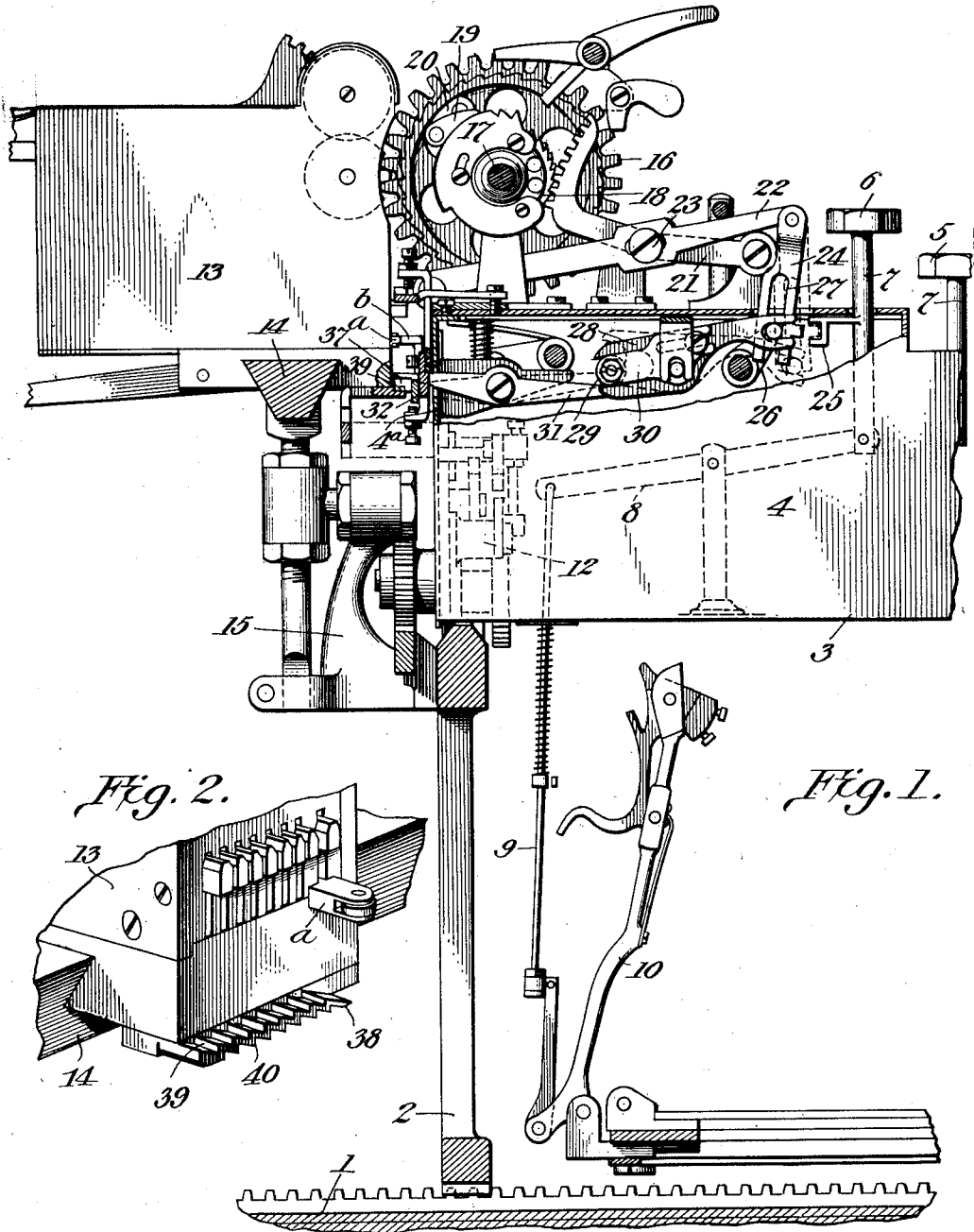


W. L. DENCH.
 RETRACTION LOCK FOR COMBINED TYPE WRITERS AND ADDERS.
 APPLICATION FILED FEB. 27, 1909.

1,049,818.

Patented Jan. 7, 1913.

