

J. N. THORNTON.
 COMBINED TYPE WRITING AND COMPUTING MACHINE.
 APPLICATION FILED APR. 13, 1912.

1,238,055.

Patented Aug. 21, 1917.

2 SHEETS—SHEET 1.

FIG. 1.

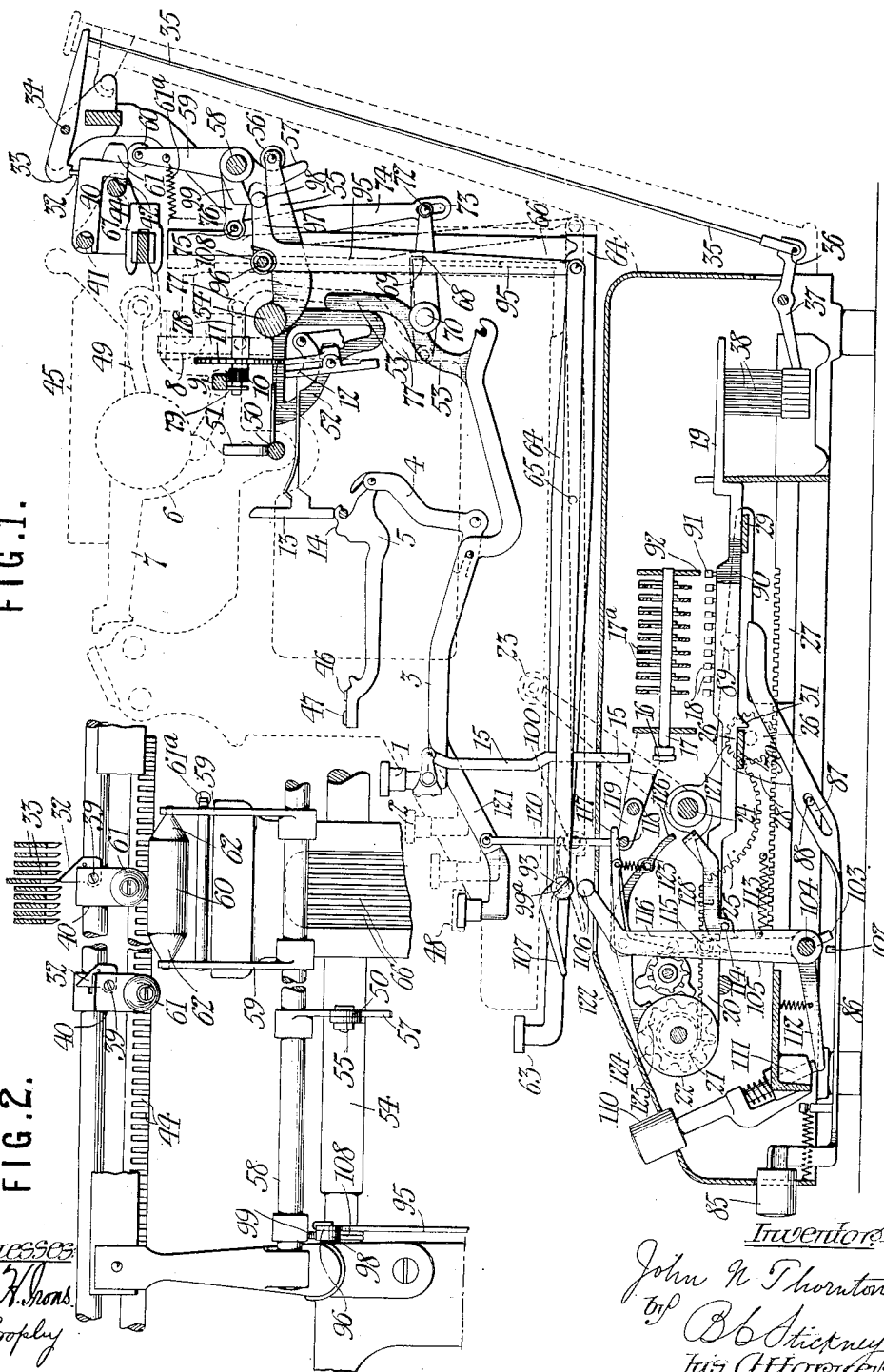


FIG. 2.

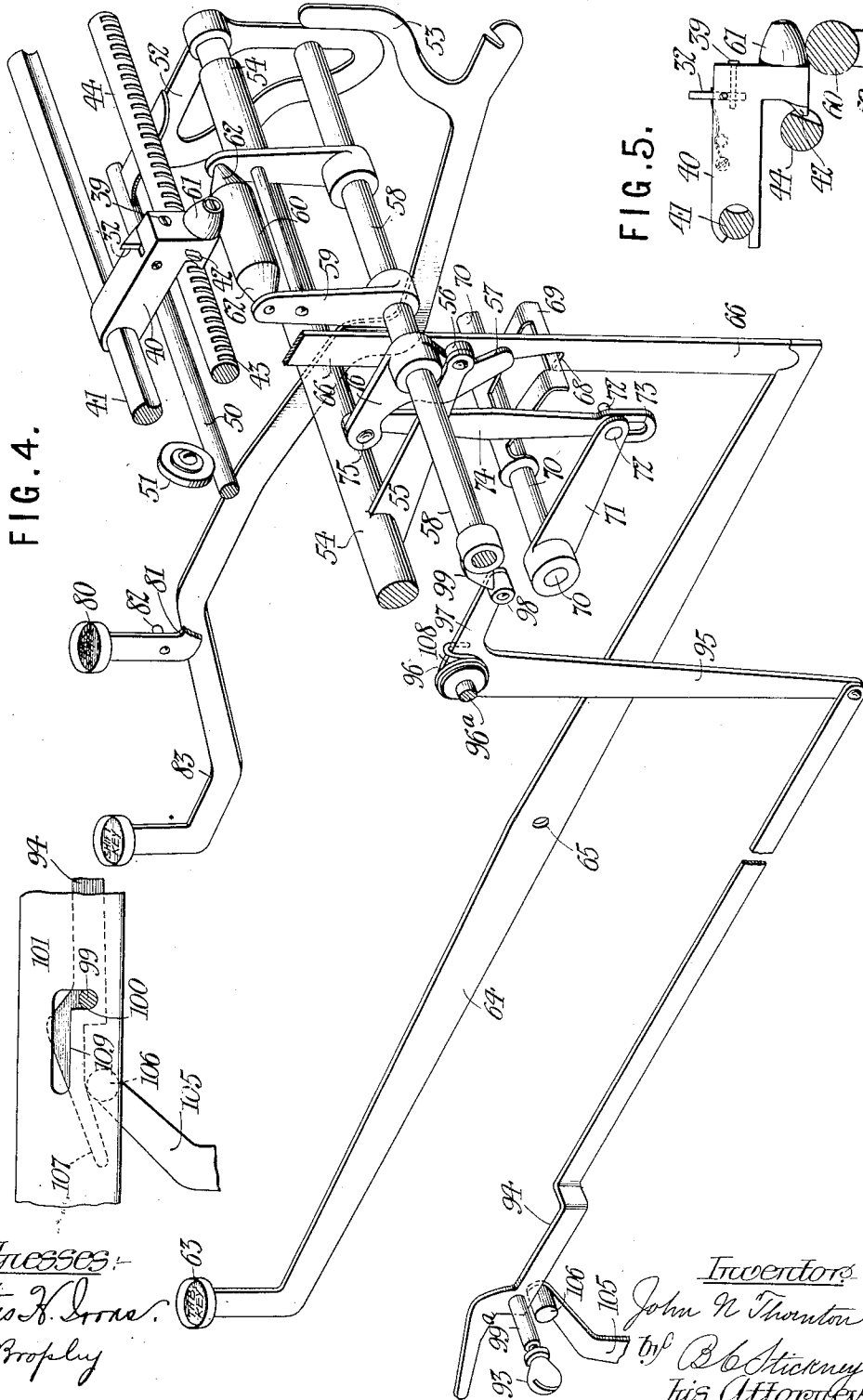
Witnesses
 John H. Thornton
 J. A. Propoy

