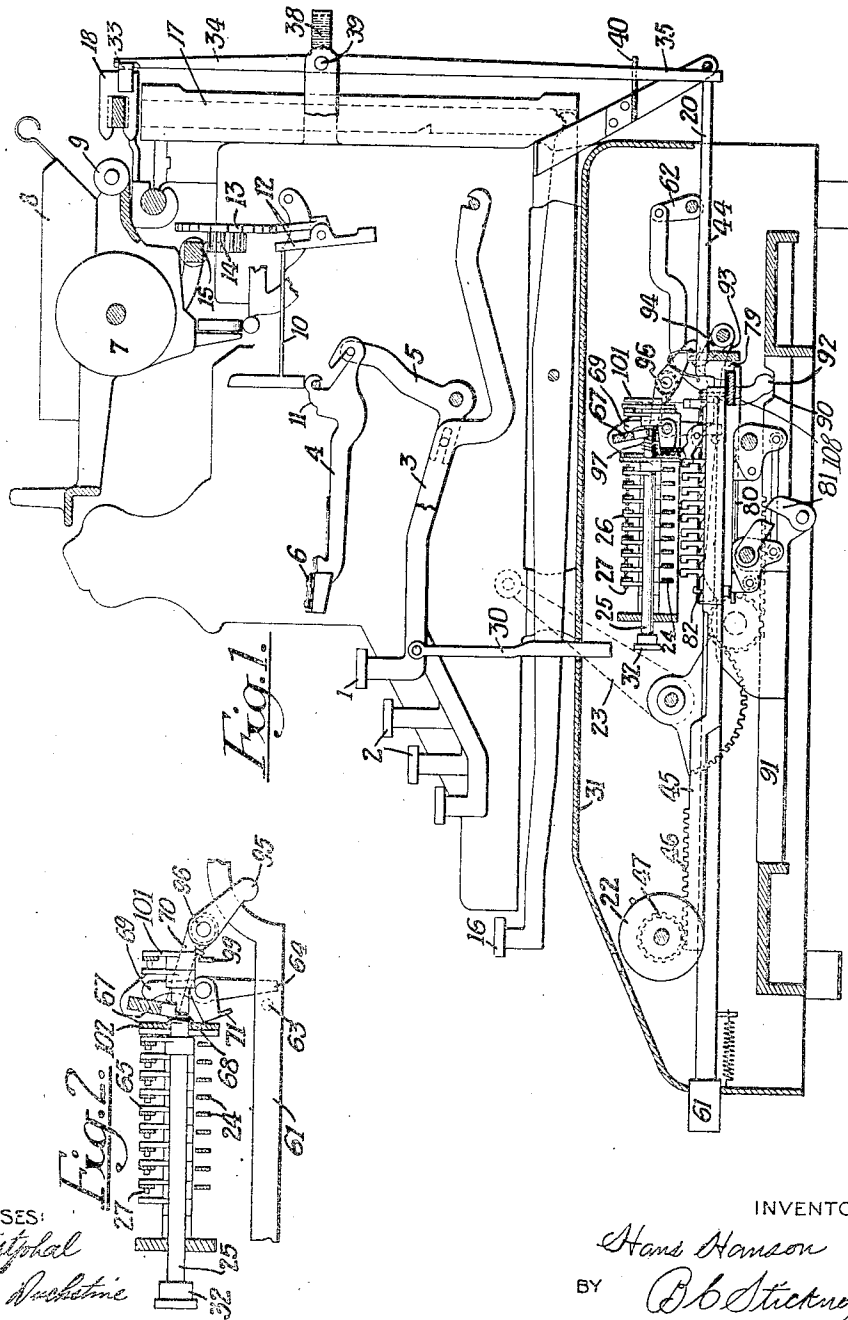


H. HANSON.
 COMBINED TYPE WRITING AND COMPUTING MACHINE.
 APPLICATION FILED APR. 9, 1915.

1,291,859.

Patented Jan. 21, 1919.
 3 SHEETS—SHEET 1.