2 SHEETS—SHEET 1.



WITNESSES
J. M. Culverwell
D. A. Colne

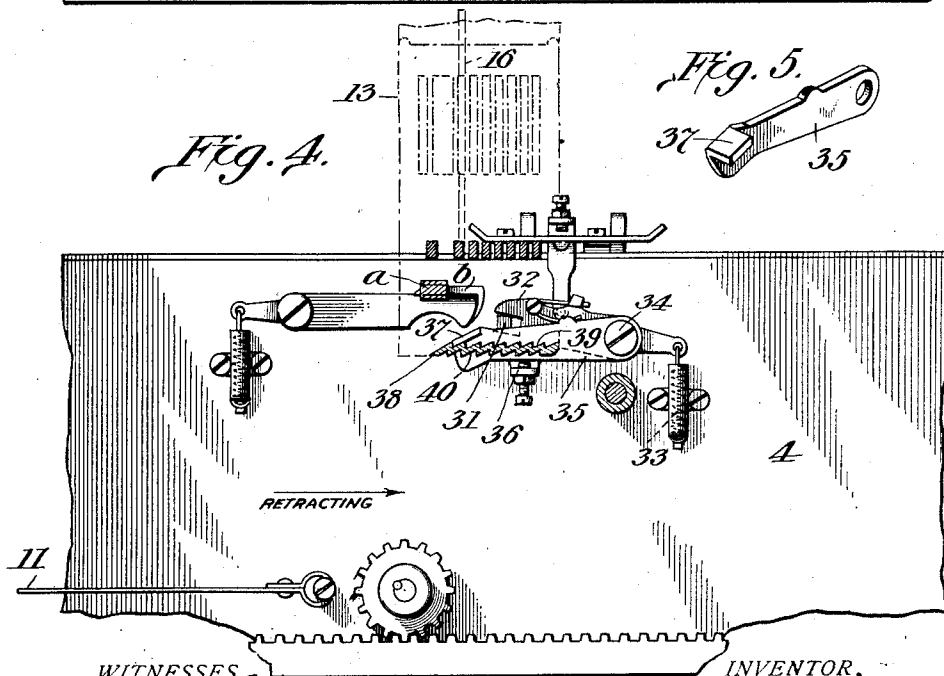
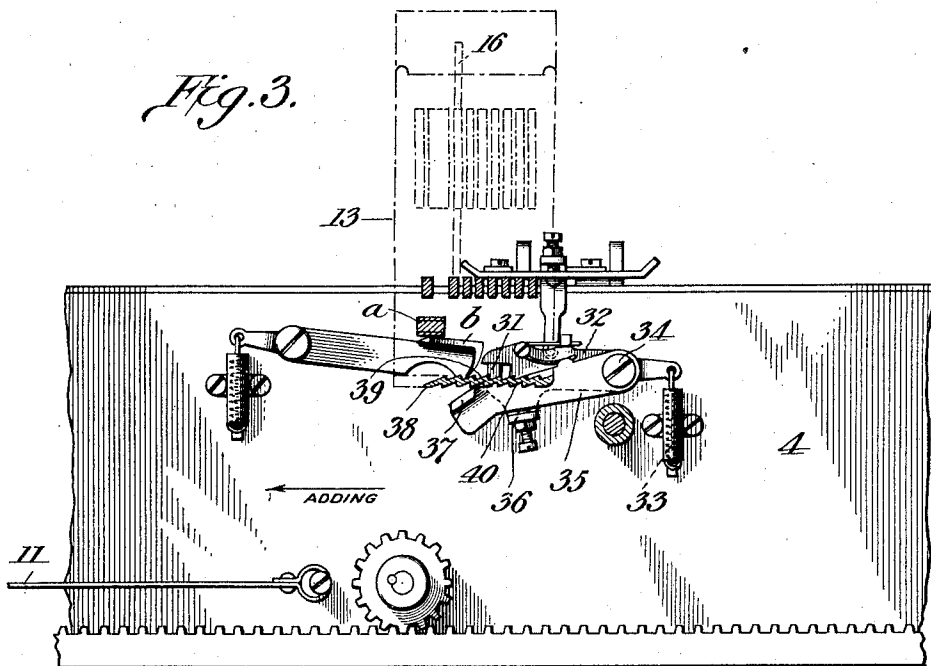
INVENTOR,
William L. Dench.
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UNITED STATES PATENT OFFICE.