Inventor
 John H. Thornton
 by O. B. Stickney
 his Attorney

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2 SHEETS—SHEET 2.



Witnesses:
 L. H. H. H.
 J. H. H. H.

Inventor:
 John N. Thornton
 By B. B. H. H.
 His Attorney.

UNITED STATES PATENT OFFICE.

JOHN N. THORNTON, OF JERSEY CITY, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COMBINED TYPE-WRITING AND COMPUTING MACHINE.

1,238,055.

Specification of Letters Patent.

Patented Aug. 21, 1917.

Application filed April 13, 1912. Serial No. 690,488.

To all whom it may concern:

Be it known that I, JOHN N. THORNTON, a citizen of the United States, residing in Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Combined Type-Writing and Computing Machines, of which the following is a specification.

This invention relates to combined type-writing and computing machines of the class in which numeral keys on the typewriter are caused to set certain members or pins in the computing mechanism which are subsequently employed for rotating the computing wheels.

These pins are usually placed upon bars, one bar for each denomination; and the bars are displaced one after another as the typewriter carriage makes its letter feeding movements; a dog being connected to the typewriter carriage, and a set of jacks being operated *seriatim* by said dog, the jacks being connected to the corresponding computation pin bars to displace or set the same. When the carriage stands at any point, the computation pin bar of corresponding denomination is displaced or set, and when a numeral key of the typewriter is depressed to print a figure at that point, the corresponding pin is set upon the displaced computation bar. After the pins have been set on all the bars in this manner, a general operator is employed for turning all the dial wheels to an extent determined by means of the set pins.

According to the present invention, the computing mechanism may be silenced by effecting a separation between said computing dog on the carriage and said set of jacks. This silencing is effected in a novel manner by devices connected to the case-shifting mechanism of the typewriting machines, so that when upper case characters are being written no computation will be done. Provision is also made for causing the tabulator keys to silence the computing mechanism. There is also provision for causing the back spacing dog to silence said computing mechanism.

There is also provided near the keyboard a finger-piece which can be thrust back and locked in position to hold the computing dog silenced. A special key for returning

the wheels to zero has means for releasing said computing dog automatically, so that it is insured that at the beginning of any computing operation the computing dog or dogs shall be rendered effective. There is also provided upon the machine another special key which is operated to write upon the work sheet a special character. This key can operate only when all the dial wheels stand at zero; and therefore the appearance of said special character on the work sheet indicates that the wheels stood at zero when said character was imprinted. This special key also has means for rendering the computing dog effective. Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional, central, longitudinal view taken from front to rear of an Underwood-Hanson combined typewriting and computing machine embodying the present improvements in one form.

Fig. 2 is a rear elevation, showing the computing dog on the carriage and associated parts, one dog being shown in use while another is dropped.

Fig. 3 is a side elevation of a device for locking in effective position the device which returns the computation dog or dogs.

Fig. 4 is a perspective rear view, showing the computation dog, means for rendering it effective, and keys connected to silencing means for said dog.

Fig. 5 is a sectional side elevation, illustrating the computation dog and the manner in which it is mounted and controlled.

The typewriter comprises numeral keys and alphabet keys, which depress levers to vibrate bell cranks; the latter engaging type bars to swing them up to strike against a platen mounted on a carriage. The carriage is driven by a spring barrel and its letter feeding movements are controlled by a rack, which meshes with a pinion connected to an escapement wheel, whose movements are controlled by dogs, said dogs operated by a universal bar which is actuated by heels on the type bars.

The numeral keys have stems to engage and depress arms on rock shafts, forming parts of linkages to depress or set computation pins on bars, which

extend forwardly and rearwardly and have at their forward ends racks 20 to mesh with pinions 21 on computation wheels 22.

The typewriter carriage 7 is connected with means to raise the computation racks or bars 19 *seriatim*, so that when said carriage is in position for writing at any point in a column, the computation bar of the corresponding denomination will be raised; and hence when a numeral key is depressed, to write at said point in the column, the linkage 17^a connected to said key will depress that particular pin 18 on the lifted bar 19 which corresponds to such depressed key.

The pins when depressed are utilized for determining the turning of the computation wheels 22; the racks 19 being for this purpose driven by a general operator, which may comprise a handle 23 connected to a shaft 24, on whose ends are fixed segments 25, meshing with idle pinions 26, the latter meshing with racks 27 guided in the opposite sides of the machine. Each rack has an offset arm 28, and these arms are rigidly connected by rear and forward cross-bars 29, 30, disposed just beneath the computation bars 19, so that when any pins 18 are depressed, the rear cross-bar 29 may, when driven forwardly by handle 23, engage the depressed pins 18 and drive their bars 19 forwardly. The racks 20 thus turn the wheels 22, each to an extent dependent upon the pin depressed. Upon the return of the handle 27 of the general operator, the forward cross-bar 30 engages shoulders 31 upon said computation bars, to return them rearwardly to normal positions.

The lifting of the bars 19 to bring their pins within range of the key-operated linkages 17^a is effected by the letter-feeding carriage 7 of the typewriter. Upon the rear of the carriage is mounted a dog 32, to engage jacks 33, pivoted at 34 upon a bracket and at their rear ends adapted to depress links 35, whose lower ends are pivoted at 36 to levers 37. These levers are adapted to operate linkages 38 to lift the rear portions of the computation bars 19; these linkages forming a denomination-transposing device as usual in said Underwood-Hanson machine.

The parts above described are similar in function and operation to those shown in the British Patent, No. 3390, of 1912.

