

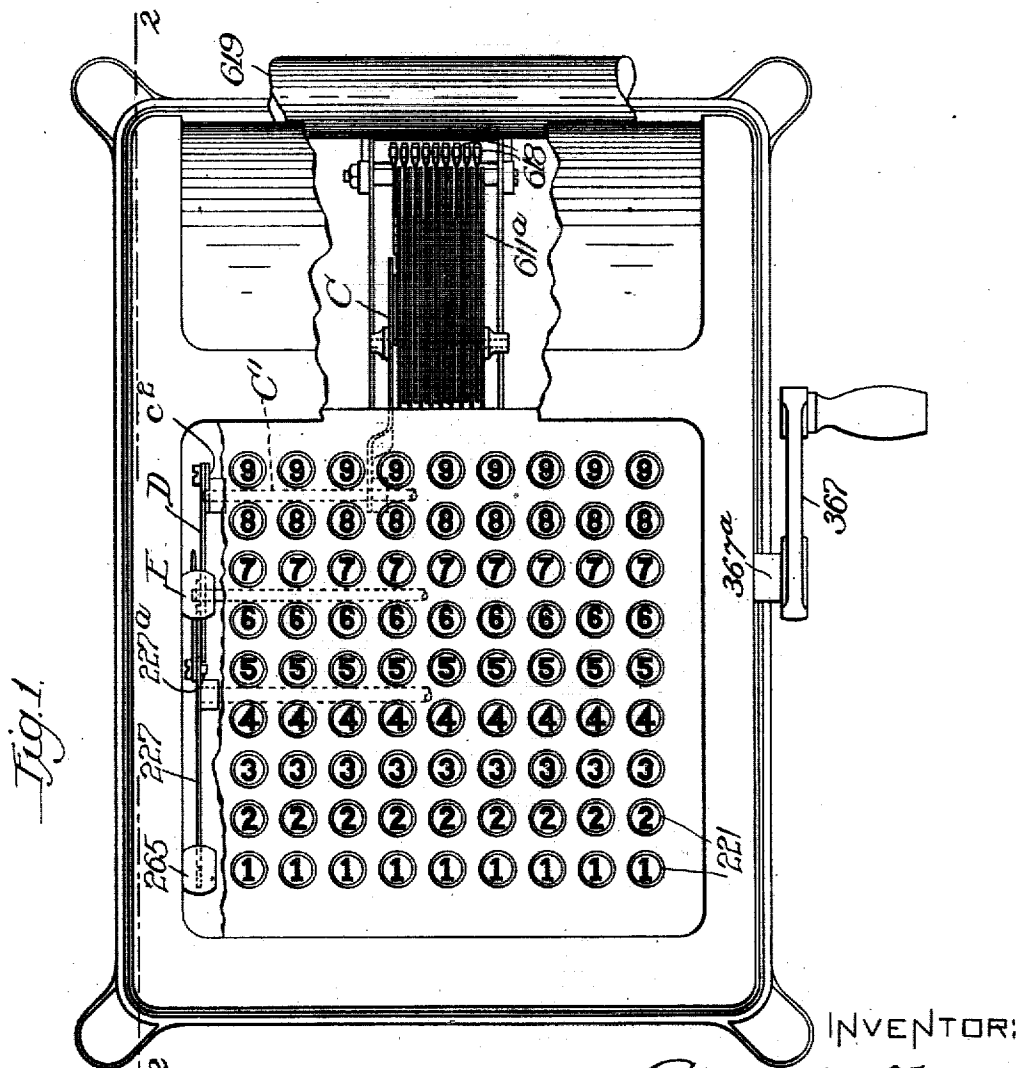
No. 836,130.

PATENTED NOV. 20, 1906.

C. N. McFARLAND.
ADDING MACHINE.

APPLICATION FILED MAR. 11, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

Edw. R. Barrett
Louis B. Erwin

INVENTOR:

Charles N. McFarland
By Rector & Hiden
His attys

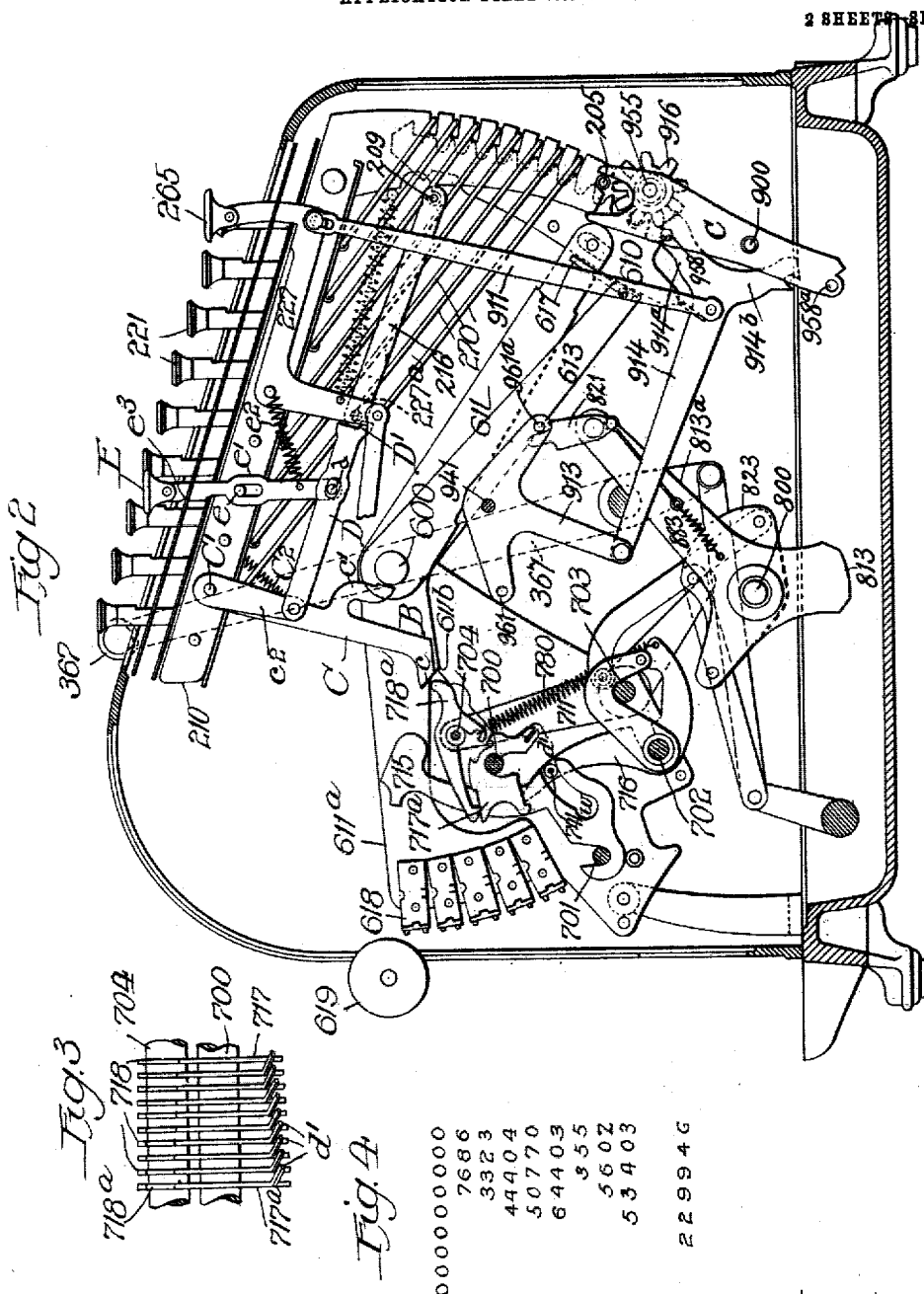
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UNITED STATES PATENT OFFICE.