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RETRACTION-LOCK FOR COMBINED TYPE-WRITERS AND ADDERS.

1,049,818.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed February 27, 1909. Serial No. 480,478.

To all whom it may concern:

Be it known that I, WILLIAM L. DENCH, a citizen of the United States of America, residing at Pelham, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Retraction-Locks for Combined Type-Writers and Adders, of which the following is a specification.

My present invention relates to improvements in combined typewriting and adding machines, but more particularly to means designed to compel the complete traverse of a register by the master operating means before the carriage can be again retracted.

In my copending application No. 438,835 for Letters Patent is described a mechanism whereby the advance of the carriage in the direction of letter spacing after the retraction has been commenced is prevented until the retractile movement has continued sufficiently to properly position the parts for a repetition of the operation of recording and adding. The present device is intended to supplement that disclosed in my previous application by preventing retractile movement until the adding field has been completely traversed. Thus the mechanism as a whole compels the complete traverse of the register in one direction or the other after the forward or retractile excursion has once been begun.

The Elliott-Fisher billing and adding machine upon which my present improvement is shown applied is a combined typewriter and adder in which a master means operated from the typewriter keys serves to operate the number wheels of a register or computing device. The register is stationary and the master means is moved to successive number wheels, thereof by the advance of the typewriter carriage, the retraction of which latter effects the resetting of the carrying devices of the registering mechanism.

The typewriter keys are normally disconnected from the master means to avoid the burdening of the keys when writing outside of the column to be computed and are automatically connected by the forward movement of the carriage after the latter has been retracted a predetermined distance subsequent to the printing and adding of a number. This retractile movement is essential to the proper setting of certain parts, as

for instance the carrying devices of the register, which may be operated during the adding of a number, or the mechanism for automatically connecting the keys with the adding device. It has sometimes happened that having printed and added a number, the operator would retract the carriage sufficiently to print the highest digit of the next number in its proper position, but insufficiently to properly set certain of the mechanisms requiring resetting. To avoid this possibility the dogging mechanism described in my previous application was devised. It happens, however, that in order to bring the cooperating parts into proper relation for resetting by the retraction of the carriage it is necessary that the latter shall have advanced a predetermined distance. Therefore, in addition to the mechanism which compels the carriage to be sufficiently retracted, I now propose to provide mechanism which will compel the carriage to advance a sufficient distance to insure that relation of the parts which will insure the proper repositioning thereof by the retractile movement of the carriage.

In the accompanying drawings—Figure 1 is a vertical section through so much of an Elliott-Fisher billing-adding machine as is necessary to illustrate my invention. Fig. 2 is a perspective view of a portion of the front end of the register or computing device. Fig. 3 is a rear elevation of a portion of the machine with certain of the parts in section and showing the mechanism as it appears during the forward or adding movement of the carriage. Fig. 4 is a similar view with the parts in the positions they assume during the retraction of the carriage, and Fig. 5 is a detail perspective view of what is known as the key connecting arm.

Each part wherever shown is designated by a reference character appropriated to it.

The Elliott-Fisher machine.—The Elliott-Fisher billing machine includes a flat platen 1 over which a machine frame 2 is mounted to travel longitudinally to space the writing. Mounted to travel on the frame 2 transversely of the platen, to letter space the writing, is a carriage 3 the upper portion of which is in the form of a casing 4 surmounted by letter and numeral keys 5 and 6 the stems 7 of which are connected to key levers 8 fulcrumed in the casing and connected by draw-wires 9 to downwardly

swinging type bars 10. The carriage is moved to the right by carriage propelling mechanism including spring drums, not shown, and tapes 11, one of which is indicated in Fig. 3. The letter space movement of the carriage is controlled by key-operated escapement mechanism indicated generally at 12 in Fig. 1. As usual in this class of machines, the characters are printed one at a time by the depression of the keys and the carriage advances step by step under the control of the escapement as the keys rise.

The computing mechanism.—This mechanism includes a computing device or register 13 adjustable longitudinally of a guide bar 14 carried by brackets 15 secured to the frame 2. The adjustment of the register 13 enables the same to be located in position for use with reference to a column located at any desired point on the work sheet, which latter is supported in a flat spread-out condition on the platen 1.

