computing mechanism from the control of the tabulating keys when said carriage moves out of a computing zone so that ordinary tabulating may be performed thereafter without idly actuating the computing mechanism.

Another feature provides means whereby the operative may predetermine whether the actuation of the tabulating keys shall start only a tabulating operation, or the computing mechanism also, at predetermined positions of the carriage.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional side view of a combined typewriting and computing machine, showing the invention applied thereto and the parts in normal position.

Fig. 2 is a fragmentary sectional front view of the tabulator stops, showing one of said stops arresting the carriage.

Fig. 3 is a fragmentary top plan view of the tabulator stops and the mechanism actuated thereby for restoring the carriage to the control of the escapement mechanism.

Fig. 4 is a sectional top plan view of the computing mechanism below the typewriter.

Fig. 5 is a diagrammatic skeleton side view, showing a tabulating action at the completion of the return stroke of the general operator.

Fig. 6 is a detail view, showing the speed governor for the carriage and adjacent mechanism.

Fig. 7 is a skeleton, isometric, perspective view, looking from the rear, showing a portion of the machine in normal position.

Numeral keys 10 and character keys 11 mounted on key levers 12 (Fig. 1) actuate bell cranks 13 to swing type-bars 14 upwardly and rearwardly against a platen 15 mounted on a typewriter carriage 16. To letter-feed the carriage, heels 17 on the type-bars actuate a universal bar 18 to swing dogs 19 of an escapement mechanism 20 provided with a pinion 21 in mesh with rack 22 swingably mounted on the carriage.

A series of tabulating keys 26 mounted on

key levers 27 raise denominational stops 28 into the path of column-stops 29 adjustable on the carriage 16, the stops 28 being adapted, through the intermediary of connections to be hereinafter described, to raise the rack bar 22 of the typewriter carriage out of mesh with the pinion 21 of the escapement mechanism, permitting a spring drum 30 (Fig. 1) to draw the carriage in letter-feeding direction.

To compute the numbers typed upon the work-sheet on the platen, each numeral key lever 12 is provided with a pendant 34 (Fig. 1) which, on the down-stroke of the key, actuates a linkage mechanism 35 of an indexing device (Figs. 1 and 4), to depress a corresponding index pin 36 on denominational members 37, having racks 38 formed at their forward ends in mesh with pinions 39 mounted on number wheels 40. The denominational member 37, upon which a pin 36 is to be depressed, is moved into coöperative relation with the linkage mechanism 35 by a denominational selecting mechanism 41 (Figs. 1 and 4) controlled by the typewriter carriage in a manner common in machines of the Underwood-Hanson type.

When a number is thus set up or registered on the pins 36, a power driven general operator 42 (Figs. 1, 4, 5 and 7), having a bar 43 universal to all the denominational members 37 and moving in the path of the depressed pins 36, is reciprocated to engage the pins and move forwardly said denominational members amounts directly proportional to the digital value of the depressed pins to actuate the number wheels in accord with the value of the set pins.

A normally silent electrically driven motor 44 (Fig. 5), provided with a switch 45 and connected with a reciprocating mechanism 46 (Figs. 5 and 7), is provided for the purpose of driving said general operator 42.

When the general operator 42 reaches the end of its return stroke, the index pins 36 are returned to their normal positions by a universal plate 50 (Fig. 1) connected with a parallel motion device 51. Said plate is actuated by an arm 52 fast on a rock shaft 53, (Figs. 1, 5 and 7), which has at one end a downwardly-extending arm 54 engageable by a one-way pawl 55 mounted on the general operator 42, in such a manner that when said general operator is moved forwardly, said pawl will pass the arm 54 idly, but will actuate said arm on the return stroke of the general operator to raise the universal plate 50 and therewith all the depressed index pins 36, after which said plate will return to its normal position.

When the last digit of a number is typed and set up in the indexing device, the motor for driving the general operator, to run the number into the number wheels, may be started by a special key, not shown herein, or the general operator may be driven by a manually-operable handle 59 (Figs. 1 and 4) connected with gearing 60 to drive the general operator, after which a tabulating key 26 may be actuated to denominationally position the carriage 16 for typing the next number to be computed.

