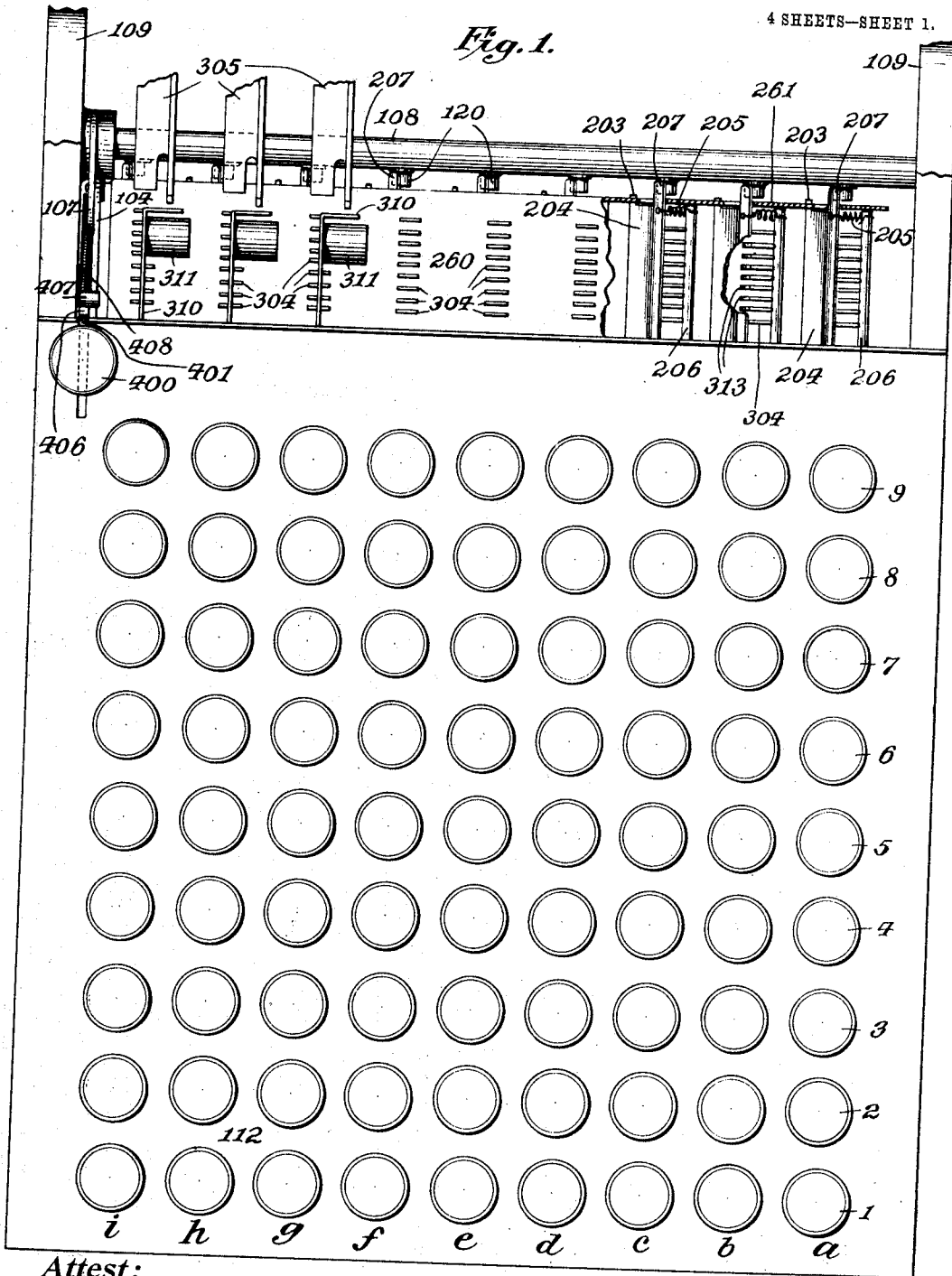


C. N. McFARLAND.
DIGIT REPEATING MECHANISM FOR ADDING MACHINES.

APPLICATION FILED SEPT. 21, 1906.