Each of the dogs 32 (of which several may be employed) is pivoted at 39 upon a block or carrier 40, which is swiveled upon, and adjustable along a rod 41 fixed upon the carriage, and has a tooth 42 to lock into any of a series of notches 43 formed at letter space intervals in a rod 44, also fixed upon the carriage. Each carrier 40 with its dog 32 may be termed a tappet, and forms with the jacks 33 a part of the denominational selecting mechanism. By swinging the car-

rier 40 up free of the rod or block 43, the block may be adjusted along said rod 44 and then reengaged with the rack.

The platen 6 is usually mounted upon a frame 45, which can shift up and down for writing upper-case and lower-case characters. Normally the lower-case types 46 strike the platen; but when the latter is shifted up, the upper-case characters 47 make the impressions. The figure types are included in the lower-case set 46; but when the capital shift key 48 is depressed, it is not desired to have any of the computing mechanism operate, as figures are not provided in the upper-case set of types 47. Mechanism is connected to the platen-shifting devices for silencing the computation dog 32 at this time. The platen frame 45 is usually mounted on a pair of arms 49 hinged upon the carriage frame 7, and a rail 50 is employed for lifting the platen frame; the latter having a roll 51 to run upon said rail. Rail 50 is mounted upon a frame 52, which is operated by a key lever 53, said lever bearing the key 48; and the platen frame also usually comprises a rock shaft 54. Extending rearwardly from this rock shaft is an arm 55, having on its rear end a roll 56 to engage a cam arm 57 which depends from a rock shaft 58. Arms 59 extend up from said rock shaft 58, and carry at their tops a roll 60 to engage transversely a roll 61 on said dog carrier 40. The arms 59 and the roll 60 form a support which holds the dog and its carrier up while camming the jacks 33. The normal position of the parts will be seen at Fig. 1, in which the dog 32 and its carrier 40 are supported in effective elevated positions by the roll 60.

It will thus be seen that the roll 60 with its arms 59 automatically raises each tappet with its dog 32 to an effective position as the carriage comes into a computing zone. The roll 60 supports the tappet throughout the computing zone in its effective position. The part 59, 60 then may be termed a zone-controller in that it determines each computing zone with the aid of a properly positioned tappet 32, 40 on the carriage. At times it is desirable to have the tappet and the denominational selecting mechanism silent even in a computing zone. To do this, the zone-controller 59, 60 is moved to an ineffective position so that the tappet 32, 40 will be in a depressed or ineffective position. Cases where this is desired will now be considered.

When the platen 6 is shifted up, the arm 59 is brought back, and by withdrawing the roll 60 permits the carrier 40 to drop, together with the dog 32, so that the latter drops below the jacks 33 and cannot operate them. Spring 61^a holds the rock shaft 58 in this normal position. The releasable dog supporting roll 60 should be of a length

equal to or greater than the width of the set of jacks 33 (see Fig. 2), so as to hold the dog supported during the time that the dog 32 is traversing the set of jacks. At each end the releasable supporting roll 60 is provided with a cam, which may be in the form of a coned end 62 formed upon the roll. This cone serves to cam the carrier upwardly to normal position during the run of the carriage, if the releasable-roll 60 is in normal Fig. 1 position. The dog-roll 61 is preferably pointed or coned, as shown to facilitate operation thereon of the releaser-roll 60. It will be understood that the releaser-roll does not need to rotate in all cases, nor is it always necessary to make an anti-friction roll on the dog-carrier 40. By reason of the cam connection at 56, 57 it will be seen that it is possible to effect the releasing operation of the rock-shaft 58 without disturbing the arm 55, or the case-shifting mechanism to which it is connected.

Said Underwood typewriting machine usually is provided with a tabulating mechanism including a set of tabulating keys 63 and levers 64, fulcrumed at 65 and at their rear ends connected to raise decimal stops 66, which coöperate with column stops 67 on the carriage. Upon each of the decimal stops is formed a shoulder 68. These shoulders engage a universal bar 69 fixed upon a rock shaft 70, from which extends an arm 71, having a pin 72 extending within a slot 73 in a link 74, whose upper end is pivoted at 75 to an arm 76, extending rearwardly from said rock shaft 58, so that whenever any decimal stop is lifted by its key 63, the releaser-roll or member 60 will be rocked backwardly to permit the dog carrier 40 to drop, thus preventing the rapid movement of the carriage from effecting injury to the dog 32 or the jacks.

From the rock shaft 70 extends an arm 70^a, which is connected by an upstanding link 77 to a lever 78, which carries at its opposite end a roll 79 to take under the carriage-feeding rack 9, and release the same from the control of the letter-feeding dogs, and permit it to run rapidly under the influence of its spring 8.

The carrier 40 is adjusted to a position to correspond with the position of the column stop 67 on the paper carriage 7, and notwithstanding the fact that the tabulator key 63 silences dog 32, still it is true that upon the release of the tabulator key and the camming up of the carrier 40 by member 60, said dog 32 will engage and raise the over-lying jack 33, so that the release of said tabulator key occasions the raising of one of the computation-pin bars 19 to position for the setting of a pin thereon by a numeral key. The slot 73 in the link 74 permits the rock shaft 58 to be operated independently of the tabulator mechanism.

There is usually provided upon said Underwood typewriter a back-spacing mechanism, a portion of which is seen at Fig. 4, said portion consisting of a key 80 and a part of a lever 81, upon which said key is mounted. From the stem of said key projects a pin 82, which overlies the forwardly-extending portion 83 of lever 53, so that whenever the back-spacing key is operated, the shift-key is also depressed, and hence the mechanism is set in motion which swings the supporting roll 60 back, to release the dog 32 and permit it to drop. At this operation the case-shift mechanism shifts idly; but the carriage is set back a single letter-space, and upon the release of the back-spacing key 80, the dog 32 will lift the corresponding jack 33.

The pivoting of the dog 32 at 39 permits the latter to slip idly past the jacks during the return of the carriage. Owing to the pivoting of the dog at 39, there occurs considerable of the return motion of the carriage before said dog slips past the first jack at the right, Fig. 2. The back-spacing key does not step the carriage back so far; but by reason of the fact that the dog 32 is moved out of engagement with the jacks by means of the pin 82 on the back-spacing key the said dog 32 maintains its upright position as seen in dotted lines at Fig. 2, while traversing any jack during the time the back-space key is depressed, and upon release of said key 80, said dog will lift the overlying jack and hence the disadvantage of pivoting the dog at 39 is overcome.

There is provided at the front of the adding machine a special key 85, which is used whenever it is desired to return all the dial wheels 22 to zero. From this key 85 extends rearwardly a rod 86, which has an inclined or cam-slot 87 working upon a pin 88 which is fixed in the machine frame, whereby the rear end of the rod 86 is thrust upwardly to engage a pin 89 upon a special bar 90; the last similar to 19, but having only a single pin 91, which, when the bar 90 is lifted, engages an abutment 92, and is checked thereby during the remainder of the ascent of the bar 90, whereby said pin 91 is set or projected below the bar 90. The key 85 is then released, and the bar 90 is subsequently carried forward by the general operator to set all the wheels to zero, in the well-known manner.