It is a great saving of time, however, to start the motor to actuate the computing mechanism and to tabulate the typewriter carriage at a single stroke of a key. For this purpose, the tabulating keys are provided with connections whereby the motor may be started and the carriage tabulated at a single stroke of any tabulating key. It is, however, undesirable to actuate the computing mechanism and the typewriter carriage concomitantly since the actuation of the typewriter carriage may actuate the denominational selecting mechanism 41 of the computing mechanism, while the parts of the computing mechanism are in action, thereby causing a malaction or wreckage of the machine.

To avoid this difficulty, means are provided whereby the carriage will not move until after the general operator 42 has run the first number set up on the pins into the number wheels 40.

For thus actuating the machine, the raised denominational stop 28 actuates a universal bar 64 (Figs. 1, 5, and 7) fast on a rock shaft 65 which has an arm 66 thereon, overlying an interponent 67 placed between the tabulating mechanism and the motor-starting mechanism, to depress said interponent 67 when positioned as shown in Fig. 5, and through the intermediary of a parallel motion device 68, depress the forward end of a bar 69 to swing a transverse lever 70 against the tension of its spring 71 to raise the latch 72 of the motor switch 45, thereby closing the circuit through the motor.

The rotation of the motor actuates the general operator 42 through the driving connections 46, so that the universal bar 43 thereof engages all of the depressed pins 36 to drive the denominational members 37, to run numbers into the number wheels.

With the parts positioned as in Fig. 5, the carriage will not be released at the depression of the tabulating key 26, since the rack bar 22 of the carriage remains in mesh with the pinion 21 of the escapement mechanism 20, thereby holding said carriage against tabulating movements.

When the general operator 42 reaches the end of its return stroke, it actuates mechanism to disconnect the carriage 16 from the escapement mechanism 20, to permit the carriage to be rapidly drawn by the spring drum 30 until a column-stop 29 thereon strikes against the raised denominational stop 28.

For this purpose, the rock shaft 53 of the

pin-restoring-device, operated by the general operator 42, is provided with an upstanding arm 75 (Figs. 1, 4, 5 and 7), fast thereon and connected by a link 76 to a bell-crank 77, to depress, by means of a pin-and-slot connection 77^a, an upwardly-extending link 78 connected to the rear end of a lever 79. When said link 78 is depressed at the end of the general operator stroke, the forward end of said lever 79 is raised so that a roller 80 underlying the carriage rack 22 raises said rack out of mesh with the escapement pinion 21, thereby releasing said carriage. Said upwardly-extending link 78 is normally out of engagement with the lever 79, but is connected to actuate said lever when the carriage moves one letter-space after actuating a key in lowest denomination.

To connect said link 78 with the lever 79, an extension 81 on the column-stop 29 moves to the apex of a cam 82, formed at one end of a lever 83, fulcrumed to the framework of the machine midway its ends, to raise a link 84 at the other end thereof, to swing a double bell-crank 85 to connect said upwardly-extending link 78 with the lever 79, said link having a hook 86 formed at its upper end, which moves into engagement with a pin 87 at the rear end of said lever 79, thus connecting said lever 79 with the computing mechanism. A link 88 (Figs. 1, 5 and 7) connects said double bell-crank 85 with the link 78, and a spring 89 serves to hold the link 78 normally in the highest position permitted by its pin-and-slot connection 77^a with bell-crank 77.

Since the carriage is held against a tabulating movement until the end of a computing action, it is desirable to hold the raised denominational stop 28 in effective position during the actuation of the general operator and during the actuation of the carriage in a tabulating operation. Each denominational stop 28 is provided with a latch 93 (Figs. 1, 2 and 5) to snap over a top plate 94 of the denominational stop housing when a stop 28 is raised, and is urged into latching position by a leaf spring 95 (Figs. 1 and 5) provided for each denominational stop. When said stop is thus latched, the operative may release the tabulating key 26 and the computing operation and the tabulating operation will be automatically completed.

When a column-stop 29 strikes against the raised denominational stop 28, the upper end thereof will be moved leftwardly as in Fig. 2, against its spring 95, to move the latch 93 out of engagement with said top plate 94, and to permit a spring 96, one for each of said stops 28, to return said stop to its normal position. It will be noted that apertures 97 (Figs. 2 and 3) are provided in the top plate 94, through which said stops 28 project, and each of said apertures is of sufficient width to permit the leftward movement of said stops while being raised or being unlatched.