4 SHEETS—SHEET 1.



Attest:
Edgeworth Malone
Alan Mc Donnell

Inventor:
Charles N. McFarland
by *William R. Baird*
his Atty.

C. N. McFARLAND.
DIGIT REPEATING MECHANISM FOR ADDING MACHINES.

APPLICATION FILED SEPT. 21, 1906.

4 SHEETS—SHEET 2.

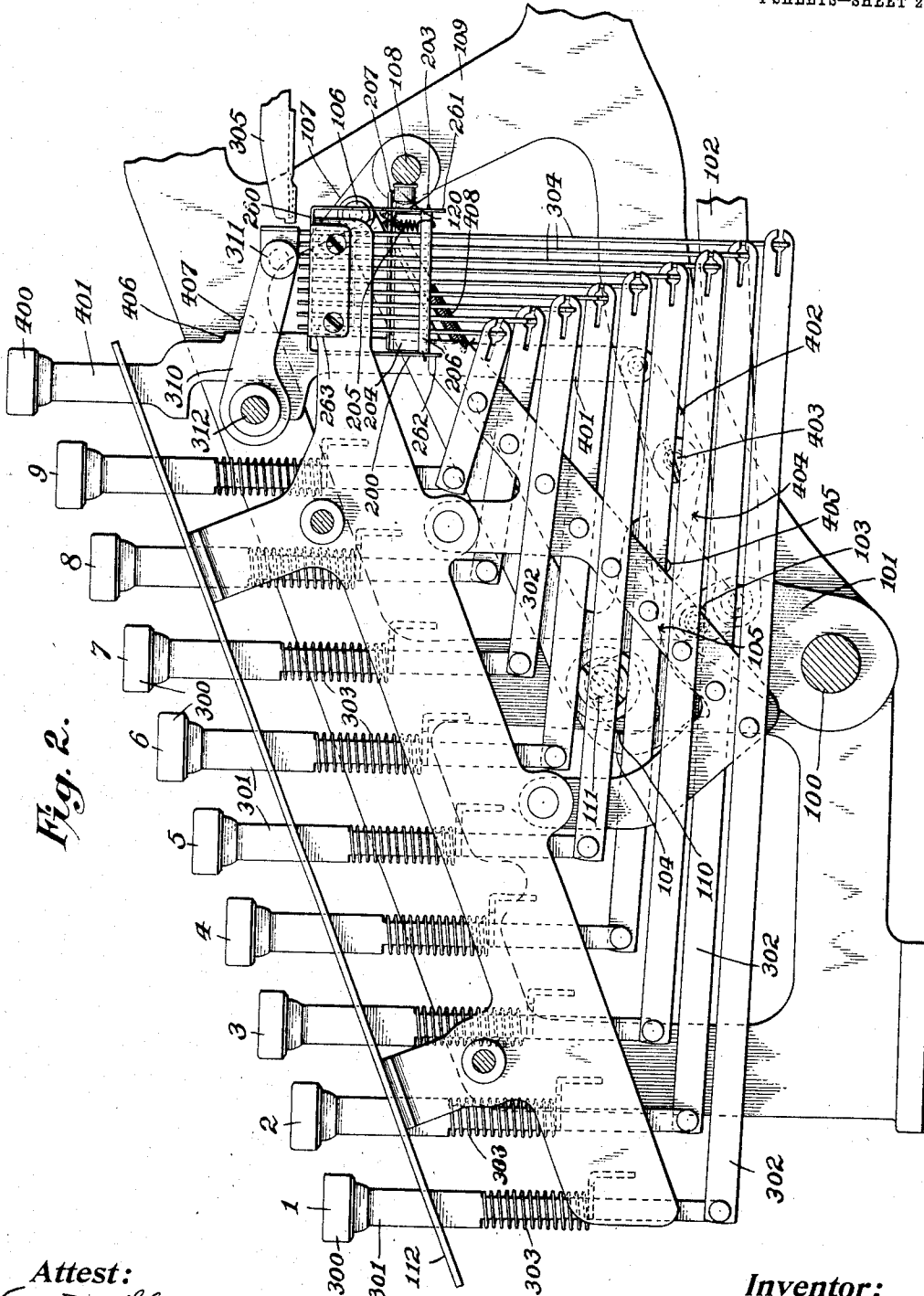


Fig. 2.