CHARLES N. McFARLAND, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BURROUGHS ADDING MACHINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

ADDING-MACHINE.

No. 836,130.

Specification of Letters Patent.

Patented Nov. 20, 1906.

Application filed March 11, 1904. Serial No. 197,650.

To all whom it may concern:

Be it known that I, CHARLES N. McFARLAND, a citizen of the United States, residing at Detroit, Wayne county, Michigan, have invented certain new and useful Improvements in Adding-Machines, of which the following is a specification.

My invention relates more particularly to improvements upon what is commonly known as the "Burroughs" adding-machine, illustrated and described in various Letters Patent of the United States granted to William S. Burroughs, of which it will suffice to refer to Nos. 504,963 and 505,078, dated September 12, 1893; but it is applicable in its essential features to other adding-machines of a similar character or intended for a similar purpose.

In machines of this character it is essential that at the beginning of operations the machine shall be "clear"—i. e., that the adding-wheels shall have nothing added upon them and shall stand at zero or initial position, so that when a list of individual items is printed and added and the machine then operated to print the total of such list the proper amount of such total will be printed and not have included in it any amount standing upon the adding-wheels at the beginning of operations. In the ordinary use of machines of this character the printing of a total clears the machine or returns the adding-wheels to zero or initial position, and it is therefore the practice at the beginning of operations to operate the machine in the manner to print a total in order to insure that the machine is clear before beginning the printing and addition of the individual items to be listed. In these machines as heretofore constructed if the machine is operated in a manner to print a total when the adding-wheels are already at zero or initial position nothing will be printed upon the sheet of paper, and there will, therefore, be nothing upon such paper to indicate whether or not the machine was "cleared" at the beginning of operations.

The object of my invention is to provide means for the printing of a character or characters for indicating the fact that the machine has been cleared, so that if such character should appear at the head of a column

or list of items or amounts the operator is thereby informed that the machine was clear when the listing of such items was begun. The character or characters may be any designation such as a cipher or ciphers, and in the present instance I have adopted the latter as the indicating character or characters, for the reason that I am thereby enabled without providing an extra type-plate or the like to utilize the regular printing mechanism of the machine, each of whose levers or type-arms are provided with type bearing the digits "1" to "9" and also "0." In the present instance the means for so printing the indicating character or characters are under the control of the operator through the medium, as shown, of a special key and of the adjusting means for the "clearing" mechanism of the machine, with the result that such last-named means not only adjusts the parts for a clearing operation of the machine, but by the same adjustment provides for a character or characters being printed to indicate the fact that the machine has been cleared. In the present instance the arrangement is such that the printing mechanism associated with all of the type-arms is actuated to so indicate that the machine has been cleared, with the result that a horizontal row of ciphers is printed in the clearing operation of the machine. However, this is not essential and the number of clear characters may be varied considerably. Furthermore, the invention is not limited to the employment of the cipher type of the regular type-arms for this purpose, but other instrumentalities may be employed to record the clear condition of the machine.

In the drawings, Figure 1 is a plan view of a Burroughs adding-machine embodying my improvements, a part of the machine-case being broken away to expose the type plates and levers; Fig. 2, a section taken on the line 2 2 of Fig. 1 looking in the direction of the arrow; Fig. 3, a detail view of the pawls and latches which trip the type-hammers and of the additional pawl and latch provided by me, and Fig. 4 an example of printing done by the machine.

Inasmuch as the Burroughs adding-machine is not only well known, but also de-

scribed in the prior Letters Patent aforesaid, and as my improvements comprise an attachment thereto for the purposes explained, I have herein shown only those parts of mechanisms of such machine which are directly concerned or associated with the operation of my improvements.

The machine herein shown is of the multiple-key-bank type having a keyboard provided with a plurality of rows of keys 221, extending from front to rear of the machine, the nine keys in each row representing the nine digits and the respective rows representing different denominations increasing from right to left.

The plurality of levers B corresponding in their number with the rows of keys are hung upon a rock-shaft 600, Fig. 2, and are each provided with a downwardly and forwardly extending arm 611, operatively connected with a gear-toothed rack 610, whose movements are controlled and determined by the rods 270, operated and set by the keys 221. The rearwardly-extending and sector-shaped arms 611^a of the levers carry at their rear ends the usual type-plates 618, whose type are forced against the paper arranged on the platen or paper-roller 619 by the action of the strikers or hammers 715 when released or tripped in the well-known way. The strikers are fulcrumed near their lower ends upon a rod 701 and provided with curved slots *w*, in which travel actuating-studs 741, carried by the curved levers 716, fulcrumed on a rod 702. The upper ends of the levers 716, which carry the studs 741, are rearwardly spring-pressed, but restrained against such spring tension by the engagement of their upper ends by latches 717, fulcrumed upon the rod 700. These latches are adapted to be tripped by the tripping-pawls 718, hung on a rod 704, which is supported between the upper ends of parallel side arms 711, secured at their lower ends to a rock-shaft 703. These latches and pawls are precisely the same in operation as those illustrated in Fig. 3 of said Burroughs patent, No. 505,078, and are identically the same in construction as the extra latch and pawl marked herein 717^a and 718^a, respectively, and forming part of my attachment hereinafter described and which in Fig. 2 of the present drawings hide the other latches and pawls, the latter, however, appearing in Fig. 3.