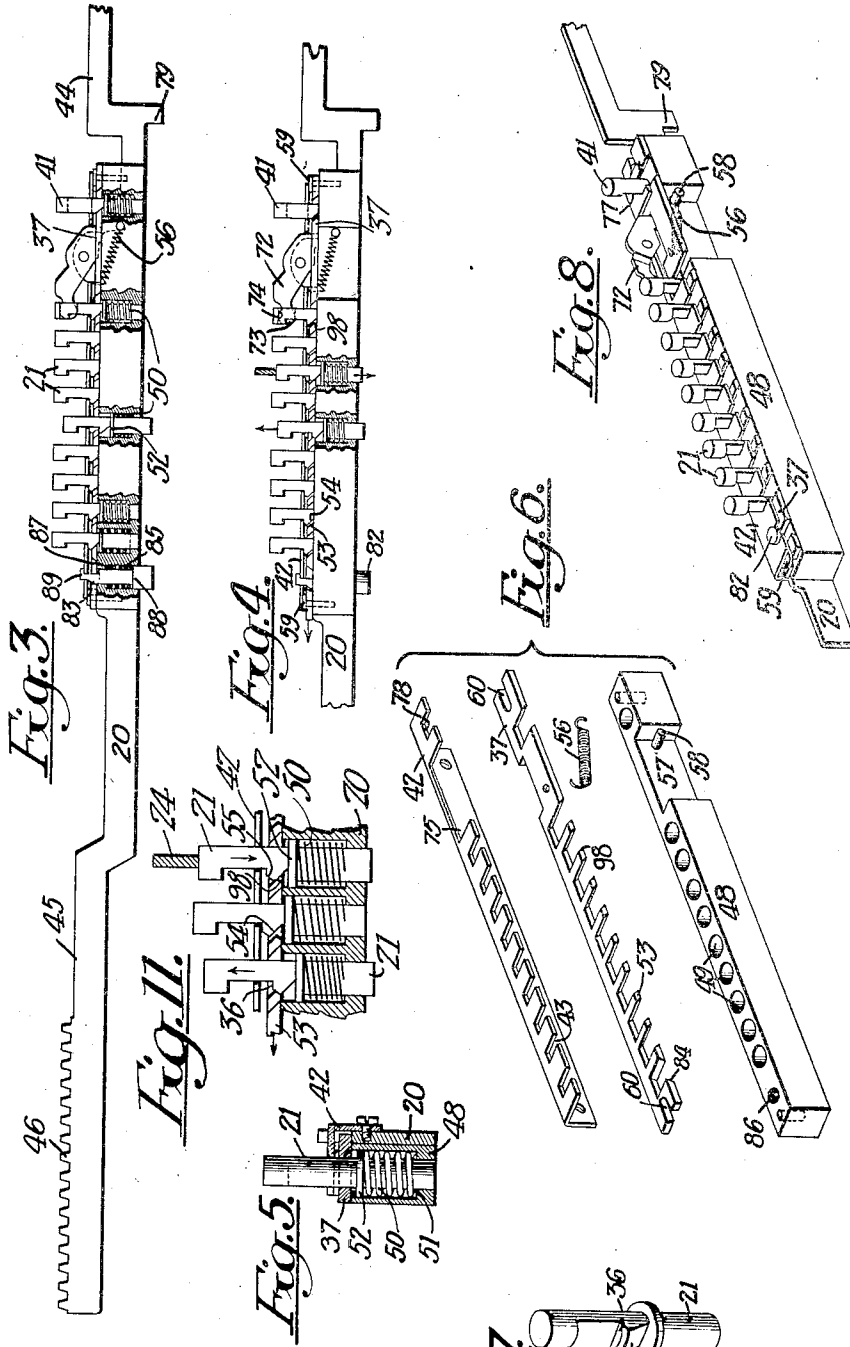
WITNESSES:
W. C. Westphal
James A. D. D. D.

INVENTOR:
Hans Hanson
 BY *O. B. Stickney*
 ATTORNEY.

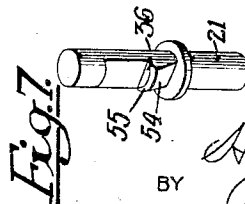
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WITNESSES:
W. O. Westphal
Julius Ruckert



INVENTOR:
Hans Hanson
 BY *B. B. Beckney*
 ATTORNEY.

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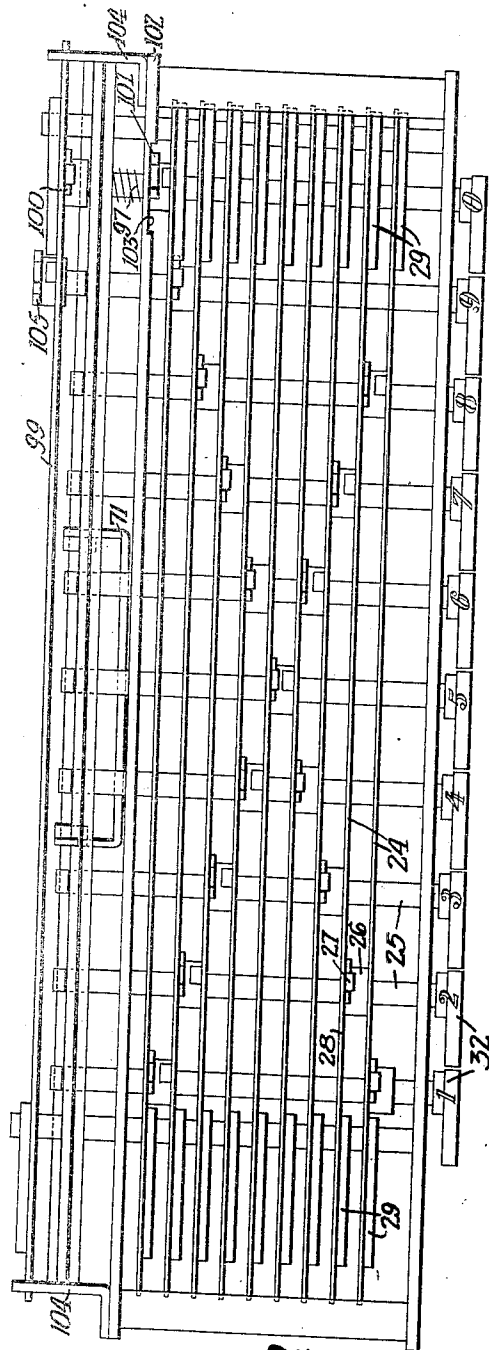


Fig. 9.