The computing device or register usually embraces a series of denominational members or digit carriers disposed at the front of the register and equipped with suitable carrying mechanism whereby, when the value accumulated upon any member reaches the limit of that particular order or denomination, the value so accumulated will be automatically transferred to the wheel of next higher order. The primary element of the actuating mechanism for the denominational members of the register is a master wheel 16 mounted on the carriage 3 of the typewriter and movable therewith into engagement with successive denominational members of the register. The master wheel or actuator 16 is rotated a different distance by each numeral key 6 for the purpose of moving the engaged member a distance proportionate to the value of the particular numeral key from which the actuator is operated. Thus when any numeral key is depressed, the digit of corresponding value will be printed on the work sheet in a given denominational position, and the registering member of corresponding denomination will be given a movement corresponding in value to that of the printed digit, so that the value of such digit will be added to the amount already accumulated in the register. The master wheel 16 is fixed to a comparatively long actuator shaft 17 suitably supported above the carriage casing 4 and each numeral key 6 is arranged to be operatively connected with the shaft by one of a series of operating connections identical in construction and operation, except as to a graduated variation of the movement transmitted to the shaft from the several keys. One of these operating connections is shown in Fig. 1. It includes a ratchet wheel 18 fixed to the shaft 17 and designed to be engaged by

a driving pawl 19 carried at one end of a driving arm or lever 20 mounted to swing loosely on the shaft 17. The opposite end of the lever 20 is geared to the rear end of a lever 21 fulcrumed at its front end on the carriage casing and arranged in crossing relation with a lever 22 fulcrumed at its rear end and having loose pivotal connection with the lever 21 at the point of intersection of said levers, as indicated at 23.

From the front end of each lever 22 depends a link 24 connected to the adjacent numeral key stem 7 by a separable connection 25 located within the casing 4. In printing outside of a column or adding field, the actuator or wheel 16 is out of coincidence with the register 13, and therefore the latter is not operated when a digit is printed. If the connection between the links 24 and the numeral keys 6 were maintained, however, the keys when printing digits outside of an adding field would be burdened by the operating mechanism of the register, which mechanism would necessarily be operated upon each depression of a key. This unnecessary burdening of the numeral keys when printing outside of a column is undesirable. It is for this reason that the links 24 are arranged to be swung out of engagement with the numeral keys so as to render the latter entirely independent of the register or its operating connections.

For a more complete disclosure of the mechanism described than has been deemed necessary for the purposes of the present disclosure, attention is directed to Patent No. 829,971 issued to Laganke and Smith, September 4, 1906.

The means for automatically connecting the keys with the register operating mechanism when the printing point of the typewriter is presented to the adding field.—The shifting of the links 24 to effect the connection and disconnection of the keys and adding mechanism is accomplished by means of a yoke 26 which engages in the slots 27 in the several links. This yoke normally occupies the position shown in Fig. 1, but at a given point in the advance of the carriage, to-wit, when the printing point of the typewriter moves into the adding field or column, the yoke is automatically operated to throw the links forward to the dotted position shown in Fig. 1, thus effecting an operative connection between said links and the numeral keys 6. The means whereby this automatic connection of the keys is effected is fully disclosed in Patent No. 863,232 to John A. Smith and a general description thereof will therefore suffice.

Suitably mounted in the casing 4 of the typewriter is a yoke operating lever 28, see Fig. 1, having its rear end bifurcated for the reception of an abutment in the form of a roller 29 carried by the abutment plate 30

which may be shifted longitudinally of the lever by setting mechanism which need not be described. In one position of the roller 29, to-wit that position shown in Fig. 1; it overlies the front end of what is called an intermediate lever 31 suitably fulcrumed in the casing 4 and having its rear end extended through the back wall 4^a of the casing and engaged by the bifurcated end of an arm 32 pivotally mounted on the rear side of the wall 4^a and normally held in its elevated position by a spring 33.