The rock-shaft 703 and consequently the associated parts described are operated in the well-known manner by the operating-handle 367, at the end of whose forward movement the arms 711 and rod 704 are rocked forward, with the result that the rearward ends of the tripping-pawls (except the one or more corresponding to any particular row or rows of keys operated or set) will be rocked upward by contact of their forward ends against the sloping shoulders 611^b of the non-operated

levers B, so that such particular pawls will not engage the shoulders on the upper edge of their respective latches, but will pass thereabove. However, with respect to the operated levers B the pawls corresponding therewith will not be rocked because of the removal of the interfering shoulders 611^b, with the result that such particular pawls will engage the shoulders on the edges of their respective latches and rock the latter in such manner as to release their levers 716, whose springs 780 will now throw such levers rearwardly and thereby throw their strikers 715 against the particular type-plates which are at that time positioned in line between them and the platen-roller 619.

In the Burroughs adding-machine as manufactured and as illustrated, particularly in Burroughs patent, No. 505,078, provision is made for tripping the latches 718 successively from left to right—that is, from the higher to the lower denominations—so that the machine will be caused to print a series of ciphers to the right of any digit, except, of course, those in the first row on the right-hand side. To this end the lower forward end of each latch (with the exception of the outermost one on the right) has a tail or lug *d'*, Fig. 3, projecting in the path of movement of the heel of its next adjacent latch on the right, so that the tripping of one latch causes a tripping of all of them successively, the first character printed being a digit corresponding in value to that represented by the particular digit-key operated and the remaining characters following successively to the right and of decreasing denomination being all ciphers.

Each lever B is held in the normal position (shown in Fig. 2) by a latch 415, controlled by the corresponding rows of keys in the keyboard of the machine, and when any key in any row is depressed the latch of the corresponding lever is tripped and the front end of the lever and the rack 610, carried by it, are released, so that they may (later) swing downward until arrested by a stop projected into the path of one of the moving parts by the operated key. The levers B do not move immediately upon the tripping of their latches by the operated keys, but only upon the subsequent movement of the operating-handle 367, Fig. 1. This handle is secured upon the projecting right-hand end of a stub rock-shaft 367^a, journaled in the right-hand side of the framework of the machine. This rock-shaft is connected with the rock-shaft 600 by a train of mechanism not necessary to be here illustrated or described, whereby when the shaft 367^a is rocked by pulling forward the operating-handle 367 the shaft 600 will be rocked in the same direction. Fast upon the rock-shaft 600, at opposite sides of the machine, Fig. 2, are two downwardly and forwardly extending levers 613, which are

connected beneath the front ends of the levers 611 by a cross-bar 617, whose opposite ends extend upward along the sides of the outside levers 611. The operating-handle 5 and parts moved by it are yieldingly held in and returned to normal position by suitable springs, so that when the operating-handle is pulled forward the frame composed of levers 613 and cross-bar 617 will be swung 10 downward and rearward, and when the operating-handle is released said frame will be swung forward and upward again to normal position. This frame constitutes the restoring or resetting frame for the levers B, its 15 downward and rearward movement at the operation of the handle permitting such levers B as have been released by the tripping of their latches to swing downward until arrested by the stops of the operated keys, as 20 heretofore explained, and the return forward and upward movement of the frame serving to restore such levers to normal position upon the release and return of the operating-handle.

25 If the racks 610 of the levers B remained in mesh with the pinions 916 of the adding-wheels during the downward movement of the racks, at the forward movement of the operating-handle the pinions and adding-wheels would be turned distances corresponding 30 to the values of the operated keys. In the present instance, however, the pinions 916 are swung forward out of gear with the racks 610 at the forward movement of the operating-handle and downward movement of the released racks, so that they are 35 not turned by the racks during the downward movement of the latter; but at the return upward movement of the parts the pinions are swung rearward into gear with the 40 racks and turned by the latter distances corresponding to the previous downward movement of the racks. This is accomplished by mounting the supporting-shaft 955 of the 45 pinions 916 in a swinging frame composed of two side arms C, located at opposite sides of the machine and fast upon the opposite sides of a rock-shaft 900. The upper end of one of these arms C is bifurcated, as shown in 50 Fig. 2, and coöperates with a stop 205, which limits the forward and backward movement of the rocking frame carrying the pinions. This rocking frame is operated for the purpose mentioned in the following manner and 55 by the following means: Pivotaly supported upon a stud 941, projecting inward from the left-hand-side frame of the machine, is a three-armed lever 913, whose vertically-depending arm has pivoted to its lower end the 60 rear end of a forwardly-extending arm 914, which is supported near its forward end by a long link 911, depending from a stud upon the front end of a bell-crank 227, fulcrumed upon the framework of the machine at 204 65 and having at its forward end an upwardly-

extending stem carrying a finger-piece 265. This bell-crank 227 and its stem and finger-button 265 constitute the "total-key" of the machine, which is yieldingly held in and returned to its normal position, Fig. 2, by 70 springs acting upon other parts of the machine connected with it and not necessary to be referred to here. It suffices for present purposes to say that the upper end of the link 911 is supported by the key or bell-crank 227 and that the lower end of the link 75 is pivoted to and supports the forward end of the arm 914. At its front end this arm 914 is divided into two diverging arms 914^a and 914^b, the former of which extends upward immediately adjacent the side arm C 80 of the rocking frame carrying the train of pinions and is provided with a notch engaging a stud 958 upon said side arm. Under this arrangement of parts it will be understood that if the arm 914 be swung bodily 85 forward by forward movement of the lower end of the vertical arm of the lever 913 and lower end of the link 911 it will force forward the rocking frame carrying the pinions and 90 disengage them from the racks 610. This movement of the parts is accomplished at the forward movement of the operating-handle by the following means:

Journalled in the lower middle part of the 95 machine is a rock-shaft 800, connected with the rock-shaft 367^a, which carries the operating-handle in such manner that the forward movement of the handle rocks the shaft 800 backward. Fast upon the shaft 800 is a 100 three-armed lever 813, whose upwardly and forwardly extending arm 813^a carries a pivoted wiper block or plate 821, adapted to coöperate with studs 961 and 961^a upon the 105 backwardly and forwardly extending arms of the three-armed lever 913. A contractile spring 883, connected by a rod or wire to the lower end of the pivoted plate 821, tends to swing said plate into alinement with the lever-arm 813^a upon which the plate is pivoted 110 and in the position of the parts shown in Fig. 2 holds the upper end of said plate against the rear side of the stud 961^a. When the operating-handle is pulled forward and the shaft 800 thereby rocked in the direction 115 of the arrow, the upward and rearward movement of the lever-arm 813^a will engage one of the shoulders of the pivoted plate 821 with the stud 961^a of the three-armed lever 913, thereby forcing upward the forward arm of 120 said lever and swinging forward its depending vertical arm, which latter will force forward the arm 914 and cause its upwardly and forwardly extending front arm 914^a, engaging the stud 958, to swing forward the rocking 125 frame C, carrying the pinions 916 and disengage the latter from the racks 610, so that the racks may swing downward without turning the pinions.

The operations thus described due to the 130

forward movement of the operating-handle will have swung the lever-arm 813^a and its pivoted plate 821 rearward into proximity with the stud 961 on the rearwardly-projecting arm of the lever 913, and at the end of the forward movement of the operating-handle the pivoted plate 821 will stand in substantially the same relation to the stud 961 that it occupies in respect to the stud 961^a in Fig. 2, its upper end bearing against the forward side of the stud and the plate itself being rocked upon the lever-arm 813^a to a position opposite that occupied by it in Fig. 2. At the return or backward movement of the operating-handle the rock-shaft 800 will be rocked forward to normal position, and as the lever-arm 813^a swings forward the rear shoulder upon the pivoted plate 821 will engage the stud 961 of the lever 913 and force the rearwardly-projecting arm of said lever upward, thereby swinging its vertically-depending arm rearward and drawing the arm 914 backward to normal position, and in this backward movement the arm 914 will carry the rocking frame C with it, owing to the engagement of the notched end of the arm 914^a with the stud 958 upon the frame, thereby reengaging the pinions 916 with the racks 610 at the beginning of the return movement of the operating-handle, so that as the levers 611, carrying the racks, are returned to normal position by the restoring-frame 613 617 the pinions and adding-wheels will be turned distances corresponding to the previous downward movements of the respective racks.

It will be understood that at the end of the forward movement of the operating-handle and of the downward movements of the respective racks which have been released by the operations of the keys in the rows corresponding to them the type-plates carried by the rear ends of the levers B will have been swung upward into positions to present at the printing-line immediately in front of the platen 619 the respective types corresponding to the values of the operated keys, and while the parts are in such position at the end of the forward movement of the operating-handle those types are forced rearward against the platen by means of strikers or hammers hereinafter described to effect the printing of the amount represented by the operated keys, an inked ribbon being passed between the types and the paper upon the platen-roll.

Under the operation above described merely the amount of the individual item represented by the operated keys will be printed upon the strip or sheet of paper, and it will be next in order to explain how the total of all of the amounts or items accumulated upon the adding-wheels may at any time be printed. It will be understood that if the pinions of the adding-wheels were al-

lowed to remain in mesh with the racks 610 during the downward movement of the latter the pinions would be turned backward by the downward movement of the racks. The pinions are free to turn backward upon their shaft 955 to but not beyond zero position. If, therefore, any rack be allowed to swing downward while in mesh with its pinion, it will turn such pinion backward until the pinion reaches zero position, whereupon the arresting of the pinion will arrest the movement of the rack. Thus if the pinion and its adding-wheel be standing at "9" it can turn backward nine-tenths of a revolution, and the rack engaged with it can move downward a corresponding distance. If it be standing at "5," it can move backward five-tenths of a revolution, and the rack a corresponding distance, and so on, with the result that if all of the racks be released and the operating-handle be drawn forward while the pinions are permitted to remain in mesh with the racks each pinion will be turned backward the exact distance which it has been moved forward from zero position and the racks will all be permitted to move downward corresponding distances, and this downward movement of the racks will cause corresponding upward movements of the type-plates 618, carried by the rear end of the levers B, so that there will be brought to the printing-line the types corresponding to the numbers which have been displayed upon the adding-wheels. In other words, the totals which have been displayed upon the adding-wheels will, by the return of those wheels to zero position, be transferred to and presented by the types at the printing-line at the rear end of the machine, so that by then forcing said types rearward against the platen the total of all the items previously added upon the adding-wheels may be printed upon the strip or sheet of paper. The pinions are left in mesh with the racks whenever it is thus desired to print a total by throwing out of operative position the arm 914 whose forward movement disengages the pinions from the racks in the manner heretofore explained. This is accomplished by depressing the total-key 265, which, through the medium of the link 911, swings the front end of arm 914 downward and disengages its member 914^a from the stud 958 upon the pinion-carrying frame C, so that when the operating-handle is then pulled forward the arm 914 will move idly forward and leave the frame C in its normal position, with the pinions 916 in engagement with the racks 610, the depression of the total-key having, through the medium of the links 216 and cross-rod 209, displaced the latches 415, and thus released the racks 610.