WITNESSES:
W. Westphal
Julius Rubenstein

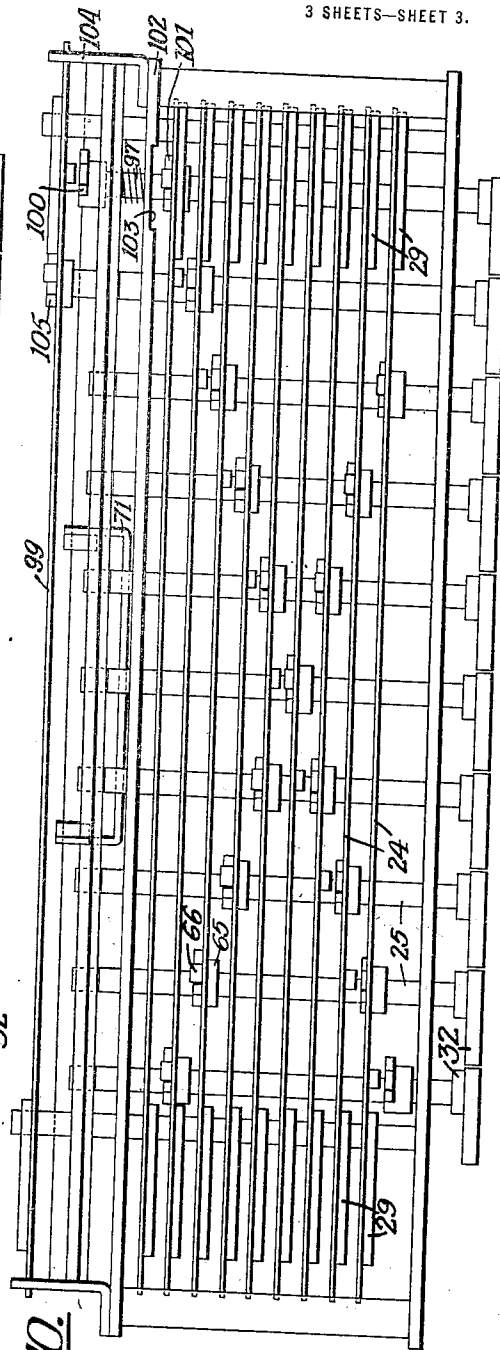


Fig. 10.

INVENTOR:
Hans Hanson
BY B. B. Sturkey
ATTORNEY.

UNITED STATES PATENT OFFICE.

HANS HANSON, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COMBINED TYPE-WRITING AND COMPUTING MACHINE.

1,291,859.

Specification of Letters Patent.

Patented Jan. 21, 1919.

Application filed April 9, 1915. Serial No. 20,130.

To all whom it may concern:

Be it known that I, HANS HANSON, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Combined Type-Writing and Computing Machines, of which the following is a specification.

My invention relates to computing machines, and is herein disclosed as an improvement on my Patent No. 816,319, dated March 27, 1906, wherein is disclosed a combined typewriting and computing machine in which the numeral keys of the typewriter, when operated in an adding column or zone, set up on a temporary register the digits as they are printed. From this register the digits set up are carried into computing or adding wheels by means of a general operator, which, after carrying in said digits, erases all the set-up digits.

Said machine is more particularly disclosed in said patent as including a set of denominational bars, there being one bar for each of the wheels in which adding is done, and on each of these bars is an array of digit pins, there being one pin for each digit on each bar. These bars normally stand in such a position that the numeral keys operate idly with respect to the bars and pins on the bars. In the adding zone, however, the bars are moved one at a time into such a position that pin-setting bars operated by the numeral keys of the typewriter will be effective to set up pins on any bar which has been moved within range of the pin-setting bars.

In said patent the pins are set up by being depressed from their normal positions to a lower position in which the lower ends of the pins project below the surface of the bars, and these projected ends are utilized to drive the bars to turn the computing wheels, the amount of turning of a wheel depending on what pin is set on its bar. For thus turning the computing wheels, there is provided in said patent, a general operator which underlies the bars and when actuated, comes forward and drives forwardly each bar to turn the computing wheel, the general operator driving each bar by catching the depressed end of any pin thereon. All of these features are utilized in the machine to which the present invention is shown as applied.