To hold the carriage rack 22 out of engagement with the escapement mechanism 20 during a tabulating run of the carriage 16, the lever 79 which raises said rack is locked in effective position when actuated as in Fig. 5, by a latch 100 (Figs. 2, 3, 5 and 7), pivoted on the framework at 101 and urged into effective position by a spring 102.

When the carriage 16 reaches the end of a tabulating run, it is restored to the control of the type keys when the stop 29 moves the upper end of the raised stop 28 leftwardly and therewith a slide 103 (Figs. 1, 2, 3 and 5), universal to all of said stops 28 against the tension of a spring 104, so that a cam 105 formed thereon swings said lever-locking latch 100 to ineffective position, to release the lever 79 and permit the carriage rack 22 to mesh with the escapement mechanism 20.

To avoid idle actuation of the general operator when a tabulating key is depressed prior to a computation, as when tabulating the carriage into the first computing zone, the mechanism for tripping the latch 72, which controls the motor 44, is disconnected from the control of the tabulating mechanism.

For this purpose, the downwardly-extending arm of the double bell crank 85 is connected by a link 109 (Figs. 1, 5 and 7) to the interponent 67 which lies between the tabulating mechanism and motor-starting devices, to move the upper end of said interponent which underlies the arm 66, forming part of the universal bar 64 for the denominational stops, so that the upper end of said interponent will lie under a notch 110 in said arm in such a manner that when said arm is actuated at the depression of a tabulating key 26, it will be ineffective to depress the interponent and start the motor. The downwardly-extending arm of the double bell-crank 85 is also connected to link 67 by means of a spring 109^a which acts to restore link 67, bell-crank 85 and the parts associated therewith, to normal position.

In order to release the carriage directly from the tabulating keys when the computing mechanism is not controllable thereon, the arm 66 of the universal bar 64, associated with the denominational stops, is connected to depress a link 111 (Figs. 5 and 7), the upper end of which is connected with the lever 79 for raising the rack 22 to disconnect the carriage from the escapement mechanism at the depression of any tabulating key, said lever 79 being locked in effective position in the same manner as when the carriage is released by the general operator. Said link 111 is connected to bell-crank 85 by means of a link 112 and by shifting said

bell-crank 85 either link 67 or link 111 will be effective to rock lever 79. The lever 79 is returned to its normal position when the carriage reaches the end of its run.

When the typewriter carriage moves at high speed in a tabulating action, its column-stop 29 striking against a denominational stop 28 may cause a rebound of the carriage, thereby arresting the carriage at an incorrect denominational position, in case its rack 22 is engaged with the escapement mechanism when said carriage is rebounded.

To avoid this difficulty, the typewriter carriage is provided with a speed governor 114 (Fig. 6) which is pivoted on the machine frame at 115 and has a pinion 116 normally out of engagement with the rack 22. When the rack 22 is disengaged from the escapement mechanism 20 in a tabulating operation, by lever 79, an arm 113 fast on said lever engages an arm 117 fast on the speed governor 114, to swing the latter about its pivot 115 to engage its pinion 116 with the rack 22, so that the speed governor will be effective to retard the carriage, thereby reducing the force with which its column-stop 29 strikes the raised denominational stop 28, thus avoiding a rebound of the typewriter carriage. The speed governor 114 will be held in effective position during the run of the carriage by the latch 100, through the intermediary of the lever 79 and its arm 113.

It will be noted that the cam 82, which is actuated by the stops 29 on the carriage to connect the tabulating keys to control the computing mechanism, may be positioned so as to be effective for any desired letter-space position, and may be made of such extent as to be effective for a plurality of letter-space positions.

It will also be noted that the same column-stops 29 may be employed when it is not desired that the typewriter carriage shall render the tabulating keys effective to control on the computing mechanism. For this purpose, the extensions 81 of the column-stops extend only over a portion of their width so that a stop may be placed on the carriage with the extension 81 in or out of engaging relation with the cam 82, as seen in Fig. 7, at the will of the operative.

When it is desired to write a word or a character after a number to be computed, the carriage having been moved out of the computing zone by this operation, the tabulating keys are ineffective to control the computing mechanism. To avoid returning the carriage into the computing zone, in order to start the computing mechanism from said keys, the handle 59 may be actuated to run the indexed number into the number wheels 40, and a tabulating key 26 may then be depressed in the usual manner to position the carriage for the next computation. The handle 59 may also be employed when it is desired to compute a number written in a computing zone for which no properly positioned column-stop has been provided, without the disarrangement of the column-stops 29, or in case a properly positioned column-stop 29 has been carried past cam 82 without actuation of a tabulating lever to cause motor actuation of the general operator.