A connection is provided between said zero key 85 and the jack-silencing mechanism hereinbefore described, such that the operation of the zero key 85 will insure that the computation dog 32 is returned to its working position, in case it has been previously released by means of the special key or finger-piece 93. It will be seen that this key is provided upon the forward portion of link 94, which is pivoted at its rear

end to arm 95 of a bell crank 96; the other arm 97 of said bell crank having a wrist 98 to engage an arm 99 fixed on the rock-shaft 58. By pressing the finger-piece 93 backwardly, the arm 99 is caused to rock the shaft 58 and swing the roll 60 to let the computation dog 32 drop or become silenced; and a pin 99^a, which forms a stem for the finger-piece 93, may be dropped into a slot 100, formed in a side-plate 101 of the machine, thereby locking the computing mechanism out of use.

The connection before mentioned between the zero key 85 and the computation dog 32, comprises a lug 102 on the said zero-key rod 86, which, during the backward thrust of said rod, engages an arm 103 on rock shaft 104, to turn the latter, and thereby swing forwardly an arm 105, which extends up from said rock-shaft and has at its end a wrist 106, to engage a finger 107 formed on the forward end of the link 94, to lift the same until the locking pin 99 is clear of the slot 100; a spring 108, on rock shaft 96^a, returning the bell crank 95, 97 to normal position, together with the link 94; the pin 99^a sliding idly along a horizontal slot 109, which extends forwardly from slot 100. It will thus be understood that the operator may at any time employ the finger-piece 93 to silence the computing mechanism, and may drop the pin 99 into the locking slot 100 to hold the computing mechanism out of use; while if the operator does not think to release the locking pin 100, the zero key 85 will do so automatically.

The same unlocking result may also be accomplished by a special key 110, which is used to print a special character on the work-sheet, to show that the computing wheels all stand at zero. This key has a stem 111, to bear down on arm 112, which is loose on the rock shaft 104, but is fixed to an arm 113, which has a projection 114 to engage said arm 105, to cause the wrist 106 to lift the finger 107 and unlock the link 94, thus permitting the computation dog 32 to be lifted, through the instrumentality of the spring, as in the other instance above mentioned. This key 110 causes a special type to print by the following means: Arm 113 has a pin-and-slot connection 115 with a bell crank 116, which has a rigidly extending arm 117 to depress a pin 118 on an arm 119. The last pulls down a link 120, that is connected to a special lever 121, corresponding to a key-lever 3, and having a bell-crank 4 to swing a type bar 5, to cause a special type to print on the work-sheet against platen 6. Detents 122 are pressed by springs 123 into the notches of gears 124, one fixed to each dial wheel 22. When any dial wheel stands at zero, its detent sinks deeply into a special notch 125, so that an obstructing or locking arm 126 on the

other end of said detent will be clear of a bar 127, which is connected by an arm 128 to said arm 113. If all the wheels stand at zero, the key 110 can be depressed by the typist; but if any wheel does not stand at zero, its locking arm 126 will remain in the path of the bar 127 to lock the special key 110 against actuation. In order to be able to print the special character on the work-sheet, therefore, the operator must first see that the wheels all stand at zero.

It will be understood, therefore, that the operation of either of the special keys will cause the machine to be brought into condition for computation to be performed.

The advantage of having the special key 110 control the computation will be apparent when considering the following example. If a date is inserted prior to the computation of an item, it is desirable to throw out the computing mechanism during the printing of the numbers forming part of the date. In order to be sure that the adding mechanism is clear before starting to compute, the key 110 is depressed to print the special character indicating that the wheels are clear. With the present construction, this operation of the key 110 puts the computing mechanism in condition to enable computation to be performed.

It will be noted that while the roll 60 has been described as a releasing roll, it normally supports the dog 32 in effective position in the adding zone. Since said roll 60 stands almost directly above the shaft 58 carrying it, any downward thrust of the jacks 33 on the dog 32 will be transmitted to the shaft 58, and as said shaft 58 may be made heavy and may be supported adjacent the roll 60, this shaft will almost rigidly carry the load of the dog 32 in operating the jacks 33. Outside of the adding zone, it will be observed that the carriers 40 rest on the rod 44, but the tooth 42 is of such size that each carrier 40 is still engaged with the notch 43 and thus is held against slipping along the rod 41.

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. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, and means for operating said releasing bar to shift the dog away from all the jacks.

2. The combination of a system of computation pins or devices, a carriage, a dog on

said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, means for operating said releasing bar to shift the dog away from all the jacks, and said releasing bar having a cam-shaped end to cam the dog into working position by a movement of the carriage.

3. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, and means for operating said releasing bar to shift the dog away from all the jacks, said releasing bar having cam shaped ends to cam the dog into working position by a movement of the carriage in either direction.

4. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, and means for operating said releasing bar to shift the dog away from all the jacks, said releasing bar being in the form of a roll having coned ends.

5. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, a releasing bar on the machine frame, keys, means controlled by the keys to set any of the pins displaced by any jack, a carrier upon said carriage on which said dog is pivoted, and means for operating said releasing bar; said carrier engageable by said releasing bar to be moved thereby to carry the dog out of working position.

6. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar on the machine frame, a carrier on which said dog is pivoted, and a rod upon said carriage along which said carrier is adjustable, and upon which it may be swung by said releaser bar to silence the said dog.

7. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar on the machine frame, a carrier on which said dog is pivoted, and a rod upon said carriage along which said carrier is adjustable, and upon which it may be swung by said releaser bar to silence the said dog, said rod being provided with a rack, and said carrier having a tooth to engage the rack.

8. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operated in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar on the machine frame, a carrier on which said dog is pivoted and a rod upon said carriage along which said carrier is adjustable, and upon which it may be swung by said releaser bar to silence the said dog, said rod being provided with a rack, and said carrier having a tooth to engage the rack, said carrier being rotatable upon said rod to permit the adjustment of the carrier and dog along the rack.

9. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, means for operating said releasing bar to shift the dog away from all the jacks, said releasing bar being in the form of a roll having coned ends, a carrier upon said carriage on which said dog is pivoted, and means for operating said releasing bar; said carrier engageable by said releasing bar to be moved thereby to carry the dog out of working position, said releaser roll mounted upon a rocking frame, and said dog carrier having a roll engageable by said releaser roll.

10. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, and means for operating said releasing bar to shift the dog away from all the jacks, a case shift mechanism including a key operated rock shaft, an arm upon said rock

shaft and a rocking device upon which said releaser bar is mounted; said releaser bar engageable by said arm, to release said dog when the case-shift key is operated.

5 11. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins
10 displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, means for operating said releasing
15 bar to shift the dog away from all the jacks, a case-shift mechanism, and means connected to said case-shift mechanism to operate said releaser bar.