The present machine is further shown as

one which is adapted to do subtracting on the same computing wheels, and is partly of the type shown in my co-pending application No. 626,550, filed May 11, 1911, wherein the subtraction is done by the complementary method. In said method of subtraction, the wheels always turn as if for adding, but the subtrahend, instead of being directly subtracted from said wheels, is set up by the numeral keys of the typewriter as by pins representing numbers complementary to those which are being printed as said subtrahend. In other words, if it is desired to subtract "3", "6" is set up and added; if it is desired to subtract "0", "9" is set up and added; and so forth and so on. This method of subtraction requires a different setting up of the pins. One way of doing this is shown in said application No. 626,550, wherein there is a subtraction key for causing the machine to subtract instead of add. When this subtraction key is made effective, it not only connects the numeral keys to the pin-setting devices in such a way that they set up complementary pins, but it also sets up a "9" pin on every pin bar, this being done because if "0" is subtracted in any denomination, "9" must be added in that denomination, this being so whether any "0" is actually printed or not.

Said subtraction bar also brings into play a special computing bar adapted to add a single unit to the computing wheel at the units place or column, thus correcting the well-known error of "1" in the units column.

Among the connections operated by said subtraction bar are the connections between the numeral keys and the pin-setting bars. In said application the pin-setting bars correspond substantially to the pin-setting bars of my patent referred to above, each of these bars being normally connected to a rock shaft which is rotated a small extent every time its numeral key is depressed. When said rock shaft is thus rotated by the depression of its numeral key, it thrusts its pin-setting bar downwardly sufficiently to set its pin on the pin bar which has been moved within range of the pin-setting bar.

In the application above referred to, the aforesaid rock shafts not only are normally connected to the adding pin-setting bars, but whenever the subtraction key is actuated, said bars are disconnected from their adding

rock shafts, and are connected to rock shafts operated by numeral keys complementary in value to the adding shafts. Thus, for example, the "3" rock shaft in subtracting
 5 will be operated by the "6" numeral key, and vice versa and so forth.

My invention is therefore disclosed herein as applied, for the purpose of illustration, to such a machine, certain features of it being
 10 especially adapted to cooperate with machines of the type previously built, while other features are adapted to give results broadly new.

One of the new features which my present
 15 invention is especially directed to, is to provide means for the correction of errors easily and rapidly. For this purpose, in the present disclosure, I have illustrated how such error-correcting mechanism can be in-
 20 corporated in machines of the general type of my aforesaid patent and application.

One of the features which is of particular value is that one which permits an operative in correcting an error to simply reset the
 25 typewriter carriage at the denomination in which the error occurs, and after the carriage has been so reset, the operative may correct the error by merely striking the correct key, without the trouble of erasing any
 30 previous setting of the computing mechanism. This is herein illustrated as accomplished by enabling the setting of any pin on one bar to unset any previously set pin on that bar.

One of the other advantages attained by my present improvements is the simplification of the structure shown in my prior patent and application.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional side view of an Underwood-Hanson combined typewriting and
 45 computing machine, showing so much of the mechanism as is convenient for illustrating my invention as applied thereto.

Fig. 2 is a similar view, on an enlarged scale, of certain features of the subtraction-setting mechanism.

50 Fig. 3 is a side view, partly broken away, of a pin bar showing the "5" pin set.

Fig. 4 is a similar view showing the "7" pin being set and displacing the "5" pin which has been previously set.

55 Fig. 5 is a sectional view showing a pin and its mountings in a pin bar.

Fig. 6 is a dissected view of some of the principal parts of a pin bar.

Fig. 7 is a perspective view of a pin.

60 Fig. 8 is a perspective view of the principal part of a pin bar.

Fig. 9 is a plan view of the pin-setting bar connections in addition position.

Fig. 10 is a similar view in subtraction
 65 position.

Fig. 11 is a detail of the pin and latch structure.

In the usual Underwood-Hanson combined typewriting and computing machine, numeral keys 1 and alphabet keys 2 mounted
 70 on the front ends of key levers 3, when depressed, swing type-bars 4 upwardly and rearwardly by means of bell-cranks or sub-levers 5, so that types 6 on said type-bars print as usual on the front side of a platen
 75 7. Said platen forms part of the platen frame 8 mounted in the usual Underwood typewriter carriage 9, and said carriage is normally under tension, tending to draw it
 80 along in letter-feeding direction, the tension being supplied by the usual spring-barrel (not shown herein).

The typewriter carriage is fed along a single letter-space at a time by means of the
 85 usual universal bar 10, which is adapted to be struck by heels 11 on the type-bars as they approach the platen, so that said universal bar will be vibrated rearwardly at each key-stroke and cause dogs 12 to alter-
 90 natively engage the usual escapement wheel 13, and permit said wheel to turn a step at a time. This escapement wheel is connected to the usual pinion 14, which meshes with the usual rack bar 15 connected to the type-
 95 writer carriage.

The typewriter carriage is adapted to be
 100 positioned by the usual Underwood tabulating keys 16, which operate the usual plungers 17, so that column-stops 18 on the typewriter carriage are enabled to cooperate
 105 with the upper ends of said plungers, which act as counter-stops. The remaining connections of the tabulating keys 16 may be of the usual Underwood type, and are not shown in the present drawings for the sake
 110 of clearness.