When a tabulating key is depressed to start the computing mechanism, and to latch into effective position the associated denominational stop 28, the bar 69 (Fig. 7) will be held in depressed position until the denominational stop 28 is released by the typewriter carriage. It will be seen that if this bar 69 should hold the switch latch 72 in raised position until the end of the tabulating operation, the motor 44 will continue to drive the machine after the end of a computation.

To avoid this difficulty, the bar 69 is provided with a hinge 118, and is so proportioned relatively to the lever 70, that when said bar is actuated at the depression of a tabulating key 26, the forward end of the bar will trip off the end of the lever 70, after starting the motor 44, and the latch 72 and the lever 70 will immediately be returned to their normal positions by the spring 71. When the lever 70 is thus returned, it will swing the forward end of the bar 69 on its hinge 118 against the tension of a spring 119, provided to return said forward end to its normal position above the lever 70 when the denominational stop 28 is released.

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 a combined typewriting and computing machine, in combination, typewriting means including a traveling carriage and an escapement therefor, a carriage-release device, computing mechanism including a general operator, a device operable by said general operator in its return movement, tabulating means including a member movable each time tabulation is to be effected, and means controlled by the carriage to connect the carriage-release device with the general operator-actuated device, or to said movable member.

2. In a combined typewriting and computing machine, in combination, computing mechanism including indexing devices, a general operator, a motor mechanism for actuating the general operator, typewriting mechanism including a traveling carriage and an escapement mechanism therefor, tabulating keys, tabulating mechanism operable by said tabulating keys including a device universal to said keys, carriage-re-

lease means normally operable by said universal device, a starting device for said motor mechanism, and carriage-controlled means for rendering said universal device ineffective to operate said carriage-release means and effective to operate said starting device.

3. In a combined typewriting and computing machine, in combination, computing mechanism comprising a general operator and a motor for actuating said general operator, typewriting mechanism including a traveling carriage and a carriage-escapement mechanism, tabulating mechanism including keys for actuating the same, a member universal to said tabulating keys, carriage-releasing means including a link adapted to be actuated by said universal member, and normally positioned to be actuated thereby, a motor-starting device including a link adapted to be actuated by said universal member, but normally in ineffective relation therewith, and carriage-controlled means for moving said carriage-releasing link into ineffective position relative to said universal member, and said motor-starting link into effective relation therewith, whereby depression of a tabulating key will cause the actuation of the general operator and will be ineffective to release the carriage.

4. In a combined typewriting and computing machine, in combination, typewriting mechanism including a traveling carriage and an escapement mechanism therefor, a carriage-releasing device, a latch to maintain said releasing device in its actuated position, computing mechanism including a general operator, a member movably supported adjacent said general operator, said general operator being ineffective on said member in its effective movement, but effective thereon near the end of its return movement, and means whereby actuation of said member by said general operator may move said releasing device to releasing position, to be retained in such position by said latch.

5. In combination, a traveling carriage, tabulating means therefor including denominational stops, means to latch said stops in actuated position, a member universal to said denominational stops and actuable thereby, a carriage-controlled link moved into effective relation with said universal member when the carriage is in certain positions, computing mechanism including a general operator, a motor for actuating the general operator, a lever for starting said motor, a second lever having its free end overlying the free end of the first lever, and connections between the second lever and said link, whereby actuation of said link will actuate the motor-starting lever, the free end of said second lever being hinged and held in alinement with the rest of the lever by a spring, whereby the free end of the second lever, after actuating the first lever, will be moved to one side, so as to enable the first-mentioned lever to return to normal position notwithstanding the latching of a denominational stop in actuated position.

6. In a combined typewriting and computing machine, the combination with typewriting mechanism including a traveling carriage and numeral-keys, of a computing mechanism in which numbers may be indexed while the carriage is passing through a computing zone, tabulating mechanism including keys by which the same may be actuated, means whereby said tabulating keys may be made ineffective to release said carriage and may be made effective to cause actuation of said computing mechanism to compute a number so indexed, and means rendered effective by said computing mechanism as it completes computation of the number to release said carriage to enable tabulating to be effected.