Attest:
Edgeworth & Sons
Alan Mc Donnell

Inventor:
Charles N. McFarland
by *William R. Baird*
his Atty.

No. 874,107.

PATENTED DEC. 17, 1907.

C. N. McFARLAND.
DIGIT REPEATING MECHANISM FOR ADDING MACHINES.

APPLICATION FILED SEPT. 21, 1906.

4 SHEETS—SHEET 3.

Fig. 3.

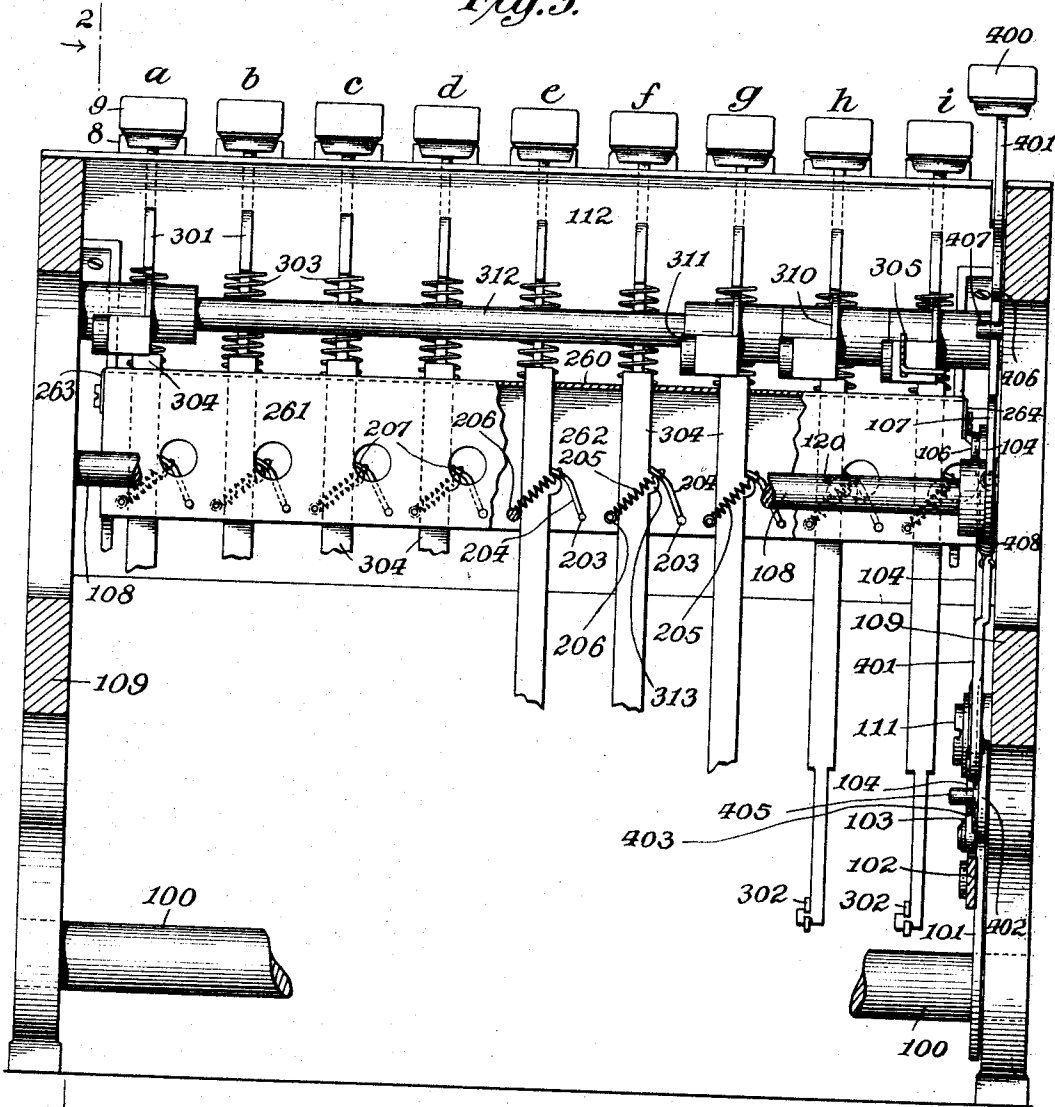
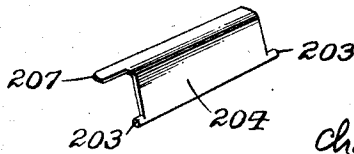