12. The combination of a system of computation pins or devices, a letter-feeding carriage, tabulating mechanism for said carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, a set of
25 keys, means controlled by the keys to set any of the pins displaced by any jack, said tabulating mechanism including a series of key-operated stops, a universal bar operable by any of said stops, a releaser for said dog,
30 and a connection between said universal bar and said releaser.

13. The combination of a system of computation pins or devices, a letter-feeding carriage, tabulating mechanism for said carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, a set of
35 keys, means controlled by the keys to set any of the pins displaced by any jack, said tabulating mechanism including a series of key-operated stops, a universal bar operable by any of said stops, a releaser for said dog, said universal bar mounted on a rock
40 shaft, and a link connecting said releaser to said universal bar.

14. The combination of a system of computation pins or devices, a letter-feeding carriage, tabulating mechanism for said carriage, a dog on said carriage, a set of
50 pin-displacing jacks on the machine frame and operable in succession by said dog, a set of keys, means controlled by the keys to set any of the pins displaced by any jack, a universal bar connected to said tabulating mechanism for effecting separation between
55 the dog and jacks, and a carriage releasing mechanism also operated by said universal bar.

15. The combination of a system of computation pins or devices, a letter-feeding carriage, a back-spacing mechanism for said carriage, including a key, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession
60 by said dog, said dog pivotally mounted to

permit it to ride freely over said jacks when the carriage is being returned, and means controlled by said back-spacing key for effecting separation between the dog and
70 jacks.

16. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins
75 displaced by any jack, a releasing bar mounted on the machine frame, and extending in the direction of the run of the carriage, means for operating said releasing bar to shift the dog away from all the jacks, a case-shift mechanism, means connected to
80 said case-shift mechanism to operate said releaser bar, a back-spacing key, and means to enable said back-spacing key to operate said case-shift mechanism, to separate the dog from the jacks.

17. The combination of a letter-feeding carriage, a case-shift mechanism, a tabulator for said carriage, a back-spacing mechanism for said carriage, a dog on said carriage, a set of computation pins or devices, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, a set of keys, means controlled by said
90 keys to set any of the pins displaced by said jacks, and means operable by either said case-shift mechanism, said tabulating mechanism, or said back-spacing mechanism, for effecting separation between the dog and
95 jacks.

18. The combination of a letter-feeding carriage, a case-shift mechanism, a tabulator, for said carriage, a back-spacing mechanism for said carriage, a dog on said carriage, a set of computation pins or devices, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, a set of keys, means controlled by said
100 keys to set any of the pins displaced by said jacks, means operable by either said case-shift mechanism, said tabulating mechanism, or said back-spacing mechanism, for effecting separation between the dog and jacks, and means operable at will for effecting separation between the dog and jacks.

19. The combination of a letter-feeding carriage, a case-shift mechanism, a tabulator for said carriage, a back-spacing mechanism for said carriage, a dog on said carriage, a set of computation pins or devices, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, a set of keys, means controlled by said
105 keys to set any of the pins displaced by said jacks, means operable by either said case-shift mechanism, said tabulating mechanism, or said back-spacing mechanism, for effecting separation between the dog and jacks, and means operable at will for effect-
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ing a separation of one of said dog and jack elements from the other, and locking it there.

20. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, shiftable means for effecting separation at will between the dog and jack elements to prevent operation of the jack by the dog when writing figures, and means to lock said shiftable means in effective position.

21. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, means to lock the dog out of working position, a zero key for the dial wheels, and means operable by said zero key for releasing said dog and causing it to return to effective position.

22. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, shiftable means for effecting separation at will between the dog and jack elements to prevent operation of the jack by the dog when writing figures, means for locking said shiftable means in effective position, a special key, a type operable by said special key only when all the dial wheels stand at zero, and means controlled by said special key for releasing the lock.

23. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a bell crank, a spring, means operable by said spring through said bell crank for holding said dog in effective position, a link connected to an arm on said bell crank, to turn the latter to release said dog, a pin to lock said link in dog-releasing position, and a zero key having means to unlatch the pin.

24. The combination of a system of computation pins or devices, a carriage, a dog on said carriage, a set of pin-displacing jacks on the machine frame and operable in succession by said dog, keys, means controlled by the keys to set any of the pins displaced by any jack, a bell crank, a spring, means operable by said spring through said bell crank for holding said dog in effective position,

a link connected to an arm on said bell crank, to turn the latter to release said dog, a pin to lock said link in dog-releasing position, a zero key having means to unlatch the pin, a special key, a type operable by said special key only when all the dial wheels stand at zero, and means controlled by said special key to release the locking pin.

25. In a combined typewriting and computing machine, the combination with computing mechanism, of a denominational selector dog for said computing mechanism, a release for said dog and a lock for said release, a special key and a special type connected to said key to be operated when all of said wheels are at zero, and means whereby said special key may operate said lock.

26. In a combined typewriting and computing machine, the combination with a traveling carriage and a series of jacks, there being one jack for each denomination in which computing is done, of a dog caused to engage said jacks *seriatim* by movement of the carriage, said dog being normally in ineffective position, and means for positively moving said dog into effective position when said carriage reaches an adding zone.

27. In a combined typewriting and computing machine, the combination with a traveling carriage, of a series of jacks, there being one jack for each denomination, a dog for engaging said jacks *seriatim*, a carrier for said dog, a rod on which said carrier is pivotally adjustable, and means for moving said dog on said pivot to effective position when an adding zone is reached.

28. In a combined typewriting and computing machine, the combination with a traveling carriage and a series of jacks, there being one jack for each denomination in which computing is done, of a dog caused to engage said jacks *seriatim* by movement of the carriage, said dog being normally in ineffective position, means for positively moving said dog into effective position when said carriage reaches an adding zone, tabulating keys for positioning said carriage, and means for moving said dog to ineffective position by the operation of a tabulating key.

29. In a combined typewriting and computing machine, the combination with a traveling carriage and a series of jacks, there being one jack for each denomination in which computing is done, of a dog caused to engage said jacks *seriatim* by movement of the carriage, said dog being normally in ineffective position, means for positively moving said dog into effective position when said carriage reaches an adding zone, a case-shift mechanism, and means for moving said dog to an ineffective position when said case shift is operated.