If the pinions were permitted to remain in mesh with the racks during the return upward movement of the latter at the release and backward movement of the operating-handle, they would be turned forward again

to the respective positions which they occupied prior to the operation of printing the total in the manner described, so that at the end of the operation there would remain accumulated upon the adding-wheels the amount which had previously been added upon them, and succeeding items or amounts would thereafter be added to this aggregate of the preceding items. This is permitted when it is desired to merely print what is termed a "subtotal" and not clear the machine; but for the purpose of printing what may be termed a "grand total" and clearing the machine means are provided for swinging the pinions of the adding-wheels out of engagement with the racks prior to the return upward movement of the latter, so that the pinions and adding-wheels will be left in zero position at the end of the operation of the machine, and the latter be thereby cleared. This is accomplished by means of the hooked lower end of the depending member 914^b of the arm 914, which hooked end is adapted to cooperate with a stud 958^a upon the lower end of the side arm C of the pinion-carrying frame. The depression of the total-key 265 swings this hooked end of the arm 914 downward into proximity to the stud 958^a, and when the arm 914 is moved forward at the forward movement of the operating-handle the hook catches over the stud 958^a, and when the arm 914 is then drawn rearward again at the beginning of the rearward movement of the operating-handle, as heretofore explained, the engagement of the hook with the stud pulls the lower end of the rocking frame C rearward and swings its upper end forward and disengages the pinions from the racks, so that the latter may move upward to normal position without turning the pinions.

The construction and operation, so far explained, in general terms, are that of the well-known Burroughs machine, and my invention which is shown embodied therein will now be described. As hereinbefore stated, the purpose of my invention is to provide means whereby the machine at the will of the operator shall print a character or characters indicating the fact that the machine has been cleared, in the present instance such indication being a horizontal row of characters composed wholly of ciphers—a result which could not be attained by the machine when constructed as hereinbefore described. To this end I provide an additional latch and pawl, (marked 717^a and 718^a, respectively) similar to the latches 717 and pawls 718 and arranged on the extreme left-hand side of the set or series of such latches and pawls, as clearly indicated in Fig. 1. It will now be understood that when this latch 717^a, which is not associated with any lever B, striker, or type-plate, but which is provided with a projecting lug *d'* in the same manner and for the

same purpose as the latches 718, is tripped by its pawl 718^a all of the latches 717 will be successively tripped, with the result that the entire set of the type-plates, including, of course, in the present instance, the one corresponding to the row of keys of the highest denomination, will be caused to print ciphers in a horizontal row. For the purpose of tripping this additional latch 717^a at the will of the operator, and thereby tripping the ordinary latches of the machine, a special key E and intermediate connections are provided, such connections in the present instance comprising a substantially vertical lever or arm C, secured at its upper end to a rock-shaft C', journaled in the plate 210, Fig. 2. The lower end of this arm C is provided with an inclined edge *c*, corresponding with the sloping shoulders 611^b of the levers B and adapted to give the same action to its pawl 718^a as given by the said shoulder 611^b to their respective pawls—that is, normally a rocking movement to elevate the rearward ends of the pawls of the non-operated levers B sufficiently to cause them to clear the shoulders on the upper edges of the latches in the movement of the pawls bodily forward. The forward movement of the arm C, which is spring-pressed in that direction by spring C², is limited by a branch arm *c'*, arranged to rest against the main rock-shaft 600.

As shown in Fig. 2, the rock-shaft C' has a second depending arm *c'*, whose lower end is pivotally connected to the rearward end of a substantially horizontal link or bar D. This link is horizontally slotted intermediate of its length to receive the pin *d* at the lower end of the stem *e'* of the special key E, whose depression, as shown in Fig. 2, against the tension of the spring *e*² brings the link D in position so that its shouldered front end may be contacted by the pin 227^a when said key is depressed, as shown in Fig. 2, with the result that the link D is thrust rearwardly and the edge *c* of the arm C raised to such extent as to be no longer controlling as to its pawl 718^a, but swung to an inoperative position with respect thereto. The pawl 718^a upon its forward movement at the end of the forward movement of the operating-handle will consequently engage its latch 717^a and thereby trip all the other latches successively to cause their strikers to operate and all the type-plates of the machine to imprint their ciphers on the paper carried by the platen-roller, with the result that in the present instance a horizontal row of characters, composed wholly of ciphers and representing all the denominations on the keyboard, will be printed.

The special key E is adapted to be locked to the keyboard in depressed condition, so as to hold the bar D properly positioned for its actuation by the total-key, and to this end such key is provided on its rearward edge

with a notch e^3 to engage the keyboard in the usual manner. In the present instance, and as shown in Fig. 2, the stem e' of the special key has a pin-and-slot connection with the plate 210, to which end the key-stem is slotted to receive a pin or stud e , projecting from said plate and on which, as a fulcrum, the key-stem is rocked, as hereinafter explained.

The forward end of the bar D is provided with a shoulder or projection D' in order to prevent such bar from being swung upwardly by the bell-crank of the total-key and the special key E from being thereby rocked at its lower end in such manner as to be disengaged from the keyboard without the intended longitudinal movement of such bar. By reason of the pin-and-slot connection between the key-stem e' and link or bar D the latter is permitted to move longitudinally a certain distance before rocking the lower end of the stem of the special key on the pin e as a fulcrum, with the result that the arm C is first rocked to inoperative position as respects its tripping-pawl 718^a before the special key is automatically disengaged from the keyboard by the further travel or movement of such link or bar. Thus the special key may be set by the operator and be automatically released from its locking means during the last stage of the downward movement of the total-key and in position to be restored to normal position upon the upward movement or restoration of such total-key, it being understood that the latter is held down during the printing operation.

In Fig. 2 of the drawings the key E is shown depressed with the associated parts in position to be operated by the total key 265 for the purpose of making the described indication of the fact that the machine has been cleared. The key E in normal condition is held upwardly by the spring e^3 , and likewise the forward end of the link D is held out of the path of travel of this pin or stud 227^a of the bell-crank, at which time the total-key 265 performs its usual and well-known functions without actuating said link.

The mechanism or attachment which I have described provides a simple and efficient means under the control of the operator for indicating to him whether the machine has been cleared when he began the printing and listing of individual items in a column, with the result that any total or footing at the bottom of that column represents the total of those particular items so listed below the horizontal row of ciphers. However, it is to be understood that the carrying out of the invention might be modified by printing less than the entire row of ciphers and that other means might be employed for recording a clear condition of the machine than those here shown without departing from the spirit and scope of the present invention.