Mounted to swing from the fulcrum 34 of the lever 32 is what is termed the key connecting arm 35 resting upon an abutment 36 at the lower edge of the arm 32, the purpose being to allow the arm 35 to swing freely in an upward direction, but to depress the arm 32 when forced downward. At its front or left hand end viewed from the rear of the typewriter, the arm 35 is provided with a laterally disposed cam 37 adapted to coact with what is termed the key connecting plate 38 of the register. The plate 38 is merely a ledge extending across the front of the register at its bottom, as shown in Fig. 2, and acts, upon the advance of the carriage, to depress the key connecting arm 35 to the position shown in Fig. 3. That is to say, as the carriage advances in the direction of letter spacing, the cam 37 of the arm 35 will engage the end of the plate 38, and being inclined, and adapted to yield, said arm will be depressed sufficiently to allow the cam 37 on the end of the arm to ride under the plate. When the arm 35 is thus depressed it in turn depresses the arm 32, which depresses the rear end of the lever 31, causing the front end of said lever to be elevated. This movement of the lever 31 will cause it to engage the roller abutment 29 and thus swing the yoke operating lever 28 for the purpose of throwing the several links 24 into engagement with the numeral key stems. Thus, when the key connecting arm 35 and the plate 38 bear the relation indicated in Fig. 3, the carriage will be advancing in the direction of letter spacing with the keys connected to the adding mechanism, as shown in dotted lines in Fig. 1, and with the printing point of the typewriter located within the adding field.

When the master means 16 has moved beyond the register and the printing point has advanced beyond the adding field, the cam 37 will have passed beyond the end of the plate 38 and will be sufficiently elevated by the spring 33 to effect the disconnection of the keys and the restoration of the key connecting arm 35 to normal position. If now, the carriage is retracted, the cam 37 will ride back over the plate 38, as shown in Fig. 4, since, as has been explained, the arm 35 may yield upwardly independently of

the arm 32. It may also be noted, by reference to Fig. 2, that what is known as a reset slide *a* projects from the front of the register casing in position to be moved back or pushed in toward the rear of the register by a cam *b* when the carriage of the typewriter is retracted, the cam being mounted on the carriage and movable therewith, as indicated in Figs. 3 and 4. On the forward movement of the carriage the cam *b* rides under the slide *a* and when it gets beyond the arm it rises to the horizontal plane indicated in Fig. 4 so that as the carriage is retracted, the cam will contact with the slide and force it back, as already stated. Thus it will be seen that there are two mechanisms dependent for their proper operation upon the movement of the typewriter carriage, to-wit, the automatic key connecting mechanism and the register resetting mechanism, the purpose of the latter being to reset the carrying devices of the register after said devices have been operated incidental to the accumulation of an amount in the register.

The letter space lock.—As stated, the mechanism thus far described is shown in the two patents heretofore identified, and in order that the state of the art prior to my present invention may be fully comprehended, I will now describe briefly the invention disclosed in my co-pending application aforesaid.

It will be seen that during the retraction of the carriage the cam 37 and the key connecting arm 35 ride back over the plate 38 and that during this manipulation of the machine the keys are disconnected and can only be re-connected by retracting the carriage sufficiently to cause the cam 37 to drop down from the end of the plate and in position to be depressed by said plate upon the forward advance of the carriage. It will also be seen that during the retraction of the carriage the cam *b* will retract the slide *a* of the register, this operation being completed by the time the cam 37 reaches the end of the plate 38. If, however, the operator retracts the carriage to a new writing position without retracting it sufficiently to cause the cam 37 to clear the plate 38, he may proceed with the writing of a number in the column to be computed while the keys remain disconnected, because during this premature forward movement of the carriage the key connecting arm will be resting upon the upper side of the plate 38. Similarly, if the operator retracts the carriage insufficiently and then proceeds with the writing of a number, he may not only fail to properly connect the adding mechanism with the keys, but he may also fail to cause the cam *b* to reset the slide *a*. To render this impossible, I provide the upper side of the plate 38 with

ratchet teeth 39 arranged, as shown in my pending application, to dog the cam 37, and hence the carriage, against forward or letter space movement in the event of insufficient retraction of the carriage to cause the proper operation of the slide *a* or to cause the cam 37 to drop into proper position for the automatic connection of the keys and adding mechanism. By reference to Fig. 4, for instance, wherein the parts are shown in the positions they assume during the retraction of the carriage, it will be seen that the lower edge of the cam engages the teeth on the plate 38 thus constituting the plate and arm 35 a pawl and ratchet mechanism which acts during a predetermined portion of the retractile movement of the carriage to prevent a forward or letter space movement of the carriage until the retractile movement of the latter has been completed sufficiently to insure the setting of the carrying mechanism and the proper operation of the automatic key connecting mechanism. It will also be observed that as soon as the proper retractile movement of the carriage has been insured, the locking mechanism becomes ineffective and permits the forward advance of the carriage, which is necessary for the proper operation of the machine, since the cam 37 will pass back of the plate 38 and be cammed down thereby as the carriage makes its next advance.