Fig. 4.



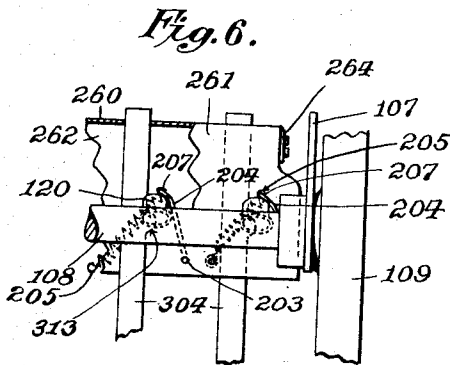
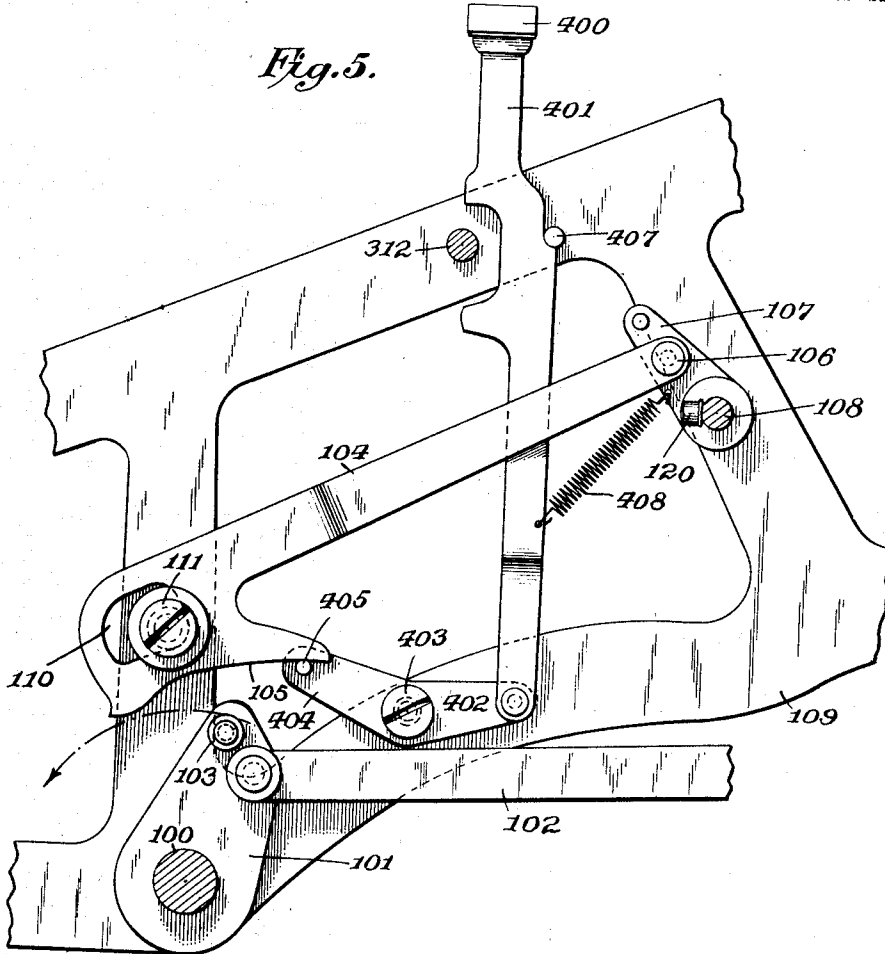
Attest:
Edgworth Carson
 Alan Mc Donnell

Inventor:
 Charles N. McFarland
 by *William R. Baird*
 his Atty.