I claim—

1. In an adding-machine, the combination of printing and adding mechanism and means for "clearing" the machine and by the same operation printing a character to indicate the fact that the machine has been "cleared;" substantially as described. 70

2. In an adding-machine, the combination of printing and adding mechanism and means for "clearing" the machine and by the same operation printing a cipher to indicate the fact that the machine has been "cleared;" substantially as described. 75

3. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, and key-controlled means coöperating with the printing mechanism and actuated by the "clearing" mechanism for printing a cipher when the "clearing" mechanism is operated to thereby indicate the fact that the machine has been "cleared;" substantially as described. 80 85

4. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, and means actuated by the "clearing" mechanism in the "clearing" operation for causing the printing mechanism to print a plurality of ciphers when the machine is "cleared" to thereby indicate the fact that the machine has been "cleared;" substantially as described. 90 95

5. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, the printing mechanism being normally arranged not to print when the machine is "clear," and means coöperating with the printing mechanism for causing the same to print a character when the machine is "clear" and to thereby indicate the fact that the machine has been "cleared;" substantially as described. 100 105

6. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, the printing mechanism being normally arranged not to print when the machine is "clear," and means under the control of the operator for causing the printing mechanism to print a character when the machine is in said condition and to thereby indicate that fact; substantially as described. 110 115

7. In an adding-machine, the combination of adding, "clearing" and printing mechanisms, the printing mechanism being normally arranged not to print when the machine is "clear" and key-controlled means coöperating with the printing mechanism to cause the same to print a character when the machine is in "clear" condition and to thereby indicate that fact; substantially as described. 120

8. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, the printing mechanism being normally arranged not to print when the machine is "clear," and means coöperating with the printing mechanism for causing the same 125 130

to print a plurality of characters when the machine is in a "clear" condition and to thereby indicate that fact; substantially as described.

5 9. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, the printing mechanism being normally arranged not to print when the machine is "clear" and means for causing the
10 printing mechanism to print a cipher when the machine is in said condition and to thereby indicate that fact; substantially as described.

10 10. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, the printing mechanism being normally arranged not to print when the machine is "clear," and means under the control of the operator for causing the printing
15 mechanism to print a plurality of ciphers when the machine is "clear" to thereby indicate that fact; substantially as described.

20 11. In an adding-machine of the multiple-key-bank type, the combination of adding, printing and "clearing" mechanisms, and means for printing a character to indicate the fact that the machine has been "cleared;"
25 substantially as described.

30 12. In an adding-machine of the multiple-key-bank type, the combination of adding, printing and "clearing" mechanisms, and means cooperating with the printing mechanism for causing the same to print a character to indicate the fact that the machine
35 has been "cleared;" substantially as described.

40 13. In an adding-machine of the multiple-key-bank type, the combination of adding, printing and "clearing" mechanisms and means cooperating with the printing and "clearing" mechanisms for causing the same to permit a plurality of ciphers to indicate the fact that the machine has been "cleared;"
45 substantially as described.

50 14. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, means arranged to cause the printing mechanism to print a character to indicate the fact that the machine has been
55 "cleared," and a special key cooperating with said means and arranged to move the same to a position to be operated by the "clearing" mechanism in the "clearing" operation of the machine; substantially as described.

60 15. In an adding-machine, the combination of adding, printing and "clearing" mechanisms, means arranged to cause the printing mechanism to print a character to indicate the fact that the machine has been
65 "cleared," a special key cooperating with said means and adapted to move the same into operative relation with the "clearing" mechanism whereby said means are operated and the indicating character caused to be printed in the "clearing" operation of the

machine and means for locking the key in operated position, said "clearing" mechanism being arranged to unlock the key during said "clearing" operation; substantially as described. 70

16. In an adding-machine, the combination of printing and adding mechanism, mechanism for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of strikers or hammers which are inoperative
75 when the machine is operated during "clear" condition, and means under the control of the operator for causing the hammers to operate and thereby print ciphers to indicate 80 the fact that the machine is "clear;" substantially as described.

17. In an adding-machine, the combination of printing and adding mechanism, and means for "clearing" the machine and by
85 the same operation printing a horizontal row of similar characters at the head of a column of listed items to indicate that the machine has been "cleared;" substantially as described. 90

18. In an adding-machine, the combination of printing and adding mechanism, and means for "clearing" the machine and by the same operation printing a series of ciphers at the head of a column of listed
95 items to indicate that the machine has been "cleared;" substantially as described.

19. In an adding-machine, the combination of printing and adding mechanism, means for adjusting the same for a "clearing" operation, and a special key cooperating with said means to enable a horizontal row of similar characters to be printed at the head of a column to indicate that the machine has been "cleared;" substantially as
105 described.

20. In an adding-machine, the combination of printing and adding mechanism, means for adjusting the same for a "clearing" the machine, and means for actuating
110 said printing mechanism to print a horizontal row of characters composed wholly of ciphers to indicate that the machine has been "cleared;" substantially as described.

21. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism being controlled by a series of latches, and means for tripping the latches and thereby causing the printing
115 mechanism to print a horizontal row of characters composed wholly of ciphers; substantially as described.

22. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, 120 125 130

a series of latches for controlling said strikers, and means for tripping all of said latches to cause the type to print a horizontal row of ciphers; substantially as described.

5 23. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of
10 spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers, and manually-operated means for tripping
15 said latches to cause the type to print a horizontal row of characters composed wholly of ciphers; substantially as described.

24. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said
20 printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers,
25 and adapted to trip each other successively from left to right, and means for tripping the outermost latch on the left without setting up any of the type-carriers, whereby a horizontal row of ciphers will be printed to indicate that the machine has been cleared; substantially as described.

25. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said
35 printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers,
40 and a separate latch tripped at the will of the operator and positioned at the left-hand side of the outermost one of said series of latches, said separate latch being arranged to trip such outermost latch and thereby cause the
45 remaining ones to be successively tripped, whereby a horizontal row of ciphers will be printed to indicate that the machine has been "cleared;" substantially as described.

26. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said
50 printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers, and a key-controlled latch positioned adjacent the outermost latch on the left-hand side of said series of latches and arranged to trip
60 said outermost latch without the operation of any of the type-carriers, thereby causing all of said series of latches to be successively tripped and a row of ciphers to be printed to indicate that the machine has been "cleared;"
65 substantially as described.

27. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of
70 spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers, a "total-key" controlling the operation of the printing mechanism to print a total, and
75 tripping device actuated by the "total-key" for tripping said series of latches and to thereby cause a row of ciphers to be printed to indicate that the machine has been "cleared;" substantially as described. 80

28. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of
85 spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers, a "total-key" controlling the operation of the printing mechanism to print a total, and
90 a separate latch actuated by the "total-key" and positioned adjacent the outermost latch on the left-hand side of said series of latches, said separate latch being arranged to cause a tripping of said series of latches and a consequent printing of a row of ciphers to indicate that the machine has been "cleared;" substantially as described. 95

29. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said
100 printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches for controlling said strikers, a "total-key" controlling the operation of the printing mechanism to print a total, a special or separate latch arranged to cooperate with said series of latches, and a tripping device
110 for said separate latch normally inoperative but moved to operative position by the operation of the "total-key;" substantially as described.

30. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said
115 printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches
120 normally restraining said strikers from movement, and having means for causing their successive tripping from left to right after the tripping of one of them by its tripping-pawl, tripping-pawls
125 718 for tripping said latches, a separate latch arranged adjacent the outermost latch on the left-hand side of such series of latches and itself adapted, when tripped, to trip said out- 130

ermost latch of the series, a special and normally inoperative trip for said separate latch, and a "total-key" and connections for rendering said special trip operative when the "total-key" is operated; substantially as described.

31. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches 717 normally restraining said strikers from movement and having means for causing their successive tripping from left to right after the tripping of one of them by its tripping-pawl, tripping-pawls 718 for tripping said latches, a separate latch arranged adjacent the outermost latch on the left-hand side of such series of latches and itself adapted, when tripped, to trip said outermost latch of the series, a special and normally inoperative trip for said separate latch, a "total-key" and connections for rendering said trip operative when the "total-key" is operated, and a separate key for bringing said special trip into operative relation with the "total-key" mechanism; substantially as described.

32. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches 717 normally restraining said strikers from movement and having means for causing their successive tripping from left to right after the tripping of one of them by its tripping-pawl, tripping-pawls 718 for tripping said latches, a separate latch arranged adjacent the outermost latch on the left-hand side of such series of latches and itself adapted, when tripped, to trip said outermost latch of the series, a special and normally inoperative trip for said separate latch, a pivoted arm C cooperating with the said trip to normally keep the same in inoperative relation with respect to said separate latch, a "total-key" and connections, and means under the control of the operator for operatively connecting the arm C with the "total-key" mechanism for swinging said arm to inoperative position; substantially as described.

33. In an adding-machine, the combination of printing and adding mechanism, means for clearing the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches 717 normally restraining

said strikers from movement and having means for causing their successive tripping from left to right after the tripping of one of them by its tripping-pawl, tripping-pawls 718 for tripping said latches, a separate latch arranged adjacent the outermost latch on the left-hand side of such series of latches and itself adapted, when tripped, to trip said outermost latch of the series, a special and normally inoperative trip for said separate latch, a pivoted arm C cooperating with the said trip to normally keep the same in inoperative relation with respect to said separate latch, a "total-key" and connections, and a key-controlled link D arranged to be moved into the path of movement of the "total-key" connections and to transmit such motion to said arm C, whereby the latter is swung to inoperative position and its trip caused to release all the latches and their hammers when the machine is operated; substantially as described.

34. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches 717 normally restraining said strikers from movement and having means for causing their successive tripping from left to right after the tripping of one of them by its tripping-pawl, tripping-pawls 718 for tripping said latches, a separate latch arranged adjacent the outermost latch on the left-hand side of such series of latches and itself adapted, when tripped, to trip said outermost latch of the series, a special and normally inoperative trip for said separate latch, a pivoted arm C cooperating with the said trip to normally keep the same in inoperative relation with respect to said separate latch, a "total-key" and connections, a rock-shaft c' to which the arm C is fastened, a second arm c'' fastened thereto, a link D pivotally connected at one end to said arm c'' , a special key E operatively connected with the link, and a "total-key" having a bell-crank connection 227 arranged to shift the link D when moved by its key into the path of movement of such bell-crank; substantially as described.

35. In an adding-machine, the combination of printing and adding mechanism, means for "clearing" the machine, said printing mechanism having a series of movable type-carriers, a corresponding series of spring-pressed strikers or hammers for forcing the type of the carriers against the platen, a series of latches 717 normally restraining said strikers from movement and having means for causing their successive tripping from left to right after the tripping of one of them by its tripping-pawl, tripping-pawls

718 for tripping said latches, a separate latch arranged adjacent the outermost latch on the left-hand side of such series of latches and itself adapted, when tripped, to trip said 5 outermost latch of the series, a special and normally inoperative trip for said separate latch, a pivoted arm C cooperating with the said trip to normally keep the same in inoperative relation with respect to said separate 10 latch, a "total-key" and connections, a rock-shaft c' to which the arm C is fastened, a second arm c^2 fastened thereto, a link D pivotally connected at one end to said arm c^2 , a special key E having a pin-and-slot connection with the link D intermediate of the latter's length, and a "total-key" having a bell-crank connection 227 arranged to shift such link longitudinally when the latter is moved by its key to cooperative relation therewith, 20 whereby the arm C will be rocked to inoperative position and its trip permitted to engage and operate its latch, thereby causing a tripping of the series of latches associated with the printing mechanism; substantially as described. 25

36. In an adding-machine, the combination of the levers B carrying type-plates 618 at their rear ends, spring-pressed strikers 715 cooperating with the type-plates, a series of 30 latches 717 corresponding in number with the strikers and levers B and normally restraining said strikers from movement, each of said latches, except the outermost one on the right, having lugs for tripping, when operated, the adjacent latch on its left, tripping-pawls 718 for tripping the latches, a special latch similar to those of the series of 35 latches, a special pawl similar to those of the series of pawls and arranged adjacent the outermost left-hand latch of said series of latches, a pivoted arm C having an inclined edge c normally in the path of movement of the special pawl to keep the latter, when moved in the operation of the machine, from 40 engagement with its latch, and key-controlled connections for shifting said arm to an inoperative position to allow said special pawl to engage its latch and thereby trip all the latches to cause a printing of a horizontal row of ciphers denoting that the machine is 50 "cleared;" substantially as described.