The entire mechanism as thus far described is disclosed in the patents and application hereinbefore identified, but has been briefly set forth in order that the object and operation of the mechanism constituting my present invention may be clearly understood.

The retraction lock.—We have seen that by providing the teeth 39 on the upper side of the plate 38 the cam 37 of the key connecting arm is dogged during the retraction of the carriage in a manner to constitute a letter space lock which prevents the forward or letter space movement of the carriage until a sufficient retractile movement to insure the proper reset of certain mechanisms has been effected. It will be seen, however, that since the cam *b* must move beyond the slide *a* during the advance of the carriage in order that it may assume a proper position to operate the slide, it is also desirable to insure sufficient forward movement of the carriage to effect this necessary relation of the parts. Furthermore, in certain classes of listing work, as for instance, census listing, an elaborate checking system is resorted to and the operators making the errors are prohibited from making corrections. Under these conditions also it is particularly desirable to compel the operator to continue across the adding field or column when the latter has once been entered, thus making it impossible to operate the same number wheel of the reg-

ister twice unless the master means is caused to completely traverse the register, then completely retracted, and finally advanced to the wheel after deliberately performing several distinct operations.

Having in mind both the proper positioning of the cam *b* with relation to the slide *a* and also the listing requirements above referred to, I now propose to provide the under face of the plate 38 with a second but reversely disposed series of teeth 40 similar to the teeth 39 and similarly coacting with the cam 37 on the key connecting arm 35, but designed to dog the carriage against retraction during a predetermined letter space advance thereof. This dogging or locking relation of the parts continues until the master means has traversed the entire register and until the cam *b* has passed beyond the slide *a* so as to insure the operation of the slide when the carriage is retracted. It will thus be seen that the cam 37 coacting with the plate 38 having reversely disposed teeth formed in its upper and lower faces constitute a mechanism which dogs or locks the carriage against material retractile movement during the advance of the master means across the register, as shown in Fig. 3, and which likewise dogs the carriage against material forward or letter space movement until the master means has re-traversed the register in the opposite direction and until the various mechanisms which are reset by the retraction of the carriage have been properly positioned for the adding of the next number.

It will be noted by reference to Fig. 3 that when during the forward advance of the carriage the latter is in a normal position of rest with the master means directly opposite one of the number wheels of the register, the upper edge of the cam 37 is not closely fitted within one of the interidental spaces between the lower series of teeth 40. On the contrary, the upper edge of the cam rests just in rear of the extreme point of a tooth. In the present machine this relation of the parts is desirable because, as heretofore explained, the plate 38 is intended to hold the arm 35 depressed for the purpose of retaining the key connecting mechanism in proper relation. The slight upward movement of the arm 35 and cam 37 as the carriage advances is not material, but it is material to have the arm held in properly depressed position when the master wheel is directly opposite a number wheel and in position to operate. It is for this reason that the specified relation of the cam 37 and the teeth 40 is effected, but it will be noted that the distance between the upper end of the cam 37 and the vertical face of the next tooth 40 in rear thereof is not sufficient to permit the carriage to be retracted sufficiently to carry the master wheel

back to a position opposite the next preceding number wheel nor is the permitted retractile movement sufficient to enable the next preceding tooth of the carriage escapement to become engaged. It may also be stated in this connection that when the master wheel is in any position opposite the register, except a position of full engagement with a number wheel, said master wheel is locked against rotation. Consequently the slight retractile movement permitted by the teeth 40 is immaterial because first, such retractile movement is only sufficient to lock the master wheel against rotation, and second, being insufficient to permit the next tooth of the carriage escapement to be engaged by the dogs, the carriage will again move forward to the position shown in Fig. 3 the instant the hand of the operator is released from the carriage. In other words, the slight retractile movement permitted is immaterial because it is insufficient to enable the operator to re-operate a number wheel beyond which the master wheel has once passed.