C. N. McFARLAND.
DIGIT REPEATING MECHANISM FOR ADDING MACHINES.

APPLICATION FILED SEPT. 21, 1906.

4 SHEETS—SHEET 4.



Attest:
Edgewood House
 Alan McDonnell

Charles N. McFarland Inventor:
 by William R. Baird
 his Att'y.

UNITED STATES PATENT OFFICE.

CHARLES N. McFARLAND, OF KINGSTON, PENNSYLVANIA, ASSIGNOR TO THE ADDER MACHINE COMPANY, OF KINGSTON, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DIGIT-REPEATING MECHANISM FOR ADDING-MACHINES.

No. 874,107.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed September 21, 1906. Serial No. 335,571.

To all whom it may concern:

Be it known that I, CHARLES N. McFARLAND, a citizen of the United States, residing at Kingston, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Digit-Repeating Mechanisms for Adding-Machines, of which the following is a specification.

My invention relates to adding machines and more particularly to means for repeating the addition and accumulation of identical digits of the same denomination in successive items wherein the other digits are varied. Machines of this class are commonly provided with a key-board consisting of keys arranged in denominational series, a usual arrangement being nine horizontal rows of nine keys each, all of the keys in each horizontal row being alike, but, of course, of different denominations. A good example of a machine of this class is described in the U. S. patent of Charles Wales, No. 797,032, issued Aug. 15, 1905. Some of these machines have also been provided with a multiplying or repeating mechanism whereby an item having been once set up by the keys in the machine, it may be successively and repeatedly accumulated in the machine by each actuation of its mechanism, without further manipulation of the machine, the principle governing the actuation of such mechanism providing for an interruption of the action of the mechanism by means of which the numeral wheels are commonly restored to zero after a number has been registered. Such a mechanism is, for instance, described in Letters Patent of the United States No. 745,541, issued Dec. 1st, 1903, to Charles Wales.

It frequently occurs that among a number of items to be registered many items will occur having identical digits, or combinations of digits of the same denominations.

It is the purpose of my invention to secure an economy of time and thought on the part of the operator by repeating these digits without re-setting them on the key-board while the other digits of the items enumerated are changed at will. Suppose, for instance, that the operator had ten items reading as follows: \$468.89; \$335.89; \$27.89; \$125.89; \$234.89; \$697.89; \$864.89; \$533.89; \$521.89 and \$432.89. It has long been desirable to find a means for permitting the digits ".89" common to all of these items to remain set up in the machine, while the other

digits are changed at each actuation. Again suppose we have the following items:

\$766.89

\$376.84

\$1526.81

\$1056.83

\$416.85

66

It will be noticed that the tens column of cents is composed entirely of 8's and the units column of dollars entirely of 6's. By my invention the "6" key in the one column and the "8" key in the other column is allowed to remain set and is added into each item enumerated, while the remaining digits in these items are changed.

It will be understood that the general mechanism to which my invention is applicable is that described in Letters Patent No. 797,032, above referred to; but only such reference will be made thereto as is necessary to a general understanding of its operation. In the following description and illustration, I have endeavored to confine myself to the specific invention and mechanism embodying the same forming the subject matter of this application. The general mechanism comprises a key board composed of keys arranged in nine denominational series, each of such series consisting of keys numbered from 1 to 9. Each key is provided with a dependent stem and key levers. These parts will remain in either one of two positions until removed therefrom by an impulse received either from the operator or other parts of the machine. The key levers serve to operate a series of stops to which they are connected at their lower ends and to raise such stops when the keys are depressed to interpose them in the paths of racks which by connected mechanism determine the position of numeral wheels, one for each denominational series. The particular stop which has been interposed determines therefore the extent of the rotation of its numeral wheel. On the periphery of each wheel is displayed a series of numerals corresponding with the successive members of its denominational series. By appropriate mechanism, the operator of the main or actuating shaft sets in motion trains of mechanism which cause the items set on the wheels to be accumulated and registered, or recorded, as the case may be. The totals are also indicated and recorded and the numeral wheels are all

returned to zero and the keys to their normal undepressed position. All of these parts are described in the patent referred to and form no part of my invention.