7. The combination of a computing mechanism comprising numeral-keys and indexing means in which digits of a number may be indexed, a traveling carriage, means controlled by said traveling carriage to determine the denomination in which indexing will be effected upon the depression of a numeral-key as the carriage passes through a computing zone, a general operator to effect computation of the number so indexed, tabulating keys, tabulating mechanism normally operable by said tabulating keys, and means whereby depression of a tabulating key, immediately after the indexing of the digit of lowest denomination in the number, will cause actuation of said general operator, and, upon return of the latter to its home position, will release said carriage to enable the tabulating movement thereof to be completed.

8. In a combined typewriting and computing machine, the combination with a traveling carriage, numeral-keys and numeral-key-controlled escapement mechanism for said carriage, of computing means in which numbers may be indexed by said numeral-keys, in different denominations determined by said carriage as it passes through a computing zone, tabulating keys, tabulating mechanism operable by said tabulating keys and normally effective to release said carriage upon depression of one of the tabulating keys, a general operator whereby computation of numbers so indexed may be effected, means whereby actuation of a tabulating key, after indexing the digit of lowest denomination of a number, will cause actuation of the general operator and render said tabulating keys ineffective to release the carriage, and means whereby said general operator, as it nears its home position, will

effect release of the carriage to permit the tabulating action, initiated by the tabulating key depressed, to be completed.

9. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys for denominationally positioning the carriage in a computing column, numeral keys for letter-feeding the carriage, and means for enabling the tabulating keys to control the computing mechanism when said carriage passes out of units position.

10. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys for denominationally positioning the carriage in a computing column, numeral keys for letter-feeding the carriage, and means for enabling the tabulating keys to start the actuation of the computing mechanism when said carriage passes into a letter-space beyond the units position.

11. In a combined typewriting and computing machine, the combination of a traveling carriage, numeral keys, tabulating keys, and means operable for starting a computing action after typing a number, at the depression of a tabulating key to position the carriage for typing another number.

12. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys, means for setting up a number in said mechanism, means for typewriting each digit of the number as it is set up in said mechanism, and means for starting a computation of the number so set up, at the depression of a tabulating key, whereby, upon completion of the computation, the carriage will be positioned for the setting up of another number.

13. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys, means for setting up the digits of a number in said mechanism and typewriting said digits as set up, and means for starting a computing action at the depression of a tabulating key after the setting up of a digit in units denomination.

14. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for setting up in said mechanism the digits of a number to be computed and concomitantly typewriting the same, tabulating keys, and means for actuating said mechanism and tabulating the carriage in sequence at a single stroke of a tabulating key.

15. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys, numeral keys for causing denominational letter-feed movements of the carriage, and means for actuating said mechanism and tabulating the carriage in sequence at a single stroke of a tabulating key after the actuation of a numeral key in units denomination.

16. In a combined typewriting and computing machine, the combination of typewriting mechanism including a traveling carriage and escapement mechanism controlling said carriage, tabulating keys controlling said carriage, a computing mechanism in which the digits of a number are set up as typewritten, controllable by said tabulating keys, and means for releasing the carriage from the control of the escapement mechanism through the computing mechanism.

17. In a combined typewriting and computing machine, the combination of a traveling carriage, escapement mechanism for controlling said carriage, tabulating keys controlling said carriage, computing mechanism including a general operator controlled by the tabulating keys, and means for releasing the carriage from the control of the escapement mechanism at the end of the general operator actuation.

18. In a combined typewriting and computing machine, the combination with a computing mechanism including number wheels, of a traveling carriage, tabulating keys, means for concomitantly setting up the digits of a number in the computing mechanism and typewriting the same, mechanism for running the number into the number wheels, and means for starting said last-named mechanism at the depression of a tabulating key after setting up a digit in units denomination.

19. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for concomitantly setting up numbers in said mechanism and typewriting the same, tabulating keys, means for actuating said mechanism and initiating a tabulating action at the depression of a tabulating key, and means for completing the tabulating action subsequent to the computing action.

20. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for concomitantly setting up numbers in said mechanism and typewriting the same, tabulating keys, numeral keys for causing denominational letter-feed movements of the carriage, and means for actuating said mechanism and tabulating the carriage in sequence at a single stroke of a tabulating key when the carriage is one letter-space beyond units position.

21. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, a key-controlled tabulating mechanism for positioning the carriage in computing zones,

and means for driving said computing mechanism controlled by the tabulating keys when the carriage is in certain letter-space positions relative to said zones, said keys being ineffective to control said driving means when the carriage is out of said letter space positions.

22. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, a key-controlled tabulating mechanism for positioning the carriage in computing zones, means for driving said computing mechanism controlled by the tabulating keys when the carriage is in certain letter-space positions relative to said zones, and settable means for determining before the carriage enters the first computing zone, whether said keys shall be effective or ineffective to control said driving means when the carriage is in said letter-space positions.

23. In a combined typewriting and computing machine, the combination of a traveling carriage, a key-controlled tabulating mechanism for positioning the carriage in computing zones, a computing mechanism including a general operator, a motor for driving the general operator controllable by the tabulating keys when the carriage is in certain letter-space positions, and settable means for determining before the carriage enters the first computing zone whether said keys shall be effective or ineffective to control said motor when the carriage is in said letter-space positions.

24. In a combined typewriting and computing machine, the combination with a computing mechanism and a traveling carriage, of tabulating mechanism, including keys, for positioning the carriage in computing zones, means for driving said computing mechanism, and controlling means for placing said driving means under the control of said keys at certain letter-space positions relative to said zones, said controlling means including settable devices, one for each zone, whereby said controlling means may be rendered ineffective for any of said letter-space positions.

25. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, a key-controlled tabulating mechanism for positioning the carriage in computing zones, and means controlled by the tabulating keys for driving said computing mechanism when the carriage is in one letter-space beyond units position, said keys being ineffective to control said driving means when the carriage is out of said letter-space position.

26. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for concomitantly setting up numbers in said mechanism and typewriting the same, tabulating keys, a motor controlled by said keys for driving said mechanism, and means controlled by the carriage for rendering said keys ineffective to control the motor.

27. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys, a motor controlled by said keys for driving said mechanism when the carriage is in certain letter-space positions, and means controlled by the carriage for rendering said keys ineffective to control the motor when the carriage is out of said positions.

28. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, tabulating keys, a motor controlled by said keys for driving said mechanism when the carriage is one letter-space beyond units position, and means controlled by the carriage for rendering said keys ineffective to control the motor when the carriage is out of said letter-space position.

29. In a combined typewriting and computing machine, the combination with a traveling carriage, of a computing mechanism, means for concomitantly setting up numbers in said mechanism and typewriting the same, tabulating keys, means for controlling the tabulating movements of the carriage from said keys, means for controlling tabulating movements of the carriage from said mechanism, and means controlled by the carriage for determining whether said carriage shall be controlled from the keys or from said mechanism.

30. In a combined typewriting and computing machine, the combination with a traveling carriage, of a computing mechanism, tabulating keys, means for controlling the tabulating movements of the carriage from said keys, means for controlling the computing mechanism from said keys, and means controlled by the carriage for determining whether or not said keys shall control the carriage from the computing mechanism.

31. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for concomitantly setting up numbers in said mechanism and typewriting the same, tabulating keys normally ineffective to control said mechanism, and means for rendering said mechanism controllable from said keys.

32. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for setting up numbers in said mechanism and typewriting the same, tabulating keys normally ineffective to control said mechanism, and means for automatically

rendering said mechanism controllable from said keys.

33. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys normally ineffective to control said mechanism, and means controlled by the carriage for rendering said mechanism controllable from said keys.

34. In a combined typewriting and computing machine, the combination with typewriting mechanism, including a carriage, a totalizer, and driving means therefor including indexing mechanism and a general operator, of motor mechanism for driving said general operator, means for starting said motor mechanism, a key and means to connect said key with said starting means when said carriage is in certain letter-space positions to enable actuation of said starting means by said key.

35. In a combined typewriting and computing machine, the combination with a computing mechanism, of means including a key for positioning the carriage in a computing zone, and means whereby said key is rendered effective to control said computing mechanism when the carriage is in certain letter-space positions, and is rendered ineffective when the carriage is in any other letter-space position.

36. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys normally ineffective to control said mechanism, means for automatically rendering said mechanism controllable from said keys, and means controlled by said carriage for releasing said mechanism from the control of said keys.