It is thought that from the foregoing, the construction and operation of my present invention will be fully comprehended, but I wish to be understood as reserving the right to effect such variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys and printing mechanism, of an adding mechanism under the control of the keys, and means operative during the advance of the carriage across the adding field to prevent the material retraction of the carriage until the latter has reached a predetermined point.

2. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys and printing mechanism, of adding mechanism, operating means for the adding mechanism, the denominational relation of the adding mechanism and its operating means being variable by the movement of the typewriter carriage, and means for dogging the carriage against material retractile movement, said dogging means being rendered operative and inoperative at different points in the forward movement of the carriage.

3. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys and printing mechanism, of adding mechanism controlled by the keys of the typewriter and including carrying-reset mechanism, and means operative during the location of the printing point of the typewriter within the adding field to prevent retractile movement of the carriage until the latter has advanced suffi-

ciently to insure the proper operation of the carrying-reset mechanism.

4. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys and printing mechanism, an adding mechanism operated from the keys of the typewriter and including a carrying-reset device operative to reset the carrying devices of the adding mechanism upon the retraction of the carriage, of pawl and ratchet mechanism arranged to dog the carriage against retractile movement during a given forward movement of said carriage to compel sufficient forward movement thereof to insure the proper operation of the carrying-reset device when the carriage is retracted.

5. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys and printing mechanism, of adding mechanism including a register having carrying-reset mechanism, means for operating the carrying-reset mechanism by the retraction of the typewriter carriage, automatic key connecting mechanism operative at a given point in the carriage travel to operatively connect the keys and adding mechanism, said key connecting mechanism including a cooperating arm and cam, and means for dogging one of said elements against movement in the direction of the carriage retraction until the forward movement of the carriage has progressed sufficiently to insure the proper operation of the carrying-reset mechanism.

6. In a combined typewriter and adder, the combination with a typewriter including a carriage, keys and printing mechanism, of adding mechanism including a register, automatic key connecting mechanism including a cooperating arm and cam one of which is associated with the carriage and the other with the register, and means coacting with one of the elements of the key connecting mechanism to dog the carriage against material retractile movement until a predetermined forward advance of the carriage has been effected.

7. In a combined typewriter and adder, the combination with a typewriting machine including a carriage, keys and printing mechanism, of adding mechanism including a register, and automatic key connecting mechanism including a plate carried by the register and an arm carried by the carriage, said arm being depressible by the plate during the advance of the carriage to effect the automatic connection of the keys and adding mechanism, said plate being provided with ratchet teeth coacting with the arm of the key connecting mechanism to dog the carriage against material retraction during a predetermined forward movement of said carriage.

8. In a combined typewriter and adder, 130

the combination with a typewriter including a carriage, keys and printing mechanism, of adding mechanism including a register, and automatic key connecting mechanism including an arm mounted on the carriage and provided with a cam, and a plate mounted on the register in position to depress the arm by coaction with the cam thereof during the forward movement of the carriage, said plate being provided on its under side with ratchet teeth adapted to coact with the cam on the arm to dog the carriage against material retractile movement until a given forward movement of the carriage has been effected.

9. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys, printing mechanism and an escapement, of adding mechanism having its operation controlled by the typewriter keys, and means independent of the keys and escapement for dogging the carriage against premature retraction but operative at a given point in the movement of the carriage to permit the retraction of the latter.

10. The combination with a computing mechanism and keys, of mechanism adapted to establish a coöperative relation between the computing mechanism and keys, a carrying-reset device for the computing mechanism, a carriage, means operated by the movement of the carriage in one direction to actuate the carrying-reset device, and means operative to prevent the movement of the carriage in such direction until its movement in the opposite direction has established a proper operative relation between the carrying-reset device and its operating means.

11. The combination with a computing mechanism including a carrying-reset device and keys, of a carriage movable in one direction to operate the carrying-reset device, and a lock operative to prevent movement of the carriage in a direction to operate the carrying-reset device until the carriage has reached a proper position for the operation of such device, said lock being inoperative to prevent the movement of the carriage to operate the carrying-reset device after said carriage shall have moved to its proper position for such purpose.