5 Referring to the drawings, Figure 1 is a top plan view of the key board and that portion of the mechanism immediately in front of the same. Fig. 2 is a vertical section on the plane of the line 2—2 in Fig. 3 and a partial side elevation, Fig. 3 is a rear view of the parts shown in Fig. 2, Fig. 4 is a perspective detail of one of the stop latches; Fig. 5 is a detail view of the train of mechanism actuated by the repeat key, Fig. 6 is a detail of the latches and adjacent parts.

10 In the drawings, 100 is the actuating shaft of the machine journaled in suitable bearings and oscillated by a handle, or other suitable means, (not shown). Rigidly secured to the shaft is a crank 101 to which is secured a link 102 connected to and cooperating with other parts of the mechanism not necessary to be described. A roller 103 is pivoted on the crank 101 and is adapted to engage with the lower surface 105 of an arm 104 which arm is pivoted at 106 to a crank 107, the other end of which is secured to a shaft 108 supported in suitable bearings in the frame 109 of the machine. The arm 104 is slotted at 110 to permit freedom of movement at that place, and also to permit of its being supported upon a pin 111 projecting from the frame of the machine.

15 The key board comprises a series of 81 keys arranged in nine rows, each row representing a denomination—*a*, being cents; *b*, tens of cents; *c*, dollars; *d*, tens of dollars; *e*, hundreds of dollars; *f*, thousands of dollars; *g*, tens of thousands of dollars; *h*, hundreds of thousands of dollars, and *i*, millions of dollars, and each row having nine keys numbered from 1 to 9, respectively. It also comprises a repeat key 400, the purpose of which will presently appear.

20 Each numeral key is provided with a finger piece or top 300, a key stem 301, a key lever 302, and a retracting spring 303. The key levers are adapted to elevate and depress a series of stops 304 to which they are secured at their lower ends and by their elevation to interpose the tops of the stops into the paths of reciprocating racks 305 which by connecting mechanism determine the position of the numeral wheels (not shown), and therefore the items to be accumulated. It will be understood that the extent of movement of the racks determine the position of the numeral wheels and that the racks move toward the front of the machine until they meet the stops in their respective paths.

25 Each denominational series of keys is provided with a gravity gate 310 having a weight 311 and pivoted to a common shaft 312 arranged across the machine. Whenever any of the stops are raised this gate in

the series affected is also raised. So long as any gate is in position its corresponding rack bar is prevented from moving toward the stops.

30 An inverted U-shaped frame 200 consisting of a horizontal plate 260; two vertical plates 261 and 262 and two dependent ears, 263 and 264, is arranged across the machine and supported on the frame which supports the key stems and is provided with suitable apertures to guide the stops 304 in their vertical reciprocation and to limit their lateral movement. The vertical plates 261 and 262 of this frame are apertured to provide bearings for pintles 203 of latches or broad pawls 204, which latter are nine in number, one for each denominational series of keys. These latches are normally pressed against the stop 304, above cam legs 313 with which the stops are provided, by means of springs 205, the other ends of which are secured to rods 206 rigidly mounted on the U-shaped frame 200 and which rods also serve to hold the parts of the frame rigidly together. The cam lugs 313 are all of the same height and each latch 204 presses against all of the stops 304 of its series just above these lugs when the keys are undepressed. Each latch 204 is provided with a trip ear 207 extending outside of the U-shaped frame 200.

35 It is obvious that when the key stems are undepressed that any one of the stops 304 may be elevated to pass the latch 204 of the denominational series of which that particular stop forms a part, because the latch yields against the tension of its spring for that purpose, but that after such stop has acquired its new position with its cam lug 313 above the latch 304 that such stop cannot be dropped and restored to its original position unless its latch 204 is moved from beneath its cam lug by some positive means. Such means is found in the shaft 108 which is provided at suitable intervals corresponding to the positions of the several latches and directly under their respective ears 207 with pins 120 which are adapted to engage such trip ears to move the latches 204 when the shaft 108 is rocked or oscillated.