37. In a combined typewriting and computing machine, the combination with computing mechanism including index-devices, a general operator, and means actuated by said general operator to restore said index-devices to normal condition, of a traveling carriage escapement mechanism including a rack pivotally mounted on said carriage, and a pinion with which said rack is normally in engagement, tabulating mechanism including column-stops on said carriage, tabulating keys, counter-stops actuable by said tabulating keys, means to latch said counter-stops in effective position, means rendered effective by a tabulator-key to actuate said general operator, means actuated by said restoring means to disengage said rack from said pinion, means to latch said rack in disengaged position, the counter-stop latch being released upon engagement of a counter-stop by a column-stop, and means whereby the unlatching of the counter-stop latch causes the release of the latch for said rack.

38. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, keys for controlling the tabulating movements of the carriage and for controlling said mechanism, and means adjustable on said carriage for rendering said keys ineffective to control said mechanism.

39. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys, means for controlling the tabulating movements of the carriage from said keys, means for controlling the tabulating movements of the carriage from said mechanism, and means adjustable on the carriage for determining whether said carriage shall be controlled from said keys or from said mechanism.

40. In a combined typewriting and computing machine, the combination with a computing mechanism, a traveling carriage, and devices for causing letter-feed movements thereof; of tabulating keys, means for controlling the tabulating movements of the carriage from said keys, means for controlling the tabulating movements of the carriage from said mechanism, and means adjustable on the carriage for determining letter-space positions at which the carriage shall be controlled from the keys or from said mechanism.

41. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys normally ineffective to control said mechanism, and means adjustable on the carriage for rendering said mechanism controllable from said keys.

42. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys, means for rendering said keys effective to control said carriage, means for rendering said keys effective to control said mechanism when the carriage is in one of a number of given computing positions, and means traveling with the carriage for rendering said keys ineffective to control said mechanism.

43. In a combined typewriting and computing machine, the combination with number wheels, of a traveling carriage, tabulating mechanism, including keys, computing mechanism, means for setting up a number in said mechanism and typewriting the number so set up, means controlled by said keys for running said number into the number wheels, and means for delaying the tabulating action until the completion of the running of said number into said wheels.

44. In a combined typewriting and computing machine, the combination with a traveling carriage, of numeral keys, a plu-

rality of number wheels, means operable by said keys for indexing the digits of numbers to be computed and typewriting the digits so indexed, a general operator for running the numbers so indexed into the number wheels, power-driven means for actuating the general operator, a series of tabulating keys, means operable by said tabulating keys for controlling said power-driven means, and means whereby the operation of tabulating the carriage is effected subsequently to the computation of a previously indexed number.

45. In a combined typewriting and computing machine, the combination with a traveling carriage, of tabulating keys, computing mechanism, means to set up a number in said mechanism and typewrite the same, a motor for driving said mechanism, connections between said keys and said motor for starting the latter at the depression of a key, and connections between said mechanism and said carriage for tabulating the latter at the end of the actuation of said mechanism.

46. In a combined typewriting and computing machine, the combination with a traveling carriage, of tabulating mechanism including keys, computing mechanism, a motor for driving said mechanism, a motor-starting mechanism, an interponent between the tabulating mechanism and the motor-starting mechanism, whereby said motor may be started at the depression of a tabulating key, and means controlled by the carriage for moving said interponent into or out of position to start the motor.

47. In a combined typewriting and computing machine, the combination with a carriage, a computing mechanism including an indexing device and a set of numeral keys, of a motor for driving said computing mechanism, normally ineffective driving connections between said motor and said computing mechanism, a series of tabulating keys for rendering said driving connections effective at the depression of a key, and means controlled by the carriage for enabling said keys to control said connections.

48. In a combined typewriting and computing machine, the combination with a carriage, numeral keys and number wheels, of tabulating keys, a device in which numbers are temporarily registered, power-driven means for running into the number wheels the numbers registered in said device, a universal bar operated by said tabulating keys, and means controlled by the carriage and operable by said universal bar for connecting said power-driven means to said device.

49. In a combined typewriting and computing machine, the combination with a carriage, of a tabulating mechanism including a series of keys, number wheels, a motor for actuating the number wheels, a motor-starting device, and means controlled by the carriage for connecting said motor-starting device with said tabulating mechanism to start the motor at the depression of a tabulating key.