12. The combination with a computing mechanism including a carrying-reset device, an actuator for the computing mechanism, a series of keys, a traveling carriage, and means movable with the carriage to operate the carrying-reset device, of a carriage lock operative when the carrying-reset device and its operating means are out of coöperative relation and inoperative when said parts are in proper coöperative relation.

13. The combination with a computing mechanism, a master actuator therefor, a

series of keys, and means for intermittently establishing a coöperative relation between the keys and actuator, of a traveling carriage arranged to effect relative movement of the computing mechanism and its actuator to present said actuator in and out of engagement with the computing mechanism, and a carriage lock operative when the actuator is in engagement with both the computing mechanism and keys and inoperative when the actuator is in engagement with the computing device and is disconnected from the keys.

14. In a combined typewriting and calculating machine, the combination with a typewriter, of a computing device, means including key connecting mechanism for establishing a coöperative relation between the typewriter keys and the computing device, a lock operative to prevent retractile movement of the carriage when the keys are in coöperative relation with the computing device and ineffective to prevent such retractile movement of said carriage when the keys and the computing device are not coöperatively related.

15. In a combined typewriting and calculating machine, the combination with a typewriter including a carriage, keys, and printing mechanism, of a computing device, a master actuator therefor, said actuator and computing device being relatively movable into and out of coöperative relation by the movement of the typewriter carriage, key connecting mechanism between the numeral keys of the typewriter and the actuator, and a carriage lock operative to prevent retractile movement of the carriage while the actuator is opposite the computing device and disconnected from the keys, said lock being inoperative when the actuator is opposite the computing device but disconnected from the keys.

16. The combination with a register having a series of denominational members and a master actuator, said register and actuator being relatively movable to establish a coöperative relation between the actuator and successive denominational members from higher to lower order, of means preventing such relative movement in the opposite direction until the register has been completely traversed.

17. The combination with a register including a series of denominational members, of keys, means for establishing a coöperative relation between the keys and successive denominational members, and means for preventing the reestablishment of a coöperative relation between the keys and a given denominational member until such relation has been established between the keys and the remaining denominational members of lower order.

18. The combination with a register in-

cluding a series of denominational members and carrying means, of a master actuator movable across the register to engage successive denominational members, and means for preventing the retraction of the actuator to reengage a denominational member until the entire register has been traversed by the actuator.

19. The combination with a register and an actuator relatively movable to change the denominational relation thereof, of means for compelling such relative movement in either direction to continue sufficiently to cause a complete traverse of the register in either direction before material movement in the opposite direction can be effected.

20. The combination with a register and a master actuator relatively movable to change their denominational relation, of dogging mechanism arranged to dog the relative movement of the register and actuator in both directions to compel predetermined movement in either direction before material movement in the opposite direction can be effected.

21. The combination with a register including a series of denominational members, of a master actuator movable in opposite directions across the register, and means for dogging the movement of the actuator in both directions to compel predetermined movement thereof in either direction before movement in the opposite direction can be effected.

22. The combination with a register having a series of denominational members, of a master actuator movable across the register in opposite directions, and dogging means for the actuator, said dogging means including two oppositely disposed series of teeth associated with the register and an element movable with the actuator and coacting with said teeth.

23. In a combined typewriter and adder, the combination with a typewriter including a carriage, keys, and printing mechanism, of a register, a master actuator therefor adapted to be operated by the keys, said register and actuator having relative reciprocatory movement in opposite directions, and means for dogging such movement in each direction for a predetermined distance.

24. In a combined typewriter and adder, the combination with a typewriter including a carriage, keys and printing mechanism, of a register, a master actuator therefor, automatic key connecting mechanism arranged to connect the keys with the actuator, said register and actuator having relative movement in opposite directions to change their denominational relation, and means for dogging such relative movement in each direction, said means including an element of the automatic key connecting mechanism.

25. In a combined typewriter and adder, the combination with a typewriter including a carriage, keys and printing mechanism, of a register including a series of denominational members, a master actuator movable with the typewriter carriage to traverse the register in opposite directions, automatic key connecting mechanism adapted to automatically connect the keys and actuator, said automatic key connecting mechanism including an arm, and two series of oppositely disposed ratchet teeth associated with the register and coacting with the arm to dog the lateral movement of the actuator in both directions.

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

WILLIAM L. DENCH.

Witnesses:

L. MAUR,

M. H. BEHR.