The numeral keys 1 of the typewriter whenever depressed, in an adding zone, not only print the digits upon the platen 7, but
 115 also set them up on denominational pin or computation bars 20 one after another. The digits are set up on these computation bars by depressing on each bar one of nine pins
 21, and after a number has thus been completely set up and printed, the said number
 120 may be carried into the usual Underwood-Hanson adding wheels 22 by means of the usual handle 23 which is drawn forward to effect this operation. The adding wheels 22 have associated with them the usual carry-
 over devices shown in said Hanson patent, but omitted in the present drawings for the sake of simplicity.

To enable the numeral keys 1 to set the
 125 pins 21, there is provided for each numeral key a pin-setting bar 24 which is connected to a rock shaft 25 operated by its numeral key through connections analogous to those shown in my prior patent described above; said connections being shown at Fig. 9, and
 130

each including a wrist 26 on the rock shaft 25, said wrist engaging an adding lug 27 on a cross-bar 28, said cross-bar together with the pin-setting bar 24 forming a linkage, which linkage also includes a bell-crank 29 at each end of the pin-setting bar 24 connecting said bar to the corresponding end of its cross bar 28.

Whenever a numeral key is depressed, whether in the adding zone or not, a pendant 30 extending from said key through the casing 31 of the adding mechanism proper, descends and strikes a wrist 32 fast on its rock shaft 25, thus rocking said shaft and thrusting down its pin-setting bar 24, as shown in said patent.

Ordinarily the pin-setting bars 24 move idly because they are out of range of their pins 21. In the present application, the pins 21 are normally out of alinement with their pin-setting bars 24, but are adapted to be moved into alinement therewith one after another by the typewriter carriage as said carriage travels along through the adding zone. For this purpose each column-stop 18 is provided with a one-way denomination-selecting cam 33, which is always effective in the adding zone on one and one only of several upstanding denomination bars 34, so that in the adding zone one denomination bar 34 is cammed rearwardly, with the result that the opposite lower end 35 of said bar is moved forwardly. This bar in moving forwardly, shifts its computation bar 20 sufficiently forward to bring the pins thereon under the pin-setting bars 24, though owing to lost motion the computing wheel does not turn appreciably. This brings about the result that if any numeral key 1 is depressed, while one computation bar is thus moved forwardly, the pin 21 thereon corresponding to that particular numeral key will be moved from its uppermost position to a lower position where said pin will be latched down by its ledge 36, which catches under a reciprocating latch bar 37, which holds it down; one pin in Fig. 3 being shown thus latched down.

Since the typewriter carriage travels to the left and thus intercepts the right-hand bar 34 first while at the same time the typewriter is printing the left-hand numeral, connections are provided whereby the right-hand bar 34 operates the left-hand lower end 35 in the series, the left-hand bar operates the right-hand end 35, etc. The connections for doing this include bails 38 of which one form is shown in my co-pending application No. 758,091, filed April 1, 1913. Said bars 34 are pivoted somewhere near their middle at 39, and the lower ends are guided in a comb 40.

Since the numeral keys of the typewriter in writing numbers print digits ranging from "0" up to "9," there are provided nine

pins 21 and in addition an "0" pin 41, said "0" pin being operated by the zero key of the typewriter.

The latch bar 37, which holds the pins 21 down, is universal to all said pins 21 and is formed in the shape of a flat bar adapted to lie on the flat upper surface of the pin-cage 48 on the bar 20. Said latch bar 37 is held in place by means of pins 59 which in turn are held in place by an L-plate 42 attached to said pin bar and overlying the surface thereof, and being provided with suitable openings 43 through which the pins 21 project so that the plate straddles each pin.

The teeth of the L-plate 42 project into flat faced cut-out portions in each of the pins 21, so as to limit the up-and-down movement thereof, thereby preventing the pins from becoming displaced from the pin-bars, and also preventing turning of the pins.

The pin bar 20 not only includes a comparatively thin rearward extension 44, but also a thin forward extension 45, said last-named extension carrying the rack 46 by which the numeral wheels 22 are turned, said rack 46 constantly meshing with a pinion 47 connected by a pawl and ratchet, as shown in my patent aforesaid, to the numeral wheels 22. The rack 46 meshes with the pinion 47 sufficiently loosely to allow for the necessary forward setting of the pin bars 20 in the pin-setting operation.

The pins 21 are carried in a pin-cage 48 forming part of the computation bar 20, and the pins are advantageously cylindrical and work in cylindrical bores 49 in said pin-cage. Each pin is normally held in its uppermost position by means of a spring 50, which bears against a neck 51 at the bottom of the bore 49, said neck forming a bearing for the pin 21, and each pin bears against its spring 50 by means of a ledge or collar 52 which fits in the enlarged main portion of the hole 49.

Whenever any pin is depressed, it, as above described, moves the universal latch 37. This latch comprises arms in front of every pin having cam faces 53 normally lying against and facing a cam or inclined plane 54 extending inwardly from the outer edge of the ledge 36, on each of the pins 21. This inclined plane 54 therefore, whenever its pin 21 is depressed, forces the latch 37 forward so that the arms of said latch will practically slip clear of the ledge 54 on every other pin on its bar, thus releasing any other pin which has been previously set and permitting that pin to rise. To facilitate the pins in thus rising when released, each pin includes a short reverse inclined plane or cam 55, which permits any pin to give the universal latch 37 a slight extra push in rising, if necessary, to completely free said pin.