30. In a combined typewriting and com-

- puting machine, the combination with a traveling carriage and a series of jacks, there being one jack for each denomination in which computing is done, of a dog caused
 5 to engage said jacks *seriatim* by movement of the carriage, said dog being normally in ineffective position, means for positively moving said dog into effective position when
 10 said carriage reaches an adding zone, a gang of dial wheels, a key for returning said dial wheels to zero, a lock for holding said dog in ineffective position, and means for releasing said lock by the operation of said zero key.
- 15 31. In a combined typewriting and computing machine, the combination with a traveling carriage and a series of jacks, there being one jack for each denomination in which computing is done, of a dog caused to
 20 engage said jacks *seriatim* by movement of the carriage, said dog being normally in ineffective position, means for positively moving said dog into effective position when said carriage reaches an adding zone, a key
 25 for locking said dog in ineffective position, a gang of dial wheels, a special type, a key for operating said special type operable only when said dial wheels are at zero, and means for moving said dog to effective position
 30 by the operation of said special key.
32. In a combined typewriting and computing machine, the combination with a traveling carriage, a series of jacks, there being one jack for each denomination, and a
 35 dog for operating said jacks *seriatim* as said carriage moves along, of a carrier for said dog on which it normally swings to an ineffective position, and a support for said dog supporting it in effective position in
 40 the adding zone.
33. In a combined typewriting and computing machine, the combination with a traveling carriage, a series of jacks, there being one jack for each denomination, and
 45 a dog for operating said jacks *seriatim* as said carriage moves along, of a carrier for said dog on which it normally swings to an ineffective position, a rock shaft, arms on said rock shaft, a support for said carrier
 50 mounted on said rock shaft and adapted to take the thrust of said carrier, and means for swinging said rock shaft to carry said supporting means clear of said carrier.
- 55 34. In a combined typewriting and computing machine, the combination with a traveling carriage, a series of jacks, there being one jack for each denomination, and a dog for operating said jacks *seriatim* as
 60 said carriage moves along, of a carrier for said dog on which it normally swings to an ineffective position, a rock shaft, arms on said rock shaft, a support for said carrier mounted on said rock shaft and adapted to take the thrust of said carrier, means for

swinging said rock shaft to carry said sup- 65
 porting means clear of said carrier, and a roll on said carrier by which it engages said supporting means.

35. In a combined typewriting and computing machine, the combination with a 70
 traveling carriage, a series of jacks, there being one jack for each denomination, and a dog for operating said jacks *seriatim* as said carriage moves along, of a carrier for
 75 said dog on which it normally swings to an ineffective position, a rock shaft, arms on said rock shaft, a support for said carrier mounted on said rock shaft and adapted to take the thrust of said carrier, means
 80 for swinging said rock shaft to carry said supporting means clear of said carrier, and a roll on said supporting means by which it engages said carrier.

36. In a combined typewriting and computing machine, the combination with a 85
 traveling carriage and a dog thereon, of a carrier for said dog, a rod along which said dog is slidable, means for locking said dog against sliding on said rod, a series of
 90 jacks forming denominational members, and means for automatically raising said dog from an ineffective to an effective position when it is in alinement with said jacks.

37. In a combined typewriting and computing machine, the combination with nu- 95
 meral keys and computing wheels, of a traveling carriage, a dog on said carriage normally in an ineffective position, a series of jacks operable by said dog when in effective position, means for raising said dog
 100 and supporting it in effective position when opposite said jacks, a lock for holding said supporting means in ineffective position, and a system of freely swinging linkages always operated ineffectively by said nu-
 105 meral keys when said dog is locked.

38. In a combined typewriting and computing machine, the combination with a 110
 traveling carriage and a dog pivoted thereon, of jacks operable by said dog when it is in effective position, a rock shaft comprising a member on rock arms adapted to be swung under said dog and support it, a spring
 115 holding said supporting member in effective position so that the thrust of the dog is substantially vertical on said rock arms, and means connected to certain keys of the typewriter for swinging said rock arms against the tension of said spring so that said sup-
 120 porting means is in ineffective position.

39. In a combined typewriting and computing machine, the combination with a 125
 traveling carriage and a dog pivoted thereon, of jacks operable by said dog when it is in effective position, a rock shaft comprising a member on rock arms adapted to be swung under said dog and support it, a spring
 holding said supporting member in effective position.

tive position so that the thrust of the dog is substantially vertical on said rock arms, and a rock arm fast on said rock shaft for swinging said supporting means against the tension of said spring by the operation of a key of the typewriter mechanism.

40. In a combined typewriting and computing machine, the combination with a traveling carriage and a dog pivotally mounted thereon, of a series of jacks, a support adapted to be swung under said dog to receive the thrust thereof directly, a platen in said traveling carriage, a shift rail for shifting said platen to change the case of writing, and a unitary connection between said shift rail and said dog support for swinging the support to ineffective position when said shift rail is operated.

41. In a combined typewriting and computing machine, the combination with a traveling carriage and a dog thereon, of a series of jacks adapted to be operated by said dog when in effective position, rock arms carrying a member supporting said dog in effective position so that said arms receive substantially the whole thrust of said dog, and a spring which may be comparatively light for moving said rock arms to their effective position.

42. In a combined typewriting and computing machine, the combination with a traveling carriage and a dog thereon of a pivot on which said dog swings, jacks positively moved by said dog in one direction and moving said dog on its pivot in the opposite direction, a support for said dog adapted to be swung to inoperative position, a back-space key for said typewriter, and a connection between said support and said back-space key such that the carriage is moved back when the dog is clear of said jacks so that said jacks when moved back by said dog are not swung on their pivots.

43. In a combined typewriting and computing machine, the combination with a traveling carriage and a dog pivoted thereon, of a series of jacks adapted to be moved *seriatim* by said dog when it is in effective position, a supporting member so holding said dog, means for setting said supporting member to ineffective position, a releasing arm for releasing said locking means and independently operable connections between said releasing arm, a zero key, and a special character key operable when the computing mechanism is set at zero.

44. In a combined typewriting and computing machine, the combination with a traveling carriage and a series of jacks, of a dog for operating said jacks *seriatim* as said carriage travels, a support normally holding said dog effective, means for locking said dog to ineffective position, a special character key operable to print a character showing that the computing mechanism is

cleared, and means for releasing said lock by operation of said special key.

45. In a combined typewriting and computing machine, the combination with a traveling carriage, of a rod on said carriage, a dog carrier slidable along said rod, a tooth on said carrier, notches into which said tooth may enter to lock the carrier against sliding, a series of jacks with reference to which said dog is normally ineffective, and a support normally held under said dog, for holding it in effective position, said carrier engaging said notches both in the effective and ineffective positions of said carrier.

46. In a combined typewriting and computing machine, the combination with numeral keys and rack bars in which numbers are temporarily recorded by said keys, of a traveling carriage, dogs movable along said carriage for selecting said rack bars, said dogs being normally ineffective, and means for moving said dogs between effective and ineffective positions.

47. In a combined typewriting and computing machine, the combination with numeral keys and a traveling carriage, of a denominational selecting means associated with said carriage and controlling said computing mechanism, a key for printing a character to show when the computing mechanism stands at zero, means controlled from said key for rendering said denominational selecting means effective, and a plurality of keys for controlling said carriage and rendering said denominational selecting means ineffective during their control of the carriage.

48. In a combined typewriting and computing machine, the combination with computing mechanism, of a denominational selector dog for controlling said computing mechanism, manual means for rendering said dog inoperative at will to control said computing mechanism, a special type operable to indicate a zero condition of said computing mechanism, and means controlled by the operation of said special type to print, to dominate the control of said selector dog and to render the same effective even though the same has been moved to ineffective position by said manual control.