50. In a combined typewriting and computing machine, the combination with number wheels, type-keys, and a traveling carriage; of a device in which a number is temporarily registered by said type-keys, a tabulating key for positioning the carriage to type another number, a general operator for running the first registered number into said wheels, a motor for driving said general operator, and means operated by said tabulating key and controlled by the carriage for causing said motor to drive said general operator.

51. In a combined typewriting and computing machine, the combination with a traveling carriage, of numeral keys normally controlling said carriage, tabulating keys controlling said carriage, a computing mechanism controllable by said tabulating keys, and means for releasing the carriage from the control of the numeral keys through the computing mechanism.

52. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys for positioning the carriage in a computing zone, numeral keys for causing letter-feed movements of the carriage, and means for actuating the computing mechanism and tabulating the carriage in sequence at a single stroke of a tabulating key when the carriage is in a predetermined letter-space position.

53. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating keys, numeral keys for controlling said mechanism and said carriage and for typing a number, and means for rendering said mechanism controllable by said tabulating keys by actuation of a numeral key when the carriage is in units position in a computing zone.

54. In a combined typewriting and computing machine, the combination with a computing mechanism and a traveling carriage, of tabulating keys, connections between said keys and said carriage for releasing the latter at the depression of the former, and means controlled by the carriage for breaking said connections and for connecting said keys to start the computing mechanism.

55. In a combined typewriting and computing machine, the combination with a computing mechanism and a traveling car-

riage, of tabulating keys, normally operative connections between said keys and said carriage for releasing the latter at the depression of the former, connections between said keys and said computing mechanism for starting the latter at the depression of the former, connections between said computing mechanism and said carriage for releasing the latter by the actuation of the former, and means controlled by said carriage for rendering said first-named connections inoperative and for rendering said second and third-named connections operative.

56. In a combined typewriting and computing machine, the combination with a computing mechanism and a traveling carriage, of tabulating keys, normally operative connections between said keys and said carriage for releasing the latter at the depression of the former, connections between said keys and said computing mechanism for starting the latter at the depression of the former, connections between said computing mechanism and said carriage for releasing the latter by the actuation of the former, means controlled by said carriage for rendering said first-named connections inoperative and for rendering said second and third-named connections operative, and means for locking said third-named connections in effective position until the carriage reaches the end of its travel.

57. In a combined typewriting and computing machine, the combination with a computing mechanism and a traveling carriage, of tabulating keys, normally operative connections between said keys and said carriage for releasing the latter at the depression of the former, connections between said keys and said computing mechanism for starting the latter at the depression of the former, connections between said computing mechanism and said carriage for releasing the latter by the actuation of the former, means controlled by said carriage for rendering said first-named connections inoperative and for rendering said second and third-named connections operative, means for locking said third-named connections in effective position until the carriage reaches the end of its travel, and means controllable by the carriage for unlocking said third-named connections.

58. In a combined typewriting and computing machine, the combination with a computing mechanism, of a traveling carriage, tabulating mechanism including keys and a carriage-releasing means, an indexing device in which the digits of a number are temporarily registered, means actuable at the end of a computation for restoring said indexing device to normal position, means controlled by the carriage for rendering the computing mechanism controllable by said keys, connections between said restoring means and carriage for actuating said carriage-releasing means, a latch for holding said carriage-releasing means in effective position, and means for permitting the return of said indexing-device-restoring means to normal position when said carriage-releasing means is latched in effective position.

59. In a combined typewriting and computing machine, the combination of a computing mechanism, a traveling carriage, means for concomitantly setting up numbers in said computing mechanism and typewriting the same, tabulating keys normally ineffective to control the computing mechanism, means controlled by the carriage for automatically rendering the computing mechanism controllable by said keys, and means for controlling the computing mechanism when said keys are ineffective to control the computing mechanism.

60. In a combined typewriting and computing machine, the combination with a computing mechanism, of a motor for driving said computing mechanism, a traveling carriage, a series of tabulating keys normally ineffective to start the motor, means controlled by the carriage for automatically connecting said keys to start the motor at the depression of a key, and means other than said motor for driving said computing mechanism at all times.

BURNHAM C. STICKNEY.

Witnesses:

CATHERINE A. NEWELL,

EDITH B. LIBBEY.