The latch 37 is normally drawn rear-

wardly by means of a spring 56 anchored therein and lying within a cut-away portion 57 of the pin-cage 48, said cut-away portion including a post 58 on which the spring 56 draws. The universal latch 37 is guided by two flat-headed pins 59 which are fast on the pin-cage 48 and form guides for the latch 37, which is provided with slots 60 at its opposite ends to engage the pins 59. These pins 59 underlie the L-plate 42.

When it is desired to perform subtraction, the operative pushes rearwardly a subtraction bar 61 which extends through the front of the casing 31 and is pivoted to an idle rock arm 62 near the rear of the casing. Whenever the subtraction bar 61 is thus pushed rearwardly, a pin 63 thereon strikes a lever 64 to shift the rock shafts 25 from their normal adding position to the subtraction position shown in Fig. 10. In this subtraction position, the rock shafts release the pin-setting bars 24 and their linkages, from the adding wrists 26, and connect said rock shafts 25 to the complementary linkages by means of subtraction wrists 65 which cooperate with subtraction lugs 66 on the corresponding complementary bars 28.

The lever 64 shifts the rock shafts 25 thus by means of a swinging plate 67 which engages notches 68 in said rock shafts, and against which plate the upper end 69 of the lever 64 bears. The subtraction bar 61 may then be released to be returned by its spring, and the rock shafts 25 will be detained in their subtraction position by means of a pawl 70 which swings up and engages the plate 68 to hold it where placed by the subtraction bar.

In addition to shifting the rock shafts 25 to their subtraction positions, the subtraction bar 61 when actuated, also is effective to set all the "9" pins 21 in order to automatically effect the adding of "9" if "0" or nothing is to be subtracted from any number. To effect this result, the usual bail or bar 71 for setting the "9" pins in the usual Underwood-Hanson subtracting machine is used, which bar is pivoted on the framework, carrying the linkages 24 and normally stands clear of the "9" pins, and their connections. When, however, the subtraction bar 61 is actuated, the "9" pin-setting bar is thrust downwardly to the point seen in Fig. 2. in moving to which position it strikes and depresses the setting levers 72 connected to the "9" pins 21; these levers being substantially the levers used for restoring the "9" pins and shown in my co-pending application No. 626,550, referred to. These levers are pivoted each on its own pin bar and each engages its "9" pin by means of a boss 73 on its end, which lies within a flat-sided notch 74 formed in the side of its "9" pin. When its pin rises, the rear end of any lever 72 strikes against the top of the body of the pin-cage

48, and thus prevents the spring 50 of the "9" pin from thrusting said "9" pin entirely out of the pin-cage 48. This enables the slot 75 in the bar 42 to be widened enough to accommodate the boss 73, because the lever 72 provides the means for holding the "9" pin in its bore. The bar 42 is unable to hold the "9" pin because it is cut away to accommodate the boss 72, although said bar holds the other pins 21 from being thrust up out of their bores as described above.

In order that the present pin-setting device may be adapted for writing and correcting all numbers whether they are limited to the ordinary digits, or also contain the digit "0," I have provided the special zero-pin 41 on each bar 20, said pin being like the pins 21 except that said pin 41 cannot be latched down. Since the pin 41 is a zero-pin, there is no need of latching said pin down, because, when "0" is to be computed in any denomination, the rack bar for that denomination is left standing at rest while the general operator moves forward. Said pin, therefore, is provided simply with the cam face 54, and said pin has no ledge 36, but might be perfectly cylindrical. It is preferably, however, provided with a flat side 77 which coöperates with a flat side 78 in a notch on the L-bar 42, and thus insures that said zero-pin will always hold its cam face 54 in the right position to operate the universal latch 37.

After a number has been set up and carried into the computing wheels, the general operator on its return stroke, carries the rack bars 46 rearwardly by means of the usual lugs 79 which are struck by the cross-bar 108 of the general operator on its return stroke. At the very end of the return stroke, the general operator restores all the set pins 21 by means of the usual pin-restoring plate 80 which may be of the kind disclosed in my prior patent mentioned above, and which is operated by a one-way cam 81, on the general operator, and other connections described in the patent to Frederick A. Hart, No. 1,176,364, patented March 21, 1916, filed December 10, 1908. This restoring plate 80 is effective on a special re-setting pin 82 which projects normally below the bottom of each pin-cage 48, and is provided with a cam 83, which, whenever the pin 82 is raised, cams the universal latch 37 forwardly, so as to release any pin 21 which at the moment is held down by said latch.

The cam 83 is effective on the universal latch 37 when the pin 82 is lifted, and for this reason, said cam 83 slants in a direction reverse to the cams 54 on the pin 21 and co-operates with a correspondingly reversely shaped cam 84 on the universal latch 37. The pin 82 is normally retained in this downward position by means of a spring 130

lying within the bore 86 on the pin-cage, in which said pin 82 is mounted. Said bore terminates in a collar 87 near its upper end against which said spring bears, and the lower end of the pin 82 is provided with a collar 88 closely fitting the bore 86, against which the spring 85 bears, to thrust the pin downward. The pin 82 is prevented from being thrust up or down out of its bore 86 by the guide plate 42 extending into a flat-faced notch on the pin which also acts to prevent the pin from turning. The pin 82 advantageously projects somewhat below the pins 21 when set, thus insuring that the pin-restoring plate 80 will be effective on said pin 82 to release the latch 37 before it can possibly strike any other pin 21.