40 The repeat key 400 is a key having a long dependent stem 401 pivoted at its lower extremity to one arm 402 of a bell crank lever adapted to oscillate on a pivot 403 and the other arm of which 404 is provided with a pin 405 adapted to move against the surface 105 of the arm 104 to raise the latter out of contact with the roller 103 of the crank 101 of the actuating shaft. The repeat key stem 401 is also provided with a shoulder 406 adapted to engage with a pin 407 secured to the frame of the machine to hold the latter in a depressed position, the key stem being so arranged that the key must not only be depressed but tilted slightly forward, to engage its shoulder 406 with this pin. When the repeat key is manu-

ally released from contact with its pin 407, a spring 408 secured to the crank 107 serves to restore it to its initial position.

It will be noted that when the key 400 is depressed the continued actuation of the shaft 100 will have no effect on the shaft 108. Therefore, the item which has been set up on the numeral keys will not be disturbed, but will be repeated at each actuation of the machine and continually and successively accumulate on the numeral wheels. This is because the stops 304, which have been lifted and interposed in the path of the respective rack bars, are held in place by their latches 204 which have not been moved.

It is readily seen that if after a number of repetitions of the items set up on the keys and through the keys on the stops and numeral wheels, the repeat key is released and allowed to return to its initial undepressed position, that such release secures the rocking of the shaft 108 at the next stroke of the actuating lever and thus moves all of the latches 204 of the different denominational series to permit their respective stops 304 to return to their initial positions, and thereafter the machine can be actuated as though it had no repeat key. It will also readily be understood that if any key be depressed, depressing another key in the same denominational series will at once and automatically restore the first named key to its original independent position, because depressing any key of a series lifts its corresponding stop 304, which acting through its cam lug 313, moves its latch 204 common to all the keys of its denominational series; and, as soon as this latch has been moved away from its stops, any stop which has been lifted is at once retracted downward under the influence of its spring 303. Thus the key board may be said to be "flexible" or "self-correcting" because depressing any key in a denominational series at once and automatically restores any other key in the same series which has previously been depressed. If now an item has been set upon the keys and the repeat key is depressed, this item will be successively and automatically repeated at each actuation of the machine as we have seen. But any digit of such item may be changed simply by depressing the key corresponding to the new digit when the

new stop is interposed in the path of its rack, instead of the old stop. If the repeat key, however, has not been touched, the shaft 108 remains inert and inoperative, and the latches of the other denominational series are unaffected and the digits set up in such series continue to be repeated at each actuation of the machine. Any digit may similarly be changed and when so changed be indefinitely repeated simply by letting the repeat key alone and striking the new digit to set up the new item. This effects a great economy of time and thought.

What I claim as new is:—

1. In a machine of the character described, numeral keys arranged in denominational series, each key under tension and each key having a stop carrying a cam lug, a latch adapted to engage with all of the lugs of the same series and which latch is under tension to hold the same against the stops, a restoring rock shaft adapted to actuate all of the latches of all of the series thereby restoring those which have been moved to their initial positions and means for interrupting the operation of said shaft comprising a key on the key board provided with a depending stem which when held depressed keeps the rock shaft inactive.

2. In a machine of the character described, numeral keys arranged in denominational series, each key under tension and each key having a stop carrying a cam lug, a latch adapted to engage with all of the lugs of the same series and which latch is under tension to hold the same against the stops, the depression of any key in a series thereby restoring to its initial position any other key in the same series, a restoring rock shaft adapted to actuate all of the latches of all of the series thereby restoring those which have been moved to their initial positions and means for interrupting the operation of said shaft comprising a key on the key board provided with a depending stem which when held depressed keeps the rock shaft inactive.

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

CHARLES N. MCFARLAND.

Witnesses:

HUBBARD B. PAYNE,
WILLIAM R. BAIRD.