37. In an adding-machine, the combination of the levers B mounted on a rock-shaft 600 and carrying type-plates 618 at their 55 rear ends, spring-pressed strikers 715 cooperating with the type-plates a series of latches 717 corresponding in number with the strikers and levers B and normally restraining said strikers from movement, each of said latches, 60 except the outermost one on the right, having lugs for tripping, when operated, the adjacent latch on its left, tripping-pawls 718 for tripping the latches, a special latch similar to those of the series of latches, a special pawl similar to those of the series of 65 special pawl similar to those of the series of

pawls and arranged adjacent the outermost left-hand latch of said series of latches, a pivoted arm C having an inclined edge c normally in the path of movement of the special pawl to keep the latter, when moved in the 70 operation of the machine, from engagement with its latch, said arm being spring-pressed rearwardly and provided with a branch arm c' arranged to contact said shaft 600 and thereby limit the movement of such arm, and 75 key-controlled means for swinging said arm to inoperative position and permitting the special pawl to engage its latch, thereby causing a tripping of the entire series of latches and strikers and a consequent printing of a horizontal row of ciphers to denote 80 that the machine is "cleared;" substantially as described.

38. In an adding-machine, the combination of the levers B carrying type-plates 618 at 85 their rear ends, spring-pressed strikers 715 cooperating with the type-plates, a series of latches 717 corresponding in number with the strikers and levers B and normally restraining said strikers from movement, each of said 90 latches, except the outermost one on the right, having lugs for tripping, when operated, the adjacent latch on its left, tripping-pawls 718 for tripping the latches, a special latch similar to those of the series of latches, 95 a special pawl similar to those of the series of pawls and arranged adjacent the outermost left-hand latch of said series of latches, a pivoted arm C having an inclined edge c normally in the path of movement of the special 100 pawl to keep the latter, when moved in the operation of the machine, from engagement with its latch, a "total-key" and its connections, a special key arranged to be locked to its depressed or downward position, and movable mechanism arranged intermediate the 105 "total-key" and said arm C and controlled by said special key, said mechanism being actuated by the "total-key" whose first movement rocks the arm C to inoperative position 110 and whose continued movement also automatically releases the special key from its downward-locked condition; substantially as described.

39. In an adding-machine, the combination 115 of the levers B carrying type-plates 618 at their rear ends, spring-pressed strikers 715 cooperating with the type-plates, a series of latches 717 corresponding in number with the strikers and levers B and normally restraining 120 said strikers from movement, each of said latches, except the outermost one on the right, having lugs for tripping, when operated, the adjacent latch on its left, tripping-pawls 718 for tripping the latches, a special 125 latch similar to those of the series of latches, a special pawl similar to those of the series of pawls and arranged adjacent the outermost left-hand latch of said series of latches, a pivoted arm C having an inclined edge c nor- 130

5 mally in the path of movement of the special
pawl to keep the latter, when moved in the
operation of the machine, from engagement
with its latch, a "total-key" and its connec-
5 tions, a special key, and a movable bar D op-
eratively connected with said arm C and con-
trolled by the special key and adapted to be
positioned thereby into the path of move-
ment of the "total-key" connections; sub-
10 stantially as described.

40. In an adding-machine, the combina-
tion of the levers B carrying type-plates 618
at their rear ends, spring-pressed strikers 715
coöperating with the type-plates, a series of
15 latches 717 corresponding in number with
the strikers and levers B and normally re-
straining said strikers from movement, each
of said latches, except the outermost one on
the right, having lugs for tripping, when op-
20 erated, the adjacent latch on its left, tripping-
pawls 718 for tripping the latches, a special
latch similar to those of the series of latches,
a special pawl similar to those of the series of
pawls and arranged adjacent the outermost
25 left-hand latch of said series of latches, a
pivoted arm C having an inclined edge *c* nor-
mally in the path of movement of the special
pawl to keep the latter, when moved in the
operation of the machine, from engagement
30 with its latch, a "total-key" having a mov-
able connection provided with a pin 227^a, a
special key arranged to be locked to its de-
pressed or downward position, and a longitu-
dinally-movable bar D, operatively connect-
35 ed with the arm C and having a pin-and-slot
connection with the special key, said bar being
controlled by the special key and adapted to
be positioned into the path of movement of
said pin 227^a whereby such bar will first
40 rock said arm C and subsequently rock the
special key to release the latter from its
locked condition; substantially as described.

41. In an adding-machine, the combina-
tion of the levers B carrying type-plates 618
45 at their rear ends, spring-pressed strikers 715
coöperating with the type-plates, a series of
latches 717 corresponding in number with

the strikers and levers B and normally re-
straining said strikers from movement, each
of said latches, except the outermost one on 50
the right, having lugs for tripping, when op-
erated, the adjacent latch on its left, tripping-
pawls 718 for tripping the latches, a special
latch similar to those of the series of latches,
a special pawl similar to those of the series of 55
pawls and arranged adjacent the outermost
left-hand latch of said series of latches, a
pivoted arm C having an inclined edge *c* nor-
mally in the path of movement of the special
pawl to keep the latter, when moved in the 60
operation of the machine, from engagement
with its latch, a "total-key" having a mov-
able connection provided with a pin 227^a, a
special key arranged to be locked to its de-
pressed or downward position, and a longitu- 65
dinally-movable bar D, operatively connect-
ed with the arm C and having a pin-and-slot
connection with the special key, said bar be-
ing controlled by the special key and adapted
to be positioned into the path of movement 70
of said pin 227^a, said bar D being provided
with means for preventing displacement or
swinging movement when engaged by the pin
227^a, whereby such bar will first rock said
arm C and subsequently rock the special key 75
to release the latter from its locked condition;
substantially as described.

42. In a machine of the character de-
scribed, the combination with printing and
adding mechanism adjustable for "clearing" 80
operations, of means controlled by such ad-
justment for recording a "clear" condition
of the machine.

43. In a machine of the character de-
scribed, the combination with adding and 85
listing means adjustable for "clearing" op-
erations, of means controlled by such adjust-
ment for recording a "clear" condition of the
machine prior to listing.

CHAS. N. McFARLAND.

Witnesses:

G. M. JARMAN,
M. E. KULEWATZ.