When a subtraction operation is finished, the general operator will automatically restore the parts to their adding position, and for this purpose, the machine is provided with the usual connections to this end. Said connections include a notch 90 in one of the general operator side bars 91 and in said notch there usually rests idly the depending end 92 of a releasing lever 93 journaled on the framework of the machine, and also carrying a rock arm 94, said last-named rock arm being adapted to release the pin-setting rock shafts 25 from the subtraction position, in which they have previously been put. The rock arm 94 is effective to do this because when the general operator comes forward, the lever 93 rides out of the notch 90 and swings the rock arm 94 against a rearwardly extending rock arm 95 fast on the shaft 96 which carries the pawl 70. Said last-named pawl, it will be remembered, is the one which holds the rock shafts 25 in their subtraction position. This releases said pawl and the usual spring 97 embracing one of the rock shafts 25, restores said shafts to their addition position by means of the plate 67.

The construction above described, it will be noted, makes an exceedingly simple structure to assemble since the universal latch plate 37 may be pushed in from one side of the pins 21, and thus the plate 42 may be pushed in from the same side between the pins, and above the latch plate 37, so that it holds both the pins 21 down, and the latch plate 37 in position, said latch plate being confined between the holding plate 42 and the pins 21, which are guided in their openings 49.

In order to make the operation of the mechanism as smooth as possible, the lower end of the cams 53 may be cut into the form of a reversing cam 98 to cooperate with the reverse cams 55 which assist in releasing any set pin.

For operating the zero pin 41 there is provided in addition to the usual pin-setting bars 24, a zero pin-setting bar 99

which is provided with an addition rock shaft 25 and an addition wrist 100, so that if the digit "0" is written in adding, the writing of said digit will erase any other digit previously set on the bar in the denomination in use at the moment. The "0" rock shaft 25 is also provided with a subtraction wrist 101 which is connected to the pin-setting bar 24 of the "9" pin 21, whenever the subtraction bar 61 is actuated. This connection is provided so that if a digit is written in any given denomination while subtracting, and said digit is erased and the digit "0" printed in place thereof, the printing of said "0" will set the "9" pin 21 in that denomination. For a similar reason, the rock shaft 25 of the "9" key is connected by a subtraction wrist 105 to the pin-setting bar 99 of the zero pin whenever the subtraction bar 61 is actuated. This is for the purpose of effecting the actuation of the zero pin whenever the "9" digit is printed in subtraction to correct the printing of any other digit, for, as indicated above, at such times it is necessary to unset any other pin already set in that denomination.

In order to provide for the mounting of these parts, the usual rear bar 102 of the frame carrying the pin-setting bars 24 and their appurtenances is cut-away at 103 to provide for the free operation of the wrist 101 and is also provided with an extension 104 on which the "9" pin-setting bail 71 may have its shaft journaled.

The bar for adding in "one" in the units column is omitted for the sake of clearness.

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

Having thus described my invention, I claim:

1. In a computing machine, the combination with a pin bar, of a series of pins settable on said bar, a latch slidable on said bar and placed thereon from one side thereof, and universal to said pins, and a holding bar overlying said pins and said latch and lying on the same side of said pins as said latch and adapted to hold said latch in position.

2. In a computing machine, the combination with a pin bar, of a series of pins settable on said bar, a latch slidable on said bar and placed thereon from one side thereof, and universal to said pins, a holding bar overlying said pins and said latch and lying on the same side of said pins and adapted to hold said latch in position, round bodies for said pins, and flat surfaces on said pins for guiding them against accidental rotation.

2. In a computing machine, the combination with a computation bar, of a pin settable on said bar, a body for said pin projecting through said bar, an enlarged bore in which said pin slides, a collar on said

pin fitting said bore, a spring confined between said collar and the end of said bore tending to hold said pin in a given position, another pin on said bar, a similar bore, a spring cooperating with said pin, a latch universal to said pins, a spring tending to draw said latch to effective position, and cam faces on said pins adapted to move said latch to position to release all other pins when one pin is set to be held by said latch.

4. In a computing machine, the combination with a computation bar, of a pin settable on said bar, a body for said pin projecting through said bar, an enlarged bore in which said pin slides, a collar on said pin fitting said bore, a spring confined between said collar and the end of said bore tending to hold said pin in a given position, another pin on said bar, a similar bore, a spring cooperating with said pin, a latch universal to said pins, a spring tending to draw said latch to effective position, cam faces on said pins adapted to move said latch to position to release all other pins when one pin is set to be held by said latch, a third pin settable on said bar with which said latch cooperates, and a lever engaging said pin and adapted to engage said bar to limit the throw of said pin in moving from set to unset position.