49. In a combined typewriting and computing machine, the combination with a traveling carriage, of a dog settable at letter-space intervals thereon, a carrier for said dog normally holding it in ineffective position, a rest for said carrier, a support for said dog normally raising it to effective position in the adding zone, a tabulating key, and means for moving said support to ineffective position when said tabulating key is operated.

50. In a computing machine, the combination with a carrier and an anti-friction roll thereon, of a support for said carrier mov-

ing transversely thereto, and an anti-friction roll by which said support engages said carrier.

51. In a computing machine, the combination with a denomination selecting dog, of a carrier for said dog, an anti-friction roll for said carrier by which it may be supported as it travels along, a carriage for causing it to so travel, a support for said roll adapted to be swung transversely into and out of effective position, and an anti-friction roll by which said support engages said first named anti-friction roll.

52. In a computing machine, the combination with a series of denominational jacks, of a traveling carriage, a dog for moving said jacks *seriatim*, a carrier for said dog pivoted on said carriage, a roll on said carrier, a support for said carrier adapted to hold said dog in effective position while it is traversing said jacks, and a roll on said support by which it engages said carrier when it is swung into and out of effective position.

53. In a combined typewriting and computing machine, the combination with numeral keys and a traveling carriage, of computing wheels, a denomination-selecting dog associated with said carriage, said dog adapted to be either in effective or ineffective position, a key adapted to print a character to show that the computing wheels stand at zero, means under the control of said key for automatically making said dog effective, a tabulating device for said carriage, and means for making said dog ineffective when said tabulating device is effective.

54. In a combined typewriting and computing machine, the combination with numeral keys and a traveling carriage, of computing wheels, a denomination-selecting dog associated with said carriage, said dog adapted to be either in effective or ineffective position, a key adapted to print a character to show that the computing wheels stand at zero, means under the control of said key for automatically making said dog effective, a back-space device for said carriage, and means for making said dog ineffective when said back-space device is effective.

55. In a combined typewriting and computing machine, the combination with numeral keys and a traveling carriage, of computing wheels, a denomination-selecting dog associated with said carriage, said dog adapted to be either in effective or ineffective position, a key adapted to print a character to show that the computing wheels stand at zero, means under the control of said key for automatically making said dog effective, a case-shift device, and means for making said dog ineffective when said case shift is effective.

56. In a combined typewriting and computing machine, the combination with numeral keys and a traveling carriage, of a normally ineffective denomination dog, computing wheels, a key for returning said computing wheels to zero, a key for printing a sign to show that the computing wheels stand at zero, means connected to said last-mentioned key for making the denomination dog effective, and devices other than the numeral keys for being effective on the carriage of said typewriter and adapted to automatically make said dog ineffective while they are effective.

57. In a computing machine, the combination with computing mechanism and numeral keys adapted to print without computing, of a key adapted to print a sign showing that the computing mechanism stands at zero, and means automatically operated by said sign-printing key for making the printing keys effective to compute.

58. In a computing machine, the combination with computing mechanism and numeral keys adapted to print without computing, of a key adapted to print a sign showing that the computing mechanism stands at zero, means automatically operated by said sign-printing key for making the printing keys effective to compute, and a key adapted to return said computing mechanism to zero, said key also acting to make said printing keys effective to compute.

59. In a computing machine, the combination with computing mechanism and numeral keys adapted to print without computing, of a key adapted to print a sign showing that the computing mechanism stands at zero, a carriage forming part of said computing mechanism and including denomination-selecting means, and means automatically operated by said sign-printing key for making the printing keys effective to compute, said automatic means acting on said denomination-selecting means.

60. The combination with a typewriting mechanism, of a computing mechanism connected to be operable thereby, means for silencing the computing mechanism connection at will so that the typewriting mechanism may operate without computing, means for printing upon a work-sheet in the typewriter, a character to indicate that the computing mechanism stands cleared, and means connected to said printing means for restoring connection between the computing mechanism and the typewriting mechanism, so that the computing mechanism will operate at the operation of the typewriting mechanism.

61. The combination with a typewriting mechanism, of a computing mechanism connected to be operable thereby, means for silencing the computing mechanism connection at will so that the typewriting mechanism

nism may operate without computing, means for printing upon a work-sheet in the typewriter, a character to indicate that the computing mechanism stands cleared, means
 5 connected to said printing means for restoring connection between the computing mechanism and the typewriting mechanism, so that the computing mechanism will operate at the operation of the typewriting
 10 mechanism, and a separate key for zeroizing the computing mechanism, also acting on said connections to restore them.

62. The combination with a series of computation devices, a carriage, a dog on said
 15 carriage, a set of device-displacing jacks on the main frame and operable in succession by said dog, keys, figure types operated by said keys, means controlled by the keys to set any device displaced by any jack, shift-
 20 able means for effecting a separation at will between the dog and jack elements to prevent operation of the jack by the dog when writing figures, and a finger-piece settable to make said separation effective.

63. The combination with a typewriting mechanism, of a computing mechanism connected to be operable thereby, means for silencing the computing mechanism connection at will so that the typewriting mechanism may operate without computing, means
 30 for printing upon a work-sheet in the typewriter, a character to indicate that the computing mechanism stands cleared, means connected to said printing means for restoring
 35 connection between the computing mechanism and the typewriting mechanism, so that the computing mechanism will operate at the operation of the typewriting mechanism, a separate key for zeroizing the computing
 40 mechanism, and means whereby said zeroizing key operates said printing means.

64. In a combined typewriting and computing machine, the combination with typewriting mechanism and computing mechanism,
 45 of a zero key for returning the computing mechanism to zero, a clearance proving key, a type connected to be operated by said clearance proving key, and means whereby the zero key operates said type
 50 without operating the clearance proving key.

65. In a combined typewriting and computing machine, the combination with typewriting mechanism, of computing mechanism, means for making said typewriting
 55 mechanism effective on said computing mechanism, manually-operable means controlling the effectiveness of said means, a zero key for said computing mechanism, and a special printing key, both of said keys acting
 60 through said manually-operable means to control the effectiveness of said means for making the typewriting mechanism effective on the computing mechanism.

66. In a combined typewriting and computing machine, the combination with com-

puting mechanism, of a typewriting mechanism including a carriage, a back-space key and a case shift key for said carriage, connections whereby the effectiveness of the carriage on said computing mechanism is controlled, and means whereby the back-space
 70 key operates the shift key to make said connections effective.

67. In a combined typewriting and computing machine, the combination with denomination members, of a pivoted dog adapted to
 75 cam said members when moving in one direction, a pivot on which said dog swings, so that it passes by said members idly when moving in the reverse direction, a support
 80 for said dog, a back-space key for moving said dog in the reverse direction, and means for moving said support to ineffective position automatically when said back-space key is operated to carry the dog free of the denomination
 85 members so that it will not swing on its pivot.