5. In a computing machine, the combination with a computation bar and a series of pins settable thereon, of a latch universal to said pins, a cam on each of said pins adapted to move said latch parallel to said bar, a spring returning said latch adapted to hold any of said pins set, a guide at each end of said bar for said latch, and a stop bar overlying said latch and extending between said pins from one side thereof, adapted to hold said latch in position independently of said guides.

6. In a computing machine, the combination with an array of bars, of a series of pins settable on said bars, a series of pin-setting members adjacent said bars for setting said pins, a single set of numeral keys for operating said pin-setting members, levers associated with certain of said pins, a separate key depressible to be effective on said levers to set their pins, and means whereby the setting of any pin on any bar unsets every other pin on said bar.

7. In a computing machine, the combination with ten numeral digit keys ranging from "0" to "9", of pin-setting members movable by said keys, a series of denominational members each comprising a pin for each of said keys, means whereby the setting of any pin on one of said denominational members unsets every other pin on said denominational member, and a separate key adapted to set a single pin on each of said denominational members simultaneously.

8. In a computing machine, the combina-

tion with ten numeral digit keys ranging from "0" to "9", of pin-setting members movable by said keys, a series of denominational members each comprising a pin for each of said keys, means whereby the setting of any pin on one of said denominational members unsets every other pin on said denominational member, a separate key adapted to set a single pin on each of said denominational members simultaneously, and means adapted to release all the said pins simultaneously.

9. In a combined typewriting and computing machine, the combination with typewriter digit keys, of computing wheels, members on which the digits written by said keys are adapted to be set up, means for carrying the set-up digits into the computing wheels, a subtraction device, a traveling typewriter carriage for determining into which wheel the printed number shall be carried, and means whereby, if a given number has been printed and set up as for a given wheel, the typewriter carriage may be re-positioned and any new digit set up, when the typewriter carriage is so re-positioned, will erase the digit previously set up at that position.

10. In a combined typewriting and computing machine, the combination with typewriter numeral keys and a traveling typewriter carriage, of computing wheels, computation members on which the numbers written by said keys are temporarily set up, pins on said members for so setting them up, a universal latch on each member for said pins adapted to release all other pins when any one pin is set up, a subtraction device adapted to set certain of said pins, and connections between said keys, said pins and said carriage, whereby after a digit has been set up by the setting of any pin, the typewriter carriage may be re-positioned and a new digit set up at said position, and the old digit will be erased.

11. In a computing machine, the combination with a round pin, of a collar on said pin, a head on said pin by which it is set, a cam on said pin adapted to operate a holding latch, and an auxiliary cam on said pin adapted to be effective on the same latch when the pin is moving in the opposite direction.

12. In a computing machine, the combination with a bar, of a round pin on said bar, a latch for holding said pin, a cam on said pin for moving said latch, a cooperating cam on said latch, said pin having a ledge adapted to be engaged by said latch to hold said pin, means for moving said latch to release said pin, a second cam on said pin assisting the releasing movement of said latch, and a second cam on said latch cooperating with the last-named cam.

13. The combination with a series of de-

nominal order sets each having settable pins ranging in values from "1" to "9", of a single means for setting all of the "9" pins at once, and pin operated connections enabling every pin from "1" to "8", when set, to unset the "9" pin in the corresponding order when thus set.

14. The combination with a nest of pins arranged in order-rows or denominations, including a plurality of pins adapted to be set representing the digits from "1" to "9", and also a "0" pin, of connections between said pins enabling some of the pins to determine the status of others of the pins, a series of digit-keys ranging from "0" to "9", order-bars for operating said pins, connections between said bars and said keys enabling the "0" key to set a pin when subtracting and to be effective only to release a pin when adding, a subtraction-setting key for altering the connections between the keys and bars to effect subtraction, and a pin-setting bar made effective by said subtraction key to set a pin in each row to enable subtraction to be effected.

15. The combination with a nest of pins arranged in orders or denominations representing a series of ascending values from "0" up, of a setting mechanism for all said pins, additional setting mechanism peculiar to all of the pins of highest ultimate value of the several orders or denominations to

set them all at once, and pin operated connections enabling the pins of lower values when set, to unset, one by one, the pins of highest ultimate value in the same orders.

16. The combination with a nest of pins arranged in order-rows or denominations, including a plurality of pins adapted to be set representing the digits from "1" to "9", and also a "0" pin, of connections between said pins enabling some of the pins to determine the status of others of the pins, a series of digit-keys ranging from "0" to "9", order-bars for operating said pins, and connections between said bars and said keys enabling the "0" key to set a pin when subtracting and to be effective only to release a pin when adding.

17. In a computing machine, the combination with a series of pin bars, each having pins thereon ranging from "1" to "9", of means for simultaneously setting all the "9" pins to cause the machine to be effective to subtract, keys for setting all the pins from "1" to "9", connections whereby the setting of a "9" pin unsets any set pin, a zero numeral key, and a pin operated by said zero numeral key for operating said connections to unset any set pin.

HANS HANSON.

Witnesses:

W. O. WESTPHAL,
JULIUS DUCKSTINE.