68. In a combined typewriting and computing machine, the combination with a traveling carriage and denomination members, of a denomination dog effective to select
 90 said denomination members in letter-feeding direction and ineffective in the opposite direction, a pivot on which said dog swings, a back-space key for moving said
 95 dog opposite to letter-feeding direction, and means connected to said back-space key to automatically move said dog clear of said denomination members to preserve its alinement during back-spacing.
 100

69. The combination with a traveling carriage, of a tabulating mechanism for said carriage, computing mechanism, a denominational selecting battery for said computing
 105 mechanism including a series of jacks, a tappet for actuating said jacks, and a roller controllable from said tabulating mechanism for determining the effectiveness of said tappet to operate said jacks.

70. The combination with a traveling carriage, of a tabulating mechanism for said carriage, computing mechanism, denominational selecting mechanism for said computing
 110 mechanism including a series of jacks, a traveling tappet for actuating said jacks, a support for holding said tappet to its work when in a computing zone, and silencing means operable from said tabulating mechanism for disabling said denominational selecting
 115 mechanism when the former is in action.
 120

71. The combination with computing mechanism, of a traveling carriage, denominational selecting mechanism for said computing mechanism including a series of
 125 jacks, a tappet for said jacks and traveling with said carriage, and a zone-controller for maintaining said tappet in an effective position while said tappet is in a computing zone.
 130

72. The combination with a computing mechanism, of a denominational selecting mechanism for said computing mechanism including a series of jacks and a traveling tappet for said jacks, a traveling carriage carrying said tappet, and a zone-controller for bringing said traveling tappet automatically to an effective position with respect to said jacks when said carriage comes into a computing zone.

73. The combination with a computing mechanism, of a denominational selecting mechanism for said computing mechanism including a series of jacks and a traveling tappet for said jacks, a traveling carriage carrying said tappet, a zone-controller for bringing said traveling tappet automatically to an effective position with respect to said jacks when said carriage comes into a computing zone, and means for silencing said tappet through the intermediary of said zone-controller when in a computing zone.

74. The combination with a computing mechanism, of a traveling carriage, a denominational selecting mechanism including a series of jacks and a tappet arranged to be brought *seriatim* into engagement with said jacks by the travel of said carriage which carries said tappet, a zone-controller for automatically bringing said tappet to an effective position with respect to said jacks when said carriage enters a computing zone, and silencing means effective to render said tappet ineffective with respect to said jacks when said carriage has some other movement than a step-by-step movement.

75. The combination with a computing mechanism, of a traveling carriage, denominational selecting mechanism for said computing mechanism including a part carried by said carriage, a zone-controller lying in the path of such part and normally acting to automatically bring said traveling part from an ineffective position to an effective position when said carriage comes into a computing zone.

76. The combination with a computing mechanism, of a traveling carriage, denominational selecting mechanism for said computing mechanism including a part carried by said carriage, a zone-controller lying in the path of such part and normally acting to automatically bring said traveling part from an ineffective position to an effective position when said carriage comes into a computing zone, and silencing means for said zone-controller effective even when said carriage is in a computing zone, to render said traveling part passive.

77. The combination with a computing mechanism, of a traveling carriage, denominational selecting mechanism including a part carried by said carriage, a zone-controller for rendering said part automatically

effective when said carriage comes into a computing zone, and silencing means for said part acting by rendering said zone-controller ineffective.

78. The combination with computing mechanism, of a traveling carriage, denominational selecting mechanism for said computing mechanism including a part carried by said carriage, a zone-controller for automatically rendering said denominational selecting mechanism effective when said carriage enters a computing zone by shifting said part carried by said carriage, tabulating mechanism for said carriage, and silencing means for said part controlled from said tabulating mechanism and acting by rendering said zone-controller ineffective.

79. The combination with a computing mechanism, of a tabulating mechanism including a traveling carriage and case-shift mechanism for determining the writing of different case characters, a denominational selecting mechanism for said computing mechanism including a part carried by said carriage, and a zone-controller lying in the path of said part to shift the same automatically and thus render said denominational selecting mechanism effective when said carriage enters a computing zone.

80. The combination with a computing mechanism, of a typewriting mechanism including a traveling carriage, for determining different computing zones or columns, selecting means for according the denominations as computed by said computing mechanism with the denominations as written by said typewriting mechanism, means for supporting said selecting means in effective position when writing numbers in a computing zone or column, and means for withdrawing said supporting means at all other times.

81. The combination with a computing mechanism, of a typewriting mechanism including a traveling carriage, zone-controlling means coöperating with said carriage during the traveling movement thereof to determine the active periods of said computing mechanism to correspond with the computing zones or columns as determined by the several positions of said carriage, and automatic means for rendering said zone-controlling means inactive while in a computing zone when not writing numbers.

82. In a combined typewriting and computing machine, the combination with a traveling carriage and a selecting device forming part of the computing mechanism; of an escapement for said traveling carriage; tabulating keys for positioning said carriage; and a single universal bar operated by said tabulating keys for releasing said carriage from said escapement, and for enabling said selecting device to move to an ineffective position.

83. In a combined typewriting and computing machine, the combination with computing mechanism including computing members, and a typewriting mechanism including a carriage having a step-by-step movement to control the denominational orders of the computing members, of a pivoted dog controlled by the carriage in its step-by-step movement, means engaged by said dog when in its normal position for enabling the step-by-step movement of said carriage to effect the denominational orders of the computing members, said dog swinging on its pivot to permit the reverse movement of said carriage, and means for effecting a separation between said dog and the means engaged thereby during said reverse movement, to enable said dog to swing to normal position, and to thereby become effective on said engaging means when said separating means ceases to act.

84. The combination with a computing mechanism, of a typewriting mechanism including a traveling carriage, a tappet carried by said carriage for according the denominations as computed with the denominations as typewritten by said typewriting mechanism, said tappet being movable between effective and ineffective positions, means for shifting said tappet, and means for effecting backward movement of said

carriage and concomitantly rendering said tappet-shifting means ineffective.

85. The combination with a computing mechanism, of a typewriting mechanism including a traveling carriage having an advancing movement and a returning movement, selecting means for according the denominations as computed by said computing mechanism with the denominations as written by said typewriting mechanism, controlling means for governing the effectiveness of said selecting means, and automatic means operating to effect backward movement of said carriage, and to govern the effectiveness of said controlling means.

86. The combination with a computing mechanism, of a typewriting mechanism including a traveling carriage, tabulating mechanism for said carriage, denominational selecting means for said computing mechanism, means for moving said carriage backwardly, and means for silencing said selecting means, said silencing means effective from either said tabulating mechanism or from said means which moves the carriage backwardly.

JOHN N. THORNTON.

Witnesses:

GEORGE E. MEWING,
C. RIPLEY.